Supplementary appendix

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Supplement to: Unemo M, Lahra MM Escher M, et al. WHO global antimicrobial resistance surveillance for Neisseria gonorrhoeae 2017–18: a retrospective observational study. Lancet Microbe 2021; published online Sept 2. https://doi.org/10.1016/S2666-5247(21)00171-3.
Table S1: Number of Neisseria gonorrhoeae isolates tested for susceptibility to ceftriaxone, cefixime, azithromycin, and ciprofloxacin by year and country

| Member states   | Year | CRO | CFM | AZM | CIP |
|-----------------|------|-----|-----|-----|-----|
| Argentina       | 2017 | 903 | 903 | 903 | 903 |
| Argentina       | 2018 | 868 | 868 | 868 | 868 |
| Australia       | 2017 | 7835| ND  | 7835| 7835|
| Australia       | 2018 | 9006| ND  | 9006| 8895|
| Austria         | 2017 | 262 | 262 | 262 | 262 |
| Austria         | 2018 | 267 | 267 | 267 | 267 |
| Bahrain         | 2017 | 15  | ND  | ND  | 15  |
| Belarus         | 2017 | 36  | 36  | 36  | 36  |
| Belarus         | 2018 | 19  | 19  | 19  | 19  |
| Belgium         | 2017 | 98  | 98  | 98  | 98  |
| Belgium         | 2018 | 180 | 174 | 180 | 180 |
| Bhutan          | 2017 | 232 | ND  | 233 | 233 |
| Bhutan          | 2018 | 174 | ND  | 315 | 315 |
| Cambodia        | 2017 | ND  | ND  | 13  | 13  |
| Cambodia        | 2018 | 7   | ND  | 7   | 7   |
| Canada          | 2017 | 2930| 2936| 2935| 2936|
| Canada          | 2018 | 3123| 3122| 3123| 3123|
| Chile           | 2018 | 2091| 2091| 2091| 2091|
| China           | 2017 | 1474| ND  | 1474| 1474|
| Colombia        | 2017 | ND  | 171 | 185 | 187 |
| Colombia        | 2018 | ND  | 182 | 183 | 183 |
| Cote d'Ivoire   | 2017 | 45  | 45  | 45  | 45  |
| Cote d'Ivoire   | 2018 | 30  | 30  | 30  | 30  |
| Croatia         | 2017 | 6   | 6   | 6   | 6   |
| Croatia         | 2018 | 10  | 10  | 10  | 10  |
| Cuba            | 2017 | ND  | 33  | 32  | 33  |
| Cuba            | 2018 | ND  | 26  | 26  | 23  |
| Cyprus          | 2017 | 2   | 2   | 2   | 2   |
| Cyprus          | 2018 | 5   | 5   | 5   | 5   |
| Czech Republic  | 2017 | 104 | 104 | 104 | 104 |
| Czech Republic  | 2018 | 95  | 95  | 95  | 95  |
| Denmark         | 2017 | 118 | 118 | 118 | 118 |
| Denmark         | 2018 | 114 | 112 | 114 | 114 |
| Dominican Republic | 2017 | 157 | 157 | ND  | 157 |
| Dominican Republic | 2018 | 159 | 159 | ND  | 159 |
| Ecuador         | 2017 | 5   | 5   | ND  | 5   |
| Ecuador         | 2018 | ND  | 5   | 5   | 5   |
| El Salvador     | 2017 | ND  | 16  | ND  | 16  |
| Estonia         | 2017 | 2   | 2   | 2   | 2   |
| Estonia         | 2018 | 7   | 7   | 7   | 7   |
| Fiji            | 2018 | 6   | ND  | ND  | 51  |
| Finland         | 2017 | 212 | 210 | 212 | 212 |
| Finland         | 2018 | 168 | 168 | 168 | 168 |
| France          | 2017 | 110 | 110 | 110 | 110 |
| France          | 2018 | 109 | 109 | 109 | 109 |
| Country                              | 2017 | 2018 | 2017 | 2018 |
|--------------------------------------|------|------|------|------|
| Germany                              | 200  | 200  | 200  | 200  |
| Germany                              | 201  | 201  | 201  | 201  |
| Greece                               | 89   | 89   | 89   | 89   |
| Greece                               | 83   | 83   | 83   | 83   |
| Hungary                              | 62   | 62   | 62   | 62   |
| Hungary                              | 89   | 89   | 89   | 89   |
| Iceland                              | 43   | 43   | 43   | 40   |
| Iceland                              | 45   | 45   | 45   | 45   |
| India                                | 28   | ND   | 28   | 28   |
