Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
				Children who had healthcare-		
				associated UTI, recurrent UTI		
				(defined as 2 proven episodes		
				within 6 mo), neurogenic bladder,		
Al-Saif et al.,				vesicostomy, and on intermittent		
[11] (2012) /				catheterization. All possible	Urine bag,	
King Abdulaziz				contaminated urine samples were	catheterization,	
Hospital, Al-	Retrospective /	To assess susceptibility pattern		excluded including those who	midstream clean catch.	Chi-square and Fisher exact test. A 2-
Ahsa, Saudi	January 2003–	of CA uropathogens in Saudi	CA-UTI in non-	grew Candida, Staphylococcus	No data on method of	sided P-value < 0.05 was considered
Arabia	April 2009	children	hospitalized children	species, or group B Streptococcus.	collection in 70% of pts.	statistically significant.
Al-Otaibi &						
Alotable						
Bukhari [12]		To describe the epidemiology	the second second			
(2013) / King		including risk factors of UTIs,	Hospitalized pts and			
Khalid	Retrospective /	and compare infections caused	out-patients (adult and			Chi-square test and Fisher's exact test.
University	June 2009–June	by ESBL- <i>E. coli</i> and non-ESBL	pediatric pts) with			A statistically significant difference was
Hospital,	2011	strains	culture-verified UTI	NA	NA	considered when <i>P</i> <0.05.

Supplementary Table 2. Details of the published studies on pediatric UTIs in the GCC countries (2011–2022)

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Riyadh, Saudi						
Arabia						
					Transurethral	
					catheterization (56.2%),	
		To detect abnormal renal US			midstream urine (42.5%),	
Garout et al.,		findings in children aged <5 y			or suprapubic aspiration	
[13] (2015) /		with UTI, and compare the			(1.3%). Main method in	
King Adbulaziz		etiology of infection and			pts aged <2 y was	
University		abnormal US finding in cases			transurethral	
Hospital,	Retrospective /	with first episode of infection	All children aged <5 y	Pts with colony count $<10^5$	catheterization (69.4%),	Chi-square test. For all the statistical
Jeddah, Saudi	October 2013–	with those with recurrence of	who had UTI confirmed	CFU/mL, as well as those with bag	and in those aged >2 y,	tests, a <i>P</i> <0.05 was considered
Arabia	February 2014	infection.	by urine culture	urine collection	midstream urine (78.6%).	statistically significant.
Hendaus et al.,		To estimate prevalence of UTI in				
[14] (2015) /		children hospitalized with			Only catheter urine	Univariate and multivariate logistic
Hamad Medical	Retrospective /	bronchiolitis. To evaluate the	Pts aged 0 to 24 mo	All children with urinary tract	samples were included	regression analyses. A two-sided P
Corporation,	January 2010–	effect of demographic and	hospitalized with acute	abnormalities and those with	to decrease the risk of	<0.05 was considered statistically
Doha, Qatar	December 2012	clinical characteristics and viral	bronchiolitis	rectal temperatures ≤38°C (100°F)	contaminated urine	significant.

