GOVERNMENT OF BERMUDA
Ministry of Health

Bermuda Joint Strategic Needs Assessment of Health

2023

BERMUDA HEALTH STRATEGY

Foreword from the Minister of Health

I am delighted to present the Bermuda Joint Strategic Needs Assessment of Health 2023.

The Bermuda Joint Strategic Needs Assessment of Health (JSNA) 2023 demonstrates this Government's commitment to delivering Universal Health Coverage (UHC) for all residents and ensuring our future health policy is effective, efficient, and equitable.

The JSNA forms a critical foundational component of the much broader Bermuda Health Strategy 2022–2027 that sets out this Government's priorities for the health system, including properly understanding our population's health needs to optimise future investment in health and healthcare.

The JSNA has been developed by an expert team using rigorous methodology, and its evidence-based findings will help inform this Government's pursuit of UHC. To take just one example, the team currently working on the First 1,000 Days initiative announced in November's Throne Speech is using the JSNA to identify priorities in Bermuda's maternal and child health so they can develop pathways to ensure that all our children have the best start to life.

I note the importance that the JSNA places on improving our health information infrastructure, integrating healthcare more effectively and prioritising prevention and chronic disease management. I am confident that the National Digital Health Strategy and the Integrated Care Pathway work led by the UHC Clinical Senate will enable us to achieve these recommendations.

As I set out in the House of Assembly in November last year, the JSNA will not just be of use for the Ministry of Health but presents an opportunity for the whole of government and civil society to utilise the JSNA to develop actions to improve the health of the people of Bermuda. The JSNA emphasises that it is not just medical care that influences our health but wider social and economic conditions, including our work, housing, education and local community networks. As a society, we can use the JSNA to rethink how we can look after our health and meet our core vision of developing "healthy people in healthy communities".

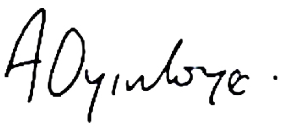
The Hon. Kim N. Wilson, JP, MP
Minister of Health

Foreword from the Chief Medical Officer

I am pleased to share the Bermuda Joint Strategic Needs Assessment of Health (JSNA) 2023 with you. I have led a multi-disciplinary team to develop the assessment using a well-established and systematic process to build a complete picture of Bermuda's health. I want to thank all those involved in its development, including the support of the UK's Office for Health Improvement and Disparities with some of the more technical aspects of the report.

Whilst the JSNA will evidently be of interest to those involved in delivering Universal Health Coverage (UHC), the JSNA reaches beyond the UHC Programme to consider deeply the societal factors that influence our health, whether for good or for ill. As a public health physician, much of my role is to understand these wider determinants of health and use my position to influence stakeholders across government and civil society to consider the impact their policies, programmes, and services will have on our people's health. The JSNA gives me and these stakeholders the information to inform and tailor our future actions.

Robust information is the key to understanding population health. The JSNA unapologetically focuses on the strengths and limitations of current data availability and the need to focus our efforts and resources on improving our data quality. Whilst there are some areas of excellence, notably Bermuda's system of notifiable diseases and the National Tumour Registry, there is still much to do to ensure that, as an island, we have the necessary information to inform our current and future decisions. This will be especially important as we embark on UHC. I hope the JSNA reinforces that comprehensive and accurate data is a prerequisite of any well-performing system of UHC and not a luxury add-on. I look forward to seeing how we, as a health system, use the findings of the JSNA to improve Bermuda's health information ecosystem.



Dr. Ayo Oyinloye, MBBS, MSc, MPH, FFPH
Chief Medical Officer

Executive Summary

Introduction

The Bermuda Health Strategy 2022–2027 sets out major changes to Bermuda's health system, including the implementation of Universal Health Coverage (UHC). To meet these changes, an accurate understanding of the baseline situation today is required, including knowledge gaps, in order to inform the development of Bermuda's future health system. The Bermuda Joint Strategic Needs Assessment of Health (JSNA) 2023 is part of a series of projects to understand Bermuda's population's health needs, international benchmarking, baseline processes and metrics, and to apply this knowledge to elements of Bermuda's health strategy and UHC.

The JSNA is a holistic and systematic assessment of the health needs of a community. It has used an established process to capture all relevant information to compile a complete picture of the health of Bermuda's population. This information can be used to inform future health planning, including policy development, public programmes, health system financing and commissioning services.

The JSNA goes beyond solely considering the provision of healthcare services to encompass the broad range of the social determinants of health. These are the conditions in which people are born, grow, live, work and age. Social determinants have a greater overall influence on health than healthcare services. The Dahlgren and Whitehead model (Figure 1) outlines the influence of social determinants on health and the complex interactive relationship between the different levels of determinants.

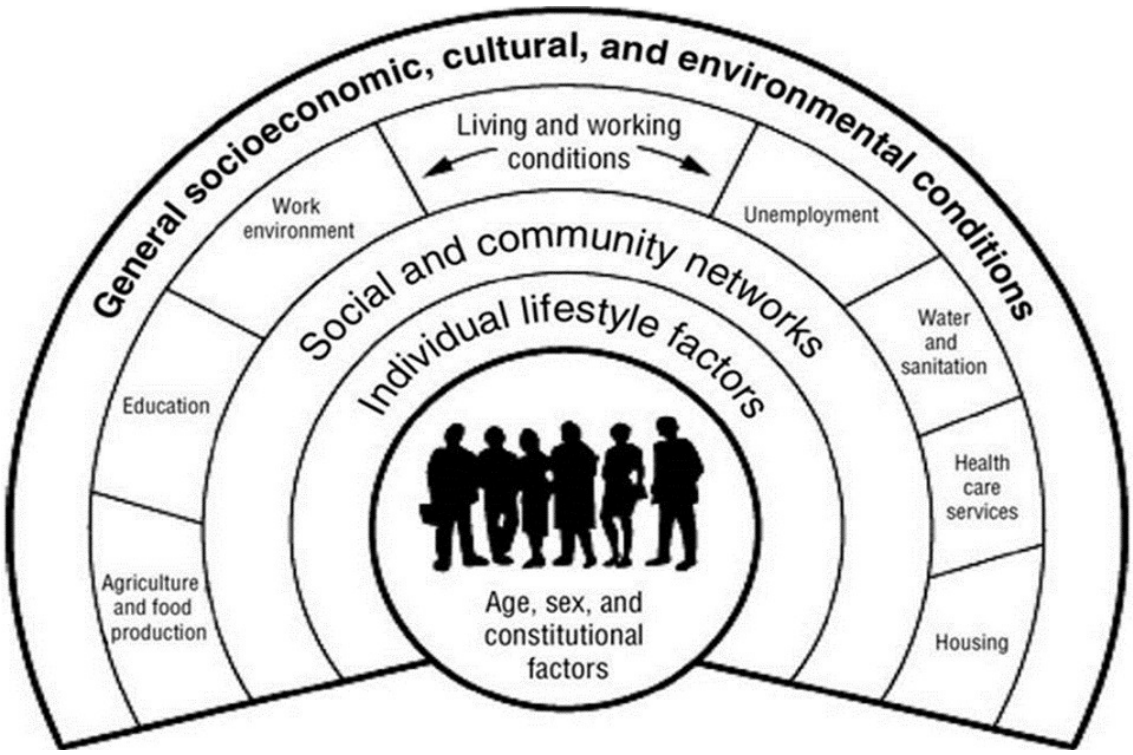


Figure 1: The Social Determinants of Health (Dahlgren and Whitehead Model of Health)
(SOURCE: Dahlgren and Whitehead (1991))

The JSNA considers the population profile of Bermuda before outlining risk factors, major causes of deaths and disease (mortality and morbidity), vulnerable groups and finally, healthcare services. The JSNA's recommendations follow the Executive Summary.

Population Profile

Population projections based on the last available census numbers from 2016 estimated that Bermuda's population will fall from a high of 64,055 in 2021 to 63,892 in 2023 and 54,304 in 2050 (Figure 2). While anecdotal evidence suggests that Bermuda's population began to decline prior to 2021 due to net emigration, there is no data available to substantiate this widely held belief. Also, the census-based population projections do not reflect the impact of the COVID–19 pandemic. It should be noted that future population estimates are characterised by considerable uncertainty, with all estimates being developed in a model relying on a variety of assumptions.[1]

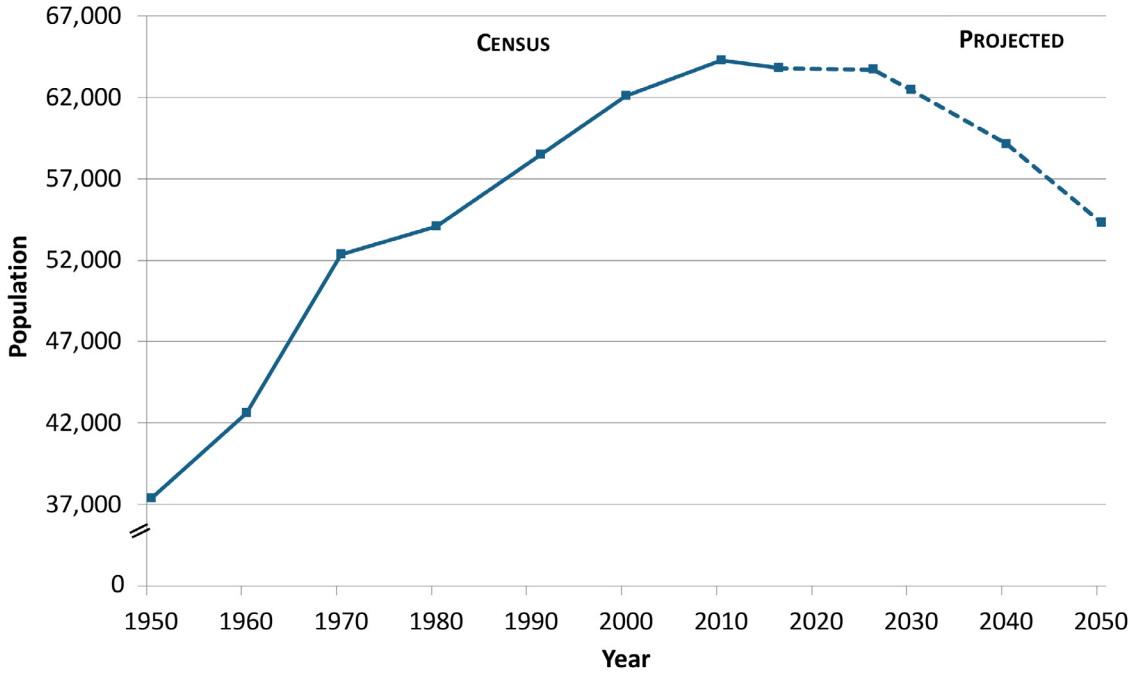


Figure 2: Bermuda Population Estimates 1950–2050
(SOURCE: Bermuda Department of Statistics)

[1] **Limitations of Projections.** Population projections are not predictions or forecasts. They are illustrations of how the structure, size and characteristics of Bermuda's population would change if certain assumptions on fertility, mortality and migration are held true over the projection period. While the assumptions are based upon an assessment of shortterm and longterm demographic trends, there is no certainty that any of the assumptions will be realised. The projections do not take into account future nondemographic factors (e.g., major government policy decisions, economic factors, natural disasters, etc.), which may diminish the accuracy of the projections. Historically, Bermuda's projections are updated after each population and housing census so that new information about demographic trends can be included. The agesex structure in this population projections report was based on selfreported data collected in the 2016 Population and Housing Census.
Scope of the Projections. This population projection series is for Bermuda as a whole from July 1, 2016 to July 1, 2050. Projections that extend farther into the future are less reliable because assumptions are less likely to hold true.
Net Migration. It was assumed that net migration would be zero each year over the projection period due to a lack of comprehensive migration data.
Birth and Death Data. The projection input file contains recorded births and deaths up to 2020.

Bermuda has an ageing population and increasing life expectancy. Whilst this is a positive consequence of improved health, the changing population profile is likely to result in an increased burden of long-term conditions, including people with multiple complex health needs. Furthermore, without a change in migration or fertility, the old-age dependency ratio is expected to increase, which will place additional pressure on health and social care services.

Bermuda's population by ethnic group is shown in Figure 3. Despite well documented ethnicity-based health inequalities in many countries, health outcomes data by ethnicity is not recorded consistently in Bermuda. Therefore, the JSNA has been unable to determine which health outcomes disproportionately impact different ethnic groups. Despite having one of the highest median incomes globally, there are significant inequalities in salaries, employment, educational attainment and housing conditions. There is an association between census districts with a higher proportion of Black residents and those with lower incomes. However, as data on poverty is not collected consistently, it is difficult to determine the level of deprivation in Bermuda.

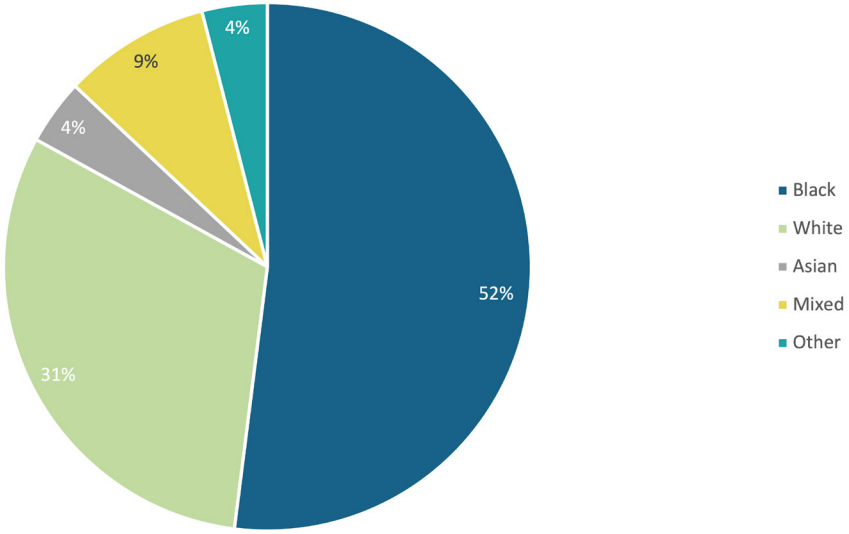


Figure 3: Bermuda's Population by Ethnic Group, 2016
(SOURCE: Bermuda Department of Statistics)

Bermuda's population looks set to age and shrink, whilst continuing to be impacted by multiple socio-economic inequalities. These factors will influence health at the level of both the population and the individual. However, further work is required to develop robust and linked data at the individual level to understand the impact of the social determinants of health and health outcomes. This work can be used to better target cross-government health and social policy at those with the greatest needs.

Health Behaviours and Risk Factors

Common risk factors – smoking, alcohol, excess weight, poor nutrition and physical inactivity – are estimated to be the leading causes of ill health and death in high-income countries. These risk factors are associated with wider socio-economic, cultural and environmental conditions and are unequally distributed throughout the population. In fact, they tend to cluster. Globally, socio-economic deprivation is the strongest predictor of multiple health risk behaviours.

- **Smoking.** The self-reported prevalence of smokers in Bermuda (10%) is lower than in many other countries (13% in the UK and USA), but the number of cigarettes consumed is higher among those who smoke. Smoking prevalence varies by demographic group. Men are more likely to smoke than women, whilst those who are unemployed and looking for work or those who are disabled and not able to work are more likely to smoke than those in employment.
- **Alcohol.** 54% of Bermuda residents self-report consuming alcohol. However, it is difficult to assess the level of high-risk drinking as Bermuda lacks alcohol consumption guidance and data is not currently being collected to determine the percentage of the population whose drinking poses low, moderate, or high risks to health. The development of such guidance is crucial to understand the impact of alcohol on health in Bermuda. Globally, people of low socio-economic status are twice as likely to die from alcohol-attributable causes compared to people of high socio-economic status.
- **Excess Body Weight.** 72% of adults in Bermuda self-report being overweight with 35% reporting being obese. Bermuda's level of overweight adults is comparable to the USA, which has one of the world's highest levels of obese and overweight individuals. Bermuda residents are at increased risk of negative health outcomes associated with excess body weight, including diabetes, cardiovascular disease and cancer.
- **Poor Nutrition.** Only 30% of Bermuda residents self-report meeting nutritional guidelines to consume at least five fruit and vegetables per day. The lowest income groups are the least likely to meet nutritional guidelines, which is likely related to the high cost of fresh produce. Frozen fruit and vegetables can be used as an option to enable people to consume the recommended daily allowance of fruit and vegetables.
- **Physical Inactivity.** 79% of Bermuda residents self-report meeting WHO recommendations for physical activity (compared to 24% in the USA). There are significant differences in physical activity attainment, with men more likely to achieve physical activity recommendations than women.

The data on risk factors is self-reported and thus may be skewed by reporting bias. In addition, the self-reported surveys to collect data on risk factors may underrepresent those with a disability and long-term illness.

The five risk factors discussed above are interlinked and a common cause of many of Bermuda's largest burdens of disease. Health promotion initiatives, therefore, should focus on addressing these risks, particularly where they cluster, while giving due consideration to the wider socio-economic environment in which they occur.

Mortality and Morbidity

Understanding the major causes of death (mortality) and ill health (morbidity) in Bermuda is vital to assess the disease burden and to respond to the corresponding health needs. It will inform the development of Bermuda's public health policy, health promotion programmes and health service planning.

Mortality (Death). Age-standardised, all-cause mortality (Figure 4) did not change significantly from 2012 to 2020 although there was a moderate decrease in the age-standardised mortality rate in men.[2] 2021 saw a rise in both male and female all-cause mortality, likely relating to direct and indirect COVID–19 pandemic deaths. However, disease-specific mortality data (see Figure 6) is available only to 2019, which prevented a conclusive finding that the increased mortality was related to diseases associated with COVID–19.

[2] Age-standardisation allows the comparison of year-to-year mortality rates taking into account changes in the underlying population structure. Three-year rolling averages are used to minimise year-to-year fluctuations and better demonstrate long-term trends. Further methodological details are contained in the main report.

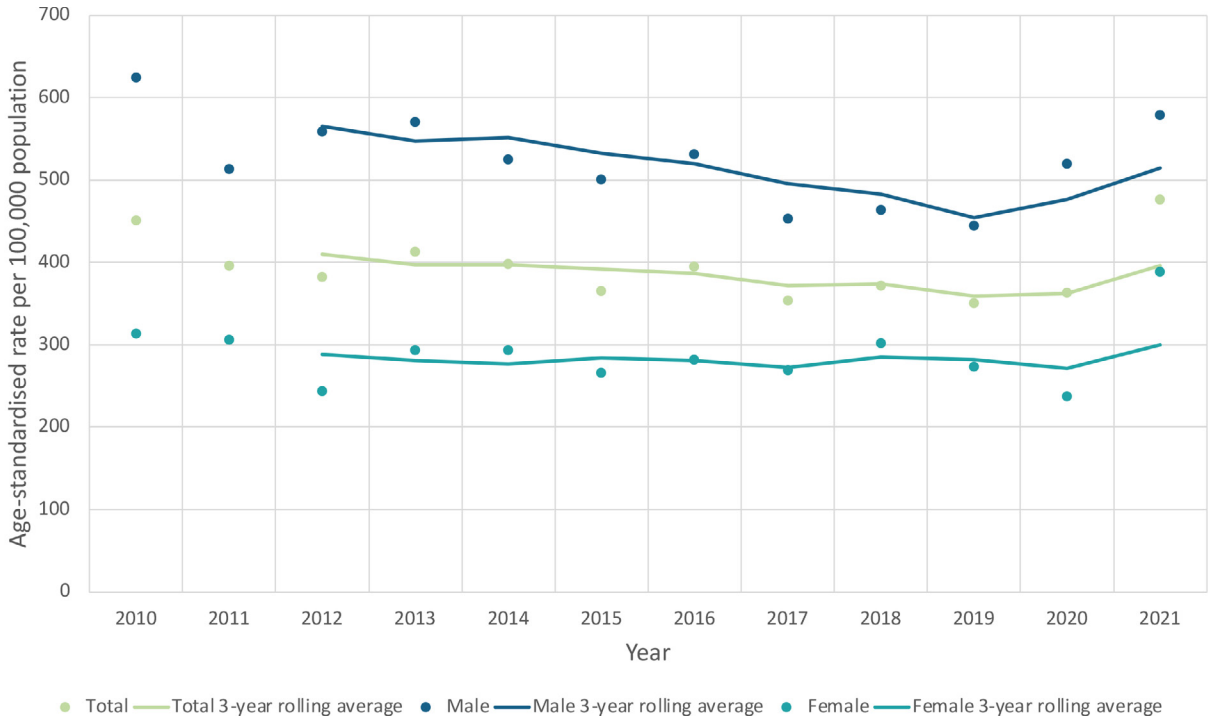


Figure 4: Age-Standardised All-Cause Mortality Rates Per 100,000 Population 2010–2021 with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Potential years of life lost[3] in Bermuda is in line with its OECD peers, with Bermuda positioned between the UK and Germany (Figure 5). Potential years of life lost should continue to be monitored to understand possible reasons for premature deaths, particularly given the apparent increase in all-cause deaths in 2021. Policies and services should be implemented to reduce potentially avoidable deaths.

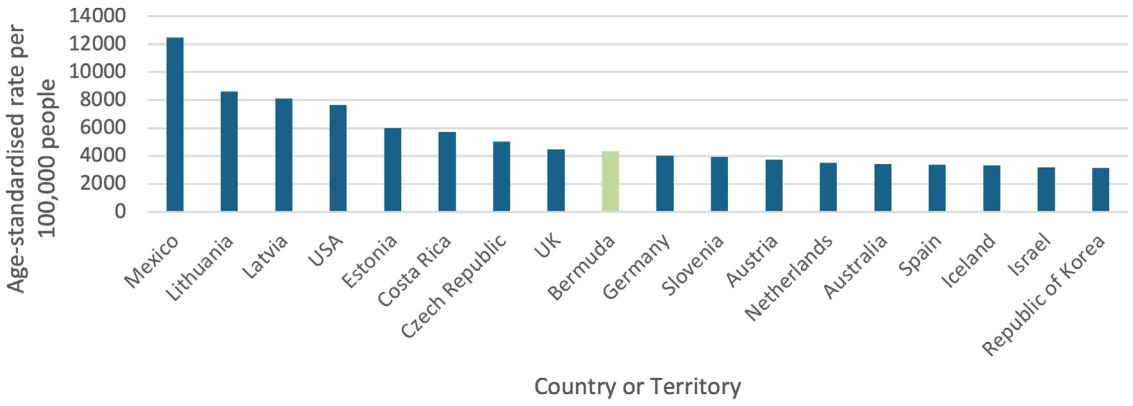


Figure 5: Potential Years of Life Lost OECD Comparison 2020 (population aged 0–75) (SOURCE: Bermuda Epidemiology and Surveillance Unit and OECD)

[3] Years of life lost estimates the years of potential life lost due to premature deaths (below the age of 75). Years of life lost takes into account the age at which deaths occur, giving greater weight to deaths at a younger age and lower weight to deaths at older age. Further methodological details (including type of age-standardisation used) are contained in the main report.

Non-communicable diseases (such as circulatory disease (e.g., heart attacks and strokes), cancer/neoplasm and mental health (including dementia)) and accidents/poisoning are the leading causes of mortality in Bermuda (Figure 6). This is a similar picture to other high-income countries and likely associated with the risk factors explored in Chapter 3.

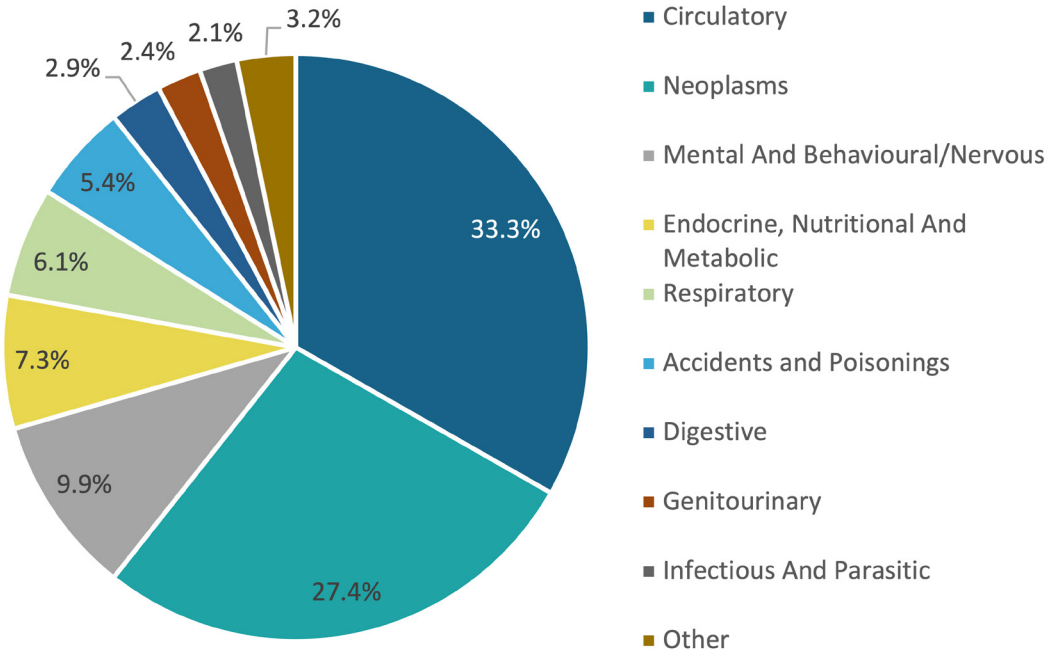


Figure 6: Leading 10 Causes of Mortality in Bermuda, Combined Total for 2010–2019 (SOURCE: Bermuda Epidemiology and Surveillance Unit)

These major causes of mortality are associated with the five common risk factors previously discussed and can be seen as resulting from the social determinants of health.

Morbidity. Bermuda lacks population-wide information systems to capture the leading causes of ill health (except for notifiable infectious diseases and cancer). Insurance claim data has been used as a substitute, but this has limitations explained in the main report and should not be seen as equivalent to actual epidemiological indicators such as incidence or prevalence. The main findings from this insurance data (Figure 7) are:

- Non-communicable diseases associated with smoking, alcohol consumption and obesity are the leading factors for insurance claims
- Chronic kidney disease appears to have a disproportionate cost burden
- Dementia is the leading mental health condition for insurance claims

Adult Physical Health Conditions

2021 Rank	Diagnosis	Total Paid for Claimed Services FY20–21
1	Cancer	$12,137,916.00
2	Chronic kidney Disease	$5,158,559.66
3	Diabetes	$3,517,748.74
4	Heart disease	$3,393,479.02
5	Low back pain	$1,722,873.15
6	Gynaecological disease	$1,299,290.75
7	Other musculoskeletal	$987,761.64
8	Stroke	$834,999.36
9	Obesity	$653,694.35
10	Headache include migraine	$519,177.59
11	Skin disease	$513,589.43
12	Asthma/COPD	$373,584.32
13	Hypertension	$217,081.38
14	COVID–19	$106,630.89
15	Upper respiratory tract infection	$77,023.66
16	Hearing loss	$52,472.08
17	Arthrosis (Osteoarthritis)	$32,527.90
18	Falls	$12,843.50

Adult Mental Health Conditions

2021 Rank	Diagnosis	Total Paid for Claimed Services FY20–21
1	Dementia	$1,261,520.63
2	Panic/anxiety	$953,141.45
3	Schizophrenia	$797,803.60
4	Other disorders	$608,294.73
5	Depression disorder	$588,457.77
6	Adjustment disorder	$475,927.30
7	Bipolar disorder	$306,523.96
8	Eating disorder	$159,482.12
9	PTSD	$104,766.67
10	Drug disorder	$98,546.20

Figure 7: Total Insurance Claims Paid for Leading Causes of Disease in 2021 (SOURCE: Bermuda Health Council)

Bermuda has much more granular data on cancer, thanks to the National Tumour Registry, which allows a much better understanding of populations at risk (e.g., by age and sex), as shown in Figure 8. The National Cancer Control Plan (using National Tumour Registry data) is an example of what can be achieved if good quality-linked data is available at the individual level.

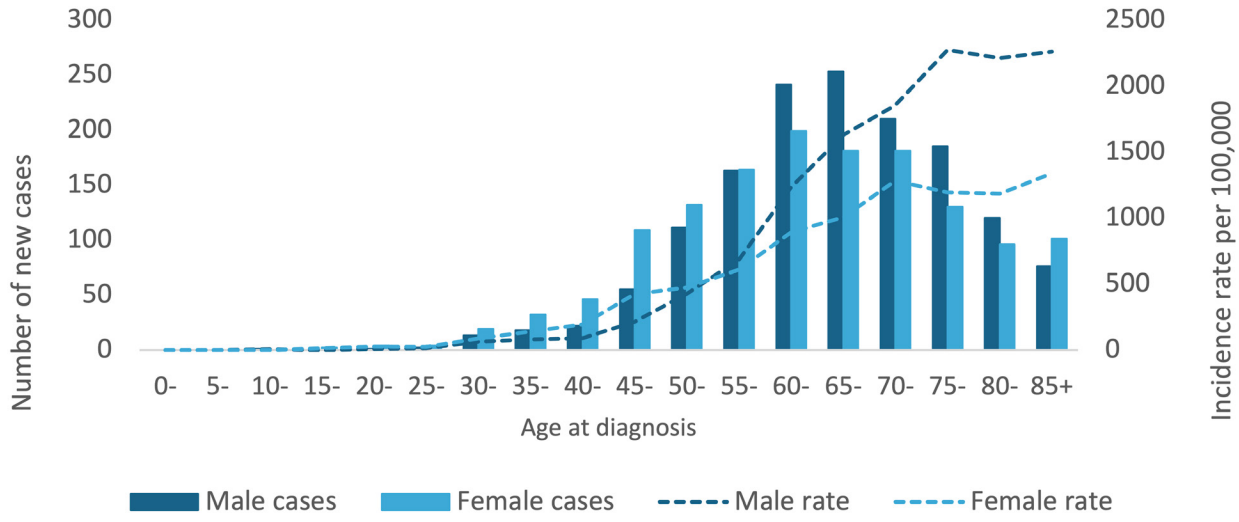


Figure 8: Number of New Cancer Registrations and Age-Specific Incidence Rates 2010–2019 (SOURCE: Bermuda Cancer and Health Centre[4])

Given that long-term conditions with common risk factors are leading reasons for ill health in Bermuda, the development of Integrated Care Pathways and disease control plans that encompass the four levels of prevention (Figure 9) should be a priority for Bermuda supported by high-quality data from disease registries.

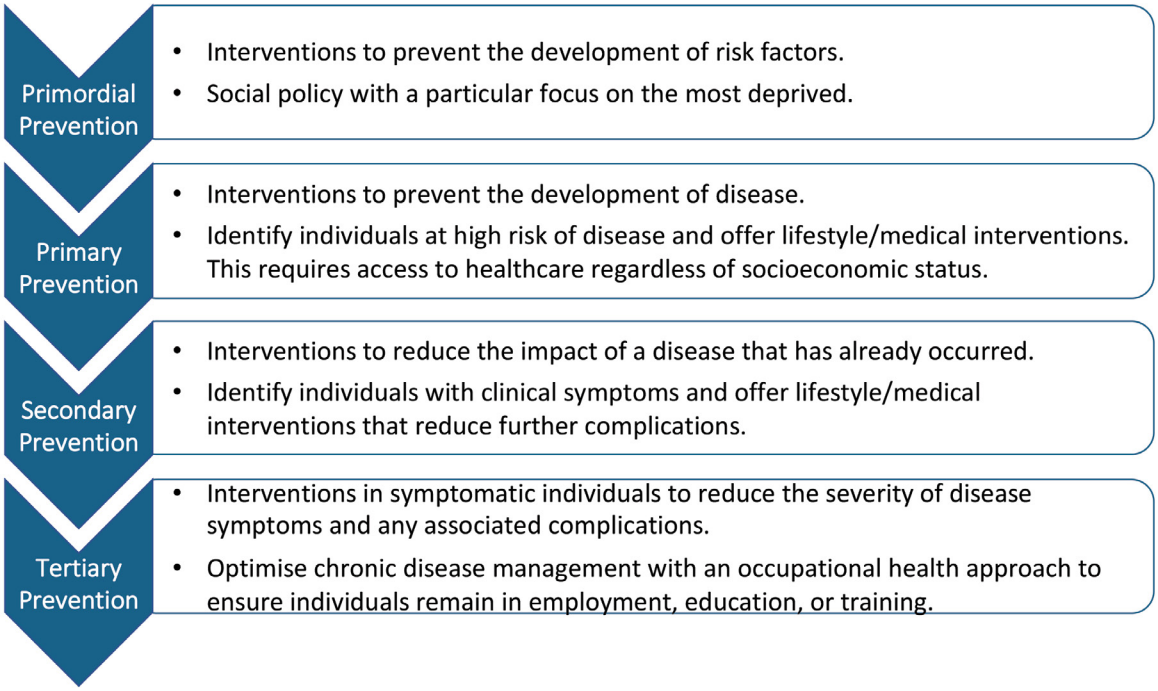


Figure 9: Four Levels of Prevention

[4] Bermuda Cancer and Health Centre. *Bermuda National Cancer Control Plan 2024–2030.* Bermuda, April 2023 (Forthcoming).

Further detailed information on Bermuda's mental health needs is contained in the main report based on the 2019 Mental Health Situational Analysis Report.

Communicable diseases are a less important burden of disease in Bermuda. However, the Ministry of Health's Epidemiology and Surveillance Unit has comprehensive communicable disease data from notifications. Whilst the overall system of surveillance is well-established, further work is required to strengthen syndromic surveillance for acute flaccid paralysis and fever and rash.

Child and Maternal Health. The main report contains a detailed section on child and maternal health. In summary, child and maternal health mortality outcomes are in line, if not better, than peer countries. The main concern is recent trends demonstrating a drop in immunisation levels for a variety of conditions (e.g., measles coverage at 65% in 2021). The trends are in line with international trends showing a decline in childhood immunisation coverage. Increasing vaccination levels to reach population herd immunity should be prioritised. The HPV vaccine uptake rate of 52% is below what would be expected to give good population protection against future oral and cervical cancers. Further work is required to boost the uptake rate of this important vaccine.

Vulnerable Groups

- **Children at risk and adverse childhood experiences.** 90% of Bermuda residents have experienced at least one type of adverse childhood experience. One in two women in Bermuda have experienced child sexual abuse (defined specifically as physical contact sexual abuse as opposed to more broadly defined abuses related to exposure or grooming).
- **Adult social care.** Based on Bermuda's population projections and the corresponding increase in chronic health conditions, there is an indication that more social care is likely to be needed.
- **Domestic violence, sexual violence and exploitation.** Estimates indicate that about 30% of women worldwide have been subjected to either physical and/or sexual partner violence or non-partner sexual violence. Bermuda currently relies on reports to the Bermuda Police Service (BPS) for data on domestic violence, even though it is understood that only a small proportion of incidents are reported. BPS data reporting up to 926 incidents a year likely underestimate the prevalence of domestic violence.
- **Disabilities, both mental and physical.** There is a lack of data on the prevalence of disability in Bermuda. Thus, overall prevalence by demographic type is not available. Data needs to be systematically collected to understand the needs of people with disabilities more clearly.
- **People with multiple complex needs.** The clustering and interaction of risk factors and health conditions gives an additional layer of complexity to health needs. Bermuda lacks individual-level linked data, so it cannot identify individuals with complex co-morbidities or multiple needs. One way of developing the necessary individual-level linked data is by using the work Bermuda Health Council has undertaken to develop a Unique Patient Identifier (UPI).
- **Older population.** Health status, cognitive ability and social network are three principal risk factors contributing to older adults' vulnerability. As Bermuda's population ages in line with demographic projections, so will the prevalence and burden of chronic diseases.
- **People in contact with the justice system.** People in contact with the justice system often come from disadvantaged and lower socio-economic groups with relatively poor health status. Those in correctional facilities are likely to have additional health needs, as identified in the unpublished 2022 Bermuda Correctional Facilities Health Needs Assessment.

- **Migrant populations.** The experience of migration is a determinant of health and well-being. In 2021, a high number of non-Bermudians were working in low-skilled, manual jobs, which can be associated with higher occupation hazards. However, more individual level data is needed for this group to understand their needs more effectively.
- **Homelessness or insecure housing.** Black and Mixed-race people are overrepresented in the non-sheltered population. Rates of homelessness in Bermuda are impacted by Bermuda's high cost of living. Bermuda should commit to a co-developed national plan to end homelessness.

Healthcare Services

Healthcare services form a relatively small but important part of health determinants. The organisation of health services often reflects a society's broader socio-economic, cultural and environmental context. Bermuda has a complex private and public healthcare sector funded primarily through employment-based insurance.

Cost. The most up-to-date National Health Accounts Report, from 2018, shows that Bermuda spent $736.6m on healthcare. This total equates to $11,529 per capita, the most expensive per capita spending globally. It constitutes 11.6% of Bermuda's GDP, the third highest percentage behind the USA and Switzerland. Overseas care consumes 13% of the health budget. This high percentage, by global standards, may exacerbate inequalities in Bermuda because it is available only as a supplementary health insurance benefit.

Insurance. Health insurance is a mandatory employment benefit for employees working more than 15 hours per week. Health insurance is thus tied to employment, limiting access to healthcare for the unemployed population. Unemployment is a risk factor for ill health, although the relationship is complex and bidirectional. Individuals who are unemployed may, under certain circumstances, apply for additional support from the Department of Financial Assistance to access healthcare, but this is not available to everybody and can be a barrier to care. 8% of the population has no health insurance and 36% of this total report working. 17% of the population has basic cover. The current schedule of benefits for basic cover focuses primarily on financial protection (to prevent catastrophic levels of household health spending) and not on health outcomes. In fact, there appear to be perverse incentives that disincentivise patients to seek primary care for lower-cost prevention and chronic disease management. Out-of-pocket or co-payments are additional costs for patients utilising healthcare services, but these costs are difficult to capture. Further work is required to better understand healthcare utilisation by insurance status and the cost of co-payments.

Services. Bermuda's health services are characterised by fragmentation between GPs, other community providers and King Edward VII Memorial Hospital (KEMH). There is a lack of agreed national-level Care Pathways and standards across Bermuda. Outside of the hospital sector, it is challenging to gain clinically relevant population-wide service utilisation data due to the fragmented digital health records system. As Bermuda's population ages, developing Integrated Care Pathways to coordinate patients with complex conditions will become increasingly important. Bermuda Hospitals Board has developed Integrated Care Pathways across multiple providers for some cancers (breast and prostate). It is also developing a pathway for palliative, end-of-life care. This important work should be expanded to develop Integrated Care Pathways for other important health conditions. Providers from across the health sector will also require a more coordinated system of tracking patients' journeys. Finally, an ageing population is likely to require additional pharmaceuticals and there is evidence from the Bermuda Government Health Insurance Department that 11.5–12.5% of individuals on FutureCare exhaust their annual prescription allocation early when they have multiple comorbidities. The cost of essential medicine should continue to be monitored and mechanisms identified to ensure affordable access.

Analysis. The current employment-based health insurance model does not lend itself to providing comprehensive UHC and may exacerbate health inequalities. The corresponding health information ecosystem

does not reliably capture all health expenditure in a meaningful way to allow conclusions to be drawn on whether expenditure is meeting health needs. The fee-for-service model does not incentivise more cost-effective prevention or early chronic disease management. Nor does it financially incentivise quality improvement or system-strengthening initiatives or collaborative work and information sharing between providers.

Implications for Bermuda's Health Needs

Bermuda's current and future health needs are situated in the context of an ageing and less economically active population that is potentially shrinking to a higher ratio of dependents to workers. The current disease burden, dominated by non-communicable diseases, is likely to continue and become more complex as people develop multiple long-term conditions. These health needs exist in a society characterised by significant socio-economic inequalities that impact health needs and can result in barriers to accessing healthcare.

Meeting these health needs will require much greater emphasis on addressing the social determinants of health with emphasis on the four levels of prevention integrated into social policy. Meeting social needs will have a far greater impact on health than solely improving healthcare. Common risk factors underpin many of Bermuda's leading causes of disease and should be prioritised in future health policy, noting that many risk factors cluster, with socio-economic deprivation being the strongest predictor of people engaging in multiple health risk behaviours. Bermuda must reflect on its priorities as a society. The adverse childhood experiences and child sexual abuse data is shocking. A failure to ensure that all children have the best start to life will continue to have negative moral and health consequences across the life course.

Healthcare will need to shift from a fragmented system of episodic single-condition management to one which can coherently manage multiple long-term conditions across different settings. Further standardisation of services is required, based on a dynamic evidence base and insurance schemes that incentivise prevention and upstream chronic disease management. UHC will be essential to reduce health inequalities and ensure all the people of Bermuda can access necessary health services. UHC, prevention, integration and standardisation of care will be vital for Bermuda, from an economic standpoint, to mitigate rising healthcare costs and ensure future healthcare inflation remains manageable. Without the wholesale adoption of these measures, the burden of ill health will consume a greater proportion of GDP, which is unsustainable given demographic trends.

The extra capital and operational IT budget needed to meet this report's recommendations will likely be substantial and require significant funding. Among other needs, the JSNA has highlighted considerable gaps in health information that must be addressed to improve Bermuda's health and successfully implement UHC. Further work is required to develop pertinent and linked information at the individual level across the health and social care sector. Improving health information should be the leading priority as we progress, and this is the primary recommendation from the JSNA.

Ultimately you cannot manage what you cannot measure.

Summary of Recommendations

The JSNA has outlined 24 recommendations to inform the work of stakeholders across the health sector, government and wider civil society (such as the voluntary third sector). The recommendations aim to bring together the evidence outlined throughout the JSNA, with the highest priority given to those recommendations likely to have the most significant impact on Bermuda's health needs.

The recommendations are as follows:

1. The Ministry of Health should lead the development of **robust and linked information/data** at the individual level across the health and social care sector. This could utilise the Unique Patient Identifier that has been developed by Bermuda Health Council and the UHC Programme's ongoing National Digital Health Strategy. Aspects for consideration include:
    - Disability
    - Disease registries
    - Linking health data with census data and socio-economic data (including housing and deprivation)
    - Non-communicable diseases
    - Risk factors
    - Social determinants on health (link with Recommendation 2)

2. The Government of Bermuda should prioritise improving health by **focusing on the social determinants of health rather than simply on healthcare**. This effort should centre on the needs of the most vulnerable and assess the impact of:
    - Availability of healthy food
    - Smoking and alcohol usage
    - Physical activity
    - Education
    - Housing
    - Income
    - Working conditions and employment status

3. The UHC Programme and Bermuda Health Council should **reform the health system's financial model** to enable better delivery of prevention and chronic disease management for the whole population.

4. Given the demographic transition expected, Bermuda should develop a **model of health and social care that is focused on the care of the elderly**, specifically:
    - The Ministry of Social Development and Seniors should reform the financial model for long-term care to ensure affordable and good-quality care. Financial planning will need to start early in an adult's working life to provide sufficient resources for future social care for seniors, and
    - The Ministry of Health should place the health needs of seniors at the centre of all relevant future health policies.

5. The UHC Programme's Clinical Senate should **prioritise the development of disease-specific control plans** and integrate them to focus on addressing common risk factors and clinical conditions that exist across the spectrum of non-communicable diseases. The National Cancer Control Plan should be seen as an exemplar of a disease-specific control plan. Aspects for consideration include:
    - Priority disease control plans (asthma and COPD, cancer, cerebrovascular disease, diabetes, ischaemic heart disease)
    - The implication of BHB's "*superuser*" quality-improvement work on disease control

6. The UHC Programme's Clinical Senate and BHB should **develop Integrated Care Pathways** for priority diseases to offer patients quality care in the most appropriate setting for their condition and to facilitate future planning of healthcare services. All four stages of prevention (primordial, primary,

secondary and tertiary) should be incorporated into each Integrated Care Pathway. Aspects for consideration include:

- Priority physical health diseases (asthma and COPD, cancer, cerebrovascular disease, diabetes, ischaemic heart disease, musculoskeletal)
- Appropriate use of diagnostic technologies in the pathway

7. The Department of Statistics should **incorporate relevant health questions into future censuses**. Aspects for consideration include:
   - Questions on health state and its impact on people's ability to carry out day-to-day activities to enable calculations of healthy life expectancy
   - Questions on household expenditure on healthcare (including both insurance and out-of-pocket payments) to better understand the proportion of healthcare expenditure by income bracket
8. The Ministry of Health, Department of Health and Bermuda Hospitals Board should **implement the findings of the 2019 Mental Health Situational Awareness Report**. They should ensure parity of esteem between mental health and physical health by removing stigma and barriers to accessing mental health services.
9. The Department of Corrections should address the specific health needs of the prison population identified in **the recent Bermuda Correctional Facilities Health Needs Assessment**.
10. The Epidemiology and Surveillance Unit should **strengthen syndromic surveillance** for
    - Acute flaccid paralysis
    - Fever and rash
11. The Department of Health should **focus on increasing vaccination levels** to reach population herd immunity once again, particularly for measles and polio.
12. Bermuda should **conduct specialist public health needs assessments** in the following areas, with considerable input from relevant subject matter experts. The recommended lead agencies are outlined in brackets.
    - Child and maternal health (Department of Health)
    - Intellectual disabilities (Bermuda Hospitals Board)
    - Long-term care (Ministry of Social Development and Seniors)
    - Musculoskeletal health (Department of Health)
    - Oral health (Department of Health)
13. Payers, providers and insurance companies should **develop payment mechanisms for clinicians involved in healthcare quality improvement** and health system-strengthening work where improvement in outcomes can be demonstrated.
14. Bermuda Health Council's Pharmacy and Therapeutics Committee should continue to monitor the cost of essential medicines and **identify the most effective way to ensure affordable access to essential medications.**
15. The Department for National Drug Control should **develop alcohol consumption guidelines** to distinguish low-, medium- and high-risk alcohol consumption, and revise its survey to capture this data.
16. The Child Safeguarding Committee should develop a multi-sector task force to plan prevention and management strategies to **tackle adverse childhood experiences**.
17. The Bermuda Police Service should prioritise improving the quality of **domestic incident reporting systems**.
18. Under third-sector leadership, Bermuda should produce a co-developed **national plan to end homelessness** and seek political buy-in and prioritisation.

19. The Department of Health should bring together key local stakeholders to **address the health and well-being needs of migrant groups**.

20. Payers and providers should incentivise the provision of **smoking prevention and cessation services**, particularly for at-risk groups (e.g., men and people with disabilities).

21. The Department of Health should **promote HPV vaccine uptake** as a critical primary prevention measure against cervical and oral cancer.

22. The Department of Health should **prioritise health promotion initiatives** to tackle common and interlinked disease risk factors, with a particular focus on the impact of deprivation on these risk factors.

23. Bermuda Health Council should commission an **academic study into health status and healthcare utilisation** by people's insurance status, including cost of co-payments.

24. The Ministry of Health should lead a cross-sector, comprehensive **investigation of the impact of COVID–19 on health**. Aspects for consideration include:
    - Direct deaths and long-term morbidity from COVID–19
    - Potential mortality from emergency services being overwhelmed
    - Indirect mortality and morbidity due to routine, urgent and non-COVID-related healthcare being postponed, reduced or cancelled
    - The direct effects of non-pharmaceutical interventions on health in the short and long term

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Table of Definitions

The Bermuda Joint Strategic Needs Assessment of Health 2023 has been developed using robust public health methodology underpinned with precise epidemiological language. However, it is understood that this may impact the report's readability for a lay audience. Therefore, a Table of Definitions is set out below to enable the reader better to understand the technical language used in the report.

Term	Definition
Association	The statistical relationship between two variables. This relationship is not necessarily causal and may be due to chance, confounding or error.
Attributable	The measure of the public health impact of a causative factor.
Causation	There is no single accepted definition for causation in epidemiology. The concept is that an event, condition, exposure or characteristic that plays an essential role in producing an outcome. The Bradford Hill criteria is a commonly used framework for establishing evidence of a causal relationship.
Census	The procedure of systematically acquiring, recording and calculating information about all the members of a population.
Communicable disease	A disease that is spread from person to person through various means, such as contact with blood and bodily fluids, surfaces, respiratory droplets or through an animal vector. There is an obligation under international law for jurisdictions to put measures in place to prevent and control the transmission of communicable diseases.
Deprivation	Deprivation is the concept of a disadvantage relative to the local community or society to which an individual belongs. Deprivation may be the outcome of a combination of many different factors, such as ethnicity, unemployment, poor education and skills, low incomes, poor housing, social exclusion, crime and family breakdown.
DMFT	DMFT is the sum of the number of Decayed, Missing and Filled Teeth. The mean number of DMFT is the sum of individual DMFT values divided by the sum of the population.
Economies of scale	The cost advantages obtained due to the size of operations.
Evidence base	The use of the best available scientific evidence from research to inform decisions about population health and individual patients. The evidence base is informed by the concept of the hierarchy of evidence, in which the weight of evidence is dependent on the relative strength of the underlying study design. Expert opinion generally ranks low in hierarchies of evidence.
FutureCare	Health insurance provided by the Government of Bermuda for residents age 65 years or over.
GDP	Gross domestic product (GDP) measures the value of goods and services produced in a jurisdiction. It estimates the size of and growth in the economy.
GDP per capita	Measures gross domestic product (GDP) per person. It is calculated by dividing gross domestic product by the total population.

Health behaviour	Actions individuals take that affect their health. These actions may promote good health (e.g., physical activity) or be detrimental to health (e.g., tobacco smoking) and are influenced by the social determinants of health.
Health inequalities	Health inequalities are avoidable, unfair and systematic differences in health between different groups of people.
Health outcome	Measurable changes in health that result from specific public health or clinical interventions.
Herd immunity	Population protection from an infectious disease as a result of a significant proportion of the population having immunity, either as a result of vaccination or previous infection. The herd immunity threshold is specific to each disease.
HIP (Health Insurance Plan)	Health insurance provided by the Government of Bermuda for residents under 65 years of age.
ICD	The International Classification of Diseases (ICD) is a clinical coding system designed to promote international comparability in the collection, processing, classification and presentation of mortality and morbidity statistics.
Incidence	The occurrence of new cases of a disease or attribute in a population over a specified period of time.
Morbidity	The state of being symptomatic or unhealthy for a disease or condition.
Mortality	The measure of the number of deaths in a particular population.
Need (i.e., health need)	The capacity to benefit from health policy or services.
Non-communicable disease	A disease that is not spread through infection or through other people, but is typically caused by unhealthy behaviours. Non-communicable diseases include both mental and physical health conditions.
Population	All the people living in a particular country, area or place.
Prevalence	The proportion of persons in a population who have a particular disease or attribute over a specific period of time.
Registry (including disease registry)	An organised system that uses observational study methods to collect uniform data (clinical and other) to evaluate specified outcomes for a population defined by a particular disease, condition or exposure, and that serves a predetermined scientific, clinical, or policy purposes.
Risk factor	A characteristic, condition or behaviour that increases the likelihood of getting a disease or injury.
Routine data/information	Routine data describes non-targeted information that is obtained in a standardised and consistent manner (e.g., GP or hospital records). Various sources of routinely collected data are available for use in epidemiological studies.
Social determinants of health	The non-medical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems.

Social gradient in health	The social gradient in health measures the effect of absolute income and subjective social status on the individual's health. It is a term used to describe the phenomenon whereby people who are less advantaged in terms of socio-economic position have worse health (and shorter lives) than those who are more advantaged.
Statistically significant	The effect observed is unlikely to be due to chance. This is determined through statistical testing. The usual threshold for statistical significance is a less than one in 20 probability that the effect observed is due to chance.
Surveillance	The ongoing systematic collection, analysis and interpretation of outcome-specific data for use in planning, implementing and evaluating public health policies and practice.
Syndromic surveillance	A type of surveillance relying on detection of individual and population health indicators that are discernible before confirmed diagnoses are made.
UK Health Security Agency (UKHSA)	The UK agency responsible for protecting the population from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. It has an overseas territory team responsible for giving technical support to the UK's overseas territories and acting as the focal point for the notification of diseases under the International Health Regulations (2005).
Vulnerable group	A group of people in need of special care, support or protection because of age, disability, risk of abuse or neglect.

Chapter 1: Introduction

1.1 Background

1.1.1 Bermuda Health Strategy 2022–2027

The production of the Bermuda Joint Strategic Needs Assessment of Health (JSNA) has been driven by the Bermuda Health Strategy 2022–2027.[5]

Bermuda's healthcare system is one of the most expensive in the world per capita[6] — and yet our people's health remains deeply troubling in many aspects, from high rates of obesity and chronic illness such as diabetes and heart and kidney disease, to the rising cost of healthcare. To address such issues, we must commit to strengthening our healthcare system.

The Bermuda Health Strategy 2022–2027 is the Ministry of Health's strategic plan directing our priorities for health up to 2027. It outlines our core vision of "*healthy people in healthy communities*".

The Ministry's mission is to make Bermuda healthier by "*ensuring that all people have equitable access to needed informative, preventive, curative, rehabilitative and palliative essential health services, of sufficient quality to be effective, while also ensuring that people do not suffer financial hardship when paying for these services and critical medicines*".

The Bermuda Strategy 2022–2027 outlines eight strategic principles for improving health in Bermuda. They are:

1. Promoting healthy living and preventative care
2. Focusing on person-centred care
3. Understanding our population's health needs
4. Providing access to healthcare coverage
5. Strengthening our healthcare workforce
6. Harnessing healthcare technology
7. Partnerships and collaborative working
8. Preventing wasteful care and promoting efficiency

The work of the JSNA links with all eight strategic principles, however its primary focus is Principle 3 – "*Understanding our population health needs*".

1.1.2 Understanding our Population's Health Needs

We need to understand our population's health needs (both physical and mental health) to optimise health outcomes and spend Bermuda's limited financial resources to the best effect. The recent growth in chronic, preventable non-communicable diseases such as heart disease, kidney disease, cancer and diabetes has strained Bermuda's health system's capacity, particularly as our population ages. Urgent action is needed to address this pressing challenge.

[5] Ministry of Health. *Bermuda Health Strategy 2022–2027.* 2022. Available: https://www.healthstrategy.bm/.
[6] Bermuda Health Council. 2019 *National Health Accounts Report: Bermuda health system finance and expenditure for fiscal year 2017–2018.* 2020. Bermuda Health Council: Bermuda. Available: https://bhec.bm/wp-content/uploads/2019-NHA-Report-20201014.pdf.

We must establish a clear and accurate picture of Bermuda's health needs and implement ways to monitor and manage them. We are doing this through three sequential activities:

Figure 1.1.1: Activities to Understand Bermuda's Population Health Needs

The role of the JSNA within the Bermuda Health Strategy 2022–2027 is shown in Figure 1.1.2.

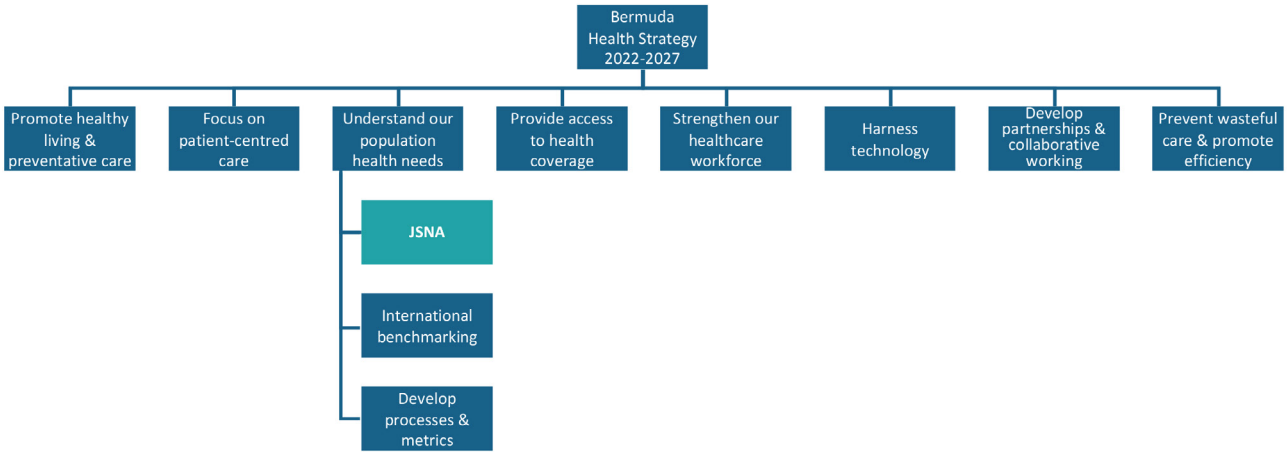


Figure 1.1.2: The Role of the JSNA Within the Bermuda Health Strategy 2022–2027

The Bermuda Health Strategy 2022–2027 sets down major changes to Bermuda's health system, including the implementation of Universal Health Coverage (UHC). To support the implementation of these changes, we need to accurately know Bermuda's health status baseline, including any knowledge gaps. A detailed explanation about how the JSNA contributes to UHC in Bermuda can be found in Section 1.4.

1.2 Bermuda Joint Strategic Needs Assessment and Universal Health Coverage

1.2.1 What is Universal Health Coverage?

UHC is a system whereby all people have access to the essential health services they need, when and where they need them, without falling into financial hardship or distress. Bermuda's UHC plan seeks to provide all people with access to essential health services.

UHC does not mean free access to all health services, but rather coverage for health services that are the most essential for Bermuda's population. There will still be a need for local insurers to provide supplementary coverage that goes beyond essential health services. Each country that has adopted UHC has taken a different path to achieve this goal. The introduction of UHC should be seen as a process (not a one-off event) that can be considered through three dimensions.

- **Population:** Extending the proportion of the population with access to essential services
- **Services:** Extending the number of essential health services to the population
- **Costs:** Extending the proportion of costs included within UHC

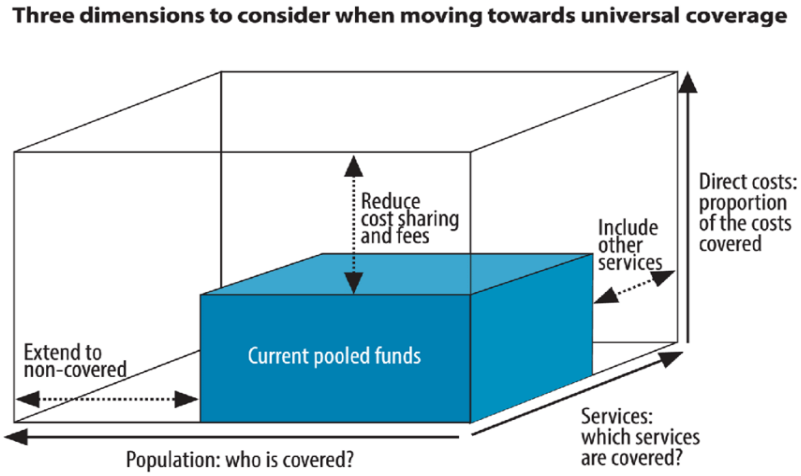


Figure 1.2.1: Dimensions to Consider When Moving Towards Universal Health Coverage (SOURCE: World Health Organization (WHO))

1.2.2 Universal Health Coverage (UHC) in Bermuda

The Ministry of Health has started work with stakeholders in developing UHC for Bermuda. The overall timeline for this programme is shown in Figure 1.2.1.

Year 1: Build our foundations & care pathways *Year 1*	**Year 2: Broaden essential care coverage** *Year 2*	**Year 3: Develop insurer expansion & alignment** *Year 3*
Projects: - Develop and pilot integrated essential care pathway - Initiate new working groups - Agree our starting points **(includes JSNA)** - Establish economic case - Develop National Digital Health Strategy	**Projects:** - Purchasing health services and payment mechanisms - Deliver improved value - Launch further pilot essential care package - Comprehensive financial modelling	**Projects:** - Payer collaboration beyond government health insurance plans - Deliver further value - Launch further pilot essential care packages

Figure 1.2.1: Timeline for UHC in Bermuda

Since 2021, a group of passionate and dedicated stakeholders from across Bermuda's healthcare community have joined together to form the UHC Steering Committee. The UHC Steering Committee is determining the best path forward for Bermuda to realise UHC and to make recommendations to the Bermuda Government to achieve it. The UHC Steering Committee oversees all UHC projects (including the JSNA).

The UHC Steering Committee has voted to start work on the following five priority projects:

Figure 1.2.2: Five Priority UHC Projects

1.2.3 JSNA's Role in UHC

The JSNA forms part of the "*Agree our Starting Points*" project. The JSNA's assessment of Bermuda's health needs will enable the UHC Steering Committee to develop national health system metrics to monitor the impact of UHC on health outcomes. The intended timeline for these projects is shown in Figure 1.2.3.

UHC has been a consideration throughout the process of the producing the JSNA. The JSNA has considered both the strategic aims of UHC and its links with other priority projects, such as the *National Digital Health Strategy and Integrated Care Pathways*. The JSNA authors emphasise the importance of preventative care in UHC. This will include addressing the upstream social determinants of health to enable the people of Bermuda to have healthy lives in healthy communities.

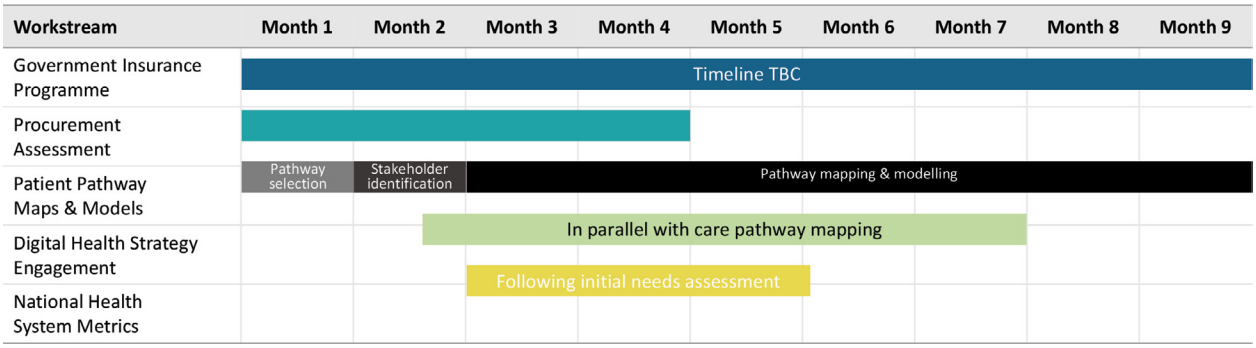


Figure 1.2.3: Five Priority Projects for Universal Health Coverage

1.3 What is a Joint Strategic Needs Assessment of Health?

A JSNA is a holistic and systematic assessment of the health needs of a community. The JSNA uses an established process to capture all relevant information to give a complete picture of our health.[7] This can then be used to prioritise future health planning, including developing health policy, public health programmes, health system financing and commissioning services.

The JSNA has used a public health approach to consider not only healthcare services but the **wider determinants of health**, defined by the WHO as:

> *"The non-medical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems."* [8]

The wider determinants of health can be visualised using the Dahlgren-Whitehead model of health determinants,[9] displayed in Figure 1.3.1. This model shows the factors that impact health, from individual lifestyle factors, social and community networks, living and working conditions through to broader general socio-economic, cultural and environmental conditions.

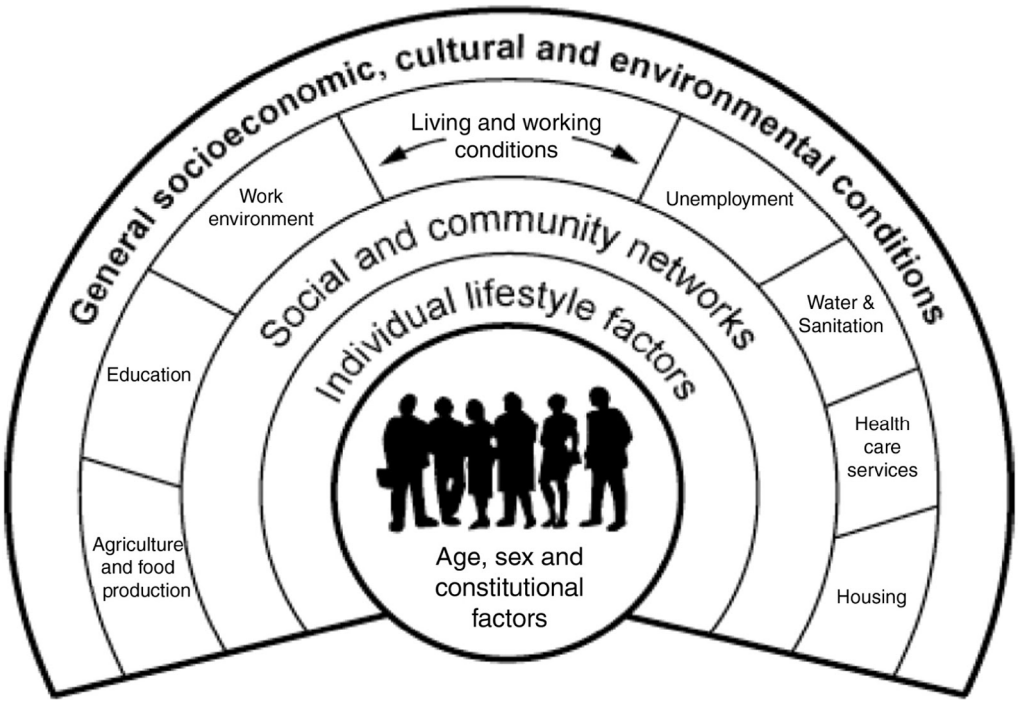


Figure 1.3.1: The Social Determinants of Health (Dahlgren and Whitehead Model of Health) (SOURCE: Dahlgren and Whitehead (1991))

[7] Department of Health and Social Care. *Joint Strategic Needs Assessment and Joint Health and Wellbeing Strategies Explained.* 2011. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/215261/dh_131733.pdf.

[8] WHO. *Social determinants of health.* 2023. Available from: https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1.

[9] Dahlgren G, Whitehead M. The Dahlgren-Whitehead model of health determinants: 30 years on and still chasing rainbows. *Public Health.* 2021;199:20–24. Available: https://doi.org/10.1016/j.puhe.2021.08.009.

Research demonstrates that the wider determinants of health can play a more important role in influencing health outcomes than healthcare services.[10] Therefore, whilst the JSNA plays a vital role in the UHC programme, its influence on cross-government policy should not be overlooked. By using the *Health for All Policies* approach, governments, including Bermuda's, can use health as a strategic enabler across all aspects of social policy.[11]

The remainder of this JSNA is organised into the following chapters:

- **Chapter 2: Population profile and wider determinants of health** – to understand our people in the unique context of Bermuda, now and in the future
- **Chapter 3: Health behaviour and risk factors** – to understand behaviours and risk factors for poor health outcomes
- **Chapter 4: Mortality and morbidity** – to understand the leading causes of death and ill-health
- **Chapter 5: Vulnerable groups** – to understand the needs of our most vulnerable, including children, the elderly, people in care and people with disabilities
- **Chapter 6: Healthcare services** – to understand the impact of our healthcare services on health
- **Chapter 7: Strengths and limitations of JSNA** – acknowledging the strengths and limitations in the JSNA's methodology
- **Chapter 8: Conclusions** – outlining the implications of the JSNA for Bermuda's health system, and
- **Chapter 9: Recommendations** – a comprehensive set of 24 recommendations for Bermuda.

The JSNA has used previous reports and studies, including their conclusions and recommendations, to inform its findings.

The JSNA should be seen as a key reference document with a broad range of information relevant to health that can be used by anyone with an interest in the field of health or social care. The audience for the JSNA includes (but is not limited to) charities, the general public, healthcare providers, patients and patient groups, payers, policy officials and professional groups.

1.4 Approach

The JSNA has been developed by a multi-disciplinary working group chaired by the Chief Medical Officer and Director of the Department of Health. The Working Group's members have a range of professional expertise, including:

- Epidemiology
- Health economics
- Healthcare management
- Health policy and UHC strategy
- Health promotion
- Medicine
- Nursing
- Public health

[10] Hood CM, Gennuso KP, Swain GR, Catlin BB. County Health Rankings: Relationships Between Determinant Factors and Health Outcomes. *Am J Prev Med.* 2016 Feb;50(2):129–35. Available: https://doi.org/10.1016/j.amepre.2015.08.024.

[11] Greer SL, Falkenbach M, Siciliani L, McKee M, Wismar M, Figueras J. From Health in All Policies to Health for All Policies. *Lancet Public Health.* 2022 Aug;7(8):e718–e720 Available: https://doi.org/10.1016/s2468-2667(22)00155-4.

The working group has benefited from technical guidance and support from the UK's Department of Health and Social Care's (Office for Heath Improvement and Disparities) UK Overseas Territories Team, as well as data support from the Bermuda Department of Statistics.

The JSNA has been developed using the following approaches:

- **Data driven:** The JSNA's findings are based on data collected from multiple sources across Bermuda to build a picture of the health of the population. Data limitations are outlined (where required) in the JSNA.
- **Evidence informed:** The JSNA references relevant literature to place Bermuda's health needs within the context of the wider evidence base.
- **Asset-based approach:** The JSNA emphasises how Bermuda's existing assets can be harnessed and built upon to improve the health of our people.
- **Pragmatic:** The JSNA has primarily built upon the data currently available in Bermuda, although new data was obtained through the January 2023 Bermuda Omnibus Pulse Survey©. Proxy measures have been used where appropriate.
- **System-wide recommendations:** The JSNA's findings have been used to develop data-driven, evidence-informed recommendations to strengthen Bermuda's health system.
- **Acknowledging limitations:** The JSNA, like all approaches to assess population health, has a number of limitations. These are detailed in Chapter 7.

The JSNA is designed to complement other Ministry of Health reports investigating the state of health in Bermuda, such as Health in Review.[12] The previous *Health in Review* report was published in 2017 and the next is due later this year. There are some subtle differences in the methodologies of the two reports. *Health in Review* compares a specific set of health indicators against those of other Organisation for Economic Co-operation and Development (OECD) countries and territories, with populations standardised against the OECD standard population.[13] By contrast, the JSNA seeks to understand a broader set of health needs and is less focused on international benchmarking. Where data has been age-standardised, the WHO Standard Population has been used, which better reflects Bermuda's contemporary demographic context.[14]

[12] Government of Bermuda, Ministry of Health. *Health in Review 2017: An International Comparative Analysis of Bermuda Health System Indicators, 2nd Edition.* Available: Health in Review 2017, 2nd Edition_2.pdf (www.gov.bm).

[13] "Standardization is an epidemiological method that removes the confounding effect of variable that we know – or think – differs in populations we wish to compare, such as age structure." PAHO. Standardization: *A Classic Epidemiological Method for the Comparison of Rates*" from *Epidemiological Bulletin.* 2002. 23(3). Available: https://www3.paho.org/english/sha/be_v23n3-standardization.htm.

[14] The Epidemiology and Surveillance Unit (ESU) also holds the primary data used in the JSNA (for figures that reference the ESU as the data source) with crude rates and standardised rates using the following standard populations (Segi World Standard, WHO World Standard and OECD Standard).

Chapter 2: General Profile

2.1 Introduction

This chapter presents a brief overview of Bermuda's population profile, including information on life expectancy, population projects and demographics. This information is critical for assessing the current and future health needs of the population, including the expected health outcomes associated with specific demographics.

This chapter also includes information on the wider determinants of health. These are factors that impact health but are outside of the health and care system. These include education, employment, housing and income.

The data is largely sourced from the Department of Statistics, with much of the data coming from the 2016 Census. In addition, data on the wider determinants of health was sourced from surveys including the Labour Force Survey.

Bermuda lacks data on deprivation and poverty. This report, consequently, is unable to assess the level of poverty on the Island. Given the associations between deprivation and poorer health outcomes, it is critical that data on poverty deprivation is collected as a standard practice in order to analyse inequalities in health need. Where available, education, employment or income has been used as a proxy for deprivation.

2.2 Basic Demographics

Bermuda is a small archipelago situated in the northern Atlantic Ocean. It is comprised of seven main islands and more than 100 smaller islands. The main land area is approximately 21 square miles and densely populated. The latest projected estimate for Bermuda's population in 2023 was 63,892.[15]

Pembroke Parish has the highest population density, followed by Devonshire and Warwick.

[15] Department of Statistics, Government of Bermuda. *Digest of Statistics 2021.* Available: https://www.gov.bm/regular-digest-statistics.

