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Supplementary Table 1. Single variable associations between individual-level characteristics, neighbourhood-level characteristics and antibiotic resistance of *E. coli*.

		Antibiotic																	
Variable	Category	Ampicillin		Amoxicillin-clavulanic acid		Ceftazidime		Cefuroxime		Cefalexin		Ciprofloxacin		Nitrofurantoin		Trimethoprim	
		OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value	OR (95% CI)	P-value
Age*	-	**1.03 (1.10-1.07)**	**0.01**	**1.11 (1.07-1.16)**	**<0.01**	**1.15 (1.07-1.24)**	**<0.01**	**1.20 (1.14-1.27)**	**<0.01**	**1.17 (1.10-1.24)**	**<0.01**	**1.20 (1.14-1.27)**	**<0.01**	**1.24 (1.16-1.33)**	**<0.01**	**1.04 (1.01-1.07)**	**0.01**
Sex	Female	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Male	**1.31 (1.04-1.65)**	**0.02**	1.30 (1.00-1.71)	0.05	1.34 (0.56-1.58)	0.81	1.11 (0.77-1.61)	0.57	1.40 (0.95-2.03)	0.09	1.40 (1.00-1.96)	0.05	**1.83 (1.26-2.68)**	**<0.01**	1.52 (0.26-2.68)	0.28
Year of isolation	2010	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	2011	1.02 (0.83-1.25)	0.86	0.55 (0.43-1.69)	0.18	1.44 (0.86-2.40)	0.16	1.33 (0.91-1.94)	0.14	1.35 (0.89-2.05)	0.16	1.31 (0.91-1.89)	0.14	1.33 (0.87-2.02)	0.19	1.23 (0.99-1.53)	0.07
	2012	1.11 (0.86-1.43)	0.22	1.63 (0.97-1.86)	0.11	1.24 (0.66-2.33)	0.50	1.32 (0.84-2.09)	0.23	1.14 (0.68-1.92)	0.22	1.35 (0.87-2.10)	0.18	1.40 (0.40-1.79)	0.21	1.40 (0.97-1.83)	0.08
Quarter	Jan-Mar	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Apr-Jun	0.97 (0.77-1.21)	0.77	0.82 (0.61-1.09)	0.17	**1.67 (1.02-2.75)**	**0.04**	1.36 (0.94-1.95)	0.10	1.38 (0.91-2.11)	0.13	1.03 (0.72-1.48)	0.87	2.54 (1.59-4.08)	0.00	1.02 (0.80-1.28)	0.90
	Jul-Sep	0.83 (0.66-1.03)	0.09	**0.69 (0.52-0.92)**	**0.01**	0.98 (0.57-1.69)	0.94	0.84 (0.57-1.25)	0.40	1.04 (0.67-1.61)	0.86	0.91 (0.63-1.30)	0.59	0.91 (0.63-1.30)	0.00	0.95 (0.76-1.19)	0.67
	Oct-Dec	0.85 (0.71-1.04)	0.11	1.02 (0.80-1.29)	0.19	1.29 (0.82-2.03)	0.17	0.96 (0.69-1.35)	0.83	1.17 (0.80-1.70)	0.21	0.83 (0.60-1.14)	0.23	0.83 (0.60-1.14)	0.07	0.86 (0.70-1.05)	0.14
RUAC	Rural	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Urban	1.62 (0.98-2.52)	0.07	1.22 (0.67-2.23)	0.51	1.38 (0.43-4.43)	0.59	1.08 (0.49-2.37)	0.85	0.83 (0.38-1.82)	0.64	0.88 (0.44-1.79)	0.73	1.05 (0.42-2.64)	0.91	1.34 (0.82-2.19)	0.24
Population density†	-	**1.03 (1.01-1.05)**	**<0.01**	1.00 (0.98-1.03)	0.76	**1.05 (1.01–1.10)**	**<0.01**	**1.04 (1.01–1.08)**	**<0.01**	**1.04 (1.01-1.08)**	**0.01**	**1.03 (1.00-1.07)**	**0.045**	1.04 (1.00-1.08)	0.06	**1.02 (1.00-1.05)**	**0.04**
