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BMJ Open

Qualitative virtual discussion identifies expert-based strategies to promote hydration in residential care during COVID-19 and beyond.

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3 1 **Qualitative virtual discussion identifies expert-based strategies to promote hydration in**
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6 2 **residential care during COVID-19 and beyond.**
7

8 3 Running title: Solutions to promote resident hydration.
9 4

10 5 Key words: hydration, residential care, pandemic, strategies, expert
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3 77 **Qualitative virtual discussion identifies expert-based strategies to promote hydration in**
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6 78 **residential care during COVID-19 and beyond.**
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10
11 80 **Abstract**
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13 81 *Objectives:* Poor fluid intake is a complex and longstanding issue in residential care, further
14
15 82 exacerbated by COVID-19 infection control procedures. There is no consensus on how best to
16
17 83 prevent dehydration in residents who vary in their primary reasons for insufficient fluid intake
18
19 84 for a variety of reasons. The objectives of this research were to determine expert and provider
20
21 85 perspectives on: (a) how COVID-19 procedures impacted hydration in residential care and
22
23 86 potential solutions to mitigate these challenges, and (b) strategies that could target key groups
24
25 87 of residents for consideration in a future multicomponent intervention.
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30 88 *Design:* Qualitative study based on virtual group discussion. The discussion was audio-recorded
31
32 89 with supplementary field notes. Qualitative content analysis was completed.
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34

35 90 *Setting:* Residential care.
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37 91 *Participants:* 27 invited researcher and provider experts.
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40 92 *Results:* Challenges that have potentially impacted hydration of residents because of COVID-19
41
42 93 procedures were categorized as resident (e.g., apathy), staff (e.g., lack of trained staff), and
43
44 94 home-related (e.g., physical distancing in dining rooms). Potential solutions were offered, such
45
46 95 as offering a beverage at every point of care with all care and management staff encouraging
47
48 96 residents to drink. Several new strategies were mapped to an existing oral hydration typology
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50 97 which identifies root causes of low fluid intake. Identified strategies provide the basis for future
51
52 98 multicomponent interventions during and beyond the pandemic.
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99 *Conclusions:* COVID-19 has necessitated new procedures and routines in residential care, some
100 of which can be optimized to promote hydration. A variety of strategies to meet the hydration
101 needs of different subgroups of residents can be compiled into multicomponent interventions
102 for future research.

104 **Key words:** hydration, long term care, strategies, COVID-19

106 **Article Summary**

107 *Strengths*

- 108 • Experience with challenges and solutions to promote hydration during an outbreak such
109 as COVID-19 were solicited from participants based on their experience.
- 110 • An oral hydration typology was used to guide discussion on interventions for discrete
111 groups of residents based on their primary reason for low intake.

112 *Limitations*

- 113 • Although diverse in experience, participants were limited to 27, 10 of whom were part of
114 the research team.
- 115 • Virtual technology was required due to the COVID-19 pandemic but allowed for a diverse
116 geographic sample.

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121 Introduction

122 Older adults living in residential care (e.g., nursing homes, long-term care, assisted living or
123 retirement homes) are at an increased risk for inadequate food and fluid intake [1, 2]. Recent
124 research suggests that the average fluid intake is ~1100 ml per day [3], which is well below
125 recommendations for older adults [4, 5]. Low fluid intake can result in dehydration with
126 subsequent delirium, falls, and avoidable hospitalizations [2, 6]. Without an adequate test to
127 demonstrate impending dehydration [7], the best strategy is prevention by ensuring sufficient
128 fluid intake.

129
130 Resident, staff, and home factors work synergistically to impact fluid intake [8]. Residents have
131 decreased thirst drive, lower body fluid, and an inability to concentrate urine [2]. Although
132 medications and disease states also impact hydration [9], low fluid intake is the primary
133 mechanism driving dehydration in residential care [2]. Age, sex, cognitive impairment, eating
134 challenges, dysphagia, inability to communicate verbally, depression and loneliness, and
135 functional dependence for eating and drinking are associated with low fluid intake [3, 6, 10-13].
136 Yet, these associations are complex. For example, residents who need some, but not total
137 eating support, have lower fluid intake compared to those who require full support [1];
138 however, more staff in the dining room does not ensure adequate fluid intake [3]. Beyond
139 numbers, staff may have inadequate mechanisms for monitoring resident fluid intake and
140 communicating this among the team, and/or have competing priorities [13-15]. Availability of
141 preferences [9, 14], including a variety of thickened fluid options, as well as hydration stations,

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3 142 and/or delivery of between-meal fluids [11] are often decisions made at the home level that
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5 143 impact resident hydration.
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10 145 Proactive solutions are needed to address the complexity of hydration in residential care. A
11
12 146 typology has been created which categorizes each resident based on the primary characteristics
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14 147 that limit their fluid intake [16]. This typology provides guidance for strategies to promote fluid
15
16 148 intake for those who can drink, those who can't drink, those who won't drink, and those at end
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18 149 of life [6]. Those who *can drink* are independent or have cognitive impairment, but do not
19
20 150 require eating assistance. Those who *can't drink* require help with drinking or have dysphagia,
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22 151 necessitating thickened fluids. Those who *won't drink* are 'sippers' who only consume small
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24 152 amounts of fluids or who avoid fluid intake for fear urinary incontinence [6].
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32 154 The current global pandemic has dramatically laid bare the vulnerability of residents, not only
33
34 155 for the spread of SARS-COV-2- and COVID-19-related deaths but also for the collateral
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36 156 consequences of procedures implemented to reduce susceptibility and spread of the virus [17,
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38 157 18]. There is currently limited data on the impacts of these procedures on the nutritional health
39
40 158 and hydration of residents. Based on media and anecdotal reports [19], nutritional side-effects
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42 159 are potentially considerable.
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49 161 The objectives of this research were to determine expert and provider perspectives on: (a) how
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51 162 COVID-19 procedures had impacted hydration in residential care and potential solutions to
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3 163 mitigate these challenges, and (b) strategies that could target key groups in the hydration
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5 164 typology [16] for consideration in a future multicomponent intervention.
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12 166 **Methods**

