EPH274

Updated Projections of HPV Vaccine Coverage Growth in Europe: Are Countries on Track to Meet WHO's 2030 Target?

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Background

- Cervical cancer (CC) is one of the most common cancers and causes of cancer-related deaths in women across the globe[1]. **Since CC is largely caused by chronic infection with human papillomavirus (HPV), it is therefore almost completely preventable through a combination of vaccination and screening[2].**
- The significant morbidity and mortality associated with CC, and the availability of effective primary and secondary prevention measures have driven the World Health Organization (WHO) to call for a coordinated action globally to eliminate cervical cancer as a public health problem[3].
- In addition to screening and treatment targets, the WHO has urged countries to take action to achieve a 90% HPV vaccine coverage rate by 2030 of girls aged 15 -year-old to be fully vaccinated.
- **A prior analysis using 2017-2022 WHO vaccine coverage rate (VCR) data indicated that only 9 European countries were on –track to timely meet the 90% VCR target[4].**
- This study provides updated projections using 2023 WHO data, highlighting how recent trends affect the likelihood of meeting VCR goals for 15-year-old girls.

Aim

This study aims to update projections of HPV VCR (2nd dose) across Europe based on 2023 data, assess changes in national trajectories, and identify countries at risk of falling further behind the 2030 target.

Method

- A previously published modeling framework was used to estimate time required to reach 90% VCR target. For each country, several univariate regression models were fitted; the best-performing model was selected based on R^2 and visual fit[4].
- **Several univariate regression models (linear; exponential; logarithmic; power regression; second order and segmented linear regression models) were fitted to observed VCR data.**
- **The independent variable in the regression models was the year, while the observed vaccine coverage rate was used as the dependent variable.**
- **To determine how well the model fits to the observed data, the regression model with the highest coefficient of determination (R^2, 0–1), alongside visual inspection and plausible restrictions to check for a realistic trend, was chosen to extrapolate vaccine coverage rate throughout the study time horizon.**

Results

Best-fitting distribution for each country is presented in Table 1. These models were used to extrapolate vaccine coverage rate growth for each country.

Table 1: WHO-reported HPV vaccination coverage (2017–2023) and selected distributions used for projections in the examined countries

Country	Vaccination coverage between 2017-2033 (%)	Selected Distribution (R^2 index)
Belgium	66, 67, 68, 69, 69, 69, 70	Logarithmic (R^2 =87%)
Bulgaria[1]	7, 9, 9, 9, 7	Piecewise 2019 (R^2 <5%)
Cyprus[2]	54, 59, 64, 64, 64, 67	Logarithmic (R^2 =83%)
Czechia	66, 62, 64, 65, 67, 71, 71	Piecewise from 2018 (R^2 =95%)
Denmark	76, 73, 75, 81, 82, 82, 83	Linear (R^2 =76%)
Finland	69, 67, 67, 67, 67, 78, 76	Logarithmic (R^2 =49%)
France	24, 24, 33, 37, 42, 42, 45	Logarithmic (R^2 =93%)
Germany	40, 43, 47, 51, 54, 54, 54	Logarithmic (R^2 =90%)
Hungary	74, 72, 73, 71, 75, 80, 76	Linear (R^2 =38%)
Iceland	88, 89, 86, 87, 91, 94, 96	Piecewise from 2018 (No projection used)
Ireland	88, 75, 58, 66, 82, 82, 75	Piecewise from 2018 (R^2 =31%)
Italy	66, 68, 62, 61, 69, 69, 64	2nd_order (R^2 <5%)
Latvia	49, 26, 34, 35, 38, 44, 46	Exponential (R^2 =95%)
Netherlands	56, 51, 52, 61, 69, 68, 65	Logarithmic (R^2 =74%)
Norway	82, 85, 87, 88, 92, 92, 93	Logarithmic (No projection used)
Portugal	90, 92, 95, 97, 96, 94,92	Power (No projection used)
Slovenia	38, 43, 39, 40, 42, 44, 52	Power (R^2 =51%)
Spain	78, 81, 74, 76, 78 86, 85	Linear (R^2 =41%)
Sweden	78, 76, 75, 80, 84, 85, 85	Linear (R^2 =87%)
Switzerland	59, 59, 59, 63, 71, 71, 70	Linear (R^2=82%)

