

Back to normal?

The health care situation of home care receivers across Europe during the COVID-19 pandemic and its implications on health

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1 **Abstract**

2 The COVID-19 pandemic began impacting Europe in early 2020, posing significant challenges
3 for individuals requiring care. This group is particularly susceptible to severe COVID-19 infections and
4 depends on regular health care services. In this article, we examine the situation of European care
5 recipients aged 50 years and older 18 months after the pandemic outbreak and compare it to the initial
6 phase of the pandemic.

7 In the descriptive section, we illustrate the development of (unmet) care needs and access to
8 health care throughout the pandemic. Additionally, we explore regional variations in health care
9 receipt across Europe. In the analytical section, we shed light on the mid- and long-term health
10 consequences of COVID-19-related restrictions on accessing health care services by making
11 comparisons between care recipients and individuals without care needs.

12 We conducted an analysis using data from the representative Corona Surveys of the Survey of
13 Health, Ageing and Retirement in Europe (SHARE). Our study examines changes in approximately 3,400
14 care-dependent older Europeans (aged 50+) interviewed in 2020 and 2021, comparing them with more
15 than 45,000 respondents not receiving care. The dataset provides a cross-national perspective on care
16 recipients across 27 European countries and Israel.

17 Our findings reveal that in 2021, compared to the previous year, difficulties in obtaining
18 personal care from someone outside the household were significantly reduced in Western and
19 Southern European countries. Access to health care services improved over the course of the
20 pandemic, particularly with respect to medical treatments and appointments that had been canceled
21 by health care institutions. However, even 18 months after the COVID-19 outbreak, a considerable
22 number of treatments had been postponed either by respondents themselves or by health care
23 institutions. These delayed medical treatments had adverse effects on the physical and mental health
24 of both care receivers and individuals who did not rely on care.

25 Introduction

26 The COVID-19 pandemic started to hit European countries at the beginning of 2020. In the first
27 phase of the pandemic, this has become problematic in particular for those in need of care. They often
28 have chronic health conditions that make them predisposed to severe COVID-19 infections and to
29 regular (health)care. While the dramatic situation of nursing home residents in the first phase of the
30 pandemic is still present to most of us, related epidemiological control measures (physical distancing,
31 stay-at-home requirements etc.) temporarily installed in almost all European countries have also
32 greatly impacted those in need of care who live and are cared for at their own homes (the non-
33 institutionalized). In fact, the vast majority of care receivers in Europe are living at home where care is
34 mainly provided by relatives and friends [1] and to a smaller extent by formal care providers [2].

35 Appropriate access to health care as well as long-term care, either formal or informal, is a
36 crucial prerequisite to preserve or improve health [3]. If access to health care is inadequate, unmet
37 needs might have adverse consequences, such as poorer health or increasing (health) inequalities [4-
38 7]. With the outbreak of the COVID-19 pandemic in early 2020, health care facilities in many European
39 countries became overwhelmed by the crisis and thus had great difficulties in satisfying the needs of
40 care receivers [8-10]. Existing studies from the first phase of the pandemic further showed that care
41 receivers often discontinued paid home services because of fear of infection or because they were
42 advised to do so [11-14]. Also, migrant care workers returned to their home countries and later could
43 not return because of closed borders [15-16]. In addition, day-care facilities where care receivers can
44 spend some of their time often had to close [11] and health services and treatments experienced
45 disruptions due to installed epidemiological control measures [17-21]. There is also evidence that help
46 and support by closer family and friends increased during this phase [12, 22-25] as those had to
47 compensate for the reduced supply of formal care providers. As health care services were often
48 unavailable, care receivers forwent medical treatments [4, 26-29] and they also showed indications of
49 physical and mental health problems [22, 30-31].

50 Despite this information about care receivers at the beginning of the pandemic, little is known
51 about the mid- and long-term implications of the COVID-19 pandemic regarding care and health care
52 receipt of older Europeans over the course of the crisis. This is where our article wants to contribute.
53 We build on previous research on (restricted) access to health care services for people aged 50+ in
54 Europe [27, 32] that mainly focus on the determinants of unmet health care needs. Based on this
55 research, the main objectives of this article are (1) to examine changes in terms of care receipt as well
56 as access to health care during the pandemic and (2) to analyze the consequences of persistent unmet
57 needs on physical and mental health for care receivers vis-à-vis people not relying on care. More
58 precisely, we want to answer the following research questions, first referring to the situation of care
59 recipients in Europe in summer 2021, about 18 months after the outbreak of the pandemic:

60 (1) How was the situation of home care receivers in 2021 compared to the first phase of the
61 pandemic with regard to the prevalence of care receipt (in general and by type of caregiver),
62 the frequency of care received, and the perceived difficulties in receiving care?

63 (2) How did the health care situation of older Europeans change during the pandemic and to what
64 extent have medical treatments been deferred?

65 Moreover, we investigated health-related outcomes for care recipients and respondents who did not
66 receive home care. In this respect, we want to answer the following research questions:

67 (3) Did the access to and use of health care services differ between receivers of care and persons
68 not relying on care in 2020 and 2021?

69 (4) How did delayed or postponed treatments affect older people's physical and mental health
70 and were care recipients and people not relying on care affected differently?

71

72 **Data and Methods**

73 In the following analyses, we used released data from the first and second SHARE Corona
74 Survey [SCS1 and SCS2; 33-34] that were fielded, respectively, during summer 2020 and 2021 in 28
75 countries (Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland,
76 France, Germany, Greece, Hungary, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands,
77 Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and Switzerland). The SHARE Corona
78 Survey is a Computer Assisted Telephone Interview (CATI), which was created in reaction to the COVID-
79 19 crisis, collecting data on the living situation of people who are 50 years and older during the
80 pandemic across Europe and Israel [see 35 for details on the background, sampling adaptations and
81 fieldwork design aspects in the SCS1]. While the gross sample of the first SHARE Corona Survey
82 consisted of all respondents that were eligible for the regular SHARE Wave 8 and did not become
83 ineligible until start of fieldwork in June 2020, the second SHARE Corona Survey re-interviewed
84 respondents of the first SHARE Corona Survey to enable the examination of changes between the start
85 of the pandemic and the situation about one and a half years later. Oral consent, emphasizing the
86 voluntary nature of participation and the confidentiality of data (e.g. researchers have no access to
87 information that could identify individual participants during or after data collection), has been
88 obtained from all participants. Respondent information from the regular SHARE panel study [36] was
89 added during our analyses to provide long-term information on stable respondent characteristics [37-
90 44]. The average response rate based on eligible respondents participating in the first SHARE Corona
91 Survey was 79 percent. In the second SHARE Corona Survey, an average retention rate (excl. recovery
92 of respondents) of 86 percent was achieved. To avoid selectivity, our analyses are based on 48,058
93 respondents aged 50 years and older who participated in both SHARE Corona Surveys.

94 In our analyses, we focused on informal (i.e., non-professional, unpaid) care receivers. They
95 were defined by the following question in the first SHARE Corona Survey: “Did you regularly receive
96 home care before the outbreak of Corona?” In the second SHARE Corona Survey, the question wording
97 was slightly adapted to capture the same period and to avoid country differences in the development

98 of the pandemic: “During the last three months, did you regularly receive home care, provided by
99 someone not living in your household?” This question was followed in the second SHARE Corona
100 Survey by a request to indicate the frequency and the provider of care receipt (if applicable):
101 “Compared to the first wave of the pandemic, how often did you receive home care from [care
102 provider] in the last three months? Less often, about the same, or more often?” The list of care
103 providers included one’s own children, one’s own parents, other relatives, other nonrelatives like
104 neighbors, friends or colleagues, and professional care providers. This offers additional information
105 that was not available in the first SHARE Corona Survey. Moreover, we used the respondents' answers
106 on possible difficulties receiving personal care for our descriptive analyses. Also, here the time
107 reference was adapted in the second compared to the first SHARE Corona Survey: “Since the outbreak
108 of Corona (SCS1)/During the last three months (SCS2), did you face [more; only SCS1] difficulties in
109 getting the amount of home care that you need?”

110 For analyzing problems regarding the continuation of medical treatments since the outbreak
111 of the pandemic (SCS1)/compared to three months ago (SCS2), we further included three
112 dichotomized variables: whether a medical treatment was canceled by the respondents themselves
113 because of being afraid of getting infected; whether a planned appointment for a medical treatment
114 was postponed by the doctor or medical facility; and whether an appointment for a medical treatment
115 was denied. Further, we used information on the type of medical treatment that was deferred,
116 including a checkup at a general practitioner, a checkup at a specialist (incl. a dentist), a planned
117 operation, physiotherapy, psychotherapy or rehabilitation, and an “other” category with some other
118 type of medical treatment. To analyze the cumulated effect of delayed medical treatments on health,
119 we used a dichotomous variable that is 0 when no medical treatments were deferred in the first and
120 second SHARE Corona Survey and 1 when a delayed medical treatment was reported either in the first
121 or second SHARE Corona Survey. With this operationalization, we took care of the possibility that
122 medical treatments that had been deferred in the beginning of the pandemic still could affect health
123 in the medium or long run.

