

Research Article

# Exploring knowledge gaps and research needs in respiratory therapy: a qualitative description study

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### Abstract

#### Background

Respiratory therapists (RTs) are expected to stay updated on technology, treatments, research, and best practices to provide high-quality patient care. They must possess the skills to interpret, evaluate, and contribute to evidence-based practices. However, RTs often rely on research from other professions that may not fully address their specific needs, leading to insufficient guidance for their practice. Additionally, there has been no exploration of knowledge gaps and research needs from RTs' perspectives to enhance their practice and patient outcomes. The research questions guiding this study were: (i) what are the perceived practice-oriented knowledge gaps? and (ii) what are the necessary research priorities across the respiratory therapy profession according to experts in respiratory therapy?

#### Methods

A qualitative description study was conducted using semi-structured focus groups with 40 expert RTs from seven areas of practice across Canada. Data was analyzed using qualitative content analysis.

#### Results

We identified four major themes relating to what these experts perceive as the practice-oriented gaps and necessary research priorities across the respiratory therapy profession: 1) system-level impact of RTs, 2) optimizing respiratory therapy practices, 3) scholarship on the respiratory therapy profession and 4) respiratory therapy education.

#### Discussion

The findings establish a fundamental understanding of the current gaps and the specific needs of RTs that require further investigation. Participants strongly emphasized the significance of research priorities that consider the breadth and depth of the respiratory therapy profession, which underscores the complex nature of respiratory therapy and its application in practice.

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## Conclusion

The unique insights garnered from this study highlight the knowledge gaps and research needs specific to RTs. These findings pave the way for further exploration, discourse, and research aimed at understanding the specific contributions and requirements of RTs.

## BACKGROUND

Lung disease profoundly impacts the quality of life for many individuals, is a major contributor to hospitalizations and decreased life expectancy, and causes a significant economic burden of an estimated \$100 billion per year.<sup>1-3</sup> Respiratory therapists (RTs) are evidence-informed professionals who play a vital role in managing patients with lung disease across the continuum of care. As of 2022, there are over 12,000 practicing RTs in Canada, highlighting their widespread presence in the healthcare system.<sup>4</sup> The respiratory therapy profession has been well-established across several regions worldwide (e.g., North America, the Middle East, and the Philippines) and is experiencing rapid growth and evolution in many other jurisdictions to adapt to the current healthcare landscape.<sup>5</sup> Despite facing challenges such as professional shortages<sup>6-8</sup> and rising healthcare costs,<sup>9</sup> RTs are expected to continuously stay informed about advancements in technology, treatments, research, and best practices. This ensures they provide up-to-date and evidence-informed respiratory care to enhance patient satisfaction, care and management, such as reducing readmission rates and shorter hospital stays.<sup>10,11</sup>

To meet these expectations, RTs must possess the necessary knowledge and skills to interpret, evaluate, and contribute to evidence-based practices.<sup>12</sup> However, RTs rely heavily on research from other professions, which may not fully consider the specific nuances of their practice. This results in insufficient evidence to effectively guide aspects of respiratory therapy practice.<sup>11,13,14</sup> One review found that many studies which aimed at determining what topics are considered important related to respiratory therapy practices (commonly referred to as research priorities) often neglected to incorporate the perspectives of RTs.<sup>15</sup> Consequently, the results generated from these studies cannot be assumed to accurately or comprehensively reflect the priorities deemed important by current practicing RTs. One way to begin addressing this gap involves a concerted effort to systematically identify the knowledge gaps and research needs that RTs consider essential. This undertaking can foster continuous advancements within a profession, optimize the use of research funding, and positively influence patient outcomes.<sup>16,17</sup>

Identifying research priorities requires a systematic process that involves identifying research needs, potential research areas, topics, and/or questions that require further exploration. However, the current absence of literature that explores general topics and concepts related to RTs, as well as the prevailing knowledge gaps within the respiratory therapy profession, hinders our ability to discern and prioritize research priorities effectively. To that end, our research group conducted a qualitative study to understand the existing knowledge gaps and research needs across the respiratory therapy profession in Canada that are perceived

to be important by experts in the field. The research questions guiding this study were: (i) what are the perceived practice-oriented knowledge gaps? and (ii) what are the necessary research priorities across the respiratory therapy profession according to experts in respiratory therapy? As a secondary outcome, the results from this study will also be used to generate items for a pan-Canadian Delphi survey that (through consensus) will establish prioritization of these research needs within the respiratory therapy profession.

## METHODS

### QUALITATIVE DESCRIPTION

We conducted a qualitative description study to explore knowledge gaps and research needs from the perspective of expert RTs. We chose this methodology because it is suitable for identifying problems through the participants' perceptions and focuses on providing a direct description of events rather than developing substantive theories or explanations.<sup>18-21</sup> This project was approved by the research ethics boards of Ontario Tech University (#16789) and the Hospital for Sick Children (#1000079058).

