Descriptive analysis of social contacts in the UK during Christmas period in 2020 and 2021 from the CoMix social contact survey
Report comparing contacts over Christmas

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Data from
02 December 2020 to 18 January 2021 for 2020 Christmas
09 December 2021 to 19 January 2022 for 2021 Christmas

Summary

- The reported contact rates for working-aged adults (18-59) were somewhat higher in early December 2020 than in the same period of 2021, mainly attributable to higher rates of work contacts. However, older adults (60+) reported contact rates were higher in 2021 than 2020 in the run-up to Christmas.
- Overall reported contact rates were similar during the Christmas periods of 2020 and 2021.
- The post-Christmas period of 2022 has seen a return to pre-Christmas levels of contact. This was not observed in the post-Christmas period last year as the third national lockdown was instigated.
- Patterns of childhood mixing appear to be similar prior to and during the Christmas periods of both years but also differed in the post-Christmas period as the lockdown also included school closure.
- Home contacts have remained fairly constant throughout the periods studied. Contacts with non-household members within the home did appear to increase for the over 60s in both years, with somewhat larger increases this year compared to last (particularly in the over 70s).
- The over 60s (and particularly the over 70s) did appear to report higher rates of “other” (mostly social and leisure) contacts in the run-up to Christmas this year compared to last.

Main

We compared mean reported contacts during and surrounding the Christmas periods of 2020 and 2021. The time periods are referred to as early December (prior to Christmas), Christmas, and early January (post-Christmas). The exact date ranges, number of participants, and reported mean contacts for all participants and adults (18+) are given in Table 1. At least 5,000 participants reported their contacts in each of the analysis periods. Time periods were selected to include at least two panels of participants (approx 2 weeks) and to follow the planned school breaks prior to and after Christmas. The “Christmas” period coincided with the school vacation period in both years.

Overall patterns of reported contacts
The highest levels of contacts were reported during early December (Table 1) in 2020. Reported contacts dropped during the Christmas period and remained low in early January 2021 consistent with the national lockdown that commenced on the 6th January 2021.

During Christmas 2021, reported contacts dropped during the Festive period but in early January 2022 returned to similar levels to those observed during early December 2021.

Reported contacts were lower in early December in 2021 compared to 2020. The Christmas period of 2020 and 2021 are very consistent, with the same estimates of mean daily reported contacts to 1dp for both years. Early January 2021 is somewhat lower than 2022 as would be expected as schools were open and there were fewer restrictions in the latter period, although, the highest levels seen overall were reported in Early December 2020 (Table 1).

Time period	Start date	End date	Participants	Mean contacts	Mean contacts (18+)
Early December 2020	02/12/2020	15/12/2020	5,992	4.6	3.4
Christmas 2020	20/12/2020	05/01/2021	9,291	2.7	2.5
Early January 2021	05/01/2021	18/01/2021	5,031	2.5	2.3
Early December 2021	09/12/2021	21/12/2021	6,115	3.5	2.8
Christmas 2021	22/12/2021	04/01/2022	7,474	2.7	2.5
Early January 2022	06/01/2022	19/01/2022	7,235	3.9	2.8

Table *1: Time periods used for analysis, number of participants and mean reported daily contacts.*

Age- and location-specific patterns of reported contacts

Looking at patterns of reported contacts by age group, it appears that contacts were higher in early December 2020 than the comparable period in 2021 for adults 18-69 years olds with the difference most pronounced in the 18-39 year olds (Figure 1). This pattern was reversed for those 70+ with a higher number of reported contacts in early December 2021 compared with 2020. During the Christmas breaks the mean reported contacts were very similar across the age groups. The mean reported contacts were higher in early January 2022 in all age groups except 50-59 (Figure 1).

Similar patterns were reported for children, with fewer mean contacts reported in early December 2021 compared to 2020, similar levels during the Christmas periods, and higher reported mean contacts in early January 2022 compared to 2021 (Figure 2). However, it should be noted that we detected a fall in reported contacts for school-aged children during autumn and early winter 2021 that is difficult to explain by restrictions or epidemiological changes and may simply reflect sample differences or how questions were being reported during that time period.

