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## antimicrobial prescribing and antimicrobial resistance among UTI patients at Buraidah Central Hospital, Saudi Arabia (Article)

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### Abstract

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**Introduction:** Most of the decisions regarding diagnosis and treatment are based on laboratory test results. Urinary tract infections (UTIs) are among the most common infections in humans. The changing antimicrobial sensitivity in UTI requires appropriate antibiotics. Antimicrobial resistance is an emerging problem in the Kingdom of Saudi Arabia where the complete reversal of antimicrobial resistance is difficult due to irrational use of antibiotics. **Objectives:** This study aimed to determine the most common bacterial agents causing UTI in different seasons among patients who were admitted to Buraidah Central Hospital (BCH), Saudi Arabia. The study also evaluated the link between prescribing and resistance toward antimicrobials. **Materials and Methods:** A 6-month retrospective study was conducted among adult patients who were admitted to the inpatient department at BCH. A total of 379 files were collected from microbiological laboratory for inpatients. **Results:** Most UTI-causing bacteria prevailed in the same season. Of 15 bacterial strains, 12 were significantly correlated with 20 (of a total of 40) antibiotics that were used. Most bacteria were gram-negative. Gram-negative bacilli including *Escherichia coli*, *Klebsiella* spp., and *Pseudomonadaceae* and gram-positive *Enterococcus faecalis* were most frequently causing UTIs. **Conclusion:** Overall prevalence of antibiotic resistance was negative in bacterial isolates. However, the relationship between antimicrobial prescribing and antimicrobial resistance was significantly negative among UTI patients in BCH, Saudi Arabia. © 2019 Journal of Pharmacy and Bioallied Sciences.

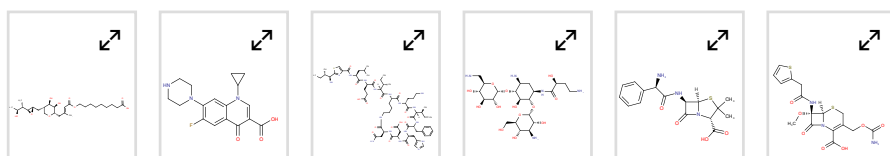
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## EMTREE drug terms:

amikacin amoxicillin plus clavulanic acid ampicillin bacitracin cefotaxime cefoxitin  
 ceftriaxone cefuroxime chloramphenicol cilastatin plus imipenem ciprofloxacin  
 gentamicin levofloxacin meticillin neomycin polymyxin B pseudomonic acid  
 tetracycline

## EMTREE medical terms:

Acinetobacter adult antibiotic resistance antibiotic sensitivity Article  
 bacterial infection bacterial strain bacterium culture Citrobacter koseri  
 Enterococcus faecalis Enterococcus faecium Escherichia coli female hospital patient  
 human Klebsiella Klebsiella pneumoniae major clinical study male prescription  
 priority journal Providencia stuartii Pseudomonadaceae Pseudomonas aeruginosa  
 retrospective study Saudi Arabia seasonal variation Staphylococcus aureus  
 Staphylococcus capitis Staphylococcus epidermidis Staphylococcus haemolyticus  
 Streptococcus agalactiae urinalysis urinary tract infection

## Chemicals and CAS Registry Numbers:

amikacin, 37517-28-5, 39831-55-5; amoxicillin plus clavulanic acid, 74469-00-4, 79198-29-1; ampicillin, 69-52-3, 69-53-4, 7177-48-2, 74083-13-9, 94586-58-0; bacitracin, 1405-87-4; cefotaxime, 63527-52-6, 64485-93-4; cefoxitin, 33564-30-6, 35607-66-0; ceftriaxone, 73384-59-5, 74578-69-1; cefuroxime, 55268-75-2, 56238-63-2; chloramphenicol, 134-90-7, 2787-09-9, 56-75-7; cilastatin plus imipenem, 92309-29-0; ciprofloxacin, 85721-33-1; gentamicin, 1392-48-9, 1403-66-3, 1405-41-0; levofloxacin, 100986-85-4, 138199-71-0; meticillin, 132-92-3, 38882-79-0, 61-32-5; neomycin, 11004-65-2, 1404-04-2, 1405-10-3, 8026-22-0; polymyxin B, 1404-26-8, 1405-20-5; pseudomonic acid, 12650-69-0, 40980-51-6, 71980-98-8; tetracycline, 23843-90-5, 60-54-8, 64-75-5, 8021-86-1

