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An examination of the perceived impact of a continuing interprofessional education experience on opiate prescribing practices

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Abstract

Chronic pain is increasingly recognized as a public health problem. We assessed the effectiveness of a multi-modal, interprofessional educational approach aimed at empowering healthcare professionals to make deliberative changes, especially in opiate prescribing practices. Education activities included enduring webcasts, regional interprofessional roundtable events, and state-level conference presentations within targeted Kentucky and West Virginia regions of the United States. Over 1,000 participants accessed the various activities. For the live events, the largest groups reached included nurses (38.1%), nurse practitioners (31.2%), and physicians (22.1%). In addition to our reach, higher levels of educational effectiveness were measured, specifically, learner's intentions to change practice patterns, confidence in meeting patient's needs, and knowledge of pain management guidelines. The majority of the conference (58%) and roundtable (69%) participants stated they intend to make a practice change in one or more areas of chronic pain patient management in post-event evaluation. Differences in pre- and post-activity responses on the measures of confidence and knowledge, with additional comparison to a control population who were not in attendance, were analyzed using non-parametric tests of significance. While

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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neither activity produced significant changes in confidence from pre-activity, participants were more confident post-activity than their control group peers. There were significant changes in knowledge for both live event and webcast participants. Impactful chronic pain continuing the education that emphasizes collaborative care is greatly needed; these results show that the approaches taken here can impact learner's knowledge and confidence, and hold potential for creating change in how opioid prescribing is managed.

Keywords

Interprofessional education; Organization learning and change; Chronic pain; Program planning/ curriculum development; Pain management

Introduction

Long-standing, diffuse chronic pain is one of the most prominent causes of disability worldwide (Vos et al., 2012) and can be associated with a number of medical conditions. Of these, the Centers for Disease Control and Prevention (CDC, 2010, 2012) reports that arthritis is the most prevalent, and is the most common diagnosis for which patients seek the care of a healthcare provider. In recognition of the challenges that chronic pain presents both to public health and to healthcare systems, a recent report called for a transformation in the way pain is understood, assessed, treated, and prevented (Institute of Medicine Committee on Advancing Pain Research CE, 2011). A recently released National Pain Strategy (NPS) from the U.S. Department of Health and Human Services (2016) further described needed initiatives and recommended research areas. Among the identified priority gaps was the need to advance health care practitioner knowledge and competencies related to pain assessment and treatment, including safe and effective opioid prescribing. In line with the NPS working group's call for professional education and training, we report here on the methodology and evaluation of a multi-faceted educational initiative that reached out to an interprofessional audience in two high-need Appalachian regions.

Convincing in the Institute of Medicine Committee on Advancing Pain Research CE (2011) background description was the significance of chronic pain as a public health problem: Pain affects at least 116 million United States (U. S.) adults, with costs that exceed \$560 billion annually or an amount equal to about \$2,000 for everyone living in the U.S. Our educational initiative sought to address the problem of chronic pain management in two areas of the country, the Kentucky and West Virginia Appalachia regions, where providers see a disproportionately high prevalence of painful and disabling conditions in their practices. In 2013, 16.1% of adults in Kentucky and 19.2% in West Virginia reported having a disability, compared with 10.8% of the U.S. population (Erickson, Lee, & Von Schrader, 2014). Adding to the tremendous burden that chronic pain presents on medical resources and lost productivity, it was the focus of this study to address the crisis-level problem of prescription overuse and abuse. In a 2014 Substance Abuse and Mental Health Services Administration (2015) National Survey, almost 2 million Americans were dependent or addicted to prescription opioids. Geographic variation exists here as well: A CDC report (2014) ranked West Virginia third, and Kentucky fourth in the United States for the number of opioid pain

reliever prescriptions (128.4 and 137.6 per 100 persons, respectively; versus 87 nationally across the same time period). These rates are alarming and are at the core of our national epidemic of overdose from prescription opioid pain relievers. Despite an ambulatory services report that there has been no overall change in rates of pain-related symptoms (Daubresse et al., 2013), the CDC (2016a) reports that opioid prescriptions have quadrupled over a 15-year study period, as has the rate of overdose from these prescriptions (on average, there are 78 deaths a day in the United States from an opioid overdose). West Virginia and Kentucky again lead the country in drug overdose deaths, both with over 24.7 deaths (compared to a national average of 16.1) per every 100,000 people (CDC, 2016b).

Several studies show that primary care providers (PCPs) do not feel adequately trained for, and/or are dissatisfied with, treating chronic pain patients (Pearson, Moman, Moeschler, Eldrige, & Hooten, 2017; Potter et al., 2001). To better address the problem of chronic pain management, many experts and clinicians agree that an interprofessional collaborative approach is needed to achieve maximum benefit for patients (Dobscha et al., 2009; Thielke, Corson, & Dobscha, 2015). Team-based approaches are also in alignment with the Patient-Centered Medical Home and Chronic Care Model. However, these efforts may fall short of their potential given reports that PCPs maintain minimal interaction and communication with other pain professionals, and often have misperceptions about how they could contribute to the plan of care (Elder, Hargraves, Boone, & Talat, 2016). For this reason, greater emphasis on interprofessional education (IPE) that fosters relationships and breaks down professional “silos” (Margalit et al., 2009) has been advanced and conceptualized as a distinct method of knowledge and value-sharing within and across two or more professions (Olenick, Allen, & Smego, 2010).

With few published studies on the topic, there exists no standardized instrument with which to measure the success of IPE relevant to chronic pain management (Carr & Watt-Watson, 2012; Ung, Salamonson, Hu, & Gallego, 2016). Nevertheless, prior research has shown gains across several domains, including knowledge of pain and interprofessional relationships (Hadjistavropoulos et al., 2015) and self-efficacy to manage patients with chronic non-cancer pain (Allen, Macleod, Zwicker, Chiarot, & Critchley, 2011). Behavioral change in provider documentation processes as well as changes in patient-reported pain intensity following IPE upon pain management has also been reported (Iraqpour, 2006).

