Cost-effectiveness of Anticipatory and Preventive multidisciplinary Team Care for complex patients: evidence from a randomized controlled trial

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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
This study evaluated the cost-effectiveness of home-based care, for patients, aged over 50 years, with chronic coronary artery disease, diabetes, congestive heart failure, or chronic obstructive pulmonary disease. The authors concluded that the care programme did not seem to be cost-effective, but further long-term trials were needed. The study was well reported with generally appropriate methods. The small sample, short time horizon, and intermediate outcome were limitations that the authors acknowledged, and their conclusions were appropriate.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study evaluated the cost-effectiveness of home-based care, for patients with chronic coronary artery disease, diabetes, congestive heart failure, or chronic obstructive pulmonary disease, who were over 50 years old.

Interventions
The intervention was the Anticipatory and Preventive Team Care (APTCare), which consisted of a nurse practitioner and a pharmacist, working alongside general practitioners (GPs), in a semi-rural family health network. The care was delivered almost exclusively in the patient's home, while they continued to see their GP at the surgery. This was compared with usual care.

Location/setting
Canada/hospital and community care.

Methods
Analytical approach:
An economic evaluation was conducted, using data from a randomised controlled trial. A subgroup of patients, who had at least one of the four chronic diseases, was analysed, with 74 patients randomised to APTCare and 78 patients randomised to usual care. The time horizon was 12 to 18 months, depending on the time of randomisation. The authors stated that the analysis was conducted from the perspective of the Canadian provincial Ministry of Health.

Effectiveness data:
The primary outcome of the trial was the change in a composite quality of care score. For each chronic condition, a score was constructed by dividing the number of appropriately performed tasks by the number of eligible tasks. Several eligible tasks, for each chronic disease, were defined, including the delivery of or recommendation for treatment, vaccination or examination. For each patient, the composite quality of care score was calculated as the average of their individual chronic disease scores. Changes in quality of care scores were determined by the number of new tasks performed during the observation period.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The health benefit was measured by a 1% improvement in the quality of care score. The net monetary benefit to

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society, where the health benefits were assigned a monetary value, was calculated.

Cost data:
The direct costs of care included medications, physician and emergency department visits, hospitalisations, diagnostic tests, and therapy. Most of these costs were from electronic medical records and patient surveys. The physician visit costs were from the Ontario Health Insurance Plan. The costs for APTCare included start-up costs, overheads (rent and office supplies), and human resource costs. Start-up costs were amortised using a 5% interest rate, over five years, for home telemedicine systems, medical supplies, and staff training. Human resource costs included the nurse and pharmacist salaries (based on time logs), administration costs, GP compensation, and transport costs (from transport logs). All costs were reported in Canadian dollars (CAD).

Analysis of uncertainty:
Bootstrapping was used to determine the probability that the intervention was cost-effective, over a range of willingness-to-pay thresholds. Bootstrapped regressions were undertaken, with and without controlling for patient characteristics, for 5,000 simulations. The results were presented in cost-effectiveness acceptability curves.

Results
Compared with the start, at the end of the study the quality of care scores rose from 74.1% to 83.9% with APTCare, and from 76.4% to 77.2% with usual care. There was a significant difference in change (p=0.0013), reflecting a 9.2% (95% CI 4.1 to 14.4) improvement in the quality of care with APTCare, when adjusting for potential confounding variables.

When considering only those costs relevant to all participants, the total cost per patient with APTCare was CAD 9,121, compared with CAD 9,222 for usual care, with a mean difference of CAD 100. Including the additional costs of APTCare, the total cost per patient rose to CAD 12,923 with APTCare, with a mean difference of CAD 3,701 (95% CI 385 to 7,024).

The incremental cost-effectiveness ratio for APTCare, over usual care, was CAD 407 per additional 1% improvement in quality of care. At a willingness-to-pay threshold of CAD 500 there was a 25% likelihood that APTCare was cost-effective. At a threshold of CAD 1,000 the likelihood that the intervention was cost-effective rose to just over 70%.

In the regression, the significance of cost-effectiveness was only reached at a threshold of CAD 750, indicating that there was a positive benefit to society in adopting the intervention, as long as a 1% increase in quality of care was valued at CAD 750 or more.

Authors’ conclusions
The authors concluded that APTCare did not seem to be cost-effective, but further long-term trials were needed.

CRD commentary
Interventions:
The intervention was briefly described, and the comparator was clearly stated. Usual care was an appropriate comparator, but it was not described.

Effectiveness/benefits:
The effectiveness measure was clearly reported, but it was an intermediate health outcome. With chronic diseases, the most relevant and important outcomes are morbidity, mortality, and quality of life. Quality of care was a limited measure because it did not indicate how APTCare affected these long-term outcomes. The authors suggested that the efficiency of the programme could be improved with practice, but no evidence was given to support this claim. It was unclear how much better, if at all, an established programme might be over a new programme.

Costs:
The cost categories and results were clearly reported and seem to have been comprehensive. Appropriate sources were used. The resource use was not reported separately from the costs, which limits the transparency of the results. The price year was not reported. The authors highlighted the limitation that self-reported measures were used for some costs, such as hospitalisation and emergency department services. Surveys to collect cost data could introduce recall bias.
and reporting errors, but the extent and direction of any bias were unclear.

Analysis and results:
The study design appeared to minimise the risk of bias; the methods were not fully reported, but were referenced. Patients were appropriately analysed by randomisation (intention to treat), rather than by the treatment received. Uncertainty was analysed using bootstrapping, with appropriate measures to control for initial differences between groups. Effectiveness was measured by 1% improvements in the quality of care score. There was no established willingness-to-pay threshold for this, so the authors used the statistical significance of the cost-effectiveness result, in regression analysis, to decide whether society would value the intervention. CAD 750 was the point at which the confidence bands only contained positive net benefits. A decision-maker or a patient might accept a lower likelihood of a positive net benefit. The authors acknowledged that the intervention could be considered cost-effective, using a different measure of benefit. They highlighted some limitations to their study, such as the short time horizon and the small sample.

Concluding remarks:
The study was well reported with generally appropriate methods. The small sample, short time horizon, and intermediate outcome were limitations of the analysis. The authors acknowledged these limitations and reached appropriate conclusions.

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