

# **Investing in Equity: An Economic Analysis of Equity-Oriented Mobile Palliative Care Models in Canada**

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## About this report

This report was prepared by Edge Health for HEC. HEC is publishing this executive summary to share the findings.



## Executive summary

Equity-oriented mobile palliative care (EOMPC) for the purpose of this report refers to community-based program models, delivering a palliative approach to care to patients experiencing serious, chronic illness or end-of-life needs while simultaneously facing social and structural barriers to care, such as homelessness or vulnerable housing. EOMPC programs aim to improve access to care by meeting patients where they are (clinically, socially and geographically). For example, clinical teams often travel to deliver care in nontraditional settings such as shelters, supportive housing or on the street.

This study examined three EOMPC programs operating in different Canadian cities: the Palliative Outreach Resource Team (PORT) in Victoria, British Columbia; the Palliative Care Outreach and Advocacy Team (PCOAT) in Edmonton, Alberta; and Palliative Education and Care for the Homeless (PEACH) in Toronto, Ontario. While each program is implemented slightly differently, all share an equity-oriented approach, operationalized

through mobile based care outside of traditional office or hospital settings, low-barrier referrals, flexible service delivery, attention to social and structural determinants of health and a person-centred approach to care.

By improving access to a palliative approach to care in the community, EOMPC programs reduce patients' reliance on emergency healthcare services to meet their healthcare needs. Across all sites, enrollment in EOMPC was associated with a 33% reduction in emergency department attendances and a 32 percent reduction in emergency ward admissions. These reductions were consistent across provinces, indicating that the EOMPC program model is effective in different healthcare contexts.

From a healthcare system perspective, the EOMPC program model not only improves quantitative and qualitative measures of care quality, it also has the potential to deliver value-for-money.

On average, EOMPC programs cost \$861 per patient per month to operate. These costs are more than offset by avoided emergency department attendances and emergency ward admissions. After accounting for program costs, the EOMPC program model generates approximately \$9,560 in net avoided emergency healthcare costs per patient, with a net return on investment of 1.65. This means that for every \$1 invested in EOMPC programs, an additional \$1.65 in emergency healthcare costs is avoided elsewhere in the system (equivalent to avoiding a total of \$2.65 in emergency healthcare costs, before accounting for EOMPC program investment costs).

Overall, this multi-province analysis shows that by improving access to palliative approaches to care to underserved populations, the EOMPC program model improves care quality,

reduces pressure on emergency services and makes more efficient use of healthcare resources. These findings provide strong economic support for healthcare organizations and policymakers considering adopting a EOMPC program model in other jurisdictions, provided fidelity to equity-oriented approaches is maintained, as this is a key driver of care quality and economic benefits.

## Background

For the purpose of this report EOMPC is defined as a program delivery model that is equity-oriented. It is designed to deliver a palliative approach to care to underserved patients by meeting them where they are - clinically, socially and geographically. In EOMPC programs, care is provided in nontraditional settings, including shelters, supportive housing, the street. Many patients served by EOMPC programs live with significant social and structural barriers to care, including homelessness or vulnerable housing that can prevent patients from accessing palliative approaches to care. Palliative approaches to care are focused on improving quality-of-life for patients both with chronic, progressive life-limiting illnesses as well as patients at the end-of-life. In these ways it is a flexible approach to care that can be adapted to meet the needs of individuals, families and communities.

A EOMPC program model is delivered across three community-based programs included in this study: Palliative Outreach Resource Team (PORT; Victoria, BC; established 2019), Palliative Care Outreach and Advocacy Team (PCOAT; Edmonton, AB; established 2016), and Palliative Education and Care for the Homeless (PEACH; -Toronto, ON; established 2014). While each program emerged independently and implement slightly different models of care (e.g. staff mix, size, palliative criteria), all three share core principles that

define the EOMPC program approach. These principles include: low-barrier referrals, flexible service provision (including but not limited to location, duration and type of care), attention to social and structural determinants of health as part of clinical care and a person-centred approach.



