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## Critical Care Medicine Abstracts

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# Cannabidiol Reduces Systemic Cytokine Release in Experimental Acute Lung Injury While Maintaining Local Immune Response

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## INTRODUCTION

The immune response to inflammation or infection within the pulmonary microcirculation drives the pathophysiology of acute lung injury (ALI). Disruption of the thin epithelial and endothelial barrier surrounding the alveoli facilitates systemic spread of pathogens, activated leukocytes, and inflammatory mediators, which in turn contribute to systemic inflammation and mortality in patients. The endocannabinoid system (ECS) is a major modulator of the immune response during inflammation and infection, and therefore a potential therapeutic target in this disease process. Phytocannabinoids such as cannabidiol (CBD) have been shown to be protective against inflammation in several disease states. The overall objective of this study was to study the effects of CBD on local and systemic inflammation in endotoxin-induced ALI in mice.

## METHODS

Four groups of young adult male C57Bl/6 mice were randomized in this study: control, LPS, LPS with CBD treatment, and control with CBD treatment. Mice received intranasal administration of 5 mg/kg LPS from *Pseudomonas aeruginosa* or saline as control. CBD-treated mice received a 10 mg/kg intraperitoneal dose of CBD immediately following intranasal procedure. At 6 hours post-induction, plasma and left lung samples were collected for Luminex assay, and right lungs were collected for hematoxylin and eosin staining. In separate groups of mice, intravital microscopy was performed to assess leukocyte activation within the intestinal and pulmonary microcirculation.

## RESULTS

LPS challenge induced robust local and systemic inflammation as evidenced by cytokine and chemokine release, lung histopathology, and leukocyte adhesion. Administration of CBD significantly reduced cytokine and chemokine levels in the plasma, chemokine levels in lung tissue, and leukocyte adhesion in the intestinal microvasculature in LPS-challenged mice. Unexpectedly, CBD treatment resulted in a modest exacerbation of ALI score in LPS-challenged mice, an outcome which appeared to be driven by enhanced neutrophil infiltration of the alveoli. CBD administration bore no significant effects in control mice.

## DISCUSSION

In this model of experimental ALI, we have shown that CBD administration reduced systemic inflammation while not impairing neutrophil infiltration of the lung parenchyma. These findings may suggest a potential therapeutic role for CBD to improve the systemic outcome in ALI. Further research is required to characterize CBD's seemingly contrasting effects on pulmonary chemokine levels and histopathology in our model.

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# Doing More Harm than Good: Understanding Medical Futility as Morally Injurious Among Canadian Healthcare Professionals During the COVID-19 Pandemic

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## INTRODUCTION

Healthcare providers (HCPs) have been exposed to distressing situations throughout the COVID-19 pandemic, including inadequate staffing and equipment, fear of virus transmission to family, and losing more patients.<sup>1</sup> These experiences can increase the risk of developing adverse mental health sequelae.<sup>2</sup> One outcome that has gained widespread recognition among HCPs during the pandemic is moral injury, due in part to the increased prevalence of events that may potentially violate deeply-held moral beliefs,<sup>3</sup> otherwise known as potentially morally injurious events (PMIEs).<sup>4</sup> Within the critical care context, the idea of “medical futility” is an inherent moral challenge, and can be understood as the use of considerable resources without reasonable hope of improving a patient's long-term outcomes.<sup>5</sup> Although this concept is well-established in literature, there is a limited understanding of its role in precipitating moral injury. This qualitative study investigated situations surrounding medical futility that were considered PMIEs among Canadian HCPs during the pandemic.

## **METHODS**

This study is part of a broader project investigating Canadian HCPs' mental health and experiences during the COVID-19 pandemic. HCPs across Canada who provided direct patient care or supported care were invited to participate in a virtual semi-structured interview from February to Sept 2021, which included questions about the types of PMIEs they may have encountered during the pandemic and the outcome of these experiences. These responses were compiled and participants who identified events associated with medical futility were included in this analysis. Responses were analyzed using an inductive thematic approach by three team members, who generated the initial and subsequent codes, followed by the overarching themes. This study was granted approval by the local research ethics board.

