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Spread, participant experience, and implementation of Pallium Canada's Palliative Care ECHO project: a mixed methods study

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Abstract

Background Pallium Canada's Palliative Care Extension for Community (ECHO) Project (PC ECHO) is a five-year national initiative (launched April 2021) to support continuous professional development and to facilitate the integration of palliative care across different care settings. PC ECHO includes a superhub (Pallium Canada) and several partner hubs. The goal of this formative evaluation study is to explore the project's early spread and the experiences of hub partners and participants from April 2021 to September 2023.

Methods A mixed-methods approach was used. Webinar and participant demographic information was collected by Pallium Canada's online learning management system and by partner hubs. Participants' experience feedback was collected through a standardized online evaluation form. Project leads at the superhub and three inaugural partners were interviewed and transcriptions subjected to a thematic analysis.

Results A total of 301 sessions were delivered during the study period; 155 (51%) by Pallium Canada and 146 (49%) by nine partner hubs. Of these, 125 (42%) were *standalone*-type sessions and 176 (58%) were community of practice (COP)- or series-type sessions. A total of 7648 individuals – representing over 17 professions – participated across the 301 sessions; the nursing professions were the largest group (36.8%). There was a total of 17,467 participations across the 301 sessions, with participants from across Canada and 31% from rural or small population centres. 5105 evaluations of sessions were received (response rate 29%). Of these, 90% stated they "Agreed" or "Strongly Agreed" that the sessions were good learning experiences, and 93% indicated that they would recommend the session

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to colleagues. Project strengths and facilitators included accelerating partners' palliative care mandates, increased connections to other partners and resources, flexibility with the ECHO model, and funding received.

Conclusion The intended outcomes of the PC ECHO Project are materializing, including utility for participants and helping partner hubs accelerate their palliative care mandates. There is evidence of significant spread, over a relatively short period of time. Future studies should include further exploration of the respective roles and impact of different session types (standalone versus communities of practice and series) and impact at higher patient and health system levels.

Keywords Palliative care, Education, Interprofessional care

Background

In 2014, the World Health Assembly, the decision-making body of the World Health Organization, passed a resolution calling on all member states to ensure access to palliative care for their citizens [1]. While specialist palliative care services with clinicians and staff with advanced training and skills in palliative care are needed, the palliative care needs of a population cannot be addressed only by these specialized services. All health care professionals who care for patients with serious illnesses should have core competencies to allow them to provide what is referred to as a "palliative care approach" [2–5]. This requires palliative care education across the career continuum for health professions [1, 6]. A growing body of evidence demonstrates the positive impact of this education on health care providers, patients and families, and the health care system [7–11].

A number of continuing professional palliative care education initiatives have been described internationally, including some at national levels [12–14]. These include adoptions and adaptations of the Extension for Community Healthcare Outcomes (ECHO) approach [12].

Project ECHO, first developed in 2003 at the University of New Mexico (UNM), is a tele-mentoring program designed to link health care providers with clinical experts and educators in different clinical fields using videoconference technology [15, 16]. It nurtures virtual learning communities that support knowledge exchange among experts and peers. In its original form, practitioners present patient case histories – deidentified to ensure patient anonymity – to experts and these cases provide just-in-time learning opportunities for participants. In the absence of real cases, other learning approaches such as problem- or case-based learning are applied. High levels of interaction and discussion are a key component of ECHO sessions. The Global ECHO program is a collaborative of all the ECHO projects across the world that is overseen by the UNM ECHO program which provides support and undertakes quality assurance.

ECHO and ECHO-like models have been applied to a variety of diseases, health conditions and care settings [17–19]. These include primary care, pediatrics, cancer care, infections disease and HIV/AIDS, geriatrics care and dementia, long term care, mental health, neurological diseases, pain management opioid misuse disorder, COVID-19 responses and renal care, among others. Numerous palliative care-related ECHO projects have evolved across the world [8–12, 15, 16, 18, 20–29].

There is a growing literature base on the evaluation of ECHO programs. A systematic review by Zhou et al. concluded that "Project ECHO is an effective and potentially cost-saving model that increases participant knowledge and patient access to health care in remote locations, but further research examining its efficacy is needed" [30]. More recently, Osie-Twum et al. identified emerging evidence of its effectiveness as a tele-education model that improves patient health outcomes and has the potential to positively impact community health [31]. A systematic review of ECHO use in cancer care found evidence of changes in provider practices [11].

An ECHO Superhub is an experienced ECHO partner that has been authorized by the Global ECHO Program to recruit, train, and support new partners to establish their own ECHO hubs. There now exist about 33 ECHO Superhubs across the world. Superhubs provide outreach support and training, ongoing support and quality assurance. Superhubs also function to ensure fidelity to the ECHO model and support to facilitate the sharing of resources and research among the larger ECHO community.

Pallium Canada, a Canadian foundation established in 2000 with the mission of building primary and generalist level palliative care across Canada, established a palliative care ECHO program in April 2021 [12]. The project aims to increase access to palliative care continuing professional development opportunities across different settings and professions and complement its *Learning Essential Approaches to Palliative Care* (LEAP) education program [9, 32]. Pallium Canada's ECHO project (PC ECHO) uses a 'hub and spoke' model with two major streams. In the first stream, Pallium Canada itself (*Pallium-delivered*) delivers ECHO sessions, while in the second stream ECHO sessions are delivered by partner hubs that Pallium Canada has helped establish and is supporting (*Partner-delivered*). Webinar sessions are

presented through the Zoom™ platform. Sessions usually consist of a panel of two to four experts who share their insights and experiences on a topic, although some sessions involve one facilitator. A case-based approach is promoted and interaction among participants and facilitators or panelists is done through unmuting and speaking up, raising a virtual hand or posting a question in the Question/Answer or Chat functions of the platform.