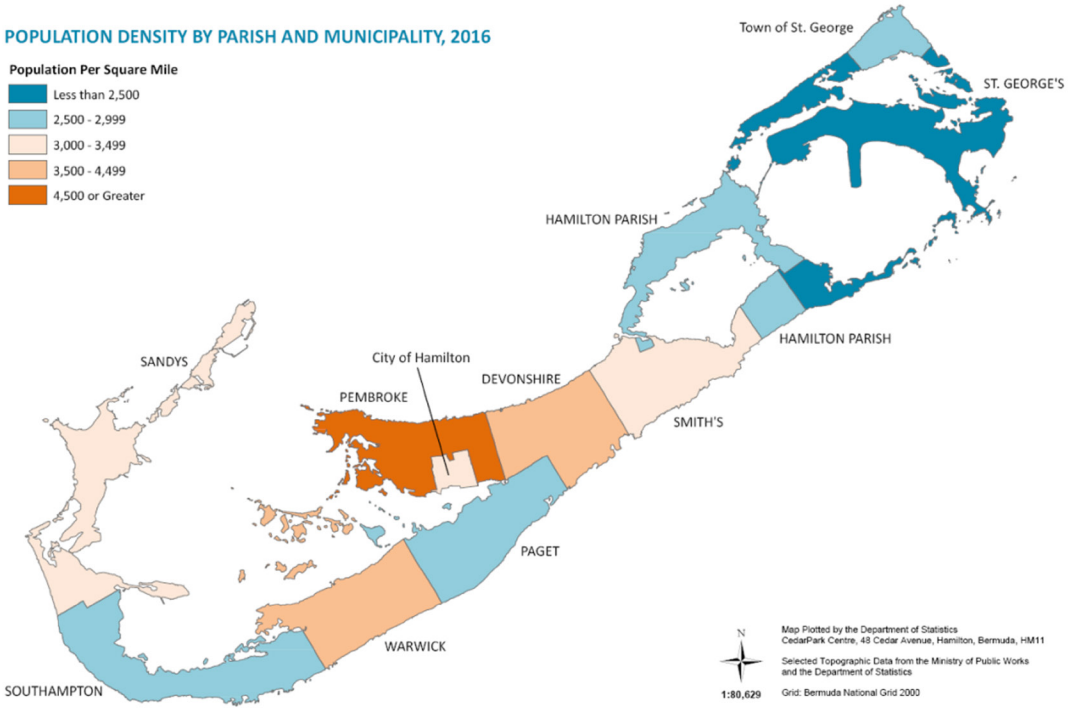


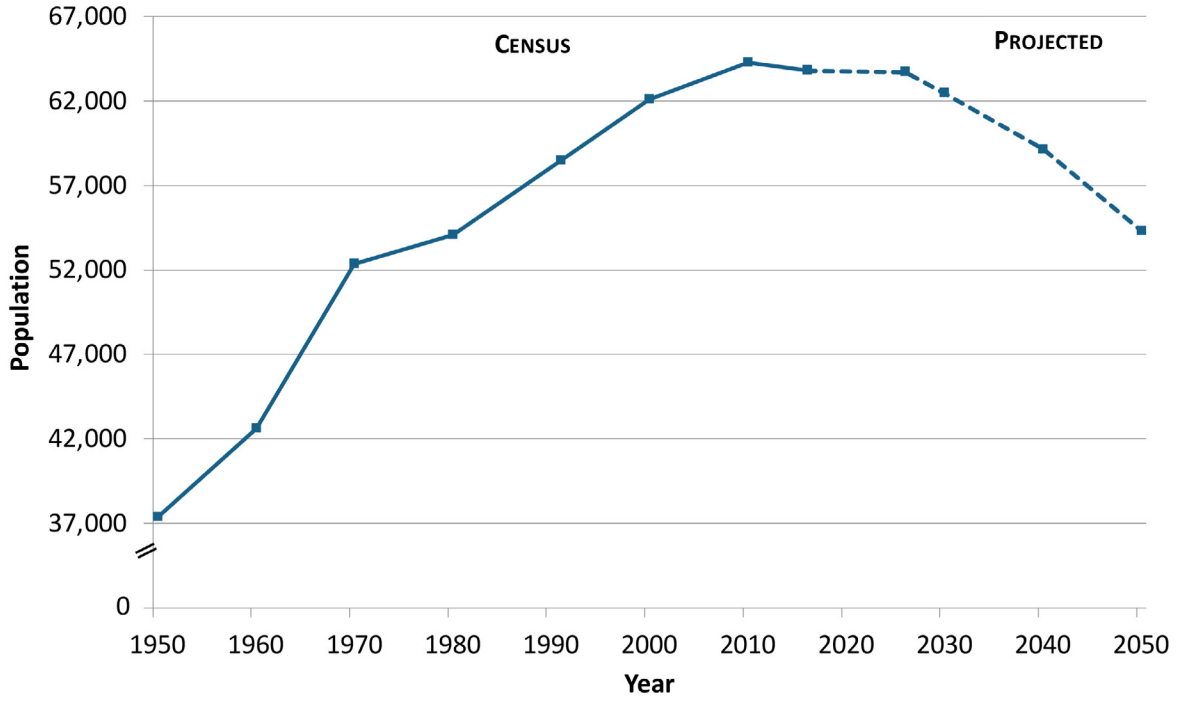
Figure 2.2.1: Population Density by Parish and Municipality, 2016
(SOURCE: Bermuda Department of Statistics[16])

The population has increased since 1950, but in recent years has started to decline. This may be due to increased emigration, decreased immigration and a declining birth rate. By 2026, the crude birth rate is projected to decrease to 7.3 while the crude death rate is expected to increase to 9.4.

The total fertility rate is expected to remain constant at 1.4 children per female of reproductive age. A fertility rate of 2.1 children per female of reproductive age is required to replace two adults and account for infant mortality. Bermuda, therefore, is projected to have sub-replacement level fertility – from 2016 onwards, according to Bermuda's 2016 Census. This projection is similar to other developed countries. Population projections based on the 2016 Census estimated that Bermuda's population will fall from a high of 64,055 in 2021 to 54,304 in 2050. While anecdotal evidence suggests that Bermuda's population began to decline prior to 2021 due to net emigration, there is no data available to substantiate this widely held belief. The COVID–19 pandemic, which likely had a significant effect on population numbers, was not accounted for in the original projections. In general, it should be noted that future population estimates are characterised by considerable uncertainty, with all estimates being developed in a model relying on a number of assumptions.[17]

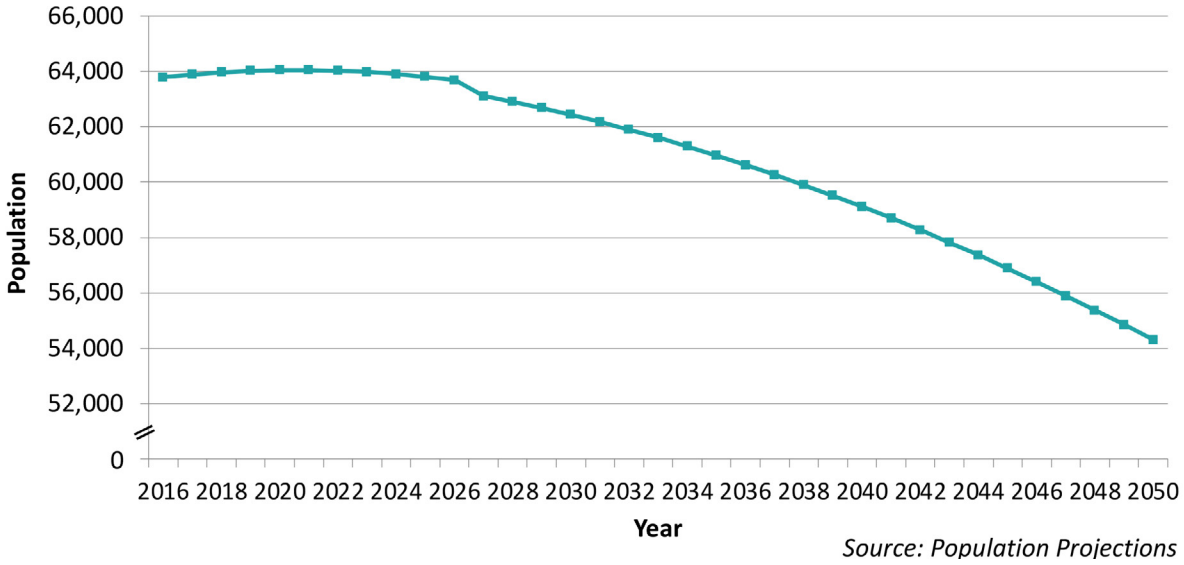
[16] Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.

[17] **Limitations of Projections.** Population projections are not predictions or forecasts. They are illustrations of how the structure, size and characteristics of Bermuda's population would change if certain assumptions on fertility, mortality and migration are held true over the projection period. While the assumptions are based upon an assessment of shortterm and longterm demographic trends, there is no certainty that any of the assumptions will be realised. The projections do not take into account future nondemographic factors (e.g. major government policy decisions, economic factors, natural disasters, etc.) which may diminish the accuracy of the projections. Historically, Bermuda's projections are updated after each population and housing census so that new information about demographic trends can be included. The agesex structure in this population projections report was based on selfreported data collected in the 2016 Population and Housing Census.
Scope of the Projections. This population projection series is for Bermuda as a whole from July 1, 2016 until July 1, 2050. Projections are less reliable the further into the future they are because assumptions are less likely to hold true.
Net Migration. It was assumed that net migration would be zero each year over the projection period due to a lack of comprehensive migration data.
Birth and Death Data. The projection input file contains recorded births and deaths up to 2020.



Sources: Population and Housing Censuses and Population Projections

Figure 2.2.2: Bermuda Population 1950–2050
(SOURCE: Bermuda Department of Statistics[18])



Source: Population Projections

Figure 2.2.3: Projected Population 2016–2050
(SOURCE: Bermuda Department of Statistics[19])

[18] Department of Statistics, Government of Bermuda. *Bermuda's Population Projections 2016–2026.* Available: https://www.gov.bm/sites/default/files/Bermuda-Population-Projections-2016-2026.pdf.

[19] Department of Statistics, Government of Bermuda. *Bermuda's Population Projections 2016–2026.* Available: https://www.gov.bm/sites/default/files/Bermuda-Population-Projections-2016-2026.pdf.

Year	Live Births	Deaths
	Total	Total
2011	670	429
2012	648	422
2013	648	471
2014	574	480
2015	583	478
2016	591	492
2017	576	481
2018	530	535
2019	525	535
2020	541	566
2021	494	727

Table 2.2.1: Registered Births and Deaths, 2011–2021
(SOURCE: Bermuda Department of Statistics[20])

2.3 Life Expectancy

Mid-Year	Life Expectancy at Birth
2010	75.9
2011	81.3
2012	81.9
2013	80.7
2014	80.9
2015	81.1
2016	81.9
2017	82.4
2018	82.6
2019	82.7
2020	82.8
2021	82.9
2022	83.0
2023	83.2
2024	83.3
2025	83.4
2026	83.5

Table 2.3.1: Life Expectancy at Birth, 2010–2026
(SOURCE: Bermuda Department of Statistics[21])

[20]Department of Statistics, Government of Bermuda. *Digest of Statistics 2021.* Available: https://www.gov.bm/sites/default/files/2021_Digest_of_Statistics.pdf.
[21] Department of Statistics, Government of Bermuda. *Bermuda's Population Projections 2016–2026.* Available: https://www.gov.bm/sites/default/files/Bermuda-Population-Projections-2016-2026.pdf.

Year	Male	Female
1960	70.6	65.1
1970	66.9	73.9
1980	68.7	76.1
1991	70.0	78.3
2000	75.3	80.6
2010	75.9	83.6
2016	78.6	85.3

Table 2.3.2: Life Expectancy at Birth, 1960–2016 (SOURCE: Bermuda Department of Statistics[22])

Life expectancy refers to the average number of years of life a person who has attained a given age can expect to live if mortality rates stay the same for the rest of their lives. Life expectancy for a Bermudian born in 2023 is 83.2 years. Life expectancy has been increasing since 2010 when looking at the population as a whole. Healthy life expectancy at birth is an estimate of the average number of years babies born this year would live in a state of 'good' general health. It is important to understand healthy life expectancy as well as overall life expectancy in order to plan health services that will be required as populations live longer lives, but not in good health. Unfortunately, there is no data on healthy life expectancy in Bermuda.

Life expectancy has been increasing for women consistently since 1960. In 2016, the life expectancy for a woman was 85.3 years whereas for a man it was 78.6 years. This parallels a similar gender gap in life expectancy in other developed countries, although Bermuda's gender disparity is wider than those of the UK[23] and USA.[24]

Life expectancy is a relatively crude measure of health outcomes, particularly given the increasing number of people living longer with chronic conditions. A more sophisticated indicator is healthy life expectancy (years of life lived without disability).[25] Bermuda does not currently have sufficiently robust primary data to be able to calculate healthy life expectancy.

2.4 Age and Gender

In 2020, there were an estimated 30,394 (48%) men and 33,186 (52%) women resident in Bermuda.[26]

Bermuda has an ageing population. The majority of Bermuda's working-age population is near retirement age (see Fig. 2.4.1). By 2026, those 65 years and older are expected to make up a quarter of Bermuda's population. This will result in an increased old-age dependency ratio – the ratio of the population 65 years and over compared to the working population. As this ratio increases, the pressure on health and social care services also increases. This coincidence means there will be a decreased ability to generate revenue from the working age population to ensure services for older people are funded.

[22] Department of Statistics, Government of Bermuda. *Bermuda's Population Projections 2016–2026.* Available: https://www.gov.bm/sites/default/files/Bermuda-Population-Projections-2016-2026.pdf.
[23] UK Office for National Statistics. *Past and Projected Period and Cohort Life Tables: 2020-based*, UK, 1981 to 2070. 2022. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/lifeexpectancies/bulletins/pastandprojecteddatafromtheperiodandcohortlifetables/2020baseduk1981to2070.
[24] Centers for Disease Control and Prevention. *NCHS Data Brief No. 293 Mortality in the United States*, 2016. 2017. Available: https://www.cdc.gov/nchs/data/databriefs/db293.pdf.
[25] Stiefel MC, Perla RJ, Zell BL. A Healthy Bottom Line: Healthy Life Expectancy as an Outcome Measure for Health Improvement Efforts. *Milbank Q.* 2010 Mar;88(1):30–53. https://doi.org/10.1111%2Fj.1468-0009.2010.00588.x.
[26] Department of Statistics, Government of Bermuda. Digest of Statistics 2021. Available: https://www.gov.bm/sites/default/files/2021_Digest_of_Statistics.pdf.

There are census districts in Bermuda, such as those in Southampton Parish and parishes adjacent to the City of Hamilton, where the proportion of residents over 65 years old is high. There may be an increased need for older age services and infrastructure in these areas.

There is a relatively smaller population of children and adolescents in Bermuda due to the sub-replacement fertility rate. It is projected that in 2026 there will be a decrease in the younger working age population and the children and adolescent population. The low numbers of a younger working age population may be due to Bermudians emigrating for school or university and establishing their careers abroad. Population modelling up to 2050 estimates that these trends of an ageing and shrinking population will continue. Please note that population projections past 2026 are experimental statistics and should be interpreted with caution (further details in footnote 17).

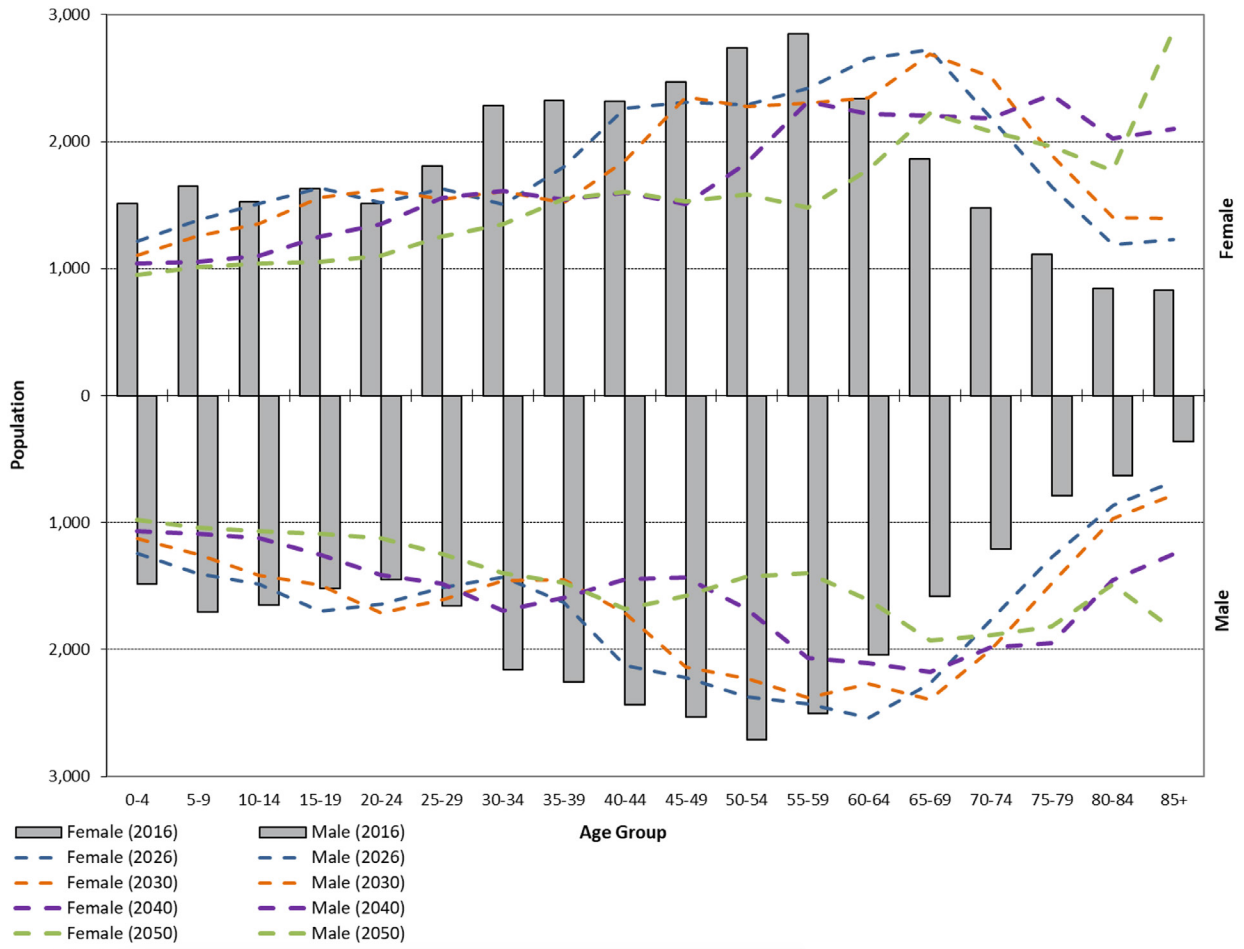


Figure 2.4.1: Population Pyramid with 2016 Census Population and 2016 Projected Population (SOURCE: Bermuda Department of Statistics[27])

[27] Department of Statistics, Government of Bermuda. *Bermuda's Population Projections 2016–2026.* Available: https://www.gov.bm/sites/default/files/Bermuda-Population-Projections-2016-2026.pdf.

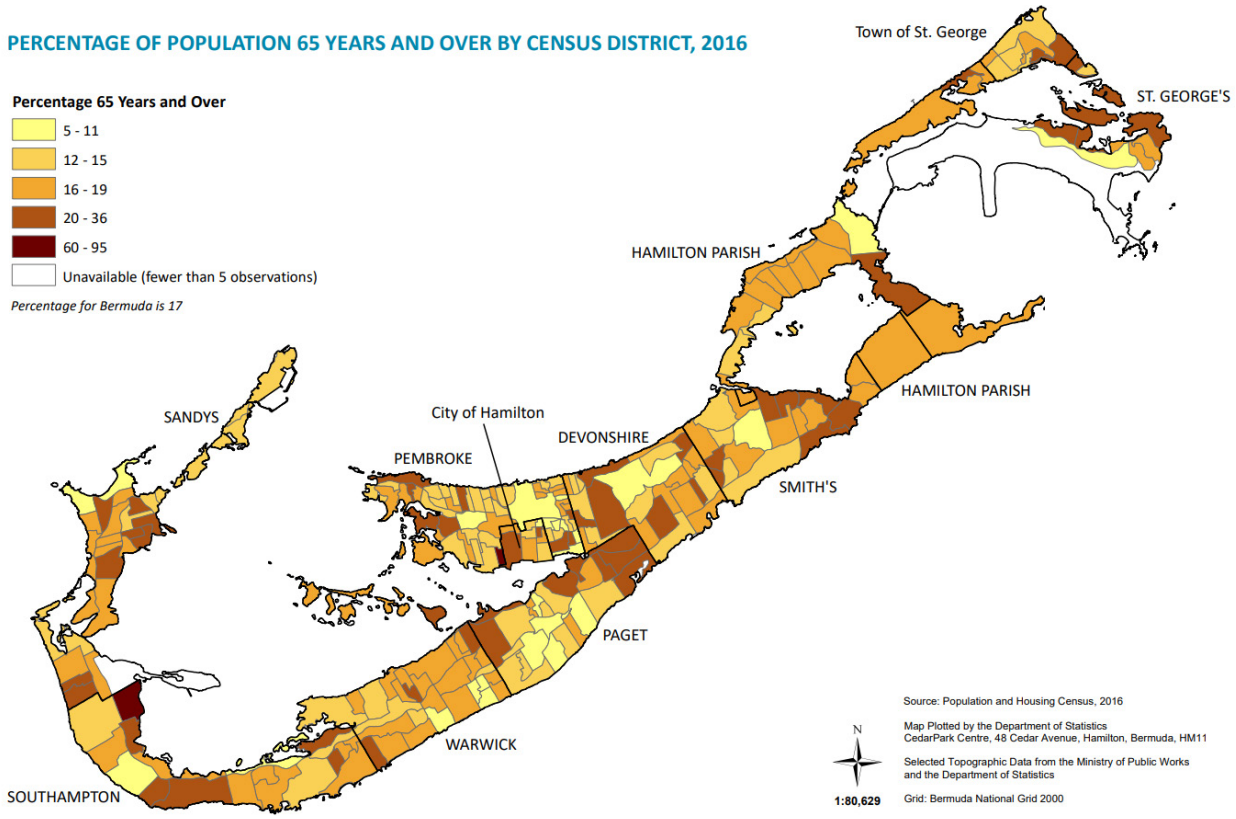


Figure 2.4.2: Percentage of Population 65 Years and Over by Census District, 2016 (SOURCE: Bermuda Department of Statistics[28])

2.5 Race and Ethnicity

In 2016, 52% of Bermuda residents who responded to the census identified as Black, 32% identified as White and 17% identified as Asian, Mixed or from an 'Other' ethnic group not captured in the census categories.

Ethnic Group	Population	Percentage of Total Population
Black	33339	52%
White	19466	31%
Asian	2592	4%
Mixed	5780	9%
Other	2553	4%
Not Stated	49	0%

Table 2.5.1: Population by Ethnic Group, 2016 (SOURCE: Bermuda Department of Statistics[29])

There are areas in Bermuda where the resident population is diverse, with multiple ethnic groups. There are also areas where the resident population has a high proportion of individuals who identify as Black, and there are areas where very few residents identify as Black. The coastal area between Paget and Smith's Parishes, for example, contains census districts where fewer than 20% of the residents identify as Black. When planning health services and considering equitable access to services, resident populations that may have more need for health and care services need to be considered.

[28]Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.
[29]Department of Statistics, Government of Bermuda. *Digest of Statistics 2021.* Available: https://www.gov.bm/sites/default/files/2021_Digest_of_Statistics.pdf.

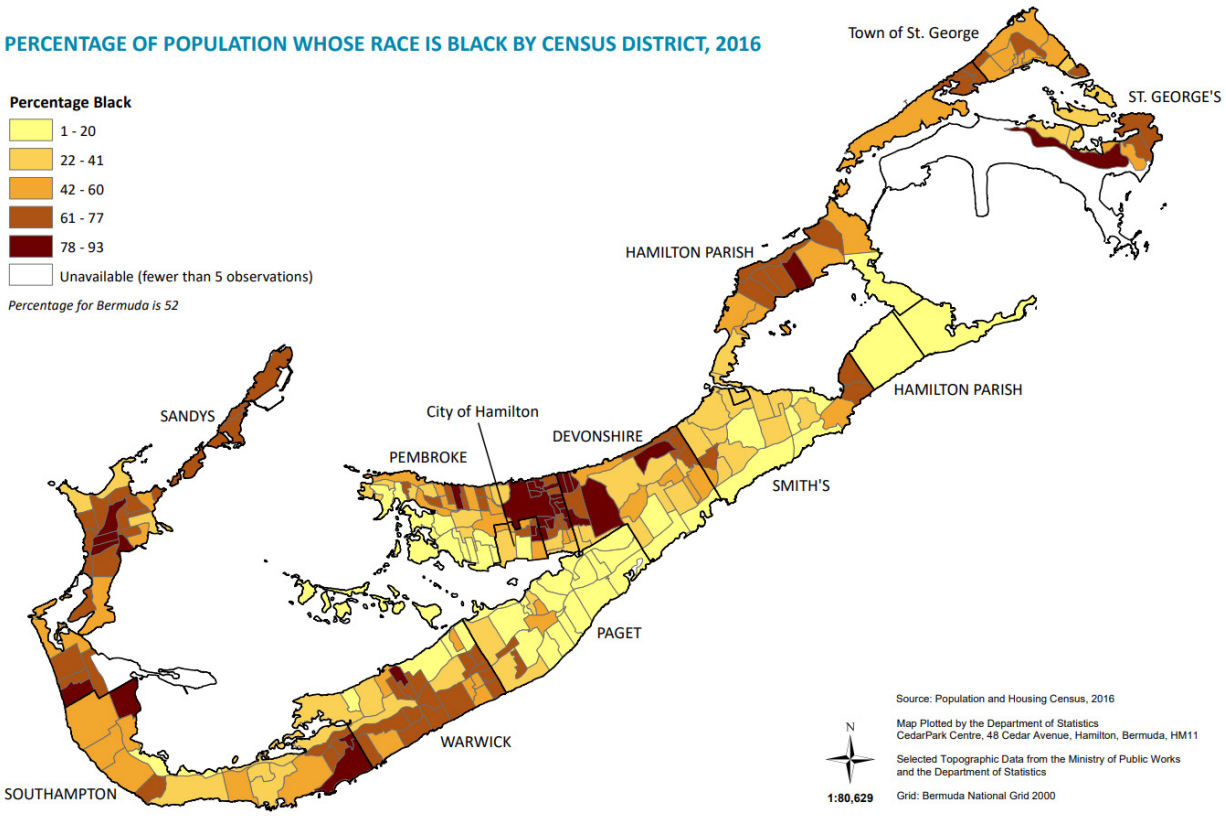


Figure 2.5.1: Percentage of Population Who Identify as Black by Census District, 2016 (SOURCE: Bermuda Department of Statistics[30])

2.6 Deprivation and Inequality

Throughout this report, education, employment or income has been used as a proxy measure for deprivation in absence of available data on poverty, inequality and deprivation. It is difficult to assess inequities in health need without available data.

2.7 Education and Academic Qualifications

Academic Qualification	Population	Percentage of Total Population
No Formal Certificate	7,283	13.6%
High School Certificate	18,764	35.0%
Tech./ Voc. / Assoc./ Diploma	11,940	22.3%
Degree	15,541	29.0%
Other	1	0.0%
Not Stated	84	0.2%

Table 2.7.1: Highest Academic Qualification in the 16+ Population, 2016 (SOURCE: Bermuda Department of Statistics[31])

[30]Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.
[31] Department of Statistics, Government of Bermuda. *Population and Housing Census 2016.* Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

Nearly a third of Bermuda residents aged 16+ have a degree level education. This varies considerably among different groups: 43% of White residents have a degree level education compared to 20% of Black residents and 30% of those identifying as Mixed or Other.[32] Women are more likely than men to achieve an academic qualification higher than a high school certificate; despite this, woman earn on average a lower median salary compared to men.

14% of Bermuda residents aged 16+ have no formal certificate of educational attainment.[33] There are areas in Bermuda where there is a higher percentage of residents with no academic qualifications, such as in Sandys Parish, some parts of Southampton Parish, as well as some census districts adjacent to the City of Hamilton.

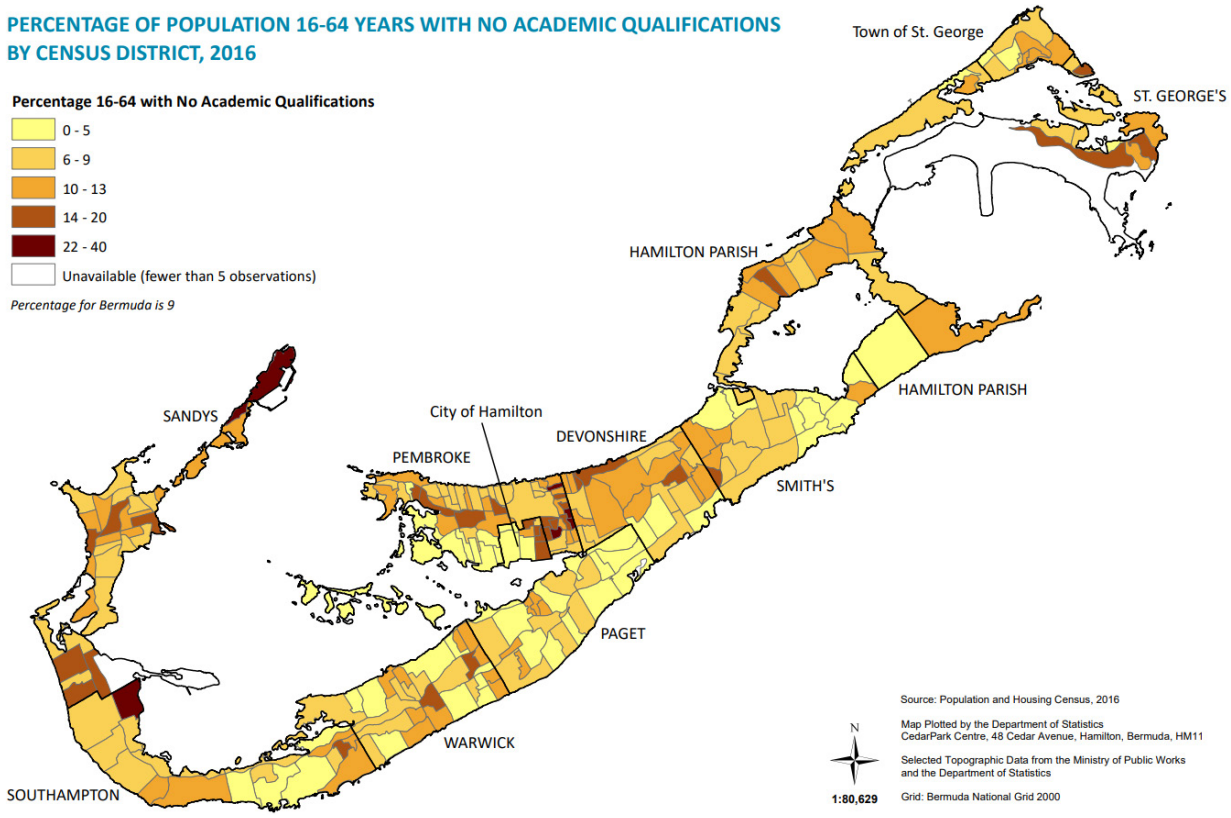


Figure 2.7.1: Proportion of the 16–64–Year-Old Population with No Academic Qualification by Census District, 2016 (SOURCE: Bermuda Department of Statistics[34])

[32]Department of Statistics, Government of Bermuda. *Population and Housing Census 2016.* Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[33]This statistic includes the population aged 16–18, which contains individuals who could go on to achieve a formal academic qualification.
[34]Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.

2.8 Employment and Income

Bermuda has one of the highest per capita incomes in the world. In 2021, GDP per capita (current US$) was $114,090,35 which was the 4th highest GDP in the world. Nevertheless, the cost of living in Bermuda is also one of the highest in the world.[36]

In 2020, international business accounted for 27.5% of GDP, real estate accounted for 15.2% of GDP, and the insurance and financial services account for 14.3% of GDP.[37] The tourism industry directly contributes 2.2% to GDP but is among the largest sectors of employment.[38]

Occupation Groups	Population	Percentage of Total Population
Professionals	6,496	21%
Senior Officials and Managers	6,150	20%
Service Workers and Shop and Market Sales Workers	5,851	19%
Clerks	4,602	15%
Technicians and Associate Professionals	2,751	9%
Craft and Related Trades Workers	2,544	8%
Plant and Machine Operators and Assemblers	1,191	4%
Elementary Occupations	956	3%
Skilled Agricultural and Fishery Workers	742	2%
Armed Forces	33	0%

Table 2.8.1: Major Occupation Groups, 2021
(SOURCE: Bermuda Department of Statistics[39])

In 2020, the total labour force was 36,387 residents. The employment rate was 75.6% and the unemployment rate 7.9%. The unemployment rate may be higher than previous years due to the COVID–19 pandemic and staff either leaving their jobs or being let go from employment. The working population constituted 33,496; 15% (4,977 residents) consider themselves underemployed.[40]

There is a higher proportion of residents who are unemployed in St George's Parish. There are also areas adjacent to the City of Hamilton and in Devonshire and Sandys Parishes, which have a higher than average level of unemployment.

[35]The World Bank. *GDP per capita (current US$) – Bermuda.* Available: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BM.
[36]Fox D. *Bermuda tops cost of living index. Royal Gazette. 2021.* Available: https://www.royalgazette.com/year-in-review/article/20211231/bermuda-tops-cost-of-living-index/
[37]Ministry of Finance, Government of Bermuda. *National Economic Report of Bermuda 2021.* Available: https://rgb-prod-public-pdfs.s3.us-east-2.amazonaws.com/NHRBmex-VIrcCID4iva-ftKomCGQ.pdf.
[38]Department of Statistics, Government of Bermuda. *Tourism Satellite Account Report 2021.* Available: https://www.gov.bm/sites/default/files/TSA_report_2021_revised.pdf.
[39]Department of Statistics, Government of Bermuda. *Digest of Statistics 2021.* Available: https://www.gov.bm/sites/default/files/2021_Digest_of_Statistics.pdf.
[40]Department of Statistics, Government of Bermuda. *Labour Force Survey Report 2020.* Available: https://www.gov.bm/sites/default/files/November%202020%20Labour%20Force%20Survey%20%20Report.pdf.

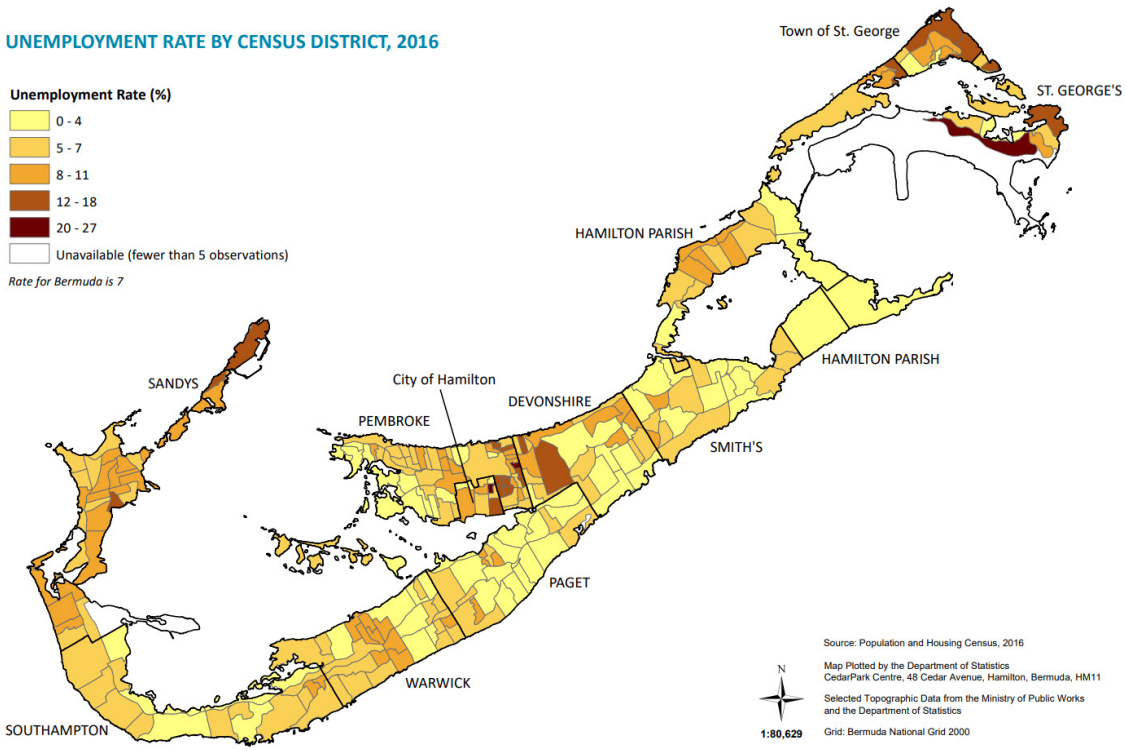


Figure 2.8.1: Unemployment Rate by Census District, 2016
(SOURCE: Bermuda Department of Statistics[41])

In 2020, the average median gross annual income from an individual's main job is $64,033. Whilst this gross annual income is high by global standards, it must be considered in the context of Bermuda having one of the highest costs of living in the world.[42] Income varies considerably across gender, age, ethnicity, citizenship status and education. Men earn significantly more than women. White residents have a significantly higher median annual salary compared to Black residents and residents who identify as Mixed or Other. Non-Bermudians earn more than Bermudians. As might be expected, median income increases with higher academic qualifications. However, the association between income and age is not as linear: Those who are aged 35–44 earn the highest median income with average salaries decreasing as individuals near retirement age.

[41]Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.
[42]Fox D. Bermuda tops cost of living index. *Royal Gazette. 2021.* Available: https://www.royalgazette.com/year-in-review/article/20211231/bermuda-tops-cost-of-living-index/.

Population Grouping	Median Annual Income
Total working population	64033.4
Gender	
Male	66878.6
Female	60878.1
Age Group	
16 - 24	31032.2
25 - 34	59981.0
35 - 44	71471.5
45 - 54	70422.7
55 - 64	65976.2
65 +	42564.3
Bermudian Status	
Bermudian	61041.7
Non-Bermudian	75890.1
Ethnicity	
Black	58605.2
White	83644.4
Mixed/Other	55521.4
Highest Academic Qualification	
No Formal Certificate	41114.1
High School Certificate	50186.5
Tech. / Voc./ Assoc. / Diploma	56934.8
Degree	93889.7

Table 2.8.2: Median Income from Main Job, 2020
(SOURCE: Bermuda Department of Statistics[43])

[43]Department of Statistics, Government of Bermuda. *Labour Force Survey Report 2020.* Available: https://www.gov.bm/sites/default/files/November%202020%20Labour%20Force%20Survey%20%20Report.pdf.

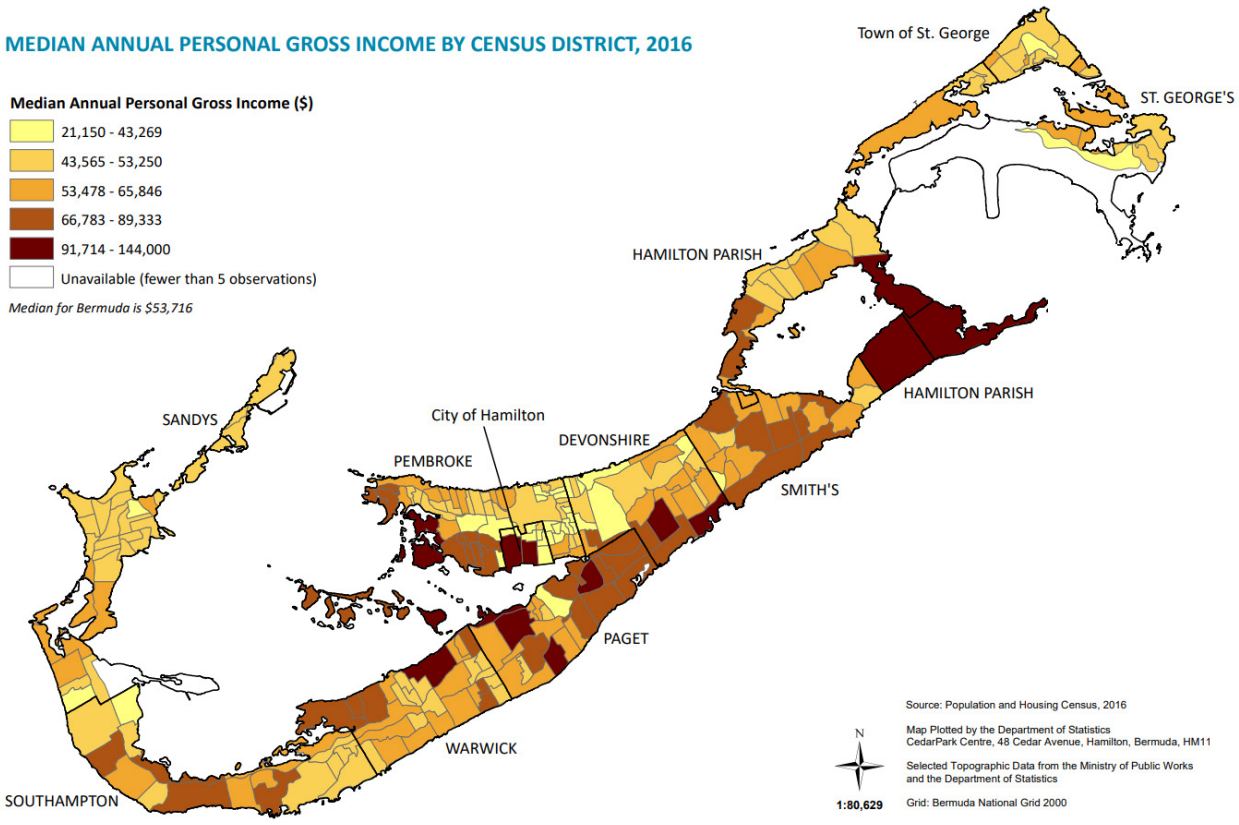


Figure 2.8.2: Median Annual Personal Gross Income by Census District, 2016 (SOURCE: Bermuda Department of Statistics[44])

When median income is mapped, the areas where residents are likely to have higher salaries are coastal areas between Paget and Smith's Parishes, Hamilton Parish and the city of Hamilton. Census districts with residents with the highest median incomes are the same areas with the lowest proportion of Black residents.

2.9 Housing

Housing conditions can influence our physical health. For example, a dry house (without mould and damp) at a good temperature (not overheated) can improve general health outcomes and reduce respiratory conditions. Housing also has a huge influence on our mental health and well-being. There is evidence that children living in crowded homes are more likely to be stressed, anxious and depressed, and have poorer physical health and lower academic attainment at school.[45] While Bermuda lacks data on multi-generational housing, there is anecdotal information suggesting there are multi-generational households in Bermuda.

The UK Housing Health and Safety Rating System (HHSRS) provides an assessment of the level of health-related hazards within a property; the potential harms associated with poor housing are summarised in the table below.

[44]Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.
[45]The Health Foundation. *How does housing influence our health? 2017.* Available: https://www.health.org.uk/infographic/how-does-housing-influence-our-health.

Physiological Requirements	Psychological Requirements	Protection Against Infection	Protection Against Accidents
Damp and mould growth	Crowding and space	Domestic hygiene, pests and refuse	Falls associated with baths, stairs, surfaces
Lead	Entry by intruders	Food safety	Electrical hazards
Radiation	Lighting	Personal hygiene, sanitation and drainage	Fire
Un-combusted fuel gas	Noise	Water supply	Flames, hot surfaces etc
Excessive cold			Collision and entrapment
Excessive heat			Explosions
Carbon monoxide and fuel combustion productions			Position and operability of amenities
Asbestos			Structural collapse and falling elements
Biocides			
Volatile organic compounds			

Table 2.9.1: Potential Housing Hazards to Health
(SOURCE: UK Office of the Deputy Prime Minister[46])

Rainwater harvesting is practiced in Bermuda. Rainwater catchment systems should be regularly cleaned and maintained to prevent contamination and infection risk.[47] As the water supply infrastructure in Bermuda is decentralised, it is critical that the public is aware of the importance of mitigating the risk of contamination and infection via rainwater harvesting.

To support good physical and mental health, housing needs to be affordable, of good quality and with enough space for all inhabitants to live and share. Overcrowding is a situation in which more people are living in a single dwelling than there is space for, so that movement is restricted, privacy is curbed, hygiene is limited and rest and sleep is difficult. Overcrowded housing is associated with worse health outcomes and increased risk of infectious disease transmission. During the COVID–19 pandemic, overcrowded homes were particularly at risk for transmitting the disease. Overcrowding disproportionately impacts those with low incomes.[48]

In Bermuda, there are some areas with higher rates of overcrowding than others. In one census district adjacent to the City of Hamilton, there are on average more than three people per bedroom.

[46]Office of the Deputy Prime Minister, Government of the United Kingdom. *Housing Health and Safety Rating System.* 2006. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7853/safetyratingsystem.pdf.
[47] Smith T et al. *Rainwater Harvesting, Vernacular Architecture and the Culture of Water Resource Management in Bermuda.* 2017. Available: https://www.gov.bm/sites/default/files/20170410_RCarticle_BDAFeature_vf.pdf.
[48]The Health Foundation. *Overcrowding is highest for those with low incomes.* 2020. Available: https://www.health.org.uk/news-and-comment/charts-and-infographics/overcrowding-is-highest-for-those-with-low-incomes.

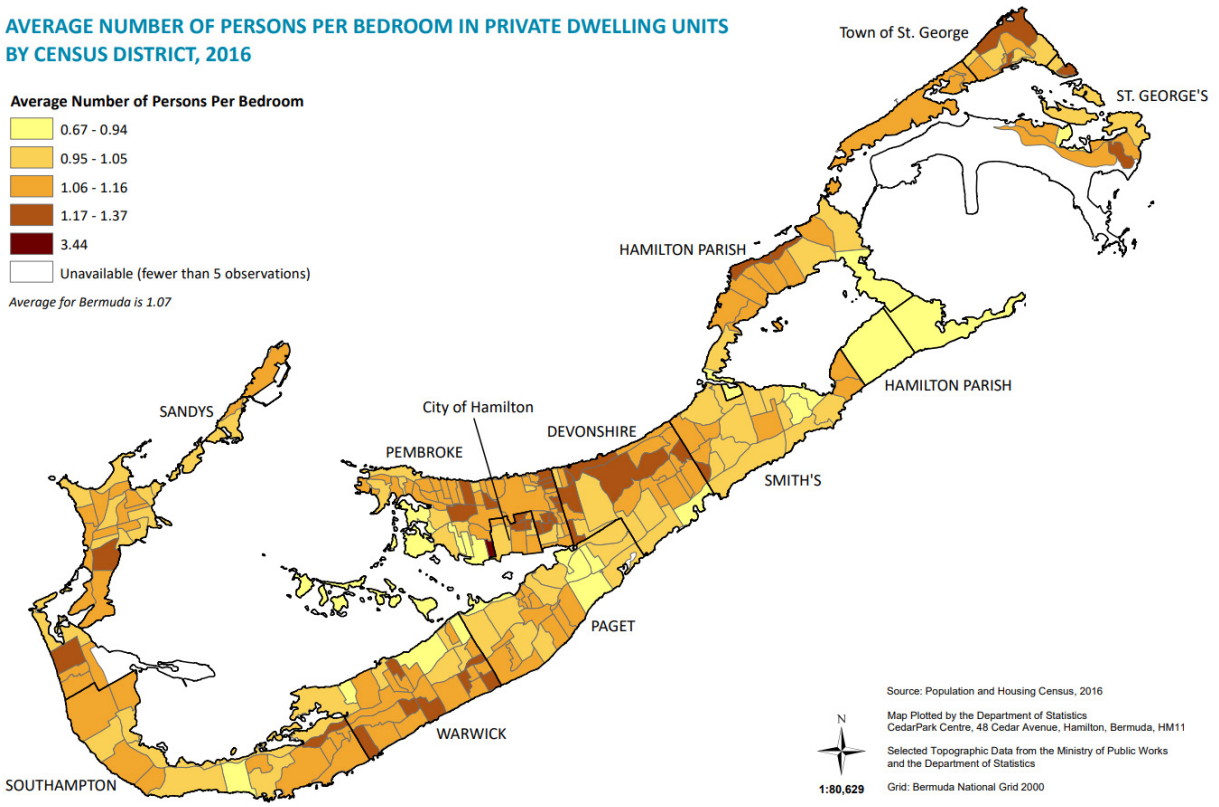


Figure 2.9.1: Average Number of Persons Per Bedroom by Census District, 2016 (SOURCE: Bermuda Department of Statistics[49])

There is a lack of data on the quality of housing in Bermuda, so it is difficult to assess its impact on health.

Owner-occupiers tend to report better health and well-being compared to renters. Some of these patterns may be attributed to the fact that housing tenure is strongly related to socio-demographic factors (such as age or income levels), which have a strong influence on health and well-being.[50] 48% of housing in Bermuda is owner occupied while 52% is rented.[51]

Primary homelessness is defined as a lack of conventional accommodation, such as people living in the street or using cars for temporary shelter.[52] Secondary homelessness includes people who move frequently from one form of temporary shelter to another, including emergency accommodation. Rough sleepers are the most visible homeless population, but homeless people can live in insecure accommodation such as hostels, squats, vehicles or in temporary and insecure conditions with friends and family. Chapter 4: Vulnerable Groups will outline available data on the homeless and rough-sleeping population in Bermuda.

[49]Department of Statistics, Government of Bermuda. *2016 Bermuda Census Maps.* Available: https://www.gov.bm/2016-bermuda-census-maps.
[50]Mason KE, Bentley E, and Baker E. *Housing affordability and mental health: does the relationship differ for renters and home purchasers? Soc Sci Med*, vol. 94, pp. 91–97, 2013. https://doi.org/10.1016/j.socscimed.2013.06.023.
[51] Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[52]Department for National Drug Control. *Survey of Substance Use among the Homeless Population in Bermuda.* 2015. Available: https://www.gov.bm/sites/default/files/homeless_survey_report_finalv2.pdf.

2.10 Implications for Health Needs

Bermuda's total population has started to decline. This may be due to increased emigration, decreased immigration and a declining birth rate. Bermuda has an ageing population and life expectancy is increasing. Without a change in migration or fertility, the old-age dependency ratio is expected to increase resulting in more pressure on health and social services.

The majority of Bermuda's population identify as Black (52%), but health outcomes data by ethnicity is not consistently recorded, so the JSNA is unable to determine which health outcomes disproportionately impact different ethnic groups. However, data on the wider determinants of health show significant differences by ethnicity and is indicative of potential disparities in health outcomes.

Despite having one of the highest median incomes globally, there are significant inequalities in salaries, employment, educational attainment and housing conditions. These wider determinants of health will have an impact on how health outcomes are distributed across the population.

There is no data collected on poverty and therefore it is difficult to determine the level of deprivation in Bermuda.

Chapter 3: Health Behaviour and Risk Factors

3.1 Introduction

This chapter provides an overview of health behaviours and risk factors that can lead to a great burden of disease. It focuses on smoking, alcohol consumption, obesity, nutrition and healthy eating, physical activity and air pollution – risks associated with long-term conditions that impact Bermuda's residents.

Health behaviour and risk factor prevalence have been analysed by gender, age, ethnicity and deprivation to illustrate inequities in different groups that may be indicative of disparities in health outcomes. This chapter also presents data against previously reported Bermuda data to identify any changes locally. Finally, this chapter presents data that compares Bermuda to other areas, such as high-income countries, and global averages. This is to help benchmark Bermuda's health needs against other countries or globally.

Local data for this chapter on smoking and alcohol is sourced from the Department for National Drug Control, 2021 National Household Survey. Local data on obesity, healthy eating and physical activity is sourced from a January 2023 Bermuda Omnibus Pulse Survey© that was commissioned by the Department of Health for this JSNA report.

The Bermuda Department for National Drug Control, 2021 National Household Survey did not include persons with a known disability or illness that could affect their responses. The data presented, therefore, may be an underestimate of current rates of smoking or alcohol consumption.

Bermuda does not have alcohol consumption guidelines, so data on low-, moderate- or high-risk alcohol consumption is not available.

3.2 Smoking

Smoking harms nearly every part of the body. It is a major behavioural risk factor for the four leading non-communicable diseases (NCDs): diabetes, cancer and cardiovascular and respiratory disease. Increased health risks due to smoking also include sight loss, arthritis, periodontal disease and tooth loss.[53] Smoking causes lung cancer, heart disease as well as cancers in other organs including lip, mouth, throat, bladder, kidney, stomach, liver and cervix.

For every death caused by smoking, approximately 20 smokers are living with a smoking related disease.[54] These include Alzheimer's disease, angina, asthma, Crohn's disease, gastric and duodenal ulcers, gum and tooth disease, osteoporosis, rheumatoid arthritis, cataracts, macular degeneration, psoriasis, reduced fertility, impotence, depression, sight loss, hearing loss, multiple sclerosis and diabetes.

Smoking during pregnancy significantly increases risks to a baby's health before and after birth, including preterm birth, low birthweight, stillbirth and miscarriage. It also increases risks to the baby's health in later life as babies of mothers who smoke are more likely to develop health conditions including respiratory conditions, obesity and diabetes.[55]

People who don't smoke are also at risk from exposure to second-hand smoke, which increases risks of cancer and cardiovascular disease. Children are particularly vulnerable to second-hand smoke, which increases the

[53]Centers for Disease Control and Prevention. *Health Effects of Cigarette Smoking.* Not dated. Available: https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/effects_cig_smoking/index.htm.
[54]Centers for Disease Control and Prevention. *How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General.* 2020. Available: https://www.ncbi.nlm.nih.gov/books/NBK53017.
[55]Action on Smoking and Health. *Smoking, pregnancy and fertility.* 2021. Available: https://ash.org.uk/wp-content/uploads/2019/10/Smoking-Reproduction.pdf.

risks of sudden infant death syndrome, lower respiratory tract infections, wheeze, asthma and middle ear infections.[56]

The best thing a smoker can do for their health is to stop smoking. Evidence shows that the most effective way to do this is with a combination of behavioural support and medication or alternative sources of nicotine.[57] Health professionals have an important part to play in supporting smoking cessation. People who smoke are more likely to experience ill health and need healthcare. Smoking status should be recorded as part of a consultation with an offer of referral to evidence-based smoking cessation services. In line with the evidence base, healthcare professionals should be trained in giving advice. Evidence-based smoking cessation services should meet WHO standards of delivery. Clear referral pathways should be established between healthcare providers and smoking cessation services.

WHO's Framework Convention on Tobacco Control (FCTC) provides evidence-based solutions to tackle the global tobacco epidemic. WHO developed the MPOWER framework[58] to help countries implement the key demand reduction measures in the FCTC. MPOWER offers a framework to assess and implement a more comprehensive approach to tobacco control:

- **Monitoring:** Bermuda should continue to monitor smoking prevalence. Efforts should be made to include in survey samples populations that may be more likely to smoke.
- **Protecting people from tobacco smoke:** Bermuda's Tobacco Control Act 2015[59] prohibits smoking in enclosed public places and workplaces. Other countries have extended this protection to prohibit smoking in work vehicles and in vehicles when an under–18 is present.
- **Quitting tobacco:** Smoking cessation services in Bermuda are limited. A universal evidence-based smoking cessation service should be developed and incorporated into Universal Health Coverage. To strengthen the treatment of tobacco dependence, smoking status should be recorded by healthcare practitioners and they should be trained in providing advice. Referral pathways should be established to give smokers an easy route to smoking cessation services.
- **Warn about the dangers of tobacco:** The Tobacco Control Act 2015 includes a 30% text warning in line with the minimum requirements of the FCTC. However, this measure is undermined by allowing the sale of single cigarettes. Allowing the sale of single cigarettes means that any legislation on tobacco packaging is of less value. Bermuda could strengthen the warnings on packaging by including graphic health warnings, or standardised packaging, which is now in place in many countries. Bermuda could strengthen its existing legislation on packaging by prohibiting the sale of single cigarettes.
- **Enforcing tobacco advertising, promotion and sponsorship bans:** The Tobacco Control Act 2015 places restrictions on advertising, promotion and sponsorship of tobacco. It falls short of a total ban, which is recommended in the FCTC.
- **Raising taxes on tobacco:** Raising tobacco taxes is one of the most effective measures to prevent youth uptake and increase smoking cessation. Raising tobacco taxes is also a key action in tackling socio-economic inequalities in tobacco consumption.[60] Bermuda does not currently tax tobacco at WHO recommended levels.

[56] Action on Smoking and Health. *Secondhand Smoke.* 2020. Available: https://ash.org.uk/wp-content/uploads/2020/03/SecondhandSmoke.pdf.
[57] World Health Organisation. *Quitting tobacco.* 2023. Available: https://www.who.int/activities/quitting-tobacco.
[58] World Health Organisation. *MPOWER.* Not dated. Available: https://www.who.int/initiatives/mpower [accessed February 23rd 2023].
[59] Tobacco Control Act 2015. Available: http://www.bermudalaws.bm/laws/Consolidated%20Laws/Tobacco%20Control%20Act%202015.pdf.
[60] Smith et al. *Impact of population tobacco control interventions on socioeconomic inequalities in smoking: a systematic review and appraisal of future research directions.* BMJ Tobacco Control. 2021;30:e87–e95 Control. Available: https://tobaccocontrol.bmj.com/content/30/e2/e87.

3.2.1 Prevalence

In 2021, the overall prevalence of cigarette smoking[61] in Bermuda was 9.7%. Reported lifetime use of cigarettes was 52.3% and use within the past year was 11.9%.

Of those who currently smoke, nearly 40% said they consume more than five packs of cigarettes per month equating to more than 100 cigarettes per month. Due to the dose-response relationship between smoking and health outcomes,[62] it is critical to encourage smokers to reduce the number of cigarettes they consume to decrease their risk of serious illness.

Cigarettes Consumed in the Past Month	Number of Smokers	Percentage of Smokers
1 to 5	297	5.6%
6 to 10	459	8.7%
11 to 20 (half to 1 pack)	804	15.3%
2 to 3 packs	1185	22.5%
4 to 5 packs	367	7.0%
More than 5 packs	2082	39.6%

Table 3.2.1: Quantity of Cigarettes Consumed in the Past Month Among Those Who Currently Smoke, 2021 (SOURCE: Bermuda Department for National Drug Control[63])

5.2% of respondents said they vape, with 1.8% of them vaping nicotine products. The remaining respondents reported vaping 'other' products such as 'flavouring' – 1.4%, and marijuana – 1.6%.[64] It is unclear how much overlap there is between current smokers and those who vape nicotine products.

A minority of those surveyed reported exposure to second-hand smoke. 6% of respondents reported someone who smoked in their home while 4% reported someone who smoked in a closed area in the workplace.[65] In Bermuda, smoking in all indoor workplaces is illegal.

[61] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf. Please note: Prevalence covers respondents to the National Household who said they *currently* use cigarettes. The survey sample did not include persons with a known disability or illness that could affect their responses, such as persons with a hearing disability, mental illness, or similar issues. These are groups who may be more likely to smoke. Therefore this data may be an underestimate of current smoking rates.

[62] Dai X et al. Health effects associated with smoking: a Burden of Proof study. *Nature Medicine.* 2022;28:2045–2055 https://doi.org/10.1038/s41591-022-01978-x.

[63] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf.

[64] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf.

[65] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf.

3.2.2 Trend

In the past 20 years, smoking prevalence globally has decreased and is projected to continue to decrease.[66]

Year	Global Smoking Prevalence
2000	32.7%
2005	29.5%
2010	26.7%
2015	24.4%
2020	22.3%
2025	20.4%

Table 3.2.2: Estimates of Global Smoking Prevalence by Year, 2020 (SOURCE: WHO[67])

In Bermuda, smoking prevalence was 11.7% in 2013, decreasing to 8.8% in 2017 and increasing to 9.7% in 2021. It is unclear what has driven the increase in smoking prevalence. The most recent survey was undertaken during the COVID–19 pandemic. During periods of social upheaval and financial strain, smoking prevalence tends to increase, and this may have impacted Bermuda's smoking prevalence. However, a number of countries went against this trend such as the USA, which saw decreased levels of smoking during the COVID–19 pandemic.[68] The 2021 increase may also be due to natural variation in survey sampling, where findings can fluctuate in small populations at different time points. Further data is needed to understand the increase in smoking prevalence and whether this increase was a temporary response to COVID–19 or other factors.

3.2.3 Age and Gender

Cigarette Use	Male	Female
Lifetime use of cigarettes	59.3%	45.7%
Used cigarettes in the past year	17.5%	6.9%
Current use of cigarettes	14.0%	5.7%

Table 3.2.3: Cigarette Use by Gender, 2021 (SOURCE: Bermuda Department for National Drug Control[69])

There are significant differences in smoking prevalence by gender. 14% of men report being a current smoker compared to 6% of women. 59% of men report smoking in their lifetime compared to 46% of women. However, both men and women report trying their first cigarette at a similar age: on average men try their first cigarette at age 17.3 and women at age 17.4.

This mirrors the gender disparity in smoking globally with 36.7% of all men and 7.8% of all women current users of tobacco.[70]

[66] World Health Organisation. *WHO global report on trends in prevalence of tobacco use 2000–2025, fourth edition.* Available: https://www.who.int/publications/i/item/9789240039322.
[67] World Health Organisation. *WHO global report on trends in prevalence of tobacco use 2000–2025, fourth edition.* Available: https://www.who.int/publications/i/item/9789240039322.
[68] Gaffney A, Himmelstein DU, Woolhandler S. *Smoking Prevalence during the COVID–19 Pandemic in the United States.* Ann Am Thorac Soc. 2022 Jun; 19(6): 1065–1068. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9169127/#:~:text=Smoking%20prevalence%20in%20the%20overall,%E2%88%920.19)%20after%20pandemic%20onset.
[69] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[70] World Health Organization. *Tobacco.* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/tobacco.

While the smoking prevalence for women is lower, there is no Bermuda data available for smoking rates in pregnant women. Smoking in pregnancy carries health risks across the life course.

Age	Cigarette Use by Age
16–24	4.7%
25–34	10.9%
35–44	13.8%
45–54	12.5%
55–64	16.1%
65–74	5.3%
75–84	3.8%
85+	6.3%

Table 3.2.4: Cigarette Use by Age, 2021
(SOURCE: Bermuda Department for National Drug Control[71])

Age	Global Smoking Prevalence
15–24	14.2%
25–34	21.7%
35–44	26.3%
45–54	28.5%
55–64	26.8%
65–74	22.7%
75–84	18.0%
85+	12.7%

Table 3.2.5: Estimates of Global Smoking Prevalence by Age Range, 2020
(SOURCE: WHO[72])

In Bermuda, 4.7% of young people aged 16–24 report being a current smoker, and the average age of first cigarette use is 17.4. Smoking is transmitted across the generations in a cycle underpinned by social norms, familiarisation and addiction. Young people with parents who smoke are more exposed to smoking behaviour, more likely to try smoking and, once hooked, find it harder to quit.[73] Data from the National School Survey 2019 found that 5.2% of young people aged 12–18 report trying cigarettes in their lifetime. 1.7% report current use of cigarettes.[74]

Globally, smoking prevalence peaks at age 45–54 at 28.5%[75] while prevalence in Bermuda peaks at age 55–64. There is decreased smoking prevalence in older age groups due to smoking cessation as well as mortality from smoking increasing in older people.

[71] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[72] World Health Organisation. *WHO global report on trends in prevalence of tobacco use 2000–2025, fourth edition.* Available: https://www.who.int/publications/i/item/9789240039322.
[73] Action on Smoking and Health. *Health Inequalities and Smoking.* 2019. Available: https://ash.org.uk/uploads/ASH-Briefing_Health-Inequalities.pdf.
[74] Department for National Drug Control. *National School Survey 2019.* Available: https://www.gov.bm/sites/default/files/Report-of-the-Survey-of-Middle-and-Senior-School-Students-on-ATOD-2019.pdf.
[75] World Health Organisation. *WHO global report on trends in prevalence of tobacco use 2000–2025, fourth edition.* Available: https://www.who.int/publications/i/item/9789240039322.

3.2.4 Race and Ethnicity

Ethnic Group	Current Smoker
Black or African	10.6%
White	7.4%
Portuguese	7.6%
Asian	12.9%
Mixed (Black & White, Black & Other, White & Other)	16.7%
Other	0.0%

Table 3.2.6: Current Cigarette Use by Ethnic Group, 2021
(SOURCE: Bermuda Department for National Drug Control[76])

There is significant disparity in smoking prevalence among different ethnic groups. Black respondents reported 11% smoking prevalence, compared to 7% of White respondents and 13% of Asian respondents. Those who identify as Mixed reported the highest smoking prevalence at 17%. There were no respondents who identified as from an Other ethnic group who reported being a current smoker.

3.2.5 Deprivation and Inequality

Highest Academic Qualification	Current Smoker
None	9.9%
School Leaving Certificate/High School Diploma	13.1%
Technical/Vocational Certificate (Bermuda College)	7.9%
Associate's Degree	13.1%
Bachelor's Degree	7.7%
Master's Degree	3.9%
Doctorate Degree	13.7%
Professional Designation (With or Without Any Prior Academic Qualification)	6.9%
Other	25.7%

Table 3.2.7: Current Cigarette Use by Highest Academic Qualification, 2021
(SOURCE: Bermuda Department for National Drug Control[77])

[76] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[77] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.

Employment Status	Current Smoker
Employed/Self-Employed, working 1–39 hours per week	9.7%
Employed/Self-Employed, working 40 or more hours per week	12.3%
Not employed, looking for work	22.3%
Not employed, NOT looking for work (e.g. housewife, student, other)	3.6%
Retired	4.6%
Disabled, not able to work	22.3%
Not Stated	0.0%

Table 3.2.8: Current Cigarette Use by Employment Status, 2021 (SOURCE: Bermuda Department for National Drug Control[78])

In the absence of data on deprivation, education and employment have been used as proxy measures. Smoking prevalence varies by highest academic qualification achieved; however, the relationship is not linear – while those with Bachelor's and Master's degree level qualification report lower than average levels of smoking prevalence, those with Doctorate degrees report higher than average smoking prevalence. As these figures are self-reported these results may be due to self-reporting bias. It is unclear what has driven the higher levels of smoking among those with higher academic qualifications. Stress is a risk factor for smoking and therefore it may be that those with higher academic qualifications are using smoking to 'relieve' their perceived stress symptoms.[79]

There is a clearer relationship between smoking and employment. Those who are currently unemployed and seeking work report significantly higher levels of smoking prevalence (22%) compared to those currently employed. Those who report a disability and are not able to work also report significantly higher levels of smoking prevalence than average (22%). Those who are employed who work 1–39 hours per week report smoking prevalence similar to average smoking levels, while those who are employed who work more than 40 hours per week report 12% smoking prevalence.

Smoking is far more common among people with lower incomes. The more disadvantaged someone is, the more likely they are to smoke and to suffer from smoking-related disease and premature death.[80] Risk of smoking is strongly linked to socio-economic status and all measures of deprivation. Higher smoking prevalence is associated with almost every indicator of deprivation or marginalisation. Compared to the population as a whole, smoking is more common among:[81]

- People with a mental health condition
- People with lower incomes
- People who are unemployed
- People who are experiencing homelessness
- People in contact with the criminal justice system
- People who live in social housing
- People without qualifications (noting limitation discussed above)
- Lone parents
- LGBTQ+
- Looked-after children

[78] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[79] Lawless MH et al. Perceived stress and smoking-related behaviors and symptomatology in male and female smokers. *Addict Behav.* 2015 Dec; 51: 80–83. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4558262.
[80] Action on Smoking and Health. *Health Inequalities and Smoking.* 2019. Available: https://ash.org.uk/uploads/ASH-Briefing_Health-Inequalities.pdf.
[81] Action on Smoking and Health. *Health Inequalities and Smoking.* 2019. Available: https://ash.org.uk/uploads/ASH-Briefing_Health-Inequalities.pdf.

3.2.6 Comparison with Other Areas

Country/Territory	Year	Age	Smoking Prevalence
Bermuda	2021	16+	9.7%
England[82]	2021	18+	13.3%
USA	2019	18+	22.8%
Canada	2017	15+	15.1%
Barbados	2006	18+	9.1%
St Helena[83]	2021	18+	22.2%
Global[84]	*2020*	*15+*	*22.3%*

Table 3.2.9: Smoking Prevalence by Country
(SOURCE: Bermuda Department for National Drug Control[85])

Bermuda has significantly lower smoking prevalence compared to the USA, Canada, the UK and the global average. Bermuda has similar smoking prevalence compared to Barbados.

3.3 Alcohol

While alcohol is part of everyday society and cultural norms in most countries, alcohol consumption is a causal factor in more than 200 diseases, injuries and other health conditions. Worldwide, three million deaths every year result from harmful use of alcohol. This represents 5.3% of all deaths. Drinking alcohol is associated with the risk of developing health problems such as mental and behavioural disorders, including alcohol dependence and major non-communicable diseases such as liver cirrhosis and cardiovascular diseases.[86] Alcohol is a carcinogen that can cause at least seven types of cancer and is a leading cause of cancer death.[87]

A significant proportion of the disease burden attributable to alcohol consumption arises from unintentional and intentional injuries, including those due to road traffic collisions, violence and suicide. Fatal alcohol-related injuries tend to occur in relatively younger age groups. Alcohol consumption by an expectant mother may cause fetal alcohol syndrome and preterm birth complications. The harmful use of alcohol can also result in harm to other people, such as family members, friends, co-workers and strangers.[88]

Bermuda does not currently have alcohol consumption guidance. To reduce the risk of alcohol-related harms, the US CDC recommends that adults of legal drinking age can choose not to drink, or to drink in moderation by limiting intake to two drinks or less in a day for men or one drink or less in a day for women, on days when alcohol is consumed.[89] In the UK, alcohol consumption guidance recommends that adults drink no more than 14 units of alcohol a week, spread across three days or more.[90] Recent Canadian alcohol consumption guidance recommends one to two drinks per week as a low-risk threshold; three to six drinks per week will lead to moderate risk for health and seven drinks or more per week will lead to increasingly high risk for health.[91]

[82]UK Office for National Statistics. *Adult smoking habits in the UK – Office for National Statistics.* 2022. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2021.
[83]St Helena Government. *St Helena Joint Strategic Needs Assessment.* 2022. Available: https://www.sainthelena.gov.sh/wp-content/uploads/2022/10/Summary-of-St-Helenas-Joint-Strategic-Needs-Assessment-2022-JSNA.pdf.
[84]World Health Organization. *Tobacco.* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/tobacco.
[85]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[86]World Health Organisation. *Alcohol.* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/alcohol.
[87] Canadian Centre on Substance Use and Addiction. *Canada's Guidance on Alcohol and Health.* 2023. Available: https://ccsa.ca/sites/default/files/2023-01/Canada%27s%20Guidance%20on%20Alcohol%20and%20Health%20Final%20Report_l.pdf.
[88]World Health Organisation. *Alcohol.* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/alcohol.
[89]Centers for Disease Control and Prevention. *Dietary Guidelines for Alcohol.* Not dated. Available: https://www.cdc.gov/alcohol/fact-sheets/moderate-drinking.htm.
[90]National Health Service. *Alcohol units.* Not dated. Available: https://www.nhs.uk/live-well/alcohol-advice/calculating-alcohol-units.
[91] Canadian Centre on Substance Use and Addiction. *Canada's Guidance on Alcohol and Health.* 2023. Available: https://ccsa.ca/sites/default/files/2023-01/Canada%27s%20Guidance%20on%20Alcohol%20and%20Health%20Final%20Report_l.pdf.

3.3.1 Prevalence

54% of Bermuda residents report being a current user of alcohol. 69% report alcohol consumption in the past year while 91% report alcohol use at some point in their lifetime.[92]

The average age of trying alcohol for the first time is 17.5.

Due to a lack of guidance on acceptable alcohol thresholds in Bermuda, it is difficult to assess the prevalence of hazardous alcohol consumption among Bermuda residents. However, 5.1% of those surveyed report daily consumption of drinks with medium and high alcohol content.[93]

Binge drinking is defined as five or more drinks on an occasion for men or four or more drinks on an occasion for women.[94] Of current users of alcohol, nearly a quarter (24%) report binge drinking between one to five times in the past month. 2% report binge drinking six to 10 times and a further 2% report binge drinking 11 times or more in the past month.

Over a quarter (27%) of respondents had been in a car driven by someone who had been drinking and 9% report being on the bike of someone who had been drinking. Road traffic collisions are further explored in Chapter 4 on mortality and morbidity (deaths from external causes).

The Department for National Drug Control Household Survey asked respondents about problematic drinking behaviour. This may be indicative of high-risk alcohol consumption in Bermuda residents. 14% reported some memory loss after drinking, 14% reported a desire to decrease alcohol consumption and 5% reported losing friendships or romantic partners because of alcohol.

Problematic Drinking Behaviour	Prevalence
When you wake up in the morning after having drunk the night before, have you ever experienced not remembering part of what happened?	14.0%
Have you felt like decreasing the amount of alcohol you drink?	13.5%
Have you lost friends or partners because of alcohol?	4.5%
Do you drink more than you want, without noticing?	3.8%
Have you had trouble with your partner because of alcohol?	3.5%
Does it bother you that you are criticised for the way you drink?	2.1%
Did you have to drink alcohol in the morning?	0.7%

Table 3.3.1: Problematic Drinking Behaviour Prevalence, 2021 (SOURCE: Bermuda Department for National Drug Control[95])

[92]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf. Please note: People responding to surveys may underreport the amount of alcohol they consume, so prevalence measures may underestimate population levels of drinking. Heavy drinking and non-routine drinking patterns, in particular, may be associated with greater under reporting, and so estimates of drinking above recommended levels are likely to be disproportionately underestimated.

[93]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf. Please note: Drinks with medium alcohol content include wine, and drinks with high alcohol content include spirits such as vodka, rum, and whiskey.

[94]Centers for Disease Control and Prevention. *Binge Drinking.* 2022. Available: https://www.cdc.gov/alcohol/fact-sheets/binge-drinking.htm#:~:text=Binge%20drinking%20is%20a%20serious,on%20an%20occasion%20for%20women.

[95]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National Household Survey 2021 Report FINAL.pdf.

3.3.2 Trend

In 2013, 54.8% of respondents reported being a current user of alcohol. That figure decreased to 50.2% in 2017 and then rose to 54.0% in 2021. It is unclear what has driven the increase.

In 2014, a similar proportion of Bermuda residents reporting binge drinking (28%) compared to current levels.[96]

3.3.3 Age and Gender

Alcohol Use	Male	Female
Lifetime use of alcohol	93.2%	89.1%
Used alcohol in the past year	74.0%	64.2%
Current use of alcohol	60.9%	47.7%

Table 3.3.2: Alcohol Use by Gender, 2021
(SOURCE: Bermuda Department of National Drug Control[97])

Across current, past year and lifetime use, there is a higher prevalence of men who consume alcohol compared to women.

