

1 **Examining the role of socioeconomic deprivation in ethnic differences in**  
2 **sexually transmitted infection diagnosis rates in England: evidence from**  
3 **surveillance data**

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## 23 **SUMMARY**

24 Differences by ethnic group in STI diagnosis rates have long been recognised  
25 in England. We investigated whether these may be explained by ethnic  
26 disparities in socioeconomic deprivation (SED). Data on all diagnoses made  
27 in sexual health clinics in England in 2013 were obtained from the mandatory  
28 STI surveillance system. Poisson regression was used to calculate incidence  
29 rate ratios (IRRs) of STIs, by ethnicity, with and without adjustment for Index of  
30 Multiple Deprivation (IMD) a measure of area-level deprivation. Unadjusted  
31 IRRs [95%CI] were highest for gonorrhoea (8.18 [7.77-8.61] and 5.76  
32 [5.28-6.29]) and genital herpes (4.24 [3.99-4.51] and 3.58 [3.23-3.98]) for  
33 people of black Caribbean and non-Caribbean/non-African black ethnicity and  
34 IRRs were highest for syphilis (8.76 [7.97-9.63]) and genital warts (2.23  
35 [2.17-2.29]) for people of non-British/non-Irish white ethnicity compared to  
36 white British ethnicity. After adjustment for IMD, IRRs for gonorrhoea  
37 (5.76[5.47-6.07]) and genital herpes (3.73 [3.50-3.97]) declined but remained  
38 highest for black Caribbeans and IRRs for syphilis (7.35 [6.68-8.09]) and  
39 genital warts (2.10 [2.04-2.16]) declined but remained highest for  
40 non-British/non-Irish white compared to white British. In England, ethnic  
41 disparities in STI diagnosis rates are partially explained by SED, but  
42 behavioural and contextual factors likely contribute. Clinic and  
43 community-based interventions should involve social peer networks to ensure  
44 they are targeted and culturally-sensitive.

## 45 **INTRODUCTION**

46 Ethnic disparities in the rates of sexually transmitted infection (STI) diagnoses  
47 have been reported in many developed countries and are a major source of  
48 health inequality worldwide.[1, 2] In the UK, disproportionately high STI and  
49 HIV rates are reported in people of black Caribbean and black African  
50 ethnicity.[3, 4] In England, among sexual health clinic attendees, the highest  
51 diagnosis rates of gonorrhoea, genital herpes, genital warts and syphilis are  
52 found in black ethnic groups.[5-7]

53 Socioeconomic deprivation (SED) is one of the major determinants of poor  
54 health,[8] and it is also frequently implicated as a contributor to the disparate  
55 health observed among racial and ethnic minorities.[9] Socioeconomic  
56 deprivation (SED) refers to the range of socioeconomic circumstances, such  
57 as income, education and occupation, by which individuals are hierarchically  
58 stratified in society,[8] and can be expressed as poor access to healthcare,[10]  
59 poor education, social segregation[11, 12] and poor housing.[13] A link  
60 between decreasing socioeconomic status and increased risk of a multitude of  
61 diseases, including infectious diseases such as STIs, has been already  
62 established.[14, 15]

63 Especially for people of lower socioeconomic status, engaging in high risk  
64 behaviour could be linked to poor self-esteem, perceived limitations of life  
65 choices and limited control over what happens to their health.[16] Behavioural  
66 risk factors are themselves linked to the social gradient by levels of risk  
67 associated with the social and structural environment.[17] A living environment  
68 with low social capital places an individual at increased risk of exposure to  
69 infections associated with behavioural risk.[18] In addition, racial disparities in

70 sexual and in general health typically reflect environmental and social  
71 differences between racial groups.[1, 19]  
72 A previous analysis investigated the association between SED and ethnicity in  
73 terms of STI risk.[20] This analysis highlighted that the STI diagnosis rates in  
74 black ethnic communities remained significantly higher than those of other  
75 ethnic groups after adjustment for SED. However, the analysis was based on  
76 patients' lower-tier Local Authority (LA) of residence, large administrative units  
77 of local government, of which there are 326 in England. In this paper, we refine  
78 and update these analyses using a much smaller geographical unit, the Lower  
79 Super Output Area (LSOA), 32482 census output areas with an average  
80 population of 1620 persons,[21] to investigate the association between  
81 ethnicity, STI diagnosis rates and SED in England.

## 82 **METHODS**

83 Data from all 215 sexual health clinics in England were obtained from the  
84 Genitourinary Medicine Clinic Activity Dataset version 2 (GUMCADv2), the  
85 mandatory surveillance system for all STI diagnoses and services in  
86 England.[22] All sexual health clinic attendances from 1st January 2013–31st  
87 December 2013, inclusive, were considered in the analysis. The diagnosis  
88 rates per 100000 population of gonorrhoea; primary, secondary and early  
89 latent syphilis; genital warts (1st episode); and genital herpes (1st episode)  
90 were derived.