This study sought to address the need for far-reaching professional education by delivering, in a 15-month program called the Central Appalachia Interprofessional Pain Education Collaborative (CAIPEC), a multi-faceted IPE program for Kentucky and West Virginia health professionals. Our educational goal was to reach a large audience of professionals by offering three different types of learning opportunities: regional interprofessional roundtable events, state-level conference presentations, and enduring webcasts. Otherwise, the content and evaluation of each venue was kept as similar as possible and was aligned with evidence-based guidelines and expert resources from the Institute for Clinical Systems Improvement, American Academy of Pain Management, American Academy of Pain Medicine, American Pain Society, and PainEDU.org. The content derived from these resources was augmented by input from specialists in each of the targeted professions as well as inter-professional societies and research including materials provided from the American Massage Therapy

Association, the Orthopedic Section of the American Physical Therapy Association, and research in Cognitive-Behavioral Therapy. While at the time of development the CDC guideline (Dowell, Haegerich, & Chou, 2016) was not yet available, our content was markedly similar in providing recommendations for evaluating the chronic pain complaint, assessing risk factors for complications and aberrant use of opioids, managing pain through non-pharmacologic options and team-based approaches and ensuring safe use of opioids.

The framework for IPE guided the content of our educational offerings to facilitate, as much as possible, an emphasis on collaborative care (see the description of Educational Framework, below). For example, the webcast modules gave equal emphasis to collaborative approaches as the in-person venues, but were necessarily less interactive and hence were not predicted to reach the equivalent level of impact as our more socialization-focused IPE roundtable events. Evaluation of the program was in line with program goals and current IPE teaching methodology approaches (Olenick et al., 2010). We investigated the effectiveness of the CAIPEC educational initiative based on pre- and post-measures of provider's intentions to change their practice patterns with regard to the care of chronic pain patients, their confidence in meeting the needs of chronic pain patients, and knowledge of evidence-based chronic pain management guidelines that served as the basis of the CAIPEC interprofessional approach.

Background

Educational activity format

CAIPEC utilized a multi-modal approach to deliver educational activities on safe prescribing and pain management practices among those suffering from chronic pain. The education activities included eight enduring webcasts (www.cecentral.com/CAIPEC), eight regional interprofessional roundtable events, and 4 state-level conference presentations. The variety of approaches, scheduling, and sheer quantity of the available activities ensured greater reach and allowed participants to attend sessions according to their own preferences and availability. In fact, the intent was not for providers to attend more than one event, but rather, offer various modalities with equivalent objectives and content to best meet their preference to achieve increased reach. All activities were delivered by at least two health providers that included a physician, psychologist, and/or a massage therapist. All events were approved for continuing education (CE) credit by CE Central for all the professions listed above. All lectures shared a cross-cutting foundation of topics and objectives that included:

- Epidemiology of Chronic Pain
- The Biopsychosocial Aspects of Chronic Pain
- Risk Management
- Chronic Pain History and Shared Decision making Approaches
- Examination and Diagnostic Testing in Patients with Chronic Pain
- Non-Pharmacologic and Pharmacologic Treatment Options

- Practice Enhancement in Managing People with Chronic Pain through a team-based approach

Content was based on several resources (described earlier) and included pain guidelines (Hooten et al., 2013) and content developed by CAIPEC's partner, Collaborative for Risk Evaluation and Mitigation Strategies (REMS) Education (<http://www.core-remis.org>).

Webcasts

The seven webcasts were approximately 30-minutes each and were delivered by a physician and psychologist. Each webcast was approved for opioid prescribing education requirements in Kentucky by the state medical licensure board.

Community roundtables

Interprofessional roundtables were performed in Eastern Kentucky (n=4) and West Virginia (n=4). These events were case-based and were structured to include an introductory discussion of salient points to pain management followed by break-out small group discussions of various cases. The groups then re-convened for a "report out" on their specific cases. The roundtables encouraged discussions focused on different professional perspectives and how team-based approaches may be possible in managing those with chronic pain. Most groups were small enough to allow participation from the breadth of professionals in a single group; larger sessions were intentionally grouped so that each profession was distributed across the groups. All roundtable events were facilitated by a physician, a psychologist, and a massage therapist.

Conferences

CAIPEC partnered with the family medicine, primary care, and rural health associations in Kentucky and West Virginia to present 2 lectures in each state, each lasting 2 to 4 hours, on safe prescribing and pain management practices at their annual conferences. Like the roundtables, these events were approved for opioid prescribing education requirements by the state medical licensure board in Kentucky. Two of the four conferences were family medicine state conferences, while the rural health and primary care conferences hosted providers of varying professions. Each was delivered by a physician and by a psychologist.

Educational activities framework

The framework for interprofessional education outlined by the World Health Organization (2010) and the findings from Englander et al. (2013) and the Interprofessional Education Collaborative (2016) on core educational competencies guided all content. Specifically, the curriculum emphasized shared values, knowledge of roles and responsibilities, interprofessional communication, and collaborative teamwork in creating improved health outcomes for chronic pain patients. While all events sought audience representation from the breadth of chronic pain specialists (physicians, physician assistants, massage therapists, physical therapists, psychologists and other behavioral health therapists, etc.), the roundtables in particular were truly interprofessional and drew upon the sharing of knowledge of one's own role and the roles of other health professionals.

Methods

This study was a quasi-experimental, with a nested case-control, design. Participants were surveyed before and after the educational activities. In addition, these participants were compared to a control group of physicians who did not participate in any of the educational activities as described below. The study occurred between March 2016 and October 2017.