Men consume alcohol for the first time at aged 16.7; the average age for women to first consume alcohol is 18.2. 45.2% of schoolchildren aged 12–18 report using alcohol in their lifetime; 13.2% report current use of alcohol.[98]

Alcohol use is a leading behavioural risk factor for death and social problems among youth and young adults and alcohol is the most common psychoactive substance used by this age group. A high proportion of alcohol consumed by youth is in the form of binge drinking with its attendant risks of injuries, aggression, violence and increased risk of unsafe sexual practice with the consequence of STIs and unwanted pregnancies. In addition, even for the same number of drinks consumed per drinking occasion, the risk of adverse outcomes from alcohol consumption is greater for youth than for adults. This may be due to several factors, including greater impulsivity and less emotional maturity among youth, lower body mass on average, less experience doing complex tasks that are made more dangerous by alcohol (such as driving) and faster drinking speeds.[99]

Globally, there are gender differences in alcohol-related mortality and morbidity, as well as levels and patterns of alcohol consumption. The percentage of alcohol-attributable deaths among men amounts to 7.7% of all global deaths compared to 2.6% of all deaths among women. Total alcohol per capita consumption in 2016 among male and female drinkers worldwide was on average 19.4 litres of pure alcohol for males and 7.0 litres for females.[100]

With increased alcohol consumption, the health risks increase more steeply for females than for males. Enzymes, genes, lean body weight and size, organ function and metabolism are important in processing alcohol and are affected by sex-related factors. These biological factors enhance the impact of alcohol on females, causing higher blood alcohol levels, faster intoxication, more risk for disease, including breast cancer and more long-term harm, such as liver damage and injury. Nevertheless, men drink more alcohol than women and are more likely to drink in excess. Consequently, they are more likely to be involved in alcohol-impaired driving collisions, to be treated in hospitals and hospitalized for alcohol-related medical emergencies and health problems, to be

[96] Ministry of Health, Government of Bermuda. Steps to a Well Bermuda. *Health Survey of Adults in Bermuda 2014.* Available: https://www.gov.bm/sites/default/files/WELL%20BERMUDA%20HEALTH%20SURVEY%202014_2%20Public%20Version_0.pdf.
[97] Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[98] Department for National Drug Control. *National School Survey 2019.* Available: https://www.gov.bm/sites/default/files/Report-of-the-Survey-of-Middle-and-Senior-School-Students-on-ATOD-2019.pdf.
[99] Canadian Centre on Substance Use and Addiction. *Canada's Guidance on Alcohol and Health: Final Report.* 2023. Available: https://ccsa.ca/sites/default/files/2023-01/Canada%27s%20Guidance%20on%20Alcohol%20and%20Health%20Final%20Report_I.pdf.
[100] World Health Organisation. *Alcohol.* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/alcohol.

diagnosed with an alcohol use disorder and to die from alcohol-related causes. Alcohol is also more strongly associated with perpetration of violence for men than for women. Men are also more likely than women to take other risks (e.g., use of other substances, drive under the influence) that, when combined with alcohol, further increase their likelihood of experiencing and causing alcohol-related harms. Overall, far more injuries, violence and deaths result from men's alcohol use, especially when exceeding more than two standard drinks per occasion.[101]

3.3.4 Race and Ethnicity

Ethnic Group	Current Drinker
Black or African	44.2%
White	69.0%
Portuguese	58.0%
Asian	41.0%
Mixed (Black & White, Black & Other, White & Other)	60.2%
Other	55.7%

Table 3.3.3: Alcohol Use by Ethnic Group, 2021
(SOURCE: Bermuda Department for National Drug Control[102])

Alcohol use varies by ethnic group with 44% of those identifying as Black or African currently consuming alcohol, compared to 69% of those identifying as White and 60% of those identifying as Mixed currently consuming alcohol.

3.3.5 Deprivation and Inequality

Highest Academic Qualification	Current Drinker
None	22.2%
School Leaving Certificate/High School Diploma	51.1%
Technical/Vocational Certificate (Bermuda College)	46.7%
Associate's Degree	59.4%
Bachelor's Degree	65.0%
Master's Degree	60.1%
Doctorate Degree	62.7%
Professional Designation (With or Without Any Prior Academic Qualification)	76.9%
Other	16.7%

Table 3.3.4: Alcohol Use by Highest Academic Qualification, 2021
(SOURCE: Bermuda Department for National Drug Control[103])

Alcohol consumption prevalence varies considerably by academic qualification, with increased levels of alcohol consumption prevalence in those with higher academic qualifications. This may be due to the cost of alcohol being prohibitively expensive for those without academic qualifications who may be on lower incomes.

[101]Canadian Centre on Substance Use and Addiction. *Canada's Guidance on Alcohol and Health: Final Report.* 2023. Available https://ccsa.ca/sites/default/files/2023-01/Canada%27s%20Guidance%20on%20Alcohol%20and%20Health%20Final%20Report_I.pdf.
[102]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[103]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.

However, this data gives no indication of harmful alcohol use (non-current drinkers may have a history of harms from alcohol use).

Employment Status	Current Drinker
Employed/Self-Employed, working 1–39 hours per week	53.1%
Employed/Self-Employed, working 40 or more hours per week	65.1%
Not employed, looking for work	54.0%
Not employed, NOT looking for work (e.g. housewife, student, other)	48.3%
Retired	39.4%
Disabled, not able to work	28.1%
Not Stated	75.6%

Table 3.3.5: Alcohol Use by Employment Status, 2021
(SOURCE: Bermuda Department for National Drug Control[104])

Among respondents, those who work 40 or more hours per week have the highest alcohol consumption prevalence. Again, this may be due to the cost of alcohol being prohibitively expensive for some, as lower levels of alcohol consumption prevalence are seen among those not employed, retired and not able to work.

Harms from a given amount of alcohol and pattern of drinking are higher for poorer drinkers and their families than for richer drinkers in any given society. This greater "harm per litre" is a consistent finding for many different kinds of harms from drinking – e.g., chronic diseases such as liver cirrhosis; injuries from drinking, both to the drinker and to others around the drinker; and infectious diseases where drinking plays a role in vulnerability to or spread of the infection or in disrupting the treatment regime. Within higher-income countries, the socio-economic differences in alcohol-attributable mortality have been found to be about 1.5 to two times the size of those in all-cause mortality.[105]

Socio-economic differences in the impact of alcohol on mortality may be explained, in part, by the effect of socio-economic status on the volume, patterns and context in which alcohol is consumed, on access to quality healthcare and on the clustering of risk factors, such as smoking, obesity and sedentary lifestyles. These risk factors, if they occur together, may have multiplicative effects on health, leading to a higher impact of alcohol on the health of people with lower socio-economic status. For example, after controlling for body mass index and smoking status, it has been observed that people of low socio-economic status are twice as likely to die from an alcohol-attributable cause compared to people of high socio-economic status.[106]

3.3.6 Comparison with Other Areas

Country/Territory	Age	Alcohol Consumption Prevalence
Bermuda	16+	54.0%
USA	18+	54.9%
Canada	15+	78.2%
Barbados	18+	36.2%

Table 3.3.6: Alcohol Use by Country, 2021
(SOURCE: Bermuda Department for National Drug Control[107])

[104]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.
[105]World Health Organisation. *Global status report on alcohol and health 2018.* Available: https://www.who.int/publications/i/item/9789241565639.
[106]World Health Organisation. *Global status report on alcohol and health 2018.* Available: https://www.who.int/publications/i/item/9789241565639.
[107]Department for National Drug Control, Government of Bermuda. *2021 National Household Survey.* Available: https://www.gov.bm/sites/default/files/National_Household_Survey_2021_Report_FINAL.pdf.

It is difficult to compare alcohol consumption in Bermuda to other countries as alcohol use, particularly at levels that are harmful, is measured differently in different countries and will depend on alcohol risk thresholds. This data is self-reported. While it is useful to have data on consumption, current alcohol data makes it difficult to assess the risk of drinking and the prevalence of those who may have an elevated risk for alcohol related harms.

3.4 Healthy Weight, Nutrition and Dietary Intake

Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Body mass index (BMI)[108] is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of their height in meters (kg/m2). For adults, WHO defines overweight as BMI greater than or equal to 25 and obesity is a BMI greater than or equal to 30.[109] Bermuda uses WHO thresholds to define overweight and obesity. Please note that this is a population level measure and may underestimate or overestimate overweight and obesity in different ethnic groups.

Childhood obesity is associated with both ill health in childhood and higher risks of obesity, early death and disability in adulthood. Childhood obesity is a strong predictor of adult obesity.[110]

Raised body mass index (BMI) is a major risk factor for many noncommunicable diseases, including cardiovascular diseases, type 2 diabetes and osteoarthritis. Obesity is associated with reduced life expectancy. It is a risk factor for a range of chronic diseases, including at least 12 kinds of cancer, liver and respiratory disease, and can impact mental health.[111]

The available evidence suggests that increased energy intake – rather than decreased physical activity – is the main driving force behind the obesity epidemic in lower socio-economic groups. The relative culpability of energy intake (food consumption) versus energy expenditure (physical activity) in gaining weight is sometimes debated, but most studies point to overconsumption of energy-dense foods being the main culprit.[112] However, obesity is a complex problem and evidence increasingly shows a complex system of factors at play leading to an increase in obesity including genetics, culture, behaviour and environment.

The obesogenic environment is the context in that an individual lives, works and spends recreational time that promotes high energy intake and sedentary behaviour, leading to obesity. The environment people live in can be one of the greatest challenges to eating healthily. For example, if people are surrounded by foods that are high in sugar, salt or fat, these can become the default choice.[113] Obesogenic environments and availability of healthy food may be particularly difficult in small island states that are highly dependent on imported foods and where the nature of the food supply and pricing are largely determined by trade dynamics.[114]

[108] Although BMI is the simplest means to identify those who are overweight and obese, it does not necessarily identify those with abdominal fat deposits that put them at greater risk of health complications.
[109] World Health Organization. *Obesity and overweight.* 2021. Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
[110] World Health Organization. *Obesity and overweight.* 2021. Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
[111] Department of Health and Social Care, Government of the United Kingdom. *Tackling obesity: empowering adults and children to live healthier lives.* 2020. Available: https://www.gov.uk/government/publications/tackling-obesity-government-strategy/tackling-obesity-empowering-adults-and-children-to-live-healthier-lives.
[112] World Health Organization (Europe). *Obesity and Inequalities.* 2014.
[113] King's Fund. *Tackling obesity: The role of the NHS in a whole-system approach.* 2021. Available: https://www.kingsfund.org.uk/sites/default/files/2021-07/Tackling%20obesity.pdf.
[114] World Health Organization. *Report of the commission on ending childhood obesity.* 2016. Available: https://www.who.int/publications/i/item/9789241510066.

3.4.1 Prevalence

In 2023, an estimated 72% of Bermuda residents self-reported as having a BMI of 25 or greater. This is the proportion of residents who are overweight (including obesity). Of this group, 37% self-reported having a BMI between 25–30 (overweight) and 35% self-reported having a BMI over 30 (obese).[115]

Approximately a third of Bermuda's children are overweight. In 2020/21, 33% of five-year-olds measured were overweight.[116]

Overall, about 13% of the world's adult population were obese in 2016.[117] In 2016, the global average of childhood obesity is just over 18%.[118]

In 2023, the average daily intake of fruit and vegetables by Bermuda residents was 3.8. This is below the recommended five portions of fruit and vegetables recommended as part of one's daily diet to reduce the risk of poor health outcomes. Only 30% of Bermudian adults reported eating five portions of fruit and vegetables daily.

3.4.2 Trend

The global prevalence of obesity nearly tripled between 1975 and 2016.[119] Childhood obesity has increased tenfold in the same period.[120]

In Bermuda, the proportion of the population that is overweight has slightly decreased since last measured in 2014 when 74.6% of adults were found to be above a healthy weight. However, this difference is unlikely to be statistically significant. Of adults surveyed in Bermuda in 2014, 40.2% were overweight and 34.4% were obese.[121]

In 2014, only 18% of Bermuda residents surveyed consumed five or more servings of fruit and/or vegetables per day. That figure has increased significantly to 30% but remains low.

School Year	14–15	15–16	16–17	17–18	18–19	19–20	20–21
Total population	716	703	599	716	563	516	259
Percentage of students screened	97% (697)	99% (697)	99% (593)	84% (600)	98% (553)	87% (451)	99% (257)
Percentage of screened who are overweight BMI >85	22% (156)	22% (154)	25% (149)	32% (191)	31% (174)	28% (127)	33% (86)

Table 3.4.1: Percentage of Five-Year-Olds That Are Overweight (SOURCE: Bermuda Department of Health[122])

In Bermuda, the proportion of five-year-olds who are overweight has increased from less than a quarter (22%) when measurements began in 2014–15 to approximately a third of children in recent years (see table 3.4.1).[123]

[115]Department of Health, Government of Bermuda. Bermuda Omnibus Pulse Survey January 2023. Unpublished. Narrative Research Bermuda.
[116]Department of Health, Government of Bermuda. Child Health Obesity Data. Unpublished. Please note: The 2020/21 data did not include all schools and therefore may not be representative.
[117]World Health Organization. *Obesity and overweight.* 2021. Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
[118]World Health Organization. *Obesity and overweight.* 2021. Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
[119]World Health Organization. Obesity and overweight. 2021. Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
[120]NCD Risk Factor Collaboration (NCD-RisC). *Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. Lancet* 2017; 390: 2627–42. Available: https://doi.org/10.1016/S0140-6736(17)32129-3
[121]Ministry of Health, Government of Bermuda. Steps to a Well Bermuda. *Health Survey of Adults in Bermuda 2014.* Available: https://www.gov.bm/sites/default/files/WELL%20BERMUDA%20HEALTH%20SURVEY%202014_2%20Public%20Version_0.pdf
[122]Department of Health, Government of Bermuda. *Child Health Obesity Data.* Unpublished. Please note: The 2020/21 data did not include all schools and therefore may not be representative.
[123]Department of Health, Government of Bermuda. *Child Health Obesity Data.* Unpublished. Please note: The 2020/21 data did not include all schools and therefore may not be representative.

3.4.3 Age and Gender

BMI	Male	Female
BMI ≥ 25 (overweight including obesity)	71.3%	71.7%
BMI 25–30 (overweight)	37.4%	36.1%
BMI ≥ 30 (obese)	33.9%	35.6%

Table 3.4.2: BMI by Gender, 2023
(SOURCE: Bermuda Department of Health[124] [125])

There are no significant differences in overweight or obesity by gender in Bermuda.

Obesity in women during pregnancy contributes to the health risks of their children and this amplifies health inequities across generations. Mothers in lower socio-economic groups are more likely to be overweight and less likely to breastfeed. Infants who are not breastfed and who are born to obese mothers with low socio-economic status are more likely to have poor eating habits and become overweight.[126] Paternal obesity can also contribute to a greater risk of obesity in the child through epigenetic mechanisms.[127]

Age Range	BMI ≥ 25 (Overweight Including Obesity)	BMI 25–30 (Overweight)	BMI ≥ 30 (Obese)
18–34	73.3%	44.4%	28.9%
35–64	75.2%	36.8%	38.4%
65+	61.8%	33.7%	28.1%

Table 3.4.3: BMI by Age Range, 2023
(SOURCE: Bermuda Department of Health[128])

In Bermuda, those aged 35–64 had the highest levels of overweight (including obesity) and only obesity. This is similar to other countries.[129] [130]

Fruit and Vegetable Intake	Male	Female
5+ fruit and vegetables daily	24.8%	33.8%

Table 3.4.4: Fruit and Vegetable Intake by Gender, 2023
(SOURCE: Bermuda Department of Health[131])

In 2023, women in Bermuda were significantly more likely to consume at least five portions of fruit and vegetables daily compared to men.

Age Range	5+ Fruits and Vegetables Daily
18–34	33.3%
35–64	31.0%
65+	25.3%

Table 3.4.5: Fruit and Vegetable Intake by Age Range, 2023
(SOURCE: Bermuda Department of Health[132])

[124] Department of Health, Government of Bermuda. Bermuda Omnibus Pulse Survey January 2023. Unpublished. Narrative Research Bermuda.
[125] Department of Health, Government of Bermuda. Bermuda Omnibus Pulse Survey January 2023. Unpublished. Narrative Research Bermuda.
[126] World Health Organization (Europe). Obesity and Inequalities. 2014.
[127] World Health Organization. Report of the commission on ending childhood obesity. 2016. Available: https://www.who.int/publications/i/item/9789241510066.
[128] Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[129] Centers for Disease Control. *Adult Obesity Facts.* Not dated. Available: https://www.cdc.gov/obesity/data/adult.html.
[130] Baker C. *Obesity statistics.* 2023. Available: https://researchbriefings.files.parliament.uk/documents/SN03336/SN03336.pdf.
[131] Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[132] Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.

Fruit and vegetable consumption decreases with age with only 25% of older Bermuda residents aged 65 and over consuming at least five portions of fruit and vegetables per day. Younger adults aged 18–34 are more likely to consume at least five portions of fruit and vegetables a day but this intake at 33% is nevertheless low.

3.4.4 Race and Ethnicity

Ethnic Group	BMI ≥ 25 (Overweight Including Obesity)	BMI 25–30 (Overweight)	BMI ≥ 30 (Obese)
Black	75.0%	38.2%	36.8%
White	62.2%	31.9%	30.3%
Mixed and Other	80.4%	41.3%	39.1%

Table 3.4.6: BMI by Ethnic Group, 2023
(SOURCE: Bermuda Department of Health[133])

There are some differences in BMI across ethnic groups, however, there is a high prevalence of overweight and obesity across all ethnicities. White Bermuda residents report the lowest level of overweight and obesity, while Mixed Bermuda residents report the highest level of overweight and obesity.[134]

People with a South Asian, Chinese, other Asian, Middle Eastern, Black African or African-Caribbean family background are prone to central adiposity and their cardiometabolic risk occurs at lower BMI.[135] The National Institute of Health and Care Excellence recommends using lower BMI thresholds as a practical measure of overweight and obesity for these ethnic groups. For the purposes of the JSNA, the analysis is based on WHO clinical thresholds, however, different measures of obesity should be considered in a clinical setting.

Ethnic Group	5+ Fruits and Vegetables Daily
Black	30.2%
White	34.1%
Mixed and Other	20.0%

Table 3.4.7: Fruit and Vegetable Intake by Ethnic Group, 2023
(SOURCE: Bermuda Department of Health[136])

Those who identify as from Mixed and Other ethnic groups are the least likely to consume at least five portions of fruit and vegetables per day. White Bermuda residents are the most likely to consume at least five portions of fruit and vegetables per day at 34%, but this intake is still low.

[133]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023*. Unpublished. Narrative Research Bermuda.
[134]NB: The sample size of survey respondents who identify as Mixed or Other was small and therefore results may be due to small numbers.
[135]National Institute for Health and Care Excellence. 2014. *Recommendations: Obesity: identification, assessment and management*. Available: https://www.nice.org.uk/guidance/cg189/chapter/Recommendations.
[136]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023*. Unpublished. Narrative Research Bermuda.

3.4.5 Deprivation and Inequality

Income Group	BMI ≥ 25 (Overweight Including Obesity)	BMI 25–30 (Overweight)	BMI ≥ 30 (Obese)
< $75,000	70.5%	35.6%	34.9%
$75,000–$150,000	72.8%	33.17%	39.7%
> $150,000	76.1%	41.3%	34.8%

Table 3.4.8: BMI by Income, 2023
(SOURCE: Bermuda Department of Health[137])

There are some differences in BMI across income groups, however, there remains high levels of overweight and obesity regardless of income. Interestingly, those with the lowest income (less than $50,000 annual) self-report the lowest levels of overweight (including obesity), overweight only and obesity only. For BMI 25–30 (overweight only), there is a positive linear relationship between income and BMI. This is unexpected as higher BMI is associated with lower income levels.[138]

Evidence has found that countries with higher income inequality have higher levels of obesity, especially in children. Low socio-economic groups appear to be around two times more likely to become obese. There is a strong relationship between obesity and low socio-economic status, especially for women; women with lower levels of education can be up to five times more likely to be obese than those with higher education.[139]

Income Group	5+ Fruits and Vegetables Daily
< $75,000	26.1%
$75,000–$100,000	31.2%
> $150,000	33.7%

Table 3.4.9: Fruit and Vegetable Intake by Income, 2023
(SOURCE: Bermuda Department of Health[140])

There is a positive linear relationship between fruit and vegetable consumption and income, with increasing income associated with being more likely to consume at least five portions of fruit and vegetables daily. In Bermuda, where much of the food is imported and can be expensive, the cost of fruit and vegetables may be a prohibitive factor barring those without the financial means from meeting recommended guidelines on healthy eating.

However, the barriers to eating healthily are not just about income and choice; there are other psychosocial factors associated with deprivation and poverty that make eating healthily harder. Living in poverty or ongoing food insecurity is associated with high levels of stress, meaning people may not have the mental energy to make choices or dedicate time and effort to cooking and preparing food that is nutritionally balanced.[141]

[137]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[138]World Health Organization (Europe). *Obesity and Inequalities.* 2014.
[139]World Health Organization (Europe). *Obesity and Inequalities.* 2014.
[140]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[141]King's Fund. *Tackling obesity: The role of the NHS in a whole-system approach.* Available: https://www.kingsfund.org.uk/sites/default/files/2021-07/Tackling%20obesity.pdf.

3.4.6 Comparison with Other Areas

Country/Territory	Year	Overweight	Obese
Bermuda[142]	2023	37%	35%
England[143]	2021	38%	26%
USA[144]	2018	31%	42%
Global[145]	2016	39%	13%

Table 3.4.10: Percentage of Adults that are Overweight and Obese by Comparator Areas (SOURCES: See Table's Footnotes)

Bermuda has similar levels of adults above a healthy weight (BMI greater than 25) compared with the USA, which is the highest in the world among high income countries. While Bermuda has lower levels of obesity compared to the USA, Bermuda has higher levels of overweight adults compared to the USA. While Bermuda has similar levels of overweight adults compared to England and the global average, Bermuda has significantly higher rates of obesity compared to England and the global average.

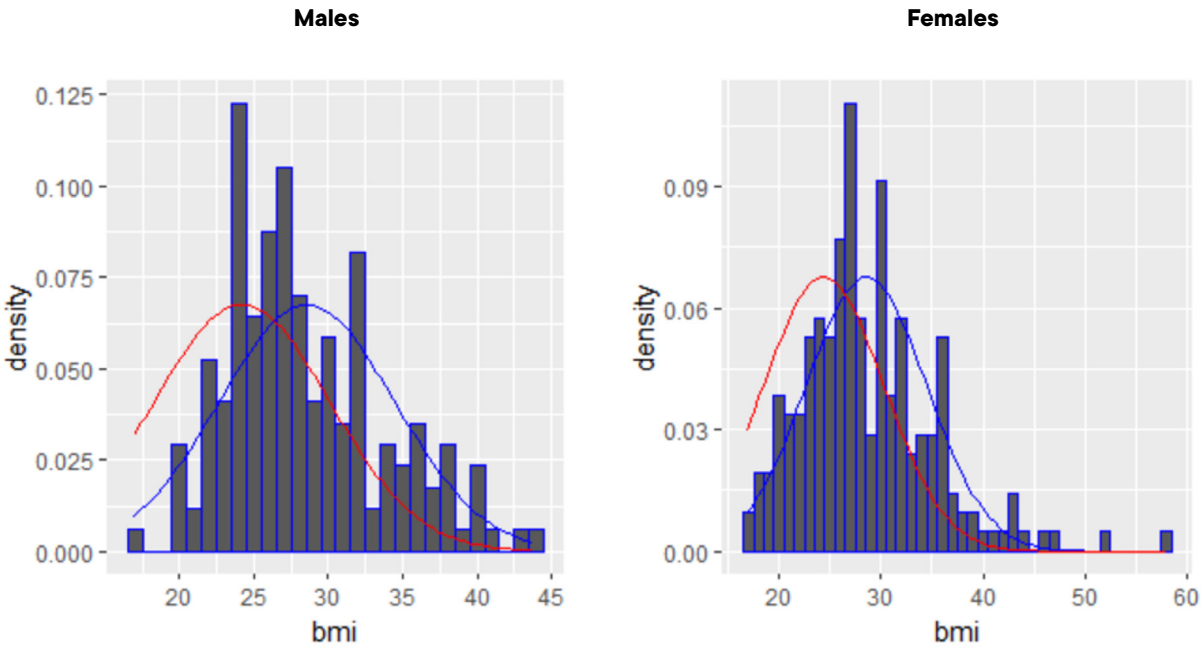


Figure 3.4.1: Histogram of BMI Distribution in Bermuda's Population (SOURCE: Bermuda Department of Health[146])

The above histograms show BMI distribution across the population, with the majority of the population clustered around the overall average BMI (mean = 28.6). It also shows that Bermuda has 'outliers'; that is, people with extremely high BMIs. Women have more extreme outliers than men. The bars show the frequency of each BMI, the blue line is the Bermuda normal distribution curve and the red line is the global normal distribution curve. Bermuda's distribution curve skews to the right, which indicates a higher proportion of the population who are overweight and obese.

[142]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[143]Baker C. Obesity statistics. Available: https://researchbriefings.files.parliament.uk/documents/SN03336/SN03336.pdf.
[144]US Department of Health and Human Services. *Overweight & Obesity Statistics.* Available: https://www.niddk.nih.gov/health-information/health-statistics/overweight-obesity.
[145]World Health Organization. *Obesity and overweight.* Available: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
[146]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.

3.5 Physical Activity and Exercise

The WHO defines physical activity as 'any bodily movement produced by skeletal muscles that requires energy expenditure'. Physical activity can be done at a variety of intensities and accumulated through participation in sport, walking, cycling, active recreation and play, and through work, domestic chores, transportation and leisure time. Physical inactivity is defined as doing insufficient physical activity to meet current physical activity recommendations. Sedentary behaviour is defined as any waking behaviour while in a sitting, reclining or lying posture with low energy expenditure.[147]

Regular physical activity is a key protective factor for the prevention and management of NCDs. Physical activity has a number of benefits to health and well-being. WHO outlines the following benefits associated with physical activity:[148]

- Being active contributes to the maintenance of healthy weight and general well-being.
- About 7–8% of all cases of cardiovascular disease, depression, and dementia could be prevented if people were more active.
- 5% of type–2 diabetes cases could be prevented if people were more active.
- Those who meet recommended levels of physical activity have a 20–30% reduced risk of premature death.
- Being active reduces the risk of developing several cancers (including breast and colon cancer).
- Being active enhances brain health, including cognitive function.
- Being active strengthens muscles and bones.
- Being active helps prevent falls among older adults.
- Physical activity reduces symptoms of depression and anxiety.
- Physical activity improves children's educational attainment.

Enabling more people to be more active not only benefits population health and well-being, it also brings societal, environmental and economic co-benefits. For example, walking and cycling can reduce air and noise pollution and contribute to healthy environments, while increased participation in sport can help bring communities together and build valuable life skills in individuals.

The economic burden of physical inactivity is large. Globally, almost 500 million new cases of preventable NCDs will occur between 2020 and 2030, incurring treatment costs of just over US$300 billion or around US$27 billion annually if there is no change in the current prevalence of physical inactivity. Nearly half of these new cases of NCDs (47%) will result from hypertension and 43% will result from depression. While three quarters of all cases will occur in lower- and upper-middle-income countries, the largest economic cost is set to occur among high-income countries like Bermuda. It is expected that 70% of healthcare expenditure will be used for treating illness resulting from physical inactivity.[149]

Bermuda does not have guidelines on physical activity. WHO recommends the following physical activity guidelines:[150]

[147]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.
[148]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.
[149]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.
[150]World Health Organisation. *WHO guidelines on physical activity and sedentary behaviour.* Available: https://apps.who.int/iris/bitstream/handle/10665/336656/9789240015128-eng.pdf?sequence=1&isAllowed=y.

Children and adolescents aged 5–17 years	• should do at least an average of 60 minutes per day of moderate-to-vigorous intensity, mostly aerobic, physical activity, across the week • should incorporate vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone, at least three days a week • should limit the amount of time spent being sedentary, particularly the amount of recreational screen time
Adults aged 18–64 years	• should do at least 150–300 minutes of moderate-intensity aerobic physical activity • or at least 75–150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week • should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on two or more days a week, as these provide additional health benefits • may increase moderate-intensity aerobic physical activity to more than 300 minutes; or do more than 150 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for additional health benefits • should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits. • To help reduce the detrimental effects of high levels of sedentary behaviour on health, all adults and older adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity.
Adults aged 65 years and above	• should follow the same guidelines as for adults aged 18–64 years • As part of their weekly physical activity, older adults should do varied multicomponent physical activity that emphasises functional balance and strength training at moderate or greater intensity, on three or more days a week, to enhance functional capacity and to prevent falls.

For further information, including recommendations for infants and children under five-years old, people with disabilities and pregnant women and postpartum mothers, please see **WHO Guidelines on Physical Activity and Sedentary Behaviour**.

3.5.1 Prevalence

In 2023, 78.8% of Bermuda residents report meeting WHO recommendations for physical activity and 21.2% report insufficient physical activity.

Globally, 27.5% of the population achieves insufficient physical activity according to WHO recommended guidelines. That increases to 36.8% in high-income countries.[151]

[151]Guthold R et al. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. *Lancet Glob Health* 2018; 6: e1077–86.

International data during the COVID–19 pandemic revealed the vital importance of regular physical activity for both mental and physical health. Walking and cycling became essential forms of exercise as well as a form transport for short trips. Access to public open spaces was essential and provided opportunities to be active outdoors when sport and exercise facilities were closed. These factors were critical in helping people to manage stress and maintain physical health through times of national constraints and movement restrictions in response to COVID–19. However, the pandemic also exposed and exacerbated existing inequities in access and opportunities for some communities to be physically active. School closures denied many children one of the opportunities they had to be active in communities where options for physical activity, sport and recreation are absent or inaccessible. The pandemic highlighted how many people live in communities where streets are poorly designed and unsafe for walking and cycling and where there is limited access to public open spaces or affordable exercise or sport facilities that meet their needs.[152]

The pandemic has had a permanent impact on physical activity in that more people are working from home leading to less opportunity for physical activity through active travel. In 2021, 32% of residents surveyed were continuing to work remotely from home for all (12%) or part (21%) of their working week.[153]

3.5.2 Trends

In 2014, 27% of adult Bermuda residents reported not meeting WHO guidelines for physical activity. 37% engaged in low levels of physical activity, 24% in moderate levels of physical activity and 39% in high levels of physical activity.[154]

The recent 2023 survey indicates that Bermuda residents are reporting higher levels of physical activity compared to 2014 (79% vs 73%).

3.5.3 Age and Gender

Physical Activity	Male	Female
Meet WHO guidelines for physical activity	86.1%	73.0%
Insufficient physical activity	13.9%	27.0%

Table 3.5.1: Physical Activity by Gender, 2023
(SOURCE: Bermuda Department of Health[155])

Globally, there is evidence that women are less active than men.[156] This was reflected in a recent survey of Bermuda residents that found that 86% of men achieve WHO guidelines for physical activity compared to only 73% of women. This results in a significant gender disparity in Bermuda residents achieving insufficient physical activity: women are nearly twice as likely to be physically inactive compared to men.

[152]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.
[153]Department of Statistics, Government of Bermuda. *Labour Force Survey Report 2020.* Available: https://www.gov.bm/sites/default/files/November%202020%20Labour%20Force%20Survey%20%20Report.pdf.
[154]Ministry of Health, Government of Bermuda. Steps to a Well Bermuda. *Health Survey of Adults in Bermuda 2014.* Available: https://www.gov.bm/sites/default/files/WELL%20BERMUDA%20HEALTH%20SURVEY%202014_2%20Public%20Version_0.pdf.
[155]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[156]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.

Age Range	Meet WHO Guidelines for Physical Activity	Insufficient Physical Activity
18–34	87.2%	12.8%
35–64	78.6%	21.4%
65+	75.0%	25.0%

Table 3.5.2: Physical Activity by Age Range, 2023
(SOURCE: Bermuda Department of Health[157])

Globally, both women and men become less active as they get older, despite clear evidence that being active benefits older adults in relation to preventing falls, remaining independent, reducing isolation and maintaining social links to improve psychosocial health.[158] In adolescence, young people are far less active than might be expected. The most recent global data reveal that the majority (81%) of boys and girls aged 11–17 years spend less than one hour a day doing moderate- to vigorous-intensity physical activity; in most countries, more girls are inactive than boys (85% and 78% respectively). Where modest improvements in physical activity levels for adolescents have been achieved, they have been among boys rather than girls, further entrenching the sex differences in physical activity that persist throughout the life-course.[159]

Physical activity levels begin to significantly decrease between ages 11 and 15 in most European countries, especially in girls. Boys continue to be significantly more active, suggesting that the opportunities to participate in physical activity may be gender biased in favour of boys. For example, activities that centre on competition and ability capture boys' interest, whereas girls focus more on health and fitness and this continues into adulthood.[160]

In Bermuda, 87% of younger adults aged 18–34 reported meeting WHO guidelines for physical activity, compared to 79% of 35– to 64–year olds and 75.0% of residents aged 65 and older.

3.5.4 Race and Ethnicity

Ethnic Group	Meet Who Guidelines for Physical Activity	Insufficient Physical Activity
Black	71.5%	28.5%
White	87.3%	12.7%
Mixed and Other	91.3%	8.7%

Table 3.5.3: Physical Activity by Ethnic Group, 2023
(SOURCE: Bermuda Department of Health[161])

Those who identify as Black report the lowest levels of physical activity compared to all other groups. There are significant differences in those achieving insufficient physical activity, with nearly a third (28.5%) of Black Bermuda residents reporting that they do not meeting WHO recommended guidelines for physical activity compared to only 4% of residents who identify as from an Other ethnic group.

[157]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[158]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.
[159]World Health Organisation. *Global status report on physical activity 2022.* Available: https://www.who.int/publications/i/item/9789240059153.
[160]World Health Organisation (Europe). *Obesity and Inequities.* 2014.
[161]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.

3.5.5 Deprivation and Inequality

Income Group	Meet Who Guidelines for Physical Activity	Insufficient Physical Activity
< $75,000	72.2%	27.8%
$75,000–$150,000	83.3%	16.7%
> $100,000	84.4%	15.6%

Table 3.5.4: Physical Activity by Income, 2023
(SOURCE: Bermuda Department of Health[162])

In Bermuda, physical activity has a positive linear relationship with income, with residents at a higher income more likely to meet WHO recommendations for physical activity.

Globally, low socio-economic groups are likely to have a more sedentary lifestyle.[163] The reasons for lower levels of physical activity in more deprived areas are multifactorial, cutting across economic, social, geographic and cultural factors. For example, levels of income will affect the relative affordability of accessing sports facilities or exercise classes, while a lack of access to green space or safe green space, can be a significant deterrent to physical exercise. As is the case with diet, some of the psychosocial factors associated with living in poverty can lead to high levels of stress, meaning that people may not have the mental energy to make choices or dedicate time and effort to exercise and will make prioritising physical activity difficult.[164]

3.5.6 Comparison with Other Areas

From self-reported survey data, Bermuda has higher physical activity levels compared to other high-income countries.

Country/Territory	Insufficient Physical Activity
Bermuda	21.2%
Barbados	42.9%
Canada	28.6%
UK	35.9%
USA	40.0%
High-income countries	36.8%
Global	27.5%

Table 3.5.5: Insufficient Physical Activity by Comparison Area
(SOURCE: WHO[165])

3.6 Air Pollution

Long-term exposure to air pollution can cause chronic conditions such as cardiovascular and respiratory diseases as well as lung cancer, leading to reduced life expectancy. Air pollution is a complex mix of particles and gases of both natural and human origin. Particulate matter (PM) and nitrogen dioxide (NO2) are both major components of urban air pollution. Currently, there is no clear evidence of a safe level of exposure below which there is no risk of adverse health effects. Therefore, further reduction of PM or NO2 concentrations below air quality standards is likely to bring additional health benefits.[166]

[162]Department of Health, Government of Bermuda. *Bermuda Omnibus Pulse Survey January 2023.* Unpublished. Narrative Research Bermuda.
[163]World Health Organisation. *Obesity and Inequities.* 2014.
[164]King's Fund. *Tackling obesity: The role of the NHS in a whole-system approach.* Available: https://www.kingsfund.org.uk/sites/default/files/2021-07/Tackling%20obesity.pdf.
[165]World Health Organisation. *Global Health Observatory.* Available: https://www.who.int/data/gho/data/indicators/indicator-details/GHO/prevalence-of-insufficient-physical-activity-among-adults-aged-18-years-(age-standardized-estimate)-(-).
[166]Public Health England. *Health matters: air pollution.* Available: https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution.

PM is a generic term used to describe a complex mixture of solid and liquid particles of varying size, shape and composition. The main sources of man-made PM are the combustion of fuels (by vehicles, industry and domestic properties) and other physical processes such as tyre and brake wear. Natural sources include wind-blown soil and dust, sea spray particles and fires involving burning vegetation.

PM is often classified by aerodynamic size and referred to as:

- coarse particles (PM10; particles that are less than 10 microns (μm) in diameter)
- fine particles (PM2.5; particles that are less than 2.5 μm in diameter)
- ultrafine particles (PM0.1; particles that are less than 0.1 μm in diameter)

The size of particles and the duration of exposure are key determinants of potential adverse health effects. Particles larger than 10 μm are mainly deposited in the nose or throat, whereas particles smaller than 10 μm pose the greatest risk because they can be drawn deeper into the lung. The strongest evidence for effects on health is associated with fine particles (PM2.5).

There is an extensive body of evidence that long-term exposure to PM increases mortality and morbidity from cardiovascular and respiratory diseases. Outdoor air pollution, particularly from PM, has also been classified by the International Agency for Research on Cancer (IARC) as carcinogenic to humans (a Group 1 carcinogen) and causing lung cancer.[167]

Short-term exposure to NO2, particularly at high concentrations, is a respiratory irritant that can cause inflammation of the airways leading to cough, production of mucus and shortness of breath. Studies have shown associations of NO2 in outdoor air with reduced lung development and respiratory infections in early childhood and effects on lung function in adulthood.

Epidemiological studies have also shown associations of outdoor NO2 with adverse effects on health, including reduced life expectancy. It has been unclear whether these effects are caused by NO2 itself, or by other pollutants emitted at the same time by sources such as road traffic. SO2 (sulfur dioxide) has an irritant effect on the lining of the nose, throat and airways and the effects are often felt very quickly.[168]

European Directive limits on air pollution are as follows:[169]

- **PM10:** 40 μg/m3 (annual mean); 50 μg/m3 (24–hour mean) not to be exceeded more than 35 times a year
- **PM2.5:** 20 μg/m3 (annual mean)
- **NO2:** 40 μg/m3 (annual mean); 200 μg/m3 (one-hour mean) not to be exceeded more than 18 times a year
- **SO2:** 125 μg/m3 (24 hour mean) not to be exceeded more than three times a year; 350 μg/m3 (one-hour mean) not to be exceeded more than 24 times a year

[167]Public Health England. *Health matters: air pollution.* Available: https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution.
[168]Public Health England. *Health matters: air pollution.* Available: https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution.
[169]UK Department for Environment Food and Rural Affairs. UK AIR. *National air quality objectives and European Directive limit and target values for the protection of human health.* Not dated. Available: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf [accessed 14th March 2023].

Component of Air Pollution	Year			
	2016	2017	2018	2019
NO2 (mg/Nm3)	274.4	242.9	322.7	353.3
SO2 (mg/Nm3)	36.5	43.8	1.7	69.4
Particulate Matter (mg/Nm3)	3.9	8.1	2.8	39.6

Table 3.6.1: Annual Air Emissions from Tynes Bay Waste-To-Energy Incinerator, 2020 (SOURCE: Bermuda Department of Statistics[170])

In 2019, the highest concentrated pollutant of air emissions from the Tynes Bay Waste-to-Energy Incinerator was NO2 (353.3 mg/Nm3). All pollutants increased from their previous year levels.

Bermuda contains five ambient air monitoring sites that are located across the Island. The maximum daily concentrations for the ambient air monitoring sites recorded pollutant concentration levels, which were below Bermuda's pollutant thresholds, except for PM10, which breached the Clean Air Regulation limit in August 2019.[171]

3.7 Disaster Preparedness and Climate Change

Bermuda's hurricane season typically runs from June to November. To manage the challenges created by hurricanes, Bermuda has developed a sophisticated disaster risk reduction and mitigation (coordinated by the Disaster Risk Reduction and Mitigation (DRRM) Team) and disaster response capabilities (coordinated by the Emergency Measures Organisation (EMO)). The Ministry of Health's Health Disaster Coordinator works closely with both organisations.

Climate change has the potential to impact the health of Bermuda, through long-term meteorological changes and the consequent impact of disasters. Whilst disaster preparedness and climate change will continue to impact health, they are not in the scope of the JSNA. The Ministry of Health will continue to work with both the DRRM and EMO to ensure that the effects of climate change are incorporated into disaster preparedness and the Public Health Preparedness and Response Plan.

3.8 Implications for Health Needs

The prevalence of smokers in Bermuda is lower than other areas of the world, but among those who smoke the number of cigarettes consumed is higher. Approximately 9.7% of Bermuda residents self-report as current smokers. There are significant differences in smoking prevalence across gender, ethnicity, educational attainment and employment status. This will lead to differences in the health outcomes associated with smoking across different groups.

54% of Bermuda residents report consuming alcohol. However, it is difficult to assess the level of high-risk drinking as Bermuda lacks alcohol consumption guidance and data is not currently being collected to determine the percentage of the population whose drinking poses low, moderate, or high risks to health.

[170]Department of Statistics, Government of Bermuda. *Environmental Statistics Compendium 2021.* Available: https://www.gov.bm/sites/default/files/2021-Environmental-Statistics-Compendium.PDF Please note: The data is captured through isokinetic sampling over a two-day period each year and is reported normalised to 11% oxygen.
[171]Department of Statistics, Government of Bermuda. *Environmental Statistics Compendium 2021.* Available: https://www.gov.bm/sites/default/files/2021-Environmental-Statistics-Compendium.PDF

A high proportion of adults in Bermuda are overweight or obese. Residents have a comparable level of overweight adults to the USA, which has one of the highest levels of overweight and obesity in the world. Bermuda residents are at increased risk of the health outcomes associated with obesity, including diabetes, cardiovascular disease and cancer.

Few Bermuda residents are meeting nutritional guidelines to consume at least five fruit and vegetables per day. Given the protective factor of fruit and vegetable consumption, they are at increased risk of the conditions associated with poor nutrition.

A high proportion of (self-reporting) Bermuda residents are meeting WHO recommendations for physical activity compared to other high-income countries. There are significant differences in physical activity attainment, with men more likely to achieve physical activity recommendations compared to women.

Chapter 4: Mortality and Morbidity

4.1 Introduction to Mortality and Morbidity

Understanding the major causes of death (mortality) and ill health (morbidity) in Bermuda is vital to assessing the disease burden and to respond to the corresponding health needs. It will inform the development of Bermuda-centric public health policy, health promotion programmes and health service planning.

The data for this chapter comes from multiple sources. The most common ones are:

- Bermuda Health Council
- Bermuda Hospitals Board (BHB, including Bermuda National Tumour Registry)
- Department of Health
- Epidemiology and Surveillance Unit (ESU), Office of the Chief Medical Officer

As discussed in Chapter 1 (Introduction), where possible, ESU data has been age-standardised using the WHO Standard Population to enable more accurate comparisons of health indicators over time.[172]

Ideally, information relating to health conditions is taken from reliable population-wide data sources, such as disease registries, surveillance systems or linked health information systems using routine data. This information can be used to calculate basic epidemiological indicators such as incidence (number of new cases of disease) and prevalence (all cases of disease at a particular time point or time period). Bermuda has population-wide data collection systems in the following areas:

- **Mortality** – ESU has a registry of all deaths up to 2021, with International Classification of Disease (ICD)[173] cause-of-death information available up to 2019.
- **Communicable diseases** – ESU hosts an island-wide communicable disease surveillance system and there is a statutory duty to report specific notifiable diseases under the Public Health Act 1949.
- **Cancer** – BHB hosts the Bermuda National Tumour Registry.

4.2 Mortality

4.2.1 All-Cause Mortality and Potential Years of Life Lost

Figure 4.2.1 shows that the number of annual deaths in Bermuda has ranged from a low of 422 in 2012 to a high of 727 in 2021. This count is useful from a health service planning perspective (particularly palliative care), but any year-to-year changes could be due to differences in the age of the population, as outlined in Chapter 2. Time series graphs have used a three-year rolling average trend line to smooth out short-term variation and highlight longer-term trends.

[172]The Epidemiology and Surveillance Unit (ESU) also holds the primary data used in the JSNA (for figures that reference the ESU as the data source) with crude rates and standardised rates using the following standard populations (Segi World Standard, WHO World Standard and OECD Standard).

[173]WHO. *International Statistical Classification of Diseases and Related Health Problems (ICD).* 2022. Available: https://www.who.int/standards/classifications/classification-of-diseases.

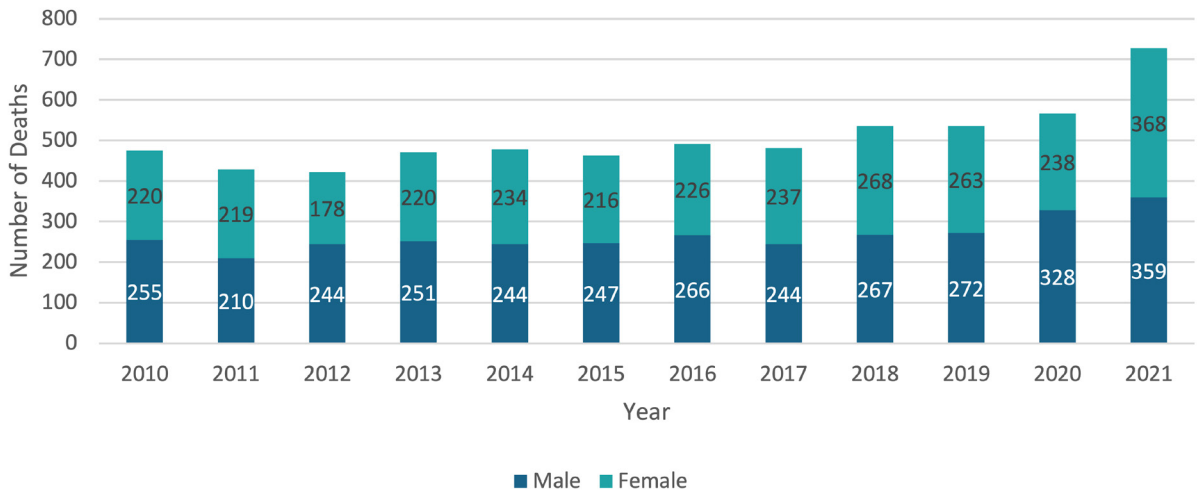


Figure 4.2.1: Number of Deaths, 2010–2021, in Bermuda
(SOURCE: Bermuda Epidemiology and Surveillance Unit)

Age-standardised all-cause mortality (Figure 4.2.2) gives greater insight into mortality trends over the past decade. The overall mortality rate has been relatively flat up to 2020, with some indication of a decrease in the age-standardised mortality rate in men. However, 2021 saw a rise in both male and female all-cause mortality, likely relating to direct and indirect deaths of the COVID–19 pandemic. ESU disease-specific mortality information based on ICD criteria is only available until 2019, meaning it is not possible to assess whether the increased mortality is related to diseases associated with COVID–19. Following ESU collection and analysis of disease-specific mortality data for the period of the COVID–19 pandemic, it is recommended that an in-depth review be carried out to understand the direct and indirect impact of COVID–19 on the causes of mortality.

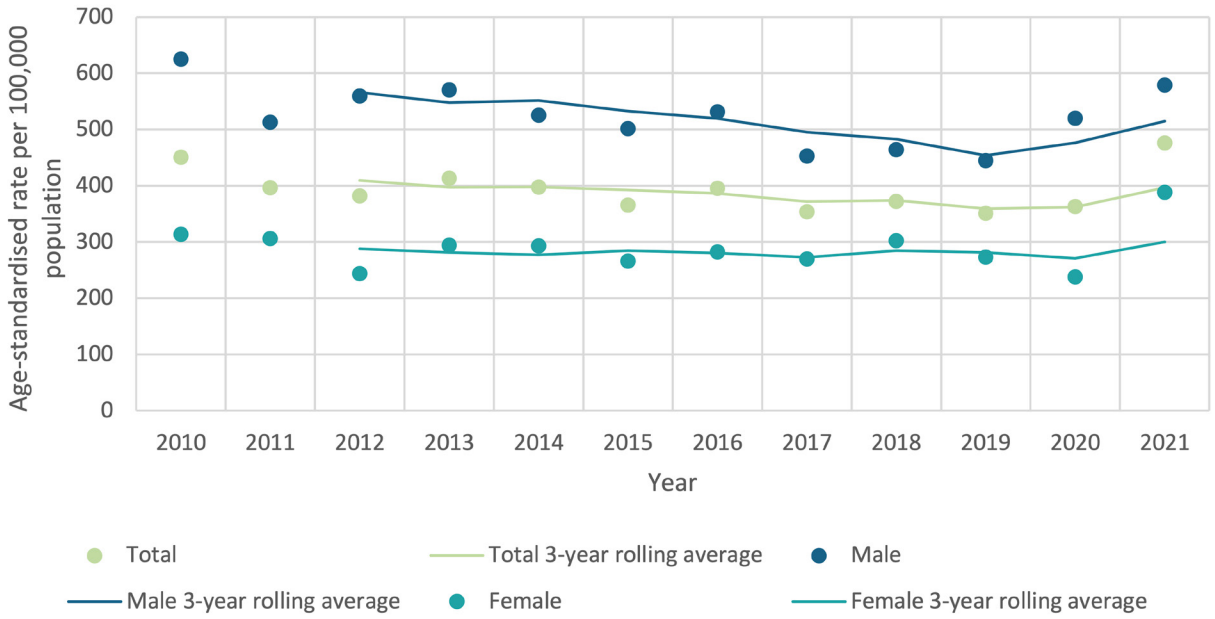


Figure 4.2.2: Age-Standardised All-Cause Mortality Rates Per 100,000 Population in Bermuda, 2010–2021, with Three-Year Rolling Average Trend Line
(SOURCE: Bermuda Epidemiology and Surveillance Unit)

Potential years of life lost is an indicator that gives a summary measure of premature mortality, providing an explicit way of weighting deaths occurring at younger ages that may be preventable. The potential years of life lost are calculated by totalling deaths occurring at each age and multiplying this with the number of remaining years up to a selected age limit. The JSNA has used the OECD age limit of 75.

Potential years of life lost information is shown in Figure 4.2.3, ranging from a low of 4,049 potential years of life lost in 2019 to a high of 6,732 potential years of life lost in 2021, which again, is likely an indication of premature mortality associated with COVID–19.

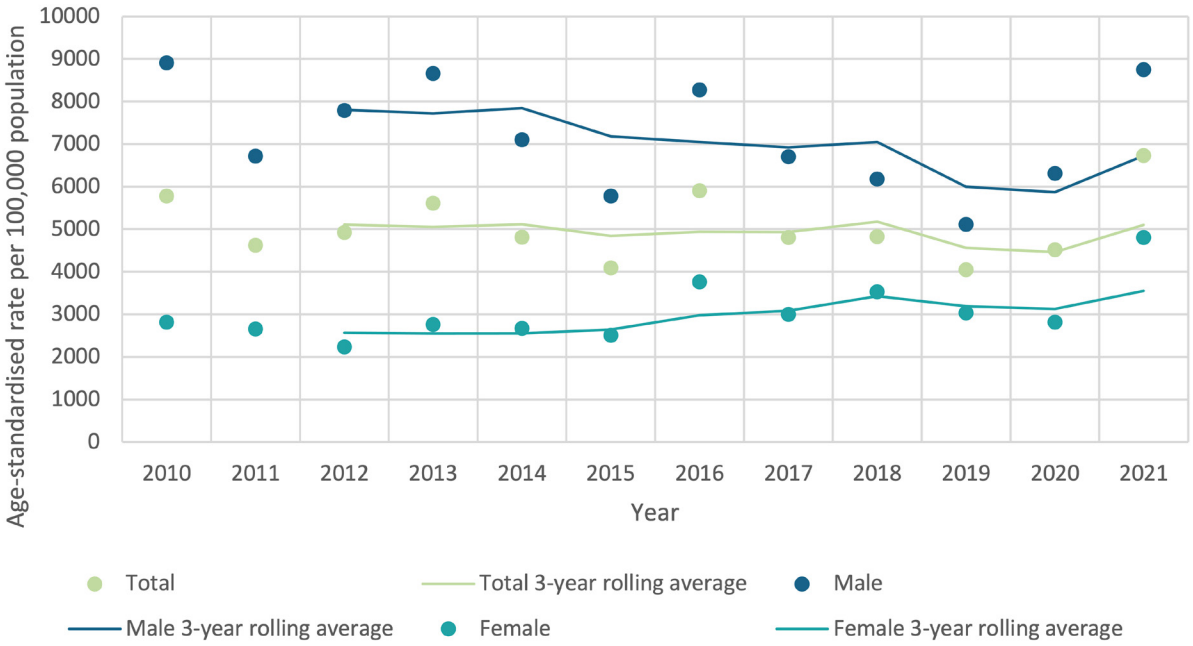


Figure 4.2.3: Age-Standardised Potential Years of Life Lost Per 100,000 Population in Bermuda aged 0–75, 2010–2021, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Figure 4.2.4 shows Bermuda's potential years of life lost compared to other OECD countries in 2020.[174] Bermuda ranks 10 out of 20 OECD countries for potential years of life lost in 2020, comparable with the UK and Germany, and indicating that Bermuda is not an outlier among OECD countries. Potential years of life lost should continue to be monitored to understand potential reasons for premature deaths, particularly given the spike in all-cause deaths in 2021 and policies and services that should be put in place to reduce potentially avoidable deaths.

[174]Comparison with OECD countries that have data available for 2020. NB: Age-standardisation using OECD standard population. See OECD. *Potential years of life lost (indicator).* 2023 https://doi.org/10.1787/bd12d298-en.

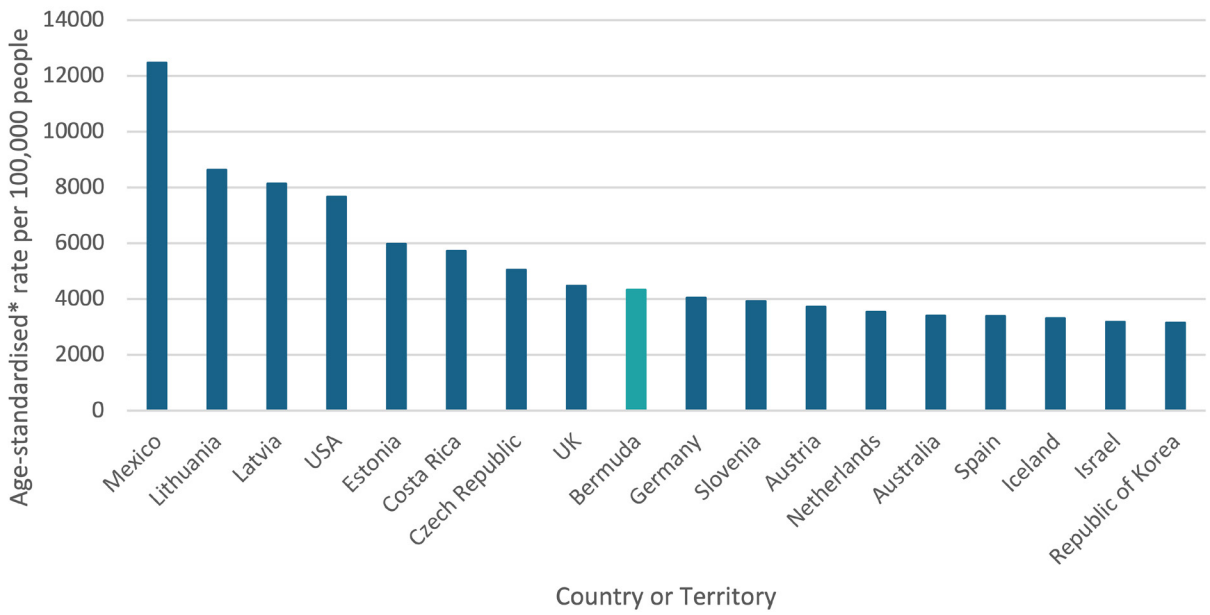


Figure 4.2.4: Age-Standardised Potential Years of Life Lost Per 100,000 Population OECD Comparison Aged 0–75, 2020.
NB: *Age-Standardisation Using OECD Standard Population
(SOURCE: Bermuda Epidemiology and Surveillance Unit and OECD)

4.2.2 Disease Specific Mortality

Data for disease-specific mortality is only available up to the end of 2019. Figures 4.2.5, 4.2.6 and Table 4.2.1 show a breakdown in the leading causes of mortality from 2010 to 2019, with the first two figures showing a percentage breakdown by ICD classification. Figure 4.2.7 shows the age-standardised rates of more specific causes of mortality over time. The JSNA has not focused on international comparisons, given the upcoming publication of *Health in Review* 2023, which will compare Bermuda to other OECD countries using age-standardisation based on the OECD standard population.

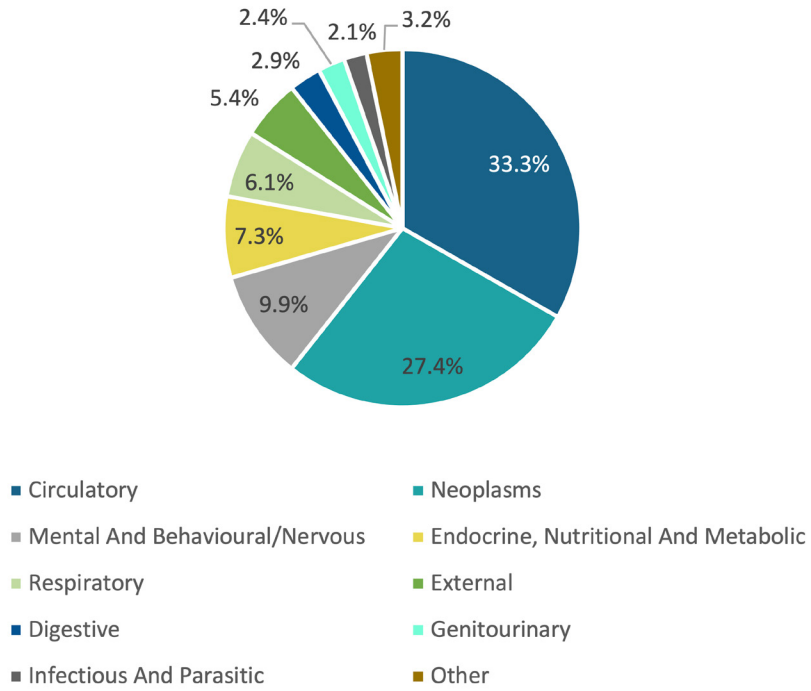


Figure 4.2.5: Leading 10 Causes of Mortality: Combined Total for 2010–2019 by ICD Group in Bermuda (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Combined 2010–2019 Rank & ICD Group	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
1. Circulatory	29.4%	34.7%	35.6%	34.5%	38.0%	36.9%	33.2%	31.0%	29.1%	31.4%	33.3%
2. Neoplasms	28.4%	26.1%	29.6%	28.6%	30.8%	26.8%	28.2%	25.9%	25.7%	24.8%	27.4%
3. Mental And Behavioural/ Nervous	5.4%	5.6%	6.5%	8.6%	9.8%	9.6%	12.0%	13.2%	12.9%	13.2%	9.9%
4. Endocrine, Nutritional And Metabolic	5.2%	11.0%	8.8%	7.1%	5.2%	7.0%	5.8%	5.9%	7.7%	10.1%	7.3%
5. Respiratory	11.6%	6.1%	6.2%	5.5%	4.4%	4.9%	5.4%	4.3%	6.6%	5.7%	6.1%
6. External	6.4%	6.3%	4.8%	4.2%	5.2%	5.1%	5.2%	6.9%	6.6%	3.7%	5.4%
7. Digestive	5.4%	2.1%	1.8%	2.9%	1.9%	1.8%	2.4%	4.3%	2.7%	3.3%	2.9%
8. Genitourinary	3.1%	3.0%	1.4%	2.1%	2.1%	1.6%	2.6%	3.1%	2.2%	3.1%	2.4%
9. Infectious and Parasitic	2.1%	2.3%	2.3%	2.3%	1.5%	2.7%	1.2%	2.4%	2.2%	1.8%	2.1%
10. Unknown	1.4%	2.1%	0.9%	1.1%	0.0%	0.8%	1.0%	0.6%	1.3%	1.5%	1.1%
11. Blood and Immunity	0.4%	0.0%	0.2%	1.5%	0.4%	1.0%	1.0%	1.0%	1.3%	0.7%	0.8%
12. Musculoskeletal and Nervous System	0.2%	0.5%	0.7%	0.4%	0.6%	0.8%	0.4%	0.8%	0.5%	0.2%	0.5%
13. Perinatal	0.4%	0.2%	0.5%	0.4%	0.2%	0.6%	0.4%	0.0%	0.5%	0.2%	0.3%
14. Skin And Subcutaneous	0.4%	0.0%	0.5%	0.2%	0.0%	0.2%	0.6%	0.6%	0.5%	0.0%	0.3%
15. Congenital	0.2%	0.0%	0.2%	0.6%	0.0%	0.0%	0.6%	0.0%	0.2%	0.4%	0.2%

Table 4.2.1: Leading 10 Causes of Mortality, 2010–2019, by ICD Group in Bermuda (SOURCE: Bermuda Epidemiology and Surveillance Unit)

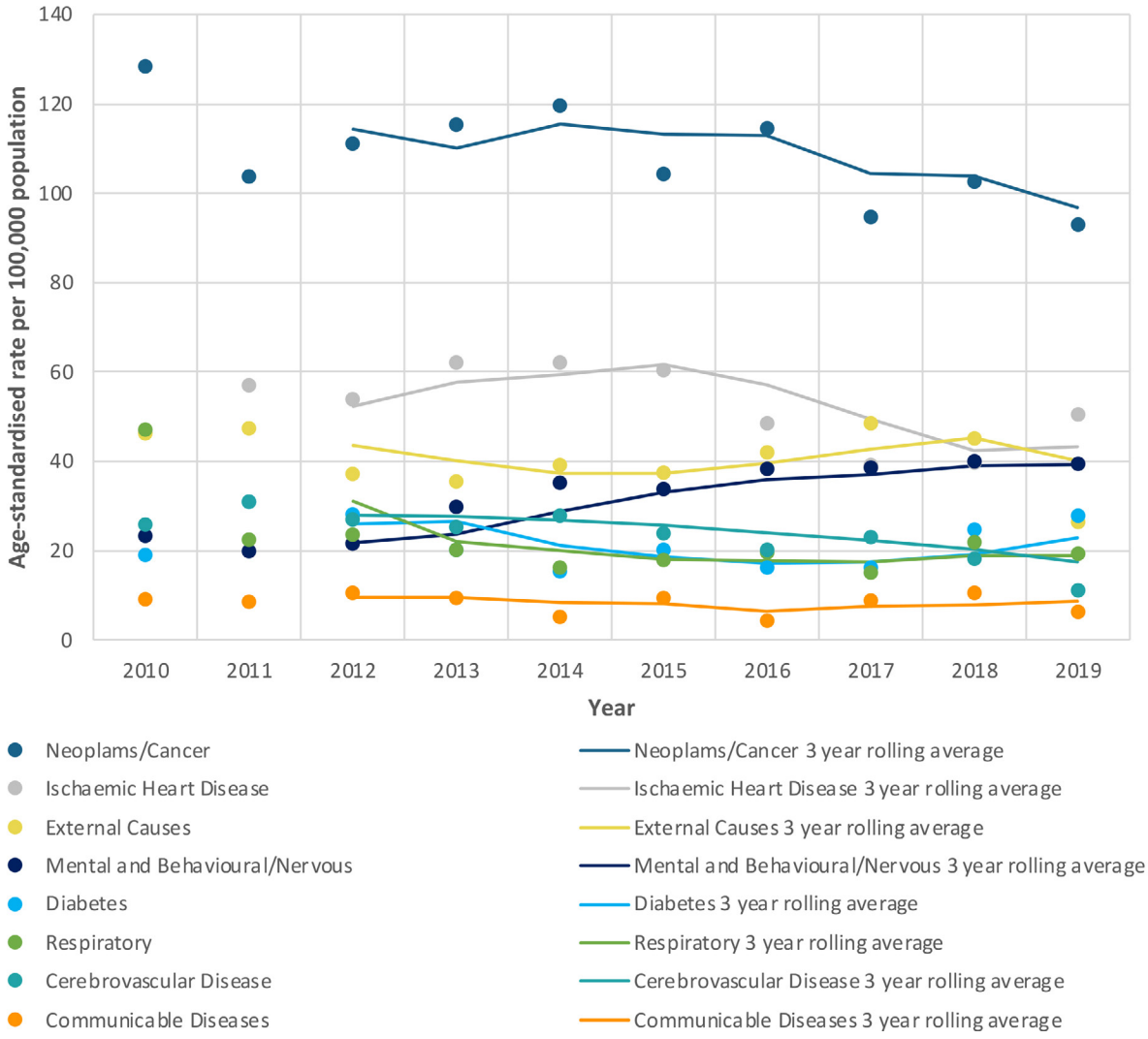


Figure 4.2.6: Age-Standardised Mortality Rates for Leading Causes of Mortality Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Circulatory Disease. Circulatory disease is a term for conditions affecting the heart and blood vessels including heart attacks, strokes, heart failure, high blood pressure, aortic disease and peripheral artery disease.[175] The leading risk factors include smoking, high cholesterol, diabetes, physical inactivity and obesity. Circulatory disease remains the leading cause of death, with 33.3% of deaths resulting from circulatory conditions in 2019, in keeping with statistics from across the OECD. Internationally 80% of cardiovascular deaths result from ischaemic heart disease (heart attacks) and cerebrovascular disease (stroke). Figures 4.2.7 and 4.2.8 show the age-standardised mortality rate for these two conditions.

[175]NHS. *Cardiovascular disease.* 2022. Available: https://www.nhs.uk/conditions/cardiovascular-disease/.

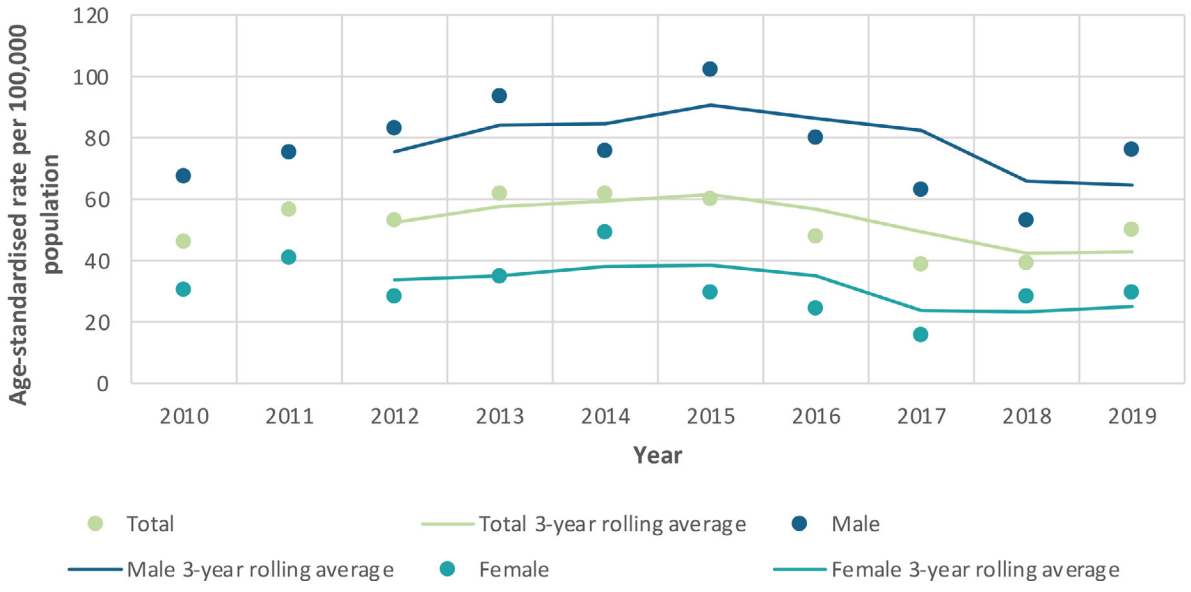


Figure 4.2.7: Age-Standardised Mortality Rates for Ischaemic Heart Disease Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

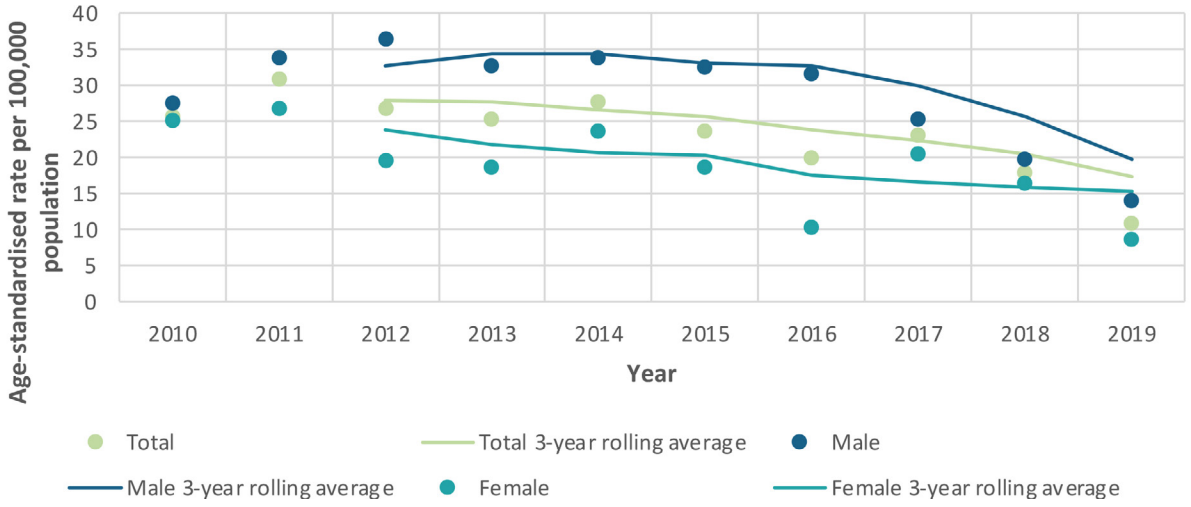


Figure 4.2.8: Age-Standardised Mortality Rates for Cerebrovascular Disease Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

The mortality rate for both ischaemic heart disease and cerebrovascular disease has been consistently higher in men than women in Bermuda since 2010. Both show a slight downward trend over the course of the decade, with cerebrovascular disease showing a considerable drop in 2018 and 2019. However, this is for only two years of data and further years of data are required to draw any robust conclusions.

Both ischaemic heart disease and cerebrovascular disease are preventable through primordial, primary, secondary and tertiary prevention (see Table 4.2.2.) Efforts to prevent these events should be considered when

developing an Integrated Care Pathway as part of UHC (see Chapter 1 (Section 1.4) and Chapter 6 (Section 6.5.5)). Given that circulatory disease remains the leading cause of death in Bermuda, it should be a priority for future Integrated Care Pathways following the completion of the current First 1,000 Days and Chronic Kidney Disease Pathways. This should include quality-improvement work such as the BHB's already started collaboration with Johns Hopkins Medicine International to tackle "Bermuda's Stroke Epidemic",[176] [177] and the Department of Health's collaboration with the Pan American Health Organization (PAHO) to deliver the HEARTS initiative.[178]

Type of Prevention	Description	Applicability to Circulatory Disease
Primordial prevention	Interventions to prevent the development of risk factors.	Reduce circulatory disease risks by promoting social policy that enables access to a balanced diet, promotes exercise and active travel and reduces the prevalence of tobacco smoking.
Primary prevention	Interventions to prevent the development of disease.	Identify individuals who are at high risk of circulatory disease (e.g. through QRISK3 score) and offer lifestyle and (if appropriate) medical interventions.
Secondary prevention	Interventions to reduce the impact of a disease that has already occurred.	Identify individuals who have developed signs of circulatory disease (e.g. hypertension or angina) and offer lifestyle and medical interventions.
Tertiary prevention	Interventions in symptomatic to reduce the severity of disease and any associated sequelae.	Optimise post heart attack and stroke treatment, (including rehabilitation) and lifestyle changes.

Table 4.2.2: Types of Prevention and their Applicability to Circulatory Disease

Cancer. Cancer remains the second leading cause of death in Bermuda. Like deaths from circulatory disease, the mortality rate is higher in men than women. There has been a decline in deaths in both men and women since 2010 (Figure 4.2.9). The *Bermuda National Cancer Control Plan* has found that that for the period 2010–2019 this decline was statistically significant for the total population and for men, but not statistically significant for women.

The Bermuda Cancer and Health Centre has started work on the *Bermuda National Cancer Control Plan*. The first phase (national cancer assessment), which includes a section on the leading risk factors (smoking, high cholesterol, diabetes, physical inactivity and obesity), was published in April 2022.[179] Further details on cancer can be found in Section 4.4.2, which presents data on cancer incidence and the leading forms of cancer in Bermuda.

[176] Johns Hopkins Medicine International. *Better Care, Better Prevention –Tackling Bermuda's Stroke Epidemic.* 2023. Available: https://www.hopkinsmedicine.org/international/health-care-consulting/americas/bermuda-hospitals-board/stroke-story.
[177] Bermuda Hospitals Board. *BHB Primary Strokes Centre.* 2022. Available: https://bermudahospitals.bm/tag/primary-stroke-centre/.
[178] Ordunez P, Campbell NRC, Giraldo Arcila GP et al. *HEARTS in the Americas: innovations for improving hypertension and cardiovascular disease risk management in primary care. Rev Panam Salud Publica.* 2022;16(46):e96. https://doi.org/10.26633%2FRPSP.2022.96.
[179] Bermuda Cancer and Health Centre. *Bermuda National Cancer Control Plan.* 2022. Available: https://www.cancer.bm/Uploaded%20Files/annual%20report/2021/bermuda%20nccp_national%20cancer%20assessment_2022%20(2).pdf.

