




# Health and economic benefits of achieving contraceptive and maternal health targets in Small Island Developing States in the Pacific and Caribbean

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## ABSTRACT

**Introduction** Reducing unmet need for modern contraception and expanding access to quality maternal health (MH) services are priorities for improving women's health and economic empowerment. To support investment decisions, we estimated the additional cost and expected health and economic benefits of achieving the United Nations targets of zero unmet need for modern contraceptive choices and 95% coverage of MH services by 2030 in select Small Island Developing States.

**Methods** Five Pacific (Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu) and four Caribbean (Barbados, Guyana, Jamaica and Saint Lucia) countries were considered based on population survey data availability. For each country, the Lives Saved Tool was used to model costs, health outcomes and economic benefits for two scenarios: business-as-usual (BAU) (coverage maintained) and coverage-targets-achieved, which scaled linearly from 2022 (following COVID-19 disruptions) coverage of evidence-based family planning and MH interventions to reach United Nations targets, including modern contraceptive methods and access to complete antenatal, delivery and emergency care. Unintended pregnancies, maternal deaths, stillbirths and newborn deaths averted by the coverage-targets-achieved scenario were converted to workforce, education and social economic benefits; and benefit–cost ratios were calculated.

**Results** The coverage-targets-achieved scenario required an additional US\$12.6M (US\$10.8M–US\$15.9M) over 2020–2030 for the five Pacific countries (15% more than US\$82.4M to maintain BAU). This additional investment was estimated to avert 126 000 (40%) unintended pregnancies, 2200 (28%) stillbirths and 121 (29%) maternal deaths and lead to a 15-fold economic benefit of US\$190.6M (US\$67.0M–US\$304.5M) by 2050. For the four Caribbean countries, an additional US\$17.8M (US\$15.3M–US\$22.4M) was needed to reach the targets (4% more than US\$405.4M to maintain BAU). This was estimated to avert 127 000 (23%) unintended pregnancies, 3600 (23%) stillbirths and 221 (25%) maternal deaths and lead to a 24-fold economic benefit of US\$426.2M (US\$138.6M–US\$745.7M) by 2050.

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Governments and donors in the Pacific and Caribbean Small Island Developing States need a better understanding of the additional investment required to scale up sexual and reproductive health and maternal health services to improve access in these regions. No global investment cases have been conducted for sexual and reproductive health and maternal health services in these Small Island Developing States, often with small populations and affordability needs.

## WHAT THIS STUDY ADDS

⇒ This study showed that zero unmet need for modern contraceptive choices and 95% coverage of maternal health services in the select Small Island Developing States could be achieved with an additional 4%–15% investment.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Reaching these targets in Small Islands and Developing States is likely to be affordable and have a high return on investment; for each US\$1 invested economic returns could range from US\$15 to US\$24, with benefits continuing to accrue over the longer term. Scaling up contraception and maternal health coverage simultaneously, rather than separately, captures the efficiencies and cost savings stemming from a more comprehensive approach.

**Conclusion** Achieving full coverage of contraceptive and MH services in the Pacific and Caribbean is likely to have a high return on investment.

## INTRODUCTION

Health services delivered to women prior to pregnancy, during pregnancy, during

childbirth and during the postnatal period should ensure women, including adolescent girls and their babies reach their full potential for lifelong health and well-being.<sup>1</sup> Most unintended pregnancies and maternal and newborn deaths can be prevented with timely care by skilled health professionals.<sup>2</sup> Ensuring people have access to modern contraception methods is critical. Globally, the proportion of women who have their need for family planning satisfied with modern methods (Sustainable Development Goals (SDG) indicator 3.7.1) in 2020 was projected at 87%.<sup>3</sup>

As Small Island Developing States (SIDS) in Pacific and Caribbean SIDS face persistent challenges in universal access to sexual and reproductive health services, countries in these regions were selected as the focus for this study. Only two out of nine countries considered in this study from the Pacific and Caribbean regions have experienced growth in contraceptive prevalence rates over the last decade.<sup>4</sup> Adolescent birth rates continue to increase in the Pacific (6% increase from 2010 to 2019<sup>5</sup>), with high rates in the Caribbean that are only slowly decreasing (20% decrease from 2010 to 2019).<sup>6</sup> Due to their small population and communities being spread over vast distances separated by ocean waters, it can be difficult to travel to seek health services, which may have low absorptive capacity and high demands placed on a small number of staff. As well, these health systems have been directly and indirectly impacted by the COVID-19 pandemic since early 2020, which has led to a period of reduced service coverage and access.<sup>7,8</sup> The pandemic has also had a harsh impact on the economies of these regions, which are heavily reliant on tourism as a major source of revenue and employment,<sup>9,10</sup> and countries may, therefore, face difficult decisions on how to best invest limited resources.

Increasing the coverage of contraception and maternal health interventions together has synergistic effects. Increased contraceptive prevalence rates can reduce unintended pregnancies, which can in turn result in reduced maternal deaths, stillbirths and newborn deaths.<sup>11</sup> Reducing unintended pregnancies can also reduce demand for, and the cost of, maternal health services. Therefore, scaling up contraception and maternal health coverage simultaneously, rather than separately, captures the efficiencies and cost savings stemming from a more comprehensive approach. Despite the knowledge that scale-up is needed, a better understanding of the investment required to do this is needed to assist governments and donors to make the best fiscal decisions in relation to resource allocation.

This study aimed to estimate the potential impact, investment requirements and return on investment for scenarios designed to achieve the United Nations targets of zero unmet need for modern contraceptive choices and 95% coverage of maternal health services by 2030, while reflecting coverage reductions in 2020 and 2021 due to disruptions from the COVID-19 pandemic. This evidence can support Pacific and Caribbean SIDS governments in their investment choices.

## METHODS

Mathematical modelling was used to estimate the reduction in unintended pregnancies, maternal deaths, stillbirths and newborn deaths that could be achieved, and the associated economic benefits, if the coverage of the set of evidence-based family planning and maternal health interventions available in the Lives Saved Tool (LiST) were increased. The settings, interventions, specific scenarios and cost and benefits framework are described below.

### Settings

Modelling was conducted across five Pacific countries (Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu) and four Caribbean countries (Barbados, Guyana, Jamaica and St Lucia), based on the availability of population surveys and data. They represent small, medium and large island types, with Jamaica representing nearly half of the total population of the English-speaking and Dutch-speaking Caribbean countries.

Annual demographic and epidemiological data that were used as model inputs are shown for each country in online supplemental material tables A1–A4. Among these countries, most recent estimates of maternal mortality ratio ranged from 27 per 100 000 live births in Barbados to 169 per 100 000 live births in Guyana; unmet need for family planning ranged from 10.0% in Jamaica to 34.8% in Samoa; and fertility rates ranged from 1.4 in Saint Lucia to 4.4 in Solomon Islands (online supplemental material tables A3 and A4). In 2019, these countries were estimated to have GDP per capita ranging from US\$1655 in Kiribati to US\$23 267 in Barbados<sup>12</sup>; health spending ranging from 3.4% of GDP in Vanuatu to 10.2% of GDP in Kiribati (compared with 9.8% globally)<sup>13</sup> and Universal Health Coverage Service Coverage Index ranging from 50 in Solomon Islands to 74 in Barbados and Guyana (compared with 67 globally).<sup>14</sup>

While there are differences among SIDS from the Caribbean and the Pacific, there are similarities between countries in their regional geography and relative isolation. They also share common challenges managing health-related workforce across multiple small islands, delivering education and obtaining commodities.<sup>15,16</sup>

### Interventions modelled

Evidence for the impact of family planning and maternal health interventions typically comes from systematic reviews and meta-analyses, which are summarised in WHO guidelines.<sup>17–20</sup> They have also been presented across multiple Lancet series, including on child survival,<sup>21</sup> maternal and child undernutrition,<sup>22,23</sup> maternal health,<sup>24</sup> child development<sup>25</sup> and the double burden of malnutrition.<sup>26</sup> LiST was developed under the guidance of the Child Health Epidemiology Reference Group to estimate the expected impact of the increased coverage of family planning and maternal health interventions on mortality and morbidity outcomes.<sup>27</sup> LiST

contains a comprehensive set of these interventions for which there is sufficient evidence for conducting modelling analyses.

This analysis considered all family planning and maternal health interventions from LiST, which includes the provision of modern contraceptive methods and access to complete antenatal care, delivery care and emergency care. The interventions are summarised in online supplemental material tables B1 and B2 along with their baseline coverage values. Coverage of both contraception and maternal health interventions were increased in this study, with estimates of total costs and investment requirements inclusive of direct cost savings from reductions in unintended pregnancies leading to reduced demand for maternal health services.

### Scenario design

For a business-as-usual coverage scenario, intervention coverage values for 2019 were maintained over the study period, based on the most recent estimates from major population surveys (eg, Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS)). Where estimates were unavailable, regional estimates from the LiST<sup>27</sup> were used. For 2020 and 2021, intervention coverage levels were reduced according to country-specific COVID-19 disruption estimates (see online supplemental material section A), which includes estimated reductions of up to 35% service coverage for 2020 and 2021 due to disruptions on both the supply (ie, staff diversions to COVID-related tasks or closures and policy restrictions) and demand sides (ie, due to stay-at-home orders, service aversion due to COVID-19-related exposure concerns). Coverages were then returned to 2019 levels in 2022 and maintained to 2030. Despite the assumed constant coverage from 2022 to 2030, the business-as-usual coverage scenario included projected changes in population size and structure, and some changes in trends for costs and health indicators are evident based on these demographic changes. Except for the modelled COVID-19 disruptions in 2020 and 2021, contraceptive prevalence and the methods mix (ie, traditional and modern methods) in 2019 was assumed to be maintained to 2030.

For the coverage-targets-achieved scenario, coverage values for 2019–2021 were the same as the business-as-usual coverage scenario, including any COVID-19 disruptions. From 2022, modern contraception coverage was scaled up to achieve zero unmet need by 2030, and maternal health services were scaled linearly to achieve 95% coverage by 2030. For the coverage-targets-achieved scenario, the methods mix for contraception use was assumed to transform from the mix applied for 2019 (ie, traditional and modern contraceptive methods) to exclusively modern methods by 2030. Both scenarios assumed the same changes to projected population size and structure, with the exception of changes due to contraceptive intervention.

### Costs

For this analysis, economic costs were considered between 2020 and 2030 from a healthcare provider perspective. Costs for commodities and human resource needs were derived from LiST,<sup>28</sup> and inflated based on a study from Stenberg *et al*<sup>29</sup> to account for the additional financing needs of health service expansion (eg, additional overheads and to increase absorptive capacity). Costs were not validated through consultations with national counterparts in the Ministries of Health. Within this study estimates of investment requirements include direct cost savings from reduced unintended pregnancies (as contraceptive coverage increased) leading to reduced demand for maternal health services. Costs are presented in 2019 US dollars discounted at 3% per year.

### Benefits

Health benefits from increased access to modern contraceptive choices included consideration of unintended pregnancies averted, as well as maternal deaths and stillbirths averted due to the reduction in unintended pregnancies (based on country-specific rates of occurrence). Health benefits from maternal health interventions included consideration of maternal deaths, stillbirths and newborn deaths averted.

These health benefits were converted to economic benefits across three domains: (1) workforce participation (increased participation in the workforce due to years of life gained, as well as for women who have unintended pregnancies averted); (2) education (average increase in years of school completed due to unintended pregnancies averted among adolescents, leading to increased productivity and earnings when they enter the workforce) and (3) social (maternal deaths, stillbirths and newborn deaths prevented leading to years of life gained).

Economic benefits were calculated up to 2050 for the cohort of women and girls receiving interventions in the 2020–2030 period, with an uncertainty range reflecting benefits accrued by the end of the investment period in 2030, and if a longer time frame is considered, up to 2070. Detailed methodological frameworks for calculating costs and benefits are provided in online supplemental material section C. Economic benefits are presented in 2019 US dollars discounted at 3% per year.

### Reported outcomes

Health impact outcomes are presented for each country, while costs and benefit–cost ratios are presented as regional aggregates for the Pacific and for Caribbean countries, since cost data were not validated at the country level.

### Interpretation of results

Due to small population sizes and low numbers of births per year in these countries, projected maternal mortality ratios should be interpreted with caution since a singular maternal death may have a substantial effect.

Therefore, this analysis focuses on cumulative outcomes over 2020–2030. When scaling up contraception and maternal health interventions, the relative reduction in the number of maternal deaths is expected to be greater than the relative reduction in the maternal mortality ratio, because not only is the risk of death per pregnancy lower but there are also fewer pregnancies as a result of scaling up modern contraception. However, because the full coverage scenario includes a gradual increase in intervention coverage, the reduction in cumulative maternal deaths from 2020 to 2030 is often lower than the reduction in the maternal mortality ratio in the year 2030. To emphasise this, we reported the per cent reduction in maternal deaths in 2030 alone to allow comparison with the reduction in the maternal mortality ratio in 2030.

## RESULTS

### Pacific Island countries

In 2019, the five Pacific Island countries included in this study spent an estimated US\$6.7 million on contraception as part of family planning and maternal health interventions. This amount, however, still leaves a high proportion of women in each country with an unmet need for modern contraceptive methods and a lack of access to maternal health services by 2030 (ranging from 18% in Kiribati to 35% in Samoa). To achieve zero unmet need for modern contraceptive choices by 2030 and achieve 95% coverage of maternal health services, the annual investment requirements would increase over time. By the year 2030, the annual resources needed to achieve coverage targets would be 36% greater than business-as-usual in that year (figure 1A).

Contraceptive and maternal health coverage targets could be achieved by 2030 for Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu if an additional US\$12.6 million (uncertainty interval US\$10.8–US\$15.9 million) was invested between 2020 and 2030, 15% more than the US\$82.4 million required to maintain current business-as-usual coverage over this period. In the model, this additional investment averted 126 000 (40%) unintended pregnancies (17% of all pregnancies), 2200 (28%) stillbirths and 120 (29%) maternal deaths (figure 2A, B with estimates by country shown in figure 3) and led to a 15-fold economic benefit of US\$190.6 million (US\$67.0–US\$304.5 million) (figure 4, top panel). This was disaggregated as a US\$61.6 million benefit from unintended pregnancies averted, US\$60.6 million benefit from stillbirths averted, US\$59.1 million benefit from newborn deaths averted and US\$9.2 million benefit from maternal deaths averted. The benefit–cost ratio was estimated to be 15.

