

# Evaluating the Impact of HPV Vaccination Programs on Cervical Cancer Prevention: A Multi-Regional Public Health Assessment

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## ABSTRACT

Cervical cancer is one of the most significant problems linked to the health of the population that reflects a comparatively high population rate regarding the presence of access to preventive medical services in the low and middle-income countries. Constant infection by the high-risk Human Papillomavirus (HPV) types has been identified to be the major cause in cervical cancer, and HPV immunization is a very essential measure in prevention of the disease. The present paper assesses how HPV vaccination programs have been effective in prevention of cervical cancer in terms of multi-regional public health situations in North America, Europe, Asia-Pacific, Latin America, and affecting Africa. It utilized a quantitative comparative research design wherein secondary data analysis was utilized by means of information gathered through international health organizations, government reports and peer reviewed literature. The study involved analyzing vaccination coverage, prevalence of HPV infections, occurrence of cervical cancer, mortality rates, and programs impacting on program performance. Its results show that those regions that had large coverage of vaccination had large reduction in HPV infections, cervical cancer occurrence and deaths. North America and Europe recording the best results, Africa recorded relatively low results given the issues of healthcare access and vaccine coverage. This analysis also lays emphasis on the role of the government, the importance of general awareness, and weekly vaccination programs in increasing the effectiveness of vaccination. Generally, the research indicates that HPV vaccination programmes do play a significant role in prevention of cervical cancer as well as in efforts in the world in the quest to eradicate cervical cancer as a concern in societal health.

**Keywords:** HPV Vaccination, Cervical Cancer Prevention, Public Health Assessment, Vaccine Coverage, Women's Health.

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## I. INTRODUCTION

Cervical cancer is one of the most major challenges facing the health issues of the public as far as women are concerned all over the world. The worldwide health reports indicate that cervical cancer is directly linked to the top causes of cancer-associated morbidity and mortality, especially in the low- and middle-income states where the use of preventive healthcare services is usually restricted [1]. On-going infection by human papillomavirus (HPV) of high-risk type, particularly, HPV-16 and HPV-18 has been named as the main cause of cervical cancer. Growing awareness of potent linkage between HPV infection and cervical carcinogenesis has risen and produced exceptionally effective vaccines to ward off HPV-related illnesses. As a result, HPV vaccination has become an essential social health initiative to counteract the incidence of cervical cancer in the population worldwide and enhance the health status of women [2]. Many

countries have established HPV vaccination programmes to protect against infection by the virus before the exposure among adolescents in the past decade. These initiatives have proved to be quite successful in decreasing the infection of HPV, genital warts and the lesions of the precancerous cervix. Nevertheless, the success of vaccination campaigns differs across regions because of the disparities in healthcare infrastructure, immunization coverage, awareness levels, the socioeconomic status, and cultural beliefs about immunization [3]. Whereas certain countries have recorded high vaccination rates, and major rates of HPV-associated dysfunctions, other nations are still struggling with the issue of vaccine hesitancy, finite health care facilities and incompetent public health belief systems. Knowing these differences, it is necessary to conduct an evaluation on the effects of HPV vaccination programs in different regions to understand their effectiveness in cervical cancer prevention. This paper hopes to evaluate the

results of HPV vaccination programs in various geographical locations and analyse the variables that determine the success of the programs. The study aims to offer useful information to the policymakers and other healthcare workers by comparing the results of vaccination, access to healthcare, and cervical cancer prevention. The results should help prove evidence-based approaches to improve vaccination rates and help all nations in the fight against the occurrence of cervical cancer as a prevalent human health issue.

## II. RELATED WORKS

The recent research has emphasized the increased significance of Human Papillomavirus (HPV vaccination program) toward lessening worldwide disease and cervical cancer rates. Scholars have explored the effectiveness of vaccines, vaccination rates, screening rates, barriers to implementation, and the cost-effectiveness of vaccines in various groups and healthcare systems. A retrospective cohort study was designed by Gabriel and Myriam [15] in Israel which aimed at assessing the relationship between HPV vaccination and cervical cancer and precancerous lesions. Their results showed that vaccinated women had much lower chances of having cervical abnormalities than those who were not vaccinated. The paper has solid evidence regarding the effectiveness of HPV vaccination in cervical cancer prevention in the long-term.

