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## IMPLEMENTING COVID REHABILITATION

### Implementation Considerations for Delivering Inpatient COVID Rehabilitation: A Qualitative Study

Christine Sheppard, PhD, MSW

St. John's Rehab Research Program, Sunnybrook Research Institute, Sunnybrook Health  
Sciences Centre

[Christine.sheppard@wellesleyinstitute.com](mailto:Christine.sheppard@wellesleyinstitute.com)

Zara Szigeti, MSc

St. John's Rehab Research Program, Sunnybrook Research Institute, Sunnybrook Health  
Sciences Centre

[zara.szigeti@sunnybrook.ca](mailto:zara.szigeti@sunnybrook.ca)

Robert Simpson, MBChB, PhD

Department of Physical Medicine and Rehabilitation & Rehabilitation Sciences Institute,  
Temerty Faculty of Medicine, University of Toronto

[robert.simpson@uhn.ca](mailto:robert.simpson@uhn.ca)

Jacqueline Minezes, BSc OT., MSc, MHSc, CHE

Musculoskeletal/STAR Rehab and Restorative Transitional Unit, St. John's Rehab, Sunnybrook  
Health Sciences Centre

[Jacqueline.minezes@sunnybrook.ca](mailto:Jacqueline.minezes@sunnybrook.ca)

Sander L. Hitzig, PhD

St. John's Rehab Research Program, Sunnybrook Research Institute, Sunnybrook Health  
Sciences Centre

Department of Occupational Science and Occupational Therapy & Rehabilitation Sciences  
Institute, Temerty Faculty of Medicine, University of Toronto

[Sander.hitzig@sunnybrook.ca](mailto:Sander.hitzig@sunnybrook.ca)

Amanda Mayo, MD, MHSc

St. John's Rehab Research Program, Sunnybrook Research Institute, Sunnybrook Health  
Sciences Centre

Department of Physical Medicine and Rehabilitation, Temerty Faculty of Medicine, University  
of Toronto

[Amanda.mayo@sunnybrook.ca](mailto:Amanda.mayo@sunnybrook.ca)

Lawrence R. Robinson, MD

St. John's Rehab Research Program, Sunnybrook Research Institute, Sunnybrook Health  
Sciences Centre

Department of Physical Medicine and Rehabilitation, Temerty Faculty of Medicine, University  
of Toronto

[Larry.Robinson@sunnybrook.ca](mailto:Larry.Robinson@sunnybrook.ca)

## IMPLEMENTING COVID REHABILITATION

47 Maria Lung, BSc(PT), MSc  
48 Musculoskeletal/STAR Rehab and Restorative Transitional Unit, St. John's Rehab, Sunnybrook  
49 Health Sciences Centre  
50 [Maria.Lung@sunnybrook.ca](mailto:Maria.Lung@sunnybrook.ca)

51  
52 Marina B. Wasilewski, PhD  
53 St. John's Rehab Research Program, Sunnybrook Research Institute, Sunnybrook Health  
54 Sciences Centre  
55 Department of Occupational Science and Occupational Therapy & Rehabilitation Sciences  
56 Institute, Temerty Faculty of Medicine, University of Toronto  
57 [marina.wasilewski@sunnybrook.ca](mailto:marina.wasilewski@sunnybrook.ca)

### 58 59 **Corresponding Author:**

60 Marina Wasilewski, PhD  
61 Scientist, St. John's Rehab Research Program  
62 285 Cummer Avenue, Toronto ON M2M 2G1

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64  
65  
66 **Authors' contributions:** CS contributed to the study design and led the data analysis and  
67 interpretation of results, manuscript writing and incorporating co-author feedback. ZS  
68 contributed to data analysis and interpretation of results, manuscript preparation, revisions, and  
69 feedback. RS contributed to data analysis and interpretation of results, and manuscript revisions  
70 and feedback. JM, SLH, AM, LRR, and ML contributed to the study design and provided  
71 manuscript revisions and feedback. MW designed and directed the study. She was responsible  
72 for funding acquisition, contributed to the analysis of the results, and provided manuscript  
73 revisions and feedback. All authors reviewed the results and approved the final version of the  
74 manuscript.