Reported contacts at home were very similar between the two years and across the time periods for most age groups (Figure 3). Reported contacts for 18-29 years appear slightly greater in 2020 compared to 2021 for all three time periods.

Changes in reported non-household contacts were most marked in the 70+ age group. The number of contacts at home that were not from their household was higher prior, during, and post-Christmas 2021 compared with Christmas 2020. For the over 60s and young adults (19-29 years) the festive period itself resulted in the highest reported daily non-household member home contacts in both years (Figure 4). Though the magnitudes of these contacts still remain low overall at less than 0.4 people per day (Figure 4).

Work contacts were highest in early December 2020 for all age groups less than 69 years of age. As expected, work contacts were lower during the Christmas period of 2020 and 2021. All age groups apart from the 50-59 years olds reported a greater number of contacts in early January 2022 compared to 2021, which is to be expected given the imposition of the third national lockdown in January 2021 (Figure 5).

The mean reported social (other) contacts were lowest during January 2021, the levels seen during Christmas 2021 were slightly higher compared to 2020 in all age groups apart from those aged 30-39 years. Social contacts prior to Christmas for those aged 18-59 were either slightly higher in 2020 or very similar. In contrast, for those aged 60+ and especially for those 70+ the reported mean contacts were much higher in 2021 compared to 2020 (Figure 6).

Figure 7 illustrates the patterns of within- and between-age-group mixing over the different periods. During the school holidays (Christmas time periods) between-children contacts significantly reduce. This was also true of the lockdown period in January 2021 when schools were closed. During the lockdown period, there was a lower rate of contact between school-aged children and the elderly than was recorded during the Christmas periods (Figure 7). There were no obvious differences in contacts across age groups during the Christmas periods of 2020 and Christmas 2021 (Figure 7).

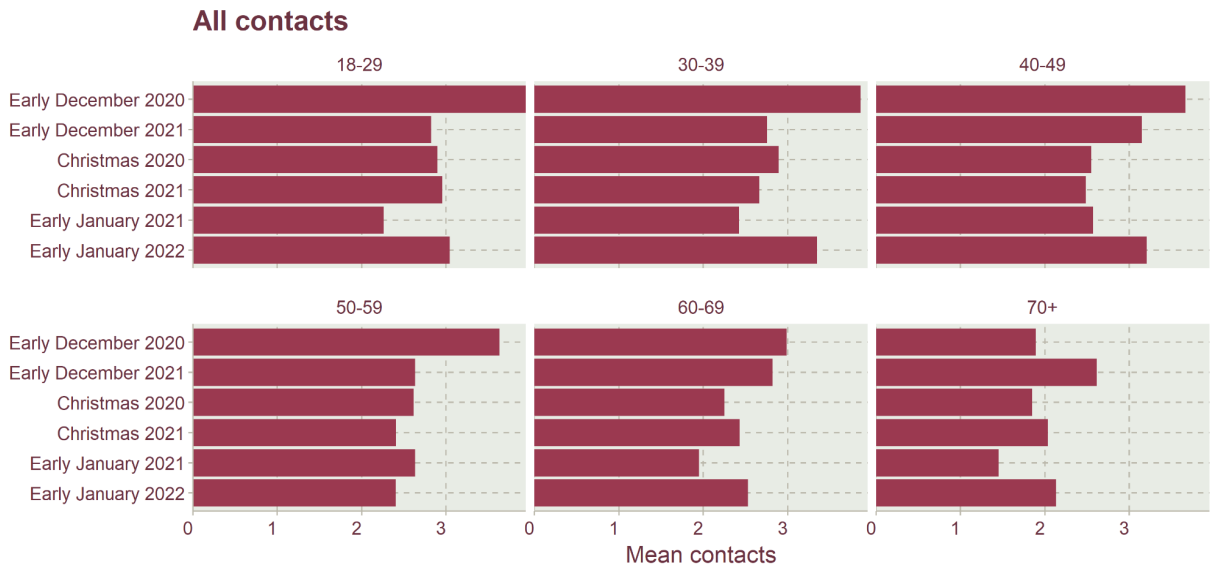

Figure 1: Mean contacts prior to, during, and after the Christmas periods in 2020 and 2021 for adults. Contacts truncated to 50 contacts per participant.

