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A consensus statement for the management and rehabilitation of communication and swallowing function in the ICU: A global response to COVID-19

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PII: S0003-9993(20)31210-7

DOI: <https://doi.org/10.1016/j.apmr.2020.10.113>

Reference: YAPMR 58014

To appear in: *ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION*

Received Date: 7 July 2020

Revised Date: 26 October 2020

Accepted Date: 26 October 2020

Please cite this article as: Freeman-Sanderson A, Ward EC, Miles A, de Pedro Netto I, Duncan S, Inamoto Y, McRae J, Pillay N, Skoretz SA, Walshe M, Brodsky MB, On behalf of the COVID-19 SLP Global Group, A consensus statement for the management and rehabilitation of communication and swallowing function in the ICU: A global response to COVID-19, *ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION* (2020), doi: <https://doi.org/10.1016/j.apmr.2020.10.113>.

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A consensus statement for the management and rehabilitation of communication and swallowing function in the ICU: A global response to COVID-19

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- The content of this manuscript was not presented
- There was no financial support for this manuscript.
- Associate Professor M.B. Brodsky discloses a relationship with MedBridge Inc. Nil other conflicts of interest are declared by other authors.

Key words/MeSH terms:

severe acute respiratory syndrome coronavirus 2; communication; critical care; deglutition disorders; telemedicine

Word counts: Abstract (245 / 300); manuscript (3093/ 3000)

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ACKNOWLEDGMENTS

The authors wish to thank the support and contributions of the COVID-19 SLP Global Group:

Sally K. Archer, Ph.D.

Sonia Baker, BSpPath

Liza Bergström, Ph.D.

Clare L. Burns, Ph.D.

Tanis Cameron, M.A.

Michelle Cimoli, BSpPath

Nicola A. Clayton, Ph.D.

Gemma Clunie, M.Sc.

Therese Cole, M.A.

Camilla Dawson, DClinP

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The authors also wish to acknowledge and thank Peter J. Thomas for his guidance in developing this research.

1 **ABSTRACT**

2 **Objective**

3 To identify core practices for workforce management of communication and swallowing
4 functions in COVID-19 positive patients within the ICU.

5

6 **Design**

7 A modified Delphi methodology was utilized, with 3 electronic voting rounds. AGREE II and
8 an adapted COVID-19 survey framework from physiotherapy were used to develop survey
9 statements. Sixty-six statements pertaining to workforce planning and management of
10 communication and swallowing function in the ICU were included.

11

12 **Setting**

13 Electronic modified Delphi process.

14

15 **Participants**

16 35 speech-language pathologists (SLPs) from 6 continents representing 12 countries.

17

18 **Interventions**

19 Not applicable.

20

21 **Main Outcome Measures**

22 The main outcome was consensus agreement, defined *a priori* as $\geq 70\%$ of participants with
23 a mean Likert score ≥ 7.0 (11-point scale: "0" = strongly disagree, "10" strongly agree).

24 Prioritization rank order of statements in a 4th round was also conducted.

25

26

27

28 **Results**

29 SLPs with a median of 15 years ICU experience, working primarily in clinical (54%), in
30 academic (29%) or managerial (17%) positions, completed all voting rounds. After the third
31 round, 64 statements (97%) met criteria. Rank ordering identified issues of high importance.

32

33 **Conclusions**

34 A set of global consensus statements to facilitate planning and delivery of rehabilitative care
35 for patients admitted to the ICU during the COVID-19 pandemic were agreed by an
36 international expert SLP group. Statements focus on considerations for workforce
37 preparation, resourcing and training, and the management of communication and swallowing
38 functions. These statements support and provide direction for all members of the
39 rehabilitation team to use for patients admitted to the ICU during a global pandemic.

40

41

42 **ABBREVIATIONS**

43	AAC	augmentative and alternative communication
44	AGP	aerosol generating procedure
45	COVID-19	coronavirus disease 2019
46	ICU	intensive care unit
47	FEES	flexible endoscopic evaluation of swallowing
48	SARS-CoV-2	severe acute respiratory syndrome coronavirus 2
49	SLP	Speech-Language Pathologist
50	VFSS	videofluoroscopic swallow study