reference/ Center Study typ / Delation Objectives netubion of the previewer rest of the upper delation of the previewer rest of the Unit of Unit. Method of urine of the upper delation of the previewer rest of the Unit of Unit. Delation of the previewer rest of Unit. Delation of the upper delation of the previewer rest of Unit. Delation of the upper delation of t	Study						
CenterDisteiveDistriction <t< th=""><th>reference /</th><th>Study type /</th><th></th><th></th><th></th><th>Method of urine</th><th></th></t<>	reference /	Study type /				Method of urine	
Image: set of upper values in the prevalue retains of UT. image: set of UT. image: set of UT. of UT. To evaluate the practicality of applying the new AAP guidelines Image: set of UT. Image: set of UT. applying the new AAP guidelines Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children aged Image: set of UT. Image: set of UT. Image: set of UT. (2011) for UT in children with single of Dec 12 y with both Image: set of UT. Image: set of UT. (2012) for UT in children with single of Dec 12 y with both Image: set of UT. Image: set of UT. (2012) for UT in children with single of Dec 12 y with both Image: set of UT. Image: set of UT. (2012) for UT in children with single of	Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Indexof UT.of UT.Index <t< td=""><td></td><td></td><td>etiology on the prevalence rates</td><td></td><td></td><td></td><td></td></t<>			etiology on the prevalence rates				
To evaluate the practicality of applying the new AAP guidelines (2011) for UTI in children aged 2-24 mo. To evaluate the value of the currently applied guidelines in detecting VUR and guidelines in detecting VUR and to the new guidelines will be culture of >50,000And culture of >50,000Husain et al., Husain et al., (2015) / Kabeer Hospital, Lune 2011-MayRetrospective / bacteria.Up to 12 y with both guidelines will be culture of >50,000Mixed pathogens, no pyuria and culture of >50,000CFU/mL of a singleHusain et al., Kabeer Hospital, Lune 2011-MayTo report common uropathogens and their appropriately collectedMixed pathogens, no pyuria and colloc CFU/mL of bacteriaChi-square tests. A P-value of <0.05 was the cut-off for statistical significance.Sharef et al., Lif (2015) / 			of UTI.				
Image: space spac			To evaluate the practicality of				
Image: bit is the second of the current second of the second of the current second of the			applying the new AAP guidelines				
Image: space spac			(2011) for UTI in children aged				
Image: space s			2-24 mo. To evaluate the value				
Husin et al., Husin et al., I fls (2015) / Mubarak Alguidelines in detecting VUR and Uthe new guidelines will be afe and valuable. To identify if Mubarak Al Kabeer Hospital, I une 2011-Maycto the new guidelines will be I the currently empiric antibiotic appropriately collected specimen of urineMixed pathogens, no pyuria and Mixed pathogens, no pyuria and Specimen of urineMixed pathogens, no pyuria and Mixed pathogens, no pyuria and Specimen of urineChi-square tests. A P-value of <0.05 was the cur-off for statistical significance.Sharef et al., I fls (2015) / Suttan Qaboos UniversityTo report common urine culturesPis with recurrent UTIs, neurological impairment, immure antiponcies. Pts with deficient antiponcies. Pts with deficient to describe clinical presentationPis with recurrent UTIs, neurological impairment, immure malignancies. Pts with deficient antiponcies. Pts with deficient antiponcies. Pts with deficient to describe clinical presentationPis with recurrent UTIs, neurological impairment, immure malignancies. Pts with deficient antiponcies. Pts with deficient to describe clinical presentationAntiponcies. Pts with deficient procedure is not wideChi-square test or Student's r-test and apriori two-chield level of significance apriori two-chield level of significance was et a 0.05.			of the currently applied	Up to 12 y with both			
Husain et al.,to the new guidelines will beculture of >50,000Ise and valuable. To identifyculture of >50,000Culture of >50,000Cu			guidelines in detecting VUR and	pyuria and urine			
[15] (2015) /safe and valuable. To identify inCFU/mL of a singleInclusion <td>Husain et al.,</td> <td></td> <td>to the new guidelines will be</td> <td>culture of >50,000</td> <td></td> <td></td> <td></td>	Husain et al.,		to the new guidelines will be	culture of >50,000			
Mubarak AlRetrospective /the currently empiric antibioticuropathogen in anImage: Composition of the currently empiric antibioticuropathogen in anMixed pathogens, no pyuria andMage: Composition of the currently empiric antibioticChi-square tests. A P-value of <0.05 wasKuwait2012bacteria.specimen of urine<50,000 CFU/mL of bacteria	[15] (2015) /		safe and valuable. To identify if	CFU/mL of a single			
Kabeer Hospital,June 2011-Mayused is suitable for the isolatedappropriately collectedMixed pathogens, no pyuria andPathogens, no pyuria andChi-square tests. A P-value of <0.05 wasKuwait2012bacteria.specimen of urine<50,000 CFU/mL of bacteria	Mubarak Al	Retrospective /	the currently empiric antibiotic	uropathogen in an			
Kuwait2012bacteria.specimen of urine<50,000 CFU/mL of bacteriaNAthe cut-off for statistical significance.KuwaitNaTo report commonPreswith recurrent UTIs,NaNaNaNaSharef et al.,Retrospective /To report commonNaNaNaNaIfal (2015) /Septemberantibiotic susceptibility inNaNaNaNaSultan Qaboos2008-Augustchildren with single episode UTI.S14 y and had positivemalignancies. Pts with deficientNaChi-square test or Student's t-test andUniversity2012To describe clinical presentationS14 y and had positivemalignancies. Pts with deficientcatheterizationa priori two-tailed level of significanceUniversity2012To describe clinical presentationurine culturesdata.procedure is not widelywas set at 0.05.	Kabeer Hospital,	June 2011–May	used is suitable for the isolated	appropriately collected	Mixed pathogens, no pyuria and		Chi-square tests. A <i>P</i> -value of <0.05 was
Image: constraint of the constra	Kuwait	2012	bacteria.	specimen of urine	<50,000 CFU/mL of bacteria	NA	the cut-off for statistical significance.
Sharef et al.,Retrospective /uropathogens and theirneurological impairment, immuneMostly clean catchChi-square test or Student's t-test and[16] (2015) /Septemberantibiotic susceptibility indeficiencies and hematologicalsamples because thethe Wilcoxon-Mann-Whitney U test. AnSultan Qaboos2008-Augustchildren with single episode UTI.14 y and had positivemalignancies. Pts with deficientcatheterizationa priori two-tailed level of significanceUniversity70 describe clinical presentationurine culturesdata.procedure is not widelywas set at 0.05.			To report common		Pts with recurrent UTIs,		
Sharef et al., uropathogens and their uropathogens and their Mostly clean catch [16] (2015) / September antibiotic susceptibility in deficiencies and hematological samples because the the Wilcoxon-Mann-Whitney U test. An Sultan Qaboos 2008-August children with single episode UTI. ≤14 y and had positive malignancies. Pts with deficient catheterization a priori two-tailed level of significance University 2012 To describe clinical presentation urine cultures data. procedure is not widely was set at 0.05.		Retrospective /			neurological impairment, immune		Chi-square test or Student's t-test and
[16] (2015) /Septemberantibiotic susceptibility in antibiotic susceptibility inantibiotic susceptibility in ≤14 y and had positive urine culturesdeficiencies and hematological malignancies. Pts with deficient data.samples because the catheterizationthe witcoson-wanti-winturey of test. And a priori two-tailed level of significance was set at 0.05.University2012To describe clinical presentation≤14 y and had positive urine culturesmalignancies. Pts with deficient data.catheterization procedure is not widelya priori two-tailed level of significance was set at 0.05.	Sharef et al.,	Contombor	uropathogens and their		deficiencies and hometalogical	Mostly clean catch	the Wilcover Monn Whitney II test An
Sultan Qaboos2008-August children with single episode UTI.<14 y and had positive urine culturesmalignancies. Pts with deficient data.catheterizationa priori two-tailed level of significance was set at 0.05.UniversityTo describe clinical presentation<14 y and had positive urine culturesmalignancies. Pts with deficient data.procedure is not widelya priori two-tailed level of significance was set at 0.05.	[16] (2015) /	September	antibiotic susceptibility in		denciencies and nematological	samples because the	the whicoxon-iviann-whitney U test. An
University 2012 To describe clinical presentation urine cultures data. procedure is not widely was set at 0.05.	Sultan Qaboos	2008–August	children with single episode UTI.	≤14 y and had positive	malignancies. Pts with deficient	catheterization	a priori two-tailed level of significance
	University	2012	To describe clinical presentation	urine cultures	data.	procedure is not widely	was set at 0.05.