The goal of this formative evaluation study is to explore the overall spread and early implementation of the program, with the goal of informing ongoing improvement.

Methods

A mixed methods formative evaluation study was done using archived data collected by Pallium Canada and qualitative interviews with key informants. The study period was April 2021 (project initiation) to 30 September 2023 (study end). All available data collected during this 29-month period were included in the analyses. The study was informed by Pallium Canada's Education Evaluation Research Framework [33]. The framework incorporates the Kirkpatrick New World Model to assess impact and the Consolidated Framework for Implementation Research (CFIR) to implementation evaluation.

Two categories of PC ECHO sessions are offered by Pallium Canada and its partners: *standalone sessions*, and *Community of Practice (CoP)* or *Series sessions (CoP/Series).* The former are individual sessions that cover a specific topic, while the latter are groupings of sessions that address a specific theme. The sessions are recorded and made available openly on a project YouTube for registrants and any others who wish to view them (see Archive at https://www.youtube.com/user/palliumcanada).

Quantitative data, routinely collected by Pallium Canada through its online learning management systems (LMS) and by its partner hubs, include ECHO session numbers, participant registrations with basic demographic data such as profession, participant sign-on into the live sessions, and session evaluations submitted by participants. We divided the hub partners into two groups; an inaugural group (Phase 1) of three partners who were part of the initial set up and the delivery of sessions in the first year, and a group of six partners who joined in Phase 2 of the project.

A standardized participant evaluation form was adapted from Pallium Canada's standardized evaluation form for its Learning Essential Approaches to Palliative Care (LEAP) courseware program [53]. Some additional items were added by the team that relate more specifically to the ECHO program. Participants in sessions were invited by an automatically generated invitation from the LMS to complete an evaluation post-session as part of the quality assurance process. The data were stored in the REDCap™ database and later transferred to an Excel™ spreadsheet by the Pallium Canada information technology (IT) support team who deidentified the data before passing it on to the research team for analyses. Each registrant was allocated a unique identifier; the key is maintained by the IT team.

The post-session evaluation form covers different aspects of the learner experience and consists of two parts; Part 1 has 8 statements using Likert scale responses (where 1= "Totally Disagree" and 5= "Totally Agree") and Part 2 includes several open-ended questions exploring participant experiences and suggestions for future learning and improvements. For the purposes of this study, we focussed on the following four statements: (a) *Overall, this ECHO session was a good learning experience; (b) This ECHO session was relevant to my practice; (c) The Overall Format of the Session was useful; and* (d) *I would recommend this session to my colleagues.* The latter is referred to as the Net Promoter Score and is generally used in industry as an important indicator of the quality of a product as rated by users [34]. The four items were selected as these were deemed the most pertinent from an overall quality improvement perspective. The number of recorded sessions viewed and downloaded after the initial presentation used data captured by Pallium's YouTube account.

Qualitative data were collected through key informant interviews. Key informants were the project leads and managers of the Superhub (Pallium Canada) and three inaugural partners identified through purposive sampling. Interviews were conducted between December 2022 to March 2023. The interviews explored the experiences of informants and their hubs and sessions related to the *implementation* of the project. A team of experienced interviewers (CAK, LMM) conducted the interviews using an interview guide. Topics explored included facilitators and barriers to developing the hubs and delivering sessions and areas that worked well as well as opportunities for improvement, specifically to support developing Phase 2. Interviews were audio-recorded with consent, transcribed verbatim, anonymized, and uploaded to NVivo 2020™ for data management and analysis support.

Data analysis

Descriptive statistics were generated for the quantitative data using MSExcel™. The five Likert responses were merged into three categories; "Strongly Agree" and "Agree" into one category, "Neutral" remained as a separate category, and "Disagree" and "Strongly Disagree" into one single category. Data related to session evaluations by different profession groups were analyzed in SPSS software (IBM SPSS Statistics version 28™), treated as having non-parametric distributions and analyzed using Chi squared (X^2) tests to identify differences across

professions. Significance level was set *a priori* at $p = 0.05$ (two tailed).

The qualitative data were analyzed by two researchers (AR and LMM) using a thematic analysis approach [35]. Themes were identified inductively by consensus. Topics were identified and then grouped to reflect similar topics and feedback. Qualitative rigour was supported through established techniques including bracketing, reflexivity, and verification [36].

The Hamilton Integrated Research Ethics Board exempted the study as it was considered quality improvement for quality improvement (QI) work.

Results

Quantitative data: spread and nature of ECHO PC

A total of 301 webinar sessions were delivered during the study period (April 2021 to September 2023) (See Table 1). Of these, 155 (51%) were organized and delivered by Pallium Canada's Superhub, 41 (14%) by the three inaugural hubs and 105 (35%) by Phase 2 partner hubs. Of all the sessions delivered, 125 (42%) were *Standalone* sessions and 176 (58%) were *CoPs or Series* sessions. Two-hundred-and-sixty-seven (89%) of sessions were delivered in English, and 34 (11%) in French.