Participants

CAIPEC targeted Eastern (Appalachia) Kentucky and West Virginia area professional providers in the field of primary care medicine and/or involved in patient care in the ambulatory setting: This included nursing, behavioral health/psychology, physical therapy, and massage therapy. These populations were reached through dissemination efforts by several collaborative partners, including respective state and national professional organizations, regional healthcare facilities, list-serves hosted by our continuing education provider (CE Central), and regional area health education centers. Dissemination was conducted through electronic transmission and print.

A control population of 54 family medicine physicians who did not participate in any CAIPEC activity was also included. This control group was compared to participants for the outcome measures described below.

Data collection

Standardized assessments were used for data collection for all participants and included demographic information to gain information about the learner profile, in addition to the outcome measures described below. Participants were met by the program coordinator and asked to complete the assessments before (learner profile, confidence, knowledge) and after (confidence, knowledge, impact/intentions to change practice) the activity by the program coordinator at each live event. Applicable CME was then provided to the participants. For webcast participants, completion of the baseline evaluations was required before they could gain access to the videos. Completion of the post-activity assessment was required in order to gain the applicable CME credit.

Outcome measures

CAIPEC outcome measures were aligned with a CE framework to evaluate the reach and effectiveness of the educational methods. The number of CE credits provided and the professional distribution of CE for each activity type was reported. The evaluation instrument for knowledge attainment and confidence as well as intention to change practice was developed based on previously tested instruments in the literature (e.g., The Knowledge and Attitudes Survey Regarding Pain: Ferrel and McCaffery (2014), the Dartmouth Hitchcock Medical Center's Medical Staff Knowledge and Attitudes Pain Survey: Whedon, 1995; and others: Brzezi ski, Zagórski, Panasiuk, & Brzezi ska, 2012; Zanolin et al., 2007). Given our inter-professional audience, these instruments were chosen as they had previously been used by different professions for research and educational purposes and provided a broad evaluation of different levels of effectiveness of our educational methods (e.g., from participation to competence; see Moore, Green, & Gallis, 2009). The assessment of

declarative intent to change practice targeted various domains, including patient management, monitoring therapy, patient education, and assessing risk factors for opioid use. The questionnaire also included specific actions participants intended to take, was given immediately after completion of the activity by the coordinator. Confidence in managing various aspects of chronic pain was assessed at baseline and then after the educational activity using a Likert scale. Also, for each activity, pre- and post-knowledge and attitude assessments were evaluated as change in percent correct based on previously published evaluation tools.

Unfortunately, learner profile (other than the profession), and analysis of learner's declarative intent to change practice, and assessment of confidence were not available for the webcasts. This is because only five participants completed the assessments within 8 weeks after finishing all eight webcasts.

Data analysis

Counts and frequencies were used to assess reach (i.e., CE credit, demographics and profiles, intent to change measures) of each activity. Intentions to change practice are reported as means and percentages for each action specified. The impact (pre/post) of the educational activities on provider's confidence in managing various aspects of chronic pain, and differences in percent correct on the knowledge assessment, were evaluated using Wilcoxon signed-rank test. Confidence and knowledge measures were also compared to the control group using the Mann-Whitney U test. All analyses were conducted using SPSS v.21 and results were evaluated at the 0.05 level of significance.

Ethical considerations

All CAIPEC activities were reviewed by the Institutional Review Board of each lead institution, and a waiver of informed consent for the collection of evaluative data from the learners was granted.

Results

Educational reach

There were 949 participants who accessed the various activities including the roundtables, conferences, and webcasts (Table 1). A total of 915 hours of continuing education credit was requested; 51.1% of CE credit was provided through the webcasts, 45.6% was provided through the conferences and 3.3% was provided through roundtables.

Learner profile—One of the goals of the CAIPEC program was to reach a diverse professional spectrum of health professionals. As Table 2 demonstrates, our program reached physicians, nurse practitioners, nurses, physician assistants, massage therapists, physical therapists, psychologists, and other health professionals, such as health administrators. The largest groups reached included nurses (38.1%), nurse practitioners (31.2%) and physicians (22.1%). No additional data on learner characteristics were gathered from webcast participants. Because the distribution of health professionals differed by type of educational event, results are reported separately for conferences and roundtables.

Conferences—Conferences were primarily attended by physicians who were mostly registered with the U.S. Drug Enforcement Agency (DEA). Over 70% reported prescribing schedule 2 or 3 medications (Table 3). Over 50% of the participants had prescribed at least one Extended-Release and Long-Acting (ER/LA) Opioid Analgesics prescription in the past year. A majority of the participants have been in practice for more than 25 years and few managed a high number (i.e., >100) of acute pain or chronic pain patients. Approximately 43% of physicians and 14.3% of nurse practitioners reported that 10–25% of their patients with chronic pain were also managed by non-physician providers such as physical therapy, massage therapy, chiropractor and/or a specialist in behavioral health.

Roundtables—Surveys of the roundtable participants also demonstrated that physician providers were the predominant group prescribing schedule 2 or 3 medications and were registered with the DEA (Table 3). This group ranged in the number of years in practice from less than 5 years to more than 25 years. In addition, there was wide variation in the number of patients managed for acute pain and/or chronic pain. Less than 20% of the participants did not use non-physician providers in the management of their chronic pain patients.

Declarative intent to change practice

Program participants were asked if they intended to make changes in practice in various domains of pain management as a result of participating in the activity. They were also asked if they would make changes in several specific domains including patient management, monitoring therapy, patient education, and assessing risk factors for opioid use.

