

Background. *E. coli* is the predominant uropathogen isolated in uncomplicated urinary tract infections (UTI). Surveillance data suggest increasing antimicrobial resistance (AMR), although recent data from the outpatient setting are limited. Treatment is typically empiric and should be guided by local resistance rates; however, this is challenging in the absence of routine culture and assessment of regional AMR. We characterized AMR trends for *E. coli* isolated from females with outpatient UTI in the US, from 2011 to 2019.

Methods. A retrospective multicenter cohort study of antimicrobial susceptibility using data from the BD Insights Research Database (Franklin Lakes, NJ) was conducted. The first *E. coli* urine culture isolates representing each distinct susceptibility pattern within 30 days of index urine from 2011–2019 were included from females ≥ 12 years old. *E. coli* isolates were identified as not-susceptible (NS) if intermediate or resistant to trimethoprim-sulfamethoxazole (TMP-SMX NS), fluoroquinolone (FQ NS), nitrofurantoin (NFT NS), ESBL+ (by commercial panels or intermediate/resistant to ceftaxime, ceftazidime or ceftazidime/cefepime), and multi-drug resistant (MDR), defined as NS to ≥ 2 or ≥ 3 FQ, TMP-SMX, NFT or ESBL+. Descriptive analyses characterized AMR (%) over time and generalized estimating equations were used to statistically assess AMR trends over time.

Results. A total of 1,513,882 *E. coli* isolates were tested at 106 to 295 US centers between 2011 and 2019. Over the study period, AMR remained persistently high (> 20%) for FQ and TMP-SMX and increased for the MDR (≥ 3 drugs) phenotype (from 3.1% to 4.0%) (Table). Prevalence of the ESBL+ phenotype increased year-on-year (from 4.1% to 7.3%). Modeling confirmed a significant increasing trend for the ESBL+ (7.7%/year) and MDR (≥ 3 drugs) phenotypes (2.7%/year) ($P < 0.001$), with decreasing or no trend change for NFT NS and other AMR phenotypes (Table).

Table. Descriptive Statistics and Model-estimated Annual Change of AMR (count and % not-susceptible out of isolates tested) in *E. coli* among US Females (≥ 12 years of age) with Outpatient UTI

Year	Total <i>E. coli</i> Tested, N	Phenotype category, % (n)					
		ESBL+	NFT NS	FQ NS	TMP-SMX NS	≥2 Drug classes	≥3 Drug classes
Overall	1,513,882	6.4 (96,306)	3.8 (56,954)	21.1 (319,354)	25.4 (384,304)	14.4 (217,326)	3.8 (57,673)
2011	67,415	4.1 (2,796)	4.0 (2,688)	21.2 (14,228)	25.2 (16,981)	14.3 (9,649)	3.1 (2,108)
2012	78,257	4.3 (3,336)	5.1 (3,993)	21.9 (17,150)	25.9 (20,249)	15.0 (11,771)	3.4 (2,634)
2013	96,431	4.6 (4,428)	5.2 (5,047)	21.8 (21,094)	26.1 (25,159)	15.1 (14,602)	3.5 (3,374)
2014	124,424	5.9 (7,304)	5.3 (6,541)	21.9 (27,297)	26.2 (32,804)	15.3 (19,073)	3.9 (4,796)
2015	167,424	6.3 (10,583)	4.0 (6,836)	21.8 (36,527)	25.8 (43,212)	14.9 (25,011)	3.9 (6,606)
2016	211,065	6.8 (13,884)	3.1 (6,801)	21.9 (46,278)	25.3 (53,481)	14.6 (30,718)	3.9 (8,209)
2017	241,545	6.9 (16,668)	3.0 (7,170)	20.7 (49,968)	25.0 (60,334)	13.9 (33,529)	3.8 (9,139)
2018	259,797	6.8 (17,611)	3.4 (8,825)	20.2 (52,408)	25.1 (65,095)	13.7 (35,648)	3.8 (9,993)
2019	267,524	7.3 (19,576)	3.5 (9,453)	20.3 (54,359)	25.1 (67,189)	14.0 (37,328)	4.0 (10,184)
Overall Model Estimate	6.8 (6.7–6.8)	4.0 (4.0–4.1)	23.0 (22.9–23.2)	26.0 (25.9–26.1)	15.7 (15.5–15.8)	4.2 (4.1–4.3)	
Trend: average yearly change in NS, % (95% CI)	7.7% (7.2% to 8.2%; $p < 0.001$)	-0.1% (-0.6% to 0.4%; $p < 0.001$)	-0.8% (-0.9% to -0.7%; $p < 0.001$)	0.0% (-0.2% to 0.1%; $p = 0.737$)	0.8% (-1.1% to 0.6%; $p < 0.001$)	2.7% (2.2% to 3.2%; $p < 0.001$)	