A total of 7648 individuals participated in one or more sessions during the study period; these accounted for 17,467 participations (or learner encounters). Of these learner encounters, 11,275 (64.5%) were in standalone sessions. On average, one in three people (33%) who registered for the sessions attended the live webinar sessions, although many others later downloaded the recorded sessions. The participation to registration rates were higher amongst the hub partners (46% and 40% respectively for the Phase 1 and Phase 2 partners) than Pallium Canada-delivered sessions (29%). Overall, the mean number of sessions that participants participated in was 2.3 as many individuals participated in more than one session. See Table 2 for participant demographics.

Of the individuals who participated in the sessions, 54% (3345) were in large urban population centres (100,000 inhabitants or more), 19% and 13% respectively were located in small population centres (1,000 to 29,000 inhabitants) and rural areas (communities of fewer than 1,000 in habitants) respectively, and 166 individuals (3%) were outside of Canada (United States, Europe, Asia, Africa, Middle East and Australia). See Fig. 1.

The median number of participants per webinar session across all 301 sessions was 34 (range 1 to 748. Overall, the median number of participants in each standalone session was 44 (range 1-748) and 27.5 for the CoPs/Series (range 4 to 204). The PC ECHO sessions covered over 50 topics, such as identifying patients with palliative care needs early across different illnesses and integrating palliative care in non-cancer illnesses and long-term care. Sessions also addressed a public health approach to palliative care and mobilizing communities, palliative care for Indigenous populations, the needs of vulnerably housed people, racism and equity-diversity-inclusion, culturally appropriate care, self care of health care professionals, and the integration of palliative care in long term care. There were also topics related to the COVID-19 pandemic response as the first phase of the project was undertaken during the pandemic. Over seventy content experts and panelists participated across the sessions.

Table 1 PC ECHO project sessions types and numbers

Provider	ECHO Sessions Total (% of all ECHO sessions)	ECHO Sessions by Type			
		Standalone* Sessions		Community of Practice (CoP) or Series Sessions**	
		Number (*n*)	Language Eng/Fre	Number (*n*)	Language Eng/Fre
Pallium Canada	**155 (51%)**	**52**	**43/9**	**103**	**95/8**
Phase 1 Hubs Partners					
Partner 1	11	0	-	11	8/3
Partner 2	11	11	11/0	0	-
Partner 3	19	2	2/0	17	17/0
Sub-total	**41 (14%)**	**13**	**13/0**	**28**	**25/3**
Phase 2 Hub Partners* **	**105 (35%)**	**60**	**51/9**	**45**	**40/5**
TOTAL	**301 (100%)**	**125 (42%)**	**107/18**	**176 (58%)**	**160/16**

Period: 1 April 2021 to 30 September 2023

PC = Palliative Care, Eng = English; Fre = French

*Standalone sessions: sessions that are independent of others. They are not repeated (Recordings available for viewing)

**Community of Practice (CoP) and Series: A group of sessions that cover a common theme (e.g., palliative care in heart disease). CoPs tend to over time and generally retain a core group of members throughout. Series refers to a group of 2 to 5 sessions that relate to a certain theme and this group of sessions is repeated (or planned to be repeated)

*** Represents 6 additional partners that joined in Phase 2

Table 2 Demographics of 17,467 learner encounters (participations) across the ECHO sessions

Profession groups	***n***	**%**
Registered Nurses (RN)	4626	**30%**
Other	2088	**13%**
Physicians CFPC	1848	**12%**
Social Worker	1158	**7%**
Administrator	1134	**7%**
Nurse Practitioner (NP/IP)	993	**6%**
Practical Nurses (LPN/RPN/IAA)	979	**6%**
Allied Health	576	**4%**
Support Workers	525	**3%**
Caregivers	330	**2%**
Physician - RC	320	**2%**
Spiritual Care	260	**2%**
Paramedic	235	**2%**
Pharmacist	220	**1%**
Student	162	**1%**
Registered Psychiatric Nurse	82	**1%**
Physician - Resident	53	**0%**
Total*	**15,589**	**100%**
Self-identified gender	**n**	**%**
Female	12,561	**87%**
Male	1450	**10%**
Prefer not to answer	456	**3%**
Gender Diverse	38	**0%**
Total*	**14,505**	**100%**
Location	**n**	**%**
Ontario	5498	**33%**
Quebec	4983	**30%**
British Columbia	2298	**14%**
Alberta	959	**6%**
Nova Scotia	521	**3%**
Saskatchewan	461	**3%**
Other	455	**3%**
New Brunswick	450	**3%**
Newfoundland and Labrador	334	**2%**
Manitoba	246	**1%**
Prince Edward Island	100	**1%**
Yukon	98	**1%**
Northwest Territories	26	**0%**
Nunavut	7	**0%**
Total*	**16,436**	**100%**

Period: April 2021 to 30 Sept 2023

*The sub-totals do not add up to 17,467 because some hubs did not provide information, some participants did not provide consent to have their information analyzed, and some entries had missing data

**Participants sometimes participated in more than one hub

Participant experience: participant evaluations

Data on participant evaluations of the sessions were available for 261 of the 301 (87%) sessions delivered; evaluation data was not provided by partner hubs in the case of 40 sessions. The response rates varied across the hubs and types of sessions. Overall, across all sessions, 5105 (29.2%) of participations provided an evaluation. The overall response rate for the standalone sessions was 32.7% and 22.8% for the CoPs/Series. The lowest and highest response rates were 3% and 45% respectively across the hubs.