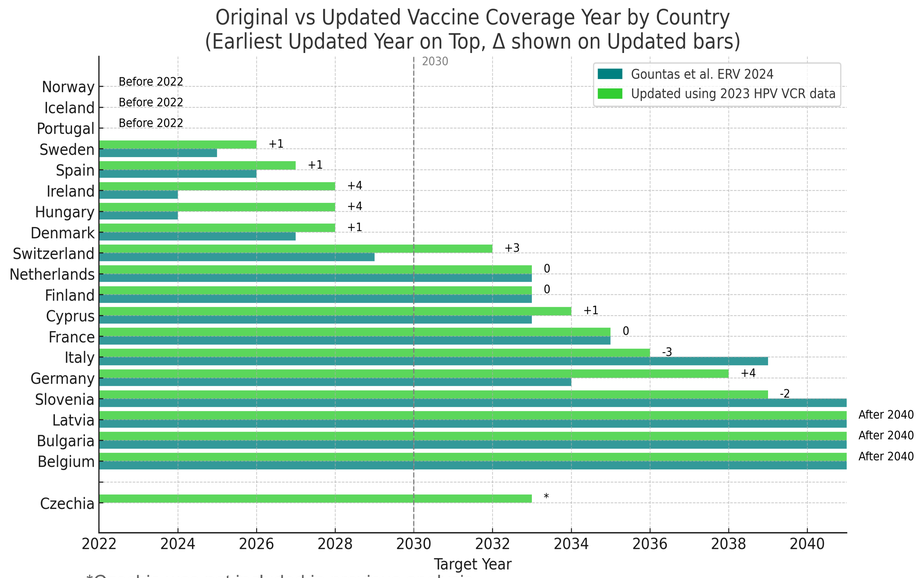
1. Data from 2019, 2.Data from 2018

VCR change between 2023, 2022

Eight countries (Belgium, Cyprus, Denmark, France, Latvia, Norway, Iceland, Slovenia) demonstrated a median VCR increase of 2% (Q1, Q3: 1%, 3%). Nine countries (Bulgaria, Finland, Hungary, Ireland, Italy, Netherlands, Portugal, Spain, Switzerland) experienced a median decrease of 2% (Q1, Q3: -4%, -2%). Finally, three countries (Czechia, Germany, Sweden) showed stagnation.

Projections

Figure 1: Expected time to reach 90% vaccine coverage rate target across Europe and comparison with previous analysis



*Czechia was not included in previous analysis

Results (cont.')

- There is a concerning deceleration progressing toward HPV vaccination goal across Europe.
- Eight countries (Norway, Denmark, Portugal, Sweden, Iceland, Hungary, Spain, and Ireland) are currently projected to meet the 90% target before 2030 (Figure 1).
- Switzerland, previously on track, is projected to meet the target in 2032 (Figure 1).
- Ireland, Germany, Hungary, and Switzerland experienced the largest delays (Figure 1).

Limitations

- VCR data quality and accuracy reported by countries to WHO may be inconsistent, causing under- or overestimation of time to reach VCR targets.
- Analysis used HPV vaccination coverage data for adolescent girls (2017–2023); a longer data span could strengthen trend estimates.
- The tool uses simple univariate regression, not accounting for country-specific factors like differing vaccination policies that may affect VCR trends.
- The results provide a useful starting point for decision makers by showing what may occur if nothing changes and the vaccine coverage rate continues along the same trend.

Conclusions

- Although 2030 is just 5 years away, this study highlights that the majority of countries in Europe are currently unlikely to meet a target of 90% vaccine coverage rate by 2030.
- Prompt actions should be designed and implemented for countries to return and stay on track toward cervical cancer elimination goal and substantially reducing other HPV-related cancers and diseases.

References

1. Singh D et al. 2023. Lancet Glob Health; 2. Torjesen I. et al. 2021 BMJ. 3. Singh D. et al. 2023 Lancet Glob Health, 4. Gountas et al. 2024 ERV

Disclosures

Funding source: This work was funded by Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA.

Conduct information

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