Is There a Role for Pediatric Residents in Teaching Community Health Care Providers?

BY

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THESIS

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I would like to dedicate this thesis to my sister Jenny Ruano, and my parents Marta Cea and Mauricio Ruano. Their ongoing love and support were invaluable in helping me complete this work.
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# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AAP</td>
<td>American Academy of Pediatrics</td>
</tr>
<tr>
<td>ACGME</td>
<td>American Council of Graduate Medical Education</td>
</tr>
<tr>
<td>CPS</td>
<td>Canadian Pediatric Society</td>
</tr>
<tr>
<td>cHCPs</td>
<td>Community Health Care Providers</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuing Professional Development</td>
</tr>
<tr>
<td>RCPSC</td>
<td>Royal College of Physicians and Surgeons of Canada</td>
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<tr>
<td>RED</td>
<td>Reverse Educational Distance</td>
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Residents commonly engage in the role of teacher for peers and junior trainees. The associated
learning benefits for both the teachers and the audience are well known. Ten Cate (2007) frame
these learning benefits into two levels: 1) cognitive, which refers to the way the information is
processed and retained, and 2) affective, which refers to the motivation and interest to learn.
However, the concept of ‘reverse educational distance’ (RED), in which residents teach to an
audience academically senior to them, has never been studied. The potential impact on the
learning for the teacher and audience in this context is therefore unknown.

The study explored Pediatric residents’ and community health care providers’ (cHCPs)
perceptions of a novel Continuing Professional Development (CPD) intervention using the RED
model, whereby the teachers are residents and the audience is comprised of cHCPs. In particular,
we aimed to explore the perceived benefits and challenges of this educational strategy, and ways
to optimize the success for implementation in a Pediatric residency program.

Using a descriptive qualitative design, 8 focus groups were conducted, 4 with Pediatric residents
and 4 with cHCPs, which included 4 to 5 participants per focus group. Data were interpreted
using an inductive thematic analysis. The anticipated benefits of a CPD activity with RED
described by the residents were organised into three main themes: 1) optimizing residents’
incentive to learn; 2) focusing on the practical ‘real-world application’ of general pediatric
knowledge; and 3) acquiring a better understanding of community health care practice. Benefits
anticipated by cHCPs were grouped into two main themes: 1) being updated on recent guidelines
and evidence-based practices around pediatric topics; and 2) improving collaboration between
cHCPs and future pediatricians. The major anticipated challenge of RED was the lack of clinical
experience of the resident-teacher compared to the audience of cHCPs. Key suggestions for
implementation of this intervention were proposed including ensuring adequate support and
SUMMARY (continued)

preparation for the residents throughout the CPD intervention process.

Engaging residents as teachers for cHCPs could lead to learning benefits for both the teacher and audience similar to those described by Ten Cate (2007) when residents teach peers and junior trainees. Some of these learning benefits for the resident-teacher may however be enhanced while others may be unique to the context of RED.

Our findings can guide the development of novel CPD approaches that align with the core educational mandate of medical programs, namely preparing future Pediatricians as health educators for the community and fostering inter-professional collaboration. RED is a promising educational strategy for CPD.
I. INTRODUCTION

A. Background

The Canadian Pediatric Society (CPS) and the American Academy of Pediatrics (AAP) propose a model of Pediatrics to better address the health care needs of children and youth. With an expected shortage of the pediatric workforce and increasing number of pediatric patients with complex medical needs (Embree, 2009; AAP 2013), the model emphasizes collaborative medical practices with other health professionals who are at the frontline of care for children. As such, the priority for Pediatricians should be the delivery of comprehensive consulting care. Their work should target specific areas, namely assurance of quality care, i.e. “setting standards for practice, ensuring a focus on teaching and research, and fostering a healthy community of care providers” (Embree 2009). Involvement in educational and clinical collaborations with other health professionals is proposed as a mean to achieve this mandate (Embree 2009, AAP 2013).

The literature suggests that greater exposure to community experiences during residency leads to greater community involvement in the trainees’ future career (Minkovitz 2014, Solomon 2012.) As such, if future paediatricians are expected to fulfill their professional mandate of collaborating with the community and undertaking an educational role towards other health care providers (Embree 2009, AAP 2013), training curricula should provide opportunities for residents to learn about and experience that role. Involving Pediatric residents in teaching community health care providers (cHCPs) about Pediatric guidelines and best practices could therefore be a useful activity to introduce in residency training. The proposed educational strategy would also align with the educational mandate of training programs. In particular, it would align with the Scholar competency of the CanMEDS framework (Frank, 2015) and the Practice Base Learning and Improvement competency of the ACGME framework (2015), as both encompass concepts
associated with developing trainees’ knowledge and application of evidence-based medicine, and participating in the education of other health care professionals.

B. Traditional teaching role: Residents-As-Teachers or peer-teaching

The teaching role of residents often referred to as “Resident-As-Teachers” or “Peer Teaching” is well described in the literature (Ten Cate 2007, Post 2009, Ten Cate 2007, Backes 2011.) In this role, residents typically teach junior trainees, or trainees of a similar academic level. Ten Cate (2007) proposes a two-dimensional framework, which encompasses several theoretical perspectives, to help understand the various learning benefits related to peer teaching (figure 1). According to this framework, the learning benefits for both the peer-teacher (trainees in the teaching role) and the audience (trainees receiving the teaching) can be divided in two levels: 1) the cognitive and metacognitive level, and 2) the affective/motivational level (Ten Cate 2007).