Granted, Haddabi et al. [16] evaluated the HPV vaccination coverage and screening attendance at cervical cancer in Iran. As they found, Iran is still lagging behind the goals that are set by the World Health Organization (WHO) in the elimination of cervical cancer. The researchers found the low vaccination coverage and lack of screening attendance as one of the key barriers to effective prevention of cervical cancer. In a similar manner, Joyce et al. [17] observed the effectiveness of COVID-19 pandemic on HPV vaccination campaigns in low and middle-income nations. Among the issues that were pointed out in the review, were the disruptions of vaccination services, decreased access to healthcare, and slowed immunizations, adversely influencing vaccine coverage in most of the regions. Community involvement has emerged as the key to successful vaccination initiatives, as well. Kalulu et al. [18] examined the participatory implementation science strategies within Nigeria and reported that community based interventions were associated with a significant enhancement in knowledge, vaccine acceptance, and sustainability of the program among the adolescent girls. Their work indicates that the process of local stakeholder engagement may empower the effects of vaccination in resource-scarce settings. Economic factors relating to HPV related illness examined Koh

et al. [19] who compared the economic impact of HPV related cancers in New Zealand. Their study found a remarkable amount of healthcare spending on treatment and management of cancers related to HPV, therefore, underlining the cost-effectiveness of preventive vaccination programs. On the same note, Lahdhiri et al. [20] also looked at the issues of HPV DNA screening and vaccination approaches in Tunisia and established that the combination of vaccination and routine screening would monolithically bring down cervical cancer incidence and mortality.

A comprehensive study within the framework of cervical cancer by Lalnunpui et al. [21] talked about the present trends and future perspectives of cancer prevention, screening, and management. The authors made clear the necessity of integrating vaccination and early screening, public awareness and access to health care to attain disease control on a long-term basis. The healthcare provider was discussed as another method of cervical cancer prevention in the studies by Lamanna et al. [22] and Lamanna et al. [23] who investigated the impact of oncology nurses through the release of screening programs related to cervical cancer. Their works emphasized the importance of nursing education, screening promotion, and vaccination advocacy of the nurses. Over the past few years, screening among underserved groups has become a more and more relevant issue. Lee-Foon et al. [24] examined the determinants of HPV self-sampling/uptake amongst Black women and cervix in Ontario, Canada. Their qualitative study traced the cultural, social, and healthcare-related issues that have an influence on the engagement in screening programs. Also, in their study Li et al. [25] and Li et al. [26] scoped HPV-related data systems in China highlighting the importance of comprehensive surveillance systems to facilitate vaccination surveillance, disease surveillance, and evidence-based decision-making about population health. All these studies prove that HPV vaccination is an effective measure of cervical cancer prevention. Nevertheless, this implementation can only be successful with several conditions, such as the accessibility of healthcare, the awareness of the population, the engagement of the population on screening, the support of the policy, and the health informational systems. Preliminary studies have mainly been limited to individual countries or specific interventions, whereas the current study creates a multi-regional evaluation on HPV vaccination programs and their influence on the prevention rates of cervical cancer in the context of the diverse public health settings.

## III. METHODS AND MATERIALS

### A. Research Design

The study design adopted a quantitative, comparative and descriptive research design to determine the effect of Human Papillomavirus (HPV) vaccination program on cervical cancer prevention in several geographical areas. A second-level data analysis strategy was embraced to evaluate the fertility of vaccination programs that were followed in other countries and healthcare systems [4]. This research aimed at investigating the correlation of HPV coverage and outcomes of cervical cancer prevention such as a decrease of HPV infection, precancerous lesions of the cervix, and the occurrence of cervical cancer. The comparative design allowed detecting differences in the effectiveness of vaccination in the regions that had their healthcare infrastructures, economic conditions, and public health strategies that differed.

The study employed publicly available epidemiological and health-based data sets of international organizations and the government. The chosen method enabled both gathering of a large amount of data related to several countries and regions and being cost effective and data available. Additionally, the analyses followed a cross-sectional analytical paradigm in the comparative analysis of the public health indicators relating to the HPV vaccination programs within a defined time [5].

