

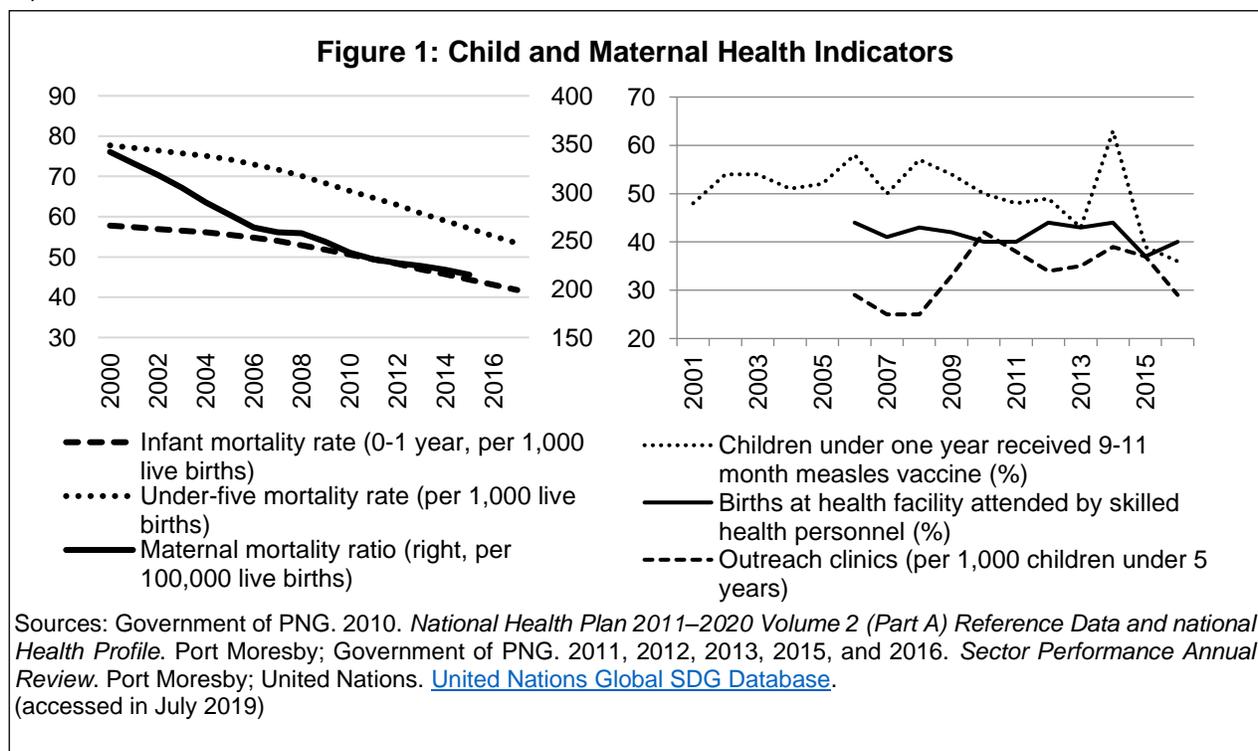
PROGRAM IMPACT ASSESSMENT

I. Introduction

1. This program impact assessment summarizes expected impact of the Health Services Sector Development Program on the economy of Papua New Guinea (PNG), focusing on reforms supported under Subprogram 2 of the policy-based operation. It documents the formulation of the program and reviews existing empirical data related to the outputs under the program to understand its potential impact.

II. Definition of the Problem

2. Despite high economic growth rates averaging 5.4% over 2011–2017 and substantial budget allocations to the health sector since 2011, PNG had the lowest health expenditure per capita and life expectancy in the Pacific region in 2014, at US\$92 per capita and 67 years, respectively.¹ The relatively low life expectancy is linked to high child and maternal mortality rates. The child and maternal health landscape in PNG has shown improvement for the most part since 1990, but the degree of improvement was not enough for the country to achieve its Millennium Development Goals (MDGs) for child and maternal health, covered under MDGs 4 and 5 (Figure 1).