Living environment	Q1	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Q2	**1.31 (1.04-1.66)**	**0.02**	1.22 (0.89-1.66)	0.21	**2.03 (1.08-3.82)**	**0.03**	1.48 (0.96-2.28)	0.08	**1.66 (1.03-2.68)**	**0.04**	1.33 (0.89-2.00)	0.17	**1.76 (1.06-2.92)**	**0.03**	1.09 (0.85-1.40)	0.49
	Q3	1.18 (0.93-1.50)	0.17	1.13 (0.82-1.55)	0.45	1.80 (0.94-3.43)	0.08	1.10 (0.70-1.74)	0.68	1.32 (0.80-2.17)	0.28	1.09 (0.71-1.67)	0.69	1.45 (0.86-2.46)	0.17	1.02 (0.79-1.31)	0.87
	Q4	**1.47 (1.16-1.86)**	**0.00**	1.34 (0.99-1.83)	0.06	1.85 (0.97-3.51)	0.06	**1.62 (1.06-2.49)**	**0.03**	1.38 (0.84-2.26)	0.21	1.23 (0.81-1.86)	0.33	1.39 (0.82-2.36)	0.23	1.16 (0.91-1.49)	0.24
	Q5	**1.51 (1.19-1.91)**	**0.00**	**1.44 (1.06-1.95)**	**0.02**	**2.89 (1.58-5.28)**	**<0.01**	**1.78 (1.17-2.71)**	**0.01**	**1.85 (1.15-2.96)**	**0.01**	**1.67 (1.13-2.48)**	**0.01**	**1.79 (1.08-2.98)**	**0.02**	1.27 (1.03-1.62)	0.05
Income	Q1	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Q2	0.90 (0.71-1.14)	0.40	0.92 (0.67-1.25)	0.58	0.91 (0.50-1.64)	0.76	0.81 (0.52-1.24)	0.33	0.89 (0.56-1.42)	0.64	0.87 (0.58-1.29)	0.48	0.89 (0.55-1.43)	0.63	0.95 (0.73-1.24)	0.72
	Q3	**1.29 (1.02-1.63)**	**0.04**	1.20 (0.89-1.61)	0.24	1.14 (0.65-2.00)	0.65	1.07 (0.71-1.61)	0.74	1.01 (0.64-1.59)	0.98	0.87 (0.59-1.30)	0.50	0.92 (0.57-1.48)	0.73	0.96 (0.74-1.24)	0.75
	Q4	1.06 (0.84-1.35)	0.60	0.94 (0.69-1.29)	0.71	1.49 (0.88-2.55)	0.14	1.18 (0.79-1.76)	0.41	1.14 (0.73-1.78)	0.56	1.00 (0.68-1.47)	0.98	1.00 (0.63-1.60)	0.99	0.99 (0.77-1.28)	0.95
	Q5	1.25 (0.99-1.60)	0.06	1.27 (0.95-1.71)	0.11	1.31 (0.76-2.27)	0.33	1.12 (0.75-1.67)	0.60	1.06 (0.67-1.66)	0.81	1.02 (0.70-1.50)	0.91	0.92 (0.57-1.48)	0.73	1.07 (0.83-1.39)	0.59
Education	Q1	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Q2	0.96 (0.76-1.21)	0.71	0.82 (0.61-1.12)	0.22	1.36 (0.75-2.45)	0.31	0.89 (0.59-1.34)	0.58	0.87 (0.56-1.36)	0.55	0.88 (0.60-1.30)	0.53	0.78 (0.50-1.23)	0.29	1.05 (0.82-1.34)	0.72
	Q3	1.05 (0.83-1.33)	0.71	1.01 (0.75-1.37)	0.93	1.60 (0.90-2.84)	0.11	0.87 (0.57-1.31)	0.50	0.89 (0.57-1.39)	0.60	0.90 (0.61-1.33)	0.60	0.66 (0.41-1.06)	0.08	0.94 (0.73-1.21)	0.65
	Q4	1.12 (0.88-1.42)	0.35	1.04 (0.77-1.40)	0.79	1.65 (0.93-2.91)	0.09	1.18 (0.80-1.74)	0.41	0.96 (0.62-1.49)	0.84	0.95 (0.65-1.39)	0.65	0.84 (0.53-1.31)	0.44	1.17 (0.92-1.50)	0.21
	Q5	1.16 (0.91-1.47)	0.23	1.08 (0.80-1.45)	0.21	1.48 (0.83-2.65)	0.19	0.92 (0.82-1.38)	0.17	0.88 (0.86-1.38)	0.18	0.86 (0.88-1.27)	0.19	0.67 (0.42-1.08)	0.10	1.07 (0.84-1.37)	0.18