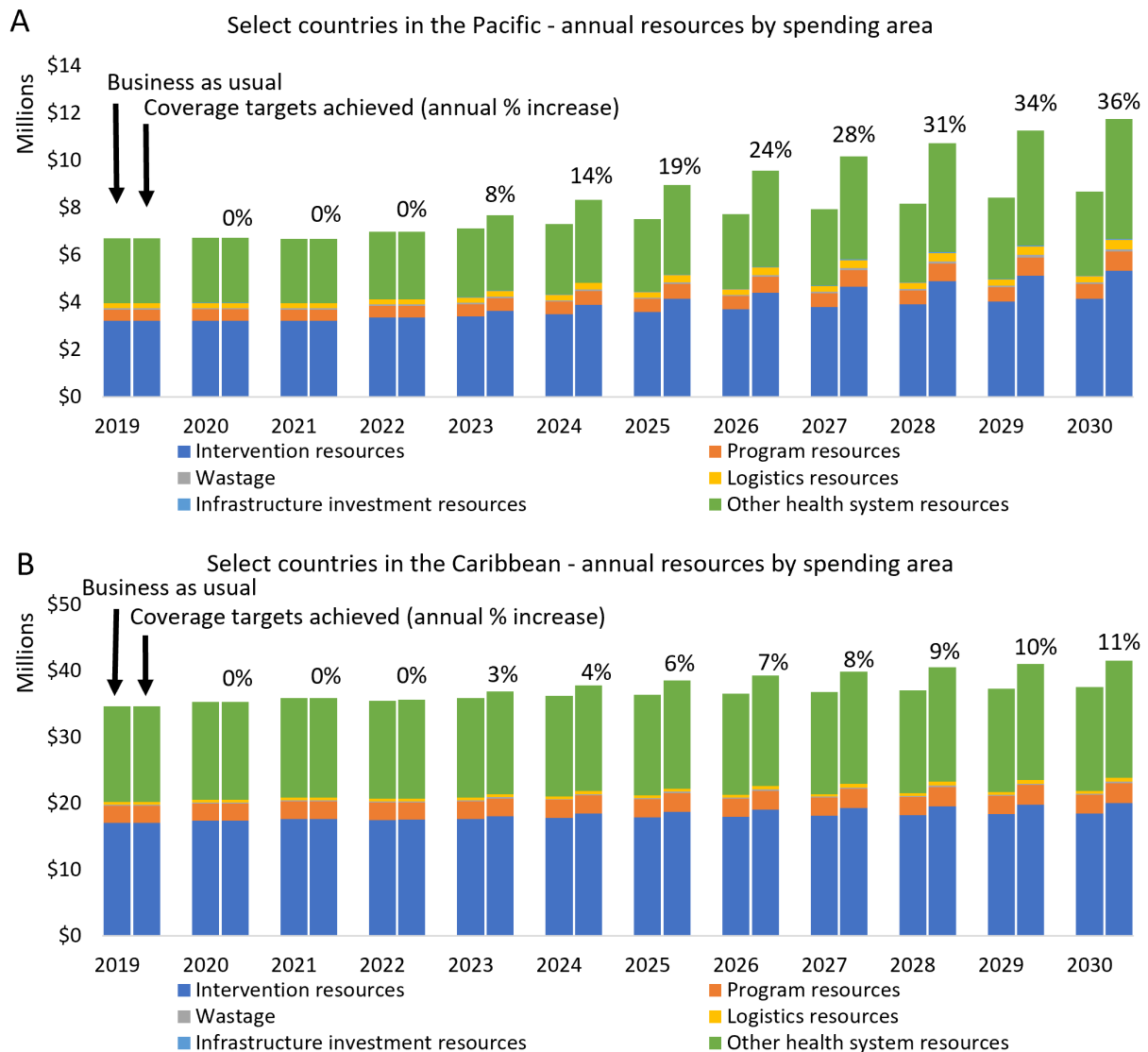
When coverage targets were met by 2030 in the model, all five countries in the Pacific achieved SDG target 3.7 on universal access to sexual and reproductive health services, including modern contraceptive choices, and all except Solomon Islands experienced a two-thirds

reduction in maternal deaths from 2010 levels by 2030. In addition, adolescent access to modern contraceptive choices produced benefits by reducing adolescent and unintended pregnancies. SDG target 3.1, to reduce the maternal mortality ratio to less than 70 maternal deaths per 100 000 live births by 2030, is already being met in Samoa, Tonga and Vanuatu, but when the coverage targets were met by 2030, these countries additionally achieved their country-specific SDG targets for maternal mortality (a two-thirds reduction compared with 2010 levels). If coverage targets were reached by 2030, Kiribati and the Solomon Islands could achieve SDG target 3.1. Major differences in the impacts, incremental investment requirements, benefits and benefit–cost ratios of achieving coverage targets exist among countries due to differences in several factors. These factors include baseline mortality rates, stillbirth rates, unmet need for modern contraceptive choices, intervention coverages, (not validated) estimates for costs, per capita gross domestic product (GDP), work participation rates among women (used to derive economic benefits) and the ratio of estimated healthcare worker costs to per capita GDP.

### Caribbean countries

For the countries in the Caribbean included in this study, an estimated US\$34.5 million was spent on contraception and maternal health interventions in 2019. However, this amount still leaves a high proportion of women in each country with an unmet need for modern contraceptive choices and a lack of access to maternal health services by 2030. To achieve zero unmet need for modern contraceptive choices and 95% coverage of maternal health interventions by 2030, annual investment must increase over time. By 2030, annual resources to achieve coverage targets would be 11% greater than the projected business-as-usual coverage scenario for that year (figure 1B).

Contraceptive and maternal health coverage targets were achieved by 2030 if an additional US\$17.8 million (US\$15.3–US\$22.4 million) was invested between 2020 and 2030 in the four Caribbean countries considered in this study, 4% more than the US\$405.4 million required to maintain business as usual. In the model, this additional investment averted 127 000 unintended pregnancies (23% more than business as usual, 10% of all pregnancies), 3600 stillbirths (23% more) and 221 maternal deaths (25% more) (figure 2C, D with estimates by country shown in figure 5) and led to a 24-fold economic benefit of US\$426.2 million (US\$138.6–US\$745.7 million). This was disaggregated as a US\$160.0 million benefit from unintended pregnancies averted, US\$116.0 million benefit from stillbirths averted, US\$125.9 million benefit from newborn deaths averted and US\$24.3 million benefit from maternal deaths averted. The benefit–cost ratio was estimated as 24 (figure 4, bottom panel). For both regions, the additional investment was required for a mix of consumables, human resources, infrastructure and other programme and logistics resources.



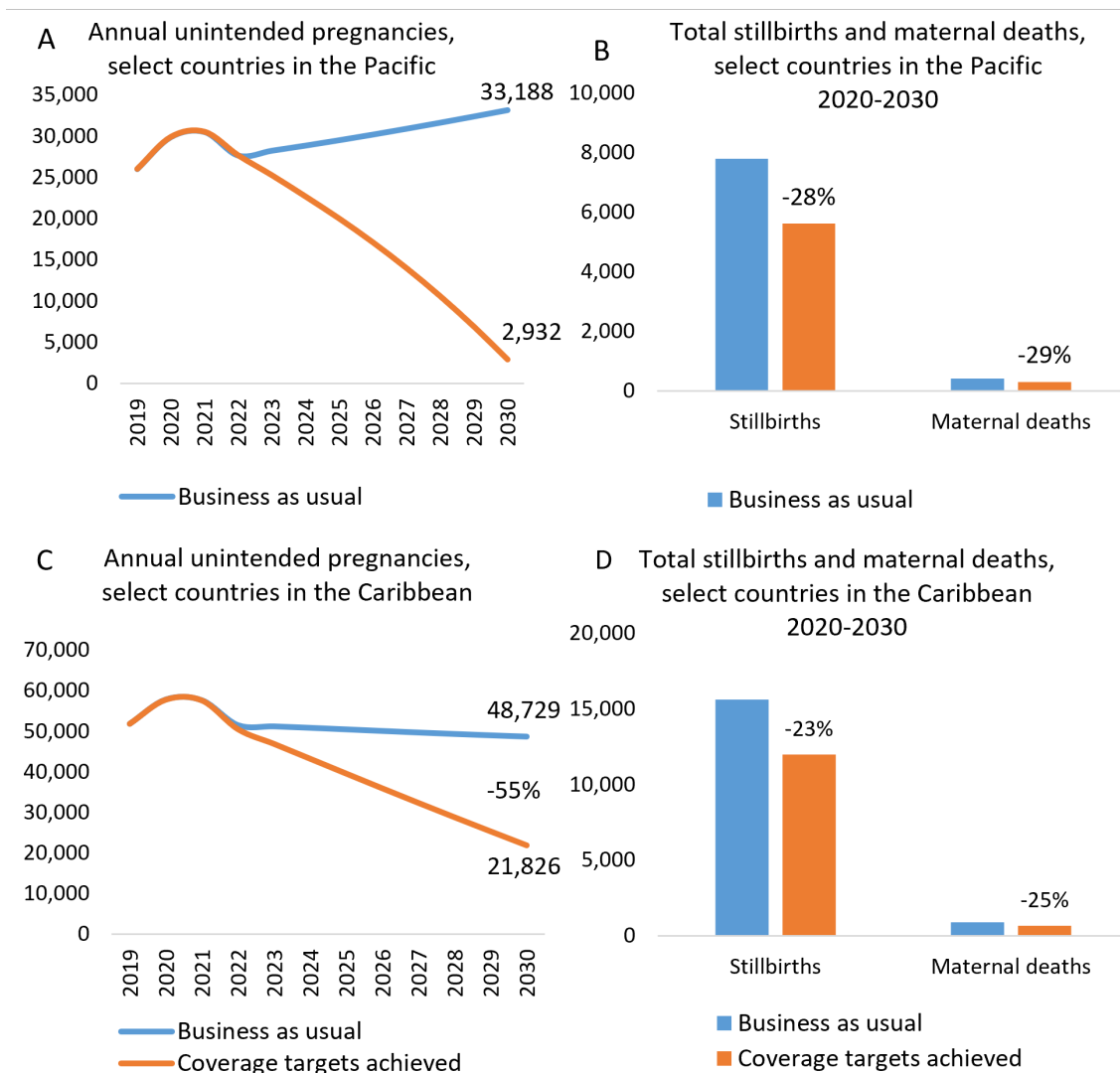
**Figure 1** Aggregated annual contraceptive and maternal health resources by spending area. Projections are presented for select countries in (A) the Pacific aggregated for Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu, and (B) for the Caribbean aggregated for Barbados, Guyana, Jamaica and Saint Lucia, for business-as-usual (left bars) and coverage-targets-achieved (right bars) scenarios for 202–2030 in 2019 US dollars (discounted at 3%). In the business-as-usual scenario with intervention coverages maintained, annual costs increased slightly due to population growth.

When coverage targets were met by 2030 in the model, all four Caribbean countries achieved SDG target 3.7 on universal access to sexual and reproductive health services, which includes modern contraceptive choices, and Barbados experienced a two-thirds reduction in maternal deaths from 2010 levels. When coverage targets for contraception and maternal health services were achieved by 2030, the SDG target 3.1, reaching a maternal mortality ratio of less than 70 deaths per 100 000 live births by 2030, was met in Barbados and Jamaica. For Guyana and Saint Lucia, the SDG target 3.1 was not met even if coverage targets were achieved by 2030 given the high estimated maternal mortality ratio in 2019; however, a 31% and 36% reduction in the projected 2030 maternal mortality ratio could be achieved over this period, respectively (figure 5, bottom right panel).

## DISCUSSION

Between 2010 and 2020, the satisfied need for modern contraception was estimated to be low in the Caribbean (84%–85%) and even lower in the Pacific (77%–78%) excluding Australia and New Zealand.<sup>3</sup> The SDG target 3.1 is to reduce the maternal mortality ratio to less than 70 maternal deaths per 100 000 live births by 2030. In the two regions considered in this study, the Pacific and the Caribbean (including Latin America), the maternal mortality ratio for 2017 was estimated at 129 (uncertainty interval 69–267) and 74 (70–81) per 100 000 live births, respectively.<sup>30</sup> Reaching SDG target 3.1 will require ensuring access to appropriate and high-quality maternal health services.

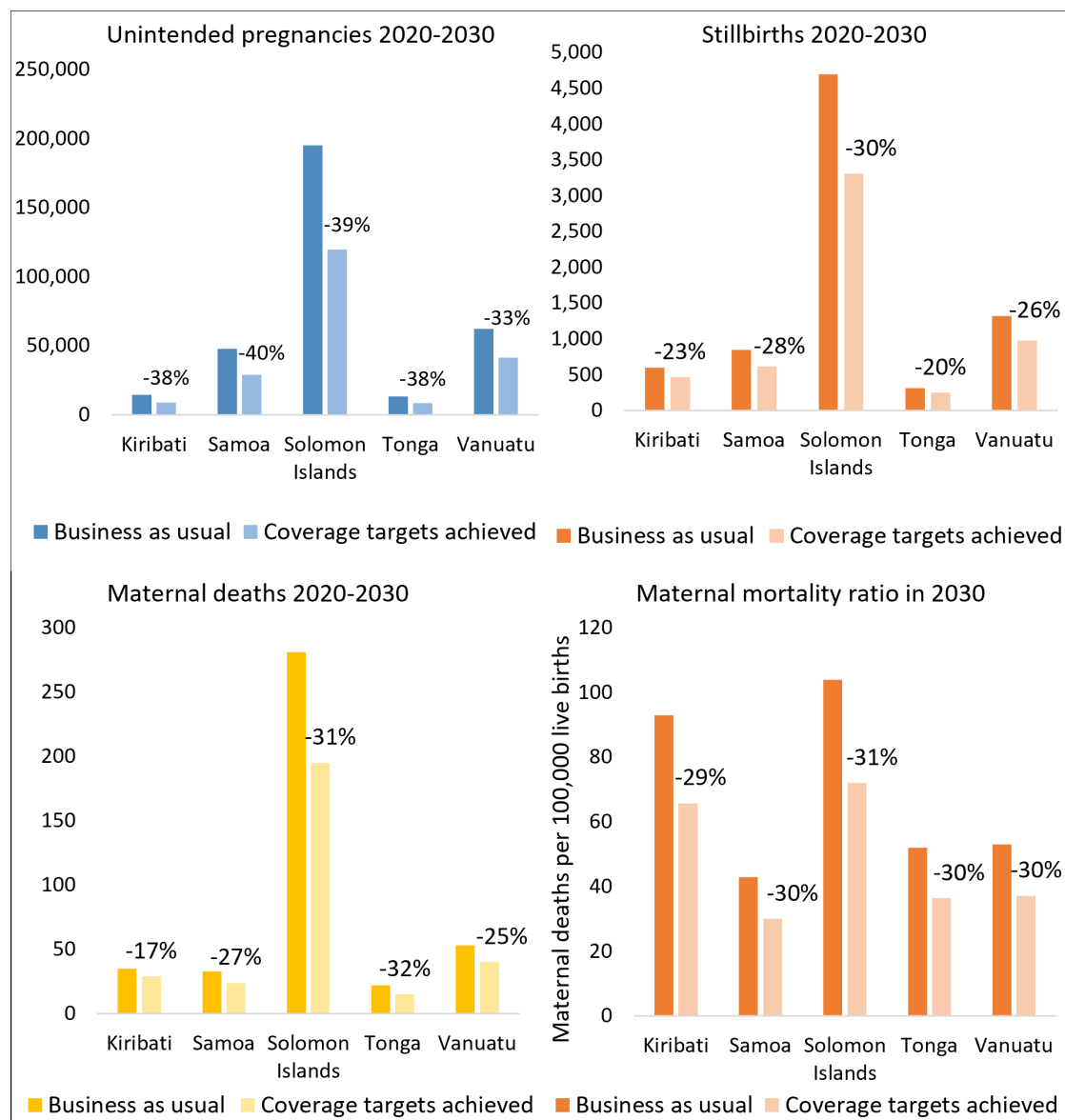
In the five Pacific countries considered, reaching zero unmet need for modern contraceptive choices and 95%



**Figure 2** Annual unintended pregnancies (right), and total stillbirths and maternal deaths that could be averted from 2020 to 2030 (left). Values are aggregated for select countries in (A, B) the Pacific aggregated for Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu and (C, D) the Caribbean aggregated for Barbados, Guyana, Jamaica and Saint Lucia.

maternal health intervention coverage by 2030 could prevent an additional 126 000 unintended pregnancies, 2200 stillbirths and 121 maternal deaths over the 2020–2030 period, compared with business as usual. In the four Caribbean countries, reaching the same targets could prevent an additional 127 000 unintended pregnancies, 3600 stillbirths and 221 maternal deaths. The additional US\$12.6 million (US\$10.8–US\$15.9 million) and US\$17.8 million (US\$15.3–US\$22.4 million) needed in the two regions, respectively, represents only 15% more than the business-as-usual scenario for the five Pacific countries considered and 4% more than the business-as-usual scenario for the four Caribbean countries considered. This means the required investment may well be within reach. This investment is estimated to lead to a 15-fold return in economic benefits by 2050 for the five Pacific countries and a 24-fold return in the four Caribbean countries, with benefits continuing to accrue over the longer term.

