Gender (in)equality in Human Papilloma Virus (HPV) vaccinations and treatment

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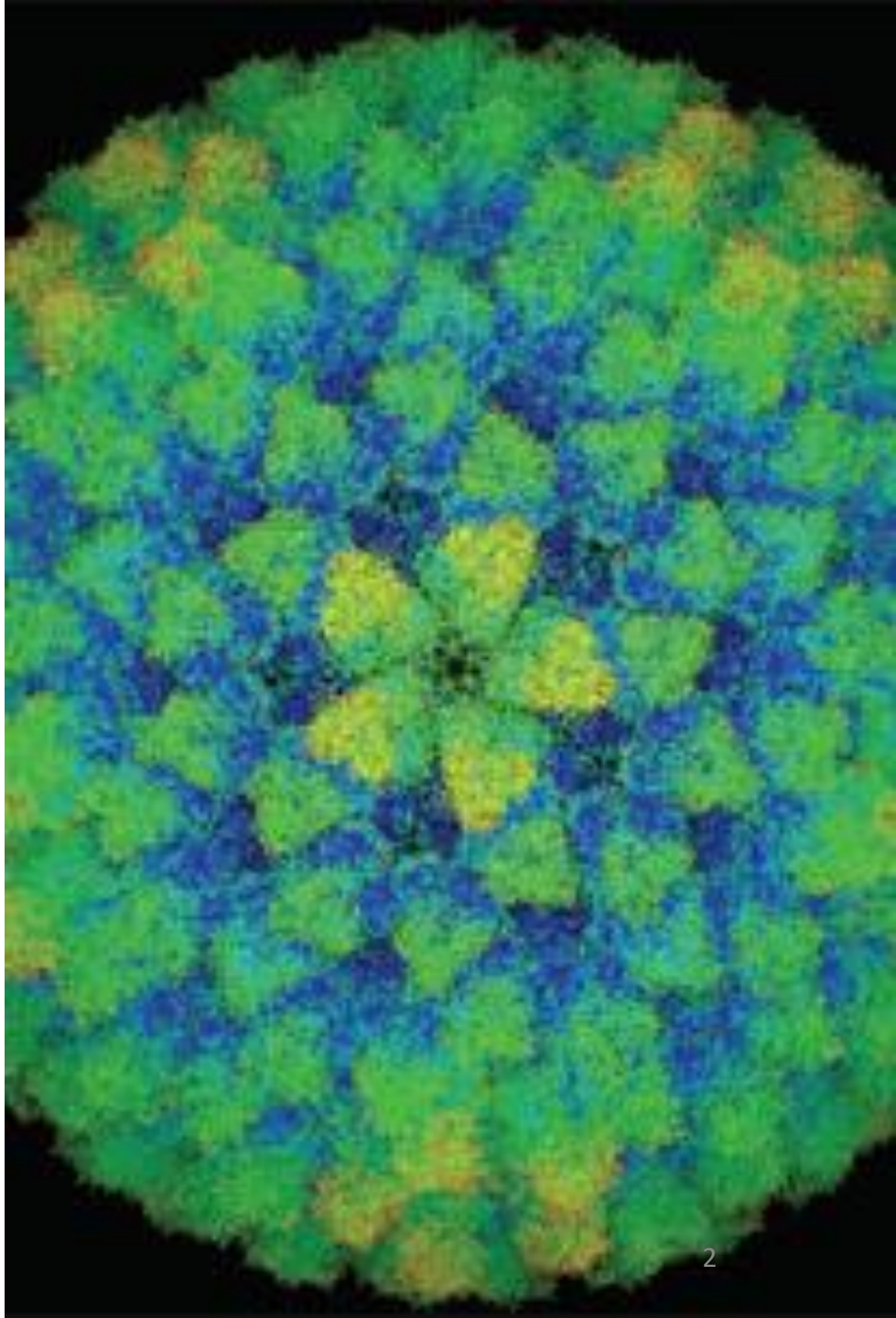
HPV virus: a gender neutral killer

- Four out of five (80%) of the world's population will contract some type of the virus once in their life via sexual contact [1]
- High risk types of HPV can cause cervical cancer in women as well as other cancers such as anal, mouth/throat and cancer of the penis in men [2]



