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Assessing the Economic Value of Supplemental Oxygen Therapy and Pulmonary Rehabilitation for Pulmonary Fibrosis in Ontario.

Executive report

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Acknowledgements

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Land Acknowledgement

The IHE respectfully acknowledges that our office is located on Treaty 6 Territory, a traditional gathering place for diverse and distinct Indigenous Peoples. We make this acknowledgement as an act of reconciliation and gratitude to those whose territory we reside on, and whose histories, languages, and cultures continue to influence and enrich our community.

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Declared Competing Interest of Authors

Competing interest is considered to be financial interest or non-financial interest, either direct or indirect, that would affect the research contained in this report or create a situation in which a person's judgement could be unduly influenced by a secondary interest, such as personal advancement.

The authors of this publication claim no competing interest.

Disclaimer

The findings in this report are based on estimates derived from limited available evidence. Given this limitation, several assumptions were made during the analysis. Therefore, the results should be interpreted carefully and in context of the current evidence. Additional research is crucial to fully understand the value of advancing innovations.

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Abstract

Background: Pulmonary Fibrosis (PF) is progressive lung disease with a high mortality rate that currently affects over 30,000 Canadians. Two key interventions for patients suffering from PF are supplemental oxygen therapy (SOT) and pulmonary rehabilitation (PR). Although medical insurance is universal, access to SOT and PR varies across Canada because eligibility for provincial coverage is defined within provincial jurisdiction. This has led to unequal access with many PF patients not having their oxygen needs met. Expanded access to SOT and PR is crucial to improving the health-related quality of life (HRQoL) of PF patients. An investment in these interventions also has the potential to reduce the burden on the healthcare system in terms of reduced hospital visits, emergency room (ER) visits, and specialist visits. The study aimed to estimate the economic implications of investment in provincial coverage of these interventions for patients living with pulmonary fibrosis in Ontario.

Methods: We conducted a return on investment (ROI) analysis to evaluate the benefits of investment in provincial coverage of SOT and PR for PF patients in comparison to the current standard of care (SOC) in Ontario for a period of one year. The ROI was evaluated using a two-phase decision tree model. In the first phase, the model estimated the proportion of patients accessing the interventions under SOC and under the scenario of investment (expanded provincial coverage). The second phase involved the estimation of costs and HRQoL outcomes among patients with PF. Annual PF-related medical cost components calculated included hospitalizations, ER visits, general practitioner visits, medication use, and specialist visits. We also included productivity losses which were measured as presenteeism and absenteeism. The analysis was done from a societal perspective, but we also report results from a provincial health perspective.

Results: Investing in provincial coverage of SOT, with a 50% increase in access and coverage in Ontario, increased the number of PF patients on oxygen from 2,520 to 2,586. From a societal perspective, this corresponded to an increase of $ 280,889 in the cost of SOT. However, this increase in SOT cost was offset by a reduction in healthcare utilization costs and productivity losses by $ 1,005,611 which led to a ROI of 258%. Similarly, investing into PR, with a 20% increase in access and provincial, increased the number of PF patients on PR from 532 to 1,122. From a societal perspective, this corresponded to an increase of $ 2,792,109 in the cost of PR. This increase in intervention cost was offset by a reduction in healthcare utilization and productivity losses costs by $ 8,862,219 which led to a ROI of 217%.

Conclusion: Results of our analysis suggest that investing in improving access and coverage of SOT and PR could lead to better health outcomes and cost savings for the province. It is however important that model assumptions about the effectiveness of these interventions and the distribution of PF patients along the different model pathways of the decision tree are validated using epidemiological and administrative data in the province.