## Methods

We conducted an economic evaluation to assess the EOMPC program model's economic impacts. This was conducted from a healthcare system perspective, which means that costs and benefits were accounted from the perspective of a healthcare payer (e.g. provincial government). The economic evaluation used a cost-benefit analysis, with key steps described below.

- First, we estimated the average impact of enrollment in a EOMPC program on patients' emergency department attendances and emergency ward admissions, using a random effects meta-analysis.
- Secondly, we compared emergency healthcare costs and quality-of-life for patients enrolled in an EOMPC program against "usual care" (UC - i.e. no

access to EOMPC), using a simulation model. To ensure that the findings of the simulation model were robust to different assumptions, several sensitivity analyses were undertaken.

Key measures of economic and clinical benefits included: net cost avoidance (CA – net avoided costs associated with EOMPC enrollment), Quality-Adjusted Life-Years (QALYs – a measure of health on a scale from 0 to 1, where 0 is death and 1 is a year of perfect health), net monetary benefit (NMB – net avoided costs plus the monetized value of QALY gains) and net return on investment (net ROI – ratio of net costs avoided across the healthcare system against program enrollment costs).

To contextualize the findings of the cost-benefit analysis, qualitative process reviews were also undertaken at each of the EOMPC sites. The goal of each of the site-level process reviews was to understand practically how the EOMPC program model is implemented across sites.

Overall, this multi-province economic evaluation enables us to draw generalizable findings with respect to EOMPC as an overall program delivery model with respect to implementation and potential value-for-money. These findings can be used practically by organizations across different healthcare contexts as a practical roadmap for adopting this program delivery model and supporting business case.

## Study population

Across sites, the combined study population included 405 patients enrolled in EOMPC programs.<sup>i</sup> Patients were relatively young for a palliative population, with a pooled mean age of approximately 59 years. The majority were male (62 percent). Among patients with available data, a substantial proportion (58 percent) died in the community rather than in hospital, suggesting alignment with end-of-life preferences.

## Healthcare utilization

Across sites, enrollment in mobile palliative care was associated with substantial and statistically significant reductions in emergency healthcare use.

EOMPC enrollment reduced the risk of emergency department attendances<sup>ii</sup> by approximately 33 percent (relative risk = 0.67; logit coefficient = -0.523 [95% CI: -0.830, -0.215]) and reduced the risk of emergency ward admissions<sup>iii</sup> by approximately 32 percent (relative risk = 0.68; logit coefficient = -0.552 [95 percent CI: -0.775, -0.329]). Reductions in ambulance transportation to the emergency department were observed but did not reach statistical significance (relative risk = 0.87; logit<sup>iv</sup> coefficient = -0.256 [95 percent CI: -0.593, 0.082]). No statistically significant change in emergency ward admission cost was detected (cost multiplier = 0.86; logcost- coefficient =

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<sup>i</sup> Only pre-aggregated data from site-level reports was pooled, in compliance with each site's data security requirements.

<sup>ii</sup> Emergency department visits (via ambulance or not) are referred to as "emergency department attendances" throughout this report. These are collected by the Canadian Institute for Health Information (CIHI's) National Ambulatory Care Reporting System (NACRS) and align with the emergency department attendance data collection standards defined by CIHI.

<sup>iii</sup> Inpatients hospital admissions where the method of admission was via the emergency department (rather than planned) are referred to as "emergency ward admissions" throughout this report. These are collected by CIHI's Discharge Abstract Database (DAD) and align with data collection standards defined by CIHI.

-0.154 [95 percent CI: -0.428, 0.120]). Despite variation across sites, the pooled multi-province estimates indicate that EOMPC consistently reduced reliance on emergency department visits and hospital admissions across jurisdictions.

## Program costs

The multi-province average cost per patient per month (CPPM) across all three sites was \$861. This represents the mean of site-specific CPPMs. Site-specific annual program expenditure details are presented in the individual site-level reports.

