

Correction: *Prophylactic human papillomavirus vaccination to prevent recurrence of cervical intraepithelial neoplasia: a meta-analysis*

Bartels HC, Postle J, Rogers AC, *et al.* Prophylactic human papillomavirus vaccination to prevent recurrence of cervical intraepithelial neoplasia: a meta-analysis. *Int J Gynecol Cancer* Published Online First: 09 April 2020. doi: 10.1136/ijgc-2020-001197

Since the online publication of this article, the authors have noticed that the total number of patients was incorrectly stated as 3562. The correct number is 2912. This has led to changes in the abstract and results section, Table 1, figures and the supplementary appendix. Please see bold for changes that have been implemented:

- The Results paragraph of the abstract now reads 'A total of 5744 citations were reviewed; 5 studies comprising **2912** patients were selected for the analysis. There were **1338** patients in the vaccinated group and **1574** in the placebo or unvaccinated group. The incidence of histologically confirmed cervical intraepithelial neoplasia 2+ was reduced in the vaccinated compared with the unvaccinated group (**OR 0.34, 95% CI 0.21 to 0.54, p<0.00001**). The number needed to treat to prevent one recurrence was **27**. Both pre-treatment vaccination (**OR 0.40, 95% CI 0.21 to 0.78, p=0.007**, number needed to treat – **37**) and adjuvant vaccination (**OR 0.28, 95% CI 0.14 to 0.56, p=0.0003**, number needed to treat – **30**) reduced recurrence rates.'
- The highlights section has been updated to:
 - Prophylactic or adjuvant HPV vaccination reduces the risk of recurrent CIN2+.
 - The overall recurrence rate was 4%, of which **1.7%** occurred in the vaccination group and **4.7%** in the unvaccinated and placebo group.
 - Ideal timing of HPV vaccination uncertain.
- In [Table 1](#), the fourth column titled Study Period now reads Study Inclusion Period. The data in columns Total N, Vaccination and Placebo/no vaccination have also been updated. Please see updated [Table 1](#).
- The Results section now reads 'A comprehensive search of databases resulted in a total of 5744 manuscripts, of which 1450 remained for review after removal of duplicate manuscripts (Figure 2). Following review of titles and abstracts, 47 full text papers were reviewed. Five studies were eventually included after meeting the study inclusion criteria 13, 19, 20, 21, 22. In total, the studies comprised **2912** patients, with study sizes ranging from **311 to 1066** patients. **The studies selected for meta-analysis included three post-hoc analyzes each of which were nested within a larger RCT, one prospective case-control trial and one retrospective case-control study** ([Table 1](#)).

All manuscripts were published between **2012 and 2018**, with patients included from **2001 to 2017**. Of the **2912** patients, **1338 (45.9%)** were vaccinated and **1574 (54.1%)** received no vaccination, placebo or hepatitis A vaccine. Studies were included which defined recurrence of disease as

Table 1 Overview of included studies

Author	Year	Country	Study inclusion period	Study type	Total N	Vaccination	Placebo/ No vaccination	Age range at time of surgical treatment (years)		Jadad Score
								Vaccinated	Unvaccinated	
Hildesheim (22)	2016	USA	2004–2005	Post-hoc analysis nested in larger RCT	311	142	169	18–25	18–25	3
Ghelardi (19)	2018	Italy	2013–2017	Prospective case-control trial	344	172	172	18–45	18–45	21
Garland (20)	2016	Australia	2004–2006	Post-hoc analysis nested in larger RCT	454	190	264	15–25	15–25	19
Kang (21)	2013	Korea	2007–2010	Retrospective case-control study	737	360	377	21–45	20–45	24
Joura (13)	2012	Austria	2001–2003	Post-hoc analysis nested in larger RCT	1066	474	592	15–26	15–25	24

histological diagnosis of cervical intraepithelial neoplasia 2+. **However, recurrence was assessed at various timepoints among the included studies with Ghelardi et al¹⁹ at 12 month follow-up, Garland et al²⁰ and Joura et al¹³ at 60 days or more following treatment, Kang et al²¹ at 6 months, and Hildesheim et al²² at any follow-up point.** Surgical procedures performed and vaccination protocols are outlined in online supplementary appendix, Table 2.