Background

Pulmonary fibrosis (PF) is a broad term for a group of progressive and irreversible lung diseases that are characterized by scarring and thickening of lung tissue which makes it harder for the lungs to expand and exchange gases, leading to shortness of breath and other respiratory problems. Survival rate can go as low as 50% after 3 years of disease onset and the disease is characterized by a continuous reduction in health-related quality of life (HRQoL). In addition to this, PF is an expensive disease with annual direct cost estimates of $13,000 and an increased demand on healthcare resource use after diagnosis. (1) In Canada, the exact number of people with PF is unknown, but it is estimated that about 30,000 people are currently living with PF and over 2,500 Canadians die of this disease annually. (2)

The standard of care (SOC) for PF patients is multifaceted: focused on managing disease symptoms and slowing progression. This includes antifibrotic medication, supplemental oxygen therapy (SOT), pulmonary rehabilitation (PR), and lung transplantation for selected patients. (3) Although medical insurance is universal, access to SOT and PR varies across Canada because eligibility for provincial coverage is defined within provincial jurisdiction. (4) In Ontario, SOT is funded by the Ontario Health Insurance Plan (OHIP) through the Assistive Devices Program (ADP), however eligibility for funding is based on medical and age-related criteria. Medically qualified (must have arterial blood concentration ≤ 55 mmHg or arterial blood concentration in the range $56 - 60$ mmHg if one of pulmonary hypertension, persistent erythrocytosis, or cor pulmonale is present) PF patients who are over 65 and resident in Ontario are typically covered 100%, while those under 65 have 75% coverage. (4, 5) PR programs on the other hand, are provided by health care centers and generally fully covered by OHIP. However, eligibility varies from center to center with core criteria being that PF patients must be mentally stable adults 18 years and older. (6-8) The facilities in Ontario can now only support about $1 - 2\%$ of patients in need of this intervention. (7)

Expanded access to SOT and PR is crucial to improving the HRQoL of PF patients. Expansion also has the potential to reduce the burden on the healthcare system in terms of reduced hospital visits, emergency room (ER) visits, and specialist visits. (9) The Canadian Pulmonary Fibrosis Foundation (CPFF) advocates for expanded access to SOT and PR for PF patients.

Objective

The Institute of Health Economics (IHE) has been engaged by Boehringer Ingelheim and the CPFF to assess the economic value of two key interventions, Supplemental Oxygen Therapy and Pulmonary rehabilitation, for pulmonary fibrosis patients in Canada. The objective of this study is to estimate the economic implications of an investment in provincial coverage and access of these interventions for patients living with pulmonary fibrosis in Ontario.

Methods

A return on investment (ROI) analysis was conducted to evaluate the benefits of an investment in expanding provincial coverage and access of SOT and PR for PF patients in comparison to the current SOC in Ontario for a period of one year. We adopted a cost of illness approach where the current annual cost of PF was estimated and compared to the projected annual cost of PF given an investment in SOT and PR coverage and access in Ontario. The ROI analysis was conducted from a societal perspective, including PF–related medical costs, SOT and PR expenses (covered by public healthcare insurance, private insurance or paid out-of-pocket by patients), productivity losses, and HRQoL. We also present results from a provincial healthcare perspective (which excludes private insurance payment, out-of-pocket costs and productivity losses).

SOT and PR have been shown to reduce healthcare resource use in patients with pulmonary diseases. (10, 11) As such, for patients on these interventions, we modelled the benefits of SOT and PR by applying a relative reduction in healthcare resource use as observed in published literature. The ROI was then calculated as the net return of investment in expanding SOT and PR coverage and access in Ontario divided by the investment (i.e., the cost of implementing the expansion).

$$ROI\ (\%) = \frac{Net\ return\ of\ investment}{Investment} * 100$$

The ROI measures the percentage gain or loss from the investment relative to its implementation cost. A positive ROI indicates net economic benefits, while a negative ROI reflects a net loss.

Although the ROI model was initially developed in Ontario, a customizable dashboard has been created to enable decision-makers to adjust province- or territory-specific inputs. This feature allows the model to be adapted and applied across other jurisdictions in Canada.

The model

The ROI was evaluated using a two-phase decision tree model. In the first phase, the model estimated the proportion of patients accessing the interventions under SOC and under the scenario of investment in coverage and access. It was assumed that the investment in SOT or PR coverage and access would lead to increased accessibility, reflected by a higher proportion of patients receiving these interventions. In the second phase, the model translated this increase to expected reductions in healthcare resource utilization and associated costs, based on evidence from the published literature. The structure and logic of the two-phase model are illustrated in Figures 1 and 2.

