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# Increasing interprofessional collaboration in community-based palliative care: a pilot study of the CAPACITI education program for primary care providers

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## ABSTRACT

Interprofessional collaboration in palliative care is essential to ensuring high-quality care for seriously ill patients. Education interventions to increase competency in palliative care should incorporate team-building skills to encourage an interprofessional approach. We developed and piloted a virtual educational program named CAPACITI for interprofessional teams to promote a community palliative approach to care. Primary care teams from across Ontario, Canada, participated in CAPACITI which consisted of 10 facilitated sessions that emphasized how to operationalize a palliative care approach as a team. Pre- and post-study questionnaires were completed by each team, including the AITCS-II, a validated instrument that measures interprofessional collaboration. We analyzed individual paired differences in summary scores and in each of three subdomains of the AITCS-II questionnaire: partnership, cooperation, and coordination. Seventeen teams completed the AITCS-II post survey, representing 133 participants. Teams varied demographically and ranged from 5 to 16 members. After CAPACITI, the overall mean AITCS-II summary score among teams increased to 96.0 (SD = 10.0) for a significant paired mean difference increase of 9.4 ( $p = .03$ ). There were also significant increases in the partnership ( $p = .01$ ) and in the cooperation subdomains ( $p = .04$ ). CAPACITI demonstrated the potential for improving collaboration among primary care teams, which can lead to improved provider and patient outcomes in palliative care.

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## Introduction

Interprofessional collaboration in palliative care is essential to providing efficient, holistic, and high-quality patient care. The shift to collaborative practice is aligned with the evolving definition of a palliative approach to care (Bainbridge et al., 2010; Frey & Balmer, 2023; Kirkpatrick et al., 2023; Reeves et al., 2017). While the term palliative care is often used in reference to a specialized care team (McCormick et al., 2012; Schenker & Arnold, 2015; Shadd et al., 2013), the World Health Organization defines palliative care as any integrated approach that improves the quality of life of patients and their families facing a life-threatening illness from the point of diagnosis to bereavement, by means of early identification and holistic care, including pain and symptom management, and psychosocial and spiritual support (World Health Organization, 2020). To ensure consistent access to an early palliative care approach, primary care providers are uniquely suited to integrating this type of care into practice to facilitate continuity of care with their patients (Ding et al., 2018; Pavlič et al., 2019; Pereira & Chasen, 2016; Shadd et al., 2013). However, providing holistic care for patients with a life-threatening diagnosis can be complex. Implementing a palliative approach to care requires primary care providers to have a basic knowledge of palliative care, along with the ability to collaborate with other healthcare

professionals with a wide range of expertise to address the physical, psychosocial, practical, and spiritual aspects of their patients' care. This team-based approach is relevant across all care settings and is referred to as interprofessional collaboration (Morley & Cashell, 2017).

Interprofessional collaboration in a palliative care context requires that team members have the skills, resources and processes in place necessary to identify, assess and manage palliative care needs among their seriously ill patients. Additionally, for collaborative practice to be viable, team members must develop shared values, trust, and mutual respect (Bainbridge et al., 2010; Mattessich et al., 2001; Reeves et al., 2017; Sullivan, 1998; Zwarenstein et al., 2009). There are several critical factors that impact collaboration on a team level, such as communication, understanding of other's roles and contributions, and inherent competencies among the members (Bollen et al., 2019; Wei et al., 2022). Interprofessional education in palliative care can address these gaps by imparting team-building skills, encouraging open communication, suggesting collaborative processes, and increasing clinical expertise, toward improving provider and patient outcomes (Kirkpatrick et al., 2023; Spaulding et al., 2021). To strengthen this team-based approach and ensure that

primary care systems are meeting patient needs in delivering early palliative care, it is important to consider inter-professional collaboration when providing this education for healthcare professionals. Unfortunately, evaluations of palliative care initiatives, specifically those involving training for providers, rarely include collaborative practice as an outcome (Kamal et al., 2014; Parker & Hodgkinson, 2011; Seow et al., 2023; Thiel et al., 2020).