Conferences—Over 58% of conference participants stated that they intended to make changes in managing patients with chronic pain as a result of participating in the activity (Table 4a). Approximately 24% were not sure, but were considering making changes as a result of the activity. In total, participants stated that they will make 4 changes in patient management factors, over 1.7 changes in monitoring therapy, 1.5 changes in the area of risk factor management, and approximately 0.5 changes in the area of patient education related to chronic pain and opioid use (Table 4b).

Roundtables—Approximately 69% of roundtable participants stated that they intend to make a change in practice in one or more areas related to chronic pain patients and opioid use. Another 24.1% of the participants were not sure, but would consider making changes. Approximately 23% of participants stated that they will work to address barriers in making these changes (Table 4a). Most changes anticipated were in the domains of patient management, monitoring therapy, and assessing risk factors for opioid use; participants reported a total of 16.8, 7.9, and 6.9 anticipated changes, respectively, for these factors (Table 4c).

Confidence assessment

Activity participants were asked a series of questions related to their confidence in managing various aspects of chronic pain. These areas included assessing the risk of abuse, misuse, or

other aberrant behavior, managing pain with a team-based approach and with other non-physician providers, and/or non-opioid and opioid regimens.

Conferences—As shown in Table 5, statistically significant changes in confidence were observed in all areas when comparing pre- to post-activity responses. When compared to the responses of a control group, post-activity responses were also higher, showing greater confidence in most categories. However, there was not a significant change in confidence in managing pain with non-opioid analgesics.

Roundtables—Participants also showed statistically significant changes pre- to post-activity in all areas of confidence as shown in Table 6. When compared to a control group of participants, roundtable participants showed significantly higher post-activity confidence measures in the areas of assessing the risk of abuse, managing pain with team-based approaches, recognizing signs of aberrant drug-related behaviors, and overall management of chronic pain patients in practice. Consistent with the content of the roundtables (which emphasized, primarily, patient and team-based practice management), there were no significant differences in the area of managing pain with non-opioid analgesics, immediate release opioids, or with ER/LA opioids.

Knowledge assessment

As shown in Table 7, there were significant changes in scores in the knowledge test for roundtables, conferences, and webcasts. Moreover, participants in each of these venues had significantly post-activity higher scores than their peers in the control group.

Discussion

Treatment of chronic pain in the primary care setting differs from many other chronic diseases cared for by primary care providers because of the ready availability of opioid medications as a single treatment option. While integration of additional care approaches and collaborative care interventions have shown promise, collaborative efforts will not reach the desired level of impact without adequate educational outreach. The CAIPEC program described here met several of the informational needs that were identified by PCPs in other studies (Clark & Upshur, 2007), as well as engaging a spectrum of care professionals to emphasize collaborative team-based efforts. Efforts like this, shown here to impact provider practices, confidence, and knowledge regarding the treatment of chronic pain, are critically needed in an era of rampant opioid prescribing and prescription abuse. That the model found success in the Appalachia areas of Kentucky and West Virginia, where opioid prescribing is disproportionately high compared to national averages, speaks to the potential that the program holds for affecting practice change.

The multi-modal continuing education approach adapted for CAIPEC is based on evidence that continuing education activities that incorporate more than one educational technique are more likely to result in a change in provider practices than single techniques (Alford, Carney, Brett, Parish, & Jackson, 2016; Davis & Galbmith, 2009). This program described here provides evidence that each educational activity significantly impacted provider's knowledge and confidence, even as compared to a control group. Such evidence is

necessary, as increased knowledge and competence are tantamount to subsequent practice change. One area where there was not a significant difference from control was in confidence of conference participants to manage pain with non-opioid analgesics, because participants tended to have already high levels of initial confidence. This ceiling effect reflects comfort with non-pharmacologic approaches to treatment; an encouraging finding given evidence that such approaches are persistently underutilized due to perceived barriers to access and availability of such services (Giannitrapani et al., 2017).

While all IPE learner outcomes are unlikely to be assessed in a given study (Gillan, Lovrics, Halpern, Wiljer, & Harnett, 2011), evidence for a change in knowledge and confidence, and the additional reporting by learners for an intention to change practices (Table 4a–c), is an especially important outcome, as it represents higher-level impact of the IPE according to frequently used models of learner outcomes of educational initiatives. These include the original evaluation model described by Kirkpatrick (1996) and adapted to IPE by Barr, Koppel, Reeves, Hammick, and Freeth (2005), as well as the formulation by Moore et al. (2009) that is more specific to planning and assessment of continuous learning for physicians. These authors describe a hierarchy for the evaluation of learner outcomes, wherein a more surface-level impact of IPE (levels 1 and 2) would be found if an individual expresses positive views on the learning experience and its interprofessional nature, and experiences change in perception or attitude towards the value or use of team approaches. A more advanced impact of IPE is found when there is individual acquisition of knowledge and/or skills, and particularly if that advances to an experienced change in the learners' approach to professional practice (level 3); the final impact is on how the IPE experience might impact organizational structure and patient outcomes (level 4).

The content and evaluation of the live events as well as the webcasts was identical, and thus it was reasonable to evaluate the CAIPEC program as a whole. However, as expected, the greater opportunity for interprofessional dialogue and socialization afforded by the roundtable events impacted the number of professionals affirming an intention to change their practices following a live event (58.6% of conference participants versus 69% of roundtable participants). Unfortunately, participant nonresponse to webcast evaluation requests did not allow us to make further comparisons of event effectiveness on confidence and intention to change practices.