Increased contraceptive prevalence rates can further reduce the costs of maternal health services and by considering the two targets together, this analysis captures these effects. These cost savings help to explain why only relatively small percentage increases in spending would be required overall to reach the targets; in part, investment in contraception represents a redistribution of funds that can lead to improved outcomes. Reducing unintended pregnancies, particularly among adolescents, has additional benefits not captured in this study. The Pacific and Caribbean are regions undergoing demographic transition, and it is essential for them to harness the demographic dividend of their young populations, by considering an intergenerational perspective and investing in sexual and reproductive health. With access to modern contraceptive choices, adolescent girls will be empowered to choose when and how many children they have, which can reduce poverty and enable them to fully exercise their rights and contribute to their families,



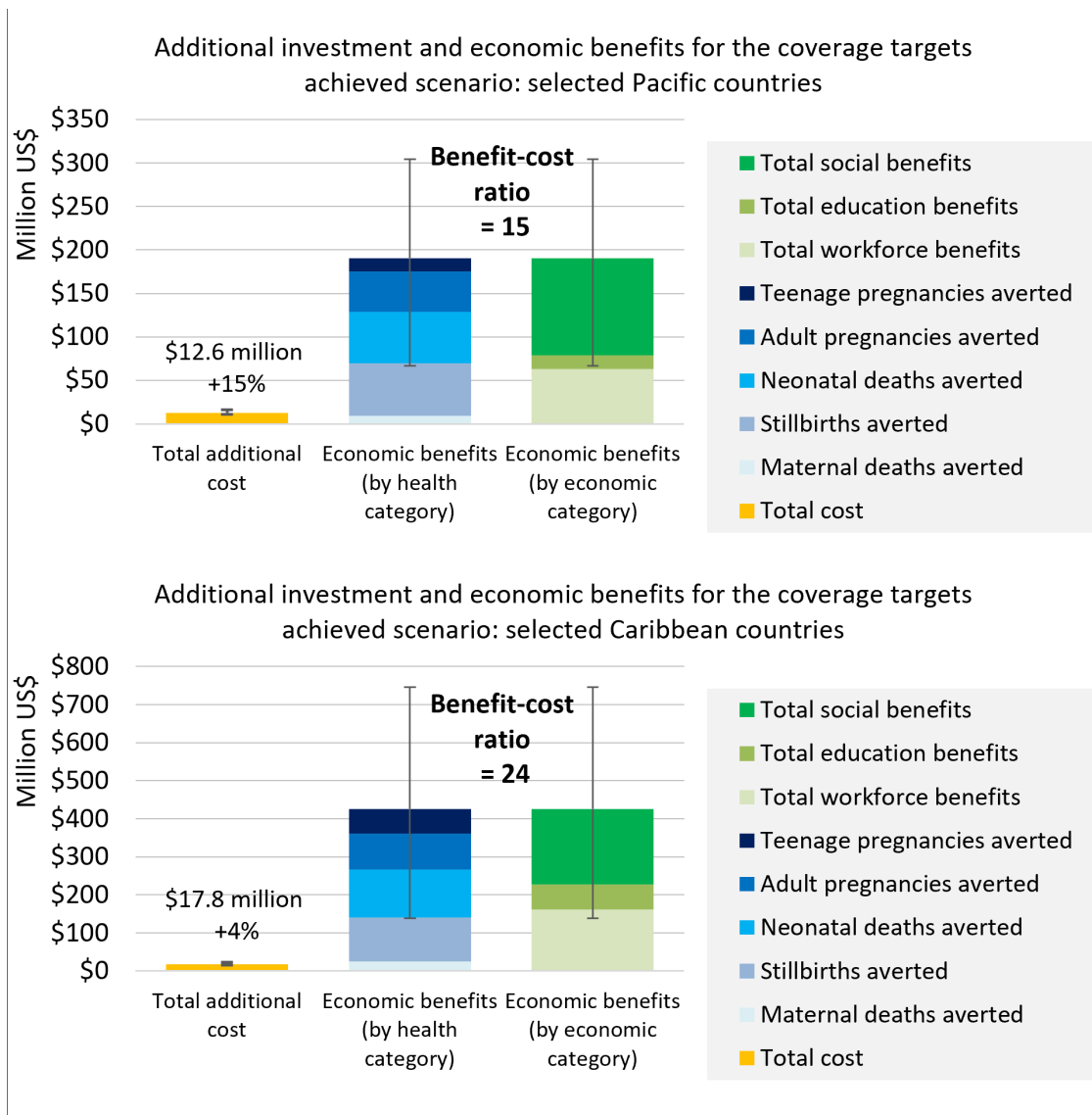
**Figure 3** Projected unintended pregnancies (top left), stillbirths (top right) and maternal deaths (bottom left) between 2020 and 2030, and projected maternal mortality ratio in 2030 (bottom right) for the business-as-usual and coverage-targets-achieved scenarios for select countries in the Pacific (Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu). Percentage values show events that could be averted. The cumulative decline in maternal deaths over the 2020–2030 period may show percentages lower than the decline in the maternal mortality ratio, which is given as a snapshot for 2030 comparing the current business-as-usual coverage to achieving coverage targets. Due to small population sizes and low numbers of births per year, maternal mortality ratios should be interpreted with caution.

communities and the economy. Similarly, investment in maternal health can have major benefits beyond those estimated; lower morbidity and health complications associated with childbirth can decrease downstream costs associated with these health conditions and avert complications such as loss of income, although such costs can be difficult to quantify.

Reaching coverage targets is not solely dependent on direct intervention and health system funding, and it will require other supporting factors. Implementers and programme managers need to ensure services are accessible, skilled midwives, nurses and other healthcare providers are available, and services provided are locally

accepted and high in quality.<sup>31 32</sup> Demand-generation activities may be necessary to increase awareness and change perceptions of contraceptive interventions. Further work is needed to understand the financial requirements beyond direct intervention and health system costs.

Contraception and maternal health intervention costs estimated in this study are consistent with other published estimates, though are specific to SIDS in the Pacific and Caribbean. For example, in 2014, it was estimated that addressing a large proportion of need for maternal and newborn health, child health, immunisation, modern contraceptive choices, HIV/AIDS and malaria services



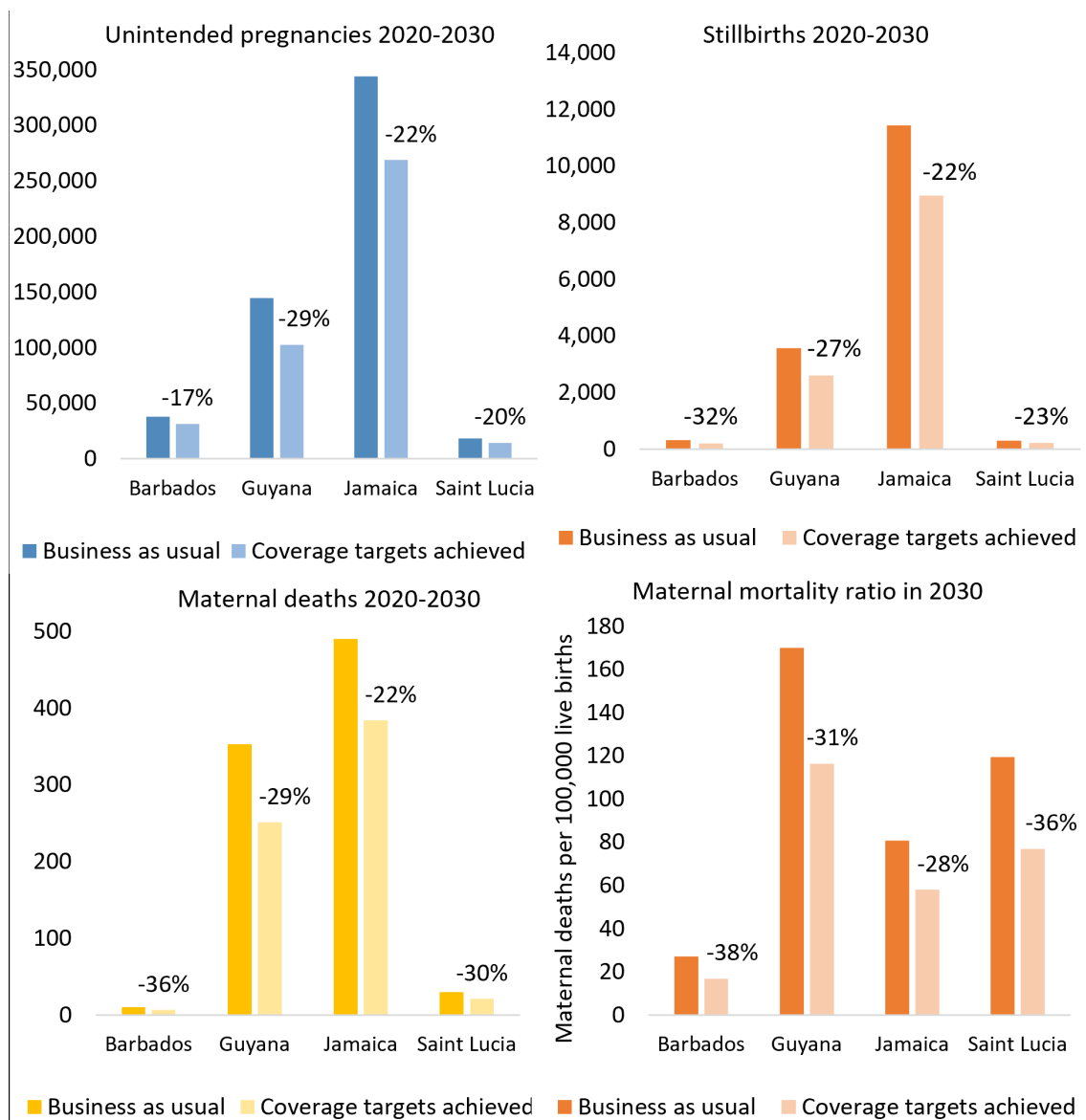
**Figure 4** Estimated additional resources and economic benefits of the coverage targets achieved scenario, compared with the business as usual scenario, for selected Pacific (top) and Caribbean (bottom) countries. Left: additional investment required (2022–2030) to reach 95% coverage of maternal health interventions and zero unmet need for family planning by 2030, compared with business as usual (left). Centre: economic benefits that are estimated by 2050, disaggregated by health benefit type (the prevention of maternal and newborn deaths, stillbirths and unintended pregnancies). Right: economic benefits that are estimated by 2050, disaggregated by economic benefit type (workforce, education, social). Values are aggregated for Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu (Pacific) and Barbados, Guyana, Jamaica and Saint Lucia (Caribbean). Error bars represent benefits calculated to 2030 (lower bound) and 2070 (upper bound).

in 74 high-burden countries would require an additional investment of US\$30 billion between 2013 and 2035, 2% more than business as usual or an average of US\$5 more per person per year.<sup>33</sup> This investment was estimated to yield up to a ninefold economic return on investment by 2035. We project an additional 15% in total investment needed for the five Pacific countries considered to reach 2030 coverage targets, and 4% more for the four Caribbean countries considered over 2020–2030. Based on population size projections over this period, to reach these targets, US\$6.50 and US\$8.90 more per capita is needed, with returns on investment of US\$15 and US\$24

projected by 2050 for the Pacific and Caribbean countries, respectively.

There are some limitations to this analysis. First, epidemiological estimates were only sufficiently available for the five Pacific and four Caribbean countries considered in this study as taken from DHS and MICS surveys conducted between 2011 and 2020 and supplemented by regional estimates where it was impractical to measure indicators for these surveys (eg, maternal mortality ratio, due to low population and birth numbers). While these sources represent the best available values, the situation in each country may have changed since the surveys were





**Figure 5** Projected unintended pregnancies (top left), stillbirths (top right) and maternal deaths (bottom left) between 2020 and 2030, and projected maternal mortality ratio in 2030 (bottom right) for the business-as-usual and coverage-targets-achieved scenarios for select countries in the Caribbean (Barbados, Guyana, Jamaica and Saint Lucia). Data for Jamaica follows those estimated by list. Percentage values show events that could be averted. The cumulative decline in maternal deaths over the 2020–2030 period may show percentages lower than the decline in the maternal mortality ratio, which is given as a snapshot for 2030 comparing the current business-as-usual coverage to achieving coverage targets. Due to small population sizes and low numbers of births per year, maternal mortality ratios should be interpreted with caution.

conducted, and the impact of the COVID-19 pandemic on contraceptive and maternal health service coverage also remains uncertain.

Second, cost data were not validated by national teams, and so economic outcomes were deliberately only presented in aggregate at a regional level, and not at a country level. Unit cost estimates were scaled between countries to reflect differences in average wages and service delivery based on per capita GDP but require further work with countries to ensure costs accurately reflect the health system and service delivery constraints. The analysis also took a healthcare provider perspective when considering costs, and as such did not include

societal costs such as individual out-of-pocket expenses to travel to or access services, or additional costs associated with social or cultural barriers to accessing contraception.

Third, the scale-up of the full set of evidence-based family planning and maternal health interventions available in LiST represents a best-case scenario, with all evidence-based interventions available to everyone in need; however, beyond health economic considerations there may be implementation or acceptability barriers that would need to be considered before implementing any new interventions.

Fourth, the effect sizes of interventions were based on global literature, primarily systematic reviews and

meta-analyses of randomised controlled trials. The actual impact of scaling up interventions in each country will depend heavily on both the quality of care and the availability of a well-trained health workforce. Without an educated and supported health workforce that is situated within an enabling environment, implementation of these interventions is not possible. Unintended pregnancies and maternal deaths may also be averted by interventions not included in this analysis, including education, social protection, health security and interventions to improve gender equity and women's empowerment. These are difficult to quantify. Similar issues apply to addressing underlying health conditions and comorbidities that may contribute to excess mortality.

Fifth, due to the smaller population sizes of most of the SIDS, the impact of increased intervention coverage on some indicators, such as maternal mortality ratio, might appear large. Therefore, reductions in maternal deaths are considered in total over the 2020–2030 period, alongside whether coverage targets are achieved. For this reason, averted maternal deaths have not been attributed to contraceptive or maternal health interventions.

Last, the methods used to capture the economic benefits of averted mortality only consider years of life lost up to 2050, with bounds estimated for 2030 and 2070, and are hence likely to underestimate the benefit–cost ratio over longer time horizons. Moreover, the economic benefits of averting unintended pregnancies among adults are based on a 3-month gain to the labour force, scaled for women's rates of participation and do not account for the benefits of a reduced dependency ratio. Alternate assumptions for the benefits calculations are explored in the sensitivity analyses, but overall they indicate that investing in modern contraception and maternal health services is likely to have significantly greater benefit than projected.

## CONCLUSIONS

The high demand for modern contraceptive options across the SIDS has yet to be satisfied, and equitable access to maternal health interventions is needed. This study provides evidence to support the prioritisation of investment for sexual and reproductive health interventions. As well as reducing the costs of maternal health services, these interventions can improve maternal health outcomes, ensure adolescent girls can continue their education and develop their professional skills, and increase women's participation in the economy and in society. Zero unmet need for modern contraceptive choices and 95% coverage of maternal health interventions in select SIDS could be achieved with as little as an additional 4%–15% investment, and for each US\$1 invested economic returns could range from US\$15 to US\$24.