Living environment	Q1	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Q2	**1.31 (1.04-1.66)**	**0.02**	1.22 (0.89-1.66)	0.21	**2.03 (1.08-3.82)**	**0.03**	1.48 (0.96-2.28)	0.08	**1.66 (1.03-2.68)**	**0.04**	1.33 (0.89-2.00)	0.17	**1.76 (1.06-2.92)**	**0.03**	1.09 (0.85-1.40)	0.49
	Q3	1.18 (0.93-1.50)	0.17	1.13 (0.82-1.55)	0.45	1.80 (0.94-3.43)	0.08	1.10 (0.70-1.74)	0.68	1.32 (0.80-2.17)	0.28	1.09 (0.71-1.67)	0.69	1.45 (0.86-2.46)	0.17	1.02 (0.79-1.31)	0.87
	Q4	**1.47 (1.16-1.86)**	**0.00**	1.34 (0.99-1.83)	0.06	1.85 (0.97-3.51)	0.06	**1.62 (1.06-2.49)**	**0.03**	1.38 (0.84-2.26)	0.21	1.23 (0.81-1.86)	0.33	1.39 (0.82-2.36)	0.23	1.16 (0.91-1.49)	0.24
	Q5	**1.51 (1.19-1.91)**	**0.00**	**1.44 (1.06-1.95)**	**0.02**	**2.89 (1.58-5.28)**	**<0.01**	**1.78 (1.17-2.71)**	**0.01**	**1.85 (1.15-2.96)**	**0.01**	**1.67 (1.13-2.48)**	**0.01**	**1.79 (1.08-2.98)**	**0.02**	1.27 (1.03-1.62)	0.05
Housing and services	Q1	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Q2	1.03 (0.82-1.31)	0.76	1.00 (0.74-1.35)	1.00	0.72 (0.41-1.27)	0.26	0.80 (0.53-1.21)	0.30	0.69 (0.43-1.11)	0.12	1.04 (0.71-1.53)	0.84	1.00 (0.62-1.61)	1.00	1.07 (0.84-1.36)	0.58
	Q3	1.01 (0.79-1.27)	0.96	1.04 (0.77-1.41)	0.80	0.98 (0.58-1.65)	0.93	0.87 (0.58-1.31)	0.51	0.89 (0.57-1.39)	0.61	0.92 (0.62-1.36)	0.66	0.78 (0.47-1.29)	0.33	0.90 (0.70-1.15)	0.40
	Q4	1.07 (0.84-1.35)	0.58	1.11 (0.83-1.50)	0.48	1.07 (0.64-1.79)	0.78	1.09 (0.74-1.60)	0.68	1.10 (0.72-1.69)	0.65	0.95 (0.64-1.40)	0.78	1.31 (0.83-2.06)	0.25	0.82 (0.64-1.06)	0.13
	Q5	0.92 (0.73-1.17)	0.49	0.98 (0.93-1.33)	0.23	0.87 (0.50-1.48)	0.60	0.91 (0.81-1.35)	0.23	0.93 (0.80-1.45)	0.17	0.97 (0.65-1.43)	0.87	0.95 (0.58-1.54)	0.82	1.07 (0.60-1.59)	0.24
Health and disability	Q1	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-	Ref.	-
	Q2	1.09 (0.86-1.37)	0.48	0.98 (0.72-1.33)	0.89	1.61 (0.89-2.94)	0.12	1.08 (0.70-1.65)	0.73	1.12 (0.71-1.78)	0.62	1.13 (0.76-1.69)	0.54	1.84 (0.52-1.37)	0.49	1.16 (0.90-1.48)	0.24
	Q3	1.26 (0.99-1.59)	0.06	1.25 (0.93-1.69)	0.14	1.62 (0.89-2.97)	0.12	1.31 (0.87-1.99)	0.20	1.15 (0.72-1.82)	0.56	1.23 (0.83-1.83)	0.30	1.27 (0.89-1.99)	0.30	1.12 (0.88-1.44)	0.36
	Q4	1.04 (0.82-1.31)	0.74	1.06 (0.78-1.43)	0.72	**1.94 (1.09-3.47)**	**0.03**	1.26 (0.83-1.90)	0.28	1.16 (0.74-1.83)	0.51	1.05 (0.70-1.57)	0.81	0.94 (0.58-1.51)	0.79	0.96 (0.75-1.23)	0.76
	Q5	1.38 (0.98-1.79)	0.09	1.10 (0.81-1.50)	0.53	1.72 (0.94-3.13)	0.08	1.31 (0.86-1.99)	0.21	1.11 (0.69-1.76)	0.68	1.21 (0.81-1.80)	0.35	0.83 (0.51-1.37)	0.24	1.22 (0.95-1.57)	0.22