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## References (59)

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All  Export  Print  E-mail  Save to PDF  Create bibliography

- 1 Campbell, N., Reece, J., Mitchell, L.  
A tour of the cell  
(2005) *Biology*, pp. 1-1390. Cited 41 times.
- 2 Demilie, T., Beyene, G., Melaku, S., Tsegaye, W.  
Urinary bacterial profile and antibiotic susceptibility pattern among pregnant women in north west Ethiopia  
(2012) *Ethiop J Health Sci*, 22, pp. 121-128. Cited 39 times.
- 3 Boye, A., Siakwa, P.M., Boampong, J.N., Koffuor, G.A., Ephraim, R.K.D., Amoateng, P.  
Asymptomatic urinary tract infections in pregnant women attending antenatal clinic in Cape Coast, Ghana  
(2012) *J Med Res*, 1, pp. 74-83. Cited 10 times.
- 4 Schaeffer, A.J.  
Infections of the urinary tract  
(2012) *Campbell-Walsh Urology*, 1. Cited 138 times.  
Tenth Edition. Elsevier-Saunders

5 Valiquette, L.  
Urinary tract infections in women.  
(2001) *The Canadian journal of urology*, 8 Suppl 1, pp. 6-12. Cited 42 times.

---

6 Hooton, T.M.  
Uncomplicated urinary tract infection  
(2012) *New England Journal of Medicine*, 366 (11), pp. 1028-1037. Cited 306 times.  
<http://www.nejm.org/doi/pdf/10.1056/NEJMcp1104429>  
doi: 10.1056/NEJMcp1104429  
View at Publisher

---

7 Dielubanza, E.J., Schaeffer, A.J.  
Urinary tract infections in women  
(2011) *Medical Clinics of North America*, 95 (1), pp. 27-41. Cited 115 times.  
doi: 10.1016/j.mcna.2010.08.023  
View at Publisher

---

8 Fisman, D.N.  
Seasonality of infectious diseases (Open Access)  
(2007) *Annual Review of Public Health*, 28, pp. 127-143. Cited 179 times.  
doi: 10.1146/annurev.publhealth.28.021406.144128  
View at Publisher

---

9 Dowell, S.F., Shang Ho, M.  
Seasonality of infectious diseases and severe acute respiratory syndrome - What we don't know can hurt us  
(2004) *Lancet Infectious Diseases*, 4 (11), pp. 704-708. Cited 79 times.  
<http://www.journals.elsevier.com/the-lancet-infectious-diseases>  
doi: 10.1016/S1473-3099(04)01177-6  
View at Publisher

---

10 Fisman, D.N., Lim, S., Wellenius, G.A., Johnson, C., Britz, P., Gaskins, M., Maher, J., (...), Newbern, C.  
It's not the heat, it's the humidity: Wet weather increases legionellosis risk in the greater Philadelphia metropolitan area (Open Access)  
(2005) *Journal of Infectious Diseases*, 192 (12), pp. 2066-2073. Cited 126 times.  
doi: 10.1086/498248  
View at Publisher

---

11 Al-Hasan, M.N., Lahr, B.D., Eckel-Passow, J.E., Baddour, L.M.  
Seasonal variation in Escherichia coli bloodstream infection: A population-based study (Open Access)  
(2009) *Clinical Microbiology and Infection*, 15 (10), pp. 947-950. Cited 42 times.  
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1469-0691](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1469-0691)  
doi: 10.1111/j.1469-0691.2009.02877.x  
View at Publisher

---

12 Hicks, L.A., Rose Jr., C.E., Fields, B.S., Dress, M.L., Engel, J.P., Jenkins, P.R., Rouse, B.S., (...), Whitney, C.G.  
Increased rainfall is associated with increased risk for legionellosis  
(2007) *Epidemiology and Infection*, 135 (5), pp. 811-817. Cited 65 times.  
doi: 10.1017/S0950268806007552  
View at Publisher