The results are shown in Table 3. In response to the statement "*Overall, session was a good learning experience*," 96% and 95% of all respondents (professions combined) rated the standalone sessions and the CoPs/Series respectively as "Strongly Agree" or "Agree". Similar response patterns were noted for relevancy to practice, the net promotor score (recommend sessions to colleagues) and overall session format. Ratings were high across the professions, although statistical differences were found for all the statements except for "Overall, the session was a good learning experience." Fewer personal support workers rated "Agree" or "Strongly agree" to the net promotor statement; 67% for the Standalone sessions and 87% for the CoPS/Series.

Qualitative data: participant experiences: key informant interviews

Five initial hub (identified as 'H' participant) and Superhub (identified as 'S' participant) partners participated in key informant interviews.

Impact

Both initial Hub and Superhub partners reported positive impact and value added of PC ECHO. Pallium Canada, as the Superhub, provides program content and options for delivery of the content. The Superhub provides national sessions through video conferencing technology; the Hubs provide sessions tailored to their specific audience in the same way. Other Project programming that became available during the study period were the bi-monthly *Palliative Care Journal Watch* (through webinars, recordings and adaptation into podcasts) and the *Palliative Care ECHO Project Newsletter* as a further resource/communication avenue.

Analysis focusing on the *Impact* identified three themes:

- Program content and delivery.
- Connection and contact with other PC ECHO members.
- Improved stakeholder relations.

Program content and delivery

The complementary nature of PC ECHO and Hub partners' goals were illustrated across Hub partners in their accomplishments approximately a year and a half after recruitment into the Project. H1 noted a strong match with the mandates of their organization. including knowledge and education. H1 also noted that becoming a

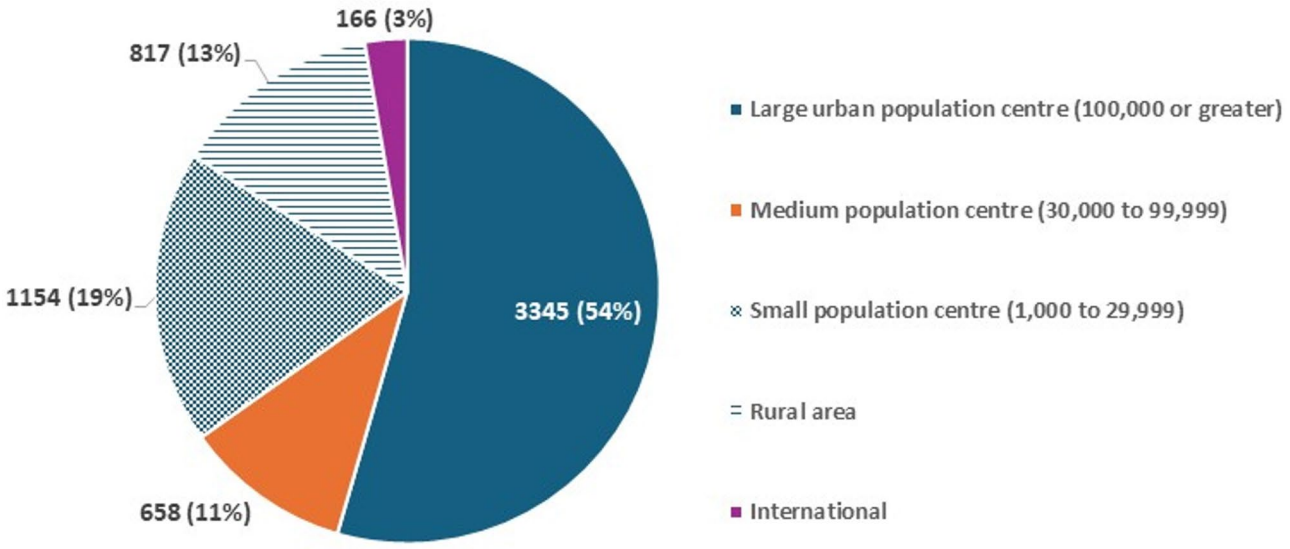

Fig. 1 Geographic locations by center size of individuals who participated in Pallium Canada's ECHO Project webinars

Hub partner and accessing PC ECHO educational materials and guidance has had an important impact:

> *"... one of the four pillars of the [organization's] mandate and raison d'être, is knowledge and education, but we also support leadership and advocacy." [H1]*

Connections and contact

Superhub and Hub partner representatives agreed that the connections made added to their capacity to advance palliative care, within their respective organizations. Benefits were also reported through interaction with organizations that participated in PC ECHO sessions but weren't solely focused on palliative care, and across the country through national PC ECHO sessions. This was particularly true for Hub partner organizations. S1 highlighted the interdisciplinary nature PC ECHO Project sessions,

> *"... another ancillary benefit of this model is that we have... doctors learning alongside nurses, learning alongside... others.... [A]s we all say, 'palliative care is everyone's business." [S1].*

It was further noted that the 'hub and spoke model' connected partners across widespread geographical locations. H2 appreciated this aspect of PC ECHO:

> *"If there is a value add from what's been offered. Yeah,... the opportunity to make the connections with people across the country." [H2].*

H3 further described their value added:

> *"There're some very passionate advocates and people working in the palliative space; it's been good to be able to interact with them and hear them speak to the issues as they see them, and... bring that back and learn from them and to the content that we were offering." [H3].*

Improved stakeholder relations

Impact and benefits go both ways for the Superhub and the Hub partners, through closer relationships and understanding among these stakeholders. As S1 explained:

> *"... we're able to supercharge the work of others. We can take great resources that many people don't even know exist and put it on a scale." [S1].*

The match of PC ECHO to the needs of Hub partners is clear and appreciated.

