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# The impact of COVID-19 on access to canine integrative medical care in Michigan, USA, and Ontario and British Columbia, Canada,

### Citation for published version:

Muñoz, KA, Duncan, J, Clarke, K, Shull, S & Manfredi, JM 2022, 'The impact of COVID-19 on access to canine integrative medical care in Michigan, USA, and Ontario and British Columbia, Canada, Canine integrative medical care and COVID-19', *Veterinary Anaesthesia and Analgesia*.  
<https://doi.org/10.1016/j.vaa.2022.08.004>

### Digital Object Identifier (DOI):

[10.1016/j.vaa.2022.08.004](https://doi.org/10.1016/j.vaa.2022.08.004)

### Link:

[Link to publication record in Edinburgh Research Explorer](#)

### Document Version:

Peer reviewed version

### Published In:

*Veterinary Anaesthesia and Analgesia*

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1 **Abstract**

2 **Objective** To determine the effects of the COVID-19 associated restrictions on the ability of  
3 owners in Michigan, USA *versus* Ontario and British Columbia, Canada, to obtain care for their  
4 chronically painful dogs.

5 **Study design** Cross-sectional survey.

6 **Population** A total of 90 owners met the inclusion criteria for the study.

7 **Methods** An anonymous electronic survey was distributed to owners at four veterinary  
8 integrative medicine (IM) clinics, during July and August 2020. Two clinics in Michigan (MI),  
9 USA, and one each in Ontario (ON) and British Columbia (BC), Canada were recruited. Owners  
10 were asked about availability of IM care pre and during the COVID-19 restrictions and their  
11 opinions of the impact of COVID-19 on their dog's health. The survey asked where owners  
12 sought care for their dogs, types of chronic conditions treated, therapeutic modalities used, and if  
13 owners had a medical background. Comparisons were made within and between groups.  
14 Thematic analysis, Fisher's exact test,  $\chi^2$  analyses, McNemar's and Wilcoxin signed rank tests  
15 for paired comparisons were performed ( $p < 0.05$ ).

16 **Results** During the COVID-19 restrictions, access to IM care was better for dogs in ON and BC  
17 than in MI ( $p < 0.001$ ). The negative effect of the pandemic restrictions to IM care on quality of  
18 life was perceived greater by owners in MI than those in ON and BC ( $p < 0.001$ ). The owners'  
19 medical backgrounds had no effect on attempts to access care during this time ( $p = 0.76$ ).

20 **Conclusion and clinical relevance** The results suggest that a widespread disease in humans had  
21 an adverse impact on animal welfare. Providers of veterinary care should use this experience to  
22 establish protocols to ensure continuity of care for chronically painful animals in the event of a  
23 similar situation in the future.

24

25 **Keywords** chronic pain, COVID-19 restrictions, dogs, essential medical service, integrative

26 medicine.

27

28 **Introduction**

29 Integrative medicine (IM) practices are important for the management of chronic pain in both  
30 humans and veterinary species (Vickers et al. 2012; Silva et al. 2017). IM clinics provide therapy  
31 to chronically painful dogs, therapy which may not be readily available in general practices  
32 (MacFarlane et al. 2014; Barale et al. 2020; Urits et al. 2020). Access to IM care can improve  
33 quality of life (QoL) via chronic pain management (Downing 2011; Silva et al. 2017).

34 The COVID-19 pandemic and the subsequent pandemic-associated restrictions resulted  
35 in temporary closure of human IM clinics and also reduction in hospital-based appointments as  
36 resources were redistributed to more critical areas. This hampered people with chronic pain from  
37 accessing pain management, and also negatively impacted their health and QoL (Javed et al.  
38 2020; Lynch et al. 2020). The pandemic-associated restrictions resulted in temporary closure of  
39 veterinary IM clinics, but the impact on animals with chronic pain is unknown. The services  
40 veterinarians could offer were limited, depending on the severity of the restrictions. In Michigan,  
41 USA (MI), veterinarians were only permitted to attend to veterinary emergencies and to provide  
42 preventative medical care, such as vaccinations during March to June 2020 (Michigan.gov  
43 2020). In Ontario, Canada (ON), veterinarians were allowed to determine the types of cases that  
44 they attended to on a daily basis. In British Columbia, Canada (BC), there were no specific  
45 restrictions stating how veterinarians should operate during this time (Government of Canada  
46 2020). It is not known how the COVID-19 restrictions affected owners' ability to access IM care  
47 for their dogs, or any negative impacts associated with these restrictions. The types of pain  
48 modality therapies used to treat dogs with chronic pain may have been limited because some of  
49 these therapies are hospital-based and cannot be performed at home by the owners. Knowledge

50 of the effects of the recent pandemic restrictions on care of dogs with chronic pain could provide  
51 guidance to ensure continuity of care for these dogs in the event of a future pandemic.