### B. Study Regions

The evaluation involved five geographical areas that reflected the various socioeconomic and health care settings. These areas were chosen due to their different degrees of the implementation of HPV vaccination and the burden of cervical cancer. Areas reviewed in this paper included North America, Europe, Asia-Pacific, Latin America and Africa. The comparison of these areas offered some good comprehension of the efficiency of vaccination campaigns in various circumstances of poor health and health policy procedures [6].

**Table 1. Selected Regions and Study Characteristics**

Region	Vaccination Program Status	Healthcare Infrastructure	Expected Coverage Level
North America	Well-established	Advanced	High
Europe	Well-established	Advanced	High

Asia-Pacific	Developing to Advanced	Moderate to Advanced	Moderate to High
Latin America	Expanding	Moderate	Moderate
Africa	Emerging	Limited to Moderate	Low to Moderate

The chosen areas allowed conducting the universal assessment of HPV vaccination activities all over the world and helped define the factors that led to the successful results of cervical cancer prevention.

### C. Data Sources

The research made use only of the secondary sources, such as the reliable international health organizations, governmental and peer-reviewed, scientific literature. Information was acquired by the use of sources like World Health Organization (WHO) information, International Agency of Research on Cancer (IARC) information, Centers of Disease Control and Prevention (CDC) information, GLOBOCAN cancer databases, national immunization reports and published scholarly journals [7].

It boosted the reliability and validity of research findings due to the availability of several data sources. The information obtained included the areas of vaccination coverage rates, HPV prevalence, incidence rates of cervical cancer, mortality rates, accessibility to screening and accessibility to health care [8]. The only data that was used was that published in the latest reporting times to guarantee relevance and accuracy of the analysis.

### D. Inclusion and Exclusion Criteria

There were specific inclusion and exclusion criteria to bring uniformity in data selection.

#### Inclusion Criteria

- Research and reports not older than 2015-2025.
- Information on HPV vaccination efforts among adolescents and youths.
- Research that presents results of vaccination coverage and prevention of cervical cancer.
- Identified national and regional public health reports.
- Scientific journal articles that have been peer reviewed.

#### Exclusion Criteria

- There are studies in which the outcome measures are not quantitative.
- Reports that have missing information on vaccination coverage.

- Multiple data points of a dataset.
- Articles that were not related to prevention of cervical cancer or immunization against HPV.

These were the criteria that only quality and relevant data were incorporated into the analysis.

**E. Variables and Measurements**

The research tools included many independent and dependent variables interrelated with the effectiveness of HPV vaccination [9].

**Independent Variables**

- HPV vaccination coverage rate (%)
- Type of vaccination program
- Healthcare accessibility
- Public awareness initiatives
- Government immunization policies

**Dependent Variables**

- HPV infection prevalence
- Incidence of cervical intraepithelial neoplasia (CIN)
- Cervical cancer incidence rate
- Cervical cancer mortality rate

The chosen variables have provided the opportunity to evaluate the association between the willingness to vaccinate and the outcome with cervical cancer prevention comprehensively [10].

**Table 2. Variables and Measurement Indicators**

Variable Category	Variable	Measurement Unit
Independent	HPV Vaccination Coverage	Percentage (%)
Independent	Healthcare Access	Healthcare Index Score
Independent	Public Awareness	Awareness Program Count
Independent	Immunization Policy Strength	Policy Rating Scale
Dependent	HPV Infection Rate	Cases per 100,000 Population
Dependent	Precancerous Lesions	Cases per 100,000 Population
Dependent	Cervical Cancer Incidence	Cases per 100,000 Women

Dependent	Cervical Cancer Mortality	Deaths per 100,000 Women
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These indicators would give quantifiable parameters of comparing the results of the vaccination programs in various areas.

**F. Data Collection Procedure**

The systematic approach was used to collect data by thoroughly searching the international databases and scientific literature. The keywords containing relevant datasets included: HPV vaccination, cervical cancer prevention, vaccine coverage as well as public health program and HPV epidemiology [11]. Data from various sources have been cross-checked to ensure that there was consistency and limit possible mistakes in reporting.

The gathered data were tabulated into an organized database comprising regional vaccination coverage rates, cancer rates, mortality and healthcare system rates. The process of data cleaning was carried out due to the necessity to eliminate duplicate data and make them complete. The lack of values in data was dealt with by the concept of exclusion in the cases where there was enough information [12].

