

The definition, diagnose, and management of urinary tract infections in Scandinavia – an overview of the national guidelines

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BACKGROUND

Urinary tract infections (UTI's) are among the most common community-acquired bacterial infections, primarily caused by *Escherichia coli*. The Scandinavian countries have similar healthcare systems, but the definition, diagnosis, and management of bacterial infections vary. The aim of this study was to identify and describe the differences in definition, diagnosis, and management of UTI in primary health care settings (PCH) in Scandinavia and describe the resistance in *E.coli*.



Table 1. Overview of classifications of UTI

	NORWAY		SWEDEN		DENMARK
Classification	No longer classify UTI's as complicated or uncomplicated.	Acute UTI in non-pregnant women 15 – 65 years	Uncomplicated:	UTI in patient with anatomically and functionally normal urinary tracts	Uncomplicated:
	Antibiotic strategy differs between:	Acute UTI in men, pregnant women and women > 65 years	Complicated:	UTI in patient with anatomically and functionally deviations of urinary tracts	Non-pregnant women without anatomically or functionally <u>urin</u> tracts.
Diagnostic methods					
- Dipstick	Not recommended		Not recommended	Yes	
- Microscopy	Only in case of pyelonephritis		No	Yes	
- Urine culture	In case of recurrent UTI, immunocompromised patient, urinary tract anomalies		In case of fever, pregnancy, therapy failure, suspected resistance, recurrent or complicated UTI	Yes	

METHOD

In a cross-country review we used the national guidelines from the three Scandinavian countries, Sweden (Läkemedelsverket), Denmark (Medicinerrådet, Danish College of General Practitioners) and Norway (Helsedirektoratet) to describe differences and similarities in guidelines for management of UTI's. Data on antibiotic usage and *E. coli* resistance in urine samples were collected from national rapports from the three countries (SWEDRES 2020, DANMAP 2020 and NORM 2020)

RESULTS

A total of 262,237 urine samples in the national reports were included in the observation (Sweden: 199,792; Denmark: 66,545 [only primary care]; Norway: 2,520). Minor differences in resistance were observed, e.g. higher resistance to amoxicillin in Denmark and Norway, higher resistance to quinolones in Sweden and higher resistance to trimethoprim in Norway.

- The diagnostic criteria of UTI differed in the three countries.
- The classification of UTIs also varied between the countries, especially with regards to complicated and uncomplicated UTI.
- The diagnostic methods differed regarding when to culture, and if urine dipstick testing and/or microscopy should be performed

All countries included “wait and see prescriptions” and primarily recommended pivmecillinam or nitrofurantoin as primary treatments. However, the guidelines disagreed on the dosage of pivmecillinam, secondary regimes, and the management of complicated UTI and pyelonephritis.

Table 2. Recommended antibiotic regimes for urinary tract infections

	NORWAY	SWEDEN	DENMARK
Uncomplicated UTI*			
Primary regimen	• Nitrofurantoin 50 mg x 3, 3 days • Pivmecillinam 200 mg x 3, 3 days or 400 mg x 2, 3 days • Trimetoprim 160 mg x 2, 3 days	• Pivmecillinam 200 mg x 3, 5 days or 400 mg x 2, 3 days • nitrofurantoin 50 mg x 3, 5 days	• Pivmecillinam 400 mg x 3, 3 days
Alternative regimes		• Trimetoprim 160 mg x2, 3 days • Cefadroxil 500 mg x 2 or 1 g x 1, 5 days (Men 7 days)	• Nitrofurantoin 50-100 mg x 2-4, 3 days • Trimethoprim 200 mg x 2 3 days
Complicated UTI**			
Primary regimes	• Nitrofurantoin 50 mg x 3, 5 days • Pivmecillinam 200 mg x 3, 5 days • Trimetoprim 160 mg x 2, 3 days	• Ciprofloxacin 500 mg x2, 7 days	• Pivmecillinam 400 mg x 3, 5 days
Alternative regimes	-	• Sulfa/Trim 800/160 mg x2, 10 days • Cefibuten 400 mg x 1, 10 days	• Nitrofurantoin 1. 50-100 mg x 2-4, 5 days
Pyelonephritis			
Primary regimes	• Sulfa/trim 800/160 mg x2, 7 days • Pivmecillinam 400 mg x 3, 7 days	• Ciprofloxacin 500 mg x 2, 7 days (men 14 days).	• Pivmecillinam 400 mg x 3, 7-10 days
Alternative regimes	-	• Sulfa/Trim 800/160 mg x2, 10 days	• Ciprofloxacin 500 mg x 2, 7 days

* For Norway: Acute UTI in non-pregnant women 15-64 years.
** For Norway: Acute UTI in men, pregnant women, women >65 years

Table 3. Antibiotic resistance (%) in *Escherichia coli* urinary tract isolates in 2020 in the primary health care (n=289,438)

	NORWAY / NORM 2020 (n=1,804)	SWEDEN / SWEDRES 2020 (n=199,172)	DENMARK /DANMAP 2020 (n=88,462)
Ampicillin	37.1	29.2	36
Mecillinam	4.3	4.8	4.9
Amoxicillin-clavulansyre	7,8	NA	6.8
Cefotaxime	3.3	3.9	5
Meropenem	0	NA	0
ESBL	3.2	((3.9))	((5))
Gentamicin	4.0	NA	3.8
Ciprofloxacin	8.0	10.7	7.5
Nitrofurantoin	0.7	1.2	0.8
Fosfomycin	2.9	NA	NA
Trimethoprim	24.1	19.9	21
Trimethoprim-sulfamethizol	20.7	NA	NA

CONCLUSION

Although similar health care systems, the definition, diagnose, and management of community acquired UTI are not fully aligned in Scandinavia. The resistance patterns of *E. coli* in urine samples varies slightly and may refleks til recommandations.