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52 Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a highly
53 contagious virus responsible for the coronavirus disease 2019 (COVID-19) outbreak and
54 consequential global pandemic.^{1,2} As of October 6, 2020, there were 35.5 million cases and
55 a sobering 1,044,490 deaths from COVID-19.³ ICU admissions with infected patients have
56 increased,^{1,4} ranging 5% to 16%^{5,6} in China, 9% - 46% in Italy,^{7,8} and as high as 30% in
57 California and Washington.⁹ Patients positive for COVID-19 who are intubated, frequently
58 endure lengthy durations of mechanical ventilation, including being turned prone to improve
59 respiratory function, resulting in higher levels of sedation and longer durations of
60 immobilization resulting in iatrogenic impairments that include muscle weakness, fatigue,
61 dysphagia, (neuro)psychological impairments, and impaired activities of daily living.¹⁰⁻¹²
62 Moreover, severe SARS-CoV-2 infection has also resulted in patients acquiring neurological
63 conditions such as Guillain-Barre syndrome, stroke, and/or corticospinal tract signs following
64 hospital discharge,¹³⁻¹⁷ emphasizing rehabilitation needs.

65 Rehabilitation specialists have been historically underutilized in the intensive care
66 unit (ICU). Speech-language pathologists (SLPs) are part of the modern ICU team, providing
67 a key role in intensive care¹⁸⁻²⁰ and tracheostomy teams.²¹⁻²³ SLPs provide clinical expertise
68 in cognitive/communication²⁴ and swallowing functions^{25,26} in the clinical management of
69 patients during and after mechanical ventilation, regardless of the presence of an oral or
70 nasal endotracheal tube or a tracheostomy.

71 Survivors of critical illness require access to care and resources for effective recovery
72 and return to work.²⁷ However, little is known about communication and swallowing
73 management or rehabilitation needs for patients with COVID-19. Empirical studies regarding
74 the rehabilitation of patients with COVID-19 are yet to emerge and peer-reviewed guidelines
75 for the management of patients with COVID-19 admitted to ICUs to date have focused on
76 nursing, medical, and physiotherapy practice.^{28,29} Clinical considerations and guidance for
77 acute, subacute, and rehabilitation practices,^{30,31} specifically to support SLP management of
78 communication and swallowing function during the COVID-19 pandemic, are emerging.³²⁻³⁵
79 The aim of this study was to determine consensus on core SLP practices for workforce

80 management and the management of both communication and swallowing functions in
81 patients diagnosed with COVID-19 admitted to the ICU.

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84 **METHODS**

85 Participant Recruitment

86 SLPs with at least 5 years of clinical experience working in ICUs were invited to
87 participate by the principal investigators (PIs: AFS, MBB). All SLPs recruited were either
88 known to the investigators or identified by peers as recognized experts with publications
89 and/or presentations at major international conferences and with expertise in assessing and
90 treating patients in the ICU for communication and swallowing disorders. Experts were
91 sought across 6 continents to provide a global lens with varied clinical, managerial, and
92 research experiences, and varied COVID-19 pandemic experiences. Ethics approval was
93 obtained from University of Technology Sydney and Johns Hopkins University, and all
94 participants provided informed consent.

95

96 Survey development

97 AGREE II³⁶ and an adapted framework of questions²⁹ were used to develop tools for
98 consensus ratings. The statements contained in the survey were developed from guidelines
99 and published research accessible from web searches, speech-language pathology,
100 otolaryngology, and intensive care societies published earlier than April 8, 2020 in
101 conjunction with expert opinion from the authorship group. A pre-study virtual meeting was
102 held on April 7, 2020 to outline study aims, methods, and timeline. The group was then
103 asked to: 1) individually and anonymously review and comment on the 72 draft statements
104 planned for inclusion in the survey and 2) contribute up to 3 additional statements for
105 consideration. In total, the group provided 22 additional statements and after duplicates were
106 removed, 15 statements were included. The PIs consolidated and refined the statements
107 further to exclude statements outlining standard practice, with the final set of 66 statements
108 included in the May 11, 2020 distribution.

109

110 Modified Delphi Methods

111 The Delphi process convenes a group of experts for decision-making during an
112 iterative process of questions, anonymous responses, and controlled feedback to the
113 respondents.³⁷ This study involved 3 rounds of modified Delphi consensus voting. The online
114 platform Qualtrics (2019) was used to collect both the demographic and questionnaire data
115 (Qualtrics, <https://www.qualtrics.com>, Provo, UT). Each round, participants were reminded
116 that the content was confidential and they were not to share, discuss, or distribute any
117 content. Participants were further reminded to respond using his/her own knowledge and
118 expertise independent of his/her country, place of business, affiliation, society membership,
119 guideline, or other external guidance.