**G. Data Analysis Techniques**

The collected data were analyzed using descriptive and inferential statistics. The vaccination coverage rates, prevalence of HPV as well as the incidence of cervical cancer were summarized through descriptive statistics in the selected areas. Calculations of mean, percentages and standard deviations were performed to give an overview of the variations across regions [13].

Comparison was done to assess disparities in cervical cancer prevention results between regions with different vaccine coverage levels. The strength and direction of the relationships between HPV vaccination coverage and cervical cancer incidence was identified with the help of correlation analysis. Also, the regression analysis was used to determine the predictive effects of the vaccination rates on the outcome of disease reduction.

The trend analysis was also done to identify the varying numbers of incidences of cervical cancer and prevalence of HPV infection over time since the introduction of the vaccination programs [14]. Statistical results were provided through the use of tables, graphs, and summary of comparison to be interpreted and discussed easily.

**H. Reliability and Validity**

To be reliable in research, the data were taken out of internationally recognized organizations and peer reviewed magazines. There were several independent sources which minimized the chances of bias and increased data consistency. Cross validation analyses

were done across databases to determine differences amongst them.

The validity was enhanced by using standardized indicators which are commonly used in research in the field of public health. The chosen variables were directly proportional to the performance of HPV vaccination and prevention of cervical cancer, which guaranteed their compatibility with the study aims.

**I. Ethical Considerations**

As this study was all done using secondary data, which was taken over the internet on open sources, there was no need of involving any human participants in the study. In turn, there was no need to have informed consent and participant recruitment processes. However, the ethical research principles were followed through correct citation of all sources of data, transparency in reporting data and the absence of any manipulation and misrepresentation of results. The research study adhered to the recommended academic integrity and ethics of research in minuscule health in the secondary level.

**IV. RESULTS AND ANALYSIS**

The section will provide the results of the multi-regional analysis that was carried out to analyze the effectiveness of Human Papillomavirus (HPV) vaccination program in prevention of cervical cancer. This analysis is based on the coverage rate, HPV infection, cervical cancer rates, mortality, and variables that affect program outcomes in five geographical areas: North America, Europe, Asia-Pacific, Latin America and Africa. The results demonstrate that there exist a large number of differences in vaccination results which are directly linked to access to healthcare, audience knowledge and governmental control of immunization [27].

**A. Regional HPV Vaccination Coverage Analysis**

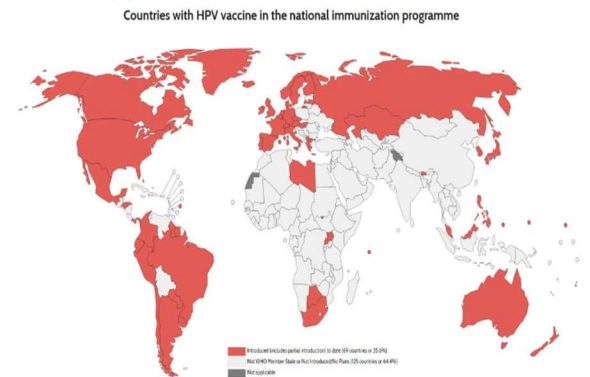
One of the most significant measurements of the level of efficiency of HPV prevention programs is the vaccination coverage. Areas where more people were vaccinated proved to have better cervical cancer prevention. The table 3 presents a summary of the estimated rates of the vaccination coverage in the chosen regions.

**Table 3. HPV Vaccination Coverage Across Regions**

Region	Female Vaccination Coverage (%)	Male Vaccination Coverage (%)	Overall Coverage (%)
North America	82	74	78

Europe	79	70	75
Asia-Pacific	68	55	62
Latin America	61	48	55
Africa	42	30	36

The outcomes suggest that the greatest total vaccination coverage was obtained in North America (78%), Europe (75%). The areas have enjoyed a good immunization system in place, extensive school based immunization programs and effective public health campaigns. Contrary to this, Africa also had the lowest coverage rate (36%), which is still indicative of persisting issues to do with healthcare accessibility, lack of funding, and awareness among the population. Asia-Pacific showed an average level of vaccination (62%), but there is a high spread between countries. Countries with higher incomes in the region documented an equivalent coverage as Europe and others with lower incomes had significantly lower vaccination coverage. Even the moderate levels of coverage were achieved in Latin America on the basis of the extended national immunization programs and the growing involvement of the governments in the HPV protection activities [28].



