

The effect of HPV Vaccination on the rate of high-grade cytology in 25-year-old women attending for cervical screening in Ireland

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Introduction

The Irish cervical screening programme commenced in 2008. For the first 11 years, screening was based on primary cytology.



In March 2020, the programme transitioned to HPV screening with reflex cytology. In 2009/10 the national school-based vaccination programme for HPV was introduced for girls aged 12/13 with a 3-year catch-up commencing in 2011/12 for 17/18-year-olds¹.

International evidence strongly suggests a reduction in the rate of HG cytology in HPV vaccinated populations².

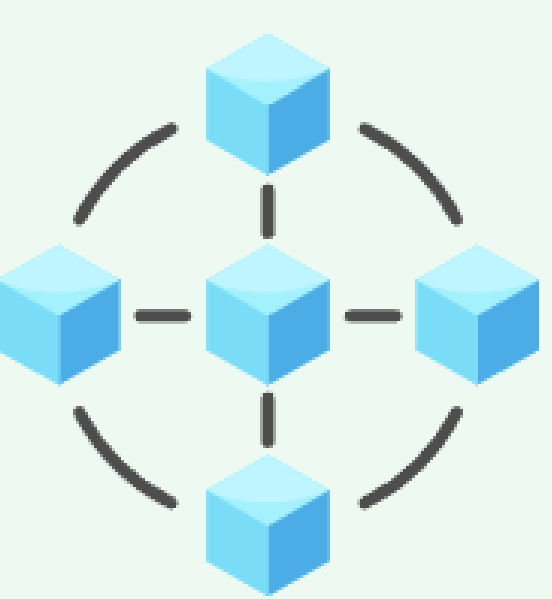
Aim

In this study, we examined the changes in the presence of high-grade (HG) cytology outcomes in 25-year-olds screened from 2010 to 2022 and compared this to the population data on HPV vaccination.



Methods

Data from the cytology results from the CervicalCheck (CSR) database were analysed from 2010 to 2022. Data was also obtained from the National Immunisation Office on the rates of HPV vaccinations in school going females from 2008 to 2022.



The rates of **High Grade (HG)**, **Low Grade (LG)** and **NAD (No Abnormality Detected)** cytology were calculated against the baseline of the entire amount of cytology tests performed on 25-year-old

females in those time periods to give a percentage for each category of cytology per year.

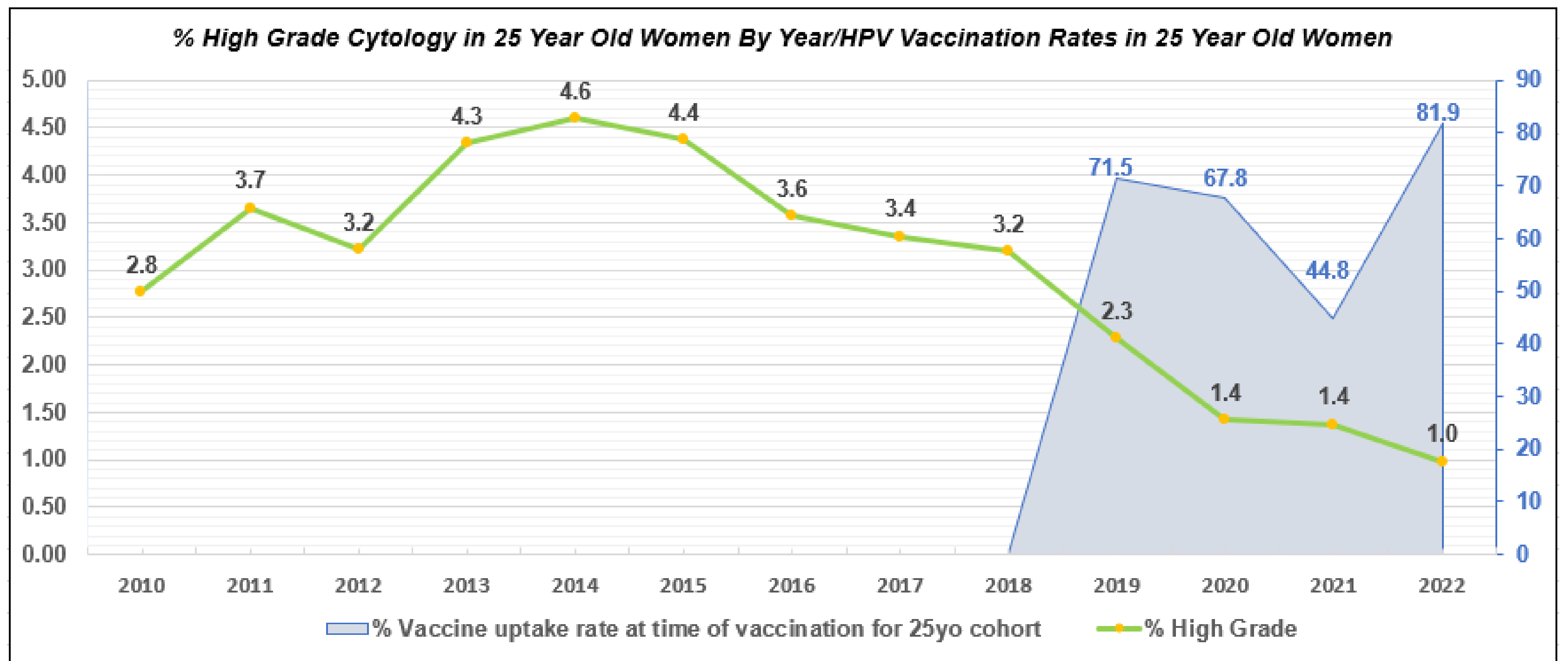
The data for 2020 was split into two sections to account for the end of primary cytology and the beginning of HPV screening (Mar/April) for descriptive purposes and was not split in two for statistical analysis.