91 SED was measured using the Index of Multiple Deprivation (IMD) a measure  
92 of area-level deprivation for each LSOA. The IMD score,[23] is constructed for  
93 each of 32482 defined LSOAs in England by combining scores derived largely  
94 from routine administrative data for the following seven domains (weighted for

95 importance): income (22.5%), employment (22.5%), health and disability  
96 (13.5%), education, skills and training (13.5%), barriers to housing and  
97 services (9.3%), crime (9.3%), living environment (9.3%).[24]  
98 Each LSOA was ranked according to the IMD score, and then assigned to  
99 quintiles. Denominators used to derive crude incidence rates of STI diagnoses  
100 were obtained from the 2011 Census.[25] Poisson regression was used to  
101 calculate unadjusted and IMD-adjusted incidence rate ratios (IRRs) for each  
102 STI by ethnic group. As census data only provide limited demographic  
103 breakdowns by LSOA, demographic factors other than ethnicity could not be  
104 considered in the Poisson regression model.  
105 A sensitivity analysis to examine the relationship between ethnicity, deprivation  
106 and other demographic factors was performed using binary logistic regression  
107 to derive odds ratios (ORs) for the diagnosis of each STI among sexual health  
108 clinic patients, with and without adjustment for IMD, age and gender/sexual  
109 orientation. Gender and sexual orientation were combined as a single variable  
110 consisting of the following categories: men who have sex with men,  
111 heterosexual men and women (less than 1% of women were lesbian, so this  
112 was not considered as a category due to small cell sizes for analysis).  
113 All analyses were performed using STATA version 13.1 (StataCorp LP, College  
114 Station, TX, USA),[26] and p-values of less than 5% were considered  
115 statistically significant.

## 116 **RESULTS**

117 In England, there was little variation in the distribution of white British people  
118 by IMD quintile of their LSOA of residence: 22% of white British people lived in  
119 the least deprived areas and 17% lived in the most deprived areas (figure 1).

120 This contrasted with other ethnic groups. For example, 47% of black British  
121 people lived in the most deprived areas, while only 4% lived in the least  
122 deprived areas (figure 1).

123 In 2013, data from 2539572 sexual health clinic attendances were submitted to  
124 GUMCADv2 and the proportion of attendances reported with known ethnicity  
125 was 99.7%.

126 Most (65.3%) of the attendances were by patients of white British ethnicity,  
127 followed by those of non-British/non-Irish white ethnicity (10.7%) and black  
128 African ethnicity (6.4%). The proportions of attendances by people of black  
129 Caribbean and non-Caribbean/non-African black ethnicity were 3.9% and 2.0%  
130 respectively.

131 Black Caribbeans had the highest crude rates per 100000 population for  
132 gonorrhoea (285.7) and genital herpes (190.0), while people of  
133 non-British/non-Irish white ethnicity had the highest rates of genital warts  
134 (228.4) and syphilis (25.8). The crude rates in those of white British ethnicity  
135 were 34.9 for gonorrhoea, 51.4 for genital herpes, 123.6 for genital warts and  
136 3.6 for syphilis (figure 2).

137 Unadjusted IRRs from the Poisson regression were highest for gonorrhoea  
138 (8.18 [7.77 – 8.61] and 5.76 [5.28 – 6.29]) and genital herpes (4.24 [3.99 –  
139 4.51] and 3.58 [3.23 – 3.98]) for people of black Caribbean and  
140 non-Caribbean/non-African black ethnicity compared to those of white British  
141 ethnicity (table 1). Unadjusted IRRs were highest for people of  
142 non-British/non-Irish white ethnicity for syphilis (8.76 [7.97 – 9.63]) and genital  
143 warts (2.23 [2.17 – 2.29]) compared to those of white British ethnicity (table 1).  
144 After adjustment for IMD, IRRs for gonorrhoea (5.76 [5.47 – 6.07]) and genital

145 herpes (3.73 [3.50 – 3.97]) declined but remained highest for black Caribbeans  
146 compared to those of white British ethnicity (table 2). IRRs for syphilis (7.35  
147 [6.68 – 8.09]) and genital warts 2.10 [2.04 – 2.16] also declined but remained  
148 highest for non-British/non-Irish white ethnicity compared to those of white  
149 British ethnicity (table 2).

150 People of Indian and Pakistani ethnicity had consistently lower IRRs (both  
151 unadjusted and adjusted) for gonorrhoea, genital warts and genital herpes  
152 compared to white British people (tables 1 and 2).

153 According to the sensitivity analysis (table 3), the ORs for gonorrhoea (1.91  
154 [1.82 – 2.02] and 1.61[1.48 – 1.76]) were highest for black Caribbean and  
155 people of non-Caribbean/non-African black ethnicity respectively, compared  
156 with white British ethnic groups. In contrast, the ORs for syphilis (1.64 [1.21 –  
157 2.21] were highest for those of non-Caribbean/non-African black ethnicity. The  
158 ORs for genital warts and genital herpes were highest in those of white British  
159 ethnicity.

## 160 **DISCUSSION**

161 After controlling for deprivation, the strength of association between ethnicity  
162 and STI diagnosis was reduced, most notably for gonorrhoea in those of black  
163 Caribbean and non-Caribbean/non-African black ethnicity, suggesting that  
164 socioeconomic status and poverty might be important correlates of racial  
165 disparities in health. However, variation by ethnicity persisted. After additional  
166 adjustment for sexual orientation and age, persons of black Caribbean  
167 ethnicity remained the ethnic group with the greatest odds of gonorrhoea  
168 diagnoses.