### PARTICIPANT SAMPLING AND RECRUITMENT

This research was conducted within the context of the respiratory therapy profession in Canada, where RTs are recognized as self-regulated healthcare professionals in most provincial jurisdictions and play a significant role within the provincial healthcare systems.<sup>22</sup> Eligible participants were considered "experts" in the respiratory therapy profession and recruited from the research team's collaborative professional network. There is no consensus regarding how "experts" are defined in the literature,<sup>23,24</sup> therefore, we purposively selected and defined expert participants if they have more than five years of practice experience; have either conducted or been a collaborator on research projects in the respiratory therapy profession; provided content-expert lectures about topics in respiratory therapy; or have volunteered their knowledge to past professional development opportunities, professional committees, or advisory boards. In addition to the defined expert criteria, we sought participants who practiced in one of the seven prominent areas of practice for RTs as identified by demographic data collected by the Canadian Society of Respiratory Therapists. The areas of practice included: 1) inpatient respiratory care (e.g., intensive care, emergency department, general wards); 2) community and chronic care; 3) cardiopulmonary diagnostics; 4) anesthesia assistance; 5) management/administration/leadership; 6) neonatal/pediatric care and 7) educators in entry-to-practice respiratory therapy programs.<sup>25</sup>

After identifying the prospective participants, a member of the research team contacted them with a standardized email invitation explaining the intent of the research project, the participation requirements, and an informed consent form. If the participant was willing to participate, they returned signed informed consent and completed an online sociodemographic questionnaire.

## DATA COLLECTION

We conducted semi-structured focus groups due to their “synergistic potentials...[that] often produce data that are seldom produced through individual interviewing and observation and thus yielding particularly powerful knowledge and insights.”<sup>26</sup> The research team collaboratively developed an open-ended focus group interview guide based on their shared understanding of the respiratory therapy profession and its context within the Canadian healthcare system. The guide was informed by the Dubois et al. framework<sup>27</sup> that describes key factors underlying the value contributed by RTs to healthcare, including technical skills, practice across settings, strategic expertise, and tools that leverage capacity (see Supplementary information). All interview questions were exploratory in nature to foster rich discussion regarding the central research questions and to account for unexpected insights and findings.

All focus groups were conducted remotely using Zoom between April to October 2022. The first focus group (n=4) was held in April 2022 to collect data and pilot-test the semi-structured interview guide. After the pilot focus group, we made minor modifications to the interview guide and then used it for the remaining six focus groups. Each focus group included between four and nine participants, which was deemed an adequate panel size to ensure each participant had an opportunity to share their insights and observations.<sup>26</sup> Focus groups were conducted by the primary author (MZ), who had previous experience conducting qualitative focus groups, while another member of the research team (MLN and/or EK) took field notes. Focus groups were audio-recorded to ensure no details were lost.

## DATA ANALYSIS

At the end of each focus group, MZ, MLN and/or EK met to debrief the results of the focus group and discuss any findings that might influence the subsequent focus groups. A research assistant and EK transcribed all audio recordings verbatim, which were then reviewed by MZ to ensure accuracy. All participants’ names were removed from the transcripts and replaced with unique study identifiers to ensure anonymity. Once the transcripts were de-identified, they were imported into NVivo software for analysis.

Data analysis was conducted using qualitative content analysis, and the transcripts were coded inductively.<sup>28</sup> Inductive coding begins by examining the data and using the patterns that the researcher identifies from the data to guide the development of subsequent coding categories.<sup>29</sup> This approach allows the researcher to derive insights and meaning directly from the data rather than imposing pre-conceived coding categories. By employing inductive cod-

ing, the analysis process was driven by the data itself, ensuring a comprehensive exploration of the patterns and themes based on the transcripts.

Specifically, MZ conducted inductive line-by-line coding of individual transcripts concurrently with data collection. MZ then grouped similar codes into sub-themes and wrote descriptions for each code and sub-themes. After MZ completed the initial grouping of codes, MZ shared them with AW to participate in the coding, analysis and interpretive decisions to enhance the credibility of the process. MZ and AW then held multiple meetings to discuss the codes, sub-themes and descriptions to group them into larger, preliminary themes. AW then independently reviewed 30% of the focus group transcripts using the codes, sub-themes and themes to reinforce the alignment between transcripts and the proposed codes and themes. This resulted in minor modifications to the codebook to address identified discrepancies.