<table>
<thead>
<tr>
<th>Cognitive and metacognitive level of learning</th>
<th>Postulated benefit for the student being taught</th>
<th>Postulated benefit for the student-teacher</th>
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<tr>
<td>Cognitive congruence</td>
<td>Goal-oriented information processing and verbal elaboration</td>
<td></td>
</tr>
<tr>
<td>Affective and motivational level of learning</td>
<td>Social congruence</td>
<td>Social, emotional and motivational components</td>
</tr>
</tbody>
</table>

Benefits for the peer-teacher include among others, improved knowledge on the topic being taught, improved teaching skills, and enhanced interest in teaching for one’s future career (Post 2009, Ten Cate 2007, Backes 2011). Ten Cate (2007) proposes that these benefits derive in part, at the cognitive level, from goal-oriented information processing and verbal elaboration. In the
process of preparing and presenting the teaching session, trainees approach the content material in a different way than when preparing for examinations. When studying for exams, trainees’ main goal is to attempt to predict what is on the test and memorize and study the material accordingly. However, when preparing for teaching, the peer-teacher develops personal learning goals about what is important to teach and how he/she will deliver the material. This allows the peer-teacher to integrate and verbalize the content in a way that will enhance his own understanding of the material. At a motivational level, benefits relate to the social and emotional aspects of teaching. Being in a teaching role makes the trainee “feel like an expert”, which provides the peer-teacher with a feeling of competence, autonomy and self-esteem. As such, the peer-teacher may be motivated to invest more time and effort to master the topic being taught (Ten Cate 2007). The expectations of the audience for a well-informed and prepared teacher may also motivate the peer-teacher to learn and master the topic to teach (Ten Cate 2007).

For the learners, benefits of peer-teaching include the facilitation of knowledge acquisition through cognitive and social congruence, two key determinants of learning (Lockpeiser 2008, Schmidt 1995, Ten Cate 2007). Cognitive congruence refers to similarities in cognitive schema or knowledge base between teachers and learners that allow the teacher to communicate the content in a way that can be easily understood by his audience (Yew 2014). Social congruence refers to the teacher’s interpersonal qualities and behaviours that create a positive and safe learning environment (Lockspeiser 2008, Yew 2014). Moust and Schmidt (1995) also emphasize in their theory of the effective tutor, that subject-matter expertise is a key determinant of learning, which is an underlying construct in Ten Cates’ framework.

**C. Residents in a new educational role**

Engaging residents in a teaching role for Continuing Professional Development (CPD) activities could be a valuable curricular strategy to introduce in Pediatric training program. This activity
could provide residents with exposure to the educator role with community health care providers (CHCPs) and as such, better prepare them to fulfill this component of their future professional mandate. However, this teaching strategy presents an important difference to the traditional model of Resident-As-Teacher or Peer Teaching in which the “audience” is usually junior, or at a similar academic level to the peer-teacher. In the proposed CPD strategy, residents would likely be teaching a more senior audience, i.e. healthcare providers with greater clinical experience and/or years of professional training compared to the teachers (Pediatric residents). Such scenario has been referred to in the literature as "reverse educational distance" (Ten Cate 2007), and has to date, been poorly described. To our knowledge, only two studies have explored the concept of reverse educational distance in a medical training program (Guffasson 2006, Wrist 2014). In both studies, the difference in seniority between the learners and the teachers was relatively small (one to two years), and all participants were still in training. For example, the study by Wrist and colleagues (2014) suggested that medical students could teach general surgery topics to junior residents at least as effectively as senior residents (Wrist 2014). This educational model was well accepted by both the students and the residents (Guffasson 2006, Wrist 2014).

The novelty of such a proposed CPD strategy lies principally in the fact that the reverse educational distance between the teacher (residents) and the audience (CHCPs) is more important than those reported in previous studies (Guffasson 2006, Wrist 2014.) This novel strategy also involves an audience of licensed health care professionals rather than trainees. Further research is needed to determine the acceptability of an educational strategy that incorporates the concept of reverse educational distance, and especially, to better understand the potential benefits and barriers to learning associated with its implementation in the context of CPD.

The objective of this study was to explore Pediatric residents’ and community health care providers’ (CHCPs) perceptions of a CPD intervention using a reverse educational distance model whereby the teachers are residents and the audience is comprised of CHCPs. In particular, we
aimed to explore the perceived benefits and challenges of this educational strategy, and ways to optimize the success for implementation in the Pediatric residency program.
II. METHODS

A. Design

The study consisted of a descriptive qualitative design using focus groups interviews.

B. Participants

We used convenience samples of Pediatric residents and community health care providers including general practitioners, nurses and nurse practitioners. All Pediatric residents (n=32) training at the Montreal Children's Hospital during the study period were recruited to participate in this study. There were no exclusion criteria, but first and second year residents (PGY1 and 2) were interviewed separately from third and fourth year residents (PGY3 and 4) because prior clinical experience could be a variable impacting their perspectives about being in a role of teacher for eHCPs.

All HCPs working in a community health care clinics offering Pediatric services and affiliated with McGill University (n=15) where recruited to participate. Health care professionals in training were excluded from the study to ensure that the idea of reverse educational distance between the teachers and the audience would be relevant to discuss. In order to facilitate interaction between participants, only the community clinics where at least four eHCPs volunteered to participate were included in the study.

The study received ethics approval by the McGill University and University of Illinois at Chicago Internal Review Board and informed consent was obtained from all participants.
C. Data sources

Between January and September 2015 all focus groups were conducted. These included a set of open-ended questions in line with the study objective (see table 1). These questions were piloted with a group of residents and cHCPs prior to conducting the study. All focus groups were conducted in English, except for 2 interviews with cHCPs that were conducted in French.