120 Each participant was sent the link to Round 1 on May 11, 2020, categorized into 3
121 domains: 1) Workforce planning, preparation, and management, including statements (n=25)
122 relating to organization of personnel and resources to address clinical surge and distribution
123 across service lines, 2) Management of communication function, which considered the
124 organization and resources for assessing and promoting effective patient understanding and
125 expression, regardless of whether the patient was intubated with mechanical ventilation,
126 post-extubation, or not intubated (n=15 statements), and 3) Management of swallowing
127 function (n=26 statements), which considered the organization and resources for assessing
128 and promoting safe and effective swallowing (see Supplemental Material 1). An 11-point
129 Likert scale was used to rate each statement (0=strongly disagree, 10=strongly agree).
130 Consensus agreement was operationally defined *a priori* as $\geq 70\%$ ^{29,38,39} of the participants
131 with a mean Likert score ≥ 7.0 for any statement.

132 In Round 1, participants were asked to rate agreement with all 66 statements. During
133 Rounds 2 and 3, participants were asked to rate only those statements that failed to meet
134 consensus on Round 1 or 2 respectively, and explain why they chose that rating for each
135 statement. In both Round 2 (beginning May 15, 2020) and 3 (beginning May 19, 2020) the
136 mean score and standard deviation (obtained from previous round) for any included
137 statement was provided as feedback. Additionally, Round 3 feedback included two
138 anonymous remarks each from participants who scored statements ≤ 2 and ≥ 8 from Round 2

139 that represented reasons for why these “extreme” scores were chosen. These remarks were
140 included as feedback for Round 3 and chosen for inclusion by the PIs. All participants were
141 advised in advance of the planned dates and timing of each rounds of consultation, with
142 each round sent to participants with 96 hours to complete.

143 An exploratory fourth round (beginning May 24, 2020) of anonymous voting and
144 unrelated to the modified Delphi procedures was added to rank order priorities within each of
145 the 3 domains of questions. Statements that scored a mean Likert score ≥ 9 and $\geq 90\%$
146 consensus were included.

147

148 Statistical analysis

149 Descriptive statistics were used to analyze demographic and statement data.
150 Differences between groups were analyzed using the Kruskal-Wallis H test. Weighted rank
151 ordering was used to determine prioritization. Stata version 12.1 (College Station, TX) and
152 Microsoft Excel 2019 (Redmond, WA) were used for statistical analyses.

153

154

155 RESULTS

156 Thirty-five invitations were sent to experts representing 6 continents (12 countries).
157 All agreed to participate. Participants self-identified their current primary role as 19 (54%)
158 clinical, 10 (29%) academic/research, and 6 (17%) managerial/administrative, with a median
159 of 19 (interquartile range [IQR]: 10, 24) years of experience. Years of experience did not
160 differ significantly between groups ($H(2) = 3.438, p = 0.18$). Participants collectively had a
161 median of 15 (IQR: 10, 20) years clinical ICU experience with no significant difference
162 between groups ($H(2) = 1.896, p = 0.38$).

163

164 Modified Delphi Results

165 The 3 modified Delphi rounds each had a response rate of 100% (35/35 participants)
166 and was completed within 96 hours of the electronic questionnaire distribution. All
167 participants attested that there was no communication between the PIs, the participants, or
168 other colleagues regarding the content of the questionnaire throughout the modified Delphi
169 rounds.

170 Round 1 resulted in consensus for 61/66 (92%) statements across the 3 domains.
171 Round 2 included the 5 items that failed to meet consensus, and agreement was reached for
172 2 of the 5 statements. Round 3 contained 3 statements, with consensus reached for 1. At the
173 end of 3 modified Delphi rounds, 64/66 (97%) statements reached consensus (Table 1), with
174 1 statement in *management of communication function* and 1 statement in *management of*
175 *swallowing function* that did not reach consensus.

176

177 *Workforce planning, preparation, and management*

178 In Round 1, 24/25 (96%) of the statements reached consensus. The statement that
179 did not reach consensus was: "Strategies, considering patient/family goals, should be posted
180 outside of the patient's room immediately after evaluation or change in recommendations,"
181 (M=7.1, SD=2.2, consensus 57%). In Round 2, consensus was reached (M=7.3, SD = 2.2,
182 74% consensus).

