Supplementary Material

The gonorrhoea care cascade in general practice: a descriptive study to explore gonorrhoea management utilising electronic medical records

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Supplementary Table S1. Intracluster correlation coefficients

	Number of general practices	Number of observations	Number of observations per unit			Intra-class correlation coefficient (ICC)[1]	95% CI of ICC
			Minimum	Mean	Max		
Gonorrhoea testing	73[4]	1,027,337	2,943	14,073.1	40,156	0.034	0.021 – 0.046
Gonorrhoea positivity	73[4]	57,653	48	789.8	4,751	0.006	0.003 – 0.009
Gonorrhoea treatment	68[5]	637	1	9.4	115	0.527[2]	0.354 – 0.701
Gonorrhoea retesting	45[6]	206	1	4.6	26	0[3]	0 – 0.093

1. ICC estimated using one way analysis of variance. 2. This ICC relates to the subgroup of gonorrhoea positivity cluster. 3. This ICC relates to the subgroup of gonorrhoea treatment cluster. 4. Seven of them were multisite general practices. 5. Five of these were multisite general practices. 6. Three of these were multisite general practices.

Sub-group analyses for pattern of gonorrhoea testing, treatment and retesting for males only

We re-analysed the pattern of gonorrhoea testing, treatment and retesting for males only as 97.7% of the patients who had TD/FTC prescription (n = 1,187) were males (Supplementary Tables S2 and S3). The pattern and associated factors of gonorrhoea care cascade were similar to the analyses that included all patients. Particularly, gonorrhoea testing, positivity and retesting in males were higher amongst those with TD/FTC prescription than those without.

Gonorrhoea Testing and Positivity in males (Supplementary Table S2)

Gonorrhoea testing in males was approximately 3.0% each year (Supplementary S2). Gonorrhoea testing in males was similar in 2018 (3.5%) and 2019 (3.6%), but was lower in 2020 (3.0%, aOR 0.84, 95% CI 0.77-0.91). Gonorrhoea testing was higher in those with TD/FTC prescriptions (83.3%, aOR 120.61, 95% CI 90.02-161.58) than those without, and 20-24-year-olds (8.7%, aOR 2.20, 95% CI 1.80-2.68) and 25-29-year-olds (8.3%, aOR 2.00, 95% CI 1.47-2.72) than 16-19-year-olds (4.0%).

Overall, gonorrhoea positivity in males was approximately 3.0% (Supplementary Table S2). Gonorrhoea positivity was higher in those with TD/FTC prescriptions (13.8%, aOR 7.17, 95% CI 5.39-9.54). Gonorrhoea positivity was approximately 3.0 % in all age groups except 16-19-year-olds (1.8%) and 60-89-year-olds (0.5%).

Of the gonorrhoea tests performed, 0.4% (n = 59) did not have test results and 0.03% (n = 5) had indeterminate/equivocal test results. These 64 gonorrhoea tests were excluded from the denominator of gonorrhoea positivity in males.

Gonorrhoea Treatment in males (Supplementary Table S3)

Overall, 52.9% (n = 212) of the gonorrhoea cases had recorded prescriptions of both ceftriaxone and azithromycin antibiotics within 31 days from the sample collection date (Supplementary Table S3). The proportion of gonorrhoea cases with recorded prescriptions of the two antibiotics in males was lower in regional clinics (10.4%, aOR 0.08, 95% CI 0.01-0.51) than in metropolitan clinics (57.6%), and was higher in 2020 (56.3%, aOR 2.02, 95% CI 1.26-3.22) than in 2018 (43.3%).

Of those without recorded prescriptions of ceftriaxone and azithromycin (n = 233), 83.3% (n = 194) reattended clinics within 31 days from the sample collection date (or from the

antibiotic prescription date if either ceftriaxone or azithromycin was prescribed) but still did not have recorded prescriptions of the two antibiotics.

Gonorrhoea Retesting in males (Supplementary Table S3)

Among the gonorrhoea cases that had recorded prescriptions of ceftriaxone and azithromycin in 2018 and 2019 (n = 140), 26.4% (n = 37) were retested within 42–182 days after treatment (Supplementary Table C). Gonorrhoea retesting in male was higher in those with TD/FTC prescription (61.5%, aOR 8.71, 95% CI 2.67-28.44) than those without (18.4%). Gonorrhoea retesting in male was above 25.0% in all age groups except 20-24-year-olds (16.0%) and 40-49-year-old (16.7%).