169 Compared to the previous analysis performed which included larger

170 geographical units,[20] the refined version presented here allowed us to  
171 investigate the association between STI diagnoses, ethnicity and SED, at a  
172 very small local level (LSOA). Confounding variables have been included as  
173 much as possible given population data availability at the local level. In this  
174 respect, one limitation of this study relates to the use of IMD. This is a measure  
175 of residential area-level and not individual, deprivation, thus is subject to  
176 ecologic fallacy. Furthermore, although IMD is composed of many closely  
177 related domains, chosen to reflect varying forms of disadvantage, the indicator  
178 provides no insight into which specific factors are associated with the pathway  
179 between exposure and infection.

180 Although we were able to adjust for SED, residual confounding suggests that  
181 there are unknown - and possibly unmeasurable - predictors for some  
182 infections. As such, we performed a sensitivity analysis to adjust for multiple  
183 demographic factors in addition to IMD, and similar results for the bacterial  
184 STIs with respect to IMD, ethnicity and STI diagnoses were observed. Other  
185 confounders such as risky sexual behaviour and drug use could not be  
186 included in this study as these characteristics are not currently collected by  
187 GUMCADv2. However, the enhancement of GUMCADv2[27] to include  
188 behavioural information is currently being piloted from a subset of STI services,  
189 and future studies may be able to address this study's limitation.

190 While chlamydia is the most common STI to be diagnosed in England,[28] it  
191 was not considered in this analysis because 48% of diagnoses are made in  
192 different settings such as Sexual and Reproductive Health clinics, General  
193 Practice, Young people's services. In addition, data are captured from another  
194 surveillance system,[29] which has poor data quality on ethnicity which could



195 potentially bias the results. In contrast, one of this study's most important  
196 strengths is that we used national surveillance data which benefits from 100%  
197 reporting compliance and high data completion (each variable collected has at  
198 least 90% completion), resulting in a dataset with over 2 million observations  
199 from all STI services throughout the country and over 450000 diagnoses of  
200 STIs reported in 2013. This enabled derivation of robust population-based  
201 estimates of the diagnosis rates of common STIs both at a national and local  
202 level.[22]

203 Evidence suggests that most STIs diagnosed in England are detected at a  
204 sexual health clinic or are referred to a sexual health clinic from general  
205 practice.[30, 31]

206 The clear disparity in sexual ill-health by ethnic group, with those from black  
207 ethnic minorities having higher rates of specific STI diagnoses found in this  
208 study, is consistent with previous studies based in the UK, as well in United  
209 States.[1, 5, 19] In line with other studies, the results of this analysis confirm  
210 SED as a key determinant of poor health outcomes.[32, 33]

211 SED only partly explains ethnic differences in STI diagnosis rates. It is likely  
212 that the high rates of STI diagnoses seen among black ethnic minorities relate  
213 to a complex interaction of structural determinants such as cultural, social and  
214 economic conditions and individual-level factors.

215 Structural determinants influence the health of communities as a whole and  
216 include education, employment, access to services and job security.[34]

217 The individual-level factors include high-risk behaviours such as unsafe  
218 sexual,[35] drug-injecting practices,[34] and health-seeking behaviour,  
219 especially the use of treatment and screening services.[36] There is limited

220 evidence in health seeking behaviour by ethnicity, however data from the  
221 second British National Survey of Sexual Attitudes and Lifestyles (Natsal 2000)  
222 show that the proportion of people of black Caribbean ethnicity reporting  
223 sexual health clinic attendance and STI diagnosis is higher compared with  
224 those of white ethnicity.[4] A higher prevalence of infections in black ethnic  
225 minorities may make them more likely to attend an sexual health clinic.  
226 However, other factors could influence the health-seeking behaviour.

227 It is well documented that an individual's sexual risk behaviour occurs within  
228 the context of a sexual partnership or partnerships within a wider sexual  
229 network and background prevalence of untreated disease.[37] These more  
230 proximal determinants of risk also occur within the context of broader social  
231 and structural determinants such as racial discrimination perception.[38, 39] In  
232 particular, perceived racial segregation acts directly upon the patterns of the  
233 sexual networks. The correlation between geographical proximity and a sexual  
234 network is a key component of STI prevalence due to high probability of  
235 choosing another sexual partner within the network.[40]

236 Disparities among groups are by definition community-level differences: the  
237 community is here intended as physical vicinity (e.g. neighborhoods) and  
238 commonality of purpose.[38]

239 Reducing STI transmission and acquisition risk among specific ethnic groups  
240 requires recognition of these contributing factors. Developing approaches that  
241 challenge the underlying social-structural drivers of vulnerability and behaviour  
242 are needed. Clinic and community-based interventions could involve  
243 counselling and social peer networks to deliver behavioural skill-based  
244 interventions such as sexual negotiation and risk perception.