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## Supplemental Material for the article: Health and economic benefits of achieving contraceptive and maternal health targets in Small Island Developing States in the Pacific and Caribbean

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## A. Demographic and epidemiological estimates and sources

**Table A1. Estimates for population size, women of reproductive age, and number of births for select countries in the Pacific, 2019**

Key indicator, 2019	Kiribati	Samoa	Solomon Islands	Tonga	Vanuatu
Population size	119,000	201,000	656,000	109,000	299,000
Women of reproductive age	30,000	46,000	156,000	27,000	75,000
Births	3,200	6,000	21,000	3,000	7,500

Source: LiST v5.88.

**Table A2. Estimates for population size, women of reproductive age, and number of births for select countries in the Caribbean, 2019**

Key indicator, 2019	Barbados	Guyana	Jamaica	Saint Lucia
Population size	301,000	851,000	3,071,000	186,000
Women of reproductive age	70,000	223,000	820,000	52,000
Births	3,400	19,000	57,000	2,400

Source: LiST v5.88.

**Table A3. Key epidemiological data inputs and respective data sources for select countries in the Pacific**

Key indicator	Kiribati (SDIS 2018-2019 unless noted)	Samoa (MICS 2019-2020 unless noted)	Solomon Islands (DHS 2015 unless noted)	Tonga (MICS 2019 unless noted)	Vanuatu (DHS 2013 unless noted)
Maternal mortality ratio <sup>1</sup>	92	43	104	52	72
Tetanus toxoid vaccination	45% <sup>2</sup>	37.5%	22.8%	5.9%	29.8%
Skilled birth attendant	91.9%	88.9%	86.2%	100%	89.4%
Health facility delivery	86.1%	88.6%	84.5%	97.6%	88.5%
Contraceptive prevalence rate, all methods	25%	16.6%	29.3%	29.3%	37.7%
Unmet need for family planning	17.3%	34.8% <sup>4</sup>	34.7%	21.8%	24.2%
Total fertility rate	3.3	3.9	4.4	3.5	3.2
Percentage of women in union	69%	59.8% <sup>4</sup>	55.8%	54.2%	68.3%
Percentage of pregnant women with anaemia	36% <sup>3</sup>	42.5% <sup>3</sup>	54.1%	28.8% <sup>3</sup>	27.8% <sup>3</sup>

<sup>1</sup>Internationally comparable maternal mortality ratio estimates by the Maternal Mortality Estimation Inter-Agency Group (1).

<sup>2</sup>LiST v5.88.

<sup>3</sup>Anaemia in pregnant women of reproductive age (2017) is from the WHO Global Health Observatory data repository available from <https://apps.who.int/gho/data/view.main.ANAEMIAWOMENPREVANEMIAv?lang=en>.

<sup>4</sup>Samoa DHS 2014.

DHS: Demographic and Health Surveys. MICS: Multiple Indicator Cluster Survey. SDIS: Social Development Indicator Survey. WRA: women of reproductive age.

**Table A4. Key epidemiological data inputs and respective data sources for select countries in the Caribbean**

Key indicator	Barbados (MICS 2012 unless noted)	Guyana (MICS 2014 unless noted)	Jamaica (MICS 2011 unless noted)	Saint Lucia (MICS 2012 unless noted)
Maternal mortality ratio <sup>1</sup>	27	169	80	117
Tetanus toxoid vaccination	0% <sup>2</sup>	99%	91%	0% <sup>2</sup>
Skilled birth attendant	99%	92%	99%	99%
Health facility delivery	100%	93%	99%	100%
Contraceptive prevalence rate, all methods	59%	34%	40%	55%
Unmet need for family planning	20%	28per cent	10%	17%
Total fertility rate	1.70	2.6	2.2	1.4 <sup>3</sup>
Percentage of women 15-49 years in union	65%	68per cent	35%	39%
Percentage of pregnant women with anaemia <sup>4</sup>	26%	29%	27%	27%

<sup>1</sup>Internationally comparable maternal mortality ratio estimates by the Maternal Mortality Estimation Inter-Agency Group (1).

<sup>2</sup>LiST v5.88

<sup>3</sup>World Bank indicators, 2018 available from <https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?view=chart>.

<sup>4</sup>Anaemia in pregnant women of reproductive age (2017) from the WHO Global Health Observatory data repository available from <https://apps.who.int/gho/data/view.main.ANAEMIAWOMENPREVANEMIA?lang=en>.

**Table A5. Assumed reductions in intervention coverage due to COVID-19 disruptions for 2020 and 2021**

Country	Maternal health intervention coverage reduction (health facility delivery), percentage	Family planning intervention coverage reduction (short-acting contraceptive methods), percentage
	Estimate	Estimate
Barbados	0	0
Guyana	5	0
Jamaica	5	5
Saint Lucia	0	5
Kiribati	35	35
Samoa	10	20
Solomon Islands	10	20
Tonga	10	20
Vanuatu	35	35

Source: Derived by the UNFPA Regional teams and the Burnet Institute based on assumptions from select data sources (2, 3) and other global health models (4-6).

## B. Interventions

**Table B1. Intervention list and baseline coverage for 2019 using Spectrum version 5.88 (November 2020) for countries in the Pacific included in this analysis**

Maternal health interventions	Baseline, 2019				
	Kiribati	Samoa	Tonga	Vanuatu	Solomon Islands
Folic acid supplementation/fortification	0.0	0.0	0.0	0.0	0.0
Safe abortion services	85.0	85.0	85.0	85.0	85.0
Post-abortion case management	0.0	0.0	0.0	0.0	0.0
Ectopic pregnancy case management	0.0	0.0	0.0	0.0	0.0
Blanket iron supplementation/fortification	0.0	0.0	0.0	0.0	0.0
Tetanus toxoid vaccination	90.0	0.0	71.2	78.0	95.0
Intermittent preventive treatment of malaria during pregnancy	0.0	0.0	0.0	0.0	0.0
Syphilis detection and treatment	21.9	14.4	24.3	19.1	19.8
Calcium supplementation	0.0	0.0	0.0	0.0	0.0
Micronutrient supplementation (iron and multiple micronutrients)	0.0	3.4	0.0	0.0	0.0
Balanced energy supplementation	0.0	0.0	0.0	0.0	0.0
Hypertensive disorder case management	16.1	14.0	21.3	12.4	15.5
Diabetes case management	12.6	10.9	16.6	9.7	12.1
Malaria case management	51.9	45.3	68.6	40.2	50.1
MgSO4 management of pre-eclampsia	31.8	27.8	42.1	24.6	30.7
Clean birth environment	70.6	72.7	80.0	72.6	69.3
Manual removal of placenta	32.2	33.1	36.5	33.1	31.6
Parenteral administration of anti-convulsants	61.6	63.4	69.8	63.3	60.4
Antibiotics for preterm or prolonged PROM	64.4	66.3	73.0	66.2	63.2
Parenteral administration of antibiotics	64.4	66.3	73.0	66.2	63.2
Assisted vaginal delivery	21.8	22.4	24.7	22.4	21.4
Parenteral administration of uterotonics	76.9	79.2	87.2	79.1	75.5
Removal of retained products of conception	28.5	29.4	32.3	29.3	28.0
Induction of labour for pregnancies lasting 41+ weeks	1.5	1.6	1.7	1.6	1.5
Caesarean section delivery	7.5	7.7	8.5	7.7	7.4
Blood transfusion	10.8	11.2	12.3	11.1	10.6
Maternal sepsis case management	0.0	0.0	0.0	0.0	0.0
<b>Family planning interventions</b>					
Contraceptive prevalence rate	25.0	21.0	17.0	37.7	29.0
Modern contraceptive prevalence ratio	80.8	92.7	82.1	74.4	82.6
Unmet need for family planning	18.0	34.7	21.8	24.2	34.7
Family planning demand satisfied with modern methods	66.3	60.5	64.2	56.39	53.9
<b>Family planning methods mix</b>					
Condoms	2.0	0.7	4.7	4.3	6.1
Female sterilization	18.4	23.3	40.8	22.5	29.5
Male sterilization	0.8	0.0	0.0	1.1	1.9
Injections	23.2	47.7	19.6	19.9	27.2
Implants (3.8 years)	31.2	0.0	0.0	0.0	0.0
Intrauterine devices (4.6 years)	2.4	0.7	10.9	4.9	14.1
Pills	2.8	20.2	6.2	21.5	3.8
Vaginal ring	0.0	0.0	0.0	0.0	0.0
Withdrawal	5.6	2.1	7.3	9.6	9.4
Standard days method	1.2	4.2	9.1	13.3	6.1
Emergency contraception	0.0	0.0	0.0	0.0	0.0
Other	12.4	1.0	1.5	2.7	1.9

**Table B2. Intervention list and baseline coverage for 2019 using Spectrum version 5.88 (as of November 2020) for countries in the Caribbean included in this analysis**

Maternal health interventions	Baseline, 2019			
	Barbados	Guyana	Jamaica	Saint Lucia
Folic acid supplementation/fortification	0.0	0.0	0.0	0.0
Safe abortion services	53.7	0.0	0.0	0.0
Post-abortion case management	0.0	0.0	0.0	0.0
Ectopic pregnancy case management	0.0	0.0	0.0	0.0
Blanket iron supplementation/fortification	0.0	0.0	0.0	0.0
Tetanus toxoid vaccination	0.0	99.0	91.0	0.0
Intermittent preventive treatment of malaria during pregnancy	0.0	0.0	0.0	0
Syphilis detection and treatment	23.1	22.4	24.1	24.5
Calcium supplementation	0.0	0.0	0.0	0.0
Micronutrient supplementation (iron and multiple micronutrients)	0.0	34.2	0.0	0.0
Balanced energy supplementation	0.0	0.0	0.0	0.0
Hypertensive disorder case management	21.1	20.8	20.6	21.7
Diabetes case management	16.5	16.2	16.0	16.9
Malaria case management	0.0	0.0	0.0	0.0
MgSO4 management of pre-eclampsia	41.8	41.2	40.7	42.9
Clean birth environment	82.0	76.3	80.8	82.0
Manual removal of placenta	37.4	34.8	73.8	37.4
Parenteral administration of anti-convulsants	71.5	66.5	70.0	71.5
Antibiotics for preterm or prolonged PROM	74.8	69.6	73.8	74.8
Parenteral administration of antibiotics	74.8	69.6	73.8	74.8
Assisted vaginal delivery	25.3	23.5	24.9	25.3
Parenteral administration of uterotonics	89.4	83.1	88.1	89.4
Removal of retained products of conception	33.1	30.8	32.7	33.1
Induction of labour for pregnancies lasting 41+ weeks	1.8	1.6	1.7	1.8
Caesarean section delivery	8.7	8.1	8.6	8.7
Blood transfusion	12.6	11.7	12.4	12.6
Maternal sepsis case management	0.0	0.0	0.0	0.0
<b>Family planning interventions</b>				
Contraceptive prevalence rate	59.2	34.1	72.5	55.0
Modern contraceptive prevalence ratio	91.2	93.5	93.7	92.8
Unmet need for family planning	19.9	28.0	7.9	17.0
Family planning demand satisfied with modern methods	73.1	67.3	86.3	77.0
<b>Family planning methods mix</b>				
Condoms	32.9	26.5	36.6	25.4
Female sterilization	7.9	9.7	15.8	12.8
Male sterilization	0.2	0.3	0.0	0.0
Injections	8.4	14.4	16.3	8.8
Implants (3.8 years)	1.3	2.9	0.5	0.5
Intrauterine devices (4.6 years)	5.2	17.1	2.3	5.9
Pills	35.8	22.6	22.3	39.3
Vaginal ring	0.8	0.0	0.0	0.4
Withdrawal	3.4	1.2	4.8	2.0
Standard days method	1.7	1.2	0.5	0
Emergency contraception	0.0	0.0	0.0	0.0
Other	0.8	4.2	1.0	0.9



## C. Methodological framework

### C.1. Costs

For family planning and maternal health interventions with available evidence on effectiveness (Tables B1 and B2), costs were calculated for the business-as-usual and coverage-targets-achieved scenarios. These costs for 2020 to 2030 were derived using LiST v5.88 (7) country models (for commodities and human resources needs) and based on the literature (4), but were not validated by national teams. LiST estimates costs for the following seven components, which were included in this analysis: capital costs, drugs and supply costs, labour costs, logistics and wastage, other health system costs, other recurrent costs, and programme costs.

Drug and supply costs and labour costs were calculated using an ingredients-based approach, estimated intervention coverages (Tables B1 and B2), and unit costs, including labour time and health-care worker salary estimates from LiST (Tables C1 and C2).

Capital and other recurrent costs were calculated using estimates of the number and costs of inpatient days and outpatient visits (8).

Logistics and wastage, other health system costs and programme costs were estimated as a percentage mark-up on commodity costs. This is calculated in the model such that the resulting distribution of total costs among each cost component approximates global estimates (4) for scaled-up health system resource needs to achieve universal health care. This result of this is that the following mark-up percentages are applied to commodity costs:

- 5% for drugs and supply costs to account for wastage, as well as country specific percentage mark-ups of drugs and supply costs to account for logistics costs (ranging from 8% in Jamaica and Vanuatu to 22% in Kiribati, Guyana, Solomon Islands and Tonga).
- 15% for programme costs, comprising 1% programme-specific human resources; 1% training; 2% supervision; 2% monitoring and evaluation; 2% infrastructure; 2% transport; 1% communication, media and outreach; 1% advocacy; 2% general programme management; 1% community health worker training.
- 85% for other health system costs. These other costs would include things like facilities and infrastructure that might be required, and are not specified in LiST but have this value such that when suites of interventions are scaled up in the model, their total costs aligns with estimates of scale-up needs for achieving universal health care from Stenberg et al. (4).

**For the countries considered in this analysis, additional funding would likely be required for health systems to absorb services and investments (e.g., for capacity building).** We assume that the investment in health system strengthening to reach the coverage targets would need to be between equal and twice as much as global averages (4). Therefore, a lower bound for the additional investment requirements was based on health system strengthening costs described in the paragraphs above. An upper bound for additional investment requirements was calculated by doubling the non-intervention components. A point estimate for total annual costs was calculated as the midpoint between the upper and lower bounds (9).

Costs are presented in 2020 dollars and are discounted at 3% per annum unless stated otherwise.

Additional costs are outside the scope of this investment case, for example, demand generation costs, as they are unknown and difficult to quantify.

**Table C1. Health-care worker annual salaries in dollars for countries in the Pacific**

Country	Range
Generalists, primary care doctors	\$3,024 - \$6,532
Obstetricians, gynaecologists, paediatricians and other specialist doctors	\$4,540 - \$9,805
Nurses, midwives, clinical officers, surgical technicians, laboratory technicians/assistants, pharmaceutical technicians/assistants, radiographers, X-ray technicians, emergency medical technicians	\$1,868 - \$4,034
Assistant nurses and midwives, nursing aides	\$1,862 - \$3,056

Community health workers	\$1,085 - \$3,056
Other	\$1,415 - \$2,343

Source: LiST v5.88, values were not validated by national teams.

**Table C2. Health-care worker annual salaries in dollars for countries in the Caribbean**

Country	Range
Generalists, primary care doctors	\$7,991 - \$19,288
Obstetricians, gynaecologists, paediatricians and other specialist doctors	\$11,995 - \$28,954
Nurses, midwives, clinical officers, surgical technicians, laboratory technicians/assistants, pharmaceutical technicians/assistants, radiographers, X-ray technicians, emergency medical technicians	\$4,935 - \$11,913
Assistant nurses and midwives, nursing aides	\$3,738 - \$9,023
Community health workers	\$2,867 - \$6,920
Other	\$3,738 - \$9,023

Source: LiST v5.88. Values for specific countries are suppressed as they were not validated by national teams, and costs, benefits and benefit cost ratios are provided in aggregate.