¹ Government of Papua New Guinea. 2015. *Papua New Guinea – Millennium Development Goals Final Summary Report 2015*. Port Moresby; Twelfth Pacific Health Ministers Meeting. 2017. *Report on the progress of the Healthy Islands Monitoring Framework*. Rarotonga. From 2011 to 2015, public health expenditure in PNG averaged 2.8% of gross domestic product (GDP), which is measurably higher than the lower middle-income country group average (1.3% of GDP). As a share of total government expenditure, PNG spent on average 9% on health in 2012–2018. This is substantially higher than the lower middle-income country group average (5.4% in 2013) and higher than Pacific comparator countries like Fiji (7.2% in 2015) and Timor-Leste (4.2% in 2015). World Bank. [World Development Indicators](#). (accessed 30 July 2019); Government of Papua New Guinea. 2019. *2018 Final Budget Outcome*. Port Moresby.

3. **Child health.** Over the period 1990–2015, the under-five mortality rate improved from 89 per 1,000 live births in 1990 to 78 in 2000 and 57 in 2015, but it was still short of the target under MDG 4, *the under-five mortality rate reduced by two-thirds between 1990 and 2015.*² Similarly, the infant (0–1 year) mortality rate decreased from 65 per 1,000 live births in 1990 to 58 in 2000 and 42 in 2017, but further improvement is still greatly needed if it was to meet the Sustainable Development Goals (SDGs) of 12 per 1,000 live births for neonatal mortality and 25 per 1,000 live births for under-5 mortality by 2030.

4. **Maternal health.** PNG's maternal mortality rate (MMR) is one of the highest in the Asia and Pacific region. While positive gains were observed between 1990 and 2015, from 470 to 215 per 100,000 live births, the target for MDG 5, *the maternal mortality ratio reduced by three-quarters between 1990 and 2015*, was not achieved. The high MMR is partially caused by low level of skilled birth attendance with just about 40% of births attended, as compared to above 90% for most countries in the Pacific region. High levels of fertility and teenage pregnancy are also likely contributing factors, and much improvement is needed to reach the SDG target of less than 70 per 100,000 live births by 2030.

5. **Disease outbreaks.** The country experienced a nationwide measles outbreak in 2014, in which more than 2,500 measles cases were confirmed. (Table 1) The proportion of one-year-old children vaccinated against measles stagnated at around 50% between 2001 and 2013, temporarily rose to 63% in 2014 following the outbreak vaccination campaign, and dropped to less than 40% in 2015 and 2016. The slow increase in the vaccine coverage is closely linked with a lagging growth of the number of outreach clinics. As shown in Figure 1, the ratio of rural outreach clinics per 1,000 children under five years has been flat since 2010, which suggests the limited capacity of the health system to provide the rural populations with accessible health services.

Table 1: Measles Incidences in PNG (2011–2015)

Year	Suspected measles cases	Confirmed measles cases	Discarded as non-measles or pending classification
2011	50	0	50
2012	42	0	42
2013	124	9	115
2014	4,660	2,589	2,071
2015	158	53	105

Note: One case was confirmed in 2008 and no case was confirmed in 2009–2012.

Sources: World Health Organization. 2012 and 2016. *Country Profile: Measles Elimination Papua New Guinea*.

http://www.wpro.who.int/immunization/documents/measles_country_profile_apr2012_PNG.pdf

http://www.wpro.who.int/immunization/documents/measles_country_profile_may2016_png.pdf

6. **Provincial variability.** The data on child and maternal health shows significant degree of *regional* variability. It reflects differences across provinces in the availability and quality of health services provided. For instance, the measles vaccine coverage for children under one year old in 2016 is ranging from the highest at 67% in Manus Province to the lowest at 16% in Jiwaka Province.³ By examining the percentage of the supervised births at health facilities, a proxy for maternal mortality, the gap between the National Capital District and other provinces are even more considerable with most of the provinces in the Highlands and Momase regions reporting lower than the national average of 40% in 2016. In ensuring every citizen has access to quality

² United Nations. [United Nations Global SDG Database](#). (Accessed in July 2019)

³ Government of Papua New Guinea. 2017. *Sector Performance Annual Review for 2016*. Port Moresby.

healthcare, as stated in the Alotau Accord II, it is imperative to increase the number of health care facilities with skilled birth attendant in rural areas.

7. The government of PNG has developed various health policies and strategies which emphasize the importance of primary healthcare, improving quality of care, disease prevention, and improving human resources for health.⁴ To successfully implement the strategies and translate them into improved health outcome, however, the sector needs to reprioritize on the high impact and cost effective interventions, and further technical and financial supports are required.