124 To explore the direct and indirect effects of the pandemic, we included several indicators that
125 measure changes in respondents' physical and mental health during the COVID-19 pandemic. For
126 physical health, we used the following question: "If you compare your health with that before the
127 outbreak of Corona (SCS1)/If you compare your health now to three months ago (SCS2), would you say
128 your health has improved, stayed about the same, or worsened?". To measure mental health, we used
129 an additive index based on indications of anxiety ("In the last month, have you felt nervous, anxious,
130 or on edge?"), depression ("In the last month, have you been sad or depressed?") and sleeping
131 problems ("Have you had trouble sleeping recently?"). We then generated dichotomized variables that
132 indicate a worsening of respondents' self-rated physical and mental health in case respondents
133 confirmed that their health strains have increased since the outbreak of the pandemic: "Has that been
134 more so, less so or about the same as before the outbreak of Corona? (SCS1)/than during the first
135 wave? (SCS2)".

136 Covariates that could confound the relationship with care receipt and health changes were
137 selected according to previous studies in this area [45-46, 27] and included sociodemographic
138 characteristics as well as living conditions. We used the respondent's sex (0: male, 1: female) and the
139 age at interview. Further, we coded the level of education attained based on the International Standard
140 Classification of Education 1997 (ISCED-97). Respondents were then grouped into three categories:
141 primary education (ISCED-97 score: 0–2), secondary education (ISCED-97 score: 3), and postsecondary
142 education (ISCED-97 score: 4–6). Further, we used information on the respondents' type of living area
143 (0: rural area, 1: urban area like a large town or big city), household composition (0: living with a
144 partner, 1: living alone), employment status (0: not employed, 1: employed, incl. self-employment),
145 and their economic status by a question that asked the degree to which respondents can make ends
146 meet (0: with great/some difficulty, 1: fairly easily/easily). Finally, we included country dummies to
147 account for regional differences, e.g., with respect to the national health care system.

148 To address our research questions, we first descriptively explored changes in the prevalence
149 of receiving home care as well as the access to and use of health care services across European regions

150 in summer 2021 compared to the first phase of the pandemic. Afterwards, we analyzed differences in
151 unmet health care needs between care receivers and persons not receiving care as well as
152 consequences of such unmet needs on physical and mental health. To do so, we used average adjusted
153 predictions and marginal effects based on multivariate logistic regression models, which control for
154 the respondent characteristics mentioned above [47-48]. Generally, we estimate a logistic model:

$$155 \quad \log\left(\frac{p_i}{1-p_i}\right) = \beta_0 + \beta_1 x_{1i} + \dots + \beta_p x_{pi}$$

156 which can be rewritten in the probability scale as

$$157 \quad \Pr(y_i = 1 | x) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_{1i} + \dots + \beta_p x_{pi})}}$$

158 The marginal effect for a continuous covariate x_1 is then given by the expression:

$$159 \quad \frac{\partial \Pr(y_i = 1 | x)}{\partial x_1} = \beta_1 \frac{e^{\beta_0 + \beta_1 x_{1i} + \dots + \beta_p x_{pi}}}{(1 + e^{-(\beta_0 + \beta_1 x_{1i} + \dots + \beta_p x_{pi})})^2}$$

160 The direction of the change is given by the sign of β_1 . Further, it is evident that the effect of x_1 depends
161 on the value of all other covariates in the model. With a dichotomous independent variable, the
162 marginal effect is simply the difference in the adjusted predictions (in the probability scale) for the two
163 groups, for example, between respondents who delayed a medical treatment and those who did not.
164 Average marginal effects compute the average of the marginal effects for each case, first treating all
165 respondents as though they delayed a medical treatment and then as though they did not, leaving all
166 other independent variable values as is.

167 With this approach, we are able to compare care receivers and respondents not receiving care
168 that have identical values on all covariates included in the model, allowing to attribute delayed medical
169 treatments and care receipt with much more confidence as the respective cause of differences in the
170 probabilities of reporting physical and mental health strains or not. All analyses were run on a balanced
171 sample of 48,058 respondents who participated in both the first and the second SHARE Corona Survey
172 to allow proper comparisons that do not suffer from selective attrition. Small differences in numbers

173 between the two surveys are due to slightly different item nonresponse rates of participating
174 respondents. We used Stata 17.0 with calibration weights provided by the SHARE coordination team.

175

176 **Results**

177 **The situation of care recipients during the pandemic**

178 The overall prevalence of receiving home care across Europe rose between the first phase of the
179 pandemic in 2020 and summer 2021 (see Fig 1). While the 2020 survey found that on average, 4.9
180 percent (n=2,611) of all respondents older than 50 years received home care from others outside their
181 own household, the prevalence increased to 7.2 percent (n=3,440) in the 2021 survey. Regional
182 variation showed the strongest relative increase in Western European countries (Austria, Belgium,
183 France, Germany, Luxembourg, Netherlands, Switzerland), the Baltic States (Estonia, Latvia, Lithuania),
184 and in Southern Europe (Croatia, Cyprus, Greece, Israel, Italy, Malta, Portugal, Slovenia, Spain).
185 However, the increase was also considerable in Eastern Europe (Bulgaria, Czech Republic, Hungary,
186 Poland, Romania, Slovakia). In contrast, no increase was found in Northern Europe (Denmark, Finland,
187 Sweden).

188

189 **Fig 1. Prevalence of receiving home care during the pandemic.** Data: SHARE Wave 8 COVID-19
190 Survey 1 and SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=48,028 and 48,005, respectively;
191 weighted) with 95% confidence intervals.

192

193 When further investigating the age and health distribution of care receivers (see S1 Table) it
194 can be seen that the absolute level of receiving home care was much higher for older respondents over
195 80 years (19.1% in SCS1 and 25.7% in SCS2) or suffering from limitations in activities of daily living (ADL;
196 22.8% in SCS1 and 25.7% in SCS2) compared to younger respondents between 50 and 65 years (1.3%

197 in SCS1 and 2.5% in SCS2) or without ADL limitations (3.0% in SCS1 and 5.3% in SCS2). In addition, the
198 relative increase of home care received by respondents between 2020 and 2021 was much stronger
199 for younger people aged 50-64 (+92%) as well as those without limitations in ADL (+77%) than for older
200 people over 80 years (+35%) or those suffering from ADL limitations (+13%). This indicates that
201 especially younger, less limited people received again a higher amount of home care in 2021 than at
202 the beginning of the COVID-19 pandemic when the focus was clearly on the most vulnerable groups of
203 old and frail people.

204 Next, we explored the perceived difficulties in receiving home care during the different phases
205 of the pandemic. Fig 2 shows the share of care recipients who reported that they faced difficulties in
206 receiving care at the beginning of the COVID-19 pandemic in 2020 and one year later in 2021 by
207 geographical regions. While in 2020 about 21 percent of all care recipients reported difficulties in
208 receiving care, this share dropped substantially to less than 5 percent in 2021. This strong decrease
209 was most pronounced in Southern and Western Europe, likely due to the severe problems of the
210 national health care system and the subsequent strict epidemiological control measures in these
211 regions at the beginning of the pandemic [49]. To underpin this finding with numbers: While every
212 third (fifth) care recipient in Southern (Western) European countries reported difficulties in receiving
213 care in the first phase of the pandemic, this was only done by every fifteenth (thirtieth) care recipient
214 one year later.

215

216 **Fig 2. Perceived difficulties in receiving home care during the pandemic.** Data: SHARE Wave 8

217 COVID-19 Survey 1 and SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=2,598 and 3,424

218 respectively; weighted) with 95% confidence intervals.

219

220 Home care in 2021 was mainly provided by professional care providers (69%) and by children
221 (42%), while other relatives and nonrelatives (12% each) contributed to a lesser extent (see Fig 3).

222 Moreover, Fig 3 reveals large regional differences: Professional care providers accounted for the bulk
223 of care provision in Western (85%) and Northern European countries (78%), while children played a
224 much more prominent role in Eastern Europe (72%) and the Baltic States (70%). In Southern Europe,
225 the picture was more mixed with children and professional care providers sharing responsibilities in
226 rather similar parts (64% and 58%, respectively). As multiple answers were possible, the percentages
227 do not sum up to 100. The most frequent pattern was care received from children and professional
228 care providers. From all respondents receiving care in the second SHARE Corona Survey, about 15
229 percent received care from these two providers in parallel. All other patterns were found less
230 frequently. Overall, more than 70 percent of respondents who stated to receive home care in the
231 second SHARE Corona Survey only named one care provider, while about 20 percent named two. More
232 than two providers were mentioned by only 5 percent of all care receivers.

233

234 **Fig 3. Care receipt by different care providers in the second SHARE Corona Survey (2021).** Data:
235 SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=3,073-3,493; weighted) with 95% confidence
236 intervals. Dashed lines indicate means of care receipt across all countries.

237

238 In addition to Fig 3, we explored whether the frequency of receiving home care was different
239 in 2021 compared to the first wave of the pandemic. In Fig 4, we differentiated between the different
240 providers of home care (thereby collapsing care from parents and other relatives due to the small
241 sample sizes) to investigate changes in care receipt. Most striking in this respect was the unchanged
242 or even increased frequency of home care receipt. Across all European regions, most respondents
243 receiving home care in 2021 reported that they received an equal amount of care compared to the
244 first wave of the pandemic (between 54% regarding nonrelatives and 61% regarding children). More
245 than one-third even reported an increase in receiving care (between 34% regarding nonrelatives and
246 36% regarding children). In contrast, only about 4 percent, ranging between less than 1 percent in the

247 Baltic States and about 10 percent in Northern and Southern Europe, of those receiving care reported
248 a decrease in care receipt by any of the mentioned care providers. While data from the first SHARE
249 Corona Survey in 2020 revealed large regional differences across Europe [22], the results from 2021
250 only showed few differences across regions. When it comes to care received from children, about two
251 thirds of home care receivers in Northern, Western, and Southern Europe reported an unchanged
252 frequency and one third reported an increase of home care, whereas in Eastern Europe and in the
253 Baltic States the share was rather fifty-fifty.

