

## Literature Search and Enquiry Service

### SEARCH DETAILS

What evidence is there around interventions that result in a reduction in antibiotic prescribing for urinary tract infections in a primary care setting (GP practices, care-nursing homes, community hospitals)

This literature search will contain a selection of material gathered from a search of the evidence base, and is not intended to be comprehensive. Professional judgement should be exercised when appraising the material. The Library takes no responsibility for the wording, content and accuracy of the information supplied, which has been extracted in good faith from reputable sources. NHSGGC is not responsible for the content of external internet sites.

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Resources Searched	Medline, Embase and Cinahl
Notes on Search	

Search Commands	Explanation
/	A MeSH subject heading with all subheadings selected
tw/	A search for a term in the title or abstract
exp	The subject heading was exploded to include the narrower, more specific terms beneath it in the subject headings thesaurus
* or \$	The search term was truncated (eg. therap* searches for therapist, therapists, therapies etc)

Adapted from the table used in NICE Clinical Knowledge Summaries see <http://cks.nice.org.uk>

## Search Strategy

The following strategy was used in Embase. Similar strategies were used in both Medline and Cinahl and are available on request.

1	("UTI" or (urinary adj3 infection*)).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	96248
2	anti?biotic*.mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	617555
3	"GP".mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword]	63413
4	exp urinary tract infection/	89258
5	exp antibiotic agent/	1115113
6	exp primary medical care/	75590
7	exp general practice/	75171
8	exp nursing home/	45778
9	exp community hospital/	14012
10	1 or 4	103482
11	2 or 5	1283151
12	3 or 6 or 7 or 8 or 9	256759
13	10 and 11 and 12	925
14	limit 13 to (english language and yr="2006 -Current")	532
15	*urinary tract infection/	35046
16	14 and 15	175
17	from 16 keep 4, 8, 22, 51, 109, 115...	9

## Journal articles

1. DUANE S., et al, 2016. **Using qualitative insights to change practice: Exploring the culture of antibiotic prescribing and consumption for urinary tract infections.** *BMJ Open*, 6(1) (pagination), pp. Arte Number: e008894. ate of Pubaton: 2016.

**Objectives:** The aim of this paper is to explore the culture of antibiotic prescribing and consumption in the community for urinary tract infections (UTI) from the perspective of the general practitioners (GPs) and community member. **Design:** Indepth interviews were conducted with GPs, and focus groups were held with community members. **Setting:** General practice and community setting. **Participants:** 15 GPs practising in rural and urban locations in Ireland participated in the indepth interviews. 6 focus groups (n=42) with participants who had direct or indirect experiences with UTI were also undertaken. **Results:** The decision to prescribe or consume an antibiotic for a UTI is a set of complex processes including need recognition, information search and evaluation processes governed by the relationship and interactions between the GP and the patient. Different GP and patient decision-making profiles emerged emphasising the diversity and variety of general practice in real-life settings. The GP findings showed a requirement for more microbiological information on antibiotic resistance patterns to inform prescribing decisions. Focus group participants wanted a conversation with the GP about their illness and the treatment options available. **Conclusions:** Collectively, this research identified the consultation as a priority intervention environment for stimulating change in relation to antibiotics. This paper demonstrates how qualitative research can identify the interacting processes which are instrumental to the decision to prescribe or consume an antibiotic for a suspected UTI. Qualitative research empowers researchers to investigate the what, how and why of interventions in real-life setting. Qualitative research can play a critical and instrumental role in designing behavioural change strategies with high impact on practice. The results of this research were used to design a complex intervention informed by social marketing.

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2. GAGYOR I., et al, 2016. **Predicting antibiotic prescription after symptomatic treatment for urinary tract infection: Development of a model using data from an RCT in general practice.** *British Journal of General Practice*, 66(645), pp. e234-e240. **Background** Uncomplicated urinary tract infection (UTI) is often treated with antibiotics, resulting in increasing resistance levels. A randomised controlled trial showed that two-thirds of females with UTI treated symptomatically recovered without subsequent antibiotic treatment. **Aim** To investigate whether there are differences between females with a UTI who were subsequently prescribed antibiotics and those who recovered with symptomatic treatment only, and to develop a model to predict those who can safely and effectively be treated symptomatically. **Design and setting** This is a subgroup analysis of females assigned to ibuprofen in a UTI trial in general practices. **Method** Multiple logistic regression

analysis was used to select variables for a prediction model, The discriminative value of the model was estimated by the area under the receiver operator curve (AUC) and the effects of different thresholds were calculated within the model predicting antibiotic prescription and need for follow-up visits. Results Of the 235 females in the ibuprofen group, 79 were subsequently prescribed antibiotics within 28 days of follow-up. The final model included five predictors: urgency/frequency, impaired daily activities, and positive dipstick test results for erythrocytes, leucocytes, and nitrite. The AUC was 0.73 (95% CI = 0.67 to 0.80). A reasonable threshold for antibiotic initiation would result in 58% of females presenting with UTI being treated with antibiotics. Of the remaining females, only 6% would return to the practice because of symptomatic treatment failure. Conclusion The present model revealed moderately good accuracy and could be the basis for a decision aid for GPs and females to find the treatment option that fits best.

