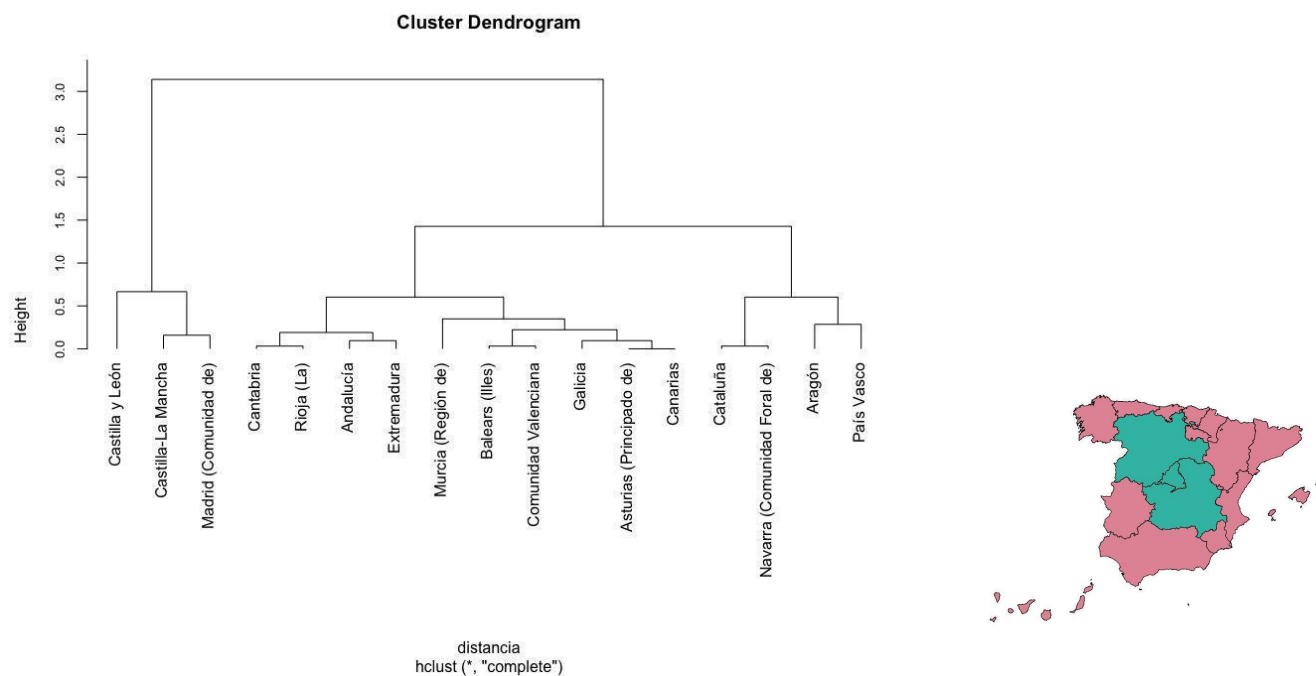


## Supplementary Material for “Lockdown measures and relative changes in the age-specific incidence of SARS-CoV-2 in Spain”