We developed a virtual educational intervention named CAPACITI (Community Access to Palliative Care via Interprofessional Teams Improvement program) that aimed to promote a community palliative approach to care among primary care provider teams. We piloted the CAPACITI intervention between January 2020 and March 2021 for teams based in Ontario, Canada, only. The intervention was specifically designed with the intention of building competency and collaborative practice within teams. CAPACITI provides practical skills, strategies, tools and action plans to adopt and operationalize an early palliative approach to care for patients with a serious illness diagnosis. In this article, we evaluate the impact of CAPACITI in healthcare teams to access changes in collaboration.

## Method

### *Study design and participants*

We conducted a quasi-experimental, single cohort study of the CAPACITI educational intervention. In-depth details on the CAPACITI program and the broader study were previously published (Seow et al., 2022). CAPACITI was designed for generalist clinicians, e.g., primary care physicians, nurses, care coordinators, and allied health professionals, etc. wanting to embed a palliative approach to care into their team practice. Primary care teams from Ontario, Canada, were invited to enroll in CAPACITI through advertising across provincial primary care and palliative care organizations and networks. A group was considered a team when including, at minimum, a prescribing clinician (e.g., primary care physician or nurse practitioner) and a care coordinator or administrator.

Each team had a self-appointed Team Lead, who serviced as the main team contact and organizer for the intervention. Most (75%) participants had already completed a standardized, evidence-based, clinical education program, namely Pallium Canada's LEAP course (Learning Essential Approaches to Palliative care), prior to starting CAPACITI. LEAP is the most widely recognized palliative care education program for healthcare providers in Canada (Pallium Canada, 2023; Pereira et al., 2022), covering topics such as complex management for common symptoms such as pain, delirium, constipation, depression, grief, etc. Each CAPACITI Team was assigned a program facilitator from the research team to respond to questions regarding CAPACITI content, materials, or activities for the duration of the study. A local palliative care specialist was also paired with each team to provide them with mentorship.

### *Intervention*

CAPACITI is an educational program consisting of 10 facilitated modules, each covering a critical topic to initiating earlier

palliative care. Topics include building a strong team, identification and assessment, communication, and engaging caregivers and specialists. CAPACITI was developed based on an extensive review of existing palliative care training programs and input from national experts (See supplemental Table S1 for CAPACITI content by session).

Each CAPACITI module comprised three components: practice support education in the form of expert advice and tips; evidence-based tools; and high-facilitation and expert coaching for adaptation to local context. Each module of CAPACITI featured a monthly virtual webinar (1-hour each) which included slides and videos and a live interactive component with an expert. Team Leads were responsible for letting the program facilitators know who from their team attended each session.

Practice supports focused on how to operationalize the clinical knowledge, guidelines, or pathways into their clinical practice. Generally, these supports focused on strategies for system coordination (e.g. palliative care registry, after-hours access, resource contact lists, etc.) and strategies for team collaboration (e.g. weekly team rounds, integrating with disease-specific providers, engaging caregivers, role clarification exercises, etc.) (Bainbridge et al., 2016). All CAPACITI sessions emphasize a team approach to practice. Three sessions are particularly relevant to interprofessional team collaboration, these being: Session 1 Building a strong team, Session 8 Care planning with the broader care team, and Session 10 Engaging with specialists.

### *Data collection and questionnaire*

Data collection for the CAPACITI study was completed prior (baseline) to and upon completion (post) of the intervention via online self-completed surveys (SurveyMonkey). Individual participants completed the study survey that included healthcare provider/team characteristics. The lead of each team also completed the Assessment of Interprofessional Team Collaboration Scale (AITCS-II) questionnaire in consultation with and on behalf of their team members. Participants were emailed the link to the online questionnaire at each time point (baseline and post intervention). We followed the Dillman Tailored Design Method to administer the questionnaire with up to five follow-up e-mails to non-responders (Dillman, 2000).

### *Assessment of Interprofessional Team Collaboration Scale II (AITCS-II)*

The AITCS-II is a validated diagnostic instrument that is designed to measure the interprofessional collaboration among team members (Orchard et al., 2018). Scale items represent three sub-domains that are key to collaborative practice (Orchard et al., 2012). These subscales are as follows: Partnership (8 items), Cooperation (8 items) and Coordination (7 items). In brief, "Partnership" is when team members work together to plan, implement, and assess care and its outcomes. "Cooperation" exists when team members work together in ways that each member's skills, knowledge and expertise are valued. Finally, "Coordination" is the ability

to work together to achieve mutual goals. Respondents indicate their general level of agreement with items on a 5-point rating scale from 1='Never,' 2='Rarely,' 3='Occasionally,' 4='Most of the time,' to 5='Always.' These ratings produce a summary score ranging from 23 to 115. A higher score for each item indicates stronger agreement with the respective statement. The AITCS-II has exhibited good reliability with an overall Cronbach's  $\alpha$  co-efficient across the scale of 0.89 (Orchard et al., 2018).