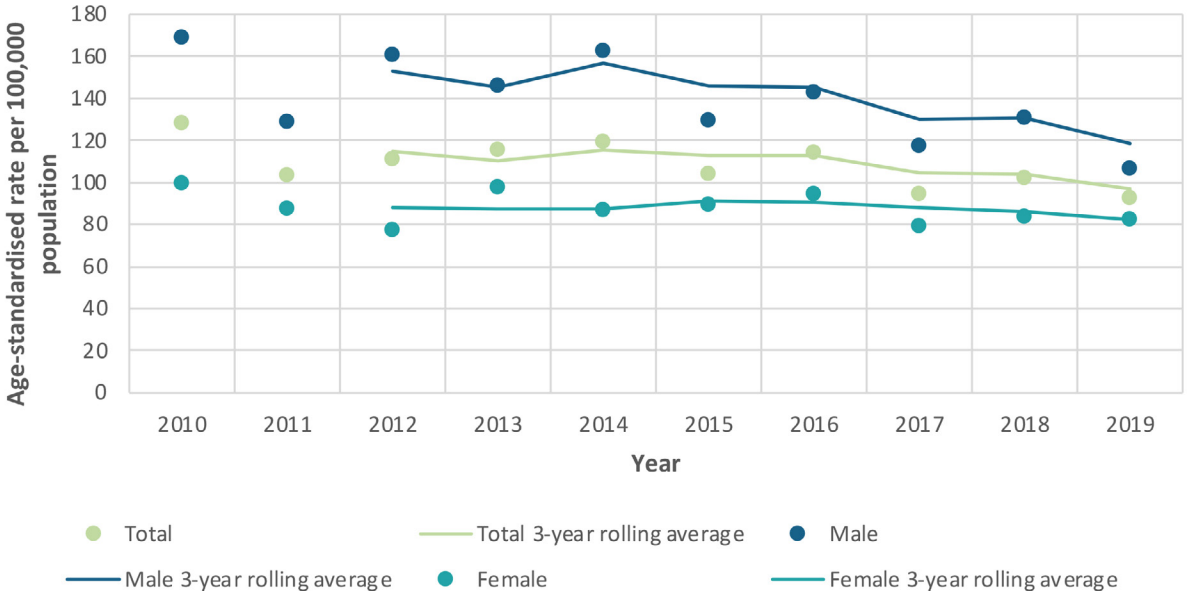


Figure 4.2.9: Age-Standardised Mortality Rates for Cancer/Neoplasms Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Diabetes. Endocrine, nutritional and metabolic causes are the fourth leading reason for deaths in Bermuda. Diabetes specifically contributes a considerable burden to the health of Bermuda residents.[180] The rate of deaths from diabetes shows considerable fluctuation, with a decrease in deaths from 2012 to 2014 followed by a short period of plateau, before an increase, particularly in men from 2018 (Figure 4.2.10).

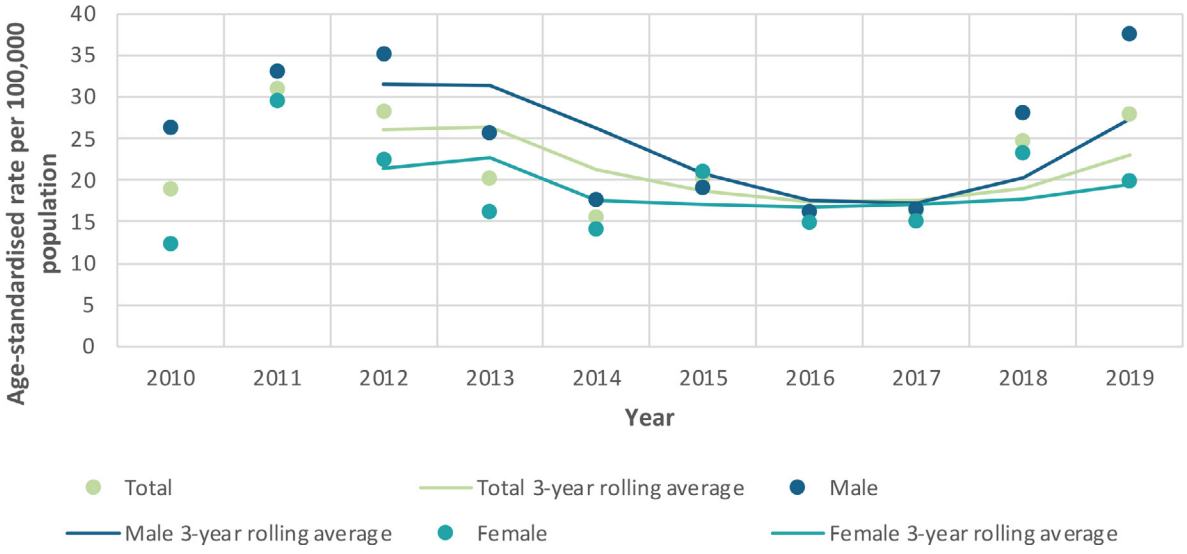


Figure 4.2.10: Age-Standardised Mortality Rates for Diabetes Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

[180]Parris D. *The Alarming Increase of Diabetes in Bermuda. West Indian Med J.* 2014 Dec;63(7):685–6. Available: https://doi.org/10.7727%2Fwimj.2015.439.

There is no robust population-wide surveillance system for non-communicable diseases (NCD) in Bermuda, including diabetes. However, previous surveys have estimated that 13% of the population in Bermuda has diabetes,[181] compared to 11.3% in the USA[182] and 8.6% in England.[183] Given the considerable disease burden of diabetes and the lack of robust population-wide data on the condition, it should be a priority to develop the Integrated Care Pathways project (which could be developed into a broader National Diabetes Control Plan, similar to that started for cancer) and for any NCD disease registry. The Integrated Care Pathway should incorporate all four levels of prevention, including reducing modifiable risk factors such as poor diet, physical inactivity and obesity.[184]

External Causes. Deaths from external causes are defined as deaths "*due to accidents and violence including environmental events, circumstances and conditions as the cause of injury, poisoning, and other adverse effects*".[185] Figure 4.2.11 shows the rate of deaths from external causes since 2010. The overall trend for mortality rates is relatively flat. However, there has been considerable fluctuation in the mortality rates of transport accidents (Figures 4.2.12–4.2.15). There was a drop in the mortality rate from overall external causes in 2019, although this could be a statistical outlier and not the beginning of a trend.

There is a considerable gap in mortality rates due to external causes between men and women, with men having a mortality rate two to 10 times higher compared to that of women (4.2.11). This corresponds with the literature that has found that men had a rate of death due to external causes five times the rate in females, with alcohol consumption contributing to more than one-quarter of the deaths in men. This is in line with findings in Chapter 3.[186]

[181]Parris D. *The Alarming Increase of Diabetes in Bermuda. West Indian Med J.* 2014 Dec;63(7):685–6. Available: https://doi.org/10.7727%2Fwimj.2015.439.
[182]Centers for Disease Control and Prevention. *National Diabetes Statistics Support.* 2022. Available: https://www.cdc.gov/diabetes/data/statistics-report/index.html.
[183]Public Health England. *Diabetes Prevalence Model.* 2016. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/612306/Diabetesprevalencemodelbriefing.pdf.
[184]Centers for Disease Control and Prevention. *Diabetes Risk Factors.* 2022. Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:External cause of death&oldid=132950.
[185]Eurostat. *Statistics Explained: External cause of death.* 2013. Available: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:External_cause_of_death&oldid=132950.
[186]Chasimpha, S., McLean, E., Chihana, M. et al. Patterns and risk factors for deaths from external causes in rural Malawi over 10 years: a prospective population-based study. *BMC Public Health.* 2015. 15;1036. Available: https://doi.org/10.1186/s12889-015-2323-z.

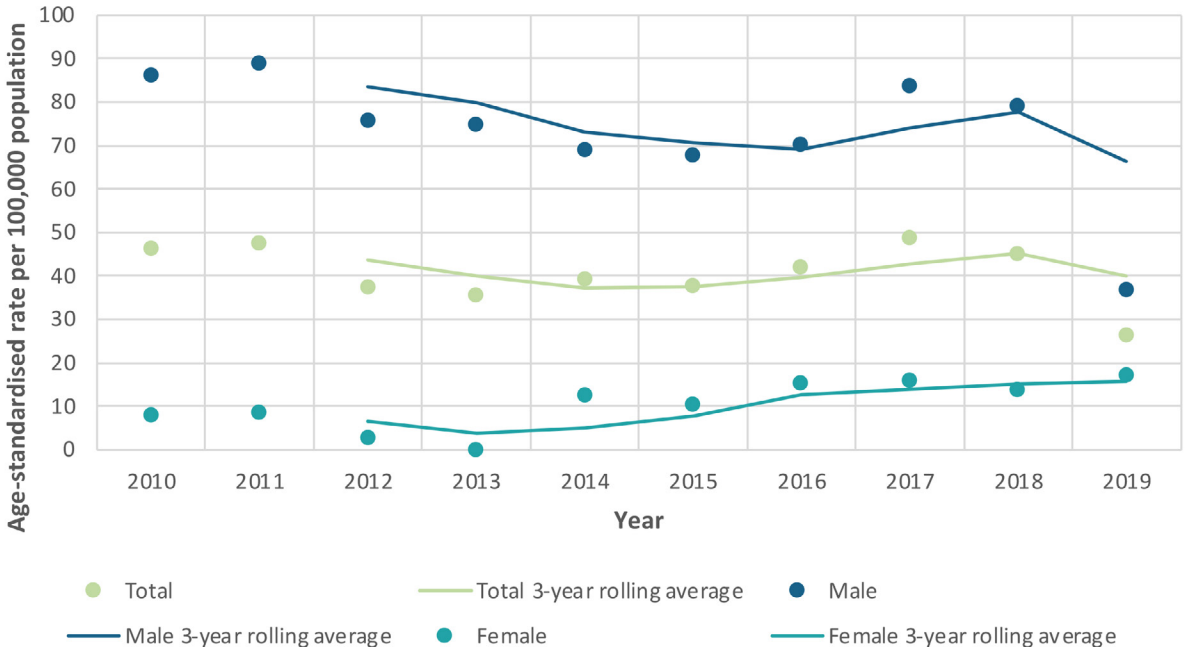


Figure 4.2.11: Age-Standardised Mortality Rates for External Causes Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Deaths from transport accidents constituted 31%–64% of all external-cause deaths. Road safety measures should continue to be a priority for Bermuda, including the protection of vulnerable road users such as pedestrians and cyclists.

Figure 4.2.14 shows BPS statistics on road traffic collisions (RTCs) per quarter since 2016. The overall trend is relatively flat, with deaths ranging from one to five per quarter (except for quarter 2 of 2020, in which there were no fatal accidents, which again may be associated with the COVID–19 lockdown). These figures are high compared to other comparable jurisdictions. BPS data for 2019 (the most recent year of statistics unaffected by COVID–19 lockdowns) found that the rate of RTC fatalities in Bermuda was more than five times higher compared to the rate in Great Britain over the same time period.[187]

Trends in RTCs resulting in serious or slight injury and those termed "damage only" have also been relatively stable, although there is more fluctuation in the data for slight injury and "damage only" RTCs. It should be noted that this data is only for RTCs that have been reported to the BPS, which likely underestimates the overall number of RTCs in Bermuda.

Data from BHB for the same period (and extending to 2021) shows that attendance at the Emergency Department (ED) and Urgent Care Centre (UCC) exceeded that of the total number of RTCs resulting in injury reported by the BPS. This may be due to each RTC resulting in multiple patients or injured patients presenting who had not reported the RTC to the BPS. Again, the overall pattern is relatively flat though there is a steep

[187]Based on a rate of fatal RTCs in Bermuda of 14.1 per 100,000 population (9 fatalities in a population of 63,906) against a rate of 2.7 per 100,000 population in the UK (1,752 fatalities in a population of 64,903,140).
Great Britain data is taken from Department of Transport, Reported road casualties in Great Britain. 2020. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/922717/reported-road-casualties-annual-report-2019.pdf, and Office for National Statistics *Population estimate for the UK, England and Wales, Scotland and Northern Ireland: mid–2019*. 2020. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2019estimates

decline in the total number of patients presenting in Q2 of 2020, which is likely due to the COVID–19 lockdown. The decline was not sustained.

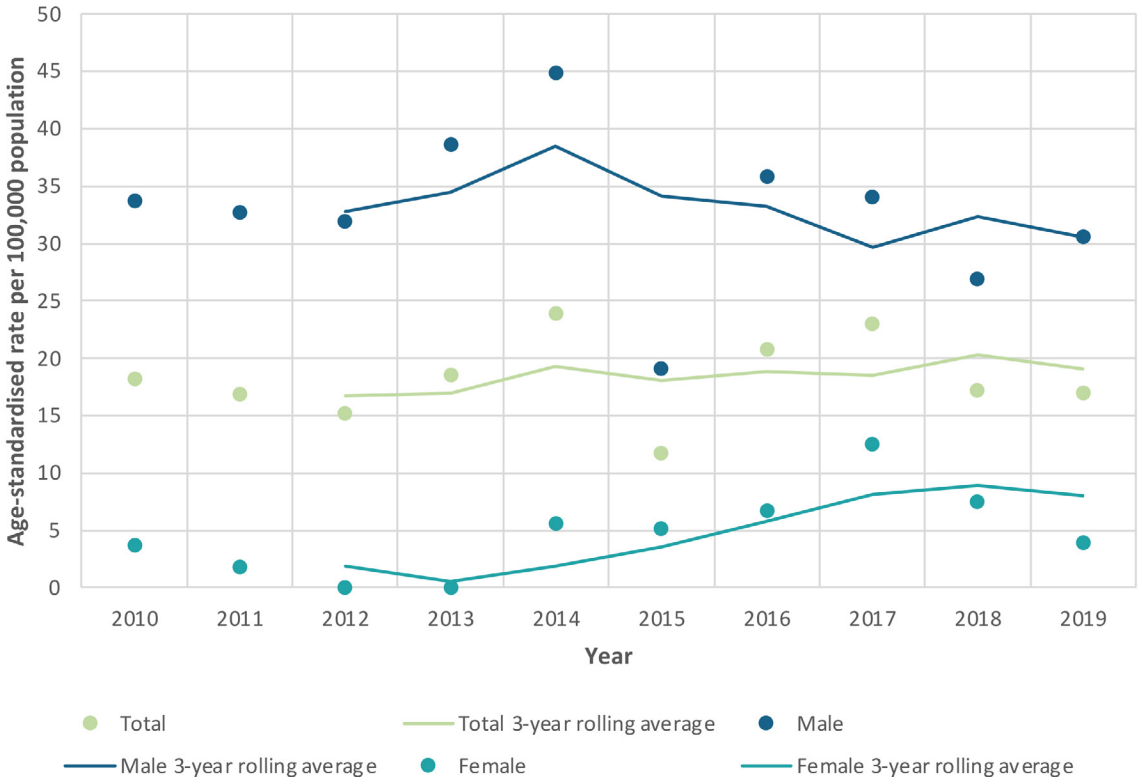


Figure 4.2.12: Age-Standardised Mortality Rates for External Causes (Transport Accidents) Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Epidemiology and Surveillance Unit)

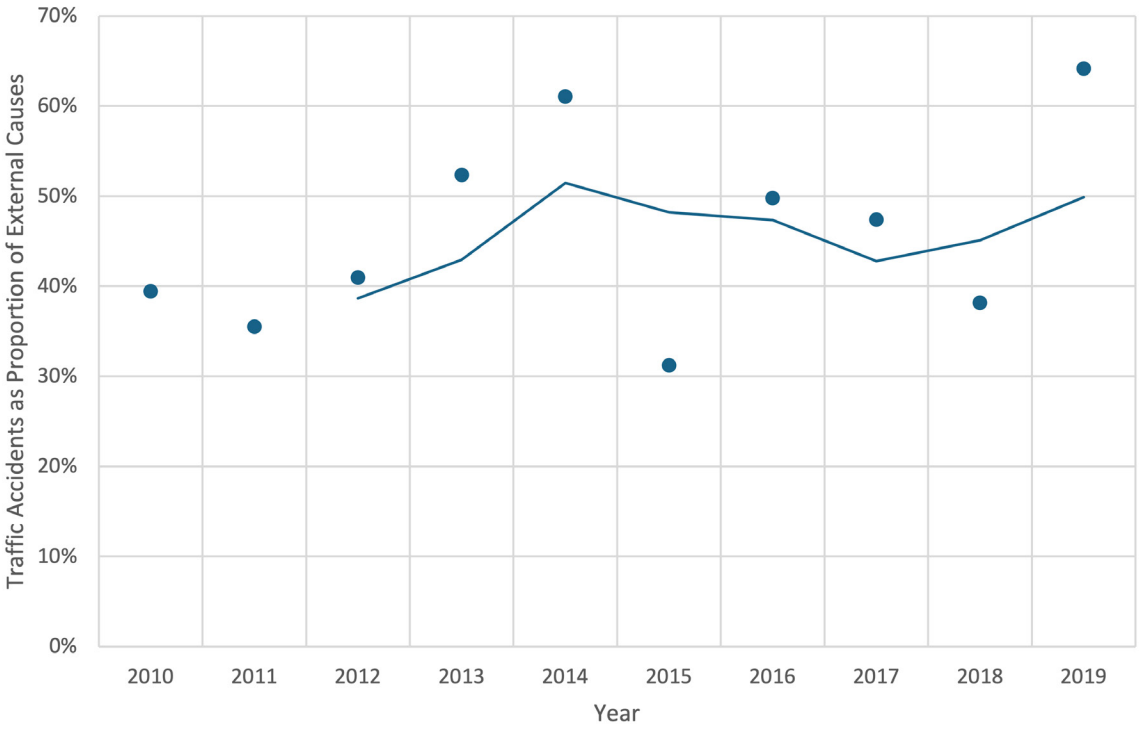


Figure 4.2.13: Proportion of External Cause Deaths Due to Transport Accidents in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

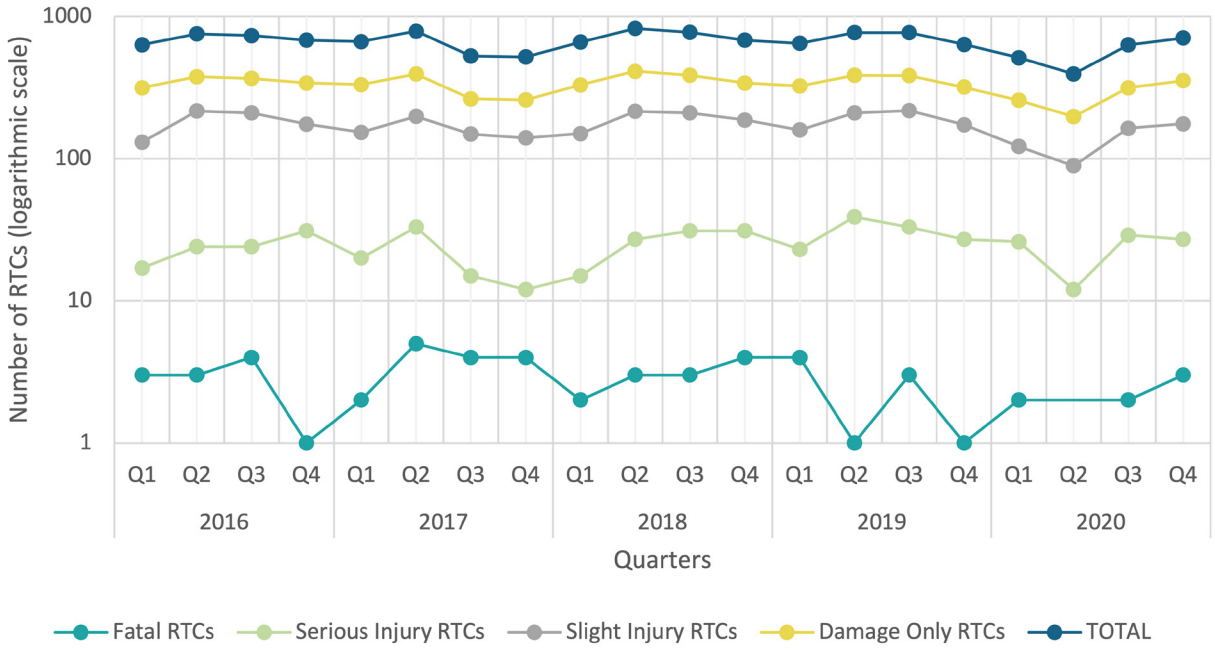


Figure 4.2.14: Road Traffic Collisions (RTCs) in Bermuda Per Quarter (2016–2020) (SOURCE: Bermuda Police Service – Official Statistics Report 2020[188]) NB: Y axis uses logarithmic scale for ease of reading

[188]Bermuda Police Service. *Official Statistics Report – 2020.* 2022. Available: https://www.bermudapolice.bm/sites/default/files/BPS%20Official%20Statistics%20Report%202020%20(30Mar2022).pdf.

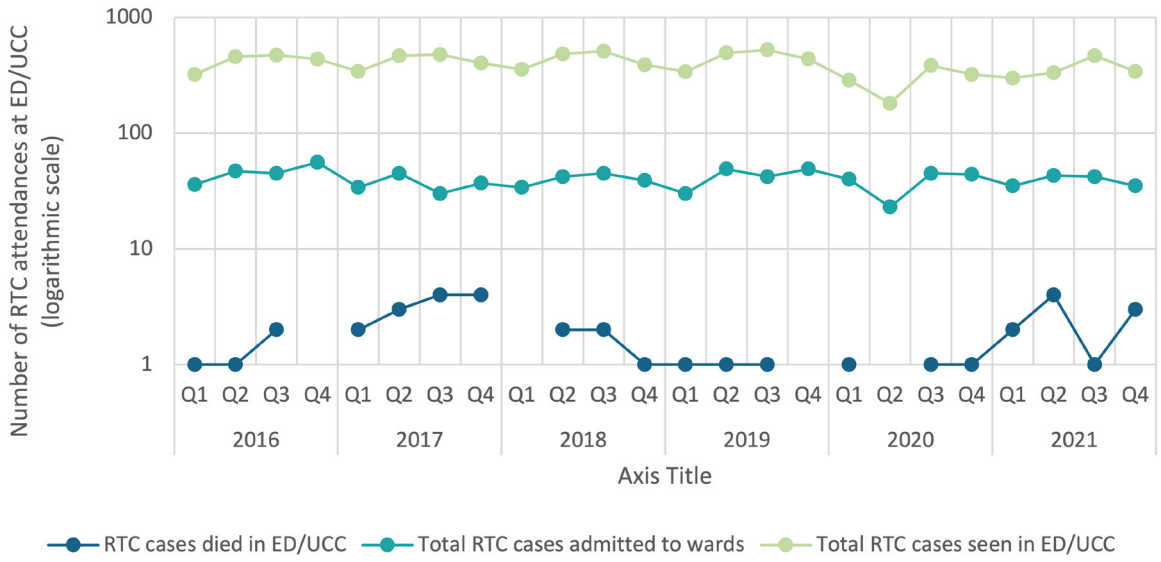


Figure 4.2.15: Road Traffic Collisions (RTCs) Attendances at Emergency Department (ED) or Urgent Care Centre (UCC) Per Quarter (2016–2021)
(SOURCE: Bermuda Hospitals Board)
NB: Y axis uses logarithmic scale for ease of reading.
No value is plotted where no event occurred (i.e., RTC cases dying in ED/UCC).

Given the picture of consistently high levels of injury and death from RTCs, further work is required to reduce deaths and injury on Bermuda's roads.[189]

[189]BermudaSMARTRISK. *Road Traffic Injuries in 2003–2004.* 2004. Available: https://rgb-prod-public-pdfs.s3.us-east-2.amazonaws.com/RG38043628.pdf.

Mental and Behavioural/Nervous. Deaths from mental and behavioural disorders have been growing in importance in Bermuda since 2010 (Figure 4.2.16). The age-standardised mortality rate is increasing in both men and women, although it has been consistently higher in men. Dementia (including Alzheimer's) is the leading reason for mental and behavioural/nervous disorder deaths in high-income countries. Dementia shares many of the same risk factors as other causes of death already outlined, such as smoking, obesity, hypertension, excessive alcohol use and diabetes.[190] Further information on mental health disorders and recommendations are outlined in the morbidity section of the JSNA, including the need for Bermuda to implement recommendations from the comprehensive 2019 Mental Health Situational Analysis Report.

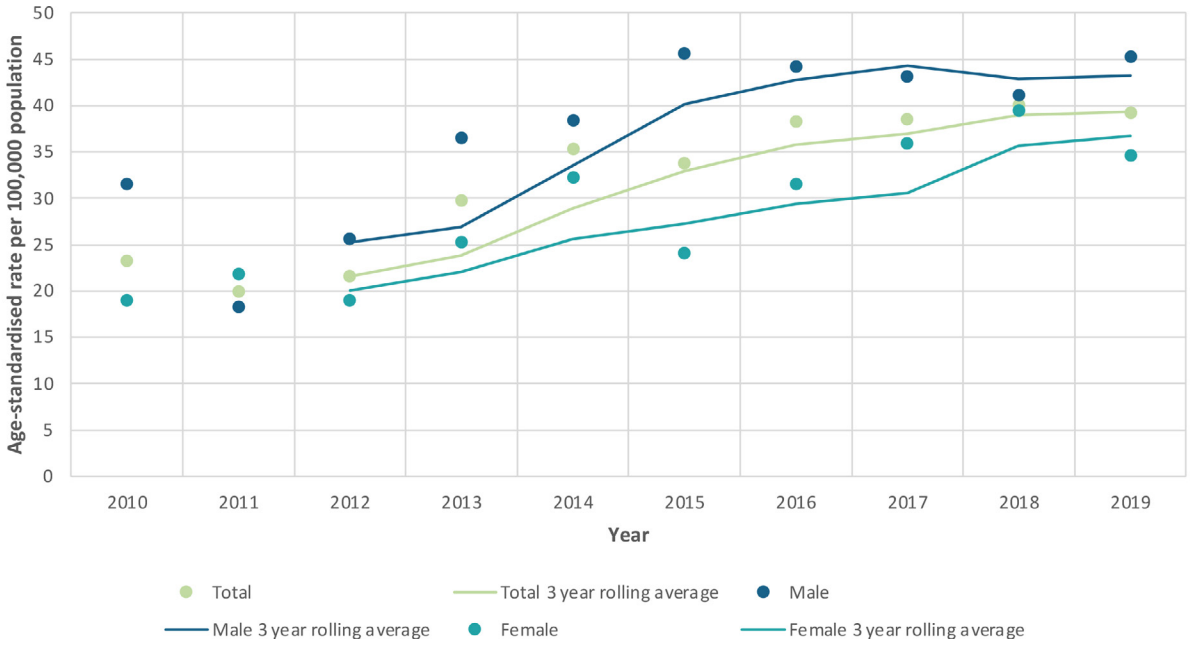


Figure 4.2.16: Age-Standardised Mortality Rates for Mental/Behavioural/Nervous Diseases Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

[190]Centers for Disease Control and Prevention. *Dementia Risk Reduction.* 2022. Available: https://www.cdc.gov/aging/publications/features/dementia-risk-reduction-june-2022/index.html.

Respiratory. Deaths from respiratory diseases (including chronic obstructive pulmonary disorder (COPD), asthma and pulmonary hypertension) remain an important cause of death in Bermuda, although it has been consistently lower than in comparable jurisdictions such as the USA and UK.[191] There is an overall downward trend in the age-standardised rate of respiratory deaths, but this trend is stronger for men than for women (Figure 4.2.17). As outlined in Chapter 3, smoking is the leading risk factor for respiratory deaths. Strong tobacco control policies will continue to be essential to reduce respiratory disease and death.

Figure 4.2.17: Age-Standardised Mortality Rates for Respiratory Diseases Per 100,000 Population in Bermuda, 2010–2019, with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

[191] Our World in Data. *Death rate from chronic respiratory diseases, 1990 to 2019.* 2023. Available: https://ourworldindata.org/grapher/respiratory-disease-death-rate?tab=chart&country=USA~GBR.

Communicable Diseases. Deaths from communicable diseases remained low in the decade up to 2019, in keeping with other high-income nations (Figure 4.2.18). This was due to robust surveillance and control programmes, along with curative care. However, this picture does not include the impact of COVID–19 (Section 4.3), nor should it be taken for granted in the decades to come given the global threat of antimicrobial resistance (AMR).[192]

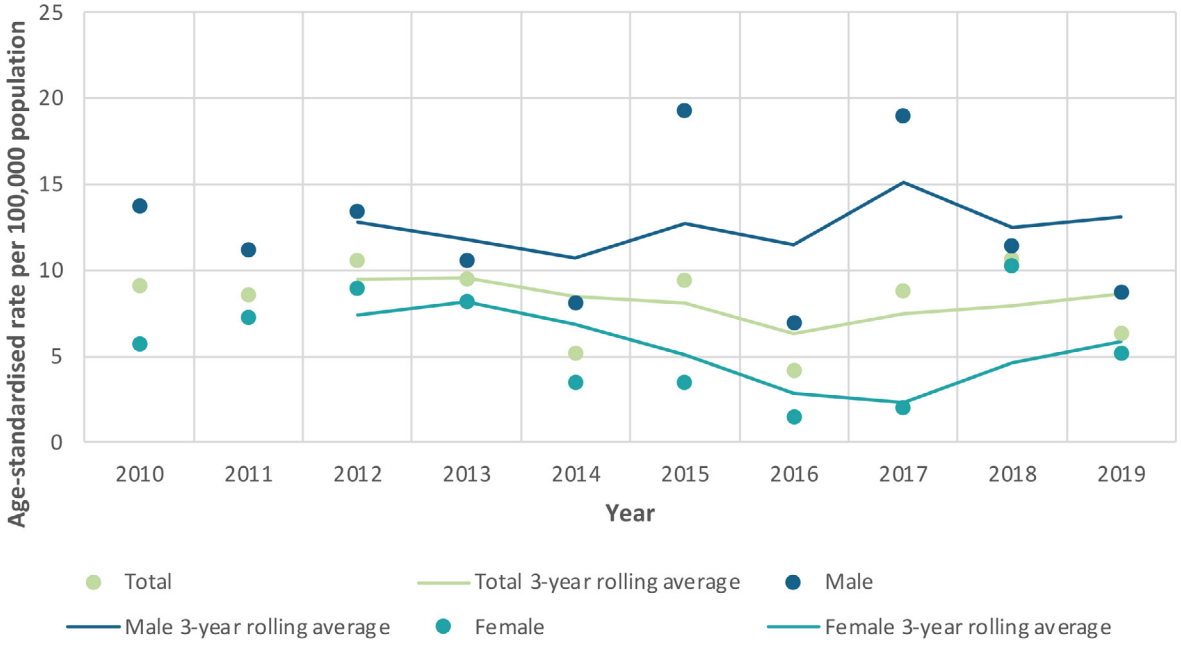


Figure 4.2.18: Age-Standardised Mortality Rates for Communicable Diseases Per 100,000 Population in Bermuda 2010–2019 with Three-Year Rolling Average Trend Line (SOURCE: Bermuda Epidemiology and Surveillance Unit)

[192]HM Government. Tackling antimicrobial resistance 2019–2024. *The UK's five-year national action plan.* 2019. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1070263/UK_AMR_5_year_national_action_plan.pdf.

4.3 Morbidity – Communicable Diseases

This section on communicable diseases has been split between a sub-section on notifiable diseases other than COVID–19 and a separate sub-section for COVID–19.

4.3.1 Notifiable Diseases

Bermuda has a well-established system of communicable disease control underpinned by sentinel surveillance and statutory disease notification requirements under the Public Health Act 1949 (Part V 67(1)).[193] The Epidemiology and Surveillance Unit (ESU) publishes weekly surveillance reports containing information on syndromes and communicable diseases,[194] and this data is considered reliable and up-to-date. It should be noted, however, that although ESU data depends on notifications from clinicians and laboratories, which is unlikely to be comprehensive and therefore containing the potential for under-reporting, the data does allow for ESU to monitor trends and detect potential public health threats.[195] The JSNA considers data up to the end of 2022.

Bermuda has obligations to monitor, notify and control diseases subject to the International Health Regulations (IHRs) 2005. From 2010 to 2022, none of the diseases subject to the IHRs (cholera, plague, polio, SARS, yellow fever) were reported to the ESU. However, the Ministry of Health remains vigilant, particularly following the environmental detection of polio in Europe and North America in 2022,[196] and the case of polio in New York.[197] Bermuda currently has no system of environmental polio surveillance. It is recommended that it develops one to detect a polio event early and take control measures to prevent any cases. Bermuda should also seek to strengthen its syndromic surveillance for acute flaccid paralysis, which is currently below the levels required by the Pan American Health Organization (PAHO).

The recent Polio Outbreak Simulation Exercise[198] identified the need to strengthen Bermuda's all-hazards Public Health Preparedness and Response Plan, which should be interoperable with a multi-agency disaster response that can be supplemented with disease-specific appendices.

[193]Public Health Act 1949. Available: http://www.bermudalaws.bm/laws/Consolidated%20Laws/Public%20Health%20Act%201949.pdf.
[194]Bermuda Government. *Health Information.* 2023. Available: https://www.gov.bm/health-information.
[195]Marier R. The reporting of communicable diseases. *Am J Epidemiol.* 1977;105(6):587–90. Available: https://doi.org/10.1093/oxfordjournals.aje.a112424.
[196]Klapsa D, Wilton T, Zealand A et al. Sustained detection of type 2 poliovirus in London sewage between February and July, 2022, by enhanced environmental surveillance. *Lancet.* 2022 Oct 12;400(10362):1531–8. doi: 10.1016/S0140–6736(22)01804–9. Epub ahead of print. Available: https://doi.org/10.1016/s0140–6736(22)01804–9.
[197]New York State Department of Health. *Polio in New York State.* 2022. Available: https://www.health.ny.gov/diseases/communicable/polio/.
[198]Government of Bermuda. *Ministry of Health hosted Bermuda's Polio Outbreak Simulation Exercise.* 2023. Available: https://www.gov.bm/articles/ministry-health-hosted-bermuda%E2%80%99s-polio-outbreak-simulation-exercise.

Year / Disease	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Chicken pox (varicella)	43	20	13	27	25	28	15	22	10	17	10	9	9
Congenital Rubella	0	0	0	0	0	0	0	0	0	0	0	0	0
COVID–19											612	6,055	11,864
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0
Influenza	11	25	37	29	38	20	75	154	93	145	186	68	110
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis (due to Haemophilis influenzae)	0	0	0	0	0	0	0	0	0	0	0	0	0
Meningitis (due to Streptococcus pneumoniae)					0	0	0	0	1	0	0	0	0
Meningococcal infection (due to Neisseria meningitidis)	0	0	0	1	0	0	0	0	0	0	0	0	0
Mumps	2	3	0	0	0	0	0	0	0	2	0	0	0
Pertussis (whooping cough)	0	1	3	0	0	3	0	2	2	2	8	0	0
Pneumonia (due to Haemophilis influenzae)	0	0	0	0	0	0	0	0	1	6	2	0	0
Pneumonia (due to Streptococcus pneumoniae)					5	6	2	6	5	11	4	12	1
Respiratory syncytial virus (RSV)			11	38	34	9	8	24	43	19	66	56	104
Rubella (German measles)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetanus (excl. neonatal)	0	0	0	0	0	0	0	0	0	0	0	0	1
Tetanus (neonatal)	0	0	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis (extra-pulmonary)*	0	0	1	0	0	0	0	1	0	0	0	0	1
Tuberculosis (pulmonary)*	1	1	2	0	0	1	1	2	2	2	2	2	2

Table 4.3.1: Number of Annual Cases Of Vaccine-Preventable Diseases in Bermuda (Notified to ESU 2010–2022) (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Bermuda has a well-established schedule of childhood immunisation, resulting in relatively low rates of vaccine-preventable disease. Prior to COVID–19, the two leading causes of vaccine-preventable diseases were both respiratory (influenza and respiratory syncytial virus). Therefore, Bermuda should maintain a level of societal resilience to control respiratory pathogens, including vaccination, non-pharmaceutical interventions and stockpiles of antivirals.

Vaccination should remain a priority, with the routine schedule of childhood immunisations (Section 4.5) being seen as one of Bermuda's core public health interventions. Bermuda should also strengthen its syndromic surveillance for fever and rash, which is currently below the levels required by the Pan American Health Organization (PAHO).

Year / Disease	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Chikungunya*					3	0	1	0	0	0	0	0	0
Dengue Fever*	2	1	0	0	1	0	0	0	0	2	0	0	0
Leptospirosis	0	0	0	0	0	0	0	0	0	0	0	0	0
Malaria*	0	2	0	0	2	1	2	1	2	1	0	0	0
Zika*							5	1	0	1	0	0	0

Table 4.3.2: Number of Annual Cases of Vector-Borne Diseases in Bermuda (Notified to ESU 2010–2022)
(SOURCE: Bermuda Epidemiology and Surveillance Unit)

The Department of Health's Environmental Health Team is responsible for the control of vector-borne disease. Despite Bermuda's sub-tropical climate and the historical presence of vector-borne diseases such as Yellow Fever, the incidence of vector-borne disease remains low. 2016 saw five cases of Zika virus, in line with the global outbreak of that year, but robust control measures subsequently reduced cases to zero. Bermuda's geographic location and global connectedness mean that the Island remains at risk of imported vector-borne disease. Strong Environmental Health and Port Health functions are necessary to mitigate this risk to as low as practicable.

Year / Disease	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Campylobacter	19	19	30	27	17	17	11	20	21	41	66	62	37
Ciguatera	0	0	0	0	0	0	10	1	15	5	0	1	0
Cryptosporidium					0	0	0	4	5	4	4	2	8
Giardia					0	1	1	9	9	7	5	5	4
Listeria					0	0	1	1	0	1	0	1	0
Norovirus	2	3	19	1	1	2	7	1	2	6	3	5	9
Rotavirus	8	13	3	6	3	6	7	16	18	15	9	8	7
Salmonellosis	40	14	60	61	95	70	71	56	65	73	38	44	42
Shigellosis	3	3	4	2	1	1	0	1	1	3	1	3	1
Typhoid and paratyphoid fevers	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4.3.3: Number of Annual Cases of Food and Water-Borne Diseases in Bermuda (Notified to ESU 2010–2022)
(SOURCE: Bermuda Epidemiology and Surveillance Unit)

Campylobacter and salmonellosis remain the leading two causes of food and water-borne diseases in line with trends for other high-income countries. Food and beverage safety and water and plumbing inspection (including maintenance of rainwater catchment systems) should remain a priority to prevent the emergence of these diseases. Robust infection prevention and control measures should remain in healthcare facilities to control norovirus, outbreaks of which can seriously impact the operational running of hospitals and other medical facilities.

Year / Disease	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Hepatitis A	0	0	0	0	0	0	0	0	0	0	0	0	0
Hepatitis B	1	0	2	1	8	5	4	8	6	2	3	2	0
Hepatitis C	28	14	13	18	8	8	6	8	8	7	1	1	0
Leprosy (Hansen's Disease)*	0	0	0	0	0	0	0	0	0	0	0	0	0
Rabies (in humans)	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 4.3.4: Number of Annual Cases of Other Diseases of Public Health Interest in Bermuda (Notified to ESU 2010–2022) (SOURCE: Bermuda Epidemiology and Surveillance Unit)

Year / Disease	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Chlamydia	431	332	380	322	312	356	416	334	384	357	262	216	207
Genital herpes	40	30	61	70	72	92	181	78	46	70	47	45	62
Gonorrhoea	31	68	65	40	25	27	14	47	61	22	22	23	20
HIV	11	8	6	7	7	5	6	0	5	3	4	5	3
Syphilis	3	1	10	11	7	8	2	3	3	6	3	4	2

Table 4.3.5: Number of Annual Cases of Sexually Transmitted Infections in Bermuda (Notified to ESU 2010–2022) (SOURCE: Bermuda Epidemiology and Surveillance Unit)

The above data in Table 4.3.5 is predominantly from the Department of Health's Communicable Disease Clinic, which offers sexual health services free at the point of use to support patients and identify at-risk contacts. There is anecdotal evidence that reporting of STIs in the private sector is inconsistent and so data presented may underestimate the true number of cases. In line with international trends, chlamydia, genital herpes and gonorrhoea remain the leading causes of sexually transmitted infections. In 2022, mpox (monkeypox) emerged from being a disease primarily concentrated in West Africa to one seen worldwide, with MSM (men who have sex with men) particularly at risk. Bermuda has had one case of confirmed mpox, with no further transmission resulting in secondary cases.

HIV and hepatitis B and C remain important blood-borne viruses that require ongoing disease control measures in Bermuda. ESU produced the latest in-depth report on HIV in 2021.[199] Bermuda should continue to strengthen its public health measures against blood-borne viruses through education, vaccination for hepatitis B, promotion of safe sex and the provision of safe and affordable sexual health services, particularly for vulnerable populations.

Looking to the future, antimicrobial resistance (AMR) is likely to have an increasing influence on the impact of Bermuda's communicable diseases. ESU has developed an AMR strategy, but the extent to which it has been adopted across the health system is not yet apparent. Bermuda should make tackling antimicrobial resistance a priority.[200] Bermuda can benefit from collaboration with UK Health Security Agency and regional health bodies to strengthen its resilience and develop strategies to confront AMR.

[199]Epidemiology and Surveillance Unit. *HIV in Bermuda.* 2021. Available: https://www.gov.bm/sites/default/files/2021%20Summary%20-%20HIV%20in%20Bermuda_0.pdf.
[200]Smith S, Tilton RC. Antibiotic Resistance: the Bermuda Experience. *J Clin Microbiol.* 1999'37(4):1231–2. Available: https://doi.org/10.1128/jcm.37.4.1231-1232.1999.

4.3.2 COVID–19

COVID–19, an infectious disease caused by the novel SARS-CoV2, first emerged in Wuhan, Hubei Province, China, in late 2019. COVID–19 rapidly spread, firstly in China and then globally. The WHO declared a Public Health Emergency of International Concern on 30 January 2020 and classified COVID–19 as a pandemic on 11 March 2020.[201]

The first two cases of COVID–19 were confirmed in Bermuda on 18 March 2020.[202] Figure 4.3.6 shows the epidemic curve for COVID–19 cases in Bermuda since March 2020. The epidemic curve shows five distinct waves of cases, with some isolated cases between waves. This will be described in more detail, in conjunction with the information on hospitalisations and deaths contained in Figures 4.3.7 and 4.3.8. It should be noted that the hospitalisations and deaths data is for individuals who were admitted to hospital or who died with a positive COVID–19 test within the previous 28 days. Bermuda used the WHO surveillance criteria for COVID–19 deaths, in which a death due to COVID–19 is defined for surveillance purposes as a death resulting from a clinically compatible illness in a probable or confirmed COVID–19 case, unless there is a clear alternative cause of death that cannot be related to COVID disease (e.g., trauma). However, it should be caveated that a review of death certificates for underlying causes has not yet been carried out and may result in a revision of the final COVID–19 death count. It is more accurate to define the current data on COVID deaths as deaths *with* COVID–19 instead of deaths *from* COVID–19.

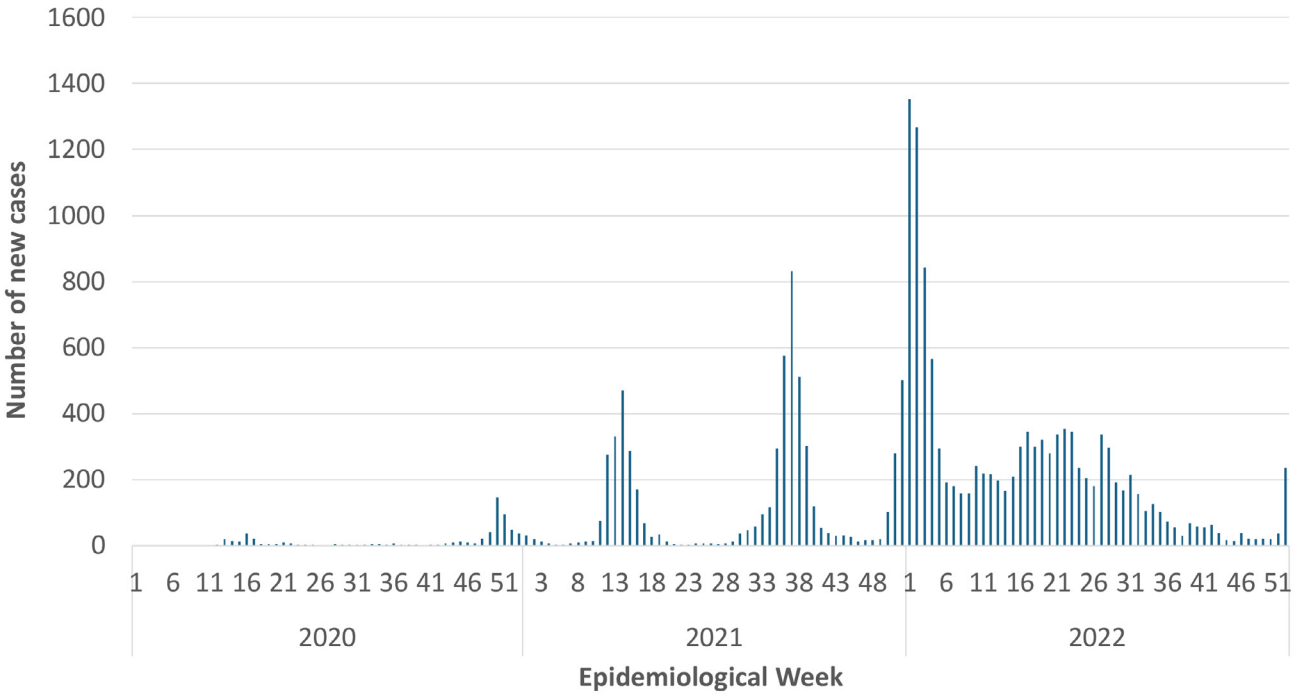


Figure 4.3.1: Cases of COVID–19 by Epidemiological Week in Bermuda (Notified to ESU 2020–2022) (SOURCE: Bermuda Epidemiology and Surveillance Unit)

[201] Allam Z. Part 1: A Chronological Account of the Pandemic: The First 150 Days. *In Surveying the COVID–19 Pandemic and Its Implications*. 2020. ScienceDirect. Available: https://doi.org/10.1016/C2020-0-01743-3.

[202] Government of Bermuda. *Bermuda Confirms First Two Cases of COVID–19*. 2020. Available: https://www.gov.bm/articles/bermuda-confirms-first-two-cases-covid-19.

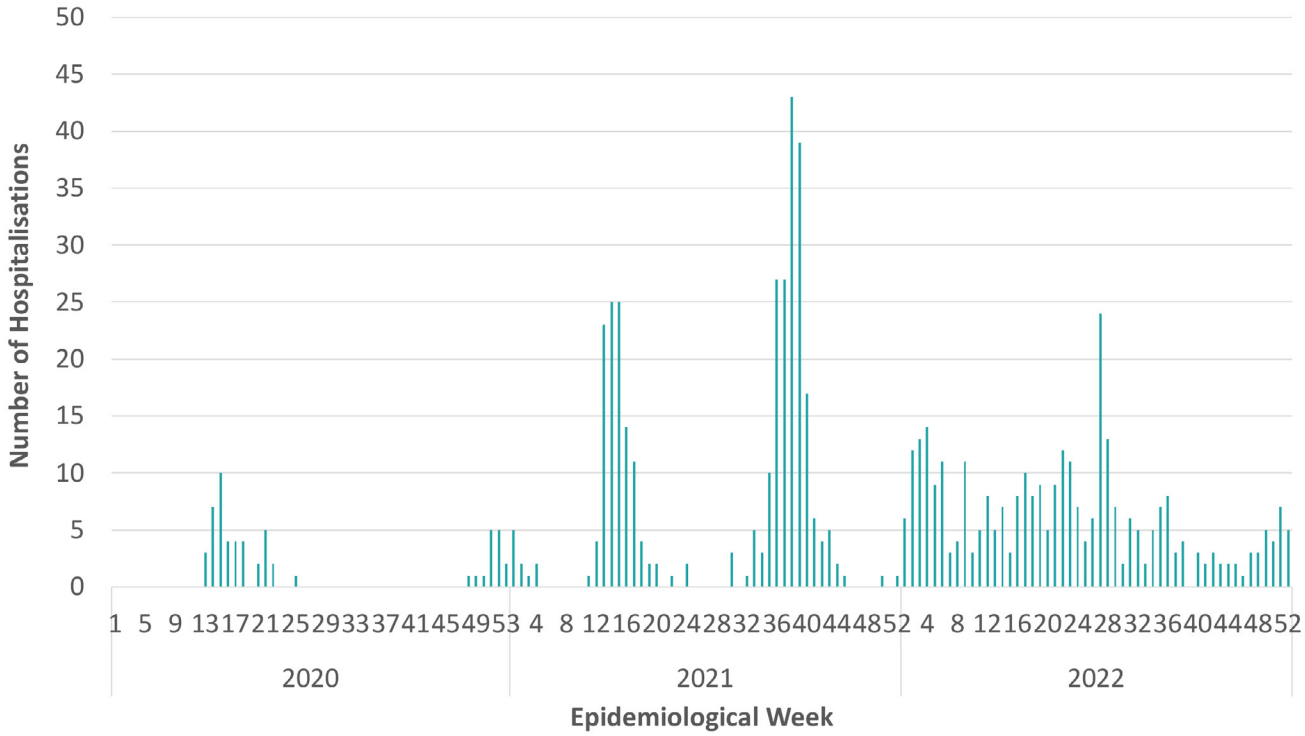


Figure 4.3.2: Admissions to Hospital with a Positive COVID-19 test in the Past 28 Days by Epidemiological Week in Bermuda (Notified to ESU 2020–2022) (SOURCE: Bermuda Epidemiology and Surveillance Unit)

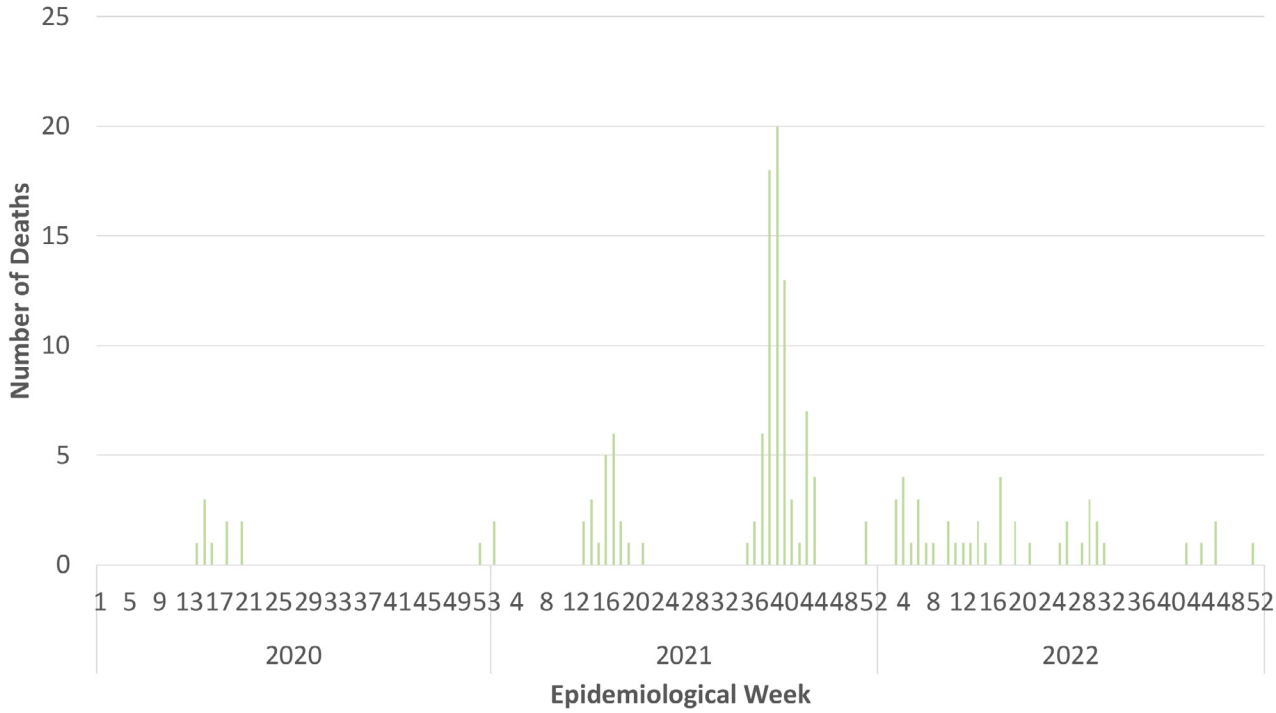


Figure 4.3.3: Deaths with a Positive COVID-19 Test in the Past 28 Days by Epidemiological Week in Bermuda (Notified to ESU 2020–2022) (SOURCE: Bermuda Epidemiology and Surveillance Unit)

The first wave occurred between epidemiological weeks 12 and 22 (12 March–30 May) in 2020. This wave had a relatively small number of new cases (peaking at 36 in week 16). However, it was associated with a relatively high proportion of hospitalisations (10 in week 15) and deaths (three in week 15), and characteristic of exposure of an immune-naïve population to a novel pathogen. This relatively high case fatality rate and hospital admission rate may also be due to a lack of availability of testing for milder cases and a still-tight case definition that was not sufficiently sensitive to COVID–19's symptomology.

Robust control measures, including travel restrictions, resulted in a small number of cases occurring in the second wave between week 44 of 2020 and week four of 2021 (25 October 2020–30 January 2021). Hospitalisations and deaths were proportionally lower than in the first wave, but this could be due to increased detection in milder cases.

The third wave, which occurred during weeks 11–24 2021 (14 March 2021–19 June 2021), was associated with a much higher peak of cases, rising to 470 in week 14 and higher hospitalisations and deaths (although still proportionally lower than previous waves). The Alpha variant (B1.1.7), more transmissible than wild-type SARS-CoV2,[203] had become dominant in the USA by late March 2021.[204] COVID–19 vaccinations started on 11 January 2021 and by 19 June 2021, 67% of the population had received a first vaccination and 59% a second vaccination, likely reducing the proportion of cases developing severe clinical illness (Figures 4.3.8–4.3.11).

The fourth wave, which occurred from weeks 28–46 2021 (27 June 2021–20 November 2021), was the most prolonged wave yet seen and was associated with a peak in weekly cases (830 in week 37), hospitalisations (43 in week 38) and deaths (20 in week 39). The Delta variant (B.1.617.2) had become dominant in the USA by late June 2021. The peak in hospitalisations was a particular concern, given that KEMH has 90 acute beds and that the figure of 43 hospitalisations represented only new admissions. It is recommended that future pandemic planning, through the Public Health Preparedness and Response Plan, considers contingency planning for hospitalisations in future epidemics, including surge capacity.

The fourth wave transitioned to the fifth wave, commencing in week 47 of 2021 (21 November 2021). This was associated with a steep rise in cases peaking at 1,351 in week 1 of 2022, followed by a steep fall to 158 cases in week 8 (ending 26 February 2022). This wave is associated with the Omicron variant (B.1.1.529) that became dominant in the USA by December 2021. Evidence has suggested that the Omicron variant is less virulent than previous variants. Combined with greater population immunity through vaccination and prior infection, this translated into proportionally fewer hospitalisations and deaths.

From week 9 of 2022 (27 February 2022) until the end of week 35 (3 September 2022), Bermuda saw a steady number of cases (102–345 per week), which has gradually declined since September 2022. This may be due to fewer actual cases or less testing, potentially, as cases display milder symptoms. All COVID–19 restrictions were lifted in Bermuda on 14 November 2022.[205] COVID–19 in Bermuda appears to be transitioning to endemicity, which will likely be characterised by a steady number of new cases and hospitalisations each week and sadly, a small number of ongoing deaths. Whilst the emergency phase appears to have ended, the future remains uncertain. Bermuda should continue to prioritise protecting its vulnerable population through vaccination, including novel bivalent booster vaccinations.

[203]Geddes L. *From Alpha to Omicron: Everything you need to know about SARS-CoV-2 variant of concern.* 2021. GAVI Available: https://www.gavi.org/vaccineswork/alpha-omicron-everything-you-need-know-about-coronavirus-variants-concern.
[204]Lambrou AS, Shirk P, Steele MK, et al. Genomic Surveillance for SARS-CoV-2 Variants: Predominance of the Delta (B.1.617.2) and Omicron (B.1.1.529) Variants — United States, June 2021–January 2022. *MMWR Morb Mortal Wkly* Rep. 2022;71:206–211. Available: http://dx.doi.org/10.15585/mmwr.mm7106a4.
[205]Government of Bermuda. *Visitors.* 2022. Available: https://www.gov.bm/coronavirus-travellers-visitors.

Figure 4.3.11 shows the proportion of Bermuda's population that had received first and second vaccinations by the end of 2022. Reassuringly, the proportion of vaccination coverage by age correlates with underlying risk from the disease. However, there remain pockets of unvaccinated individuals, even in the oldest age groups. The Bermuda Government should continue to reassure the public about the safety and efficacy of vaccination and the importance of at-risk groups continuing to take up the offer of booster vaccinations to prevent waning immunity.

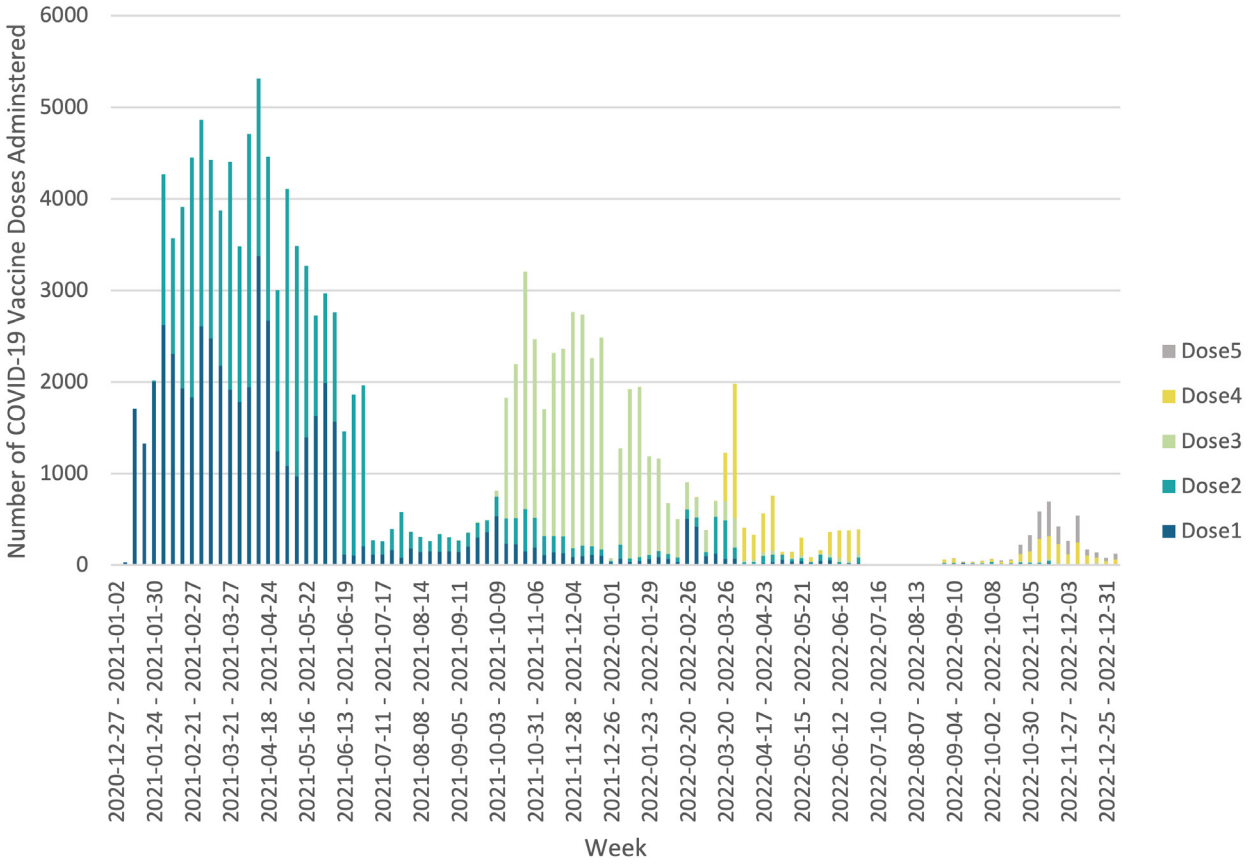


Figure 4.3.4: Weekly COVID–19 Vaccine Doses Given in Bermuda (Split by Dose)
27 December 2021–31 December 2022
(SOURCE: Government of Bermuda's Pandemic Administration System)

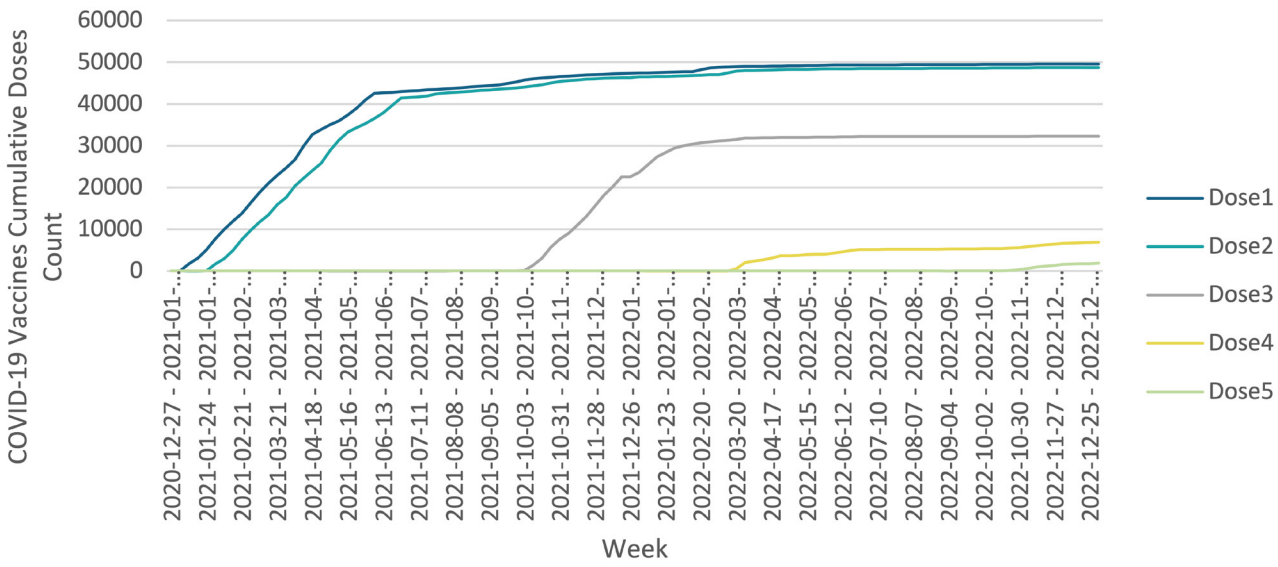


Figure 4.3.5: Weekly COVID–19 Vaccines Cumulative Doses Given in Bermuda (Split by Dose)
27 December 2021–31 December 2022
(SOURCE: Government of Bermuda's Pandemic Administration System)

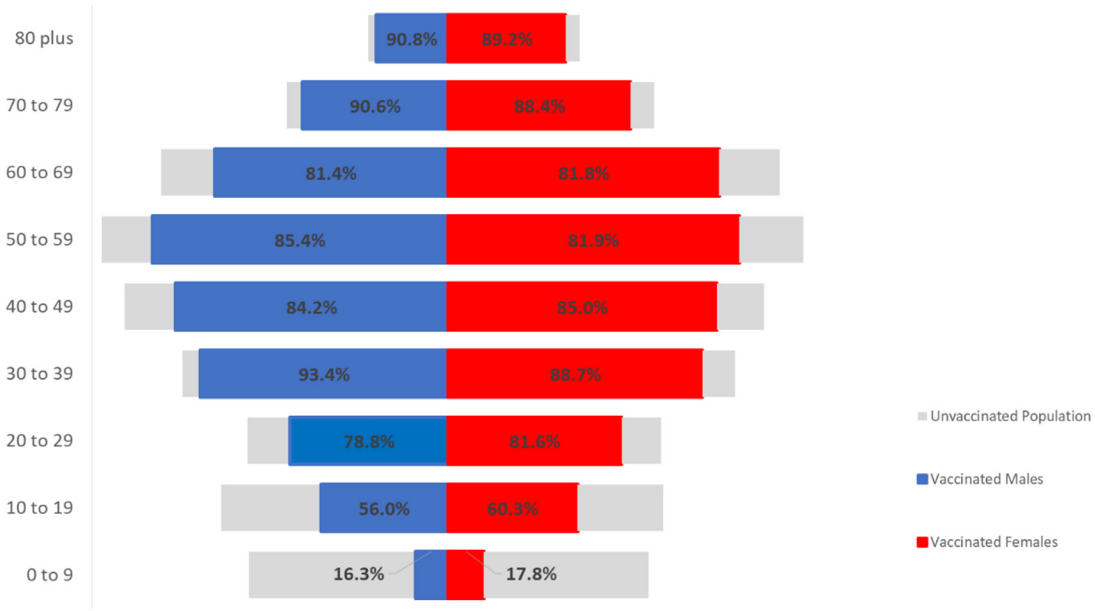


Figure 4.3.6: COVID–19 Vaccine Coverage by Age and Gender in Bermuda
(SOURCE: Government of Bermuda's Pandemic Administration System)

The JSNA has only briefly touched on the COVID–19 pandemic. However, a more in-depth, retrospective epidemiological investigation is required. Consideration should be given to how future deaths are reported, noting that the UK has started to report deaths from COVID–19 as the percentage of deaths within 28–days of a positive COVID–19 test where COVID–19 was subsequently mentioned on the death registration had fallen below 50% by September 2022 (Figure 4.3.12).[206]

[206]UK Health Security Agency. *Changes to the way we report on COVID–19 deaths.* 2023. Available: https://ukhsa.blog.gov.uk/2023/01/27/changes-to-the-way-we-report-on-covid-19-deaths/.

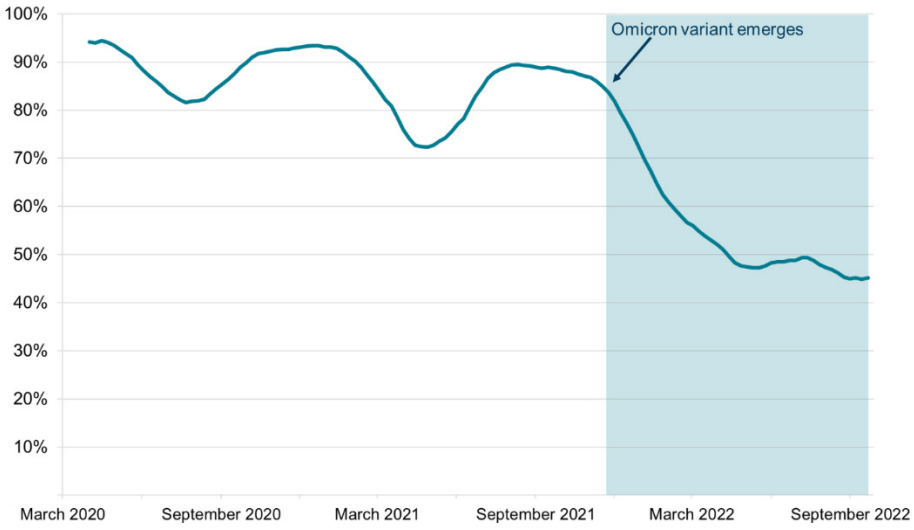


Figure 4.3.7: Percentage of Deaths Within 28 Days of a Positive COVID–19 Test Where COVID–19 was Subsequently Mentioned on the Death Registration in UK (SOURCE: UK Health Security Agency)

This information can then be used to develop a granular understanding of the impact of COVID–19 on health, particularly excess mortality and morbidity, which has potentially occurred in four ways:

- Direct deaths and long-term morbidity from COVID–19
- Potential mortality from emergency services being overwhelmed
- Indirect mortality and morbidity due to routine, urgent and non-COVID related healthcare being postponed, reduced or cancelled
- The direct effects of non-pharmaceutical interventions on health in the short and long term[207]

Bermuda should also conduct a multi-agency evaluation of COVID–19 control measures as a priority to ensure that Bermuda is prepared for future pandemics. Pandemics (not including COVID–19) remain the leading risk on the UK's national risk register and there is no evidence to suggest that this would not be the case for Bermuda.[208] Bermuda should integrate the lessons learned from COVID–19 into the Public Health Preparedness and Response Plan to strengthen pandemic preparedness.

4.4 Morbidity – Non-Communicable Diseases (NCDs)

As previously outlined, there is a lack of reliable and valid population-wide data for non-communicable diseases (NCDs), except for cancer. The JSNA has used Bermuda Health Council's combined cost and utilisation data from insurance claims to build a picture of the causes of ill health in Bermuda, along with data from the January 2023 Bermuda Omnibus Pulse Survey© (as outlined in Chapter 3). Whilst this data is a useful proxy, it cannot be used to develop measures of incidence and prevalence.

Due to the way this data was coded and combined, it was necessary to specify the conditions of interest in advance of data collection. These conditions were chosen based on a combination of information on the Global Burden of Disease's leading causes of death and disability for Bermuda,[209] The Burden of Disease in

[207]Whitty C. Chief Medical Officer's Annual Report 2020. *Health trends and variation in England.* 2020. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945929/Chief_Medical_Officer_s_annual_report_2020_-_health_trends_and_variation_in_England.pdf.
[208]HM Government. *National Risk Register 2020 Edition.* 2020. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf.
[209]Institute for Health Metrics and Evaluation. *Bermuda.* 2023. Available: https://www.healthdata.org/bermuda.

England compared with 22 peer countries[210] and the specification of the Chair and Co-Chair of the JSNA Working Group.

The combined cost and utilisation data has additional limitations. Bermuda Health Council does not make any guarantees or provide third-party validation for the data source. It is recognised that whilst being the nearest proxy to system-wide data, it excludes claims rejected by insurers and out-of-pocket payments. This excludes utilisation data from those without health insurance and contains a bias towards those services covered in insurance schedules of benefit. One patient may generate several claims. There is also anecdotal evidence from discussions with clinicians that there is considerable variation in coding for insurance claims. This is due to the system being primarily designed to facilitate payments rather than as a tool for disease surveillance.

Physical health and mental health have their own sections due to the differences in service provision and billing. Cancer has its own section (4.4.2) based on data from the Bermuda National Tumour Registry.

4.4.1 Adult Physical Health Conditions

Tables 4.4.1 and 4.4.2 outline total claims for and total paid claims for 18 important NCDs in adults. A claim is the bill a healthcare professional submits to an insurance company so it can be reimbursed. One episode of care for a patient could result in one claim or a number of claims.

2021 Rank	Diagnosis	Total Number of Claims				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Diabetes	45,979	36,198	37,579	34,248	43,930
2	Cancer	15,245	35,975	44,248	33,835	33,520
3	Low Back Pain	1,2711	19,797	19,332	18,263	17,159
4	Chronic Kidney Disease	31,971	21,399	20,344	15,817	16,673
5	Gynaecological disease	4,498	1,027	3,014	6,651	10,875
6	Heart Disease	2,662	4,916	5,240	5,873	7,165
7	Obesity	8,325	10,506	7,374	5,746	5,956
8	Skin Disease	2,265	3,226	2,967	3,171	4,440
9	Headache include migraine	3,234	1,537	2,284	1,809	3,552
10	Stroke	4,884	6,134	8,037	5,621	3,417
11	Asthma/COPD	4,124	4,429	4,149	3,298	2,977
12	Hypertension	8,194	6,847	7,996	7,366	2,258
13	Other Musculoskeletal	11,890	7,187	9,450	6,380	1,872
14	COVID–19					1,043
15	Upper respiratory tract infection	3,532	4,537	3,853	3,637	973
16	Arthrosis	1,245	906	796	600	352
17	Hearing Loss	211	177	185	301	165
18	Falls	66	104	34	34	145

Table 4.4.1: Total Insurance Claims for Leading Causes of Adult Physical Disease Burden in Bermuda (SOURCE: Bermuda Health Council's Cost and Utilisation Data)

[210] Public Health England. *The Burden of Disease in England compared with 22 peer countries.* 2020. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/856938/GBD_NHS_England_report.pdf.

2021 Rank	Diagnosis	Total Paid for Claimed Services				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Cancer	$6,050,441.95	$12,502,938.40	$16,309,391.90	$14,060,613.70	$12,137,916.00
2	Chronic Kidney Disease	$16,029,180.10	$6,421,700.60	$4,421,724.09	$5,352,591.47	$5,158,559.66
3	Diabetes	$6,334,446.66	$3,627,838.91	$3,322,119.57	$3,252,003.50	$3,517,748.74
4	Heart Disease	$1,350,058.16	$2,809,861.44	$3,267,365.42	$4,277,101.83	$3,393,479.02
5	Low Back Pain	$2,444,214.39	$2,429,714.49	$2,632,211.46	$2,255,246.84	$1,722,873.15
6	Gynaecological disease	$563,686.78	$160,719.59	$500,405.64	$570,828.61	$1,299,290.75
7	Other Musculoskeletal	$2,615,459.28	$1,739,127.95	$2,237,460.16	$1,618,515.07	$987,761.64
8	Stroke	$2,193,628.84	$2,018,009.62	$2,222,567.97	$2,310,114.37	$834,999.36
9	Obesity	$770,225.44	$919,085.43	$655,415.04	$684,203.25	$653,694.35
10	Headache include migraine	$860,455.24	$214,560.02	$383,637.90	$420,193.67	$519,177.59
11	Skin Disease	$302,235.22	$348,103.78	$331,928.13	$413,847.07	$513,589.43
12	Asthma/COPD	$1,091,652.30	$952,157.07	$679,273.92	$467,734.81	$373,584.32
13	Hypertension	$754,866.61	$574,063.64	$773,134.23	$668,391.59	$217,081.38
14	COVID–19					$106,630.89
15	Upper respiratory tract infection	$375,013.37	$506,791.45	$407,398.90	$368,858.74	$77,023.66
16	Hearing Loss	$115,881.03	$64,349.24	$95,893.15	$91,871.85	$52,472.08
17	Arthrosis (Osteoarthritis)	$131,896.98	$60,414.51	$73,365.90	$51,386.63	$32,527.90
18	Falls	$21,573.67	$4,797.75	$2,123.37	$8,825.52	$12,843.50

Table 4.4.2: Total Insurance Claims Paid for Leading Causes of Adult Physical Disease Burden (SOURCE: Bermuda Health Council's Cost and Utilisation Data)

The main finding from this data is that Bermuda lacks the health information architecture to calculate basic epidemiological indicators for NCDs, such as incidence or prevalence. Other jurisdictions use routine health information to do this. Bermuda has an enormous opportunity to harness the National Digital Health Strategy to enable the development of a surveillance system to accurately capture health information and understand the burden of NCDs more accurately.