Ref.=reference; CI = confidence interval; OR = odds ratio; Q1–Q5 = quintile 1 (least deprived) – quintile 5 (most deprived); RUAC = rural/urban area classification. * per 10 years of age. † per 1000 persons/hectare

Supplementary Table 2. Adjusted associations between individual-level characteristics, neighbourhood-level characteristics and antibiotic resistance of *E. coli*.

Antibiotic	Age*		Sex			Population density†		RUAC		
			Female	Male				Rural	Urban	
	OR (95% CI)	P-value	OR	OR (95% CI)	P-value	OR (95% CI)	P-value	OR	OR (95% CI)	P-value
Ampicillin	**1.04 (1.01–1.07)**	**0.01**	Ref.	**1.34 (1.05–1.71)**	**0.03**	1.02 (0.99–1.05)	0.10	Ref.	1.37 (0.84–2.22)	0.20
Amoxicillin-clavulanic acid	**1.12 (1.07–1.16)**	**<0.01**	Ref.	1.16 (0.87–1.54)	0.17	**1.02 (1.01–1.03)**	**0.04**	Ref.	1.17 (0.63–2.18)	0.61
Ceftazidime	**1.18 (1.10–1.27)**	**<0.01**	Ref.	0.94 (0.55–1.63)	0.54	1.05 (0.99–1.10)	0.10	Ref.	0.82 (0.23–2.93)	0.76
Cefuroxime	**1.22 (1.15–1.29)**	**<0.01**	Ref.	1.00 (0.66–1.50)	0.09	**1.06 (1.01–1.10)**	**0.01**	Ref.	0.74 (0.31–1.80)	0.51
Cefalexin	**1.18 (1.11–1.26)**	**<0.01**	Ref.	1.29 (0.85–1.95)	0.27	**1.05 (1.01–1.10)**	**0.05**	Ref.	0.59 (0.25–1.42)	0.24
Ciprofloxacin	**1.22 (1.15–1.29)**	**<0.01**	Ref.	1.32 (0.91–1.91)	0.25	1.03 (0.99–1.08)	0.11	Ref.	0.59 (0.25–1.42)	0.24
Nitrofurantoin	**1.25 (1.16–1.34)**	**<0.01**	Ref.	**1.60 (1.04–2.46)**	**0.02**	**1.05 (1.00–1.10)**	**0.02**	Ref.	0.78 (0.27–2.27)	0.65
Trimethoprim	**1.05 (1.02–1.08)**	**<0.01**	Ref.	0.81 (0.63–1.04)	0.07	**1.02 (1.00–1.04)**	**0.05**	Ref.	1.20 (0.71–2.00)	0.50