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3. VELLINGA, A., et al, 2016. **Intervention to improve the quality of antimicrobial prescribing for urinary tract infection: a cluster randomized trial.** *CMAJ: Canadian Medical Association Journal*, 188(2), pp. 108-115 8p.

Background: Overuse of antimicrobial therapy in the community adds to the global spread of antimicrobial resistance, which is jeopardizing the treatment of common infections. Methods: We designed a cluster randomized complex intervention to improve antimicrobial prescribing for urinary tract infection in Irish general practice. During a 3-month baseline period, all practices received a workshop to promote consultation coding for urinary tract infections. Practices in intervention arms A and B received a second workshop with information on antimicrobial prescribing guidelines and a practice audit report (baseline data). Practices in intervention arm B received additional evidence on delayed prescribing of antimicrobials for suspected urinary tract infection. A reminder integrated into the patient management software suggested first-line treatment and, for practices in arm B, delayed prescribing. Over the 6-month intervention, practices in arms A and B received monthly audit reports of antimicrobial prescribing. Results: The proportion of antimicrobial prescribing according to guidelines for urinary tract infection increased in arms A and B relative to control (adjusted overall odds ratio OR] 2.3, 95% confidence interval CI] 1.7 to 3.2; arm A adjusted OR 2.7, 95% CI 1.8 to 4.1; arm B adjusted OR 2.0, 95% CI 1.3 to 3.0). An unintended increase in antimicrobial prescribing was observed in the intervention arms relative to control (arm A adjusted OR 2.2, 95% CI 1.2 to 4.0; arm B adjusted OR 1.4, 95% CI 0.9 to 2.1). Improvements in guideline-based prescribing were sustained

at 5 months after the intervention. Interpretation: A complex intervention, including audit reports and reminders, improved the quality of prescribing for urinary tract infection in Irish general practice. Trial Registration: ClinicalTrials.gov, no. NCT01913860.

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4. DELAMARRE DAMIER F., et al, 2015. **Bacteriological analysis of urinary tract infections in a French nursing home. Introduction of an empiric antibiotic protocol.** *European Geriatric Medicine*, 6, pp. S113-S114.

Introduction: Antibiotic resistance has become a major concern in the nursing home (NH) communities. Despite this, antibiograms are not being used enough in the NH to help physicians make more educated decisions. Bacterial ecology of urinary tract infections in the NH is unknown and selection of an antibiotic is based on physician personal experience. Objective: To develop an empirical antibiotic protocol according to urinary tract infections ecology in the NH Methods: This retrospective study was performed during one year. We checked all bacterial urinary cultures (MSU) for susceptibility to multiple antibiotics (ATB). Results: 112 MSU were done in 309 potential residents with 34 antibiograms. Ecology: Escherichia coli (E. coli) was the most common bacteria (75%) 32% of E. coli were sensitive to most ATB 40% of E. coli were resistant to ampicillin and sensitive to amoxicillin-clavulanic acid 28% of E. coli were resistant to quinolone 28% of E. coli were resistant to sulfa drug 0% of E. coli were resistant to nitrofurantoin. A standard operating procedure (SOP) was performed according to this ecology Conclusion: Information gathered from this study was helpful in establishing SOP on a nursing home for GP to know when and which antibiotics should be used.

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5. HOLM, A., et al, 2015. **Point of care susceptibility testing in primary care - does it lead to a more appropriate prescription of antibiotics in patients with uncomplicated urinary tract infections? Protocol for a randomized controlled trial.** *BMC Family Practice*, 16(1), pp. 1-8 8p.

Background: Urinary tract infection (UTI) is a common infection in primary care and is the second leading reason for prescription of antibiotics in Denmark. The diagnosis is often based on symptoms and urine dip-stick, which has limited validity, causing the risk of unnecessary antibiotic prescription. Additionally, with increasing antibiotic resistance, the risk of choosing an antibiotic to which an infecting pathogen is resistant is rising. Combined point-of-care-tests (POCT) for urine culture and susceptibility testing have been developed and validated for primary care, and

performing such a test in all patients with suspected UTI in primary care seems rational in order to reduce the use of inappropriate antibiotics. However, the clinical effect of the culture and susceptibility test has not yet been investigated. This study aims to investigate whether POCT urine culture and susceptibility testing decreases the inappropriate use of antibiotics and leads to faster patient recovery. Methods/design: Randomized controlled open label trial of two diagnostic approaches. 750 patients with symptoms of uncomplicated UTI, consecutively contacting their general practitioner (GP), randomized to either POCT urine culture and susceptibility testing and targeted treatment or POCT urine culture without susceptibility testing and empirical treatment. Treatment is started when the POCT is read. The two groups are compared with regard to appropriate choice of antibiotics, clinical remission, and microbiological cure rates. Discussion: The results of this study may provide important evidence to recommend POCT culture and susceptibility testing in all patients with suspected uncomplicated UTI. This could become an additional strategy to fight antibiotic resistance.

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6. BATES, J., et al, 2014. **Point of care testing for urinary tract infection in primary care (POETIC): protocol for a randomised controlled trial of the clinical and cost effectiveness of FLEXICULT<sup>TM</sup> informed management of uncomplicated UTI in primary care.** *BMC Family Practice*, 15, pp. 187.