## **RESULTS**

A total of 16 Canadian HCPs were included in this study. Most participants were respiratory therapists (12/16), hospital-based (14/15), women (13/15), and residents of Ontario (9/15). Demographic data was partially missing for one participant. From the thematic analysis, four major themes (with associated subthemes) were identified across the interview excerpts to encompass the experience of medical futility in the context of moral injury: (1) Quality over quantity of care (productive patient care, emotional burden on HCPs); (2) Inadequate end-of-life conversations by HCPs (communication with families, communication with patients); (3) Wishes of families imposed on patients (selfish motives, unawareness of the situation); and (4) Lack of HCP autonomy over care provision (conflicting views among HCPs, conflicting personal and professional values, organizational betrayal). Overall, these themes speak to moral dilemmas surrounding compassionate and productive patient care, informed decision-making, patient autonomy, and provider autonomy, respectively.

## **DISCUSSION**

Findings from this study contribute further knowledge about the negative impacts of delivering futile care and describe the occupational situations related to medical futility that are considered by Canadian HCPs as being morally injurious. Understanding events that contribute to moral injury is critical to prevent and mitigate mental health problems in HCPs. Importantly, this study highlights many targetable areas in the acute care setting that can be addressed to improve well-being for HCPs. Organizations and critical care leaders should be aware of these events to appropriately respond with necessary supports and resources.

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# Patient and Family Centered Care, Communication, and Relationship Development in the ICU: A Scoping Review

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## INTRODUCTION

Communication in the ICU is difficult due to the complexity of care, the number of healthcare providers involved, the nature and pace of the decisions, and the emotional toll of having a loved one in critical condition. The COVID-19 pandemic challenged communication and the ability to build trusting relationships as a result of restrictive visitation policies, but provided preliminary insight into the potential role of technology in communication in the ICU. <sup>1</sup>

As part of a Design Thinking project, the purpose of this scoping review was to broadly collect and synthesize information about patient and family centered care (PFCC), communication, and relationship development in the ICU. This abstract will focus on communication technology, one of the four emerging themes of the scoping review

## METHODS

We adopted an established framework for conducting a scoping review: identifying and refining the research question; identifying and selecting relevant studies; charting and extracting themes and data; and collating, summarizing, and reporting the results.<sup>2</sup> The search was conducted between May and December 2021. We purposefully designed broad search terminology, which was peer-reviewed by a health science librarian. To assess for inclusion eligibility, title and abstract screening were completed independently by two reviewers. A third team member served as a tiebreaker in cases of disagreement. Full text inclusion was assessed in the same manner. Full text data was extracted and results were sorted into major themes. Rigor and trustworthiness of the scoping review were enhanced using qualitative thematic content analysis to extract themes, and by consulting with the multidisciplinary research team (e.g., healthcare providers, patient partners) to confirm and contextualize the results.

## RESULTS



59,101 sources were imported to Covidence (a screening and data extraction tool), of which 13,805 were duplicates. The 45,296 unique sources have undergone a three-stage review process: a title and abstract screening, resulting in 44,654 sources excluded using stringent inclusion and exclusion criteria; a resulting full text review of 551 sources with 110 sources meeting the inclusion criteria; and a thematic analysis of the 110 sources was completed by several research team members. Thematic analysis of these 110 sources resulted in 4 overall themes: Communication technology (15), End-of-life care complexities (13), Limitations to patient capacity for decision-making/communication (11), and Patient and family lived experience (74).

## DISCUSSION

Insights suggest that communication technology tools are generally cautiously positively received, but preferences vary significantly by age, ethnicity, and prior ICU experience. Although sparse literature is available, communication technology can be used for different purposes in the ICU setting, including for education or to facilitate communication.<sup>3-5</sup> The importance of stakeholder engagement throughout development cannot be understated. Priority must be given to ensuring that technologies are accessible and meet the needs of end-user(s). Ultimately, our findings can inform recommendations for communication technology solutions to empower ICU patients and their loved ones in shared decision-making and engage the healthcare team in PFCC.