254

255 **Fig 4. Changes in care receipt by different care providers in the second SHARE Corona Survey (2021).**

256

257 Unmet health care needs during the pandemic

258 The last section showed that home care receipt in general seemed less problematic in most
259 European regions in 2021 compared to the first phase of the pandemic. In this paragraph, we check
260 for possible long-term effects of the pandemic and its accompanying control measures regarding
261 access to the national health care system. Therefore, we analyzed whether older respondents aged 50
262 years and over had problems in accessing medical treatments and if there were differences between
263 those relying on personal care and those not. Fig 5 shows that in the second SHARE Corona Survey in
264 2021, about 9 percent of the respondents said that they forwent medical treatments (canceled by
265 themselves) because of fear of infection. This is an overall reduction of about 3 percentage points
266 compared to the beginning of the COVID-19 pandemic one year before. Differences were most
267 pronounced in Southern and Eastern Europe and in the Baltic States, where the gaps reached a
268 significant level.

269

270 **Fig 5. Medical treatments forwent by respondents during the pandemic by geographical regions.**

271 Data: SHARE Wave 8 COVID-19 Survey 1 and SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0

272 (n=48,017 and 47,961 respectively; weighted) with 95% confidence intervals.

273

274 Differences were even larger with regard to postponed medical appointments canceled by the
275 health care institutions (see Fig 6). Here, the share of respondents who had a medical appointment
276 that the doctor or medical facility decided to postpone due to COVID-19 dropped from about 26
277 percent in 2020 to 12 percent one year later. This significant divergence was found across all regions,
278 again pointing to an improved health care situation in 2021 compared to the first phase of the
279 pandemic.

280

281 **Fig 6. Medical appointments postponed by health care institutions during the pandemic by**

282 **geographical regions.** Data: SHARE Wave 8 COVID-19 Survey 1 and SHARE Wave 9 COVID-19 Survey

283 2, Release 8.0.0 (n=48,013 and 47,923 respectively; weighted) with 95% confidence intervals.

284

285 To assess the relevance of this decrease, we applied a robustness check by excluding forwent
286 or postponed visits to specialists that also include dentists in the question text. Missed visits in this
287 mutual category are likely to be mainly driven by postponed dentist check-ups [50], which might not
288 have the same relevance for health outcomes in the longer run compared to a necessary operation or
289 therapy. However, our findings revealed that although the absolute level of forwent and postponed
290 medical treatments clearly decreased when excluding specialist visits (incl. dentists), unmet needs
291 were still substantially lower across Europe in 2021 compared to one year before. Excluding this
292 category would hence not change the interpretation of our findings regarding canceled medical
293 treatments by the respondents themselves or by care facilities (see S1 and S2 Figures).

294 With respect to denied medical appointments canceled by health care institutions, the
295 differences were much smaller, as was the absolute level (see Fig 7). About 5 percent of all respondents
296 reported that they asked for an appointment for medical treatment but did not get one, both in 2020
297 and 2021. There was one exception: In the Baltic States, the share of denied appointments was much
298 higher in 2020 (about 10%) and nearly halved one year later, likely due to the quickly and centralized
299 implemented measures of infection control in Estonia, Lithuania, and Latvia shortly after the outbreak
300 of the pandemic [51].

301

302 **Fig 7. Medical appointments denied by health care institutions during the pandemic by**
303 **geographical regions.** Data: SHARE Wave 8 COVID-19 Survey 1 and SHARE Wave 9 COVID-19 Survey
304 2, Release 8.0.0 (n=48,017 and 47,954 respectively; weighted) with 95% confidence intervals.

305

306 When looking at the type of medical treatments and appointments that have been postponed
307 or denied by the respondent or the health care facility, respectively, we found more similarities than
308 differences. First, with respect to forewent medical treatments on behalf of the respondent, it turned
309 out that specialist visits (including dentist visits) were canceled most often (69% in SCS1 and 70% in
310 SCS2; $p=.543$), followed by visits to the general practitioner (38% in SCS1 and 27% in SCS2; $p<.001$). A
311 planned operation or therapy, such as physiotherapy, psychotherapy, or rehabilitation, was forewent
312 to a much lesser extent: only around 10 percent forewent these types of treatment in the first and
313 second SHARE Corona Survey. Another 13 percent forewent some other medical treatment not
314 specified in the first and second SHARE Corona Survey, respectively. Both differences were
315 insignificant.

316 Second, with respect to medical appointments that have been postponed by the health care
317 facility, we found that specialist visits were again postponed most often (77% in SCS1 and 73% in SCS2;
318 $p=.021$), followed by visits to the general practitioner (18% in SCS1 and 19% in SCS2; $p=.519$). Planned

319 operations were postponed more often by health care institutions in 2021 compared to 2020 (12% in
320 SCS1 and 15% in SCS2; $p=.008$), while therapies (10% in SCS1 and 5% in SCS2; $p<.001$) and other medical
321 appointments were postponed less often (10% in SCS1 and 8% in SCS2; $p=.020$).

322 Third, considering denied medical appointments canceled by the health care institution, we
323 found similar tendencies on a lower absolute level. Again, specialist visits were postponed most often
324 (68% in SCS1 and 69% in SCS2; $p=.767$), followed by visits to the general practitioner (26% in SCS1 and
325 23% in SCS2; $p=.463$). Other differences in denied appointments between 2020 and 2021 were even
326 smaller than before and did not reach a significant level.

327

328 Access to and use of health care services for care receivers and

329 persons not receiving care

330 We further analyzed whether the more vulnerable group of care receivers experienced larger
331 problems in getting access to medical treatments than respondents who did not rely on care. Table 1
332 shows average adjusted predictions based on multivariate logistic regression models that control for
333 the covariates presented above (see Data and Methods chapter). The depicted results reveal that in
334 the first phase of the pandemic, care receivers compared to respondents not receiving care suffered
335 significantly more often from postponed (31.1% vs. 25.7%; $p=.006$) and denied medical appointments
336 (8.2% vs. 5.2%; $p=.015$) that have been canceled by the health care institution. In contrast, there was
337 no significant difference in forewent medical treatments canceled by the respondents themselves
338 (13.3% vs. 11.9%; $p=.283$) in 2020. This pattern changed in the second SHARE Corona Survey. In 2021,
339 care receivers also reported forewent medical treatments due to fear of infection significantly more
340 often than respondents not receiving care (13.6% vs. 8.6%; $p=.009$). When looking at the change over
341 time (see last column) it gets clear that this difference was mainly caused by the decrease of forgone
342 medical treatments in the group of respondents not receiving care, while there was even a small
343 (insignificant) increase for care receivers. The general tendency of more frequent unmet needs for care

344 receivers compared to respondents not receiving care can also be seen with regard to denied
 345 appointments for medical treatments. However, here the difference was somewhat smaller (3.0%) and
 346 did not change at all during the pandemic (see last column).

347

348 **Table 1. Delayed medical treatments during the pandemic by care status of respondents.**

	Care recipient (yes/no)	SCS1 (2020)		SCS2 (2021)		Change over time (%-points)
		Share (%)	Difference by care status (%-points)	Share (%)	Difference by care status (%-points)	
Forwent medical treatment	Yes	13.3	1.4	13.6	5.1**	0.4
	No	11.9		8.6		-3.3***
Postponed medical appointment	Yes	31.1	5.3**	15.8	4.0*	-15.3***
	No	25.7		11.8		-13.9***
Denied medical appointment	Yes	8.2	3.0*	8.2	3.0	0.0
	No	5.2		5.2		0.0

349 Significance: ***: p<.001, **: p<.01, *: p<.05 (significances based on average marginal effects (AMEs)).

350 Notes: Entries are adjusted predictions, controlled for sex, age, level of education, household composition, area of living,
 351 employment status, economic status and country of interview.

352 Source: SHARE Wave 8 COVID-19 Survey 1, release 8.0.0 and SHARE Wave 9 COVID-19 Survey 2, release 8.0.0 (n= 89,940,
 353 89,909 and 89,939, respectively; weighted).

354

355 The consequences of delayed medical treatments on physical and 356 mental health

357 In a final step, we analyzed whether (and how) a delayed medical treatment during the
 358 pandemic – either because it was forgone by the respondent due to fearing an infection or
 359 postponed/denied by the care facility – affected physical and mental health in the second SHARE
 360 Corona Survey about 18 months after the outbreak of the pandemic. In addition, we investigated
 361 whether potential negative consequences were stronger for care receivers compared with
 362 respondents not receiving care. Like in the previous section, we used multivariate logistic regression
 363 models, now focusing on the interaction between delayed medical treatments and care status, while
 364 again controlling for a variety of relevant respondent background characteristics. In this respect, Table

365 2 depicts the results of the regression models with worsened physical and mental health as
 366 dichotomous dependent variables to analyze the implications of delayed treatments. As can be seen
 367 from the positive differences in the last column, both physical and mental health were perceived
 368 significantly worse by respondents when medical treatments or appointments were deferred during
 369 the pandemic. The largest differences were found with regard to medical appointments that were
 370 denied by care facilities. Further, mental health seemed to be affected somewhat stronger, which can
 371 also be noticed when comparing the absolute level of the share of respondents reporting worsened
 372 health. This share was between 7 and 10 percentage points higher than for physical health.

