

RESEARCH LETTER

Molecular epidemiology of *Neisseria gonorrhoeae* clinical isolates in Reunion and Mayotte

Epidemiological surveillance of *Neisseria gonorrhoeae* has become a major issue, due to the increasing number of cases and the emergence of multidrug-resistant clinical isolates.¹ However, little is known about the epidemiology of *N. gonorrhoeae* in the Indian Ocean. We conducted a retrospective study between 20 October 2016 and 10 April 2017 to characterise the main circulating genotypes of *N. gonorrhoeae* and their resistance profiles on two islands in the Indian Ocean, Reunion and Mayotte. These islands are part of French overseas territories, and are populated by approximately 860 000 and 250 000 inhabitants, respectively. In total, 206 *N. gonorrhoeae* isolates were obtained within a network of 40 private and hospital laboratories, and 88 viable isolates (72 from Reunion and 16 from Mayotte) were selected at random for further microbiological and molecular investigations. Minimum inhibitory concentrations (MICs) were determined for six antibiotics using E-tests (Biomérieux, Marcy l'Etoile, France) and interpreted according to European Committee on Antimicrobial Susceptibility Testing (EUCAST) recommendations.² Genotyping was performed using the NG-MAST technique (*Neisseria gonorrhoeae* multi-antigen sequence typing).³ *N. gonorrhoeae* isolates were recovered from symptomatic patients, 38 women (43.2%) and 50 men (56.8%), with a median age of 25 years.

On both islands, the genotypic diversity was low (figure 1). Most isolates from Mayotte belonged to ST9993 (5/16, 31.3% (8.5%–54.0%)) or ST12496 (4/16, 25.0% (3.8%–46.2%)). All ST9993 and ST12496 isolates were penicillinase-producing *N. gonorrhoeae* and ciprofloxacin-resistant, and highly resistant to tetracycline. This high level of resistance suggests that surveillance should be reinforced on this island. The epidemiology of *N. gonorrhoeae* isolates on this island is particularly complex, with 50% of the population of Mayotte originating from other countries, mainly from East Africa.

Most isolates from Reunion belonged to ST5441 (18/72, 25.0% (15.0%–35.0%)), ST2318 (16/72, 22.2% (12.6%–31.8%))