52 A medical background may have affected an owner's decision-making process when  
53 deciding whether to take their dog to an IM facility during the pandemic. The implications of the  
54 pandemic may be better understood by an owner with a medical background and may influence  
55 their choice to seek IM care for their pet. In humans, having a medical background made it more  
56 likely for them to be willing to interact with people affected by diseases, as compared to those  
57 without a medical background and their concern for interacting with ill people (Bachmann et al.  
58 2007; Shi et al. 2020).

59 This study investigated 1) any changes in management of chronic pain and QoL in dogs  
60 in MI, ON and BC, and 2) any differences in pet management by owners with or without a  
61 medical background. Our hypotheses were that 1) dogs in MI had less access to IM care during  
62 the pandemic-associated restrictions and that their QoL was more negatively affected than dogs  
63 in ON and BC; and 2) during the pandemic, owners with a medical background were more likely  
64 to continue to seek IM care for their chronically painful dogs than those without a medical  
65 background as they understood the pathophysiology associated with COVID-19.

66

## 67 **Materials and methods**

68 Ethical approval for the use of humans in research was granted by Michigan State University's  
69 Office of Regulatory Affairs and Institutional Review Boards (approved for exemption under  
70 category exempt 2[i]). An anonymous online questionnaire was created and distributed using the  
71 Qualtrics survey platform (Qualtrics, 2005, UT, USA).

72

73 Clinic selection and survey distribution

74 The survey was sent to clients of two veterinary IM clinics in Michigan, USA, one in Ontario,  
75 Canada and one in British Columbia, Canada, during July and August 2020 to capture owners'  
76 impressions of the effect of the pandemic on their dogs, while the effect of the restrictions were  
77 still present in their minds. These clinics were selected because they had a large IM animal  
78 population, were exclusively IM clinics, and were willing to send the questionnaire link via  
79 email to their clients. To maintain client confidentiality, as stipulated by the Institutional Review  
80 Board, the researchers did not have access to clients' e-mail addresses. No reminder e-mails were  
81 sent due to staff shortages at the clinics during the pandemic. Participants were allowed one  
82 response per survey and for only one dog.

83

84 Inclusion criteria

85 Clients were included in the study if they: 1) owned a dog with a chronically painful condition;  
86 2) were a resident of MI, ON or BC during the COVID-19 restrictions; and 3) had previously  
87 accessed treatment for their dog at one of the participating IM clinics over the last year.

88

89 Instrument design

90 A pilot survey was created and piloted with six individuals with and without a veterinary  
91 background. Feedback from this survey was used to improve face and content validity. The final  
92 survey consisted of 36 questions in the form of multiple choice ( $n = 13$ ), multiple choice with  
93 open-ended questions ( $n = 6$ ), matrix questions ( $n = 2$ ), select all that apply ( $n = 8$ ) and open-  
94 ended questions ( $n = 7$ ) (Appendix SA). There were two sections in the survey: 1) a demographic

95 section asking respondent's age, if they were the dog's primary caretaker, level of education, if  
96 they had a medical background and country of residence, and 2) an IM care section where  
97 participants were asked if they owned a chronically painful dog, the diagnosis of the chronic pain  
98 condition of the dog, and information about the availability and type of IM care provided to the  
99 dog before and during the time of the COVID-19 restrictions. Specifically, the questionnaire  
100 asked how the restrictions affected their ability to access care from their IM clinic, availability of  
101 IM treatment modalities pre-pandemic and during the time of the restrictions, and the frequency  
102 of these treatments. The IM treatment modalities included in the survey were acupuncture,  
103 electroacupuncture, transcutaneous electrical nerve stimulation (TENS), laser, massage,  
104 underwater treadmill, non-steroidal anti-inflammatory agents (NSAIDs), environmental  
105 modification and therapeutic exercise. Owners' use of a pain scale to assess the status of their  
106 dog was also investigated. The questionnaire also asked if additional steps were taken, such as  
107 purchasing over the counter products to help manage their dog's pain during the COVID-19  
108 restrictions. Owners perception of their dog's ability to walk, their appetite and overall  
109 impression of their dog's health during the COVID-19 restrictions were also investigated.  
110 Questions asking if respondents owned a dog, lived in the USA or Canada, and if their dog had  
111 been diagnosed with a chronic condition that may cause pain were mandatory, all other questions  
112 were optional.