**Figure 1: "HPV Vaccination Coverage Across Different Regions"** These results lead to the conclusion that healthcare infrastructure and policy commitment is a critical factor in defining the level of vaccination coverage and consequent level of cervical cancer prevention.

**B. Impact of Vaccination on HPV Infection Rates**

A key aim of HPV vaccination programs is to decrease the level of high-risk HPV infections that cause the development of cervical cancer. The conclusion of the

analysis showed that the coverage of vaccination and the prevalence of HPV infection have an excellent negative association.

**Table 4. HPV Infection Rates by Region**

Region	HPV Infection Rate Before Vaccination (%)	Current HPV Infection Rate (%)	Reduction (%)
North America	18.5	7.2	61.1
Europe	17.8	7.5	57.9
Asia-Pacific	19.3	10.1	47.7
Latin America	20.6	12.9	37.4
Africa	22.4	17.5	21.9

The findings show that there has been a significant decrease in the rates of HPV infection after the enactment of vaccination programs. The greatest decrease was done by North America with an infection prevalence of 61.1 and then Europe with 57.9. These declines can be mostly traced to the high levels of vaccine coverage, and long-term governmental health initiatives.

Rates of infection decreased by 47.7% in the Asia-Pacific region, which was positive even with moderate vaccination coverage in this region. The improvement was significant in Latin America but the rates of infection are still more significant than the rates of infections in North America and Europe [29]. The reduced percentage in Africa was the least (21.9%), indicating a lower rate of vaccination and remains the barrier to vaccine accessibility.

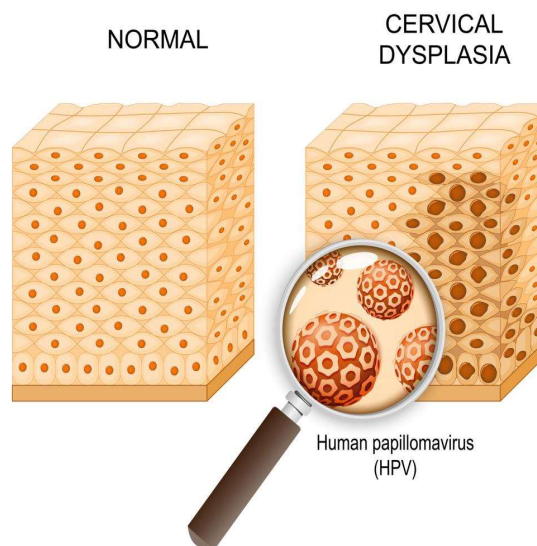


Figure 2: “Mechanism of HPV Infection and Cervical Cancer Prevention”

The results made it very clear that extensive vaccination can easily decrease the spread of HPV and the prevalence of its infection. Moreover, vaccine coverage led to significant decreases in the rates of HPV infection in regions with higher vaccine coverage, which supports the efficacy of the HPV vaccination as an efficient preventive measure against HPV infections.

**C. Cervical Cancer Incidence Following Vaccination Programs**

The end goal of HPV vaccination programs is to reduce the incidence of cervical cancer. The study considered how the rates of cervical cancer cases changed after the introduction of the widespread use of vaccines.

**Table 5. Cervical Cancer Incidence Rates Across Regions**

Region	Incidence Before Vaccination (per 100,000 Women)	Current Incidence (per 100,000 Women)	Reduction (%)
North America	11.2	6.1	45.5
Europe	10.8	6.3	41.7

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Asia-Pacific	15.4	10.3	33.1
Latin America	19.6	14.8	24.5
Africa	28.7	24.6	14.3

The statistics show significant trends of decreases in incidences of cervical cancer in all regions. The greatest relaxation (45.5%) was in North America and Europe recorded a similar relaxation of 41.7%. When these findings are taken into account it can be argued that long-term vaccination programs along with successful screening programs will have a major impact in reducing the occurrence of cervical cancer. The 33.1% decrease in the Asia-Pacific region showed a significant improvement even though countries had varying levels of healthcare growth. Latin America had moderate improvement with Africa being the least improved in terms of reduction in incidence rates. The relative reduction in Africa was relatively low and can be explained by lower vaccine coverage, lack of access to health facilities and national vaccination programs were implemented late.