Figure 1 presents a decision tree model developed to evaluate patient accessibility to the interventions under two policy scenarios: the current SOC, characterized by existing levels of provincial coverage and access, and an EXPANDED scenario, in which there is an investment in both coverage and access to the interventions. The model stratifies patients with PF into a series of mutually exclusive pathways based on clinical need, prescription status, patient access to the intervention, and eligibility for provincial health insurance coverage. These pathways enable a detailed assessment of intervention uptake under each policy scenario and serve as the foundation for estimating healthcare cost savings and ROI. The same model structure is applied independently to assess accessibility for the interventions of SOT and PR.

The model reflects real-world clinical practice considerations, informed by consultations with registered respiratory therapists. It accounts for cases where patients, particularly those who may benefit from PR, do not receive prescriptions from their primary care providers, due to multiple constraints. Moreover, even when prescriptions are issued, patients may face geographic or systemic barriers that impede access to care. (12)

Model Structure: SOC Scenario

Under the SOC scenario, the model proceeds through the following stages:

- **Clinical Need for Intervention**: Patients are first assessed for clinical need for either SOT or PR. We assume that 40% of PF patients need SOT. (13) Based on expert opinion, we assume that 100% of PF patients need PR.
- **Prescription of the Intervention**: Based on discussions with registered respiratory therapists, some patients who need these interventions may not get a prescription. Specifically for PR, due to doctors' lack of awareness of existing programs, some PF patients may not get a prescription. Based on expert opinion, we assume that all patients who need SOT receive a prescription in Ontario. We also assume that 9% of PF patients who need PR get a prescription. (14)
- **Access to the Intervention**: Among those prescribed the intervention, not all patients ultimately access it. This reflects real life constraints such as availability of program facilities to serve patients with prescriptions, patient-level factors like willingness or ability to pursue treatment, and geographic location and distance to nearest program facility. (2) In Ontario, based on expert opinion, we assume that 95% of patients prescribed SOT and 90% of those prescribed PR proceed to access the prescribed intervention.
- **Eligibility for Provincial Health Insurance Coverage**: For patients who access the intervention, the model then accounts for their level of coverage under provincial health insurance plans. In the Ontario base case, we assume that 80% have full coverage, 10% have partial coverage, and 10% have no coverage.

Model Structure: EXPANDED Scenario

The lower portion of Figure 1 outlines the model structure for the EXPANDED scenario. While the overall structure remains consistent with the SOC scenario, several key modifications capture the effects of the investment:

- **Prescription of the Intervention**: Patients who would not have received a prescription under the SOC scenario are given an additional probability of receiving a prescription under the EXPANDED scenario. This reflects the impact of policy measures aimed at creating awareness of the availability of programs. As we assume that all patients that need SOT receive prescriptions in Ontario base case, there is no investment in this area. On the other hand, for PR, this additional probability is set at 20%. This indicates that 20% of patients not prescribed PR under SOC would receive a prescription as a result of the investment.
- **Access to the Intervention**: Similarly, patients who would not have accessed the intervention under SOC are given an additional probability of doing so under the EXPANDED scenario. This adjustment reflects efforts to increase clinical capacity and improve patient uptake, for example, addressing logistical barriers or enhancing service availability. In the Ontario base case, this proportion is set at 50% and 20% for SOT and PR respectively.

Figure 2 illustrates the second phase of the analytic framework for estimating costs and HRQoL outcomes among patients with PF. Annual PF-related medical cost components calculated included hospitalizations, ER visits, general practitioner visits, medication use, and specialist visits. We also included productivity losses which were measured as presenteeism and absenteeism. All costs were expressed in 2025 Canadian dollars. The framework applies to both patients who access and those who do not access the interventions, with the distinction that patients without access are at a higher risk of incurring greater costs, as documented in published literature.

The overall impact of the investment program is assessed by integrating the decision tree model from Phase I with the cost–utility framework in Phase II. Specifically, the Phase I model estimates the increased proportion of patients accessing the interventions under the EXPANDED scenario, while the Phase II model calculates the associated costs.