373

374 **Table 2. Marginal effects of delayed medical treatments during the pandemic on physical and**
 375 **mental health.**

	Type of delayed health care service		Share of worsened health (%)	Difference (%-points)
Worsened physical health	Forwent medical treatment	Yes	15.5	2.7**
		No	12.8	
	Postponed medical appointment	Yes	15.0	2.6**
		No	12.5	
	Denied medical appointment	Yes	21.0	8.5***
		No	12.5	
Worsened mental health	Forwent medical treatment	Yes	26.1	6.8***
		No	19.4	
	Postponed medical appointment	Yes	24.0	4.9***
		No	19.1	
	Denied medical appointment	Yes	29.3	9.7***
		No	19.6	

376 Significance: ***: $p < .001$, **: $p < .01$, *: $p < .05$ (significances based on average marginal effects (AMEs)).
 377 Notes: Entries are adjusted predictions, controlled for sex, age, level of education, household composition, area of living,
 378 employment status, economic status and country of interview.
 379 Source: SHARE Wave 9 COVID-19 Survey 2, release 8.0.0 (n= 45,011-45,046; weighted).

380

381 In addition, Table 3 further specifies these findings by distinguishing between care receivers
 382 and respondents not receiving care. In this respect, it can be seen that, overall, there were no
 383 significant differences between these two groups when analyzing the relationship between delayed

384 medical treatments during the pandemic and worsened health compared to three months before
 385 (see last column). Although the difference was positive in most cases, pointing to a larger marginal
 386 effect of delayed medical treatments for care receivers compared to respondents not receiving care
 387 (in particular concerning physical health), these differences did not reach a significant level. This
 388 contrasts with the observation that care receivers more frequently reported worsened health than
 389 respondents who did not receive care (see column “Share (%)”). That is, our findings here and in
 390 Table 1 point out that although respondents’ care status shows a strong association with health
 391 deterioration (care receivers reported a worsening health consistently more often than respondents
 392 not receiving care), the negative consequences of delayed medical treatments 18 months after the
 393 outbreak of the pandemic were not significantly larger for care receivers.

394

395 **Table 3. Marginal effects of delayed medical treatments during the pandemic on physical and**
 396 **mental health by care status of respondents.**

	Care receipt	Type of delayed health care service		Share (%)	Difference (%-points)	Difference by care status (%-points)
Worsened physical health	yes	Forwent medical treatment	yes	28.8	2.8	0.2
			no	26.0		
	no		yes	14.1	2.6*	
			no	11.6		
	Postponed medical appointment	yes	yes	30.3	5.8	3.9
		no	no	24.5		
yes			13.3	1.9*		
no		11.4				
Denied medical appointment	yes	yes	38.1	13.2	5.7	
	no	no	24.9			
		yes	18.9	7.6***		
	no	11.3				
Worsened mental health	yes	Forwent medical treatment	yes	35.5	4.1	-2.8
			no	31.4		
	no		yes	25.2	6.9***	
			no	18.4		
	Postponed medical appointment	yes	yes	33.6	2.3	-2.6
		no	no	31.3		
yes			23.0	4.9***		
no						

		no	18.1		
	yes	yes	42.4	12.0	
		no	30.5		2.9
	no	yes	27.8	9.1***	
		no	18.7		

397 Significance: ***: $p < .001$, **: $p < .01$, *: $p < .05$ (significances based on average marginal effects (AMEs)).

398 Notes: Entries are adjusted predictions, controlled for sex, age, level of education, household composition, area of living,
399 employment status, economic status and country of interview.

400 Source: SHARE Wave 9 COVID-19 Survey 2, release 8.0.0 (n= 45,002-45,037; weighted).

401

402 Discussion

403 This paper analyzed the (health)care situation of Europeans aged 50 years and older during the
404 first one and a half years of the COVID-19 pandemic. By explicitly focusing on care recipients, we were
405 able to analyze changes in the access to and the use of health care services to study the consequences
406 of delayed medical treatments on their physical and mental health vis-à-vis respondents not relying
407 on care. Based on the two waves of the SHARE Corona Survey in 2020 and 2021, we applied our
408 analyses on a large representative sample of more than 45,000 respondents aged 50 years and older
409 across 27 European countries and Israel. This cross-national perspective along with the possibility of
410 studying many home care recipients (more than 3,400 in 2021) is a key strength of this article.

411 Our findings revealed that the overall situation of care receivers improved in the sense that home
412 care from outside the household was again more widely available in summer 2021 compared to one
413 year before in nearly all European regions. There are two interpretations for this pattern: First, due to
414 the vaccination campaign, which started at the end of 2020 and picked up speed in spring 2021 in most
415 European countries, epidemiological control measures and restrictions that had been introduced could
416 be relaxed so that social contacts as well as support in general (and care in particular) were possible
417 again more easily [23]. This was particularly true in Western and Southern European countries, which
418 had been hit hardest by the first wave of the pandemic in 2020 and hence had more restrictive control
419 measures in place [49] compared to one year later when vaccination was available for large parts of
420 the population. Moreover, there was presumably less fear of a severe SARS-CoV-2 infection for
421 vaccinated individuals, especially for younger and less severely care-dependent people. This group

422 again received a higher relative amount of home care in 2021 compared to the beginning of the
423 pandemic when access to strictly necessary health care services was clearly restricted to the most
424 vulnerable people.

425 A second methodological explanation is based on the question formulation that slightly changed
426 between the first and second SHARE Corona questionnaire. Thus, while the latter survey in 2021
427 explicitly mentioned “professionals” in addition to relatives or friends providing home care for those
428 in need in the interviewer instructions, the former survey in 2020 did not. Thus, it might be the case
429 that respondents in the second SHARE Corona Survey had a broader understanding of (formal and
430 informal) home care, which might explain to some extent the higher percentage of care receipt in the
431 second SHARE Corona Survey compared to the first. However, at the same time, it has to be considered
432 that the second SHARE Corona Survey contains the explicit specification of “people from outside your
433 home” from which home care was received. It is likely that this further clarification had a lowering
434 effect compared to the first SHARE Corona Survey, where respondents had to interpret this based on
435 previous questions. Overall, we thus believe that the found increase of home care receipt between
436 2020 and 2021 is rather substantive than due to a question wording effect. This view is backed up by
437 our finding of significantly less frequently reported difficulties in receiving home care in 2021, when
438 only about 5 percent of care receivers reported problems compared to the beginning of the pandemic,
439 when more than 20 percent reported problems. In this respect, changes in question wording cannot
440 easily justify the perceived improvement of the situation of care recipients, which again was most
441 notable in Western and Southern European countries.

442 When looking at those who provided home care, our findings revealed large regional differences
443 across Europe. While professionals were the main providers of care in Western and Northern European
444 countries in 2021, children did the bulk of care work in Eastern Europe and the Baltic States. These
445 findings are in line with theories and empirical findings that relate care use with family norms and
446 welfare state arrangements [52-57]. While most countries in Northern and Western Europe are
447 described as defamilialized (or individualistic), which is reflected in a high share of formal care services,

448 Eastern Europe and the Baltic States are rather seen as family-oriented with a low share of formal care
449 options [53-54]. According to this literature, Southern European countries are usually classified as
450 family-oriented and should therefore show lower levels of formal care use. However, our results
451 indicate that children and professionals share the responsibility of care provision in Southern Europe.
452 This might be explained by differences in the composition of countries that are summarized as
453 “Southern Europeans”. While earlier studies mainly focused on South-Western Europe, such as Spain,
454 Italy, Portugal, and Greece [53-54], our study also included countries from South-Eastern Europe
455 (Croatia and Slovenia) as well as Israel. According to Saraceno [54], familialism can be further
456 distinguished into different types, from which the type of “supported familialism” can go hand in hand
457 with formal home care, while the other two (“familialism by default”, “prescribed familialism”) are
458 primarily characterized by the absence of formal care options. In this respect, Israel, which shows a
459 very high share of formal care services by professionals, and to some extent also Croatia might be
460 classified by supported familialism, while in Italy and Greece, much higher shares of children providing
461 care for their older parents were found.

462 With regard to the frequency of receiving home care, our findings indicate an unchanged or even
463 increased frequency of home care receipt in 2021, which was largely independent from the
464 relationship of the care provider or the region. This is also a notable difference compared to the
465 beginning of the COVID-19 pandemic in 2020, when family caregiving was almost exclusively focused
466 on vulnerable people, such as older parents, while most other groups reported decreases, particularly
467 in regions that have been hit hardest by the pandemic [22].

468 Next, we investigated the health care situation in Europe with a particular focus on unmet health
469 care needs. The descriptive findings showed that medical treatments were postponed less often by
470 respondents fearing an infection as well as by health care institutions, both indicating a generally
471 improved access to and use of necessary health care services across Europe in summer 2021 compared
472 to one year before. While especially at the beginning of the pandemic health care institutions were
473 overstained in some countries [9, 10] and/or implemented rather strict measures of infection control

474 leading to cancelations or postponements of routine services [51], the situation generally improved
475 during the pandemic when more and more people were vaccinated.