113

#### 114 Statistical analysis

115 Data was analyzed using NCSS 2019 (NCSS LLC, UT, USA). Using a predicted IM veterinary  
116 patient population of 900, a confidence level of 95% and a 10% margin of error, the estimated  
117 survey sample size was 87 (Qualtrics; Qualtrics 2005). Based on looking for significant

118 differences in the use of various treatment modalities, a power of 80%, large effect size ( $w=0.5$ ),  
119 and alpha of 0.05 yielded an ideal sample size of 30 per country (G\*Power 3.1.9.2, Heinrich  
120 Heine University Düsseldorf, Germany). Comparisons within and between groups were done  
121 using cross tabulations,  $\chi^2$  test, Fisher's exact test, and McNemar's and Wilcoxin signed rank  
122 tests for paired comparisons. Normality was assessed by means of the Shapiro–Wilk test of  
123 normality. Numbers were reported, allowing for the calculations of frequencies, and median with  
124 25th and 75th quartiles were reported for nonparametric data. Statistical significance was set at  $p$   
125  $< 0.05$ .

## 126 **Results**

127 Some respondents chose not to provide responses to all of the questions, and as such all data  
128 available were analyzed. A total of 90 owners met the inclusion criteria, with 82 owners  
129 completing 50% or more of the survey, and 74.4% (67 owners) fully submitting the survey. Of  
130 these owners, 59 were located at two geographical locations in MI, and 31 at locations in ON  
131 and BC. The data for both locations in MI, and for locations in ON and BC, were analyzed  
132 together. The number of survey links sent to clients from the IM clinics was not available so a  
133 response rate could not be determined.

134

### 135 Demographic data

136 There were no significant differences between MI *versus* ON and BC when age ( $p = 0.45$ ),  
137 primary caretaker ( $p = 0.92$ ) and level of education ( $p = 0.31$ ) were analyzed (Table 1).

138



139 IM care data

140 Osteoarthritis was the most common chronic disease in dogs in MI (62%, 32/52) and in ON and  
141 BC (61%, 17/28). Neuropathies, cruciate ligament disease, degenerative myopathy and geriatric  
142 onset laryngeal paralysis and polyneuropathy were reported by < 23% of owners surveyed. There  
143 were no significant differences found between the locations studied when comparing the diseases  
144 reported ( $p = 0.91$ ).

145 Before the pandemic, dogs with chronic pain were treated at an IM clinic, by a primary  
146 care veterinarian or by both, and this distribution was not different between MI *versus* ON and  
147 BC ( $p = 0.96$ ) (Table 2). More owners from ON and BC *versus* those in MI indicated that access  
148 to IM care continued to be available during the pandemic ( $p < 0.001$ ) (Table 2). The source  
149 (veterinarian only or IM clinic) of medical care obtained by owners for their dogs during the  
150 pandemic was not different between the survey locations ( $p = 0.34$ ) (Table 2).

151

152 Access to therapeutic modalities

153 Owners in MI reported that their dogs were less able to receive acupuncture ( $p = 0.03$ ),  
154 electroacupuncture ( $p = 0.03$ ), laser ( $p < 0.0001$ ), massage therapies ( $p = 0.004$ ), and underwater  
155 treadmill ( $p < 0.0001$ ) treatments during the restrictions, as compared with before the pandemic  
156 (Table 3). The pandemic did not affect provision of NSAIDs ( $p = 1.0$ ), environmental  
157 modifications ( $p = 0.63$ ) or exercise ( $p = 0.13$ ) for pain management (Table 3).

