Economic Evaluations (EE) of Cervical Cancer Screening Methods in United States: A Systematic Literature Review

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Conclusion

- Less-intensive screening algorithms can provide greater health benefit than current screening strategies which do not differentiate based on HPV vaccination status

Background

- Guidelines recommend cytology screening of cervical cancer every 3-years starting at the age 21 to 29 years
- For age 30 onwards primary human papillomavirus (HPV) testing alone or co-testing (HPV+ cytology) is also recommended every 5-years through age 65[1,2,3]

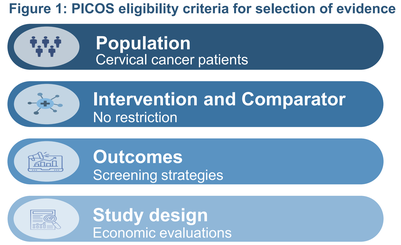
Objective

- The objective of the current review is to summarise the model-based cervical cancer screening studies

Methodology

- An SLR was performed as per the guidelines provided by the National Institute for Health and Care Excellence (NICE) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)
- Key biomedical databases (EMBASE, MEDLINE, NHS-EED) were searched for English language economic evaluations reporting cervical cancer screening methods from 2012 to 2022 in the US (Figure 1)

Figure 1: PICOS eligibility criteria for selection of evidence



Results

- A total of 10 studies from 14 publications fulfilling the PICOS criteria were included (Figure 2)

Figure 2: PRISMA diagram for the screening process

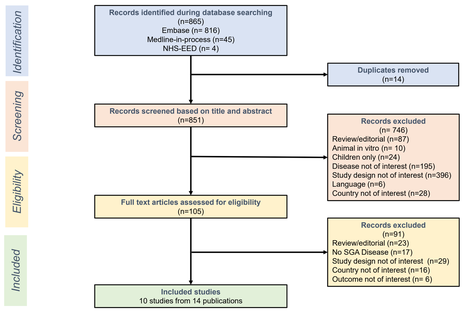


Table 1: Study characteristics of the included studies

Study	Type of model	Perspective	Time horizon	Cycle length	Cost year	Discounting
Kim 2015	Simulation model	Societal	Life-time	NR	2012	3%
Free 2019	Markov decision model	Societal and healthcare	Life-time	1 year	2016	3%
Campos 2021	Monte Carlo microsimulation model	Payer	Life-time	NR	2019	3%
Ting 2015	Markov model	NR	Life-time	1 year	2012	3%
Wright 2016	Decision-tree and Markov model	Payer	1 year	1 month	2015	NR
Kim 2017	Microsimulation model	Societal	Life-time	NR	2012	3%
Huh 2015	Markov model	Payer	40 years	NR	2013	3%
Felix 2016	Markov model	Payer	1 year	NR	2014	3%
Vaffis 2018	Markov decision model	Payer	35 years	NR	2017	3%
Simms 2016	Dynamic model	Payer	Life-time	NR	2015	3%

- Nine studies were cost effectiveness analysis, while one study was budget impact analysis[5]
- Markov model was the most commonly used model (n=6), followed by microsimulation model (n=3) and dynamic model (n=1) (Table 1)
- Six studies used lifetime horizon, two studies used 40-years, and one study each used 35-years and 1-year time horizon
- Payer perspective was utilized in six studies, while three studies used societal perspective
- Discounting rate of 3% was applied in majority of the studies
- Findings of the SLR revealed that current screening practice (annual cytology) was not cost-effective relative to guideline based strategies with an ICER of $1 million per QALY gained[4]
- Co-testing was reported as a dominant screening strategy compared to cytology or HPV alone[5.6.7]
- Co-testing with genotyping was also superior to co-testing without genotyping[5,8]

Results (Cont'd)

- A switch from 3-year cytology to 5-year co-testing at the age of 30 is associated with an ICER of $59,440/QALY[4]
- However, co-testing at 3-year intervals is predicted to be a cost-effective approach over currently recommended 5-year intervals with an ICER of $18,060/QALY[6]
- Current guidelines (early (21-year) or more frequent screening than every 5-years) were in-efficient and had a high ICER of $200,000/QALY gained[9]
- Across already vaccinated women, cytology or HPV testing alone every five years starting at age 25 or 30 were the optimal methods, with an ICER ranging from $34 680-$138560/QALY gained[9]

References

1. Saslow D, et al. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. Journal of lower genital tract disease 2012; 16(3):175–204

2 Moyer VA. Screening for Cervical Cancer: U.S. Preventive Services Task Force Recommendation Statement. Annals of internal medicine. 2012;156:880–891

3 Massad LS,et al. Updated consensus guidelines for the management of abnormal cervical cancer screening tests and cancer precursors. Journal of lower genital tract disease. 2013; 17(5 Suppl 1):S1–S27

4Kim JJ,et al. Inefficiencies and high-value improvements in U.S. cervical cancer screening practice: A cost-effectiveness analysis. Annals of Internal Medicine 2015; 163(8): 589-597

5 Wright T, et al. The budget impact of cervical cancer screening using HPV primary screening. Journal of Managed Care and Specialty Pharmacy 2016; 22(3): e95-e105

6 Felix JC,et al. The clinical and economic benefits of co-testing versus primary HPV testing for cervical cancer screening: A modeling analysis. Journal of Women's Health 2016;25(6): 606-616.

7 Vaffis S,et al. Cervical cancer screening decision model. Value in Health 2018;21(Supplement 1): S170-S171

8 Huh W K,et al. Cost Effectiveness of Human Papillomavirus-16/18 Genotyping in Cervical Cancer Screening. Applied Health Economics and Health Policy 2015;13(1): 95-107

9 Kim J J,et al. Optimal cervical cancer screening in women vaccinated against human papillomavirus. Journal of the National Cancer Institute 2017; 109(2)

Disclosure

- GK, BS, and SK, the authors, declare that they have no conflict of interest

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