13 167 This meeting was originally planned for April 2020 as an in-person all-day think tank to identify
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15 168 feasible strategies to consider for a multi-component hydration intervention for residential care
16
17 169 based on the hydration typology [16]. It was rescheduled for June 2020, after the first wave of
18
19 170 the global COVID-19 pandemic, as a virtual three-hour meeting. The original think tank
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21 171 participants (experts in hydration, representatives of residential care provider roles [e.g., food
22
23 172 service manager]) were invited, and the list expanded to include more residential care
24
25 173 providers. A total of 36 were invited to the think tank, including the research team. These
26
27 174 invitees were from the professional networks of the research team and thus, some participants
28
29 175 were known to the authors but were not considered close colleagues. The researcher leading
30
31 176 the meeting (HK; senior researcher with expertise in geriatric nutrition) has extensive
32
33 177 experience in qualitative methods and leading large group discussions. The research team
34
35 178 included experts in in speech-language pathology, nursing, hydration, oral health, dietetics, and
36
37 179 geriatric medicine; all had experience conducting research in residential care. Two research
38
39 180 assistants were also part of the research team. Confirmed participants provided a short
40
41 181 biography and photo, as well as a signed consent form before the virtual meeting and sent this
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43 182 to the research lead via email. An overview of the oral hydration typology and background on
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45 183 potential hydration strategies was sent to participants before the meeting to stimulate
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3 184 thoughts on strategies before the meeting. Ethics review and clearance was provided by the
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5
6 185 University of Waterloo Research Ethics Board (ORE #41775).
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10 187 As the COVID 19 pandemic had precipitated changes in practice in residential care, the focus of
11
12
13 188 the think tank was expanded to consider the effects of the pandemic on strategies to support
14
15 189 hydration in residential care. The meeting was designed to be consistent with best practices for
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18 190 virtual focus groups [20]. The three-hour meeting was divided into four segments: (a)
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20 191 introductions followed by a short evidence-based presentation on strategies used in residential
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23 192 care to support hydration of residents, and a review of the oral hydration typology [16] (~35
24
25 193 minutes); (b) guided discussion (HK) on the impacts of COVID-19 procedures on hydration in
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28 194 residential care and potential solutions (~25 minutes); (c) assigned small groups (n=4) to discuss
29
30 195 oral hydration typologies (sipper, forgets to drink, fears incontinence, dysphagia, and physically
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32
33 196 dependent) and potential strategies to support hydration for these residents (~45 minutes);
34
35 197 and (d) large group debriefing on the small group discussions (~30 minutes). A break was
36
37
38 198 provided after the first large group segment. During the first large group session, participants
39
40 199 were asked to reflect on what challenges had occurred with hydrating residents during the first
41
42
43 200 wave of the pandemic and what strategies were used to overcome these challenges. In small
44
45 201 group discussions, 5-6 participants and 2-3 researchers were assigned to each virtual breakout
46
47 202 room. Each of the four small groups was assigned two types of residents from the typology [16]
48
49 203 (e.g., sippers and persons with dysphagia). The lead for each small group (a member from the
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52 204 research team) asked two questions of participants for each typology: (a) what strategies would
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55 205 work best for residents who fit into this typology (e.g., having dysphagia), and (b) how these
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3 206 strategies would need to be modified during an infectious outbreak. An effort was made by
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6 207 group leads to include all participants in the discussion, by using a 'round robin' approach for
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8 208 each question. 'Fearing incontinence' and 'dysphagia' were only discussed in one group each as
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11 209 they were expected to have fewer focused strategies, while 'sipper', 'physically dependent' and
12
13 210 'forgets to drink' were discussed in two small groups. A second member of the research team
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15 211 took detailed fieldnotes. After the breakout sessions, the lead for each group shared comments
16
17 212 on their discussion with the larger group and ideas were compared across groups. Zoom
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20 213 conference software provided the technology for this meeting; therefore, large group segments
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22 214 were audio-recorded, while small groups relied on comprehensive fieldnotes. Zoom audio
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25 215 recordings and notes were stored on a secure server for analysis at the University of Waterloo.
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30 217 Immediately following the meeting, the research team members from each small group
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32 218 reviewed their notes to ensure key concepts raised during the discussion were included. These
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34 219 summaries were forwarded to the team leads (HK, CW) for amalgamation and analysis. CW and
35
36
37 220 HK reviewed the audio-recorded large group discussions independently, summarized key points
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39
40 221 and concepts, and then amalgamated these notes. A few exemplary quotes were transcribed
41
42 222 verbatim for this report. Small and large group discussion notes were further analyzed using
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44 223 qualitative content analysis [21, 22] and matrices were developed by HK and CW as an initial
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47 224 analysis. These were shared with the research team at a virtual meeting for discussion,
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50 225 organization, and refinement. Results were also shared with members of the discussion if
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52 226 requested. A postpositivist [23] stance was taken to data collection and analysis, as the data
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227 were highly descriptive, based on participant observed practices and experiences, and resulted
228 from the dynamics of the discussion and the values of participants.

229 *Patient and Public Involvement* No patient involved.

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231 **Results**

232 Meeting participants included 18 academics/researchers (10 from the research team) and 9
233 providers, with the majority from Canada (78%); over half were from nutrition or food service
234 disciplines. Participant details are provided in Table 1. Participant comments on changes due to
235 COVID-19 that impacted hydration were categorized as resident-, staff-, or home-related (Table
236 2). Participants' suggestions for overcoming these challenges are also provided. Resident-
237 related issues resulted from the confinement of residents to rooms during the first wave of the
238 pandemic. Residents were interacting with staff only during care routines in their room and
239 these touch points were minimized (at least initially) to prevent the potential spread of
240 infection. Isolation resulted from this seclusion and affected appetite and interest in
241 eating/drinking.

242

243 Participants reported that COVID-19 precautions and procedures exacerbated longstanding
244 issues with staffing: "If staff are already not thinking about hydration during normal operations,
245 then they are certainly not thinking about hydration during pandemic times" (dietitian
246 provider). Due to the many new tasks and activities required as infection control procedures,
247 staff time was reported to be even more limited than usual. This was especially challenging for
248 residents who required drinking support. To promote hydration, participants suggested offering

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3 249 or encouraging fluid at every touch point. It was noted that systemic communication challenges
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6 250 among staff, such as lack of time to review documentation, impacted resident-centred
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8 251 practices, such as knowing individual drink preferences and how to support intake. In some
9
10 252 homes, food service staff who usually provided between meal fluids through a snack service
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13 253 were removed from this activity, to minimize the number of staff entering a resident's room.
14
15 254 The nursing staff, some of whom were new, were not aware of preferences for beverage
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17 255 provision. Educating or communicating preferences and extending meals to allow for greater
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19 256 fluid consumption and including other staff at meals to meet eating assistance needs were key
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21 257 strategies. Finally, documentation on intake was deprioritized with the new required infection
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23 258 control procedures taking priority. Considering that all residents are at risk for dehydration, it
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25 259 was deemed crucial to encourage the implementation of home-level efforts to promote
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27 260 hydration.
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35 262 Pandemic procedures varied across Canada and internationally. For example, in some regions,
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37 263 residents were not confined to their rooms, but grouped into smaller cohorts to increase
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39 264 physical distance during dining, while in other regions, residents were confined to their rooms
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41 265 and used disposable dishware and cups. High touch point areas such as self-serve beverages or
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43 266 water coolers were removed to reduce contamination. The use of personal protective
44
45 267 equipment resulted in challenges recognizing and communicating with residents, while
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47 268 family/volunteer visits were abruptly stopped. Staff were redeployed to provide support at
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49 269 meals, and recreation staff specifically launched hydration events using trolleys to deliver
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51 270 special drinks to residents' rooms. The capacity to physically distance based on home
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3 271 configuration was reported to impact decisions about when and where food and beverages
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6 272 should be consumed. As well, it was noted that, based on the suddenness of the COVID-19
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8 273 pandemic in Canada, “Decisions are [sic] made fast and the larger picture, which is [sic] the
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10 274 resident and their quality of life, is [sic] lost” (food service manager provider). It was also noted
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12
13 275 that “COVID has rewound the clock with respect to factors that lead to malnutrition and
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15 276 dehydration” (dietitian provider). However, participants reported that crises such as the
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18 277 pandemic clarified for policy makers, homes, staff, residents, and their families, what was
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20 278 important for residential care. They commented on the importance of working together with all
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23 279 staff being involved in promoting hydration and addressing challenges, the recognition that
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25 280 meals provide an important social opportunity for residents, and the understanding that
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28 281 families have a vital role in encouraging fluid intake and providing preferred beverages from
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30 282 outside the home. The group felt that lessons could be learned from the experience of COVID-
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33 283 19, and these should be incorporated into routines beyond the pandemic. For example, the
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35 284 rigid time frames for meals result in rushed care; during the pandemic, some homes extended
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38 285 the meal serving times out of necessity due to delivery of trays to resident rooms or having two
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40 286 seatings for meals to reduce numbers. This was seen as a positive practice that could be
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43 287 sustained post-pandemic.

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45 288 The oral hydration typology [16] was new to many participants, especially the providers.
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47 289 Ideas for supporting hydration using the typology are outlined in Table 3 and categorized as:
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50 290 supplies, timing, facility context, socialization, and education. It was noted that some form of
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52 291 assessment process would be needed to make the most of using the typology to identify
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55 292 strategies for individual residents. Trial and error were noted as important for employing

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3 293 strategies at the individual level. A philosophy of care that promotes a social model was
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6 294 discussed as a means of promoting fluid intake across the typology subgroups. Eating and
7
8 295 drinking were noted to be social events and a key strategy offered was incorporating beverages
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10 296 into every communal activity in the home as “[residents] can’t drink what is not offered”
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13 297 (nutrition researcher). The continuous, mindful creation of new routines to offer beverages and
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15 298 assistance, as residents change in their capacity, was a key learning from the experience of the
16
17 299 pandemic. Understaffing was an overarching issue for addressing hydration that impacted all of
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19
20 300 the hydration typology. The pandemic has highlighted, especially for those who do not work in
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22
23 301 this sector, that residential homes are understaffed. Many of the strategies identified in Tables
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25 302 2 and 3 require staff for encouraging, creating opportunities, or aiding drinking. It is evident
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28 303 that hydration requires sufficient staffing. Education is a final overarching requirement to
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30 304 ensure adequate hydration, as reasons for not drinking are vary. During the pandemic the
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33 305 continual replacement of staff, exacerbated by illness and policies of having only one home for
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35 306 employment, means that new and current staff need to be adequately and continuously
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38 307 trained.
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41 42 309 **Discussion**

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45 310 There is insufficient research on improving resident fluid intake in residential care settings [7,
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47 311 15, 24]. Considering the current context of the COVID-19 pandemic, and framing the discussion
48
49 312 using a typology of oral hydration, researchers and providers offered new insights on how the
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52 313 hydration needs of older adults in residential care can be met. This is the first known study to
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55 314 frame potential strategies using the oral hydration typology. Furthermore, new strategies are