## Cost-benefit results

From a public healthcare payer perspective, the EOMPC program model generated substantial economic benefits. The base-case scenario utilizes the average EOMPC program cost per patient per month since inception, modelling two states (enrollment in the program and death). This conservatively assumes that no patients are discharged from the palliative pathway.

In the base-case scenario, program costs were not only offset by avoided emergency department visits and hospital admissions but avoided costs for the healthcare system as a whole. After accounting for program costs, the EOMPC program model results in \$9,561 in net avoided costs per patient (UC: \$36,005 vs EOMPC: \$26,444)<sup>v</sup> and a positive net return on investment of 1.65.<sup>vi</sup> This is equivalent to a gross ROI of 2.65 (so a gross emergency healthcare use cost avoidance of \$15,362). This means that per \$1 invested in EOMPC, the costs associated with this program model are not only covered, but an additional \$1.65 in

emergency healthcare costs are avoided in the wider healthcare system. In addition to direct cost avoidance, the EOMPC also likely increases QALYs for patients (an average QALY gain of .1 per patient), reflecting improvements in patients' quality of life when they are able to access a palliative approach to care.

When cost avoidance and health gains were combined, the resulting net monetary benefit was even more favourable (\$14,737 at a willingness-to-pay per QALY threshold of \$50,000 CAD). Sensitivity analyses conducted on our simulation modelling also indicated a very high likelihood that the program is economically favourable across different assumptions, time horizons, and staffing configurations.

## Methodological considerations

While this analysis uses standard cost-effectiveness methodology employing QALYs as the primary measure of patient clinical benefits, it is important to note that QALYs may not fully capture the value of palliative care. The palliative care literature documents that 'quality of death' encompasses dimensions not fully reflected in conventional quality of life measures, including dignity, autonomy, pain management and alignment with end-of-life preferences.<sup>1</sup>

Therefore, QALYs measured in this analysis should be considered a conservative estimate of patient clinical benefit. Other measures of patient benefits have been characterized in detail in previously published literature on this model of care's benefits across EOMPC sites.

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<sup>v</sup> EOMPC costs include the cost of program delivery.

<sup>vi</sup> This is equivalent to a gross ROI of 2.65 (so a gross emergency healthcare use cost avoidance of \$15,362).

More details on assumptions and limitations are outlined in the appendix.

## Conclusions

Taken together, this multi-province analysis provides strong economic evidence in support of the EOMPC program model for underserved populations. While the process evaluation demonstrates that there is some flexibility in implementation approach (e.g. staff, size, palliative criteria), all EOMPC sites converge on a core equity-oriented program model in response to a shared service gap for patients experiencing homelessness or vulnerable housing.

This report demonstrates that the equity-orientation of the EOMPC program model is core to its success in reducing reliance on emergency healthcare, improving patient quality of life, and delivering net economic benefits to the healthcare system. Therefore,

fidelity to an equity-oriented approach is essential for policy-makers looking replicate economic findings in other jurisdictions.

Overall, this report provides strong evidence that the EOMPC program model is a high-value investment for health systems seeking to improve equity and quality of care while simultaneously making efficient use of healthcare resources.

Learn more about our work to improve equity in access to palliative care.

[Improving Equity in Access to Palliative Care >](#)

## References

- 1 Seow H, Bainbridge D, Brouwers M, Bryant D, Tan Toyofuku S, Kelley ML. Common care practices among effective community-based specialist palliative care teams: a qualitative study. *BMJ Supportive & Palliative Care*. 2016;10(1), e3. doi:10.1136/bmjspcare-2016-001221

# Appendix

## Strengths

This study has several methodological strengths. We discuss key points related to the multi-provincial results here.

Firstly, pooling results<sup>vii</sup> across three distinct EOMPC sites, operating in different provinces and slightly different implementation approaches (but all with the same underlying philosophy of care) increases the generalizability of our findings.

Secondly, in each of the site-level reports consistent methodology was used to estimate the impact of program enrollment on emergency healthcare use. These were then aggregated using a random effects meta-analysis. While the findings of the random effects meta-analysis should be treated with caution, given the relatively small number of sites included, it does, in-theory, enable us to appropriately account for between-site heterogeneity. This, in turn, enables us to calculate program impacts that are generalizable to other organizations looking to adopt this model of care.