Figure 1: *Decision tree of how PF patients are stratified according to prescription, access and eligibility for provincial coverage*

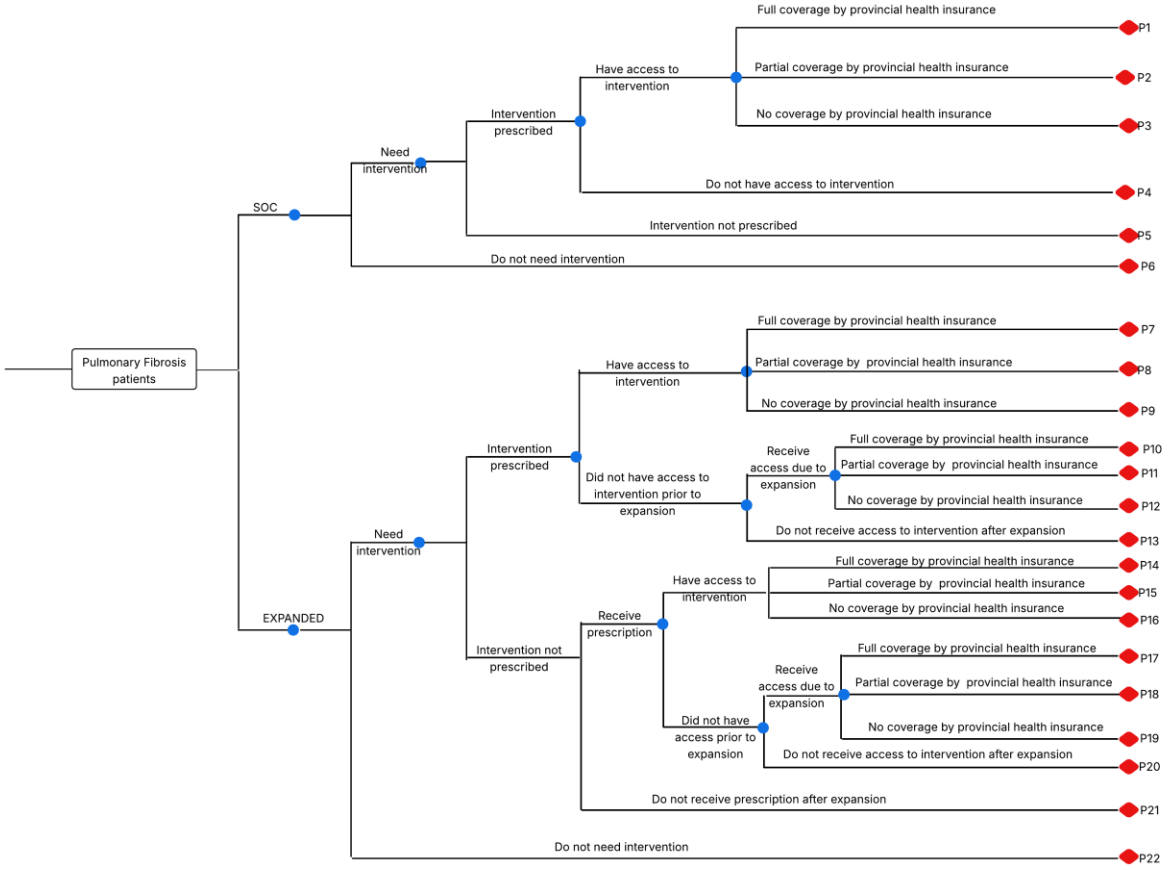
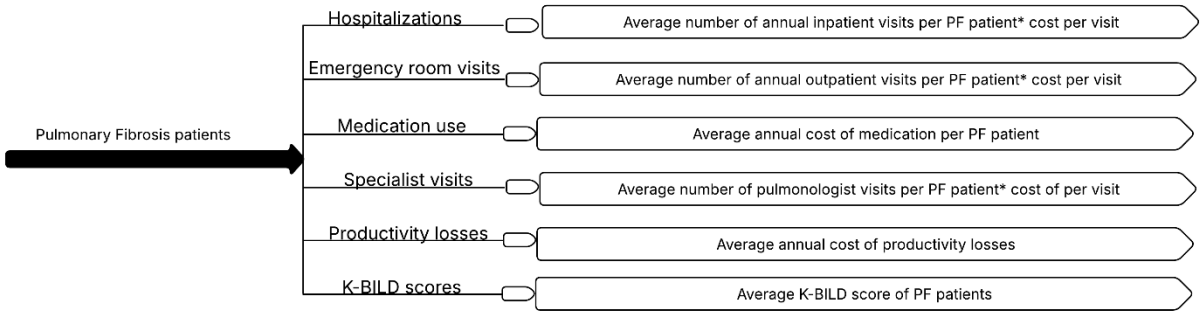


Figure 2: *Costs and quality of life for Pulmonary Fibrosis Patients.*



For PF patients on SOT or PR, the impact of these interventions on the listed outcomes is applied to the calculation of the related costs by multiplying the corresponding effectiveness.