183

184 *Management of communication function*

185 In Round 1, 14/15 (93%) communication statements reached consensus. The
186 statement that did not reach consensus was: "Speaking (i.e., oral communication) is a low
187 risk aerosol generating procedure (AGP)" (M=5.9, SD=2.9, 49% consensus). In both Rounds
188 2 and 3, this statement failed to reach consensus (Round 2: M=5.8, SD=2.8, 57%
189 consensus; Round 3: M=5.9, SD=2.8, 63% consensus).

190

191 *Management of swallow function*

192 In Round 1, 23/26 (88%) of statements reached consensus. The 3 statements that
193 did not reach consensus were: 1) "Assessment of the gag reflex is considered an aerosol
194 generating procedure (AGP). Assessment should be discussed with the treating ICU team"
195 (M=7.1, SD=3.0, 66% consensus), 2) "A voluntary cough (i.e., asking the patient to cough) is
196 considered an aerosol generating procedure. Assessment should be discussed with the
197 treating ICU team" (M=7.2, SD=3.1, 63% consensus), and 3) "Swallowing therapy tasks that
198 are aerosol generating tasks should be provided to patients" (M=6.9, SD=2.7, 57%
199 consensus). After Round 2, participants only agreed that a voluntary cough is an AGP
200 (M=7.7, SD=2.6, 86% consensus), whereas "testing the gag reflex" (M=6.9, SD=2.5, 71%
201 consensus) and "swallowing therapy tasks" (M= 6.8, SD=2.6, 63% consensus) failed to
202 reach consensus. At the end of Round 3, "swallowing therapy tasks" reached consensus
203 (M=7.3, SD=2.7, 77% consensus), but "testing the gag reflex" did not reach consensus
204 (M=5.3, SD=3.2, 49% consensus).

205

206 *Post-hoc Analysis*

207 A *post-hoc* analysis was completed to address the 17 statements that contained an
208 additional phrase: "...should be discussed with the treating ICU team" (or similar). All of
209 these statements regarded AGPs. On June 17, 2020, a questionnaire was distributed,
210 specifically removing this phrase from each statement (supplemental material 2). Two

211 additional questions asked participants to average how frequently and how much weight the
212 “discuss with the treating ICU team” phrase influenced the ratings across all questions
213 containing this phrase using a 0-10 scale (i.e., 0=never; 10=always). There was 100%
214 (35/35 participants) response rate. Consensus was reached on 15/17 (88%) statements
215 using previously stated criteria for consensus. The 2 statements that did not reach
216 consensus were: 1) “Swallowing/feeding trials may be considered an aerosol generating
217 procedure” (M=7.4, SD=2.7, 66% consensus) and 2) “Videofluoroscopic swallow studies
218 (VFSS) may be considered an aerosol generating procedure” (M=7.5, SD=2.6, 66%
219 consensus). Finally, for the phrase “...should be discussed with the treating ICU team” (or
220 similar), participants reported a mean of 7.3 (SD=2.7) for how frequently they regarded the
221 phrase and a mean of 6.5 (SD=2.3) for how much weight they placed on the phrase.

222

223 Rank Order Results

224 Thirty-three statements resulted in a mean ≥ 9.0 for $\geq 90\%$ of participants during
225 voting rounds. These statements were ranked in priority order across the three survey
226 sections (Table 2) which encompassed five themes (Table 3). The top three statements
227 included: identify staff with ICU-specific skills in relation to communication, swallow, and
228 tracheostomy management; access to resources e.g., glasses, hearing aids, call bells,
229 augmentative and alternative communication (AAC) to enable increased patient
230 communication; and staff should meet regularly with ICU staff (i.e., physicians, nurses) to
231 determine indications for swallowing management in patients with (or suspected) COVID-19.

232

233 **DISCUSSION**

234 This study engaged a global expert panel of SLPs to determine consensus in 3
235 domains of SLP practice in the ICU that apply more broadly to rehabilitation professionals
236 and the ICU multidisciplinary teams in several countries. Our criteria for defining consensus
237 ensured a high threshold for final inclusion. We achieved consensus for 97% of the
238 questionnaire’s 66 statements across three distinct groups of professionals (i.e., clinicians,

