Pulmonary Rehabilitation for Chronic Obstructive Pulmonary Disease: Clinical, Economic, and Budget Impact Analysis

EXECUTIVE SUMMARY

The Issue
Chronic obstructive pulmonary disease (COPD) causes disability and impaired quality of life. In 2006, more than 10% of all hospitalizations in Canada were due to COPD. Pulmonary rehabilitation (PR) can be used to assist in the management of COPD. In Canada, there is poor access to PR because of limited program capacity. Policy-makers and health care providers need advice to help with decision-making about the future establishment and use of PR programs. Information on the cost-effectiveness, budget impact, and operational needs of PR programs and the impact of program elements on clinical outcomes would be helpful for decision-makers.

Objectives
The objectives of this assessment were to evaluate the effect of PR programs for COPD on clinical and economic outcomes, and to assess their health services impact.

The research questions were:
- What is the clinical effectiveness of PR and pharmacotherapy (together) compared with pharmacotherapy alone for adults with COPD?
- What is the effectiveness of specific elements of PR programs for adults with COPD?
- What is the cost-effectiveness of PR and pharmacotherapy compared with pharmacological therapy alone in adults with COPD?
- What is the health services impact of implementing PR for adults with COPD in Canada?
- What are the recommendations for the use of PR in current COPD clinical practice guidelines that are relevant to the Canadian context?

Methods
Literature searches were conducted to obtain clinical and economic data using bibliographic databases and grey literature sources. Systematic reviews of clinical and economic literature were undertaken. Recommendations and judgments on evidence were extracted from relevant clinical practice guidelines.
A cost-effectiveness analysis was undertaken to compare the costs and health outcomes of usual care (pharmacotherapy) to the costs and health outcomes of usual care plus PR. PR consisted of three sessions per week at 2.5 hours per session over six weeks. A health system perspective was taken.

In the budget impact analysis, COPD prevalence data were used to estimate the number of patients recommended to receive PR. The desired capacity for PR in each year is estimated as current capacity plus the number of additional persons served each year. The budget impact of the additional services was estimated by multiplying the unit cost of PR by the additional persons served per year. A time horizon of ten years was used.

**Clinical Effectiveness of Pulmonary Rehabilitation**

The studies that are included in this review showed that, when compared with the usual care (pharmacotherapy) of patients with stable COPD, PR plus usual care is effective in the short term (up to three months), as indicated by improvement in exercise capacity, health-related quality of life (HRQL), and mental health. In some studies, however, the improvements in outcomes were below the minimal clinically important differences. Some longer-term studies found that the benefits from the use of PR disappeared in 12 months or less. Others found that the benefits were sustained for two to three years. Reductions in health care utilization, as indicated by the number of hospital admissions or the length of stay, were reported in studies of variable quality.

The findings suggested that patients with COPD can benefit from the use of PR regardless of age, sex, and disease severity. Home-based PR programs provided similar benefits to those obtained from hospital outpatient PR programs. The appropriate duration and content of PR programs is unclear. Information on comparisons of PR with other treatments and on the effectiveness of components of PR programs was limited. Four clinical practice guidelines were identified as being relevant to Canada. Common themes included support for the use of PR for patients with COPD who have dyspnea and reduced exercise capacity, and the inclusion of education as a component of PR.

**Economic Analysis**

If the duration of efficacy of PR is 18 months, the incremental cost-effectiveness ratio of usual care plus PR compared with usual care is $27,924 per additional quality-adjusted life-year (QALY) gained.
Health Services Impact

If it is assumed that only the moderate and severe cases need PR, then 1,505 additional persons would be served annually in Canada over a ten-year period for an added annual cost of $1.8 million. If 25% of persons with COPD need PR, this cost would rise to $33.9 million annually for 100% uptake or $19 million if 67% of those who are in need used the services. If all persons with COPD needed PR, the additional annual cost would be $168 million.

Conclusions

The use of PR improves short-term exercise capacity, HRQL, and mental health outcomes for patients with COPD. More work is needed to confirm the factors that contribute to the successful long-term management of COPD after PR. There is limited information on the effectiveness of specific elements of PR programs. There are issues relating to patient characteristics and the operation of PR and maintenance programs that require consideration by those who establish or implement these services.

The cost-effectiveness of PR will depend on the duration of benefits. If the duration of the efficacy of PR is 18 months, the incremental cost-effectiveness ratio or ICER of usual care plus PR compared with usual care is $27,924 per additional QALY gained. In the most likely scenario from the budget impact analysis, an additional 15,900 persons per year would need PR, and an additional budget of $19 million would be required annually.