### Data analysis and sample size

The unit of analysis for this study was at the team level. We completed descriptive statistics on the AITCS data of all teams that completed CAPACITI and Cronbach's alpha tests to measure the reliability of this scale. Our primary analysis was based upon individual paired differences in AITCS summary scores between pre- (baseline) and post-intervention responses. Our secondary analyses were the paired differences in scores in each of the three sub-domains, Partnership, Cooperation and Coordination. Data were analyzed using IBM SPSS v28.0 employing descriptive and inferential statistics (paired sample t-test). The significance level was set at 0.05 and tests were two-tailed. Ethical approval for this study was obtained from the Hamilton Integrated Research Ethics Board (#7054).

## Results

### Respondent characteristics

The CAPACITI sessions ran monthly from January 2020 to March 2021. The program was paused for 6 months from April to August 2020 due to the COVID-19 pandemic. Of the 27 teams (185 participants) that started CAPACITI, 4 teams (26 participants) dropped out after Session 3 because of COVID-related redeployment of their team members. This resulted in a total of 159 participants across 23 teams that completed the CAPACITI intervention.

Of the 23 teams that completed CAPACITI, 17 teams (74% of teams) representing 133 participants provided both the pre and post responses on the AITCS-II questionnaire. These

paired data were used for the primary analysis. The number of participants per team ranged from 5 to 16 (median = 7). Team characteristics are presented in Table 1. Eight of the teams had a designated team coordinator, manager, and/or quality improvement specialist that participated in CAPACITI. Sixteen participants (12.0%) were in a role that did not provide direct care to patients such as office assistant, manager, or care coordinator. Of the remaining 117 participants, the majority were either registered nurses or registered practical nurses (30.8%,  $n = 36$ ), physicians (26.5%,  $n = 31$ ), nurse practitioners (19.7%,  $n = 23$ ), or social workers (10.3%,  $n = 12$ ). The remaining healthcare providers were other allied health professionals (12.8%,  $n = 15$ ) such as pharmacists, dietitians, respiratory therapists, occupational therapists, and psychotherapists. Among the teams, eight were in urban locations and nine were rural, representing a diversity of rural and urban setting across Ontario.

Among all teams that completed a baseline survey ( $n = 20$  teams), team responses to the AITCS-II items covered the full range of the scale (1 to 5) and the mean summary score was 87.2 (SD 16.6) with a range from 27 to 107. The AITCS-II items demonstrated a high level of internal consistency overall ( $\alpha = 0.97$ ) and within the Partnership ( $\alpha = 0.94$ ), Cooperation ( $\alpha = 0.94$ ), and Coordination ( $\alpha = 0.90$ ) sub-domains.

The AITCS-II items, pre- and post-mean item scores, and mean paired differences by item for the paired teams ( $n = 17$ ), are presented in Table 2. One team did not respond to items in the Coordination sub-domain in the post CAPACITI survey, and consequently this calculated sub-domain and AITCS summary score were the only missing data from the paired teams. The mean scores of individual AITCS-II items prior to the CAPACITI intervention (baseline) ranged from 3.3 to 4.4; the mean summary score among included teams ( $n = 17$ ) at baseline was 86.6 (SD = 19.3). After CAPACITI ( $n = 16$ ), the overall mean AITCS-II summary score among teams increased to 96.3 (SD = 10.5) for a significant paired mean difference increase of 9.4 (SD = 16.0) (95% CI: 0.9–17.9,  $p = .03$ ). Thus, following the CAPACITI intervention, overall, the teams demonstrated an improvement in interprofessional collaboration. Table 2 also summarizes the scores for the