HPV infection can be prevented

- Individuals who are not sexually active almost never develop genital HPV infections [3]
- HPV vaccination before sexual activity can reduce the risk of infection by the HPV types targeted by the vaccine [4]

GARDASIL®
Human Papillomavirus Vaccine
Types 6,11,16,18

Debate on vaccination strategies

Gender neutral vaccination

- Physicians recommend to vaccinate girls and boys

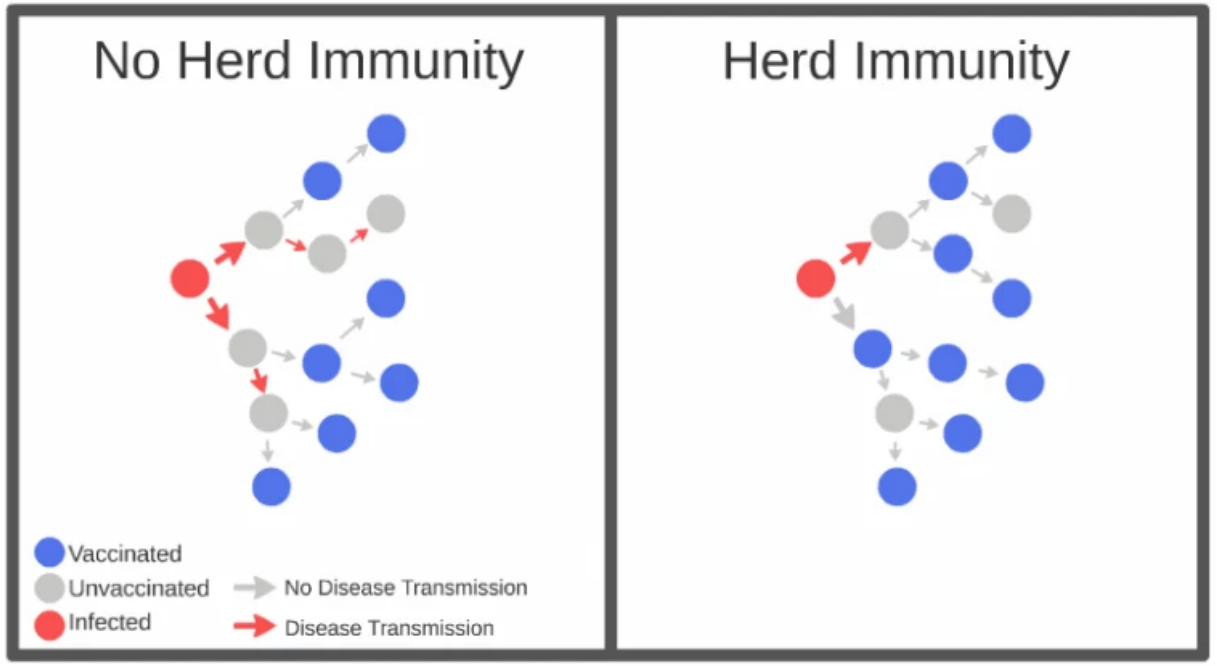
Selective vaccination

- Most of the National Health Systems in Europe continue to implement the selective immunization of 12-year-old girls only
- This policy decision is based purely on cost-effectiveness

How are boys protected if they are not vaccinated?