The findings corroborate that HPV vaccination plays an important role in preventing cervical cancer [30]. Areas that are better-immunized and have greater uptake of vaccinations invariably have lower incidences, and people should ensure that vaccinations are widely adopted.

**D. Analysis of Cervical Cancer Mortality Trends**

Besides decreasing incidences of diseases, effective vaccination programs can reduce mortality rates, as they can prevent the development of advanced cervical cancer. Table 6 shows the trends in mortality regionally.

**Table 6. Cervical Cancer Mortality Rates**

Region	Mortality Before Vaccination (per 100,000 Women)	Current Mortality (per 100,000 Women)	Reduction (%)
North America	4.8	2.3	52.1
Europe	4.5	2.4	46.7

Asia-Pacific	7.6	4.8	36.8
Latin America	9.2	6.8	26.1
Africa	17.5	15.1	13.7

The results show significant deaths on cervical cancer especially in areas where the number of people vaccinated is high and those in areas with well-developed healthcare facilities. The highest mortality percentage was reduced in North America (52.1 percent), and then in Europe (46.7 percent).

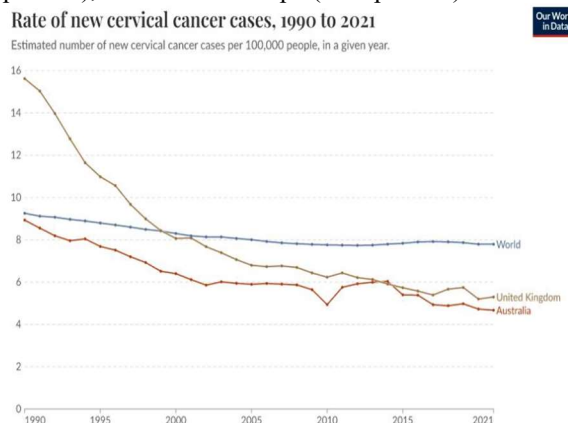


Figure 3: “Comparative Cervical Cancer Incidence Before and After Vaccination Programs”

In the Asia-Pacific region, there was a notable reduction by 36.8 percent which reflects on how the region has been making strides to improve the vaccination of children as well as cancer screening exercise. Both Latin America and Africa had moderate declines, with Africa having little improvement because of continued disparities in healthcare and late diagnosis of cervical cancer patients.

**E. Factors Influencing Vaccination Program Effectiveness**

A number of determinants that have an impact on the success of HPV vaccination programs were identified across the regions. These are access to healthcare, health awareness by the population, support by the government, education campaigns and socioeconomic status.

**Table 7. Key Factors Affecting HPV Vaccination Program Success**

Factor	North America	Europe	Asia-Pacific	Latin America	Africa
Healthcare Accessibility	High	High	Moderate-High	Moderate	Low
Government Support	High	High	Moderate	Moderate	Low
Public Awareness	High	High	Moderate	Moderate	Low
School-Based Programs	Extensive	Extensive	Moderate	Limited	Limited
Vaccine Affordability	High	High	Moderate	Moderate	Low

The examination shows that the regions with well-developed healthcare, widespread publicity campaigns, and outstanding vaccination programs funded by the governments still achieved better results. Vaccination programs in schools specifically proved to be effective in raising the number of adolescents who receive vaccines.

Europe and North America had an advantage of a well-developed vaccination system which included education, access, and monetary aid. Conversely, areas that were struggling economically tended to struggle with maintenance of mass immunization programs. Affordability of vaccines was a major obstacle in most of the low-income contexts especially in Africa.

