Evaluation of suspected urinary tract infection in ambulatory women
Barry H C, Ebell M H, Hickner J

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Office-based strategies for the management of suspected urinary tract infections (UTI): empiric therapy, use of dipstick and microscopic urinalysis, use of complete urinalysis and use of office or laboratory cultures.

Type of intervention
Diagnosis and treatment.

Economic study type
Cost-utility analysis.

Study population
An otherwise healthy woman aged 18 to 50, who presents to her primary care physician with suspected urinary tract infections and no symptoms or signs of pyelonephritis.

Setting
Primary Care. The economic study was carried out in Michigan, USA.

Dates to which data relate
The main effectiveness data were taken from studies published between 1974 and 1995. The dates for resource use data were not reported. Fiscal year was not explicitly specified.

Source of effectiveness data
Effectiveness data were derived from a review of the literature and authors= estimates.

Modelling
A decision analysis model using a computer program (DATA) was constructed to determine the optimal office-based approach to diagnosis and treatment of suspected UTI in women.

Outcomes assessed in the review
The review provided estimates of treatment response, medication-induced side effects, the probability of urinary tract infection in an index patient, the sensitivity and specificity of the tests used in the analysis, and disutilities of health states.

Study designs and other criteria for inclusion in the review
Not reported.
Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
A total of 44 studies were included in the review.

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not stated.

Results of the review
The probability of cure was estimated to be 75% in a single dose, 81% in a 3-day dose and 94% in a 7-day dose of initial antibiotic therapy. The probability of side effects was estimated to be 10% (single), 20% (3 day) and 30% (7 day) for initial antibiotic therapy. The probability of medication-induced vaginitis was 0.06, 0.10, and 0.13, respectively, for different courses of antibiotic therapy. The sensitivity of dipstick, complete urinalysis, and office culture was 0.65 (range: 0.4 - 0.999), 0.90 (range: 0.5 - 0.999), and 0.93 (range: 0.75 - 0.999), respectively. The specificity of dipstick, complete urinalysis, and office culture was 0.75 (range: 0.5 - 0.999), 0.72 (range: 0.5 - 0.999), and 0.93 (range: 0.5 - 0.999). The probability of urinary tract infection in an index patient was 0.67 (range: 0 - 1). Treatment success for 7-day therapy was 0.94 (0.4 to 1.0). The probability of vaginitis and other side effects of therapy such as rash or diarrhea was 0.13 (range: 0.10 - 0.80) and 0.22 (range: 0.05 - 0.50), respectively. The disutility per month was 0.0033 (range: 0 - 0.2) for an office visit, 0.0023 (range: 0 - 0.2) for antibiotic treatment, 0.1244 (range: 0.01 - 0.5) for pyelonephritis, 0.0367 (range: 0.01 - 0.2) for vaginitis, 0.0367 (range: 0.01 - 0.2) for persistent dysuria, and 0.0289 (range: 0.001 - 0.1) for other side effects.

Methods used to derive estimates of effectiveness
Estimates of effectiveness were also based on the authors’ estimates.

Estimates of effectiveness and key assumptions
The sensitivity and specificity of lab culture were 0.96 (range: 0.75 - 0.999), and 0.96 (range: 0.5 - 0.999). The probability of pyelonephritis without treatment was estimated to be 0.05 (range: 0 - 0.25) and due to treatment failure was estimated to be 0.01 (range: 0 - 0.5).

Measure of benefits used in the economic analysis
The benefit measure was quality-adjusted life months (QALM). The method used was the Index of Well-Being (a well-validated, multi-attribute health scale that takes into account patient mobility, social activity and symptoms). Patients' values were used to assess the health states.
Direct costs
Costs were not required to be discounted due to the short time frame of the study. Quantities were not systematically analysed separately from the costs. Cost items were reported separately. Cost analysis covered the costs of diagnostic tests, antibiotic therapy, and side effects. The perspective adopted in the cost analysis was that of a payer. The sources of cost data were surveys conducted on hospitals, physicians, and pharmacies. The date of the price data was not explicitly stated.

Indirect Costs
Not considered.

Currency
US dollars ($).

Sensitivity analysis
A set of one-way sensitivity analyses was carried out on all the costs, utilities, probabilities and test characteristics. Two-way sensitivity analyses were performed on the sensitive parameters identified in the one-way sensitivity analyses. Threshold analysis was performed for some of the most sensitive parameters of the model.

Estimated benefits used in the economic analysis
The QALMs were estimated to be 0.976 (empiric therapy), 0.981 (complete urinalysis), 0.966 (culture and wait in office), 0.985 (culture and treat in office), 0.967 (culture and wait in lab), 0.986 (culture and treat in lab) and 0.977 (dipstick only).

Cost results
The total costs were estimated to be $69.78 (empiric therapy), $84.60 (complete urinalysis), $96.03 (culture and wait in office), $97.03 (culture and treat in office), $99.87 (culture and wait in lab), $100.87 (culture and treat in lab) and $118.24 (dipstick only). The marginal costs relative to the empiric therapy were $14.82, $11.43, $1.00, $2.84, $1.00 and $17.37, respectively.

Synthesis of costs and benefits
The estimated benefits and costs were combined by calculating average and incremental cost per QALM. An incremental analysis was performed. The cost-effectiveness ratios (outcome of cost per QALM) were estimated to be $71.52, $86.24, $99.43, $98.51, $103.29, $102.29 and $121.01 for the seven strategies. The marginal cost-effectiveness relative to the empiric therapy (incremental cost for each additional QALM) was estimated to be $2,964.00 (dominated) for complete urinalysis, $3,027.78 (dominated) for culture and treat in office, $3,109.00 for culture and treat in lab and $48,460.00 for dipstick only. The extensive sensitivity analyses performed established the robustness of the results to a wide range of variations in the parameters of the model.

Authors' conclusions
The preferred strategy of empiric therapy is robust over a wide range of sensitivity analyses. While empiric therapy is associated with the best cost-utility ratio, doing a culture yields the greatest utility at greater incremental cost per QALM. Many primary care physicians already treat UTIs empirically with antibiotics. This study confirms that empiric therapy, while frowned upon by some, is a cost-effective strategy. Other strategies may be considered, but at greater marginal cost. Ultimately these findings need to be confirmed in clinical trials.

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparators is clear.
Validity of estimate of benefit
The internal validity of the estimates of measure of benefit used in the economic analysis can not be guaranteed due to the lack of information regarding the critical appraisal of the literature including the quality assessment of the primary studies included in the review.

Validity of estimate of costs
Quantities of resource use were not fully reported separately from the costs. However, adequate details of methods of cost estimation were given. As pointed out by the authors, some of the cost items may have been excluded because of the limited perspective (not societal view) adopted in the cost analysis.

Other issues
The authors' conclusions were justified, given the extensive sensitivity analyses performed to address uncertainties in the data. The issue of generalisability to other setting was addressed and appropriate comparisons were made with other studies.

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None stated.

Bibliographic details

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Other publications of related interest

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Subject indexing assigned by NLM

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