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3 315 offered to support resident hydration. Consistent with the literature [6, 11], our participants
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5 316 noted that hydration was rarely considered by residential providers and that consuming
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8 317 sufficient fluids requires time and effort on the part of the staff. Providing fluid alone is not
9
10 318 sufficient, as residents who can't drink need support from staff, and residents who won't drink
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12
13 319 need encouragement to do so. Consistent with our findings is the need to individualize
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15 320 strategies [11, 15], which suggests that multi-component interventions should be trialed [6, 11,
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17
18 321 14]. However, there is a lack of consensus on how to tackle the complex causes of poor
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20 322 hydration in residential care [6, 15, 24]. Most homes use selected individual strategies rather
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23 323 than consider the typology and multicomponent interventions [11].
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27 325 Evidence coincides with the strategies identified in this study including: considering the social
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30 326 and physical environments; providing prompts to drink; staff communication; access to fluids
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32
33 327 including beverage carts, cups and glasses; and, determining drink preferences [14, 15, 24].
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35 328 Recent research suggests the value of mimicry to support fluid intake [25] and the use of
36
37 329 technology to support communication of fluid intake among staff [26]. A key outcome of this
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40 330 study is the consideration of individualized strategies to meet the specific needs of residents,
41
42 331 rather than using global strategies and assuming they work for most. Prior research has noted
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45 332 that when interventions are tailored to the resident, such as considering their preferences and
46
47 333 offering choice, there is an increase in fluid intake [27]. Strategies outlined in Table 3 mapped
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50 334 onto the oral hydration typology [16] have the potential of ensuring that all residents' drinking
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52 335 needs are met. These strategies should be explored in further research.
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3 337 COVID-19 has raised awareness of the challenges within residential care homes, and specifically
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5 338 the importance of sufficient, well-trained staff [19]. As between-meal offerings can provide 70%
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7
8 339 of the fluid a resident consumes [28], strategies must focus on such fluid offerings. During the
9
10 340 pandemic, between-meal visits were noted by our participants to provide the resident with
11
12 341 emotional and psychological support. Thus, there is socialization opportunity with frequently
13
14 342 planned offerings of fluid between meals. As described by our participants, sufficient staffing
15
16 343 and the need for improved communication of low fluid intake require special attention during
17
18 344 an outbreak. Challenges due to the COVID-19 pandemic and potential novel strategies were
19
20 345 offered at the resident, staff, and home levels. Finally, the added value of family and volunteers
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22 346 to support residents with essential tasks such as drinking were recognized when this care was
23
24 347 suddenly withdrawn [19]. Families are necessary to include in hydration interventions [11] and
25
26 348 several ideas were provided by our participants, such as sitting and drinking with residents or
27
28 349 providing culturally preferred beverages. These ideas are worthy of exploration as part of the
29
30 350 routine to promote hydration in residential care and for future research.
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352 *Strengths and Limitations*

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42 353 Although this novel study investigates researcher and provider consideration of the oral
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44 354 hydration typology and examines how the pandemic has impacted the hydration of residents,
45
46 355 this study has limitations. All providers were from Canada, and several invitees ($n=9$) were
47
48 356 unable to attend the meeting due to their workload and home priorities during the pandemic.
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50 357 International experts, however, had direct experience with homes in their region and could
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52 358 speak to the challenges posed with COVID-19. Further, due to the platform used, we were
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3 359 unable to record the small group discussions. The best practices for virtual focus groups are
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6 360 evolving and comfort with the virtual format and opportunity for discussion using this
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8 361 technology may have impacted findings. Audio files were not transcribed for large group
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10 362 discussions; however, two researchers individually reviewing the files and noting key concepts
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13 363 was considered sufficient for this descriptive qualitative content analysis. Finally, not all
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15 364 perspectives were garnered during this study. The views of family members and residents are
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18 365 missing, and this likely limited the problems identified and the potential solutions or strategies
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20 366 that could be employed to support hydration.
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25 368 **Conclusions and Implications**

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28 369 This analysis provides a new perspective on hydration strategies mapped to an oral hydration
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30 370 typology [16] and considers how these need to be modified during an infectious outbreak when
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32 371 residents are isolated to their rooms. Future research should create the evidence base for
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35 372 multi-component interventions to address poor fluid intake of older adults living in residential
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7
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17
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19
20 388 **Data Availability:** No additional data available.
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22
23 389 **Competing Interests:**

24
25 390 Authors declare no conflicts of interest, excepting HK and GH are endowed research chairs. JM
26
27 391 was the creator of the hydration typology used to frame this data collection.
28
29

30 392 **Author Contributions**

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32 393 HK is the senior researcher for this project, leading on the methods, analysis and writing of the
33
34 394 manuscript. CW supported all aspects of the research including ethics submission, data
35
36 395 collection and analysis and drafting of the manuscript. LM and SS supported data collection,
37
38 396 analysis and revision of the manuscript. SES, MNY, GH, PG, CL, ANM are original members of
39
40 397 the research team and designed the study, were involved in data collection and analysis and
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42 398 revision of the manuscript.
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34 473

474 **Table 1: Characteristics of Participants (n=27)**

Demographic Characteristic	% Participants (n)
Discipline	
Nutrition	44.4 (12)
Nursing	18.5 (5)
Speech Language Pathologist	11.1 (3)
Administration	11.1 (3)
Food Service	7.4 (2)
Other	7.4 (2)
Primary Role	
Academic/Researcher	66.6 (18)
Provider	33.3 (9)
Country	
Canada	77.8 (21)
United Kingdom	11.1 (3)
United States of America	7.4 (2)
Germany	3.7 (1)

495 Participant characteristics. Table is original work and not previously published elsewhere.

517 **Table 2: COVID-19 Potential Challenges to Hydration and Solutions Offered**

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COVID-19 Procedure	Hydration Challenge	Potential Solutions
<i>Resident-Related</i>		
Residents confined to rooms	Restricted access to beverages; only beverages delivered by staff; lack of social stimulation to drink	Offer trolley service of drinks between meals; provide selection of preferred beverages including thickened fluids
Boredom/depression from room isolation	Apathy, decreased appetite and lack of interest in food and fluid consumption	Create physically distanced interactions for sharing fluids (e.g., residents sitting near entrance to rooms); popsicles and fun beverages; bells on carts to announce drink trolley
<i>Staff-Related</i>		
Limited entries by staff into residents' rooms and time spent with each resident; reduced medication passes	Decreased fluid offerings to residents	Offer a beverage at every contact opportunity and encourage residents to drink Create new routines that include offering of fluid Implement Comfort Rounds to check on all residents and offer fluid and other care needs
New staff	Lack of understanding of individual residents and how to support intake; residents may not respond to staff they do not recognize	Educate staff on how to approach residents and encourage intake
Limited care staff	Fluid intake reduced especially for those who need support to eat	Develop an 'all hands on deck' approach to providing beverages and meals; shift mealtimes to make the meal longer
Shift in roles of staff	Food service staff no longer involved in snack rotation to reduce opportunities for contamination; care staff do not know resident beverage preferences, increased burden on care staff	Acronym checklist used by staff to ensure resident needs are met (e.g., SAFE: Social, Active, Fluid, Eating; SIP: Social Intake Preferred)
Professional staff working remotely	Normal procedures for tracking and determining hydration limited	Assume all residents at risk for dehydration and institute global processes to support hydration
<i>Home-Related</i>		

Water coolers removed to reduce contamination risk	Lack of freely available beverages; require staff to provide all beverages	Provide more fluids directly to residents at meals/snacks
Use of disposable glasses and personal protective equipment (PPE)	Smaller volume, harder to hold and manipulate for residents Residents can't see staff face with PPE	Use preferred glassware, recognizing that dishwasher will sufficiently sterilize Tell the resident who they are (as face covered due to masks) or create unique aspects to uniform to promote identification by residents Use verbal and nonverbal cues to prompt fluid intake; mimic fluid intake
Lack of family/volunteer visitors	Reduced opportunities for social drinking or special drinks brought by family; reduced communication to staff around beverage preferences; cultural preferences not met	Relocate support staff, such as recreation staff to provide hydration events and beverage passes to residents' rooms between meals; Encourage family to bring in items that could be quarantined for a few days and then provided to resident
Convenience shop closed	Beverage treats unavailable	Create hydration events (e.g., Hawaiian luau drinks); portable convenience cart for residents
Physical distancing in dining rooms	Residents spread out for beverage and meal delivery; more than one seating for meals required, resulting in reduced time for meals	Provide water automatically at meals for all residents as well as preferred beverages

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Participant views on challenges and solutions to hydration during COVID-19 pandemic. Table is original work and not previously published elsewhere.