Models were adjusted by hospital characteristics (bed size, urban/rural status, and teaching status)

≥ 2 Drug NS, not-susceptible to ≥ 2 drug classes; ≥ 3 Drug NS, not-susceptible to ≥ 3 drug classes; AMR, antimicrobial resistance; CI, confidence interval; ESBL+, extended spectrum β-lactamase positive; FQ, fluoroquinolone; NFT, nitrofurantoin; NS, not-susceptible; TMP-SMX, trimethoprim-sulfamethoxazole; US, United States; UTI, urinary tract infection

Conclusion. Characterization of AMR trends for *E. coli* over the last decade, in outpatient *E. coli* isolates in US females, shows persistently high AMR to FQ and TMP-SMX, and increasing AMR trends for the ESBL+ and MDR (≥ 3 drugs) phenotypes.

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1699. Variation of antimicrobial resistance by age groups for outpatient UTI isolates in US females: A multicenter evaluation from 2011 to 2019

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Background. An estimated 12% of women experience ≥ 1 episode of urinary tract infection (UTI) annually. Incidence is bimodal, with peaks occurring in young, sexually active women (18–24 years) and in post-menopausal women. Previous studies suggest the prevalence of antimicrobial resistance (AMR) in UTI is rising; however recent AMR data for community-acquired UTI are lacking. We estimated the prevalence of AMR among US females with outpatient UTI in 2011–2019, stratified by age.

Methods. A retrospective, multicenter, cohort study of AMR among non-duplicate urine isolates in US females (≥ 12 years of age) from 296 institutions from 2011–2019 (BD Insights Research Database, Franklin Lakes, NJ). Phenotypes examined for *Enterobacteriales* (ENT) were: extended spectrum β-lactamase positive (ESBL+; determined by commercial panels or intermediate/resistant to ceftaxime, ceftazidime or ceftazidime/cefepime); nitrofurantoin (NFT) not-susceptible (NS); fluoroquinolone

(FQ) NS; trimethoprim-sulfamethoxazole (TMP-SMX) NS; and NS to ≥ 2 or ≥ 3 drug classes (including ESBL+). Gram-positive phenotypes were, methicillin resistant *S. aureus* and *S. saprophyticus* and vancomycin-resistant *Enterococcus*. Isolates were stratified by patient age (≥ 12 to < 18 , ≥ 18 to < 55 , ≥ 55 to < 65 , ≥ 65 to < 75 , ≥ 75 years). Chi-square tests were used to evaluate AMR difference between groups.

Results. In total, urine isolates were collected from 106 to 296 (2011–2019) US sites. Overall, the prevalence of antimicrobial NS increased with age for all *E. coli* phenotypes (all $P < 0.001$; Table 1), and for non-*E. coli* ENT (all $P < 0.001$), except NFT NS, which decreased from 70.6% to 59.7% ($P = 0.002$; Table 2). The greatest difference between age groups in prevalence of resistance was observed for FQ NS *E. coli*: 5.8% (≥ 12 to < 18 years) vs 34.5% (≥ 75 years). For the multi-drug resistant *E. coli* phenotypes, resistance increased with age, ranging from 4.8–22.4% and 0.9–6.5% for ≥ 2 and ≥ 3 drug NS, respectively. Overall, the prevalence of resistance for Gram-positive phenotypes increased with age (all $P < 0.001$; Table 3).

Table 1. Prevalence of antimicrobial resistance among *E. coli* isolates in US females with outpatient UTI by age group.

<i>E. coli</i> Age group, years	Phenotype Category																	
	ESBL+			NFT NS			FQ NS			TMP-SMX NS			≥2 Drug NS			≥3 Drug NS		
≥12 to <18	tested	NS	%NS	tested	NS	%NS	tested	NS	%NS	tested	NS	%NS	tested	NS	%NS	tested	NS	%NS
18 to <55	700,604	30,256	4.3	700,604	20,778	3.0	700,604	91,891	13.1	700,604	174,411	24.9	700,604	66,580	9.5	700,604	14,822	2.1
55 to <65	186,708	13,047	7.0	186,708	6,722	3.6	186,708	42,076	22.6	186,708	47,318	25.3	186,708	28,798	15.4	186,708	7,892	4.2
65 to <75	222,516	17,860	8.0	222,516	9,394	4.2	222,516	60,189	27.0	222,516	97,271	43.7	222,516	40,297	18.1	222,516	11,522	5.2
≥75	355,078	33,995	9.6	355,078	18,991	5.3	355,078	122,339	34.5	355,078	95,795	27.0	355,078	79,448	22.4	355,078	23,242	6.5

≥ 2 Drug NS, not-susceptible to ≥ 2 drug classes; ≥ 3 Drug NS, not-susceptible to ≥ 3 drug classes; ESBL+, extended spectrum β-lactamase positive; FQ, fluoroquinolone; NFT, nitrofurantoin; NS, not-susceptible; TMP/SMX, trimethoprim-sulfamethoxazole; US, United States; UTI, urinary tract infection.

