



HPV vaccination in Europe Past Present and Future

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5th Nov 2018, Lisbon

B V
C C



Human Papilloma Virus

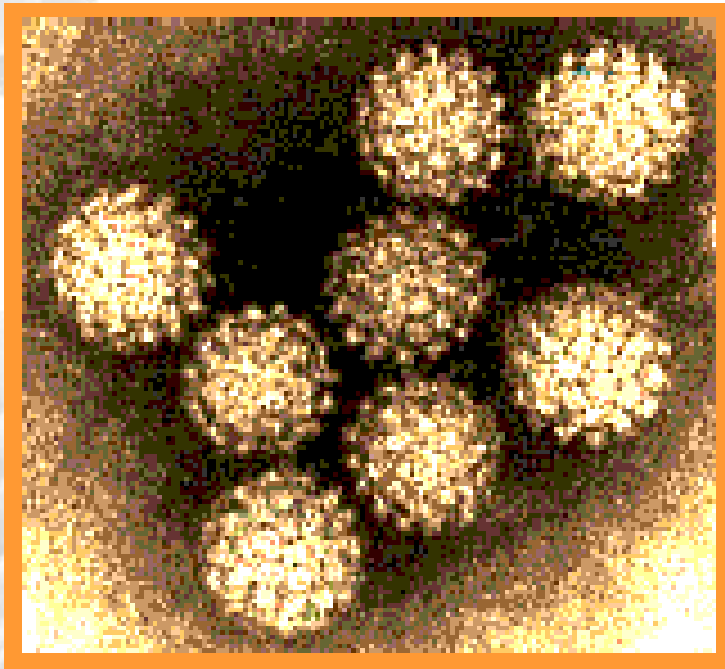
B

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Papillomaviruses



- a diverse group of viruses that infect animals ranging from birds to manatees (sea cows)
- More than 100 different human papillomavirus (HPV) types have also been identified.



Warts or Verrucas

B V C C



Types

1, 2, 27 & 57



B

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C

Genital warts - "low risk"



Types
6, 11



Francis Peyton Rous (1879-1970)



- Nobel Laureate 1966
- showed that a papillomavirus could cause skin cancer in infected rabbits. This was the first demonstration that a virus could cause cancer in mammals



Hiding in plain sight

B

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Harald zur Hausen



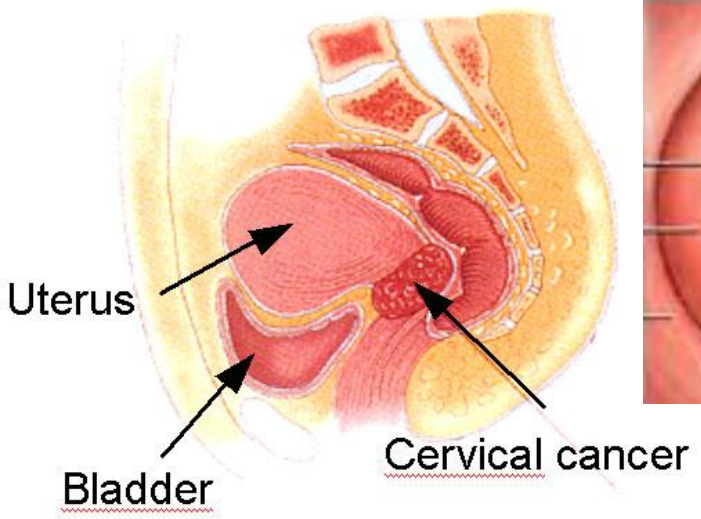
"The condyloma agent has been entirely neglected thus far in all epidemiological and serological studies relating not only to cervical and penile, but also to vulvar and perianal carcinomas.

