

Systematic review of research interventions to improve human papillomavirus vaccination rates including systematic reviews and randomized controlled trials from 2015 to 2025



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INTRODUCTION

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States and the leading cause of cervical cancer worldwide. HPV vaccination has substantially reduced HPV-related infections associated with cancers and genital warts, with reported reductions of 88% among adolescent girls and 81% among young adult women. Despite evidence supporting the vaccine efficacy and safety, HPV vaccination uptake remains below national level in Missouri.

Objective: To identify and compare current strategies to improve vaccination uptake rates and reduce disparities in HPV-related cancer prevention, with particular consideration to vaccination efforts in Missouri.

METHODS

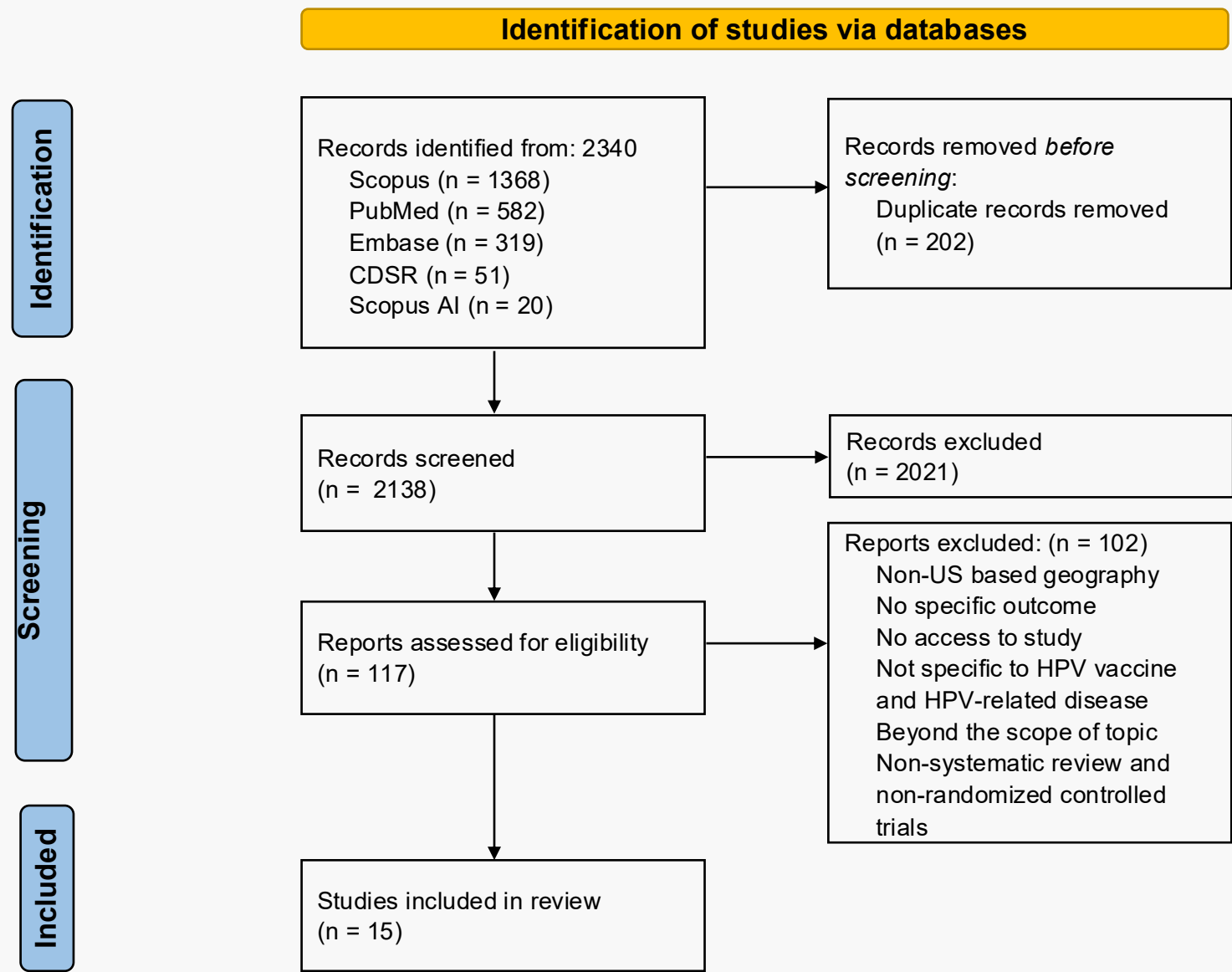


Figure 1: PRISMA Flow Diagram

Five electronic databases were searched. Studies included in the review were limited to peer-reviewed publications from 2015-2025. Eligible studies were conducted in the United States, evaluated strategies to improve HPV vaccine uptake rates, and reported intervention outcomes. Studies were excluded if they were not specific to HPV vaccination or HPV-related sexually transmitted infections or cancers.

Study screening was independently conducted by two reviewers, with discrepancies resolved by a third reviewer. Data extraction and analysis were performed by both authors. The methodological quality and risk of bias of included articles were assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist tools.

RESULTS

7 Key interventions:			
1. Provider recommendations & provider training + feedback			
2. Patient reminder messages/alerts (environmental)			
3. Education			
4. Community engagement			
5. Policy			
6. Tailored messaging for specific populations			
7. Multi-level strategies			
Key findings:			
Population	Study Type	Intervention	Outcome
Unvaccinated Adolescents, age 11-12 year old, 52.5% male and 47.5% female	Cluster Randomized Control Trial	<i>Multi-component:</i> mailed reminders/recalls to parents, mailed audit/feedback to healthcare professionals, usual care in primary care practice	Reminder/recall: 34.6% vaccinated; Audit/feedback: 30.4%; Reminder/recall + Audit/feedback: 39.7%; Usual care: 21.9%
Adolescents and parents of adolescents	Systematic Review	<i>Multi-component strategy (Environmental, Education, community engagement, and Tailored messaging):</i> SMS reminder text message, Mobile app outreach, Social media campaign, Digital games-based message, video-based message	Improved HPV-knowledge, confidence in initiating vaccine conversation, and vaccination intention with all 5 interventions. However, minimal change was observed.