---

- 13 Nicolle, L.E.  
Epidemiology of urinary tract infections  
(2002) *Clinical Microbiology Newsletter*, 24 (18), pp. 135-140. Cited 36 times.  
<http://www.journals.elsevier.com/clinical-microbiology-newsletter/>  
doi: 10.1016/S0196-4399(02)80035-6  
View at Publisher
- 
- 14 Anderson, J.E.  
Seasonality of symptomatic bacterial urinary infections in women (Open Access)  
(1983) *Journal of Epidemiology and Community Health*, 37 (4), pp. 286-290. Cited 26 times.  
doi: 10.1136/jech.37.4.286  
View at Publisher
- 
- 15 Stamm, W.E., McKeivitt, M., Roberts, P.L., White, N.J.  
Natural history of recurrent urinary tract infections in women  
(1990) *Reviews of Infectious Diseases*, 13 (1), pp. 77-84. Cited 123 times.  
doi: 10.1093/clinids/13.1.77  
View at Publisher
- 
- 16 Gupta, K., Hooton, T.M., Naber, K.G., Wullt, B., Colgan, R., Miller, L.G., Moran, G.J., (...), Soper, D.E.  
International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: A 2010 update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases (Open Access)  
(2011) *Clinical Infectious Diseases*, 52 (5), pp. e103-e120. Cited 1161 times.  
doi: 10.1093/cid/ciq257  
View at Publisher
- 
- 17 Sanchez, G.V., Master, R.N., Karlowsky, J.A., Bordon, J.M.  
In vitro antimicrobial resistance of urinary Escherichia coli isolates among U.S. outpatients from 2000 to 2010 (Open Access)  
(2012) *Antimicrobial Agents and Chemotherapy*, 56 (4), pp. 2181-2183. Cited 132 times.  
<http://aac.asm.org/content/56/4/2181.full.pdf+html>  
doi: 10.1128/AAC.06060-11  
View at Publisher
- 
- 18 Olson, R.P., Harrell, L.J., Kaye, K.S.  
Antibiotic resistance in urinary isolates of Escherichia coli from college women with urinary tract infections (Open Access)  
(2009) *Antimicrobial Agents and Chemotherapy*, 53 (3), pp. 1285-1286. Cited 41 times.  
<http://aac.asm.org/cgi/reprint/53/3/1285>  
doi: 10.1128/AAC.01188-08  
View at Publisher
- 
- 19 Tempera, G., Furneri, P.M., Cianci, A., Incognito, T., Marano, M.R., Drago, F.  
The impact of prulifloxacin on vaginal lactobacillus microflora: An in vivo study  
(2009) *Journal of Chemotherapy*, 21 (6), pp. 646-650. Cited 12 times.  
[http://www.jchemother.it/counter/list.asp?ci\\_hug=yh\\_9982746hg666ysede&spoofindex=tttie&id=4212&urk=772384812-4899f03h](http://www.jchemother.it/counter/list.asp?ci_hug=yh_9982746hg666ysede&spoofindex=tttie&id=4212&urk=772384812-4899f03h)  
doi: 10.1179/joc.2009.21.6.646  
View at Publisher

- 20 Dethlefsen, L., Huse, S., Sogin, M.L., Relman, D.A.  
The pervasive effects of an antibiotic on the human gut microbiota, as revealed by deep 16s rRNA sequencing ([Open Access](#))

(2008) *PLoS Biology*, 6 (11), art. no. e280, pp. 2383-2400. Cited 1310 times.  
[http://biology.plosjournals.org/archive/1545-7885/6/11/pdf/10.1371\\_journal.pbio.0060280-L.pdf](http://biology.plosjournals.org/archive/1545-7885/6/11/pdf/10.1371_journal.pbio.0060280-L.pdf)  
doi: 10.1371/journal.pbio.0060280

[View at Publisher](#)

---

- 21 Colodner, R., Kometiani, I., Chazan, B., Raz, R.  
Risk factors for community-acquired urinary tract infection due to quinolone-resistant *E. coli*

(2008) *Infection*, 36 (1), pp. 41-45. Cited 59 times.  
doi: 10.1007/s15010-007-7083-y

[View at Publisher](#)

---

- 22 Kurtaran, B., Candevir, A., Tasova, Y., Kibar, F., Inal, A.S., Komur, S., Aksu, H.S.Z.  
Antibiotic resistance in community-acquired urinary tract infections: Prevalence and risk factors