Model inputs

The model parameters for the base case in Ontario are listed in the appendix (Table A1). The model was parameterized using a combination of data found in published literature and expert opinion. We used linear regression to predict the current number of PF cases based on a study that estimated the number of PF patients in Ontario between years 1996 to 2019. (15) Healthcare resource use and its related costs for PF patients were based on published literature. Costs of SOT was based on the annual average cost of home oxygen therapy which was calculated as the average annual tank cost (refills and rental fee). Cost of PR was based on the findings of a cross-survey of PR in Ontario. (7) Annual costs of productivity losses were based on a work productivity study on patients with idiopathic PF in the Canadian Registry for Pulmonary Fibrosis (CARE-PF).(16) We used the employment distribution of the patients on or not on SOT in the CARE-PF study to categorize patients in our model as employed or non-employed. HRQoL was based on the King's Brief Interstitial Lung Disease (KBILD) scores of PF patients in the Ambulatory Oxygen trial study. (17) KBILD is a 15-item validated HRQoL questionnaire and scores range between 0 and 100. (18) Due to the paucity of data, we used the effectiveness of SOT and PR on healthcare resource use for Chronic Obstructive Pulmonary Disorder (COPD) patients as a proxy for PF patients. We note that assumptions on model inputs are modifiable to reflect regional variation.

Model was designed to be flexible to accommodate regional variation. An interactive dashboard accompanying the report allows users to modify key parameters, thereby enabling decision-makers to assess the impact of parameter uncertainty and to adapt the model to reflect practice patterns in other provinces and territories.

Results

The results for the analysis focusing on SOT in Ontario are presented in Table 1 and Table A2. A total of 2,652 PF patients were estimated to need SOT. Of these, Only 2,520 patients were estimated to be on SOT under SOC. Investing in SOT, with a 50% increase in access and provincial coverage, increased the number of PF patients on oxygen to 2,586. From a societal perspective, this corresponded to an increase of $ 280,889 in the cost of SOT. However, this increase in SOT cost was offset by a reduction in healthcare utilization costs and productivity losses by $ 1,005,611 which led to a ROI of 258%. There was also an increase of 265 in the total K-BILD scores of patients that need SOT as a result of the investment. Similarly, results were also estimated from a provincial health care perspective, with an estimated reduction in healthcare utilization costs of $568,371, corresponding to a ROI of 131%.

The results for the base case analysis focusing on PR in Ontario are presented in Table 2 and Table A3. A total of 532 patients were estimated to be on PR under SOC. Investing in PR, with a 20% increase in access and provincial coverage, increased the number of PF patients on PR to 1,122. From a societal perspective, this corresponded to an increase of $ 2,792,109 in the cost of PR. This increase in intervention cost was offset by a reduction in healthcare utilization and productivity losses costs by $ 8,862,219 which led to a ROI of 217%. There was also an increase of 4,489 in the total K-BILD scores of patients that need PR due to the investment.

From a provincial health system perspective, the investment likewise increased PR uptake and patient HRQoL. However, the direct health system savings from reduced utilization (i.e., $2,616,397) were not offset by the additional PR expenditures (i.e., $2,792,109), resulting in a negative ROI of –6%.