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### Abstract

**Rationale:** Patients recovering from significant COVID-19 infections benefit from rehabilitation; however, aspects of rehabilitative care can be difficult to implement amidst COVID infection control measures.

**Aims and Objectives:** We used the Consolidated Framework for Implementation Research (CFIR) to evaluate the rapid implementation of a COVID zone in an in-patient rehabilitation hospital at the onset of the first wave of the pandemic.

**Methods:** Semi-structured interviews were conducted with healthcare providers (n=12) supporting the COVID zone, as well as with patients (n=10) who were discharged from the COVID zone and their family caregivers (n=5). The interviews explored the successes and challenges of working on the unit and the quality of care that was delivered to patients recovering from COVID.

**Results:** Rapid implementation of the COVID zone was supported by champions at the middle-management level but challenged by a number of factors, including: conflicting expert opinions on best infection control practices (outer setting), limited flow of information from senior leaders to frontline staff (inner setting), lack of rehabilitation equipment and understanding of how to provide high quality rehabilitative care in this context (intervention characteristics), willingness and self-efficacy of staff working in the COVID zone (individual characteristics), and lack of time to reflect on and assess effectiveness (process).

**Conclusions:** While there was an apparent need for rapid implementation of a COVID rehabilitation zone, senior leadership, middle management, and frontline staff faced several challenges. Future evaluations should focus on how to adapt COVID rehabilitation services during fluctuating pandemic restrictions, and to account for rehabilitative needs of people recovering from significant COVID infections.

**Key Words:**

In-Patient Rehabilitation

Pandemic

COVID-19

Implementation

## 111 **Introduction**

112  
113 Patients recovering from significant COVID-19 infections (COVID) commonly  
114 experience long-term physical, cognitive, and psychosocial impairments that negatively impact  
115 daily functioning and quality of life <sup>1-3</sup>. Therefore, many patients hospitalized with COVID  
116 require subsequent in-patient rehabilitation <sup>4-6</sup>, which promotes recovery, improves health  
117 outcomes <sup>7,8</sup>, and facilitates community reintegration <sup>9,10</sup>.

118 Specific aspects of rehabilitative care can be difficult to implement amidst COVID  
119 infection control measures <sup>11</sup>. Reduced access to therapy opportunities (limited group therapies  
120 or access to therapy equipment), visitor restrictions, and physical distancing all necessitate novel  
121 implementation strategies to deliver safe and effective rehabilitation during COVID <sup>10-12</sup>. One  
122 strategy for facilitating COVID rehabilitation was through the creation of a designated COVID  
123 unit with a dedicated team <sup>5</sup>. However, little has been published about the implementation of  
124 such units. Therefore, we assessed the rapid implementation of a COVID zone in an in-patient  
125 rehabilitation hospital (IRH) at the onset of the pandemic using the Consolidated Framework for  
126 Implementation Research CFIR; <sup>13</sup>.

## 127 **Methods**

128 This analysis draws on data from a larger qualitative study examining the COVID care  
129 pathway <sup>14</sup>. This qualitative evaluation uses the CFIR to explore the barriers and facilitators to  
130 implementing a COVID zone <sup>15-17</sup>. CFIR constructs guiding this evaluation included:  
131 intervention characteristics, outer setting, inner setting, characteristics of the individual and  
132 processes. Our methodology and findings below are reported in accordance with the  
133 Consolidated Criteria for Reporting Qualitative Research (COREQ, see Appendix A).

134 *Study Setting & Intervention*

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135           This evaluation was conducted at an IRH located in Toronto, Canada. The hospital offers  
136 in-patient and outpatient rehabilitation services to people recovering from a range of illnesses  
137 and injuries. The COVID zone was implemented on the Musculoskeletal and Geriatric  
138 Rehabilitation Unit, wherein seven of the units' 39 beds were designated to the COVID zone,  
139 with an additional 15 beds available if needed. The unit was staffed by a hospitalist physician,  
140 physiatrist, consulting psychiatrist, nurses, and allied health professionals. They also had direct  
141 support from the Infection Prevention and Control (IPAC) team. The COVID zone provided  
142 rehabilitation to a total of 45 patients between March 2020 and July 2021.