This is particularly unusual in view of the localization of genital warts, their mode of venereal transmission, the number of reports on malignant transition and the presence of an agent belonging to a well characterized group of oncogenic DNA viruses"

[CANCER RESEARCH 36, 794, February 1976]

HPV causes ~5% of all cancers
Cancers - "high risk"

B **V**
C **C**



Types
16, 18 70%
31, 33, 35, 39, 45, 51, 52,
56, 58, 59 and 68

HPV is the
commonest
sexually
transmitted
disease



Oral
cancer



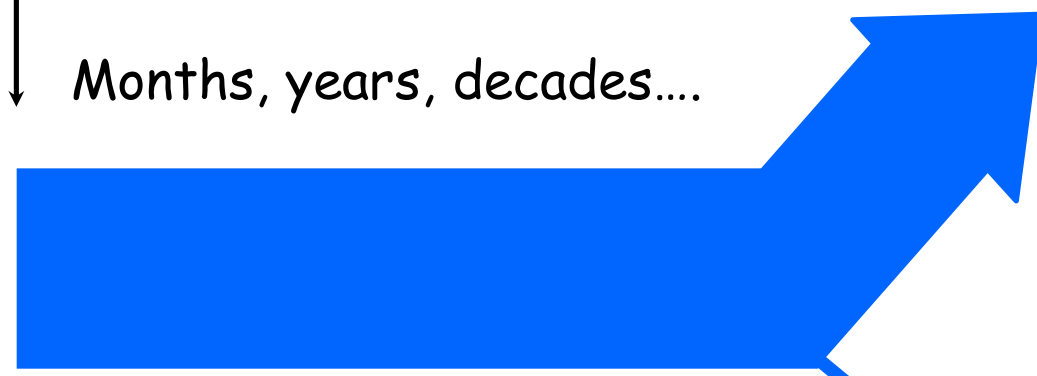
Cervical cancer natural history



Infection



Months, years, decades...



Infection cleared

Pre-cancer
Cancer



Vaccine



B

V

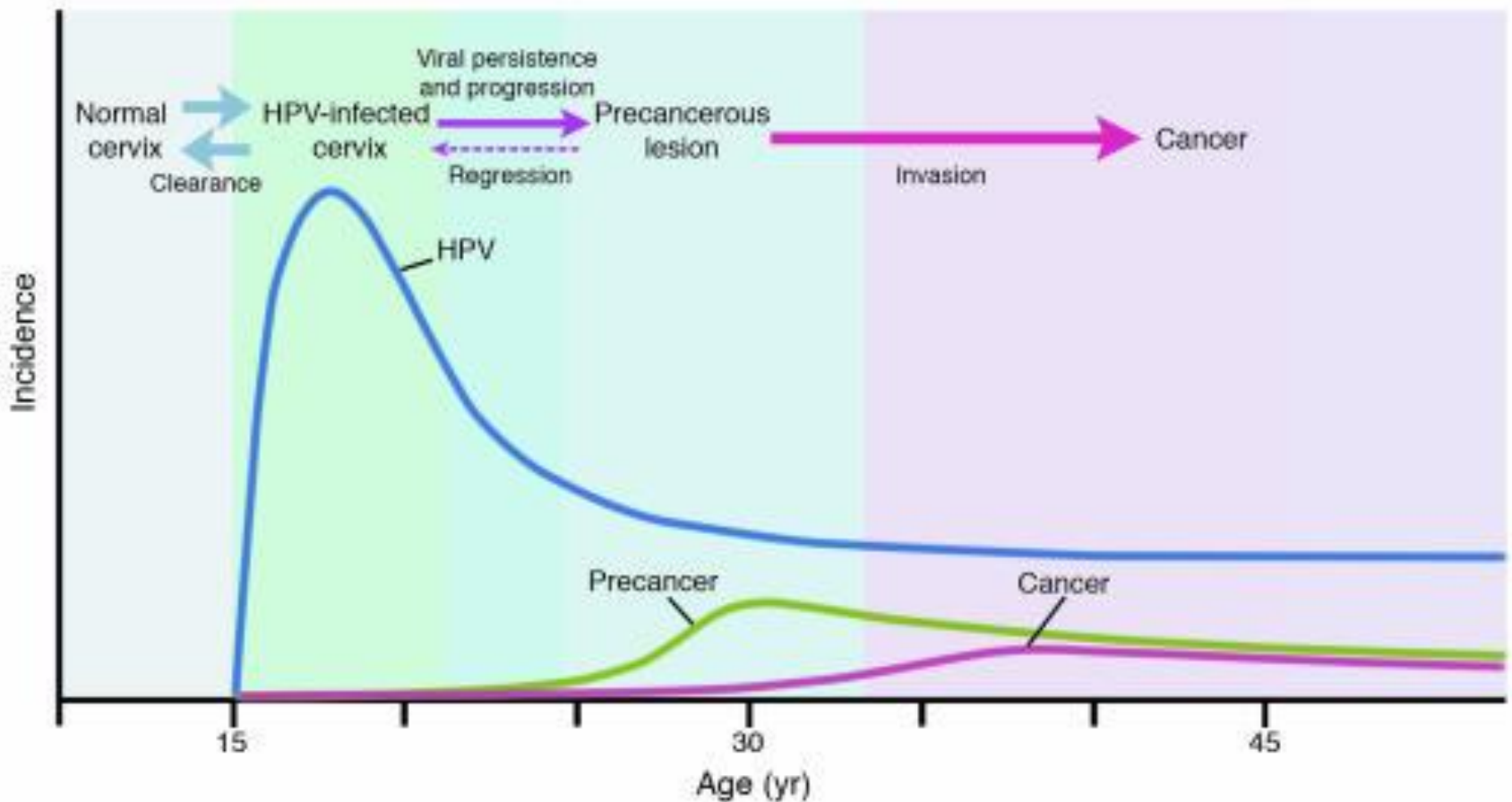
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So vaccination...