The revised codebook was circulated to the full research team, followed by team-reflexive discussions about the codebook results to challenge any assumptions, acknowledge our inherent biases, and integrate findings into the final reporting of themes.<sup>30</sup> We continued to have periodic team meetings to iteratively reflect on the themes until the manuscript was submitted. The qualitative analysis and reporting of the data were guided by the consolidated criteria for reporting qualitative research (COREQ).<sup>31</sup>

## REFLEXIVITY AND TRUSTWORTHINESS

Multiple steps were integrated with the research process to enhance the trustworthiness of the results according to quality criteria by Lincoln and Guba.<sup>32</sup> Firstly, we kept an audit trail to transparently describe the research steps from the start of the project to the development and reporting of findings. Concurrently, the primary author (MZ) kept a reflexive journal throughout the research project to examine explicit and implicit assumptions, preconceptions, and values. These steps enhance the dependability and confirmability of the findings. Secondly, two researchers engaged in the coding, analysis, and interpretative decisions, which enhanced the credibility of the findings. Thirdly, team members were only included in focus groups if their presence was deemed unlikely to exert undue influence on the participants or affect their participation and responses (i.e., due to their professional role or other factors). Finally, we held multiple meetings to engage in team reflexive discussions about the codebook results to reflect on how the team has collected and analyzed the data, challenge any assumptions, acknowledge our inherent biases, and integrate everything into the final reporting of themes, which enhances the credibility of the findings.

## RESULTS

A total of 40 participants representing experts from across respiratory therapy took part in the seven focus groups (Table 1). The median time of focus groups was 73:44 minutes (range 68:36 - 88:13). We identified four major themes

**Table 1. Demographics.**

Demographics n=40	
Age, mean (SD) years	44 (8)
Years of practice, mean (SD)	20 (9)
Self-identified gender (Man/Woman), n (%)	20 (50) / 20 (50)
Highest academic level achieved, n (%)	
Respiratory Therapy Diploma (RT)	13 (33)
Undergraduate (e.g., BSc)	17 (43)
Graduate (e.g., MSc)	9 (23)
Doctorate (e.g., PhD)	1 (2.5)
Full-time equivalent (FTE), n (%)	
0.8-1.0 FTE	35 (87.5)
0.3-0.79 FTE	3 (7.5)
< 0.29 FTE (e.g., temporary leave)	2 (5)
Location of practice, n (%)	
Ontario	15 (37.5)
British Columbia	10 (25)
Nova Scotia	4 (10)
Québec	3 (7.5)
Manitoba	3 (7.5)
Saskatchewan	2 (5)
New Brunswick	2 (5)
Alberta	1 (2.5)
Focus group composition, n (%)	
In-patient care (e.g., ICU, ER)	5 (13)
Anesthesia assistant	4 (10)
Education	7 (18)
Diagnostics	9 (23)
Neonatal and/or pediatric	4 (10)
Community, chronic care	5 (13)
Management/Leadership	6 (15)
Patient populations n (%)	
Adult only	23 (57.5)
Pediatric only	3 (7.5)
Neonatal only	2 (5)
Adult + Pediatric	3 (7.5)
Adult + Neonatal	1 (2.5)
Pediatric + Neonatal	4 (10)
Adult + Pediatric+ Neonatal	4 (10)

SD = Standard Deviation; RT; Respiratory Therapist; ICU = Intensive Care Unit; ER = Emergency Room; FTE = Full Time Equivalent

relating to what these experts perceive as the practice-oriented gaps and necessary research priorities across the respiratory therapy profession. [Table 2](#) outlines the major themes, sub-themes, and illustrative quotes.

## SYSTEM-LEVEL IMPACT OF RTS

Participants agreed that RTs play a valuable role in the delivery of healthcare services at broad levels (e.g., organizational and system levels). RTs are responsible for managing and coordinating care for many patients with cardiorespiratory conditions and collaborate closely with other healthcare professionals (e.g., physicians, nurses, physiotherapists) to develop unique treatment plans and ensure they receive the highest quality care.

To better illustrate how RTs play a valuable role in healthcare, participants emphasized the importance of conducting research to evaluate the value of RTs' contributions to healthcare. They highlighted that RTs play unique roles within the healthcare system, and assessing their worth is crucial for optimizing patient care and resource allocation. To accomplish this, participants suggested utilizing a broad range of metrics, including monetary and non-monetary measures such as patient satisfaction, self-perceived quality of life, safety, length of hospital stay, and readmission rates, to evaluate the care RTs deliver. As one participant explains: *"We do need some quality improvement metrics to show safety, viability, and utility of anesthesia assistants [i.e., RTs]. How that can improve surgical waitlist, how that can provide safer anesthetic care in the anesthesia care team"* (Participant 3, Anesthesia Assistant group). Similarly, participants suggested that it would be important to conduct research to explore the possible ways RTs could adapt their practices to improve the overall care delivery at an organizational level. As one participant suggested, *"For example, if, in a certain region of the country, we're having difficulty attracting certain professions, how can RTs be leveraged to help address the gap."* (Participant 3, Leadership group)

Finally, participants emphasized the need for incorporating emerging technologies at the organizational and system level to enhance RT practice. Participants noted that technology can be an effective tool for enhancing the care they provide:

*"We are used to use technology because you do remote settings. You use cloud, you are using a lot of computers to transmit data. So, you have to adapt yourself. You don't have the choice, but I think at this period in time you don't have the option to not be comfortable with the technology."* (Participant 2, Community Care group)

Participants suggested several ways in which technology could be utilized to enhance practice. For example, participants mentioned the use of electronic medical records, telemedicine and other remote monitoring technologies to link information for healthcare teams to quickly identify problems and solutions in the patient's care.