D. Data analysis

All focus group discussions were audio-recorded and transcribed verbatim. Through an inductive thematic analysis using a semantic approach and using open and selective coding, common themes and sub-themes were formulated and interpreted (Green 2014, Marshall 1996). Two investigators (ER and CK) independently coded two interviews (one with residents and one with cHCPs) and reached agreement on the main coding template. The remainder of the data was coded by the principal investigator (ER) using the main coding template and reviewed by two co-investigators (CK and AT) for inter-rater agreement. The French interviews were translated to English by the principal investigator and reviewed by a co-investigator (AT).

To ensure trustworthiness of the data analysis, member checking was performed with two Pediatric residents and two cHCPs. Participant identifying information was removed through anonymization with coding identifiers during the data analysis.
III. RESULTS

Between January and September 2015, a total of eight focus groups were conducted. Fifteen Pediatric residents (47%) participated in four focus groups (two focus groups with PGY1-2 trainees and two groups with PGY3-4 trainees). Each focus group was comprised of four participants except for one focus group that had three participants due to a last minute cancellation. A total of 18 cHCPs participated in four focus groups, with four to five participants per group. All focus group discussions were conducted by the principal investigator (ER) and lasted between 45 and 75 minutes. Data saturation of the focus group analysis was reached for both Pediatric residents and cHCPs.

The demographic characteristics of the participating residents and cHCPs are summarized in table I and II.

<table>
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<th>TABLE I</th>
<th>DEMOGRAPHIC CHARACTERISTICS OF PARTICIPATING RESIDENTS</th>
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<tr>
<td></td>
<td>Group</td>
</tr>
<tr>
<td>Residency level</td>
<td></td>
</tr>
<tr>
<td>PGY1-2</td>
<td>7 (47)</td>
</tr>
<tr>
<td>PGY2-3</td>
<td>8 (53)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>12 (80)</td>
</tr>
<tr>
<td>Male</td>
<td>3 (20)</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>1 (7)</td>
</tr>
<tr>
<td>26-30</td>
<td>10 (67)</td>
</tr>
<tr>
<td>31-40</td>
<td>4 (27)</td>
</tr>
<tr>
<td>Future career</td>
<td></td>
</tr>
<tr>
<td>General pediatrics</td>
<td>8 (53)</td>
</tr>
<tr>
<td>Sub-specialty</td>
<td>5 (33)</td>
</tr>
<tr>
<td>Not sure</td>
<td>2 (13)</td>
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The focus group interviews generated three main themes for the learning benefits for residents related to teaching in the context of reverse educational distance. Four main themes related to challenges about the proposed CPD intervention. For cHCPs, two main themes were obtained for their learning benefits, and one main theme emerged as a challenge related to the CPD intervention. Four themes were generated from the resident and cHCPs data regarding suggestions on how to optimize the success of the CPD strategy. An additional four themes were suggestions proposed by residents.

A. Residents’ perspectives of teaching in the context of reverse educational distance

1. Benefits

Pediatric residents reported that a teaching strategy involving reverse educational distance with cHCPs would benefit their learning by:

### TABLE II
DEMOGRAPHIC CHARACTERISTICS OF PARTICIPATING COMMUNITY HEALTH CARE PROVIDERS

<table>
<thead>
<tr>
<th>Group</th>
<th>Number (%)</th>
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<tbody>
<tr>
<td>Profession</td>
<td></td>
</tr>
<tr>
<td>Nurse/Nurse Practitioner</td>
<td>9 (50)</td>
</tr>
<tr>
<td>Family MD</td>
<td>9 (50)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14 (78)</td>
</tr>
<tr>
<td>Male</td>
<td>4 (18)</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
</tr>
<tr>
<td>20-30</td>
<td>5 (28)</td>
</tr>
<tr>
<td>31-40</td>
<td>9 (50)</td>
</tr>
<tr>
<td>41-50</td>
<td>3 (17)</td>
</tr>
<tr>
<td>51-60</td>
<td>1 (6)</td>
</tr>
<tr>
<td>% of practice related to children</td>
<td></td>
</tr>
<tr>
<td>0-25%</td>
<td>12 (67)</td>
</tr>
<tr>
<td>26-50%</td>
<td>6 (33)</td>
</tr>
</tbody>
</table>
1) Optimizing their incentive to learn because having an academically senior audience would increase their motivation to master the topic more so than when teaching junior trainees. This idea is exemplified by a senior resident who said: “I actually think I might learn a lot more (…) and the reason is I would research it more; I would want to know all the details. (…) Versus me teaching the students is (…) more of a routine that I do because it’s basics, and they need to learn that, but it doesn’t make me think more about it.”

2) Focusing on the practical ‘real-world application’ of general pediatric knowledge rather than focusing on the aspects required for examinations purposes. A PGY4 resident mentioned: “Often the teaching sessions we had as R4’s, we’d be like, ‘Okay, in the exam, what will you do?’ ‘Okay, now in real life, what would we do?’ Honestly, they’re different things (laughs).”

Other residents also felt this CPD strategy would shift the focus away from sub-specialty content and allow for greater exposure to general paediatrics. When discussing the idea of teaching cHCPs about the management of common pediatric topics, one resident said: “In a way, the weaknesses that residents identify in our program here is that we’re not equipped, or least experienced dealing with those kinds of problems, so it’s a [learning] opportunity for us.”