(2010) *Medical Science Monitor*, 16 (5), pp. CR246-CR251. Cited 21 times.  
<http://www.medscimonit.com/fulltxt.php?ICID=878545>

[View at Publisher](#)

---

- 23 Obiogbolu, C.H., Okonko, I.O., Anyamere, C.O., Adedeji, A.O., Akanbi, A.O., Ogun, A.A., Ejembi, J., (...), Faleye, T.O.C.  
Incidence of Urinary Tract Infections (UTIs) among pregnant women in Akwa metropolis, Southeastern Nigeria

(2009) *Scientific Research and Essays*, 4 (8), pp. 820-824. Cited 13 times.  
<http://www.academicjournals.org/sre/PDF/pdf2009/Aug/Obiogbolu%20et%20al.pdf>

- 24 Behzadi, P., Behzadi, E.  
The microbial agents of urinary tract infections at central laboratory of Dr. Shariati Hospital, Tehran, Iran

(2008) *Turkiye Klinikleri Journal of Medical Sciences*, 28 (4), pp. 445-449. Cited 16 times.  
<https://www.turkiyeklinikleri.com/journal/journal-of-medical-sciences/1300-0292/en-index.html>

- 25 Ayhan, N., Basbug, N., Ozturk, S.  
Causative agents of urinary tract infections and sensitivity to antibiotics

(1988) *Mikrobiyoloji Bulteni*, 22 (3), pp. 215-221. Cited 5 times.

- 26 Ebie, M., Kandakai-Olukemi, Y., Ayanbadejo, J., Tanyigna, K.  
Urinary tract infections in a Nigerian military hospital  
(2001) *Nig J Microbiol*, 15, pp. 31-37. Cited 16 times.

- 27 Garofalo, C.K., Hooton, T.M., Martin, S.M., Stamm, W.E., Palermo, J.J., Gordon, J.I., Hultgren, S.J.  
*Escherichia coli* from urine of female patients with urinary tract infections is competent for intracellular bacterial community formation

(2007) *Infection and Immunity*, 75 (1), pp. 52-60. Cited 116 times.  
doi: 10.1128/IAI.01123-06

[View at Publisher](#)

---

- 28 Bonadio, M., Meini, M., Spitaleri, P., Gigli, C.  
Current microbiological and clinical aspects of urinary tract infections  
(2001) *European Urology*, 40 (4), pp. 439-445. Cited 60 times.  
doi: 10.1159/000049813  
[View at Publisher](#)
- 
- 29 Grude, N., Tveten, Y., Kristiansen, B.-E.  
Urinary tract infections in Norway: Bacterial etiology and susceptibility. A retrospective study of clinical isolates  
(2001) *Clinical Microbiology and Infection*, 7 (10), pp. 543-547. Cited 56 times.  
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1469-0691](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1469-0691)  
doi: 10.1046/j.1198-743x.2001.00306.x  
[View at Publisher](#)
- 
- 30 Okeke, I.N., Wallace-Gadsden, F., Simons, H.R., Matthews, N., Labar, A.S., Hwang, J., Wain, J.  
Multi-locus sequence typing of enteroaggregative escherichia coli isolates from nigerian children uncovers multiple lineages ([Open Access](#))  
(2010) *PLoS ONE*, 5 (11), art. no. e14093. Cited 50 times.  
<http://www.plosone.org/article/fetchObjectAttachment.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0014093&representation=PDF>  
doi: 10.1371/journal.pone.0014093  
[View at Publisher](#)
- 
- 31 Belet, N., İşlek, Belet, U., Sunter, A.T., Küçüködük, Ş.  
Comparison of trimethoprim-sulfamethoxazole, cephadroxil and cefprozil as prophylaxis for recurrent urinary tract infections in children  
(2004) *Journal of Chemotherapy*, 16 (1), pp. 77-81. Cited 17 times.  
<http://www.maneyonline.com/loi/joc>  
doi: 10.1179/joc.2004.16.1.77  
[View at Publisher](#)
- 
- 32 Karlowsky, J.A., Kelly, L.J., Thornsberry, C., Jones, M.E., Sahm, D.F.  
Trends in antimicrobial resistance among urinary tract infection isolates of Escherichia coli from female outpatients in the United States ([Open Access](#))  
(2002) *Antimicrobial Agents and Chemotherapy*, 46 (8), pp. 2540-2545. Cited 253 times.  
doi: 10.1128/AAC.46.8.2540-2545.2002  
[View at Publisher](#)
- 
- 33 Alós, J.-I., Serrano, M.-G., Gómez-Garcés, J.-L., Perianes, J.  
Antibiotic resistance of Escherichia coli from community-acquired urinary tract infections in relation to demographic and clinical data ([Open Access](#))  
(2005) *Clinical Microbiology and Infection*, 11 (3), pp. 199-203. Cited 105 times.  
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1469-0691](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1469-0691)  
doi: 10.1111/j.1469-0691.2004.01057.x  
[View at Publisher](#)
- 
- 34 Moreira Jr., E.D., De Siqueira, I.C., Alcântara, A.P., Guereiro De Moura, C.G., De Carvalho, W.A., Riley, L.  
Antimicrobial resistance of Escherichia coli strains causing community-acquired urinary tract infections among insured and uninsured populations in a large urban center  
(2006) *Journal of Chemotherapy*, 18 (3), pp. 255-260. Cited 10 times.  
<http://www.maneyonline.com/loi/joc>  
doi: 10.1179/joc.2006.18.3.255  
[View at Publisher](#)