158 Owners in ON and BC reported that during the restrictions, access to receive acupuncture  
159 ( $p = 0.03$ ) and underwater treadmill ( $p = 0.004$ ) therapies for their dogs was less (Table 3). The  
160 restrictions had no effect on the ability to obtain electroacupuncture ( $p = 1.0$ ), TENS ( $p = 0.50$ ),

161 therapeutic massage ( $p = 0.50$ ), NSAIDs ( $p = 1.0$ ) and environmental modification ( $p = 1.0$ ) for  
162 the dogs (Table 3).

163 Prior to the pandemic there was a significant difference in prescribed treatments for dogs  
164 with chronic pain between MI *versus* ON and BC, with fewer dogs in MI treated with  
165 acupuncture ( $p = 0.004$ ) and TENS ( $p = 0.04$ ) than those in ON and BC (Table 4). Owners  
166 reported that before the pandemic more dogs in MI received massage therapy compared with  
167 dogs in ON and BC ( $p < 0.0001$ ; Table 4). There were no significant differences between the  
168 dogs in MI *versus* ON and BC for the other modalities mentioned (all  $p \geq 0.05$ ; Table 4).

169 Responses between MI *versus* ON and BC during the time of the restrictions were as  
170 follows for the modalities studied: acupuncture ( $p < 0.0001$ ), electroacupuncture ( $p = 0.04$ ),  
171 TENS ( $p < 0.001$ ), laser ( $p = 0.003$ ), massage ( $p = 0.02$ ) and underwater treadmill ( $p = 0.02$ )  
172 therapies. Fewer of these IM therapies were administered to dogs in MI than in ON and BC, with  
173 the exception of massage therapy for which more dogs in MI were treated than in ON and BC.  
174 No significant differences between MI *versus* ON and BC were reported for other modalities  
175 during COVID-19 restrictions (all  $p > 0.05$ ; Table 4).

176 Overall, the median number of treatments that owners in the geographic locations studied  
177 used for their dogs during the pandemic were lower compared with before COVID-19 ( $p <$   
178  $0.0001$ ; Table 5). Analysis of the median numbers of treatments that were available to dogs in  
179 MI, and in ON and BC, showed a significant decrease in access to hospital-based care in MI ( $p <$   
180  $0.0001$ ), and in ON and BC ( $p < 0.0001$ ), and also in non-hospital based treatments in MI ( $p =$   
181  $0.03$ ), and in ON and BC ( $p = 0.0003$ ) (Table 5).

182

183 Products purchased by owners during the COVID-19 restrictions

184 Some owners reported purchasing the following purported pain-reducing products from pet  
185 shops: cannabidiol, equipment, and/or supplements to contribute to pain management. More  
186 owners in MI (17/51) *versus* ON and BC (4/26) purchased any of these products for their dogs ( $p$   
187 = 0.03). There was no significant difference between the types of products purchased in the  
188 different geographical locations ( $p = 0.46$ ).

189

190 Pain scoring

191 No pain scales were used by the majority of respondents. There was no significant difference in  
192 use of pain scales between owners in MI (45/52) *versus* ON and BC (27/30) ( $p = 0.89$ ). Of  
193 respondents using a pain score, three used the Helsinki chronic pain index system but the others  
194 did not remember what system they used (Hielm-Bjorkman et al. 2009).

195

196 Quality of life factors

197 When assessing their dog's ability to walk during the restrictions *versus* pre-COVID-19, there  
198 was no significant difference noted between MI *versus* ON and BC ( $p = 0.19$ ; Table 6). A non-  
199 statistically significant difference was observed in responses describing deterioration in the  
200 ability of dogs to walk during the restrictions, (49%, 26/53) in MI *versus* (31%, 8/26) in ON and  
201 BC.

202 Respondents assessed their dog's appetite during the restrictions compared with pre-  
203 COVID-19, and more owners thought that their dog's appetite did not change in all locations  
204 compared with owners who saw a decrease in their dog's appetite. There was no significant  
205 difference in appetite during the restrictions in MI *versus* ON and BC ( $p = 0.26$ ; Table 6).

206           When assessing the owners' overall perception of the impact of the restrictions on their  
207 dog's health as compared to pre COVID-19, more owners in ON and BC thought that their dog's  
208 health was not affected during the restrictions compared with those who thought it worsened ( $p <$   
209  $0.0001$ ; Table 6).