245 The ethnic disparity in STI diagnosis rates is partially explained by SED, but  
246 behavioural and other factors are likely to contribute. To investigate and adjust  
247 for other potential predictors of the STI diagnosis rates by ethnicity,  
248 behavioural data from the proposed enhancement of GUMCADv2 can be  
249 taken into account in a future study. This proposed enhancement is to collect  
250 details on high risk sexual behaviour, including the use of recreational drugs in  
251 a sexualised context, and these data will contribute to our understanding of the  
252 ethnic disparities in sexual health. Further research into understanding the  
253 drivers and context of sexual risk taking behaviours using geo-spatial  
254 information in order to highlight sexual networks is also warranted.

255

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257 This research received no specific grant from any funding agency, commercial  
258 or not-for-profit sectors.

259

#### 260 **Conflict of interest**

261 None

262

#### 263 **Ethics standards**

264 Ethics committee approval is not required, as the analyses are based on  
265 surveillance data held by Public Health England. These datasets have  
266 approval for analyses for public health purposes

267

#### 268 **Contributors**

269 MF, YC and ES performed the analysis with HM supervision. MF and YC wrote

270 the manuscript. HM, CM and GH contributed to further interpretation of the  
271 findings and provided critical review of the manuscript.

272

273

274 Table 1. Unadjusted Incidence Rate Ratios (IRRs) for gonorrhoea, syphilis\*, genital herpes and genital warts by ethnic group,  
 275 England - 2013

Ethnic group	Gonorrhoea (Number 25238)				Syphilis (Number 2710)				Genital herpes (Number 28465)				Genital warts (Number 64372)			
	%	IRR	(95% CI)	P-value	%	IRR	(95% CI)	P-value	%	IRR	(95% CI)	P-value	%	IRR	(95% CI)	P-value
White British	56.7	1			53.8	1			74.0	1			78.6	1		
White Irish	1.5	<b>2.19</b>	(1.98 - 2.43)	<0.001	1.7	<b>6.78</b>	(5.06 - 9.09)	<0.001	0.7	<b>2.15</b>	(1.88 - 2.46)	<0.001	0.8	<b>2.21</b>	(2.03 - 2.41)	<0.001
White other	16.2	<b>4.97</b>	(4.80 - 5.15)	<0.001	22.4	<b>8.76</b>	(7.97 - 9.63)	<0.001	8.7	<b>2.48</b>	(2.38 - 2.59)	<0.001	8.3	<b>2.23</b>	(2.17 - 2.29)	<0.001
Mixed	5.7	<b>3.64</b>	(3.45 - 3.84)	<0.001	4.2	<b>3.97</b>	(3.28 - 4.80)	<0.001	3.4	<b>2.32</b>	(2.17 - 2.47)	<0.001	2.9	<b>1.84</b>	(1.76 - 1.93)	<0.001
Indian	1.5	<b>0.8</b>	(0.72 - 0.88)	<0.001	1.6	1.21	(0.89 - 1.64)	0.216	1.5	<b>0.83</b>	(0.75 - 0.91)	<0.001	1.1	<b>0.56</b>	(0.52 - 0.60)	<0.001
Pakistani	1.2	<b>0.82</b>	(0.73 - 0.91)	<0.001	1.2	1.09	(0.77 - 1.54)	0.616	0.8	<b>0.5</b>	(0.44 - 0.57)	<0.001	1.1	<b>0.64</b>	(0.59 - 0.69)	<0.001
Bangladeshi	0.5	0.91	(0.77 - 1.08)	0.278	0.3	0.97	(0.50 - 1.87)	0.924	0.4	0.91	(0.76 - 1.08)	0.288	0.4	<b>0.77</b>	(0.68 - 0.87)	<0.001
Chinese	0.6	<b>1.19</b>	(1.01 - 1.41)	0.038	1.1	<b>6.2</b>	(4.29 - 8.95)	<0.001	0.3	<b>1.45</b>	(1.19 - 1.77)	<0.001	0.4	<b>1.46</b>	(1.28 - 1.65)	<0.001
Asian other	1.1	1.04	(0.92 - 1.17)	0.554	1.5	<b>2.45</b>	(1.79 - 3.35)	<0.001	0.9	1.08	(0.96 - 1.23)	0.196	0.8	<b>0.91</b>	(0.84 - 0.99)	0.037
Black African	3.9	<b>3.04</b>	(2.85 - 3.24)	<0.001	3.4	<b>3.09</b>	(2.50 - 3.82)	<0.001	2.7	<b>1.78</b>	(1.66 - 1.92)	<0.001	1.9	<b>1.2</b>	(1.14 - 1.27)	<0.001
Black Caribbean	6.4	<b>8.18</b>	(7.77 - 8.61)	<0.001	3.8	<b>5.83</b>	(4.77 - 7.13)	<0.001	3.8	<b>4.24</b>	(3.99 - 4.51)	<0.001	1.7	<b>1.82</b>	(1.72 - 1.94)	<0.001
Black other †	2.2	<b>5.76</b>	(5.28 - 6.29)	<0.001	1.7	<b>6.75</b>	(5.03 - 9.05)	<0.001	1.3	<b>3.58</b>	(3.23 - 3.98)	<0.001	0.7	<b>1.87</b>	(1.70 - 2.04)	<0.001
Other ethnicity	2.6	<b>3.67</b>	(3.39 - 3.97)	<0.001	3.4	<b>7.22</b>	(5.84 - 8.92)	<0.001	1.4	<b>2.13</b>	(1.93 - 2.36)	<0.001	1.2	<b>1.79</b>	(1.67 - 1.93)	<0.001