BACKGROUND: Urinary tract infections (UTI) are the most frequent bacterial infection affecting women and account for about 15% of antibiotics prescribed in primary care. However, some women with a UTI are not prescribed antibiotics or are prescribed the wrong antibiotics, while many women who do not have a microbiologically confirmed UTI are prescribed antibiotics. Inappropriate antibiotic prescribing unnecessarily increases the risk of side effects and the development of antibiotic resistance, and wastes resources. METHODS/DESIGN: 614 adult female patients will be recruited from four primary care research networks (Wales, England, Spain, the Netherlands) and individually randomised to either POCT guided care or the guideline-informed 'standard care' arm. Urine and stool samples (where possible) will be obtained at presentation (day 1) and two weeks later for microbiological analysis. All participants will be followed up on the course of their illness and their quality of life, using a 2 week self-completed symptom diary. At 3 months, a primary care notes review will be conducted for evidence of further evidence of treatment failures, recurrence, complications, hospitalisations and health service costs. DISCUSSION: Although the Flexicult<sup>TM</sup> POCT is used in some countries in routine primary care, it's clinical and cost effectiveness has never been evaluated in a randomised clinical trial. If shown to be effective, the use of this POCT could benefit individual sufferers and provide evidence for health care authorities to develop evidence based policies to combat the spread and impact of the unprecedented rise of infections caused by antibiotic resistant bacteria in Europe. TRIAL REGISTRATION NUMBER: ISRCTN65200697 (Registered 10 September 2013).

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[2296&isbn=&volume=15&issue=1&spage=187&pages=187&date=2014&title=BMC+Family+Practice&atitle=Point+of+care+testing+for+urinary+tract+infection+in+primary+care+%28POETIC%29%3A+protocol+for+a+randomised+controlled+trial+of+the+clinical+and+cost+effectiveness+of+FLEXICULTTM+informed+management+of+uncomplicated+UTI+in+primary+care.&aulast=Bates&pid=%3Cauthor%3EBates+J%3BThomas+Jones+E%3BPickles+T%3BKirby+N%3BGal+M%3BBongard+E%3BHood+K%3BFrancis+N%3BLittle+P%3BMoore+M%3BRumsby+K%3BLlor+C%3BBurgman+C%3BVerheij+T%3BCohen+D%3BWootton+M%3BHowe+R%3BButler+CC%3C%2Fauthor%3E%3CAN%3E25425162%3C%2FAN%3E%3CDT%3EJournal+Article%3C%2FDT%3E](https://doi.org/10.1186/s12874-014-0187-1)

7. COOPER, D., 2014. **Urinary Tract Infections in Long-Term Care: An Implementation Project to Reduce Inappropriate Antibiotic Treatment.** *Western journal of nursing research*, 36(10), pp. 1382-1383 2p.  
<http://search.ebscohost.com/login.aspx?direct=true&AuthType=athens,cookie,ip,url,uid&db=rzh&AN=103902621&site=ehost-live>

8. FLEET, E., et al, 2014. **Impact of implementation of a novel antimicrobial stewardship tool on antibiotic use in nursing homes: a prospective cluster randomized control pilot study.** *Journal of Antimicrobial Chemotherapy*, 69(8), pp. 2265-2273.

OBJECTIVES: To evaluate the impact of 'Resident Antimicrobial Management Plan' (RAMP), a novel antimicrobial stewardship tool on systemic antibiotic use for treatment of infection in nursing homes (NHs). METHODS: A pilot cluster randomized control study was conducted in 30 NHs in London. Pre-intervention, we collected point prevalence data on antimicrobial use on three occasions and total antimicrobial consumption for a 12 week period. Post-intervention data were collected in the same manner and included assessment of compliance with RAMP in the intervention group (IG). RESULTS: The number of residents included was 1628 pre-intervention [825 IG/803 control group (CG)] and 1610 post-intervention (838 IG/772 CG). The corresponding pre- and post-intervention point prevalence of systemic antibiotic prescribing for treatment of infection was 6.46% and 6.52% in the IG [estimated prevalence ratio: 1.01 (95% CI: 0.81-1.25), P = 0.94] compared with 5.27% and 5.83%, respectively, in the CG [estimated prevalence ratio: 1.11 (95% CI: 0.87-1.41), P = 0.4]. Total antibiotic consumption was 69.78 defined daily doses/1000 residents/day (DRD) pre-intervention and 66.53 DRD post-intervention in the IG compared with 49.68 and 51.92 DRD, respectively, in the CG. There was a significant decrease of 4.9% (3.25 DRD) in the IG (95% CI: 1.0%-8.6%) (P = 0.02) compared with a significant increase of 5.1% (2.24 DRD) in the CG (95% CI: 0.2%-10.2%) (P = 0.04). Main indications for antibiotics were lower respiratory tract infections (34.1%), urinary tract infections (28.5%) and skin/soft tissue infections (25.1%). CONCLUSIONS: This pilot study demonstrated that use of RAMP was associated with a statistically significant decrease in total antibiotic consumption and has the potential to be an important antimicrobial stewardship tool for NHs. Copyright © The Author 2014. Published by Oxford University Press on behalf of the British Society for Antimicrobial Chemotherapy. All rights reserved. For Permissions, please e-mail: [journals.permissions@oup.com](mailto:journals.permissions@oup.com).