Table 3: Strategies to Promote Fluid Intake Categorized by the Hydration Typology

		Strategies to Promote Fluid Intake				
		Supplies	Timing	Facility Context	Socialization	Education
Typology Subgroup	Sipper	<ul style="list-style-type: none"> Offer fluid vessels with graduated marking Implement cooler stations Identify preferred cups/bowls/bottles for drinking Offer lidded vessels to take on the go 	<ul style="list-style-type: none"> Identify times when resident drinks more Have staff frequently encourage residents Increase frequency of fluid offering 	<ul style="list-style-type: none"> Identify preferred beverage Use technology to communicate preferences Offer fluid with each pill (one at a time) at medication delivery Offer beverage cart at every activity 	<ul style="list-style-type: none"> Promote drinking as a social activity Have staff model drinking behaviors Allow to linger after meals to drink and socialize 	<ul style="list-style-type: none"> Educate those who are cognitively well on water consumption goals
	Forgets to Drink	<ul style="list-style-type: none"> Accessible beverage or cooler station (when no outbreak) 	<ul style="list-style-type: none"> Offer between meal reminders & prompts Implement a reminder system to prompt drinking (using tablets, games, robots) 	<ul style="list-style-type: none"> Develop resident-specific plan for hydration 	<ul style="list-style-type: none"> Pair residents with tablemates who drink a lot Create daily social opportunities with fluid 	<ul style="list-style-type: none"> Provide on-going education to staff on hydration needs of these residents; strategies that support the individual to drink more Increase staff awareness by completing intake assessments
	Fears Incontinence	<ul style="list-style-type: none"> Provide quality protective incontinent products 		<ul style="list-style-type: none"> Clearly identify toilets near dining rooms Promote Kegel exercises 		<ul style="list-style-type: none"> Provide resident education on the importance of fluid intake Train all staff to assist resident bathroom use when out of room
	Dysphagia	<ul style="list-style-type: none"> Provide adaptive vessels with spouts to slow flow 		<ul style="list-style-type: none"> Identify resident fluid preferences Offer a variety of options of thickened fluids 	<ul style="list-style-type: none"> Offer all residents a thickened fluid as a snack choice to normalize this choice of fluid 	<ul style="list-style-type: none"> Educate resident & family: reason for thickened fluid Adequate training of non-SLP staff on

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				<ul style="list-style-type: none"> • Offer new formats of thickened fluids (e.g., Jelly Drops®) • Consider implementing a free water protocol for those with adequate cognition and mouth care • Re-assess swallowing routinely 	<ul style="list-style-type: none"> • Staff work to reduce stigma with other residents 	identifying changes in swallowing capacity
	Physically Dependent	<ul style="list-style-type: none"> • Trial and identify preferred cups that promote self-drinking • Provide appropriate adaptive equipment such as specialized cups with lids 	<ul style="list-style-type: none"> • Offer fluid during routine care activities 	<ul style="list-style-type: none"> • Sufficiently trained staff and/or volunteers to support 	<ul style="list-style-type: none"> • Create fun & social food and fluid offerings 	<ul style="list-style-type: none"> • Educate all staff/volunteers on supportive strategies to assist with fluid intake, individualized techniques that work

Matrix of hydration typology and strategies provided by participants to promote hydration. Table is original work and not previously published elsewhere.

For peer review only

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No.	Topic	Item	
Title and abstract			
S1	Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Pg 1
S2	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Pg 1
Introduction			
S3	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Pg 3
S4	Purpose or research question	Purpose of the study and specific objectives or questions	Pg 4/5
Methods			
S5	Qualitative approach and research paradigm	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/interpretivist) is also recommended; rationale ^b	Pg 7
S6	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Pg 5
S7	Context	Setting/site and salient contextual factors; rationale ^b	Pg 5
S8	Sampling strategy	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale ^b	Pg 5
S9	Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Pg 6
S10	Data collection methods	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale ^b	Pg 6/7
S11	Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg 6/7
S12	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Pg 5
S13	Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts	Pg 7
S14	Data analysis	Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale ^b	Pg 7
S15	Techniques to enhance trustworthiness	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale ^b	Pg 7
Results/findings			
S16	Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg 8-11
S17	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Tables 2/3
Discussion			
S18	Integration with prior work, implications, transferability, and contribution(s) to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg 11-13
S19	Limitations	Trustworthiness and limitations of findings	Pg 13/14
Other			
S20	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg 15
S21	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg 15
<p>^aThe authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.</p> <p>^bThe rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.</p>			

ACADEMIC MEDICINE

BMJ Open

Qualitative analysis of a virtual research meeting summarizes expert-based strategies to promote hydration in residential care during COVID-19 and beyond

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3 1 **Qualitative analysis of a virtual research meeting summarizes expert-based strategies to**
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6 2 **promote hydration in residential care during COVID-19 and beyond.**
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8 3 Running title: Solutions to promote resident hydration.
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10 5 Key words: hydration, residential care, pandemic, strategies, expert
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3 77 **Qualitative analysis of a virtual research meeting summarizes expert-based strategies to**
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6 78 **promote hydration in residential care during COVID-19 and beyond.**
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8 79 **Abstract**
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10 80 *Objectives:* Poor fluid intake is a complex and longstanding issue in residential care, further
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13 81 exacerbated by COVID-19 infection control procedures. There is no consensus on how best to
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15 82 prevent dehydration in residents who vary in their primary reasons for insufficient fluid intake
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18 83 for a variety of reasons. The objectives of this research were to determine expert and provider
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20 84 perspectives on: (a) how COVID-19 procedures impacted hydration in residential care and
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23 85 potential solutions to mitigate these challenges, and (b) strategies that could target five types
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25 86 of residents based on an oral hydration typology focused on root causes of low fluid intake.
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27 87 *Design:* Qualitative study based on virtual group discussion. The discussion was audio-recorded
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30 88 with supplementary field notes. Qualitative content analysis was completed.
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32 89 *Setting:* Residential care.
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35 90 *Participants:* 27 invited researcher and provider experts.
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37 91 *Results:* Challenges that have potentially impacted hydration of residents because of COVID-19
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40 92 procedures were categorized as resident (e.g., apathy), staff (e.g., new staff), and home-related
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42 93 (e.g., physical distancing in dining rooms). Potential solutions were offered, such as fun
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45 94 opportunities (e.g., popsicle) for distanced interactions; training new staff on how to approach
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47 95 specific residents and encourage drinking; and automatically providing water at meals. Several
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50 96 strategies were mapped to the typology of five types of residents with low intake (e.g., sipper)
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52 97 and categorized as: supplies (e.g., vessels with graduated markings), timing (e.g., identify best
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54 98 time of day for drinking), facility context (e.g., identify preferred beverages), socialization (e.g.,
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99 promote drinking as a social activity), and education (e.g., educate cognitively well on water
100 consumption goals).

101 *Conclusions:* COVID-19 has necessitated new procedures and routines in residential care, some
102 of which can be optimized to promote hydration. A variety of strategies to meet the hydration
103 needs of different subgroups of residents can be compiled into multicomponent interventions
104 for future research.

105 **Key words:** hydration, long term care, strategies, COVID-19

106 **Strengths and Limitations of this Study** *Strengths*

- 107 • An oral hydration typology was used to guide discussion on interventions for discrete
108 groups of residents based on their primary reason for low intake.

109 *Limitations*

- 110 • The experience of the 27 participants, 10 of whom were part of the research team, was
111 diverse.
- 112 • Virtual technology required due to the COVID-19 pandemic allowed for wide geographic
113 participation, but limited the time for engagement of the expert group.

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35 134 **Introduction**
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38 135 Older adults living in residential care (e.g., nursing homes, long-term care, assisted living or
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40 136 retirement homes) are at an increased risk for inadequate food and fluid intake [1, 2]. Recent
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42 137 research suggests that the average fluid intake is ~1100 ml per day [3], which is well below
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44 138 recommendations for older adults [4, 5]. Low fluid intake can result in dehydration with
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46 139 subsequent delirium, falls, and avoidable hospitalizations [2, 6]. Without an adequate test to
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48 140 demonstrate impending dehydration [7], the best strategy is prevention by ensuring sufficient
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50 141 fluid intake.
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Introduction

Older adults living in residential care (e.g., nursing homes, long-term care, assisted living or retirement homes) are at an increased risk for inadequate food and fluid intake [1, 2]. Recent research suggests that the average fluid intake is ~1100 ml per day [3], which is well below recommendations for older adults [4, 5]. Low fluid intake can result in dehydration with subsequent delirium, falls, and avoidable hospitalizations [2, 6]. Without an adequate test to demonstrate impending dehydration [7], the best strategy is prevention by ensuring sufficient fluid intake.