"... in terms of how the ECHO program meets the needs and the goals of the [name of the agency here], it directly meets every one of our key pillars." [H1].

The reciprocity of communication to support PC ECHO programming was again noted by S1:

> *"We're connecting more closely with our stakeholder partners across the country - we have a better understanding as to what their challenges and frankly, what their opportunities are as it comes to palliative care education." [S1].*

Hub partners continue to be excited about the nationwide opportunities provided through ECHO. H1

Table 3 Participant evaluations across profession groups for all ECHO sessions (all hubs combined)

ECHO STANDALONE sessions									ECHO CoPs/SERIES sessions							
Statement	**Group**	***n***	**Strong Disagree or Disagree**	**Neutral**	**Strongly Agree or Agree**	**X^2**	**df**	***p***	**Statement**	**Group**	***n***	**Strong Disagree or Disagree**	**Neutral**	**Strongly Agree or Agree**	**X^2**	**df**	***p***
Overall, the session was a good learning experience	Admin	79	3%	5%	92%	19.29	14	0.154	**Overall, the session was a good learning experience**	Admin	54	4%	2%	94%	21.71	14	0.085
	Carer	13	0%	0%	100%					Carer	23	0%	4%	96%			
	Nurse	558	2%	1%	97%					Nurse	389	1%	2%	97%			
	Paramed	1	*	*	*					Paramed	31	0%	7%	94%			
	MD	249	3%	3%	94%					MD	128	0%	6%	94%			
	SW	100	1%	6%	93%					SW	72	0%	7%	93%			
	PSW	29	3%	0%	97%					PSW	80	4%	4%	93%			
	Other	334	3%	3%	94%					Other	150	2%	3%	95%			
	TOTAL	**1363**	**2%**	**2%**	**96%**					**TOTAL**	**927**	**1%**	**4%**	**95%**			
The session was relevant to my practice	Admin	94	1%	2%	97%	26.81	14	0.020	**The session was relevant to my practice**	Admin	60	5%	12%	83%	27.02	14	0.019
	Carer	12	8%	0%	92%					Carer	25	0%	8%	92%			
	Nurse	636	2%	2%	96%					Nurse	414	1%	2%	97%			
	Paramed	1	*	*	*					Paramed	32	0%	3%	97%			
	MD	264	2%	2%	97%					MD	130	1%	4%	95%			
	SW	105	0%	3%	97%					SW	77	0%	7%	94%			
	PSW	42	2%	2%	95%					PSW	136	3%	4%	93%			
	Other	350	2%	6%	92%					Other	174	1%	6%	93%			
	TOTAL	**1503**	**2%**	**3%**	**95%**					**TOTAL**	**1048**	**1%**	**4%**	**94%**			
I would recommend this session to colleagues	Admin	94	2%	9%	89%	107.8	14	0.000	**I would recommend this session to colleagues**	Admin	60	5%	0%	95%	34.47	14	0.002
	Carer	13	0%	15%	85%					Carer	24	0%	8%	92%			
	Nurse	636	2%	2%	96%					Nurse	414	1%	3%	97%			
	Paramed	1	0%	*	*					Paramed	32	0%	6%	94%			
	MD	264	2%	3%	95%					MD	130	1%	8%	92%			
	SW	105	3%	7%	91%					SW	77	0%	5%	95%			
	PSW	42	2%	31%	67%					PSW	136	2%	11%	87%			
	Other	352	2%	5%	93%					Other	174	2%	3%	95%			
	TOTAL	**1507**	**2%**	**5%**	**93%**					**TOTAL**	**1047**	**1%**	**5%**	**94%**			

Table 3 (continued)

ECHO STANDALONE sessions								ECHO CoPs/SERIES sessions							
Statement	**Group**	***n***	**Strong Disagree or Disagree**	**Neutral**	**Strongly Agree or Agree**	**X^2**	**df**	***p***	**Statement**	**Group**	***n***	**Strong Disagree or Disagree**	**Neutral**	**Strongly Agree or Agree**	**X^2**	**df**	***p***
The overall format of the session was useful	Admin	94	2%	3%	95%	16.27	14	0.297	**The overall format of the session was useful**	Admin	60	3%	3%	93%	26.25	14	0.024
	Carer	12	0%	8%	92%					Carer	25	4%	0%	96%			
	Nurse	634	2%	2%	96%					Nurse	414	1%	2%	98%			
	Paramed	1	*	*	*					Paramed	32	0%	6%	94%			
	MD	263	3%	3%	94%					MD	131	0%	7%	93%			
	SW	105	2%	9%	90%					SW	77	0%	4%	96%			
	PSW	41	0%	5%	95%					PSW	136	2%	2%	96%			
	Other	352	1%	5%	94%					Other	174	1%	6%	93%			
	TOTAL	**1502**	**2%**	**4%**	**95%**					**TOTAL**	**1049**	**1%**	**4%**	**96%**			