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9. ZIMMERMAN, S., et al, 2014. **Successfully Reducing Antibiotic Prescribing in Nursing Homes.** *Journal of the American Geriatrics Society*, 62(5), pp. 907-912 6p.  
<http://search.ebscohost.com/login.aspx?direct=true&AuthType=athens,cookie,ip,url,uid&db=rzh&AN=103946581&site=ehost-live>

10. BOOTH, J.L., et al, 2013. **Antibiotic treatment of urinary tract infection by community pharmacists: a cross-sectional study.** *British Journal of General Practice*, 63(609), pp. 244-249 6p.

BACKGROUND: Urinary tract infections (UTIs) are one of the most common conditions seen in female patients within primary care. Community pharmacists are familiar with symptomatic UTI management and supplying trimethoprim under patient group direction (PGD) for moderate-to-severe uncomplicated UTIs could improve patient access to treatment. AIM: To compare the care pathway of patients with UTI symptoms attending GP services with those receiving management, including trimethoprim supply under PGD, via community pharmacies. DESIGN AND SETTING: Prospective, cross-sectional, mixed methods approach in 10 community pharmacies within NHS Greater Glasgow and Clyde. METHOD: Pharmacies invited a purposive sample of female patients to participate. Pharmacists had the option of supplying trimethoprim under PGD to patients with moderate-to-severe infection meeting the PGD inclusion criteria. Data from patient (questionnaires and semi-structured telephone interviews) and pharmacist (questionnaires and semi-structured, face-to-face interviews) were quantitatively and qualitatively analysed. RESULTS: Data were recorded on 153 patients, 97 presenting with GP prescriptions and 56 presenting directly in the pharmacy with symptoms suggestive of UTI, of whom 41 received trimethoprim via PGD and 15 received symptomatic management. Both GP adherence to local infection management guidelines and pharmacist application of PGD inclusion/exclusion criteria required improvement. There was demand and support, from patients and pharmacists, for access to antibiotic treatments for UTIs, without prescription, through community pharmacies. CONCLUSION: Operating within PGD controls, antibiotic treatments for UTIs could be provided via community pharmacy to improve patient access to treatment which may also maintain antibiotic stewardship and reduce GP workload.

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11. COUPAT C., et al, 2013. **Selective reporting of antibiotic susceptibility data improves the appropriateness of intended antibiotic prescriptions in urinary tract infections: A case-vignette randomised study.** *European Journal of Clinical Microbiology and Infectious Diseases*, 32(5), pp. 627-636.

The purpose of this investigation was to assess the impact of selective reporting of antibiotic susceptibility data on the appropriateness of intended documented antibiotic prescriptions in urinary tract infections (UTIs) among residents training in general practice. We conducted a randomised-controlled case-vignette study in three French universities using a questionnaire with four UTI vignettes. In each university, residents were randomly allocated to two groups: a control group with usual full-length reporting of antibiotic susceptibility data (25 antibiotics) and an intervention group with selective reporting of antibiotic susceptibility data (2 to 4 antibiotics only). 326/611 residents (53 %) participated in the survey, 157/305 (52 %) in the intervention group and 169/306 (55 %) in the control group. For all four UTI scenarios, selective reporting of antibiotic susceptibility data significantly improved the appropriateness of antibiotic prescriptions (absolute increase ranging from 7 to 41 %, depending on the vignette). The variety of antibiotic prescriptions was reduced in the intervention group, and cephalosporins and fluoroquinolones were less often prescribed. Among 325 respondents, 124 (38 %) declared being either not really or not at all at ease with antibiotic susceptibility data, whereas 112/157 (71 %) of the residents in the intervention group declared that selective reporting of antibiotic susceptibility data made their antibiotic choice easier. Selective reporting of antibiotic susceptibility data could be a promising strategy to improve antibiotic use in UTIs, as part of a multi-faceted antibiotic stewardship programme. Microbiology laboratories should be aware that they can have a significant influence on antibiotic use. © 2012 Springer-Verlag Berlin Heidelberg.

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12. DUANE, S., et al, 2013. **Supporting the improvement and management of prescribing for urinary tract infections (SIMPLE): protocol for a cluster randomized trial.** *Trials*, 14(1), pp. 441-441 1p.

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13. KNOTTNERUS, B.J., et al, 2013. **Women with symptoms of uncomplicated urinary tract infection are often willing to delay antibiotic treatment: a prospective cohort study.** *BMC Family Practice*, 14, pp. 71.

