



# Strategies for Increasing Immunization Rates Among Children and in Low to Middle Income Countries

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## Abstract

The article reviews the importance and what strategies are effective in improving immunization rates in children and adults. How can we help improve immunization rates in the U.S. and in LMICs? Do strategies to improve childhood vaccination rates work? [1,2] reported the importance of immunizations as an important childhood preventive health maintenance program towards improving childhood survival.

This is an important feature for childhood health for two reasons:

- 1) Direct reduction in disease through immunization and
- 2) It allows time during visit to review for other treatable conditions [3].

Reported immunizations as the most successful public health prevention program for preventing childhood diseases and untimely illnesses or death in childhood. The WHO highly recommends safe monitoring and administration of vaccinations. In conclusion [1] found mostly a low level of evidence to support each strategy for improving immunization rates among children in LMICs and there is some low level of evidence for a combined effect among strategies as follows: information handouts, health education with reminder cards at facilities, immunization outreach with and without household incentives, home visits, and integration of immunization with other services [4]. Found some significance in single-method interventions, but found a combined effect more promising to increase vaccine rates. Further well conducted RCTs are needed.

## Background Summary

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States with approximately 79 million Americans are infected with HPV both men and women alike. Each year an estimated 14million people become newly infected. Not all 100 types of HPV cause pathological disease,

however some do and can lead to genital warts, different types of cancers (i.e., cervical, vulvar, vaginal, penile, anal, and oropharyngeal). There are approximately 27,000 adults affected by HPV associated cancer annually and approximately 360,000 people experience genital warts. HPV vaccine is the primary prevention for HPV associated diseases. HPV vaccine rates like others in a series tend to drop by the time of the last dose by about 20%. Overall HPV vaccination rates are low at 40% for girls and 22% for boys [1,2].

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- 1) Direct reduction in disease through immunization and
- 2) It allows time during visit to review for other treatable conditions [1].

In a Cochrane review studied interventions for improving coverage of childhood immunizations in low and middle-income countries (LMICs) updated from prior review in 2011 [3], reported immunizations as the most successful public health prevention program for preventing childhood diseases and untimely illnesses or death in childhood. The WHO highly recommends a safe monitoring and administration of vaccinations. Vaccines typically have a high safety profile and side effects are minimal, if at all, mostly site redness, fatigue, and tenderness for a couple days [4].

## Study Purpose

Completed a systematic review to evaluate the effectiveness of interventions or strategies for increasing HPV vaccination rates and [1,2] also completed a review to examine interventions or strategies for improving vaccination rates in childhood in LMICs. According to the [5] in the U.S. many immunization rates are overall fairly high, but gaps still exist and there is still room for

improvement timeliness at the recommended age is essential for proper coverage. In 2011 in the U.S., 4 cases of rubella, no cases of diphtheria, 36 cases of tetanus, and no polio cases existed at the time. Vaccines in a series were noted to be a problem such as DTaP from 19-35 months of age only 84.6% of the children had completed the four dose series in 2011 [5]. In cases of outbreaks, it is often found that it may exist in an unimmunized person or a person at risk due to illness or immunocompromise. Flu vaccination rates in health care workers and the elderly population overall are less than 70% [5]. Sustainable strategies for improving vaccination rates to reduce vaccine preventable diseases remain an important role in our health care prevention plan.

## Research Question

The research question is clear what strategies are effective in improving immunization rates in children and adults? How can we help improve immunization rates in the U.S. and in LMICs? Do strategies to improve childhood vaccination rates work?

## Research Design

Studies reviewed included randomized controlled trials (RCT) [1], non-RCTs, controlled before after studies, and interrupted time series conducted in LMICs involving children age 0-4 years, caregivers, and healthcare providers in a Cochrane Review meta-analysis [4]. Studies included RCTs, quasi-experimental or observational studies all quantitative data.

## Sample Size and Selection

Studies reviewed included randomized controlled trials (RCT) [1], non-RCTs, controlled before after studies, and interrupted time series conducted in LMICs involving children age 0-4 years, caregivers, and healthcare providers. Two authors independently reviewed studies for eligibility. Study participants were over 1,692 [4] Located 2,569 studies in the primary search and included 34 studies in the review that met inclusion criteria.

## Measuring Instruments

Used RR for dichotomous data and planned to report costs with a mean difference (MD) [1], but no studies reported this type of data. Confidence intervals (CI) for all measures [4]. Utilized a forest plot of selected results of intervention studies measuring series initiation of >1 dose of HPV vaccine and additional results is shown in an additional forest plot.

## Statistical Analyses

Consisted of 14 studies (10 cluster RCTs and 4 individual RCTs) all met inclusion criteria. Study locations included states in the U.S. (i.e. Georgia) and other countries such as (i.e., Ghana, Honduras, India, Mali, Mexico, Nicaragua, Nepal, Pakistan, and Zimbabwe) [1]. One study had a unclear risk of bias and 13 had high risk of bias. Interventions or strategies utilized were as follows: community based health education (3 studies), facility-based health education (3 studies), household incentives (three studies), regular immunization, outreach sessions (1 study),

home visits (1 study), and supportive supervision (1 study), and information campaigns (1 study), and integration of immunization services with intermittent prevention treatment of malaria (1 study). There was a moderate level of evidence to support health education at town meetings or at home (risk ratio (RR) 1.68, 95% confidence interval (CI) 1.09 to 2.59).

Low-certainty, evidence that facility-based health education plus vaccine reminder cards may improve vaccination rates (RR 1.50, 95% CI, 1.21-1.87). Household monetary incentives have little or no effect on vaccine rates. Regular immunization outreach may improve vaccine rates with low level of evidence (RR 3.09, 95% CI, 1.69-5.67). Immunization outreach when combined with household incentives may improve vaccine rates with low level of evidence (RR 6.66, 95% CI, 3.93-11.28). Home visits to identify non-vaccinated children and health clinic referrals for immunization updates may improve vaccine rates with low level of evidence (RR 1.22, 95% CI, 1.07 to 1.39). Integration of immunizations with services had low level of evidence to improve vaccine rates (RR 1.92, 95%, CI 1.42-2.59).

[4] Included a study of mostly girls 70.6%, n=24 but included adolescents and young adults regarding HPV vaccination rates. Sixteen studies (47.1%) included looked at intervention effects on more than on e vaccine including HPV vaccine while 18 (52.9%) evaluated the intervention impact only on HPV vaccine coverage. Interventions included vaccine requirement for school attendance, patient reminder and recall systems, patient education, community-based interventions implemented in combination, provider assessment and feedback, provider reminders, healthcare system-based interventions, vaccine program in schools, reducing out of pocket costs. Most interventions demonstrated an increase in vaccine rates. Patient education when used alone as little evidence to demonstrate effect but in combination with other intervention has more success. Reminder and recall (i.e., text, mail, phone, e-mail etc.) with patient education demonstrated the most single effect.

## Conclusion

[1] Found mostly a low level of evidence to support each strategy for improving immunization rates among children in LMICs and there is some low level of evidence for a combined effect among strategies as follows: information handouts, health education with reminder cards at facilities, immunization outreach with and without household incentives, home visits, and integration of immunization with other services. Further well conducted RCTs are needed. [4] Found some significance in single-method interventions but found a combined effect more promising to increase vaccine rates. More studies were recommended to integrate in multi-type facilities and adapted into practice on a wide scale.

## References

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