| India                                | 32   | ND   | 32   | 32   |
| Ireland                              | 163  | 163  | 163  | 163  |
| Ireland                              | 200  | 199  | 200  | 198  |
| Italy                                | 100  | 100  | 100  | 100  |
| Italy                                | 100  | 100  | 100  | 100  |
| Japan                                | 523  | ND   | 524  | 524  |
| Japan                                | 692  | ND   | 692  | 607  |
| Kenya                                | 96   | 96   | 96   | 96   |
| Republic of Korea                    | 89   | ND   | 89   | 89   |
| Republic of Korea                    | 115  | ND   | 115  | 115  |
| Lao People's Democratic Republic     | 80   | ND   | ND   | 80   |
| Lao People's Democratic Republic     | 64   | ND   | ND   | 65   |
| Latvia                               | 4    | 4    | 4    | 4    |
| Latvia                               | 5    | 5    | 5    | 5    |
| Luxembourg                           | 18   | 18   | 18   | 18   |
| Luxembourg                           | 1    | 1    | 1    | 1    |
| Madagascar                           | 40   | ND   | 38   | 44   |
| Madagascar                           | 81   | ND   | 26   | 82   |
| Malaysia                             | 207  | ND   | ND   | 203  |
| Malaysia                             | 170  | ND   | ND   | 165  |
| Malta                                | 27   | 27   | 27   | 27   |
| Malta                                | 25   | 25   | 25   | 25   |
| Mongolia                             | 282  | ND   | 432  | 266  |
| Mongolia                             | 129  | ND   | 262  | 327  |
| Netherlands                          | 342  | 342  | 342  | 342  |
| Netherlands                          | 402  | 401  | 402  | 402  |
| New Zealand                          | 456  | ND   | 304  | 455  |
| Norway                               | 107  | 107  | 107  | 107  |
| Norway                               | 126  | 126  | 126  | 126  |
| Oman                                 | 24   | ND   | ND   | 24   |
| Oman                                 | 11   | ND   | ND   | 11   |
| Pakistan                             | 32   | ND   | 32   | 32   |
| Pakistan                             | 1    | ND   | 47   | 48   |
| Panama                               | ND   | 9    | ND   | 9    |
| Paraguay                             | 36   | 36   | ND   | 36   |
| Peru                                 | 89   | 89   | 89   | 89   |
| Peru                                 | 77   | 77   | 77   | 77   |
| Philippines                          | 119  | ND   | 112  | 157  |
| Philippines                          | 99   | 95   | 48   | 100  |
| Country              | 2017  | 2018  |
|----------------------|-------|-------|
| Poland               | 65    | 73    |
| Portugal             | 110   | 122   |
| Qatar                | 78    | 200   |
| Saudi Arabia         | 42    | 64    |
| Singapore            | 58    | 200   |
| Slovakia             | 110   | 77    |
| Slovenia             | 133   | 155   |
| South Africa         | 286   | 167   |
| Spain                | 421   | 421   |
| Sri Lanka            | 63    | 24    |
| Sweden               | 100   | 200   |
| Switzerland          | 41    | 110   |
| Thailand             | 428   | 218   |
| Tonga                | ND    | ND    |
| Tunisia              | 5     | ND    |
| Uganda               | 147   | 340   |
| Ukraine              | 14    | 340   |
| United Arab Emirates | 51    | 5     |
| United Kingdom       | 240   | 5061  |
| United States of America | 5160 | 5160  |
| Vietnam              | 197   | 197   |