An interprofessional audience was targeted for the CAIPEC educational activities as modern practice is seldom a single professional entity. Especially in chronic pain management, various professionals are engaged that reside outside the primary care setting, such as physical therapy, massage therapy, and pain management specialists. Nonetheless, awareness of each other's role and what each offers in the care of a patient with chronic pain is vital in order to achieve optimal patient-centered outcomes. This also lends to managing chronic pain with non-pharmacologic modalities, potentially reducing the dependency of opioid medications. Like other reports of continuing education programming on topics of importance to the primary care provider (e.g., Coleman, Roberts, Wulff, Van Zyl, & Newton, 2008; Robben et al., 2012), we learned from our project that the relationships and exposure to each other's viewpoints in an IPE setting can be just as important as the educational content. Relatedly, the messaging that we feel was most important to convey to learners

concerned the need for shared decision-making as the core of an individualized approach to chronic pain management. Secondary to this, our recommendation for development of IPE for chronic pain treatment is content that focuses on the type and source of pain, impact on psycho- and functional status (and monitoring of these aspects), a focus on non-pharmacological options, and considerations of risk and monitoring when opioids are the considered treatment option.

CAIPEC successfully reached numerous types of professionals and its online materials allows its various health professional partners to continue disseminating this free resource, further sustaining the program's reach. Virtual access, combined with the in-person initiatives, may be especially effective within other rural areas similar to those studied; as suggested by a review of rural CE, Internet-based learning is most useful when combined with local outreach and opportunity for communication with colleagues and consultants (Curran, Rourke, & Snow, 2010).

In relation to study limitations, some professions that are involved in the dispensation of opioids were not included in our initiative either because they were not thought to be involved in direct patient care, such as pharmacy, or are not centered in the ambulatory setting, for example, dentistry. We recognize that our focus on the interaction of professions who are centered in primary care may have limited the applicability of our findings to other professions, and future research certainly may benefit from the inclusion of these perspectives. It is inherently difficult to avoid the problems of self-selection and self-report bias, and generalization to a larger population of professionals may be limited given the possibility of higher levels of motivation and/or baseline knowledge of our attendees. The influence of levels of experience or years in practice on adaptability to interprofessional training may also influence our findings and should be examined further. Finally, there has been a call for more robust evaluation of IPE in literature reviews (Reeves et al., 2016; Zwarenstein et al., 2001), and a recognized need to strengthen the evidence base linking IPE with health and changes in behavior, as well as organizational and system outcomes to reflect higher levels of learning within evaluative models of IPE (Brandt, Lutfiyya, King, & Chioreso, 2014; Carr & Watt-Watson, 2012; Gillan, Lovrics, Halpern, Wiljer, & Harnett, 2011; Jackson et al., 2016; Reeves et al., 2010; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013), and it will be a priority in further development of our program to meet this call by assessing impact of our IPE on patient-centered outcomes (e.g., quality of life, change in functional status) as well as rates of opioid prescribing.

Concluding comments

Providers are obligated to provide a safe approach in managing patients suffering with chronic pain. The CAIPEC program has shown it can increase knowledge and confidence in domains that are aligned with national guidelines and current educational competency needs for interprofessional education. Continuing education programs can, and must, empower the medical profession to make deliberative changes to address our current epidemic of opioid dependency and overdose.

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References

- Alford DP, Carney BL, Brett B, Parish SJ, Jackson AH. Improving residents' safe opioid prescribing for chronic pain using an objective structured clinical examination. *Journal of Graduate Medical Education*. 2016; 8(3):390–397. DOI: 10.4300/jgme-d-15-00273.1 [PubMed: 27413443]
- Allen M, Macleod T, Zwicker B, Chiarot M, Critchley C. Interprofessional education in chronic non-cancer pain. *Journal of Interprofessional Care*. 2011; 25(3):221–222. DOI: 10.3109/13561820.2011.552134 [PubMed: 21425918]
- Barr H, Koppel I, Reeves S, Hammick M, Freeth D. *Effective interprofessional education: Assumption, argument and evidence*. Oxford (UK): Blackwell Publishing; 2005.
- Brandt B, Lutfiyya MN, King JA, Chioreso C. A scoping review of interprofessional collaborative practice and education using the lens of the Triple Aim. *Journal of Interprofessional Care*. 2014; 28(5):393–399. DOI: 10.3109/13561820.2014.906391 [PubMed: 24702046]
- Brzeziński K, Zagórski J, Panasiuk L, Brzezińska M. Assessing levels of knowledge on the principles of pain management during post-graduate education of physicians in Poland. *Annals of Agricultural and Environmental Medicine*. 2012; 19(4):851. [PubMed: 23311819]
- Carr E, Watt-Watson J. Interprofessional pain education: Definitions, exemplars and future directions. *British Journal of Pain*. 2012; 6(2):59–65. DOI: 10.1177/2049463712448174 [PubMed: 26516470]
- CDC - Centers for Disease Control and Prevention. National health interview survey years 2007–2009. National Statistics; Arthritis Prevalence in Women and Men. 2010. Retrieved from <https://www.cdc.gov/nchs/nhis/>
- CDC - Centers for Disease Control and Prevention. National ambulatory medical care survey: 2012 State and national summary tables. 2012. Retrieved from https://www.cdc.gov/nchs/data/ahcd/namcs_summary/2012_namcs_web_tables.pdf
- CDC - Centers for Disease Control and Prevention. Opioid painkiller prescribing, Where you live makes a difference. 2014. Retrieved from <http://www.cdc.gov/vitalsigns/opioid-prescribing>
- CDC - Centers for Disease Control and Prevention. Injury prevention & control: Opioid overdose. Understanding the epidemic. 2016a. Retrieved from <http://www.cdc.gov/drugoverdose/epidemic/index.html>
- CDC - Centers for Disease Control and Prevention. Increases in drug and opioid overdose deaths — United States, 2000–2014. *Morbidity and Mortality Weekly Report*. 2016b; 64(50):1378–1382. [PubMed: 26720857]
- Clark LG, Upshur CC. Family medicine physicians' views of how to improve chronic pain management. *Journal of the American Board of Family Medicine*. 2007; 20(5):479–482. DOI: 10.3122/jabfm.2007.05.070029 [PubMed: 17823465]
- Coleman MT, Roberts K, Wulff D, Van Zyl R, Newton K. Interprofessional ambulatory primary care practice-based educational program. *Journal of Interprofessional Care*. 2008; 22(1):69–84. DOI: 10.1080/13561820701714763 [PubMed: 18202987]
- Curran V, Rourke L, Snow P. A framework for enhancing continuing medical education for rural physicians: A summary of the literature. *Medical Teacher*. 2010; 32(11):e501–508. DOI: 10.3109/0142159x.2010.519065 [PubMed: 21039092]