Of the gonorrhoea cases not retested within 42-182 days (n = 103), 55.3% (n = 57) reattended the clinic within 6 months after treatment but were not re-tested.

Supplementary Table S2. Factors associated with gonorrhoea testing and positivity in male patients.

	Gonorrhoea testing in males								Gonorrhoea positivity in males							
	Clinical episodes	Tests performed	Univariable			Multivariable			Test performed[1]	Positive cases	Univariable			Multivariable		
	N	n (%)	OR[2]	95% CI	p	aOR[3]	95% CI	p	N	n (%)	OR[2]	95% CI	p	aOR[3]	95% CI	p
Overall	454,648	15,310 (3.37)							15,246	445 (2.92)						
Year					< 0.001			< 0.001					0.242			0.142
2018	144,875	5,051 (3.49)	Ref			Ref			4,991	141 (2.83)	Ref			Ref		
2019	156,638	5,598 (3.57)	1.03	0.94 – 1.12		0.98	0.90 - 1.08		5,595	176 (3.15)	1.12	0.94 – 1.33		0.99	0.80 – 1.24	
2020	153,135	4,661 (3.04)	0.87	0.80 – 0.94		0.84	0.77 - 0.91		4,660	128 (2.75)	0.97	0.72 – 1.31		0.78	0.55 – 1.11	
GP location					< 0.001			0.006					0.022			0.151
Metropolitan	277,945	10,495 (3.78)	Ref			Ref			10,433	337 (3.23)	Ref			Ref		
Regional	62,393	2,978 (4.77)	1.28	0.63 – 2.61		1.39	0.76 – 2.55		2,977	77 (2.59)	0.80	0.50 – 1.27		0.75	0.53 – 1.06	
Rural	1143,10	1,837 (1.61)	0.42	0.26 – 0.66		0.64	0.44 – 0.99		1,836	31 (1.69)	0.51	0.32 – 0.83		0.71	0.45 – 1.13	
TD/FTC Med					< 0.001			< 0.001					< 0.001			< 0.001
No	453,461	14,321 (3.16)	Ref			Ref			14,258	309 (2.17)	Ref			Ref		
Yes	1,187	989 (83.32)	153.17	116.42 – 201.51		120.61	90.02 – 161.58		988	136 (13.77)	7.21	5.63 – 9.22		7.17	5.39 – 9.54	
Age group, years					<0.001			< 0.001					< 0.001			0.052
16-19	22,301	888 (3.98)	Ref			Ref			886	16 (1.81)	Ref			Ref		
20-24	33,949	2,945 (8.67)	2.29	1.83 – 2.87		2.20	1.80 – 2.68		2,927	77 (2.63)	1.47	0.85 – 2.54		1.20	0.68 – 2.15	
25-29	40,694	3,358 (8.25)	2.17	1.50 – 3.13		2.00	1.47 – 2.72		3,333	108 (3.24)	1.82	0.94 – 3.54		1.26	0.60 – 2.63	
30-39	85,079	4,321 (5.08)	1.29	0.88 – 1.89		1.20	0.88 – 1.64		4,312	148 (3.43)	1.93	1.08 – 3.47		1.31	0.67 – 2.59	
40-49	72,781	1,908 (2.62)	0.65	0.48 – 0.88		0.61	0.47 – 0.80		1,905	59 (3.10)	1.74	1.08 – 2.81		1.22	0.76 – 1.94	
50-59	70,207	1,086 (1.55)	0.38	0.29 – 0.49		0.37	0.29 – 0.48		1,080	30 (2.78)	1.55	0.81 – 2.99		1.15	0.63 – 2.09	
60-89	129,637	804 (0.62)	0.15	0.11 – 0.20		0.16	0.12- 0.21		803	7 (0.87)	0.48	0.19 – 1.19		0.42	0.17 – 1.01	

CI, confidence interval.