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3 143 Resident, staff, and home factors work synergistically to impact fluid intake [8]. Residents have
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5 144 decreased thirst drive, lower body fluid, and an inability to concentrate urine [2]. Although
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8 145 medications and disease states also impact hydration [9], low fluid intake is the primary
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10 146 mechanism driving dehydration in residential care [2]. Age, sex, cognitive impairment, eating
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13 147 challenges, dysphagia, inability to communicate verbally, depression and loneliness, and
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15 148 functional dependence for eating and drinking are associated with low fluid intake [3, 6, 10-13].
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18 149 Yet, these associations are complex. For example, residents who need some, but not total
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20 150 eating support, have lower fluid intake compared to those who require full support [1];
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23 151 however, more staff in the dining room does not ensure adequate fluid intake [3]. Beyond
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25 152 numbers, staff may have inadequate mechanisms for monitoring resident fluid intake and
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28 153 communicating this among the team, and/or have competing priorities [13-15]. Availability of
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30 154 preferences [9, 14], including a variety of thickened fluid options, as well as hydration stations,
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32 155 and/or delivery of between-meal fluids [11] are often decisions made at the home level that
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35 156 impact resident hydration.

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40 158 Proactive solutions are needed to address the complexity of hydration in residential care. A
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42 159 hydration typology has been created which categorizes each resident based on the primary
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45 160 characteristics that limit their fluid intake [16]. This typology was created based on a
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47 161 longitudinal observation of nursing home residents in two homes, including determination of
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50 162 hydration based on their urine specific gravity, bioimpedance and meal intake records, and
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52 163 informal interviews with staff. This typology provides guidance for strategies to promote fluid
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55 164 intake in four overall groups and six subgroups. The four main groups identify the root cause of

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3 165 low intake and although discrete, can often co-occur in residents: those who can drink, those
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5 166 who can't drink, those who won't drink, and those at end-of-life [6]. Those who *can drink* are
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7 167 subdivided into those who are physically independent or have cognitive impairment, but do not
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9 168 require eating assistance. Those who *can't drink* are subdivided into those who require physical
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11 169 help with drinking or have dysphagia, necessitating thickened fluids. Those who *won't drink*
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13 170 were subdivided into 'sippers' who only consume small amounts of fluids or those who avoid
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15 171 fluid intake for fear of urinary incontinence [6]. The end-of-life category was not further
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17 172 subdivided; strategies observed in the homes to overcome these reasons for low intake were
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19 173 also provided [6].
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27 175 The current global pandemic has dramatically highlighted the vulnerability of residents, not
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29 176 only for the spread of SARS-COV-2- and COVID-19-related deaths but also for the collateral
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31 177 consequences of procedures implemented to reduce susceptibility and spread of the virus [17,
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33 178 18]. There is currently limited data on the impacts of these procedures on the nutritional health
34
35 179 and hydration of residents. Based on media and anecdotal reports [19], nutritional side-effects
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37 180 are potentially considerable.
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44 182 The objectives of this research were to determine expert and provider perspectives on: (a) how
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46 183 COVID-19 procedures had impacted hydration in residential care and potential solutions to
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48 184 mitigate these challenges, and (b) strategies that could target key groups in the hydration
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50 185 typology [16] for consideration in a future multicomponent intervention.
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187 **Methods**

188 This meeting was originally planned for April 2020 as an in-person all-day think tank to identify
189 feasible strategies to consider for a multi-component hydration intervention for residential care
190 based on the hydration typology [16]. It was rescheduled for June 2020, after the first wave of
191 the global COVID-19 pandemic, as a virtual three-hour meeting. The original think tank
192 participants (experts in hydration, representatives of residential care provider roles [e.g., food
193 service manager]) were invited, and the list expanded to include more residential care
194 providers. A total of 36 were invited to the think tank, including the research team. These
195 invitees were from the professional networks of the research team and thus, some participants
196 were known to the authors but were not considered close colleagues. The researcher leading
197 the meeting (HK; senior researcher with expertise in geriatric nutrition) has extensive
198 experience in qualitative methods and leading large group discussions. The research team
199 included experts in speech-language pathology, nursing, hydration, oral health, dietetics, and
200 geriatric medicine; all had experience conducting research in residential care. Two research
201 assistants were also part of the research team. Confirmed participants provided a short
202 biography and photo, as well as a signed consent form before the virtual meeting and sent this
203 to the research lead via email. An overview of the oral hydration typology and background on
204 potential hydration strategies was sent to participants before the meeting to stimulate
205 thoughts on strategies before the meeting.

206 **Ethics Approval Statement**

207 Ethics review and clearance was provided by the University of Waterloo Research Ethics Board
208 (ORE #41775).

209

210 As the COVID 19 pandemic had precipitated changes in practice in residential care, the focus of

211 the think tank was expanded to consider the effects of the pandemic on strategies to support

212 hydration in residential care. The meeting was designed to be consistent with best practices for

213 virtual focus groups [20]. The three-hour meeting was divided into four segments: (a)

214 introductions followed by a short evidence-based presentation on strategies used in residential

215 care to support hydration of residents, and a review of the oral hydration typology [16] (~35

216 minutes); (b) guided discussion (HK) on the impacts of COVID-19 procedures on hydration in

217 residential care and potential solutions (~25 minutes); (c) assigned small breakout groups (n=4)

218 to discuss oral hydration typologies (sipper, forgets to drink, fears incontinence, dysphagia, and

219 physically dependent) and potential strategies to support hydration for these residents (~45

220 minutes); and (d) large group debriefing on the small group discussions (~30 minutes). A break

221 was provided after the first large group segment. During the first large group session,

222 participants were asked to reflect on what challenges had occurred with hydrating residents

223 during the first wave of the pandemic and what strategies were used to overcome these

224 challenges. In small group breakout discussions, 5-6 participants and 2-3 researchers were

225 assigned to each virtual breakout room. Each of the four small groups was assigned two types

226 of residents from the hydration typology [16] (e.g., sippers and persons with dysphagia). The

227 lead for each small group (a member from the research team) asked two questions of

228 participants for each typology: (a) what strategies would work best for residents who fit into

229 this typology (e.g., having dysphagia), and (b) how these strategies would need to be modified

230 during an infectious outbreak. An effort was made by group leads to include all participants in

1
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3 231 the discussion, by using a 'round robin' approach for each question. 'Fearing incontinence' and
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6 232 'dysphagia' were only discussed in one group each as they were expected to have fewer
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8 233 focused strategies, while 'sipper', 'physically dependent' and 'forgets to drink' were discussed
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10 234 in two small groups. A second member of the research team took detailed fieldnotes. After the
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13 235 breakout sessions, the lead for each group shared comments on their discussion with the larger
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15 236 group and ideas were compared across groups. Zoom conference software provided the
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17 237 technology for this meeting; large group segments were audio-recorded, while small group
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19 238 discussion needed to rely on comprehensive fieldnotes. Zoom audio recordings from the large
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21 239 group discussion and notes were stored on a secure server for analysis at the University of
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25 240 Waterloo.

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28 241 *Analysis:*

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30 242 A postpositivist [21] stance was taken to data collection and analysis, as the data were
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32 243 highly descriptive, based on participant observed practices and experiences, and resulted from
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34 244 the dynamics of the discussion and the values of participants. Immediately following the
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36 245 meeting, each dyad (facilitator and recorder) for the four small break out groups reviewed and
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38 246 filled in details on their individual notes and exchanged notes as a Word document to ensure
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40 247 completeness. These detailed notes were forwarded to the team leads (HK, CW) and CW
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42 248 amalgamated comments for specific hydration typology groups that were discussed in more
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44 249 than one small group (e.g., sipper). CW and HK each reviewed the audio-recorded large group
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46 250 discussion where these small group session findings were reported back to determine any
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51 251 further details that were missed from the written facilitator and recorder notes.
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252 CW and HK independently reviewed the first audio-recorded large group discussion
253 focused on the effects of COVID-19 on resident hydration and strategies developed to promote
254 hydration. Individual notes from this session completed by HK and CW were compared to
255 determine any missing details. Word documents with an initial content analysis [22, 23] of
256 notes into main concepts and draft tables/matrices were circulated among the larger research
257 team prior to a virtual meeting of the research team. This virtual meeting of the research team
258 was used to validate the findings extracted, as all members of the research team were present
259 at the meeting; they also discussed how best to proceed with presentation of the data and
260 what findings were most salient. Tables depicting key concepts were evolved and shared with
261 the research team for confirmation prior to writing of textual results; further organization of
262 the tables to highlight findings was provided (e.g., organize COVID-19 related challenges into
263 resident, staff, and home levels; strategies for hydration typology organized as supplies, home
264 context etc.). The large group sessions that were audio-recorded were reviewed again by CW
265 for extraction of exemplary quotes. High level results were also shared with invited think tank
266 participants if requested.