## OPTIMIZING RESPIRATORY THERAPY PRACTICES

The patient-facing role of RTs (i.e., at the bedside) was discussed by participants as another important part of respiratory therapy practice. There exists a need for research that explores, evaluates, and establishes a stronger evidence base for existing and future respiratory therapy practices at the level of clinical interaction. This research would

**Table 2. Main results.**

Major Theme	Sub-Theme	Illustrative quotes
<b>1) System-level impact of RTs</b>  <b>Description:</b> Evaluating the way in which RTs contribute widely to healthcare at organizational and system levels	<i>Models of in-hospital care</i>  <b>Description:</b> Research about unique roles that RTs could play within the hospital to improve care delivery	<i>We've had some of our lead physicians on the ward say, we have no idea what a deteriorating patient looks like. It's only the RTs to tell us what they look like, and half of the patients that we admit to the ICU before they're dead would have been dead if it hadn't been for RTs out there facilitating the critical care consult. – Participant 1-Critical Care group</i>
	<i>Value of RT contributions</i>  <b>Description:</b> Research aimed at establishing a broad set of metrics (monetary and/or non-monetary) about the care RTs deliver	<i>We need people that are kind of way at the beginning and again going back to the metrics? We need those metrics to be able to say No, this this is the better way to do it. This is what's happening to our wait times this is you know how much research we're involved in that sort of thing. – Participant 2-Diagnostics group</i>
	<i>Technology-enhanced practice</i>  <b>Description:</b> Research related to the integration of emerging technologies, or innovative application of established technologies, for the enhancement of practice. Technology as a tool	<i>From the outpatient side, we look at downloads of our ventilation and our BIPAP as an assessment of success or quality, or adequacy of ventilation and that is something that there's not a lot of research being done into that field. Participant 1- Community and Chronic Care group.</i>
<b>2) Optimizing respiratory therapy practices</b>  <b>Description:</b> Exploring, evaluating and building an evidence base regarding respiratory therapy practices at the level of clinical interaction (e.g., bedside care, patient experience, therapy effectiveness)	<i>Clinical assessment and diagnostics</i>  <b>Description:</b> Research about how RTs go about collecting information and drawing conclusion about a patient's problems	<i>The problem is that that info, that knowledge on what the nuances of the different types of modes and different ventilation that are specific for the patient, or the right endotracheal tube or the right.....any of these devices. Really rely on the end operator [RTs] to know the device and the limitations and the benefits inside and out - Participant 1- Critical Care group</i>
	<i>Respiratory therapeutics</i>  <b>Description:</b> Research investigating the therapeutic interventions performed by RTs	<i>I think we should also look at the teaching value of the RTs as the masters of the airway as the head of the baby just because I think we don't promote enough the role of the RTs as well for that part I taught myself, fellows, residents, and as soon as I started giving them the program, it changed their rotation in the NICU, it also changed the relationship with the RTs it changed everything. Participant 4- Neonatal and Pediatric group</i>
	<i>Assisted devices and healthcare technologies</i>  <b>Description:</b> Device-specific research. Both mechanical and best practice education	<i>I'm still curious, because even if you think about you know the MISTs and LISAs, aerosolization of surfactant are more non-invasive compared to those less invasive right? So I feel like that would be an awesome project like I said. Participant 3 - Neonatal and Pediatric group</i>
	<i>Models of care – out of hospital</i>  <b>Description:</b> Research about unique roles that RTs could play outside the hospital to improve care delivery	<i>Another area of research which you could look at the role of the RT Would be more, I guess, in pediatrics, is transition of care to outside of the hospital, whether they be community or to a care home, or something like that. And what that discharge planning looks like and the role of an RT for pediatrics in transition of care and and/or even in the community. Participant 2- Neonatal and Pediatric group</i>
	<i>The therapeutic relationship</i>  <b>Description:</b> Research relating to the relationships between respiratory therapists and patients/families, including the essence of those relationships and their impacts	<i>One thing that we haven't talked about is patient perspectives, particularly those who have chronic ventilation needs and perhaps people who live in the community using ventilation. I think that may be good research for seeing the value I know we're using this word value, but just seeing the value that our RTs provide, not just in critical care units but within the team but for patients. Because there are many patients who say they really rely on their RT. – Participant 8 - Educator group</i>