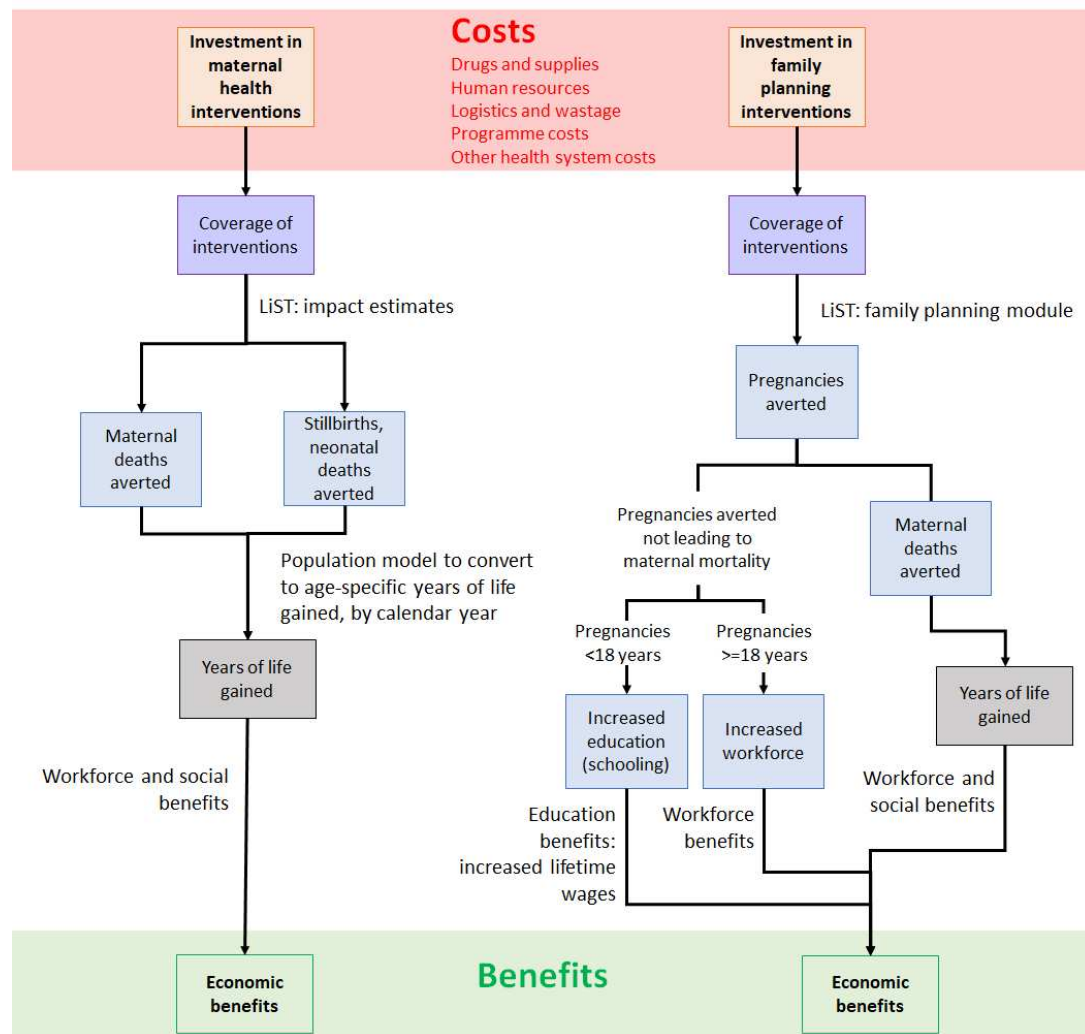
### C.2. Benefits calculations overview

Using LiST, it is possible to quantify expected reductions in unintended pregnancies, maternal deaths, stillbirths and newborn deaths when coverage of interventions is increased. These health outcomes were then converted to economic benefits across three domains, described in more detail in the following sections:

1. **Workforce:** increased participation in the workforce due to (a) years of life gained; and (b) unintended pregnancies averted
2. **Education:** average increase in years of school completed due to unintended pregnancies averted among adolescents, leading to increased productivity and earnings when they enter the workforce
3. **Social:** maternal deaths, stillbirths and newborn deaths prevented leading to years of life lost.

Economic benefits were considered up to 2050, but only for the population cohort receiving the interventions over 2020-2030. The reason for the longer time frame for calculating benefits is that some benefits are not captured immediately; for example, unintended pregnancies averted among adolescents lead to greater education and increased earnings, but only once they enter the workforce.

Economic benefits were discounted at 3% per annum and are presented in 2019 USD.



**Figure C1. Overview of the methodological framework for family planning and maternal health interventions**

### C.3. Calculating years of life gained

Maternal deaths, stillbirths and child deaths prevented in each year over 2020-2030 due to increased coverage of maternal health interventions were derived from LiST. Increased coverage of family planning was also assumed to result in maternal deaths averted, which were calculated according to the maternal mortality rates among current pregnancies.

However, the economic benefit calculations are based on total years of life gained in each calendar year, rather than from the number of deaths averted in each calendar year. Therefore, a population model was constructed to convert annual deaths averted to annual age-specific years of life gained.

The population model was stratified in single year age brackets, and each year people could enter the model if their death was averted, turn a year older, and be removed due to all-cause mortality. Stillbirths and newborn deaths averted entered the model at age zero, and maternal deaths averted entered the model according to the age-distribution of all pregnancies. There is some debate about years of life gained from averting stillbirths (more specifically disability-adjusted life years gained) (10), and for this analysis years of life gained were considered for 50% of the stillbirths averted, which is the global estimated percentage that are intrapartum (11).

**The total number of people in this population model, in each year, represents the age-specific years of life gained (in the year they would otherwise have been lived) and is used to calculate workforce and social benefits.** Note that this population model can be run for an arbitrary duration to capture longer term benefits of deaths averted in the 2020-2030 window.

#### *C.4. Workforce participation economic benefits*

Economic benefits from increased workforce participation can be calculated from years of life gained. For years of life gained among people aged 18-65 years, average salary is estimated as GDP per worker, and then scaled for workforce participation rates among women (for maternal deaths averted) or the whole population (for child deaths averted).

Unintended pregnancies averted among women >18 years were also assumed to lead to an increase in workforce participation. Pregnancy was assumed to remove a woman from the labour force for 3 months, based on maternity leave policies (12). Hence, the economic benefit was calculated as 0.25 multiplied by the GDP per worker, scaled for workforce participation rates among women.

#### *C.5. Education economic benefits*

Reductions in unintended pregnancies as a result of family planning services were assumed to lead to increases in the average level of schooling obtained by girls (13). A percentage of all unintended pregnancies averted were assumed to be among girls <18 years, based on estimates of the age distribution of pregnancies, and were assumed to lead to an average 1.1 years increased education, based on the median age of adolescent pregnancy relative to expected years of schooling across the countries being considered. Length of schooling is known to lead on average to an increased lifetime earnings, with each additional year in education associated with an 8.8% increase in per capita income (14). GDP per worker was used as a proxy for average wage, which was multiplied by the percentage income increase to obtain an economic benefit for each working year. These benefits were applied from the year girls turned 18 years until retirement age, scaled for workforce participation rates among women.

#### *C.6. Social economic benefits*

Social economic benefits can be calculated from years of life gained following methods from Stenberg et al. (13). These social benefits are based on the statistical value of a life year from Jamison et al (15), which is estimated to be 2.3 times GDP per capita in LMICs, and to vary between 1.4 and 4.2 depending on world region. Stenberg et al (13) use a conservative estimate of 1.5 times GDP per capita, assumed to comprise 1.0 times GDP per capita for workforce benefits and 0.5 times GDP per capita for social benefits. For this analysis, we follow these methods and use 0.5 times GDP per capita to estimate the economic social benefit for any year of life saved, regardless of age. The social benefit computation used the average GDP per capita across all countries in this analysis, to avoid implicitly valuing life differently across settings.

GDP per capita was assumed to increase at 1.5 per cent per year.

#### *C.7. Limitations and exclusions from benefit calculations*

There are significant additional benefits from family planning and maternal health interventions that are outside the scope of this analysis. In particular, empowering women to choose when and how many children they have can reduce poverty and reducing the fertility rate can increase the proportion of working-age adults relative to dependent children, which can increase productivity (16, 17). This is known as the “Demographic Dividend”, and has been approximated in models previously as increased rates of GDP growth. It is not clear how many of the assumptions in these calculations translate to Small Islands and Developing States, and so this was not included in the main benefit calculations; however, a sensitivity analysis has been run where increased rates of GDP growth are assumed (5% versus 1.5% in the main analysis).

Other factors not accounted for in this analysis are the benefits of women's empowerment, gender equity, social cohesion and protection, diversification, and health security benefits. These are difficult to quantify, and minimal evidence currently exists to support their inclusion. In addition, higher-quality maternal and newborn health is likely to result in reduced demand for other health interventions.

**Table C3. Economic indicators used for benefit calculation for countries in the Pacific**

Economic indicator	Kiribati	Samoa	Solomon Islands	Tonga	Vanuatu
GDP per capita (average across Pacific and Caribbean countries considered) <sup>1</sup>	\$5,752.27	\$5,752.27	\$5,752.27	\$5,752.27	\$5,752.27
GDP per capita <sup>2</sup>	\$1,655.10	\$4,315.90	\$2,127.50	\$4,443.10 <sup>5</sup>	\$3,058.10
GDP per worker	\$4,597.50	\$9,382.39	\$2,502.94	\$9,067.56	\$4,307.18
Education gained due to teenage pregnancy averted <sup>3</sup>	1.1 year	1.1 year	1.1 year	1.1 year	1.1 year
Additional earnings per year of education gained <sup>4</sup>	8.8%	8.8%	8.8%	8.8%	8.8%
Workforce participation rate <sup>5</sup>	36%	46%	85%	49%	71%
Workforce participation rate (women) <sup>6</sup>	29%	34%	84%	41%	62%
Time out of workforce due to pregnancy <sup>7</sup>	3 months	3 months	3 months	3 months	3 months
Proportion of stillbirths that are intrapartum <sup>8</sup>	0.5	0.5	0.5	0.5	0.5
Social value of a life year gained <sup>9</sup>	0.5 average GDP per capita	0.5 average GDP per capita	0.5 average GDP per capita	0.5 average GDP per capita	0.5 average GDP per capita
Discounting per annum	3%	3%	3%	3%	3%

<sup>1</sup> World Development Indicators database (18). Indicator of 'GDP per capita (current US\$)'; value in 2020, or most recent available value were used where data in 2020 were unavailable. Non-weighted average across Pacific and Caribbean countries included in this analysis.

<sup>2</sup> World Development Indicators database (18).

<sup>3</sup> The difference between the expected years of schooling (UN Human Development Index) and the median age of first birth among women reporting a first birth <18 years (MICS data). This was calculated for each country, but due to small numbers an average was taken across the nine Pacific and Caribbean countries in this study.

<sup>4</sup> Psacharopoulos and Patrinos (19)

<sup>5</sup> World Development Indicators database (18). Indicator of 'Labor force participation rate, total (% of total population ages 15-64) (modeled ILO estimate)'; value in 2019.

<sup>6</sup> World Development Indicators database (18). Indicator of 'Labor force participation rate, female (% of female population ages 15-64) (modeled ILO estimate)'; value in 2019.

<sup>7</sup> Assumption based on maternity leave policies.

<sup>8</sup> Lawn et al 2016 (11)

<sup>9</sup> Stenberg et al (13)., based on 1.5 times GDP per capita for statistical value of a life year, subtracting 1.0 times GDP per capita assumed to be workforce benefits.

**Table C4. Economic indicators used for benefit calculation for countries in the Caribbean**

Economic indicator	Barbados	Guyana	Jamaica	Saint Lucia
GDP per capita (average across Pacific and Caribbean countries considered) <sup>1</sup>	\$5,752.27	\$5,752.27	\$5,752.27	\$5,752.27
GDP per capita <sup>2</sup>	\$18,148.00	\$5,468.40	\$5,582.30	\$11,611.40
GDP per worker	\$23,267.00	\$9,268.47	\$7,862.39	\$14,697.97
Education gained due to teenage pregnancy averted <sup>3</sup>	1.1 year	1.1 year	1.1 year	1.1 year
Additional earnings per year of education gained <sup>4</sup>	8.8%	8.8%	8.8%	8.8%
Workforce participation rate <sup>5</sup>	78%	59%	71%	79%
Workforce participation rate (women) <sup>6</sup>	75%	46%	66%	76%
Time out of workforce due to pregnancy <sup>7</sup>	3 months	3 months	3 months	3 months
Proportion of stillbirths that are intrapartum <sup>8</sup>	0.5	0.5	0.5	0.5
Social value of a life year gained <sup>9</sup>	0.5 average GDP per capita	0.5 average GDP per capita	0.5 average GDP per capita	0.5 average GDP per capita
Discounting per annum	3%	3%	3%	3%

<sup>1</sup> World Development Indicators database (18). Indicator of 'GDP per capita (current US\$)'; value in 2020, or most recent available value were used where data in 2020 were unavailable. Non-weighted average across Pacific and Caribbean countries included in this analysis.

<sup>2</sup> World Development Indicators database (18).

<sup>3</sup> The difference between the expected years of schooling (UN Human Development Index) and the median age of first birth among women reporting a first birth <18 years (MICS data). This was calculated for each country, but due to small numbers an average was taken across the nine Pacific and Caribbean countries in this study.

<sup>4</sup> Psacharopoulos and Patrinos (19)

<sup>5</sup> World Development Indicators database (18). Indicator of 'Labor force participation rate, total (% of total population ages 15-64) (modeled ILO estimate)'; value in 2019.

<sup>6</sup> World Development Indicators database (18). Indicator of 'Labor force participation rate, female (% of female population ages 15-64) (modeled ILO estimate)'; value in 2019.

<sup>7</sup> Assumption based on maternity leave policies.

<sup>8</sup> Lawn et al 2016 (11)

<sup>9</sup> Stenberg et al (13), based on 1.5 times GDP per capita for statistical value of a life year, subtracting 1.0 times GDP per capita assumed to be workforce benefits.

### *C.8. Sensitivity analyses for cost and benefit calculation assumptions*

Sensitivity analyses were run to test the impact of different modelling assumptions on total costs, total benefits and benefit-cost ratios. This included:

- The impact of benefits as of 2050, with a lower bound by 2040 and an upper bound by 2060 (20), as benefits need longer-term time frames to be better captured.
- Annual increase in GDP per capita of 0% or 5%, compared with 1.5%.
- Average wage estimated as 75% or 125% GDP per worker, compared with 100% GDP per worker
- Increase in earnings per additional year of education of 3% or 35%, compared with 8.8%.
- The value of social benefits of 0 or 1 times GDP per capita, compared with 0.5.
- Workforce participation of zero months or six months for pregnancies averted among women, compared with 3 months
- Education gains of zero months (i.e., no benefit) or two years, compared with 1.1 years for unintended teenage pregnancies are averted.
- Proportion of stillbirths counted of 20% or 100%, compared with 50%.
- Discounting of 0% or 6% discounting, compared with 3%.