III. Impact, Outcome, and Outputs of the Sector Development Program

8. The impact of the program is affordable, accessible, equitable, and high-quality health services for all citizens of Papua New Guinea. The program is expected to achieve a more sustainable and efficient healthcare system as the effect of the reform. It will be reflected in the increase in (i) the average annual provincial health expenditure as a proportion of estimated need to at least 80% for 2023–2024, and (ii) the average annual percentage of months that facilities do not have a shortage of any of eight essential supplies for more than 1 week in any month to at least 85% for 2022–2023.

IV. Impact Analysis

9. The program addresses the aforementioned problem with a multi-sector approach. To improve the effectiveness and quality of public expenditures and provide the foundation for sustainability of health financing, the program supports national level fiscal policy and public financial management (PFM) reforms (reform area 1). More directly, it supports health system management and decentralized health service delivery at subnational and district levels (reform areas 2 and 3). Each of the elements complements the others toward the achievement of a sustainable and efficient healthcare system.

a. Impact of Reform Area 1: Enhanced National Frameworks and Public Financial Management

10. The reform actions under Subprogram 2 to enhance national public expenditure management system include: (i) delivery of the 2019 national budget by the Department of Treasury (DOT) that maintains the fiscal targets outlined in the Medium Term Fiscal Strategy (MTFS) and safeguards funding for essential health service delivery, (ii) amending the legal framework for public financial management by the Department of Finance (DOF), (iii) implementation of improved budget processes, and (iv) DOF's approval of an implementation plan for the Procurement Act and launch of a public procurement website to provide transparency of tenders and awards.

11. **MTFS and 2019 budget.** The MTFS, which was approved by the Cabinet under Subprogram 1, targets a balanced budget over the term of the government based on a deficit reduction plan. In line with the MTFS, the 2018 budget started introducing financial management control mechanisms over personnel emoluments to ensure that amounts spent are within the budgeted allocation.⁵ To sustain progress made in 2018, the 2019 budget was developed to

⁴ Government of Papua New Guinea. 2010. *National Health Plan 2011–2020*. Port Moresby; Government of Papua New Guinea. 2013. *Free Primary Health Care and Subsidized Specialist Services Policy*. Port Moresby; and Government of Papua New Guinea. 2013. *Health Workforce "Enhancement Plan"*. Port Moresby.

⁵ Government of Papua New Guinea. 2017. *2018 Budget Strategy Paper*. Port Moresby.

ensure that fiscal fundamentals remain as programmed.⁶ The government is expected to continue implementing greater expenditure prioritization and reallocation of spending from non-essential projects to those effectively promoting economic growth and human development. In that spirit, essential health service delivery will be safeguarded, as free primary health care is one of the high priority expenditure projects of the government. These measures are expected to ensure adequate domestic health financing within a sustainable overall resource envelope.

12. **PEFA assessment.** Along with the improvement in the fiscal framework and aggregate budget allocations, the government is carrying out public financial management (PFM) reforms for better expenditure productivity. In 2014–2015, the IMF and DOF conducted an assessment of PNG's PFM, based on the Public Expenditure and Financial Accountability (PEFA) framework.⁷ Key areas for improvement and proposed reform measures are summarized in the Public Expenditure and Financial Accountability Road Map 2015-2018 and Assessment report.⁸

13. In the 2015 PEFA assessment, PNG scored relatively well on credibility of fiscal strategy and budget (Pillar I of the PEFA framework) and policy-based planning and budgeting (Pillar IV). (Figure 2) However, in the areas of the quality, availability, comprehensiveness, and timeliness of fiscal accounts (Pillar VI), management of public assets and associated fiscal risks (Pillar III), accountability (Pillars V and VII), and comprehensiveness and transparency (Pillar II), the assessment report suggests that there is considerable scope for improvement.