The January 2023 Bermuda Omnibus Pulse Survey© found that:

- 27% of respondents had been diagnosed with hypertension
- 24% of respondents had been diagnosed with raised cholesterol
- 14% of respondents had been diagnosed with raised blood sugar or diabetes
- 3% of respondents had been diagnosed with kidney disease

Diabetes. The two leading causes for claims, cancer and diabetes, reflect the data in the mortality section of the JSNA. All further discussions of cancer will be in Section 4.4.2. Diabetes is the leading reason for insurance claims and the third highest cost for these claims. Diabetes has serious consequences, including retinopathy, nephropathy and peripheral artery disease that can result in amputation. Type 2 diabetes is predominantly a preventable condition that can be prevented using all four stages of prevention. As discussed in the section on mortality, in addition to an Integrated Care Pathway, Bermuda would benefit from the development of a

National Diabetes Control Plan.

Chronic Kidney Disease. Bermuda appears to have a disproportionately high number of claims and costs for chronic kidney disease (CKD). The underlying reason for this is ultimately unknown. CKD can result from diabetes and hypertension (two diseases which appear to have a high burden in Bermuda), but some local physicians have hypothesised that there may a genetic pre-disposition in Bermuda's population to CKD. Prevention of CKD should be a priority, controlling known risk factors to reduce the likelihood of CKD. However, there may be scope for future study of the genetic component of CKD in Bermuda.

Work is starting on the CKD Integrated Care Pathway, as part of UHC. All four stages of prevention should be incorporated into this pathway.

Circulatory Disease (Heart Disease, Hypertension, Stroke). Circulatory disease (including heart disease, hypertension and stroke) forms a sizeable portion of insurance claims. As discussed in the section on mortality, circulatory disease is preventable using the four stages of prevention.

Musculoskeletal Disease. Musculoskeletal disease (including low back pain, other musculoskeletal, arthrosis) is often an overlooked area of NCDs. Low back and neck pain have consistently ranked as the leading cause of morbidity in England,[211] with physical inactivity as a major risk factor. It is a major cause of absence from work globally.[212] Evidence suggests that workers receiving guideline-recommended interventions typically return to work in fewer days.[213] Prevention, particularly the enhancement and enforcement of occupational health and safety measures, are vital in combatting the burden of musculoskeletal disease. Given the ongoing burden, both health and economic, the development of an Integrated Care Pathway (see Chapter 6 for details), with a focus on prevention and occupational health (including minimising workplace absences through evidence-based interventions), should be a priority.[214]

Gynaecological Disease. Gynaecological disease was the fifth leading reason for insurance claim (and sixth for claims paid). Gynaecological disease covers a wide spectrum of health conditions. More granular data is required. It is recommended that any further investigation is conducted as part of a comprehensive review of women's health in Bermuda.

Diseases of Older Age. Claims for diseases associated with older age (falls and hearing loss) were relatively low in contrast to the expected prevalence. This may be due to a reduced burden of these disease in Bermuda or a variation in coding. Falls in older people can be life-changing or fatal. Falls can be prevented through engineering, minimising the impact of sense organ diseases (such as hearing loss through hearing aids), promoting physical activity and pharmacovigilance (e.g., optimising anti-hypertensive prescriptions to minimise risk of falls). A holistic investigation of the state of health in older age people would benefit from survey data on health status and quality of life.

Respiratory Disease. Respiratory disease (including asthma, COPD and upper respiratory tract infections) continues to represent a sizeable portion of claims. Optimising management for respiratory conditions can prevent avoidable hospital admissions and increase patient quality of life. Smoking cessation is the only method of preventing the progression of COPD. The development of Integrated Care Pathways for asthma and COPD should be a priority (behind musculoskeletal disease).

[211] HM Government. *National Risk Register 2020 Edition.* 2020. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf.

[212] Wynne-Jones G, Cowen J, Jordan JL, et al. Absence from work and return to work in people with back pain: a systematic review and meta-analysis. *Occupational and Environmental Medicine* 2014;71:448–456. Available: http://dx.doi.org/10.1136/oemed-2013-101571.

[213] Gaspar FW, Thiese MS, Wizner K, Hegmann K (2021) Guideline adherence and lost workdays for acute low back pain in the California workers' compensation system. PLOS ONE 16(6): e0253268. Available: https://doi.org/10.1371/journal.pone.0253268.

[214] Following the development of Integrated Care Pathways for diabetes and circulatory disease.

Other Diseases. The cost and utilisation data has found that obesity, headache (including migraine) and skin disease are important areas for insurance claims. Obesity has been covered in more detail in Chapter 3 (Health Behaviours and Risk Factors). Better data systems are required to understand headaches and skin diseases in more detail. These could be areas of focus in future JSNAs.

Sickle Cell Disease. The JSNA has also included a short section on sickle cell disease (SCD), given its history of being a relatively neglected disease and the fact that it primarily impacts people of African descent. Information was gathered from clinicians as data from other sources was not available. Approximately 88 patients have been admitted to hospital due to SCD since December 2015.

- Paediatric SCD patients are reviewed at various paediatric clinics, admitted (when required) to Gosling Ward at KEMH and can be referred to Boston for further review.
- Adult SCD patients are reviewed by GPs, internists' offices (and some) hospital haematologists.
- SCD patients in crisis will attend KEMH Emergency Department and either be admitted (if required) or discharged for community management (if safe to do so). Hospital haematologists see patients in clinic for consultation and red cell exchange.

Common Risk Factors. Whilst the JSNA has outlined the impact of specific health conditions and recommended the development of individual Integrated Care Pathways or disease-specific control plans, many of the diseases discussed above have common risk factors as outlined in Chapter 3 (alcohol, obesity, physical inactivity, poor diet and tobacco). These risk factors often cluster, with socio-economic status as the strongest predictor of engaging in multiple-risk behaviours.[215] The results from the January 2023 Bermuda Omnibus Pulse Survey© are consistent with these findings, with respondents from lower income households being more likely to have raised blood sugar and cholesterol, whilst those reporting raised blood pressure or hypertension more commonly also having raised cholesterol and kidney disease.

Developing a common approach to tackle these risk factors should be at the centre of any disease-specific plan. Furthermore, these risk factors all exist within the social determinants of health, which should be addressed through social policy as part of comprehensive upstream prevention.

4.4.2 Cancer

The data outlined for cancer comes from the Bermuda National Tumour Registry, the same data source used by Bermuda National Cancer Control Plan.[216] Figure 4.4.1 shows the number of new invasive cancer cases since 2012, whilst Figure 4.4.2 shows the number and rate of new cancer registrations in adults broken down by age and gender. Figure 4.4.2 shows the risk of cancer increasing with age. However, the female incidence rate exceeds males from age 30–54, at which point incidence among male exceeds females for all groups aged 55 and above. The difference may be due in part to differences in healthcare-seeking behaviour and in the prevalence of risk factors.

[215] Meader, N., King, K., Moe-Byrne, T. et al. *A systematic review on the clustering and co-occurrence of multiple risk behaviours. BMC Public Health.* 2016;16,657. https://doi.org/10.1186/s12889-016-3373-6.

[216] Bermuda Cancer and Health Centre. *Bermuda National Cancer Control Plan.* 2022. Available: https://www.cancer.bm/Uploaded%20Files/annual%20report/2021/bermuda%20nccp_national%20cancer%20assessment_2022%20(2).pdf.

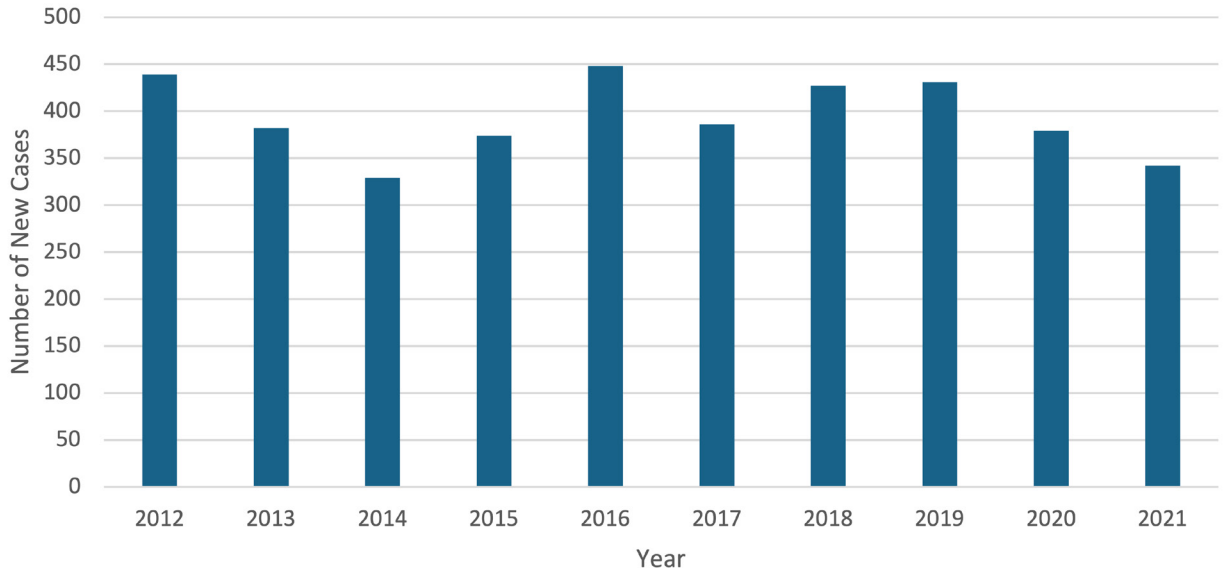


Figure 4.4.1: Number of New Cancer Registrations 2012–2021 in Bermuda (SOURCE: Bermuda National Tumour Registry, Bermuda Hospitals Board) Note: Data includes all carcinomas (invasive, in-situ and skin)

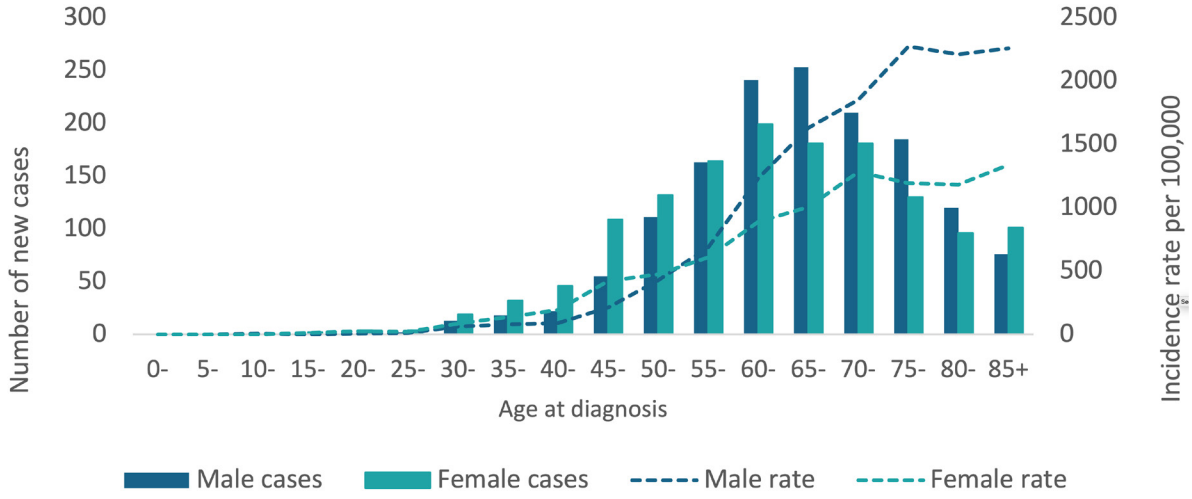


Figure 4.4.2: Number of New Cancer Registrations and Age-Specific Incidence Rates (per 100,000) in Bermuda, 2010–2019 (SOURCE: Bermuda Cancer and Health Centre[217]) Note: Non-melanoma skin cancer and in-situ carcinoma excluded

Figures 4.4.3 and 4.4.4 show the breakdown of the most common cancers by primary site in men and women, with sex-specific cancers such as breast[218] and prostate being the leading causes of cancer in Bermuda.

[217] Bermuda Cancer and Health Centre. *Bermuda National Cancer Control Plan 2024–2030.* Bermuda, April 2023 (Forthcoming)

[218] Breast cancer can occur in both men and women, with 1% of cases in the USA being found in a man. CDC. *Breast Cancer in Men.* 2022. Available: https://www.cdc.gov/cancer/breast/men/index.htm#:~:text=About%201%20out%20of%20every,is%20found%20in%20a%20man.&text=Invasive%20ductal%20carcinoma.

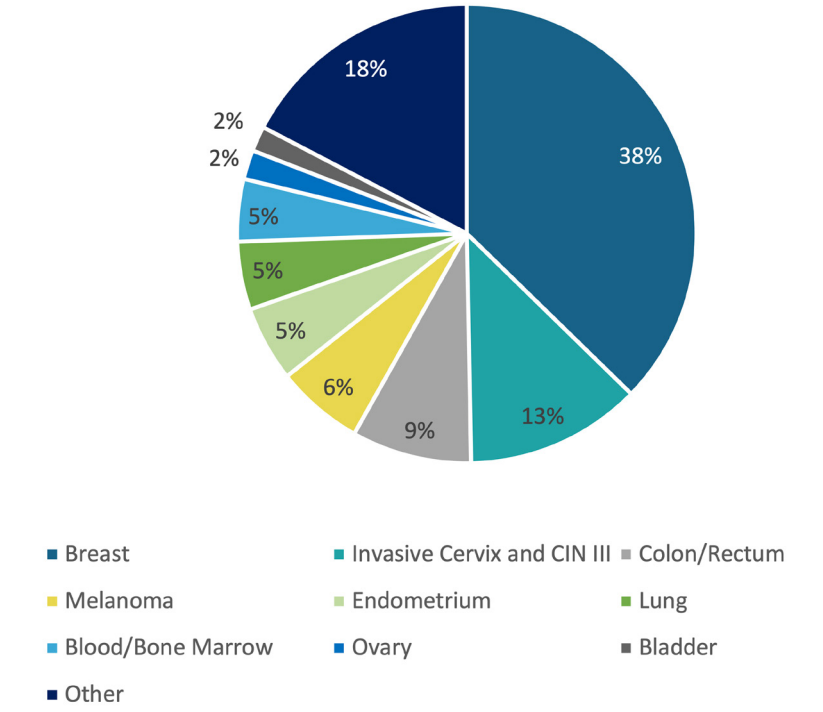


Figure 4.4.3: Ten Most Common Cancers Among Females by Site 2012–2021 in Bermuda
(SOURCE: Bermuda National Tumour Registry, Bermuda Hospitals Board)
Note: Data excludes non-melanoma skin cancers

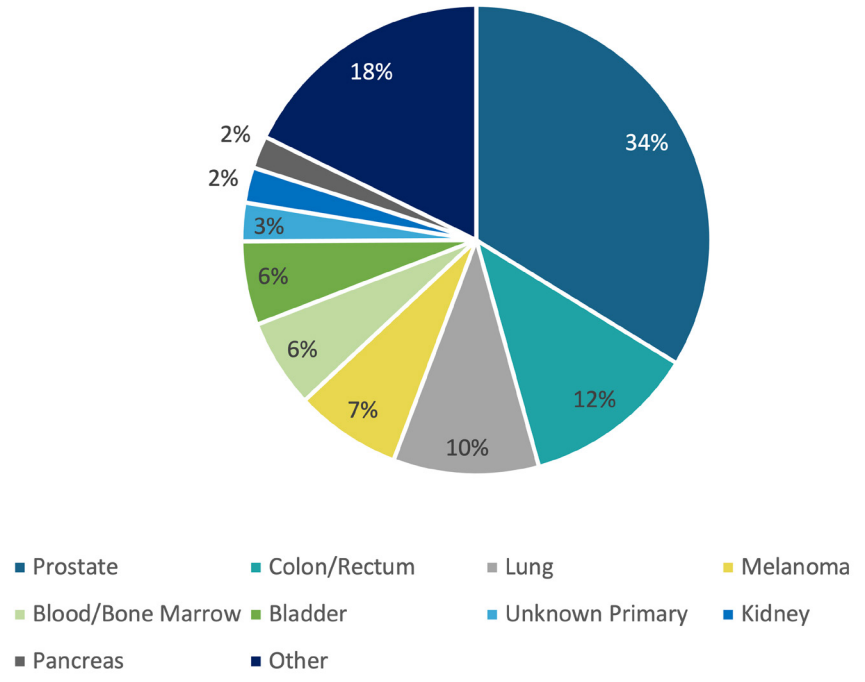


Figure 4.4.4: Ten Most Common Cancers Among Males by Site 2012–2021 in Bermuda
(SOURCE: Bermuda National Tumour Registry, Bermuda Hospitals Board)
Note: Data excludes non-melanoma skin cancers

Data from the tumour registry can be combined with a Geographic Information System (GIS) to produce maps of cases, which can be useful to map neighbourhood-specific deprivation. An interactive version of this map is available at: **https://experience.arcgis.com/experience/8b267dd2090c450792945b7ad23bdf3c**.

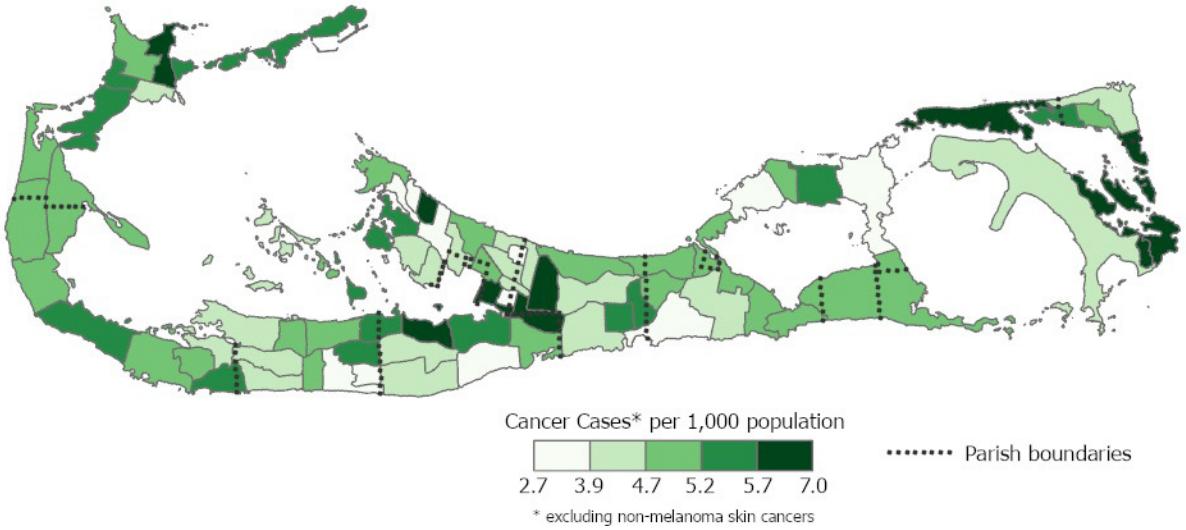


Figure 4.4.5: Cancer Cases Per 1,000 Population 2012–2021 Mapped by Postcode[219]
(SOURCE: Bermuda National Tumour Registry, Bermuda Hospitals Board)
Note: Bottom panel's numbers refer to cancer cases per 1,000 population in each postcode
Note: Data excludes non-melanoma skin cancers

Registry data also allows investigation into inequalities, such as access to care. Data from the Bermuda National Cancer Control Plan has demonstrated such inequalities by ethnicity for cancer staging data. Cancer diagnosed earlier (stages 0 and I) are associated with better outcomes than those diagnosed later (stages III and IV). However, the distribution of early and late diagnoses is not equally distributed, with White patients constituting a greater proportion of early diagnoses and Black patient a greater proportion of late diagnoses.[220] This could suggest that Black residents of Bermuda may have had barriers to accessing cancer diagnosis, which would warrant further investigation.

4.4.3 Adult Mental Health Conditions

Mental health conditions are one of the leading causes of disability globally, including in the Americas.[221] In England they are estimated to be a leading cause of disability.[222] The data landscape for mental health in Bermuda is similar to that for NCDs in that there is a lack of reliable and valid population-wide data. Consequently, Bermuda Health Council's Cost and Utilisation Data has again been used to develop a picture of mental health in Bermuda. The same caveats and limitations apply.

[219]The numerator data is taken from all cancers (excluding non-melanoma skin cancers) 2012–2021, whilst the denominator data is 10 x 2016 census data per census district. Whilst the denominator data does not reflect the exact underlying population per census district per year, the degree of variation is likely to be within an acceptable margin of error.
[220]Bermuda Cancer and Health Centre. *Bermuda National Cancer Control Plan*. 2022. Available: https://www.cancer.bm/Uploaded%20Files/annual%20report/2021/bermuda%20nccp_national%20cancer%20assessment_2022%20(2).pdf.
[221]PAHO. *The Burden of Mental Disorders in the Region of the Americas 2000–2019*. 2021. Available: https://www.paho.org/en/enlace/burden-mental-disorders#allmh.
[222]Davies SC. *Annual Report of the Chief Medical Officer 2013, Public Mental Health Priorities: Investing in the Evidence*. 2014. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/413196/CMO_web_doc.pdf.

Tables 4.4.3 and 4.4.4 outline total claims and total paid claims for 10 common mental health conditions in adults. A claim is the bill a healthcare professional submits to an insurance company so they can be reimbursed. One episode of care for a patient could result in one claim or a number of claims.

2021 Rank	Diagnosis	Total Claims				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Panic/anxiety	745	1,682	1,680	2,841	6,687
2	Other disorders	5,071	5,241	7,463	6,626	4,789
3	Adjustment disorder	1,549	2,557	3,383	4,216	3,816
4	Depression disorder	1,913	2,484	3,042	2,880	3,399
5	Schizophrenia	1,448	2,374	1,922	2,189	2,268
6	Bipolar disorder	517	1,686	2,178	2,309	1,218
7	ADD/ADHD	83	493	629	905	703
8	Drug disorder	816	1,363	2,054	2,179	443
9	PTSD	*	93	153	156	382
10	Eating disorder	*	216	289	273	307

Table 4.4.3: Total Insurance Claims for Leading Causes of Adult Mental Health Burden in Bermuda
(SOURCE: Bermuda Health Council's Cost and Utilisation Data)
Note: *Data has been removed due to the reporting of small numbers to protect privacy

2021 Rank	Diagnosis	Total Paid for Claimed Services				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Dementia	$14,015.73	$1,055,130.09	$1,584,011.70	$1,625,890.43	$1,261,520.63
2	Panic/anxiety	$100,611.01	$174,554.27	$220,090.76	$420,189.88	$953,141.45
3	Schizophrenia	$547,241.70	$619,222.60	$1,218,834.25	$994,972.62	$797,803.60
4	Other disorders	$743,375.68	$721,740.84	$2,739,687.52	$1,014,521.41	$608,294.73
5	Depression disorder	$340,986.63	$269,406.21	$426,913.55	$409,100.59	$588,457.77
6	Adjustment disorder	$182,025.80	$284,567.02	$434,003.72	$490,816.11	$475,927.30
7	Bipolar disorder	$152,492.10	$336,742.71	$424,775.44	$371,763.51	$306,523.96
8	Eating disorder	*	$32,492.85	$41,474.68	$37,217.29	$159,482.12
9	PTSD	*	$11,061.16	$22,014.40	$34,759.35	$104,766.67
10	Drug disorder	$496,420.90	$355,511.28	$530,738.50	$526,986.49	$98,546.20

Table 4.4.4: Total insurance Claims Paid for Leading Causes of Adult Mental Health Burden
(SOURCE: Bermuda Health Council's Cost and Utilisation Data)
Note: *Data has been removed due to the reporting of small numbers to protect privacy

Unlike the cost and utilisation data for physical health conditions, there is considerable divergence between total claims and the total paid for claimed services, potentially due to high payments associated with single claims.

Dementia. Dementia has been the leading cost for adult mental health claims since 2017. Globally, the prevalence of dementia is estimated to almost treble between 2019 and 2050.[223] Given Bermuda's projected ageing population, dementia should be a healthcare priority for Bermuda. Better quality data is required to assess the burden in ways that can inform health service planning and societal efforts to make Bermuda more dementia friendly. The risk factors for dementia have crossover connections with those for physical health conditions, and these can be addressed through strengthening public health policy with a focus on prevention.

Anxiety and Depression. Anxiety and depression have been major factors in annual mental health claims, with anxiety being the leading cause in FY21–22. Both conditions benefit from a biopsychosocial approach. Psychological therapies and social interventions can play as important a role as medication, and for some patients medication is not required at all. The development of Integrated Care Pathways that encompass the biopsychosocial approach is recommended. Work is recognised as a protective factor for mental health, but anxiety and depression are both leading causes of workplace absence.[224] Therefore, policies to tackle these conditions should encompass occupational health.

Other Adult Mental Health Conditions. The Bermuda Health Council data demonstrates that other mental health conditions, including ADD/ADHD, adjustment disorder, bipolar, drug disorders, eating disorders, PTSD and schizophrenia continue to play an important role in Bermuda's disease burden. However, additional data and insight into patient, provider and family experience is required before making further recommendations. International data has shown that physical health outcomes in individuals suffering from mental health conditions are poorer than those who do not have mental health conditions.[225] Identifying and addressing these inequalities in Bermuda should be a priority. Bermuda Health Council's development of the Unique Patient Identifier (UPI) could play an important role in this work.

Analysis and Recommendations for Adult Mental Health. In 2019, Bermuda conducted a joint assessment of its national mental health strategy in collaboration with the Pan American Health Organization (PAHO) and Public Health England (PHE) using PAHO's Plan of Action on Mental Health as a framework.[226] This work resulted in the development of the 2019 Mental Health Situational Analysis Report that outlined 19 recommendations for improving mental health in Bermuda, with responsibilities for the Ministry of Health and BHB.[227]

The recommendations from the 2019 Mental Health Situational Analysis Report should be incorporated into the future work of the Ministry of Health and BHB, noting that BHB has published the 2021–2026 MWI Directorate Plan outlining the strategic direction for the development of mental healthcare services. Implementation of these recommendations should place as much emphasis on mental health promotion of ill-health prevention as it does on the treatment of illness. The Bermuda Health Strategy 2022–2027 can be used as the policy vehicle for improving public mental health and mental healthcare provision.

4.5 Child and Maternal Health

Child and maternal health refer to the health conditions that affect children and women in their childbearing age. The First 1,000 Days approach focuses on the 1,000 days from pregnancy to age two, given the window of enormous potential and vulnerability for child health. The Government of Bermuda's 2022 Throne Speech highlighted this focus as "*a pathway that will provide that foundation leading to a healthy life… by mapping all 'touch points', the needs, and drivers for services, documenting the gaps, disparities, and inequalities so that*

[223]GBD 2019 Dementia Forecasting Collaborators. Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. *Lancet Public Health.* 2022 Feb;7(2):e105–e125. doi: 10.1016/S2468-2667(21)00249-8. Available: https://doi.org/10.1016/s2468-2667(21)00249-8.
[224]WHO. *Mental health at work.* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/mental-health-at-work.
[225]Davies SC. *Annual Report of the Chief Medical Officer 2013, Public Mental Health Priorities: Investing in the Evidence.* 2014. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/413196/CMO_web_doc.pdf.
[226]Pan American Health Organization. *Plan of Action on Mental Health 2015–2020.* 2015. Available: https://www.paho.org/en/file/40664/download?token=0mhB43rS.
[227]Bermuda Hospitals Board. *2021–2026 MWI Directorate Plan.* 2022. Available: https://bermudahospitals.bm/wp-content/uploads/2022/04/MWI_Directorate-Plan-2021-2026-FINAL.pdf.

service integration is improved, leading to better outcomes, and an improved quality of life".[228] For this reason, this section of the JSNA will focus on the First 1,000 Days as well as broader health issues of children and teenagers.

4.5.1 Child and Maternal Mortality

Core child and maternal mortality are outlined[229] in Table 4.5.1. Data is not displayed due to small numbers to protect privacy. However, analysis of data from 2010 to 2019 by ESU has found low rates of child and maternal mortality, in keeping with Bermuda's socio-economic status and sophisticated healthcare infrastructure.

Indicator
Maternal Mortality Ratio
Under–5 Mortality Rate
Infant Mortality Rate
Post Neonatal Mortality Rate
Neonatal Mortality Rate
Stillbirth Rate

Table 4.5.1: Core Indicators – Child and Maternal Mortality in Bermuda
(SOURCE: Bermuda Epidemiology and Surveillance Unit)
No data displayed due to the reporting of small numbers to protect privacy

4.5.2 Reproductive Health Indicators

Access to contraception and good-quality antenatal care is a prerequisite for good maternal health. In particular, access to long-acting reversible contraceptives (LARCs) free of charge reduces the unplanned pregnancy and abortion rate.[230]

Reproductive Health Indicators	2019	2020	2021	2022
Prescribed long-acting reversible contraceptives/1,000 patients[231]	10.9	14.3	11.4	13.9
Abortion rate per 1,000 women[232]	2.9	4.2	5.1	3.9
% of pregnant women who have four or more antenatal contacts with Department of Health Maternal Services	94	94	83.6	83.6

Table 4.5.2: Contraception, Abortion and Antenatal Indicators in Bermuda
(SOURCE: Bermuda Department of Health)

The rate of prescribed LARC/1,000 for patients at the Department of Health Maternal Health Clinic ranged from 10.9 in 2019 to 14.3 in 2020. This is below the mean for England over a similar period, which did not fall below 34.4.[233] However, the two statistics are not comparable, given that Bermuda's data excludes those seen in the private sector. Developing a health information infrastructure that can capture reproductive health indicators will be crucial to better understanding reproductive health. The abortion rate is consistently lower than England and Wales over the same period.[234] However, the Bermuda data only captures abortions

[228]Speech from the Throne 2022. Available: https://www.gov.bm/sites/default/files/Throne-Speech-2022.pdf.
[229]For further details on how these indicators are calculated, visit. WHO: The Global Health Observatory. *Indicator Metadata Registry List*. 2023. Available: https://www.who.int/data/gho/indicator-metadata-registry.
[230]Gyllenberg F, Juselius M, Gissler M, Heikinheimo O. Long-Acting Reversible Contraception Free of Charge, Method Initiation, and Abortion Rates in Finland. *Am J Public Health*. 2018 Apr;108(4):538–543. https://doi.org/10.2105%2FAJPH.2017.304280.
[231]Denominator value from number of patients presenting at Department of Health clinics.
[232]Numerator value is the number of abortions carried out by Department of Health. Denominator value is total mid-year population estimate forwomen aged 15–44.
[233]OHID. *Sexual and Reproductive Health Profiles*. 2023. Available: https://fingertips.phe.org.uk/profile/sexualhealth/data#page/4/gid/8000057/pat/159/par/K02000001/ati/15/are/E92000001/iid/92254/age/1/sex/2/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1.
[234]OHID. Abortion statistics, *England and Wales: 2021*. 2023. Available: https://www.gov.uk/government/statistics/abortion-statistics-for-england-and-wales-2021/abortion-statistics-england-and-wales-2021.

occurring in the Department of Health and may therefore underestimate the true abortion rate in Bermuda. The indicators outlined in Table 4.5.2 are essential to understanding reproductive health and should include an indicator of performance in the First 1,000 Days Integrated Care Pathway.

4.5.3 Child Physical Health Conditions

Data on child physical (and mental) health conditions has been collected in the same way that data on adult health has been collected, with the same caveats and limitations. Childhood conditions were chosen based on the *RCPCH State of Child Health – Evidence*[235] and OHID's Child and Maternal Health indicators.[236]

Tables 4.5.3 and 4.5.4 outline total claims for and total paid claims for child health conditions.

2021 Rank	Diagnosis	Total Paid for Claimed Services				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Ear Nose and Throat Conditions	794	1226	1468	1201	1205
2	Upper respiratory tract infection	2777	4897	4475	5115	922
3	Asthma/COPD	237	489	507	482	205
4	Diabetes	162	80	147	178	146
5	Cancer	72	92	61	140	123
6	Obesity	192	105	136	234	64
7	COVID–19					41
8	Epilepsy	59	113	77	74	28
9	Gastroenteritis	235	119	146	77	27
10	Lower respiratory tract infection	*	*	*	*	*

Table 4.5.3: Total Insurance Claims for Leading Causes of Paediatric Physical Disease Burden (SOURCE: Bermuda Health Council's Cost and Utilisation Data)
Note: *Data has been removed due to the reporting of small numbers to protect privacy

[235]RCPCH State of Child Health. *Evidence.* 2023. Available: https://stateofchildhealth.rcpch.ac.uk/evidence/ (RCPCH stands for the Royal College of Paediatrics and Child Health).
[236]OHID. *Child and Maternal Health.* 2023. Available: https://fingertips.phe.org.uk/profile/child-health-profiles/data#page/1/gid/1938133230 (OHID stands for the UK Office for Health and Improvement and Disparities).

2021 Rank	Diagnosis	Total Paid for Claimed Services				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Ear nose and throat conditions	$111,743.06	$130,235.68	$169,105.15	$164,770.57	$129,977.84
2	Upper respiratory tract infection	$197,279.69	$355,759.38	$338,191.87	$423,746.60	$64,098.90
3	Cancer	$152,869.83	$44,077.06	$46,312.71	$100,400.25	$49,001.72
4	Asthma/COPD	$30,160.87	$48,903.56	$60,608.82	$45,544.82	$18,934.53
5	Diabetes	$23,184.38	$12,792.02	$23,240.08	$25,527.51	$13,312.57
6	Obesity	$17,501.82	$11,318.40	$13,407.38	$25,084.48	$7,858.40
7	Epilepsy	$9,881.81	$77,040.64	$18,293.17	$14,434.46	$4,957.52
8	Gastroenteritis	$54,249.78	$34,550.76	$23,187.11	$14,643.55	$3,208.08
9	COVID–19					$2,583.70
10	Lower respiratory tract infection	*	*	*	*	*

Table 4.5.4: Total Insurance Claims Paid for Leading Causes of Paediatric Physical Disease Burden (SOURCE: Bermuda Health Council's Cost and Utilisation Data)
Note: *Data has been removed due to the reporting of small numbers to protect privacy

Ear, nose and throat conditions (ENT), upper respiratory tract infections and asthma/COPD were the leading five reasons for paediatric insurance claims, followed by diabetes and cancer. ENT conditions and upper respiratory tract infections are frequently found in children internationally and cover a wide range of clinical presentations. Globally, asthma is the most common long-term condition in children and one of the leading reasons for paediatric hospital admissions.[237] High-quality management of asthma by community healthcare providers, combined with education for the child, their family and school, can prevent asthma emergency admissions and deaths.

Globally, the epidemiology of diabetes in children differs from adults, with around 90% having type 1 diabetes.[238] Lifelong control of blood glucose is essential to prevent diabetic ketoacidosis emergencies and to reduce the risk of long-term complications. Like asthma, schools often require additional help in supporting children with diabetes.

Childhood cancers are relatively rare but remain a leading cause of death among children in high-income countries.[239] Treatment can be complex and may require families in Bermuda to seek treatment overseas.

[237]RCPCH State of Child Health. *Asthma.* 2023. Available: https://stateofchildhealth.rcpch.ac.uk/evidence/long-term-conditions/asthma/.
[238]RCPCH State of Child Health. *Diabetes.* 2023. Available: https://stateofchildhealth.rcpch.ac.uk/evidence/long-term-conditions/diabetes/.
[239]RCPCH State of Child Health. *Cancer.* 2023. Available: https://stateofchildhealth.rcpch.ac.uk/evidence/long-term-conditions/cancer/.

4.5.4 Child Mental Health Conditions

Tables 4.5.5 and 4.5.6 outline total claims for and total paid claims for child mental health conditions.

2021 Rank	Service	Total Claims				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Other disorders	1,563	3,820	4,672	4,654	3,163
2	Panic/anxiety	219	484	1,166	1,327	2,108
3	ADD/ADHD	138	331	457	649	899
4	Autistic disorder	31	95	231	441	512
5	Adjustment disorder	296	754	702	556	418
6	Eating disorder		17	159	160	231
7	Depression disorder	128	189	322	293	195
8	Dementia		*	12	139	194
9	OCD		*	27	10	110
10	Phobias	*	16	27	66	57

Table 4.5.5: Total Insurance Claims for Leading Causes of Paediatric Mental Health Burden (SOURCE: Bermuda Health Council's Cost and Utilisation Data)
Note: *Data has been removed due to the reporting of small numbers to protect privacy

2021 Rank	Service	Total Paid for Claimed Services				
		FY16–17	FY17–18	FY18–19	FY19–20	FY20–21
1	Other disorders	$197,803.80	$363,205.59	$501,834.95	$481,119.51	$319,340.10
2	Panic/anxiety	$29,784.51	$66,625.10	$201,069.48	$196,824.36	$290,239.15
3	ADD/ADHD	$20,451.67	$118,307.17	$161,335.60	$124,198.29	$134,422.43
4	Eating disorder		$2,505.00	$54,460.83	$55,169.41	$95,804.82
5	Autistic disorder	$2,799.70	$43,791.42	$72,801.19	$114,070.21	$74,913.13
6	Adjustment disorder	$35,791.00	$86,055.15	$85,779.53	$61,924.38	$50,099.00
7	Depression disorder	$20,744.67	$20,432.63	$45,775.96	$35,395.97	$24,543.34
8	Dementia		*	$1,135.00	$16,450.00	$23,753.00
9	Gender disorder[240]			$570.00	$2,029.75	$22,549.35
10	OCD		*	$7,648.40	$1,500.00	$13,315.00

Table 4.5.6: Total Insurance Claims Paid for Leading Causes of Paediatric Mental Health Burden (SOURCE: Bermuda Health Council's Cost and Utilisation Data)
Note: *Data has been removed due to the reporting of small numbers to protect privacy

The consequences of mental health conditions in childhood can have long-term effects, with approximately half of all mental health conditions in adults starting before the age of 14.[241] Tables 4.5.5 and 4.5.6 show a wide range of mental health conditions affecting children, with "other disorders" being the most common reason for a claim. However, this data only covers health insurance claims. Children at the highest risk of mental ill-health are those living in deprivation or having a family member with poor mental health.[242] The statistics above may

[240]Bermuda's insurance claim data is based on coding using previous versions of ICD, which used the term 'gender disorder'. The authors note that ICD-11 has revised language on gender-identity health to reflect modern understanding of sexual health and gender identity. Further information can be found at: WHO. Gender incongruence and transgender health in the ICD. Not dated (accessed 20th February 2023). Available: https://www.who.int/standards/classifications/frequently-asked-questions/gender-incongruence-and-transgender-health-in-the-icd.

[241]RCPCH State of Child Health. *Prevalence of Mental Health Conditions*. 2023. Available: https://stateofchildhealth.rcpch.ac.uk/evidence/mental-health/prevalence/.

[242]Wlodarczyk, O., Pawils, S., Metzner, F. et al. Risk and protective factors for mental health problems in preschool-aged children: cross-sectional results of the BELLA preschool study. *Child Adolesc Psychiatry Ment Health*. 2017;11(12). https://doi.org/10.1186/s13034-017-0149-4.

underestimate the burden of mental ill-health in children. Early interventions, including social interventions, are required to promote mental well-being and emotional resilience, particularly for the most vulnerable children. The eighth most common reason for childhood mental health insurance claims is dementia. Whilst these claims could relate to childhood dementia (a collective term for a number of rare neurodegenerative disorders in children and adolescents), this is most likely due to coding error.[243]

Paediatric mental health in Bermuda can be best optimised by implementing the recommendations in the 2019 Mental Health Situational Analysis Report.[244]

4.5.5 Childhood Immunisations

Immunisation is estimated to prevent four to five million deaths globally every year, making it one of the most clinically and cost-effective public health interventions.[245] Bermuda has a well-established programme of childhood immunisation run by the Department of Health's Extended Programme of Immunisation (EPI). EPI report Bermuda's vaccination status to PAHO annually. Table 4.5.7 outlines Bermuda's childhood routine vaccination coverage.

Vaccine	% Coverage by Year			
	2018	2019	2020	2021
Rotavirus, 1st dose	87	93	89	86
Rotavirus, last dose	75	87	83	101
DTP-containing vaccine, 1st dose	91	100	93	96
DTP-containing vaccine, 2nd dose	92	100	93	102
DTP-containing vaccine, 3rd dose	95	98	89	108
Diphtheria-containing vaccine, 4th dose (1st booster)	76	90	84	88
Diphtheria-containing vaccine, 5th dose (2nd booster)	64	77	65	65
Diphtheria-containing vaccine, 6th dose (3rd booster)	67	91	85	ND
Tetanus-containing vaccine, 4th dose (1st booster)	76	90	84	88
Tetanus-containing vaccine, 5th dose (2nd booster)	64	69	65	65
Tetanus-containing vaccine, 6th dose (3rd booster)	67	91	85	ND
Pertussis-containing vaccine, 4th dose (1st booster)	76	90	84	88
Hib3	95	96	87	71
Polio, 1st dose	91	100	93	96
Polio, 2nd dose	92	101	93	102
Polio, 3rd dose	95	98	89	108
Polio, 4th dose	76	90	84	88
Pneumococcal conjugate vaccine, 1st dose	90	99	94	94
Pneumococcal conjugate vaccine, 2nd dose	91	97	91	102
Pneumococcal conjugate vaccine, final dose	94	96	92	105
HepB3	78	97	89	100
Measles-containing vaccine, 1st dose	87	108	99	92
Measles-containing vaccine, 2nd dose	70	102	74	65
Rubella-containing vaccine, 1st dose	87	108	99	92

[243]European Commission. *Childhood dementia at forefront of rare disease battle.* 2017. Available: https://ec.europa.eu/research-and-innovation/en/horizon-magazine/childhood-dementia-forefront-rare-brain-disease-battle.
[244]Bermuda Hospitals Board. *2021–2026 MWI Directorate Plan.* 2022. Available: https://bermudahospitals.bm/wp-content/uploads/2022/04/MWI_Directorate-Plan-2021-2026-FINAL.pdf.
[245]WHO. *Immunization.* 2019. Available: https://www.who.int/news-room/facts-in-pictures/detail/immunization#:~:text=Immunization%20currently%20prevents%204%2D5,cost%2Deffective%20public%20health%20interventions.

Varicella	98	98	89	108
HPV Female (final dose)	No consistent data available			52
HPV Male (final dose)	No consistent data available			52

Table 4.5.7: Coverage of Childhood Immunisations by Year (SOURCE: Extended Programme of Immunisation)

Immunisation eliminated diseases previously seen in Bermuda's children, such as polio and measles. However, recent trends have shown that immunisation has dropped for some conditions. Polio coverage is now below 90% and measles below 95% (65% in 2021), the thresholds required for herd immunity. A decrease in vaccinations has led to the re-emergence of measles and polio conditions across Europe and North America. Increasing vaccination levels to reach herd immunity should be a priority for Bermuda.

HPV vaccination was introduced into the childhood immunisation schedule for all children aged 11 and is an essential primary prevention measure against cervical and oral cancers caused by HPV. However, uptake has been low, with coverage of just 52% in 2021. Efforts to increase uptake should be a priority for the Department of Health.

4.5.6 Child and Maternal Health Analysis and Recommendations

The social determinants of health are critical in childhood and should be prioritised to "*give every child the best start in life*".[246] The provision of health services also plays an important role, but for the vast majority of children, these look very different to the clinical focus of chronic disease management seen in adults. Many child health services involve the provision of preventative, screening and oral health, with intermittent contact with clinicians for urgent care for children who are otherwise healthy. However, there are a minority of children with more complex physical and mental health needs that require considerable support.

The First 1,000 Days Integrated Care Pathway's development offers an opportunity to put child and maternal health in the spotlight in Bermuda, from pre-conception to the second year. The pathway is mainly focused on healthcare but is likely to touch upon wider determinants and other services as it is developed. The UHC's Clinical Senate – a working group of medical practitioners and statutory board chairs providing guidance on health system strategy and development – should ensure that these wider aspects are captured and fed into the Ministry of Health to optimise child public health services. This JSNA has only briefly touched on child and maternal health. Bermuda would benefit from an additional Child and Maternal Health Needs Assessment (or Annual Report of the Chief Medical Officer), with considerable input from community health, education, mental health, midwifery, obstetric and paediatric professionals.

4.6 Oral Health

The WHO defines oral health as "*the state of the mouth, teeth and orofacial structures that enables individuals to perform essential functions such as eating, breathing and speaking, and encompasses psychosocial dimensions such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment*".[247]

Oral diseases are some of the most common NCDs globally, including:

- Tooth decay (also known as dental caries) (the most common NCD globally)[248]
- Periodontal disease

[246]Marmot M. *Health Equity in England: The Marmot Review 10 Years On.* 2020. Available: https://www.health.org.uk/publications/reports/the-marmot-review-10-years-on.
[247]WHO. *Oral Health.* 2023. Available: https://www.who.int/health-topics/oral-health#tab=tab_2.
[248]WHO. *Sugars and dental caries.* 2018. Available: https://www.who.int/news-room/fact-sheets/detail/sugars-and-dental-caries#:~:text=Dental%20caries%20(also%20known%20as,may%20result%20in%20tooth%20extraction.

- Tooth loss
- Oral cancer
- Oro-dental trauma
- Orofacial birth defects

The risk factors for oral health reflect those discussed for other NCDs, such as poor diet (particularly diets high in sugar), alcohol and tobacco. There is also a causal link between dental caries, diabetes and obesity. Oral health also follows a social gradient, with poor oral health associated with deprivation.[249]

Dental caries develops when bacteria in the mouth metabolize sugars to produce acid that demineralises the hard tissue of the teeth (enamel and dentine). The most widely used indicator for dental caries is the mean number of decayed, missing and filled teeth (DMFT), which can be collected from routine data or screening surveys. Bermuda's dental health information is not systematically collated preventing the calculation of DMFT from routine data.

The findings from the last comprehensive DMFT screening survey, "screen and seal" was conducted in 2014–15 in M2 students (aged 12), which are displayed in Table 4.6.1 and compared to US DMFT in a similar population from the USA National Health and Nutrition Examination Survey.[250]

Indicator	Bermuda	USA
Mean DMFT	0.46	3.6
Mean DT	0.26	0.6
Mean MT	0.00	0.1
Mean FT	0.20	2.9

Table 4.6.1: Mean DMFT from M2 Students in 2014–2015
(SOURCE: Bermuda Department of Health – Dental Section – Bermuda Data)

Bermuda appeared to have a lower mean DMFT compared to the equivalent population in the USA. However, this data is more than eight years old, whilst the US National Health and Nutrition Examination Survey has continued, underpinned by a robust methodology to ensure the reliability of their estimates. Bermuda's "screen and seal" programme was discontinued following concerns about the quality of seals. However, this has left crucial gaps in oral health information. There is anecdotal evidence from dentists that DMFT has escalated in recent years, exacerbated by the impact of the COVID–19 pandemic on dental visits and oral hygiene habits. The Department of Health should aim to examine the feasibility of reintroducing the "screen and seal" programme, developing a more flexible model to enable parents to opt for the seal component to be provided by their dentist.

Aside from modifying individual risk factors and good quality oral hygiene, fluoridation is the most effective way of preventing dental caries through tooth remineralisation. Bermuda has a supplemental fluoride programme provided by the Department of Health to child through schools, available according to parental choice.[251] Given the lack of mains water in most homes, salt fluoridation could be explored as public health policy. Salt fluoridation is commonly used in Europe (e.g., Germany and Switzerland) and is the cheapest form of population-wide fluoridation.[252] Salt fluoridation is associated with significant reductions in mean DMFT, particularly in the most deprived populations.

[249]Goldfeld S, Francis KL, O'Connor E, Ludvigsson J, Faresjö T, et al. Comparative inequalities in child dental caries across four countries: Examination of international birth cohorts and implications for oral health policy. *PLOS ONE*. 2022;17(8): e0268899. https://doi.org/10.1371/journal.pone.0268899.
[250]Mean DMFT in adolescents aged 12–16, 2011–2106. Table 16 in Centers for Disease Control and Prevention. *Oral Health Surveillance Report: Trends in Dental Caries and Sealants, Tooth Retention, and Edentulism, United States, 1999–2004 to 2011–2016.* Available: Oral Health Surveillance Report (cdc.gov).
[251]Government of Bermuda. *Dental Health.* No date. Available. https://www.gov.bm/dental-health.
[252]Marthaler TM. Salt fluoridation and oral health. *Acta Med Acad.* 2013;42(2):140–55. https://doi.org/10.5644/ama2006–124.82.

The overall finding is that Bermuda's oral health needs are largely unknown. The last large-scale DMFT survey was in 2014–2015 and only covered children. A comprehensive oral health needs assessment is required to understand the oral health needs in Bermuda in the 2020s, which can feed into the UHC to ensure that access to dentistry is an affordable element of any essential care package. In the meantime, given that oral caries is the most prevalent disease of childhood,[253] the First 1,000 Days of Life Integrated Care Pathway should incorporate oral health components for infants into the pathway, including prevention and treatment.

The low uptake of the HPV vaccine (Table 4.5.7) has relevance for Bermuda's future oral health, given that HPV is thought to cause an estimated 70% of oropharyngeal cancers. The Department of Health's Dental Section should advocate for an urgent increase in HPV vaccine coverage.

Dental services are not covered here. Details about dental services can be found in Chapter 6 (6.5.3).

4.7 Limitations

Whilst the JSNA authors have sought to emulate best practice whilst developing this chapter, the following limitations should be acknowledged:

- Disease-specific mortality data, whilst accurate, is only available until the end of 2019, limiting the ability to understand the impact of COVID–19 on mortality.
- A lack of reliable data for NCDs (including mental health and oral health) due to the absence of an integrated health information infrastructure or disease registries (except for cancer) has prevented the authors from being able to calculate indicators such as incidence and prevalence for NCDs.
- No insight into patients with multiple complex needs due to the inability to link multiple conditions to the same patient. The Bermuda Health Council's Unique Patient Identifier may help alleviate this gap if widely adopted.
- A lack of population-wide data for reproductive health indicators.
- A lack of understanding of inequalities due to health data not linking to wider socio-economic information. Where possible, proxy markers (e.g., race in the National Cancer Control Plan) have been used.
- Gaps in insights from the public, patients, providers and payers due to the speed of the JSNA's production. The authors sought insight from stakeholders through the JSNA Launch Event in November 2022, follow-up interviews, a search of open-source literature, UHC stakeholder event question and answer sessions, the monthly JSNA newsletter and additional ad hoc engagement. However, future JSNAs would benefit from a more systematic method for gaining insights across Bermuda.

[253]National Institute of Dental and Craniofacial Research. *Dental Caries (Tooth Decay).* 2022. Available: https://www.nidcr.nih.gov/research/data-statistics/dental-caries.

4.8 Mortality and Morbidity – Implications for Health Needs

This chapter of the JSNA has aimed to synthesise relevant information on the burden of disease in Bermuda, both mortality and morbidity. Despite the data limitations outlined, it has been found that the disease burden is driven primarily by NCDs, principally circulatory disease, diabetes, cancer, musculoskeletal disorders and mental health conditions. Deaths and injury from external causes remain an important risk, particularly for men. The state of oral health is largely unknown. Many of these conditions have common risk factors, which should be addressed through both UHC and wider prevention.

Whilst this chapter has identified a number of recommendations, they can be summarised into the following areas:

- Improve health information architecture through the National Digital Health Strategy and the development of NCD registries.
- Develop Integrated Care Pathways for priority diseases.
- Understand the impact of COVID–19 through a retrospective analysis of epidemiology (particularly mortality) and evaluation of health policy services.
- Understand specialist areas of health by undertaking:
    - Public mental health needs assessment
    - Child and maternal health needs assessment
    - Oral health needs assessment
- Protect the public by strengthening the Public Health Preparedness and Response Plan, improving syndromic surveillance and increasing childhood vaccination uptake.

Chapter 5: Vulnerable Groups

5.1 Introduction to Vulnerable Groups

A dictionary definition of "vulnerable" is people in need of special care, support, or protection because of age, disability, risk of abuse or neglect. Vulnerability, traumatic experiences and wider inequalities can impact people's health and well-being, from childhood and across the life course. These groups are at higher risk of poor health for many reasons, including the effects of deprivation and difficulty accessing services. This chapter looks at health inequalities in disadvantaged or vulnerable groups and the wider determinants of their health such as education, employment and the environment, which help shape the health and well-being of individuals, families and local communities. Those in vulnerable groups are more likely to fall through gaps between different services leading to unplanned and subpar care and the risk of revolving through the system. The health needs of vulnerable groups can be complex and call for a co-ordinated response from health and social care services.

The data for this chapter comes from multiple sources. Very limited recent prevalence data was found, so proxy and anecdotal data has been used to describe the health needs of these population groups. The most common data sources used throughout this chapter are:

- Population and Housing Census 2016
- Bermuda Adverse Childhood Experiences Study (2020)
- Ageing and Disability Services
- Bermuda Police Service
- UK Health Security Agency (UKHSA) Correctional Facilities Health Needs Assessment

International comparisons were difficult to make given the lack of local data. Whilst descriptions of health and risk factors in these vulnerable groups go some way to illustrating the issues, data in this section should be treated with caution given the lack of robust representative data.

The impacts of COVID–19 on the vulnerable groups included in this section are not well represented in current data. However, it is likely that the impacts of the pandemic were felt most by this population and it is important to identify these impacts to strengthen decision-making for meeting the needs of this group.

It is also worthy to note that there are many other population groups considered "vulnerable" that are not included in this section.

5.2 Children at Risk and Adverse Childhood Experiences

5.2.1 Introduction

International evidence identifies "Looked After Children"[254] as a group at risk of health inequalities and who have higher rates of mental health issues and emotional disorders than the general child population. They are more likely to have special educational needs, less likely to do well at school and less likely to be in education, training or employment. There is some evidence that children in care make better progress than children in need, when considering children who are likely to have had similar experiences of abuse or neglect.[255] Data on the prevalence of "Looked After Children" and their health outcomes was not found during the course of this project.

[254]A child who has been in the care of their local authority for more than 24 hours is known as a "Looked After Child". Looked After Children are also often referred to as children in care. (Looked after children | NSPCC Learning).

[255]NSPCC. Statistics about looked after children [Internet]. *NSPCC Learning.* 2021. Available: https://learning.nspcc.org.uk/research-resources/statistics-briefings/looked-after-children.

Adverse childhood experiences (ACEs) are defined as traumatic events or aspects of a child's environment whose severe activation of the stress response system, particularly repeatedly or in combination, can result in lifelong adverse risks to health, well-being and life opportunities.

The Bermuda Adverse Childhood Experiences Study 2021 concluded that Bermuda is under-represented in research related to adverse childhood experiences, as well as many other social determinants metrics for the Caribbean Community and Common Market (CARICOM) region and globally.[256]

ACEs have considerable impact socially as well as economically, with one study indicating that a 10% reduction in the prevalence of ACEs could generate benefits equivalent to the Bermuda's annual health budget.[257]

5.2.2 Overall Prevalence

Looked after children in Bermuda live in group homes (one for males and one females) and foster homes. The capacity of each group home is 12. There are six therapeutic foster homes, 16 kinship homes and 26 traditional foster homes.

The Bermuda Adverse Childhood Experiences Study (2020)[258] used an internationally validated survey tool – the WHO Adverse Childhood Experiences International Questionnaire – as the basis for the survey. The study also drew from Bermuda-based surveys and research and stakeholder engagement to incorporate additional questions related to adverse childhood events of unique cultural import. Significantly more responses in the study were made by females, which likely skewed all its conclusive associations to be more representative of females. The Bermuda Adverse Childhood Experience Study aimed to obtain baseline national data trends for the population, so no time-trend data is available at this time.

Trauma indicators collectively can indicate the level of community trauma. The vast majority (90%) of respondents in the Bermuda study experienced at least one type of ACE. Given this high occurrence, prevalence across all demographic groups is estimated to be high.

The study also reported that witnessing abuse or loss has a similar impact on chronic disease outcomes as those who experienced abuse or loss first hand.[259]

[256]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.
[257]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.
[258]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.
[259]Hines, T, Guthman S. Bermuda adverse childhood Experiences study. 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.

	Bermuda[260]	USA	Europe[261]
Experienced at least one type of ACE before 18	>90% respondents*	61%[262]	23.5%
Experienced two or more types of ACE before 18	48%	35%[263]	18.7%
Experienced four or more types of ACE before 18	21%	~16%[264]	18.7%
ACEs associated with illicit drug use	30.7%[265]	41.1%**	34.1%

*The addition of new domains and multiple options of response (including the additional "Bermuda" ACEs regarding racism and exposure to traffic collisions (specifically "bikes")) likely contributed to more than 90% of respondents sharing that they have at least one adverse childhood experience to report.

**population-attributable fractions (PAFs) associated with ACEs

Table 5.2.1 Proportion of Population Who Have Experienced ACEs (SOURCE: see footnotes in table)

Gender. One in two women in Bermuda have experienced child sexual abuse (defined specifically as physical contact sexual abuse as opposed to the more broadly defined exposure abuse or grooming).[266] Due to the smaller percentage of men who participated in the survey, gender stratifications are difficult to assess for men specifically.

Race. Among the responses in the Adverse Childhood Experiences Study, 47.3% said they sometimes felt that the way they were treated in childhood was unfair because of their race.[267] Individuals from all races reported that they have felt treated unfairly due to their race. Because of bullying and racism, the study found an 8–fold increase in odds of having mental health issues or an inability to focus or function due to lack of concentration.

Types of ACEs. Two of the most commonly reported household dysfunctions were parental misunderstanding and verbal abuse witnessing.[268] 26% of survey respondents witnessed a parent or household member being physically abused and 22% of people directly experienced physical abuse in childhood (either from within or outside of the household). One third of respondents lived in a household as a child where substance abuse was an issue. One in 10 respondents lived in a household where a family member was sent to jail or prison.

Data from the BPS Memex Intelligence System shows offences against children fluctuating since 2018 with 23 crimes in 2018, nine in 2019 and 12 in 2020.[269] It is important to note that the data on arrests does not indicate convictions and that not all arrests result in a conviction.

[260]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.

[261]Bellis MA, Hughes K, Ford K, Ramos Rodriguez G, Sethi D, Passmore J. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *The Lancet Public Health.* 2019 Oct;4(10):e517–28. Available: https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(19)30145-8/fulltext.

[262]Centers for Disease Control and Prevention. *Preventing adverse childhood experiences [Internet].* www.cdc.gov. 2020. Available: https://www.cdc.gov/violenceprevention/aces/fastfact.html.

[263]Bellis MA, Hughes K, Ford K, Ramos Rodriguez G, Sethi D, Passmore J. Life course health consequences and associated annual costs of adverse childhood experiences across Europe and North America: a systematic review and meta-analysis. *The Lancet Public Health [Internet].* 2019 Oct;4(10):e517–28. Available: https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(19)30145-8/fulltext.

[264]Centers for Disease Control and Prevention. *Preventing adverse childhood experiences [Internet].* www.cdc.gov. 2020. Available: https://www.cdc.gov/violenceprevention/aces/fastfact.html.

[265]Household member(s) reported as a problem drinker or alcoholic, or misused street or prescription drugs.

[266]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.

[267]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.

[268]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study.* 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.

[269]Government of Bermuda, Department for National Drug Control. *Annual Report of the Bermuda Drug Information Network [Internet].* [cited 2023 Jan 26]. Available: https://www.gov.bm/sites/default/files/13068%20BerDIN%20Report%202022%20%28Final%29.pdf.

Year	2013	2014	2015	2016	2017	2018	2019	2020
Number of arrests for offences against children	14	15	8	19	20	23	9	12

Table 5.2.2 Reason for Arrests Over Time (SOURCE Bermuda Police Service[270])

Anti-social behaviour

Antisocial behaviour is a symptom and subtype of conduct disorder as defined by Diagnostic and Statistical Manual of Mental Illnesses (DSM–5) and International Classification of Diseases (ICD10). Antisocial behaviour often co-exists with other mental disorders such as attention-deficit/hyperactivity disorder, depression and anxiety disorder.[271] [272] Antisocial behaviour is associated with adverse health outcomes later in life such as low educational achievement,[273] [274] [275] mental health disorders[276] and overall health.[277] [278] Anti-social behaviour can cause distress and harm to others.

The table below shows data from the BPS Memex Intelligence System and gives some indication as to the prevalence of anti-social behaviour in Bermuda. It is important to note that the data on arrests does not indicate convictions and that not all anti-social behaviour results in arrest.

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of arrests for anti-social behaviour	266	237	188	142	174	102	145	140	121	153

Table 5.2.3 Total Number of Arrests Per Year for Anti-Social Behaviour (SOURCE Bermuda Police Service[279])

The Mirrors Programme works with young people and their personal development. The data shared by Mirrors is based on self-reported information from programme applications. Referrals to the programme are through self-referrals, healthcare and social service agencies, schools, community agencies, Court Services, Child and Family Services, family members and sports coaches. The Mirrors data in the table below indicates that Programme cohorts, which could be considered high-risk individuals, experience education disruptions. This indicates a need to focus on upstream interventions to prevent anti-social behaviour and disruptions to education, which can affect health outcomes.

[270]BPS website | CRIME STATISTICS [Internet]. www.bermudapolice.bm. [cited 2023 Jan 26]. Available: https://www.bermudapolice.bm/crime-statistics.
[271]NICE. Overview | Antisocial behaviour and conduct disorders in children and young people: recognition and management | Guidance | NICE [Internet]. Nice.org.uk. NICE; 2013. Available: https://www.nice.org.uk/Guidance/CG158.
[272]Ritakallio M, Luukkaala T, Marttunen M, Pelkonen M, Kaltiala-Heino R. Comorbidity between depression and antisocial behaviour in middle adolescence: the role of perceived social support. *Nord J Psychiatry*. 2010;64(3):164–71.
[273]Miech RA, Caspi A, Moftt TE, Wright BRE, Silva PA. Low Socioeconomic Status and Mental Disorders: A Longitudinal Study of Selection and Causation during Young Adulthood. *American Journal of Sociology*. 1999;104(4):1096–131.
[274]Bardone AM, Moftt TE, Caspi A, Dickson N, Stanton WR, Silva PA. Adult physical health outcomes of adolescent girls with conduct disorder, depression, and anxiety. *J Am Acad Child Adolesc Psychiatry*. 1998;37(6):594–601.
[275]Simonof E, Elander J, Holmshaw J, Pickles A, Murray R, Rutter M. Predictors of antisocial personality. Continuities from childhood to adult life. *Br J Psychiatry*. 2004;184:118–27.
[276]Bardone AM, Moftt TE, Caspi A, Dickson N, Stanton WR, Silva PA. Adult physical health outcomes of adolescent girls with conduct disorder, depression, and anxiety. *J Am Acad Child Adolesc Psychiatry*. 1998;37(6):594–601.
[277]Zoccolillo M, Pickles A, Quinton D, Rutter M. The outcome of childhood conduct disorder: implications for defning adult personality disorder and conduct disorder. *Psychol Med*. 1992;22(4):971–86.
[278]Fergusson DM, Horwood LJ, Ridder EM. Show me the child at seven: the consequences of conduct problems in childhood for psychosocial functioning in adulthood. *J Child Psychol Psychiatry*. 2005;46(8):837–49.
[279]BPS website | CRIME STATISTICS [Internet]. www.bermudapolice.bm. [cited 2023 Jan 26]. Available from: https://www.bermudapolice.bm/crime-statistics.

	All Cohorts from 2017–2022 Aged 10–15 (Junior Forum)	All Cohorts from 2007–2017 Aged 12–18 (General Mirrors Programme)
Been involved in administration services for disciplinary actions in the last 12 months	32%	-
Expelled or suspended in the last 12 months	7%	64% suspended
		11% expelled
Ever displayed violent behaviour towards others	7%	28% violent outbreaks
Displayed self-harm behaviour in the last 12 months	4%	17% (self-harm attempts)
Repeated a grade	-	27%

Table 5.2.4 Data from Junior Forum and General Mirrors Programme

5.3 Adults and Children in Social Care (Long-Term Care)

5.3.1 Introduction

Long-term care (LTC) is provided by private, charitable and government providers. LTC was previously under the remit of the Ministry of Health, however a Cabinet decision in 2020 resulted in the creation of the Ministry of Social Development and Seniors (MSDS) and the remit of LTC now falls under this new Ministry.[280] Although responsibility for strategic planning is held by MSDS, most operational services provided under social care are provided by entities that fall under the direct management or regulatory control of the Ministry of Health.

The introduction of the personal home care service as a benefit in 2015 under government subsidized health plans led to increased access to in-home care and enabled family members access to paid caregivers.[281] Previously, home care was paid for out of pocket unless a person was eligible under Financial Assistance or received services from Department of Health.

Ageing and Disability Services primarily provide adult protection (safeguarding) services, in addition to general case management and general information for persons over 65 years of age and persons with long-term disabilities. If a primary diagnosis is mental health or substance abuse, referrals are made to the respective specialist agency.

In 2022, there were 512 children referred for investigation of allegations of abuse/neglect. There were 19 children cared for in residential facilities and 49 children in foster care.

The Government of Bermuda spends approximately $100m per year[282] on LTC through the following functions:

- Subsidised health insurance benefits and the aged subsidy
- Provision of two (of the three) 24/7 Registered Nurse care homes at a fee rate substantially below operating costs
- Funding to three charitable care homes
- KEMH long-stay wards

[280]Government of Bermuda, Ministry of Health & Seniors, Long Term Care Action Plan [Internet]. Available: https://www.gov.bm/sites/default/files/Long%20Term%20Care%20Action%20Plan%202017%20PUBLICATION_0.pdf.

[281]Government of Bermuda. A Guide to Benefits Available to Persons with Disabilities in Bermuda [Internet]. [cited 2023 Jan 26]. Available: https://www.gov.bm/sites/default/files/Disability-Advisory-Council-Booklet-Visually-Impaired.pdf.

[282]Government of Bermuda, Ministry of Health, The Provision of Funding, Financing and Governance of Long-Term Services and Supports for the Elderly and Disabled in Bermuda [Internet]. [cited 2023 Jan 26]. Available: https://www.gov.bm/sites/default/files/Long%20Term%20Care%20Services%20and%20Supports%20Funding%20April%202018_1.pdf.

- Mid Atlantic Wellness Institute (quango) responsible for group homes and support services for persons with intellectual disabilities and mental health needs
- Department of Financial Assistance home care and care home benefits (Up to 70% of care home residents are on financial assistance.)

There is no centralised process for referrals into social care/long-term care.

5.3.2 Adult Long-Term Care

There are 22 residential care homes in Bermuda, with 20 privately run and two Government run.[283] In addition, some seniors with medical needs have long stays on four wings at KEMH and one wing at the Mid-Atlantic Wellness Institute (MWI), run by the BHB. MWI also provides eight group homes for people with mental illness and 15 group homes for people with learning disabilities. There is one privately run home for people with physical disabilities. Together, these institutions provide 655 beds, which are generally occupied at 90% to 100%, and usually with waiting lists for the appropriate level of care. The locations of Bermuda's adult LTC facilities (excluding the wings at KEMH) are shown in Figure 5.3.1. An interactive version of this map is available at: **https://experience.arcgis.com/experience/0fbbb53850694bcca6e55fa7cbd0622f**.

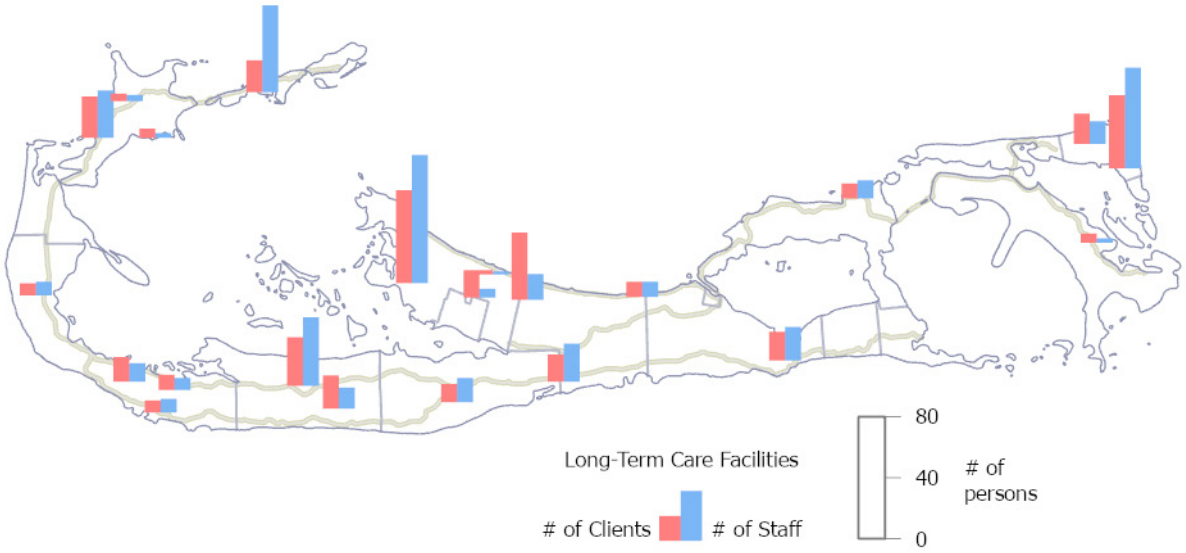


Figure 5.3.1 Location of Adult Long-Term Care Facilities in Bermuda with Number of Clients Per Facility (SOURCE: Bermuda Department of Health)
Note: Excludes KEMH Long-Term Care Wings

The occupied and empty beds are based on reported information from the Care Homes (seniors & physical disabilities) and the MWI intellectual disability homes. Mental health homes are not captured below but are at capacity and have been for the last seven years. Table 5.3.1 captures the larger permanent bed loss numbers due to business closures, damage to homes from hurricanes, etc.

Based on Bermuda's population projections report, there is an indication that, based on chronic health conditions projections, more beds may be needed.

[283]Government of Bermuda. *Long Term Care Action Plan [Internet].* [cited 2023 Jan 27]. Available from: https://www.gov.bm/sites/default/files/Long%20Term%20Care%20Action%20Plan%202017%20PUBLICATION_0.pdf.

Nursing											
	<2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bed	216	216	227	238	268	268	263	266	254	246	246
Occupied beds	206	206	217	228	258	258	256	259	237	237	237
Empty beds	10	10	10	10	10	10	7	7	17	9	9
Residential											
	<2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Bed	137	137	129	129	124	117	117	86	80	80	88
Occupied beds	137	137	129	129	124	117	117	86	80	80	88
Empty beds	0	0	0	0	0	0	0	0	0	0	0

Table 5.3.1 Nursing and Residential Care Beds 2012–2022
(SOURCE: Bermuda Health Council)

Anecdotal evidence from the Bermuda Health Council and Ageing and Disability Services, describes some of the reasons for families and residents moving into care homes:

- Family no longer able to support increasing care needs of adult
- Absence of appropriate persons to facilitate in home care
- Care needs exceed the care that can be provided by their current care home
- Client has a desire for companionship, reduction of isolation
- Cost of 24/7 in home-care supervision exceeds client resources even with minimal care needs
- Needing more specialised nursing care on a consistent basis

Care homes in Bermuda typically provide residence and care to seniors (65 years and older), but data shows they also provide care to people between the ages of 35 to 65 who are unable to remain at home. Rest homes provide care for persons who require minimal assistance with activities of daily living. Nursing homes provide care for persons who require more extensive assistance. It is estimated that the 90+ age group in rest and nursing home is increasing given the ageing population.

All day-care services provided by care homes for seniors, including those with dementia, stopped during the pandemic and only a few have resumed. This does not include the subsidised programmes provided by the two government homes. There are two private day care centres (one of which is a charity) that provide five days per week day care for seniors.

	Overall Count	Percentage Distribution	Percentage Point Change
Demographic Characteristics	**2016**	**2016**	**2010–2016**
Sex	**314**	**100**	
Male	122	39	+8
Female	192	61	–8
Given female's increased life expectancy in Bermuda, this could explain the higher population of women in rest and nursing homes in 2016.			
Age Groups	**314**	**100**	
0–69	38	12	–1
70–79	65	21	**
80–89	131	42	–3
90 & Over	80	25	+4
Median Age (years)	85		
The proportion of 90 and over is increased over time (2010–2016) reflecting the increasing life expectancy over time.			
Race	**314**	**100**	
Black	219	70	–1
White	85	27	**
Mixed & Other	10	3	+1
The percentage distribution for race in rest and nursing homes is similar to total population race percentage distribution for white, mixed and other but the percentage distribution for the black population in rest and nursing homes is higher than the general black population (70% vs 52%).			
Highest Academic Qualification (16 Years +)	**314**	**100**	
No Formal Certificate	158	57	–20
High School Certificate	69	25	+18
Tech./ Voc. / Assoc./ Diploma	31	11	+4
Degree	17	6	–3
Not Stated	39		
"Highest academic Qualification" is being used here as a proxy for deprivation in the absence of other data available.			
** Less than 1%.			

Table 5.3.2 Rest and Nursing Home Population by Demographic Characteristics, 2016 (SOURCE: Bermuda Department of Statistics[284])

5.4 Domestic Violence, Sexual Violence and Exploitation

5.4.1 Introduction

Domestic violence, also called domestic abuse, includes physical, emotional and sexual abuse in couple relationships or between family members. Domestic abuse has an impact on people's health and well-being. The direct and immediate physical adverse health of domestic violence include injuries such as bruises, cuts, broken bones, lost teeth and hair, miscarriage, stillbirth and other complications of pregnancy.[285] In addition, long-term effects may exacerbate chronic health problems, including asthma, epilepsy, digestive problems, migraine, hypertension and skin disorders. Domestic abuse is detrimental to mental health and can lead to increased use of alcohol, drugs and other substances.

[284] Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[285] Women's Aid. *Domestic abuse and your physical health [Internet].* 2022. Available: https://www.womensaid.org.uk/information-support/the-survivors-handbook/domestic-abuse-and-your-physical-health/

There are no safe refuges in Bermuda. The focus for domestic violence cases has been to obtain a protection order and remove the perpetrator from the home rather than providing the victim with a safe refuge.

Bermuda Police Service strive to record offences using a victim-centred approach, meaning a victim's claims will be investigated unless there is substantial evidence to suggest otherwise.

5.4.2 Overall Prevalence

The data on arrests for sexual assault and domestic incident events goes some way to describe the probable prevalence of domestic violence, sexual violence and exploitation. But, as it is in jurisdictions across the world, most cases of domestic violence in Bermuda are not reported, so it can be assumed that this issue is far more widespread than current data reveals.

Year	2010	2013	2014	2015	2016	2017	2018	2019	2020
Number of arrests for sexual assault	28	36	25	19	23	17	28	26	21

Table 5.4.1 Number of Arrests for Sexual Assault Over Time (SOURCE: Bermuda Police Service[286])

Arrests are the first stage of the judicial process and, as such, convictions are predicted to be lower than the figures presented in the table above.

