



Antimicrobial Resistance and Extended Spectrum Beta-Lactamase Agents in Urinary Tract Infections: a Serious Problem in the North of Mexico

Pedro Madero-Morales MD, Iván Robles-Torres MD, Adrián Gutiérrez-González MD PhD, Lauro Gómez-Guerra MD PhD, Soraya Mendoza-Olazarán PhD, Elvira Garza-González PhD, Samantha Flores-Treviño PhD, Rolando Delgado-Balderas PhD.

Hospital Universitario Dr. José E. González, Universidad Autónoma de Nuevo León. Monterrey, Nuevo León, Mexico

Abstract: 18-4716

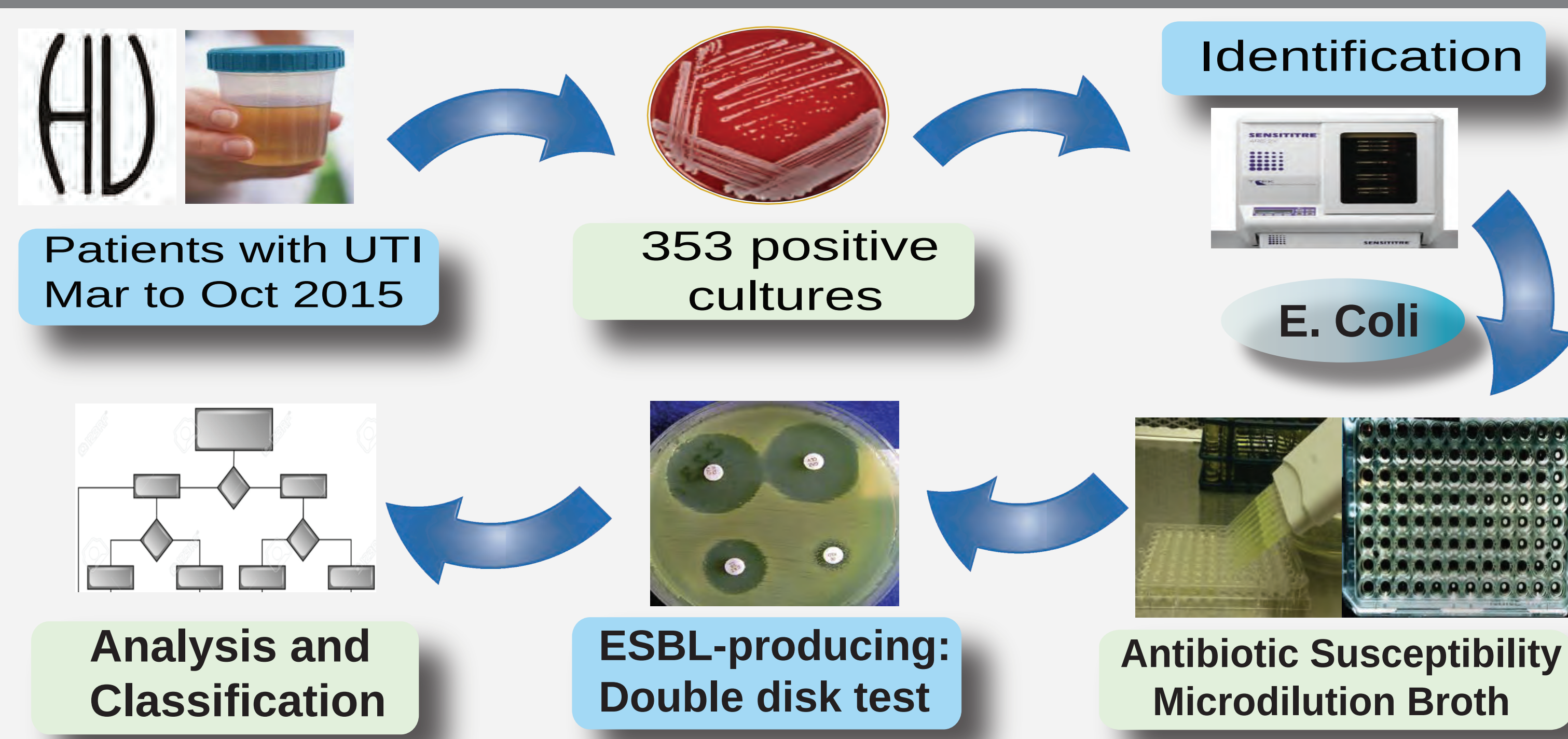
Correspondence to:
Lauro Gómez-Guerra MD PhD
laurogomez@hotmail.com