### 143 *Data Collection*

144           A convenience sample of HCPs working in or supporting the COVID zone were recruited  
145 using the hospital's COVID unit listservs (n=12; see Table 1 for sample characteristics). We also  
146 recruited a convenience sample of family caregivers (n=5) and patients (n=10) who were  
147 discharged from the COVID zone at the IRH between March and September 2020 (see Table 2  
148 for sample characteristics). All patients were contacted by telephone or email to share  
149 information about the study, and each patient was asked for their caregiver's contact details for  
150 us to follow-up. Eligible patients and caregivers included those who spoke English and were  
151 cognitively able to provide consent. Additionally, caregivers were eligible if they were a friend  
152 or family member of a patient who was discharged from the IRH COVID unit during the  
153 abovementioned period. Thirteen patients and caregivers were eligible for the study but were not  
154 interested (n=9) or could not be reached (n=4). One family caregiver (CG10) also worked as a  
155 frontline nurse at the IRH, and relevant quotes that pertained to implementation are included in  
156 the current analysis.

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157 Data were collected through single, semi-structured, one-to-one interviews conducted via  
158 Zoom or telephone between August 2020 and February 2021 by a trained research analyst (SG)  
159 with expertise in qualitative research. The interviewer and the research team were embedded  
160 within the IRH; the participants had no prior relationship with the interviewer and understood  
161 that the goals were to explore stakeholder experiences with COVID care. Interviews ranged from  
162 30 to 80 minutes. Questions examining the implementation of the COVID zone focused on  
163 successes and challenges working on the unit, supports received, and the quality of care  
164 delivered to patients. Data were collected until saturation was reached<sup>18</sup>. All sessions were  
165 audio-recorded, transcribed verbatim, and uploaded into NVivo for data management and  
166 collaborative coding. Ethical approval for this study was granted by Sunnybrook Health Sciences  
167 Centre, and informed consent was obtained from all participants prior to data collection.

### 168 *Data Analysis*

169 We used a qualitative descriptive approach to elicit a rich description of the  
170 implementation of the COVID zone to inform the development of actionable policy and practice  
171 recommendations that were reflective of our participants' views<sup>19</sup>. We conducted a deductive  
172 thematic analysis<sup>20</sup> guided by a coding framework based on the CFIR (see Table 3). All  
173 transcripts were coded independently and then jointly by two independent researchers (ZS and  
174 SG), and three additional researchers (CS, RS, MW) participated in the thematic analysis. Rigour  
175 was established by double coding, keeping audit trails, recording memos, and regular team  
176 meetings.

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### Results

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Although participants recognized the need for a COVID zone, several implementation challenges were identified. Participants' insights fell into several CFIR constructs that spanned all five domains of the framework (see Table 3).

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#### **Domain 1: Intervention Characteristics (attributes of the intervention that impact implementation success)**

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Participants recognized that the IHR had to *“move forward and dedicate a zone or unit for COVID-19 patients,”* (HCP06, PCM), as cohorting was thought to have the advantage of minimizing the risk of disease transmission, conserving personal protective equipment (PPE), and increasing staff competencies. However, the decision of where to establish the COVID zone was made by senior leadership, with little engagement of frontline staff due to urgency. As one participant described, *“we had to get this unit up and running because we had to isolate patients who were already there on our unit. We didn't have time to prepare.”* (HPC05, OT)

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Patients and family caregivers were *“glad to be given the opportunity”* (CG05) to safely participate in rehabilitation, but staff had concerns about the quality and amount of rehabilitation that could be offered within the COVID zone. While this was in part related to various COVID restrictions, there was also a certain level of *“anxiety and conflict within the team that hindered what they were able to deliver.”* (HCP03, PPL)

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*“My concern is that they wouldn't be getting enough rehab [...], they would have to be treated in their rooms, they wouldn't have access to all the equipment. They wouldn't be getting all that they should have been getting.”* (HCP09, PCM)

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#### **Domain 2: Outer Setting (external influences on the intervention implementation)**



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202 Participants discussed external pressure to create a COVID zone, as not all other  
203 rehabilitation programs were accepting COVID patients. This IRH was networked with a large  
204 acute-care hospital and this institutional partnership was thought to provide a clear path for  
205 patients from acute care to rehabilitation.