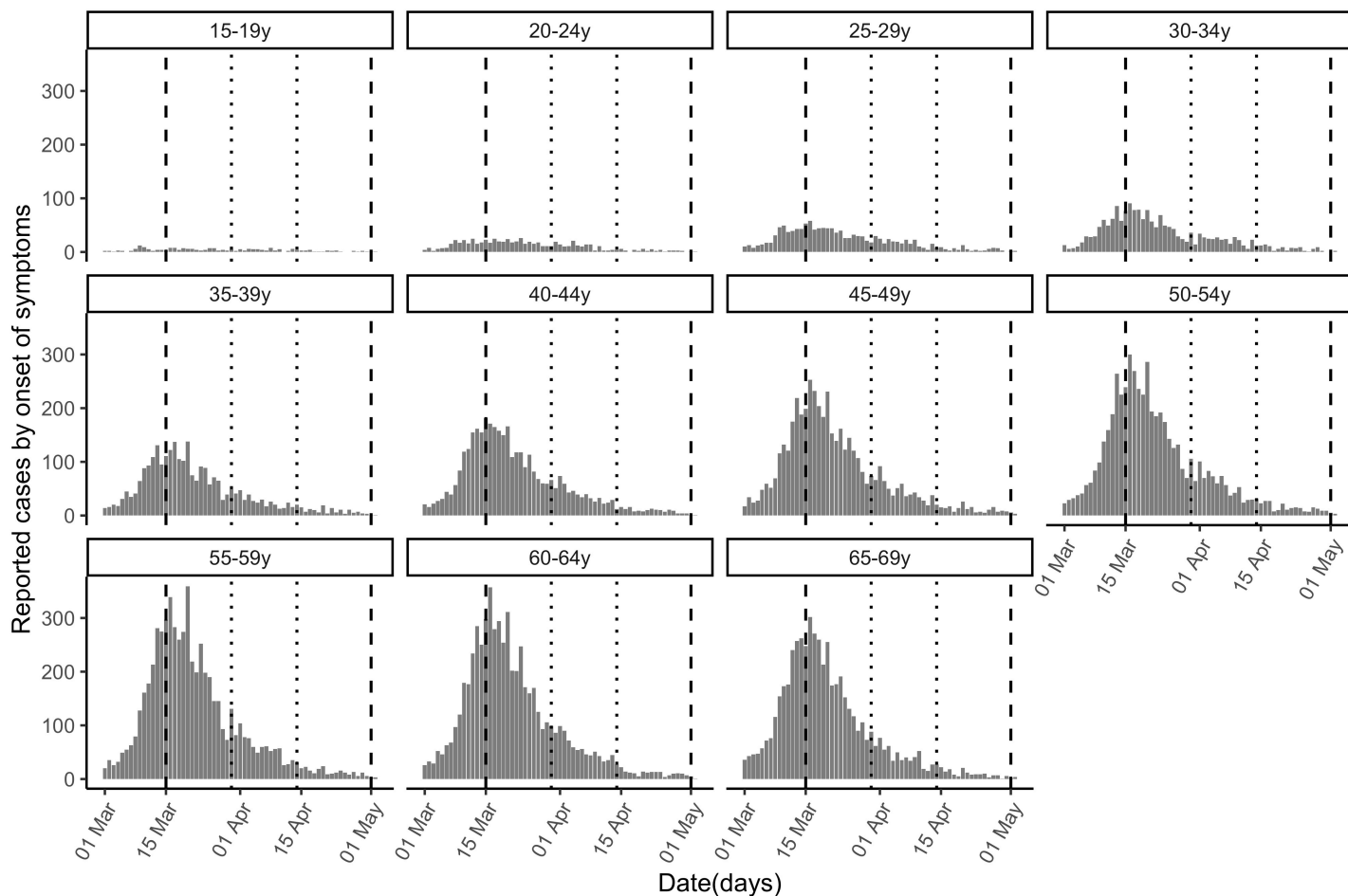
### Section S1: Proportion ratios by geographical cluster

A hierarchical cluster analysis (Figure S1) classified Spanish regions (“comunidades autónomas”) in two clusters: a central cluster (around Madrid), which has higher serologically confirmed incidence rates [2], and a peripheral cluster with lower incidence (Figure S2).