276 \* Syphilis is defined as primary, secondary and early latent syphilis CI: Confidence Interval  
 277 †Black other: non-Caribbean/non-African black ethnicity

278 Table 2. Incidence Rate Ratios for gonorrhoea, syphilis\*, genital herpes and genital warts by ethnic group adjusted for IMD, England

279 - 2013

Ethnic group	Gonorrhoea (Number 25238)				Syphilis (Number 2710)				Genital herpes (Number 28465)				Genital warts (Number 64372)			
	%	IRR	(95% CI)	P-value	%	IRR	(95% CI)	P-value	%	IRR	(95% CI)	P-value	%	IRR	(95% CI)	P-value
White British	56.7	1			53.8	1			74.0	1			78.6	1		
White Irish	1.5	<b>2.0</b> 1	(1.82 - 2.23)	<0.001	1.7	<b>5.6</b> 3	(4.19 - 7.55)	<0.001	0.7	<b>2.0</b> 2	(1.76 - 2.31)	<0.001	0.8	<b>2.0</b> 8	(1.91 - 2.27)	<0.001
White other	16.2	<b>4.2</b> 6	(4.11 - 4.41)	<0.001	22.4	<b>7.3</b> 5	(6.68 - 8.09)	<0.001	8.7	<b>2.3</b> 4	(2.24 - 2.44)	<0.001	8.3	<b>2.1</b> 0	(2.04 - 2.16)	<0.001
Mixed	5.7	<b>2.9</b> 9	(2.83 - 3.15)	<0.001	4.2	<b>3.1</b> 1	(2.57 - 3.77)	<0.001	3.4	<b>2.1</b> 2	(1.99 - 2.26)	<0.001	2.9	<b>1.6</b> 9	(1.61 - 1.77)	<0.001
Indian	1.5	<b>0.6</b> 8	(0.61 - 0.75)	<0.001	1.6	1.0 0	(0.74 - 1.36)	0.987	1.5	<b>0.7</b> 7	(0.70 - 0.85)	<0.001	1.1	<b>0.5</b> 2	(0.49 - 0.56)	<0.001
Pakistani	1.2	<b>0.5</b> 6	(0.50 - 0.63)	<0.001	1.2	0.7 6	(0.53 - 1.07)	0.115	0.8	<b>0.4</b> 4	(0.38 - 0.50)	<0.001	1.1	<b>0.5</b> 5	(0.51 - 0.60)	<0.001
Bangladeshi	0.5	<b>0.6</b> 0	(0.51 - 0.72)	<0.001	0.3	0.6 4	(0.33 - 1.23)	0.182	0.4	<b>0.7</b> 7	(0.65 - 0.92)	0.005	0.4	<b>0.6</b> 5	(0.58 - 0.74)	<0.001
Chinese	0.6	1.0 6	(0.90 - 1.25)	0.492	1.1	<b>5.1</b> 7	(3.58 - 7.48)	<0.001	0.3	<b>1.3</b> 6	(1.11 - 1.66)	<0.001	0.4	<b>1.3</b> 7	(1.20 - 1.55)	<0.001
Asian other	1.1	<b>0.8</b> 6	(0.76 - 0.96)	0.01	1.5	<b>1.9</b> 5	(1.43 - 2.67)	<0.001	0.9	1.0 0	(0.88 - 1.13)	0.996	0.8	<b>0.8</b> 4	(0.77 - 0.92)	<0.001
Black African	3.9	<b>2.0</b> 9	(1.96 - 2.24)	<0.001	3.4	<b>2.1</b> 7	(1.75 - 2.68)	<0.001	2.7	<b>1.5</b> 6	(1.45 - 1.68)	<0.001	1.9	1.0 6	(1.00 - 1.12)	0.059
Black Caribbean	6.4	<b>5.7</b> 6	(5.47 - 6.07)	<0.001	3.8	<b>4.1</b> 1	(3.35 - 5.03)	<0.001	3.8	<b>3.7</b> 3	(3.50 - 3.97)	<0.001	1.7	<b>1.6</b> 0	(1.51 - 1.70)	<0.001
Black other ‡	2.2	<b>3.9</b> 3	(3.60 - 4.29)	<0.001	1.7	<b>4.5</b> 8	(3.41 - 6.15)	<0.001	1.3	<b>3.1</b> 0	(2.79 - 3.45)	<0.001	0.7	<b>1.6</b> 1	(1.46 - 1.77)	<0.001
Other ethnicity	2.6	<b>2.8</b> 4	(2.62 - 3.07)	<0.001	3.4	<b>5.4</b> 2	(4.38 - 6.71)	<0.001	1.4	<b>1.9</b> 2	(1.74 - 2.13)	<0.001	1.2	<b>1.6</b> 2	(1.51 - 1.74)	<0.001
<b>IMD quintile</b>																
1 - least	7.8	1			7.3	1			14.	1			15.	1		