- Protects a lot of women, most of whom **WOULD** get HPV infection but would **NOT** get cancer
- Will take a long time to impact on cancer rates because cancer takes so long to develop
- Will have a big effect on reducing infections and circulation of the target viruses in the population

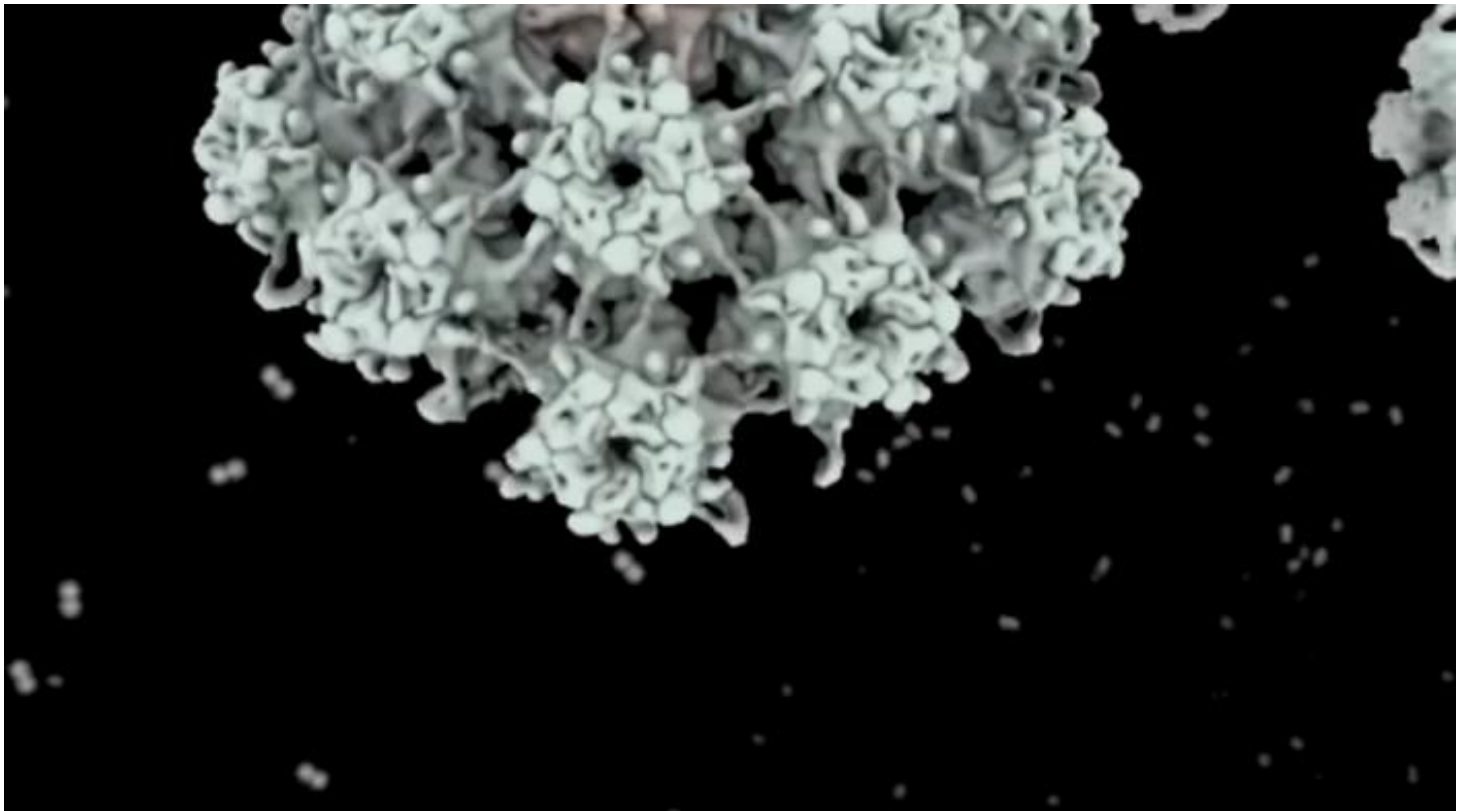
B **V** **C** **C**

It takes a LONG TIME: 10-30 years