**BACKGROUND:** Women presenting with symptoms of acute uncomplicated urinary tract infection (UTI) are often prescribed antibiotics. However, in 25 to 50% of symptomatic women not taking antibiotics, symptoms recover spontaneously within one week. It is not known how many women are prepared to delay antibiotic treatment. We investigated how many women presenting with UTI symptoms were willing to delay antibiotic treatment when asked by their general practitioner (GP). **METHODS:** From 18 April 2006 until 8 October 2008, in a prospective cohort study, patients were recruited in 20 GP practices in and around Amsterdam, the Netherlands. Healthy, non-pregnant women who contacted their GP with painful and/or frequent micturition for no longer than seven days registered their symptoms and collected urine for urinalysis and culture. GPs were requested to ask all patients if they were willing to delay antibiotic treatment, without knowing the result of the culture at that moment. After seven days, patients reported whether their symptoms had improved and whether they had used any antibiotics. **RESULTS:** Of 176 women, 137 were asked by their GP to delay antibiotic treatment, of whom 37% (51/137) were willing to delay. After one week, 55% (28/51) of delaying women had not used antibiotics, of whom 71% (20/28) reported clinical improvement or cure. None of the participating women developed pyelonephritis. **CONCLUSIONS:** More than a third of women with UTI symptoms are willing to delay antibiotic treatment when asked by their GP. The majority of delaying women report spontaneous symptom improvement after one week.

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14. OLSHO, L.E.W., et al, 2013. **Does adherence to the Loeb minimum criteria reduce antibiotic prescribing rates in nursing homes?** *Journal of the American Medical Directors Association*, 14(4), pp. 309.e1-309.e7.

**OBJECTIVES:** The Loeb minimum criteria (LMC), developed by a 2001 consensus conference, are minimum standards for initiation of antibiotics in long term care settings, intended to reduce inappropriate prescribing. This study examined the relationship between nursing home prescriber adherence to the LMC and antibiotic prescribing rates, overall and for each of three specific conditions (urinary tract infections, respiratory infections, and skin and soft tissue infections). **DESIGN:** We performed a cross-sectional analysis at the resident-day level. We estimated multivariate models adjusting for nursing home characteristics via multilevel Poisson regression, with robust standard errors to account for clustering of prescriptions within residents within nursing homes. **SETTING:** Data were collected through medical record abstraction in 12 North Carolina nursing homes between March and May 2011. **PARTICIPANTS:** In total, we identified 3381 antibiotic prescriptions across the 3-month observation period, representing 110,810 nursing home resident-days.

In addition, we performed chart audits for a random sample of 653 prescriptions for urinary tract, respiratory, and skin and soft tissue infections to create measures of LMC adherence. MEASUREMENTS: The primary outcome was a count of prescriptions per resident per day, and the key explanatory variable was a nursing home-level estimate of the proportion of antibiotic prescriptions that adhered to the LMC. RESULTS: Only 12.7% of prescriptions were classified as LMC adherent, although there was substantial variation across study nursing homes (range: 4.8% to 22.0%) and by infection type (1.9% adherence for respiratory infections, 10.2% for urinary tract infections, and 42.7% for skin and soft tissue infections). We found no statistically significant relationship between adherence to the LMC and total prescribing rates (IRR 1.00, 95% CI 0.98-1.03; P = .84). Similarly, there was no significant relationship between LMC adherence and prescribing rates for treating urinary tract infections (IRR 0.99, 95% CI 0.96-1.02; P = .49), respiratory infections (IRR 0.91, 95% CI 0.76-1.08; P = .28), or skin and soft tissue infections (IRR 0.99, 95% CI 0.98-1.01; P = .39) considered alone. CONCLUSION: We found little evidence that prescribers in study nursing homes considered the LMC when making prescribing decisions. Further, we found no evidence that greater adherence to the LMC was associated with lower rates of antibiotic prescribing. Evidence-based guidelines for antibiotic initiation must be adopted more widely before any substantial gains from adherence are likely to be recognized. Copyright © 2013 American Medical Directors Association, Inc. All rights reserved.

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15. RUMMUKAINEN M.L., et al, 2012. **Reduction in inappropriate prevention of urinary tract infections in long-term care facilities.** *American Journal of Infection Control*, 40(8), pp. 711-714.

Background: Urinary tract infection (UTI) is the most common diagnosis made in prescribing antimicrobials in long-term care facilities (LTCF). The diagnostic criteria for UTI vary among institutions and prescribers. Our aim was to reduce the inappropriate use of antimicrobials in LTCFs. Methods: A team comprising infectious disease consultant, infection control nurse, and geriatrician visited all LTCFs for older persons (2,321 patients in 25 primary care hospitals and 39 nursing homes and dementia units) in the Central Finland Healthcare District (population 267,000) during 2004-2005. The site visits consisted of a structured interview concerning patients, ongoing systematic antimicrobials, and diagnostic practices for UTI. Following the visits, regional guidelines for prudent use of antimicrobials in LTCFs were published, and the use of antimicrobials was followed up by an annual questionnaire. Results: The proportions of patients receiving antimicrobials in 2005,

2006, 2007, and 2008 were 19.9%, 16.9%, 16.2%, and 15.4%, respectively. Most of the antibiotics were used for UTI (range by year, 66.6%-81.1%). From 2005 through 2008, the proportion of patients on antibiotic prophylaxis for UTI decreased from 13% to 6%. The decrease was statistically significant in both types of settings. Conclusion: The visits and guidelines were associated with a reduction in the usage of antimicrobials. To sustain this, UTI surveillance and close collaboration between infection control experts and LTCFs are crucial. © 2012 by the Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.

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16. RUMMUKAINEN, M., et al, 2012. **Reduction in inappropriate prevention of urinary tract infections in long-term care facilities.** *American Journal of Infection Control*, 40(8), pp. 711-714 4p.