- 35 Zhanel, G.G., Hisanaga, T.L., Laing, N.M., DeCorby, M.R., Nichol, K.A., Palatnick, L.P., Johnson, J., (...), Hoban, D.J.

Antibiotic resistance in outpatient urinary isolates: Final results from the North American Urinary Tract Infection Collaborative Alliance (NAUTICA)

(2005) *International Journal of Antimicrobial Agents*, 26 (5), pp. 380-388. Cited 147 times.  
doi: 10.1016/j.ijantimicag.2005.08.003

[View at Publisher](#)

---

- 36 Al-Rubeaan, K.A., Moharram, O., Al-Naqeb, D., Hassan, A., Rafullah, M.R.M.

Prevalence of urinary tract infection and risk factors among Saudi patients with diabetes

(2013) *World Journal of Urology*, 31 (3), pp. 573-578. Cited 25 times.  
doi: 10.1007/s00345-012-0934-x

[View at Publisher](#)

---

- 37 Al-Mendalawi, M.D.

Antibiotic resistance pattern and empirical therapy for urinary tract infection in children

(2008) *Saudi Medical Journal*, 29 (10), p. 1520. Cited 3 times.  
<http://www.smj.org.sa/PDFFiles/Oct08/01Antibiotic.pdf>

- 38 Altekruze, S.F., Elvinger, F., Wang, Y., Ye, K.

A Model To Estimate the Optimal Sample Size for Microbiological Surveys ([Open Access](#))

(2003) *Applied and Environmental Microbiology*, 69 (10), pp. 6174-6178. Cited 14 times.  
doi: 10.1128/AEM.69.10.6174-6178.2003

[View at Publisher](#)

---

- 39 Al Johani, S., Akhter, J., Balkhy, H., El-Saed, A., Younan, M., Memish, Z.

Prevalence of antimicrobial resistance among gram-negative isolates in an adult intensive care unit at a tertiary care center in Saudi Arabia ([Open Access](#))

(2010) *Annals of Saudi Medicine*, 30 (5), pp. 364-369+423. Cited 53 times.  
doi: 10.4103/0256-4947.67073

[View at Publisher](#)

---

- 40 Hamid, M.E., Mustafa, F.Y., Alwaily, A., Abdelrahman, S., Al Azragi, T.

Prevalence of bacterial pathogens in Aseer region, Kingdom of Saudi Arabia: Emphasis on antimicrobial susceptibility of staphylococcus aureus ([Open Access](#))

(2011) *Oman Medical Journal*, 26 (5), pp. 368-370. Cited 7 times.  
[http://www.omjournal.org/fulltext\\_PDF.aspx?DetailsID=152&pdf=images/152\\_M\\_Deatials\\_Pdf\\_.pdf&type=pdf](http://www.omjournal.org/fulltext_PDF.aspx?DetailsID=152&pdf=images/152_M_Deatials_Pdf_.pdf&type=pdf)  
doi: 10.5001/omj.2011.91

[View at Publisher](#)

---

- 41 Memish, Z.A., Shibl, A.M., Kambal, A.M., Ohaly, Y.A., Ishaq, A., Livermore, D.M.