Table 2. Prevalence of antimicrobial resistance among non-*E. coli* ENT isolates in US females with outpatient UTI by age group.

Non- <i>E. coli</i> ENT* Age group, years	Phenotype Category											
	ESBL+ KPK/KPO and PM			NFT NS			FQ NS			TMP/SMX NS		
≥12 to <18	tested	NS	%NS	tested	NS	%NS	tested	NS	%NS	tested	NS	%NS
18 to <55	105,100	3,523	3.4	130,562	88,383	67.7	130,562	5,899	4.4	130,562	11,077	8.5
55 to <65	48,774	2,628	5.4	59,979	38,051	63.4	59,979	5,880	9.8	59,979	8,070	13.5
65 to <75	71,625	3,726	5.2	88,161	53,637	60.8	88,161	9,319	10.6	88,161	12,104	13.7
≥75	142,706	7,817	5.5	178,185	106,324	59.7	178,185	28,181	15.8	178,185	28,466	16.0

*Non-*E. coli* Enterobacteriales isolates included: *K. pneumoniae*, *K. oxytoca*, *E. cloacae*, *A. aerogenes*, *P. mirabilis*, *M. morgani*, *C. freundii*, and *S. marcescens*

ENT, Enterobacteriales; ESBL+, extended spectrum β-lactamase positive; FQ, fluoroquinolone; KPK/KPO, *K. pneumoniae*/oxytoca; NFT, nitrofurantoin; NS, not-susceptible; PM, *P. mirabilis*; TMP/SMX, trimethoprim-sulfamethoxazole; US, United States; UTI, urinary tract infection.

Table 3. Prevalence of antimicrobial resistance among Gram-positive isolates in US females with outpatient UTI by age group.

Age group, years	Phenotype Category								
	<i>S. aureus</i>			<i>S. saprophyticus</i>			<i>Enterococcus</i>		
≥12 to <18	tested	Ox/Meth resistant, %	MRSA, %	tested	Ox/Meth resistant, %	Ox/Meth resistant, %	tested	Vanco resistant, %	VRE, %
18 to <55	1,221	200	16.4	2,654	1,457	54.9	2,082	11	0.5
55 to <65	14,763	4,048	27.4	15,688	8,684	55.4	37,446	1,260	3.4
65 to <75	2,919	1,231	42.2	553	301	54.4	15,675	1,092	7.0
≥75	7,818	4,616	59.0	81	51	63.0	53,179	4,836	9.1

MRSA, methicillin-resistant *S. aureus*; Ox/Meth-R, oxacillin/methicillin-resistant; UTI, urinary tract infection; Vanco, vancomycin; VRE, vancomycin-resistant *Enterococcus*.

Conclusion. The prevalence of AMR in *E. coli* and non-*E. coli* ENT increased with age among US females presenting for care in the outpatient setting overall. A similar trend increase by age is also seen in Gram-positive isolates.

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1700. What Is Specific With Bacterial Escherichia Coli Urinary Tract Infection

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Background. Bacterial urinary tract infections continue to be a major health problem, responsible for a significant morbidity and mortality. Its prognosis is more severe than non-bacterial forms. The aim of this work was to study the clinical and evolutionary features of bacterial urinary tract infections caused by *Escherichia coli* (*E. coli*).

Methods. We conducted a retrospective study including all patients hospitalized in infectious diseases department for urinary tract infection (UTI) caused by *E. coli* between 2010 and 2017.

Results. During the study period, we enrolled 613 cases of UTI caused by *E. coli*, among whom 75 cases (12.2%) were bacterial. There were 47 females (62.7%). The mean age was 59 ± 17 years. Thirty-three patients were aged ≥ 65 years (44%). Diabetes was noted in 38 cases (50.7%) and renal lithiasis in 14 cases (18.7%). A history of UTI was reported in 13 cases (17.3%). The most common clinical presentation was acute pyelonephritis (59 cases; 78.7%) and followed by prostatitis (8 cases; 10.6%). Renal