**Table 1.** Team characteristics ( $n = 17$ ).

Team ID number	Number of CAPACITI participants	Prescribers (MD or NP)	Nurses (RN or RPN)	Other	Rural or urban location	Team Coordinator (TC) or Quality Improvement Specialist (QIS) district role on team
1	9	4	1	4	urban	no
2	5	1	2	2	urban	QIS
3	16	4	6	6	urban	no
4	10	4	3	3	rural	TC
5	7	5	2	0	urban	no
6	6	3	0	3	rural	no
7	11	1	5	5	rural	TC
8	6	4	0	2	rural	no
9	8	5	0	3	urban	QIS
10	5	2	2	1	rural	TC
11	8	1	4	3	urban	TC
12	8	4	1	3	urban	no
13	6	3	1	2	rural	TC
14	5	5	0	0	urban	no
15	7	2	4	1	rural	no
16	10	4	2	4	rural	TC
17	6	2	2	2	rural	TC

**Table 2.** AITCS item pre and post CAPACITI mean scores and paired differences ( $n = 17$ ).

Item (When we are working as a team all of my team members . . .)	Pre CAPACITI		Post CAPACITI		Paired Difference*	
	Mean	SD	Mean	SD	Mean	SD
1. Include patients in setting goals for their care <sup>A</sup>	3.85	0.87	4.29	0.67	0.44	0.68
2. Listen to the wishes of their patients when determining the process of care chosen by the team <sup>A</sup>	4.12	0.95	4.41	0.69	0.29	0.84
3. Meet and discuss patient care on a regular basis <sup>A</sup>	3.35	0.97	3.76	0.73	0.41	0.91
4. Coordinate health and social services based upon patient care needs <sup>A</sup>	3.59	1.03	4.06	0.64	0.47	0.92
5. Are involved in goal setting for each patient <sup>A</sup>	3.65	0.85	4.00	0.69	0.35	0.78
6. Use consistent communication within team to discuss patient care <sup>A</sup>	3.53	0.9	4.00	0.59	0.47	0.79
7. Encourage and use the knowledge and skills that each of us can bring in developing plans of care <sup>A</sup>	3.47	0.92	4.00	0.59	0.53	0.78
8. Work with the patient and relatives in adjusting care plans <sup>A</sup>	3.88	0.90	4.00	0.59	0.12	0.76
9. Share power with each other <sup>B</sup>	3.79	0.96	4.29	0.57	0.50	0.87
10. Respect and trust each other <sup>B</sup>	4.35	0.74	4.76	0.42	0.41	0.75
11. Are open and honest with each other <sup>B</sup>	4.26	0.55	4.59	0.49	0.32	0.66
12. Make changes to their team functioning based on reflective reviews <sup>B</sup>	3.62	0.96	3.82	0.71	0.21	0.96
13. Strive to achieve mutually satisfying resolution for differences of opinions <sup>B</sup>	3.88	0.92	4.24	0.55	0.35	0.95
14. Understand the boundaries of what each other can do <sup>B</sup>	4.12	0.92	4.35	0.59	0.24	0.96
15. Understand that there are shared knowledge and skills between health providers on the team <sup>B</sup>	4.09	0.94	4.47	0.5	0.38	0.76
16. Establish a sense of trust among the team members <sup>B</sup>	4.09	1.00	4.65	0.48	0.56	0.84
17. Apply a unique definition of interprofessional collaborative practice to the practice setting <sup>C</sup>	3.91	0.91	4.25	0.56	0.38	0.93
18. Equally divide agreed upon goals amongst the team <sup>C</sup>	3.35	0.84	4.06	0.56	0.69	0.92
19. Encourage and support open communication, including the patients and their relatives during team meetings <sup>C</sup>	3.71	1.02	4.25	1.09	0.56	1.32
20. Use an agreed upon process to resolve conflicts <sup>C</sup>	3.29	1.19	3.69	0.92	0.41	1.21
21. Together select the leader for our team (to lead the patient's care plan) <sup>C</sup>	3.41	1.14	3.88	0.99	0.50	1.06
22. Support the leader for the team, varying depending on the needs of our patients <sup>C</sup>	3.85	0.94	4.06	1.03	0.22	1.07
23. Openly support inclusion of the patient in our team meetings (about the patient) <sup>C</sup>	3.41	1.27	4.00	1.06	0.53	1.32
<b>Sub-domain: Partnership (Mean, items 1 to 8)<sup>A</sup></b>	3.68	0.84	4.07	0.51	<b>0.39†</b>	<b>0.58†</b>
<b>Sub-domain: Cooperation (Mean, items 9 to 16)<sup>B</sup></b>	4.03	0.81	4.40	0.39	<b>0.37†</b>	<b>0.67†</b>
<b>Sub-domain: Coordination (Mean, items 17 to 24)<sup>C</sup>**</b>	3.56	0.96	4.03	0.77	0.47	0.95
<b>AITCS Summary Score (items 1 to 24)**</b>	86.59	19.3	96.3	10.500.0	<b>9.41†</b>	<b>16.01†</b>

\*Individual Paired Differences = Post – Pre CAPACITI score.