X^2test to detect differences across groups (omnibus test)

X: chi-squared statistic; MD = Physician Group;; RN = Nurse Group;, SW = Social Worker Group; PSW = Personal Support Worker or Aide; Paramed = paramedic; Admin = administrator; Other = includes pharmacists, therapists, dieticians, spiritual care providers, pharmacist; carer = caregiver

No post-hoc analysis was undertaken to identify which groups are statistically different as there appeared to be no "clinically significant" differences across the groups for the purposes of this study

*too few responses to analyze (< 10 responses)

provided an example of a Hub partner's reaction to their stakeholder members' feedback:

> *"... Getting feedback is the greatest aspect, or the greatest value that I'm hearing, and that we're being told about through our survey information—immediate contact and connection." [H1].*

What is working well?

The PC ECHO evaluation key informants provided information that illustrated strengths of PC ECHO. Themes identified as working well in the Project were:

- Enhancement of partner organization mandates.
- Flexibility of content.
- Connection, collaboration, and reach.

Enhancement of partner organization mandates

Recruitment of Hub partners to PC ECHO include those with mandates that center specifically on palliative care and Hub partners that focus on specific diseases or contexts. PC ECHO provides resources to incorporate and advance palliative care as part of their mandates that support education, advocacy.

> *"What we wanted to do and the vehicle we wanted to use was to create a community of practice and establish a relationship with a broad network and so on. And then actually, it was announced that Pallium Canada was developing the ECHO community of practice." [H3].*

Another Hub partner illustrated how PC ECHO fits well with their current and future needs through the Project's 'all learn, all teach' approach:

> *"We don't specifically have an education mandate, but we do have a mandate to share best practices and facilitate networking... So, ECHO for us, kind of helps us advance that best practices mandate that we have. So, going forward that would continue to be sort of the mandate under which we would operate and stay connected with Pallium and ECHO." [H2].*

Flexibility of educational content

The opportunity and support to tailor learning materials and content for their diverse audiences and needs were recognized by the Superhub and Hub partners. The sharing of educational tools, including discussions of experience, expertise and knowledge from session participants from coast to coast was valued. The resources that are part of ECHO membership have been a 'game changer' that meet partner needs well:

"ECHO has transformed how we have been doing our learning. Bringing in that case study aspect made the didactic content that was being delivered through what was previously our knowledge network, tangible and applicable, and breathed life into that didactic content… the audience could see the real-life application." [H3].

Some Hub partners members described programming as a dynamic thing as they evolve programming and varying audiences. One partner uses on-going polling of members to identify their community needs, recently adding bereavement talks to meet current needs. As well, feedback collected by on-going evaluation of sessions was used to identify new topics and make adjustment for quality improvement.

Use of PC ECHO resources for connection

One Hub partner provided an example of both connection through a PC ECHO session and collaboration for improved patient care:

"I had someone reach out to me from a remote northern location if you can imagine wanting to connect with the speaker to discuss some clinical issues regarding a very specific pain issue that she was experiencing in a client. And the fact that they were able to connect… because of this webinar, was actually monumental." [H1].

H3 noted that the reach of PC ECHO sessions was important whether connecting with a few people or many who attended. The same sentiment was expressed by another informant.

"[The Palliative Care ECHO Project session… was given in French and we had lots of participants, which is great. And [the presenter] said it was so good and so interactive.… we feel we're making a difference is in these sessions. [H1]

The *Palliative Care Journal Watch* was introduced as part of the PC ECHO Project in 2023. Participants can join live or access the podcasts when convenient. Participants and success of the podcasts derived from them:

"The Journal Watch is basically just a live webinar. It's an hour long and they go through the four articles that they want to highlight, so they do a little presentation for each one. And then after each presentation, they have a panel discussion talking about the article and an audience members can ask questions in the Q&A.… Since starting, we've had, I think, 8,892 learner encounters. So these are people actually joining the sessions, but we're already at 12,667 views of our session recordings." [S2].

Although not widely attended by the inaugural Hub partner interviewees, *Palliative Care Journal Watch* - held every other month - was seen as a valuable resource.

"I don't think I have a strong enough understanding of it at this stage. So, it potentially could be something I've missed that could benefit our members that I'd be open to learning more about." [H2].

Another informant pointed to its utility and the need it might serve for them:

"[… our role is to bring the latest into our organisation as a centre of excellence. And so I would I think it's very important. That being said, I can't say we've attended [Palliative Care Journal Watch}, but I think it's important." [H3].

S2 revealed a new resource for recent Hub partner recruits illustrating the Superhub's responsiveness to feedback from PC ECHO partners and the value Hub partners place on connecting with other members:

"We run formal training where we're onboarding new Hub partners called Partner Launch Training.… we're just wrapping up our first cohort… not only are we able to train them on the ECHO model… but it gives the opportunity for hopefully a group of Hub partners to move through that process together as they're learning." [S2].

Opportunities for improvement

While overall experiences with joining the PC ECHO Project for the inaugural Hub partners was seen as a positive benefit for them, opportunities for improvement were also noted. These included the organic evolution of the Project, resources provided or needed to support partner sessions, and future funding.