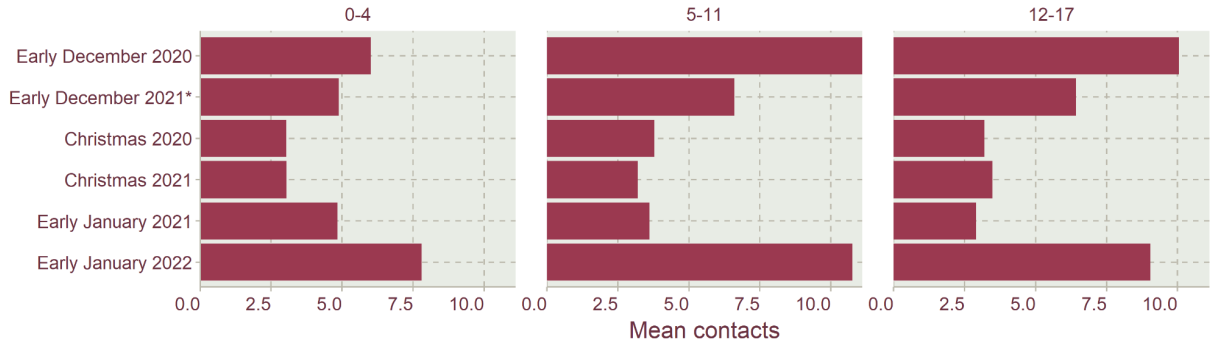

Figure 2: Mean contacts prior to, during, and after the Christmas periods in 2020 and 2021 for children. Contacts truncated to 50 contacts per participant. *Contacts for 5-11 and 12-17 age groups were unexpectedly lower in early December compared to previous weeks, suggesting this drop may be due to a change in the parent sample or the way the questions were being received as opposed to an actual reduction in contacts.