\*\*Post CAPACITI  $n = 16$ .

†**Bolded subdomain and summary scores indicates  $p < .05$ .**

Sub-domain scores range from 1 to 5 with higher numbers constituting greater interprofessional collaboration.

Summary score ranges from 23 to 115.

<sup>A</sup>Sub-domain=Partnership.

<sup>B</sup>Sub-domain=Cooperation.

<sup>C</sup>Sub-domain=Coordination.

AITCS-II sub-domains that follow. In a sensitivity analysis of data from the 6 teams that did not complete the post-intervention survey, these teams had a mean AITCS-II baseline summary score of 92.8 (85 to 100, SD = 6.9), similar but slightly higher than the teams included in the paired analysis (ANOVA,  $p = .45$ ).

### Partnership

The Partnership sub-domain assesses the ability of all relevant team members including patients and family members to collaborate on planning, implementing, and assessing care and its outcomes, wherein all partnerships and opinions are trusted and equitably acknowledged regardless of the level of education and experience that one brings to the team. Prior to the CAPACITI intervention the reported Partnership mean among teams was 3.7 (SD = 0.8). After participating in CAPACITI, we saw an increase in the mean to 4.1 (SD = 0.5) with a significant overall paired difference of 0.4 (SD = 0.6) (95% CI: 0.1–0.7,  $p = .01$ ), indicating an overall improvement in partnership. All paired item differences in this sub-domain were positive. The item that saw the highest increase in paired scores was “Q7. Encourage each other and patients and their families (caregivers) to use the knowledge and

skills that each of us can bring in developing plans of care” (paired difference mean = 0.5, SD = 0.8).

### Cooperation

The Cooperation subdomain assesses a care team's or provider's ability to work together in an environment where each person's skills, knowledge, and expertise are valued and sought out, thus achieving the highest level of health outcomes and meeting the expressed needs for their patients. The reported mean among teams in the Cooperation subdomain prior to the CAPACITI intervention was 4.0 (SD = 0.8). The post-intervention mean increased to 4.4 (SD = 0.4) with a significant paired difference of 0.4 (SD = 0.7) (95% CI: 0.03–0.7,  $p = .04$ ). All paired differences in the items within this subdomain were positive, ranging from item “Q12. Make changes to their team functioning based on reflective reviews” (mean = 0.2, SD = 1.0) to the item that saw the greatest improvement in paired scores, “Q16. Establish a sense of trust among the team members” (mean = 0.6, SD = 0.8).

### Coordination

The Coordination subscale assesses the ability of a care team's or provider's ability to collaborate to achieve mutual goals and



**Table 3.** Individual team AITCS scores pre CAPACITI and pre/post-paired differences ( $n = 17$ ).

Team	Pre CAPACITI				Pre/Post Paired Difference*			
	Partnership (Range 1(least)- 5(most))	Cooperation (Range 1(least)- 5(most))	Coordination (Range 1(least)- 5(most))	AITCS Summary Score (Range 23–115)	Partnership	Cooperation	Coordination	AITCS Summary Score
1	3.88	4.25	4.14	94	-0.25	-0.25	-0.71	-9
2	4.25	4.25	4.00	96	-0.13	-0.13	-0.14	-3
3	4.25	4.38	4.21	99	0.25	0.13	-0.64	-2
4	4.63	4.75	4.57	107	0	-0.25	0	-2
5	3.88	5.00	4.57	103	0.25	-0.25	-0.14	-1
6	4.00	4.00	4.00	92	0	-0.13	0	-1
7	4.63	4.88	4.43	107	0.13	-0.13	0.29	2
8	3.38	3.75	2.29	73	0.13	0.75	-0.43	4
9	3.44	3.69	3.64	83	0.31	0.31	missing	missing
10	3.50	3.50	2.71	75	0.38	0.25	0.43	8
11	3.63	4.38	3.29	87	-0.25	0.38	1.29	10
12	3.75	3.88	3.57	86	0.38	0.63	0.57	12
13	4.00	4.50	4.00	96	0.50	0.38	0.86	13
14	3.75	4.00	3.57	87	0.63	0.75	0.57	15
15	4.00	4.50	4.14	97	0.88	0.50	0.86	17
16	2.63	3.25	2.43	64	1.38	0.88	1.71	30
17	1.00	1.50	1.00	27	2.00	2.50	3.00	57