BPS defines a Domestic Incident as "any incident of threatening behaviour, violence or abuse (whether psychological, physical, sexual, financial or emotional) between adults who are or have been in a close relationship, regardless of gender. It will also include family members defined as mother, father, son, daughter, brother and sister, grandparents, in-laws and stepfamily". The table below gives a range in which the true number of domestic incidents may have occurred. We know the number of 911 calls or other first contacts that were categorised as a domestic incident (the maximum number of domestic incidents). Where this categorisation has been confirmed, this may be the minimum number of domestic incidents that occurred. Due to inconsistency of categorisation of confirmations of domestic incidences, we cannot assume that confirmed domestic incidences are the total domestic incidences.

Events	2017	2018	2019	2020	2021	2022
Minimum and maximum number of domestic incidents	127–873	89–861	62–926	233–904	106–681	254–694
Minimum and maximum % of domestic Incidents as a % of all call types	2–6.5%	1–6.4%	1– 6.1%	2–5.7%	1–4.8%	3–5.3%

Table 5.4.2 Domestic Incident Events (SOURCE: Bermuda Police Service[287])

It is important to remember that globally, domestic violence cases are underreported, and it is therefore difficult to know the real incidence of domestic violence cases.[288]

[286]BPS website | CRIME STATISTICS [Internet]. www.bermudapolice.bm. Available: https://www.bermudapolice.bm/crime-statistics.
[287]BPS Memex Intelligence System – https://www.womensaid.org.uk/information-support/the-survivors-handbook/im-not-sure-if-my-relationship-is-healthy/#1667903922917-e1fb1199-d633.
[288]Women's Aid. *How common is domestic abuse?* (womensaid.org.uk).

5.4.3 Trend

There has not been a significant reduction in sexual assault crimes between 2018 and 2020. The Centre Against Abuse found their counselling service to victims of domestic and sexual assault over 18–years old has been more in demand since 2020 (a 176% increase since 2017). This is most likely a result of the lockdown restrictions in place during the height of the COVID–19 pandemic,[289] although there are other explanations such as services being better advertised and increased media interest following high profile incidents.[290]

5.4.4 International Comparisons

Domestic violence is a serious public health problem.[291] Globally, most cases are underreported. Estimates indicate that globally about 30% of women worldwide in their lifetime have been subjected to either physical and/or sexual intimate partner violence or non-partner sexual violence.[292] Applied to Bermuda's population and based on the data available, we can estimate that women in Bermuda may have experienced domestic violence in their lifetime above the worldwide average.

Since the start of the pandemic, reported cases of domestic violence have increased globally.[293] The increase is partly explained by reasons such as security, health and money stresses being exacerbated by cramped and confined living conditions.

In Bermuda, one in two women have experienced child sexual abuse, which is defined specifically as physical contact sexual abuse as opposed to the more inclusive definitions of exposure abuse or grooming.[294] This is a concerning finding from the Bermuda Adverse Childhood Experiences Study.

The Centre Against Abuse has initiated implementation of a Multi-Agency Risk Assessment Conference (MARAC) in Bermuda involving participation from NGOs, BPS and Department of Child and Family Services. A Bermuda MARAC will provide multi-agency support for high-risk victims of domestic abuse with the common goal of maintaining their safety and providing options for the person who harms. CAA is said to be looking forward to supporting a Bermuda MARAC, which will be the first of its kind in a Caricom nation, and it is hoped that this will be fully implemented by the end of 2023. It is hoped that through the MARAC, better data of better quality around the issues of domestic violence is collected and reported.

The Bermuda Police Service launched a Victims and Survivors of Domestic Abuse Survey in August 2022.[295] The purpose was to gauge the performance of first responders such as the Bermuda Police Service, as well as partner agencies who provide the necessary aftercare and rehabilitation where needed. The results from this survey are awaited.

5.5 Disabilities: Mental and Physical

5.5.1 Introduction

WHO classes disability as a global public health issue and defines it as "*people with disability, throughout the life course, face barriers in accessing health and related services, such as rehabilitation, and have worse*

[289]Mineo L. Shadow pandemic' of domestic violence. *The Harvard Gazette*. 2022. Available: https://news.harvard.edu/gazette/story/2022/06/shadow-pandemic-of-domestic-violence/.
[290]McWhirter F. Covid–19 leads to spike in domestic violence [Internet]. *The Royal Gazette*. 2020 [cited 2023 Feb 21]. Available: https://www.royalgazette.com/other/news/article/20200520/covid–19–leads-to-spike-in-domestic-violence/.
[291]Krantz G. *Violence against women: a global public health issue! Journal of Epidemiology & Community Health*. 2002 Apr 1;56(4):242–3.
[292]World Health Organisation. *Violence against women [Internet]*. www.who.int. 2021. Available: https://www.who.int/news-room/fact-sheets/detail/violence-against-women#:~:text=Estimates%20published%20by%20WHO%20indicate.
[293]World Health Organization. (2020a). *COVID–19 and violence against women: What the health sector/system can do*. WHO. Available: https://www.who.int/publications/i/item/WHO-SRH–20.04.
[294]Hines, T, Guthman S. *Bermuda adverse childhood Experiences study*. 2021 Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018–2020–Bermuda-Adverse-Childhood-Experiences-Study.pdf.
[295]Bermuda Police Service. *Introduction of the Victims and Survivors of Domestic Abuse Survey*. 2022. Available: https://www.bermudapolice.bm/content/introduction-victims-and-survivors-domestic-abuse-survey.

health outcomes than people without disability".[296] Ageing populations and the increasing prevalence of non-communicable diseases are factors contributing to the increase of disability.[297] People with disabilities are more likely to die earlier, have worse health and experience more restrictions in everyday functioning due to health inequities.

5.5.2 Overall Prevalence

There is a lack of data on recent prevalence of disability in Bermuda so overall prevalence, by demographics is not available. The most recent nationwide survey was the 2016 Population and Housing Census,[298] which included questions on types of disability and which is referenced in the 2017 LTC Action Plan.[299] A total of 3,174 persons (5% of total population) were reported to have a disability; 373 are aged under 24 and 1,213 are seniors aged over 65.

Estimated prevalence rates of people in Bermuda with an intellectual disability can be seen in the table below based on total population in the 2016 census data.[300]

Age Band	Total Bermuda Population		Bermudian Population (Excludes the 21% of the Total Population Who are Non-Bermudian)**	
	General Population	Estimated ID Population Based On 1% Prevalence*	General Population	Estimated ID Population Based On 1% Prevalence
0–18 years	12,063	121	9,949	99
19–85+ years	51,716	517	40,252	403
Total	63,779	638	50,201	502
* Based on international prevalence estimates that 1% of the general population is likely to have an intellectual disability (Maulik et al., 2011)				
**There is an assumption that the prevalence of intellectual disability is likely to be significantly lower in the non-Bermudian population, as the majority of this group (13,578) will be resident in Bermuda on work permits, and less likely to have dependents with an intellectual disability on the island				

Table 5.5.1 Estimated Intellectual Disability Prevalence
(SOURCE: Bermuda Ministry of Social Development and Seniors)

In England, people with an intellectual disability have worse physical and mental health than people without an intellectual disability.[301] Health outcomes for people living with intellectual disabilities have not been systematically analysed. However, it is important to consider the barriers that prevent people with learning disabilities from accessing healthcare, including people not identified as having an intellectual disability, anxiety or lack of confidence.[302]

The K. Margaret Carter Centre (KMCC) (under Aging and Disability Services (ADS)) is the only public (free) day programme for people with intellectual disabilities. It is at capacity and limited in the level of care available as it has no registered nursing staff.

[296]WHO. *WHO global disability action plan 2014–2021 [Internet].* www.who.int. Available: https://www.who.int/publications/i/item/who-global-disability-action-plan-2014-2021.
[297]WHO. *WHO reveals leading causes of death and disability worldwide: 2000–2019 [Internet].* www.who.int. 2020. Available: https://www.who.int/news/item/09-12-2020-who-reveals-leading-causes-of-death-and-disability-worldwide-2000-2019.
[298]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[299]Government of Bermuda, Ministry of Health and Seniors. *Long Term Care Action Plan.* 2017. Available: https://www.gov.bm/sites/default/files/Long%20Term%20Care%20Action%20Plan%202017%20PUBLICATION_0.pdf.
[300]Government of Bermuda. *Draft National Plan for People with Intellectual Disabilities and their families 2022–2027.* Available: https://forum.gov.bm/en/projects/idplan/1.
[301]HQIP. *The Learning Disabilities Mortality Review – Annual Report 2018 [Internet].* 2019 [cited 2023 Jan 26]. Available: https://www.hqip.org.uk/resource/the-learning-disabilities-mortality-review-annual-report-2018/.
[302]Heslop et al. 2013; Tuffrey-W*ijnes et al.* 2013; *Allerton and Emerson* 2012.

In 2010, there were 1,213 people aged 65 years and older suffering from a long-term health condition that affected some aspect of their daily lives in Bermuda.[303] The most common disabling health conditions that affected the older population were high blood pressure, impaired vision, arthritis, heart conditions, diabetes and moving/mobility difficulties – findings unchanged from 2000. Non-communicable diseases appear to be the main cause of disability, and this is reflected globally where non-communicable diseases are the number one cause of death and disability.[304]

The average number of people with a disability on financial assistance in Bermuda in 2020/2021 was 782, with 47% of them categorised as disabled, pensioner, earnings low and able-body unemployed.[305] This category was the second highest category of people on financial assistance. It was lower than pensioners (although there are likely pensioners also receiving financial assistance for disability), but higher than low earners and unemployed able-bodied people. In 2020/21, the financial payout for people with a disability was $15.28 million, which amounted to 33% of total financial payouts. Again, while this is lower than the payouts for pensioners, it is more than five times greater than low earners and able-bodied unemployed.

Employment Issues, Stigma and Discrimination

Employment is an important determinant of health. In 2016, 1174 people over 16–years old in Bermuda were unable to work due to disabling health conditions, up from 834 in 2010. Of these people in 2016, 629 were male and 545 were female.[306] The Department of Workforce Development plays a role in supporting persons with disabilities for employment, but, anecdotally speaking, there is still a lot of unmet need for this kind of support. Enabling environments in the workplace are needed to support people with disabling health conditions to contribute to the workforce and the economy. Without employment opportunities for this population, the risk of adverse health outcomes associated with unemployment and low incomes will rise.

As explained by stakeholders working with this population, the barriers that exist for people with intellectual or other cognitive-related disabilities, especially in terms of employment and inclusion, include:

- Available social support for work shadowing or onsite job coaching as required
- Inappropriate or insufficient compensation for work done
- Employers' hesitancy due to health insurance requirements

Through ADS's programmes and engagement with the sector, including the Disability Advisory Council, there is indication of stigma around disability in Bermuda that impacts employment and social inclusion. The Human Rights Act 1981 provides protection against discrimination within employment due to disability. Furthermore, a person with a disability shall not be considered disqualified for employment by reason of their disability if it is possible to modify the circumstances of their employment without causing unreasonable hardship to the employer or prospective employer. Complaints and queries received by the Human Rights Commission that involve disability go some way to illustrate the issue in Bermuda (see table below). As quoted by staff at the

Human Rights Commission, "The Commission recognises that the complaints or queries received and logged by the Office represent a fraction of the experiences of alleged discrimination or harassment people face in Bermuda and particularly in 'vulnerable' populations". The Human Rights Commission has observed that people with disabilities are often excluded from or under-represented in employment, so individual experiences may not be reported or captured in labour force surveys or other data collection methods.

[303]Government of Bermuda. A Profile of Bermuda's Senior Citizens. 2013 [cited 2023 Jan 26]. Available: https://www.gov.bm/sites/default/files/A-Profile-of-Bermudas-Senior-Citizens-2010.pdf.
[304]WHO. *Non communicable diseases [Internet].* www.who.int. Available: https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases#:~:text=Cardiovascular%20diseases%20account%20for%20most.
[305]Government of Bermuda. *Department of Financial Assistance. Annual report 2020/2021.* Available: https://cloudfront.bernews.com/wp-content/uploads/2022/05/DFA-Annual-Report-2020-21.pdf.
[306]Department of Statistics, Government of Bermuda. *Population and Housing Census 2016.* Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

Year	Total Number of Intakes	Disability Related Intakes	Percentage Total of All Intakes for Other Protected Grounds and Areas
2017	149	19	13%
2018	180	21	12%
2019	128	18	14%
2020	140	24	17%
2021	174	13	7%
Total	**771**	**95**	**12%**

Table 5.5.2 Intakes (Queries and Complaints) by Ground of Discrimination (sec. 2(2)(a)(iiiA) – Disability, 2017 to 2021) (SOURCE: Human Rights Commission Bermuda[307])

The disability-protected ground has accounted for 12% of all intakes received by the Office of the Human Rights Commission between 2017 and 2021, with filings being highest in 2020 (17% of all intakes related to disability). Currently, Bermuda has a dated receivership legislative framework (Mental Health Act 1968) that is not reflective of the standard within the UN Convention for the Rights of Persons with Disabilities. Experience from ADS case management has found individuals being denied decision-making rights based on stigma/ assumption of abilities.

The Disability Advisory Council (DAC) is a ministerial appointed council of volunteers who live with, work in the area of or advocate for disabilities. It coordinates awareness initiatives developed around UN Day for Persons with Disabilities and has identified the need to support or develop sustained stigma-reduction campaigns.

5.5.3 International Comparisons

About 16% of the global population currently experience significant disability.[308] 26% of adults in the United States have some type of disability.[309] It is likely that the percentage of people living with disabilities in Bermuda is similar, given the ageing population and prevalence of non-communicable disease.

5.6 People with Multiple Complex Needs

5.6.1 Introduction

People with multiple and complex needs may experience several coexisting social, economic and health problems at the same time, such as mental ill health, homelessness, drug and alcohol addiction, offending and family breakdown. There may be overlap with BHB's "*Superuser*" study, which is outlined in Chapter 6.

Staff from NGOs and other organisations highlighted the issue of lack of coordination between health and social care sectors for case management of people with complex needs. They recommend that people with multiple complex needs should have a primary case manager or service provider based on their primary diagnosis who coordinates and collaborates with other required services. However, there are limited resources for people with complex needs and, if the needs exceed service capacity and skill level, the client can remain

in an inappropriate level of care or be discharged from services. Bermuda is reliant on overseas care for more complex behavioural supports that can't be met on island by existing services, but access to that care is tied primarily to forensic-related cases for adults.

[307]Human Rights Commission, Bermuda, unpublished.
[308]WHO. *Disability [Internet].* www.who.int. 2022. Available: https://www.who.int/health-topics/disability#tab=tab_1.
[309]CDC. *Disability Impacts All of Us* Infographic | CDC [Internet]. Centers for Disease Control and Prevention. 2019. Available: https://www.cdc.gov/ncbddd/disabilityand-health/infographic-disability-impacts-all.html.

Data sharing occurs by collaborative agreements between agencies and/or patient/client consent. Staff working with this population explained that, as a small community, there is a historical route to obtaining information through professional working relationships. There are now more formalised agreements in light of the Personal Information Protection Act (PIPA). ADS is in the process of re-establishing resources needed to monitor and track transitions of people with more complex needs or at risk of placement breakdown. This will include more consistent and standardised data sharing.

5.6.2 Overall Prevalence

As discussed in Chapter 4, when preparing for this JSNA, data used could not be tracked to the individual level, which meant co-morbidities and people with multiple complex needs were difficult to ascertain. Utilising the work the Bermuda Health Council has undertaken to develop a Unique Patient Identifier (UPI) will go some way to better identifying vulnerable people with complex needs.

Individuals in the Bermuda Adverse Childhood Experiences Study, who said care in Bermuda is prohibitively costly, were four times more likely to have multiple self-reported chronic diseases.[310] There also is evidence that 11.5–12.25% of individuals on FutureCare exhaust their annual prescription allocation early when they have multiple comorbidities.[311]

5.7 Older Population

5.7.1 Introduction

Health status, cognitive ability and social network are three of the main risk factors that contribute to vulnerability in older adults. As life expectancy increases in developed countries, so does the prevalence of age-related chronic diseases. As discussed in Chapter 4, ageing is the main risk factor for chronic diseases such as cancer, cardiovascular disease and neurodegeneration. Older adults can become economically vulnerable if their cost of care exceeds their income especially when chronic ill-health increases their dependency and cost of living.

Loneliness is the pain felt when social connections do not meet a person's needs. Social isolation can contribute to loneliness when someone has a smaller number of social contacts.[312] Social isolation and loneliness among older people can be detrimental to health as they can shorten lives, damage physical and mental health and reduce quality of life. Social isolation and loneliness are important social determinants of the health of older people. Data was not found or available for the prevalence of loneliness and isolation, but staff working for charities and government agencies described these, anecdotally, as prevalent issues.

5.7.2 Overall Prevalence

In 2016, nearly half of the population was 45 years or older compared with 44% in 2010.[313] As indicated in previous chapters of this document, census data indicates an ageing population in Bermuda.

[310]Hines, T, Guthman S. Bermuda *Adverse Childhood Experiences Study*. 2021. Available: https://www.tfc.bm/wp-content/uploads/2021/01/2018-2020-Bermuda-Adverse-Childhood-Experiences-Study.pdf.
[311]From unpublished information given by Bermuda Health Insurance Department.
[312]WHO. *Social Isolation and Loneliness [Internet]*. www.who.int. 2021. Available: https://www.who.int/teams/social-determinants-of-health/demographic-change-and-healthy-ageing/social-isolation-and-loneliness.
[313]Government of Bermuda, Department of Statistics. *Census Report*. 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

The average number of pensioners on financial assistance in 2020/21 was 1,024.[314] The financial payout for this group was $23.87 million. This is the highest category of financial assistance payout, and it indicates that many pensioners are vulnerable and living close to, if not below, the minimum standard of living.

The charity Age Concern runs an information, advice and referral service, which links seniors to services to meet their needs and provides information and advice. 83% of the users of this programme are female, suggesting that the male older adult group are not accessing services available to them. Alternatively, this may reflect women's longer life expectancies. Of ADS's 257 new referrals in 2021–2022, it is estimated that 41% were male and 59% female.

Age Concern also runs a hardship support programme, which provides hardship relief by helping older adults avoid, reduce or alleviate a financial difficulty. The table below shows the demographics of clients using this programme. Similar to the information, advice and referral programme, clients using the hardship support programme are mostly female, again potentially suggesting a reflection of women's longer life expectancies. Most clients are Black and there is a shift towards younger persons using the programme. This data suggests it is those people living alone or with immediate family (that are not their spouses) who are at greater need for the services provided by the hardship programme. Anecdotally, Age Concern explained that individuals living alone need assistance as they have no one to share the burden. Those with extended family are often in a household with children and grandchildren, but are the primary billing account holders and bear the responsibility of bill payment whether or not others in the household contribute to the capacity needed.

[314]Government of Bermuda. Department of Financial Assistance. *Annual report 2020/2021.* Available: https://cloudfront.bernews.com/wp-content/uploads/2022/05/DFA-Annual-Report-2020-21.pdf.

Demographic Characteristic	% of Clients
Age (years)	
50–64	41
65–79	44
80+	15
Race	
Black	86
Other	5
White	9
Sex	
Female	87
Male	13
Annual income	
$1–36,000	94
$36,000–71,999	6
Residential status	
Homeless	1
Other	1
Resides alone	39
Resides in care facility	1
Resides with immediate family	44
Resides with spouse	13
Employment status	
Full time	9
Other	14
Part-time	7
Retired	39
Unemployed	31
Insurance coverage	
No	22
Yes	78
Financial assistance	
No	48
Yes	52

Table 5.7.1 Hardship Client Data and Demographics 2021–2022 (SOURCE: Age Concern, Bermuda)

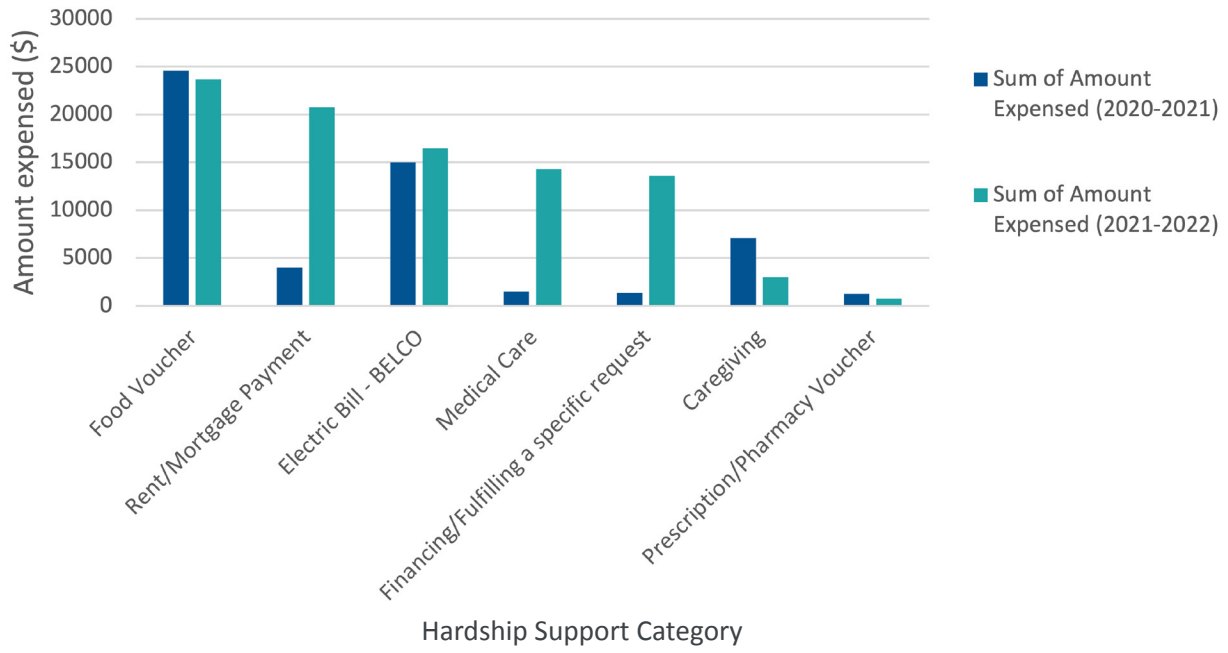


Figure 5.7.1 Hardship Disbursement Comparison (SOURCE: Age Concern, Bermuda)

In terms of food support, Age Concern recognises that it acts as a supplemental service to those receiving financial assistance from the government or those awaiting eligibility determination. Age Concern is of the view that its clients appear to be relying on third sector services much more than government services and family support. Age Concern's objectives for 2022–2023 reflect this need and are to expand older people's access to food support, respond to crisis electricity needs and continue to strengthen general short-term emergency financial assistance.

Anecdotal evidence from Age Concern indicated that there is a common underlying issue for clients of their hardship programme who are not able to fully follow through with financial support and financial assistance. This can be explained, in part, by the barriers older people face using technology to engage with not only financial assistance but also healthcare more generally. With more technological advances and hospital records going online, there is a real risk of further isolating the older population from accessing care. Staff described the lack of coordination for long-term care and estimated that many medical situations in this population group happen as a result of the failing of long-term care.

No data was found on loneliness and social isolation in Bermuda in the older adult population. However, we know that globally, social isolation and loneliness are widespread, with some countries reporting that up to one in three older people feel lonely.[315] Anecdotally, staff at Age Concern and at the Ageing and Disability Services highlighted this as a known issue in Bermuda.

Data from ADS case management shows that of the 257 new referrals in 2021–2022 fiscal years, there were 84 senior abuse reports. Of the 173 case management referrals, 151 referrals were for persons over 65 years who are at risk due to self-neglect or who required general case management support.

[315]World Health Organization. *Social Isolation and Loneliness [Internet]*. www.who.int. 2021. Available: https://www.who.int/teams/social-determinants-of-health/demographic-change-and-healthy-ageing/social-isolation-and-loneliness.

5.8 People in Contact with the Justice System

5.8.1 Introduction

People in contact with the justice system often come from disadvantaged and lower socio-economic groups in the wider population. By tackling health inequalities in this population we can address wider health inequalities, benefitting not only those in prisons, but also the wider society.[316]

An unpublished health needs assessment of Bermuda's correctional facilities was conducted by UKHSA in 2022. A random sampling approach was used to invite people in prison to participate. There were 40 survey respondents (out of 122 people detained in prison). However, complete demographic information was only available for 35 respondents.[317] Twenty-three people in prison were interviewed. UKHSA observed a limited health information system, which meant that it was challenging to gather data and that there was limited human resource capacity to support it.

5.8.2 Overall Prevalence

Bermuda's incarceration rate was 200 per 100,000 in 2021. There has been a sharp decline in the incarceration rate, which was 417 per 100,000 in 2012. Bermuda has a higher incarceration rate per 100,000 than the global average (200 per 100,000 vs 140 per 100,000 respectively), but lower than other United Kingdom Overseas Territories such as BVI, Anguilla and Cayman Islands.[318]

[316]World Health Organization. Regional Office for Europe. *Addressing the noncommunicable disease (NCD) burden in prisons in the WHO European Region: Interventions and policy options [Internet].* apps.who.int. 2022 [cited 2023 Jan 28]. Available: https://apps.who.int/iris/handle/10665/352257.
[317]UK Health Security Agency. *Bermuda Correctional Facilities Health Needs Assessment.* 2022. Unpublished.
[318]World Prison Brief, an online database comprising information on prisons and the use of imprisonment around the world [Internet]. Prisonstudies.org. 2014. Available: https://www.prisonstudies.org/.

	Number	Percentage Distribution	Percentage Point Change
Demographic Characteristics	**2016**	**2016**	**2010–2016**
Sex	**182**	**100**	
Male	171	94	–2
Female	11	6	2
Sex Ratio	1,555		
Age Groups	182	100	
0–24	19	10	–8
25–34	74	41	9
35–44	38	21	–7
45 & Over	51	28	6
Median Age (years)	35		
Race	**182**	**100**	
Black	178	98	7
White	3	2	–5
Mixed & Other	1	1	**
Not Stated	0		
Bermudian Status	**182**	**100**	
Bermudian	173	95	7
Non-Bermudian	9	5	–7
Not Stated	0		
Health Insurance	**182**	**100**	
Insured	0	**	
Uninsured	182	100	
Not Stated	0		
Highest Academic Qualification (16 Years +)	**182**	**100**	
No Formal Certificate	69	39	–36
High School Certificate	92	52	34
Tech./ Voc. / Assoc./ Diploma	11	6	**
Degree	6	3	2
Not Stated	4		
** Less than 1%.			

Males accounted for 94% of the 182 inmates in correctional facilities in 2016[319]. Black people are highly overrepresented in the correctional facilities' population; in 2016, 98% were black, compared to 52% in the rest of the population. This disparity appears to be increasing, as the figures have risen from 91% black in the 2010 in the correctional facilities' population. 39% of the correctional facilities population reported having no formal academic qualifications. This is a proxy indicator for socio economic status.

Table 5.8.1 Correctional Facilities Population by Demographic Characteristics, 2016 (SOURCE: Bermuda Department of Statistics[320])

[319]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[320]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

Health Status

Perceived health status appears to be lower amongst people in prison in Bermuda than in the general population, wherein the study Health in Review 2017 found 85% of the population self-reported good to excellent health, well above the OECD average.[321] Less than half of survey respondents (approximately 42.5%) rated their health on the day they completed the survey as either "good", or "very good".

Almost 40% of interviewees had a pre-existing health condition when they came to prison, namely non-communicable diseases, mental health issues and broken bones. Data from health services records showed that among the 122–person population at the time of the UKHSA visit in 2022, the most common recorded chronic conditions were:

- Hypertension (17.2%, of which approximately half were on medication)
- Mental health conditions (14.8%)
- Asthma (12.3%)
- Diabetes (4.1%)

This indicates the need for upstream prevention interventions targeted at at-risk of incarceration groups (i.e., disadvantaged populations such as people experiencing homelessness, those with substance misuse issues, mental health illness, lower educational attainment and unemployed).

Health Behaviours

Although 58.8% of interviewees reported smoking daily previously, only 11.1% of people interviewed reported that they currently smoke tobacco.[322] This appears to be lower than in the general population, where data from 2014 found that 14% of the total population and 20% of men reported smoking in the past 30 days.

The 2014 health survey found that 64% of people in the general population reported having drunk alcohol in the past 30 days.[323] 11.1% of interviewees said they had drunk alcohol while in prison. Alcohol-related offenses resulted in 183 convictions in Bermuda in 2020.

The prison has a no smoking or alcohol policy, which most likely accounts for the lower prevalence of these behaviours in the prison compared to the wider community.[324] It is more difficult for people in prison to engage in these behaviours and there is also an associated punishment, which could lead to under-reporting of behaviours. There is currently no behavioural change support, so any gains made from being in a smoke-free/ alcohol-free environment may not be realised after release.

Many people in prison are incarcerated for drug-related offences, with 63 people being convicted of this in 2020 alone.[325] Data from the Bermuda Drug Information Network (2021) reports that in 2020 most people at Westgate (86.1%) were screened for illegal drugs on reception and the majority (93.4%) resulted in a positive result, a substantial increase from 2019 where the figure was 58.2%.[326] The most common drug indicated was marijuana (58.5% in 2020), followed by cocaine (27.7% in 2020), followed by opiates (21.5% in 2020). In 2020, over one-quarter (25.8%) tested positive for more than one drug. Data indicated that substance misuse is far higher amongst people who have been in prison more than once, with 2020 data showing positive results for 17.2% of people coming into prison for the first time, compared with 82.8% amongst those who have been in prison before. Cocaine and opiates were typically used by people who had been in prison more than once.

[321]Government of Bermuda, Ministry of Health. *Health in Review 2017: An International Comparative Analysis of Bermuda Health System Indicators*, 2nd Edition. Available: https://www.gov.bm/sites/default/files/Health%20in%20Review%202017%2C%202nd%20Edition_2.pdf.
[322]Government of Bermuda, Ministry of Health. *Health in Review 2017: An International Comparative Analysis of Bermuda Health System Indicators*, 2nd Edition. Available: https://www.gov.bm/sites/default/files/Health%20in%20Review%202017%2C%202nd%20Edition_2.pdf.
[323]Government of Bermuda, Ministry of Health. *Health in Review 2017: An International Comparative Analysis of Bermuda Health System Indicators*, 2nd Edition. Available: https://www.gov.bm/sites/default/files/Health%20in%20Review%202017%2C%202nd%20Edition_2.pdf.
[324]UK Health Security Agency. *Bermuda Correctional Facilities Health Needs Assessment*. 2022.
[325]Government of Bermuda. Department for National Drug Control. *Annual Report of the Bermuda Drug Information Network 2021*. Available: https://www.gov.bm/sites/default/files/BerDIN-Report-2021.pdf.
[326]Government of Bermuda. Department for National Drug Control. *Annual Report of the Bermuda Drug Information Network 2021*. Available: https://www.gov.bm/sites/default/files/BerDIN-Report-2021.pdf.

After reception, screenings amongst people in prison are carried out at various intervals; sometimes randomly, at times if there is suspicion of substance misuse or after a person has returned from a work placement. Such screenings indicate that substance misuse amongst the Westgate population decreased from 2019 to 2020, as positive results were 12.6% and 1.3%, respectively.[327] In The Right Living House (a therapeutic community, which is a segregated residential substance abuse programme with a capacity to house 18 people), out of 163 screenings conducted over two years from 2019 to 2020, four positive results were found in 2019 and zero in 2020. At the Farm Facility, just three positive results (1% of tests) were obtained in 2020, all of which were for THC. At the Co-Educational facility in 2020, all results out of 34 screenings were negative.

Views amongst interviewees on substance misuse were mixed.[328] Most (81.8%, N=22) reported knowing someone in prison currently addicted to drugs. Several felt that drug use, particularly marijuana, is prevalent and that prison "enables you to take drugs" through staff either turning a blind eye or, in some cases, through certain staff members smuggling drugs into prison. In contrast, another interviewee felt that there are "no drugs in prison" and that drug control is "probably the only thing they get right."

Homelessness and Incarceration

Evidence from around the world shows a strong association between homelessness, incarceration and the chance of reoffending. People in prison often experience other complex disadvantages intertwined with homelessness, including substance misuse issues, mental health problems, lower educational attainment, higher unemployment and racial inequalities. All these factors put them at greater risk of incarceration and reoffending.[329]

Data from the study 'Toward Ending Homelessness in Bermuda' revealed that of the 274 participants, more than three quarters had been arrested (76%), and of those who had been arrested, 83% reported being arrested more than once.[330] On average, respondents had been arrested approximately eight times (ranging from one to 74 times). Over half had been incarcerated (69%) and only 16% stated that they received counselling/support to help them find a job or to transition back into the community while they were incarcerated. The most common convictions included drug possession (17%), unpaid fines/speeding tickets/bills (15%), theft/ shoplifting/ stealing/robbery (15%) or assault (7%).

60% of people in prison in Bermuda believe that having a place to live would help stop them re-offending.[331] Numbers of people experiencing homelessness appear to be on the rise in Bermuda and this means there are even more who may end up being incarcerated given the known association.

5.9 Homeless or Insecure Housing

5.9.1 Introduction

According to the 2016 Census,[332] the "non-sheltered population" is defined as those who have no fixed abode and who do not stay in adult shelters. The non-sheltered population has no habitable dwelling to call home and usually sleep outdoors in places such as building entrances, bus shelters, vehicles and derelict buildings.

More recent data in this section comes from a 2021 survey to understand the challenges and experiences facing individuals experiencing homelessness/housing insecurity.[333] The survey, which interviewed 274 homeless/ housing insecure people, was challenged to collect what it considered a representative sample of homeless/

[327]Government of Bermuda. Department for National Drug Control. *Annual Report of the Bermuda Drug Information Network 2021.* Available: https://www.gov.bm/sites/default/files/BerDIN-Report-2021.pdf.
[328]UK Health Security Agency. B*ermuda Correctional Facilities Health Needs Assessment.* 2022. Unpublished.
[329]UK Health Security Agency. *Bermuda Correctional Facilities Health Needs Assessment.* 2022. Unpublished.
[330]Catalyst Consulting Limited. *Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet].* 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.
[331]Catalyst Consulting Limited. *Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet].* 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.
[332]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[333]Catalyst Consulting Limited. *Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet].* 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.

housing-insecure respondents. The 2021 study provides comprehensive data into causes, challenges and solutions for addressing homelessness in Bermuda.

5.9.2 Overall Prevalence

	Number	Percentage Distribution	Percentage Point Change
Demographic Characteristics		**2016**	**2010–2016**
Sex	138	100	
Male	121	88	–2
Female	17	12	2
Sex Ratio	712		
Age Groups	138	100	
0–19	0	**	–2
20–39	22	16	–8
40–64	92	67	2
65 +	24	17	8
Median Age (years)	56		
Race	138	100	
Black	128	93	13
White	3	2	–8
Mixed & Other	7	5	–5
Bermudian Status	138	100	
Bermudian	137	99	**
Non-Bermudian	1	1	**
Not Stated	0		
Highest Academic Qualification (16 Years +)	138	100	
None	68	50	7
High School Certificate	48	36	–3
Tech./ Voc. / Assoc./ Diploma	17	13	–5
Degree	2	1	1
Not Stated	3		
** Less than 1%.			

Table 5.9.1: Non-Sheltered Population by Demographic Characteristics, 2016 (SOURCE: Bermuda Department of Statistics[334])

Black people are highly overrepresented in the non-sheltered population, according to the Population and Housing Census Report 2016. 93% were Black compared to 52% in the general population.[335] The disparity appears to be increasing as Blacks accounted for 80% of the 2010 non-sheltered population. Half of non-sheltered residents reported having no formal academic qualifications.

It is likely that the true number of people experiencing homelessness and insecure housing is significantly higher than shown in the census. The charity HOME recorded 555 people experiencing homelessness in Bermuda at the end of 2021.[336]

[334]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[335]Government of Bermuda. Population and Housing Census. 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[336]HOME records only people with whom the charity has had direct contact or who have been confirmed through reliable third-party sources. Available: https://home.bm/homelessness/#rough.

Economic Activity

The report 'Toward Ending Homelessness in Bermuda' showed that 28% of interviewees had become homeless/housing insecure within the last year.[337] This increase could be driven by COVID–19, which had a negative impact on the global economy worldwide from 2020. Over half of respondents stated that COVID–19 had negatively impacted their employment and income (59%) and social/emotional well-being (52%). It is important to consider homelessness as a secondary impact of the pandemic.

In the 2021 survey,[338] 51% of respondents were unemployed, 10% were working full-time and 23% were working part-time and 14% were retired. 88% reported receiving earned income. Homeless/housing-insecure respondents earned 25% of the average income of Bermuda's adult population. The most common sources of income reported included earned income (e.g., alternative sources such as trade, sex, drugs, panhandling, hustling) (52%), financial assistance (20%), retirement benefits/pension (19%), employment income (18%) and social insurance (5%).This indicates that even though some people experiencing homelessness are employed, they are more likely to be employed in lower paying jobs that are not sufficient to ensure they have a good standard of living.

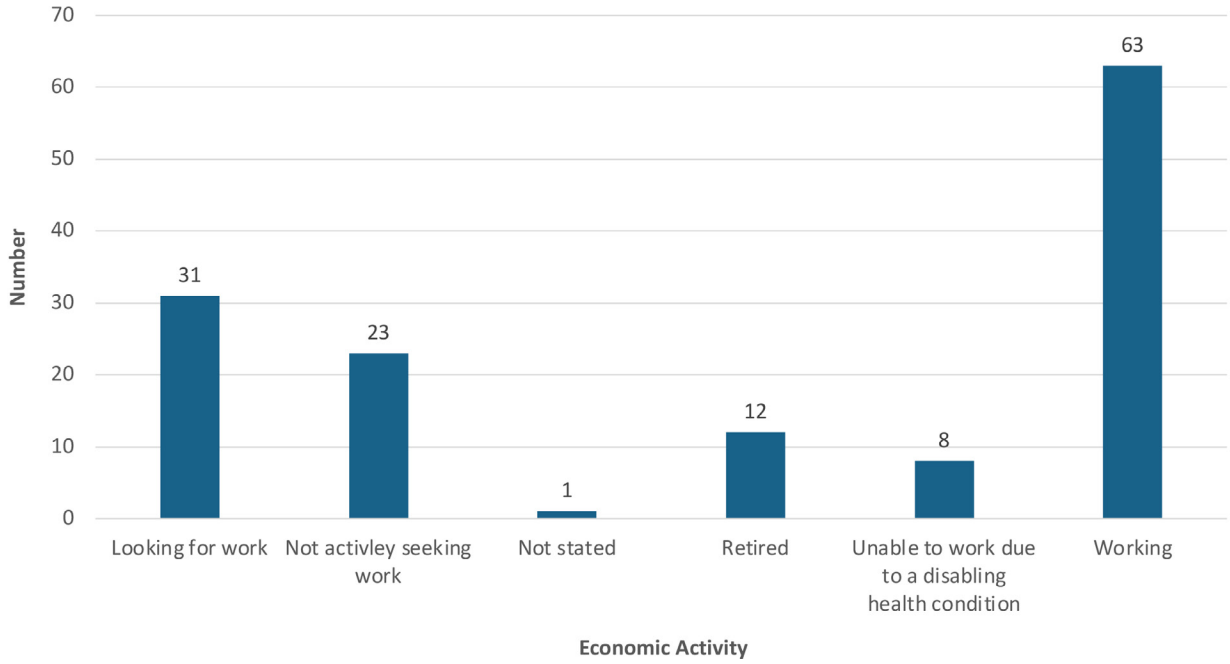


Figure 5.9.1 Non-Sheltered Population 16 Years and Older by Economic Activity (SOURCE: Bermuda Department of Statistics[339])

[337]Catalyst Consulting Limited. Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet]. 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.
[338]Catalyst Consulting Limited. Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet]. 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.
[339] Government of Bermuda. *Population and Housing Census Report [Internet].* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

The top reasons for homelessness/housing insecurity as found in the 2021 survey, were losing a job/being unable to find a job, alcohol/drug use, conflict with family/friends, death of a family member, being kicked out of a home, or poor budgeting skills/financial insecurity.[340]

Housing Quality

According to WHO, "Improved housing conditions can save lives, prevent disease, increase quality of life, reduce poverty and help mitigate climate change. Housing is becoming increasingly important to health in light of urban growth, ageing populations and climate change."[341]

Living arrangements of people experiencing homelessness can vary. A survey found 22% of respondents were classified as unsheltered (i.e., living outside, in a home unfit for habitation, in a temporary non-conventional structure or in a car/vehicle).[342] 88% of respondents were classified as sheltered (i.e., temporarily living with others, living in a shelter, transitional housing, or emergency accommodation, or in an unstable physical living environment).

Data was not found on other housing quality considerations such as overcrowding, air quality, neighbourhood noise, asbestos, lead and tobacco smoke. There appears to be a need to collect data and monitor housing quality.

Health

Unsheltered respondents (individuals sleeping in parks, alleyways or "in places not intended for human habitation") were less likely to have health insurance (25%) compared to those considered sheltered homeless (i.e., emergency sheltered, provisionally accommodated and at risk for homelessness) (49%).[343]

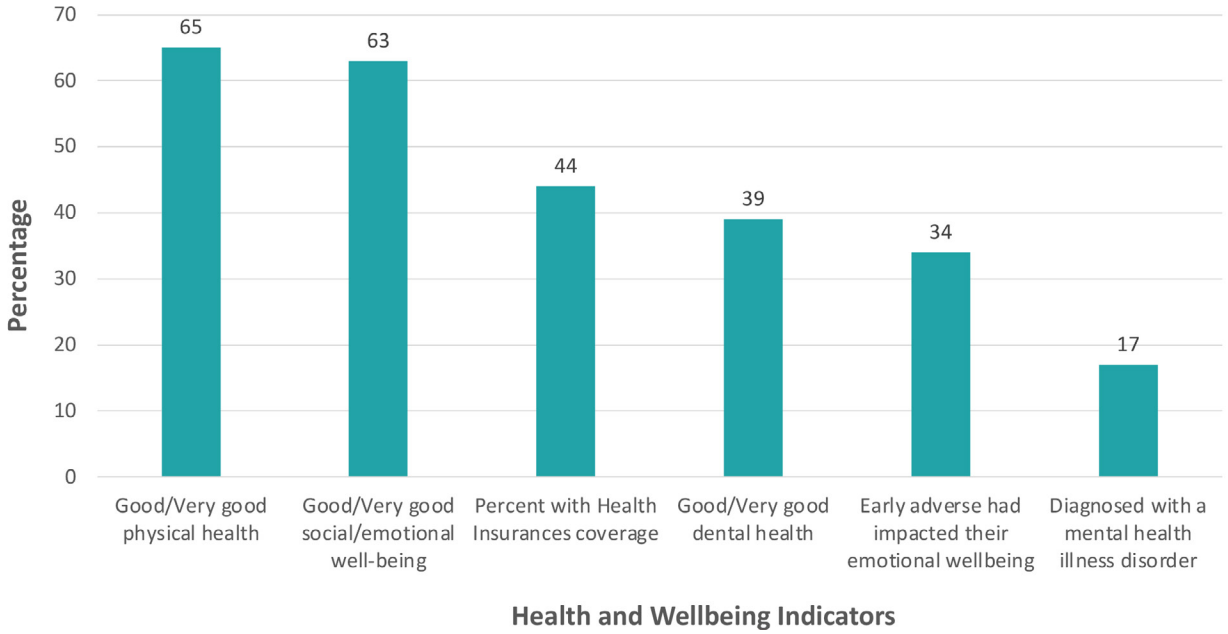


Figure 5.9.2 Health and Well-Being of the Homeless/Housing Insecure (SOURCE: Catalyst Consulting Limited)

Respondents aged 65 years and over and unsheltered respondents were more likely to have received treatment in the past 12 months for a physical health condition. The most common conditions included general

[340]Catalyst Consulting Limited. *Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet].* 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.
[341] World Health Organization. *WHO Housing and health guidelines [Internet].* www.who.int. 2018. Available: https://www.who.int/publications/i/item/9789241550376.
[342]Catalyst Consulting Limited. *Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet].* 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.
[343]Catalyst Consulting Limited. *Toward Ending Homelessness in Bermuda: Empowering the Most Vulnerable. [Internet].* 2022 [cited 2023 Jan 26]. Available: https://ccbdapp.files.wordpress.com/2022/07/toward-ending-homelessness-in-bermuda-quantitative-research-report-full-report-july-18-2022.pdf.

body injuries/ailments (37%), strokes/heart issues or chest pain (10%), bike/vehicle accident injuries (7%) or hypertension (6%). Only 52% of those with a physical health issue stated that it was resolved. This indicates a high burden of ill-health for people experiencing homelessness and issues with continuity of care and chronic disease management.

	Total	Male	Female	18–34	35–54	55–64	65+	Unsheltered	Sheltered
Survey sample	274	233	41	28	92	78	74	61	200
Very good or good	63%	64%	61%	46%	65%	63%	66%	67%	62%
Fair	25%	25%	22%	43%	25%	22%	22%	22%	23%
Poor or very poor	12%	11%	17%	11%	9%	15%	12%	10%	14%

Table 5.9.2 Survey Results to the Question "How would you describe your social and emotional well-being?" (SOURCE: Catalyst Consulting Limited)

17% of respondents to the 2021 survey had been diagnosed with a mental health illness or disorder, with younger residents aged 18–34 years more likely to have been diagnosed.

Mental Health Illness or Disorder	Total
Total responses	**56**
Schizophrenia	21%
Depression	18%
Bipolar disorder	13%
Anxiety	11%

Table 5.9.3: Most Common Mental Health Illness or Disorder of Diagnosed Survey Respondents (SOURCE: Catalyst Consulting Limited)

52% of respondents had received medication for a mental health condition. 53% of those with a mental health condition said the condition was managed or resolved. Again, this indicates a high burden of mental health issues in this population and issues of continuity of care.

Health and Social Behaviours

Over nine in 10 of the non-sheltered population surveyed had consumed alcoholic beverages, tobacco or other substances, and close to three in 10 believed that the use of substances had impacted their ability to secure stable housing. Whilst this may be unsurprising, it is concerning that this already vulnerable group are engaging in risky health behaviours with the potential to exacerbate health issues.

International Benchmarking

Available data collected by the OECD regarding homelessness across 36 countries showed that rates of homelessness can range from 0.03% (Lithuania) to 0.86% (New Zealand).[344]

[344]OECD. HC3.1. *Homeless Population, Definitions and methodology. [Internet].* 2021. Available: https://www.oecd.org/els/family/HC3-1-Homeless-population.pdf.

Country/Territory	Homeless as a % of Total Population (Data Year)
Bermuda	0.22% (2016)[345]
England[346]	1.25% households (2020)
USA	0.18% (2020)
Canada	0.36% (2016)
New Zealand	0.86% (2018)
Australia	0.48% (2016)

Table 5.9.4 Estimated Number of Homeless as a % of Total Population, Latest Year Available (SOURCE: See footnotes in table)

5.10 Migrant Population

5.10.1 Introduction

The experience of migration is a key determinant of health and well-being.[347] Refugees and migrants are considered a vulnerable group of society often experiencing xenophobia, discrimination, poor living, housing and working conditions, and inadequate access to health services. However, Bermuda has a very small number of registered refugees. Therefore, this section will focus on economic migrants.

5.10.2 Overall Prevalence

In 2016, there were a total of 19,332 foreign-born people living in Bermuda.[348] The non-Bermudian population made up 25% of the working population. 4,088 people were from the United Kingdom, 3,598 from the United States, 2,755 from the Caribbean and 2,563 from Asian countries. Other foreign-born people living in Bermuda in 2016 were from Canada (2,140), Azores/Portugal (1,643), other European countries (1,231), African countries (637) and other (687).

Evidence on the "healthy migrant effect" indicates that migrants arriving in high-income countries are healthier initially, but that over time their rates of mortality, morbidity and other negative health outcomes can become worse than the general population.[349] In the absence of local data on this matter and given that it has been shown to occur in UK, US, Canada and Australia, this effect may pertain to migrants in Bermuda too.

Indicators of wider determinants of health between the migrant and non-migrant population in Bermuda include type of employment.

[345]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[346]ECD. HC3.1. *Homeless Population, Definitions and methodology. [Internet].* 2021. Available: https://www.oecd.org/els/family/HC3-1-Homeless-population.pdf.
[347]WHO. *Refugee and migrant health.* 2022. Available: https://www.who.int/health-topics/refugee-and-migrant-health#tab=tab_1.
[348]Department of Statistics. *Bermuda Digest of Statistics 2021.* 2022. Available: https://www.gov.bm/sites/default/files/2021_Digest_of_Statistics.pdf.
[349]Kennedy, Kidd, McDonald and Biddle, The Healthy Immigrant Effect: Patterns and Evidence from Four Countries, *Journal of International Migration and Integration*, p. 16;2:317–332, 2015

Selected Occupations	Total Filled Jobs	Median Gross Annual Income ($)
Lifeguard	6	21,000
Waiter/Chef de rang	36	24,857
Building construction labourer	29	28,313
Butler	7	31,500
Minister of Religion/Chaplain/Nun/Priest/Pastor	14	33,000
Assistant Housekeeper/Night housekeeper/Housekeeper	8	33,000
Underwater worker/diver	8	33,000
Char worker cleaner and related worker N.E.C[350]	6	34,000
Barber/hairdresser	50	34,071
Housekeeper (Private service)	74	34,200
Commis de Cuisine/Assistant cook	53	35,063
Farm worker (general)	30	35,143
Occupational therapist	11	35,400
Kitchen assistant	37	37,125
Waiter/Waitress general	233	38,647
Beautician	107	39,273
Cleaner/houseperson	168	39,763
Pastry maker	13	40,286
Hotel receptionist/cashier	6	40,800
Nursemaid/nanny	96	41,000

Figure 5.10.1 Other Non-Bermudians in 20 Lowest Paid Occupations Who Worked 35 Hours or More Per Week by Median Gross Annual Income, 2021 (SOURCE: Bermuda Department of Statistics[351])

In 2021, a high number of non-Bermudians were working in low-skilled, manual jobs.[352] In Europe, occupational accidents are twice as likely to occur in migrant workers as non-migrant workers.[353] Migrant workers do a disproportionate number of challenging, unhygienic or dangerous jobs,[354] which may be ineffectively supervised and regulated. Migrants not fluent in English may face challenges understanding safety warnings or machine operating instructions.[355] This may also be the case in Bermuda.

[350]Bermuda Government, Department of Statistics. *The Bermuda Job Market Employment Briefs*, August 2022. "N.E.C." stands for "Not Elsewhere Classified".
[351] Bermuda Government, Department of Statistics. *The Bermuda Job Market Employment Briefs*, August 2022. Available: https://www.gov.bm/sites/default/files/2022-Employment-BriefsV2.pdf.
[352]Bermuda Government, Department of Statistics. *The Bermuda Job Market Employment Briefs*, August 2022. Available: https://www.gov.bm/sites/default/files/2022-Employment-BriefsV2.pdf.
[353]OSHA, European Agency for Health and Safety at Work *Literature study on migrant workers.* Bilbao, 2007. Available: https://osha.europa.eu/sites/default/files/Literature_Study_on_Migrant_Workers.pdf.
[354]Rienzo. Migrants in the UK Labour Market: An Overview. Migration Observatory, *Oxford*, 2016. Available: https://migrationobservatory.ox.ac.uk/resources/briefings/migrants-in-the-uk-labour-market-an-overview/.
[355]Ingleby. How health systems can address health inequities linked to migration and ethnicity. *WHO Copenhagen*, 2010. Available: https://apps.who.int/iris/handle/10665/345463.

Chapter 6: Healthcare Services

6.1 Introduction

Bermuda has a well-developed and well-financed insurance-based, mixed-model healthcare system. The system consists of the following:

- A diversity of primary care, dentistry, pharmacy, and community healthcare providers, predominantly in the private sector
- Bermuda Hospitals Board providing secondary and tertiary care through two hospitals and an urgent care centre:
  - King Edward VII Memorial Hospital
  - Mid-Atlantic Wellness Institute
  - Lamb Foggo Urgent Care Centre
- A diversity of providers of clinical laboratories and diagnostic imaging, predominantly in the private sector, with
- A large proportion (12–15.7%) of care provided overseas (compared to other jurisdictions, particularly to small island nations).[356]

Bermuda's healthcare costs are some of the most expensive in the world, but without evidence of proportionately high health outcomes. In fact, many health outcomes from the system are unknown. The overall system is characterised by fragmentation, lack of communication and a lack of clear patient pathways or accepted system-wide clinical guidelines or standards. There are considerable system inequalities. It currently does not meet the WHO's criteria for UHC.[357]

6.2 Health Financing and Expenditure

The most recent comprehensive assessment of Bermuda's total health expenditure has been taken from the 2018 National Health Accounts Report produced by the Bermuda Health Council.[358] The report outlines health system financing and spending up to fiscal year 2017–2018 (FY17–18). Whilst this data is almost five years out of date and does not capture the costs of COVID–19, it is still the most accurate and complete set of data for the territory's healthcare financing. The use of more recent incomplete accounts information may introduce inaccuracies into the JSNA. Internationally, Bermuda is not an outlier in terms of the availability of recent health finance data, with 2019 being the World Bank's most recent year for health expenditure by country.[359]

Health Expenditure Summary

Bermuda's annual total health expenditure in 2017 – 2018 was **$736.6m**, with a per capita spend of **$11,529**. This accounted for **11.6% of GDP**.

[356]Bermuda Health Council. *2019 National Health Accounts Report: Bermuda health system finance and expenditure for fiscal year 2017 - 2018.* 2020. Bermuda Health Council: Bermuda. Available: https://bhec.bm/wp-content/uploads/2019-NHA-Report-20201014.pdf.
[357]WHO. *UHC (UHC).* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc).
[358]Bermuda Health Council. *2019 National Health Accounts Report: Bermuda health system finance and expenditure for fiscal year 2017 - 2018.* 2020. Bermuda Health Council: Bermuda. Available: https://bhec.bm/wp-content/uploads/2019-NHA-Report-20201014.pdf.
[359]World Bank. *Current health expenditure per capita (current US$).* 30 Jan 22. Available: https://data.worldbank.org/indicator/SH.XPD.CHEX.PC.CD?end=2019&most_recent_year_desc=false&start=2004.

6.2.1. Health Expenditure Comparisons and Trends

Bermuda's health expenditure of $11,529 per capita (FY17–18) was the highest in the world.[360] By contrast, the USA spent $10,515 and the UK $4,270. When compared by share of GDP, Bermuda's expenditure is the third highest amongst OECD countries, behind the USA and Switzerland (see Figure 6.2.1). The comparative UK GDP spend on health was 9.75%.

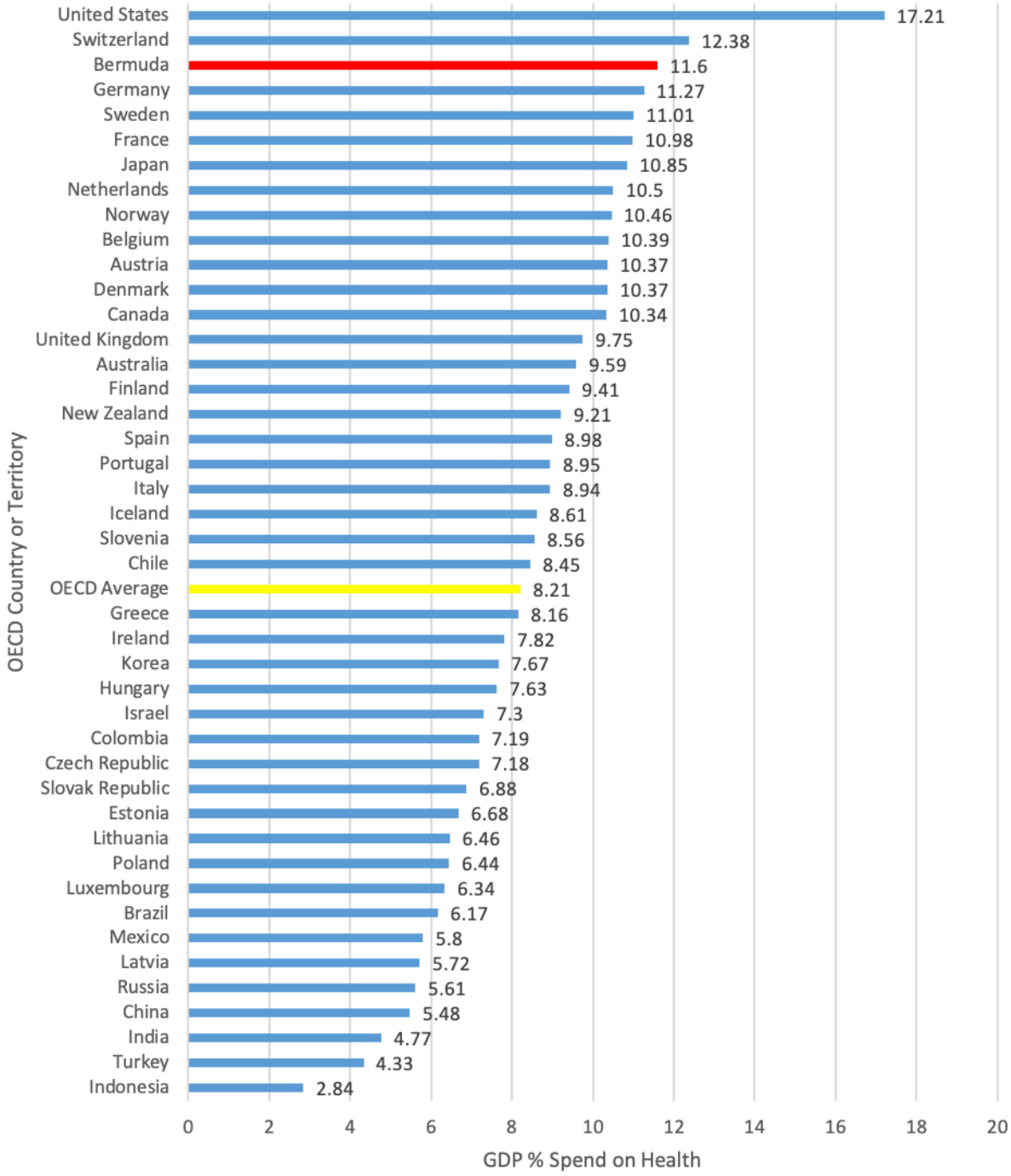


Figure 6.2.1: International Comparison of Health Expenditure as Share of GDP (SOURCE: 2019 Health Accounts Report)

[360] World Bank. *Current health expenditure per capita (current US$).* 30 Jan 22. Available: https://data.worldbank.org/indicator/SH.XPD.CHEX.PC.CD?end=2019&most_recent_year_desc=false&start=2004.

Total health expenditure has grown year-on-year from $679m in 2011 (with the most recent annual growth of 1.9% from a total expenditure of $723m in 2017), but as a proportion of total GDP it has remained relatively fixed, with a slight fall from a high of 12.45% of GDP in 2013 (see Figure 6.2.2).

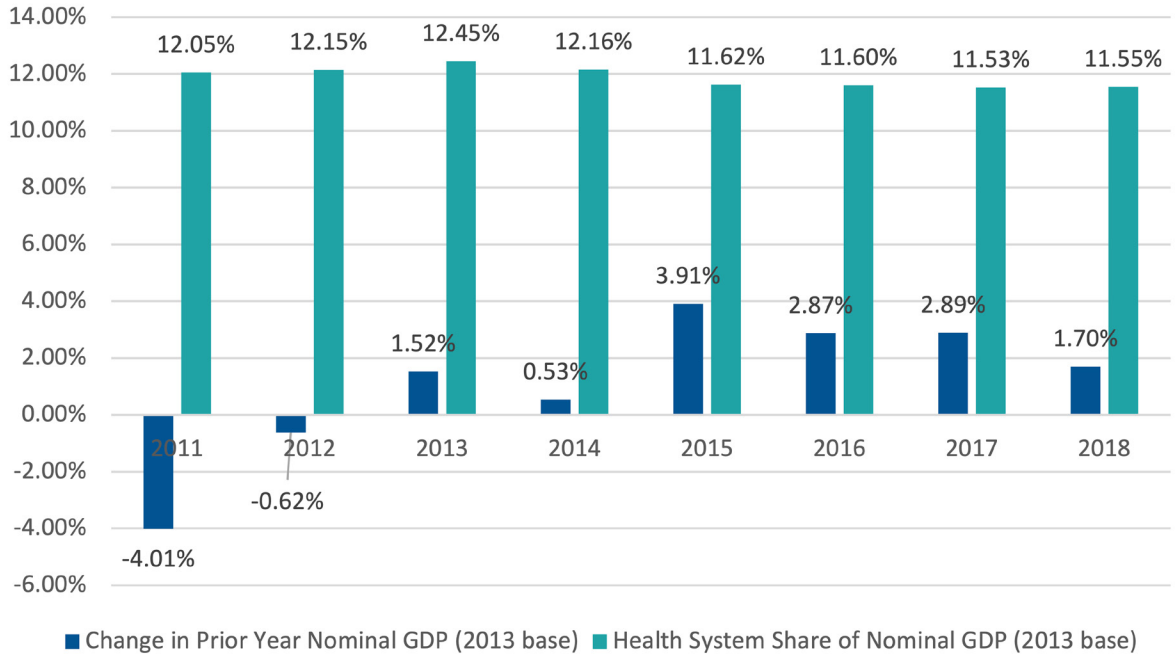


Figure 6.2.2: Changes in GDP and Health Expenditure Since 2011 (SOURCE: 2019 Health Account Report)

Bermuda's total health economy is small by international standards, particularly when compared to its nearest neighbour, the USA, which spent $3.6 trillion on health in 2018,[361] or the UK's expenditure of $214.4bn,[362] also in 2018. Bermuda's small size is likely to result in the territory being unable to take advantage of economies of scale seen in larger jurisdictions.

The COVID–19 pandemic has seen considerable disruptions to the macroeconomic and healthcare environments across all countries. International trends have shown rapid growth in both total health expenditure and its proportion of the total economy, dominated by government expenditure (in mixed healthcare economies).[363] The long-term impact of COVID–19 on health expenditure will be difficult to establish until several years of post-pandemic accounts data are available.

The Global Burden of Disease's internationally modelled data estimated that Bermuda's health expenditure in 2018 was $7,689 per capita.[364] This is $3,840, or 33% lower than the actual per capita spend in the 2019 National Health Accounts Report. This discrepancy introduces considerable uncertainty into the Global Burden of Disease 2050 estimates of expenditure, which also do not include the potential impact of UHC.

This demonstrates the limitations of estimates generated from international comparative data and the requirement for Bermuda to accurately collect, analyse and publish its own health information rather than relying on international estimates.

[361] Hartman M, Martin AB, Benson J, Catlin A; National Health Expenditure Accounts Team. National Health Care Spending In 2018: Growth Driven By Accelerations In Medicare And Private Insurance Spending. *Health Aff (Millwood).* 2020 Jan;39(1):8–17. https://doi.org/10.1377/hlthaff.2019.01451.

[362] UK Office for National Statistics. *Healthcare expenditure, UK Health Accounts: 2018.* 2020. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/bulletins/ukhealthaccounts/2018.

[363] Georgetown University Health Policy Insitute – Center for Children and Families. *How the COVID–19 Pandemic Affected U.S. National Health Spending.* 2022. Available: https://ccf.georgetown.edu/2022/02/03/how-the-covid-19-pandemic-affected-u-s-national-health-spending/#:~:text=National%20health%20spending%20increased%20by,because%20people%20used%20less%20health.

[364] Institute for Health Metrics and Evaluation. *Bermuda.* 2023. Available: https://www.healthdata.org/bermuda.

6.2.2 Health Expenditure and Health Outcomes

Mapping health outcome data together with health expenditure enables greater insight into the health system's performance, particularly cost-effectiveness. Figure 6.2.3 plots life expectancy at birth against 2018 per capita health expenditure. Bermuda's health expenditure is considerably higher than other countries with an equivalent life expectancy at birth (81.3 years), such as UK, Netherlands and Canada. It should be noted that healthcare (outside of childhood immunisations) is a relatively small contributor to life expectancy. Investment in the social determinants of health is likely to be the most effective way of increasing life expectancy.[365]

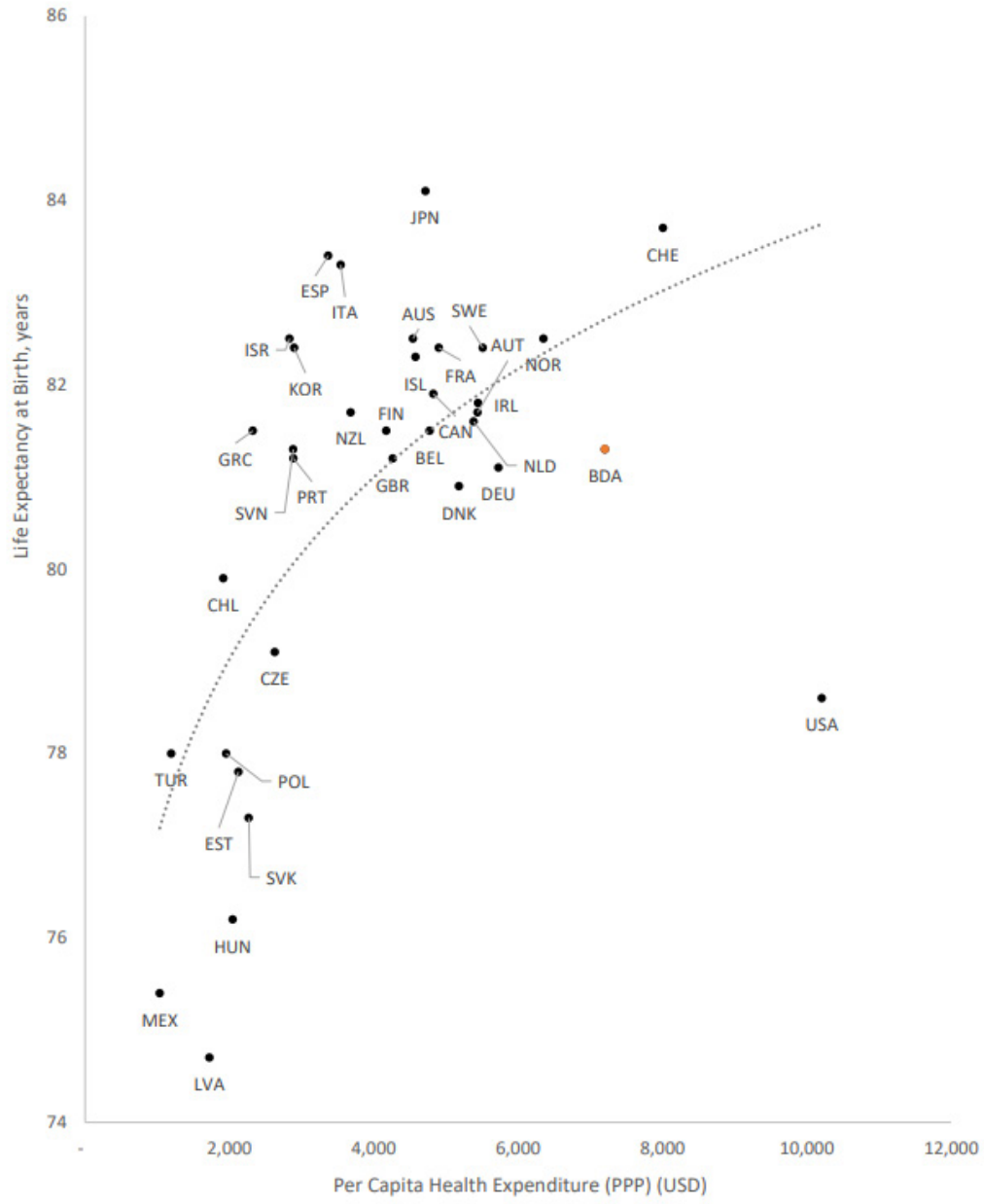


Figure 6.2.3: Life Expectancy at Birth and Per Capita Health Expenditure (Purchasing Power Parity) FY17–18 (SOURCE: 2019 Health Account Report)

[365] Hood CM, Gennuso KP, Swain GR, Catlin BB. County Health Rankings: Relationships Between Determinant Factors and Health Outcomes. *Am J Prev Med.* 2016 Feb;50(2):129–35. https://doi.org/10.1016/j.amepre.2015.08.024.

6.2.3 Sources of Health Finance

Bermuda has a mixed economy health system that is dominated by private sector financing that accounts for $570m (77.4%) of the total. Public sector financing accounts for the remaining $167m (22.6%) of health finance. Table 6.2.1 summarises sources of health finance.

Source Health Finance	Amount (000s)	% of Total
Ministry of Health	$161,080	21.9%
Department of Social Insurance	$3,235	0.4%
Grants for provision of health services	$2,363	0.3%
Public Sector Sub-Total	**$166,678**	**22.6%**
Health Insurance	$453,260	61.5%
Out-of-Pocket Expenditure	$109,992	14.9%
Donations	$6,696	0.9%
Private Sector Sub-Total	**$569,947**	**77.4%**
Total Public & Private	$736,625	100.0%

Table 6.2.1: Sources of Health Finance FY17–18
(SOURCE: 2019 Health Account Report)

Public sector healthcare financing has proportionally decreased year-on-year due to cost control policies across government. The Ministry of Health is the principal source of public funding, with additional spending for war veterans coming from the Department of Social Insurance and government grants for specific health services such as care homes.

Private sector funding is predominantly insurance based, with $453m of $570m of private sector funding originating from health insurance. Recent trends indicate an increasing proportion of funding from out-of-pocket payments, although, over the longer term, this source of funding appears relatively flat. It should be noted that there is considerable uncertainty over the accuracy of out-of-pocket payment data. Bermuda Health Council has calculated this data based on the following:

- Assumptions about typical levels of health insurance for different categories of care
- The difference between known sources of financing and known categories of expenditure

There are still significant unknown areas that this model may not have captured, underestimating the overall contribution of out-of-pocket payments.

Figure 6.2.4: Sources of Health Finance 2006–2018
(SOURCE: 2019 Health Account Report)

The uncertainty surrounding out-of-pocket payments is a concern. Out-of-pocket payments shift the burden of payments to those who are frequent users of health services, often those with higher health needs. The high costs of out-of-pocket payments can result in patients not attending services, leading to worsening health, complications of unmanaged conditions and a greater overall burden on the health system and the economy.[366] Out-of-pocket payments greater than 40% of household expenditure can be classified as catastrophic health expenditure, increasing the risk of bankruptcy and household poverty.[367]

[366]OECD Library. *Health at a Glance 2009.* 2009. Available: https://www.oecd-ilibrary.org/docserver/health_glance-2009-en.pdf?expires=1674602196&id=id&accname=guest&checksum=03B2BF1C6C17006D66FF5F03E7804A2E.

[367]Cylus J, Thomson S, Evetovits T. Catastrophic health spending in Europe: equity and policy implications of different calculation methods. *Bull World Health Organ.* 2018. 1:96(9):599–609. Available: https://doi.org/10.2471/blt.18.209031.

6.2.4 Health Expenditure

The private sector accounted for $392m of expenditure or 53.2% in FYE 2018, with the public sector accounting for the other $345m (46.8%) (see Table 6.2.2).

Health Expenditure	Amount	% of Total
Ministry of Health HQ	$11,479	1.6%
Department of Health	$25,689	3.5%
Bermuda Hospitals Board	$307,514	41.7%
Public Sector Sub-Total	**$344,681**	**46.8%**
Local Practitioners – Physicians	$57,656	7.8%
Local Practitioners – Dentists	$31,820	4.3%
Other Health Providers, Services & Appliances	$92,385	12.5%
Prescription drugs	$44,597	6.1%
Overseas care	$93,114	12.6%
Administration of health insurance, health policy and health programmes	$72,374	9.8%
Private Sector Sub-Total	**$391,945**	**53.2%**
Total Public & Private	$736,625	100.0%

Table 6.2.2: Health Expenditure FY 17–18
(SOURCE: 2019 Health Account Report)

BHB was the largest single service, accounting for $307.5m or 42% of total expenditure. BHB's proportion of health spending has been relatively flat since 2006, with a slight dip from a high of 46% in 2017.

Bermuda Health Council notes that the fall in expenditure at BHB is likely due to a reduction in diagnostic imaging fees and reduced spending on pharmacy. It does not reflect a change in service use. Information relating to hospital expenditure during COVID–19 is not yet available. BHB has recently embarked on a cost improvement programme,[368] but the financial data relating to this initiative is not yet reflected in the most recent Health Account Report.

The remaining public sector spending is split between the Ministry of Health HQ ($11.5m, 1.6% of total expenditure) and the Department of Health ($25.7m, 3.5% of total expenditure). Ministry of Health expenditure accounts for costs associated with regulating the health system, public health programmes and providing policy direction for the health system. This includes funding the Bermuda Health Council to regulate, coordinate and enhance the delivery of health services.

Department of Health expenditure includes all operational and administrative expenses associated with providing public healthcare services to the population of Bermuda, including health promotion, community health, oral health, environmental health and the Central Government Laboratory.

Expenditure within the private community sector has been relatively stable overall. However, individual components in this sector (e.g., other local providers, services and appliances) have fluctuated year to year. This is likely a result of diversification in services delivered by providers and differences in coding.[369]

Overseas care expenditure stood at $93.1m, 12.6% of total expenditure and 23.8% of private sector spending. Overseas expenditure has fluctuated between 12.0% and 15.7% since 2008, with a peak expenditure of $101.2m in 2013. Smaller jurisdictions, such as Bermuda, often use overseas care more due to limited local capacity

[368] McWhirter F. KPMG helps save BHB $30m in costs. *Royal Gazette*. 2021. Available: https://www.royalgazette.com/health/news/article/20210104/kpmg-helps-save-bhb-30m-in-costs/#:~:text=An%20efficiency%20drive%20at%20the,about%20%245%20million%20in%20total.

[369] Bermuda Health Council. *2018 National Health Accounts Report: Bermuda health system finance and expenditure for the fiscal year 2016–2017*. 2018. Available: http://bhec.bm/wp-content/uploads/NHA-Report-2.pdf.

and a relatively transient population. Overseas care can be a cost-effective way of ensuring residents have access to specialist services, but efforts are made to ensure that necessary services are available on-island. Overseas care is not included under the Standard Health Benefit (SHB), only under a supplemental package. Thus, there is no regulated coverage or process to monitor the appropriateness of referrals. It is possible that the unregulated nature of overseas care provision could be a further driver of health inequalities.