206 Political directives and external mandates also impacted implementation. For instance,  
207 the lack of government-instituted ‘pandemic pay’ for allied health professionals created friction  
208 within the COVID zone, and participants were frustrated that *“none of us who were working*  
209 *face-to-face with the COVID patients, except for nurses, got pandemic pay.”* (HCP05, OT)  
210 Another challenge was linked to the fact that professional associations were providing members  
211 with their own best practice guidelines for working in healthcare settings during the pandemic  
212 that conflicted with both those of the provincial government and the local hospital’s IPAC team.

213 *“There was a document circulated by our [physiotherapy] and [occupational*  
214 *therapy] associations to say what needed airborne precautions and we needed*  
215 *droplet precautions [...] We were not supplied with N95 because our infection*  
216 *control practitioners were saying, no, everything is droplet and only certain things*  
217 *were airborne. Who would I believe?”* (HCP1, PPL)

218 Participants expressed frustration at *“these two different viewpoints coming from two*  
219 *different experts,”* (HCP3, PPL); the lack of compatibility between external recommendations  
220 and internal policies left them questioning whether *“the experts in the hospital were really*  
221 *looking out for the best needs of the clinicians [...] by not providing them with every piece of*  
222 *personal protective equipment that [clinicians] felt was needed.”* (HCP3, PPL)

223 **Domain 3: Inner Setting (characteristics of the implementing organization)**

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224           At the onset of the pandemic, a strong tension for change emerged, as the facility  
225           “*couldn’t have these patients spread out anymore, because staff were concerned about risk of*  
226           *transmission [...] of staff getting infected, for other patients getting infected.*” (HCP6, PCM)  
227           However, frontline staff raised concerns about the compatibility of the unit that was selected to  
228           house the COVID zone. Participants felt that the zone’s location on the upper-most level of the  
229           IRH disrupted workflow and required additional coordination to transport patients from the  
230           hospital entrance. Others commented that while the unit’s original staff had expertise in caring  
231           for deconditioned patients, their team dynamics were still developing and thus were not  
232           optimally positioned to deliver the intervention. As one participant described, “*it would have*  
233           *made sense to look at a variety of factors [...] not solely the population that [the COVID zone]*  
234           *was going to serve. [The unit] didn’t have the capacity.*” (HCP3, PPL)

235           Senior leadership was predominantly responsible for initiating the implementation of the  
236           COVID zone, leaving some frontline staff feeling that they could have been better engaged.  
237           Although management staff implemented ‘*COVID huddles*’ to provide COVID-related updates,  
238           senior leadership was perceived as largely inaccessible, especially at the onset of the pandemic  
239           where information was shared primarily through town halls and email. As the pandemic  
240           progressed, senior leadership was more present on the frontline, which staff felt showed a greater  
241           commitment and accountability to the COVID zone and the wellbeing of its staff.

242           Provision of rehabilitation was strained by a lack of resources (e.g., PPE shortages) and  
243           inaccessible rehabilitation equipment (e.g., gym). Conversely, rehabilitation was facilitated by  
244           extra time that HCPs had with patients, which was necessary, as rehabilitation took longer to  
245           deliver, and patients had more complex psychosocial needs due to visitor restrictions.

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246            *“On the COVID unit, I would spend an hour with each of my patients. [...] normally,*  
247            *I’m in and out of a patient’s room every 15-20 minutes. [But] this was some of the*  
248            *most healthy nursing I’ve done in years. It meant that I could spend [time] working*  
249            *through some of the things they were concerned about.”* (HCP8, RN)

### 250 **Domain 4: Characteristics of Individuals (characteristics of the implementing individuals)**

251            HCPs recognized the importance of rehabilitation for COVID patients; however, frontline  
252            staff varied in how comfortable and eager they were to participate in the intervention. Many felt  
253            ‘forced’ and discussed how they *“were put in a position where we don’t know a lot, but we’re*  
254            *having to make decisions and deal with it. [...] It wasn’t a choice.”* (HCP07, OT)