Background: Urinary tract infection (UTI) is the most common diagnosis made in prescribing antimicrobials in long-term care facilities (LTCF). The diagnostic criteria for UTI vary among institutions and prescribers. Our aim was to reduce the inappropriate use of antimicrobials in LTCFs. Methods: A team comprising infectious disease consultant, infection control nurse, and geriatrician visited all LTCFs for older persons (2,321 patients in 25 primary care hospitals and 39 nursing homes and dementia units) in the Central Finland Healthcare District (population 267,000) during 2004-2005. The site visits consisted of a structured interview concerning patients, ongoing systematic antimicrobials, and diagnostic practices for UTI. Following the visits, regional guidelines for prudent use of antimicrobials in LTCFs were published, and the use of antimicrobials was followed up by an annual questionnaire. Results: The proportions of patients receiving antimicrobials in 2005, 2006, 2007, and 2008 were 19.9%, 16.9%, 16.2%, and 15.4%, respectively. Most of the antibiotics were used for UTI (range by year, 66.6%-81.1%). From 2005 through 2008, the proportion of patients on antibiotic prophylaxis for UTI decreased from 13% to 6%. The decrease was statistically significant in both types of settings. Conclusion: The visits and guidelines were associated with a reduction in the usage of antimicrobials. To sustain this, UTI surveillance and close collaboration between infection control experts and LTCFs are crucial.

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17. WILLEMS L., et al, 2012. **Can we improve adherence to guidelines for the treatment of lower urinary tract infection? A simple, multifaceted intervention in**

**out-of-hours services.** *Journal of Antimicrobial Chemotherapy*, 67(12) (pp 2997-3000), pp. Arte Number: ks336. ate of Pubaton: eember 2012.

Objectives: To improve antimicrobial prescribing behaviour of general practitioners in large-scale out-of-hours services for uncomplicated lower urinary tract infection (LUTI) in females aged 20-80 years, which is regarded as one of the most prevalent bacterial infections in primary care. Methods: A quasi-experimental design was used in two regional large-scale out-of-hours services. A simple, multifaceted intervention was offered in a 16 week period in one region (the intervention region). During the two washout periods, at 5 and 17 months, we observed diagnoses and prescriptions. The main outcome measure was the share of appropriate and inappropriate prescriptions. Results: The proportion of patients with LUTI ranged from 1.0% to 2.1%. The relative proportion of appropriate prescriptions in the intervention region increased from 26.9% to 69.4%, but decreased afterwards to 40.8%. Conclusions: A simple, multifaceted intervention for treatment of LUTI during out-of-hours care may improve the quality of antimicrobial prescribing, although the improvement may not be sustained in the longer term. © The Author 2012. Published by Oxford University Press on behalf of the British Society for Antimicrobial Chemotherapy. All rights reserved.

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18. MCNULTY, C.A., et al, 2011. **Does laboratory antibiotic susceptibility reporting influence primary care prescribing in urinary tract infection and other infections?**

*Journal of Antimicrobial Chemotherapy (JAC)*, 66(6), pp. 1396-1404 9p.

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19. PETERSSON, E., et al, 2011. **Can a multifaceted educational intervention targeting both nurses and physicians change the prescribing of antibiotics to nursing home residents? A cluster randomized controlled trial.**

*Journal of Antimicrobial Chemotherapy (JAC)*, 66(11), pp. 2659-2666 8p.

[http://search.ebscohost.com/login.aspx?direct=true&AuthType=athens,cookie,ip,url\\_uid&db=rzh&AN=104588574&site=ehost-live](http://search.ebscohost.com/login.aspx?direct=true&AuthType=athens,cookie,ip,url_uid&db=rzh&AN=104588574&site=ehost-live)

20. LITTLE P., et al, 2010. **Effectiveness of five different approaches in management of urinary tract infection: Randomised controlled trial.** *BMJ (Online)*, 340(7743) (pp 405), pp. Arte Number: 199. ate of Pubaton: 20 Feb 2010.

Objective: To assess the impact of different management strategies in urinary tract infections. Design: Randomised controlled trial. Setting: Primary care. Participants:

309 non-pregnant women aged 18-70 presenting with suspected urinary tract infection. Intervention: Patients were randomised to five management approaches: empirical antibiotics; empirical delayed (by 48 hours) antibiotics; or targeted antibiotics based on a symptom score (two or more of urine cloudiness, urine smell, nocturia, or dysuria), a dipstick result (nitrite or both leucocytes and blood), or a positive result on midstream urine analysis. Self help advice was controlled in each group. Main outcome measures: Symptom severity (days 2 to 4) and duration, and use of antibiotics. Results: Patients had 3.5 days of moderately bad symptoms if they took antibiotics immediately. There were no significant differences in duration or severity of symptoms (mean frequency of symptoms on a 0 to 6 scale: immediate antibiotics 2.15, midstream urine 2.08, dipstick 1.74, symptom score 1.77, delayed antibiotics 2.11; likelihood ratio test for the five groups  $P=0.177$ ). There were differences in antibiotic use (immediate antibiotics 97%, midstream urine 81%, dipstick 80%, symptom score 90%, delayed antibiotics 77%;  $P=0.011$ ) and in sending midstream urine samples (immediate antibiotics 23%, midstream urine 89%, dipstick 36%, symptom score 33%, delayed antibiotics 15%;  $P<0.001$ ). Patients who waited at least 48 hours to start taking antibiotics reconsulted less (hazard ratio 0.57 (95% confidence interval 0.36 to 0.89),  $P=0.014$ ) but on average had symptoms for 37% longer than those taking immediate antibiotics (incident rate ratio 1.37 (1.11 to 1.68),  $P=0.003$ ), particularly the midstream urine group (73% longer, 22% to 140%; none of the other groups had more than 22% longer duration). Conclusion: All management strategies achieve similar symptom control. There is no advantage in routinely sending midstream urine samples for testing, and antibiotics targeted with dipstick tests with a delayed prescription as backup, or empirical delayed prescription, can help to reduce antibiotic use. Study registration National Research Register N0484094184 ISRCTN: 03525333.