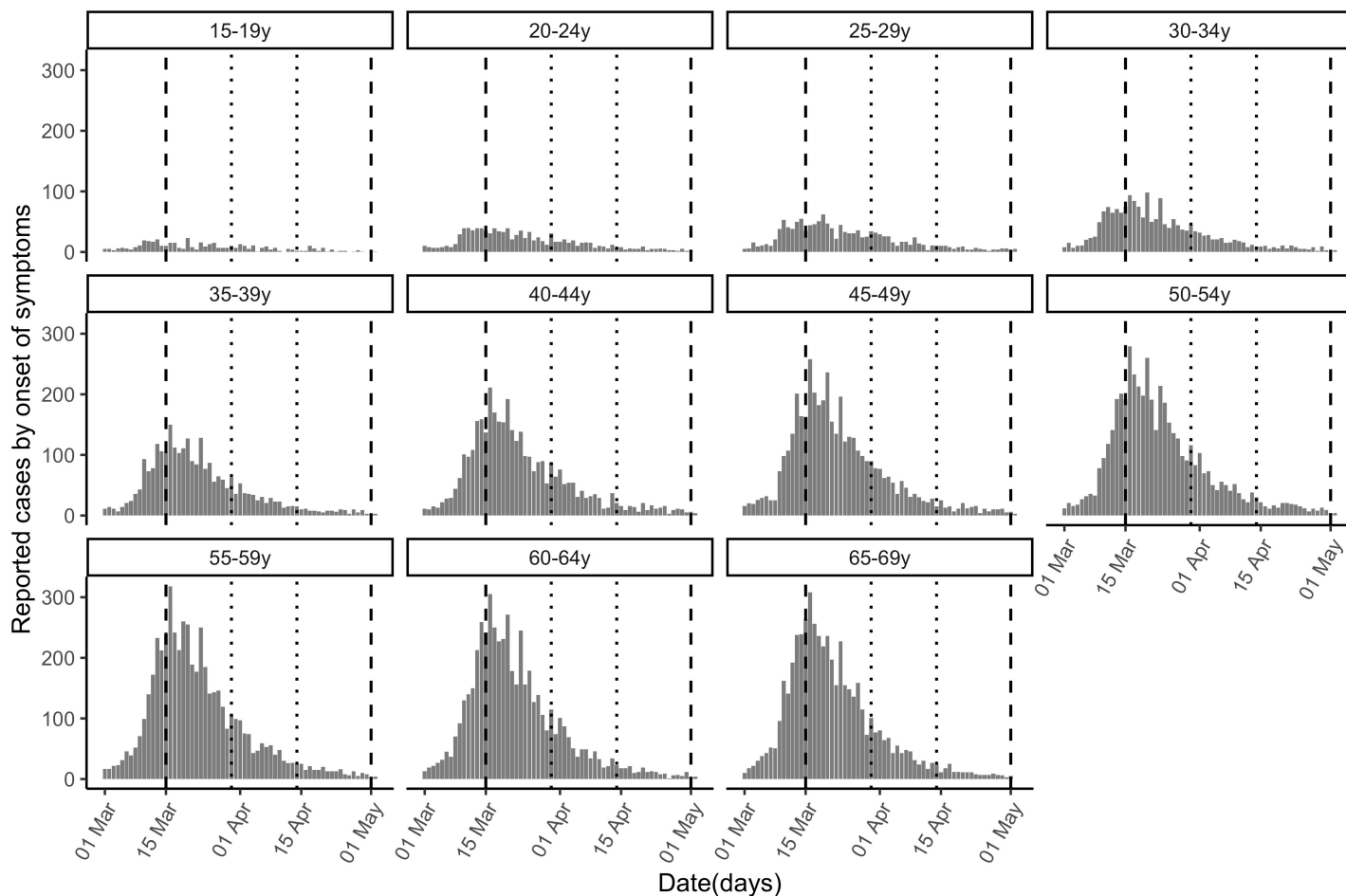


**Figure S1:** Splitting of Spain into a Central cluster and Peripheral cluster.

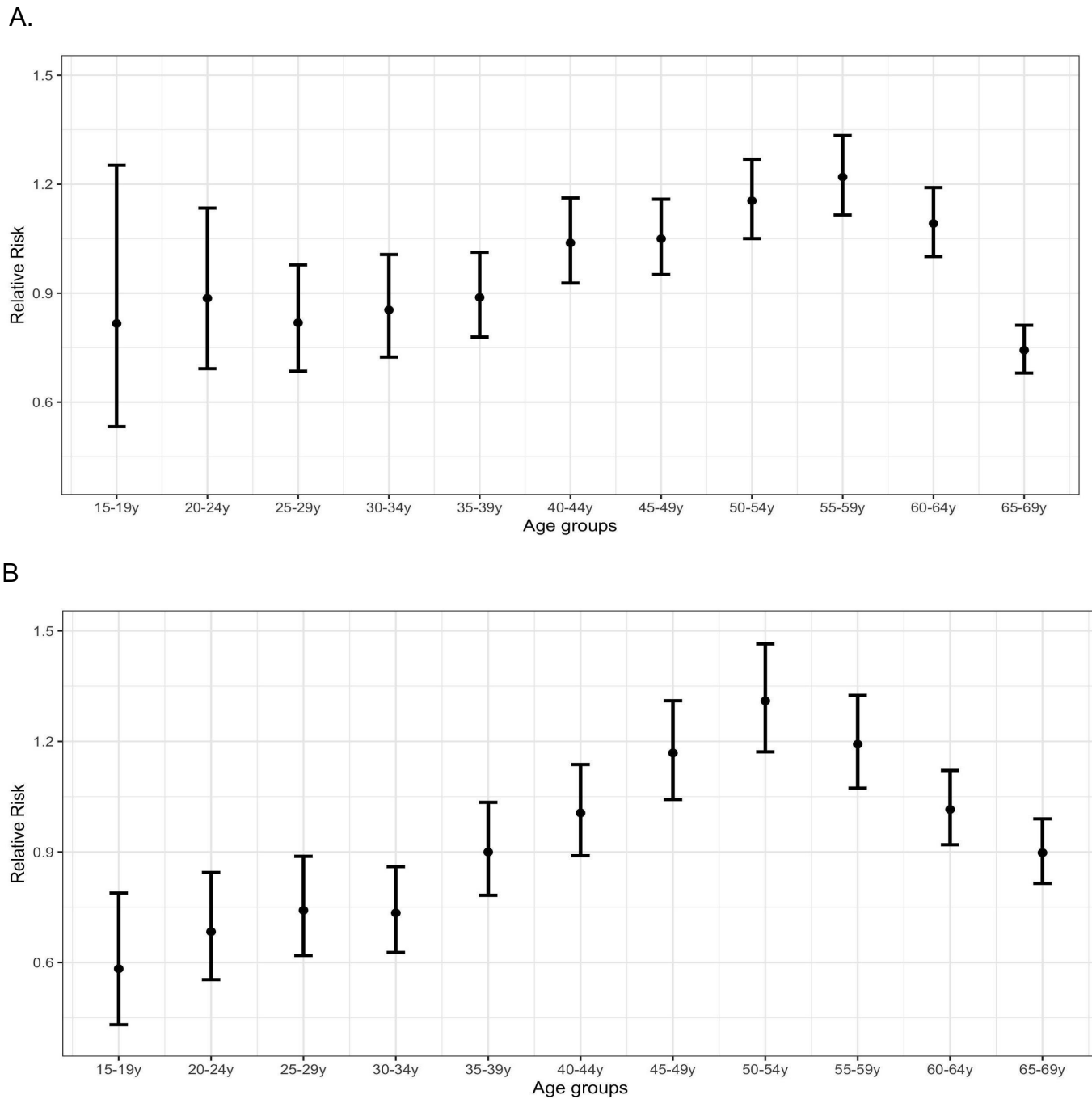
### A: Central cluster



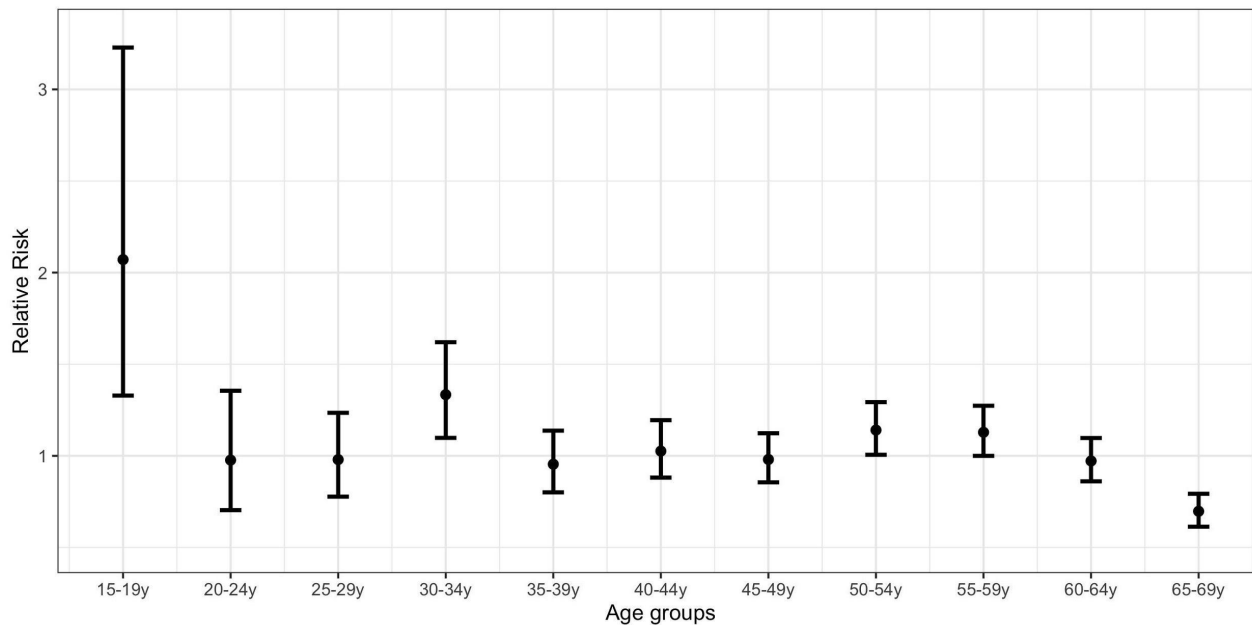
## B: Peripheral cluster



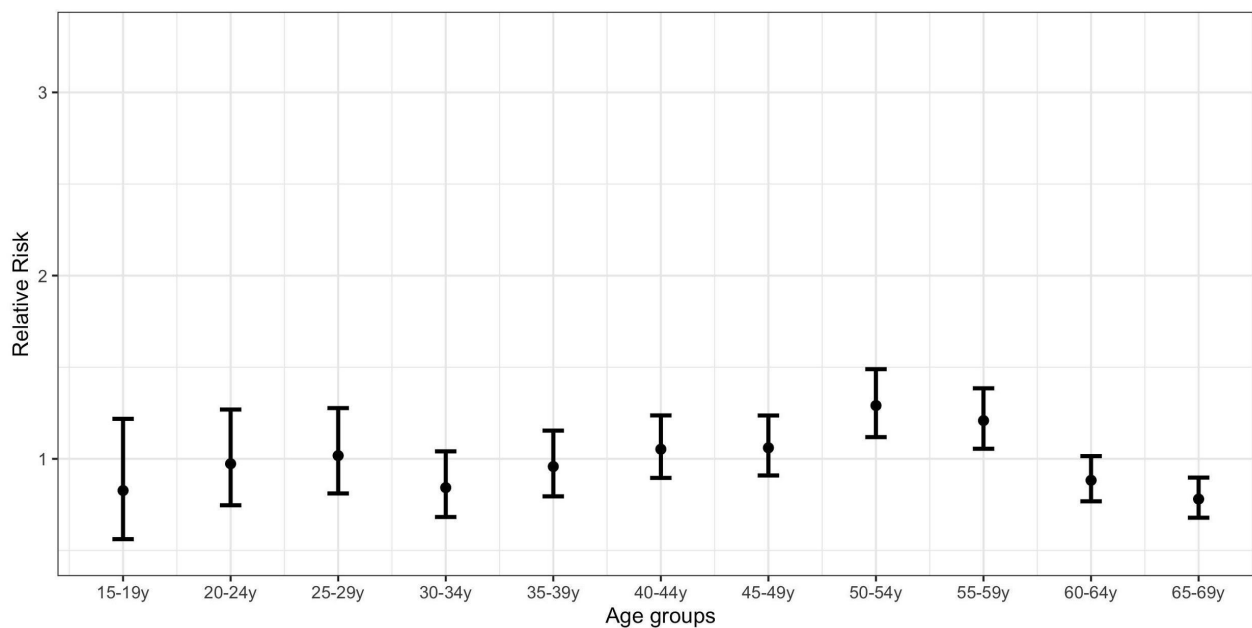
**Figure S2:** Cases of COVID-19 (reported by the day of symptom onset) by age group between March 1 and April 30, 2020 in each the Central cluster (A) and Peripheral cluster (B) in Spain. Vertical dashed lines demarcate the first lockdown period (March 15 to April 30) and dotted lines the second (strengthened) lockdown period (March 30-April 14).



**Figure S3:** Proportion ratio (PR) estimates of confirmed COVID-19 cases by age group in Spain for the period March 25–April 3 vs. March 1-10 for the Central cluster (A) and the Peripheral cluster (B).



