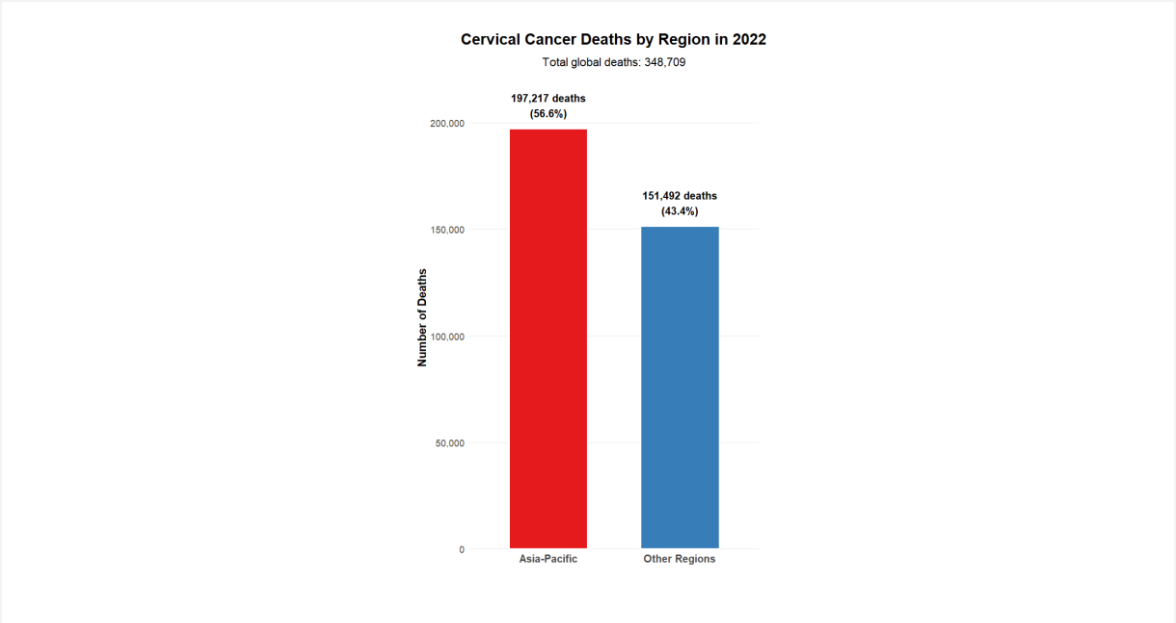
Section B - Background and Rationale for HPV vaccine introduction in PNG

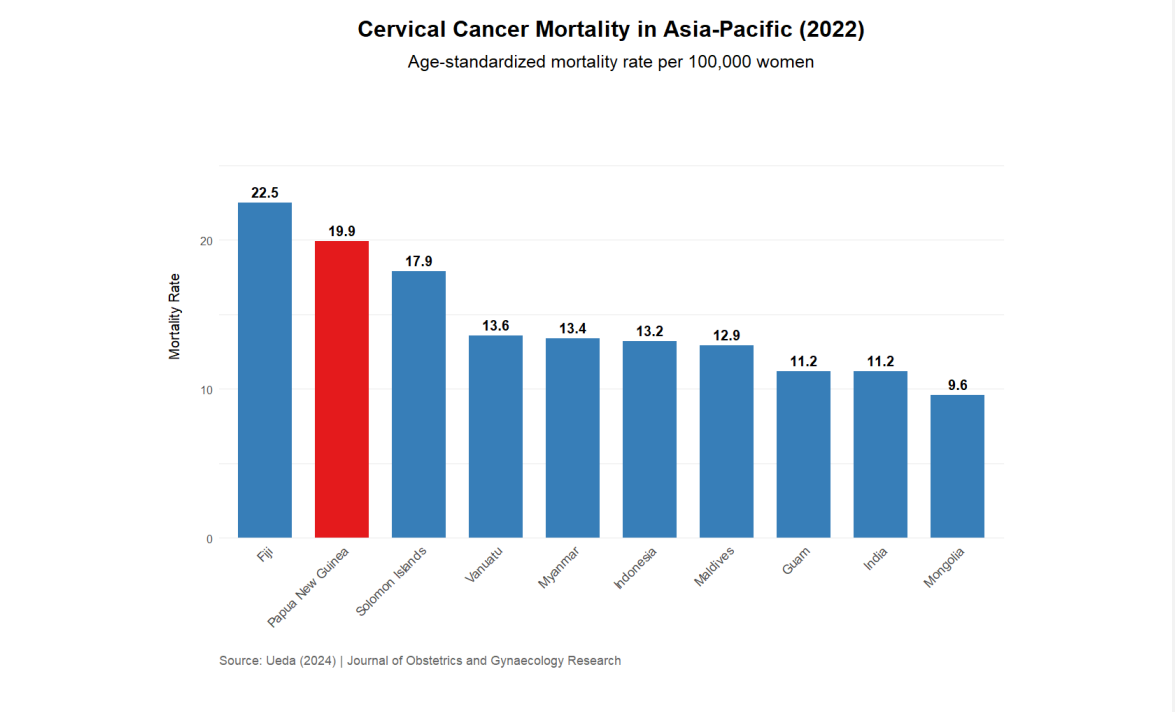
B.1 Disease burden of cervical cancer in PNG