239 academics/researchers, managers/administrators) from 12 countries on 6 continents
240 regardless of ICU specialty. The 2 statements that did not reach consensus both related to
241 classifying tasks/behaviors as AGPs, one related to communication, the other related to
242 swallowing. Considering the current lack of clarity regarding exactly what SLP tasks meet
243 the criteria for classification as AGPs this finding is not unexpected.^{40,41} However, it does
244 highlight a potential difference in perceived approaches in management of safety risk, work,
245 and health. Prioritization for our panel of SLPs differed across domains. For workforce
246 planning, preparation and management, highest priority was given to specialist training for
247 SLPs and caseload management strategies. For management of communication, highest
248 priority was given to communication access for patients in the ICU. Finally, for management
249 of swallowing, focus was almost entirely on viral containment and enabling patients to
250 continue to receive appropriate and timely swallow assessments and rehabilitation without
251 risking the health of the health professionals (Table 3).

252 Participants agreed that rehabilitation occurs within and beyond the ICU. As a group,
253 participants' highest ranked item for the workforce planning and management section, was
254 the need to identify SLPs with specific skills for the provision of communication and
255 swallowing rehabilitation in ICU patients. To bolster extent and continuity of care, a
256 multidisciplinary team inclusive of physicians, advanced-practice providers (e.g., nurse
257 practitioner, physician assistant), nurses, respiratory therapists, physical therapists,
258 occupational therapists, dieticians, and social workers is also necessary, but this is only a
259 first step.²⁰ Strategic planning, including contingencies for service delivery of independent
260 and specialized clinical practices within the changing nature of the pandemic, should be
261 considered. In fact, as an autonomous clinical provider, the weight and frequency of how
262 SLPs regarded the phrase: "...should be discussed with the treating ICU team" influenced
263 their ratings. Prioritizing staffing is paramount to deliver rehabilitation services that will
264 reduce morbidities and to promote improved functional outcomes in survivors of critical
265 illness.

266 Access to equipment and resources for purposes of enabling patient communication
267 function, was regarded as the highest statement within the communication management
268 survey section. Communication difficulties in the ICU arise from a variety of factors, including
269 loss of voice with mechanical ventilation. Other communication difficulties can co-occur with
270 onset of acquired weaknesses. As a result, patients have diverse communication needs
271 during admission to the ICU, and may require communication supports with all members of
272 the rehabilitation team during periods on and off mechanical ventilation.

273 Consideration of AGPs is a concept that arose particularly within swallowing function
274 at the start of the COVID-19 pandemic. There were 14/15 (93%) AGP statements in the
275 management of swallowing function section of questionnaire that reached consensus. From
276 January to May, AGP definitions and their delineation of risks continued to mature.^{40,42,43} The
277 timing of the questionnaire distributions began during the time of full lockdown, arguably the
278 time of most conservative thinking and uncertainty. Interestingly, the *post-hoc* questionnaire
279 underscored these findings, but also demonstrated a shift in opinions concerning swallowing
280 feeding trials and the VFSS, i.e., more disagreement that these two procedures should be
281 regarded as AGPs. Distribution of this *post-hoc* questionnaire in mid-June was
282 approximately 1 month after several countries began phases of reopening. VFSS
283 services/clinics, in particular, were largely shut down across many institutions prior to June
284 when they began reopening.⁴⁴ With 5 weeks between Round 1 and the *post-hoc*
285 questionnaires, this shift in opinions may reflect practice changes and clinical experience, as
286 we learned that differences with the density and potential transmission of SARS-CoV-2
287 during AGPs can vary across physiological functions of speaking and breathing. This new
288 evidence may have been reflected in the variation of opinions in the expert group.⁴⁵⁻⁴⁹

289 Ongoing research into the rehabilitation needs and outcomes of survivors of COVID-
290 19 is needed to assist with ongoing workforce planning and delivery of healthcare. Full
291 participation across all Delphi rounds and our panelists' experience, individually spanning
292 multiple countries, attests to the robustness of our findings and the broad applicability across
293 geographic boundaries in practice.

294

295 Limitations

296 Despite efforts to ensure rigorous methodology, the study has limitations that need to
297 be considered. Recruitment was through a network of experienced ICU clinicians and clinical
298 researchers, and hence may not represent the views of all clinicians. Also, it is
299 acknowledged that although 12 countries were within the participant cohort, the majority
300 (66%) came from 3 specific countries (i.e., Australia, United Kingdom, United States).
301 However, both between and within these countries, variation is evident with SARS-CoV-2
302 infection rates, pandemic response, and clinical practice.⁵⁰ As such we believe each
303 participating clinician brought differing perspectives and experiences to the study,
304 independent of demographic or country composition.