deprived																
2	10. 3	<b>1.2</b> <b>9</b>	(1.22 - 1.37)	<0.001	10. 8	<b>1.3</b> <b>8</b>	(1.15 - 1.65)	<0.001	16. 7	<b>1.1</b> <b>1</b>	(1.06 - 1.15)	<0.001	17. 4	<b>1.0</b> <b>8</b>	(1.05 - 1.11)	<0.001
3	15. 6	<b>1.8</b> <b>2</b>	(1.73 - 1.93)	<0.001	16. 5	<b>1.9</b> <b>1</b>	(1.61 - 2.26)	<0.001	19. 6	<b>1.2</b> <b>5</b>	(1.20 - 1.30)	<0.001	19. 1	<b>1.1</b> <b>6</b>	(1.13 - 1.19)	<0.001
4	30. 2	<b>3.1</b> <b>8</b>	(3.03 - 3.34)	<0.001	31. 8	<b>3.1</b> <b>7</b>	(2.71 - 3.71)	<0.001	23. 8	<b>1.4</b> <b>2</b>	(1.37 - 1.48)	<0.001	23. 6	<b>1.3</b> <b>9</b>	(1.36 - 1.43)	<0.001
5 - most deprived	36. 1	<b>3.6</b> <b>6</b>	(3.48 - 3.85)	<0.001	33. 6	<b>3.2</b> <b>4</b>	(2.76 - 3.79)	<0.001	25. 3	<b>1.4</b> <b>8</b>	(1.42 - 1.54)	<0.001	24. 1	<b>1.4</b> <b>4</b>	(1.40 - 1.48)	<0.001

\* Syphilis is defined as primary, secondary and early latent syphilis CI: Confidence Interval

‡Black other: non-Caribbean/non-African black ethnicity

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284 Table 3. Adjusted odds ratios (aOR) for gonorrhoea, syphilis\*, genital herpes and genital warts diagnoses by ethnic group, England –  
 285 2013

Ethnic group	Gonorrhoea (Number 27115)				Syphilis (Number 2953)				Genital herpes (Number 29986)				Genital warts (Number 67850)			
	%	aOR	(95% CI)	P-value	%	aOR	(95% CI)	P-value	%	aOR	(95% CI)	P-value	%	aOR	(95% CI)	P-value
White British	56.6	1			54.3	1			78.3	1			73.5	1		
White Irish	1.5	<b>1.27</b>	(1.14 - 1.40)	<0.001	1.7	1.13	(0.85 - 1.50)	0.390	0.8	<b>0.77</b>	(0.67 - 0.87)	<0.001	0.8	<b>0.84</b>	(0.77 - 0.92)	<0.001
White other	16.3	<b>1.25</b>	(1.21 - 1.30)	<0.001	22.0	<b>1.46</b>	(1.33 - 1.61)	<0.001	8.5	<b>0.78</b>	(0.75 - 0.81)	<0.001	8.9	<b>0.88</b>	(0.76 - 0.80)	<0.001
Mixed	5.7	<b>1.52</b>	(1.44 - 1.60)	<0.001	4.1	<b>1.40</b>	(1.16 - 1.69)	<0.001	2.9	<b>0.74</b>	(0.70 - 0.79)	<0.001	3.4	<b>0.59</b>	(0.57 - 0.62)	<0.001
Indian	1.4	0.97	(0.88 - 1.08)	0.610	1.7	1.21	(0.91 - 1.62)	0.180	1.1	<b>0.82</b>	(0.75 - 0.91)	<0.001	1.5	<b>0.57</b>	(0.53 - 0.61)	<0.001
Pakistani	1.2	1.08	(0.97 - 1.22)	0.170	1.1	1.25	(0.88 - 1.79)	0.220	1.1	<b>0.66</b>	(0.58 - 0.75)	<0.001	0.8	<b>0.75</b>	(0.70 - 0.82)	<0.001
Bangladeshi	0.5	1.15	(0.97 - 1.36)	0.110	0.3	1.01	(0.52 - 1.95)	0.970	0.4	<b>0.66</b>	(0.63 - 0.90)	<0.001	0.4	<b>0.62</b>	(0.55 - 0.70)	<0.001
Chinese	0.6	<b>0.73</b>	(0.63 - 0.85)	<0.001	1.2	<b>1.40</b>	(1.01 - 1.95)	0.050	0.4	<b>0.59</b>	(0.49 - 0.70)	<0.001	0.4	<b>0.60</b>	(0.53 - 0.68)	<0.001
Asian other	1.1	0.98	(0.87 - 1.10)	0.710	1.5	1.27	(0.94 - 1.73)	0.120	0.8	<b>0.71</b>	(0.63 - 0.80)	<0.001	0.9	<b>0.63</b>	(0.58 - 0.68)	<0.001
Black African	3.9	1.04	(0.98 - 1.11)	0.210	3.3	1.22	(0.98 - 1.51)	0.080	2.0	<b>0.38</b>	(0.35 - 0.41)	<0.001	2.8	<b>0.31</b>	(0.29 - 0.33)	<0.001
Black Caribbean	6.3	<b>1.91</b>	(1.82 - 2.02)	<0.001	3.6	<b>1.38</b>	(1.13 - 1.70)	<0.001	1.7	<b>0.75</b>	(0.70 - 0.80)	<0.001	3.8	<b>0.34</b>	(0.32 - 0.36)	<0.001
Black other †	2.1	<b>1.61</b>	(1.48 - 1.76)	<0.001	1.7	<b>1.64</b>	(1.21 - 2.21)	<0.001	0.7	<b>0.64</b>	(0.57 - 0.70)	<0.001	1.3	<b>0.36</b>	(0.32 - 0.39)	<0.001
Other ethnicity	2.6	<b>1.19</b>	(1.10 - 1.28)	<0.001	3.5	<b>1.34</b>	(1.09 - 1.65)	0.010	1.3	<b>0.65</b>	(0.59 - 0.72)	<0.001	1.4	<b>0.60</b>	(0.56 - 0.65)	<0.001
<b>IMD Quintile</b>																
1 - least	7.6	1			7.2	1			15.	1			14.	1		