Table 1: Outcomes for SOC and EXPANDED scenarios for base case analysis with a focus on SOT in Ontario

Outcome	EXPANDED	SOC	Net Benefit
Number of PF Patients Needing SOT	2,652		
Number of PF Patients on SOT	2,586	2,520	66
KBILD Scores of PF Patients Needing SOT	145,617	145,352	265
Provincial Health Perspective*			
SOT Cost ($)***	9,585,343	9,339,565	245,778
Total Cost ($)	89,116,772	89,685,143	-568,371
ROI (%)			131
Societal Perspective**			
SOT Cost ($)***	10,954,677	10,673,788	280,889
Total Cost ($)	124,955,619	125,961,231	-1,005,611
ROI (%)			258

*: SOT cost includes only the portion covered by public health insurance; Total cost represents total medical costs excluding SOT.
**: SOT cost includes both public insurance and out-of-pocket payments; Total cost represents total medical costs plus productivity losses due to PF, excluding SOT.
***: A positive Net Benefit in SOT cost indicates that the SOT cost under the Expanded scenario is higher than under SOC.

Table 2: Outcomes for SOC and EXPANDED scenarios for base case analysis with a focus on PR in Ontario

Outcome	EXPANDED	SOC	Net Benefit
Number of PF Patients Needing PR	6,631		
Number of PF Patients on PR	1,659	537	1,122
KBILD Scores of PF Patients Needing PR	344,818	340,329	4,489
Provincial Health Perspective*			
PR Cost ($)***	4,128,442	1,336,332	2,792,109
Total Cost ($)	107,414,601	110,030,998	-2,616,397
ROI (%)			-6
Societal Perspective**			
PR Cost ($)***	4,128,442	1,336,332	2,792,109
Total Cost ($)	149,364,322	159,380,579	-10,016,257
ROI (%)			259

*: PR cost includes only the portion covered by public health insurance; Total cost represents total medical costs excluding PR.
**: PR cost includes both public insurance and out-of-pocket payments; Total cost represents total medical costs plus productivity losses due to PF, excluding PR.
***: A positive Net Benefit in PR cost indicates that the PR cost under the Expanded scenario is higher than under SOC.

Discussion

Summary of findings

The findings of the economic evaluation reported here suggest that compared to the standard of care (SOC), an investment in access and coverage of SOT and PR for PF patients in Ontario would substantially increase the number of patients receiving these interventions and, consequently, improve HRQoL. Although higher intervention costs under the EXPANDED scenario were incurred due to increased uptake, there was also a reduction in healthcare utilization costs and productivity losses. From a societal perspective, this cost reduction was sufficient to offset the increased costs for both SOT and PR, yielding a positive return on investment (ROI) over a one-year period. From a provincial health perspective, however, the results differed by intervention. While investing in SOT was associated with cost savings and a positive ROI, investing in PR substantially increased uptake and improved HRQoL, but the savings from reduced healthcare utilization were not offset by the additional costs of PR leading to a negative ROI. This estimate should be interpreted with caution, as the ROI calculations based solely on direct cost offsets may understate the broader value of PR by not accounting for monetary values from quality-of-life gains and functional improvements. These findings highlight that cost savings alone should not be regarded as the sole indicator of the value of investing in PR. Moreover, the estimated savings from reduced utilization are highly dependent on the assumed effectiveness of PR in PF patients. Due to the absence of direct evidence, our analysis applied a 17% reduction in hospital readmissions observed among COPD patients discharged from hospitalization within one year of PR initiation (See Table A1). This assumption may underestimate the benefits of PR in PF, since our model did not restrict the population to hospitalized patients only. Our dashboard indicates that if PR effectiveness in PF patients increased modestly from 17% to 19%, the ROI from the health system perspective would turn positive.

Our decision tree model, primarily based on parameter values informed by expert opinion and epidemiological data where available, revealed that as a result of an investment in these interventions, 66 and 1,122 more PF patients would get on SOT and PR respectively when compared to the current standard of care. The higher percentage of patients on these interventions is associated with better health outcomes and less burden on the healthcare system. These findings reflect the expectation of interventions targeted at managing pulmonary diseases. (19)