According to the Global Cancer Observatory (GCO) report, an estimated 348,709[1] women died from Cervical Cancer, globally, in 2022. More than half of these deaths occurred in the Asia-Pacific region. Papua New Guinea, a low-middle-income country in the Western Pacific region, has the second highest age-standardized cervical cancer mortality rate in the region, at an estimated 19.9[2] per 100,000 women, and is the 12th highest globally, making it a major public health concern.



[1] Global Cancer Observatory (GCO, 2022): https://gco.iarc.fr/en/projects#database

[2] Epidemiology of cervical cancer and HPV infection in Asia and Oceania (2024): https://obgyn.onlinelibrary.wiley.com/doi/10.1111/jog.15943?af=R



Cervical cancer is the 2nd most common cancer in women of all ages in Papua New Guinea, with an estimated 1,053 new cases per year[3]. However, the disease burden is likely to be an underestimate as there is currently no national screening program for cervical cancer in the country.

The research findings above highlight the urgency and need for a coordinated effort to introduce the HPV vaccine as the primary preventative care into the National immunisation program, alongside a nationwide cancer screening program in PNG and improved access to treatment options. Furthermore, the Senior Executive Management (SEM) officially recommended the introduction of the HPV vaccine in the March 2024 meeting, based on the evidence of the disease burden and statistical modelling presented. PNG is also a signatory to the regional Western Pacific Region 2023-2030 framework for cervical cancer elimination, a key pillar of which is the introduction of the HPV vaccine.

Papua New Guinea is also uniquely prepared to leverage its past experiences piloting the HPV vaccine in several provinces (National Capital District and Western Highlands) to effectively scale and introduce the HPV vaccine for 9-14 year old girls. These earlier and ongoing efforts showcase the country's ability to conduct immunisation campaigns that target the adolescent age cohort.

B.2 Equity implications and projected lives saved by HPV vaccination

Analyses comparing cancer burdens across the region show that PNG has the highest cervical cancer incidence and mortality rates in the Asia-Pacific, with an incidence roughly five times higher than Australia, and contributing to many preventable deaths each year.

This heavy burden is fundamentally a problem of health inequity because most cases are diagnosed at late stages, when curative treatment is far less effective or simply unavailable. Also, access to radiotherapy, chemotherapy and specialist oncology services is extremely limited, particularly for

[3] Globocan PNG Factsheet, 2022 : https://gco.iarc.who.int/media/globocan/factsheets/populations/598-papua-new-guinea-fact-sheet.pdf

women outside Port Moresby and a few referral centres. Lastly, women with cervical cancer are often in their 30s, 40s and 50s - prime ages for child-rearing, caregiving and income generation. Their illness and premature death therefore have large ripple effects on children, families and communities.

UNFPA and IARC analyses further suggest that, without significant scale-up of prevention, screening and treatment, at least an estimated 60,232 women in PNG could die from cervical cancer by 2070. However, Gavi also estimates that HPV vaccination translates to 17.4 deaths averted per 1,000 vaccinated[4]. This underscores the critical need for a nationwide effort to introduce the HPV vaccine and address the cervical cancer burden in PNG, especially in light of limited screening and treatment options.