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Hospital,		and laboratory evaluation of			accepted in our	
Muscat, Oman		these children.			community	
Kabbani et al.,						
[17] (2016) /		To determine the incidence,			Cultures collected in an	
King Abdulaziz		etiology, main risk factors, and			aseptic technique by	Poisson logistic regression, Wilcoxon
Cardiac Center,	Retrospective /	outcome of UTIs in post-	All post-operative pts,		indwelling urinary	Rank-Sum test, and Fisher's Exact Test.
Riyadh, Saudi	January 2012–	operative cardiac children	aged <14 y, admitted to		catheters or suprapubic	<i>P</i> values <0.05 were considered
Arabia	December 2012	admitted to the PCICU	PCICU.	Pts admitted for other reasons.	needle aspiration.	statistically significant.
Alanazi et al						
[18] (2018a) /		To determine the current				
King Adbulaziz		prevalence and susceptibility to				
Medical City,	Retrospective /	AMP, AMC, SXT, NIT, CFZ, and			A properly collected	
Riyadh, Saudi	January 2008–	CIP amongst all <i>E. coli</i> isolated	Pts diagnosed with UTIs		midstream "clean catch"	
Arabia	March 2008	from pts with UTIs	due to <i>E. coli</i>	NA	urine sample.	NA
Alanazi [19]		To determine the prevalence of		Incomplete antibiotic		Pearson's chi-square test. For all
(2019b) / King	Potrospostivo /	CALITIC among ED visits in Saudi		procerintions infants weighing <e< td=""><td>A properly collected</td><td>statistical tosts, R < 0.05 was considered</td></e<>	A properly collected	statistical tosts, R < 0.05 was considered
(20100) / King				preseriptions, inidites weighning <5	midstream "clean catch"	
Abdulaziz	First quarter of	Arabia, assess the pattern of	All pts aged >6 mo	kg. Pts with acute complicated UTI,	urine sample	statistically significant. Prevalence of
Medical City,	the year	antibiotic treatment of CA-UTIs,	admitted to the ED with	catheter-associated UTI, and	anne sample.	inappropriate antibiotic prescriptions