Finally, the main cost-benefit analysis utilizes a robust simulation model design which demonstrates that the cost-benefit conclusions are robust to alternative model structures and input parameters. In fact, as outlined in detail in section 9.3.2, the primary model specification is the most conservative estimate of program benefits across sensitivity analyses, providing an even stronger justification for the economic benefits of this model of care.

## Methods

Several limitations should be considered when interpreting these results. We discuss key points related to the multi-provincial findings here.

Firstly, this analysis uses aggregates of summary statistics from each site, rather than conducting patient-level pooling. In other words, the multi-provincial estimates were produced by combining summary statistics (e.g., average costs, event probabilities) from each site, rather than pooling all individual patient records into a single dataset and re-running the analysis. This is a pragmatic design choice as patient-level data cannot leave each site's secure environment due to privacy and data governance requirements. However, it means the multi-provincial model cannot capture patient-level variation (e.g., how outcomes differ by age) that would be visible in a pooled individual-level analysis. In practice, this may slightly understate the uncertainty around multi-provincial estimates, since the within-site spread of individual outcomes is summarized before aggregation. However, this caveat is minor and does not meaningfully change the overall interpretation of multi-provincial findings.

Secondly, there were differences between sites in data availability. For example, data collection methods varied: some sites have province-wide linked health records while others had hospital-level data. Furthermore, the sample size available from the PCOAT site was much larger than for PORT or PEACH,

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<sup>vii</sup> Note that only aggregated results were pooled, due to data security/data sharing requirements. See limitations section for further details.

mainly for data quality reasons. Therefore, results may be skewed to reflect PCOAT's population and impact, and less weighted towards other sites. However, site-level data analyses found similar results across sites, and so this is not anticipated to materially impact the broader applicability of cost-benefit analysis findings.

Thirdly, there are also differences between sites in implementation, which can affect site-level results. The programs themselves, while sharing a common philosophy towards implementing a palliative approach to care, differ in patient reach, staffing models, and duration of operation.

These differences are a strength in that they reflect real-world variation, but they also mean that the "EOMPC average" blends meaningfully different contexts. When translating these results to other contexts (e.g. new sites looking to implement this model of care), it is important to keep in mind that site-level results will vary and may not be exactly equivalent to the calculated "EOMPC average impact" presented in this report.

Finally, it is important to caveat the representativeness of the three included sites. The three sites provide valuable multi-provincial evidence but cannot capture the full diversity of settings where similar programs might be implemented, such as rural or remote communities. Organizations considering adopting this program delivery model should assess how closely their local context aligns with the characteristics of the included sites.

# Acknowledgments

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## **Palliative Education and Care for the Homeless (PEACH), Toronto, Ontario**

We gratefully acknowledge the support of both Inner City Health Associates (ICHA) and Unity Health. Specifically, data on PEACH program enrollment was extracted by ICHA's decision support team. Data on PEACH patient emergency department and ward admissions at Unity Health, St. Michael's Hospital was extracted by Unity Health's decision support team.

We would also like to thank the PEACH staff members who participated in the qualitative process review.

## **Palliative Care Outreach and Advocacy Team (PCOAT), Edmonton, Alberta**

We gratefully acknowledge the Palliative Care Outreach and Advocacy Team. Data was extracted from the Alberta Health Services Enterprise Data Warehouse with support provided by the Alberta Strategy for Patient Oriented Research Support Unit (AbSPORU) which is funded by CIHR, Alberta Innovates, University Hospital Foundation, University of Alberta, University of Calgary and Alberta Health Services. This study is based in part on data provided by Alberta Health and Alberta Health Services. The interpretation and conclusions contained herein are those of the researchers and neither the Government of Alberta nor Alberta Health Services expressed any opinion in relation to this study.

We would also like to thank the staff members who participated in the qualitative process review.

## **Palliative Outreach Resource Team (PORT), Victoria, British Columbia**

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