476 However, this general picture must be put into perspective when distinguishing between care receivers
477 and persons not receiving care. Here, our analyses based on average adjusted predictions controlling
478 for a broad range of relevant covariates showed that care recipients still experienced significantly more
479 problems in getting access to health care services one and a half years after the outbreak of the
480 pandemic. This was true for postponed medical appointments canceled by health care facilities but
481 also regarding forewent medical treatments canceled by respondents themselves. While differences
482 between care recipients and people not receiving care persisted regarding postponed and denied
483 medical treatments canceled by health care institutions, they became even larger with respect to
484 medical treatments that have been forgone by respondents themselves because of fear of infection.
485 This indicates that the situation at the beginning of the pandemic was similar (bad) for care receivers
486 and respondents not receiving care with respect to the uncertainty linked to a SARS-CoV-2 infection.
487 With progressing vaccinations, particularly respondents not relying on care reported less forewent
488 medical treatments due to fearing an infection in 2021, while this was not the case for care receivers.
489 That is, although the overall level of forewent medical treatments and postponed appointments
490 decreased during the pandemic, care receivers still experienced significantly more problems in getting
491 access to health care services, both because of fearing an infection but also because of the existing
492 capacity problems of care facilities and doctors.

493 These delayed medical treatments had a significant negative impact on physical and mental
494 health. In particular, medical appointments that have been denied by health care institutions have led
495 to substantial worsened health. This result is in line with other studies showing a decline in health for
496 certain population groups in the first phase of the pandemic [22, 31, 58] and increased morbidity [28].
497 However, the implications of delayed medical treatments on health outcomes did not significantly
498 differ between respondents receiving versus not receiving care. That is, although care receivers were
499 disadvantaged with regard to access and use of health care services, this did not yield significantly

500 stronger deteriorations of physical and mental health compared to people not relying on care. While
501 negative consequences of delayed medical treatments on physical health were indeed somewhat
502 more pronounced for care receivers than for people without care needs, the difference did not reach
503 a significant level when controlling for relevant background characteristics. Thus, although other
504 studies reported higher unmet health care needs in the first phase of the pandemic for economically
505 disadvantaged older people [4, 59] or people with comorbidities [29] and poor health [60], this did not
506 directly translate into substantive health inequalities between those in need of care and those not –
507 at least not in the medium run about one and a half years after the outbreak of the pandemic. Whether
508 this will change eventually remains to be seen. The fact that care recipients keep foregoing medical
509 treatments and that these treatments are not generally caught up [61] gives at least some cause for
510 concern. If delayed necessary treatments will not be caught up in a reasonable period, this might still
511 lead to the health deterioration in the long run. Therefore, further research in this area is needed to
512 better assess the implications of delayed medical treatments for care receivers (but also for people
513 not relying on care) over the next few years.

514 Like other studies our analyses have some limitations, too. We already mentioned the differences
515 in questionnaire wording between the first and second SHARE Corona Surveys. This limits the
516 conclusiveness to some extent, although we have good arguments to believe that our interpretation
517 of substantive instead of question wording effects is correct. Another point of critique is that the
518 fieldwork of both the SHARE Corona Survey in 2020 and in 2021 was during summer. This must be
519 recognized regarding the absolute level of receiving care or reporting unmet health care needs. People
520 might have forgotten how they felt during winter and/or lockdown periods. In this respect, our findings
521 might depict a too optimistic a picture of the situation in 2020 and 2021. Further, care receivers
522 obviously differ from people not relying on care and thus could be on a different health trajectory
523 irrespective of unmet health care needs. More research is thus needed to verify our results. Finally, it
524 must be noticed that a large fraction of the SHARE respondents, although aged 50 years and older, are
525 still in rather good health. Therefore, our analyses might underrepresent the actual prevalence of care

526 receipt in Europe and severe health conditions. Linked to this, the specific age group of our sample
527 must be carefully considered when drawing generalized conclusions based on our results.

528 Despite these limitations, our study contributes to the existing literature by providing a cross-
529 national overview of how care receipt by older Europeans aged 50 years and older changed during the
530 pandemic and whether unmet health care needs lead to deteriorations of physical and mental health.
531 Our results show that despite a general improvement in the health care situation between 2020 and
532 2021, difficulties in accessing medical treatments persisted for one and a half years after the outbreak
533 of the pandemic, at least to some extent. Such delayed treatments and visits had an overall negative
534 effect on physical and mental health but discriminated care receivers not significantly stronger than
535 persons not relying on care. Nonetheless, care receivers are a highly vulnerable group that was
536 particularly affected by the COVID-19 pandemic. In this respect, policymakers and health care
537 institutions should pay special attention to those in need of care and emphasize the importance of
538 catching up postponed medical treatments. Otherwise, negative health outcomes are still possible in
539 the long run, which is why future (longitudinal) research in this area is crucially needed in our view.

540

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712

713 **Supporting information**

714 **S1 Table. Prevalence of receiving home care during the pandemic (in percent) by age and health**
715 **groups.** Data: SHARE Wave 8 COVID-19 Survey 1 and SHARE Wave 9 COVID-19 Survey 2, Release
716 version: 8.0.0 (n=48,058, respectively; weighted) with 95% confidence intervals in brackets.

717

718 **S1 Fig. Medical treatments (without check-up at a specialist, incl. a dentist) forwent by**
719 **respondents during the pandemic by geographical regions.** Data: SHARE Wave 8 COVID-19 Survey 1
720 and SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=48,016 and 47,958 respectively; weighted)
721 with 95% confidence intervals.

722

723 **S2 Fig. Medical appointments (without check-up at a specialist, incl. a dentist) postponed by health**

724 **care institutions during the pandemic by geographical regions.** Data: SHARE Wave 8 COVID-19

725 Survey 1 and SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=48,012 and 47,921 respectively;

726 weighted) with 95% confidence intervals.