\*Individual Paired Differences = Post – Pre CAPACITI score.

the ability to effectively communicate with team members to ensure access to appropriate resources to meet their goals. Prior to the CAPACITI intervention, the reported mean for coordination among teams was 3.6 (SD = 1.0). After the intervention ( $n = 16$ ), there was an increase in the mean, albeit not significant, to 4.0 (SD = 0.8) with a paired difference of 0.5 (SD = 1.0) (95% CI:  $-0.04$ – $1.0$ ,  $p = .07$  ns). All paired differences of items in this subdomain were also positive ranging from item “Q22. Support the leader for the team, varying depending on the needs of our patients” (paired difference mean = 0.2, SD = 1.1) to item “Q18. Equally divide agreed upon goals amongst the team” seeing the greatest increase (paired difference mean = 0.7, SD = 0.92).

### Individual team level comparisons

Paired comparisons of the AITCS-II summary scores of each team pre and post CAPACITI are presented in Table 3. The baseline summary scores varied greatly between teams, ranging from 27 to 107 (maximum possible = 115). The paired differences analysis revealed that 11 out of the 17 teams that participated showed an increase overall on the paired Summary score. Seven teams saw an increase across all three AITCS-II subdomains, whereas two teams had a negative paired difference score in all three subdomains.

There was no apparent discernible association with increased overall collaboration (AITCS-II Summary Score) based on team size, rurality, or remuneration model. The largest improvement post intervention tended to be seen in the teams that had the lowest level of collaboration prior to CAPACITI. Teams that had someone with a managerial role (Teams 4, 7, 10–11, 13, 16–17) or a quality improvement specialist (Teams 2 & 9) involved in CAPACITI were generally more likely to report a positive change in AITCS-II post intervention (ANOVA not significant,  $p = .23$ ), compared to teams without this support.

### Discussion

We developed and piloted CAPACITI as an education intervention for primary care providers to better apply a palliative care approach in their practice, facilitated through teamwork. The teams that participated in this study were interprofessional, including physicians, nurses, allied health professionals, and administrative staff. Following the training intervention, we found that there was a significant improvement in team collaboration overall, as measured on the AITCS-II questionnaire. Improvements in the Cooperation and Partnership subdomains of the scale were also demonstrated. There was considerable variation between the teams in reported pre-intervention collaboration and the extent to which this improved following CAPACITI, although most teams scored at the higher end of the AITCS-II scale from the start. This is not surprising within a sample of teams whose members were already organized among themselves enough to participate together in an education intervention, particularly one that spanned 10 monthly sessions.

Throughout the intervention, the ideas of partnership, cooperation, and coordination among inner team members and external community members was encouraged. In the first session of CAPACITI, educators stressed the importance of teamwork, described how to assess team readiness for change, and encouraged team reflection on sentinel events of when patient palliative care went well or poorly. As part of their CAPACITI work, the teams mapped out who their partners are in providing palliative care both within their care setting and in the broader community. Teams were to decide who would be responsible for the processes implemented, such as, identifying, assessing, and ongoing monitoring of their patients requiring palliative care – establishing role clarity. The CAPACITI Team, including experts and facilitators, regularly encouraged members of teams to work together on the assignments that followed each session, for example, creating a registry of patients identified as requiring a palliative

approach to care. Finally, CAPACITI was inclusive of managers and administrative assistants, as they are instrumental in promoting team communication and coordination. Indeed, six of the teams had a designated coordinator/manager. In doing these things, CAPACITI supported the key tenants to strengthening interprofessional practice, as proposed in the Framework for Interprofessional Team Collaboration for Advancing Team Competencies (McLaney et al., 2022) including group reflection, role clarification, shared decision-making, and open communication. Ultimately, our results suggest that collaboration can be improved through a dedicated education program, including those facilitated virtually.