Limitations

Due to paucity of data on PF epidemiology, intervention use and associated effectiveness, our model inputs were based on several assumptions informed by expert opinion. As such there were a few limitations of this study. First, our model assumes that PF patients on SOT and PR were on these interventions for the duration of our study period (one year). However, for SOT, eligibility, clinical need and provincial health coverage for SOT could change within a year as patients on oxygen would need to be reassessed for eligibility after the first three months. This means that model results on the number of PF patients on SOT may not be a true reflection of the current situation. Furthermore, PR programs in Canada usually last between 6-12 weeks, which means, for the most part of the study period, PF patients may not have been on the program. Nevertheless, the impact of PR has been shown to improve healthcare utilization and quality of life during the first 12 months post-program (20), as such estimates on its impact on healthcare utilization would not be too far

from what is expected. Second, our model uses the effectiveness of SOT and PR on healthcare resource utilization for chronic obstructive pulmonary disease (COPD) patients. This assumption may possibly be an over-estimation as PF progresses faster and is often associated with worse prognosis than COPD. (21) Finally, the cost of SOT was based on the average annual cost of home oxygen for PF patients. This was calculated as the cost of oxygen tank rental plus the cost of refills (an average of 8 refills per month). As there as many types of oxygen requirements for PF patients, this may not accurately capture the reality faced by PF patients. Furthermore, some provincial health insurance plans may provide a fixed amount for oxygen supply regardless of specific patient needs.

Conclusion

Results of our analysis suggest that investing into improving access and provincial coverage of SOT and PR could lead to better health outcomes and cost savings for the province. It is however important that model assumptions about the effectiveness of these interventions and the distribution of PF patients along the different model pathways are validated using epidemiological and administrative data in the province. Although PF is a progressive disease with no cure, it is vital that patients receive their needed oxygen requirements and access pulmonary rehabilitation programs to improve their quality of life and help manage disease progression.

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Appendix

Table A1: Model input parameters

Parameter	Value	Source
Disease prevalence		
Number of PF patients in Ontario	6,631	(15)
Decision tree probabilities (%)		
Percentage of PF patients that need SOT	40	(13)
Percentage of PF patients that need pulmonary rehabilitation	100	Expert opinion
Percentage of PF patients that are prescribed to be on SOT	100	Expert opinion, (22)
Percentage of PF patients that are prescribed to go on PR	9	(14)
Percentage of PF patients that are prescribed SOT and have access to it	95	Expert opinion
Percentage of PF patients that are prescribed PR and have access to it	90	(7) Expert opinion
Percentage of PF patients that have access to SOT and are fully covered by provincial health insurance	80	Expert opinion
Percentage of PF patients that have access to SOT and are partially covered by provincial health insurance	10	Expert opinion
Percentage of PF patients that have access to SOT and are not covered by provincial health insurance	10	Expert opinion
Percentage of PF patients that have access to PR and are fully covered by provincial health insurance	100	Expert opinion
Percentage of PF patients that have access to PR and are partially covered by provincial health insurance	0	Expert opinion
Percentage of PF patients that have access to PR and are not covered by provincial health insurance	0	Expert opinion
Healthcare resource use		
Number of hospitalizations per year	0.69	(1)
Number of ED visits per year	1.7	(1)
Number of primary doctor visits per year	10.9	(1)
Number of specialist visits per year	11	(1)
Effectiveness (%)		
Effectiveness of SOT on reducing hospitalizations	62.5	Expert opinion, (23)
Effectiveness of SOT on reducing ED visits (%)	62.5	Expert opinion, (23)
Effectiveness of SOT on reducing primary doctor visits (%)	62.5	Expert opinion, (23)

Effectiveness of SOT on reducing specialist visits (%)	62.5	Expert opinion, (23)
Effectiveness of PR on reducing hospitalizations (%)	17	(24)
Effectiveness of PR on reducing ED visits (%)	17	(24)
Effectiveness of PR on reducing primary doctor visits (%)	17	(24)
Effectiveness of PR on reducing specialist visits (%)	17	(24)
Costs ($)		
Cost per hospital visit	12,633	(1)
Cost per ER visit	376	(1)
Cost per primary doctor visit	87	(25)
Cost per specialist visit	310	(25)
Cost of SOT per year	11,960	Expert opinion
Cost of PR per year	2,488	(7)
Cost of medication per year	3,068	(1)
Productivity losses for PF patients on SOT	29,874	(16)
Productivity losses for PF patients not on SOT	11,816	(16)
Quality of life		
K-BILD scores for PF patients on SOT	55.5 (13.8)	(17)
K-BILD scores for PF patients not on SOT	51.8 (13.6)	(17)
Percentage of PF patients on intervention that are employed	11.7	(16)
Percentage of PF patients not on intervention that are employed	26.7	(16)