- Daubresse M, Chang HY, Yu Y, Viswanathan S, Shah ND, Stafford RS, Alexander GC. Ambulatory diagnosis and treatment of nonmalignant pain in the United States, 2000–2010. *Medical Care*. 2013; 51(10):870–878. DOI: 10.1097/MLR.0b013e3182a95d86 [PubMed: 24025657]
- Davis D, Galbmith R. Continuing medical education effect on practice performance. *Chest*. 2009; 135(3 SUPPL):42S–48S. DOI: 10.1378/chest.08-2517 [PubMed: 19265075]
- Dobscha SK, Corson K, Perrin NA, Hanson GC, Leibowitz RQ, Doak MN, Gerrity MS. Collaborative care for chronic pain in primary care: A cluster randomized trial. *The Journal of the American Medical Association*. 2009; 301(12):1242–1252. DOI: 10.1001/jama.2009.377 [PubMed: 19318652]
- Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain — United States, 2016. *MMWR Recommendations and Reports*. 2016; 65(RR-1):1–49. DOI: 10.15585/mmwr.rr6501e1
- Elder NC, Hargraves D, Boone J, Talat R. Interprofessional collaborative care for chronic pain: A qualitative assessment of collaboration for primary care patients with chronic pain. *The Journal of Continuing Education in the Health Professions*. 2016; 36(Suppl 1):S54–55. DOI: 10.1097/ceh.000000000000091 [PubMed: 27584075]
- Englander R, Cameron T, Ballard AJ, Dodge J, Bull J, Aschenbrener CA. Toward a common taxonomy of competency domains for the health professions and competencies for physicians. *Academic Medicine: Journal of the Association of American Medical Colleges*. 2013; 88(8):1088–1094. DOI: 10.1097/ACM.0b013e31829a3b2b [PubMed: 23807109]
- Erickson W, Lee C, Von Schrader S. 2012 disability status report: United States. Ithaca, NY: Cornell University Employment and Disability Institute (EDI); 2014. Retrieved from <http://disabilitystatistics.org/reports/2012/English/HTML/report2012.cfm>
- Ferrell B, McCaffery M. Knowledge and attitudes survey regarding pain. 2014. Retrieved from <http://prc.coh.org/>
- Giannitrapani KF, Ahluwalia SC, McCaa M, Pisciotta M, Dobscha S, Lorenz KA. Barriers to using nonpharmacologic approaches and reducing opioid use in primary care. *Pain Medicine*. 2017; :pnx220–pnx220. DOI: 10.1093/pm/pnx220
- Gillan C, Lovrics E, Halpern E, Wiljer D, Harnett N. The evaluation of learner outcomes in interprofessional continuing education: A literature review and an analysis of survey instruments. *Medical Teacher*. 2011; 33(9):e461–e470. DOI: 10.3109/0142159X.2011.587915 [PubMed: 21854139]
- Hadjistavropoulos HD, Juckes K, Dirkse D, Cuddington C, Walker K, Bruno P, Pitzel Bazylewski M. Student evaluations of an interprofessional education experience in pain management. *Journal of Interprofessional Care*. 2015; 29(1):73–75. DOI: 10.3109/13561820.2014.917613 [PubMed: 24828782]
- Hooten M, Thorson D, Bianco J, Bonte B, Clavel A, JrHora J, Walker N. Institute for Clinical Systems Improvement. Assessment and management of chronic pain. 2013. Retrieved from <https://www.icsi.org/>
- Institute of Medicine Committee on Advancing Pain Research CE. The National Academies Collection: Reports funded by National Institutes of Health. Washington (DC): National Academies Press (US), National Academy of Sciences; 2011. *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*.
- Interprofessional Education Collaborative. Core competencies for interprofessional collaborative practice: 2016 update. 2016. Retrieved from <https://www.ipecollaborative.org/resources.html>
- Irajpour A. Interprofessional education: A facilitator to enhance pain management? *Journal of Interprofessional Care*. 2006; 20(6):675–678. DOI: 10.1080/13561820600907799 [PubMed: 17095445]
- Jackson M, Pelone F, Reeves S, Hassenkamp AM, Emery C, Titmarsh K, Greenwood N. Interprofessional education in the care of people diagnosed with dementia and their carers: A systematic review. *BMJ Open*. 2016; 6:e010948.doi: 10.1136/bmjopen-2015-010948
- Kirkpatrick D. Great ideas revisited. *Training & Development*. 1996; 50(1):54.