To the best of our knowledge, the AITCS-II questionnaire has not previously been used to measure collaboration in a palliative care context in a primary care setting. The scale has been used in other areas of care such as physical rehabilitation, neonatal intensive care settings and with therapists in a tertiary care settings (i.e., Hospitals) (Beynon et al., 2022; Caruso et al., 2018; Mäki-Asiala et al., 2022; Pawłowicz-Szlarska et al., 2022; Suzuki et al., 2022). In fact, team collaboration itself is rarely cited as an outcome in evaluations of palliative care training, as evidenced in the findings of two recent systematic reviews that examined the measures used in these types of initiatives (Li et al., 2021; Seow et al., 2023). Education focusing on specialized clinical skills alone may be limited in changing behavior in generalist practice without team-based supports to affirm and operationalize this knowledge (Bohmer, 2016; Regmi & Jones, 2020; Rosen et al., 2018). Increasing interprofessional team collaboration helps improve healthcare process, benefits providers, and is the key to better care for patients overall (Reeves et al., 2017; Regmi & Jones, 2020; Zwarenstein et al., 2009). While training initiatives in palliative care often aimed at groups of providers from a given setting (Li et al., 2021; Seow et al., 2023), interprofessional teams do not function by virtue of providers working in proximity to one another. As with CAPACITI, these training initiatives should include a team-building component and incorporate relevant metrics of effectiveness into assessments.

### Limitations

Our study has several limitations. Our unit of analysis for this study was the team, translating to a relatively small sample size for team analysis (17 teams paired). The paired differences in the teams' summary and sub-domain scores were positively skewed, bringing into doubt the assumption of normality of the data for the parametric test we used. Comparable non-parametric tests produced results similar to the paired t-tests (Wilcoxon Signed-Rank Test AITCS summary score  $p = .028$  vs paired  $T = 0.033$ ); however, for simplicity, we reported the parametric results. The very high reliability we found for the AITCS scale overall ( $\alpha = 0.97$ ) may indicate redundancy among the questionnaire items but may also be a product of our small sample size. Participating teams varied in size, location, other characteristics; nonetheless, our study lacked power to statistically test associations between these characteristics and changes in collaboration. While many of the teams

improved similarly in the three sub-domains in the AITCS-II scale, coordination did not reach statistical significance, likely due to greater variability between teams on this sub-domain and missing data from one team, reducing the sample size for this analysis. If we apply a Bonferroni correction for the three multiple subdomain tests ( $p < .017$ ), only the change in the Partnership sub-domain remains significant. Another limitation is that the start of CAPACITI in early 2020 coincided with the beginning of the COVID-19 pandemic, which meant a pivot in the education sessions to accommodate changes in priorities for healthcare workers and some teams withdrawing from the program. Among the teams that completed CAPACITI, we were missing post-intervention data from six teams. Although these teams' AITCS-II scores were similar to those teams included in the main analysis, it is possible that the missing teams were less successful at improving interprofessional collaboration. Furthermore, the survey data was self-reported by teams leads and could be subject to social desirability bias, and/or may not be a true representation of the options of all team members. However, with approximately 15 months transpiring between pre and post surveys, recollection and deliberate inflation of initial responses would be unlikely. Finally, our findings may not be representative of community-based primary care practices in general. Our intervention used targeted recruitment strategies for teams interested in building competency in a palliative approach to care and were willing to work together to achieve this goal.

### Conclusion

In our quasi-experimental study, CAPACITI demonstrated the potential for improving collaboration within interprofessional teams looking to increase their knowledge and competency in providing a palliative approach to care. This study adds to the limited body of research examining team collaboration in relation to palliative care training. Team building is critical to building capacity in primary care to care for seriously ill and end-of-life patients and should be examined as part of the intervention evaluation plan. We will be conducting a large scale, randomized controlled trial of CAPACITI that will examine individual (member) assessments of team collaboration (AITCS-II) as an outcome, comparing self-directed versus facilitated modes of program delivery. This study will allow for greater exploration of the impact of co-variables, such as team readiness, on the intervention's ability to improve collaboration.

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