305 Governing bodies and professional organizations were frequently updating opinions
306 and offering new guidance for safety, clinical procedures, and clinical management. To this
307 point, the World Health Organization (WHO) declared COVID-19 a pandemic on March 11,
308 2020.⁵¹ This questionnaire was finalized April 14, 2020 and distributed with ethics committee
309 approvals on May 11, 2020, during the time when the evidence base was emerging.
310 Generally speaking, survey instruments are quick and responsive to obtaining new
311 information. In the rapidly changing environment of a new pandemic, changes in
312 understanding SARS-CoV-2 continued to drive daily policy changes.⁵²⁻⁵⁴ These changes
313 may not have been updated between the questionnaire's development and its distribution.
314 Global dissemination and relative acquisition of the latest information may not have been
315 equal, potentially leading to differing professional opinions on these two AGP statements.
316 Moreover, we were unable to determine whether the variable opinions among participants
317 was a reflection of regional differences, general ICU experience, or service experience
318 during the COVID-19 pandemic.

319 Despite the global variability that is known to exist with COVID-19 infection rates and
320 the personal experiences of clinicians in each service and each country, the current study
321 was able to obtain consensus on all but 2 of the items. Because of this, we believe the

322 current findings objectively represent a group of professionals with differing experiences, but
323 who maintain a unified mindset and approach to the management, assessment, and
324 treatment of communication and swallowing management for patients in ICU diagnosed with
325 COVID-19. Further research is need to explore regional and country needs with the
326 changing nature of COVID-19.

327

328 Conclusion

329 Rehabilitation during the COVID-19 pandemic brings challenges for patients,
330 healthcare workers, and organizations with the added complexity of the highly infectious and
331 transmissible nature of SARS-CoV-2. Key areas of patient rehabilitation within the ICU
332 include communication and swallowing functions. The statements contained in the
333 questionnaire help guide the design and delivery of services to improve communication and
334 swallowing function, while protecting staff and limiting the risk of virus spread. For managers,
335 the workforce statements also support decisions regarding the management of the SLP
336 workforce providing these services. The consensus statements from this work provide a
337 unified voice to guide clinicians in the planning, implementation of initiatives, and
338 prioritization of services for swallowing and communication management in the ICU, and
339 then into the post ICU rehabilitation phase.

340

341

342

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Running Head: SLP Consensus during COVID-19 in ICU1 **Table 1. Delphi Voting Rounds**

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3

Survey components	Round 1		Round 2		Round 3	
	Statements voted	Consensus reached	Statements voted	Consensus reached	Statements voted	Consensus reached
Workforce planning, preparation and management	25	24	1	1		
Management of communication function	15	14	1	0	1	0
Management of swallowing function	26	23	3	1	2	1
Total statements	66	61	5	2	3	1

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Running Head: SLP Consensus during COVID-19 in ICU

1 Table 2. Prioritization Results

2

Workforce planning, preparation and management	Total Rank Score	Rank
Identify staff with ICU-specific clinical skills in relation to communication, swallow, and tracheostomy patient management.	369	1
Transparent, clear, and timely communication of COVID-19 infection information relating to ICU care.	334	2
Review of current caseload service delivery to identify capacity for increased service provision to higher acuity and increased clinical demand.	304	3
Transparent, clear, and timely communication of COVID-19 infection information from federal authorities for training in COVID-19 appropriate PPE	304	3
Educate staff to minimize environmental cross contamination with equipment.	284	5
Facilitate clinical education for ICU specific clinical skills in relation to communication, swallow, and tracheostomy patient management.	282	6
Educate staff for the developments of COVID-19-specific disease progression (e.g., delayed onset of new laryngeal symptoms, post intensive care syndrome-PICS).	256	7
Monitor staff mental well-being.	213	8
Consider provision of rehabilitation services for post-ICU discharge, including access for ongoing swallow and communication therapies.	190	9
Staff access to uniforms (e.g., scrubs) for provision of care in ICU.	187	10
Educate staff of reporting guidelines for clinical incidents related to COVID-19.	180	11
Consider additional resources (including training) for the acquisition of telehealth capabilities.	143	12
Consider staff training needs for provision of rehabilitation services post-ICU discharge (i.e., post intensive care syndrome; PICS)	139	13
Management of communication function	Total Rank Score	Rank
Access to resources (e.g., glasses, hearing aids, call bells, AAC) to enable increased patient communication.	247	1
Make accessible a range of communication options to address diverse communication profiles, including alternative and augmentative communication systems and strategies, to non-SLP staff (e.g., nurses, physicians).	220	2
Patients should be provided with support for engaging with family and support networks using communication aids and technologies.	209	3
First consider non-aerosol generating communication supports and aids.	195	4
Consider interpreting services (via phone or electronics) to enhance communication (to include culturally and linguistically diverse backgrounds).	172	5
Cuff deflation is an aerosol generating procedure. Communication procedures for patients with a tracheostomy that require cuff deflation (e.g., speaking valves, leak speech) during mechanical ventilation should be discussed with the treating ICU team.	159	6
Cuff deflation is an aerosol generating procedure. Communication procedures for patients with a tracheostomy that require cuff deflation (e.g., speaking valves, leak speech) without mechanical ventilation should be discussed with the treating ICU team.	147	7
Above cuff phonation is an aerosol generating procedure. Management and use should be discussed with the treating ICU team.	129	8
Communication procedures for patients with a stoma (i.e., laryngectomy including voice prostheses) should be discussed with the treating ICU team.	97	9