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Riyadh, Saudi	(January 2018–	determine the prevalence and	CA-UTIs during the first	comorbidities (such as liver		was determined as the number of
Arabia	March 2018)	types of antibiotic-prescribing	quarter of the year.	disease, renal insufficiency,		physician orders with one or more
		errors, and assess the cost of		malignant tumour, and AIDS).		types of error divided by the total
		inappropriate antibiotic use in				number of prescriptions and multiplied
		the treatment of CA-UTIs.				by 100. The prevalence of prescribing
						errors (selection, dose, frequency, and
						duration) was first calculated as
						mutually exclusive prevalence by
						dividing the number of errors over the
						number of antibiotic prescriptions
						multiplied by 100.
Waham at al						
Hisnam et al.,						
[20] (2018) /						
King Abdulaziz						
University			Clinical diagnosis of UTI			
Hospital,		To evaluate antimicrobial	from the patient			
Jeddah, Saudi	Retrospective /	resistance patterns of UTI	database of selected	Pts with any comorbidity and at		
Arabia	2016–2017	pathogens among children	clinical settings.	stage of chronic condition.	NA	Correlation analysis was performed

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Alfakeekh et al.,				Diagnosis of congenital nephrotic		
[21] (2019) /		To estimate the		syndrome, secondary nephrotic		
King Abdul-Aziz	Retrospective,	immunosuppressive burden,		syndrome (e.g., IgA nephropathy,		
Medical City,	cross-sectional /	rate of infection and identify	Children ≤ 14 years of	lupus nephritis), primary		Mann-Whitney U test or Kruskal-Wallis
Riyadh, Saudi	January 2003–	possible risk factors in PCNS	age with the diagnosis	immunodeficiency, malignancy,		test. A <i>P</i> -value of <0.05 was considered
Arabia	December 2013	requiring hospitalization	of PCNS.	pts on dialysis	NA	statistically significant difference.
			Pts aged 1 d–14 y, diagnosed to have UTI (a positive urine culture of single pathogen with >10 ⁴ CFU/ mL)			Chi-square test and Fisher Exact or Yates corrected Chi-square tests;
Awean et al.,			obtained by catheter,			unpaired and Mann Whitney U tests;
[22] (2019) / Al			midstream urine			Pearson's correlation coefficients.
Wakra Hospital,	Retrospective,	To estimate the prevalence of	sample, or any single	UTI based on urine culture		Univariate and multivariate logistic
Hamad Medical	cross-sectional /	UTI due to ESBL bacteria in	colony for culture	obtained by other means and	Catheter, midstream	regression. Two-tailed P values were
Corporation,	January 2016–	children. To identify possible risk	obtained by suprapubic	culture result showing mixed	urine sample, or by	considered statistically significant if
Qatar	December 2016	factors for ESBL-UTI.	aspiration.	growth.	suprapubic aspiration.	<0.05.