Major Theme	Sub-Theme	Illustrative quotes
<b>3) Scholarship on the respiratory therapy profession</b>  <b>Description:</b> Understanding the profession itself, e.g., its nature, theoretic basis, influences, perceptions of, standards, future directions	<i>Practice profiles of respiratory therapy</i>  <b>Description:</b> Research related to the practice profile of RTs across Canada	<i>And I think that I like having seen the role and how it's different across Canada. Where we don't really have a standardized or any sort of regulation per say anesthesia assistant [AA] specifically. I think the role is still so variable.</i> – Participant 1- Anesthesia Assistant group
	<i>Interprofessional relationships</i>  <b>Description:</b> Research related to the function of RTs amongst the interprofessional team	<i>I am constantly being pulled in and asked for my opinion and asked for my viewpoint and considerations on any respiratory related studies that we're doing whether I'm an author on it or not.</i> – Participant 2- Critical Care group
	<i>Mentorship and intraprofessional collaborations and perceptions</i>  <b>Description:</b> Research related to the interrelations between RTs, e.g., mentorship, assumptions about areas of practice	<i>You need a mentor, you need someone to help you navigate the steps so you can go and say I have this idea but how do I translate that?</i> – Participant 2- Critical Care group
	<i>Mobilizing knowledge to practice</i>  <b>Descriptions:</b> Research related to strategies and methods of translating evidence into practice	<i>I think I think even industry has a lot to learn about our expertise and what we can offer them in the development phase of all things respiratory.</i> Participant 1- Neonatal and Pediatric group
	<i>Public relationship with respiratory therapy profession</i>  <b>Description:</b> Research about how the public view the respiratory therapy profession	<i>We have a strong sense of who we are. You know, and we know that the public doesn't necessarily have a very varied knowledge of who we are.</i> Participant 7-Educator group
	<i>Public policy</i>  <b>Description:</b> Research related to how RTs can influence policy	<i>And if we can show that as a profession that we're able to do that, working with other professions as well and the difference that we are making in terms of getting patients outside of bed capacity and into community and exactly what we do, how we do it and essentially market that to government, so that we can lobby for our profession.</i> – Participant 5- Leadership group
	<i>Professional profile of RTs</i>  <b>Description:</b> Research to understand and establish excellent RTs in clinical practice	<i>I don't think that there are many specific things that were in my diploma for respiratory therapy about how to critically go through research and speaking with my coworkers when I was practicing as a respiratory therapist. It was not a place of comfort, so many people just chose not to look at the research. And without doing that, I don't think that we can grow as easily, especially in complicated critical cases.</i> – Participant 4- Educator group
	<i>The workplace experience</i>  <b>Description:</b> Research related to factors in the workplace that might support or hinder RTs	<i>We also need to support our RTs as clinicians and we need to support them as humans beings and looking at the moral injury side and looking at the professional development side.</i> – Participant 2- Critical Care group
	<i>Fostering Research Capacity</i>  <b>Description:</b> Researching strategies and process that may enhance and support respiratory therapy research	<i>I think of our colleagues across the border. I mean that's where a respiratory therapist is not only heading research but doing a lot of the bench studies doing nebulized surfactant, doing that research, bringing RTs from the, you know, the floors or from the units into actually see the research taking place that helps better prepare them for what's coming in the future.</i> – Participant 1- Neonatal and Pediatric group
<b>4) Respiratory therapy education</b>	<i>Entry to practice respiratory therapy education</i>	<i>I do struggle with the idea of like where would I, if I was designing a new program from scratch, I don't know if I could design it in such a way that it's still a diploma program at a base level and still meets the minimum</i>

Major Theme	Sub-Theme	Illustrative quotes
<b>Description:</b> The theory and practice of how RTs teach and learn in formal and informal education environments	<b>Description:</b> Research related to the RT entry-to-practice education, including pedagogy, standards, and outcomes	<i>requirements expected of graduates and also add in all these other potential additional things</i> – Participant 1- Educator group
	<i>RTs as clinical educators</i> <b>Description:</b> Research related to respiratory therapy educational practices in clinical settings	<i>Also, education would be a big one for us. So, education that includes [for] RTs and AA students, but we do in services like, and we sort of do refreshers for each other, anesthesia residents we do, so that's a big, I think, ... I don't know if that's because we just step into that because we are those kind of people or if that's like an ask that's been put to us [to educate other professionals]</i> – Participant 1- Anesthesia Assistant group
	<i>Specialization, certification and higher education</i> <b>Description:</b> Research exploring the educational and credential norms and standards in the profession	<i>But you know I did a post-diploma program and didn't get a masters, and I, you know, and it changed my life as a clinician.</i> – Participant 1- Neonatal and Pediatric group
	<i>Technological-enhanced education</i> <b>Description:</b> Research relating to the integration of technology in environments where RTs learn	<i>How's that [virtual education] affected the graduate that was coming out at the end? How has it affected them? Is it? Are they more resilient? Are they less resilient? Do they have are their hands on skills as good?</i> – Participant 6- Educator group

ICU= Intensive Care Unit; NICU = Neonatal Intensive Care Unit; MIST = Minimally invasive surfactant therapy; LISA = Less invasive surfactant administration

encompass topics such as the effectiveness of different assessment and diagnostic methods, therapeutic interventions regularly undertaken by RTs, enhancing respiratory care device-specific knowledge, and investigating the relationship between RTs, patients and their families.