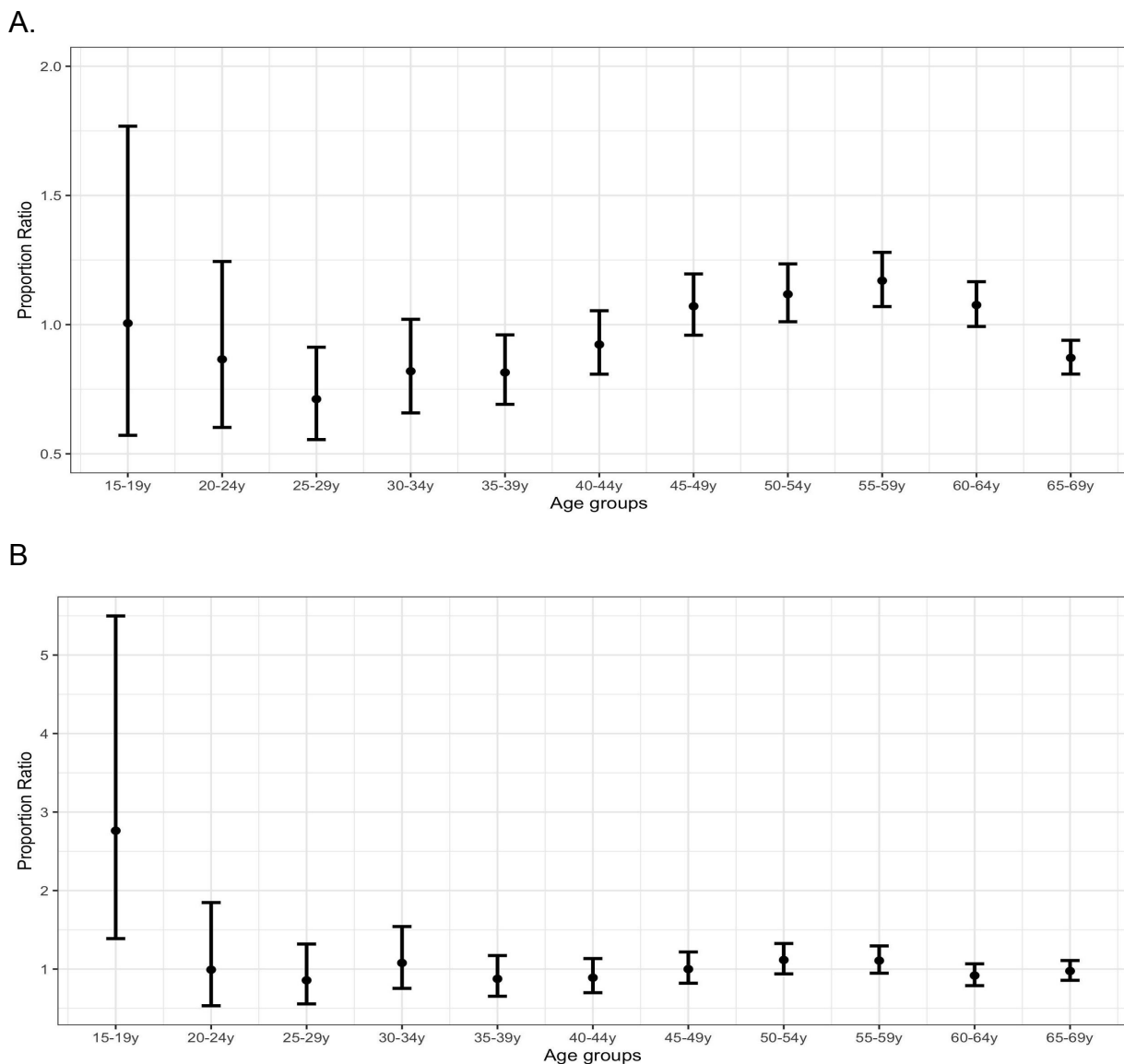
B



**Figure S4:** Proportion ratio (PR) estimates of confirmed COVID-19 cases by age group in Spain for the period April 8-17 vs. March 1-10 for the Central cluster (A) and the Peripheral cluster (B).

**Section S2:** Proportion ratio by age-group for hospitalized cases.

Figure S5A plots the estimates of the proportion ratio (PR) for the period of March 25 –April 3 vs. March 1 –March 10 (eq. 1) and Figure S5B plots PR for the period April 8-17 vs March 1-March 10 for individuals requiring hospitalization (n=72283, obtained from RENAVE /SiViEs for those with available information, see Methods). While the confidence bounds in Figures S5A, B are wide due to smaller sample size, especially within younger age groups, the point estimates shown in Figure S5A are in alignment to those shown in Figure 2 with the highest PR estimates belonging to persons aged 50-59y. Similarly, the estimates showed in Figure S5B are consistent with those in Figure 3, with a relative increase in old adolescents/younger adults (15-34y) in addition to those 50-59y.



**Figure S5:** Estimates of the proportion ratio (PR) for hospitalized cases the period of March 25 –April 3 vs. March 1st –March 10 (A) and April 8 –April 17 vs. March 1st –March 10

**Section S3:** Confidence bounds and pairwise comparison for proportion ratios

For the proportion ratio statistic introduced in the main text (eq. 1), the logarithm  $\ln(PR(g))$  of the  $PR(g)$  is approximately normally distributed [14] with the standard error:

$$SE = \sqrt{\frac{1}{L(g)} + \frac{1}{E(g)} - \frac{1}{\sum_h L(h)} - \frac{1}{\sum_h E(h)}} \quad (S1)$$

For each pair of age groups  $g1$  and  $g2$ , the proportion ratios  $PR(g1)$  and  $PR(g2)$  are compared using the odds ratio (OR)

$$OR(g1, g2) = \frac{PR(g1)}{PR(g2)}$$

It follows from eq. 1 in the main body of the text that  $OR(g1, g2)$  equals

$$OR = \frac{\frac{L(g1)}{E(g1)}}{\frac{L(g2)}{E(g2)}} \quad (S2)$$

which is the OR for a COVID-19 case to be in age group  $g1$  vs  $g2$  for the later vs early period.

Estimates for pairwise OR were performed using Fisher's exact test. Table S1 gives the estimates of the odds ratios (ORs) for different pairs of age groups (15-29y through 65-69y) for a COVID-19 case to be detected for the period of March 25 –April 3 vs. March 1st –March 10 (eq. 3). Table S1 suggests that for persons aged 50-59y, the corresponding odds ratio relative to any age group either between 15-39y, or above 60y is significantly above 1. For persons aged 45-49y, the corresponding odds ratio relative to any age group either between 15-39y, or 65-69y is significantly above 1.