3) Acquiring a better understanding of community health care practice. A junior trainee commented: “We don’t know what is in the community, what is available, what is doable, so it might help us to learn that too. (…) We might be able to have a better idea of what is going on in the community, be more realistic in terms of what we are asking of our outside colleagues.”
2. Challenges

Though residents perceived several benefits of teaching in the context of reverse educational distance, many described potential challenges. Residents thought they would feel uncomfortable and intimidated if teaching in that context due to:

1) *Feeling inadequate to be in a teaching role* due to their own limited clinical experience, “You might feel a bit intimidated, or unfit to teach a community general practitioner who has been in practice for many, many years, and who has probably seen a much higher patient load than you have”;

2) *Feeling the pressure to “know all”/”know more”* vis-à-vis a more senior and experienced audience that would have higher expectations from the teacher as compared to an audience of junior trainees. A resident said for example: “If I’m doing an allergy rotation and I do a presentation (...) the whole point of it is not to teach the staff – they know the stuff; the point is for me to learn and to teach the other people there. But if I’m in a community, I’m supposed to be the most knowledgeable, technically, about this topic. So I don’t know how I feel if they ask me a question and ‘Hmm, I don’t know the answer to that’ ”;

3) *Feeling that their teaching would be poorly received by cHCPs* namely due to a possible lack of credibility, “It’s more their perception of the person who’s saying the knowledge; not the knowledge itself that’s gonna be the issue”;

4) *Fearing the increased workload from participating in the CPD activity.* A resident commented: “It is very nice, but will there be time put aside for the residents to work on this presentation? (...) Because it would be a significant presentation, and to be put on our own time, it’s something that’s already added onto the calls, the study time that we already devote for our
patients and for our learning, so I think that would be an issue that would be important to foresee.”

Residents also commented that, provided they were comfortable with the content of the material to teach, they would feel less intimidated teaching in the context of reverse educational distance to allied health care professionals compared to senior physicians. Indeed, residents felt that having a different area of expertise than allied HCPs was more likely to make the material useful to this audience. One resident said: “I feel like I can provide a lot more. People who have a lot of background and who see it day in and day out, probably more than I have, that’s where I feel less comfortable. So intuitively, I think that it would be easier for me to present to allied health professionals rather than to family docs.” Another resident mentioned: “I feel like I have more to offer them (allied health care providers) (...) in terms of being a trainee presenting. Because I feel that our level of knowledge is less likely to be at the same level. So I don’t have to provide an answer to that weird case that stumps everybody, which I don’t know the answer to. I’m just doing the basics, and I feel comfortable doing the basics.”

B. Community health care providers perspectives of teaching in the context of reverse educational distance

1. Benefits

Overall, cHCPs (family physicians, nurses and nurse practitioners) were very open and interested in receiving teaching from residents. Perceived learning benefits of this strategy included:

1) Being updated on recent guidelines and evidence-based practices around pediatric topics, as cHCPs felt they often had limited time to search the medical literature and/or limited access to journals/guidelines, “A lot of times the residents are the ones who are the most up-to-date because they’ve been looking at the guidelines; they’ve been looking at the latest research”; and
2) Improving collaboration between cHCPs and future pediatricians. A community physician said: “I think it could help the relationship between family doctors and future Pediatricians—because when we talk about residents, we are actually talking about future Pediatricians.”

2. Challenges

Perceived challenges from cHCPs was mainly worded around one major theme:

1) The residents’ lack of clinical experience, which would limit practical input on the teaching content that expert physicians can provide, and which cHCPs felt was especially true for junior trainees compared to more senior trainees. A community physician mentioned: “The residents (…) haven’t tried their recipe 50 times. Experience is what we don’t find in book and that is what is difficult to get sometimes.” Another community family doctor commented: “sometimes it’s nice when you have this specialist because their anecdotal experience can be very helpful.”

Community HCPs also commented that the quality of teaching was not always dependent on clinical experience, but more so on the: 1) speakers’ teaching skills and characteristics such as level of interest and motivation, “Probably, the quality of presentations you get at any conference by any specialist is variable. I just went to the worst conference ever (laughs). It was a whole day of like terrible talks by specialists that have been in practice for 20, 25 years.”; 2) speaker’s level of mastery of topic, “I think that if the resident comes to present to us it’s because he masters well the topic, so I don’t see the importance of who is presenting (…) whether it is any resident level, it doesn’t matter in my opinion”; and 3) appropriateness and relevance of teaching content, “Whether it is a resident or a licensed physician [that presents] it doesn’t change anything, the most important really is to provide the training that we need.”
C. Proposed solutions to enhance the success of a teaching strategy featuring reverse educational distance

For both residents and cHCPs, key areas to address in the process of developing a teaching strategy with reverse education distance included:

1) Ensuring adequacy and quality of the teaching content with a focus on evidence-based practices and guidelines, and having topics that are relevant and adapted to the needs of cHCPs. A resident mentioned: “I would be sure that the teaching is adjusted to what they [cHCPs] see and what they are able to do in their setting”, and a community physician said “I think if residents are there to say factual things, like newest guidelines and newest evidence, that is something we can learn from or brush up on.” Overall, residents and cHCPs felt that evidence-based content was an area where residents would be more appropriate to engage in a teaching role because the content relied more on facts and literature, rather than prior clinical experience;

2) Ensuring adequate preparation and support for residents, particularly through mentorship, teaching residents about the content material and around teaching skills, and creating opportunity for practice and feedback. As one resident said: “Of course, for all levels, there should be an attending physician who’s reviewing the presentation with the resident, helping them get the resources they need to figure out what’s more recent, what would be relevant to the audience, the topic that’s being addressed. I think those are all things that need to be in place before residents go out and actually give these presentations”;

3) Engaging senior residents who have more clinical experience rather than junior residents, “Seniors will be better able to answer if we have a certain case that we want to run by them, that fits the topic. I think they would have a better ability to be able to handle questions surrounding a case in particular that we might be dealing with”; and
4) Using adequate instructional design, namely by pairing residents during the presentation or having a staff pediatrician supervising the residents. Staff supervision was thought to lead to a more valuable learning experience for both the cHCPs and residents, and trainees also felt it would decreased the feeling of intimidation associated with teaching in the context of reverse educational distance, “If we were paired with a staff, and the staff was there to answer any questions that the resident wasn’t able to answer, maybe that would change that feeling” of intimidation and insecurity.