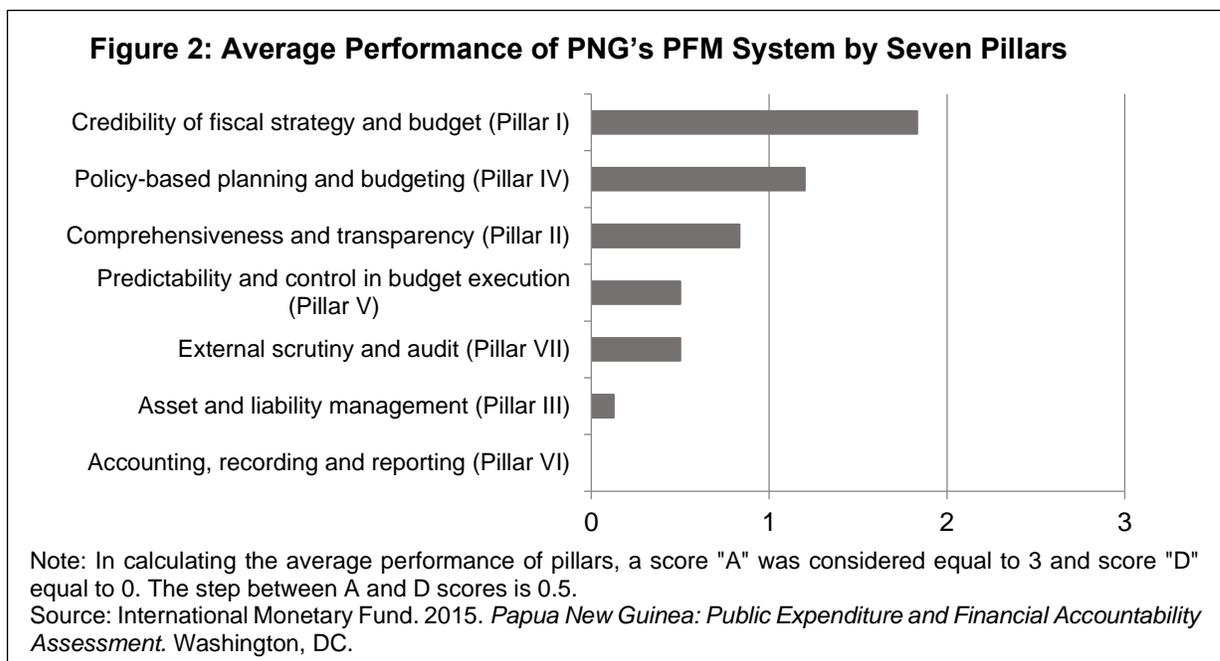
14. **Pillar III: Asset and liability management.** Public asset and liability management is one of the weakest areas in the PFM system of PNG. There are various statutory bodies, fulfilling a range of commercial and social functions, and many of them are several years behind in submitting their annual financial statements and have received audit disclaimers or adverse opinions. PNG scored D on a Pillar III indicator for fiscal risk management (performance indicator [PI]-10).⁹ The indicator assesses the extent to which the government collects information on the fiscal risks that arise from its policies and operations, quantifies those risks and makes information available to the public, and has developed effective strategies to manage the risks. In PNG, as of 2015, there were 138 statutory bodies and 12 state-owned enterprises (SOEs), and they have created substantial fiscal risks due to weak financial management practices. To improve the quality of governance and accountability mechanisms of those entities, one of the key recommendations of the PEFA report was the amendment of the PFM law. Responding to the recommendation, the Parliament has approved an amendment of the Public Finances (Management) Act (PFMA) in August 2016, which replaces the PFMA 1995. This was one of policy actions supported under Subprogram 1 of the program. The coverage of the Act was extended to public and statutory bodies, and those institutions are obliged to manage their resources following the DOF guidelines and provide the services they were intended to deliver as specified in their establishment legislation. The reform will continue in 2019 and over the medium-term. In 2019, Department of Finance (DOF) has (i) reviewed the legal framework for public financial management to identify further gaps in the PFM Act and other relevant legislation in line with the PEFA Road Map and (ii) drafted amendments to legislation.

⁶ Government of Papua New Guinea. 2018. *2019 Budget Strategy Paper*. Port Moresby.

⁷ International Monetary Fund. 2015. *Papua New Guinea: Public Expenditure and Financial Accountability Assessment*. Washington, DC. PEFA is a methodology for assessing public financial management performance. It provides the foundation for evidence-based measurement of countries' PFM systems. It identifies 94 characteristics (dimensions) across 31 key components of public financial management (indicators) in 7 broad areas of activity (pillars). <https://pefa.org/>

⁸ Government of Papua New Guinea. 2015. *Public Expenditure and Financial Accountability (PEFA) Road Map 2015–2018 and Assessment*. Port Moresby. An IMF-led team carries out a new PEFA assessment in the third quarter of 2019, which will form the basis for a new PFM reform road map to succeed the current one.

⁹ From seven possible ratings of A, A-, B, B-, C, C-, and D, from high to low.