**F. Comparative Analysis of Regional Performance**

An overall analysis of all the results reveals a consistent trend of the positively related outcomes of higher vaccination rates to the better prevention rates of cervical cancer. North America became the most successful region in terms of all indicators, such as vaccination uptake, reduction of HPV infection, reduction of incidences and reduction of mortality. Europe was not far behind, with comparable healthcare abilities and investments in health of the population. Asia-Pacific recorded positive trends although there was a lot of diversity within the nations. A number of countries have been able to implement HPV vaccination into national immunization regimens, positive socio-economic impacts on the population. Latin America provided a medium success, yet more investing in vaccination infrastructure and sensibilization is needed to achieve

the most. Africa continues to be the part of the world with the highest cervical cancer burden, and the least vaccinated. Though there has been improvement, there are significant obstacles that hamper the widespread use of vaccines. More assistance from any foreign country, better healthcare facilities, and upgrading of more educational programs among the population are necessary to maximize the impact of vaccinations in the region. In general, the comparative study already proves that the programs of vaccination against HPV play a significant role in the prevention of cervical cancer. The extent of their effects varies with much on the coverage rates, access to healthcare, governmental dedication, and community involvement.

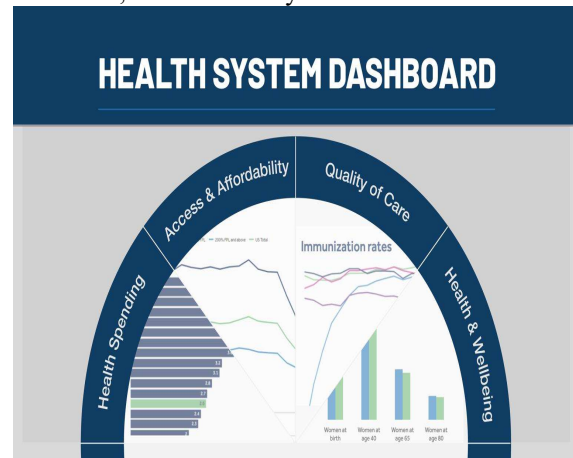


Figure 4: “Multi-Regional Public Health Assessment Framework”

**G. Discussion of Findings**

The findings are highly congruent with the literature that shows that HPV vaccination is a feasible social health program to lower HPV infection and cervical cancer rates. Areas with extensive vaccination policies always showed higher results as compared to those with little coverage of the programs. These limitations on the HPV infection prevalence can also be interpreted in the following way: It is evident that vaccination does not only protect vaccinated individuals, but it also helps in protecting the larger community in terms of herd immunity. Moreover, the reduction of cervical cancer morbidity and mortality is an indication of the benefits, in the long-term, of investing in preventive healthcare services. It is also shown in the study that the effectiveness of vaccination programs is most frequent in case they are combined with cervical cancer screening services, popularization of the program and supportive healthcare policies. The best outcomes in terms of mothers' health occurred in countries that engaged in multimanual prevention strategies.

**V. CONCLUSION**

In this research, the effectiveness of Human Papillomavirus (HPV) vaccination programs in

preventing cervical cancer in the various parts of the world were assessed such as North America, Europe, Asia-Pacific, Latin America and Africa. Its results have shown that HPV vaccination is a highly effective public health measure that has a significant impact on decreasing the rate of HPV infection, incidence of cervical cancer and mortality rates. Areas with increased vaccination rates had better health outcomes and the importance of universal immunization in the prevention of HPV related diseases became highly important. It was found that there are significant disparities between regions in terms of the effectiveness of the vaccination programs. Strong healthcare systems, massive campaigns to create awareness of HPV infections and cervical cancer, and friendly government policies have led to the highest vaccination rates and greatest reduction of HPV infections and cases of cervical cancer as recorded in North America and Europe. Conversely, areas where the vaccination rates were lower, especially in parts of Africa and Latin America, still saw a greater disease burden illustrated by a lack of adequate healthcare facilities and access to vaccines and weak awareness initiatives. Other factors affecting the success of vaccination have also been outlined in the study such as accessibility to health care services, affordability, education programs, community involvement and policy support. Moreover, HPV vaccination combined with regular screening programs in cervical cancer was determined to improve the prevention rates and help to detect the diseases early. Generally, the findings indicate that HPV vaccination campaigns are important to mitigate the global incidence of cervical cancer and help achieve the objective of the World Health Organization of eliminating cervical cancer. Further investment in infrastructures on vaccination, civic education and access to equitable healthcare should be made to enhance vaccine coverage and eventual general population health outcomes. The way forward should be rallied around solving regional inequalities and reinforcing comprehensive prevention policies to guarantee a sustainable control of cervical cancer in the world.

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