- Margalit R, Thompson S, Visovsky C, Geske J, Collier D, Birk T, Paulman P. From professional silos to interprofessional education: campuswide focus on quality of care. *Quality Management in Healthcare*. 2009; 18(3):165–173. DOI: 10.1097/QMH.0b013e3181aea20d
- Moore DE Jr, Green JS, Gallis HA. Achieving desired results and improved outcomes: Integrating planning and assessment throughout learning activities. *The Journal of Continuing Education in the Health Professions*. 2009; 29(1):1–15. DOI: 10.1002/chp.20001 [PubMed: 19288562]
- Olenick M, Allen LR, Smego RA. Interprofessional education: A concept analysis. *Advances in Medical Education and Practice*. 2010; 1:75–84. DOI: 10.2147/AMEP.S13207 [PubMed: 23745066]
- Pearson AC, Moman RN, Moeschler SM, Eldrige JS, Hooten WM. Provider confidence in opioid prescribing and chronic pain management: Results of the opioid therapy provider survey. *Journal of Pain Research*. 2017; 10:1395–1400. DOI: 10.2147/jpr.s136478 [PubMed: 28652805]
- Potter M, Schafer S, Gonzalez-Mendez E, Gjeltema K, Lopez A, Wu J, Croughan-Minihane M. Opioids for chronic nonmalignant pain. Attitudes and practices of primary care physicians in the UCSF/stanford collaborative research network. University of California, San Francisco. *The Journal of Family Practice*. 2001; 50(2):145–151. [PubMed: 11219563]
- Reeves S, Fletcher S, Barr H, Birch I, Boet S, Davies N, Kitto S. A BEME systematic review of the effects of interprofessional education: BEME Guide No. 39. *Medical Teacher*. 2016; 38(7):656–668. DOI: 10.3109/0142159X.2016.1173663 [PubMed: 27146438]
- Reeves S, Perrier L, Goldman J, Freeth D, Zwarenstein M. Interprofessional education: Effects on professional practice and healthcare outcomes (update). *Cochrane Database of Systematic Reviews*. 2013; (3) Art. No.: CD002213. doi: 10.1002/14651858.CD002213.pub3
- Reeves S, Zwarenstein M, Goldman J, Barr H, Freeth D, Koppel I, Hammick M. The effectiveness of interprofessional education: Key findings from a new systematic review. *Journal of Interprofessional Care*. 2010; 24(3):230–241. DOI: 10.3109/13561820903163405 [PubMed: 20178425]
- Robben S, Perry M, Van Nieuwenhuijzen L, Van Achterberg T, Rikkert MO, Schers H, René Melis R. Impact of interprofessional education on collaboration attitudes, skills, and behavior among primary care professionals. *The Journal of Continuing Education in the Health Professions*. 2012; 32(3):196–204. DOI: 10.1002/chp.21145 [PubMed: 23008082]
- Substance Abuse and Mental Health Services Administration. Center for Behavioral Health Statistics and Quality. Behavioral health trends in the United States: Results from the 2014 national survey on drug use and health. 2015. HHS Publication No. SMA 15-4927, NSDUH Series H-50 Retrieved from <http://www.samhsa.gov/data>
- Thielke S, Corson K, Dobscha SK. Collaborative care for pain results in both symptom improvement and sustained reduction of pain and depression. *General Hospital Psychiatry*. 2015; 37(2):139–143. DOI: 10.1016/j.genhosppsy.2014.11.007 [PubMed: 25554014]
- U.S. Department of Health and Human Services. National pain strategy: A comprehensive population health-level strategy for pain. 2016. Retrieved from <https://iprcc.nih.gov/docs/DraftHHSNationalPainStrategy.pdf>
- Ung A, Salamonson Y, Hu W, Gallego G. Assessing knowledge, perceptions and attitudes to pain management among medical and nursing students: A review of the literature. *British Journal of Pain*. 2016; 10(1):8–21. DOI: 10.1177/2049463715583142 [PubMed: 27551407]
- Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, Memish ZA. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990–2010: A systematic analysis for the Global Burden of Disease Study 2010. *The Lancet*. 2012; 380(9859):2163–2196. DOI: 10.1016/s0140-6736(12)61729-2
- Whedon M. Medical staff knowledge & attitudes pain survey. Lebanon: New Hampshire: Dartmouth-Hitchcock Medical Center; 1995. Retrieved from <http://prc.coh.org/html/medka.htm>
- World Health Organization. Framework for action on interprofessional education and collaborative practice. 2010. Retrieved from http://www.who.int/hrh/resources/framework_action/en/
- Zanolin ME, Visentin M, Trentin L, Saiani L, Brugnolli A, Grassi M. A questionnaire to evaluate the knowledge and attitudes of health care providers on pain. *Journal of Pain and Symptom*

Management. 2007; 33(6):727–736. DOI: 10.1016/j.jpainsymman.2006.09.032 [PubMed: 17531913]

Zwarenstein M, Reeves S, Barr H, Hammick M, Koppel I, Atkins J. Interprofessional education: Effects on professional practice and health care outcomes. Cochrane Database of Systematic Reviews. 2001; :Cd002213.doi: 10.1002/14651858.cd002213 [PubMed: 11279759]

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Table 1

Reach analyses.

Activity	Number attended/Accessed^a	Total CE requested
Roundtables (8)	64	30
Conferences (4)	417	417
Webcast		
Module 1	70	70
Module 2	64	64
Module 3	60	60
Module 4	57	57
Module 5	56	56
Module 6	55	55
Module 7	55	55
Module 8	51	51
Totals	949	915

^aSame individuals may have accessed 1 or more webcasts

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Table 2

Learner profile^a.

Activity	Number attended/Accessed								Totals
	Physicians	Nurse Practitioners	Nurse	Physician Assistants	Massage Therapists	Physical Therapists	Behavioral Specialists	Other	
Roundtables (8)	23	10	7	6	6	6	0	6	64
Conferences (4)	102	20	0	6	0	0	0	6	134
Webcasts (Modules 1–8)	26	180	239	6	0	0	1	6	468
Totals	151	210	246	18	6	6	1	28	666

^aMay not equal 949 due to non-response

Table 3

Learner profile for live events.