deprived									7					6			
2	10. 2	<b>1.0</b> <b>6</b>	(1.00 - 1.12)	0.050	9.9	1.04	(0.87 - 1.24)	0.700	17. 3	0.9 9	(0.95 - 1.03)	0.480	16. 5	0.9 8	(0.96 - 1.01)	0.190	
3	15. 7	<b>1.2</b> <b>0</b>	(1.14 - 1.26)	<0.001	17. 0	1.17	(1.00 - 1.38)	0.060	19. 1	0.9 8	(0.94 - 1.02)	0.270	19. 4	<b>0.9</b> <b>4</b>	(0.92 - 0.96)	<0.001	
4	30. 1	<b>1.4</b> <b>8</b>	(1.40 - 1.55)	<0.001	32. 4	<b>1.28</b>	(1.10 - 1.49)	<0.001	23. 6	<b>0.9</b> <b>2</b>	(0.88 - 0.95)	<0.001	23. 7	<b>0.9</b> <b>2</b>	(0.90 - 0.95)	<0.001	
5 - most deprived	36. 4	<b>1.6</b> <b>7</b>	(1.59 - 1.75)	<0.001	33. 6	<b>1.36</b>	(1.17 - 1.59)	<0.001	24. 3	<b>0.9</b> <b>2</b>	(0.88 - 0.95)	<0.001	25. 8	<b>0.8</b> <b>9</b>	(0.87 - 0.92)	<0.001	
<b>Sexual orientation</b>																	
Heterosexual men	25. 8	1			15. 3	1			50. 3	1			32. 9	1			
MSM**	47. 6	<b>5.9</b> <b>0</b>	(5.72 - 6.09)	<0.001	75. 9	<b>11.7</b> <b>4</b>	(10.55 - 13.06)	<0.001	4.4 4	<b>0.3</b> <b>4</b>	(0.32 - 0.36)	<0.001	4.2 7	<b>0.2</b> <b>7</b>	(0.26 - 0.28)	<0.001	
Women	26. 7	<b>0.5</b> <b>7</b>	(0.55 - 0.59)	<0.001	8.7	<b>0.36</b>	(0.31 - 0.42)	<0.001	45. 3	<b>1.1</b> <b>9</b>	(1.16 - 1.22)	<0.001	62. 9	<b>0.5</b> <b>1</b>	(0.50 - 0.51)	<0.001	
<b>Age group</b>																	
15-24	39. 3	1			13. 2	1			40. 6	1			52. 7	1			
25-34	36. 0	<b>0.7</b> <b>2</b>	(0.70 - 0.74)	<0.001	33. 6	<b>1.65</b>	(1.46 - 1.87)	<0.001	33. 1	<b>1.0</b> <b>6</b>	(1.03 - 1.09)	<0.001	30. 3	<b>0.6</b> <b>8</b>	(0.67 - 0.69)	<0.001	
35-44	15. 7	<b>0.5</b> <b>5</b>	(0.53 - 0.57)	<0.001	28. 3	<b>2.24</b>	(1.98 - 2.54)	<0.001	14. 0	<b>1.1</b> <b>2</b>	(1.08 - 1.16)	<0.001	9.8	<b>0.5</b> <b>4</b>	(0.53 - 0.56)	<0.001	
45-64	8.5	<b>0.3</b> <b>8</b>	(0.36 - 0.40)	<0.001	23. 5	<b>2.31</b>	(2.03 - 2.63)	<0.001	11. 4	<b>1.2</b> <b>9</b>	(1.24 - 1.34)	<0.001	6.6	<b>0.4</b> <b>8</b>	(0.46 - 0.50)	<0.001	
65+	0.4	<b>0.2</b> <b>1</b>	(0.17 - 0.25)	<0.001	1.5	<b>1.72</b>	(1.26 - 2.36)	<0.001	0.8	1.0 9	(0.95 - 1.23)	0.210	0.6	<b>0.4</b> <b>1</b>	(0.37 - 0.46)	<0.001	