Table A2: Extended outcomes for SOC and EXPANDED for SOT in Ontario

Outcome	EXPANDED	SOC	Net Benefit
Patient			
Number of PF Patients Needing SOT	2,652	2,652	
Number of PF Patients on SOT	2,586	2,520	66
Number of PF Patients Fully Covered by Public Insurance	2,069	2,016	53
Number of Patients Partially Covered by Public Insurance	259	252	7
Number of Patients Not Covered by Public Insurance	259	252	7
Healthcare Utilization			
Number of Hospitalizations	3,460	3,489	-29
Number of GP Visits	54,660	55,112	-452
Number of ER Visits	8,525	8,595	-70
Number of Specialist Visits	55,162	55,618	-456
Cost			
Cost of Hospitalization ($)	43,711,932	44,073,188	-361,256
Cost of GP Visits ($)	4,755,434	4,794,735	-39,301
Cost of ER Visits ($)	3,205,392	3,231,883	-26,491
Cost of specialist Visits ($)	17,100,106	17,241,429	-141,323

Outcome	EXPANDED	SOC	Net Benefit
Productivity Losses ($)	35,838,847	36,276,088	-437,241
Cost of Medication ($)	20,343,908	20,343,908	0
Total Cost Excluding SOT (Societal Perspective) ($)	124,955,619	125,961,231	-1,005,611
Total Cost Excluding SOT (Provincial Health Perspective) ($)	89,116,772	89,685,143	-568,371
SOT Cost			
SOT Cost by Public Insurance and Patient ($)	10,954,677	10,673,788	280,889
SOT Cost Covered by Public Insurance ($)	9,585,343	9,339,565	245,778
SOT Cost Paid by Patient ($)	1,369,335	1,334,224	35,111
Benefit and ROI			
KBILD Scores of PF Patients Needing SOT	145,617	145,352	265
Net Benefit (Societal Perspective) ($)			1,005,611
Net Benefit (Provincial Health Perspective) ($)			568,371
ROI (Societal Perspective) (%)			258
ROI (Provincial Health Perspective) (%)			131

Table A3: Extended outcomes for SOC and EXPANDED with for PR in Ontario

Outcome	EXPANDED	SOC	Net Benefit
Patient			
Number of PF Patients Needing PR	6,631	6,631	
Number of PF Patients on PR	1,659	537	1,122
Number of PF Patients Fully Covered by Public Insurance	1,659	537	1,122
Number of Patients Partially Covered by Public Insurance	0	0	0
Number of Patients Not Covered by Public Insurance	0	0	0
Healthcare Utilization			
Number of Hospitalizations	4,381	4,512	-132
Number of GP Visits	69,203	71,283	-2,079
Number of ER Visits	10,793	11,117	-324
Number of Specialist Visits	69,838	71,937	-2,099
Cost			
Cost of Hospitalization ($)	55,342,005	57,004,983	-1,662,978
Cost of GP Visits ($)	6,020,673	6,201,589	-180,916
Cost of ER Visits ($)	4,058,225	4,180,171	-121,946
Cost of specialist Visits ($)	21,649,790	22,300,347	-650,557
Productivity Losses ($)	41,949,722	49,349,581	-7,399,860
Cost of Medication ($)	20,343,908	20,343,908	0
Total Cost Excluding PR (Societal Perspective) ($)	149,364,322	159,380,579	-10,016,257
Total Cost Excluding PR (Provincial Health Perspective) ($)	107,414,601	110,030,998	-2,616,397
PR Cost			
PR Cost by Public Insurance and Patient ($)	4,128,442	1,336,332	2,792,109
PR Cost Covered by Public Insurance ($)	4,128,442	1,336,332	2,792,109
PR Cost Paid by Patient ($)	0	0	0
Benefit and ROI			
KBILD Scores of PF Patients Needing PR	344,818	340,329	4,489
Net Benefit (Societal Perspective) ($)			10,016,257
Net Benefit (Provincial Health Perspective) ($)			2,616,397
ROI (Societal Perspective) (%)			259

Outcome	EXPANDED	SOC	Net Benefit
ROI (Provincial Health Perspective) (%)			-6

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