Adolescents ages 9 to 18	Systematic Review	<i>Policy strategy:</i> school-entry requirements (SER), federally-funded policies (FFP), education program	Positive association with increase HPV vaccination rate with SER. 8% increase in HPV vaccination with FFP- Vaccines For Children and 4% increase in HPV vaccination initiation with FFP-Medicaid expansion. 9% increase in HPV vaccination with state-level education program.
Adolescents aged 11-17 years of age	Systematic Review and Meta-Analysis	<i>Clinician communication</i>	Overall, 5.2% increase in vaccination uptake with clinician communication interventions, 9.1% increase with presumptive communication methods, 9.4% with audit and feedback, 11.4% increase when combining presumptive strategies plus audit and feedback

DISCUSSIONS

INCIDENTAL FINDINGS: Several studies identified disparities in HPV vaccination uptake rates by parental income and education attainment. Among studies evaluating reminder messages/alerts interventions, some reported a preference for postal letters over SMS text messages or patient portal messages. Non-white participants were more likely to complete the vaccine series, while Black participants were less likely to initiate vaccination in some studies.

STRENGTHS: This review included studies spanning over 15,000 total participants from diverse demographic populations. Many included studies implemented a randomized controlled method. Lastly, the review evaluated a broad range of intervention strategies, increasing the applicability of findings across healthcare settings.

LIMITATIONS: Several studies assessed HPV vaccine initiation without assessing series completion, while some studies reported results that were not statistically significant. Additionally, a few studies reported gender-specific outcomes, limiting the generalizability of the findings across populations.

FUTURE DIRECTIONS: Future research should expand evidence on HPV vaccination strategies for adults aged 27-45. Further research should prioritize the long-term sustainability and cost-effectiveness to determine their feasibility in standard practice.

CONCLUSIONS

Evidence indicates that HPV interventions are effective when tailored to target populations and implemented using multi-level strategies. Patient reminder messages/alerts and strong provider recommendations were among the most commonly implemented interventions in clinical settings, with greater effectiveness when combined with educational and community-based approaches. In Missouri, integrating these strategies may address population specific barriers and improve HPV-related cancer prevention.

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REFERENCES