## D. Results for countries in the Pacific

### D.1. Kiribati

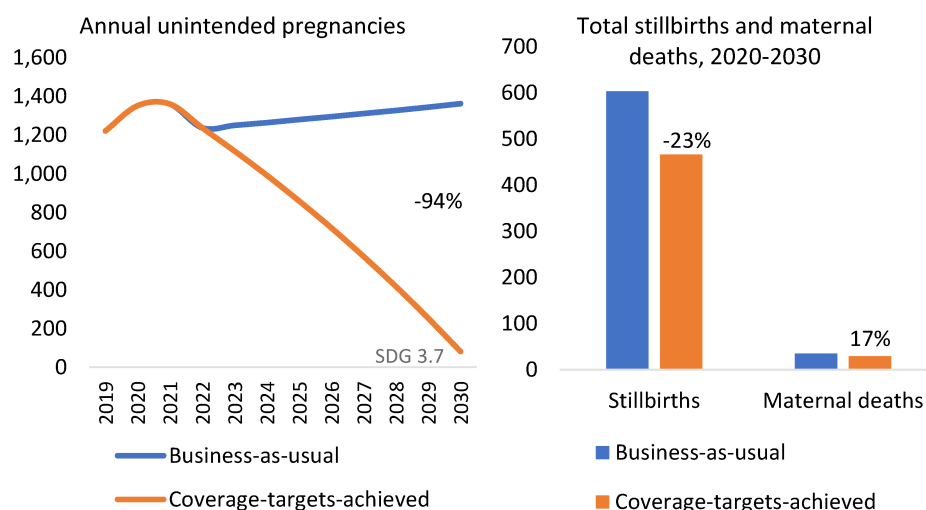
In 2019, Kiribati had a population of 119,000, including 30,000 women of reproductive age, and an estimated 3,200 births, 86% of which occurred in health facilities. The 2018-2019 Social Development Indicator Survey suggested that Kiribati has an estimated 25% contraceptive prevalence rate (modern and traditional methods), 17% unmet need for family planning and a total fertility rate of 3.3. The maternal mortality ratio for 2019 was an estimated 92 per 100,000 live births (1).

A commitment to enhancing access to quality family planning services, made as part of Kiribati's 2016-2019 Health Strategic Plan (21), was renewed in the 2020-2023 Health Strategic Plan (22). Targets for 2023 include a contraceptive prevalence rate of 25% for modern family planning methods and no maternal deaths.

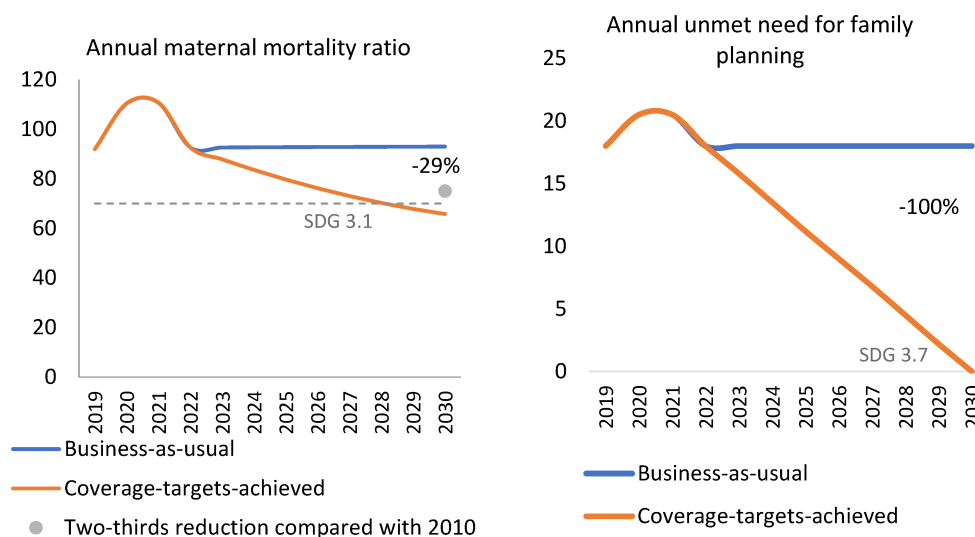
The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, predicted 14,382 unintended pregnancies, 603 stillbirths, and 35 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 91 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Kiribati could prevent an additional 5,422 unintended pregnancies (38% more, 10% of all pregnancies), 137 stillbirths (23% more), and 6 maternal deaths (17% more) between 2020 and 2030 (Figure D1), with the projected 2030 maternal mortality ratio falling to 66 deaths per 100,000 live births (Figure D2).

If coverage targets were reached, Kiribati could achieve SDG target 3.7 on universal access to sexual and reproductive health services, SDG target 3.1 on reducing maternal deaths to less than 70 per 100,000 live births (Figure D1 and Figure D2) as well as the country-specific SDG target of reducing the maternal mortality ratio by two thirds from 2010 levels by 2030. A small population size and a low number of births per year, however, mean the maternal mortality ratio should be interpreted with caution.



**Figure D1. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for modern contraception through family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**



**Figure D2. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to a small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

#### D.2. Samoa

In 2019, Samoa had a population of 201,000, including 46,000 women of reproductive age, and an estimated 6,000 births, 89% of which occurred in health facilities. The 2019-2020 Multi-Indicator Cluster Survey found that Samoa has an estimated 17% contraceptive prevalence rate (for both modern and traditional methods), 35% unmet need for family planning and a total fertility rate of 3.9. In addition, the maternal mortality ratio was an estimated 43 deaths per 100,00 live births in 2019 (1), already surpassing SDG target 3.1 on reducing maternal deaths to less than 70 per 100,000 live births.

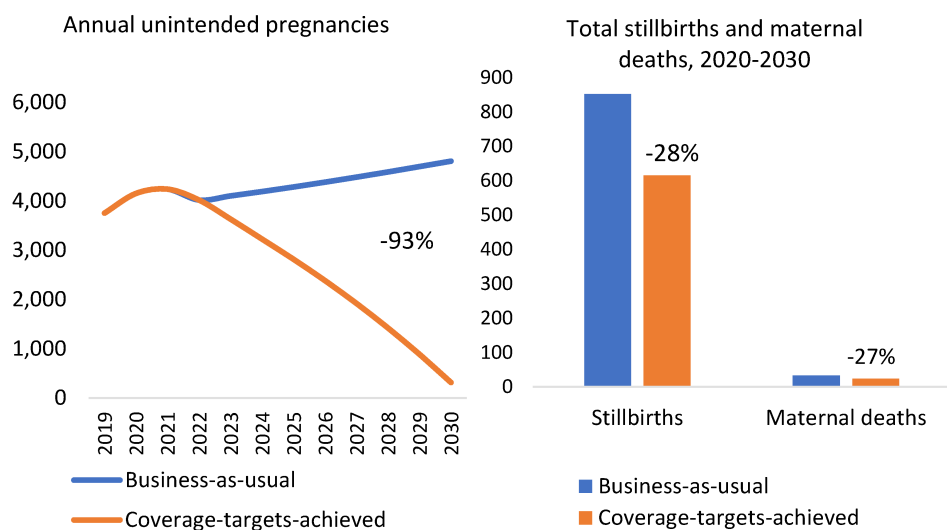
The Samoan National Sexual Reproductive Health Policy for 2018-2023 aims to achieve safe, effective, affordable and acceptable delivery of sexual and reproductive health services for all Samoans. Since 2011, Samoa has developed policies to improve ongoing issues of low levels of modern contraceptive use, an increase in adolescent pregnancies, and rising perinatal and child mortality (23).

The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, predicted 47,918 unintended pregnancies, 852 stillbirths and 33 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to remain the same as in 2019 at 43 deaths per 100,000 live births.

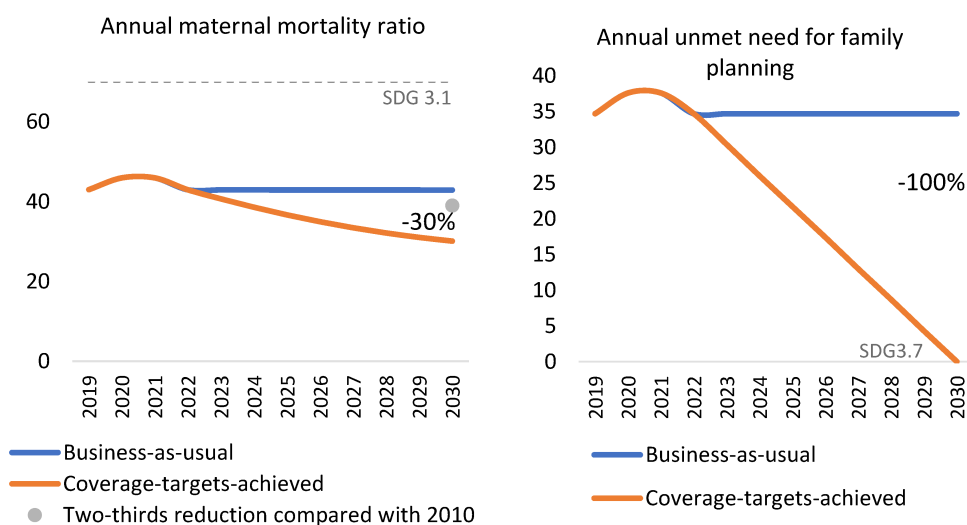
Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Samoa could prevent an additional 18,933 unintended pregnancies (40% more, 18% of all pregnancies), 236 stillbirths (28% more), and 9 maternal deaths (27% more) between 2020 and 2030 (Figure D3), with the projected 2030 maternal mortality ratio falling to 30 deaths per 100,000 live births (Figure D4).

If the coverage targets were reached, Samoa could achieve SDG target 3.7 on universal access to sexual and reproductive health services, as well as the country-specific target of reducing the maternal mortality ratio by two thirds from 2010 levels by 2030 (Figure D3 and Figure D4). Its small population size and low number of births per year mean the maternal mortality ratio should be interpreted with caution.





**Figure D3. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**



**Figure D4. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

### D.3. Solomon Islands

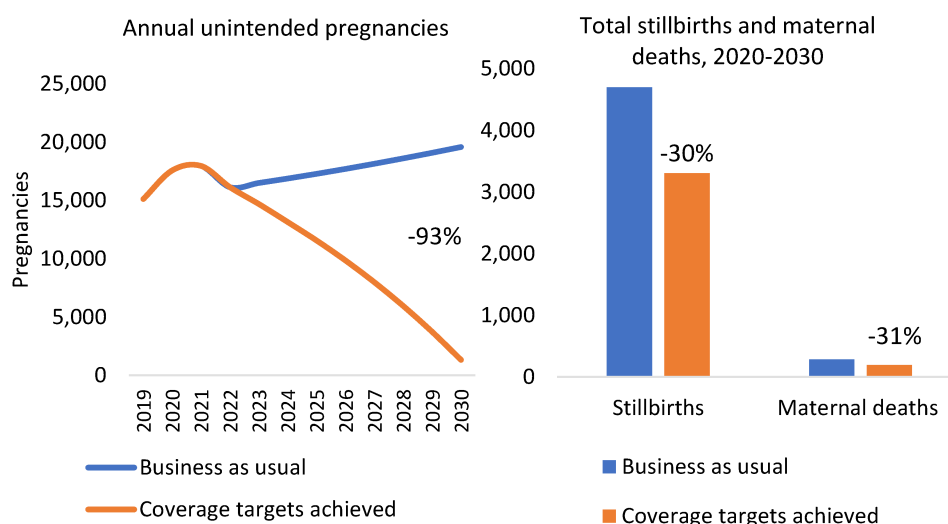
In 2019, Solomon Islands had a population of 656,000, including 156,000 women of reproductive age, and an estimated 21,000 births, 85% of which occurred in health facilities. The 2015 Demographic Health Survey estimated a 29% contraceptive prevalence rate (modern and traditional methods), 35% unmet need for family planning and a total fertility rate of 4.4 births per woman. In addition, the maternal mortality ratio was estimated to be 104 deaths per 100,00 live births in 2019 (1).

A review of the Solomon Islands 2016-2020 National Health Strategic Plan is in progress to inform development of a new National Health Strategic Plan 2022-2026. Notable goals from the existing plan include increasing the contraceptive prevalence rate to 55%, as well as improving maternal health for mothers in hard-to-reach communities, thereby aiming for 100% health facility-based deliveries (24).

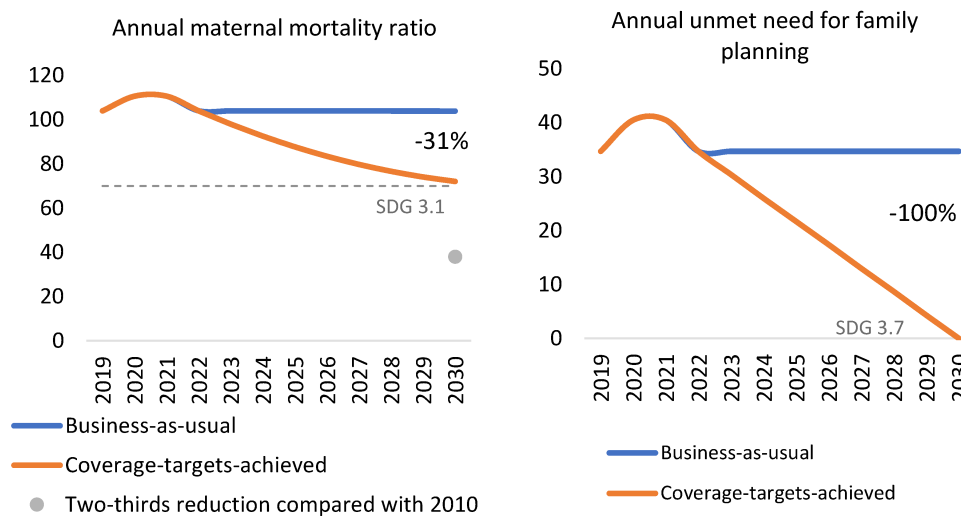
The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, predicted 195,337 unintended pregnancies, 4,679 stillbirths and 281 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 104 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Solomon Islands could prevent an additional 75,491 unintended pregnancies (39% more, 19% of all pregnancies), 1,391 stillbirths (30% more), and 86 maternal deaths (31% more) between 2020 and 2030 (Figure D5), with the projected 2030 maternal mortality rate falling to 72 deaths per 100,000 live births (Figure D6).

If the coverage targets are reached by 2030, then the Solomon Islands could achieve the SDG target 3.7 on universal access to sexual and reproductive health services, as well as the SDG 3.1 target on reducing maternal deaths to less than 70 per 100,000 live births. In addition, the country would experience a 31% reduction in the projected 2030 maternal mortality ratio (Figure D5 and Figure D6). A small population size and a low number of births per year mean the maternal mortality ratio should be interpreted with caution.



**Figure D5. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**



**Figure D6. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

#### D.4. Tonga

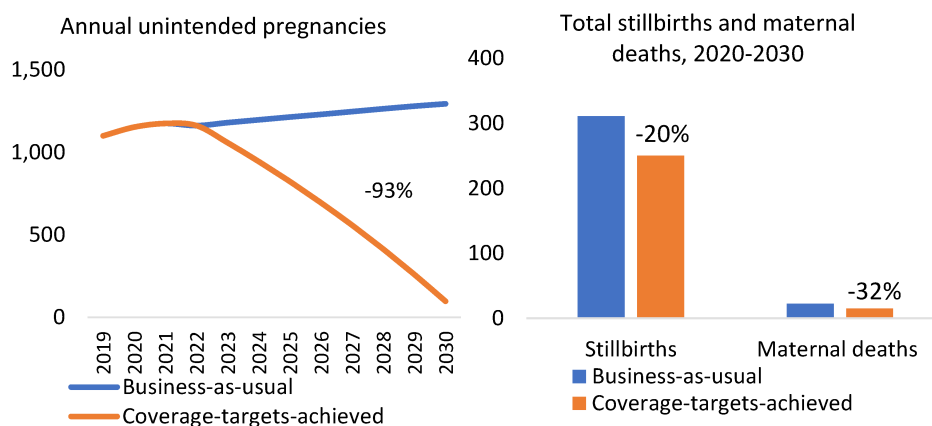
In 2019, Tonga had a population of 109,000, including 27,000 women of reproductive age, and an estimated 3,000 births, 98% of which occurred in health facilities. The 2019 Multiple Indicator Cluster Survey estimated a 29% contraceptive prevalence rate (modern and traditional methods), 22% unmet need for family planning and a total fertility rate of 3.5. The maternal mortality ratio for 2019 was an estimated 52 per 100,000 live births (1), already surpassing SDG target 3.1 on reducing maternal deaths to less than 70 per 100,000 live births.