HG results are expressed as a percentage of total results for that cohort in the period. Inconclusive/unsatisfactory results were excluded. The percentages of HG cytology detected were overlaid with the vaccination rates in the catch-up programme for HPV vaccination.

Statistical Analysis: Chi Square test used for comparison of proportions. A linear by linear association chi square test was applied to examine the change in High Grade Cytology between 2015 and 2022. SPSS was used for analysis.

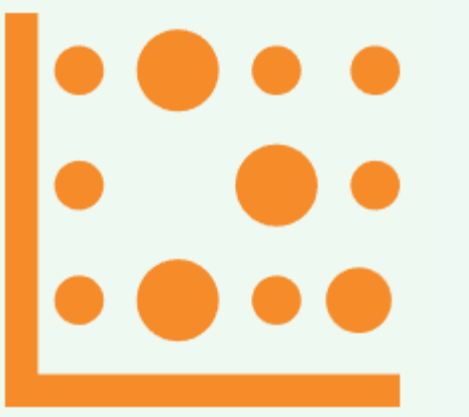
Results

In Ireland, the girls who were offered HPV vaccination in 6th year of secondary school, as part of the initial catch-up campaign, would have turned 25 and become eligible for cervical screening in 2019. In the period before this cohort joined the programme the results show an increase in HG cytology in 25-year-olds from **2.7% to 4.6% in 2010-2014** followed by a reduction from **4.4% to 2.3% in 2015-2019**. The reduction becomes steeper as further vaccinated cohorts become eligible in 2019-2022 (**2.3% to 1.0%**). The fluctuation in vaccination rates (**44.8% in 2021 and 81.9% in 2022**) reflects past vaccine hesitancy followed by a rebound in vaccine uptake³.



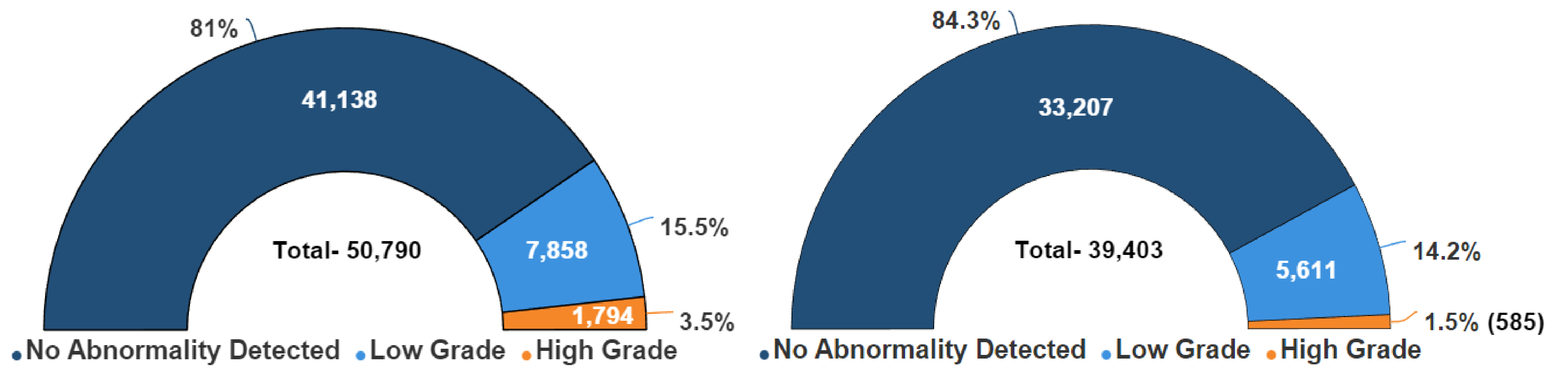
Analysis

The average percentage of HG Cytology in 25 Year olds for the time period 2015-2018 was 3.7% of all cytology tests taken in this age group. For the corresponding period from 2019-2022 the average percentage of HG Cytology was significantly reduced to 1.5%. A test for trend showed a significant reduction in HG Cytology proportions between 2015 and 2022. The decline in high grade disease which preceded the introduction of free HPV vaccination is likely to represent private uptake of vaccination. It was not possible to access records to confirm this.



Screening Test Results For 25 Year Olds - 2015-2018

Screening Test Results For 25 Year Olds - 2019-2022



Conclusion

This study provides early evidence of the potential impact of HPV vaccination on cervical disease in the Republic of Ireland, (which supports the HPV vaccination, cervical screening and cancer treatment approach of the WHO Strategy for Cervical Cancer Elimination). Despite lower vaccination uptake in the initial catch up group, we are seeing early signs of the positive protective effect of vaccination in women on their first cervical screen. As the higher vaccination coverage cohort become eligible for screening, we expect a greater impact on HG disease. Plans to incorporate individual-level vaccination status for women on the screening database will allow more detailed assessment of the impact of HPV vaccination in the Irish population.



References

1. HSE School Vaccination Programme - HPV/TDAP/MenC/MenCAWY Uptake Data up to 2021/2022 – Health Protection Surveillance Centre (HPSC)
2. Schurink-van 't Klooster TM, Siebers AG, Hoes J, et al. Early effect of bivalent human papillomavirus vaccination on cytology outcomes in cervical samples among young women in the Netherlands. *Cancer Med.* 2023;00:1-9. doi:10.1002/cam4.5842
3. Corcoran B, Clarke A, Barrett T. Rapid response to HPV vaccination crisis in Ireland. *Lancet.* 2018 May 26;391(10135):2103. doi: 10.1016/S0140-6736(18)30854-7