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Hameed et al.,				Age >14 y, HA-UTI, chronic renal		
[23] (2019) /				failure, severe birth defects		
King Abdulaziz		To investigate uropathogens and	Age 0–14 years with a	involving the urinary tract,		
Medical City,		their resistance patterns in	discharge diagnosis of	immunodeficiency or	An appropriately	Independent samples t-tests.
Riyadh, Saudi	Retrospective /	children presenting with their	UTI (as per AAP Clinical	immunosuppression and solid	collected urine	Significant differences were identified
Arabia	2006–2012	first admission for a UTI.	Practice Guidelines)	organ transplant	specimen.	at <i>P</i> <0.05.
Mohammed et						
al., [24] (2019) /						
Salmaniya		To evaluate most common	All infants with UTIs	Urine samples collected by the		
Medical	Retrospective /	underlying organisms and	(defined as the	bag, or urine sample showing		
Complex,	June 2015–June	associated urological anomalies	presence of 10,000 to	mixed organisms indicating	Suprapubic aspiration or	
Bahrain	2017	in infants with UTIs.	50,000 CFU/mL).	contaminations	catheterization.	NA
Abuzeyad et al.,			<14 y with a diagnosis			
[25] (2020) /		To evaluate the most common	of UTI, fever of			
King Hamad		presentation and most common	unknown origin, urinary	>14 y, structural urological	Fifty-four (51.9%) urine	
University	Retrospective /	organism of UTI in different age	complaints, vomiting	anomalies, already diagnosed	samples were collected	
Hospital,	July 2015–July	groups. To evaluate appropriate	with or without fever	cases of UTI, and children with a	by midstream clean	
Bahrain	2016	empirical antibiotic therapy.	and abdominal pain.	long history of antibiotic therapy.	catch method	NA

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
			Pts were randomly selected.			
Safdar et al.,						
[26] (2020) /				Neonates with urogenital		
King Abdulaziz				abnormalities or neonates	Midstream (59.1%),	
University		To determine the sensitivity and		admitted for surgical reasons.	transurethral (37.4%),	
Hospital,		specificity of pyuria as a	All pts aged ≤14 y who	Asymptomatic pts, for whom a	nephrostomy tube	Shapiro-Wilk test, Mann-Whitney U
Jeddah, Saudi	Retrospective	predictor of culture-proven UTI	had UTI confirmed by	urine sample was taken for	(2.6%), suprapubic	test, Pearson chi-square test, Fisher's
Arabia	/2015–2020	in the pediatric pts.	culture.	another purpose.	aspiration, (0.9%)	exact test, or 2x2 tables.
				Cultures with <10 ⁵ CFU/mL and		
				those already on antibiotic drugs.		
				Non-bacterial uropathogens,		
				incomplete antibiotic		
Alavudeen et		To assess antibiotic of choice for	Relevant data related	prescriptions, pts with acute		
al., [27] (2021) /		empirical therapy and	to microbiological	complicated UTIs (e.g., acute	Urinary catheterization	
Tertiary care	Retrospective /	susceptibility pattern of	isolates from confirmed	pyelonephritis and UTIs with	and midstream urine	t-test, ANOVA, and chi-square test. A P
hospital, Abha,	October 2020–	uropathogens to commonly	cases of UTIs in pts	sepsis or bacteremia), catheter-	method as per the	value <0.05 was considered statistically
Saudi Arabia	March 2021	used antimicrobials	aged <10 y.	associated UTI, and major	standard procedure.	significant.