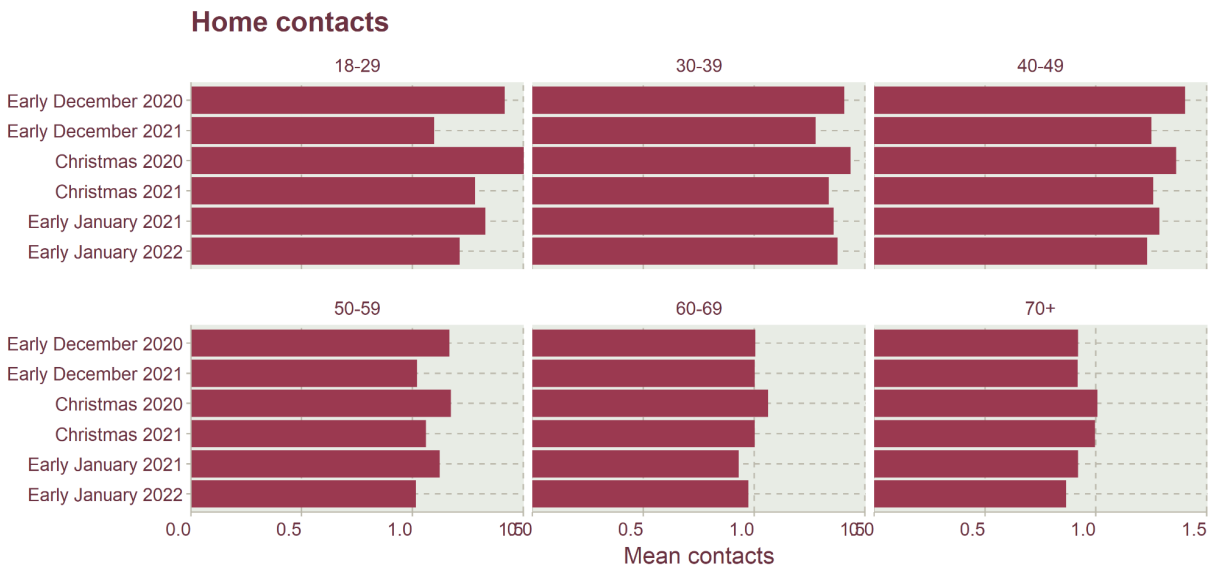

Figure 3: Mean home contacts prior to, during, and after the Christmas periods in 2020 and 2021 for adults. Contacts truncated to 50 contacts per participant.

Figure 4: Mean home non-household member contacts prior to, during, and after the Christmas periods in 2020 and 2021 for adults. Contacts truncated to 50 contacts per participant.

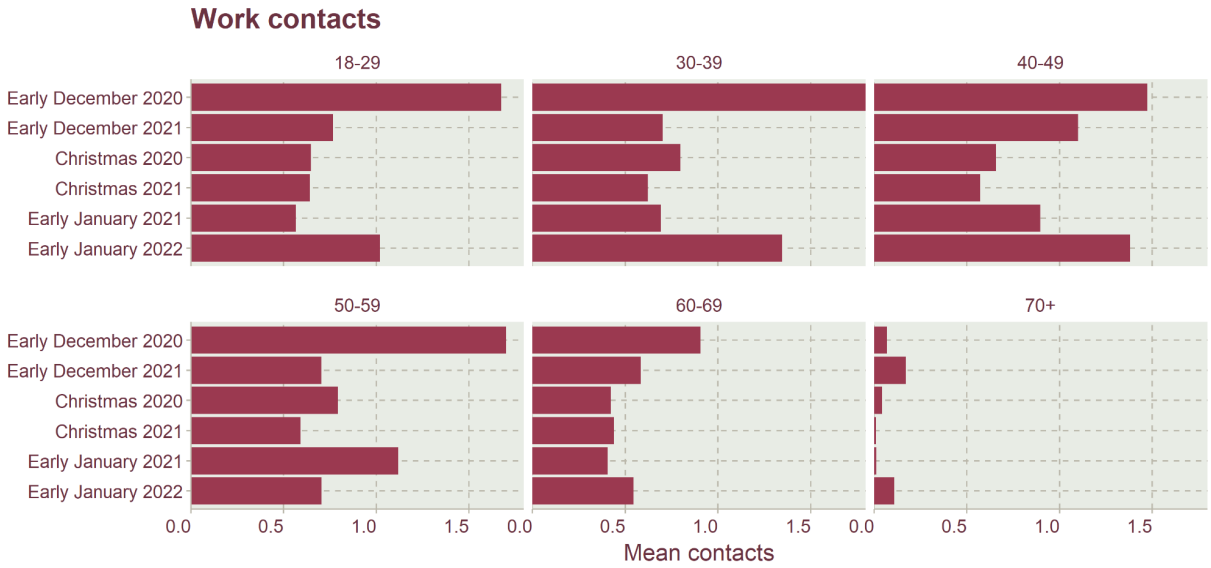

Figure 5: Mean work contacts prior to, during, and after the Christmas periods in 2020 and 2021 for adults. Contacts truncated to 50 contacts per participant.