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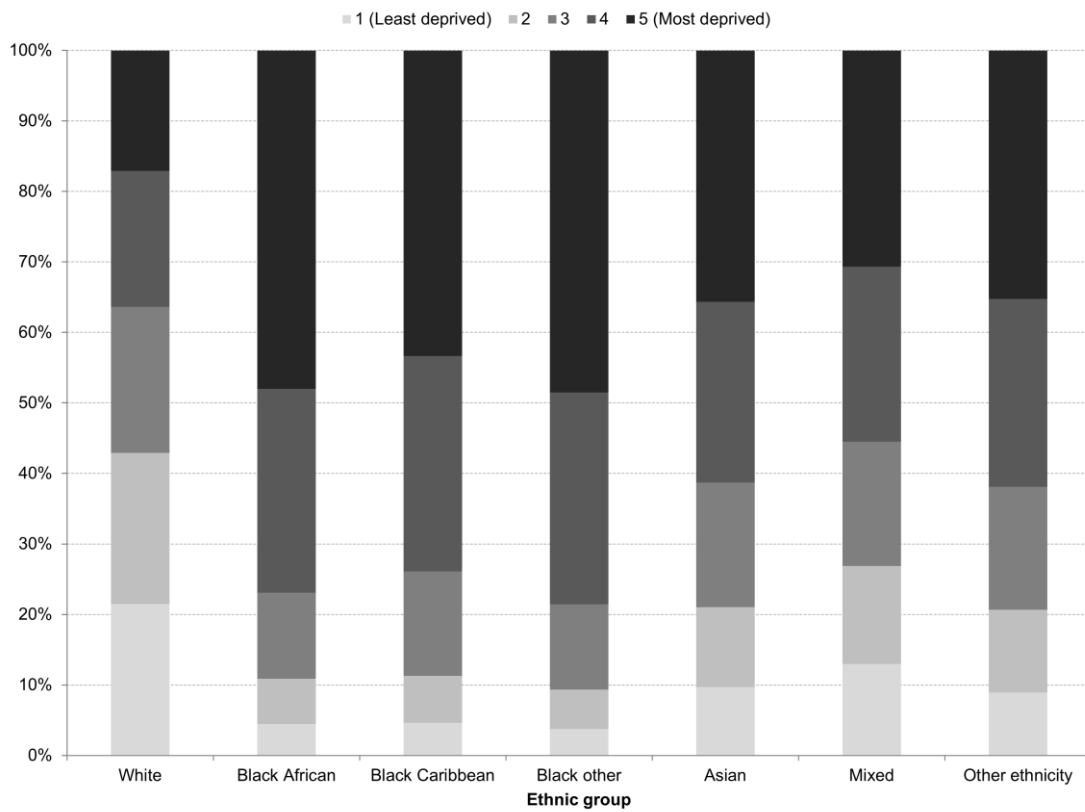
\* Syphilis is defined as primary, secondary and early latent syphilis

CI: Confidence Interval

‡Black other: non-Caribbean/non-African black ethnicity

\*\* MSM: Men who have sex with m

290 Figure 1. Ethnic variations in the distribution of IMD in England, 2011



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292 Figure 2. Crude rates for gonorrhoea, syphilis, genital herpes and genital warts  
293 by ethnic group, England – 2013

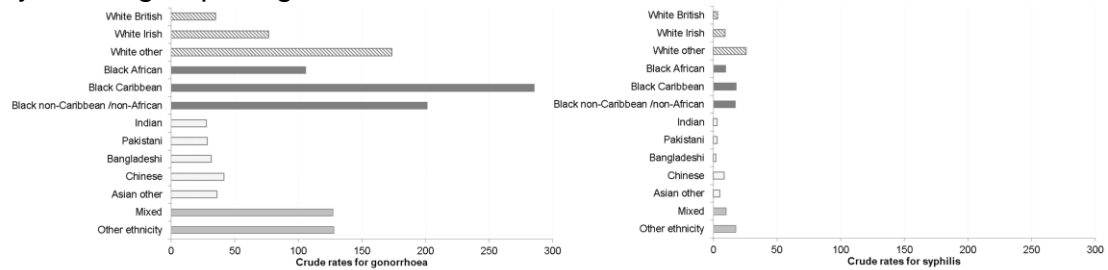


Figure 2.a Crude rates for gonorrhoea

Figure 2.b Crude rates for syphilis

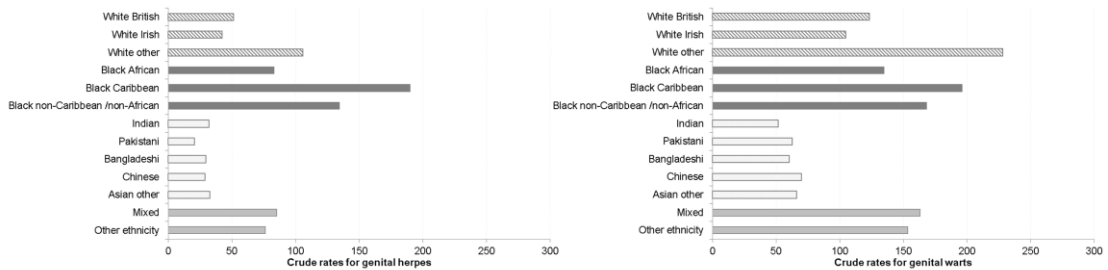


Figure 2.c Crude rates for genital herpes

Figure 2.d Crude rates for genital warts

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354 [ons/guide-method/geography/beginner-s-guide/census/super-output-areas--soas-/index.](http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/super-output-areas--soas-/index.html)  
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