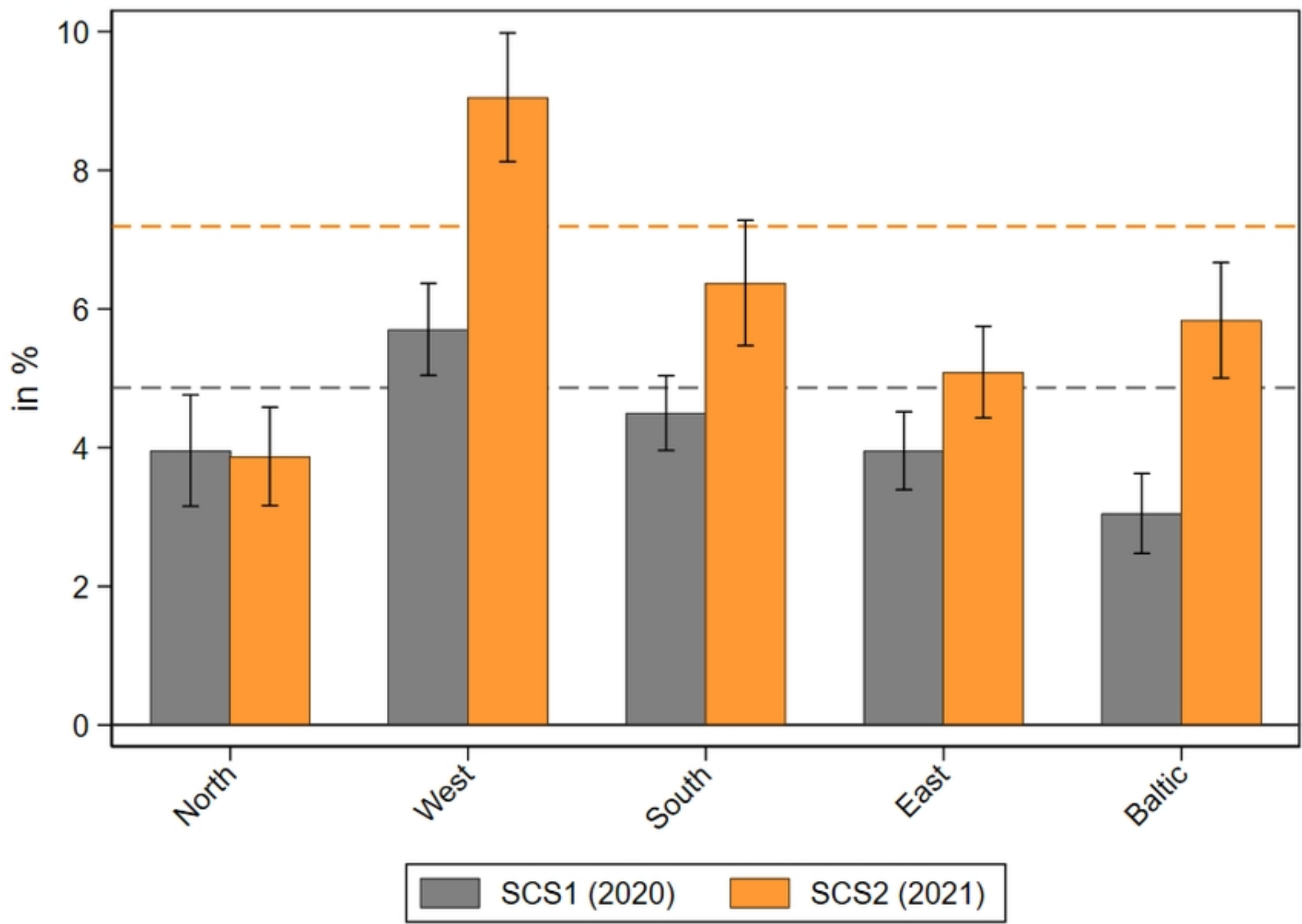


Fig1

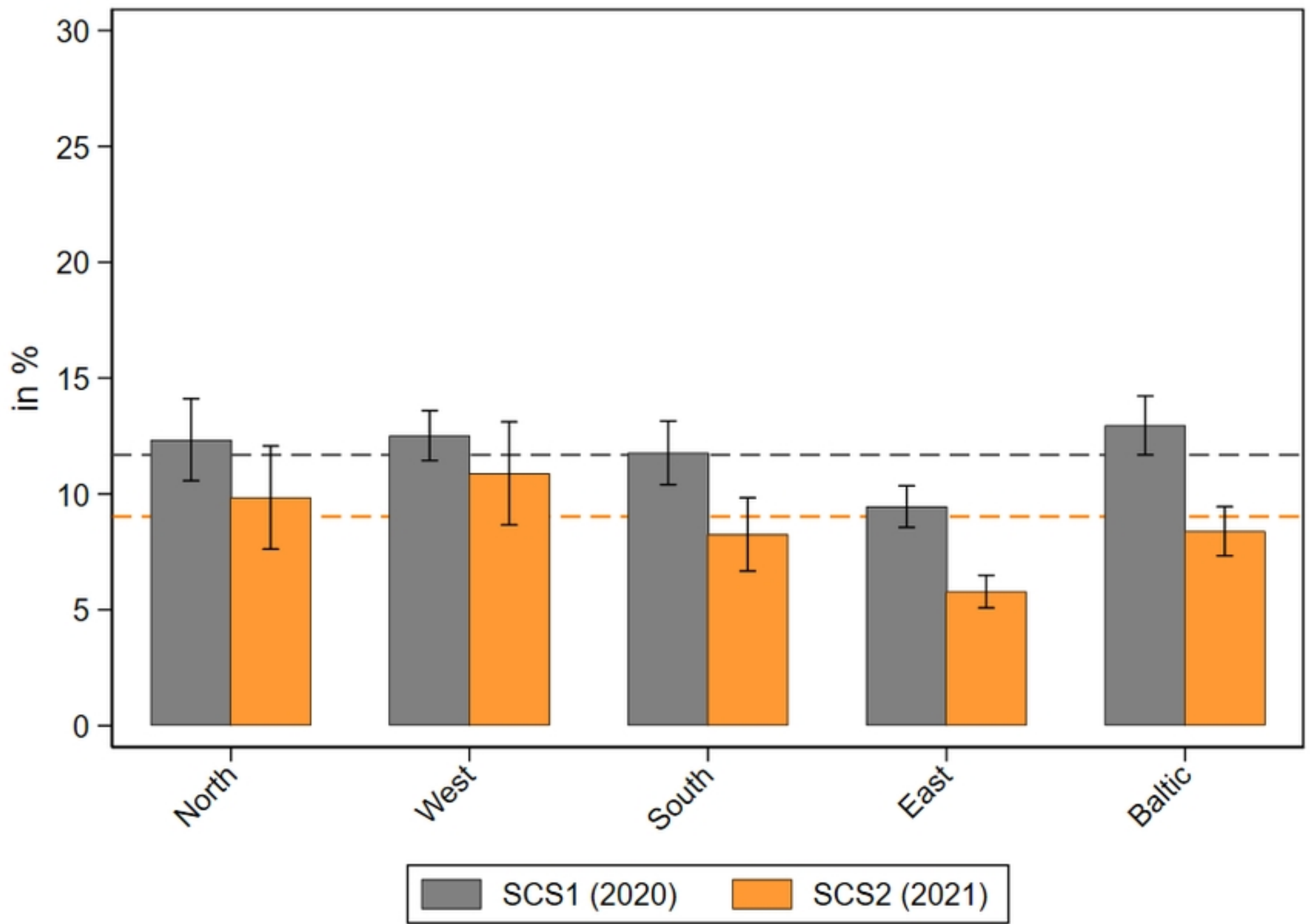


Fig5

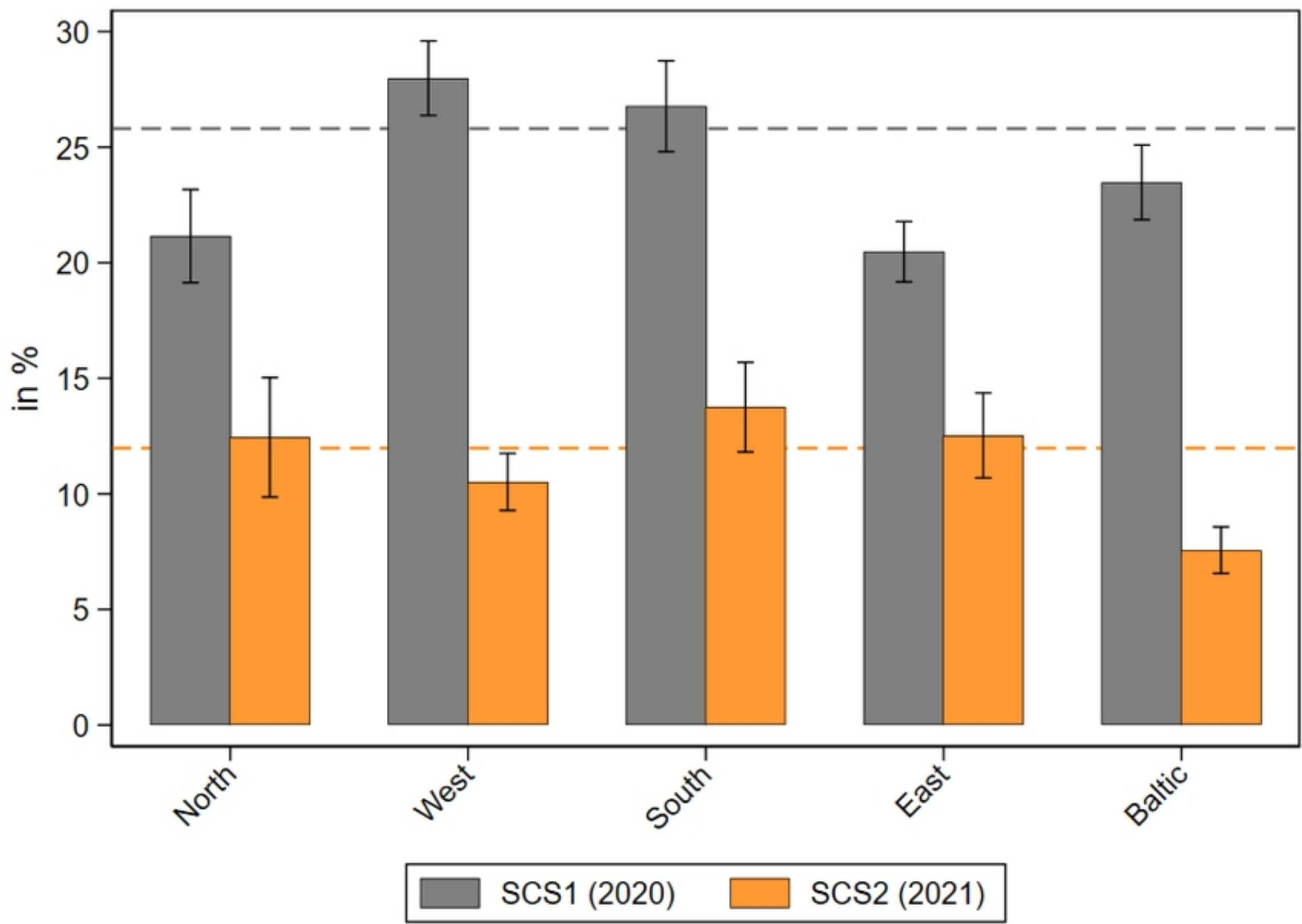


Fig6