Age group (years)	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
15-19	0.89 (0.65-1.21)	0.9 (0.6-1.20)	0.88 (0.61-1.17)	0.79 (0.57-1.04)	<b>0.69</b> <b>(0.53-0.91)</b>	<b>0.65</b> <b>(0.5-0.85)</b>	<b>0.59</b> <b>(0.45-0.77)</b>	<b>0.60</b> <b>(0.46-0.78)</b>	<b>0.68</b> <b>(0.52-0.89)</b>	0.88 (0.67-1.15)
20-24		1.01 (0.82-1.25)	0.99 (0.81-1.22)	0.89 (0.73-1.08)	<b>0.78</b> <b>(0.65-0.94)</b>	<b>0.73</b> <b>(0.61-0.88)</b>	<b>0.66</b> <b>(0.55-0.79)</b>	<b>0.67</b> <b>(0.56-0.80)</b>	<b>0.76</b> <b>(0.64-0.92)</b>	0.99 (0.82-1.18)
25-29			0.98 (0.82-1.17)	0.88 (0.74-1.04)	<b>0.77</b> <b>(0.66-0.90)</b>	<b>0.72</b> <b>(0.62-0.84)</b>	<b>0.65</b> <b>(0.56-0.76)</b>	<b>0.66</b> <b>(0.57-0.77)</b>	<b>0.75</b> <b>(0.65-0.87)</b>	0.97 (0.84-1.13)
30-34				0.90 (0.77-1.05)	<b>0.79</b> <b>(0.68-0.92)</b>	<b>0.74</b> <b>(0.64-0.85)</b>	<b>0.67</b> <b>(0.58-0.77)</b>	<b>0.68</b> <b>(0.59-0.78)</b>	<b>0.77</b> <b>(0.67-0.89)</b>	1.0 (0.87-1.15)
35-39					0.88 (0.77-1)	<b>0.82</b> <b>(0.72-0.93)</b>	<b>0.74</b> <b>(0.65-0.84)</b>	<b>0.75</b> <b>(0.66-0.85)</b>	<b>0.86</b> <b>(0.76-0.97)</b>	1.11 (0.98-1.25)
40-44						0.94 (0.83-1.05)	<b>0.85</b> <b>(0.75-0.95)</b>	<b>0.86</b> <b>(0.76-0.96)</b>	0.98 (0.87-1.09)	<b>1.26</b> <b>(1.13-1.42)</b>
45-49							0.90 (0.81-1.01)	0.92 (0.82-1.02)	1.04 (0.94-1.16)	<b>1.35</b> <b>(1.21-1.50)</b>
50-54								1.03 (0.9-1.15)	<b>1.15</b> <b>(1.04-1.28)</b>	<b>1.49</b> <b>(1.34-1.66)</b>
55-59									<b>1.14</b> <b>(1.03-1.26)</b>	<b>1.47</b> <b>(1.33-1.63)</b>
60-64										<b>1.29</b> <b>(1.17-1.43)</b>

**Table S1.** Odds ratios (ORs) for different pairs of age groups (15-19y through 65-69y) for a COVID-19 case to be detected for the period of March 25 –April 3 vs. March 1st –March 10 (eq. 3).

Table S2 shows the estimates of the odds ratios (ORs) for different pairs of age groups (15-19y through 65-69y) for a COVID-19 case to be detected for the period of April 8-17 vs. March 1st –March 10 (eq. 3). Table S2 suggests that for persons aged 40-59y, the corresponding odds ratio relative to persons aged 60-69y is significantly above 1.



Age group (years)	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
15-19	1.27 (0.9-1.79)	1.33 (0.97-1.83)	1.27 (0.93-1.74)	<b>1.42</b> <b>(1.05-1.92)</b>	1.32 (0.98-1.77)	1.34 (1-1.80)	1.15 (0.86-1.55)	1.22 (0.91-1.63)	<b>1.55</b> <b>(1.15-2.07)</b>	<b>1.95</b> <b>(1.45-2.61)</b>
20-24		1.05 (0.81-1.35)	1. (0.79-1.28)	1.12 (0.88-1.41)	1.04 (0.83-1.30)	1.06 (0.85-1.32)	0.91 (0.73-1.13)	0.96 (0.77-1.19)	1.22 (0.98-1.51)	<b>1.53</b> <b>(1.23-1.91)</b>
25-29			0.96 (0.78-1.18)	1.07 (0.87-1.30)	0.99 (0.82-1.20)	1.01 (0.84-1.22)	0.87 (0.72-1.04)	0.91 (0.76-1.10)	1.16 (0.97-1.40)	<b>1.47</b> <b>(1.22-1.76)</b>
30-34				1.11 (0.92-1.34)	1.03 (0.86-1.23)	1.05 (0.88-1.25)	0.9 (0.76-1.07)	0.95 (0.81-1.13)	<b>1.21</b> <b>(1.02-1.44)</b>	<b>1.53</b> <b>(1.28-1.82)</b>
35-39					0.93 (0.78-1.10)	0.95 (0.8-1.11)	<b>0.81</b> <b>(0.69-0.95)</b>	<b>0.86</b> <b>(0.73-1.00)</b>	1.09 (0.93-1.28)	<b>1.37</b> <b>(1.17-1.61)</b>
40-44						1.02 (0.88-1.19)	<b>0.88</b> <b>(0.76-1.01)</b>	0.92 (0.8-1.07)	<b>1.18</b> <b>(1.02-1.36)</b>	<b>1.48</b> <b>(1.28-1.72)</b>
45-49							<b>0.86</b> <b>(0.75-0.99)</b>	0.91 (0.79-1.04)	<b>1.15</b> <b>(1.00-1.32)</b>	<b>1.45</b> <b>(1.26-1.67)</b>
50-54								1.05 (0.92-1.21)	<b>1.34</b> <b>(1.17-1.53)</b>	<b>1.69</b> <b>(1.48-1.94)</b>
55-59									<b>1.27</b> <b>(1.11-1.45)</b>	<b>1.60</b> <b>(1.40-1.83)</b>
60-64										<b>1.26</b> <b>(1.10-1.44)</b>

**Table S2.** Odds ratios (ORs) for different pairs of age groups (15-19y through 65-69y) for a COVID-19 case to be detected for the period of April 8-17 vs. March 1st –March 10 (eq. 3).