Recombinant L1 protein

Self assembles into virus-like particles





HPV vaccines: VERY strong immune responses

- 16 & 18 - prevents most cervical cancers
4 valent vaccine
- 6 & 11 - also prevents most genital warts
9 valent vaccine
- Adds 31, 33, 45, 52, and 58 - additional
cancer-causing types



B

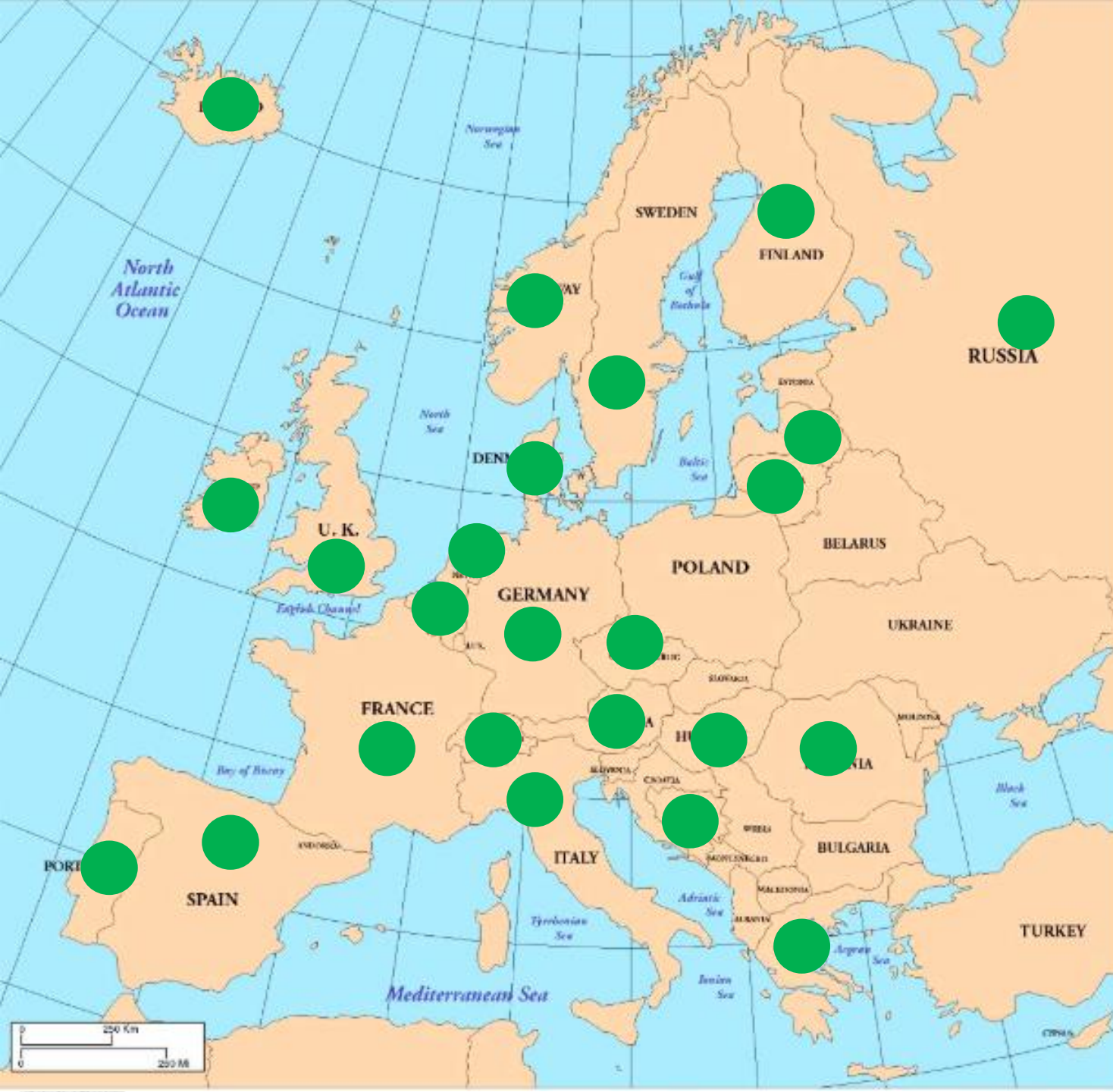
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HPV in Europe