Participants emphasized the need to conduct research about the unique and sometimes misunderstood ways RTs collect clinical information and draw therapeutic conclusions for their patients. Participants discussed the misconception that “we don’t just do the respiratory assessment,” but rather, the clinical assessments done by RTs are a much more “global and systemic evaluation” (Participant 3, Critical Care group). One participant stated, “We work very closely with nurse practitioners, and not to say we can do their job. But I can triage. Triage is not something I learned in school specifically, but I can take it A to Z” (Participant 3, Community Care group). Participants emphasized a need to conduct research to gain a deeper understanding of the unique clinical assessment approaches by RTs. They believed that this research is central for RTs to effectively meet the comprehensive care needs of individual patients.

Another key area discussed by the participants included research about respiratory care devices, and other technologies RTs use in their practice. For example, further understanding of aerosol therapy, understanding the effectiveness of different aerosol delivery systems, resource utilization and clinical application considerations, and influences on patient outcomes; “Aerosol delivery or surfactant delivery. It’s always changing and [we need to] look at different methods” (Participant 2, Neonatal and Pediatric group). A similar example involved appropriate alarm settings for

respiratory therapy devices, “I’m a big proponent of some research around the appropriate setting of ventilator alarms. And when I say ventilator, I mean everything from BiPap to full-blown life support” (Participant 3, Leadership group). Participants expressed the need for research relating to alarm safety in different settings (e.g., adult, children, at home, in hospital), the impact of alarm frequency and volume on patient outcomes, identifying best practices for alarm management, and understanding the impacts of alarm fatigue.

Finally, participants acknowledged the importance of considering the patient. There was a perceived need to investigate the relationship between RTs and the patient/family experience such as, the impacts of communication and education provided by RTs on multiple patient outcomes:

“One thing that we haven’t talked about is patient perspectives, particularly those who have chronic ventilation needs and perhaps people who live in the community using ventilation. I think that may be good research for seeing the value [of RTs], because there are many patients who say they really rely on their RTs.” (Participant 9, Educator group)

Investigating the bedside, patient-facing role of RTs was expressed as central to establishing a knowledge base that could enhance patient care, optimize treatment outcomes, and further advance the practice of respiratory therapy.

## SCHOLARSHIP ON THE RESPIRATORY THERAPY PROFESSION

Focus group participants also articulated the need to study the respiratory therapy profession more comprehensively, such as the practice profile of the profession, its position amongst the interprofessional team, existing standards, future directions, and societal perceptions of the profession. More specifically, there exists a need for baseline research on the scope of practice for RTs across Canada. *“We talk about scope of practice. But it’d be important to know the inconsistencies between scopes of practice across the provinces”* (Participant 2, Leadership group). Research might include exploring the different roles and responsibilities of RTs across jurisdictions (i.e., different provinces and territories), identifying variations in practice due to healthcare policies and regulations, and understanding the impact of these variations on patient outcomes and the overall delivery of healthcare services. *“It seems we have 100 different ways of doing 100 different things, depending on what region and where you are”* (Participant 2, Diagnostic group). Extending from this work, participants felt a need for deeper understanding of workforce trends for RTs across Canada. This includes studying the supply and demand for RTs, identifying barriers to recruitment and retention, and factors in the workplace that might support or hinder RTs (e.g., burnout, resilience). *“Our troops are getting more and more demotivated. They’re leaving the profession. How can we improve in all of this? How can we get better?”* (Participant 4, Neonatal and Pediatric group).

RTs rarely work in isolation and frequently practice as part of interprofessional teams. Participants discussed the need to undertake research that explores the respiratory therapy profession relative to other interprofessional team members, including the perceptions and attitudes of other healthcare professionals towards RTs, elements of collaboration and effective teamwork, and the impacts of these factors on healthcare.

*“You work with so many different physicians, you work with so many different nurses and every person brings a different element to the context. But somehow, RTs are able to navigate that effectively for patient care... I find that RTs tends to be very well positioned to be a very strong interprofessional there in the hospital team setting.”* (Participant 7, Educator group)

Furthermore, participants emphasized the importance of engaging in introspective reflection and examining long held assumptions about respiratory therapy practice in certain contexts. As one participant in the diagnostic focus group explained:

*“It’s hard to be a good pulmonary function clinician or diagnostic clinician; it’s incredibly hard. It takes a bunch of years of trial and error and learning and good teachers. It’s no different than becoming a master of ventilation. It’s a very, very difficult thing, and I think the industry as a whole has given diagnostics, and then private industry, a stigma that it’s the easy, floaty type of section of the industry.”* (Participant 2, Diagnostic group)

As a result, participants identified the need to conduct research about intra-professional attitudes and perceptions.