Running Head: SLP Consensus during COVID-19 in ICU

Management of swallowing function	Total Rank Score	Rank
Staff should meet regularly with ICU staff (i.e., physicians, nurses) to determine indications for swallowing management in patients with (or suspected) COVID-19.	322	1
Cuff deflation is an aerosol generating procedure. Swallowing procedures for patients with a tracheostomy that require cuff deflation (e.g., speaking valves) during mechanical ventilation should be discussed with the treating ICU team	240	2
Cuff deflation is an aerosol generating procedure. Swallowing procedures for patients with a tracheostomy that require cuff deflation (e.g., speaking valves) without mechanical ventilation should be discussed with the treating ICU team	231	3
Flexible endoscopic evaluation of swallowing (FEES) is considered an aerosol generating procedure. Assessment should be discussed with the treating ICU team.	227	4
Patients should be supported to independently complete aspects of swallow rehabilitation as able.	217	5
Non-invasive ventilation (e.g., high flow nasal oxygen, BiPAP) is considered an aerosol generating procedure. A swallowing assessment in this context should be discussed with the treating ICU team.	210	6
Patients should be encouraged to self-feed where able.	210	6
Swallowing therapy tasks that are not aerosol generating tasks should be provided to patients.	208	8
Videofluoroscopic swallow studies (VFSS) may be considered an aerosol generating procedure. Assessment should be discussed with the treating ICU team.	183	9
Cleaning non-invasive equipment (e.g., stethoscopes, flashlights, ultrasound) between patients should be discussed with the ICU staff due to risk of cross contamination and healthcare worker infection.	167	10
Respiratory muscle strength training (i.e., EMST and IMST) is considered an aerosol generating procedure. Implementation should be discussed with the treating ICU team.	95	11

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Running Head: SLP Consensus during COVID-19 in ICU

1 **Table 3. Prioritization Statements Themed**
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Theme	No. of statements	Examples
Viral containment	16	<p>Transparent, clear, and timely communication of COVID-19 infection information relating to ICU care.</p> <p>Videofluoroscopic swallow studies (VFSS) may be considered an aerosol generating procedure. Assessment should be discussed with the treating ICU team.</p>
Managing extreme workloads / influx of patients	2	<p>Review of current caseload service delivery to identify capacity for increased service provision to higher acuity and increased clinical demand.</p> <p>Staff should meet regularly with ICU staff (i.e., physicians, nurses) to determine indications for swallowing management in patients with (or suspected) COVID-19.</p>
Specialist training and staff well being	5	<p>Identify staff with ICU-specific clinical skills in relation to communication, swallow, and tracheostomy patient management.</p> <p>Consider staff training needs for provision of rehabilitation services post-ICU discharge (i.e., post intensive care syndrome; PICS)</p>
Communication accessibility	7	<p>Access to resources (e.g., glasses, hearing aids, call bells, AAC) to enable increased patient communication.</p> <p>Consider additional resources (including training) for the acquisition of telehealth capabilities.</p>
Swallow intervention accessibility	5	<p>Patients should be supported to independently complete aspects of swallow rehabilitation as able.</p> <p>Swallowing therapy tasks that are not aerosol generating tasks should be provided to patients.</p>

3 NB: Some statements crossed over two themes