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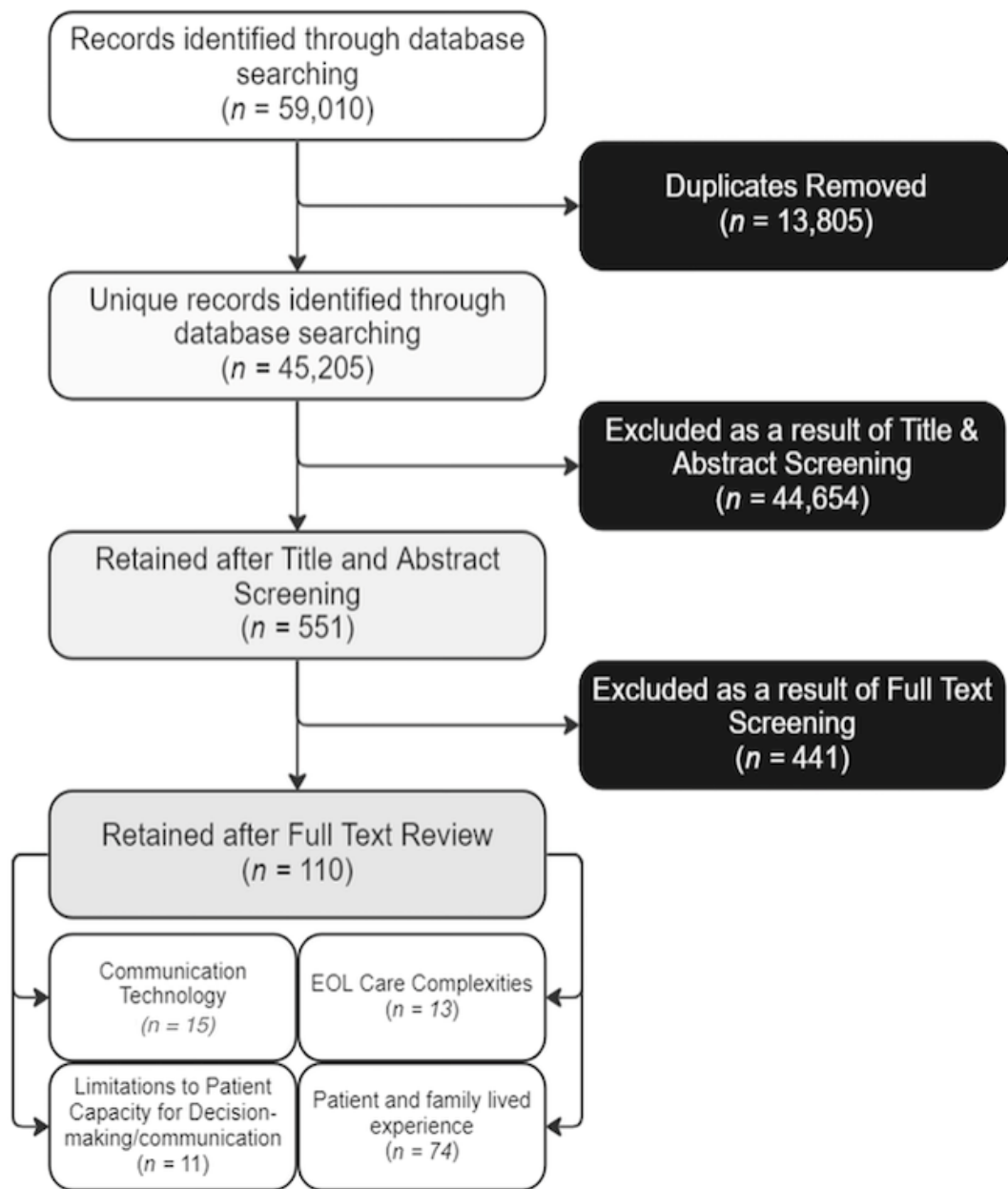


Figure 1