Antimicrobial resistance among non-fermenting gram-negative bacteria in Saudi Arabia ([Open Access](#))

(2012) *Journal of Antimicrobial Chemotherapy*, 67 (7), art. no. dks091, pp. 1701-1705. Cited 29 times.  
doi: 10.1093/jac/dks091

[View at Publisher](#)

---

- 42 Savage, R.D., Fowler, R.A., Rishu, A.H., Bagshaw, S.M., Cook, D., Dodek, P., Hall, R., (...), Daneman, N.  
The effect of inadequate initial empiric antimicrobial treatment on mortality in critically ill patients with bloodstream infections: A multi-centre retrospective cohort study ([Open Access](#))

(2016) *PLoS ONE*, 11 (5), art. no. e0154944. Cited 13 times.  
<http://journals.plos.org/plosone/article/asset?id=10.1371%2Fjournal.pone.0154944.pdf>  
doi: 10.1371/journal.pone.0154944

[View at Publisher](#)

---

- 43 Ibrahim, E.H., Sherman, G., Ward, S., Fraser, V.J., Kollef, M.H.  
The influence of inadequate antimicrobial treatment of bloodstream infections on patient outcomes in the ICU setting

(2000) *Chest*, 118 (1), pp. 146-155. Cited 1388 times.  
doi: 10.1378/chest.118.1.146

[View at Publisher](#)

---

- 44 Zaragoza, R., Artero, A., Camarena, J.J., Sancho, S., González, R., Nogueira, J.M.  
The influence of inadequate empirical antimicrobial treatment on patients with bloodstream infections in an intensive care unit ([Open Access](#))

(2003) *Clinical Microbiology and Infection*, 9 (5), pp. 412-418. Cited 159 times.  
[http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1469-0691](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1469-0691)  
doi: 10.1046/j.1469-0691.2003.00656.x

[View at Publisher](#)

---

- 45 Marquet, K., Liesenborgs, A., Bergs, J., Vleugels, A., Claes, N.  
Incidence and outcome of inappropriate in-hospital empiric antibiotics for severe infection: A systematic review and meta-analysis ([Open Access](#))

(2015) *Critical Care*, 19 (1), art. no. 63. Cited 50 times.  
<http://ccforum.com/content/17>  
doi: 10.1186/s13054-015-0795-y

[View at Publisher](#)

---

- 46 Lemmen, S.W., Häfner, H., Zolldann, D., Stanzel, S., Lütticken, R.  
Distribution of multi-resistant Gram-negative versus Gram-positive bacteria in the hospital inanimate environment

(2004) *Journal of Hospital Infection*, 56 (3), pp. 191-197. Cited 144 times.  
doi: 10.1016/j.jhin.2003.12.004

[View at Publisher](#)

---

- 47 Seppälä, H., Järvinen, H., Huovinen, S., Huovinen, P., Herva, E., Nissinen, A., Jahkola, M., (...), Klaukka, T.  
Resistance to erythromycin in group a streptococci

(1992) *New England Journal of Medicine*, 326 (5), pp. 292-297. Cited 329 times.  
doi: 10.1056/NEJM199201303260503

[View at Publisher](#)

---

- 48 Lesch, C.A., Itokazu, G.S., Danziger, L.H., A. Weinstein, R.  
Multi-hospital analysis of antimicrobial usage and resistance trends

(2001) *Diagnostic Microbiology and Infectious Disease*, 41 (3), pp. 149-154. Cited 42 times.  
doi: 10.1016/S0732-8893(01)00296-6

[View at Publisher](#)