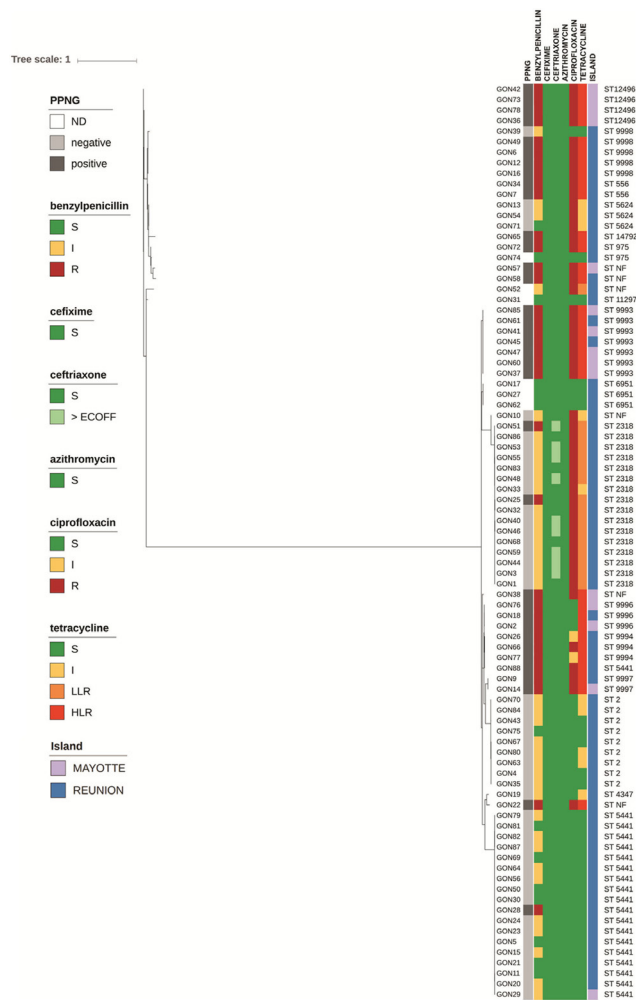



Figure 1 Phylogenetic tree of concatenated *porB* and *tbpB* sequences of *Neisseria gonorrhoeae* isolates, including resistance patterns, location and ST. HLR, high level of resistance (MIC >16 mg/L); I, intermediate; LLR, low level of resistance (1 < MIC ≤ 16 mg/L); MIC, minimum inhibitory concentrations; ND, not determined; PPNG, penicillinase-producing *Neisseria gonorrhoeae*; R, resistant; S, susceptible; ST, Sequence Typing.

and ST2 (9/72, 12.5% (4.9%–20.1%)). The ST5441 and ST2 isolates were fully susceptible to ceftriaxone and ciprofloxacin, and all ST2318 isolates were resistant to ciprofloxacin, and 9/16 displayed a MIC of ceftriaxone of 0.064 mg/L, that is above the ECOFF (ECOFF: epidemiological cut-off). Interestingly, ST2 and ST5441 were among the most frequent genotypes in mainland France in 2017, accounting for 6.4% and 3.6% of cases, respectively.⁴ These results suggest the impact of population flows between mainland France and Reunion on the local *N. gonorrhoeae* epidemiology. Conversely, ST2318 is poorly represented in France⁴ but predominates in China, particularly in *N. gonorrhoeae* isolates with high MICs for ceftriaxone.⁵ The strong representation of this clonal complex in Reunion probably reflects the presence of a large Chinese community on this island.

Altogether, our results underline the link between the epidemiological features of *N. gonorrhoeae* and population flow in our island study model.

Our data should be interpreted with some caution due to several limitations of our study: (i) the sample size is small, particularly for Mayotte, (ii) the genomic data were obtained through NG-MAST analysis. Moreover, the clinical data are limited, and information about sexual orientations or patient origins should be investigated in further studies for a better understanding of *N. gonorrhoeae* epidemiology. This work paves the way for further in-depth studies. Indeed, the French National Reference Centre for Bacterial STIs has recently reinforced *N. gonorrhoeae* surveillance in French overseas territories,⁴ to improve control of the spread of *N. gonorrhoeae* isolates, particularly those with a high MIC for ceftriaxone.

Hervé Jacquier ^{1,2} Guillaume Miltgen,^{3,4}
 Damien Hoarau,³ Sylvain Kumanski,²
 Olivier Rollot,⁵ Sandrine Bruniquet,⁴
 Ndeindo Ndeikoundam,⁶ Ghislaine Li Pat-Yuen,⁴
 Olivier Belmonte,⁴ Beatrice Bercot,^{1,7}
 Bénédicte Roquebert^{3,4}

¹IAME, INSERM UMR 1137, Université de Paris, Paris, France

²Department of Infectious Agents, French National Reference Center for Bacterial STI, Associated Laboratory for Gonococci, Hospital Group Saint-Louis Lariboisiere and Fernand-Widal, Paris, France

³CNRS 9192, INSERM U1187, IRD 249, Unité Mixte Processus Infectieux en Milieu Insulaire Tropical (PIMIT), Plateforme Technologique CYROI, Université de la Réunion, Sainte-Clotilde, Réunion

⁴Microbiology Laboratory, Felix Guyon University Hospital Center, Saint-Pierre, La Réunion, Réunion

⁵INSERM CIC 1410, INSERM, Saint-Pierre, Réunion

⁶STI Program, Sante Publique France, Saint-Maurice, Île-de-France, France

⁷Department of Infectious Agents, Hospital Group Saint-Louis Lariboisiere and Fernand-Widal, Paris, France

Correspondence to Professor Beatrice Bercot, Department of Infectious Agents, Hospital Group Saint-Louis Lariboisiere and Fernand-Widal, 75013 Paris, France; beatrice.bercot@aphp.fr

Correction notice The article has been corrected since it was published online first. The first author's name has been amended to Hervé Jacquier.

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ORCID iD

Hervé Jacquier <http://orcid.org/0000-0002-6323-5910>

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