Section 6.6 contains more detailed information on overseas care based on a 2017 study by the Bermuda Health Council.

6.2.5 Controlling Healthcare Costs

Despite the high costs associated with Bermuda's health system, the Island has made impressive progress in controlling healthcare costs. In 2010 healthcare spending was forecast to reach $1bn by 2017. Actual healthcare spending in 2017 was $723m. In 2019 the Bermuda Health Council published a report outlining how the Bermuda Health Strategy 2014–2019 implemented actions to contain healthcare costs.[370] In summary, it reported:

- Efficiencies by providers, led by BHB
- Increasing the proportion of on-island care
- Adapting subsidy levels to reflect changing demographics
- Reform of the SHB with an emphasis on community care and sustainability
- Adding peritoneal dialysis to patient benefits to reduce spending on dialysis
- Adjustment to long-term care reimbursement
- Introduction of the Enhanced Care Pilot Programme to reduce unnecessary emergency department visits
- Promoting wellness

The report also identified four areas for future development:

- Transitioning from activity-based payment mechanisms to one that focuses on patient outcomes
- Providing more focus on wellness and preventative care
- Optimising medicines management to reduce pharmaceutical costs
- Standardising care and developing evidence-based Integrated Care Pathways

The current Bermuda Health Strategy 2022–2027 is building on this initial work with "*preventing wasteful care and promoting efficiency*"[371] forming one of the eight pillars of the strategy. However, cost containment cannot be achieved in isolation from the strategy's other pillars. Additional work is required to develop evidence-based Integrated Care Pathways that map every stage of care and associated costs (including prevention). The ongoing UHC programme has the potential to contain costs further whilst improving health outcomes through promoting smarter procurement practice and harnessing health data through the National Digital Health Strategy.

Ultimately, long-term sustainable control of healthcare costs will only be achieved by prioritising prevention and targeting the social determinants of health across the life course. This will require a much more joined-up cross-government approach, adopting Health in All Policies to allow policymakers to build healthy communities to enable people lead healthy lifestyles.

[370] Bermuda Health Council. *Bermuda's Health Care Cost Curve*. 2019. Available: http://bhec.bm/wp-content/uploads/BHC Issues Brief Cost–2019–1.3.pdf.
[371] Ministry of Health. *Bermuda Health Strategy 2022–2027*. 2022. Available: https://www.healthstrategy.bm/.

6.2.6 Limitations of Health Finance Data

Our review of Health Financing Expenditure is limited by the fact that the most recent complete health accounts data is for Fiscal Year 17–18. This is almost five years out of date and does not reflect the impact of the COVID–19 pandemic. The health accounts data relies on information from health insurance claims, government funds, BHB and information requested by the Bermuda Health Council (i.e., from charities' audited financials). Out-of-pocket payments have been calculated by balancing the difference between known financing and known expenditure. However, information relating to out-of-pocket payments and co-payments remains opaque. More work is required to better understand this method of healthcare financing, particularly given its disproportionate impact on health inequalities.

This section also does not include information on pro bono work carried out by healthcare professionals, which from the authors' discussions with providers from across the health and social care sector, may play an important role in providing care to patients who would otherwise be unable to afford it. However, whilst providing pro bono services by providers is admirable, it is not a substitute for an adequately financed system of UHC that provides essential care to all patients in Bermuda. It should also be noted that much of the quality improvement and healthcare system strengthening work that clinicians undertake (such as contributing to the UHC and the initial COVID–19 vaccination programme) is also made pro bono.

Therefore, further work is required to:

- Review the most recent health accounts data, including the impact of the COVID–19 pandemic
- Understand out-of-pocket and co-payments, including transparency of cost across Bermuda, and
- Understand the value of pro bono work to inform the financial model of UHC.

6.3 Affordability and Access to Care

6.3.1 Affordability and Access – Health Insurance

Patients primarily access healthcare through insurance benefits. Health insurance is a mandatory employment benefit for employees working more than fifteen hours per week. Employers may deduct no more than 50% of the monthly premium from an employee's salary.[372] Health insurance is thus tied to employment, limiting access to healthcare for the unemployed population. As outlined in Chapter 2, unemployment is a risk factor for ill health, although the relationship is complex and bidirectional.[373] The unemployed population may purchase a health insurance policy (cost $429 to $1500+ per month), which is unaffordable for many. Unemployed individuals may apply to the Department of Financial Assistance for support in paying Health Insurance Department plans. However, individuals must meet a specific set of criteria to be eligible.

Bermuda has the following providers of health insurance.[374]

[372]Health Insurance Act 1970. Available: http://www.bermudalaws.bm/laws/Consolidated%20Laws/Health%20Insurance%20Act%201970.pdf.
[373]OECD. *Health and Work.* 2023. Available: https://www.oecd.org/els/emp/health-and-work.html.
[374]Bermuda Health Council. *Licensed Health Insurers and Approved Health Insurance Schemes.* 2022. Available: https://bhec.bm/wp-content/uploads/2022/01/2022-Website-Notice.pdf.

Type of Insurance Scheme	Insurance Provider
Employer-sponsored health insurance	Bank of N T Butterfield & Son Ltd Health Insurance Scheme (BNTB)
	Government Employees Health Insurance Scheme (GEHI)
	HSBC Bank Bermuda Ltd Health Insurance Scheme
Private health insurers	Bermuda Life Insurance Company Ltd (Argus)
	BF&M Life Insurance Company Ltd
	CG Insurance Company Ltd
Public health insurer	Health Insurance Department (HID) (Health Insurance Plan (HIP)) (FutureCare Plan – for persons aged 65 and older)

Table 6.3.1: Providers of Health Insurance
(SOURCE: Bermuda Health Council)

Private Health Insurance. Private health insurance premiums are based on medical risk. A person with higher health needs is likely to attract a higher premium. Private health insurers may opt not to provide specific coverage to individuals/groups at certain risk,[375] providing a barrier to access care for individuals with potentially greater health needs. For Fiscal Year 17–18, 33,505 (70%) of the insured population were on private plans.

Public Health Insurance. Public health insurance premiums (provided by Health Insurance Department or HID) have a fixed premium regardless of medical risk. This fixed premium is made possible by financial transfer from the Mutual Reinsurance Fund (MRF). As of 9 January 2023, the Health Insurance Plan monthly premium for adults started at $429.24 per month and FutureCare $500.15 per month.[376] The main factor influencing the cost of public health insurance for persons aged 65 or above is eligibility for the Certificate of Entitlement (COE), which provides a government-funded age-subsidy.[377] Eligibility is based on an individual's status (Bermudian) and residence status. HIP without the COE is $1,104.87 per month, whilst FutureCare is $1498.48 per month. For Fiscal Year 17–18, 14,707 (30%) of the insured population were in government plans.

Standard Health Benefit. The Standard Health Benefit is the minimum package of benefits, which must be provided within any health insurance policy sold in Bermuda, whether public health insurance, private health insurance or employer-sponsored health insurance. The types of services and reimbursement rates for SHB are set by the Minister of Health and reviewed annually. The SHB was originally designed to ensure access to hospital care, but in more recent years has shifted to include community services and some prevention.

Optional Supplemental Benefits. Individuals may pay additional premiums to cover supplemental packages of health benefits, including access to overseas care.

Mutual Reinsurance Fund. The MRF is funded by a fee paid for by every insured person. It is used to support health system administration, the government's block grant to Bermuda Hospitals Board (BHB) (including kidney and dialysis care) and to subsidise public health insurance plans (HIP and Future Care). A significant reform in 2019 resulted in an annual block payment to BHB, replacing the former fee-for-service model.

Standard Premium Rate. The Standard Premium is the cost of the mandatory base of benefits that pays for the SHB and MRF. The Minister of Health sets it annually. For Fiscal Year 21–22 it was $400.31 comprising:[378]

- $23.34 for SHB
- $376.97 for MRF

[375] NB: This standard practice in medical underwriting. KFF. *Health Reform: Pre-Existing Condition Prevalence for Individuals and Families.* 2019. Available: https://www.kff.org/health-reform/issue-brief/pre-existing-condition-prevalence-for-individuals-and-families/.
[376] Government of Bermuda. *Health Insurance.* 2023. Available: https://www.gov.bm/department/health-insurance.
[377] Government of Bermuda. *Certificate of Entitlement.* 2023. Available: https://www.gov.bm/certificate-entitlement.
[378] Bermuda Health Council. *Standard Premium Rates for fiscal years 2016 to present.* 2021. Available: https://bhec.bm/wp-content/uploads/2021/10/SPR-Spidergrams-FY16-Present-Updated-20211008.pdf.

Co-Payments/Out-of-Pocket Payments. Depending on the schedule of insurance benefits, patients may also need to pay co-payments to access services. Direct out-of-pocket payments are required for services not covered by insurance.

Affordability. The latest Bermuda Digest of Statistics[379] reports weekly wages for industrial workers from 2020. Weekly wages ranged from $658.88–$1,643.60. For tipped workers, weekly salaries started at $314.95. The corresponding 2020 weekly SHB cost $81.99,[380] of which the maximum employee contribution would be capped at $40.96. This does not accurately capture all healthcare costs, given the requirement for co-payments and services not covered by SHB.

The Bermuda Vital Signs® Study 2017 conducted by Bermuda Community Foundation reported that 38% of respondents felt that healthcare in Bermuda was affordable.[381] It would be beneficial to understand household expenditure by income bracket across the population. This information could be captured from the 2026 census.

Finance Flows

The flow of healthcare financing from insurance premiums along with taxes and out-of-pocket payments is shown in Figure 6.3.1.

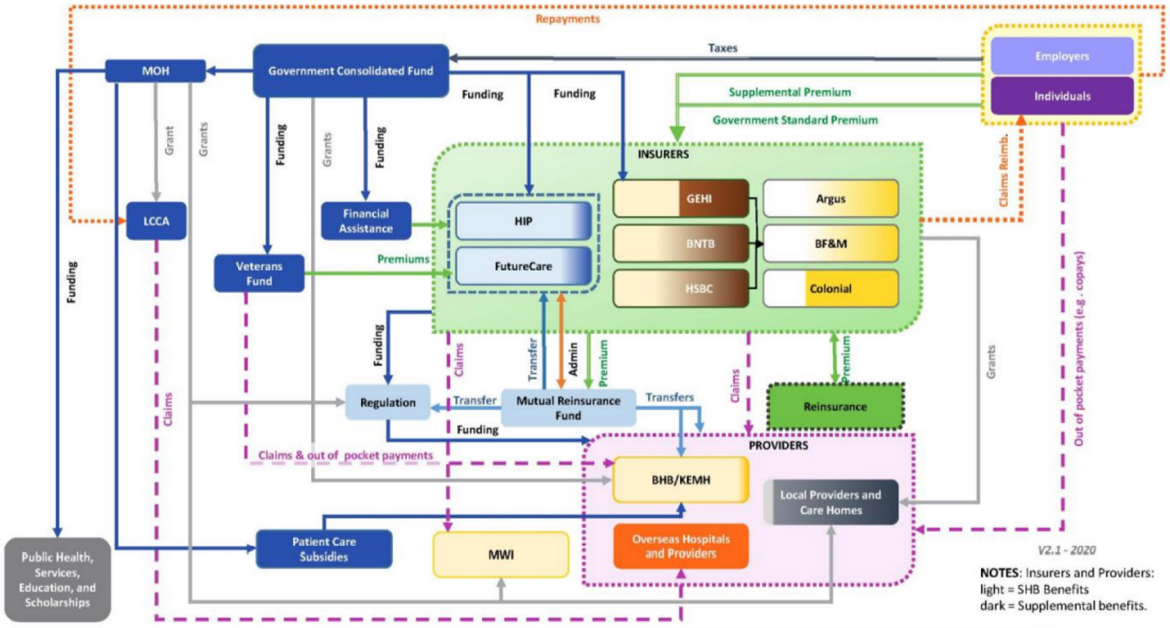


Figure 6.3.1: Health Financing Flow
(SOURCE: 2019 Health Account Report)

Health Insurance Benefits. It is beyond the scope of the JSNA to review all private health insurance schemes available in Bermuda. A review of the two public health insurance schemes (HIP and FutureCare) has found that their schedules of benefits are based on a fee-for-service model, reflecting the wider financial model of the Bermuda health system rather than based on health outcomes. The schedules also appear to favour hospital services (particularly HIP) as opposed to GP office visits (capped at $42 per visit, maximum four visits per year) and do not include many basic forms of preventive medicine such as vaccination. The prioritisation of hospital

[379]Department of Statistics. *Bermuda Digest of Statistics 2021.* 2022. Available: https://www.gov.bm/sites/default/files/2021 Digest of Statistics.pdf.
[380]Bermuda Health Council. *Standard Premium Rates for fiscal years 2016 to present.* 2021. Available: https://bhec.bm/wp-content/uploads/2021/10/SPR-Spider-grams-FY16-Present-Updated-20211008.pdf.
[381]It should be noted that this is an average value taken from a population sample. From Bermuda Community Foundation. 2017. *Bermuda Vital Signs® Study.* 2017. Available: https://bermudacommunityfoundation.org/news-reports/.

benefits is logical from a perspective of minimising policyholder catastrophic health expenditure. However, it may inadvertently disincentivise more cost-effective preventative care and chronic disease management in primary care, leading to more complex and expensive presentations in hospital. This will likely result in greater costs to the health system and poorer patient outcomes.

6.3.2 Affordability and Access – Department of Health

Department of Health provides publicly funded health services at no-cost or low-cost at the point of use. These services are focused on child health and development, maternal health and family planning, preventive care for children and seniors (including dental care), communicable disease control and sexual health services. Whilst these services are theoretically provided for the whole population, they are limited in their capacity to do so, with many patients choosing private providers if they can afford to do so.

6.3.3 Affordability and Access – Insurance Status

The last whole population investigation into health insurance status was the 2016 Census and Housing Report.[382] The report found that:

- 72% of the population reported having major health coverage
- 17% of the population reported having only basic health coverage[383]
- 8% of the population reported having no health coverage

This represents a 12% decrease in the population reporting having major health coverage and an increase in those reporting only basic health coverage or being without health insurance. A full breakdown of the figures is shown in Table 6.3.2.

Type of Health Insurance Coverage	Number		Percentage		Percentage Change 2010–2016
	2016	2010	2016	2010	
Total	**63,779**	**64,237^**	**100**	**100**	
Major Health Coverage (Private or GEHI)	46,084	50,759	72	84	–12
None	5,341	3,233	8	5	+3
Only Private Basic Coverage	4,015	1,349	6	2	+4
Only HIP	3,632	3,053	6	5	+1
Only FutureCare	3,244	1,965	5	3	+2
Insured – Type Unknown	1,389	*	2	*	*
Not Stated	74	1,327			

Notes: * represents <1%, ^includes 2,551 persons for whom there is no data

Table 6.3.2: Population by Type of Health Insurance Coverage, 2010 and 2016 (SOURCE: Bermuda Department of Statistics[384])

This 8% uninsured population is not equally distributed throughout the population. Bermudians represent 93% of the uninsured population. The Black population represented 77% of the population reporting no health insurance coverage, followed by those who are Mixed race at 14% and White at 9%.

[382]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.
[383]Those with only basic private coverage, Health Insurance Plan (HIP) or FutureCare.
[384]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

Demographic Characteristics	Number		Percentage in 2016	Percentage Change 2010–2016
	2010	2016		
Sex	**3,233^**	**5,341**	**100**	
Male	1,911	3,000	56	+3
Female	1,322	2,341	44	–3
Age Groups (years)	**3,233**	**5,341**	**100**	
0–14	602	1,008	19	*
15–29	897	1,286	24	–4
30–44	637	942	18	–2
45–64	210	564	11	+5
Median Age (years)	32	35		
Race	**3,233**	**5,341**	**100**	
Black	2,480	4,085	77	*
White	288	499	9	*
Mixed and Other	444	754	14	*
Not Stated	21	3		
Nativity	**3,233**	**5,341**	**100**	
Bermuda Born	2,786	4,601	86	*
Foreign Born	438	737	14	*
Not Stated	9	3		
Bermudian Status	**3,233**	**5,341**	**100**	
Bermudian Status	2,974	4,949	93	+1
Non-Bermudian	251	392	7	–1
Not Stated	8			
Highest Academic Qualification (16 years +)	**2,596**	**4,254**	**100**	
No Formal Certificate	1,001	880	21	–18
High School Certificate	970	2,063	49	+11
Tech./Voc./Assoc./Diploma	338	845	20	+7
Degree	219	460	11	+2
Other	27	0	*	–1
Not Stated	41	6		
Economic Activity (16 years +)	**2,596**	**4,254**	**100**	
Working	1,139	1,550	36	–8
Unemployed	755	1,354	32	+3
Economically Inactive	679	1,344	32	+6
Not Stated	23	6		

Notes: ^ excludes persons for whom there is no data

Table 6.3.3: Demographic Characteristics of Uninsured Population, 2010 and 2016 (SOURCE: Bermuda Department of Statistics[385])

36% (1,650) of those reporting no health insurance coverage also reported working. This may indicate those working less than 15 hours per week and not entitled to health insurance or, potentially, those working informally

[385]Government of Bermuda. *Population and Housing Census.* 2016. Available: https://www.gov.bm/sites/default/files/2016%20Census%20Report.pdf.

outside the protection of employment and other legislation. Since 2010, there has been an increase of 7% in the proportion of those without insurance aged 45 years and above. This group represented 40% of the uninsured (33% in 2010), with the medium age rising from 32 years in 2010 to 35 years in 2016. Given the association between older age and increasing health risks, this is likely to represent an increased burden of health need in the uninsured population.

When the percentage of the population without insurance coverage is mapped by census district, there is an association with wider measures of deprivation as outlined in Chapter 2.

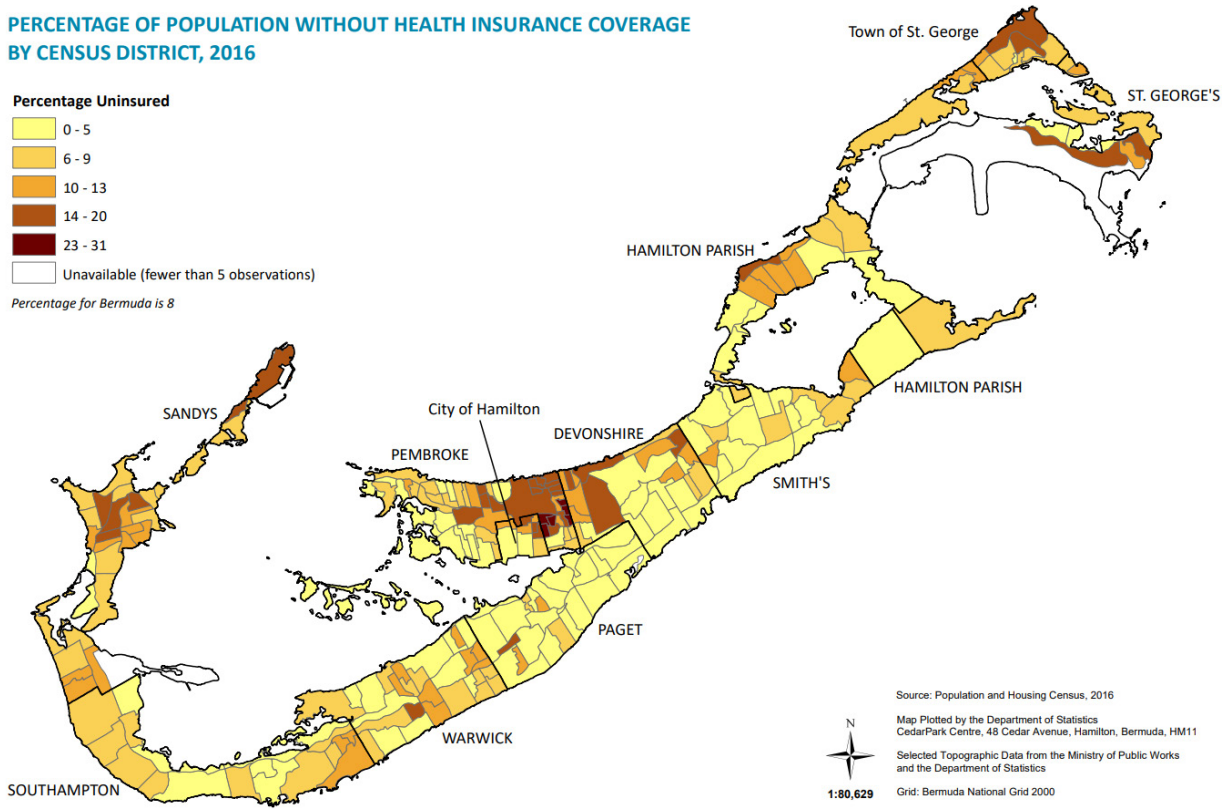


Figure 6.3.2: Percentage of Population Without Health Insurance Coverage by Census District (SOURCE: 2016 Census and Housing Report)

More recent figures from the Bermuda Health Strategy 2022–2027 estimate the uninsured population at 12% with a further 23% of the population having unaffordable health insurance or being underinsured, based on changes to employment that occurred during COVID–19. These statistics will need to be confirmed by the next whole population census in 2026.

The current US-based literature shows variation in health and corresponding health utilisation behaviours of people, depending on insurance status. Uninsured individuals are, on average, in a worse state of health but utilise healthcare less than those who are insured. This indicates a potential unmet health need. Whilst there is a common perception that the uninsured in the US use the emergency department more than those who are insured, this finding has yet to be born out in the literature.[386] However, these findings may not be generalisable to Bermuda, which would benefit from its own academic study to investigate the impact of insurance status both on health state and healthcare utilisation across the health system.

[386]Zhou RA, Baicker K, Taubman S, Finkelstein AN. The Uninsured Do Not Use The Emergency Department More, They Use Other Care Less. *Health Aff (Millwood).* 2017;36(12):2115–2122. https://doi.org/10.1377%2Fhlthaff.2017.0218.

One area of local investigation is an ongoing study by BHB into "superusers" of the emergency department. Superusers are individuals, often with complex needs, making disproportionate use of health resources. Superusers have been defined as one of the top 25 most frequently attending patients in the emergency department. The study, which ran from October 2020 to October 2021, found that 48% of emergency department users received some sort of patient subsidy. The most common specific conditions responsible for return "superuser" attendance were chronic physical health conditions (e.g., asthma, COPD) followed by mental health conditions. Better access to high-quality chronic disease management services in the community could potentially prevent these attendances. Ongoing work by BHB in 2023 will further investigate the social context of emergency department "superusers", which will have important implications for the development of UHC.

6.3.4 Affordability and Access – Key Findings

- The current employment-based health insurance model does not provide UHC to the whole population and may be exacerbating health inequalities.
- The current health information ecosystem does not reliably capture all health expenditure in a meaningful way to allow conclusions to be drawn on whether expenditure is meeting health need.
- The fee-for-service model does not incentivise more cost-effective prevention or early chronic disease management. Nor does it financially incentivise quality improvement or system strengthening work.

6.4 Healthcare Resources

6.4.1 Healthcare Facilities

The Bermuda Health Council maintains a list of healthcare facilities, classified by OECD health facility type. Community healthcare facilities are predominantly provided by the private sector with a multiplicity of providers. KEMH, Bermuda's only general hospital, offers a comprehensive range of secondary (and some tertiary) care services. This is a voluntary listing and can be seen on a publicly available spreadsheet.

A summary of healthcare facilities is shown below:

OECD Health Facility Sub Type	Number in Bermuda	Comments
Dental Practices	26	
General Hospital	1	King Edward VII Memorial Hospital
General Practitioners	15	See also medical and diagnostic laboratories
Medical and Diagnostic Laboratories	34	Also includes general practitioners and medical specialist services (Bermuda Cancer and Health Centre)
Medical Mental Health Specialists	1	
Medical Specialists	27	See also medical and diagnostic laboratories
Mental Health Hospital	1	Mid-Atlantic Wellness Institute
Other Healthcare Professionals	74	Including physiotherapy, nutrition, community health centre, speech and language therapy, eye care
Pharmacies	29	

Table 6.4.1: Bermuda Health Facilities
(SOURCE: Bermuda Health Council Health Facility Data, December 2022)

The public and other healthcare professionals would benefit from a publicly available real-time interactive dashboard displaying healthcare facilities, including their mapped locations and services provided. This could later be combined with Integrated Care Pathway information (see Section 6.5.5) to allow patients to map their journey geographically and enable better collaboration between healthcare providers.

A map of healthcare facilities show they are concentrated centrally around the City of Hamilton and neighbouring parishes (Pembroke and Paget) (Figure 6.4.1). Healthcare facilities are less prevalent at the extremes of Bermuda (Sandys and St George's). This may result in reduced accessibility for populations living in these parishes. However, given the relatively short distance from the extreme ends of Bermuda and the public transport links across the island, it should not present a significant geographic barrier for individuals wanting to access healthcare. An interactive version of this map is available at: **https://experience.arcgis.com/experience/877aed4fe3d94346b81a2de649fe94f4**.

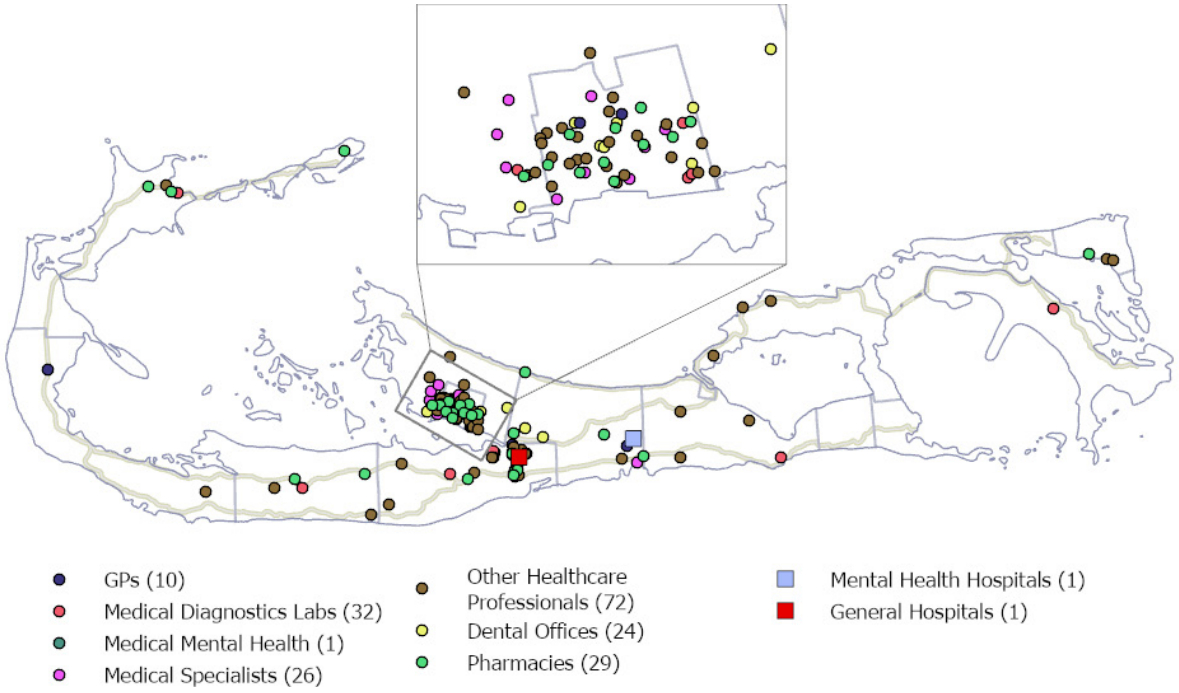


Figure 6.4.1: Map of Bermuda Health Facilities
(SOURCE: Bermuda Health Council Health Facility Data, December 2022)

6.4.2 Healthcare Workforce

2,046 people work in human health activities out of a total labour force of 31,316, or 6.5% of the workforce.[387] Whilst most of the health workforce is Bermudian (69.65%), some key professions (including pharmacists, physicians, registered nurses and surgeons) are majority non-Bermudians.

[387]Department of Statistics. *2021 Employment Survey. Tabulation Set.* Government of Bermuda. Available: https://www.gov.bm/sites/default/files/2021-Employment-Survey-Detailed-Tabulation-SetV2.pdf.

Occupation	Number	Bermudian	Non-Bermudian	% Non-Bermudian
Dentist	34	21	13	38.24%
Medical Laboratory Technician	38	20	18	47.37%
Medical Worker NEC	103	85	18	17.48%
Occupational Therapist	31	16	15	48.39%
Pharmacist	81	23	58	71.60%
Physician	160	70	90	56.25%
Physiotherapist	47	26	21	44.68%
Radiological Technician	44	24	20	45.45%
Registered Nurse	373	95	278	74.53%
Surgeon	10	4	6	60.00%
Total Human Health Workers	2046	1425	621	30.35%

Table 6.4.2: Bermuda Health Workforces
(SOURCE: 2021 Labour Force Survey)

The OECD publishes detailed information on healthcare workforce numbers with country-by-country comparisons. Bermuda's *Health in Review 2023* (to be published later in the year) will provide a detailed comparison against other OECD jurisdictions. For the purposes of the JSNA, the number of physicians and nurses per 1000 population is provided below.

OECD Indicator	Bermuda (2021)[388]	OECD Average 2019 (Average Range)[389]
Number of doctors per 1000 population[390]	2.8	3.6 (2.0–6.2)
Number of nurses and midwives per 1000 population[391]	7.0	8.8 (1.4–18.0)

Table 6.4.3: Bermuda Health Facilities
(SOURCE: 2021 Labour Force Survey)

The number of doctors and nurses/midwives per 1000 population is below the OECD average. However, it should be noted that there are variations between each OECD territory in its classification of healthcare staff, particularly nursing staff.

Bermuda College offers courses in Allied Health and Nursing. However, the vast majority of professional training and education is delivered overseas. This includes both undergraduate/graduate education and postgraduate specialty training. The combination of a high proportion of overseas healthcare professionals and the requirement for the vast majority of healthcare professionals to train overseas leaves Bermuda vulnerable to international trends in healthcare workers.

There is currently a global shortage of healthcare workers, so Bermuda will need to continue competing to recruit and retain these valuable staff.

[388] Government of Bermuda, Department of Statistics. *2021 Employment Survey, Tabulation Set.* Available: https://www.gov.bm/sites/default/files/2021-Employment-Survey-Detailed-Tabulation-SetV2.pdf.
[389] OECD. Health at a Glance 2021: *OECD Indicators, Chapter 8: Health Workforce.* 2021. Available: https://www.oecd-ilibrary.org/sites/ae3016b9-en/1/3/8/index.html?itemId=/content/publication/ae3016b9-en&_csp_=ca413da5d44587bc56446341952c275e&itemIGO=oecd&itemContentType=book.
[390] Doctors include physicians and surgeons.
[391] Nurses is total of 'nursing and midwifery professionals'.

6.4.3 Hospital Services

BHB is a quasi-autonomous, non-government organisation (quango) mandated under legislation to provide acute medical and mental healthcare for the people of Bermuda. BHB has the following healthcare facilities:

- King Edward VII Memorial Hospital (KEMH)
- Mid-Atlantic Wellness Institute (MWI)
- Lamb Foggo Urgent Care Centre

BHB is currently working to its 2021–2026 strategic plan "*to continuously deliver the highest quality and safest care to our patients, every day*".[392] The plan reflects some of the findings within the JSNA relating to population health, including an ageing population, an increasing burden of chronic disease, an increasing dependency ratio and inequalities in accessing healthcare. Naturally, the plan focuses primarily on continuous quality improvement in BHB but recognises the requirement for whole-system collaboration to integrate care better and develop a system of UHC.

A summary of KEMH inpatient vital statistics (April 2018–March 2022), relating to beds, patient days and occupancy is shown below. A comprehensive outline of BHB statistics is available on BHB's website.[393] More detailed information relating to hospital utilisation can be found in Section 6.6 (Healthcare Utilisation).

[392]BHB. *2021–2026 Strategic Plan.* 2021. Available: Bermuda Hospitals Board Strategic Plan 2021–2026.
[393]BHB. *BHB Statistics.* 2023. Available: https://bermudahospitals.bm/about-us/news-media/bhb-statistics/.

		April 2018 – March 2019	April 2019 – March 2020	April 2020 – March 2021	April 2021 – March 2022
King Edward VII Memorial Hospital					
Inpatient General Wing	Beds	97	97	98	98
	Patient Days	11,925	14,972	13,838	14,770
	% of Occupancy	34%	42%	39%	41%
Inpatient Acute Care Wing	Beds	90	90	90	90
	Patient Days	30,465	30,947	30,833	31,454
	% of Occupancy	93%	94%	94%	96%
Long Term Care Units	Beds	105	105	105	113
	Patient Days	36,883	37,383	36,219	36,002
	% of Occupancy	96%	97%	95%	87%
Hospice	Beds	8	8	8	8
	Patient Days	1,768	1,507	1,458	1,431
	% of Occupancy	61%	52%	50%	49%
Mid-Atlantic Wellness Institute					
Inpatient Acute Care	Beds	23	23	23	23
	Patient Days	7,275	6,842	6,559	6,460
	% of Occupancy	87%	81%	78%	77%
Long Term & Rehabilitation	Beds	40	40	40	40
	Patient Days	14,18	14,583	14.273	14,463
	% of Occupancy	97%	100%	98%	99%
Substance Abuse Detox Unit	Beds	8	8	8	8
	Patient Days	1,076	1,135	540	705
	% of Occupancy	37%	39%	18%	24%
Child & Adolescent Services	Beds	4	4	4	4
	Patient Days	621	481	565	528
	% of Occupancy	43%	33%	39%	36%

Table 6.4.4: BHB Hospital Vital Statistics
(SOURCE: Bermuda Hospitals Board)

BHB provides the only healthcare facilities that can deliver comprehensive emergency care. It is an enormous asset to Bermuda's healthcare system. However, concentrating acute services in a single centre of care also presents a risk, either if beds are unavailable for patients or, worse if KEMH suffers a critical event (e.g., fire) preventing its ability to operate.

Acute bed capacity has been an issue at KEMH in recent years, both before and during COVID-19, with acute bed occupancy consistently above 93% since 2018. The 2017 BHB annual report outlined the impact of an upsurge in respiratory admissions on bed capacity at KEMH, resulting in the postponement of elective surgery.[394] As BHB recognised at the time, high-quality chronic disease management in the community and public action can make an important difference to the availability of hospital beds. These rates of acute bed occupancy are similar to other comparable jurisdictions. For example, England has seen hospital bed occupancy rates rise from an average of 87.1% in 2010–2011 to over 90% since 2017–2018. However, COVID-19 control measures resulted in a reduction of England's bed occupancy rate to an average of 76.8% in 2020/2021. Bermuda did not see a comparative drop.[395]

[394]BHB. *Annual Report 2017.* 2017. Available: https://bermudahospitals.bm/wp-content/uploads/2022/10/BHB-Annual-Report-2017.pdf.
[395]Ewbank L, Thompson J, McKenna H et al. NHS hospital bed numbers: past present, future. *King's Fund.* 2021. Available: https://www.kingsfund.org.uk/publications/nhs-hospital-bed-numbers.

KEMH's bed occupancy statistics for the general wing include maternity, paediatric and intensive care beds, and the relatively low bed occupancy may not represent additional general inpatient capacity. As a territory with a small population, Bermuda is likely to see greater fluctuation in bed use for these specialist services.

The development of Integrated Care Pathways can help optimise chronic disease management, reduce avoidable admission and help protect the availability of BHB's beds. The alternative will be the need to increase bed capacity, an expensive option requiring additional infrastructure, healthcare staff and equipment.

BHB also provides the Patient-Centred Medical Home service at KEMH for patients with chronic diseases who are not currently seeing a GP and who are uninsured or deemed to be underinsured.[396] Approximately 200 to 250 patients make use of this service. Whilst this service may go some way to mitigate inequalities in access to healthcare, it should not be seen as a substitute for UHC across the health system.

BHB's 2021–2026 MWI Directorate Plan outlines the aim of transitioning mental healthcare into the community and close the MWI site in the long term.[397] This will see a major change to the provision of mental health services in Bermuda, with the ambition to integrate care more effectively, reduce stigma and ensure that services are more patient-centric.

6.4.4 Medical Technologies

Digital Health. Digital health is the use of technology within the healthcare system that aims to organise and deliver healthcare services and data more efficiently to enable better patient outcomes. The National Digital Health Strategy exists as a separate UHC workstream; a detailed overview of the current state of digital health is out of scope of the JSNA. However, it is important to acknowledge the following:

- There is currently no overarching digital infrastructure or information infrastructure for health in Bermuda, with a wide variety of digital platforms being used by healthcare providers.
- BHB launched the Patient Electronic & Administrative Records Log (electronic medical records) in October 2022, enabling enhanced collection, interpretation, and analysis of patient hospital data.
- The National Digital Health Strategy will be vital to filling the data gaps identified within the JSNA (including chronic disease information) and providing the information required for the smooth operation of Integrated Care Pathways.
- Implementing a coherent National Digital Health Strategy is an essential step in delivering a clinical and cost-effective system of UHC and should be commensurately resourced.

Diagnostic Technologies: Imaging and Laboratories. Bermuda has an abundance of diagnostic technologies provided by both the private and public sectors. Since 2019 laboratory and diagnostic imaging facilities have been regulated by the Bermuda Health Council. In the same year, the Council published a Diagnostic Imaging and Laboratory Consultation Summary, which had the goal of better understanding this important sector of Bermuda's health economy.[398]

[396]Bermuda Hospitals Board. *BHB introduces Patient-Centre Medical Home.* 2017. Available: https://bermudahospitals.bm/bhb-introduces-patient-centred-medical-home/.
[397]Bermuda Hospitals Board. *2021–2026 MWI Directorate Plan.* 2022. Available: https://bermudahospitals.bm/wp-content/uploads/2022/04/MWI_Directorate-Plan-2021-2026-FINAL.pdf.
[398]Bermuda Health Council. *Diagnostic Imaging & Laboratory Consultation Summary.* 2019. Available: http://bhec.bm/wp-content/uploads/DI-Lab-Consultation-Summary-.pdf.

The consultation outlined that:

- Bermuda has 12 registered clinical laboratory facilities, 11 of which exist in the private sector and one at BHB. Only BHB's services were covered under Standard Health Benefit (SHB).
- Bermuda has nine registered diagnostic imaging facilities (although in practice, 11 facilities can offer diagnostic imaging). Eight facilities receive coverage under SHB for part or all of their service.

The consultation identified themes that characterise the sector, which are summarised in Table 6.4.5:

Theme	Sub-Theme	Comment
Quality of Services	Stability and Consistency	Providers felt that stability and consistency in the health sector is required in order for providers to create and maintain the high levels of service provided.
	Oversight	There was a variety of views on the subject of oversight, with strongly held views on oversight of market entry criteria.
	Lack of Clinical Guidelines	The lack of nationally accepted and enforced clinical guidelines for diagnostic services was universally identified as an immense risk to the provision of care.
	Competition	Competition was cited as a system strength with many providers expressing confidence that market pressures resulted in superior quality of services.
	Education and Training	The high quality of services were directly attributed to the education and training of clinical professionals.
	Gatekeeping	The lack of gatekeeping was mentioned as a threat to all aspects of medicine, with the importance of clinical reasoning emphasised by respondents.
Cost of Care	Incentives	Misaligned incentives, such as co-pays and coverage decisions, have steered patients away from cheaper care alternatives resulting in rising costs pressures.
	Public Expectations	Public expectations were believed to be major factor in increasing the cost of health services. The cost is divided by a very small market.
	Utilisation	All providers acknowledged that inappropriate utilisation has detrimental effects on the cost of care. Specific points discussed were test duplication due to lack of reciprocity with local reference facilities, double billing for verifications, titration and retesting, inappropriate test grouping, defensive medicine and questionable self-referral practices.
	System Capacity	Unclear system capacity and unchecked market entry were mentioned as system cost drivers.
System Waste	Communication	Providers indicated that better communication would have the most impact in reducing waste.
	Efficiency	Efficiency requires providers to exclusively hub local assets, standardise how and why services are delivered and reduce the complexity of system navigation. There were concerns about the movement towards a more socialised system.
	Technology	Rational development of technology was cited as an important tool in enhancing productivity. Certain IT assets should be seen as a national resource.
	Scopes of Practice	There is a requirement for the development and monitoring of clear prescriptive scopes of practice for professionals and facilities to ensure the "right" professional, is requesting the "right" test, at the "right" time for the "right" patient.

Table 6.4.5: Themes from Diagnostic Imaging and Laboratory Consultation Summary (SOURCE: Bermuda Health Council)

The findings from this consultation also reflect trends identified in Bermuda Health Council's *Lab and Diagnostic Imaging Order Rates (2018 Report)*.[399] which found an overall year-on-year increase in laboratory test and diagnostic imaging order rates. In addition, *Health in Review* 2017 found that Bermuda had some of the highest in-hospital rates of CT (third highest) and MRI (fifth-highest) scans per 1000 patients in the OECD. This benchmarking with similar jurisdictions suggests potential overutilisation of diagnostic imaging. However, useful conclusions cannot be drawn about the appropriateness of ordering from this population-level data. Instead, this can be better deduced from developing evidence-based clinical standards for ordering laboratory tests and diagnostic imaging and monitoring adherence to these standards through a programme of clinical audit.

The Integrated Care Pathways element of UHC should include diagnostic technologies in all relevant pathways based on evidence-based clinical criteria for ordering laboratory test and diagnostic imaging, which can be monitored through clinical audit. There is evidently a role for the National Digital Health Strategy in developing digital systems that can aid communication, decrease duplication, aid oversight and present ordering clinicians with evidence-based digital clinical decision tools to guide ordering decisions. The UHC Programme should also seek to reduce evident inequalities in the system.

6.5 Healthcare Utilisation

6.5.1 Healthcare Utilisation from Insurance Claims

Bermuda has no surveillance system that uses routine healthcare data for capturing healthcare utilisation from across the health and social care sector. This contrasts with other jurisdictions that collate healthcare utilisation data (such as the number of GP and specialist appointments) in near real-time.[400]

The nearest equivalent (almost) system-wide data set is Bermuda Health Council's Cost and Utilisation data. This data is submitted by private and public insurers (Argus, BF&M, CG, Health Insurance Plan and FutureCare) for local and overseas claims. This excludes local hospital and subsidy claims.

The JSNA has used this data set to outline the total claims and total paid for claimed services to indicate service use in Bermuda (for overseas care, see Section 6.6). This can be used as a proxy indicator for healthcare utilisation, noting that the number of claims per visit may differ depending on the procedure codes involved. The data is displayed by fiscal year (i.e., 1 April to 31 March).

This data set has limitations. Bermuda Health Council does not make any guarantees or provide third-party validation for the data source. It is recognised that whilst being the nearest proxy to system-wide data, the data set excludes claims rejected by insurers and out-of-pocket payments. This means the set excludes utilisation data from those without health insurance and that it contains a bias towards those services covered in insurance schedules of benefit. Bermuda would benefit from a surveillance system that captures healthcare utilisation across the entire health and social care sector, which the National Digital Health Strategy could enable. It will be difficult to monitor the impact of UHC without such a system.

This proxy data for healthcare utilisation has been divided by age into three population groups:

- Children (aged 0–19)
- Working Age Adult (aged 20–65)[401]
- Older Adults (aged 66 and over)

[399] Bermuda Health Council. *Diagnostic Imaging & Laboratory Consultation Summary*. 2019. Available: http://bhec.bm/wp-content/uploads/DI-Lab-Consultation-Summary-.pdf.
[400] NHS Digital. *Appointments in General Practice, November 2022*. 2022. Available: https://digital.nhs.uk/data-and-information/publications/statistical/appointments-in-general-practice/november-2022.
[401] It is recognised that the working-age population includes those aged <20 and >65 years of age.

The reason for this divide was because these population age groups have very different health needs. It was critical that important relevant services for one group (e.g., paediatric services for children) were not lost in the noise of overall population utilisation data. The data has been ranked by level of utilisation in the most recent fiscal year.

Utilisation of Healthcare by Children (aged 0–19).

Data outlining healthcare utilisation by children is displayed in Tables 6.5.1 (by number of claims) and 6.5.2 (by total paid for claims).

FY 21–22 Rank	Service	Total Claims				
		FY17–18	FY18–19	FY19–20	FY20–21	FY21–22
1	Dental	53,204	50,719	47,594	42,245	48,770
2	Paediatrician	24,546	22,306	24,003	18,812	22,562
3	Pharmacy	22,341	21,236	21,484	14,727	15,384
4	Physician	8,636	8,996	9,286	9,139	9,502
5	Laboratory	4,968	5,154	5,927	6,625	7,834
6	Specialist	8,868	10,254	10,305	7,355	7,510
7	GP	4,017	3,592	4,137	3,756	6,134
8	Psychologist	3,415	4,440	4,763	4,702	4,950
9	Other facility	4,904	4,698	4,946	4,292	4,702
10	Speech	3,344	2,656	2,700	2,483	2,521
11	Physiotherapist	3,039	2,410	2,834	2,528	2,382
12	Neonatologist	72	152	623	1,889	2,298
13	Vision	1,748	1,876	1,981	2,120	2,091
14	Other allied health or CAM	1,555	1,680	2,689	2,073	2,046
15	Optometrist	1,490	1,384	1,317	1,332	1,379
16	Medical goods/supplies	1,238	1,067	1,195	1,037	1,337
17	Chiropractor	1,056	1,384	1,233	1,227	1,138
18	Facility	1,593	1,377	1,600	1,195	1,100
19	Chiropodist	558	466	496	470	507
20	Overseas accommodation & transportation/airline	1,206	1,067	981	192	457

Table 6.5.1: Children's (Aged 0–19) Healthcare Service Use Leading Healthcare Services by Total Claims for 2017–2022 (SOURCE: Bermuda Health Council's Cost and Utilisation Data)

FY 21–22 Rank	Service	Total Paid for Claimed Services				
		FY17–18	FY18–19	FY19–20	FY20–21	FY21–22
1	Dental	$3,909,569	$3,820,960	$3,587,855	$3,207,422	$3,787,019
2	Paediatrician	$2,274,463	$2,284,238	$2,642,922	$1,902,079	$2,113,487
3	Pharmacy	$1,884,043	$1,938,651	$1,984,667	$1,570,641	$1,706,915
4	Laboratory	$418,335	$433,372	$597,257	$721,108	$964,554
5	Physician	$894,932	$942,404	$987,182	$965,230	$961,593
6	Specialist	$944,456	$1,058,796	$1,134,042	$808,722	$856,807
7	Psychologist	$425,905	$552,054	$632,230	$640,157	$718,524
8	GP	$423,132	$398,969	$460,327	$415,920	$627,342
9	Facility	$471,144	$453,149	$614,509	$563,245	$411,833
10	Overseas accommodation & transport	$765,676	$670,658	$674,556	$183,912	$384,971
11	Medical goods/supplies	$354,486	$342,854	$393,780	$348,268	$382,435
12	Vision	$333,001	$334,316	$332,357	$372,960	$368,528
13	Other facility	$315,679	$253,684	$269,317	$203,683	$281,357
14	Other allied health or CAM	$116,514	$170,241	$273,610	$202,150	$222,393
15	Neonatologist	$7,358	$16,477	$74,012	$172,216	$208,279
16	Speech	$219,024	$208,436	$222,312	$202,832	$200,999
17	Physiotherapist	$194,362	$167,115	$206,933	$188,838	$180,576
18	Optometrist	$180,560	$170,834	$168,601	$172,855	$179,774
19	Orthopaedic surgeon	$147,861	$126,396	$130,624	$108,227	$102,063
20	Other services	$27,664	$69,972	$97,691	$85,717	$101,762
	Total Paid^ (includes other services not listed)	**$15,930,305**	**$16,118,283**	**$16,529,063**	**$14,185,801**	**$15,909,104**

Table 6.5.2: Children's (Aged 0–19) Healthcare Service Use
Leading Healthcare Services by Total Paid for Claimed Services 2017–2022
(SOURCE: Bermuda Health Council's Cost and Utilisation Data)

The leading five causes of healthcare utilisation for children were dental, paediatrician and physician visits, along with claims for pharmacy and laboratory services. Claims for GP visits was ranked seventh in 2022 and eighth by expenditure, Future health system reform encompassing child health should consider the provision of the following:

- Dental services
- Paediatric services
- Physician services (including GP and specialist)
- Enabling services (pharmacy and laboratory)
- Hospital services (whilst not being a leading cause of healthcare utilisation for children in Bermuda, remain an essential service)

The overall trends for claims and expenditure from 2017–2022 were relatively stable with a couple of notable exceptions. Laboratory claims show an increase (particularly when looking at costs) from FY20–21 onwards. This may be due to additional testing associated with the COVID-19 pandemic. Longer-term data is required to determine whether this rise in laboratory services will continue.

The other notable exception is the increase in claims for neonatology services. It is recognised that neonatology is a complex and expensive service and use by a small number of patients could result in multiple and costly claims. The increase in local neonatology claims is not associated with a corresponding decrease in overseas claims, which would indicate a shift in service use. It is recommended that the First 1,000 Days of Life Integrated Care Pathway investigates this trend in more detail to ensure that the health system provides Bermuda's residents with the best start to life.

Utilisation of Healthcare by Working-Age Adults (aged 20–65).

Data outlining healthcare utilisation by working-age adults is displayed in Tables 6.5.3 (by number of claims) and 6.5.4 (by total paid for claims).

FY 21–22 Rank	Service	Total Claims				
		FY17–18	FY18–19	FY19–20	FY20–21	FY21–22
1	Laboratory	218,217	221,169	227,635	229,462	249,416
2	Pharmacy	215,097	218,043	215,104	191,636	204,949
3	GP	126,496	121,529	121,563	118,257	153,589
4	Dental	166,058	157,216	147,446	128,918	148,705
5	Hospital	312,280	314,026	105,412	53,582	52,878
6	Other facility	24,800	24,591	24,746	21,897	26,643
7	Specialist	15,891	16,994	17,288	15,877	26,499
8	Chiropractor	29,801	29,461	29,239	25,893	26,071
9	Physician	14,730	14,860	16,740	17,212	22,230
10	Physiotherapist	22,539	23,033	23,270	20,753	21,921
11	Other allied health or CAM	17,262	17,236	20,975	19,030	19,332
12	Vision	10,156	11,494	12,058	11,871	13,086
13	Home Healthcare	699	5,355	12,415	13,471	12,959
14	Medical goods/supplies	11,332	11,083	11,619	9,960	12,212
15	Psychologist	7,867	9,141	9,697	10,243	11,448
16	Optometrist	9,506	10,350	9,263	8,703	9,965
17	Radiologist	8,019	7,467	10,011	9,230	9,764
18	Obstetrics and Gynaecology	10,308	9,485	10,108	9,895	9,604
19	Chiropodist	11,086	10,220	9,440	7,591	8,272
20	Orthopaedic surgeon	10,272	10,488	8,915	5,980	5,992

Table 6.5.3: Working Age Adults' (20–65) Healthcare Service Use Leading Healthcare Services by Total Claims for 2017–2022 (SOURCE: Bermuda Health Council's Cost and Utilisation Data)

2022 Rank	Service	Total Paid for Claimed Services				
		FY17–18	FY18–19	FY19–20	FY20–21	FY21–22
1	Laboratory	$18,424,455	$19,199,914	$20,445,432	$20,917,834	$23,948,508
2	Pharmacy	$18,317,967	$19,124,208	$20,309,455	$19,654,205	$22,447,785
3	Hospital	$101,628,994	$99,495,834	$38,280,807	$20,742,533	$20,302,852
4	Dental	$20,415,948	$17,981,610	$17,289,776	$14,850,755	$17,552,136
5	GP	$13,381,815	$13,573,911	$14,197,578	$13,868,687	$17,431,560
6	Other facility	$5,621,882	$5,608,653	$5,843,489	$5,496,533	$6,604,984
7	Physician	$3,348,191	$3,371,670	$3,794,282	$3,577,391	$4,229,551
8	Obstetrics and Gynaecology	$5,258,511	$5,149,788	$5,487,509	$4,536,857	$4,066,616
9	Radiologist	$2,708,947	$2,792,266	$3,850,862	$3,411,133	$3,806,518
10	Medical goods/ supplies	$3,373,760	$3,464,158	$3,839,897	$3,280,638	$3,781,652
11	Facility	$2,705,521	$3,115,974	$3,277,526	$3,475,437	$3,175,597
12	Specialist	$2,204,657	$2,419,264	$2,506,298	$2,286,030	$2,971,857
13	Vision	$2,095,213	$2,169,419	$2,234,965	$2,259,031	$2,502,888
14	Chiropractor	$1,981,915	$2,199,757	$2,337,242	$2,019,392	$2,069,375
15	Overseas accommodation & transport	$2,098,825	$1,933,981	$2,140,689	$1,045,632	$1,797,774
16	Other allied health or CAM	$1,250,731	$1,549,517	$2,007,694	$1,649,504	$1,770,292
17	Psychologist	$965,481	$1,115,074	$1,289,700	$1,458,373	$1,681,300
18	Physiotherapist	$1,409,465	$1,645,205	$1,830,701	$1,567,251	$1,673,944
19	Home Healthcare	$129,507	$714,398	$1,613,813	$1,909,483	$1,445,349
20	Orthopaedic surgeon	$2,292,758	$2,390,559	$2,124,307	$1,395,514	$1,361,685
	Total Paid (includes other services not listed)	**$220,040,526**	**$219,219,324**	**$165,696,359**	**$139,310,960**	**$156,540,890**

Table 6.5.4: Working Age Adults' (20–65) Healthcare Service Use
Leading Healthcare Services by Total Paid for Claimed Services 2017–2022
(SOURCE: Bermuda Health Council's Cost and Utilisation Data)

Laboratory and pharmacy services are the leading causes of insurance claims in working age adults. GP services are the third largest reason for insurance claims, followed by dental and hospital services. The total paid for claimed services shows a similar picture, although hospital services became the third largest total paid for claimed services.

Therefore, future health system reform involving adult health should consider the provision of the following:

- Dental services,
- Hospital services,
- Physician services (including GP and specialist)
- Enabling services (pharmacy and laboratory)

Again, service trends appear relatively stable with a few exceptions:

- A steep reduction in claims for hospital services from Fiscal Year 19–20 is likely reflecting the impact of

2019 reforms to BHB funding.

- A steep rise in claims for home healthcare from 699 in Fiscal Year 17–18 ($129,507) to 12,959 in Fiscal Year 21–22 ($1,445,349), which was likely due to the introduction of home healthcare to public health insurance schedules of benefits
- An increase in psychologist claims from 7,867 in Fiscal Year 17–18 ($965,481) to 11,448 in Fiscal Year 21–22 ($1,681,300), suggesting an increased focus on mental health and access to such services through insurance coverage
- A steep reduction in orthopaedic surgeon claims from Fiscal Year 19–20, which may be an impact of COVID–19, suggesting further years of data are required to assess this trend better
- Pharmacy- and laboratory-paid claims continue to rise year-on-year. The recent rise in laboratory costs may be due to the impact of increased testing during COVID–19. The rise in pharmacy costs follows a global trend, but continued close monitoring in Bermuda is required, along with identifying measures to control costs.

Utilisation of Healthcare by Older Adults (66 and over)

Data outlining healthcare utilisation by older adults is displayed in Tables 6.5.5 (by number of claims) and 6.5.6 (by total paid for claims).

FY 21–22 Rank	Service	Total Claims				
		FY17–18	FY18–19	FY19–20	FY20–21	FY21–22
1	Pharmacy	175,163	145,038	175,651	165,909	175,548
2	Laboratory	90,059	79,233	94,810	95,857	102,367
3	Hospital	215,227	189,925	124,561	100,507	84,483
4	Home Healthcare	4,769	38,234	75,710	75,355	75,986
5	GP	49,941	41,565	46,402	40,763	46,890
6	Dental	34,905	34,313	34,236	30,870	36,610
7	Physician	7,727	6,811	10,261	11,584	17,007
8	Other facility	11,221	11,857	14,418	9,463	11,037
9	Chiropodist	10,003	8,180	9,104	7,122	7,802
10	Radiologist	6,947	6,136	8,542	6,300	7,777
11	Specialist	8,090	7,719	8,894	6,102	7,104
12	Ophthalmologist	9,854	7,967	7,332	5,232	6,960
13	Physiotherapist	5,055	4,246	5,613	3,975	5,164
14	Medical goods/supplies	3,342	3,222	3,271	3,182	4,074
15	Other allied health or CAM	2,058	2,427	3,071	2,858	3,552
16	Other	50,292	17,123	3,360	2,860	3,040
17	Optometrist	4,414	4,026	3,628	2,345	2,698
18	Cardiothoracic	3,360	3,579	3,456	2,447	2,445
19	Chiropractor	3,813	3,032	3,323	2,206	2,315
20	Surgeon	1,287	1,724	2,489	2,300	2,280

Table 6.5.5: Older Adults' (66 and Above) Healthcare Service Use Leading Healthcare Services by Total Claims for 2017–2022 (SOURCE: Bermuda Health Council's Cost and Utilisation Data)

2022 Rank	Service	Total Paid for Claimed Services				
		FY17–18	FY18–19	FY19–20	FY20–21	FY21–22
1	Pharmacy	$14,423,030	$12,733,483	$15,774,487	$14,785,463	$16,510,383
2	Hospital	$26,950,050	$21,894,246	$14,877,453	$12,898,832	$11,139,592
3	Laboratory	$7,024,117	$6,455,059	$7,615,527	$7,575,884	$8,125,775
4	Home Healthcare	$697,623	$4,245,198	$7,735,348	$7,882,528	$8,046,632
5	Dental	$4,276,172	$3,973,982	$4,002,652	$3,658,274	$4,553,318
6	GP	$4,043,202	$3,714,748	$4,084,510	$3,865,788	$4,339,123
7	Radiologist	$2,821,543	$2,588,473	$3,710,141	$2,671,913	$3,414,094
8	Other facility	$2,765,059	$2,132,401	$2,266,039	$2,379,199	$2,860,515
9	Physician	$1,606,536	$1,531,413	$1,816,760	$1,843,888	$2,170,024
10	Medical goods/ supplies	$1,493,964	$1,359,637	$1,282,376	$1,097,965	$2,010,377
11	Specialist	$1,338,594	$1,113,767	$1,408,458	$1,130,931	$1,619,331
12	Ophthalmologist	$1,324,504	$967,368	$846,522	$627,273	$928,133
13	Facility	$1,095,082	$1,230,906	$1,040,401	$803,841	$915,904
14	Surgeon	$525,418	$782,304	$1,088,229	$706,034	$657,014
15	Other	$4,522,371	$1,657,949	$599,972	$538,356	$573,431
16	Overseas accommodation & transport	$508,225	$455,058	$441,154	$243,273	$507,376
17	Orthopaedic surgeon	$1,050,963	$814,933	$930,267	$524,158	$505,301
18	Chiropodist	$544,892	$483,943	$544,214	$426,567	$467,015
19	Internist	$429,378	$374,950	$414,177	$403,097	$441,402
20	Cardiothoracic	$542,982	$591,505	$523,070	$388,059	$395,026
	Total Paid (includes other services not listed)	**$81,614,316**	**$72,817,457**	**$75,519,037**	**$68,635,908**	**$74,826,873**

Table 6.5.6: Older Adults' (66 and Above) Healthcare Service Use
Leading Healthcare Services by Total Paid for Claimed Services 2017–2022
(SOURCE: Bermuda Health Council's Cost and Utilisation Data)

Laboratory and pharmacy services are the leading causes of insurance claims in older adults. Hospital services and home healthcare are increasingly important aspects of health claims in this age group. GP, dental and physician claims sit just below these services (for both the number of claims and total paid claims).

Future health system reform considering older adults' health should consider the provision of the following:

- Dental services
- Hospital services
- Home healthcare services
- Physician services (including GP and specialist)
- Enabling services (pharmacy and laboratory)

Again, service trends appear relatively stable with a few exceptions:

- A steep reduction in claims for hospital services from FY19–20 is likely reflecting the impact of 2019 reforms to BHB funding.
- A steep rise in claims for home healthcare from 4,769 in FY17–18 ($697,623) to 75,986 in FY21–22 ($8,046,632), again likely due to the introduction of home healthcare to public health insurance schedules of benefits
- A steep reduction in "other" claims from 50,292 in FY17–18 ($4,522,371) to 3,040 in FY21–22 ($573,431), which may represent an improved quality of coding
- A steep reduction in orthopaedic surgeon claims from FY19–20, which may be an impact of COVID–19, suggesting further years of data is required to assess this trend better

Pharmacy and laboratory paid claims continue to rise year-on-year. The recent rise in laboratory costs may be due to the impact of increased testing during COVID–19. The rise in pharmacy costs follows a global trend, but continued close monitoring in Bermuda is required, along with identifying measures to control costs.

6.5.2 Hospital Utilisation

Hospital utilisation data (including discharge rates, average length of stay, reason for hospitalisation and emergency department indicators) is useful in developing situation awareness of a health system.

Hospital utilisation is not simply determined by hospital infrastructure, workforce and policies but by the wider health system, including prevention, the provision of community services, availability of social care infrastructure, overseas care and health system financing.

Hospital Discharges. A hospital discharge is defined as the release of a patient who has stayed at least one night in hospital, including discharges following normal childbirth and psychiatric stays. It includes death in hospital following inpatient care. Same-day separations are usually excluded.

The number of discharges for the period 2012–2018 averaged 6,128 per year with some year-to-year fluctuation (Figure 6.5.1). The number of discharges dropped to 5,299 in 2020 and 2021, probably due to COVID–19. Further years' data is required to analyse the medium-to-long-term impact of COVID–19 on hospital use. When age-standardised (Figure 6.5.2), the overall trend shows a year-on-year reduction in hospital discharges. The JSNA has used hospital discharge data as a proxy for admission, indicating a reduction in hospital use per age cohort. This may suggest improvements in community healthcare, but also a shift towards in-hospital ambulatory care and day cases, reducing the need for admission. From a healthcare planning perspective, the age-standardised reduction in hospital discharges may be offset by an ageing population (see Chapter 1), which will require further improvements in community healthcare or a possible expansion of hospital beds.

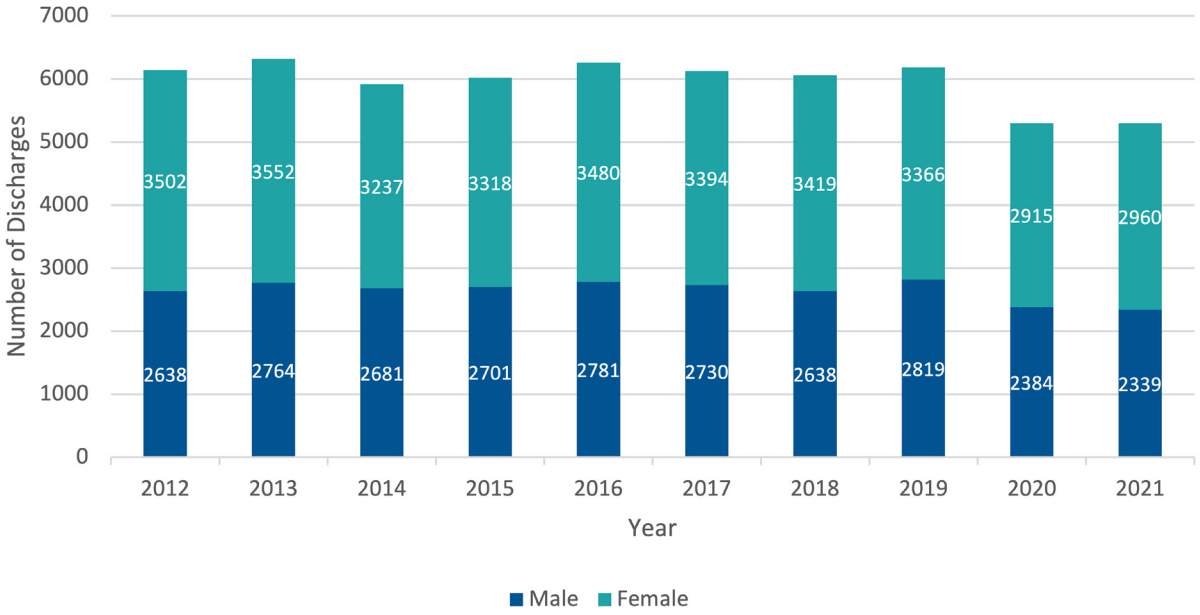


Figure 6.5.1: All-Cause Hospital Discharges (2012–2021)
(SOURCE: Bermuda Hospitals Board, Bermuda Epidemiology and Surveillance Unit)

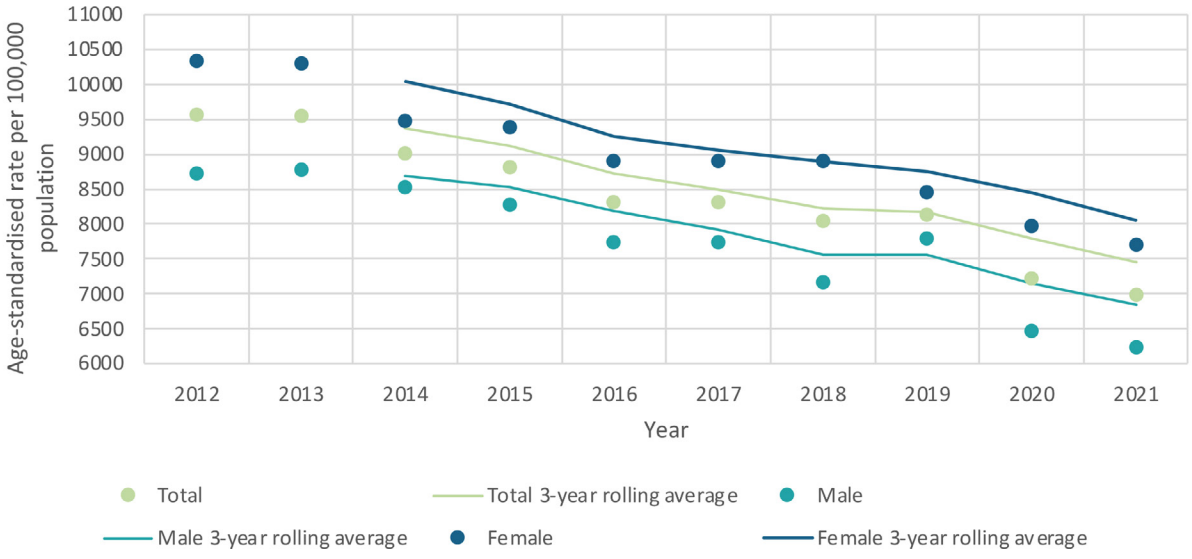


Figure 6.5.2: Age-Standardised Rate of All-Cause Hospital Discharges (2012–2021)
with Three-Year Rolling Average Trend Line.
Note: Age-standardised to WHO Standard Population.
(SOURCE: Bermuda Hospitals Board, Bermuda Epidemiology and Surveillance Unit)

Average Length of Stay. The average length of stay refers to the average number of days that a patient spends in hospital, including psychiatric admissions. It is measured by dividing the total number of days stayed by all inpatients during a year by the number of admissions or discharges. The average length of stay from 2012–2021 was 15 days. Figure 6.5.3 shows the trend over this period.

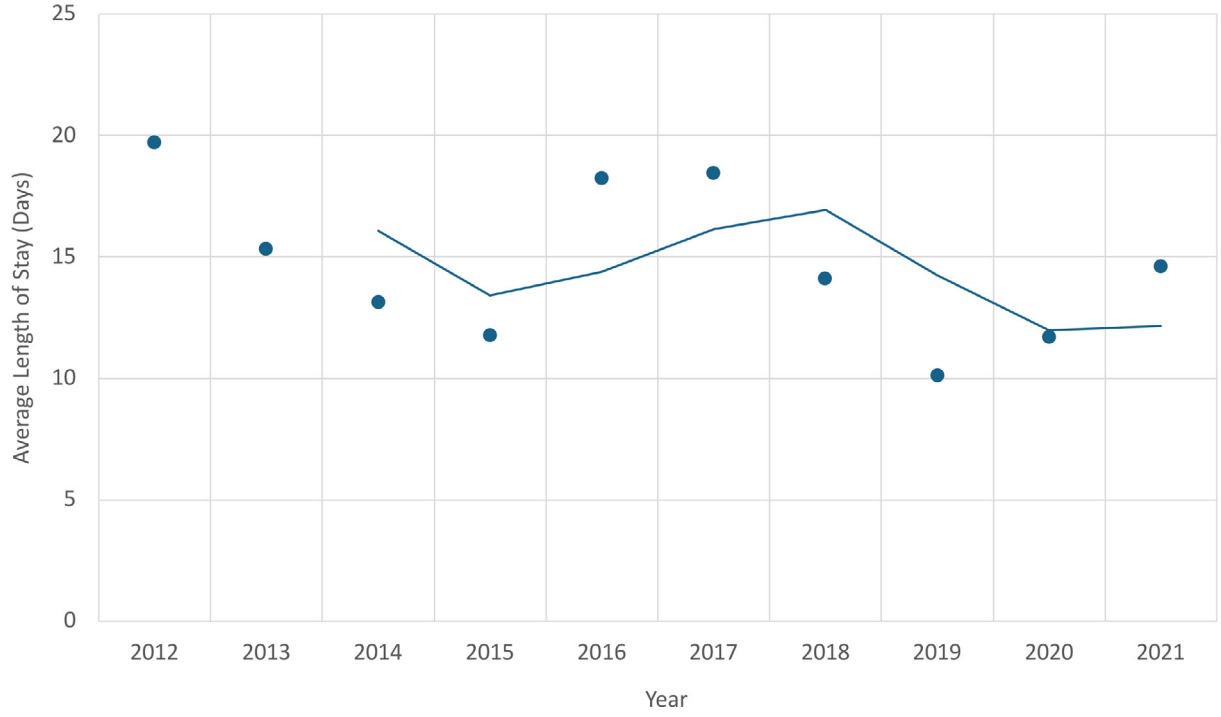


Figure 6.5.3: Average Length of Hospital Stay (All-Cause, 2012–2021) with Three-Year Rolling Average Trend Line. (SOURCE: Bermuda Hospitals Board, Bermuda Epidemiology and Surveillance Unit)

Psychiatric admissions can skew average length of stay data, as some patients require extended lengths of stay over months or years. While it has not been possible to separate psychiatric admissions from the available data set, it has been possible to separate admissions for mental and behavioural/nervous disorders (using ICD codes). This has demonstrated a significantly longer average length of stay for those admitted for mental and behavioural/nervous disorders than for those admitted for other reasons (Figure 6.5.4). Using this proxy indicator, there has been an overall trend of decreasing average length of stay for psychiatric admissions, whilst the average length of stay has been stable for physical admissions. It should be noted that the methodology here is only a proxy indicator, which may still include admissions for physical neurological conditions.

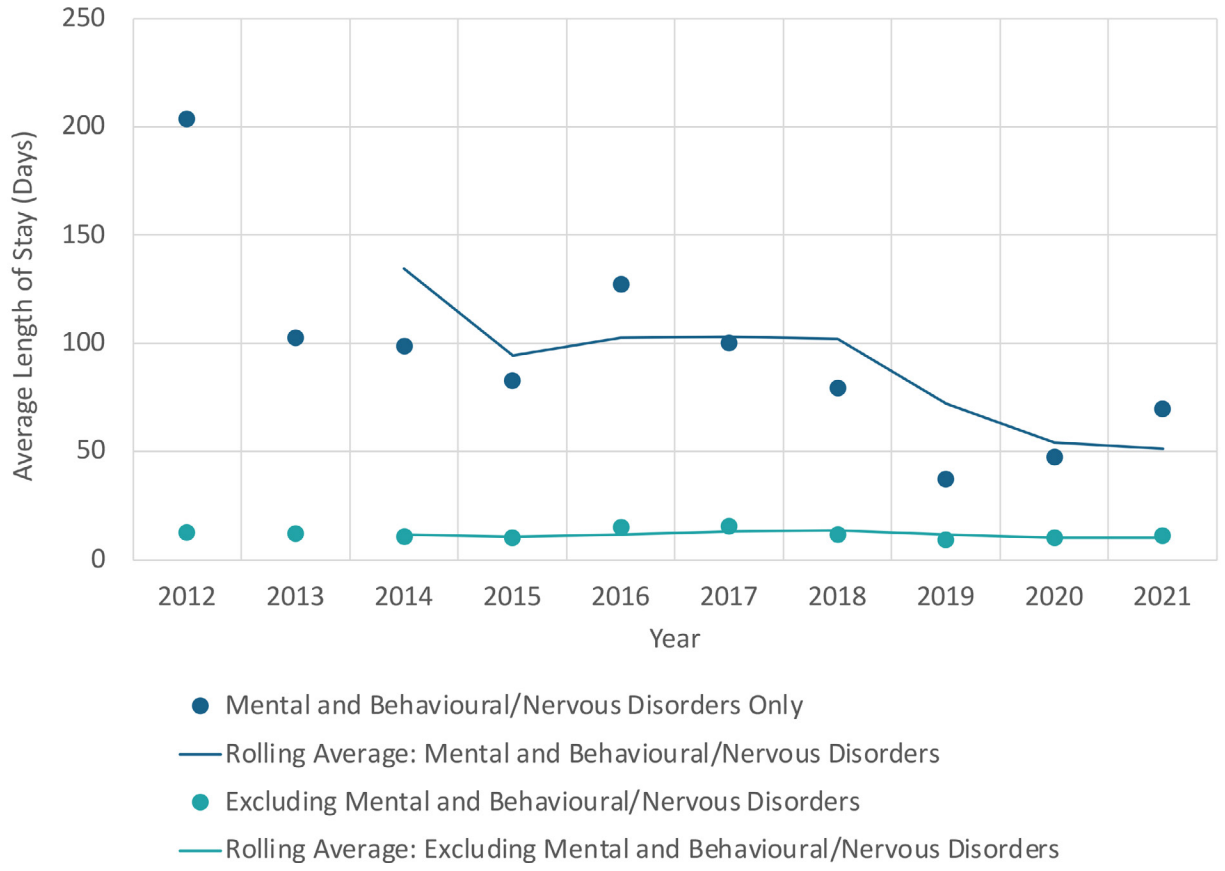


Figure 6.5.4: Average Length of Hospital Stay (All-Cause, 2012–2021) with Three-Year Rolling Average Trend Line. (SOURCE: Bermuda Hospitals Board, Bermuda Epidemiology and Surveillance Unit)

Reason for Hospital Admission. Excluding pregnancy and childbirth, the main conditions leading to hospitalisation over 2012–2021 were injuries and poisoning, circulatory disease, diseases of the digestive system and respiratory disease (Figure 6.5.5). This corresponds with Bermuda's leading causes of mortality and morbidity (although gastrointestinal diseases were less prominent in that chapter and warrant further investigation, as this may be a coding issue).