Introduction

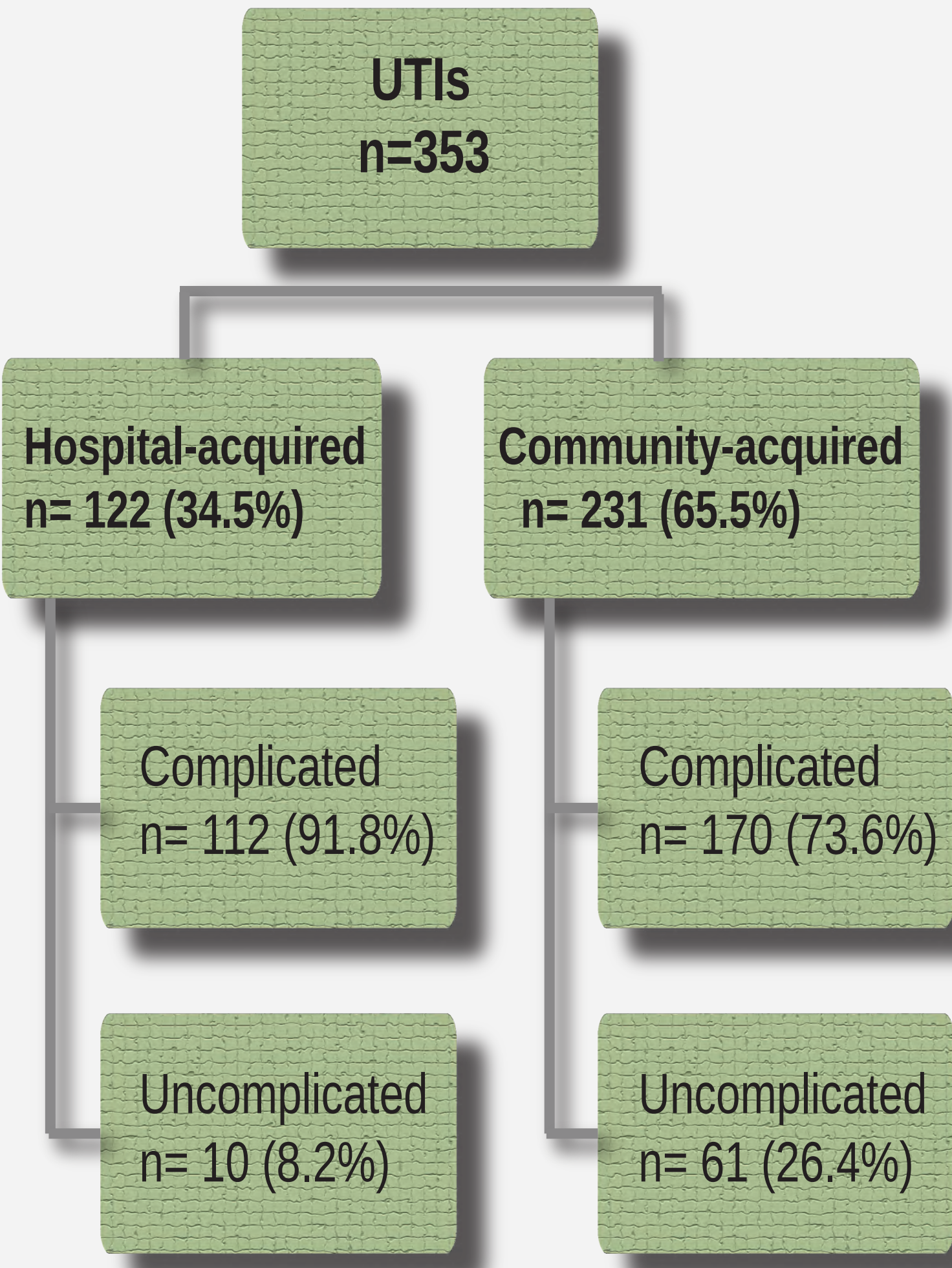
Inappropriate use of antibiotics has developed an increased incidence of resistant strains in Urinary Tract Infections (UTI) in the past decades. The incidence of Extended Spectrum Beta Lactamase (ESBL) agents has increased in community acquired UTI, reaching up to 11% in some studies. Few reports have been published about risk factors for development of ESBL producing bacteria in UTI. Our aim was to compare the causal agents, antimicrobial resistance and risk factors associated with ESBL-producing bacteria between hospitalized, community-acquired,complicated and uncomplicated UTI.