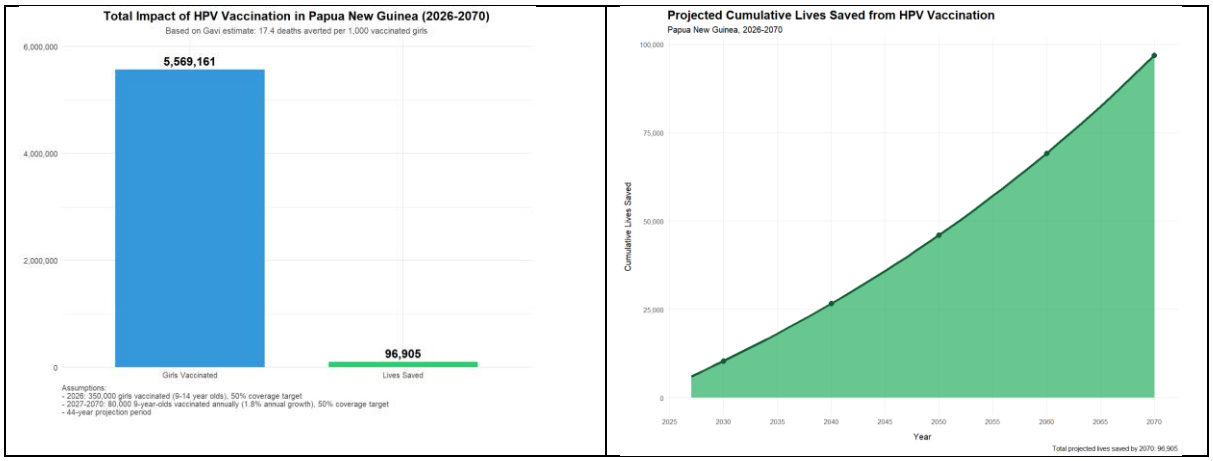


Figure 1: Projections of Lives Saved (2026-2070) based on Gavi estimate of 17.4 deaths averted for every 1000 girls vaccinated. R code used to generate charts, available here: https://github.com/bk-advisors/hpv-png/blob/main/R/sandbox/png-hpv-rationale.R

From an equity perspective, failing to act means that rural women, poorer women and women outside major centers continue to bear a disproportionate share of an entirely preventable disease. Introducing HPV vaccination is therefore not only a technical immunization decision; it is a gender, equity and social justice decision.

B.3 Economic and fiscal rationale for HPV vaccination

Introducing HPV vaccine in PNG must be justified not only on health grounds but also on economic and fiscal grounds, especially given tight fiscal space and competing budget pressures.

B.3.1 Global evidence on cost-effectiveness

Multiple systematic reviews of HPV vaccination in low and middle-income countries (LMICs) conclude that: 1) HPV vaccination is highly cost-effective in almost all LMIC settings, especially where cervical cancer incidence is high and screening coverage is low; 2) In many scenarios, HPV vaccination is cost-saving once avoided treatment costs and productivity gains are included; and 3)

[4] Gavi HPV Impact Report, 2022: https://www.gavi.org/types-support/vaccine-support/human-papillomavirus#:~:text=HPV%20vaccine%20has%20among%20the,strategy%20for%20cervical%20cancer%20elimination.

Combining HPV vaccination with even modest levels of screening and treatment is among the most cost-effective cancer control strategies available.

These findings are echoed in global modelling of the WHO elimination strategy, which estimates that achieving the 90-70-90 targets in high-burden countries is cost-effective in over 95% of settings and yields substantial economic returns due to improved female labour force participation.

B.3.2 PNG-specific economic analyses

PNG-specific modelling carried out by UNFPA for the cervical cancer elimination initiative estimates that:

- Implementing the WHO elimination strategy (including HPV vaccination, screening and treatment) would save around 148,000 women's lives between 2020 and 2120.
- For PNG, the elimination strategy would require around USD 20-21 million over the first 10 years, but would generate an estimated USD 19 in economic return for every USD 1 invested over 30 years, rising to USD 61.32 per USD 1 over a 50-year horizon.
- Even a scenario with vaccination alone (without full scale-up of screening and treatment) is projected to save over 100,000 lives by 2120 and deliver a positive return on investment, though with a slower path to full elimination.

The UNFPA country brief similarly concludes that HPV vaccination and cervical cancer screening/treatment are "best buys" in PNG's health sector, given the high disease burden, relatively low programme costs versus treatment costs, and the large productivity impact of keeping women healthy and economically active.

In practical terms, this means that while HPV introduction will add to the immunization and health budget in the short term, it is a fiscally responsible investment when viewed over a medium to long-term horizon. It prevents expensive late-stage cancer care, reduces catastrophic health expenditures for families, and preserves the economic contribution of women.

Notes and References – Section B

i. https://png.unfpa.org/sites/default/files/pub-pdf/cervical_cancer_papua_new_guinea_final.pdf
ii. https://www.ogmagazine.org.au/25/4-25/overview-of-cervical-cancer-in-papua-new-guinea/
iii. https://github.com/bk-advisors/hpv-png/blob/main/R/sandbox/png-hpv-rationale.R
iv. https://gco.iarc.fr/media/elimination_tool/factsheets/598-PNG-papua_new_guinea.pdf
v. https://png.unfpa.org/sites/default/files/pub-pdf/cervical_cancer_papua_new_guinea_final.pdf