Cost-effectiveness model comparing olanzapine and other oral atypical antipsychotics in the treatment of schizophrenia in the United States
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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.

CRD summary
The objective was to assess the cost-effectiveness of five oral antipsychotics that were frequently used in the usual care of community-dwelling patients with schizophrenia. The authors concluded that olanzapine might be cost-effective for these patients. The methods were satisfactory and the results were reported sufficiently. The authors’ conclusions appear to be appropriate, but the short time horizon should be considered.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of five oral antipsychotics that were frequently used in the usual care of community-dwelling patients with schizophrenia.

Interventions
The following oral treatments for schizophrenia were compared: olanzapine, risperidone, quetiapine, ziprasidone, and aripiprazole.

Location/setting
USA/secondary care.

Methods
Analytical approach:
The authors reported that a Monte Carlo micro-simulation model was developed to assess the cost-effectiveness of the five antipsychotics. The time horizon was one year and the authors reported that the perspective was that of a US third-party payer.

Effectiveness data:
The effectiveness data were from published studies and expert opinion. The main effectiveness estimates were: the medication adherence levels; the relapse rates; and treatment-related adverse events. Adherence data were from a number of published studies and the authors’ assumptions. Relapse rates were from the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE). Adverse events data were from published studies and an integrated analysis of 23 clinical trials.

Monetary benefit and utility valuations:
The utility estimates were from a published study (Lenert, et al. 2004, see 'Other Publications of Related Interest' below for bibliographic details), which used the Positive and Negative Syndrome Scale. A group of 12 schizophrenia experts matched the health states in this study to those in the micro-simulation model.

Measure of benefit:
Quality-adjusted life-years (QALYs) gained was the measure of benefit.

Cost data:
The direct costs were those relating to: the medications; hospitalisation; emergency room visits; physician visits; mental
health clinic visits; home care; group interventions; nutritionist visits; and treatment of adverse events. Medication costs were their net wholesale prices, except for risperidone, which was reduced because the patent had recently expired. Health service costs were from the Nationwide Inpatient Sample database in the USA. The costs of adverse events were from published studies. All costs were updated to 2007 prices, using the medical services component of the consumer price index. They were reported in US dollars ($).

Analysis of uncertainty:
One-way sensitivity analyses were performed by varying the: adherence rates; adverse event rates; hospitalisation risk ratios; relapse risk ratios; and costs of generic drugs. These results were presented in a table. Probabilistic sensitivity analysis (PSA) was undertaken, by varying the inputs over ranges of values that were mostly -50% to +50%. A second PSA assigned distributions for stable patients (no relapse), patients experiencing in-patient relapse, and patients experiencing out-patient relapse. Each PSA consisted of 1,000 simulations of 1,000 patients. The results were presented in an incremental cost-effectiveness acceptability curve.

Results
The average QALYs gained per patient over one year were: 0.731 for olanzapine, 0.717 for risperidone, 0.706 for quetiapine, 0.711 for ziprasidone, and 0.713 for aripiprazole. The mean cost per patient was: $8,544 for olanzapine, $9,080 for risperidone, $13,619 for quetiapine, $11,414 for ziprasidone, and $11,603 for aripiprazole.

Olanzapine was dominant over all the other antipsychotics, as it was more effective and less costly.

The one-way sensitivity analysis showed that the base-case results were robust to the changes in inputs. The PSA showed that the probability of olanzapine being dominant, compared with risperidone, was 59%. At a cost-effectiveness threshold of $50,000 per QALY gained, the probability that olanzapine was cost-effective was 84% and at a threshold of $100,000 the probability was 93%. In the second PSA, the probability was 74% at $50,000 and 93% at $125,000.

Authors’ conclusions
The authors concluded that olanzapine might be cost-effective for patients with schizophrenia.

CRD commentary
Interventions:
The interventions were reported clearly and appear to have been appropriate comparators. Two relevant comparators were excluded and a justification was given. The five interventions might be relevant in other settings.

Effectiveness/benefits:
The authors did not report the method used to identify the studies that provided the effectiveness estimates and it is unclear if all the relevant information was included. The methods used to derive the utilities were reported in full. Discounting of the benefits was not necessary as the time horizon was one year.

Costs:
The perspective adopted was explicitly reported and it appears that all the major relevant costs, for this third-party payer perspective, were included. The sources from which the costs and resource use data were derived were sufficiently reported. The price year, time horizon and currency were all reported and, as the costs were incurred over one year, no discounting was necessary.

Analysis and results:
The costs and outcomes were synthesised, using a decision model, and the full details of its structure, including a diagram, were provided. The impact of uncertainty in the results was adequately tested in a series of one-way and probabilistic sensitivity analyses. A one-year time horizon might seem too short to fully capture the costs and outcomes, but the authors justified it as follows: in the longer term, there could be shifts in drug pricing, high rates of medication switching, and high discontinuation rates; and one year was the coverage period for which the payer was responsible.

Concluding remarks:
The methods were satisfactory and the results were reported sufficiently. The authors’ conclusions appear to be
appropriate, given the short time horizon.

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**Other publications of related interest**
Lenert LA, Sturley AP, Rapaport MH, Chavez S, Mohr PE, Rupnow M. Public preferences for health states with schizophrenia and a mapping function to estimate utilities from positive and negative symptom scale scores. Schizophrenia Research 2004; 71: 155-165.

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