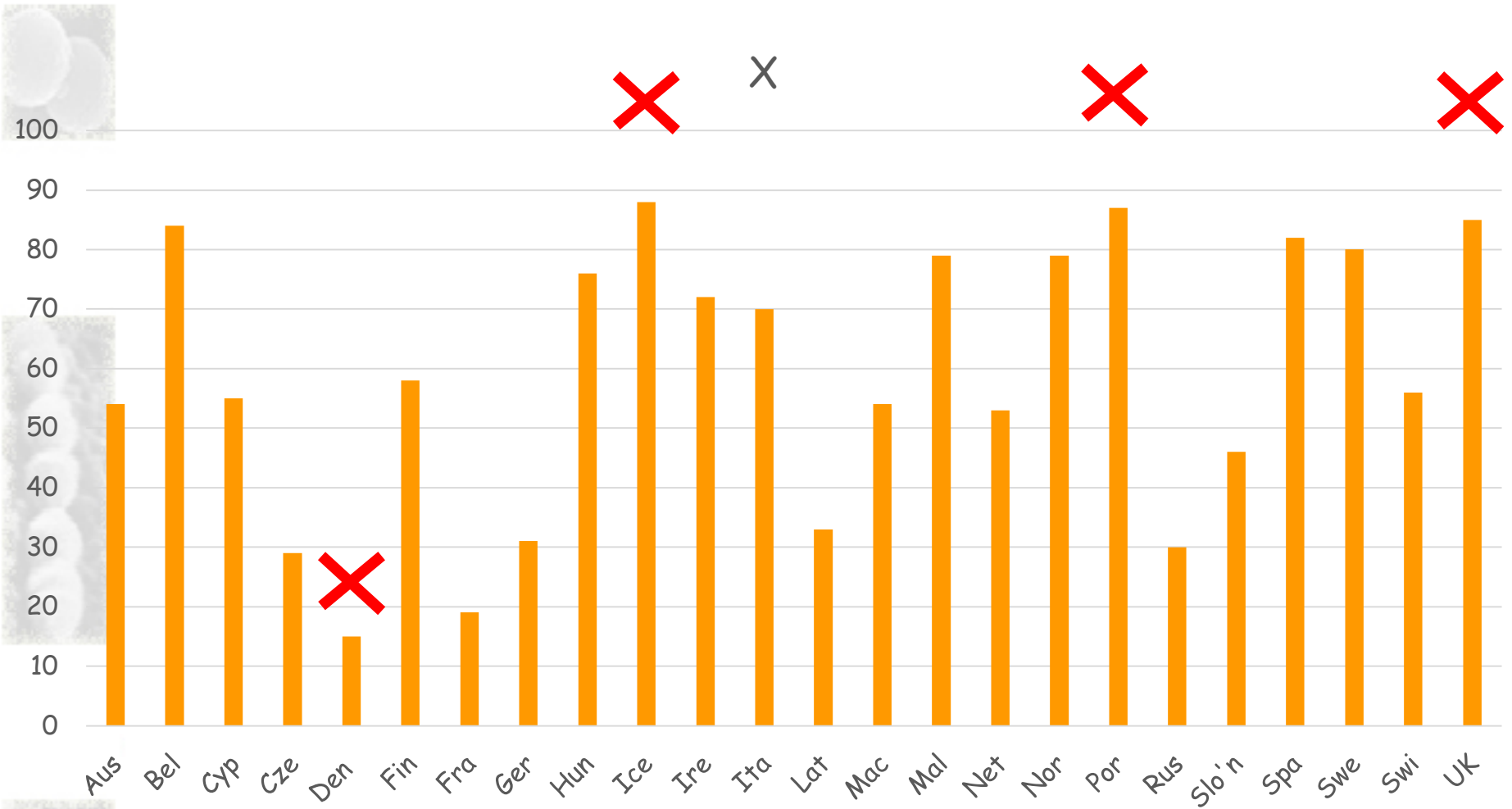
- 33,000 cases cervical cancer and 15,000 deaths every year
- 1 in 100 Europeans have genital warts - that's 7.4 million people!
- Preventing most of these deaths and all this suffering would be a:
VERY GOOD IDEA



2007
2008
2009
2010
Later..