267 *Patient and Public Involvement* No patient involved.

268

269 **Results**

270 Meeting participants included 18 academics/researchers (10 from the research team) and 9
271 providers, with the majority from Canada (78%); over half were from nutrition or food service
272 disciplines. Participant details are provided in Table 1. Participant comments on changes due to
273 COVID-19 that impacted hydration were categorized as resident-, staff-, or home-related (Table

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3 274 2). Participants' suggestions for overcoming these challenges are also provided. Resident-
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6 275 related issues resulted from the confinement of residents to rooms during the first wave of the
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8 276 pandemic. Residents were interacting with staff only during care routines in their room and
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11 277 these touch points were minimized (at least initially) to prevent the potential spread of
12
13 278 infection. This meant that access to beverages was limited as well as lack of social stimulation
14
15 279 to drink. Isolated residents were reported to be bored and depressed, resulting in apathy and
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18 280 decreased appetite. One provider highlighted that as a result of the COVID-19 restrictions
19
20 281 there were "no volunteers, no exercise groups, no social activities... [this] would definitely make
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22 282 a downswing on the amount of liquid." Solutions included using a trolley to delivery drinks
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25 283 between meals and providing socially distanced opportunities for residents to share fluids with
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28 284 others.

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32 286 Participants reported that COVID-19 precautions and procedures exacerbated longstanding
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35 287 issues of staff not prioritizing hydration: "If staff are already not thinking about hydration
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37 288 during normal operations, then they are certainly not thinking about hydration during
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40 289 pandemic times" (dietitian provider). Specific to COVID-19, limited staff, limited entries into
41
42 290 residents' rooms, and new staff resulted in decreased fluid offerings, lack of time to support
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45 291 drinking assistance and lack of understanding of residents' specific needs. Due to the many new
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47 292 tasks and activities required as infection control procedures, staff time was reported to be even
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50 293 more limited than usual for the routine tasks such as monitoring fluid intake. To promote
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52 294 hydration, participants suggested offering or encouraging fluid at every touch point. It was
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55 295 noted that systemic communication challenges among staff, such as lack of time to review

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3 296 documentation, impacted resident-centred practices, such as knowing individual drink
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6 297 preferences and how to support intake. New roles for staff were also a concern. In some
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8 298 homes, food service staff who usually provided between meal fluids through a snack service
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10 299 were removed from this activity, to minimize the number of staff entering a resident's room.
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13 300 Educating or communicating preferences and extending meals to allow for greater fluid
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15 301 consumption and including other staff at meals to meet eating assistance needs were key
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17 302 strategies offered. Finally, documentation on intake was deprioritized with the new required
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19 303 infection control procedures taking priority. One provider attendee described that the "biggest
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21 304 challenge is sometimes [staff are] documenting everybody in the last fifteen minutes of their
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23 305 shift... we really question accuracy." Considering that all residents are at risk for dehydration, it
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25 306 was deemed crucial to encourage the implementation of home-level efforts to promote
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27 307 hydration. For example, one participant reported that "a lot of the processes and systems in
28
29 308 long-term care [during the pandemic] is for residents to receive in-room service, rather than
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31 309 gather in dining rooms. Having that social aspect will encourage them to sit longer and have a
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33 310 few more sips, and improve their hydration."
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42 312 It was noted that, based on the suddenness of the COVID-19 pandemic in Canada, "Decisions
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44 313 are [sic] made fast and the larger picture, which is [sic] the resident and their quality of life, is
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46 314 [sic] lost" (food service manager provider). There were several home-related effects due to
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48 315 pandemic procedures described by participants, but these varied across Canada and
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50 316 internationally, often because these decisions were left to the management of the home. For
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52 317 example, in some regions and homes, residents were not confined to their rooms, but grouped
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3 318 into smaller cohorts to increase physical distance during dining, while in others, residents were
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6 319 confined to their rooms and used disposable dishware and cups.
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8 320 Several challenges were noted at the home-level. High touch point areas such as self-
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10 321 serve beverages or water coolers were removed to reduce contamination. Similarly, a provider
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12 322 attendee noted that, with COVID-19, “tuck shops are closed—they [residents] can’t go out to
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14 323 get a drink like they used to.” The use of personal protective equipment resulted in challenges
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16 324 recognizing and communicating with residents, while family/volunteer visits were abruptly
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18 325 stopped and physical distancing occurred in dining rooms. To overcome these challenges, staff
19
20 326 were redeployed to provide support at meals, and recreation staff specifically launched
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22 327 hydration events using trolleys to deliver special drinks to residents’ rooms. Strategies at the
23
24 328 home level included education on the ability of industrial dishwashers to sufficiently sterilize
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26 329 dishware and on having staff wearing masks to introduce themselves to residents or have other
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28 330 identifying information readily visible for residents. Families were encouraged to bring in
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30 331 speciality items that could be quarantined.
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37 332 The capacity to physically distance based on home configuration was reported to impact
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39 333 decisions about when and where food and beverages should be consumed. Offering water at
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41 334 every meal automatically provided an opportunity to support hydration. It was also noted that
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43 335 “COVID has rewound the clock with respect to factors that lead to malnutrition and
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45 336 dehydration” (dietitian provider). However, participants reported that crises such as the
46
47 337 pandemic clarified for policy makers, homes, staff, residents, and their families, what was
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49 338 important for residential care. They commented on the importance of working together with all
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51 339 staff being involved in promoting hydration and addressing challenges, the recognition that
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3 340 meals provide an important social opportunity for residents, and the understanding that
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6 341 families have a vital role in encouraging fluid intake and providing preferred beverages from
7
8 342 outside the home. For instance, an attendee described that “families have a beautiful way of
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10 343 getting their family members to eat and drink,” and another provider emphasized that “families
11
12 344 have been limited in bringing products into a facility or into a centre, and sometimes families
13
14 345 are providing those special foods or treats that can’t be accessed anywhere else, and that
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16 346 certainly is creating some issues in maintaining hydration overall.” The group felt that lessons
17
18 347 could be learned from the experience of COVID-19, and these should be incorporated into
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20 348 routines beyond the pandemic. For example, the rigid time frames for meals result in rushed
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22 349 care; during the pandemic, some homes extended the meal serving times out of necessity due
23
24 350 to delivery of trays to resident rooms or having two seatings for meals to reduce numbers. This
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26 351 was seen as a positive practice that could be sustained post-pandemic. Participants also noted
27
28 352 that successful strategies targeted more than one challenge at time, for example: “the key thing
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30 353 is that there has to be beverages available... so it’s not adding too much work to their [staff
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32 354 members’] day, and it’s part of their routine.”

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40 355 The oral hydration typology [16] was new to many participants, especially the providers.
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42 356 Ideas and strategies for supporting hydration using the typology for five resident subcategories
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44 357 of sippers, forgets to drink, fears incontinence, dysphagia, and physically dependent are
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46 358 outlined in Table 3 and categorized as: supplies, timing, facility context, socialization, and
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48 359 education. Examples for sippers include, identifying times when the resident drinks more as
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50 360 well as preferred beverages; offering beverages on a mobile cart at activities and promoting
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52 361 socialization by having staff model drinking behaviours; or allowing residents to stay in the
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3 362 dining room to linger over their beverages. Making beverages accessible for those who forget
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6 363 to drink and providing between meal reminders and prompts, but also pairing these residents
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8 364 with tablemates who drink well were strategies provided by the group. Eating and drinking
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10 365 were noted to be social events and a key strategy offered was incorporating beverages into
11
12 366 every communal activity in the home as “[residents] can’t drink what is not offered” (nutrition
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14 367 researcher not from the research team). Educating staff on hydration needs and strategies to
15
16 368 support these residents were other ideas. For those who fear incontinence, educating the
17
18 369 resident on the importance of fluid intake and Kegel exercises while training staff (including
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20 370 non-nursing) to support them to the washroom when they are out of their personal room, were
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22 371 noted ways of helping these residents. For those with dysphagia, sufficient variety of thickened
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24 372 fluids, normalizing a thickened texture to support hydration in all residents and educating the
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26 373 family and resident on the need for thickened fluids were ideas offered by participants for this
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28 374 group. For residents who are physically dependent on others, finding cups or using adaptive
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30 375 equipment that they could potentially use and drink from on their own were noted strategies.
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32 376 However, it was noted that sufficient trained staff or volunteers who can individualize support
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34 377 at meals, recreation activities and routine care (e.g., brushing teeth, medication times) was
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36 378 needed.