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21. SCHMIEMANN, G., et al, 2010. **The diagnosis of urinary tract infection: a systematic review.** *Deutsches Arzteblatt International*, 107(21), pp. 361-367. BACKGROUND: Urinary tract infections (UTI) are among the leading reasons for treatment in adult primary care medicine, accounting for a considerable percentage of antibiotic prescriptions. Because this problem is so common and so significant in routine clinical practice, a high level of diagnostic accuracy is essential. Antibiotics should not be prescribed excessively, particularly in view of the increasing prevalence of antibiotic resistance. METHOD: Systematic review of relevant articles that were retrieved by a search of the Medline, Embase, and Cochrane Library databases. The recommendations of selected international guidelines were also

taken into account, as were the German national quality standards for microbiological diagnosis. RESULTS: The diagnosis of UTI by clinical criteria alone has an error rate of approximately 33%. The use of refined diagnostic algorithms does not completely eliminate uncertainty. CONCLUSION: With the aid of a small number of additional diagnostic criteria, antibiotic treatment for UTI can be provided more specifically and thus more effectively. Differentiating UTI from asymptomatic bacteriuria, which usually requires no treatment, can lower the frequency of unnecessary antibiotic prescriptions.

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22. LITTLE P., et al, 2009. **Dipsticks and diagnostic algorithms in urinary tract infection: Development and validation, randomised trial, economic analysis, observational cohort and qualitative study.** *Health technology assessment*, 13(19), pp. 59.

Objectives: To estimate clinical and dipstick predictors of infection and develop and test clinical scores; to compare management using clinical and dipstick scores with commonly used alternative strategies; to estimate the cost-effectiveness of each strategy; and to understand the natural history of urinary tract infection (UTI) and women's concerns about its presentation and management. Design: There were six studies: (1) validation development for diagnostic clinical and dipstick scores; (2) validation of the scores developed; (3) observation of the natural history of UTI; (4) randomised controlled trial (RCT) of scores developed in study 1; (5) economic analysis of the RCT; (6) qualitative study of patients in the RCT. Setting: Primary care. Participants: Women aged 17-70 with suspected UTI. Interventions: Patients were randomised to five management approaches: empirical antibiotics; empirical delayed antibiotics; target antibiotics based on a higher symptom score; target antibiotics based on dipstick results; or target antibiotics based on a positive mid-stream specimen of urine (MSU). Main outcome measures: Antibiotic use, use of MSUs, rates of reconsultation and duration, and severity of symptoms. Results: (1) 62.5% of women had confirmed UTI. Only predicted diagnosis of UTI. A dipstick rule - based on having nitrite or both leucocytes and blood - was moderately sensitive (77%) and specific (70%) [positive predictive value (PPV) 81%, negative predictive value (NPV) 65%]. A clinical rule - based on having two of urine cloudiness, offensive smell, reported moderately severe dysuria, moderately severe nocturia - was less sensitive (65%) (specificity 69%, PPV 77%, NPV 54%). (2) 66% of women had confirmed UTI. The predictive values of nitrite, leucocyte esterase and blood were confirmed. The dipstick rule was moderately sensitive (75%) but less specific (66%) (PPV 81%, NPV 57%). (3) Symptoms rated as moderately bad or worse lasted 3.25

days on average for infections sensitive to antibiotics; resistant infections lasted 56% longer, infections not treated with antibiotics 62% longer and symptoms associated with urethral syndrome 33% longer. Symptom duration was shorter if the doctor was perceived to be positive about prognosis, and longer with frequent somatic symptoms, previous history of cystitis, urinary frequency and more severe symptoms at baseline. (4) 66% of the MSU group had laboratory-confirmed UTI. Women suffered 3.5 days of moderately bad symptoms if they took antibiotics immediately but 4.8 days if they delayed taking antibiotics for 48 hours. Taking bicarbonate or cranberry juice had no effect. (5) The MSU group was more costly over 1 month but not over 1 year. Cost effectiveness acceptability curves showed that for a value per day of moderately bad symptoms of over 10, the dipstick strategy is most likely to be cost-effective. (6) Fear of spread to the kidneys, blood in the urine, and the impact of symptoms on vocational and leisure activities were important triggers for seeking help. When patients are asked to delay taking antibiotics the uncomfortable and worrying journey from 'person to patient' needs to be acknowledged and the rationale behind delaying the antibiotics made clear. Conclusions: To achieve good symptom control and reduce antibiotic use clinicians should either offer a 48-hour delayed antibiotic prescription to be used at the patient's discretion or target antibiotic treatment by dipsticks (positive nitrite or positive leucocytes and blood) with the offer of a delayed prescription if dipstick results are negative. © 2009 Queen's Printer and Controller of HMSO. All rights reserved.