15. **Pillar V. Predictability and control in budget execution.** PNG scored D for its *transparency, competition and complaints mechanism in procurement* (PI-23). The indicator assesses how well the procurement system ensures that money is used efficiently and effectively. At the time of assessment, there was neither central monitoring of procurement and nor independent administrative procurement complaint system. To remedy this problem, under Subprogram 2, the DOF has approved an implementation plan for the new Procurement Act that will come into force in 2019 that strengthens the procurement frameworks and provide very clear separation of functions and roles. This is complemented by a public procurement portal that will provide transparency on tenders and contract awards.

16. All these reforms are intended to ensure the long-term fiscal sustainability, which is important in maintaining the adequate level of domestic health financing. There are a growing number of empirical studies on the relationship between the quality of PFM and fiscal outcomes, though there are not many studies directly using the PEFA ratings due to the relatively young history of the methodology. Prakash and Cabezon (2008) analyzed the link between the quality of PFM and fiscal outcomes in Sub-Saharan African countries using data from the PFM assessments for the highly indebted poor countries (HIPC) countries conducted by the IMF and World Bank.^{10,11} They presented empirical evidence that there is a significant correlation between PFM quality and fiscal balances, after controlling for important macroeconomic effects. Especially, the overall balance, both including and excluding grants, is positively and significantly related to the PFM overall score in the HIPC assessments.

17. Some of the 16 indicators in the HIPC assessments are closely related to the expected outcome of the action plans under Subprogram 2, such as composition of the budget entity (indicator 1), use of expenditure tracking surveys (indicator 10), and timeliness of internal budget

¹⁰ T. Prakash and E. Cabezon. 2008. *Public Financial Management and Fiscal Outcomes in Sub-Saharan African Heavily-Indebted Poor Countries*. IMF Working Paper. No. 08/217. Washington, DC: International Monetary Fund.

¹¹ The IMF and World Bank developed a detailed methodology to test PFM systems in countries qualifying for debt relief under the Highly Indebted Poor Countries (HIPC) initiative. HIPC assessments were carried out in 2001 and 2004 in 23 countries.

reports (indicator 12). Reform actions within Subprogram 2, therefore, have potential to positively impact on the overall fiscal balance in PNG.

18. Similarly, Dabla-Norris et al. (2010) constructed multi-dimensional indices of the quality of budget institutions, using several sources of data including PEFA, and investigated whether the quality of budget institutions is associated with desirable fiscal outcomes.¹² Their analysis suggests that strong budget institutions help improve fiscal balances and public external debt outcomes. The results also support that the reform actions under Subprogram 2 on fiscal management are expected to improve the fiscal balance.

b. Impact of Reform Area 2: Strengthened Subnational Health System Management and Reform Area 3: Strengthened Health Service Delivery Components

19. Reform area 2 will support subnational health system management by strengthening institutional arrangements, PFM, and governance. Under Subprogram 2, Department of Health (DOH) has established additional six Provincial Health Authority (PHA), consulted with 11 existing PHAs on updated PHA regulations, and endorsed a PHA manual outlining guidelines for HR, finance, governance and Board procedures. Other reform actions achieved include: the Parliament's approval of FY2019 budget showing direct transfers to all existing PHAs; establishment of separate line items for each PHA in the PHA budget for FY2019 to cover basic maintenance on hospitals and lower level facilities; preparation of comprehensive FY2019 budgets for all the established PHAs, actions to strengthen accounting and reporting of PHAs, and internal and external scrutiny on health sector expenditure.

20. Reform area 3 supports effective delivery of quality health services through improved availability of medical supplies and supporting new partnerships. Under Subprogram 2, Secretary of Health has endorsed a standard operating procedure for uninterrupted supply of medicines and drugs; DOH has developed a revised drug catalogue; and Secretary of Health has approved a framework for ongoing monitoring of the number and scope of agreements at the provincial and national level.

21. The economic rationale for investing in primary health care is strong for several reasons. The major direct costs of disease that could be saved by provision of health care services include: (i) the loss of healthy life expectancy and adult earning power due to the combination of premature and preventable deaths and chronic disability; (ii) the costs of medical treatment contributing to potential catastrophic out-of-pocket expenditures, which can significantly impact the consumption of other necessities and push families into poverty; and (iii) the opportunity costs of caretakers for sick family members.¹³ Broader benefits of public health interventions are also discussed in the literature, such as increased productivity from improved physical and cognitive development during childhood development. To estimate the potential impact of health system improvements, we can assess the economic benefits that would accrue from reducing these disease-induced losses. For illustrative purposes, focusing on the costs associated with loss of healthy life

¹² E. Dabla-Norris, R. Allen, L. F. Zanna, T. Prakash, E. Kvintradze, V. Lledo, I. Yackovlev, and S. Gollwitzer. 2010. Budget Institutions and Fiscal Performance in Low-Income Countries. IMF Working Paper. No. 10/80. Washington, DC: International Monetary Fund.