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
				comorbidities (such as liver disease, renal insufficiency, malignant tumor, and AIDS)		
Al Nafeesah et al., [28] (2022) / King Abdulaziz Medical City, Riyadh, Saudi Arabia	Retrospective / 2006–2012	To compare demographic characteristics, radiological abnormalities, and other predictors of <i>E. coli</i> and non- <i>E.</i> <i>coli</i> UTIs in children in a tertiary care center	0–14 y, UTI defined as presence of both positive urinalysis (pyuria, bacteriuria) and positive urine culture result of ≥10,000 CFU/mL.	HA-UTI, underlying urogenital abnormalities, chronic renal failure, immunosuppression. Pts with positive urine cultures obtained from bag collection.	For younger children, catheterization or by suprapubic aspirate	Significant differences were identified at <i>P</i> -value <0.05
Alrasheedy et al., [29] (2021) / Ministry of Health tertiary hospitals, Saudi Arabia	Cross-sectional / April 2020–July 2020	To identify prevalence of UTI in children; risk factors for UTI including region in Saudi Arabia with highest prevalence; most common types of presentation; and risk factors for development of UTI.	Citizens or residents of Saudi Arabia, hospitalized for ≤2 d at time of diagnosis, age 1–10 y	HA-UTI.	NA	Univariate analysis using chi-square test and Mann-Whitney U test, multivariate analysis using binary logistic regression. <i>P</i> value was set at a significance level of <0.05. Severe/complicated UTI was defined as that which required hospitalisation, presented with

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
						pyelonephritis, or recurrent UTI within
						30 days after the initial diagnosis.
					For infants, babies, and	
					young children: clean	
					catch method, bagged	
					method and suprapubic	
					bladder aspiration. For	
Alzahrani et al.,					children aged >10 y,	
[30] (2021) /					midstream urine or 20	
King Fahad		To determine the various			mL urine was retrieved	
Hospital, Al	Retrospective /	bacteria causing UTI in pediatric			aseptically from the	
Baha, Saudi	May 2017–April	pts and the antimicrobial	All pediatric pts aged 0–		catheter after initial	
Arabia	2018	resistance pattern	14 y with UTI.	Pts >14 y.	urine was voided.	NA
Edun et al., [31]		To determine prevalence of UTI				
(2021) / King	Retrospective,	in children admitted for	0–2 y old, admitted for		Urine investigations via	
Abdullah	cross-sectional /	bronchiolitis. To establish	bronchiolitis, with	Pts >2 y and if admitted to other	urinary catheterization	
Specialized	November	whether routine urine	positive urinalysis and a	departments such as Pediatric	are routinely done for	Chi-square tests at a level of
Children's	2016–April 2017	investigations should continue	positive culture.	Cardiology.	pts with bronchiolitis.	significance (P = 0.05).

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
hospital, Riyadh,		to be carried out in children				
Saudi Arabia		diagnosed with bronchiolitis.				
		To report most common				
		uropathogens, and their		Neurological disability (laid up		
El-Naggari et		antibiotic sensitivity pattern in		pts), immune deficiencies and		
al., [32] (2021) /		children presented with first and		hematological malignancies. Pts		
Sultan Qaboos	Retrospective /	recurrent UTI. To describe		with deficient information		
University	September	clinical presentation and		accessible in electronic pts'		Ci-square test, where a <i>P</i> -value of 0.05
Hospital,	2008–August	laboratory evaluation in those	<14 y having a single or	records. Mixed cultures were	Either clean catch or	was set as cut-off of statistical
Muscat, Oman	2012	children.	recurrent UTI	rejected.	catheter samples.	significance.
Saeed et al.,						
[33] (2021) /		To determine the antimicrobial	All pure growth of <i>E</i> .			
Salmaniya		susceptibility of ESBL-producing	<i>coli</i> with colony count			
Medical	Retrospective /	E. coli isolated from urinary	≥10 ⁵ CFU/mL.			
Complex,	January 2018–	samples to FOF and other	Not limited to pediatric	Duplicate samples and mixed		Chi-squared test. A <i>P</i> -value of <0.050
Bahrain	December 2019	antibiotics	population.	infections.	Midstream urine	was considered statistically significant.