One strategy that participants frequently discussed to help address this is the idea of mentorship in the respiratory therapy profession. Mentorship is essential for the development of new RTs and may reduce misconceptions in other areas of respiratory therapy practice. Many participants acknowledge the importance of mentorship but expressed that there is a lack of learning opportunities for mentors to develop as supportive figures for their students/peers, *“even for us [regarding] how to be educators at the bedside, they get thrown students. But do we really know how to mentor those students or guide those students?”* (Participant 2, Critical Care group). Participants suggested that valuable insights can be gained by in-depth investigation of the respiratory therapy profession, paving the way for its evolution and advancement.

## RESPIRATORY THERAPY EDUCATION

Finally, participants expressed the need for research focusing on the theory and practice of how RTs teach and learn in formal and informal education environments. Their discussions centred on issues such as entry-to-practice education, RTs as clinical educators, certification/higher education, and technological-enhanced education.

Participants emphasized the need for practice-based specializations, certification and higher education might improve patient outcomes and increase job satisfaction among RTs. *“I think it’s really important that we establish that there’s a necessity for specialization in the different practice fields that we enter”* (Participant 1, Neonatal and Pediatric group). Similarly, participants discussed research areas that revolve around identifying and understanding the factors that motivate clinicians to pursue specialization, barriers and facilitators to higher education and developing standards and guidelines for possible certifications.

Participants also expressed interest in the utilization of technology in respiratory therapy education. Specifically, to explore ways to utilize new technology to improve the efficiency and effectiveness of education and evaluate the effect of technology on education outcomes. These included topics such as virtual education and simulation-based education.

*“We’re doing more and more simulation. But how does that simulation directly affect RTs? And/or is there specific respiratory therapy simulations that can improve the clinical care that we provide. I think there’s opportunity for research around the use of simulation for clinical care specifically geared towards that respiratory care component.”* (Participant 2, Neonatal and Pediatric group)

Participants agreed that exploring the theoretical and practical aspects of how RTs teach and learn in educational settings might serve to enrich the foundational knowledge of aspiring RTs.



## DISCUSSION

The purpose of this paper was to explore the practice-oriented gaps and essential research areas within the respiratory therapy profession, as perceived by respiratory therapy experts from prevalent areas of practice. The findings establish a fundamental understanding of the current gaps and the specific needs of RTs that require further investigation.

The potential knowledge gaps we identified in this study relate to a variety of topic areas, ranging from RTs' broad, system-level impact (e.g., specialized roles of RTs in practice areas and the value that RTs bring to healthcare systems) to the narrower, day-to-day activities such as airway management, bench research, lung ultrasound and individualized mechanical ventilation. (Table 2) The participants strongly emphasized the significance of research priorities that consider the breadth and depth of the respiratory therapy profession. This finding underscores the complex nature of respiratory therapy and its application in practice.

Participants suggested numerous areas within the profession that lack sufficient research evidence or is less well-developed. This finding is not surprising, as a considerable portion of the work performed by RTs draws upon low-level evidence. For example, a frequently employed practice in respiratory therapy is using 3% hypertonic saline and/or N-acetylcysteine nebulizer therapies as a means of airway clearance therapy. This method is commonly applied to address a range of airway diseases, even though there exists limited research substantiating its efficacy.<sup>33</sup> These situations are less than ideal because they may not accurately reflect the best practices for patient care and lead to wasted resources and time.

A notable highlight of our findings was the participant's enthusiasm for RTs to have a larger role in the research process and an appreciation for developing research evidence in respiratory care. The participants in this study demonstrated the capacity to articulate a diverse array of research topics that could potentially enhance the profession of respiratory therapy and the patient care offered by RTs. Previous studies have demonstrated that many RTs recognize the significance of research and have a desire to engage in research activities to enhance patient outcomes, prioritizing this over seeking higher pay or prestige.<sup>13,34</sup> However, RTs frequently encounter a multitude of challenges that hinder their research efforts, such as a lack of resources, funding or opportunities to participate.<sup>13,34</sup> Our findings can potentially reduce some challenges by serving as the initial phase in recognizing crucial gaps in knowledge, which can enable decision-makers to distribute research funds more strategically to maximize the positive outcomes of their research investments.<sup>16,17</sup>

It should be acknowledged that exploring research priorities within the respiratory therapy profession is a significant step toward enhancing its professionalization. Professionalization refers to the process through which a particular occupation gains recognition, credibility, and autonomy as a distinct and valuable profession.<sup>35</sup> Throughout this study, participants frequently highlighted situations

where RTs could be effectively utilized and valued within healthcare settings. For instance, participants emphasized the importance of researching distinct roles that RTs could assume within hospitals to enhance the delivery of healthcare. Identifying research priorities leads to conducting more focused research to expand the body of knowledge within respiratory therapy. It leads to the development of new techniques, interventions, and best practices that improve patient care. As the profession's knowledge base grows, RTs can provide more effective and evidence-informed care, demonstrating their expertise and professionalism.<sup>12,36</sup> Furthermore, a profession steeped in research elevates the visibility and recognition of RTs within the broader healthcare landscape.<sup>37</sup> As the profession's achievements become more evident through research outcomes, there is a stronger basis for advocating for increased resources, improved working conditions, and regulatory support.<sup>11,12,36,37</sup>