Pediatric residents also reported that key areas to address in optimizing the successful implementation of the teaching activity within the residency program included:

1) Instilling in residents a positive attitude towards reverse educational distance by recognizing that they can have a degree of expertise that can benefit cHCPs (namely in the area of evidence-based practices), and seeing the activity as an opportunity for exchange between the residents and cHCPs. Residents also felt it was important to recognize that ‘not knowing everything is OK’ as long as they are pro-active in searching for the answer when facing uncertain questions. A resident mentioned: “One of the things that we learn to accept is that we’re not perfect and we don’t know the answer to everything (…) and we need to learn to be comfortable with this because, often with patients, it does happens. People tell me, ‘She asked me this and I don’t know’. I go, ‘I don’t know either, and I’m going to go look it up’ ”;

2) Providing residents with relevant exposure in the community to better understand the reality of community practice. As a resident said: “We’re so trained into also tertiary care and all of that. (…) Maybe us being more in the community first would probably be something important”;

3) Optimizing the buy-in of residents by tailoring the teaching activity to their area of interest, “I think that [the residents] should be given a little bit of freedom, in terms of what general paediatric topic they can present to make it more interesting to them”; and
4) *Limiting the workload for trainees* associated with the activity. A resident mentioned: “We do want to do a good job; we always want to please, but I think that for every give, there’s going to have to be a little bit of take, so we have to figure where to adjust the curriculum in order to provide maybe a better exposure to what general Pediatrics would be, and less in terms of what a sub-specialists would be.” For this proposed solution, trainees commonly emphasized that the current training curriculum was already very busy and recommended that providing them with protected time to prepare and present the teaching sessions and making this activity an alternative to already existing curricular activities, would be helpful.
IV. DISCUSSION

The purpose of the study was to explore Pediatric residents’ and community health care providers’ (cHCPs) perceptions of a CPD intervention integrating a reverse educational distance model whereby the teachers are residents and the audience is comprised of cHCPs. In particular, we aimed to explore the perceived benefits and challenges of such an educational strategy, and ways to optimize the success for implementation in the Pediatric residency program.

Our results suggest that both residents and cHCPs were interested in participating in the proposed CPD strategy and saw several benefits to this type of teaching model. Residents and cHCPs agreed that this educational strategy could benefits the learning for both the teachers and the learners, and described some challenges, which we examine in light of Ten Cate’s 2-dimensional framework proposed by (2007). (See figure 1)

A. Benefits and challenges of the novel CPD strategy for the resident-teachers

At a cognitive level, related to information processing and verbal elaboration, residents felt that providing teaching to cHCPs would allow them to move the focus away from final examinations preparation, which is not felt to necessarily be representative of the knowledge needed for a general pediatric practice into the “real world”. They suggested that they would approach the material differently, emphasizing on the practical aspect of the material to teach and taking into consideration the reality of community practice. Thus having as a personal goal to make the teaching relevant for HCPs, and preparing and presenting in such as way, would be a valuable learning for the residents’ themselves. Residents also mentioned that when teaching medical students, they often engaged in routine teaching, repeating over and over basic concepts that no longer challenged their own knowledge.
At the affective and motivational levels of learning, residents felt that teaching in the context of reverse educational distance would enhance their learning as compared to their most typical teaching roles. They mentioned perceiving higher expectations from the audience regarding the teaching content, and anticipated a stronger incentive to master the topic to present. As Ten Cate describes, “The reason why student-teachers often perform well may be attributed to the motivating expectations of significant others. The social pressure of a group expecting a well informed teacher—or peer in a teaching role—serves as a powerful engine to prepare well for this teaching.”(Ten Cate 2007, p.551)

Using Ten Cate’s framework, our study results suggest that learning benefits for the resident-teacher both at the cognitive and motivational level are enhanced in the context of reverse educational distance. However, having an academically senior audience also involves potential challenges for the resident-teachers that may be more pronounced in the context of reverse educational distance compared to the traditional peer-teaching model. Namely, residents anticipate higher expectations for the audience and greater pressure to master the topic, which lead to feeling intimidated to undertake such teaching role. They also anticipated greater workload in preparing teaching sessions for an audience of cHCPs, which could potentially decrease their interest in participating to the CPD activity.

**B. Benefits and challenges of the novel CPD strategy for cHCPs**

The influence of cognitive and social congruence on the learning of an audience of cHCPs were not perceived as benefits, but rather perceived as possible challenges. Indeed, cognitive congruence between the teacher and the learner would not be applicable to a teaching strategy involving reverse educational distance. While resident-teacher can relate (given their prior experience) to the learning context of junior trainees and adapt their teaching accordingly, this would not be the case with a senior audience of cHCPs who work in a different context and have
different clinical experiences compared to the residents (Lockspeiser 2008). At a cognitive level, both resident’s and cHCPs’ suggested that the benefits for cHCPs was more about the opportunity for residents to share their knowledge around guidelines and evidence-based practices, which relied less on prior clinical experience. In other words, it was suggested that teaching content that is grounded on theory and literature was an area in which residents could have a level of expertise (despite their limited clinical experience) that could be beneficial to cHCPs.