¹³ See, for example, the following studies; D. E. Bloom, D. Canning, and M. Weston. 2005. *World Economics*. Vol.6. No.3. pp.15–39; T. Barnighausen, et al. 2011. Rethinking the benefits and costs of childhood vaccination: The example of the *Haemophilus influenzae* type b vaccine. *Vaccine* 29, pp. 2371–2380.

expectancy, the economic losses are calculated as the summation of losses associated with each year of life lost due to disease, in the form of Disability-adjusted life year (DALY).

22. DALY is a measure to quantify the burden of disease from associated morbidities and mortalities. DALYs for a disease or health condition are calculated as the sum of the years of life lost due to premature mortality and the years lost due to disability in the population. Table 2 summarizes the estimated deaths, under-five deaths, and DALYs lost attributed to communicable diseases, maternal, perinatal, and nutritional conditions in PNG in 2016.¹⁴

23. One way to illustrate the costs of disease is to convert DALYs into monetary terms to approximate the aggregate economic cost to the society. An estimate of the monetary value of one DALY is usually equal to at least one times the average national income per capita, and often its multiple is used.¹⁵ The WHO's Commission on Macroeconomics and Health suggests that, "each DALY would be valued at a multiple of annual income, perhaps three times current income."¹⁶ To be conservative, one times and two times the average national income are used in this document. The annual number of lost DALYs due to each disease are multiplied by per capita income to get a conservative estimate of the aggregate economic loss. For instance, WHO estimates that 78,300 DALYs were lost due to neonatal sepsis and infections in PNG in 2016, thus using the gross national income (GNI) per capita of approximately \$2,500 (in 2016 US Dollars), the total cost of neonatal sepsis and infections would be valued at about \$197 million or equivalent to 0.97 percent of the GNI of PNG.¹⁷ Assuming we value each DALY at twice the per capita income, the total cost would be equivalent to 1.9 percent of the GNI.

Table 2: Estimated Deaths, Years of Life Lost, Years Lost Due to Disability, and DALYs by Communicable Diseases, Maternal, Perinatal and Nutritional Conditions, 2016 ('000)

Cause	Deaths	Deaths under age five	Years of life lost	Years lost due to disability	DALYs
A. Infectious and parasitic diseases, total ^a	11.2	3.3	634.2	99.3	733.5
Of which: Tuberculosis	33.4	0.0	118.8	1.9	120.7
Of which: Childhood-cluster diseases	0.2	0.1	18.2	0.3	18.5
i. Whooping cough	0.0	.	1.7	0.3	2.0
ii. Diphtheria	0.0	0.0	0.1	0.0	0.1
iii. Measles	0.1	0.1	11.8	0.1	11.9
iv. Tetanus	0.1	0.0	4.6	0.0	4.6
Of which: Malaria	2.9	1.5	215.6	3.2	218.8
B. Respiratory Infectious	4.0	1.9	238.9	11.6	250.5
C. Maternal conditions	0.3	.	19.1	0.5	19.6
D. Neonatal conditions	4.5	4.5	409.8	11.8	421.6
1. Preterm birth complications	1.8	1.8	160.9	8.4	169.2
2. Birth asphyxia and birth trauma	1.6	1.6	142.9	1.0	143.9
3. Neonatal sepsis and infections	0.8	0.8	77.4	0.9	78.3

¹⁴ World Health Organization. [Global Health Estimates 2016 Summary Tables](#). Geneva. (accessed July 2019).

¹⁵ H. G. Eichler, S. X. Kong, W. C. Gerth, P. Mavros, and B. Jönsson. 2004. "Use of Cost-Effectiveness Analysis in Health-Care Resource Allocation Decision-Making: How Are Cost-Effectiveness Thresholds Expected to Emerge?" *Value in Health* 7 (5): 518–528; A. J. Stein. 2013. Rethinking the Measurement of Undernutrition in a Broader Health Context: Should We Look at Possible Causes Actual Effects? IPFRI Discussion Paper 01298. Washington, DC: International Food Policy Research Institute.