CI = confidence interval; OR = odds ratio; RUAC = Rural/Urban Area Classification; Ref. = reference group. *per 10 years of age; †1000 persons per hectare.

Bold text applies to significant results (p=<0.05). Associations have been adjusted for education deprivation where it was included in the final multivariable model (cefuroxime, nitrofurantoin).

Supplementary Table 3. Adjusted associations between living environment deprivation, education deprivation and antibiotic resistance of *E. coli*.

Antibiotic	Living environment deprivation										Education, skills and training deprivation									
	Q1	Q2		Q3		Q4		Q5			Q1	Q2		Q3		Q4		Q5		
	OR	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P		OR	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	
Ampicillin	Ref.	**1.28 (0.99–1.67)**	**0.06**	1.14 (0.68–1.50)	0.37	**1.41 (1.03–1.91)**	**0.03**	**1.61 (1.20–1.99)**	**0.04**		-	-	-	-	-	-	-	-	-	
Amoxicillin-clavulanic acid	Ref.	**1.25 (0.89–1.73)**	**0.19**	1.22 (0.86–1.74)	0.26	**1.49 (1.02–2.19)**	**0.04**	**1.67 (1.09–2.55)**	**0.02**		-	-	-	-	-	-	-	-	-	
Ceftazidime	Ref.	**2.15 (1.05–4.40)**	**0.04**	**1.94 (0.91–4.14)**	**0.09**	1.89 (0.84–4.25)	0.13	**3.03 (1.27–7.19)**	**0.01**		-	-	-	-	-	-	-	-	-	
Cefuroxime	Ref.	**1.58 (0.95–2.64)**	**0.08**	1.27 (0.72–2.24)	0.41	**1.85 (1.02–3.36)**	**0.04**	**2.00 (1.03–3.88)**	**0.04**		Ref.	0.82 (0.50–1.35)	0.43	0.70 (0.39–1.27)	026	0.69 (0.34–1.41)	0.31	**0.47 (0.20–0.92)**	**0.05**	
Cefalexin	Ref.	**1.76 (1.02–3.03)**	**0.04**	1.45 (0.80–2.60)	0.22	1.49 (0.79–2.81)	0.21	**2.04 (1.03–3.07)**	**0.04**		-	-	-	-	-	-	-	-	-	
Ciprofloxacin	Ref.	1.46 (0.89–2.40)	0.13	1.29 (0.76–2.19)	0.34	1.49 (0.84–2.64)	0.17	**2.16 (1.16–4.05)**	**0.02**		-	-	-	-	-	-	-	-	-	
Nitrofurantoin	Ref.	**1.94 (1.04–3.62)**	**0.04**	1.95 (0.98–3.85)	0.06	1.86 (0.87–3.94)	0.11	**2.47 (1.08–5.66)**	**0.03**		Ref.	0.66 (0.36–1.18)	0.16	0.50 (0.24–1.04)	0.06	0.49 (0.21–1.18)	0.11	**0.32 (0.12–0.90)**	**0.03**	
Trimethoprim	Ref.	1.09 (0.83–1.44)	0.53	1.04 (0.77–1.38)	0.81	1.18 (0.86–1.62)	0.31	**1.33 (1.07–1.75)**	**0.04**		-	-	-	-	-	-	-	-	-	

CI = confidence interval; OR = odds ratio; Q1–Q5 = quintile 1 (least deprived) – quintile 5 (most deprived); Bold text applies to significant results (p=<0.05). Associations have been adjusted for age, sex, population density, and rural/urban nature.