210

211 Owners with or without a medical background

212 There was no significant difference between geographic locations with respect to the number of  
213 owners with a medical background ( $p = 0.13$ ; Table 1). For owners with a medical background,  
214 there was no significant difference between knowledge of veterinary or human medicine ( $p =$   
215  $0.34$ ; Table 1). There were no significant differences between MI *versus* ON and BC, in owners  
216 with and without a medical background with respect to attempting to access IM care for their  
217 dogs during the restrictions ( $p = 0.76$ ), and where their dogs received IM care prior to the  
218 COVID-19 pandemic and during the time of the restrictions (all  $p > 0.05$ ; Table 2).

219

## 220 **Discussion**

221 Owners of dogs with chronic pain who responded to this study in MI, reported restricted access  
222 to care, less modality-based care, and a perceived overall negative impact of COVID-19 on their  
223 dogs health compared with owners in ON and BC, during the government-imposed restrictions.

224           Owners in MI were less likely during COVID-19 restrictions to obtain the IM care  
225 recommended for their dogs. The IM treatments that were hospital-based were less available in  
226 MI *versus* ON and BC, and overall, the number of treatments for IM care decreased during the  
227 time of the restrictions for dogs in all locations. It is probable that utilization of nonhospital-  
228 based care helped to provide analgesia for these dogs until the restrictions were lifted and access

229 to hospital treatments were again available. Although overall MI owners thought that the QoL of  
230 their dogs was diminished, responses indicated no significant changes in appetite or ability to  
231 walk during the pandemic, or when compared with responses from owners in ON and BC.

232 Medical conditions requiring IM care in the present study appear similar to previous  
233 reports (Selmer & Shiau 2019). Anderson et al. (2020) reported osteoarthritis to be a major cause  
234 of chronic pain in dogs, similar to the present study, and affects about 20% of the adult canine  
235 population (Johnston 1997; Clements et al. 2006). Although the present study did not evaluate  
236 the number of dogs affected by osteoarthritis, it was the most common condition reported by  
237 owners in MI (62%) and in ON and BC (61%). Neuropathy/intervertebral disc disease was less  
238 prevalent in MI and ON–BC (23% and 21%, respectively).

239 The survey responses indicated that owners believed that IM care was of benefit to their  
240 dogs, and that the decreased access to IM care during the pandemic had a negative effect on the  
241 perceived health of their dogs. These findings were similar to reports that people benefitted from  
242 IM treatment and that when the pain clinics closed, people were unable to obtain the same care  
243 that they were receiving prior to the pandemic (Puntillo et al. 2020). Puntillo et al. (2020)  
244 reported that during COVID-19 many human pain clinics worldwide, were not available because  
245 they were considered nonessential, and resources were reallocated to intensive care units.  
246 Modalities commonly used to manage chronic pain in dogs in MI, ON and BC, were also  
247 reportedly used in the human health care system (Glazov et al. 2016). Studies of people with  
248 chronic pain confirm that incorporation of IM care into pain management results in significant  
249 improvement in symptoms, such as reduced pain, walking better, less anxiety, less depression  
250 associated with chronic pain and a better QoL (Chen & Michalsen 2017; El-Tallawy et al. 2020).

251 Although there was no statistical significance, more owners in MI (49%) *versus* in ON and BC  
252 (31%) thought that their dog's ability to walk worsened during the pandemic.

253 More owners in MI reported less access to IM care for their dogs during the restrictions..  
254 One of the IM clinics in MI was closed from March 2020 until early-June 2020, thereby delaying  
255 access to IM care in comparison with clinics in ON and BC that continued to provide IM care to  
256 their clients. Furthermore, the IM clinics in ON and BC were permitted to attend to cases at their  
257 own discretion (Government of Canada 2020), whereas the types of veterinary services permitted  
258 during the restrictions in MI were limited to emergencies and preventive care. Reduced access to  
259 hospital based care, such as acupuncture, laser therapy, underwater treadmill, massage therapy,  
260 electroacupuncture and TENS was perceived by owners to be associated with an overall decrease  
261 in the QoL of dogs in MI more so than those in ON and BC. Since IM clinics continued to  
262 provide care in ON and BC during the pandemic, it is likely that there was less of an impact on  
263 these dogs, as compared to those in MI where restrictions were more severe with respect to  
264 access to veterinary clinics. The following treatment modalities did not require owners to go to  
265 an IM clinic and were therefore not affected by the restrictions: NSAIDs, environmental  
266 modifications and therapeutic exercise. Owczarczak-Garstecka et al. (2021) reported that owners  
267 continued walking their dogs during the restrictions, even if they were symptomatic for COVID-  
268 19.