Table S3 shows the estimates of the odds ratios (ORs) for different pairs of age groups (15-19y through 65-69y) for a COVID-19 case to be detected for the period of April 8-17 vs. March 25-April 3 (eq. 3). Table S3 shows an increase in the incidence of detected SARS-CoV-2 infection for younger persons (aged under 34y) compared to older persons (aged over 40y) for a number of pairs of age groups.

Age group (years)	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
15-19	1.4 (0.98-2)	1.39 (0.99-1.93)	1.33 (0.96-1.83)	<b>1.66</b> <b>(1.21-2.28)</b>	<b>1.75</b> <b>(1.28-2.38)</b>	<b>1.93</b> <b>(1.41-2.61)</b>	<b>1.8</b> <b>(1.32-2.43)</b>	<b>1.83</b> <b>(1.35-2.47)</b>	<b>2.01</b> <b>(1.47-2.72)</b>	<b>1.99</b> <b>(1.45-2.67)</b>
20-24		0.99 (0.76-1.28)	0.95 (0.74-1.21)	1.25 (0.93-1.51)	1.25 (0.99-1.57)	<b>1.37</b> <b>(1.09-1.72)</b>	<b>1.28</b> <b>(1.02-1.60)</b>	<b>1.31</b> <b>(1.04-1.63)</b>	<b>1.43</b> <b>(1.14-1.79)</b>	<b>1.41</b> <b>(1.12-1.76)</b>
25-29			0.96 (0.77-1.19)	1.20 (0.98-1.47)	<b>1.26</b> <b>(1.04-1.53)</b>	<b>1.39</b> <b>(1.15-1.68)</b>	<b>1.30</b> <b>(1.08-1.56)</b>	<b>1.32</b> <b>(1.1-1.59)</b>	<b>1.45</b> <b>(1.2-1.74)</b>	<b>1.42</b> <b>(1.18-1.72)</b>
30-34				<b>1.25</b> <b>(1.04-1.52)</b>	<b>1.32</b> <b>(1.1-1.58)</b>	<b>1.45</b> <b>(1.22-1.73)</b>	<b>1.36</b> <b>(1.14-1.61)</b>	<b>1.38</b> <b>(1.17-1.63)</b>	<b>1.51</b> <b>(1.28-1.79)</b>	<b>1.49</b> <b>(1.25-1.77)</b>
35-39					1.05 (0.89-1.24)	1.16 (0.98-1.36)	1.08 (0.92-1.26)	1.10 (0.94-1.28)	<b>1.21</b> <b>(1.03-1.41)</b>	<b>1.18</b> <b>(1.01-1.39)</b>
40-44						1.10 (0.95-1.28)	1.03 (0.89-1.19)	1.05 (0.91-1.21)	<b>1.15</b> <b>(1-1.33)</b>	1.13 (0.97-1.31)
45-49							0.93 (0.81-1.07)	0.95 (0.83-1.09)	1.04 (0.91-1.19)	1.02 (0.89-1.18)
50-54								1.02 (0.9-1.16)	1.12 (0.98-1.27)	1.10 (0.96-1.25)
55-59									1.10 (0.96-1.25)	1.08 (0.94-1.23)
60-64										0.98 (0.86-1.12)

**Table S3.** Odds ratios (ORs) for different pairs of age groups (15-19y through 65-69y) for a COVID-19 case to be detected for the period of April 8 –April 17 vs. March 25 –April 3 (eq. 3).

**Section S4:** Number of reported cases in different age groups during different time periods

Table S4 shows the number of reported COVID-19 cases with available information on the date of symptom onset in different age groups for different time periods. Those case counts increased a great deal with age, likely reflecting higher case ascertainment for older individuals.

Period	15-19y	20-24y	25-29y	30-34y	35-39y	40-44y	45-49y	50-54y	55-59y	60-64y	65-69y
March 1-10	113	250	399	482	646	795	942	970	1065	1200	1342
March 25 - April 3	139	346	545	674	1004	1409	1783	2032	2200	2177	1882
April 8 -17	76	135	215	278	330	441	506	618	657	593	522

**Table S4:** Number of reported COVID-19 cases with available information on the date of symptom onset in different age groups for different time periods.