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45 379 Participants described that some form of assessment process would be needed to make
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47 380 the most of using the typology to identify strategies for individual residents. Trial and error
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49 381 were discussed as important for employing strategies at the individual level. A philosophy of
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51 382 care that promotes a social model was discussed as a means of promoting fluid intake across
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53 383 the typology subgroups. The continuous, mindful creation of new routines to offer beverages
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3 384 and assistance, as residents change in their capacity, was a key learning from the experience of
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5
6 385 the pandemic.
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8 386 Understaffing was an overarching issue for addressing hydration that impacted all of the
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10 387 hydration typology. The pandemic has highlighted, especially for those who do not work in this
11
12 388 sector, that residential homes are understaffed. Many of the strategies identified in Tables 2
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14 389 and 3 require staff for encouraging, creating opportunities, or aiding drinking. It is evident that
15
16 390 hydration requires sufficient staffing and the concentration of all care tasks to the nursing staff
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18 391 during the first wave of COVID-19 likely exacerbated risk for dehydration. As one provider
19
20 392 participant put it, “in some sites, food service staff did have the responsibility of providing
21
22 393 fluids, and with COVID, decisions had been made that there were risks associated with food
23
24 394 service staff moving from one unit to another unit providing those fluids. That task was then
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26 395 removed for those individuals and put back to healthcare aides.” Education is a final
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28 396 overarching requirement to ensure adequate hydration, as reasons for not drinking vary. During
29
30 397 the pandemic the continual replacement of staff, exacerbated by illness and policies of having
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32 398 only one home for employment, means that new and current staff need to be adequately and
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34 399 continuously trained.
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401 Discussion

402 There is insufficient research on improving resident fluid intake in residential care settings [7,
403 15, 24]. Considering the current context of the COVID-19 pandemic and framing the discussion
404 using a typology of oral hydration, researchers and providers offered new insights on how the
405 hydration needs of older adults in residential care can be met. Furthermore, new strategies

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3 406 were offered to expand on those originally reported with this typology [16]. Consistent with the
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6 407 literature [6, 11], our participants noted that hydration was rarely considered by residential
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8 408 providers and that consuming sufficient fluids requires time and effort on the part of the staff.
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10 409 This necessitates educating staff on the importance of hydration, the typology for low fluid
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12 410 intake, fluid needs and when challenges such as COVID-19 arise, not forgetting this basic need
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14 411 for residents. Providing fluid alone is not sufficient, as residents who can't drink need support
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16 412 from staff, and residents who won't drink need encouragement to do so. Consistent with our
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18 413 findings is the need to individualize strategies [11, 15], which suggests that multi-component
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20 414 interventions should be trialed [6, 11, 14]. However, there is a lack of consensus on how to
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22 415 tackle the complex causes of poor hydration in residential care [6, 15, 24]. Most homes use
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24 416 selected individual strategies rather than consider the typology and multicomponent
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26 417 interventions [11]. Further, standardized hydration education programs are needed to support
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28 418 homes in raising awareness and motivating staff to emphasize fluid intake.
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32 420 Evidence coincides with the strategies identified in this study including: considering the social
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34 421 and physical environments; providing prompts to drink; staff communication; access to fluids
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36 422 including beverage carts, cups and glasses; and, determining drink preferences [14, 15, 24].
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38 423 Recent research suggests the value of mimicry to support fluid intake [25] and the use of
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40 424 technology to support communication of fluid intake among staff [26]. A key outcome of this
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42 425 study is the consideration of individualized strategies to meet the specific needs of residents,
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44 426 rather than using global strategies and assuming they work for most. Prior research has noted
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46 427 that when interventions are tailored to the resident, such as considering their preferences and
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3 428 offering choice, there is an increase in fluid intake [27]. Strategies outlined in Table 3 mapped
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5 429 onto the oral hydration typology [16] have the potential of ensuring that all residents' drinking
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8 430 needs are met. These strategies should be explored in further research.
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13 432 COVID-19 has raised awareness of the challenges within residential care homes, and specifically
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15 433 the importance of sufficient, well-trained staff [19]. As between-meal offerings can provide 70%
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17 434 of the fluid a resident consumes [28], strategies must focus on such fluid offerings. During the
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19 435 pandemic, between-meal visits were noted by our participants to provide the resident with
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21 436 emotional and psychological support. Thus, there is a socialization opportunity with frequently
22
23 437 planned offerings of fluid between meals. As described by our participants, sufficient staffing
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25 438 and the need for improved communication of low fluid intake require special attention during
26
27 439 an outbreak. Challenges due to the COVID-19 pandemic and potential novel strategies were
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29 440 offered at the resident, staff, and home levels. Finally, the added value of family and volunteers
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31 441 to support residents with essential tasks such as drinking were recognized when this care was
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33 442 suddenly withdrawn [19]. Families are necessary to include in hydration interventions [11] and
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35 443 several ideas were provided by our participants, such as sitting and drinking with residents or
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37 444 providing culturally preferred beverages. These ideas are worthy of exploration as part of the
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39 445 routine to promote hydration in residential care and for future research.
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49 446
50 447 *Strengths and Limitations*

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52 448 Although this novel study investigates researcher and provider consideration of the oral
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54 449 hydration typology and examines how the pandemic has impacted the hydration of residents,
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3 450 this study has limitations. All providers were from Canada, and several invitees ($n=9$) were
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6 451 unable to attend the meeting due to their workload and home priorities during the pandemic.
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8 452 This affects the generalizability of study findings. International experts, however, had direct
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10 453 experience with homes in their region and could speak to the challenges posed with COVID-19.
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13 454 Further, due to the platform used, we were unable to record the small group discussions; we
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15 455 included a facilitator and recorder in each group to capture this discussion, however this led to
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18 456 10 of 27 participants being from the research team. Further, participants were invited from the
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20 457 networks of the research team; this potentially impacted the extent and generalizability of the
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23 458 strategies identified. The best practices for virtual focus groups are evolving and comfort with
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25 459 the virtual format and opportunity for discussion using this technology may have impacted
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28 460 findings. Audio files were not transcribed for large group discussions; however, two researchers
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30 461 individually reviewing the files and noting key concepts was considered sufficient for this
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33 462 descriptive qualitative content analysis. Finally, not all perspectives were garnered during this
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35 463 study. The views of family members and residents are missing, and this likely limited the
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38 464 problems identified and the potential solutions or strategies that could be employed to support
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40 465 hydration.

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45 467 **Conclusions and Implications**

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47 468 This analysis provides a new perspective on hydration strategies mapped to an oral hydration
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49 469 typology [16] and considers how these need to be modified during an infectious outbreak when
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52 470 residents are isolated to their rooms. Future research should create the evidence base for
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3 471 multi-component interventions to address poor fluid intake of older adults living in residential
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47 490 involvement in the conduct of this research.

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51 491 **Data Availability:** No additional data available.