The results of this study are distinct from previously published studies aimed at determining research priorities. First, our results were generated using a systematic and structured approach that reflects the collective wisdom and expertise of a diverse group of experts in respiratory therapy as stakeholders. Second, we chose to use qualitative methodology to generate our eventual research priority items, which provides a more comprehensive understanding of the data and allows us to create items using appropriate language for the intended population for the second Delphi phase.<sup>38</sup> Third, by using qualitative methodology we deliberately involved stakeholders in the research agenda-setting process. This is important as previous research notes that the involvement and engagement of stakeholders enhance the potential adoption of research into practice by ensuring relevance, gaining stakeholder buy-in and support, fostering collaboration and partnership, facilitating effective communication, and increasing policy and practice impact.<sup>39,40</sup>

Our research yielded novel findings when compared to a prior review that explored research and practice priorities in respiratory care but did not include the perspective of RTs.<sup>15</sup> This difference implies that previously published research and practice priorities for respiratory care may not fully encompass the specific knowledge gaps and research needs unique to the respiratory therapy profession. Indeed, there were some knowledge and practice areas that our findings have in common with these earlier publications, such as management of mechanical ventilation, clinical assessment and diagnostics of patients, the patients' perspectives of their care team, and communication with patients.<sup>15</sup> However, we identified many unique priorities, such as determining the perception and value of RTs, the interprofessional relationships, and the technology-enhanced care RTs provide (e.g., virtual, simulation, lung ultrasound).

## STRENGTHS AND LIMITATIONS

Using focus groups was a strength of this project due to the dynamic interaction it fostered among participants. This interactive environment stimulated novel idea generation,

encouraged participants to build on each other's responses, and potentially revealed shared experiences or differing viewpoints, providing valuable insights for the study. However, there is an inherent possibility of social desirability bias associated with focus groups. The risk of social desirability bias was minimized by assuring strict confidentiality at multiple points of the research. Additionally, when the research team recruited experts for the focus group, they were contacted by a research assistant not known to them, minimizing any undue influence. Another limitation is that participants in focus groups may hesitate to express their unique viewpoints or personal experiences due to fear of judgment or conformity pressure, limiting an in-depth understanding of individual perspectives. We attempted to mitigate this by ensuring the moderator made deliberate efforts to explore the individual perspectives of each participant through the interviews.

Another strength of this study was the planned methods to enhance the trustworthiness of the data, which included audit trails, multiple team members involved in coding the data and reflexive team meetings. Furthermore, we provided a thick description of the findings and the context in which the research was done throughout the manuscript to support the transferability of the findings. However, it is important to note that the viewpoints shared by the participants in this study may not be representative of all RTs. In recognition of this limitation, as a next step, we intend to utilize the insights gained from this study as a foundation for a Delphi study that will examine a broader and more diverse subject pool.

## CONCLUSION

The findings of this study were generated through exploration of the unique perspectives, practice contexts and knowledge requirements of RTs. The unique insights garnered from this study contribute important insights into the knowledge gaps and research needs specific to RTs. These findings pave the way for further exploration, discourse, and research aimed at understanding the specific contributions and requirements of RTs.

Building upon this understanding, we intend to utilize the findings to generate items for the second phase of the Delphi study using a pan-Canadian survey. In this next phase, we will build consensus (i.e., voting, ranking, and prioritizing) on the items, enabling us to identify specific

research priorities that hold the most significance for the respiratory therapy community.

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## COMPETING INTERESTS

MZ is deputy editor of the *Canadian Journal of Respiratory Therapy*, AW is an associate editor of the *Canadian Journal of Respiratory Therapy*, SQ and MLN are on the editorial board for the *Canadian Journal of Respiratory Therapy*. None were involved in any decision regarding this manuscript. EK has no conflicts to disclose. All authors have completed the ICMJE uniform disclosure form.

## CONTRIBUTORS

All authors contributed to the conception or design of the work, the acquisition, analysis, or interpretation of the data. All authors were involved in drafting and commenting on the paper and have approved the final version.

## ETHICAL STATEMENT

This project was approved by the research ethics boards of Ontario Tech University (#16789) and the Hospital for Sick Children (#1000079058).

## AI STATEMENT

The authors confirm no generative AI or AI-assisted technology was used to generate content.

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## SUPPLEMENTARY MATERIALS

### **Supplementary Information**

Download: <https://cjrt.ca/article/91184-exploring-knowledge-gaps-and-research-needs-in-respiratory-therapy-a-qualitative-description-study/attachment/189655.pdf>

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