Table 6.5.7 outlines the reasons for hospitalisation by year. It indicates a reduction in the proportion of admissions due to injuries and poisonings and an increase in the proportion of admissions due to circulatory disease, diseases of the digestive system, infectious and parasitic diseases and mental and behavioural/ nervous disorders. This information should be interpreted carefully, given changes in the underlying population structure. Health in Review 2023 will investigate age-standardised reasons for hospitalisation in more depth. The development of Integrated Care Pathways that map a patient's journey in and out of hospital, together with the development of key performance indicators, should enable Bermuda to offer patients care in the most appropriate setting for their condition and to facilitate future planning of healthcare services.

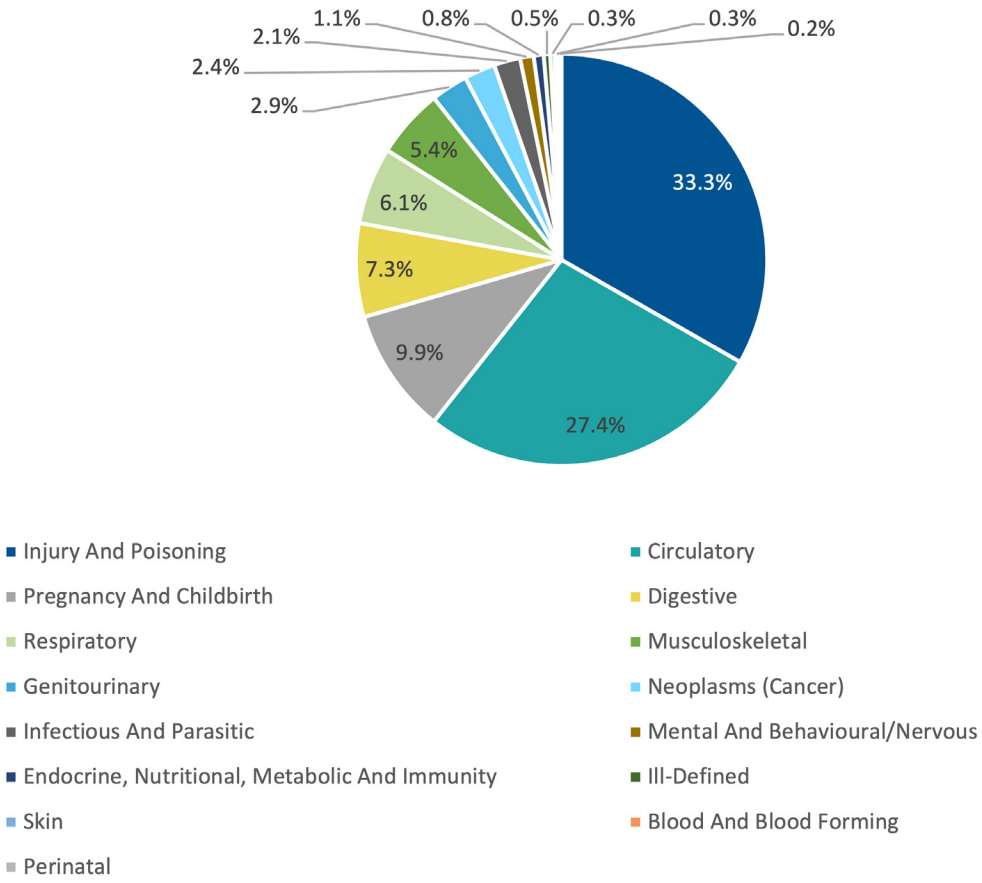


Figure 6.5.5: Reasons for Hospitalisation: Combined Total by ICD Code (2012–2021) (SOURCE: Bermuda Hospitals Board, Bermuda Epidemiology and Surveillance Unit)

ICD Group	2012	2013	2014	2015	2016	2017	2018	2019	2020[402]	2021
Injury and Poisoning	21.8%	21.3%	21.2%	20.0%	19.8%	20.1%	19.8%	19.7%	15.2%	11.1%
Circulatory	12.5%	13.7%	13.6%	14.1%	14.4%	15.7%	15.8%	17.1%	17.8%	16.5%
Pregnancy and Childbirth	12.6%	12.3%	11.1%	11.2%	10.9%	10.6%	9.9%	9.6%	12.3%	11.7%
Digestive	9.6%	9.6%	10.1%	9.5%	11.9%	10.8%	10.5%	10.4%	11.5%	12.7%
Respiratory	10.2%	8.9%	9.5%	9.7%	8.8%	8.5%	8.7%	8.8%	7.6%	10.4%
Musculoskeletal	6.3%	6.3%	6.7%	6.9%	6.8%	5.2%	5.4%	4.9%	4.2%	3.7%
Genitourinary	5.1%	4.7%	4.6%	6.2%	5.2%	5.5%	6.7%	5.4%	5.6%	5.9%
Neoplasms (Cancer)	5.9%	5.5%	6.3%	5.6%	5.4%	4.9%	4.9%	5.2%	5.1%	5.2%
Infectious and Parasitic	2.5%	2.6%	3.0%	4.0%	4.6%	4.8%	4.4%	5.8%	5.9%	4.9%
Mental & Behavioural/ Nervous	3.7%	3.9%	3.2%	2.8%	3.3%	4.0%	4.1%	4.1%	4.9%	7.3%
Endocrine, Nutritional, Metabolic and Immunity	3.2%	3.5%	3.5%	3.2%	2.8%	3.8%	3.7%	3.2%	3.3%	3.7%
Ill-Defined	2.5%	3.4%	3.1%	2.7%	1.9%	2.1%	2.3%	2.5%	2.3%	3.1%
Skin	1.6%	1.9%	1.9%	1.7%	1.8%	2.0%	1.9%	1.7%	1.9%	2.2%
Blood and Blood Forming	1.8%	1.7%	1.7%	1.9%	2.0%	1.6%	1.6%	1.4%	1.7%	1.6%
Perinatal	0.5%	0.5%	0.4%	0.4%	0.3%	0.3%	0.2%	0.2%	0.4%	0.1%
Congenital	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 6.5.7: Reasons for Hospitalisation by ICD Code (2012–2021)
(SOURCE: Bermuda Hospitals Board, Bermuda Epidemiology and Surveillance Unit)

Emergency Department Attendances. The emergency department at KEMH saw upwards of 30,000 attendances in the two years leading up to the COVID-19 pandemic.[403] However, whole-year data has seen a drop in attendance to 21,830 in FY2020–2021, rising to 23,357 in FY2021–2022. Month-by-month data shows this dip in activity in more detail, along with a trend in the rise in the number of attendances since February 2022 (Figure 6.5.6).

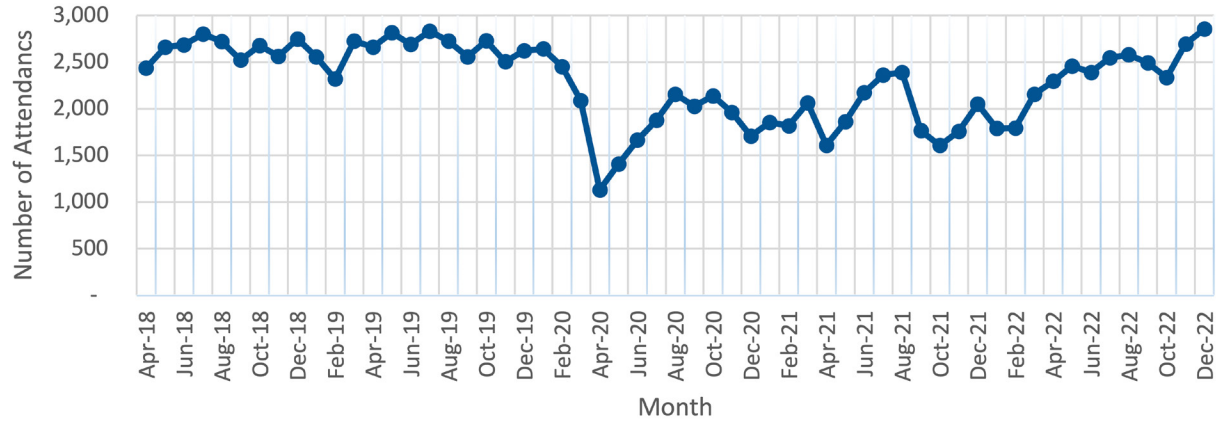


Figure 6.5.6: Monthly Number of Attendances at KEMH Emergency Department April 2018–December 2022
(SOURCE: Bermuda Hospitals Board)

[402] NB: Changed from ICD 9 to ICD 10 in 2020.
[403] 31,594 attendances FY2018–2019, 30,846 attendances FY2019–2020. Data prior to 2018 is less readily available due to the current dashboard system being launched in 2018.

This drop in the number of attendances may represent a hidden set of health needs not met by the health system during COVID–19, but could also be due to a reduction in the risk of acute events because of pandemic control measures. Close monitoring of the emergency department will be required to fully capture post-pandemic trends in patient use of acute services.

Corresponding data for attendance at the Lamb Foggo Urgent Care Centre demonstrates a similar drop in the number of attendances from March 2020 (Figure 6.5.7). However, the overall number of attendances remains below pre-pandemic levels. Again, close monitoring of urgent care attendance data will be important to capture post-pandemic trends in patient use of acute services.

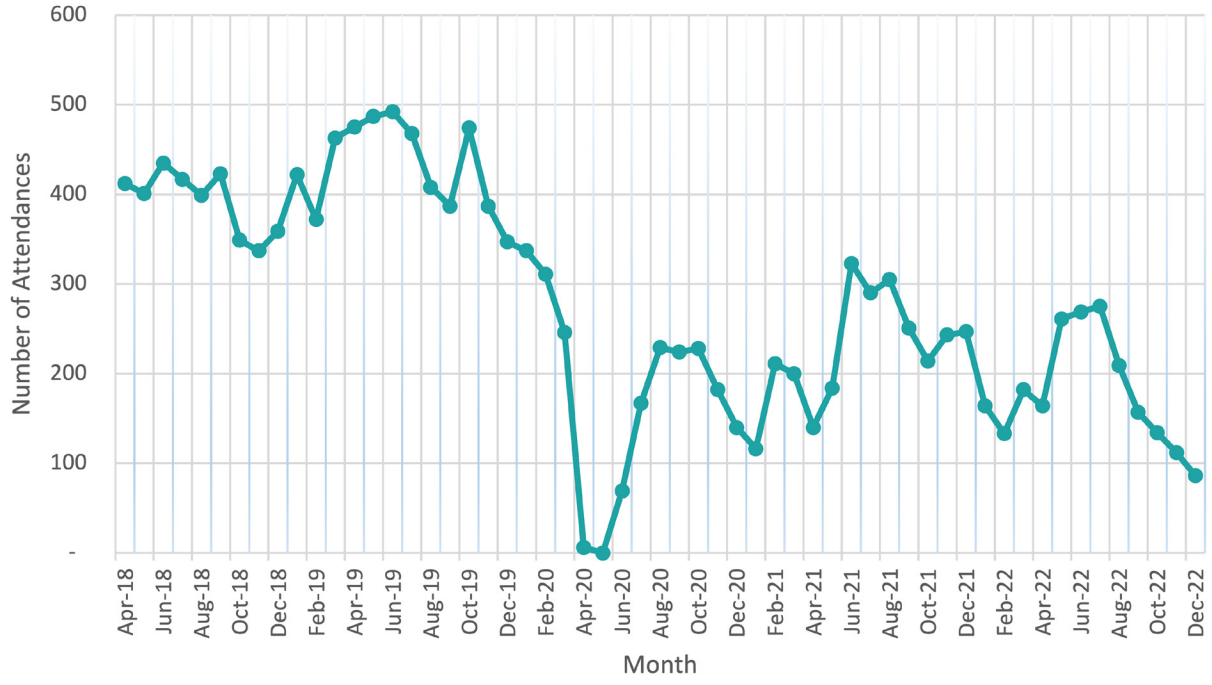


Figure 6.5.7: Monthly Numbers of Attendances at Lamb Foggo Urgent Care Centre April 2018–December 2022 (SOURCE: Bermuda Hospitals Board)

The average length-of-stay data in the emergency department at KEMH has been relatively consistent within a range of 180–360 minutes since April 2018 (Figure 6.5.8). Since the start of the pandemic (March 2020), there appears to be a trend indicating an increase in the average length of stay. This may be due to a greater proportion of higher acuity patients requiring stabilisation, increased requirement for infection prevention control measures during COVID–19 or delayed transfer of care. It is unclear whether this trend will continue. Again, it will be important to monitor the average length-of-stay data to understand patterns of patient utilisation of emergency services post-pandemic.

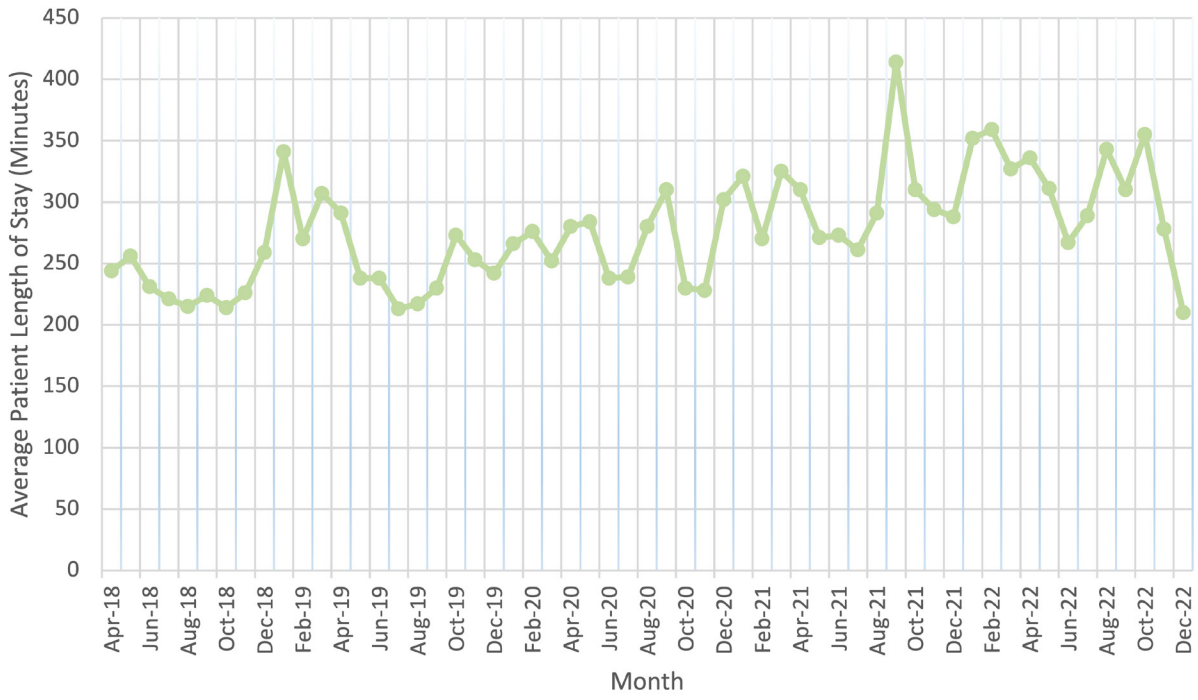


Figure 6.5.8: Average Patient Length of Stay at KEMH Emergency Department April 2018–December 2022 (SOURCE: Bermuda Hospitals Board)

BHB classifies patients attending the emergency department into five levels of acuity:

- Level 1: Resuscitation – immediately life-threatening
- Level 2: Emergency – could become life-threatening
- Level 3: Less urgent – not life-threatening
- Level 4: Semi-urgent – not life-threatening
- Level 5: Non-urgent – needs treatment when time permits

Figure 6.5.9 demonstrates a relatively flat trend in the numbers of patients presenting in the two highest categories of acuity (resuscitation and emergency), with potentially a slight uptick during the COVID–19 pandemic. There was an overall trend of a drop in patients with less acuity presenting from Quarter 4 of 2019/2020. There appears to be an increase in attendance for lower-acuity patients from Quarter 2 of 2021/22. However, it is still too early to make an informed judgement about whether this increased attendance amounts to a trend.

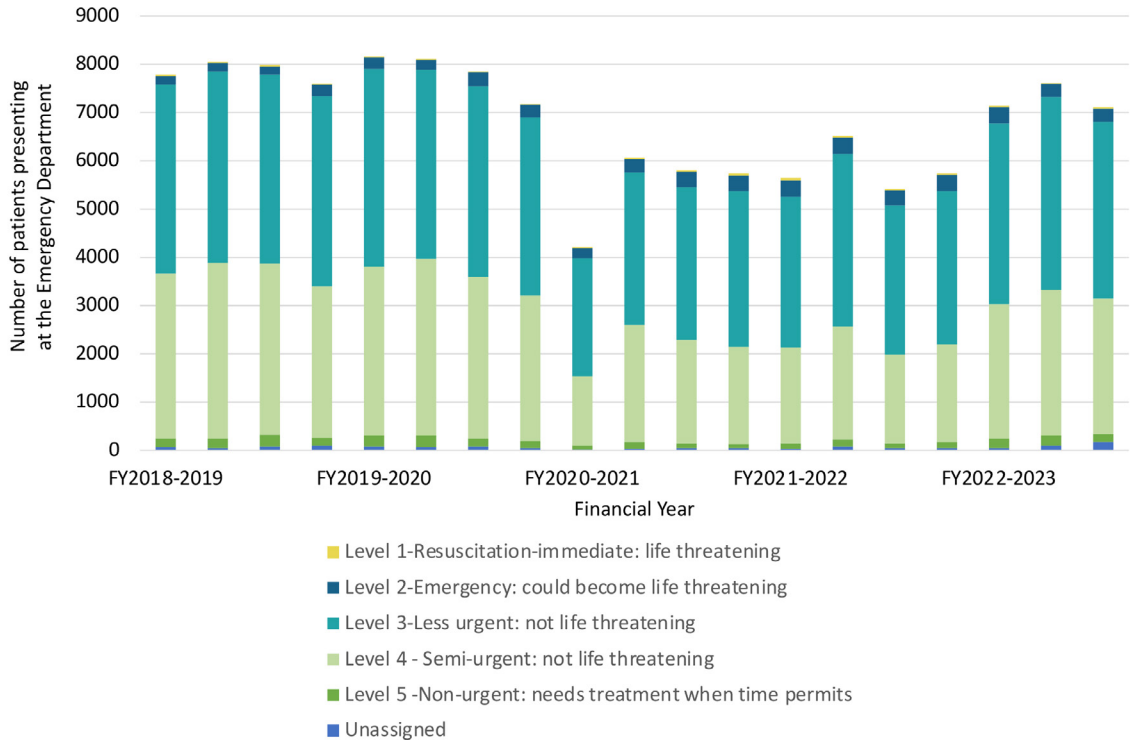


Figure 6.5.9: Patient Acuity KEMH Emergency Department by Quarter from Q1 2018/19 (SOURCE: Bermuda Hospitals Board[404])

6.5.3 Dental Services

Dental services are predominantly provided in the private sector, with 82.0%–83.1% of dental claims (and 79.5%–82.4% of the total paid) from FY17–18 to FY21–22 resulting from services provided in the private sector. Tables 6.5.8 and 6.5.9 show a breakdown of data for total claims and total paid from 1st April 2017 to 31st March 2022.

	Private Dentistry		Government Dentistry		
Fiscal Year	Claims	Percentage	Claims	Percentage	Total Claims
17–18	213,267	82.7%	44,661	17.3%	257,928
18–19	204,372	83.2%	41,335	16.8%	245,707
19–20	193,294	83.1%	39,288	16.9%	232,582
20–21	167,074	82.0%	36,763	18.0%	203,837
21–22	195,051	82.5%	41,400	17.5%	236,451

Table 6.5.8: Dental Services Total Claims 1 April 2017 to 31 March 2022 (SOURCE: Bermuda Health Council's Cost and Utilisation Data[405])

[404]The number of "Level 1–Resuscitation-immediate: life threatening" is small as a proportion of total encounters and is therefore not visible on the chart. Over the time period shown, the number ranges from 16 to 41 per Quarter.
[405]The same caveats apply to this cost and utilisation data as that in Section 6.5.1.

Fiscal Year	Private Dentistry		Government Dentistry		Total Paid
	Paid Amount	Percentage	Paid Amount	Percentage	
17–18	$23,222,605.00	79.5%	$5,971,149.00	20.5%	29,193,754
18–19	$21,584,684.00	82.1%	$4,709,583.00	17.9%	26,294,267
19–20	$20,827,462.00	82.0%	$4,586,535.00	18.0%	25,413,997
20–21	$17,877,366.00	81.3%	$4,116,493.00	18.7%	21,993,859
21–22	$21,657,276.00	82.4%	$4,611,201.00	17.6%	26,268,477

Table 6.5.9: Dental Services Total Paid for Claims 1 April 2017–31 March 2022 (SOURCE: Bermuda Health Council's Cost and Utilisation Data[406])

FY20–21 showed a dip in the total number of dental claims (and total paid), which is likely to represent delays in presentation due to the COVID-19 pandemic. Further years of data are required to verify that this was a one-off dip rather than a longer-term trend.

It was not possible to gain more granular data on the type of dental service provided. This is due to the fact that whilst most providers code their treatments using the Ontario Schedule of Dental Services and Fees, there remains considerable variation in coding, which is unlikely to result in accurate dental data at a population level. This data does not necessarily include the full spectrum of dental services provided at no or low cost at the point-of-use by the Department of Health for children and those aged 65 and over. Dental services in Bermuda show considerable inequalities, with adults under 65 having limited access to "affordable" public dental care[407] and anecdotal evidence from discussions with dentists that vulnerable patients are directed to KEMH to seek urgent dental treatment.

This JSNA has found a lack of detailed usable service and oral health data (Chapter 4). Further work is required to gain a greater understanding of dental health and dental services in Bermuda. This could be achieved through a specific Oral Health Needs Assessment that can bring together the epidemiological and service data to inform future oral health strategies and feed into the UHC programme. Dental services will be important in the First 1,000 Days of Life Integrated Care Pathway.

6.5.4 Rehabilitation Services

The WHO defines rehabilitation as "*a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment*".[408] The WHO classifies rehabilitation as an essential component of UHC.

Rehabilitation is a vital service to minimise the disabling effects of chronic conditions. It can empower people to self-manage their conditions, enabling greater independence for the patient and cost savings for the healthcare service.

Rehabilitation services in Bermuda are provided across the private and public sectors. The JSNA has focused on rehabilitation services provided by the Department of Health to understand better the services provided, reasons for referral and service performance data. Data provided by the Department of Health is displayed in Figures 6.5.10. and 6.5.11.[409]

[406] The same caveats apply to this cost and utilisation data as that in Section 6.5.1.
[407] With some exceptions for adults with disabilities who meet strict criteria.
[408] WHO. *Rehabilitation.* Key Facts. 2021. Available: https://www.who.int/news-room/fact-sheets/detail/rehabilitation#:~:text=Rehabilitation%20helps%20to%20minimize%20or,addressing%20pain%20or%20other%20complications.
[409] Data from private providers of this service is not captured or available in a consistent way.

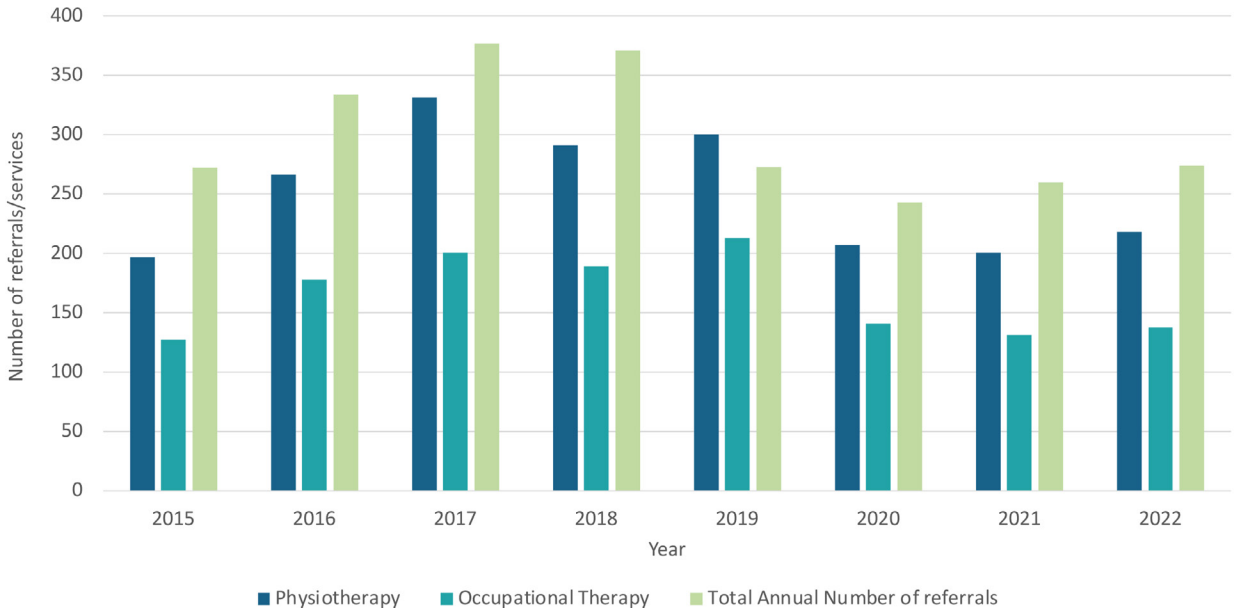


Figure 6.5.10: Referrals to Department of Health Rehabilitation Services and Service Provided (SOURCE: Bermuda Department of Health)
Note: A single referral can result in both physiotherapy and occupational therapy

The total number of referrals to the Department of Health's Rehabilitation Services rose year to year to a high of 377 in 2017 before declining to a low of 243 in 2020. The WHO estimates that rehabilitation services were amongst those most severely disrupted by the COVID–19 pandemic. Bermuda's Department of Health statistics does not reflect this global trend. However, these statistics do not capture activity in the private sector.

Consistent data for reasons for referral are available only for 2022, as shown in Figure 6.5.11.

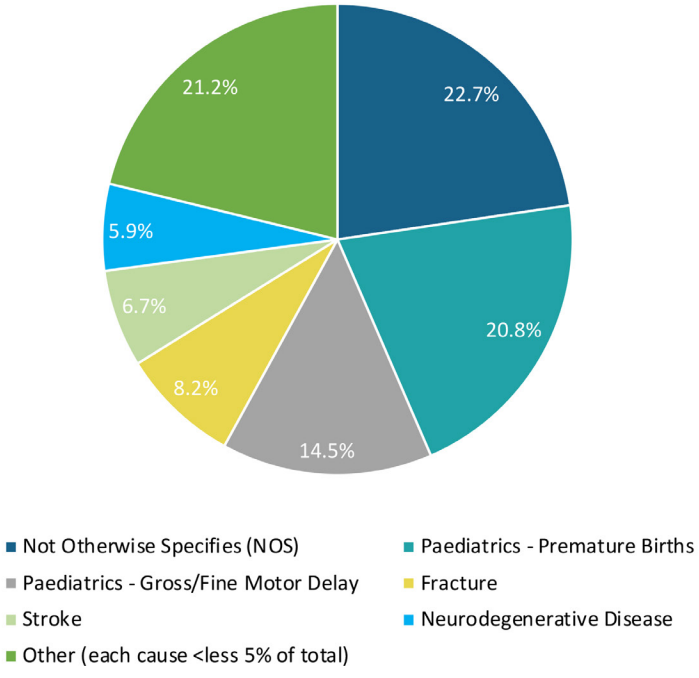


Figure 6.5.11: Reasons for Referrals to Department of Health Rehabilitation Services 2022 (SOURCE: Bermuda Department of Health)

Available data on reasons for referral is limited by the fact that the largest category (22.7%) is for "not otherwise specified". The leading known reasons for referral were both paediatric (premature birth and motor delay). It will be important for the First 1,000 Days of Life Integrated Care Pathway to include rehabilitation services within the pathway to reflect this important work. The three leading known reasons for adult referrals are fracture, stroke and neurodegenerative disease. Interestingly, the number of adults referred for falls between 2015 and 2022 was reasonably low, with a mean of 7.4 referrals (range 4–14). This may be due to patients opting for private sector providers, gaps in coding "not otherwise specified", or the role of rehabilitation being undervalued.

6.5.5 Palliative Care Services

The WHO defines palliative care as *"an approach that improves the quality of life of patients (adults and children) and their families who are facing problems associated with life-threatening illness. It prevents and relieves suffering through the early identification and treatment of pain and other problems, whether physical, psychosocial or spiritual"*.[410] The WHO classifies palliative care as an essential component of UHC.[411]

Palliative care provision in Bermuda is primarily delivered by BHB, Agape House Hospice and PALS Cancer Care, but is relatively underdeveloped and relatively unfunded outside the charitable sector.

Agape House is Bermuda's only dedicated hospice and delivers specialist palliative care, focusing on end-of-life care. However, in the past, it has admitted patients for symptom management. The service was previously headed by a specialist palliative care consultant but is currently run on rotation by geriatricians with variable levels of palliative care training and experience.

PALS Cancer Care supports cancer patients with quality care mainly in the home setting. Cancer patients are assisted by the clinical team at any stage of their diagnosis and PALS doesn't charge a patient or their family for services, relying solely on fundraising activities, donations and, where possible, by claiming on patients' insurance.

All of Bermuda's health insurance providers cover end-of-life care through an "End of Life Benefit" for patients with a prognosis of three- to six-months life expectancy certified by a doctor. The benefit covers approximately $260 per day to be spent on the care of that individual at home and it covers domiciliary care, nursing and allied healthcare through TLC Homecare or PALS. From discussions with providers, given the cost of care, this schedule of benefits is unlikely to be sufficient.

In 2022, BHB convened an in-depth, pan-system working group to help review palliative care provision.[412] The study was led by a multidisciplinary working group from across the health system, including palliative care specialists, geriatricians and nursing staff.

The review identified five key areas for improvement:

- Insufficient community care (for non-oncology patients)
- Disjointed palliative care teams
- Poor integration with off-island services
- Varied education and awareness of palliative care among both staff and patients
- Operational problems across the Care Pathway, particularly around referring and discharging

[410] WHO. *Palliative Care.* 2020. Available: https://www.who.int/news-room/fact-sheets/detail/palliative-care.
[411] WHO. *Universal Health Coverage (UHC).* 2022. Available: https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc).
[412] The BHB Pan-system Palliative Pathway Review 2022 is awaiting publication.

The review made 11 recommendations to improve future palliative care services for the Island:

- Create a Palliative Passport – a consolidated patient record that houses critical information to be shared amongst service providers so they can quickly identify patient needs
- Establish community care for non-cancer palliative patients
- Review patients going overseas for treatment
- Develop a palliative education programme
- Simplify hospice admission
- Establish a palliative care clinic
- Improve discharge support
- Improve consistency of data coding
- Review the end-of-life-benefit
- Establish a palliative care team in the hospital
- Create a palliative toolkit

The JSNA supports all of the above recommendations, noting that they should be integrated into the UHC Programme, recognising that the WHO considers palliative care an essential component of UHC.

6.5.6 Development of Integrated Care Pathways

The development of Integrated Care Pathways is a crucial element of Bermuda's UHC programme. Healthcare provision is currently fragmented, existing in silos with little coordination. This results in sub-optimal use of resources, leading to inefficiencies and often unknown health outcomes for the patient. For much of the healthcare system, there is a lack of clear clinical standards and evidence-based guidelines, and these deficiencies prevent clinicians from having access to the information required to navigate care providers to ensure the best outcomes for their patients.

This theme also emerged from the University of Edinburgh's insight interviews with healthcare professionals as part of the National Digital Health Strategy.

"There are no clinical standards of practice/care. Clinicians are trained in many different countries and come from different backgrounds. As a result, they often disagree on professional guidelines, which makes it hard to implement national ones."

The development of Integrated Care Pathways, using a collaborative approach across the health system, should enable the standardisation of best practices and their application to operational reality, making the best use of available resources and infrastructure. An example of a generic Bermuda Integrated Care Pathway is shown in Figure 6.5.12, integrating prevention, community and hospital care in Bermuda and through overseas providers.

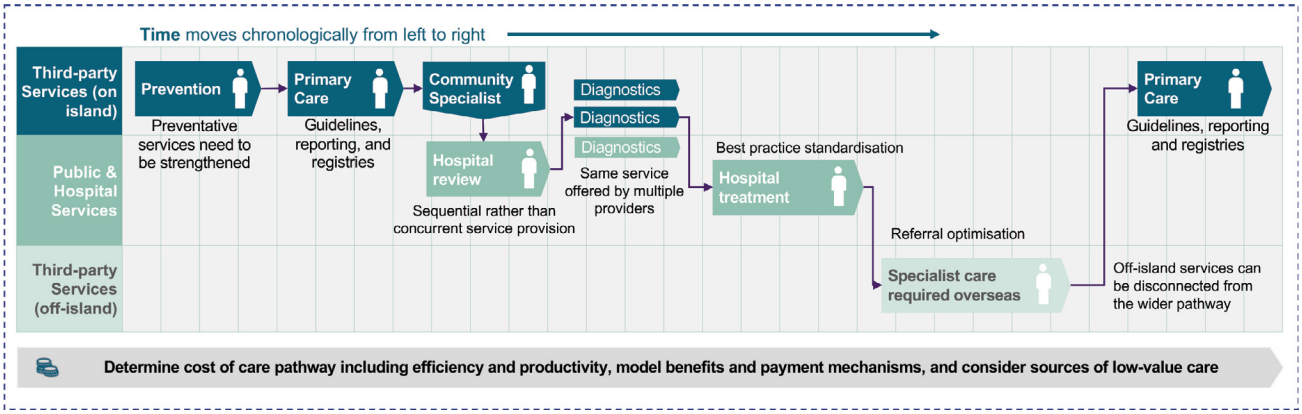


Figure 6.5.12: Integrated Care Pathway Map
(SOURCE: UHC Programme)

BHB has already developed Integrated Care Pathways for:

- **Cancer (in particular, Breast Cancer and Prostate Cancer)**
- **End of Life Care**

The Ministry of Health has recently completed Integrated Care Pathways for three important areas of health:

- **First 1,000 Days** (focusing on child health from pre-conception to two years of age)
- **Chronic Kidney Disease** (chronic kidney disease has a disproportionate impact on Bermuda's health burden and is linked to other important chronic diseases, including diabetes, obesity and hypertension)
- **Acute Adult Mental Health** (focusing on better understanding the current provision of acute mental healthcare services and the patient's experience of these services)

The development of Integrated Care Pathways will also enable the capturing of cost information, allowing for the development of an appropriate financial model to ensure that all people in Bermuda have access to essential care as part of UHC. It will be important for Integrated Care Pathways work to fully capture the ongoing work in both primary and secondary healthcare in order to develop evidence-based guidelines, including work done by BHB and Bermuda Cancer and Health Centre. The process for developing Integrated Care Pathways and charting the path to UHC is shown in Figure 6.5.13.

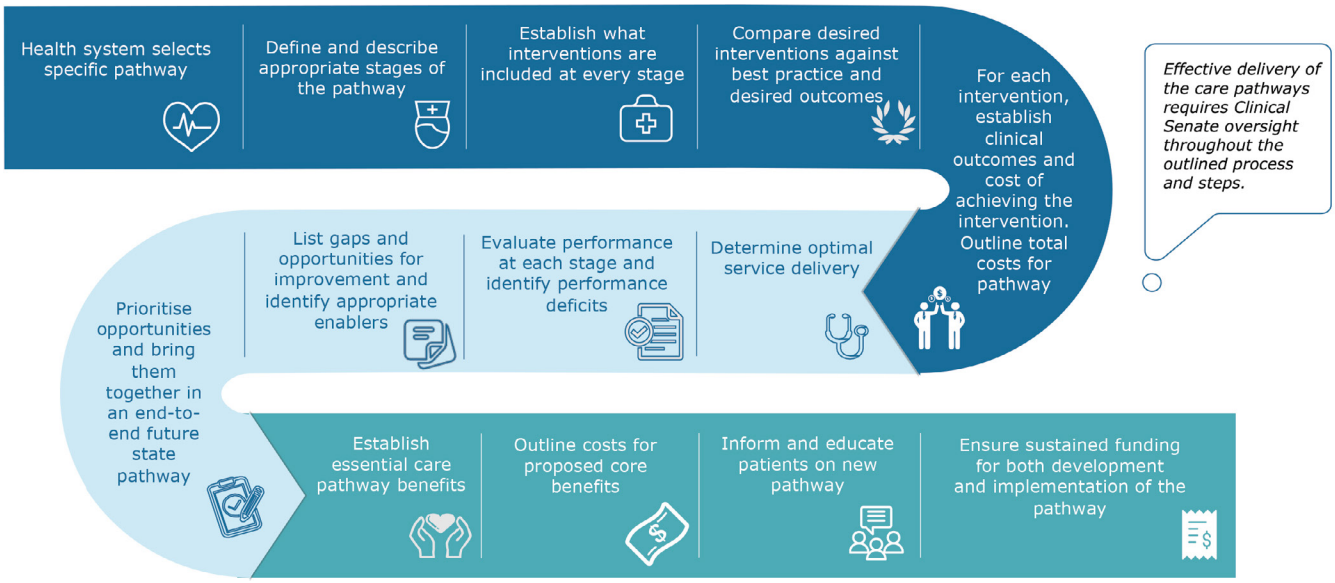


Figure 6.5.13: Integrated Care Pathways: Charting the Path to UHC (SOURCE: UHC Programme)

6.6 Overseas Care

6.6.1 Introduction

The Bermuda Health Council published a report in 2017 analysing trends for overseas care. The report analysed all local and overseas healthcare claims submitted to insurers 1 April 2015 to 31 March 2016.[413] A literature review was conducted to compare with other international jurisdictions. The summary of findings is below:

Overseas Healthcare Summary (April 2015 – March 2016)

- Overseas care consumed 13% of Bermuda's health expenditure
- 7,526 individuals from Bermuda received healthcare overseas
- Provided by:
    - 5,000 providers overseas providers
    - 41 different US states
    - 29 different countries
    - 50% on the eastern seaboard of the USA; specifically in the Boston, Massachusetts region
- 154,275 of health insurance claims were submitted for a total amount of $108m
    - 146,379 (95%) of claims were paid a total amount of $84.5m
    - >$6m (7%) of claims paid were for transport and accommodation
        - $1.9m - air ambulance services
        - $4.5m – commercial airline travel and lodging
- The leading reason for overseas care (primary diagnosis) was "**General Symptoms**"

[413] Bermuda Health Council. *Overseas Care: A Synopsis of Trends for the Islands of Bermuda.* 2017. Bermuda Health Council: Bermuda. Available: http://bhec.bm/wp-content/uploads/2017/05/2017-Overseas-Care-Synopsis.pdf.

As a small territory, Bermuda is not unique in having a relatively large expenditure on overseas healthcare, particularly given its proximity to the USA, the world's largest healthcare economy (two to three hours by flight). However, the proportion of Bermuda's spend on overseas healthcare is still the largest in the world. For a small healthcare system, such as Bermuda, there should be a balance between ensuring adequate provision for local healthcare services with the availability of overseas specialist services to ensure the effectiveness of health outcomes, system efficiency and consideration of health equity. Underutilising high-quality local services in favour of overseas care could undermine the economic case for local investment in the necessary supply chain (including infrastructure, equipment, workforce and referral pathways), whilst prioritising highly specialised services locally may not represent the best value for money. In recent years the proportion of spending on overseas care has plateaued, falling from a high of 15.7% in 2009 to 12.6% in 2018. Services that were traditionally only available overseas have now been developed in Bermuda (see Section 6.6.3 radiation therapy case example).

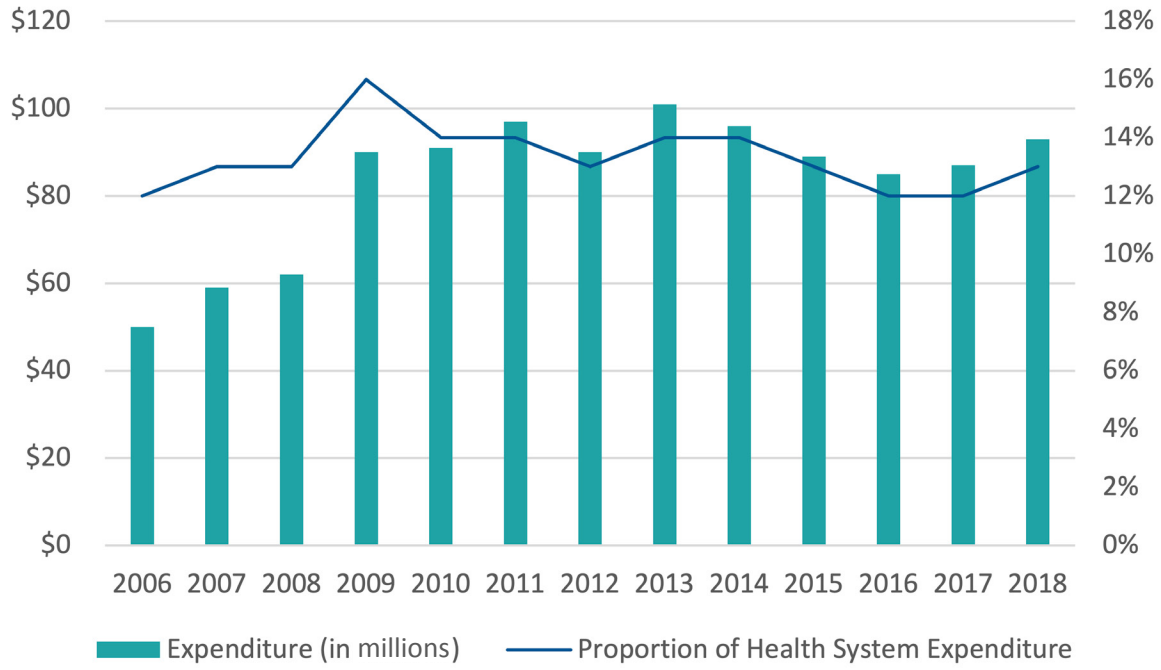


Figure 6.6.1 Bermuda's Overseas Healthcare Expenditure Trends 2006–2018
(SOURCE: 2019 Health Accounts Report)

6.6.2 Implications

Costs. Average claims paid overseas are $345 more expensive than claims paid locally. The overall picture is that overseas episodes are more expensive (general office visits, diagnostic imaging, cardiovascular care costs), while laboratory and pathology tests cost more locally. The reasons for these additional costs are unclear. However, it should be noted that most overseas care is delivered in the USA, which has higher costs than other jurisdictions. These may be due to equivalent overseas services being more specialist or using more advanced (and expensive) technologies. The Bermuda Health Council's report recommends that greater information on comparative costs be disseminated more widely to enable patients to make more informed choices regarding healthcare providers.

Transport and accommodation costs are inevitable elements of overseas healthcare and additional to the extra cost of clinical services. They also represent an opportunity cost of expenditure that has not been invested in direct healthcare services.

General symptoms. The leading reason for overseas healthcare was "general symptoms". These symptoms are not aligned with a specific diagnosis and can include symptoms as diverse as syncope, fever, malaise, fatigue and convulsions. It is therefore difficult to conclude from the available data whether overseas healthcare for "general symptoms" is driven primarily by a gap in local services or patient choice. Healthcare is typically purchased in groups, with the impact of unnecessary utilisations. Patients with low co-payments may demand a complete package of healthcare overseas (including pharmaceuticals and other treatments that could be provided locally), rather than just the healthcare episode in which overseas care may offer a comparative advantage. More granular data is required to better understand the drivers for overseas healthcare relating to general symptoms.

Choice of Overseas Providers. The reasons why patients choose their healthcare provider are complex and not restricted to a rational economic perspective of maximising benefits whilst minimising costs.[414]

Patients are unlikely to have access to the complete information required or have the time, skills and knowledge to weigh up this information, particularly when in a vulnerable position due to illness. Patients rarely actively choose their providers, relying instead on the advice of friends and family or experts (local providers).[415] Some local providers, such as Bermuda Cancer and Health Centre, have partnerships with overseas providers, to assure the quality of local care and to have a centre for onward referral. It is recommended that payers and providers more formally integrate overseas healthcare providers into Integrated Care Pathways to optimise the quality of care and use of resources to reduce unnecessary duplication.

Care Quality, Service Volume and Specialisation. Globally, healthcare is becoming more specialised, with care providers increasingly concentrated in high-volume specialist centres of excellence (such as major trauma centres in the UK). Clinical quality is increasingly associated with reasonably large specialist multi-disciplinary teams and a minimum volume of procedures. The small size of Bermuda's health economy places it at a comparative disadvantage in developing its system along such lines. It may result in an increasing number of patients opting to choose elective care in high-volume specialist centres abroad. These problems are not unique to Bermuda and are faced by other small island nations, rural areas of high-income nations and deployed military health systems. The indirect consequences of this healthcare model may be an increase in health inequalities and healthcare costs and decreased clinical experience locally. Bermuda may be able to harness the benefits of specialisation whilst retaining local services through telehealth capabilities (see Section 5.6.3).

Exacerbation of Health Inequalities. The relatively high use of overseas healthcare may exacerbate health inequalities. Patients have been unable to use Standard Health Benefit for overseas healthcare since 2015. This includes the use of government subsidies for care overseas. Supplemental benefits, out-of-pocket payments and charity donations are required to cover overseas healthcare. This may exacerbate health inequalities in two ways:

- Directly – Patients without supplemental benefits or other means to pay are unable to access specialist services overseas or they incur catastrophic healthcare spending to do so.
- Indirectly – The high use of overseas care may undermine the case for investment in healthcare services locally, particularly when a minimum capacity is required for economic or clinical reasons, which all patients could utilise. The lack of granular data on the clinical reasons for overseas care makes it difficult to judge the degree to which overseas care exacerbates these inequalities.

[414]Victoor, A., Delnoij, D.M., Friele, R.D. et al. Determinants of patient choice of healthcare providers: a scoping review. *BMC Health Serv Res.* 2012. 12:272. Available: https://doi.org/10.1186/1472-6963-12-272.

[415]Robertson A, Dixon A. Choice at the point of referral: Early results of a patient survey. *The Kings' Fund.* 2009. Available: https://www.kingsfund.org.uk/sites/default/files/choice-point-of-referral-patient-survey-ruth-robertson-anna-dixon-kings-fund-november-2009.pdf.

6.6.3 Recent Developments

Telehealth. Telehealth (or telemedicine) is defined as *"the delivery and facilitation of health and health-related services via telecommunications and digital communication technologies"*.[416] Telehealth offers an opportunity for Bermuda to digitally access global specialist expertise without patients being required to travel overseas for diagnosis, treatment or rehabilitation. Harnessing the potential of telehealth, bolstered by the National Digital Health Strategy, may enable more care to be delivered locally with better health outcomes and at a lower cost and to benefit from the increasingly specialised model of care seen overseas. This will require collaboration between local providers and overseas centres of excellence and should be considered by policymakers developing Integrated Care Pathways.

Case Example: Radiation Therapy

Radiation therapy was a specialist service traditionally only available to Bermudians travelling overseas (primarily to the USA). This changed in 2017 when the Bermuda Cancer and Health Centre established Bermuda's first radiation therapy service.

Bermuda Cancer and Health Centre partnered with the Dana –Farber Brigham Cancer Center in Boston to design and deliver the state-of-the-art Radiation Therapy Unit. This enables people in Bermuda requiring radiation therapy to access a service designed around their needs whilst harnessing the expertise and resource of a global centre of excellence.

The Radiation Therapy Unit uses the same treatment systems, software, radiation therapy protocols and quality assurance programmes utilised at Dana-Farber Brigham. Bermuda could extend this model to other relevant services across the health system.

Partnering with global centres of excellence is an opportunity not only to enhance the patient experience but to improve health outcomes through adopting internationally recognised quality assurance and quality improvement practices.

COVID–19. The COVID–19 pandemic will have impacted the ability of patients to seek healthcare overseas due to travel restrictions and other disease control measures. This may have resulted in elements of healthcare traditionally delivered overseas being provided locally, or in care being delayed. The pandemic also demonstrated the vulnerability of healthcare systems in small jurisdictions that, to some degree, rely on overseas delivery of care. The health system should seek to build sufficient resilience to be able to deliver necessary care during potential periods of travel restrictions.

It is recommended that the Bermuda Health Council investigate trends in overseas healthcare that cover changes during the COVID–19 pandemic, particularly if there have been shifts from the provision of care overseas to local providers.

6.6.4 Overseas Care: Analysis

Due to Bermuda's small size, overseas care will likely remain an important component of the healthcare system. However, the current provision of overseas care is fragmented, unequal and expensive. Granular data on the rationale for much of overseas care provision is missing. COVID–19 and telehealth may have led to significant shifts in the balance between local and overseas care. Understanding recent developments in overseas care provision and gaining more granular data on "general symptoms" should be a priority for the health system.

[416]NEJM Catalyst. *What is Telehealth.* 2018. Available: https://catalyst.nejm.org/doi/full/10.1056/CAT.18.0268.

6.7 Patient Experience

6.7.1 Patient Satisfaction

Bermuda has no system for capturing patient satisfaction across the whole health and social and care sector. The nearest proxy marker is the summary of patient satisfaction at KEMH that BHB has published since 2012. The JSNA has summarised the 2022 data in Table 6.7.1. The full report showing trends since 2012 and an explanation of the survey methodology can be found on BHB's website.[417] This information cannot be generalised to any service provided outside of KEMH.

Department	Indicator	% Satisfaction
Emergency Department	% Satisfied with Emergency Department's Overall Service	93.3
	% Satisfied with Emergency Doctors	96.4
	% Satisfied with Emergency Nurses	95.9
	% Satisfied with Emergency Wait Time	81.9
	% Satisfied with Emergency Environment	86.0
Inpatient Units	% Satisfied with Inpatient Unit's Overall Service	93.3
	% Satisfied with Inpatient Doctors	97.8
	% Satisfied with Inpatient Nurses	95.3
	% Satisfied with Inpatient Pain Management	82.4
	% Satisfied with Inpatient Environment	89.1
	% Satisfied with Inpatient Meals	74.6
Outpatients	% Satisfied with Outpatient Unit's Overall Service	99.0
	% Satisfied with Outpatient Doctors	99.0
	% Satisfied with Outpatient Nurses	98.7
	% Satisfied with Outpatient Environment	96.1
Surgical Outpatients	% Satisfied with Surgical Outpatient Unit's Overall Service	97.5
	% Satisfied with Surgical Outpatient Doctors	100.0
	% Satisfied with Surgical Outpatient Nurses	99.3
	% Satisfied with Surgical Outpatient Environment	94.4

Table 6.7.1 Patient Satisfaction at King Edward VII Memorial Hospital (SOURCE: Bermuda Hospitals Board)

Patient satisfaction for hospital services appears to be very high. Additional system-wide information on patient satisfaction may provide helpful insight into the patient experience and drive improvements in the quality of care. However, like any individual health indicator, the use of patient satisfaction scores is not without its risks. The literature on the association between patient satisfaction and health outcomes is mixed.[418] Whilst improvements in health outcomes can be associated with greater patient satisfaction, there is also evidence that a disproportionate emphasis on patient satisfaction can skew clinical decision-making (resulting in overprescribing or over-ordering diagnostic investigations) or divert resources towards expenditure on elements that have "more to do with the perception of healthcare quality rather than actual [health] outcomes".[419] The opportunity cost of such decisions ultimately results in direct and indirect harm to patients.

[417] Bermuda Hospitals Board. *KEMH Patient Satisfaction Survey Summary FY2012–2022.* 2022. Available: https://bermudahospitals.bm/wp-content/uploads/2022/06/KEMH-Patient-Satisfaction-Survey-Summary-FY2012–2022.pdf.
[418] Adler KG. *Does High Patient Satisfaction Mean High Quality of Care? Fam Pract Manag.* 2016;23(3):4. Available: https://www.aafp.org/pubs/fpm/issues/2016/0500/p4.html.
[419] Heath S. *Do Patient Satisfaction Scores Truly Portray Quality Care? Patient Engagement Hit.* 2017. Available: https://patientengagementhit.com/news/do-patient-satisfaction-scores-truly-portray-quality-care.

6.7.2 COVID–19 Pandemic and Perceptions of Healthcare

The Bermuda Foundation published the Bermuda Vital Signs® Special COVID–19 Pandemic Edition in October 2022.[420] The report was based on answers from two surveys.[421] One element of the report was the public perception of the effect of the COVID–19 pandemic on the accessibility and availability of healthcare and how the availability and accessibility of healthcare would change in the next year (2023). The findings are summarised in Figure 6.7.1.

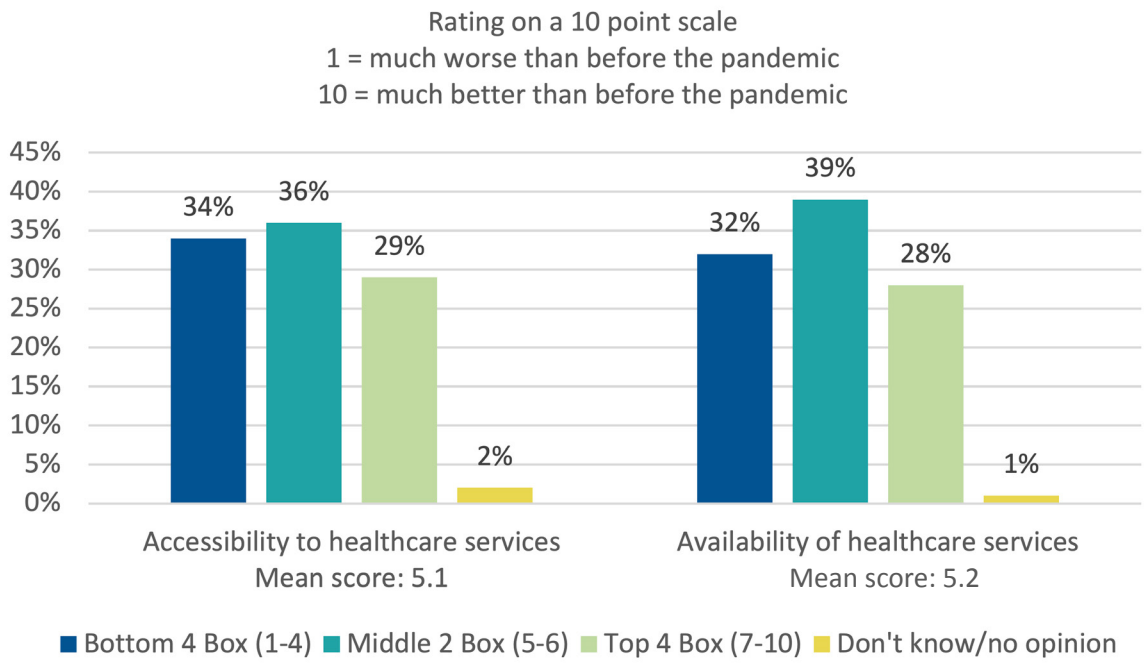


Figure 6.7.1: Effect of Pandemic on Accessibility and Availability of Healthcare
(SOURCE: Bermuda Vital Signs® Special COVID–19 Pandemic Edition in October 2022)

The report's findings on the impact of the COVID–19 pandemic on healthcare accessibility and availability are relatively mixed and interpretation will differ depending on how responses along the 10–point scale are categorised. The mean scores of 5.1 and 5.2 do not suggest any significant change in healthcare accessibility and availability due to the pandemic.

[420]Bermuda Foundation. *Bermuda Vital Signs® Special COVID–19 Pandemic Edition 2022.* Available: https://bermudacommunityfoundation.org/news-reports/.
[421]The Bermuda Omnibus Survey© and Narrative Research Bermuda's Propriety Online Panel.

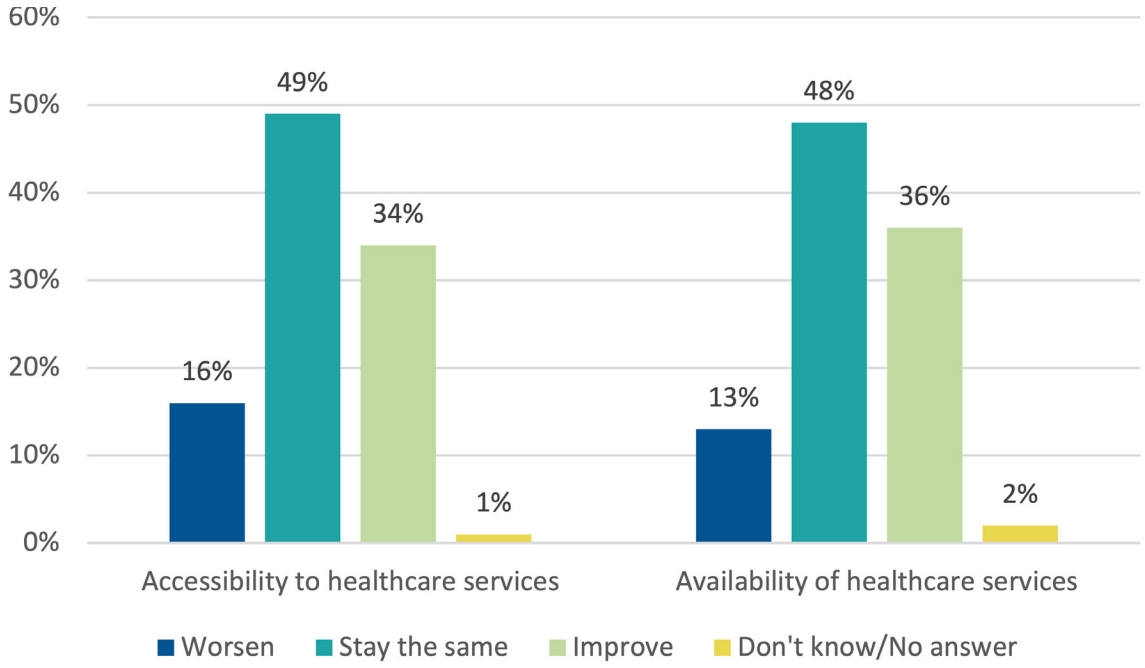


Figure 6.7.2: Accessibility and Availability of Healthcare Within the Next Year
(SOURCE: Bermuda Vital Signs® Special COVID–19 Pandemic Edition in October 2022)

The most frequent answer to questions considering accessibility and availability of healthcare over the next year (2023) was that these factors would stay the same. Just over a third of respondents believed that accessibility and availability would improve, whilst 16% believed that accessibility would worsen and 13% believed that availability would worsen.

There is an ongoing requirement to collect routine health data to understand better the impact of COVID–19 on accessibility to and availability of healthcare. Further surveys based on representative samples will allow greater insight into patients' perceptions of these indicators.

6.8 Limitations

Whilst the JSNA authors have sought to emulate best practice whilst developing this chapter, the following limitations should be acknowledged:

- Inconsistent access to contemporary, relevant data (e.g., the latest complete National Health Accounts Report is from 2017) limits the ability to comment on the impact of COVID–19 on healthcare
- Gaps in data availability from across the healthcare system (as identified throughout the chapter)
- Gaps in understanding of healthcare use by those without adequate levels of insurance, particularly as many services are provided on a pro bono basis and do not necessarily appear in the system's financial data
- Gaps in insights from patients, providers, payers and the public due to the speed of the JSNA's production. The authors sought insight from stakeholders through the JSNA Launch Event in November 2022 and follow-up interviews, a search of open-source literature, UHC stakeholder event question and answer sessions, the monthly JSNA newsletter and additional ad hoc engagement. However, future JSNAs would benefit from a more systematic method for gaining insights across Bermuda, and using an academic team to conduct a series of interviews, focus groups and surveys followed by robust

qualitative evaluation (similar to the work that the University of Edinburgh did for the National Digital Health Strategy). This exercise would strengthen the JSNA's qualitative insights on healthcare services.

6.9 Healthcare Services – Implications for Health Needs

"Bermudians want quality services and good results; people don't care about the process but the results."[422]

This chapter of the JSNA has aimed to synthesise relevant information from across the health sector to outline the current state of Bermuda's health system. It has found a sophisticated health system staffed by highly qualified professionals with access to some of the latest developments in diagnostic technologies, therapeutics and international expertise at global centres of excellence. However, the system is also expensive, fragmented and unequal, and the quality of care in many areas is simply unknown.

There is currently insufficient granular information to draw meaningful conclusions on whether services match health needs and whether certain services are being over-utilised or under-utilised. However, KEMH data suggests that the leading reasons for attendance are linked to the leading causes of mortality and morbidity, which likely indicates that appropriate hospital services are being provided. The financial model would appear to disincentivise the use of preventative services or upstream chronic disease management, potentially resulting in an under-utilisation of these services.

Bermuda would benefit from developing its health information infrastructure to a stage where there is sufficient data to enable the prioritising of health services based on underlying health needs.

The recommendations outlined seek to harness the considerable assets in Bermuda's health system, particularly its dedicated staff, to ensure that Bermuda can meet its UHC objectives.

[422]Quotation from insight interviews conducted by the University of Edinburgh for the National Digital Health Strategy.

Chapter 7: Strengths and Limitations of JSNA

7.1 Strengths

The JSNA is Bermuda's first comprehensive needs assessment of recent years that has combined information on the wider population context, social determinants of health and healthcare services.

The JSNA has been written by a multidisciplinary team in Bermuda, with technical support from the UK's Department of Health and Social Care's (Office for Heath Improvement and Disparities) UK Overseas Territories Team and Bermuda's Department of Statistics. This joint approach has enabled the JSNA to combine a knowledge of the local context with international best practice.

The JSNA working group has attempted to maintain openness and transparency throughout developing the JSNA. The JSNA Launch Event on 1 November 2022 brought together stakeholders from across the health sector at the Bermuda Health Council to set the JSNA's priorities and to offer their data sets and insight. The Office of the Chief Medical Officer has been keeping stakeholders up to date through a monthly newsletter, which has resulted in enquiries about how individual organisations could contribute further to the JSNA's development. The Minister of Health has kept MPs updated in the House of Assembly, allowing MPs to ask questions about the project's progress. The public has been kept informed through press releases and social media updates.

The JSNA has used a pragmatic approach, using currently available data sources and, importantly, existing work on Bermuda's health from various organisations across Bermuda. At times this has required the use of proxy indicators, but limitations are clearly stated throughout the report, with recommendations to close data gaps in future.

Finally, the JSNA has been completed in a timely manner to enable the next two projects – international benchmarking and development of processes and metrics – to begin promptly. These projects make up the "*understanding our population's health needs*" strategic principle of the Bermuda Health Strategy 2022–2027 and the "agree our starting points" workstream of UHC Programme.

7.2 Limitations

This JSNA has a number of limitations, which should be acknowledged to ensure that its findings and recommendations are interpreted in line with these limitations.

As discussed throughout the report, Bermuda's current health information infrastructure is limited, preventing the calculation of various basic epidemiological indicators, such as prevalence and incidence, for NCDs. Service data is similarly limited. Proxy markers have been used to determine healthcare utilisation outside of the hospital, which introduces possible bias. There is limited reliable data that covers the period of the COVID–19 pandemic, and so there may be areas of the JSNA that are already out of date.

The data used in this report is thus of varying quality. Some comes from robust population-wide registries (e.g., Bermuda National Tumour Registry), whilst others have been developed by clinicians using pencil and paper as they have searched through their health records. Any inaccuracies in the JSNA result from relatively limited health information infrastructure in what is otherwise a sophisticated health system. It is hoped that the National Digital Health Strategy will be harnessed to ensure that Bermuda's health information is commensurate with the ambitions of the Bermuda Health Strategy 2022–2027.

The JSNA has been developed at pace to meet the requirements of the Bermuda Health Strategy 2022–2027 and the UHC Programme. However, there are trade-offs to the speed of the JSNA's development. Whilst the JSNA working group has prioritised openness, transparency and stakeholder engagement, there has been a lack of patient, provider, payer and public involvement. If the JSNA had been conducted over a more extended period, there would have been scope to carry out work to gain further quantitative and qualitative insights from these groups using rigorous academic methodologies.

Lastly, whilst the JSNA is broad, it is not deep. Further specialist needs assessments are required for child and maternal health, oral health and public mental health. These assessments should be a joint effort of public health professionals and specialists in these fields.

7.3 Recommendations for Future JSNAs

It is recommended that a comprehensive JSNA is conducted every five years to ensure that health policymakers, providers, patients, payers, the voluntary sector, politicians and the public continue to have access to comprehensive and contemporary information on Bermuda's health needs. Bermuda should next conduct a JSNA in 2028, which can incorporate the findings of the upcoming 2026 census.

Future JSNAs should be conducted over a longer period (12 months is recommended) to enable the following approaches to be taken:

- Epidemiological – a comprehensive synthesis of health data relevant to Bermuda's needs
- Inclusive insight – gain insights from a diversity of stakeholders using quantitative and qualitative methods
- Comparative benchmarking of Bermuda's health needs against the findings of previous JSNAs and international peers
- Synergistic integration of work across the health sector, utilising studies and reports written by stakeholders from across the system

Achieving this final approach will require additional coordination of work across the health sector to ensure unity of effort in the lead-up to the 2028 JSNA. There is already a considerable amount of effort put in by organisations, whether charities, healthcare providers or government, to understand aspects of Bermuda's health needs and to develop proposals to improve the quality of policy and services. However, there is a lack of coordination across the sector resulting in duplication of effort and reports potentially not being used to their full potential. In addition, not all reports are publicly available. Therefore, it is recommended that stakeholders from across the health sector develop a 2023–2028 campaign plan to ensure that organisations' expertise is put to best use and that findings can be fed into the 2028 JSNA to affect system change.

Chapter 8: Conclusions

Bermuda Joint Strategic Needs Assessment of Health 2023 is the first comprehensive assessment of Bermuda's health needs of recent years that considers both the social determinants of health and healthcare services. Chapter 9 outlines the JSNA's recommendations.

Bermuda's current and future health needs are situated in the context of an ageing and less economically active population that is potentially shrinking, with a higher ratio of dependents to workers. The current disease burden, dominated by non-communicable diseases, is likely to continue and become more complex as people develop multiple long-term conditions. These health needs exist in a society characterised by significant socio-economic inequalities that impact health needs and can result in barriers to accessing healthcare.

Meeting these health needs will require much greater emphasis on addressing the social determinants of health with emphasis on the four levels of prevention integrated into social policy. Meeting social needs will have a far greater impact on health than solely improving healthcare. Common risk factors underpin many of Bermuda's leading causes of disease and should be prioritised in future health policy, noting that many risk factors cluster with socio-economic deprivation being the strongest predictor of people engaging in multiple health-risk behaviours. Bermuda must reflect on its priorities as a society. The adverse childhood experiences and child sexual abuse data is shocking. A failure to ensure that all children have the best start to life will continue to have negative moral and health consequences across the life course.

Healthcare will need to shift from a fragmented system of episodic single-condition management to one which can coherently manage multiple long-term conditions across different settings. Further standardisation of services, based on a robust evidence base, is required and insurance schemes that disincentive prevention and upstream chronic disease management need to be addressed. UHC will be essential to reduce health inequalities and ensure that all the people of Bermuda can access necessary health services. UHC, prevention and the integration and standardisation of care will also be vital for Bermuda from an economic standpoint to mitigate rising healthcare costs and ensure future healthcare inflation remains manageable. Without the wholesale adoption of these measures, the burden of ill health will consume a greater proportion of GDP, which is unsustainable given estimated future demographic trends.

Finally, the JSNA has highlighted considerable gaps in health information that must be addressed as an essential step to improve Bermuda's health and successfully implement UHC. Further work is required to develop robust and linked information at the individual level across the health and social care sector. Improving health information should be the leading priority as we progress and is the primary recommendation from the JSNA.

Ultimately you cannot manage what you cannot measure.

Chapter 9: Recommendations

The JSNA has outlined 24 recommendations to inform the work of stakeholders across the health sector, government and wider civil society (such as the voluntary third sector). The recommendations aim to bring together the evidence outlined throughout the JSNA, with the highest priority given to those recommendations likely to have the most significant impact on Bermuda's health needs.

The recommendations are as follows:

1. The Ministry of Health should lead the development of **robust and linked information/data** at the individual level across the health and social care sector. This could utilise the Unique Patient Identifier that has been developed by Bermuda Health Council and the UHC Programme's ongoing National Digital Health Strategy. Aspects for consideration include:
    - Disability
    - Disease registries
    - Linking health data with census data and socio-economic data (including housing and deprivation)
    - Non-communicable diseases
    - Risk factors
    - Social determinants on health (link with Recommendation 2)

2. The Government of Bermuda should prioritise improving health by **focusing on the social determinants of health rather than simply on healthcare**. This effort should centre on the needs of the most vulnerable and assess the impact of:
    - Availability of healthy food
    - Smoking and alcohol usage
    - Physical activity
    - Education
    - Housing
    - Income
    - Working conditions and employment status

3. The UHC Programme and Bermuda Health Council should **reform the health system's financial model** to enable better delivery of prevention and chronic disease management for the whole population.

4. Given the demographic transition expected, Bermuda should develop a **model of health and social care that is focused on the care of the elderly**, specifically:
    - The Ministry of Social Development and Seniors should reform the financial model for long-term care to ensure affordable and good-quality care. Financial planning will need to start early in an adult's working life to provide sufficient resources for future social care for seniors.
    - The Ministry of Health should place the health needs of seniors at the centre of all relevant future health policies.

5. The UHC Programme's Clinical Senate should **prioritise the development of disease-specific control plans** and integrate them to focus on addressing common risk factors and clinical conditions that exist across the spectrum of non-communicable diseases. The National Cancer Control Plan should be seen as an exemplar of a disease-specific control plan. Aspects for consideration include:
    - Priority disease control plans (asthma and COPD, cancer, cerebrovascular disease, diabetes, ischaemic heart disease).
    - The implication of BHB's "*superuser*" quality-improvement work on disease control.

6. The UHC Programme's Clinical Senate and BHB should **develop Integrated Care Pathways** for priority diseases to offer patients quality care in the most appropriate setting for their condition and to facilitate future planning of healthcare services. All four stages of prevention (primordial, primary, secondary and tertiary) should be incorporated into each Integrated Care Pathway. Aspects for consideration include:
    - Priority physical health diseases (asthma and COPD, cancer, cerebrovascular disease, diabetes, ischaemic heart disease, musculoskeletal).
    - Appropriate use of diagnostic technologies in the pathway.
7. The Department of Statistics should **incorporate relevant health questions into future censuses**. Aspects for consideration include:
    - Questions on health state and its impact on people's ability to carry out day-to-day activities to enable calculations of healthy life expectancy.
    - Questions on household expenditure on healthcare (including both insurance and out-of-pocket payments) to better understand the proportion of healthcare expenditure by income bracket.
8. The Ministry of Health, Department of Health and Bermuda Hospitals Board should **implement the findings of the 2019 Mental Health Situational Awareness Report**. They should ensure parity of esteem between mental health and physical health by removing stigma and barriers to accessing mental health services.
9. The Department of Corrections should address the specific health needs of the prison population identified in **the recent Bermuda Correctional Facilities Health Needs Assessment**.
10. The Epidemiology and Surveillance Unit should **strengthen syndromic surveillance** for
    - Acute flaccid paralysis
    - Fever and rash
11. The Department of Health should **focus on increasing vaccination levels** to reach population herd immunity once again, particularly for measles and polio.
12. Bermuda should **conduct specialist public health needs assessments** in the following areas, with considerable input from relevant subject matter experts. The recommended lead agencies are outlined in brackets.
    - Child and maternal health (Department of Health)
    - Intellectual disabilities (Bermuda Hospitals Board)
    - Long-term care (Ministry of Social Development and Seniors)
    - Musculoskeletal health (Department of Health)
    - Oral health (Department of Health)
13. Payers, providers and insurance companies should **develop payment mechanisms for clinicians involved in healthcare quality improvement** and health system-strengthening work where improvement in outcomes can be demonstrated.
14. Bermuda Health Council's Pharmacy and Therapeutics Committee should continue to monitor the cost of essential medicines and **identify the most effective way to ensure affordable access to essential medications**.
15. The Department for National Drug Control should **develop alcohol consumption guidelines** to distinguish low-, medium- and high-risk alcohol consumption, and revise its survey to capture this data.

16. The Child Safeguarding Committee should develop a multi-sector task force to plan prevention and management strategies to **tackle adverse childhood experiences**.
17. The Bermuda Police Service should prioritise improving the quality of **domestic incident reporting systems**.
18. Under third-sector leadership, Bermuda should produce a co-developed **national plan to end homelessness** and seek political buy-in and prioritisation.
19. The Department of Health should bring together key local stakeholders to **address the health and well-being needs of migrant groups**.
20. Payers and providers should incentivise the provision of **smoking prevention and cessation services**, particularly for at-risk groups (e.g., men and people with disabilities).
21. The Department of Health should **promote HPV vaccine uptake** as a critical primary prevention measure against cervical and oral cancer.
22. The Department of Health should **prioritise health promotion initiatives** to tackle common and interlinked disease risk factors, with a particular focus on the impact of deprivation on these risk factors.
23. Bermuda Health Council should commission an **academic study into health status and healthcare utilisation** by people's insurance status, including cost of co-payments.
24. The Ministry of Health should lead a cross-sector, comprehensive **investigation of the impact of COVID–19 on health**. Aspects for consideration include:
    - Direct deaths and long-term morbidity from COVID–19
    - Potential mortality from emergency services being overwhelmed
    - Indirect mortality and morbidity due to routine, urgent and non-COVID-related healthcare being postponed, reduced or cancelled
    - The direct effects of non-pharmaceutical interventions on health in the short and long term

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- Epidemiology and Surveillance Unit
- UK Department of Health and Social Care (Office for Health Improvement and Disparities) UK Overseas Territories Team
- UK Faculty of Public Health Specialty Training Scheme

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- Bermuda Hospitals Board
- Bermuda Cancer and Health Centre

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