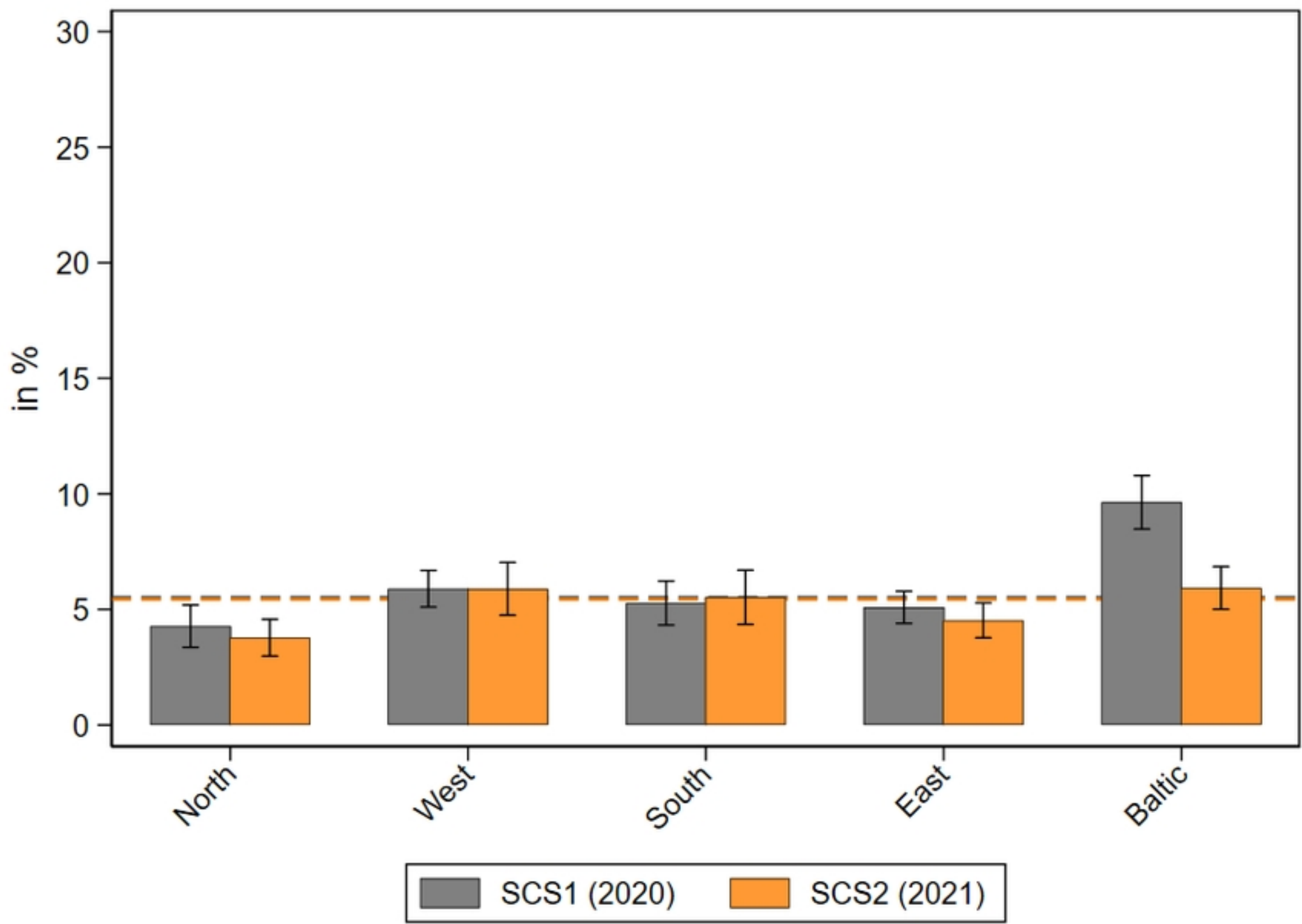


Fig7

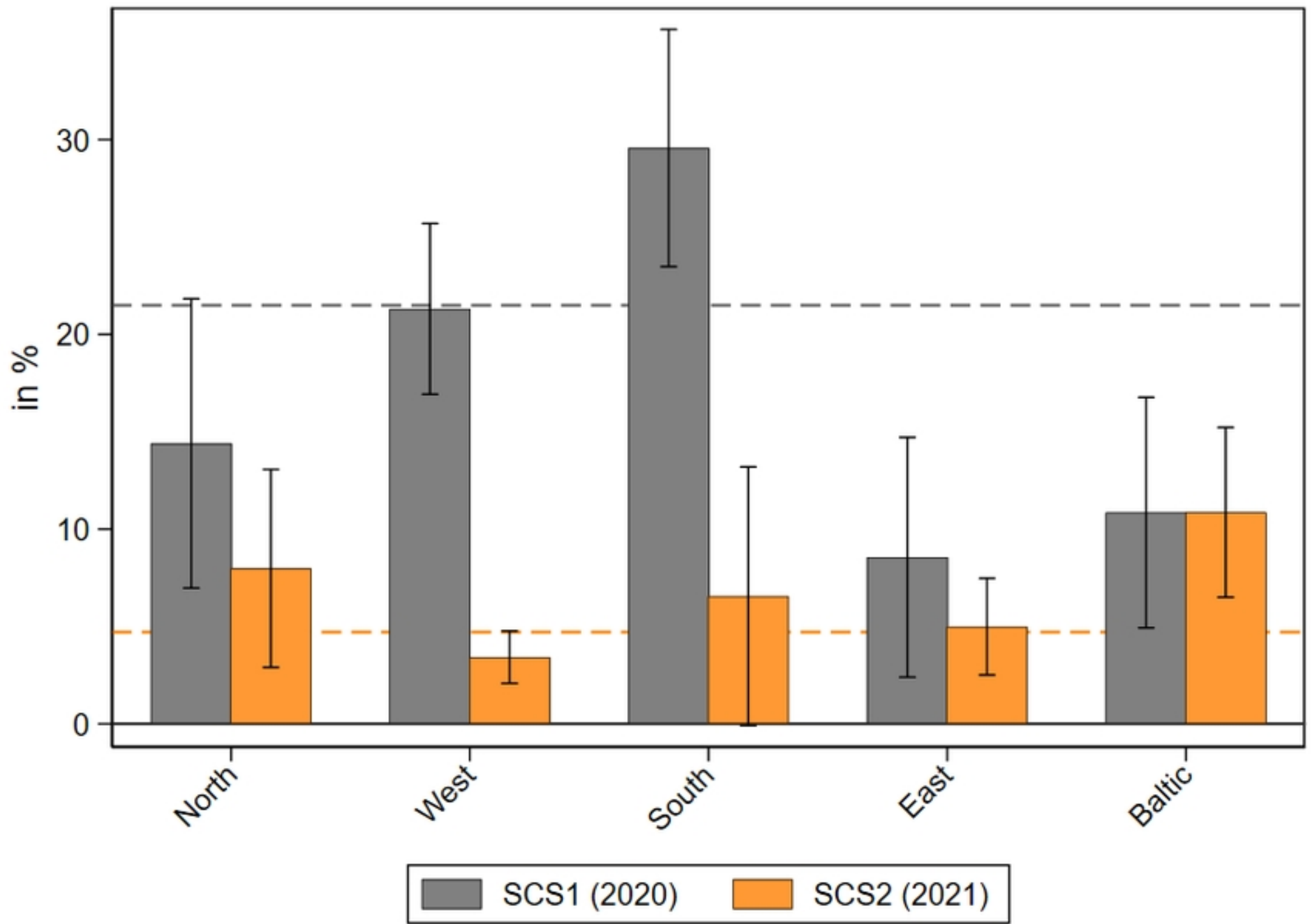


Fig2

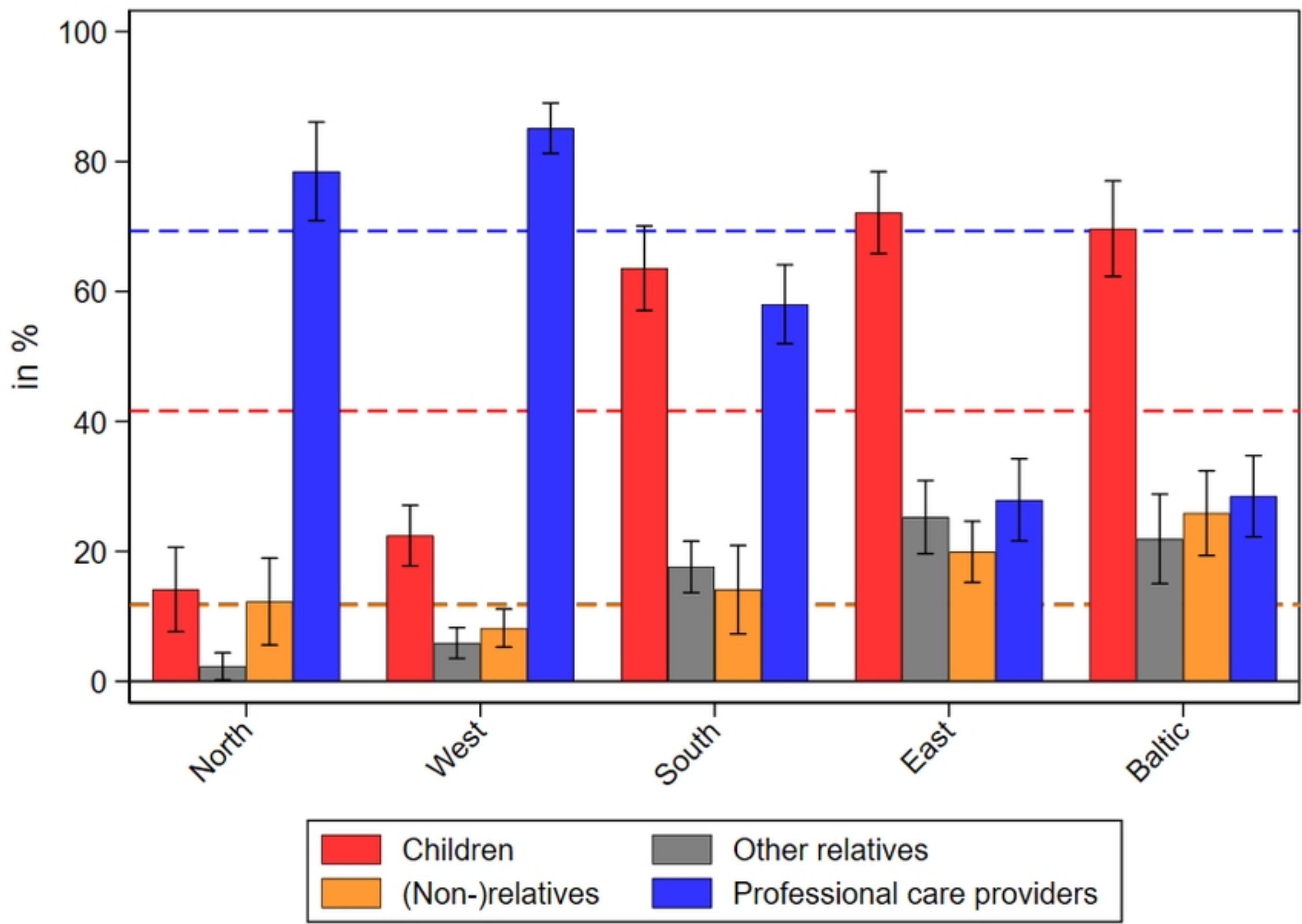
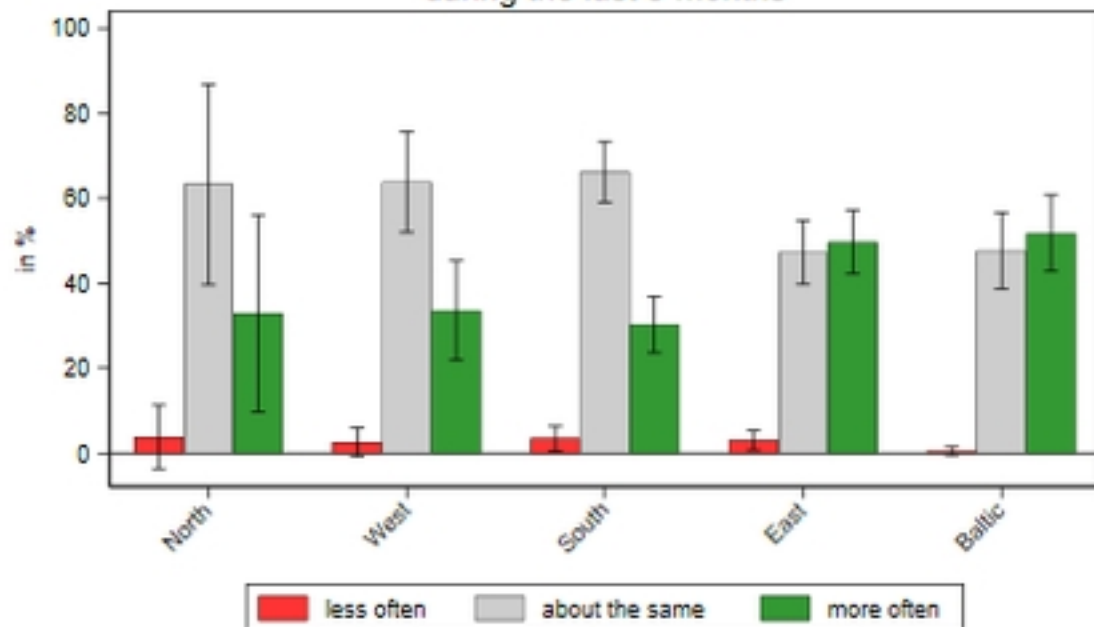