% Coverage 2014..



B

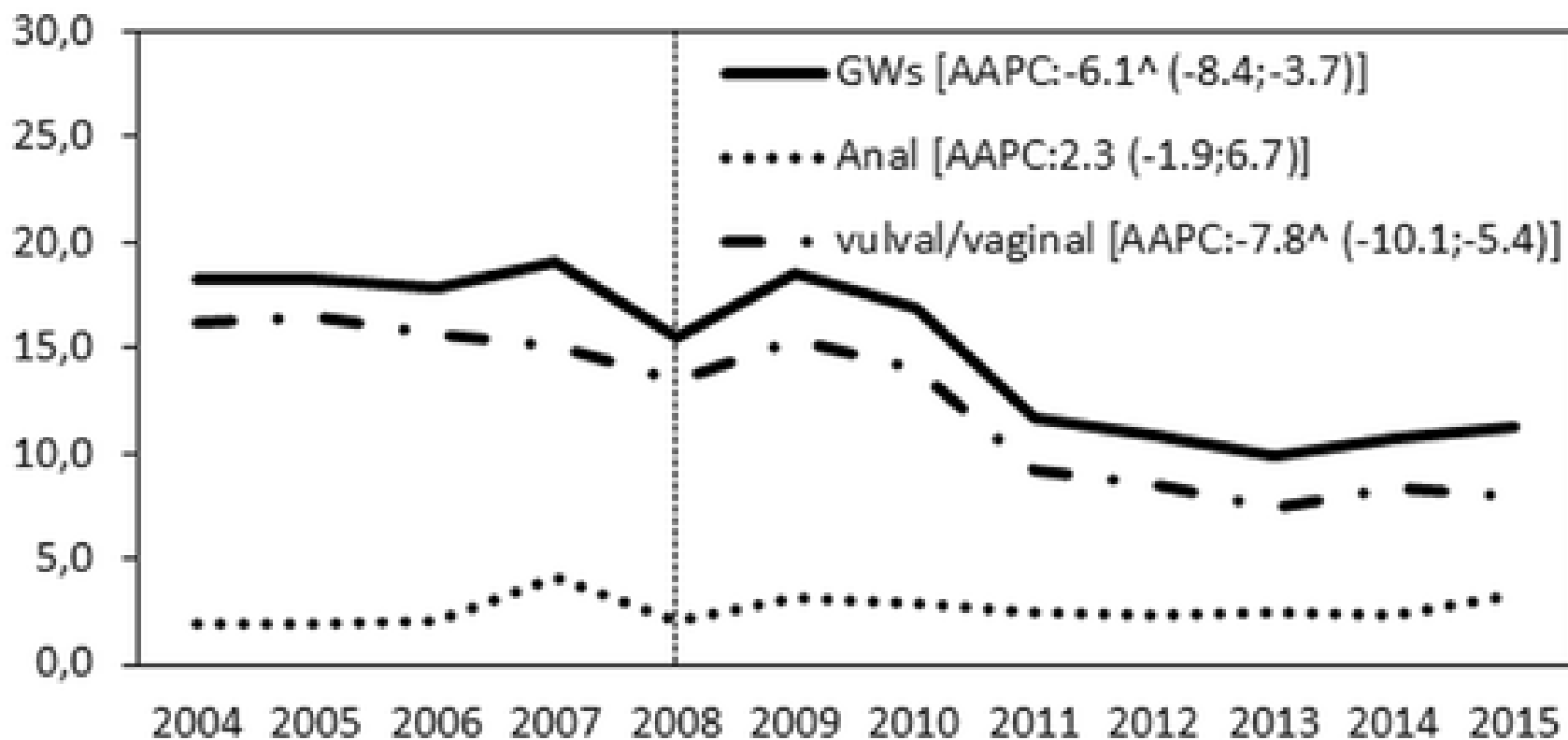
V

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Genital Warts - Veneto, Italy