255            Although senior leadership hoped that *“develop[ing] staff competencies [so] they get*  
256            *really good at treating these patients”* (HCP4, Senior Leader) would foster self-efficacy,  
257            frontline staff felt *“unsure of what I was supposed to do [because] no one was telling me*  
258            *anything.”* (HCP2, Pharmacist) Others lacked knowledge of specific rehabilitation strategies to  
259            address the complex needs of COVID patients and discussed how they were required to think of  
260            creative solutions in an environment where usual resources (e.g., rehabilitation equipment) were  
261            unavailable. Willingness to work in the COVID zone was further influenced by personal  
262            circumstances, including prior experience caring for a loved one with COVID, childcare and  
263            caregiving responsibilities, and personal health risks. For some, however, interest working in the  
264            COVID zone increased as the pandemic progressed:

265            *“When we first started, everybody was afraid [...] by the beginning of the second*  
266            *month, we had nurses volunteering because they saw it as an easier rotation. [...] It*  
267            *was almost like we painted the fence white, and everybody wanted to start painting*  
268            *the picket fence.”* HCP8, RN

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### 269 **Domain 5: Process (stages of implementation)**

270 Participants explained that the abrupt onset of the pandemic and the rapid influx of  
271 COVID patients created little time for comprehensive planning. As one participant described,  
272 *“once it was decided that [unit] would have the COVID zone [...] they only had a couple of days*  
273 *to figure it out [and] jump into action.”* (HCP1, PPL) Due to the lack of opportunity for  
274 planning, there were no mechanisms in place for formal evaluation and participants questioned,  
275 *“Did we do it right? Did we do it wrong? Nobody told us.”* (HCP7, OT)

276 Since working on the COVID zone was initially perceived as *“not cool”* (HCP7, OT),  
277 management had to champion the intervention among frontline staff to overcome some  
278 resistance. Frontline staff who were resistant wanted to be more involved in implementation  
279 decision making and to be more *“connected to [senior leadership] to feel they can trust them”*  
280 (HCP3, PPL).

281 The exclusion of family caregivers further exacerbated implementation, as caregivers  
282 usually work with staff to facilitate discharge planning and support psychosocial outcomes.

283 *“We didn’t have the same ability to bring families into the building to teach them, to*  
284 *show them things, to work with them. [...] We didn’t [have the capacity] to be able to*  
285 *be effective with all those aspects of care.”* (HCP3, PPL)

### 286 **Discussion**

287 At the onset of the pandemic, rehabilitation institutes across the globe struggled to  
288 provide care to patients recovering from significant COVID-19 infections<sup>21</sup>. While emerging  
289 research has explored rehabilitative outcomes for these patients<sup>7,22-25</sup>, this is the first study to  
290 examine the challenges of rapidly implementing a COVID rehabilitation strategy in an IRH<sup>13</sup>.  
291 Senior leadership was under pressure, as few other rehabilitation institutes in the region were

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292 willing to accept COVID patients, and tensions around the need to cohort necessitated the  
293 implementation of a COVID zone.

294 In the current study, senior leadership had limited opportunity to gauge organizational  
295 readiness and engage stakeholders in decision-making processes. While these are key steps for  
296 the implementation of health care innovations<sup>13,26-29</sup>, crisis conditions, like those observed in the  
297 pandemic, made it difficult to engage in collaborative decision-making<sup>30</sup>. As a result, staff  
298 questioned the physical location of the COVID zone and had concerns about the capacity of the  
299 team to work successfully in such challenging conditions. Like other COVID implementation  
300 studies<sup>17</sup>, champions were critical for overcoming this resistance. In the current study, this role  
301 was carried out by middle management who shared information, addressed staff concerns, and  
302 boosted team morale.

303 Despite the support provided by middle management, implementation was still strained  
304 by several factors. These included: conflicting opinions on best IPAC practices (outer setting),  
305 limited flow of information from senior leaders to frontline staff (inner setting), reduced access  
306 to rehabilitation equipment and understanding of how to provide high quality rehabilitative care  
307 in this context (intervention characteristics), willingness and self-efficacy among frontline staff  
308 (individual characteristics), lack of opportunity to trial the intervention on a small scale, and  
309 reverse or change course if warranted (intervention characteristics); and lack of time to reflect on  
310 and assess effectiveness (process). While these barriers are similar to those discussed in other  
311 studies implementing health interventions during COVID<sup>15,31-33</sup>, this was the first study to  
312 explore these challenges in a rehabilitation context and adds to the growing literature exploring  
313 rehabilitation in COVID care.