In its 2015-2025 Strategic Development Framework, Tonga has committed to a “more progressive Tonga”, including to empower human development and gender equality (25). The framework outlines strategies for improving family planning and maternal and child health.

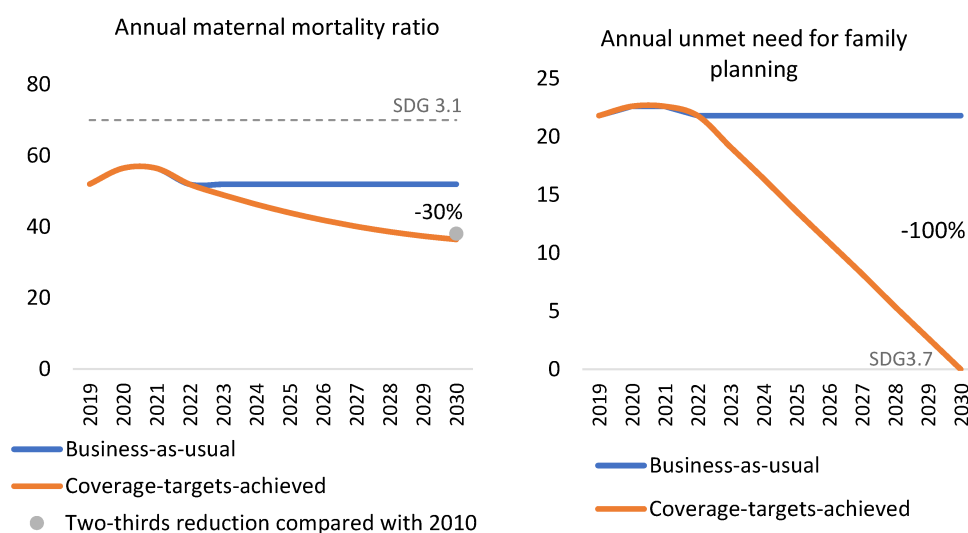
The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, predicted 13,396 unintended pregnancies, 311 stillbirths and 22 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 52 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Tonga could prevent an additional 5,060 unintended pregnancies (38% more, 11% of all pregnancies), 61 stillbirths (20% more), and 7 maternal deaths (32% more) between 2020 and 2030 (Figure D8), with the projected 2030 maternal mortality ratio falling to 36 deaths per 100,000 live births (Figure D9).

If coverage targets were reached, Tonga could achieve SDG target 3.7 on universal access to sexual and reproductive health services, as well as the additional target of reducing the maternal mortality ratio by two thirds from 2010 levels by 2030 (Figure D8 and Figure D9). A small population size and low number of births per year mean the maternal mortality ratio should be interpreted with caution.



**Figure D7. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right)**



**Figure D8. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

#### D.5. Vanuatu

In 2019, Vanuatu had a population of 299,000, including 75,000 women of reproductive age, and an estimated 7,500 births, 89% of which occurred in health facilities. The 2013 Demographic and Health Survey estimated a 38% contraceptive prevalence rate (modern and traditional methods), 24% unmet need for family planning and a total fertility rate of 3.2. The maternal mortality ratio for 2019 was an estimated as 72 deaths per 100,000 live births (1), almost meeting SDG target 3.1 on reducing maternal deaths to less than 70 per 100,000 live births.

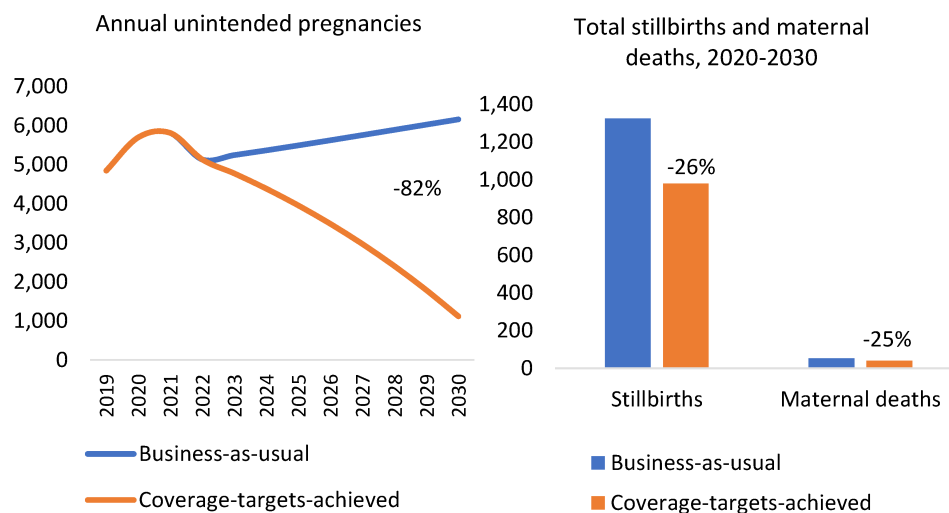
Vanuatu's population growth rate of 2.4% is the highest in the Pacific region (26). This, combined with a high fertility rate, results in a relatively large number of adolescent girls and adult women leaving the workforce during

childbearing and rearing periods, which imposes significant burdens on Vanuatu's economy, according to its 2017-2020 Reproductive, Maternal, Newborn Child and Adolescent Health Policy and Implementation Strategy (27). Improved access to family planning could ease this burden and increase (young) female participation in the workforce.

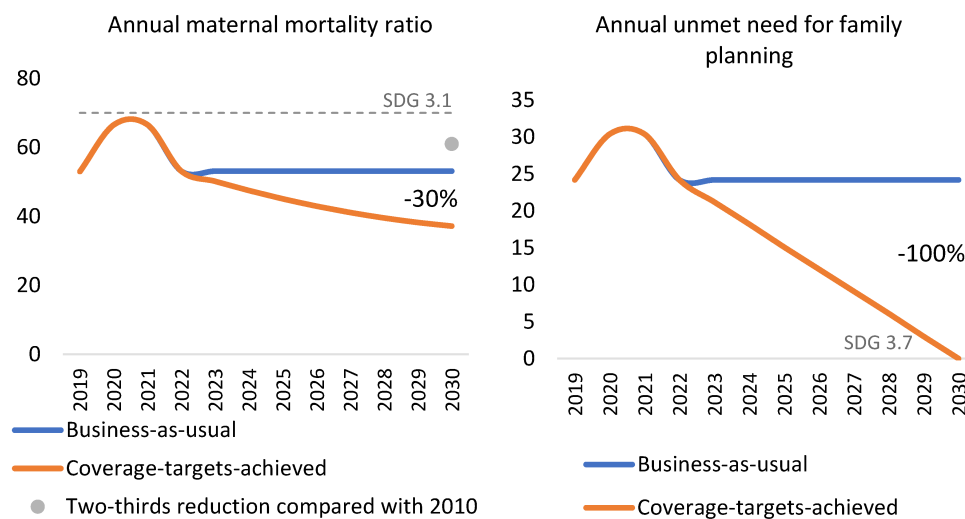
The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, predicted 62,190 unintended pregnancies, 1,324 stillbirths and 53 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 53 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Vanuatu could prevent an additional 20,681 unintended pregnancies (33% more, 15% of all pregnancies), 346 stillbirths (26% more), and 13 maternal deaths (25% more) between 2020 and 2030 (Figure D9), with the projected 2030 maternal mortality ratio falling to 37 deaths per 100,000 live births (Figure D10).

If the coverage targets were reached, Vanuatu could achieve SDG target 3.7 on universal access to sexual and reproductive health services, as well as the additional target of reducing the maternal mortality ratio by two thirds from 2010 levels by 2030 (Figure D9 and Figure D10). A small population size and a low number of births per year mean the maternal mortality ratio should be interpreted with caution.



**Figure D9. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**



**Figure D10. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to a small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

## E. Results for countries in the Caribbean

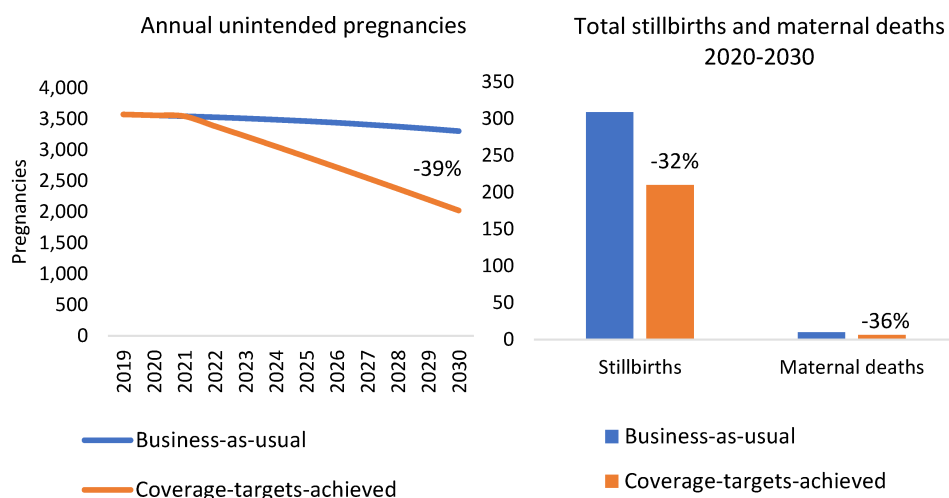
### E.1. Barbados

In 2019, Barbados had a population of 301,000, including 70,000 women of reproductive age, and an estimated 3,400 births, all of which occurred in health facilities. In the 2012 Multiple Indicator Cluster Survey it was reported that there was an estimated 59% contraceptive prevalence rate (modern and traditional methods), 20% unmet need for family planning, and a total fertility rate of 1.7 for Barbados. The maternal mortality ratio for 2019 was an estimated 27 deaths per 100,000 live births (1).

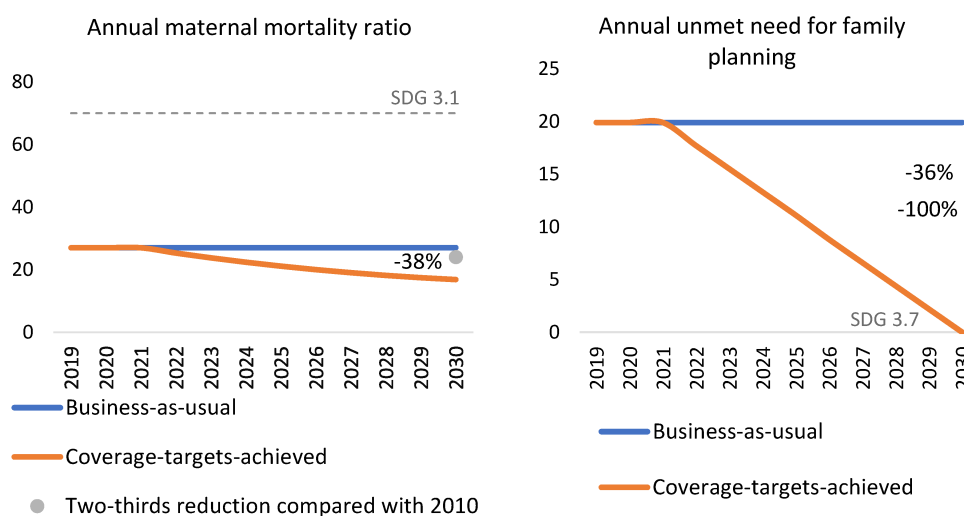
For the business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19-related disruptions, 37,964 unintended pregnancies, 309 stillbirths, and 10 maternal deaths were predicted between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 27 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Barbados could prevent an additional 6,447 unintended pregnancies (17% more, 10% of all pregnancies), 99 stillbirths (32% more), and 3 maternal deaths (36% more) between 2020 and 2030 (Figure E1), with the projected maternal mortality ratio falling to 17 deaths per 100,000 live births (Figure E2).

If the coverage targets were reached, Barbados could achieve SDG target 3.7 on universal access to sexual and reproductive health services, as well as the target for reducing the maternal mortality ratio by two thirds from 2010 levels by 2030 (Figure E1 and Figure E2). A small population size and a low number of births per year means the maternal mortality ratio should be interpreted with caution.



**Figure E1. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right)**



**Figure E2. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right).** Due to small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

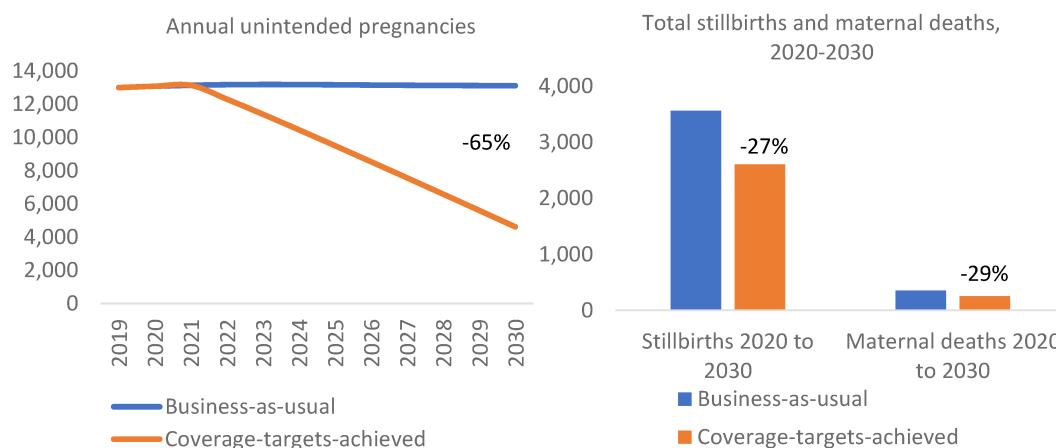
### E.2. Guyana

In 2019, Guyana had a population of 851,000, including 223,000 women of reproductive age, and an estimated 19,000 births, 93% of which occurred in health facilities. The 2014 Multiple Indicator Cluster Survey estimated a 34% contraceptive prevalence rate (modern and traditional methods), 28% unmet need for family planning and a total fertility rate of 2.6. The Maternal Mortality Estimation Inter-Agency Group (1) estimated that the maternal mortality ratio was 169 deaths per 100,00 live births in 2019.

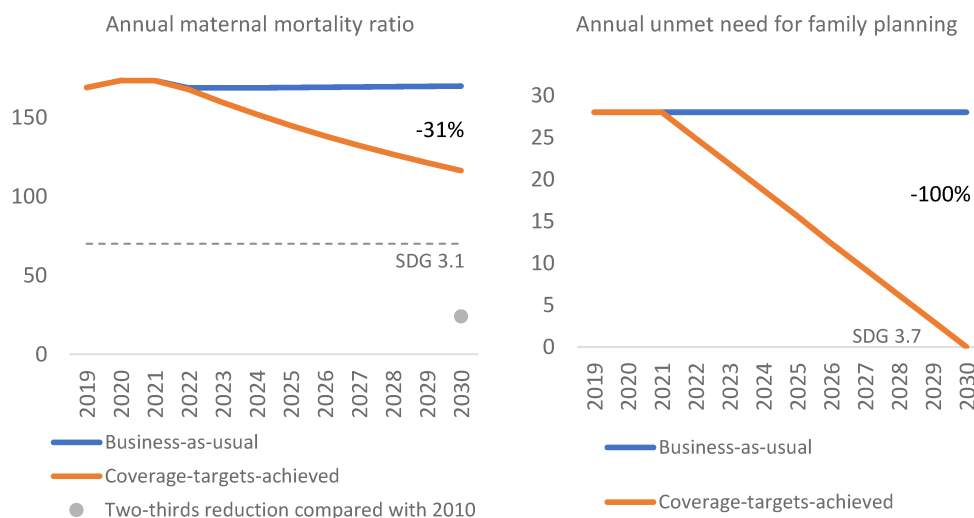
For the business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, 144,510 unintended pregnancies, 3,562 stillbirths, and 353 maternal deaths were predicted between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 170 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Guyana could prevent 41,793 unintended pregnancies (29% more, 12% of all pregnancies), 955 stillbirths (27% more), and 102 maternal deaths (29% more) between 2020 and 2030 (Figure E3), with the projected 2030 maternal mortality ratio falling to 116 deaths per 100,000 live births (Figure E4).