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Shaaban et al.,						
[34] (2021) /		To describe the prevalence and				
King Hamad	Retrospective,	the antimicrobial resistance		Pts with chronic urinary tract		
University	cross-sectional /	patterns of the pathogens		conditions or neurodevelopmental		
Hospital,	January 2018–	causing UTI in the pediatric age	Pts aged < 14 y with	problems involving the urinary		Chi-square tests. <i>P</i> ≤0.05 was
Bahrain	May 2021	group	confirmed UTI	tract.	NA	considered statistically significant.
Cofden et al			Fabrila abildrea with an			
Safdar et al.,			Februe chudren with an			
[35] (2015) /			average temperature of			
King Abdulaziz			>38°C in the emergency			
University			or pediatric ward (0–14			Shapiro-Wilk's test, Mann-Whitney U
Hospital,	Cross-sectional /	To assess the specificity and	y), clinically assessed		Catheter in infants and	test, and Spearman correlation. The
Jeddah, Saudi	June 2014–	sensitivity of urinary NGAL in the	and suspected to have		by midstream urine in	level of statistical significance was
Arabia	August 2014	early diagnosis of UTI	UTI	NA	older age groups	examined at P <0.05.
		To determine the phenotypic		Samples that did not vield	Urinary catheter for all	
Eltai et al., [36]		and genotypic profiles of	Children aged 0–15 y	significant bacterial growth those	pts ≤2 y, cerebral palsy	Non-parametric Kappa statistics,
(2018) /	Cross-sectional /	antimicrobial-resistant	hospitalized with lower	that had multiple organisms and	pts and pts under	Pearson chi-square test, and Jacquard's
Pediatric	February 2017–	Enterobacteriaceae among	UTI as their primary	samples with suspected	intermittent	coefficient. P value <0.05 was
Emergency	June 2017	children with UTI	diagnosis.	contamination as per lab report.	catheterization.	considered statistically significant.

Study						
reference /	Study type /				Method of urine	
Center	Dates	Objectives	Inclusion criteria	Exclusion criteria	collection	Statistical analysis
Center, Doha,				No duplicate samples were	Otherwise, midstream	
Qatar				collected.	urine.	
					Samples were obtained	
Ahmad et al.,					using sterile collection	
[37] (2020) /					bags. Bags were removed	
Children's	Cross-sectional /	To determine the prevalence			as soon as urine was	
Hospital,	September	and antibiotic sensitivity of UTI			passed and the sample	
Riyadh, Saudi	2018–	caused by Enterococcus in	Newborn (age not		was transferred to a	
Arabia	November 2018	newborns	defined)	Newborn UTI pts	sterile container.	NA
Al Mana et al.,						
[38] (2021) /						
Pediatric				Samples that did not yield	Urinary catheter for pts	
Emergency				significant bacterial growth, those	aged ≤2 y, cerebral palsy	
Center at Al-				with multiple organisms, and	pts, and pts under	
Saad, Hamad				samples with suspected	intermittent	
Medical	Cross-sectional /	To investigate genotypic profile	Children presenting	contamination as per lab report.	catheterization.	
Corporation,	October 2015–	of CREs among pediatric	with lower UTIs as their	No duplicate samples were	Otherwise, midstream	
Qatar	November 2019	population with UTIs	primary diagnosis.	collected.	catch.	NA

AAP, American Academy of Pediatrics; AIDS, acquired immunodeficiency syndrome; AMC, amoxicillin-clavulanic acid (Augmentin); AMP, ampicillin; ANOVA, analysis of variance; CA, community-acquired; CA-UTI, community-acquired urinary tract infection; CFU/mL, colony forming units per milliliter; CFZ, ; CIP, ; CRE, carbapenem-resistant Enterobacterales; d, days; ED, emergency department; ESBL, extendedspectrum β-lactamase; FOF, fosfomycin; HA-UTI, hospital-acquired UTI; IgA, Immunoglobulin A; mo, months; NA, data not available/reported; NGAL, neutrophil gelatinase-associated lipocalin; NIT, nitrofurantoin; PCICU, Pediatric Cardiac intensive care unit; PCNS, primary childhood nephrotic syndrome; pts, patients; SXT, trimethoprim-sulfamethoxazole (Bactrim or co-trimoxazole); US, ultrasound; UTI, urinary tract infection; VUR, vesicoureteral reflux; and y, years.