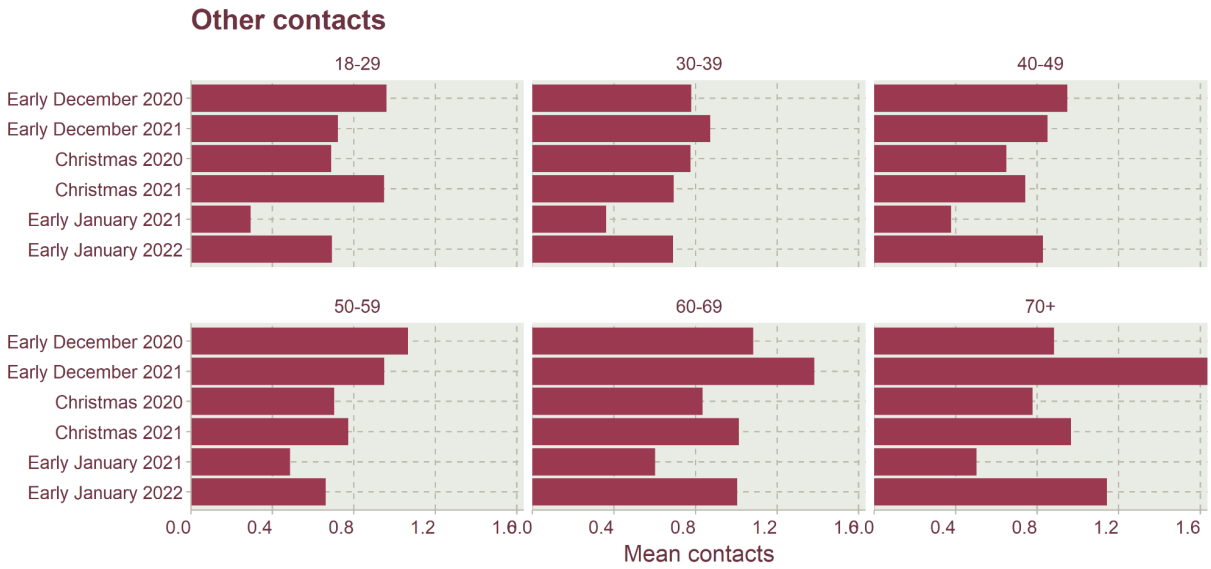

Figure 6: Mean social (other) contacts prior to, during, and after the Christmas periods in 2020 and 2021 for adults. Contacts truncated to 50 contacts per participant.