CRO, ceftriaxone; CFM, cefixime; AZM, azithromycin; CIP, ciprofloxacin; ND, not determined
**Table S2:** Empirical first-line treatments for uncomplicated gonorrhoea (urogenital, rectal, and pharyngeal) recommended in the WHO global, European, and some main national gonorrhoea guidelines

| WHO Global¹ | Europe² | United Kingdom³ | Australia⁴ | USA⁵ | Canada⁶ | Japan⁷ | China⁸ |
|------------|--------|----------------|-----------|------|--------|--------|--------|
| **Recommended first-line regimen(s)²** | Ceftriaxone 250 mg IM PLUS Azithromycin 1 g orally | Ceftriaxone 1 g IM PLUS Azithromycin 2 g orally OR Ceftriaxone 1 g IM (only where ceftriaxone susceptibility confirmed, TOC is mandatory, patient likely to return for TOC, and doxycycline therapy is given if C. trachomatis has not been excluded)⁶ | Cefixime 400 mg orally PLUS Azithromycin 1 g orally | Ceftriaxone 500 mg IM PLUS Azithromycin 1 g orally (Urogenital and Rectal) OR Ceftriaxone 500 mg IM PLUS Azithromycin 2 g orally (Pharyngeal) | Ceftriaxone 500 mg IM PLUS Azithromycin 1 g orally OR Cefixime 800 mg orally PLUS Azithromycin 1 g orally (Only Urogenital and Rectal, and not Pharyngeal) | Ceftriaxone 250 mg IM PLUS Azithromycin 1 g orally | Ceftriaxone 1 g IV or IM OR Spectinomycin 2 g IM (if not Pharyngeal infection) OR Azithromycin 2 g orally may be considered. |
| **Recommended regimen when first-line therapy failed** | Ceftriaxone 500 mg IM PLUS Azithromycin 2 g orally OR Cefixime 800 mg orally PLUS Azithromycin 2 g orally OR Gentamicin 240 mg IM PLUS Azithromycin 2 g orally | Spectinomycin 2 g IM PLUS Azithromycin 2 g orally OR Gentamicin 240 mg IM PLUS Azithromycin 2 g orally OR Gentamicin 240 mg IM PLUS Azithromycin 2 g orally | Seek specialist advice | Gentamicin 240 mg IM PLUS Azithromycin 2 g Clinicians should obtain relevant clinical specimens for culture and antimicrobial susceptibility testing, consult an infectious disease specialist or STD clinical expert (https://www.stdccn.org/) for guidance in clinical management. | It is strongly recommended that treatment be guided by antimicrobial susceptibility test results to determine the appropriate antimicrobial agent in consultation with an expert in infectious diseases and local public health authorities. | Spectinomycin 2 g IM (if not Pharyngeal infection) OR Azithromycin 2 g orally may be considered. | Ceftriaxone 1 g IV or IM daily for 3 days OR If not given as first-line, spectinomycin 2 g IM (4 g for cervicitis) NOTE: Gentamicin regimen is recommended and used by some experts. |
| OR | OR |
|----|----|
| Spectinomycin 2 g IM PLUS Azithromycin 2 g orally | Azithromycin 2 g orally (all listed as alternative treatments) |

IM, intramuscularly; TOC, test of cure; IV, intravenously

*When antimicrobial susceptibility is unknown

*Recommended doxycycline therapy of 100 mg orally twice daily for 7 days
Figure legends

**Figure S1:** Percentage (%) of isolates with decreased susceptibility or resistance (‘Resistance’) to ceftriaxone reported to WHO Global GASP/GLASS in 2017. For Cambodia, Chile, Fiji, Kenya, Paraguay and Uruguay, the data are from 2018 (no data reported in 2017). Due to the low number of isolates in several countries (Table S1), interpretations of AMR levels in these countries should be done with great caution. Not applicable: disputed territories (Western Sahara, Jammu and Kashmir) and no data were available from these regions. **Disclaimer:** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

**Figure S2:** Percentage (%) of isolates with decreased susceptibility or resistance (‘Resistance’) to cefixime reported to WHO Global GASP/GLASS in 2017. For Chile, Kenya, Panama, Paraguay, Philippines and Uruguay, the data are from 2018 (no data reported in 2017). Due to the low number of isolates in several countries (Table S1), interpretations of AMR levels in these countries should be done with great caution. Not applicable: disputed territories (Western Sahara, Jammu and Kashmir) and no data were available from these regions. **Disclaimer:** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

**Figure S3:** Percentage (%) of isolates with resistance to azithromycin reported to WHO Global GASP/GLASS in 2017. For Chile, Ecuador, Kenya and Uruguay, the data are from 2018 (no data reported in 2017). Due to the low number of isolates in several countries (Table S1), interpretations of AMR levels in these countries should be done with great caution. Not applicable: disputed territories (Western Sahara, Jammu and Kashmir) and no data were available from these regions. **Disclaimer:** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

**Figure S4:** Percentage (%) of isolates with resistance to ciprofloxacin reported to WHO Global GASP/GLASS in 2017. For Chile, Fiji, Kenya, Panama, Paraguay and Uruguay, the data are from 2018 (no data reported in 2017). Due to the low number of isolates in several countries (Table S1), interpretations of AMR levels in these countries should be done with great caution. Not applicable: disputed territories (Western Sahara, Jammu and Kashmir) and no data were available from these regions. **Disclaimer:** The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of WHO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.
Figure S1
Figure S2
Figure S3
Figure S4
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