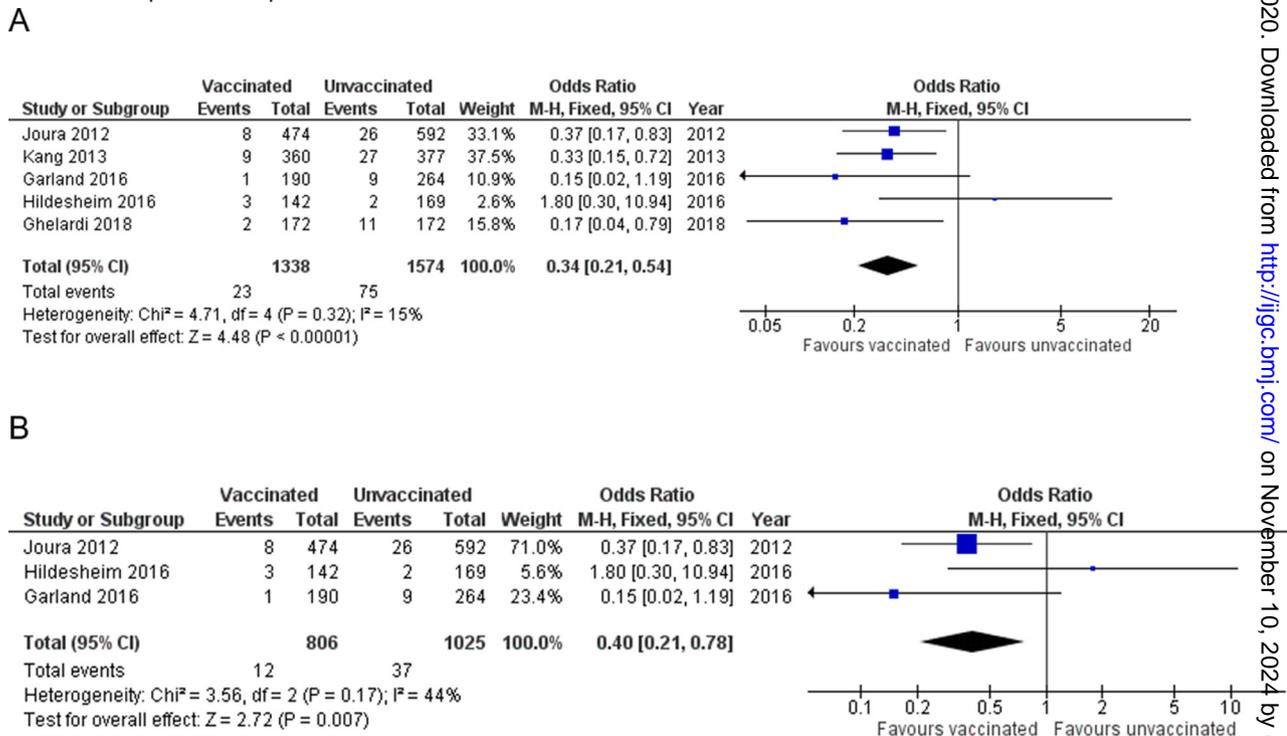
- The Meta-analysis section now reads 'All studies reported on recurrence of disease following treatment, as per the inclusion criteria. The overall recurrence rate **was 3.37% (n=98)**, with a **1.72% (n=23)** recurrence rate in the vaccinated group and **4.76% (n=75)** in the unvaccinated and placebo group. Meta-analysis demonstrated a reduction in recurrence of CIN2 +in the vaccinated group compared with the unvaccinated group (**OR 0.34, 95% CI 0.21 to 0.54, p=<0.00001**, Figure 3A). The number needed to treat calculated for the five studies was **27**.

In sub-group analysis, we analyzed if the time of vaccination influenced cervical intraepithelial neoplasia 2+recurrence rates. Three of the five studies^{13, 20, 22} reported on pre-treatment vaccination. The pre-treatment group included **806** vaccinated patients and **1025** who received either a placebo or Hepatitis A vaccine. Recurrence of cervical intraepithelial neoplasia 2+was reduced in the vaccinated group compared with **placebo (OR 0.40, 95% CI 0.21 to 0.78, p=0.007**Figure 1). The number needed to treat to prevent one recurrence was **37**.

Two studies^{19, 21} reported on vaccination after surgical treatment. The post-treatment group included **532** vaccinated patients and **549** unvaccinated patients. Vaccination after surgical treatment reduced recurrence compared with those who received no vaccine (**OR 0.28, 95% CI 0.14 to 0.56, p=0.0003** online supplementary appendix figure 3C). The number needed to treat in the post-treatment vaccination group was **30**.

- The NNT calculations within online supplementary appendix 1 has also been updated.
- Figure 3 has also been updated to take into account the number change. Please see corrected version below.

Figure 3 Forest plots. (A) Overall CIN recurrence. (B) CIN recurrence—pre-treatment vaccination. CIN, cervical intraepithelial neoplasia.



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