Organic evolution

An organic approach was initially adopted by the Superhub to initiate the partnerships, CoPs, and sessions. It was felt that a rigid approach would not allow for modifications and tailoring to best suit the needs of the partner, the Superhub, and ECHO session participants as the project evolved. In essence, a quality improvement approach using the Plan, Do, Study, Act cycle [37] was taken, alongside a rapid prototyping approach, successfully used in the curriculum development and roll out of Pallium Canada *Learning Essential Approaches to Palliative Care* (LEAP) courses [12, 32]. S1 saw the ECHO

model as a way of reducing work for Hub partners and avoiding:

> *"Too often, I'm sure you've seen this as well, we have people, you know, [ECHO Presenter] talks about this a lot as well about reinventing the wheel, right, people who take it upon themselves to develop something that already exists in it. And there's many motivations for that, as we know. But this is what I like about the model, as well as that it allows us to make more with, you know, disparate resources and, you know, and not enough time to be doing everything that we need to be doing. So I think that's another really big benefit of this." [S1].*

However initially accessing resources was not always a smooth process. Access to subject matter experts by a Hub whose main focus was not palliative care proved a challenge.

> *"We were just desperate to get speakers and get the program off the ground… we had to do a lot of begging at first." [H1].*

Early on when the Superhub suggested speakers to contact, the link was not always made. H1 elaborated on their experience:

> *"… we needed more of that facilitated introduction than what was happening. And to be quite honest, it did affect my outreach to turn to them again to say like, I'm wondering if you help me connect with a speaker that could speak to this." [H1].*

Sharing PC ECHO resources

Along with connections to potential speakers and subject matter experts, Hub partners felt the need for PC ECHO MS PowerPoint™ templates and example slide decks, a repository holding past or potential educational materials and other information to avoid duplicating efforts. A resource clearinghouse, managed by the Superhub, was seen as advantageous resources for expert speaker recruitment.

> *"… One of the benefits I'd like out of ECHO is to have more sharing amongst the Hubs of our curriculum of what we're doing so that we can maybe, you know, learn from each other or even get each other to help each other with our own audiences rather than reinvent the wheel. And that hasn't really happened yet. There's no forum for it." [H3].*

It was noted by another Hub that it would be useful to shared potential audiences through shared programming resources. Helping each other in this way would be,

> *… helping each other, so for me, that's the whole piece, is better being able to leverage what others are doing and better being able to leverage the whole network." [H1].*

During the inaugural period of the PC ECHO Project, Pallium Canada held a national forum for all current ECHO Hubs and Superhubs, as a special event at the McGill International Palliative Care Congress in Montreal, QC (October 2022). Those who had been able to attend, expressed enthusiasm about the potential to meet other partner members of the Project and share ideas, and collaborate, leverage instant cross-country connections enabled by the project, and hear updates from the Superhub. Not all the Hub partners had the resources to attend this event. Those that joined virtually expressed the need for improvements in the virtual platform in the future.

On-going and future funding

The issue of limited ongoing and complementary funding to enhance scale-up and spread was also identified. The current funding - while pivotal - is sometimes not sufficient to fully fund the activities that the Hub partners wish to offer their members. This was even more distressing, since Hub members have the expectation that session attendance would continue to be free of charge. It was noted that resources, including staff, to organize, deliver, and run these programs are needed. While some Hub partners have robust in-house resources that is not always the case. In those cases, all these program resources are based on a volunteer basis. A Superhub representative recognized the challenges experienced by Hub partners in this regard.

> *"We have to acknowledge all of the hard work that's done by our Hub partners and clinical leads and [program] developers and the Pallium staff to make all of this happen. It is a tremendous amount of work and requires ongoing support. It doesn't run itself. So I have to be careful about how we use free content and we were quite liberal in that in the early days when we were describing it. But I would have maybe positioned that a bit differently.… But I think there's a role for the provinces and territories to play in funding this. And we have a model that we can already point to. ECHO Ontario was funded by the Ministry of Health as an example and has been for many, many years. So there's already some, some cases to point to in that regard.… When I say empowered, not just in terms of program execution, but in terms of going out and finding their own funding to support their own respective ECHO programs that still fall under the Palliative Care ECHO Proj-*

ect umbrella. But they that they have the data and the evidence to go back and request their own funding." [S1].

Discussion

In this formative evaluation study of Pallium Canada's PC ECHO Project, significant spread and reach was noted across professions, care settings and the country, including urban, rural and remote areas. It has increased collaboration among stakeholders and education providers and supported some partners with tools to address their palliative care mandates. Health care professionals and care providers – in over 17 different occupations – across Canada have participated, demonstrating increased access to palliative care learning opportunities.

Geographic spread across professions and care sectors have been described in other PC ECHO projects [28, 38, 39] internationally [17, 40–42]. The reach of 32% of participants in the project were into rural and smaller communities, including in small urban centers of less than 30,000. Approximately 8% of Canadian physicians are in rural regions. The proportion of 32% (13% for rural) is a higher uptake than expected. The majority of participants identified themselves as female (87%), which is not surprising given the workforce demographics in palliative care.

The topics covered in the PC ECHO project, in addition to important topics related to providing a palliative care approach and organizing palliative care services, optimized access and coverage. In addition, topics also included areas that are increasingly recognized as societal priorities. These are, among others, a public health approach to palliative care and mobilizing communities, palliative care for Indigenous Populations, the needs of vulnerably housed people, racism and equity-diversity and inclusion, culturally appropriate care, self care of health care professionals and burnout amongst the workforce, and compassion in health care [43–47]. In the early phase, there was also evidence of the project being used to help health care professionals, including palliative care providers, respond to the COVID-19 pandemic.