	Conferences	Roundtables
Are you registered with the DEA?		
No	14.3%	54.8%
Yes	85.6%	45.2%
Are you licensed by the FDA to prescribe schedule 2/3 drugs?		
No	20.3%	61.0%
Yes	79.7%	39.0%
Have you written at least one ER/LA opioid prescription in the past year?		
No	46.1%	71.0%
Yes	53.8%	29.0%
Number of years in practice		
5 years	14.4%	30.9%
6–15 years	15.2%	20.0%
16–25 years	21.6%	20.0%
>25 years	48.0%	16.4%
Patients managed for acute pain		
5	40.5%	31.9%
6–15	27.0%	23.4%
16–30	11.7%	19.1%
31–60	6.3%	12.8%
61–100	5.4%	8.5%
100+	9.9%	4.3%
Patients managed for chronic pain		
5	35.6%	20.4%
6–15	12.2%	34.7%
16–30	15.6%	12.2%
31–60	11.3%	14.3%
61–100	9.7%	10.2%
100+	15.7%	8.2%
Pain Patients also managed by non-physician provider (PT, MT, BS)		
0%	28.6%	18.8%
10–25%	57.5%	37.5%
26–50%	0.0%	12.5%
51–75%	14.3%	18.8%
>75%	0.0%	12.5%

Table 4a

Live events-declaration of intent to change.

	Conferences	Roundtables
Intend to make changes?		
Yes	58.6%	69.0%
Not sure, considering	24.2%	24.1%
No, already practice it	14.8%	6.9%
No, not interested/willing to make change	2.3%	0.0%
Will address barriers?		
N/A	20.9%	33.9%
Yes	35.8%	22.6%
No	36.6%	40.3%

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Table 4b

Mean number of changes: Conferences.

Specific domain in which willing to make change	N	Risk Factors	Patient Management	Monitoring Therapy	Patient Education
Physician	102	1.71	4.03	1.70	0.57
APRN	20	1.10	3.70	1.45	0.25
PA	6	1.33	6.00	2.83	0.50
Other	6	0.50	3.00	1.67	0.33
Total	134	1.54	4.02	1.71	0.51

Table 4c

Mean number of changes: Roundtables.

Specific domain in which willing to make change	N	Risk Factors	Patient Management	Monitoring Therapy	Patient Education
Physician	22	2.00	5.00	2.59	0.45
APRN	9	1.56	2.00	1.11	0.56
PA	5	1.80	6.20	2.80	0.40
MT	6	0.50	1.50	0.50	0.67
PT	9	1.00	2.11	0.89	0.44
Total	51	6.86	16.81	7.89	2.52

Table 5

Conferences-learner confidence impact.^a.

How confident are you...	Conferences					
	Baseline to Post-activity			Education vs. Control group ^b		
	mean diff.	SE	p-value	mean diff.	SE	p-value
Assessing risk of abuse, misuse or other aberrant behavior?	0.92	0.08	<.001	0.63	0.18	0.001
Managing pain with a team-based approach?	1.54	0.23	<.001	0.78	0.30	0.01
Managing pain with other non-physician providers?	1.52	0.25	<.001	0.41	0.30	0.22
Managing pain with non-opioid analgesics?	0.87	0.12	<.001	0.36	0.21	0.15
Managing pain with immediate-release opioids?	1.36	0.14	<.001	0.64	0.23	0.01
Managing pain with ER/LA opioids?	1.43	0.16	<.001	0.76	0.26	0.007
Recognizing signs of aberrant drug-related behaviors?	0.71	0.10	<.001	0.56	0.17	0.001
Managing chronic pain patients in your practice?	1.39	0.23	<.001	0.84	0.26	0.002
In prescribing naloxone to opioid users for potential overdose emergencies? ^c	2.71	0.81	0.03	2.19	0.68	0.003

^aBased on the Likert scale (1 = No confidence to 7 = Very confident)^bComparison of scores from an independent control group to post-activity scores.^cNot asked in all activity assessments due to the required use of conference-provided assessment

Roundtables-learner confidence impact.^a.

Table 6

How confident are you...	Roundtables					
	Baseline to Post-activity			Education vs. Control group ^b		
	mean diff.	SE	p-value	mean diff.	SE	p-value
Assessing risk of abuse, misuse or other aberrant behavior?	1.36	0.17	<.001	0.54	0.22	0.01
Managing pain with a team-based approach?	1.02	0.18	<.001	0.56	0.28	0.05
Managing pain with other non-physician providers?	1.25	0.28	<.001	0.48	0.28	0.14
Managing pain with non-opioid analgesics?	1.15	0.29	<.001	-0.31	0.28	0.17
Managing pain with immediate-release opioids?	1.72	0.29	<.001	0.18	0.31	0.45
Managing pain with ER/LA opioids?	1.58	0.29	<.001	0.52	0.32	0.11
Recognizing signs of aberrant drug-related behaviors?	1.31	0.24	<.001	0.49	0.22	0.02
Managing chronic pain patients in your practice?	1.18	0.29	<.001	0.67	0.27	0.01
In prescribing naloxone to opioid users for potential overdose emergencies? ^c	na	na	na	na	na	na

^aBased on the Likert scale (1 = No confidence to 7 = Very confident)

^bComparison of scores from an independent control group to post-activity scores.

^cNot included, as topic coverage could not be guaranteed given case-based format of the sessions

Table 7

Continuing education knowledge impact.

	% Correct					
	Baseline		Post-activity		Control group ^a	
	mean	SE	mean	SE	mean	p-value
Roundtables (n = 62)	64.5%	2.6%	76.3%	2.0%	62.1%	1.5% <.001
Conferences (n = 136)	53.6%	1.2%	70.2%	1.4%	62.1%	1.5% 0.001
Webcasts (n = 46)	37.8%	2.4%	86.2%	2.8%	62.1%	1.5% <.001
All activities (n = 244)	53.4%	1.2%	74.6%	1.1%	62.1%	1.5% <.001

^aComparison of scores from an independent control group to post-activity scores.