Benefits to the cHCPs as it related to social congruence that favors a positive learning environment was perceived differently between residents and cHCPs. Similar to the literature suggesting that peer teaching could be associated with prejudice and skepticism from the audience due to the lack of experience/competence of the peer-teacher (Knobe 2010, Glynn 2006), residents anticipated that cHCPs would also poorly receive their teaching. Because of the greater clinical experience of the audience, residents’ thought cHCPs would lack interest in attending the teaching sessions, and potentially even be insulted if non pediatrician-experts provided the teaching. Residents expressed concern that the teaching activity would actually benefit more their own learning than that of the audience. From the residents’ perspective, the novel CPD strategy would therefore not fulfill the goal of promoting educational collaboration between future pediatricians and cHCPs, and I fact, it may even be a sub-optimal learning experience for the audience. In contrast, cHCPs had a more positive view towards the activity. Many pointed out that the quality of teaching was not necessarily based on the clinical experience of the teacher, but more so on other factors related to teaching skills and teaching content. This is consistent with Toolsgaard (2007) findings showing that student-teachers could be as great teachers of clinical skills as associate professors. The student-learner also felt student-teachers were more engaging and organized teachers than associate professors. Some cHCPs also viewed the activity as a great opportunity for exchange between them and future pediatricians, highlighting the idea of promoting collaborative work. As such, cHCPs perceived that
establishing a positive learning environment between the resident-teachers and the audience was possible.

In the context of reverse educational distance, learning benefits for the audience related to cognitive congruence and social congruence are less applicable than in the traditional peer-teaching model. The findings suggest that the absence of cognitive and social congruence, in addition to a limited clinical experience of the teacher compared to the audience could in fact lead to a suboptimal learning experience for an audience of cHCPs. However, other benefits at the cognitive level (e.g. cHCPs acquiring valuable knowledge on evidence based practices) and at the motivational level (e.g. opportunity for educational collaboration between future pediatricians and the community) were identified.

**C. Summary of findings in relation to Ten Cate's framework**

In summary, our results suggest that while the learning benefits for the resident-teacher could be enhanced at a cognitive and motivational level in the context of reverse education distance, the learning benefits for the audience are different from the traditional peer-teaching context (related to cognitive and social congruence). The reverse educational distance was also thought to be a challenging educational strategy to implement mainly due to the lack of clinical experience of the resident-teacher compared to the audience of cHCPs. This limitation was central in residents’ feelings of intimidation and inadequacy of being in a teaching role, and they thought the proposed CPD strategy could result in a sub-optimal learning experience for cHCPs.

Key solutions proposed by both the residents and cHCPs to enhance the success of an educational strategy featuring reverse educational distance were therefore mainly aiming at addressing the challenge of limited clinical experience of the resident-teacher. These included ways to best support and prepare residents on both the content material to teach (which should focus around
evidence-based practices) and in being in a teaching role. Participants suggested engaging senior residents rather than junior trainees in the activity, and having a staff physician supervise the residents during the presentations. Trainees also felt it was important to instill among residents a positive view about reverse educational distance. For instance, residents suggested viewing the strategy as an exchange opportunity, recognizing they can have useful knowledge/expertise to share, and acknowledging that ‘not knowing the answer’ to everything is normal and should lead to a proactive approach to fill their own knowledge gap.

Ten Cate’s 2 dimensional framework (2007) of the learning benefits of Peer-teaching for both the teacher and the audience is useful in helping us anticipate the learning implications of an educational strategy involving residents as teachers for cHCPs.

**D. The bigger picture - Professional and educational mandate of training universities**

The current study results suggest that engaging residents in teaching cHCPs around evidence-based approaches to Pediatric topics is an educational strategy with reverse educational distance that could benefit the learning of both the teacher and the audience. Pediatric residents taking on an active role in CPD activities for cHCPs would help future pediatricians fulfill their professional mandate in collaborating and engaging in an educator role towards other health care providers. As such, the proposed novel strategy for CPD aligns with the educational mandate of training programs, namely the Scholar competency of the CanMEDS framework (Frank, 2015) and the Practice Base Learning and Improvement competency of the ACGME framework (2015). We also propose that this CPD strategy could be a way to involve physicians in health advocacy, which is part of the Health Advocate CanMEDS (Frank, 2015) competency and the ACGME (2015) System-Based Practice competency. Indeed, through teaching cHCPs about best practices in Pediatric care, training residents would be engaging in health promotion and disease prevention interventions that could benefit the Pediatric population at large. Finally, the proposed
educational curricular intervention could also address some of the barriers leading to suboptimal uptake of evidence based practices among health care providers, namely time constraint in searching the literature and difficulty accessing key sources of information (Ely 2002, Green 2005).

**E. Limitations**

The main limitation of this study relates to the generalizability of our results, as we interviewed Pediatric residents from a single training program, and community health care providers from only four different community centers. Moreover, our focus groups involved a small number of participants, which may have been sub-optimal in optimizing interactions amongst people. The main investigator also conducted all interviews and it is possible that participants may have avoided voicing barriers related to the proposed CPD strategy. However, it was made clear to all participants that the project was at an early stage of design and that there was a strong interest in exploring potential limitations as much as benefits in order to best inform future steps of development.