¹⁶ J. Sachs, et al. 2001. *Macroeconomics and Health: Investing in Health for Economic Development*, Report of the Commission on Macroeconomics and Health. Geneva: World Health Organization.

¹⁷ Nominal GNI of Papua New Guinea in 2016 was approximately \$20.3 billion. World Bank. [World Development Indicators](#). (accessed July 2019)

Cause	Deaths	Deaths under age five	Years of life lost	Years lost due to disability	DALYs
4. Other neonatal conditions	0.3	0.3	28.6	1.6	30.2
E. Nutritional deficiencies	0.4	0.2	20.1	57.8	77.9
Communicable, maternal, perinatal and nutritional conditions (Total of A-E)	20.3	9.8	1,322.1	181.0	1,503.2
Population	8,085	1,033			

DALY = Disability-adjusted life year.

^a *Infectious and parasitic diseases, total* contains numbers associated with the following diseases: (1) tuberculosis, (2) STDs excluding HIV, (3) HIV/AIDS, (4) diarrhoeal diseases, (5) childhood-cluster diseases (whooping cough, diphtheria, measles, and tetanus), (6) meningitis, (7) encephalitis, (8) hepatitis, (9) parasitic and vector diseases, (10) intestinal nematode infections, (11) leprosy, and (12) other infectious diseases.

Source: World Health Organization. [Global Health Estimates 2016 Summary Tables](#). Geneva. (accessed in July 2019)

24. In this way, the economic losses from other communicable, maternal, perinatal and nutritional conditions can be estimated. Table 3 summarizes the estimated costs of (i) tuberculosis, (ii) childhood-cluster infectious and parasitic diseases, including measles, (iii) malaria, (iv) maternal conditions, and (v) neonatal conditions, expressed in percentage of GNI in 2016. This table includes the health conditions that the Program will potentially benefit given the primary health care focus of reforms, although not discounting its potential impact on other health conditions. The table shows the estimated upper limits of the impacts of an improvement of communicable, maternal, perinatal and nutritional conditions, and does not imply the total elimination of each condition through the Program.

25. Analysis showed that if the total DALYs lost by these conditions had been lowered by only 5 percent, the total economic cost of 0.5–1.0 percent of the GNI could have been saved in 2016.¹⁸ Note that these cost estimates do not consider the effects of the disease other than the loss of healthy life expectancy, such as medical and non-medical cost savings, or opportunity costs of caretaking activities. Non-communicable disease burden are also not included in the estimates, although the longer term effects of established health infrastructures and strengthen health systems can also be beneficial for the treatment and prevention of common non-communicable diseases such as cardiovascular diseases, diabetes mellitus, respiratory diseases and injuries.

Table 3: Estimated Costs of Communicable, Maternal, Perinatal and Nutritional Conditions, 2016 (% of GNI)

Cause	DALYs ('000)	Multiplier applied to per capita income = 1	Multiplier applied to per capita income = 2
A. Infectious and parasitic diseases			
Tuberculosis	120.7	1.49%	2.99%
Childhood-cluster diseases	18.5	0.23%	0.46%
i. Whooping cough	2.0	0.02%	0.05%
ii. Diphtheria	0.12	0.00%	0.00%
iii. Measles	11.9	0.15%	0.29%
iv. Tetanus	4.6	0.06%	0.11%
Malaria	218.8	2.71%	5.41%

¹⁸ Equivalent to 5% of 9.88% and 19.77%. A 10% and 20% reduction could result in total economic cost savings of 1.0–2.0% of GNI and 2.0–4.0% of GNI, respectively.

Cause	DALYs ('000)	Multiplier applied to per capita income = 1	Multiplier applied to per capita income = 2
C. Maternal conditions	19.6	0.24%	0.48%
D. Neonatal conditions	421.6	5.21%	10.43%
1. Preterm birth complications	169.2	2.09%	4.19%
2. Birth asphyxia and birth trauma	143.9	1.78%	3.56%
3. Neonatal sepsis and infections	78.3	0.97%	1.94%
4. Other neonatal conditions	30.2	0.37%	0.75%
Total	799.2	9.88%	19.77%

DALY = Disability-adjusted life year.

Sources: ADB estimates and World Health Organization. [Global Health Estimates 2016 Summary Tables](#). Geneva. (accessed in July 2019)