Methods

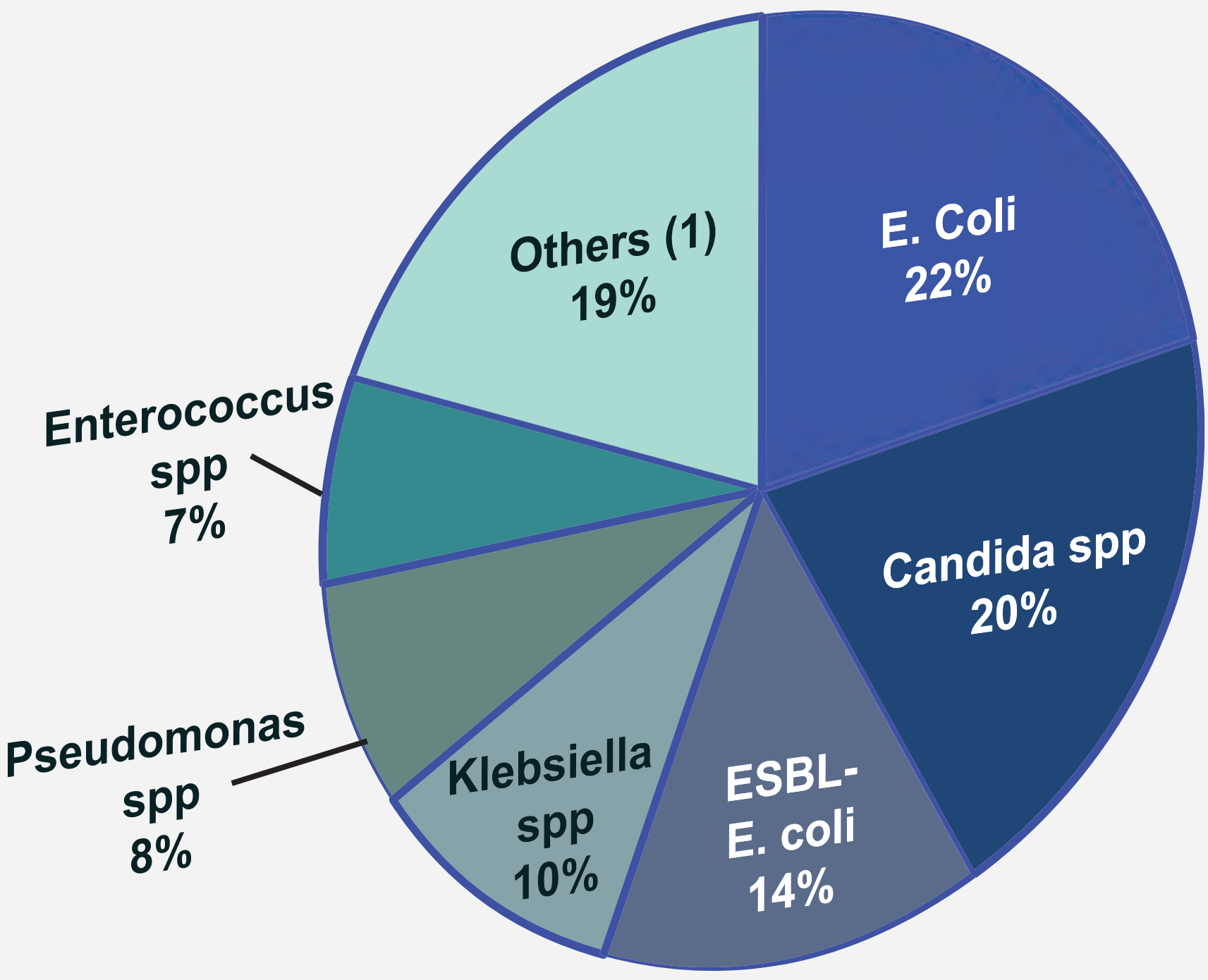


Conclusions

Results

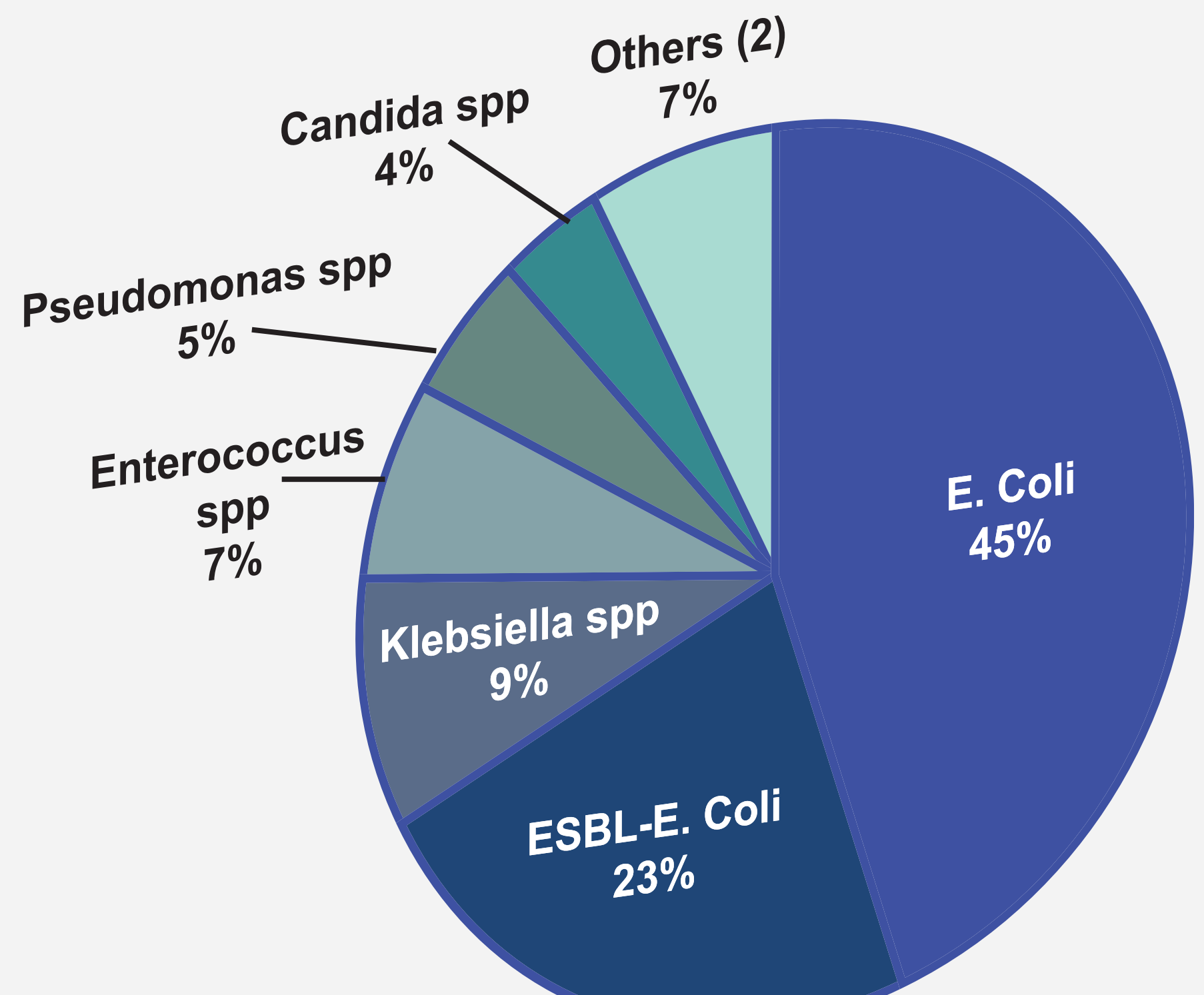


Hospital-Acquired UTI n=122



(1) Staphylococcus spp, Enterobacter spp, Providencia rettgeri, Burkholderia cepacia, Citrobacter freundii, Myroides odoratus, Stenotrophomas maltophilia, Acinetobacter baumannii, Proteus mirabilis, Streptococcus spp. (2) Morganella morganii, Proteus mirabilis, Enterobacter spp, Providencia rettgeri, Streptococcus spp, Staphylococcus spp.