**F. Future directions**

Future research should aim at implementing a CPD strategy in which residents are engaged in the role of teachers for cHCPs, and should be designed taking into account the proposed implementation suggestions that were highlighted in our study. Exploring the outcome of such CPD strategy could focus on the residents and cHCPs perceptions’ of their learning benefits to confirm our findings. Outcome in terms of evidence-base practices uptake by residents in their own clinical practice and among cHCPs could also be explored. Finally, further research could focus on the impact of such CPD strategy in the residents’ future involvement as educators in the
community, and on their views regarding the educator role being part of their professional mandate and/or being a strategy to practice health advocacy.
V. CONCLUSION

Results from this study suggest that Pediatric residents and cHCPs would be interested in participating in a CPD strategy integrating a reverse educational distance model whereby residents engage in the role of teachers for cHCPs. Perceive learning benefits at a cognitive and motivational level for both the teachers and the audience are anticipated, and in some instances, are enhanced compared to the learning benefits associated with the traditional model of Peer-teaching. A number of potential barriers were also suggested, which mainly derived from the limited clinical experience the resident-teachers would have compared to an audience of cHCPs. Solutions to address the barriers were described and could guide the development of future educational strategies featuring reverse educational distance. The proposed novel CPD strategy aligns with the professional and educational mandate of teaching universities, and could help bridge the gap of sub-optimal uptake of evidence-based practices among health care providers.
APPENDIX A

**Object:** Seeking permission to reprint copyright material

February 7, 2016

Dear Dr. Olle Ten Cate,

My name is Elisa Ruano and I am a Pediatrician from McGill University currently completing my master’s in Health Professions Education (MHPE) with the University of Illinois at Chicago.

I am currently finalizing my master’s thesis, which is exploring a novel approach for continuous professional development. I found your paper *Peer Teaching in Medical Education* published in *Medical Teacher* in 2007 extremely insightful, and used your two-dimensional classification of theoretical perspectives on peer-teaching to frame part of my analysis.

I am writing to request permission to use a slightly modified version of the Table 3 from your paper in my thesis. This material would appear as shown below. Unless you request otherwise, I would use the conventional style of the Graduate College of the University of Illinois at Chicago as reference and acknowledgment.

<table>
<thead>
<tr>
<th>Two-Dimensional Framework of Peer Teaching Benefits*</th>
<th>Postulated Benefit for the Student Being Taught</th>
<th>Postulated Benefit for the Student-teacher</th>
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<td>Cognitive and metacognitive level of learning</td>
<td>Cognitive congruence</td>
<td>Goal-oriented information processing and verbal elaboration</td>
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<tr>
<td>Affective and motivational level of learning</td>
<td>Social congruence</td>
<td>Social, emotional and motivational components</td>
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</tbody>
</table>

* Figure adapted from Ten Cate and Durning, 2007

Thank you for your kind consideration of this request.

Sincerely,

Elisa Ruano MD FRCPC
General Pediatrician and Clinical Educator
Montreal Children’s Hospital, McGill University
1001 Boulevard Decarie, B 6069.1
Montreal, Quebec, H4A-3J1
514.412.4400, ext 22593
elisa.ruano@umontreal.ca

The above request is approved.

Approved by: [Signature]

Date: 8 Feb 2015
CITED LITERATURE


Tolsgaard MG, Gusftasson A, Rasmussen MB, et al. Student teachers can be as good as associate professors in teaching clinical skills. *Med Teach.* 2007; 26:553-557 (ref in discussion)


A. IDENTIFICATION

Name Elisa Carolina Ruano Cea

B. EDUCATION

DEGREES AND HONOURS

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<thead>
<tr>
<th>Year</th>
<th>Degree</th>
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<td>M.D.C.M.</td>
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<td>Dean’s Honour Roll (2005 and 2008)</td>
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<tr>
<td>2002-2004</td>
<td>D.E.C.</td>
<td>André-Laurendeau Cegep, Montreal</td>
<td>With Honours for best academic achievement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Diplôme du Baccalauréat International”</td>
<td>With Honours for best academic achievement</td>
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CERTIFICATION

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<td>2009-2013</td>
<td>FRCPC, Pediatrics</td>
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<td></td>
<td></td>
<td>McGill University</td>
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POST-GRADUATE TRAINING

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<th>Institution</th>
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<tr>
<td>July 2013-</td>
<td>Master of Health Professions Education</td>
<td>University of Illinois at Chicago, Chicago</td>
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<td>present</td>
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<td></td>
</tr>
<tr>
<td>2012-2014</td>
<td>Academic General Pediatric Fellowship</td>
<td>Montreal Children’s Hospital (MCH), McGill University, Montreal</td>
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C. SPECIAL HONOURS AND AWARDS

<table>
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<th>Year</th>
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<tbody>
<tr>
<td>May 2013</td>
<td>First prize, Poster Presentation (Fellow), 3rd Annual Joint Resident Fellow Research Day, Montreal Children's Hospital and Ste-Justine Hospital.</td>
</tr>
<tr>
<td>Oct 2012</td>
<td>MUHC Director’s General Award – Resident section in recognition for leadership in the field of health advocacy</td>
</tr>
<tr>
<td>2008</td>
<td>McGill J.W. McConnell Award in recognition for academic achievement ranking in the top 5% of all medical students</td>
</tr>
<tr>
<td>2005</td>
<td>McGill J.W. McConnell Scholarship in recognition of a cumulative average within the top 10% of all students</td>
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</table>

D. CLINICAL WORK EXPERIENCE (Montreal)

<table>
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<tbody>
<tr>
<td>Jan 2015-</td>
<td>Pediatrician and Clinical Educator, Montreal Children’s Hospital</td>
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<tr>
<td>present</td>
<td>Full-time position as a Academic General Pediatrician in a university teaching hospital</td>
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Sept 2014- present  **Neonatal Intensive Care Unit (NICU) moonlighting, Royal Victoria Hospital**  
Overnight shift coverage at the NICU under the supervision of a Staff neonatologist.

Sept 2014- March 2015  **Newborn care, Lasalle Hospital**  
Work duties included examination of newborns at birth and at time of discharge, newborn nursery with associated overnight home calls coverage, and post-natal outpatient newborn clinic follow-up.