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314 Our findings point to several recommendations for future COVID zones: first,  
315 information sharing from senior leadership must be prioritized to reduce the ‘unknown’ and  
316 combat conflicting messaging. At the onset of the pandemic, emerging research evidence,  
317 government regulations, public health recommendations, clinical guidelines and media  
318 messaging were changing rapidly <sup>30</sup>, which negatively impacted implementation by creating  
319 confusion and misinformation among staff. Therefore, strategies to communicate with staff  
320 across all units of the hospital will be critical to ensure that those supporting patients recovering  
321 from COVID are kept up-to-date on emerging information related to the pandemic, COVID  
322 infectivity, and best rehabilitation practices for this population.

323 Secondly, efforts must be made to promote staff competencies providing care to this  
324 population. While our data did not explore the nature and extent of rehabilitation provided, it was  
325 clear that pandemic created a nebulous and unfamiliar environment that generated feelings of  
326 uncertainty as to the best way to provide rehabilitation to patients recovering from COVID.  
327 Therefore, more research is needed to understand if and how patients recovering from significant  
328 COVID infections require a more nuanced rehabilitation approach, and how best to deliver this  
329 in situations where usual resources (e.g., rehabilitation gym) are restricted due to ongoing  
330 outbreaks <sup>11</sup>.

331 Given ongoing restrictions to community-based rehabilitation services, staff may also  
332 require supports to train patients to self-manage recovery at home <sup>25</sup>. As the pandemic  
333 progresses, staff will also need to become competent providing care to patients with long  
334 COVID; while this population experiences a wide range of persistent health challenges that  
335 benefit from rehabilitation <sup>1,34</sup> they are frequently dismissed by HCPs <sup>35,36</sup>, highlighting the need  
336 to build skills among staff to recognize and support long COVID symptoms.

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337           Third, our findings suggest that implementation of a COVID zone would be strengthened  
338 through greater incorporation of the needs of patients and their family caregivers. Although  
339 patients in the current study were grateful to have opportunities for rehabilitation, many felt that  
340 the physical isolation outweighed the advantages of the program. Furthermore, the exclusion of  
341 family caregivers from the rehabilitation environment strained implementation, as families  
342 usually play a key role in promoting psychosocial health outcomes<sup>37,38</sup>. These findings support  
343 recommendations from Safaeinili and colleagues<sup>39</sup> to expand the CFIR to include “patient needs  
344 and resources” as its own domain. This would provide a richer understanding of implementation  
345 processes and reinforce the importance of patient and family-centred care when designing,  
346 implementing, and evaluating novel health interventions<sup>39,40</sup>.

### 347 *Strengths and Limitations*

348           The major strength of this study was the ability to rapidly evaluate the implementation of  
349 a COVID zone at the onset of the pandemic, using a robust theoretical framework<sup>13</sup>.  
350 Importantly, our findings add to the growing body of literature exploring the challenges  
351 implementing health interventions during a crisis like the COVID pandemic<sup>15-17,30-32</sup>. However,  
352 this study did not explore the implementation of specific rehabilitation therapies for patients  
353 recovering from COVID and additional research is needed to understand both the types of  
354 therapies and how best to implement them in this adapted context for patients recovering from  
355 acute infections as well as long COVID<sup>1,8,10,41-43</sup>.

356           The COVID zone was adapted in July 2021 once it was understood that cohorting  
357 patients recovering from COVID was no longer needed. While changes in IPAC measures will  
358 address some implementation barriers identified in the current study (e.g., increased access to  
359 equipment, reintroduction of family caregivers into the hospital setting), others (such as access to

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360 information and staff self-efficacy) will require additional considerations. As the pandemic  
361 progresses and emerging viral variants create new ‘unknowns’ that amplify crisis circumstances  
362 or lead to outbreaks on units within the facility, our findings offer valuable insights to ensure that  
363 rehabilitation services can continue.

### 364 *Conclusion*

365           While there was the need for rapid implementation of a COVID-19 rehabilitation zone,  
366 several barriers were faced by senior leadership, middle management, and frontline staff. These  
367 barriers were most predominately associated with the inner setting and personal characteristics.  
368 Future evaluations should focus on how to adapt COVID rehabilitation services during  
369 fluctuating pandemic restrictions.

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373

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