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54 492 **Competing Interests:**

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3 493 Authors declare no conflicts of interest, excepting HK and GH are endowed research chairs. JM
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6 494 was the creator of the hydration typology used to frame this data collection.
7

8 495 **Author Contributions**

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10 496 HK is the senior researcher for this project, leading on the methods, analysis and writing of the
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13 497 manuscript. CW supported all aspects of the research including ethics submission, data
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15 498 collection and analysis and drafting of the manuscript. LM and SS supported data collection,
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18 499 analysis and revision of the manuscript. JM, SES, MNY, GH, PG, CL, ANM are original members
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20 500 of the research team and designed the study, were involved in data collection and analysis and
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23 501 revision of the manuscript.
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576 **Table 1: Characteristics of Participants (n=27)**

Demographic Characteristic	% Participants (n)
Discipline	
Nutrition	44.4 (12)
Nursing	18.5 (5)
Speech Language Pathologist	11.1 (3)
Administration	11.1 (3)
Food Service	7.4 (2)
Other	7.4 (2)
Primary Role	
Academic/Researcher	66.6 (18)
Provider	33.3 (9)
Country	
Canada	77.8 (21)
United Kingdom	11.1 (3)
United States of America	7.4 (2)
Germany	3.7 (1)

597 Participant characteristics. Table is original work and not previously published elsewhere.

619 **Table 2: COVID-19 Potential Challenges to Hydration and Solutions Offered**

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COVID-19 Procedure	Hydration Challenge	Potential Solutions
<i>Resident-Related</i>		
Residents confined to rooms	Restricted access to beverages; only beverages delivered by staff; lack of social stimulation to drink	Offer trolley service of drinks between meals; provide selection of preferred beverages including thickened fluids
Boredom/depression from room isolation	Apathy, decreased appetite and lack of interest in food and fluid consumption	Create physically distanced interactions for sharing fluids (e.g., residents sitting near entrance to rooms); popsicles and fun beverages; bells on carts to announce drink trolley
<i>Staff-Related</i>		
Limited entries by staff into residents' rooms and time spent with each resident; reduced medication passes	Decreased fluid offerings to residents	Offer a beverage at every contact opportunity and encourage residents to drink Create new routines that include offering of fluid Implement Comfort Rounds to check on all residents and offer fluid and other care needs
New staff	Lack of understanding of individual residents and how to support intake; residents may not respond to staff they do not recognize	Educate staff on how to approach residents and encourage intake
Limited care staff	Fluid intake reduced especially for those who need support to eat	Develop an 'all hands on deck' approach to providing beverages and meals; shift mealtimes to make the meal longer
Shift in roles of staff	Food service staff no longer involved in snack rotation to reduce opportunities for contamination; care staff do not know resident beverage preferences, increased burden on care staff	Acronym checklist used by staff to ensure resident needs are met (e.g., SAFE: Social, Active, Fluid, Eating; SIP: Social Intake Preferred) Use acronym at each contact with resident
Professional staff working remotely	Normal procedures for tracking and determining hydration are limited	Assume all residents at risk for dehydration and institute global processes to support hydration
<i>Home-Related</i>		

Water coolers removed to reduce contamination risk	Lack of freely available beverages; require staff to provide all beverages	Provide more fluids directly to residents at meals/snacks
Use of disposable glasses	Smaller volume, harder to hold and manipulate for residents	Use preferred glassware, recognizing that dishwasher will sufficiently sterilize
Personal protective equipment (PPE)	Residents can't see staff face with PPE	Tell the resident who they are (as face covered due to masks) or create unique aspects to uniform to promote identification by residents Use verbal and nonverbal cues to prompt fluid intake; mimic fluid intake
Lack of family/volunteer visitors	Reduced opportunities for social drinking or special drinks brought by family; reduced communication to staff around beverage preferences; cultural preferences not met	Relocate support staff, such as recreation staff to provide hydration events and beverage passes to residents' rooms between meals; Encourage family to bring in items that could be quarantined for a few days and then provided to resident
Convenience shop closed	Beverage treats unavailable	Create hydration events (e.g., Hawaiian luau drinks); portable convenience cart for residents
Physical distancing in dining rooms	Residents spread out for beverage and meal delivery; more than one seating for meals required, resulting in reduced time for meals	Provide water automatically at meals for all residents as well as preferred beverages

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Participant views on challenges and solutions to hydration during COVID-19 pandemic. Table is original work and not previously published elsewhere.

Table 3: Strategies to Promote Fluid Intake Categorized by the Hydration Typology

		Strategies to Promote Fluid Intake				
		Supplies	Timing	Facility Context	Socialization	Education
Typology Subgroup	Sipper	<ul style="list-style-type: none"> Offer fluid vessels with graduated marking Implement cooler stations Identify preferred cups/bowls/bottles for drinking Offer lidded vessels to take on the go 	<ul style="list-style-type: none"> Identify times when resident drinks more Have staff frequently encourage residents Increase frequency of fluid offering 	<ul style="list-style-type: none"> Identify preferred beverage Use technology to communicate preferences Offer fluid with each pill (one at a time) at medication delivery Offer beverage cart at every activity 	<ul style="list-style-type: none"> Promote drinking as a social activity Have staff model drinking behaviors Allow to linger after meals to drink and socialize 	<ul style="list-style-type: none"> Educate those who are cognitively well on water consumption goals
	Forgets to Drink	<ul style="list-style-type: none"> Accessible beverage or cooler station (when no outbreak) 	<ul style="list-style-type: none"> Offer between meal reminders & prompts Implement a reminder system to prompt drinking (using tablets, games, robots) 	<ul style="list-style-type: none"> Develop resident-specific plan for hydration 	<ul style="list-style-type: none"> Pair residents with tablemates who drink a lot Create daily social opportunities with fluid 	<ul style="list-style-type: none"> Provide on-going education to staff on hydration needs of these residents; strategies that support the individual to drink more Increase staff awareness by completing intake assessments
	Fears Incontinence	<ul style="list-style-type: none"> Provide quality protective incontinent products 		<ul style="list-style-type: none"> Clearly identify toilets near dining rooms Promote Kegel exercises 		<ul style="list-style-type: none"> Provide resident education on the importance of fluid intake Train all staff (beyond nursing) to assist residents in bathroom use when out of their room
	Dysphagia	<ul style="list-style-type: none"> Provide adaptive vessels with spouts to slow flow 		<ul style="list-style-type: none"> Identify resident fluid preferences 	<ul style="list-style-type: none"> Offer all residents a thickened fluid as a snack choice to 	<ul style="list-style-type: none"> Educate resident & family: reason for thickened fluid

136/bmjopen-2021-055457 on 8 February 2022. Downloaded from <http://bmjopen.bmj.com/> on April 19, 2024 by guest. Protected by copyright.

				<ul style="list-style-type: none"> • Offer a variety of options of thickened fluids • Offer new formats of thickened fluids (e.g., Jelly Drops®) • Consider implementing a free water protocol for those with adequate cognition and mouth care • Re-assess swallowing routinely 	<p>normalize this choice of fluid</p> <ul style="list-style-type: none"> • Staff work to reduce stigma with other residents 	<ul style="list-style-type: none"> • Adequate training of non-speech language pathology staff on identifying changes in swallowing capacity
	Physically Dependent	<ul style="list-style-type: none"> • Trial and identify preferred cups that promote self-drinking • Provide appropriate adaptive equipment such as specialized cups with lids 	<ul style="list-style-type: none"> • Offer fluid during routine care activities 	<ul style="list-style-type: none"> • Sufficiently trained staff and/or volunteers to support 	<ul style="list-style-type: none"> • Create fun & social food and fluid offerings 	<ul style="list-style-type: none"> • Educate all staff/volunteers on supportive strategies to assist with fluid intake, individualized techniques that work

Matrix of hydration typology and strategies provided by participants to promote hydration. Table is original work and not previously published elsewhere.

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No.	Topic	Item	
Title and abstract			
S1	Title	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended	Pg 1
S2	Abstract	Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions	Pg 3
Introduction			
S3	Problem formulation	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement	Pg 6-7
S4	Purpose or research question	Purpose of the study and specific objectives or questions	Pg 8
Methods			
S5	Qualitative approach and research paradigm	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/interpretivist) is also recommended; rationale ^b	Pg 10
S6	Researcher characteristics and reflexivity	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability	Pg 8
S7	Context	Setting/site and salient contextual factors; rationale ^b	Pg 8
S8	Sampling strategy	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale ^b	Pg 8
S9	Ethical issues pertaining to human subjects	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	Pg 9
S10	Data collection methods	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale ^b	Pg 8-10
S11	Data collection instruments and technologies	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Pg 8-10
S12	Units of study	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Pg 8
S13	Data processing	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts	Pg 10-11
S14	Data analysis	Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale ^b	Pg 11
S15	Techniques to enhance trustworthiness	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale ^b	Pg11
Results/findings			
S16	Synthesis and interpretation	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Pg12-17
S17	Links to empirical data	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Tables 2/3
Discussion			
S18	Integration with prior work, implications, transferability, and contribution(s) to the field	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field	Pg 18-20
S19	Limitations	Trustworthiness and limitations of findings	Pg 20
Other			
S20	Conflicts of interest	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Pg 22
S21	Funding	Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Pg 22
<p>^aThe authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.</p> <p>^bThe rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.</p>			

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