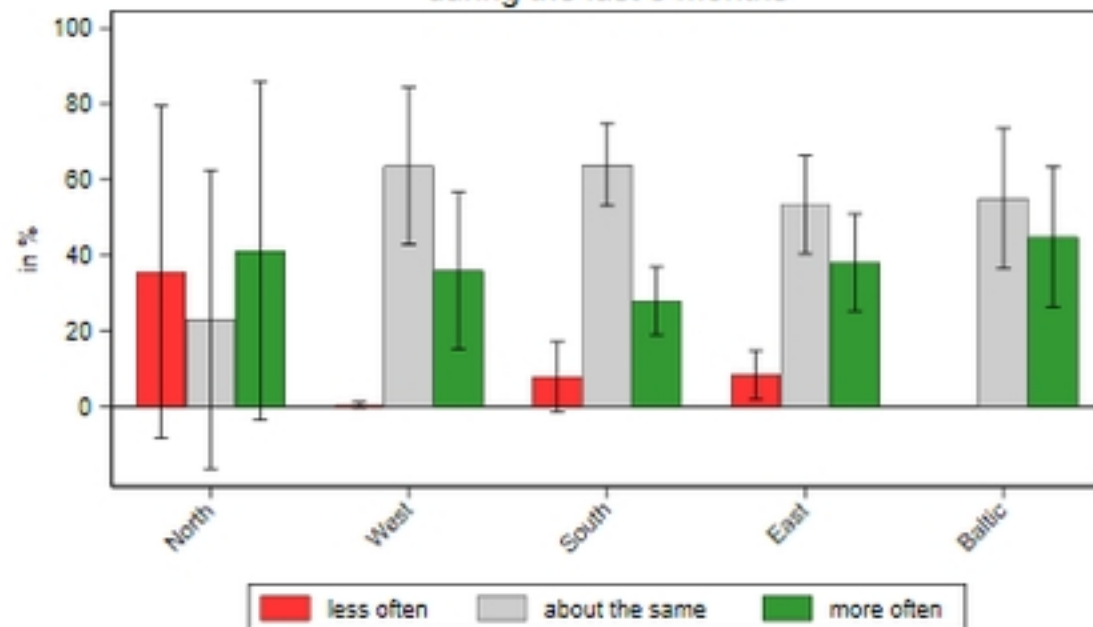
Fig3

(A) Home care received from children during the last 3 months



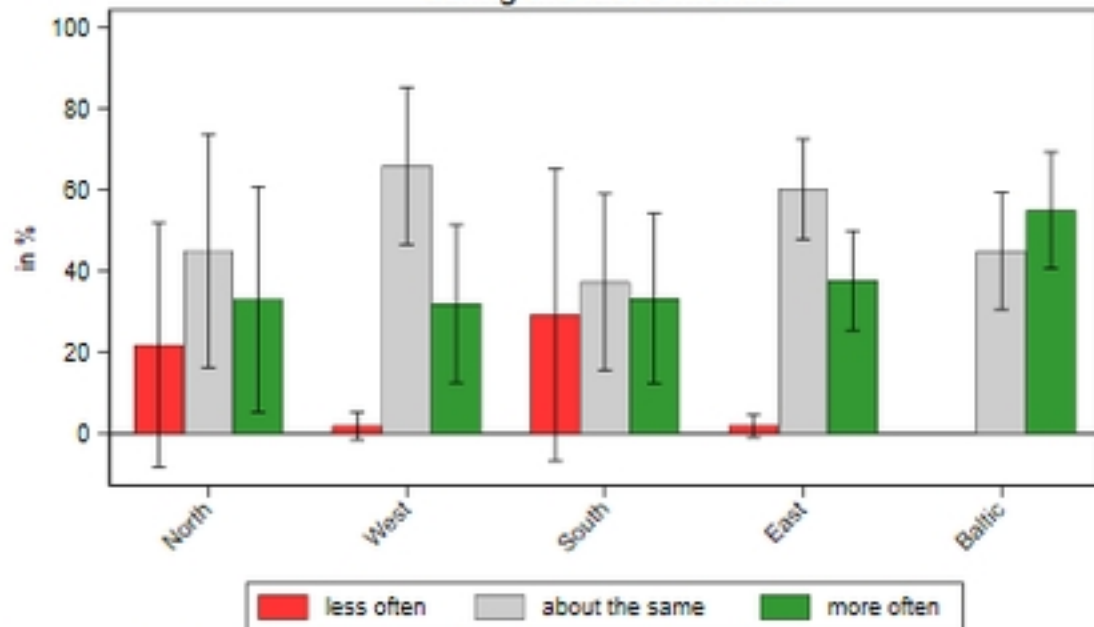
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(B) Home care received from parents and relatives during the last 3 months



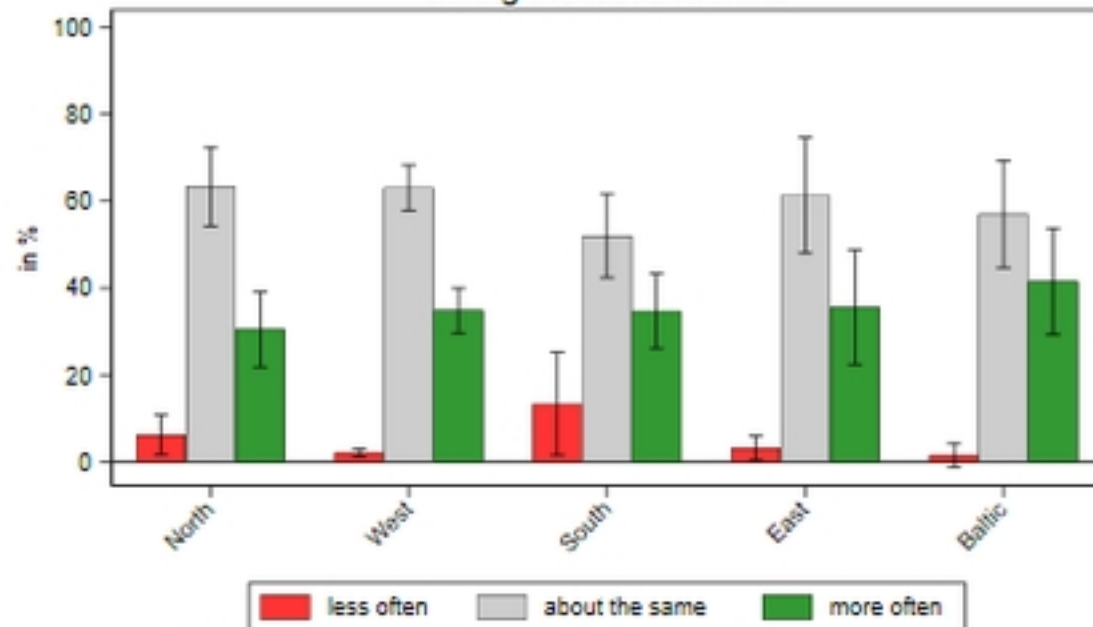
Data: SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=384; weighted) with 95%-confidence intervals.

(C) Home care received from non-relatives during the last 3 months



Data: SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=376; weighted) with 95%-confidence intervals.

(D) Home care received from professional care providers during the last 3 months



Data: SHARE Wave 9 COVID-19 Survey 2, Release 8.0.0 (n=2,259; weighted) with 95%-confidence intervals.