Females



Cocchio et al BMC ID 2017

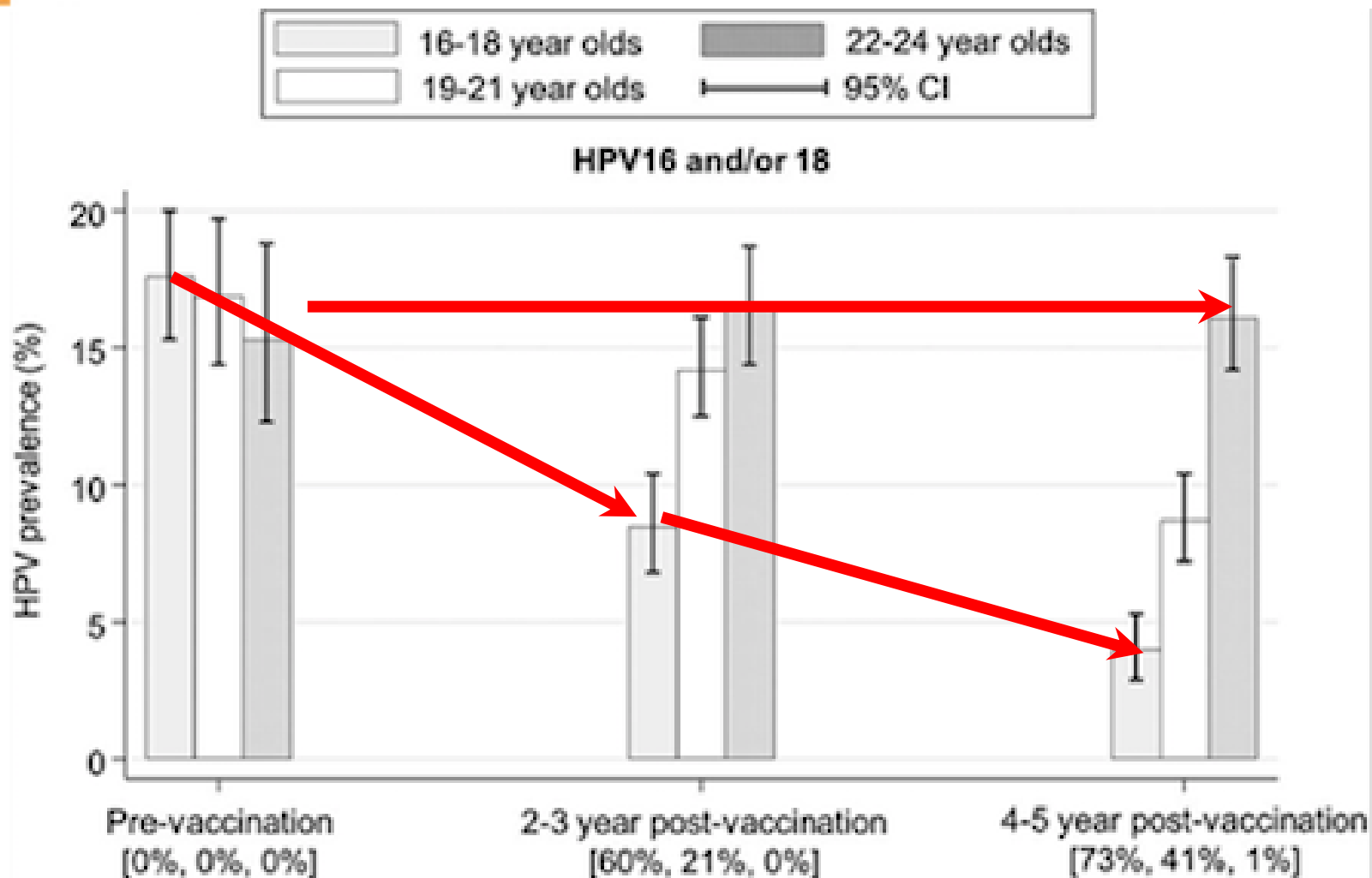
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HPV 16/18 prevalence - UK



Mesher et al BMJ Open 2016



Challenges for the future

- Communication...
- Delivery...
- Strategy...