Herd immunity

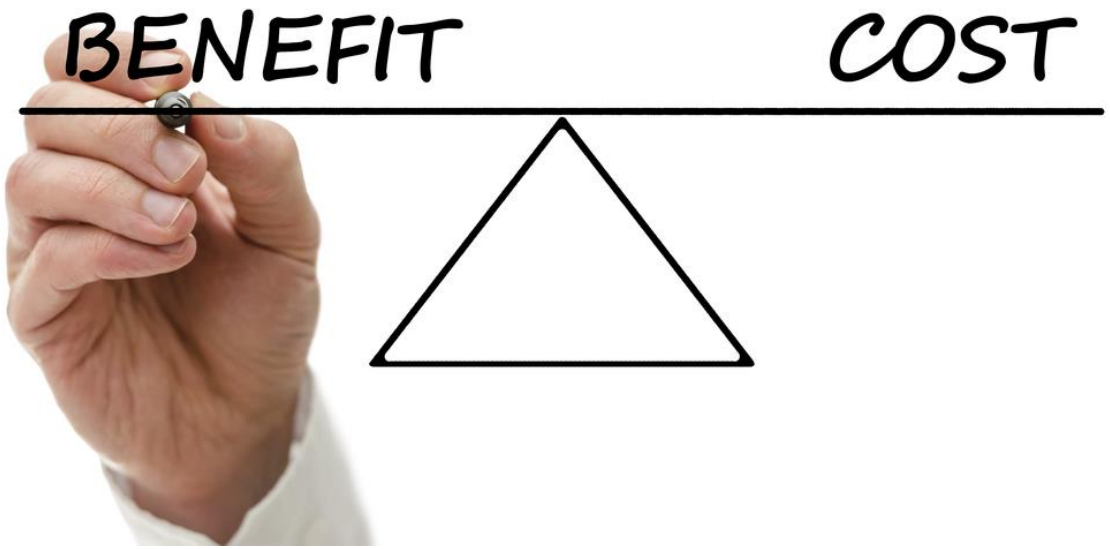
- The presence of enough immune (vaccinated) individuals in a community interrupts the transmission of an infective agent, thereby providing indirect protection to unvaccinated (susceptible) persons [5].



Our research: critical review of cost effectiveness studies (n=8)

What is cost-effectiveness?

- Form of economic analysis that compares the relative costs and outcomes (effects) of different interventions.
- If the incremental cost of a new intervention results below a given threshold, then it is cost-effective.



Outcome 1: a matter of price

Sensitivity to boundary conditions

- All the cost-effectiveness studies resulted extremely sensitive to the inputs used to inform the models
- In particular, adding boys to HPV vaccination became cost effective in all models at a threshold price/vial

Threshold price per vaccine vial

€28

at 2015 values

Outcome 2: ecological validity

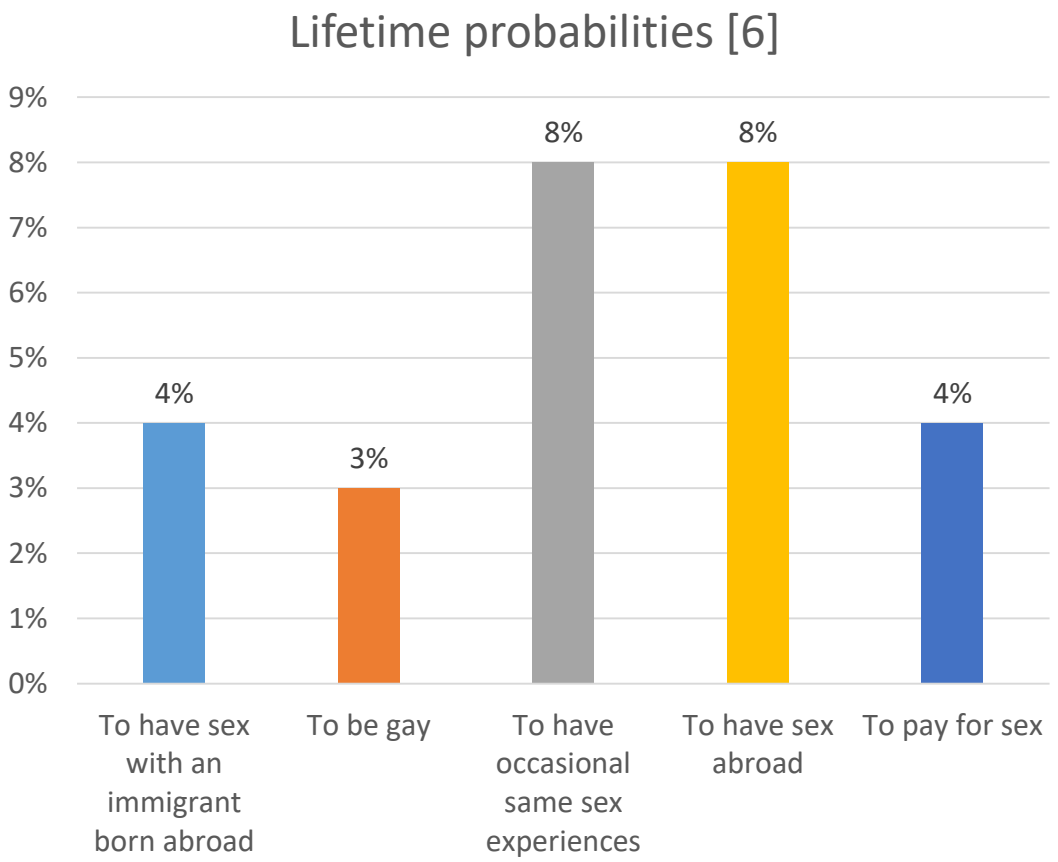
How well the models reflect our society?