---



- 49 Willemsen, I., Bogaers-Hofman, D., Winters, M., Kluytmans, J.  
Correlation between antibiotic use and resistance in a hospital: Temporary and ward-specific observations  
(2009) *Infection*, 37 (5), pp. 432-437. Cited 28 times.  
doi: 10.1007/s15010-009-8325-y  
[View at Publisher](#)
- 
- 50 Lai, C.-C., Wang, C.-Y., Chu, C.-C., Tan, C.-K., Lu, C.-L., Lee, Y.-C., Huang, Y.-T., (...), Hsueh, P.-R.  
Correlation between antibiotic consumption and resistance of Gram-negative bacteria causing healthcare-associated infections at a university hospital in Taiwan from 2000 to 2009 ([Open Access](#))  
(2011) *Journal of Antimicrobial Chemotherapy*, 66 (6), art. no. dkr103, pp. 1374-1382. Cited 49 times.  
doi: 10.1093/jac/dkr103  
[View at Publisher](#)
- 
- 51 Mascarello, M., Simonetti, O., Knezevich, A., Carniel, L.I., Monticelli, J., Buseti, M., Schincariol, P., (...), Luzzati, R.  
Correlation between antibiotic consumption and resistance of bloodstream bacteria in a University Hospital in North Eastern Italy, 2008–2014  
(2017) *Infection*, 45 (4), pp. 459-467. Cited 7 times.  
[link.springer.de/link/service/journals/15010/index.htm](http://link.springer.de/link/service/journals/15010/index.htm)  
doi: 10.1007/s15010-017-0998-z  
[View at Publisher](#)
- 
- 52 Velickovic-Radovanovic, R., Petrović, J., Kocić, B., Antić, S., Ranelović, G.  
Correlation between antibiotic consumption and bacterial resistance as quality indicator of proper use of these drugs in inpatients ([Open Access](#))  
(2009) *Vojnosanitetski Pregled*, 66 (4), pp. 307-312. Cited 18 times.  
[http://www.vma.mod.gov.rs/vsp/download/vsp\\_04\\_09.pdf](http://www.vma.mod.gov.rs/vsp/download/vsp_04_09.pdf)  
doi: 10.2298/VSP0904307V  
[View at Publisher](#)
- 
- 53 Kahlmeter, G.  
An international survey of the antimicrobial susceptibility of pathogens from uncomplicated urinary tract infections: The ECO.SENS project ([Open Access](#))  
(2003) *Journal of Antimicrobial Chemotherapy*, 51 (1), pp. 69-76. Cited 405 times.  
doi: 10.1093/jac/dkg028  
[View at Publisher](#)
- 
- 54 Goettsch, W., Van Pelt, W., Nagelkerke, N., Hendrix, M.G.R., Buiting, A.G.M., Petit, P.L., Sabbe, L.J.M., (...), De Neeling, A.J.  
Increasing resistance to fluoroquinolones in *Escherichia coli* from urinary tract infections in The Netherlands  
(2000) *Journal of Antimicrobial Chemotherapy*, 46 (2), pp. 223-228. Cited 209 times.  
[View at Publisher](#)
- 
- 55 Goossens, H., Ferech, M., Vander Stichele, R., Elseviers, M.  
Outpatient antibiotic use in Europe and association with resistance: A cross-national database study  
(2005) *Lancet*, 365 (9459), pp. 579-587. Cited 1768 times.  
<http://www.journals.elsevier.com/the-lancet/>  
doi: 10.1016/S0140-6736(05)07099-6  
[View at Publisher](#)
-

□ 56 Dufawa, J.  
Urinary tract infection--2003.  
(2004) *Roczniki Akademii Medycznej w Białymstoku (1995)*, 49, pp. 182-184. Cited 7 times.

□ 57 Landgren, M., Odén, H., Kühn, I., Österlund, A., Kahlmeter, G.  
Diversity among 2481 *Escherichia coli* from women with community-acquired lower urinary tract infections in 17 countries  
(2005) *Journal of Antimicrobial Chemotherapy*, 55 (6), pp. 928-937. Cited 36 times.  
doi: 10.1093/jac/dki122  
View at Publisher

□ 58 Wilson, M.L., Gaido, L.  
Laboratory diagnosis of urinary tract infections in adult patients (Open Access)  
(2004) *Clinical Infectious Diseases*, 38 (8), pp. 1150-1158. Cited 281 times.  
doi: 10.1086/383029  
View at Publisher

□ 59 Moore, K.N., Day, R.A., Albers, M.  
Pathogenesis of urinary tract infections: A review  
(2002) *Journal of Clinical Nursing*, 11 (5), pp. 568-574. Cited 26 times.  
doi: 10.1046/j.1365-2702.2002.00629.x  
View at Publisher

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