Community-Acquired UTI n=231



MIC50 (µg/mL), MIC90 (µg/mL) and % of resistance to antibiotics of the UTI-causing E. coli

UTI type	GEN	AMK	AMC	CRO	CIP	LEV	NIT	FOS	ETP	AZT	SXT	CL
Complicated (MIC ₅₀)	≤ 2	≤ 8	> 32/16	> 4	> 4	> 8	≤ 16	64	≤ 0.25	> 16	> 4/76	≤ 1
Uncomplicated (MIC ₅₀)	≤ 2	≤ 8	> 32/16	≤ 0.5	1	≤ 1	≤ 16	64	≤ 0.25	≤ 2	> 4/76	≤ 1
Complicated (MIC ₉₀)	> 16	≤ 8	> 32/16	> 4	> 4	> 8	64	> 256	0.5	> 16	> 4/76	≤ 1
Uncomplicated (MIC)	> 16	≤ 8	> 32/16	> 4	> 4	> 8	64	256	≤ 0.25	> 16	> 4/76	≤ 1
Complicated (% R)	32.2	0.6	57.2	39.4	48.3	46.7	5.0	45.6	2.2	32.2	44.4	2.8
Uncomplicated (%R)	5.0	0.0	19.4	8.3	11.7	9.4	2.8	16.1	1.1	10.0	15.0	0.6
p-value	0.042	0.698	0.678	0.035	0.041	0.0001	0.901	0.658	0.707	0.028	0.930	0.823

GEN: gentamicin, AMK: amikacin, AMC: amoxicillin-clavulanic acid, CRO: ceftriaxone, CIP: ciprofloxacin, LEV: levofloxacin, NIT: nitrofurantoin, FOS: fosfomicin, ETP: ertapenem, AZT: aztreonam, SXT: trimethoprim-sulfamethoxazole, CL:colistin.

Demographic and clinical data of patients according to ESBL- production

Characteristic	ESBL n=61 (%)	non-ESBL n=119 (%)	p value	OR (95% IC)
Demographic				
Male	24 (39.2)	45 (37.8)	0.136	0.645 (0.362-1.150)
Age mean (years)	49.7	48.8		
Age (≥ 60 years)	27 (44.2)	62 (52.1)	0.584	0.853 (0.483-1.506)
UTI type				
Hospital acquired	14 (22.9)	27 (22.7)	0.951	0.98 (0.515-1.863)
Complicated	54 (88.5)	81 (68)	0.001	3.652 (1.689-7.895)
Comorbidities				
Type 2 DM	26 (42.6)	34 (28.6)	0.023	1.927 (1.090-3.408)
CKD	16 (21.1)	24 (15.2)	0.265	1.489 (0.738-3.004)
Immunodeficiency	8 (13.1)	4 (3.4)	0.008	3.838 (1.340-10.997)
AHT	18 (23.7)	30 (19)	0.405	1.324 (0.683-2.566)
Pregnancy	4 (5.3)	16 (10.1)	0.213	0.493 (0.159-1.529)
Previous use of antibiotics	32 (52.4)	34 (28.6)	<0.001	2.705 (1.536-4.765)
Urologic alterations				
HPB	4 (5.3)	15 (9.5)	0.267	0.53 (0.170-1.654)
Obstructive uropathy	8 (10.5)	21 (13.2)	0.548	0.767 (0.323-1.822)
Tumor	7 (9.2)	8 (5)	0.225	1.902 (0.663-5.455)
Lithiasis	6 (7.9)	14 (8.9)	0.805	0.882 (0.325-2.392)
Neurogenic bladder	4 (5.3)	9 (5.7)	0.892	0.92 (0.274-3.087)
RX/QX	5 (6.6)	2 (1.3)	0.025	5.493 (1.041-28.995)
Recurrent UTI	27 (35.5)	54 (34.2)	0.839	1.061 (0.598-1.883)
Catheter	22 (28.9)	36 (22.8)	0.307	1.381 (0.743-2.566)
Urologic Cx	10 (13.1)	13 (8.2)	0.236	1.69 (0.705-4.051)
Urosepsis	9 (11.8)	23 (14.6)	0.32	0.788 (0.346-1.798)

ESBL: Extended-spectrum beta-lactamase; OR odds ratio; DM, Diabetes mellitus; CKD, Chronic renal disease; AHT, Arterial Hypertension; BPH, Benign prostatic hyperplasia; RX /QX, Radiotherapy and or chemotherapy; UTI, Urinary Tract Infection; Cx, Surgery

REFERENCES
1. Infectious Disease Clinics of North America 2014; 28: 75-89.
2."Guidelines on Urological Infections". European Association of Urology 2014
3. Clinical Microbiology Newsletter 2014; 36.12: 87-93.
4. Clinical Infectious Diseases 2013; 719-24
5. Clinical infectious diseases 2010; 52.5: 103-20.
6. Clinical Infectious Diseases 2005: 643-654.
7. Recommendations by the Infectious Diseases Society of America (IDSA) and the American Society for Microbiology (ASM) Clinical infectious diseases 2013; 57.4: 22-121.