1. Excludes gonorrhoea tests performed that had indeterminate/ equivocal result (n = 5) or did not have test results (n = 59).

2. Unadjusted odds ratio (OR) were estimated using univariable regression model with robust standard errors.

3. Adjusted odds ratio (aOR) were estimated using multivariable regression model with robust standard errors, including all explanatory variables (year, clinic location, TD/FTC medication and age group) in the same model.

Supplementary Table S3. Factors associated with gonorrhoea treatment and re-testing in male patients.

| | Gonorrhoea treatment in males (antibiotic prescription pattern) | | | | | | | | Gonorrhoea re-testing in 2018 and 2019 in males[3] | | | | | | | |
| | Positive cases | Cases with dual antibiotics | Univariable | | | Multivariable | | | Cases with dual antibiotics | Re-tested case | Univariable | | | Multivariable | | |
	N	n (%)	OR[1]	95% CI	p	aOR[2]	95% CI	p	N	n (%)	OR[1]	95% CI	p	aOR[2]	95% CI	p
Overall	445	212 (52.91)		26.89 – 68.39					140	37 (26.43)		15.98 – 36.88				
Year					0.025			0.008								0.057
2018	141	61 (43.26)	Ref			Ref			61	11 (18.03)	Ref			Ref		
2019	176	79 (44.89)	1.07	0.65 – 1.74		1.32	0.78 – 2.23		79	26 (32.91)	2.23	1.20 – 4.14	0.011	2.00	0.98 – 4.10	
2020	128	72 (56.25)	1.69	1.09 – 2.60		2.02	1.26 – 3.22		-	-	-	-		-	-	-
GP location					0.04			0.019					0.966			0.713
Metropolitan	337	194 (57.57)	Ref			Ref			127	35 (27.78)	Ref			Ref		
Regional	77	8 (10.39)	0.09	0.01 – 0.58		0.08	0.01 – 0.51		7	2 (28.57)	1.04	0.17 – 6.31		1.39	0.24 – 8.10	
Rural	31	10 (32.26)	0.35	0.09 – 1.39		0.30	0.09 – 1.07		7	0 (0)	-	-		-	-	
TD/FTC Med					0.222			0.106					< 0.001			< 0.001
No	309	158 (51.13)	Ref			Ref			114	21 (18.42)	Ref			Ref		
Yes	136	54 (39.71)	0.63	0.30 – 1.32		0.55	0.27 – 1.13		26	16 (61.54)	7.09	2.84 – 17.65		8.71	2.67 – 28.44	
Age group, years					0.146			0.089					0.40			0.04
16-19	16	9 (56.25)	Ref			Ref			7	2 (28.57)	Ref			Ref		
20-24	75	37 (49.33)	0.76	0.27 – 2.15		0.79	0.22 – 2.78		25	4 (16.00)	0.48	0.04 – 6.29		0.18	0.02 – 1.86	
25-29	109	57 (52.29)	0.85	0.29 – 2.51		0.92	0.26 – 3.32		38	11 (28.95)	1.02	0.16 – 6.35		0.41	0.06 – 2.82	
30-39	149	72 (48.32)	0.73	0.32 – 1.63		0.72	0.26 – 2.05		47	14 (29.79)	1.06	0.18 – 6.29		0.66	0.11 – 3.97	
40-49	58	22 (37.93)	0.48	0.19 – 1.21		0.42	0.11 - 1.58		12	2 (16.67)	0.50	0.09 – 2.80		0.29	0.11 – 0.75	
50-59	31	14 (45.16)	0.64	0.16 – 2.59		0.81	0.19 - 3.41		10	4 (40.00)	1.67	0.24 – 11.56		0.73	0.18 – 3.04	
60-89	7	1 (14.29)	0.13	0.01 – 2.11		0.18	0.01 - 3.51		1	0 (0)	-	-		-	-	

CI, confidence interval.

1. Unadjusted odds ratio (OR) were estimated using univariable regression model with robust standard errors.

2. Adjusted odds ratio (aOR) were estimated using multivariable regression model with robust standard errors, including all explanatory variables (year, clinic location, TD/FTC medication and age group) in the same model.

3. Retested proportion in 2020 was not calculated due to lack of data in 2021.