- Closed population or cohort models: no immigration allowed
- Behaviours relevant to sexual mixing [6] ignored:
  - Sexual identity
  - Concurrent partnerships
  - Sex abroad
  - Pay for sex
  - Frequency of unprotected sex

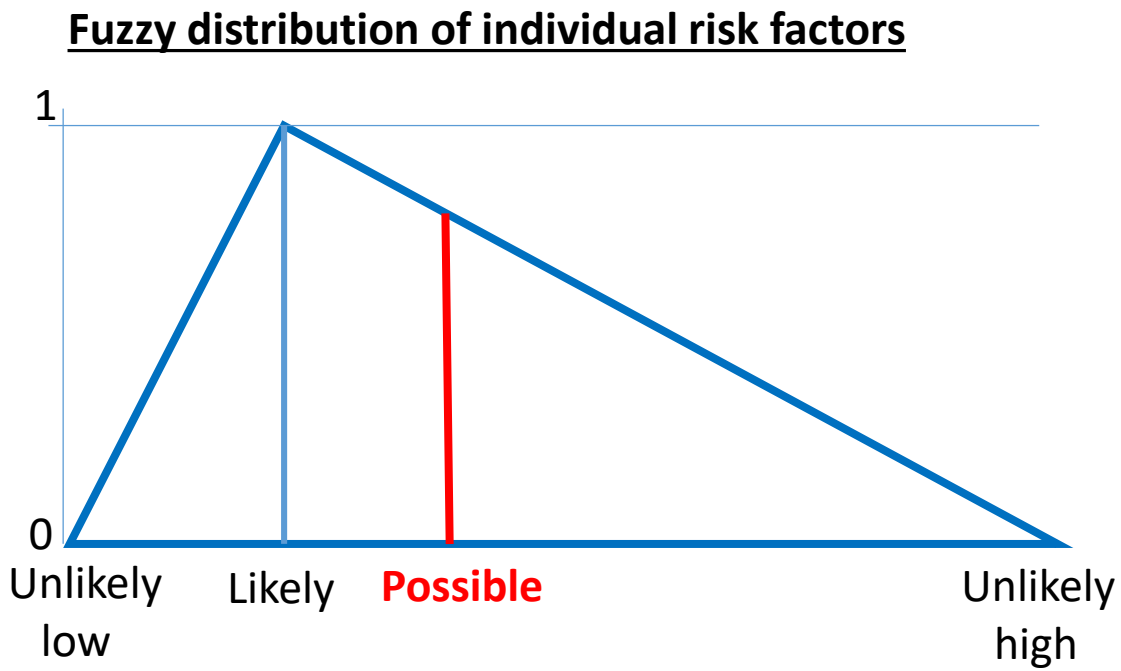
Implications

- The non-modelled behaviours related to sexual mixing may have produced an over-estimation of the impact of herd immunity [7]
- When we tested a credible hypothesis of 5% to 20% over-estimation of herd immunity, **most of the scenarios including gender neutral vaccination became cost-effective.**

About a 12 year old boy



In his life, an unvaccinated boy has a 4 to 5 % possibility to be unprotected by herd immunity…



…when it counts the most

MSM PAY FOR SEX SEX ABROAD

up to **44x** risk of HPV infection

vs. general population [8]

Conclusions

- The published cost effectiveness studies on HPV vaccination to boys are likely to over-estimate the benefits of herd effects on the unvaccinated population
- A relatively small (15 to 20%) over-estimation of herd immunity obtained with selective immunisation could induce a significant error in the estimate of the cost-effectiveness of gender neutral immunisation.

Offering the HPV vaccination to both boys and girls would be the most effective option for improving public health.

[Research Council UK, 2013]

References

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