**E. TEACHING**

**UNDER-GRADUATE TEACHING**

June 2015  **Workshop presenter, Transition To Clerkship course**  
Topic: Optimizing learning during clerkship (2.5h/workshop, 3 workshops)  
McGill second year medical students, McGill University

2013-2015  **Lecturer, Introduction to Pediatric course**  
Topic: Approach to the febrile infant and Common respiratory tract infections in children (2h/lecture, 2 lectures per year)  
McGill second year medical students, MCH

Feb 2014  **Small group leader, Introduction to Pediatric course**  
Topic: General Pediatrics topics (2h/week for 8 weeks)  
McGill second year medical students, Montreal Children’s Hospital (MCH)

**POST-GRADUATE TEACHING**

Nov 2013  **Workshop, guest speaker, Annual Pediatric Resident Retreat**  
Topic: Residents as Learners  
Presented to MCH pediatric residents, Orford, Quebec

Oct 2013  **Interactive teaching session, Academic General Pediatrics Teaching**  
Topic: Challenges in curriculum design and implementation  
Presented to general pediatric fellows, MCH

March 2012  **Presentation, General Pediatrics Evidence Based Rounds**  
Topic: Evaluation and management of antenatal hydronephrosis  
Presented to general pediatricians, MCH

**F. OTHER EDUCATIONAL INVOLVEMENT**

**LOCAL**

Aug 2015- present  **Co-Chair, Curriculum and In-Training Evaluation (CITE) committee of the Pediatric residency program, McGill University**  
Oversee the ongoing development and improvement of the teaching curriculum in all areas of the residency training program.

Aug 2015- present  **Co-Chair, Competency Based Education CITE sub-committee, McGill University**  
Ensure the transition of the Pediatric residency program to a new system of trainee education, assessment and program evaluation implemented by the Royal College of Physicians and Surgeons of Canada.
Sept 2013- Current  
**Affiliated member, Centre for Medical Education, McGill University**  
Attendance and participation to the weekly centre meetings and rounds

Jan to June 2015  
**Group Leader, Workshop on communication Skills, conflict resolution, and professionalism**  
Lead group discussion and provide feedback to trainees around a variety of clinical scenarios with simulated patients, McGill Simulation center. (2h/workshop, 2 workshops)

Sept 2012- July 2013  
**Resident representative, Advanced Pediatrics Training Committee**  
Montreal Children’s Hospital (MCH). 24-Hours/years

August- Oct 2012  
**Healthy Active Living teaching curriculum, Resident Protected Teaching**  
Development of a four hours teaching curriculum for pediatric residents, MCH

**PROVINCIAL**
April 2014  
**Workshop presenter, Annual Educational Symposium for adolescents 14-18 years old and their parents.**  
Develop and lead in collaboration with two MCH Pediatricians (Dr. C.LeBlanc and Dr. E. Constantin) an interactive workshop for adolescents with inflammatory bowel disease on current healthy active living recommendations.

**NATIONAL**
June 2014  
**Workshop presenter, Canadian Pediatric Society 2014 Annual Conference**  
Develop and lead in collaboration with two MCH Pediatricians (Dr. LeBlanc and Dr. Constantin) an interactive workshop on current healthy active living guidelines for infants, toddlers and school-aged children.

Mar 2013- May 2014  
**Resident representative, CanMEDS 2015 Scholar-Teaching Working Group.**  
2h/month  
Core member of the Advisory Committee responsible of reviewing the definition and objectives of the Scholar canMEDS core competency of the Royal College of Physicians and Surgeons of Canada.

**INTERNATIONAL**
Oct 2015  
**Workshop presenter, International Conference on Residency Education**  
Develop and lead in collaboration with Dr. L. Mazer a workshop on the application of mastery learning and standard setting in competency-based curricula

**G. RESEARCH**
**CURRENT**
2013- present  
**The Resident-led Healthy Active Living in Youth (RHALY) Project: Impact on Pediatric Residents’ Behavioral Intentions and Skills in Counselling on Healthy Active Living**  
Prospective Cohort Study, Medical Education Department, MCH  
Co- PIs: Drs. E. Ruano, M. Dandavino and E. Constantin

*Post intervention data completed, manuscript to be submitted for publication*
H. PUBLICATIONS

PEER-REVIEWED PUBLICATIONS

1) **Healthy Active Living for Children and Adolescents: Evidence-Based Educational Modules** (Teaching Curriculum for Health Care Professionals)
   Primary Authors: Drs. E. Ruano, E. Constantin, C. LeBlanc
   Co-Authors: B. Riverin, E. Mok, A. Huynh and the RHALY group
   Endorsed by the Canadian Pediatric Society, 2013, in press

2) **Teacher Scholar Role, CanMEDS 2015**
   Chairs of the expert working group: Drs Anna Oswald and Ming-Ka Chan
   Dr E.ruano was a core member of the expert working group that established the key competencies and milestones related to the Teacher-Scholar CanMEDS role.

3) **Draining Fluids through a Peritoneal Catheter in Newborns after Cardiac Surgery Helps to Control Fluid Balance**

ACCEPTED ABSTRACT

1) Ruano Cea E, Constantin E, Dandavino M. Exploring Behavioural Intentions of Pediatric Residents regarding Childhood Obesity Counselling.
   Abstract and facilitated poster presentation
   Canadian Pediatric Society annual conference, London, Ontario, June 2012

2) Ruano Cea E, Constantin E, Dandavino M. Exploring Pediatric Residents’ Skills, Practice, and Behavioural Intentions around Childhood Obesity Counselling.
   Abstract and facilitated poster presentation. To be published.
   International Conference on Residency Education (ICRE), Ottawa, Ontario, October 2012