Consistent with other evaluations of ECHO projects in palliative care and in other areas [17, 48–52], participants in the PC ECHO sessions rated the learning experience highly (95% on average), across profession groups and session types (standalone or CoP/Series). This included relevancy to practice and usefulness of session format. Similar response patterns have been noted across professions in the LEAP courses [53]. Some of the sessions deviated from the traditional ECHO format, namely telementoring using patient cases presented by participants. However, the high ratings by participants in terms of format, relevancy and the overall learning experience, suggests that they are meeting learners' needs.

The lower ratings by personal support workers merits attention; in the standalone sessions only 67% strongly agreed or agreed that they would recommend the session to colleagues (although the majority found them a positive learning experience, useful and relevant to their practices). We hypothesize the topics covered by the PC ECHO sessions did not necessarily address the scopes of practice of this profession group to the extent it addressed the scopes of the other professions. The reason for this could be explored in more depth in future qualitative studies as the interviews with the hub leads did not explore this phenomenon. Although we did not study the profession responses for each session separately, the list of topics covered by the ECHO sessions include topics that would resonate with this caregiver group. For those sessions it is possible that the ratings may have been higher.

Although the organic evolution supported flexibility in session topics and development it worked best for Hubs that had robust infrastructures rather than those staffed solely by volunteers. Given the formative evaluation nature of our study, the key informant interviews also explored areas of the project that could be improved. The interview results provided valuable feedback that identified elements such as organizational focus and size, that informed the Super Hub evolution.

Several opportunities for improvement were identified. Some of these, such as initiating a Partner Launch Training program and the launch of the dedicated PC ECHO website (August 2022, https://www.echopalliative.com/), were already being implemented during Phase 2 of PC ECHO. With respect to instructional design and fidelity to the ECHO model, the learner experiences of the sessions with larger participant numbers versus those with smaller numbers should be explored further, as should their respective roles, advantages and limitations. Importantly, more research is needed to understand PC ECHO's CoPS and standalone sessions, specifically their respective characteristics and roles. Ranmuthugala and colleagues propose that "… cultivating CoPs to improve healthcare performance requires a greater understanding of how to establish and support CoPs to maximise their potential to improve healthcare" [54]. McKellar et al. argue that although CoPS are increasingly applied in health care and education, there is little agreement on approaches to evaluate their influence and effectiveness [55]. Notwithstanding, frameworks do exist to study the evolution of a CoP [56].

Limitations

This study has several limitations. In the analysis of the participant experiences, the overall response rates of the session evaluations were in the 20–30% range, limiting generalizability. Lack of data from some Hubs and from some sessions contributed to this. However, the 20–30% represents large numbers of respondents, which

can inform ongoing improvements and implementation. Merging the "Strongly agreed" and "Agreed", and "Strongly Disagree" or "Disagree" responses into single categories may have reduced the sensitivity to detect differences between professions by groups. No evaluation was undertaken of the usefulness of the viewings and downloads of the recorded sessions. This will need to be explored going forward.

Conclusion

There is evidence of significant spread, over a relatively short period of time, of Pallium Canada's PC ECHO Project, including its partner hubs. For the hubs and the superhub, the ECHO project has been a "game changer", accelerating their respective palliative care mandates. Large numbers of participants across many professions and care settings have been reached and given opportunities for continuing professional development. The sessions have been rated very positively across key learning experience parameters. Partner Hubs have been empowered to enhance their palliative care mandates. PC ECHO sessions are reported by participants as useful and addressing their learning needs. The PC Superhub has acted already to address some issues raised by Hub partners. Additional research and evaluation is needed to further assess its impact at levels beyond reach and spread, acceptability, and to further understand implementation, especially with new partners and as current content, processes and materials require updating and adjustments to emerging needs and realities.

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Author contributions
JP: Study concept, data analysis, manuscript writing and review. LMM: Study concept, data collection (qualitative), qualitative analysis, manuscript writing and review. AG: Data Analysis, manuscript writing and review. MP, AR: Data collection and analysis; manuscript writing and review. JF: Data collection and management. JM: Led development of ECHO program and manuscript review.

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Data availability
Availability of data and materials: Anonymized, deidentified data is available from the corresponding author upon reasonable request.

Declarations

Consent for publication
Not applicable. No identifying information and details have been included in this publication that may compromise anonymity.

Competing interests
Conflicts of Interest JP: Has received stipends from Pallium Canada as Scientific Officer of Pallium and more recently as Scientific Advisor. JM: Is paid by Pallium Canada as its Chief Executive Officer. JF: Is paid by Pallium Canada as Vice President of Operations.

Consent to participate
PC ECHO participants complete consent prior to ECHO session participation for the inclusion of their feedback for evaluation purposes. Interview participants provided informed consent prior to interview participation, to be audio recorded, and for anonymized, deidentified data to be included for analysis and dissemination.

Ethics approval
Hamilton Integrated Research Ethics Board granted this investigation as quality improvement ethics exemption, citing item TCPS2 [2022] Article 2.5. No reference number was provided, as an email verification was provided for full board ethics exemption for program evaluation and local program development.

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