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23. GOULD, I.M., et al, 2007. **Use of the bacteriology laboratory to decrease general practitioners' antibiotic prescribing.** *European Journal of General Practice*, 13(1), pp. 13-15.

OBJECTIVE: Use of the bacteriology laboratory to guide antibiotic prescribing in primary care is often considered inappropriate due to difficulties of access in a relevant time scale. The overnight analysis offered to general practitioners in the Grampian area of Scotland for the past 6 years (ABLE), and which had previously been shown to reduce antibiotic prescribing by two-thirds in a randomized controlled trial, was audited to see if it was being used correctly in general practice, that is to reduce unnecessary antibiotic prescribing. METHODS: 699 consultations were audited. Of these, 357 were ABLE patients. The other 342 were chosen because an antibiotic had been prescribed. RESULTS: Only 36.7% (140) of the ABLE patients were prescribed an antibiotic, 65.7% being given a delayed action script. All but 10 were culture positive. ABLE patients had a greater proportion of urinary tract



infections than the non-ABLE patients, but less lower-respiratory and skin or soft-tissue infection. The antibiotics prescribed reflected the differences in infection type. The repeat visit rate and repeat antibiotic prescription rate were almost identical between the two groups. CONCLUSION: While the overall use of ABLE in Grampian is low, its use seems to be appropriate in that it is successfully being used to identify bacterial infection and reduce unnecessary antibiotic prescribing.

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24. LOHFELD L., et al, 2007. **Evidence-Based Clinical Pathways To Manage Urinary Tract Infections in Long-Term Care Facilities: A Qualitative Case Study Describing Administrator and Nursing Staff Views.** *Journal of the American Medical Directors Association*, 8(7), pp. 477-484.

Objectives: This article examines the views of nursing staff and administrators in long-term care facilities (LTCFs) regarding a clinical pathway for managing urinary tract infections (UTIs) in LTCF residents. Design: A qualitative (case study) design was used. Setting: Data were collected from 8 LTCFs in southern Ontario and 2 in Iowa enrolled in a larger randomized controlled trial of clinical pathway for managing UTIs in LTCF residents, conducted between September 2001 and March 2003. The clinical pathway, designed to more effectively identify, diagnose, and treat UTIs, and reduce inappropriate antibiotics use for asymptomatic UTIs, introduced 2 decision tools to determine when to order a urine culture and initiate antibiotic treatment for suspected UTIs. Participants: We conducted 19 individual interviews with administrators and 10 focus groups with 52 nurses. Findings: Nurses generally thought that the pathways were well developed and easy to use, and administrators believed they were an important educational resource. Barriers to their use varied by group-initial lack of buy-in from nurses (medical directors), additional work (directors of nursing), and the need to change the protocol to exclude certain residents based on prior health conditions and/or pressure from physicians or families (nurses). Conclusions: Both administrators and staff, once familiar with a new clinical protocol to improve UTI management in LTCFs, generally supported its use. © 2007 American Medical Directors Association.

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OBJECTIVE: To assess whether a multifaceted intervention can reduce the number of prescriptions for antimicrobials for suspected urinary tract infections in residents of nursing homes. DESIGN: Cluster randomised controlled trial. SETTING: 24 nursing homes in Ontario, Canada, and Idaho, United States. PARTICIPANTS: 12 nursing homes allocated to a multifaceted intervention and 12 allocated to usual care. Outcomes were measured in 4217 residents. INTERVENTIONS: Diagnostic and treatment algorithm for urinary tract infections implemented at the nursing home level using a multifaceted approach--small group interactive sessions for nurses, videotapes, written material, outreach visits, and one on one interviews with physicians. MAIN OUTCOME MEASURES: Number of antimicrobials prescribed for suspected urinary tract infections, total use of antimicrobials, admissions to hospital, and deaths. RESULTS: Fewer courses of antimicrobials for suspected urinary tract infections per 1000 resident days were prescribed in the intervention nursing homes than in the usual care homes (1.17 v 1.59 courses; weighted mean difference -0.49, 95% confidence intervals -0.93 to -0.06). Antimicrobials for suspected urinary tract infection represented 28.4% of all courses of drugs prescribed in the intervention nursing homes compared with 38.6% prescribed in the usual care homes (weighted mean difference -9.6%, -16.9% to -2.4%). The difference in total antimicrobial use per 1000 resident days between intervention and usual care groups was not significantly different (3.52 v 3.93; weighted mean difference -0.37, -1.17 to 0.44). No significant difference was found in admissions to hospital or mortality between the study arms. CONCLUSION: A multifaceted intervention using algorithms can reduce the number of antimicrobial prescriptions for suspected urinary tract infections in residents of nursing homes.

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