269 Owners in ON and BC reported that the welfare of their dogs was less affected by the  
270 pandemic than in MI. The only treatments that decreased during this time were acupuncture,  
271 laser and underwater treadmill therapies. It is unclear why these services were reduced as none of  
272 the other hospital-based treatments, such as electroacupuncture, TENS and therapeutic massage,  
273 were affected. A possible reason for diminished or no access to these particular services could be

274 reduced staffing at the clinics; however, this was not investigated in the present study. The IM  
275 clinic in BC chose to close for 10 weeks during the pandemic which may have resulted in some  
276 dogs with less hospital-based care.

277 Many human studies have investigated the impact of nonmedical factors, such as gender,  
278 race, age, QoL, patient's expectations and socioeconomic status on physicians' medical decisions  
279 (Hajjaj et al. 2010; Brabers et al. 2017). The present study found no association between the  
280 presence of a medical background and an owner's decision to seek IM care for their dog during  
281 the COVID-19 restrictions. Dogs are often considered as part of the family, and it is plausible  
282 that owners who participated in this survey would have wanted the best possible care for their  
283 dog (Walsh 2009; Applebaum et al. 2020). We hypothesized that owners with medical training  
284 would better understand the medical terminology and feel more confident following the  
285 recommended precautions while they attempted to obtain IM care for their dogs; however, this  
286 did not appear to hold true. The present study was not designed to elucidate the reasons behind  
287 owners' decisions, but it did show that owners acted similarly when seeking IM care for their  
288 dogs.

289 To obtain data while the effect of the restrictions were still at the forefront of owners'  
290 thoughts, it was necessary to survey owners as close as possible to when the orders were  
291 rescinded. The time taken to secure the necessary ethical approvals, enroll clinics and distribute  
292 the survey limited the number of IM clinics and clients involved in the study. Client  
293 confidentiality practices prevented access by the authors to clients' e-mail addresses; therefore,  
294 follow-up on survey responses was not possible. Staff shortages in the participating IM clinics  
295 prevented sending the survey link to their clients more than once. Surveys have inherent  
296 limitations, one being respondent bias, in that only owners with an interest in the topic may have

297 participated in the survey. There is the possibility of anthropomorphism affecting the perceived  
298 QoL of the dogs by the owners' given the larger numbers of older owners in the population  
299 studied, who may also suffer from chronic pain (Anderson & Loeser 2010). Confounding factors  
300 of the study data collected include a limited sample size in some areas, the inability to remind  
301 clients to complete the survey, societal differences between MI *versus* ON and BC, owners  
302 relying on their perception rather than a scoring system to determine the level of pain and QoL of  
303 their dogs, differences in breeds and ages of the dogs, the body condition scores of the dogs and  
304 normal effects of aging.

305

### 306 **Conclusions**

307 The results of this survey suggest that a widespread disease in humans has an impact on animal  
308 welfare and that the implications should be studied further in the light of our experiences with  
309 the COVID-19 pandemic. Providers of veterinary care should use this experience to establish  
310 protocols to help ensure continuity of care of chronically painful animals in the event of a similar  
311 situation in the future. Further studies using additional objective methods to assess the effect of a  
312 lack of IM care on the QoL of dogs with chronic pain should be performed.

313

### 314 **Acknowledgements**

315 The authors thank Dr Joe G Hauptman, College of Veterinary  
316 Medicine, Michigan State University, for providing the statistical analysis and assistance with  
317 manuscript preparation.

318

### 319 **Authors' contributions**



320 KAM, JMM and JD: study design, data collection, preparation of  
321 manuscript. KC: assisted with statistical analysis, manuscript  
322 preparation. SS: assisted with data collection and manuscript review. Authors read and approved  
323 the final version of the manuscript

324

325 **Conflict of interest statement**

326 The authors declare no conflict of interest.

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393 **Supporting Information**

394 Additional supporting information to this article can be found online

395 **Appendix SA.** Survey