If the coverage targets were reached, Guyana could achieve SDG target 3.7 on universal access to sexual and reproductive health services. While Guyana is not projected to reach SDG target 3.1 even if the coverage targets are achieved (because of a high estimated maternal mortality ratio in 2019), a 31% reduction in the projected 2030 maternal mortality ratio could be achieved (Figure E3 and Figure E4). A small population size and a low number of births per year mean the maternal mortality ratio should be interpreted with caution.



**Figure E3. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**





**Figure E4. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to a small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

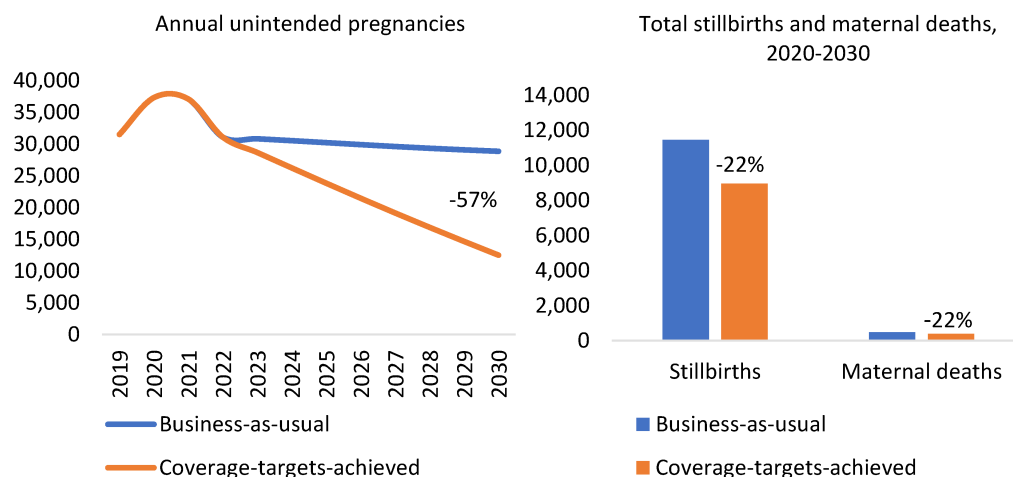
### E.3. Jamaica

In 2019, Jamaica had a population of 3,071,000, including 820,000 women of reproductive age, and an estimated 57,000 births, 99% of which occurred in health facilities. The 2011 Multiple Indicator Cluster Survey estimated a 40% contraceptive prevalence rate (modern and traditional methods), 10% unmet need for family planning and a total fertility rate of 2.2. The Maternal Mortality Estimation Inter-Agency Group (1) estimated the maternal mortality ratio at 80 deaths per 100,000 live births in 2019.

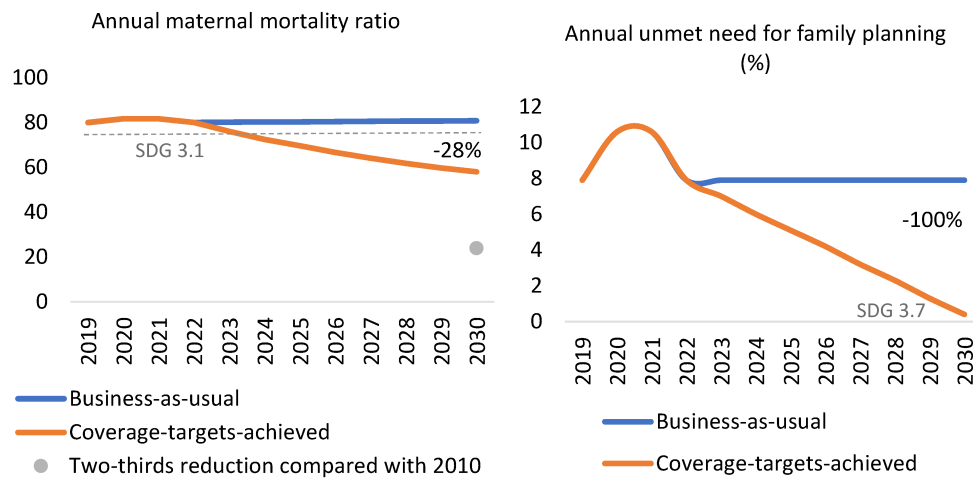
The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19, predicted 343,719 unintended pregnancies, 11,436 stillbirths, and 490 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 81 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Jamaica could prevent 75,003 unintended pregnancies (22% more, 9% of all pregnancies), 2,487 stillbirths (22% more), and 106 maternal deaths (22% more) between 2020 and 2030 (Figure E5), with the projected 2030 maternal mortality ratio falling to 58 deaths per 100,000 live births (Figure E6).

If the coverage targets were reached, Jamaica could achieve SDG target 3.7 on universal access to sexual and reproductive health services, and SDG target 3.1 on reducing maternal deaths to less than 70 per 100,000 live births (Figure E5 and Figure E6). A small population size and a low number of births per year means the maternal mortality ratio should be interpreted with caution.



**Figure E5. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**



**Figure E6. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to a small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

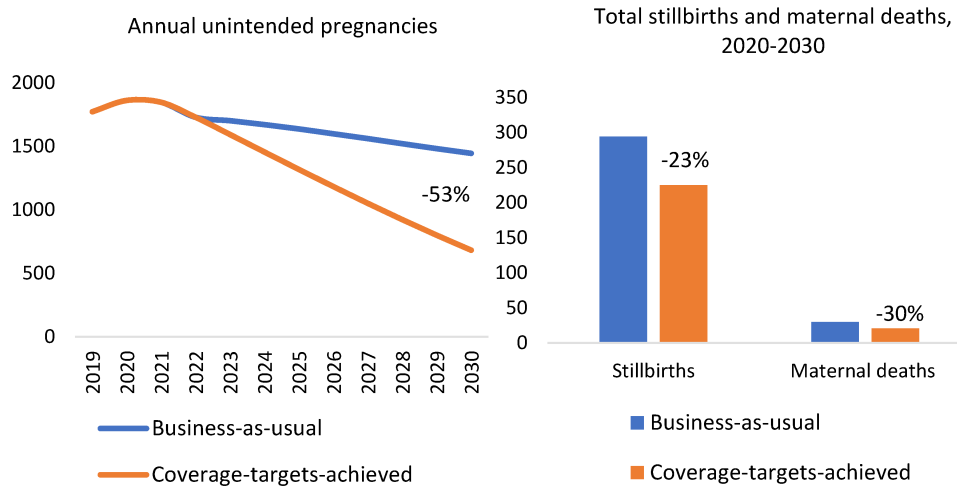
#### E.4. Saint Lucia

In 2019, Saint Lucia had a population of 186,000, including 52,000 women of reproductive age, and an estimated 2,400 births, all of which occurred in health facilities. In the 2012 Multiple Indicator Cluster Survey it was reported that there was an estimated 55% contraceptive prevalence rate (modern and traditional methods), 17% unmet need for family planning and a fertility rate of 1.4. The Maternal Mortality Estimation Inter-Agency Group (1) estimated the maternal mortality ratio at 117 deaths per 100,000 live births in 2019.

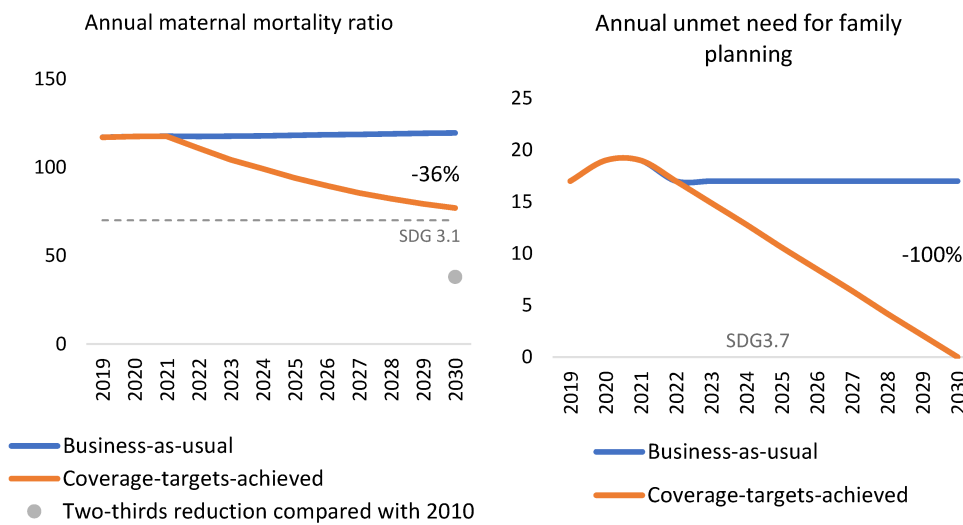
The business-as-usual coverage scenario with estimated 2019 coverage levels maintained until 2030, incorporating any reductions in 2020 and 2021 due to COVID-19 disruptions, predicted 18,056 unintended pregnancies, 294 stillbirths, and 30 maternal deaths between 2020 and 2030, with the 2030 maternal mortality ratio projected to be 119 deaths per 100,000 live births.

Achieving 95% coverage of maternal health interventions and zero unmet need for family planning by 2030 in Saint Lucia could prevent an additional 3,613 unintended pregnancies (20% more averted, 9% of all pregnancies), 69 stillbirths (23% more), and 9 maternal deaths (30% more) between 2020 and 2030 (Figure E7), with the projected 2030 maternal mortality ratio falling to 77 deaths per 100,000 live births (Figure E8).

If the coverage targets were reached, Saint Lucia could achieve SDG target 3.7 on universal access to sexual and reproductive health services. While Saint Lucia is not projected to reach SDG target 3.1 even if the coverage targets are achieved, given a high estimated maternal mortality ratio in 2019, a 36% reduction in the projected 2030 maternal mortality ratio could be achieved (Figure E7 and Figure E8). A small population size and a low number of births per year means the maternal mortality ratio should be interpreted with caution.

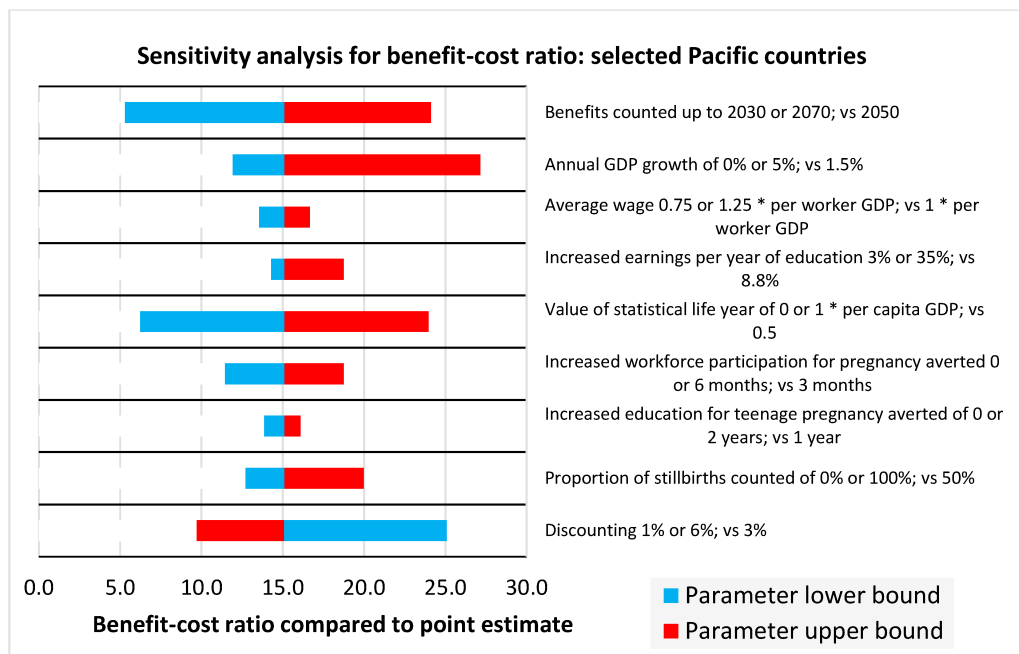


**Figure E7. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on unintended pregnancies (left), and stillbirths and maternal deaths (right)**

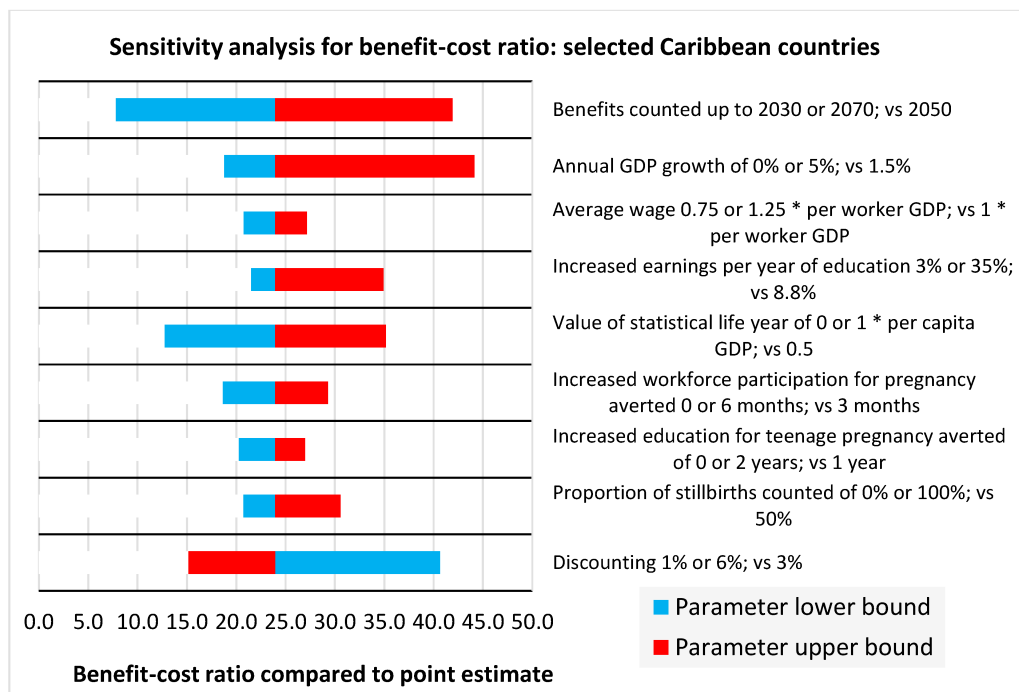


**Figure E8. Impact of achieving coverage targets (95% coverage of maternal health interventions and zero unmet need for family planning) on the maternal mortality ratio (left) and unmet need for family planning (right).** Due to a small population size and a low number of births per year, the maternal mortality ratio should be interpreted with caution.

**F. Sensitivity analysis**



**Figure F1: Sensitivity analysis of benefit cost ratios parameters for select countries in the Pacific**  
 Values are aggregated for Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu.



**Figure F2. Sensitivity analysis of parameters for benefit cost ratios for select countries in the Caribbean**  
 Values are aggregated for Barbados, Guyana, Jamaica, and Saint Lucia.

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