

HIPS/26/1021 - Linking bacterial genomics to sexual health interventions: evaluating the impact of 4CMenB vaccine and doxyPEP on *Neisseria gonorrhoeae* in Scotland

Gonorrhoea is the second most common bacterial sexually transmitted infection (STI) in Scotland. Gonorrhoea is caused by a type of bacteria (*Neisseria gonorrhoeae*) that is becoming harder to treat because it readily becomes resistant to antibiotics. Untreated gonorrhoea can lead to serious health problems including infertility. *N. gonorrhoeae* has developed resistance to all available classes of antimicrobials, leaving ceftriaxone as the last line of antibiotic treatment. In 2024, the World Health Organisation classed *N. gonorrhoeae* as a priority pathogen to motivate prevention and control programmes. Two new prevention methods have recently become available for people who are at higher risk of catching bacterial STIs:

- A vaccine to reduce the chance of getting gonorrhoea
- Antibiotics that can be taken after unprotected sex to lower the chance of getting syphilis (doxyPEP)

These interventions represent significant steps forward, and the first time they have been used together anywhere in the world. However, we still need to understand how well they work together and how they affect the bacteria over time. This research project will study how *N. gonorrhoeae* reacts to the vaccine and to doxyPEP, focusing on whether it becomes harder to treat, spreads more easily, or finds ways to escape vaccine protection. Using bacterial genome sequencing we will be able to identify what makes the bacteria resistant, how transmission between people is affected, and whether the vaccine might lose effectiveness over time. This will help health services safeguard people now and design stronger protections for the future.