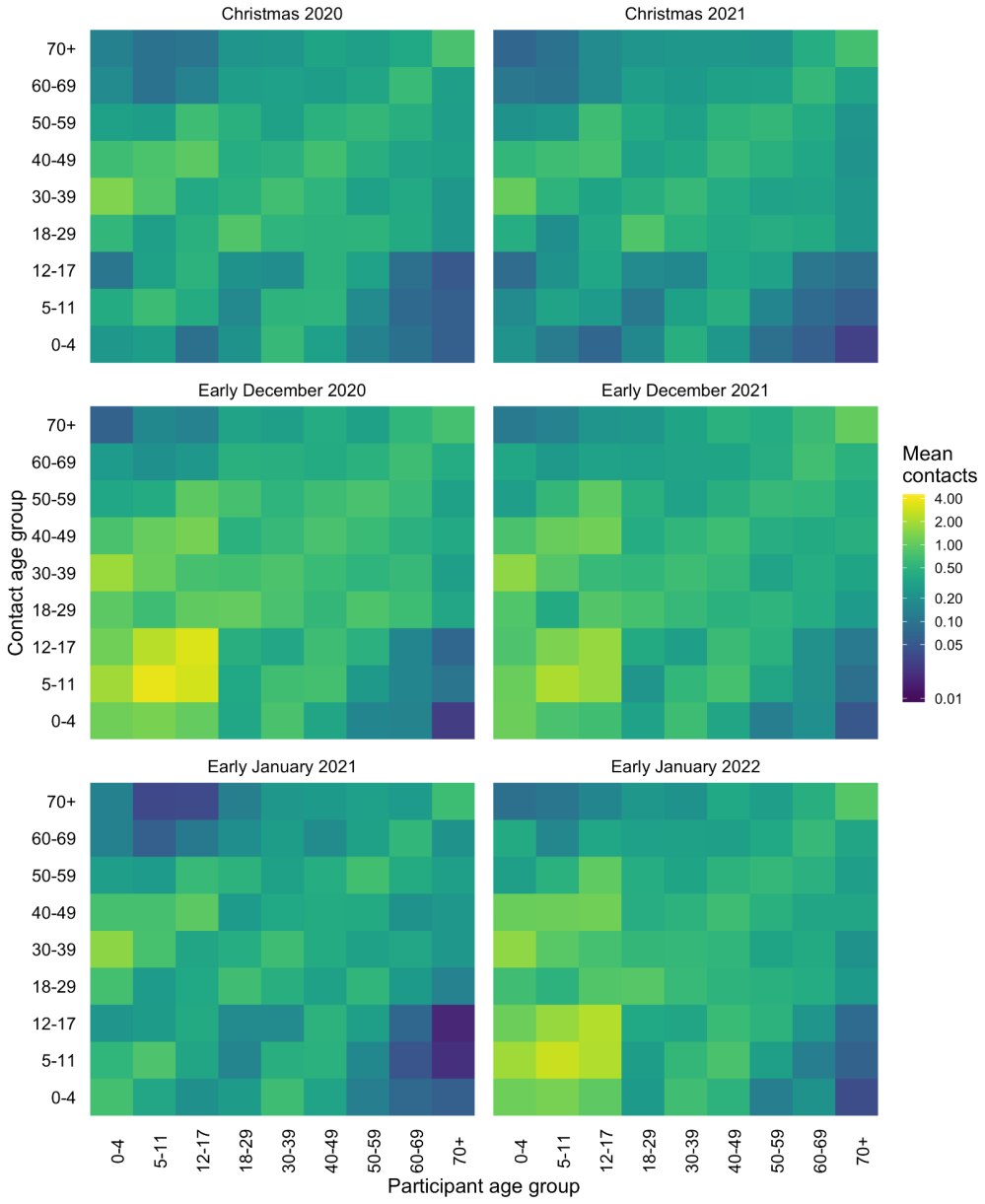

Figure 7. Contact matrices prior to, during, and after the Christmas periods in 2020 and 2021. Contacts truncated to 50 contacts per participant.

Methods

CoMix is a behavioural survey, launched on 24th of March 2020. The sample is broadly representative of the UK adult population. Participant's are invited to respond to the survey once every two weeks. We collect weekly data by running two alternating panels. Parents complete the survey on behalf of children (17 years old or younger). Participants record direct, face-to-face contacts made on the previous day, specifying certain characteristics for each contact including the age and sex of the contact, whether contact was physical (skin-to-skin contact), and where contact occurred (e.g. at home, work, while undertaking leisure activities, etc). Further details have been published elsewhere [1]. The contact survey is based on the POLYMOD contact survey [2].

We selected three time periods (prior-, during, and post-Christmas) to compare contacts over the Christmas periods and compare differences between 2020 and 2021. The time periods were selected to provide at least two panels of participants (approx 2 weeks) and to track anticipated school closures/openings either side of Christmas. In short, this provides roughly two weeks of data prior to Christmas, two weeks during the Christmas holidays, and two weeks in early January. The exact dates used are in Table 1.

We calculated the mean contacts overall and by age and setting prior-to, during, and post the Christmas break in 2020 and 2021. The mean number of contacts is influenced by a few individuals who report very high numbers of contacts (often in a work context). The means shown here are calculated based on truncating the maximum number of contacts recorded at 50 per individual per day. For adults, we compared the mean contacts visually for all contacts, home contacts, home but not households members, work, and social (other). For children, we only compared all contacts.

We constructed age-stratified contact matrices for nine age groups (0 to 4, 5 to 11, 12 to 17, 18 to 29, 30 to 39, 40 to 49, 50 to 59, 60 to 69, and 70+ years old). For child participants and contacts, we did not record exact ages and therefore sampled from the reported age-group with a weighting consistent with the age distribution of contacts for the participants' own age group, according to the POLYMOD survey method. We fitted a negative binomial model censored to 50 per matrix cell, due to dispersion of the reported number of contacts, to calculate mean contacts between each participant and contact age groups. To find the population normalised reciprocal contact matrix, we first multiplied the columns of the matrix by the mean-normalised proportion of the UK population in each age-group.

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References

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