

Inequalities in A&E presentations in Cambridgeshire and Peterborough during the Covid-19 outbreak (September 2020)

The aim of this document is to monitor the trend of A&E presentations across Cambridgeshire and Peterborough and determining whether health inequalities are present. Data is split by (age standardised) quintiles of deprivation and rates are presented over time. Additionally, we analysed presentations by age, sex and ethnicity.

Inequality analysis

A&E presentations were cross-referenced with the LSOA IMD deprivation score of the address where the A&E patients were registered, and rates were age standardised. According to this analysis, in Cambridgeshire and Peterborough **we can observe the presence of a socio-economic gradient in A&E presentations** throughout the last 12 months as, the more deprived an area is, the higher the rate of A&E presentations deriving from its population (figure 1). More precisely, if we compare the rates between the most and least deprived areas over the months, there is a constant difference in presentations, with individuals from quintile 5 (the most deprived) displaying 1.5-times higher presentation rates than quintile 1 (the least deprived) in pre-Covid-19 months. It is unfortunate to see a worsening trend post Covid-19, with more deprived areas having 1.7-fold higher rates than least deprived ones. The largest inequality gap occurred in June 2020 with the presentation rate from the most deprived areas nearly twice that from the least deprived areas (1.9-fold).

From figure 1 we can also appreciate the **marked reduction in presentation for all five quintiles of deprivation that took place in April 2020, probably due to the direct and indirect effects of lockdown measures following Covid-19**. Rates gradually restored to pre-Covid-19 values with a 1.6- to 1.8-fold increase in attendance rates in August when compared to April.

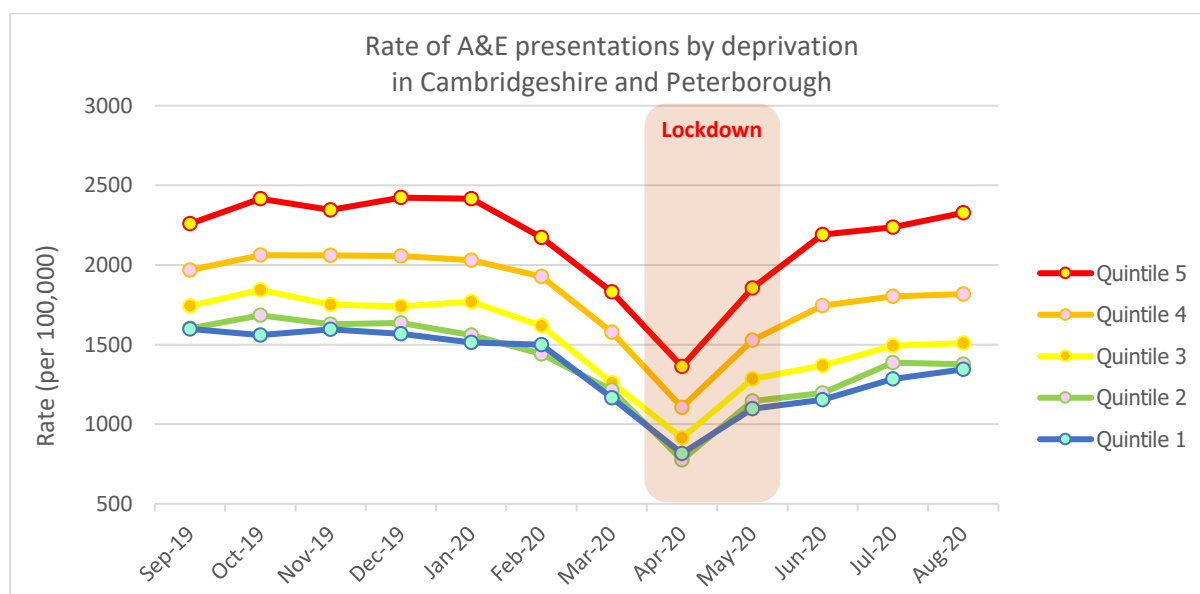


Figure 1. Directly age standardised rates for A&E presentations in Cambridgeshire and Peterborough between September 2019 and August 2020 show the presence of a socio-economic inequality gradient. Quintile 1, least deprived; quintile 5, most deprived. The lockdown period is highlighted in a light red area. See table S1 in the appendix for exact values and confidence intervals.

Analysis by age, sex and ethnicity

The highest percentage of A&E attendances in Cambridgeshire and Peterborough in the last year occurred among younger individuals below forty years of age with age groups 0-9, 20-29 and 30-39 years all around 12% (table 1). However, if we take into consideration the population size of each age group, **elderly people display highest rates** (figure 1A). People over the age of ninety have a rate of 7,849 presentations per 10,000 people, followed by 80-89 years old with rates of 5,040 per 10,000 people (figure 2A and table 1). Rates decrease thereafter with decreasing age.

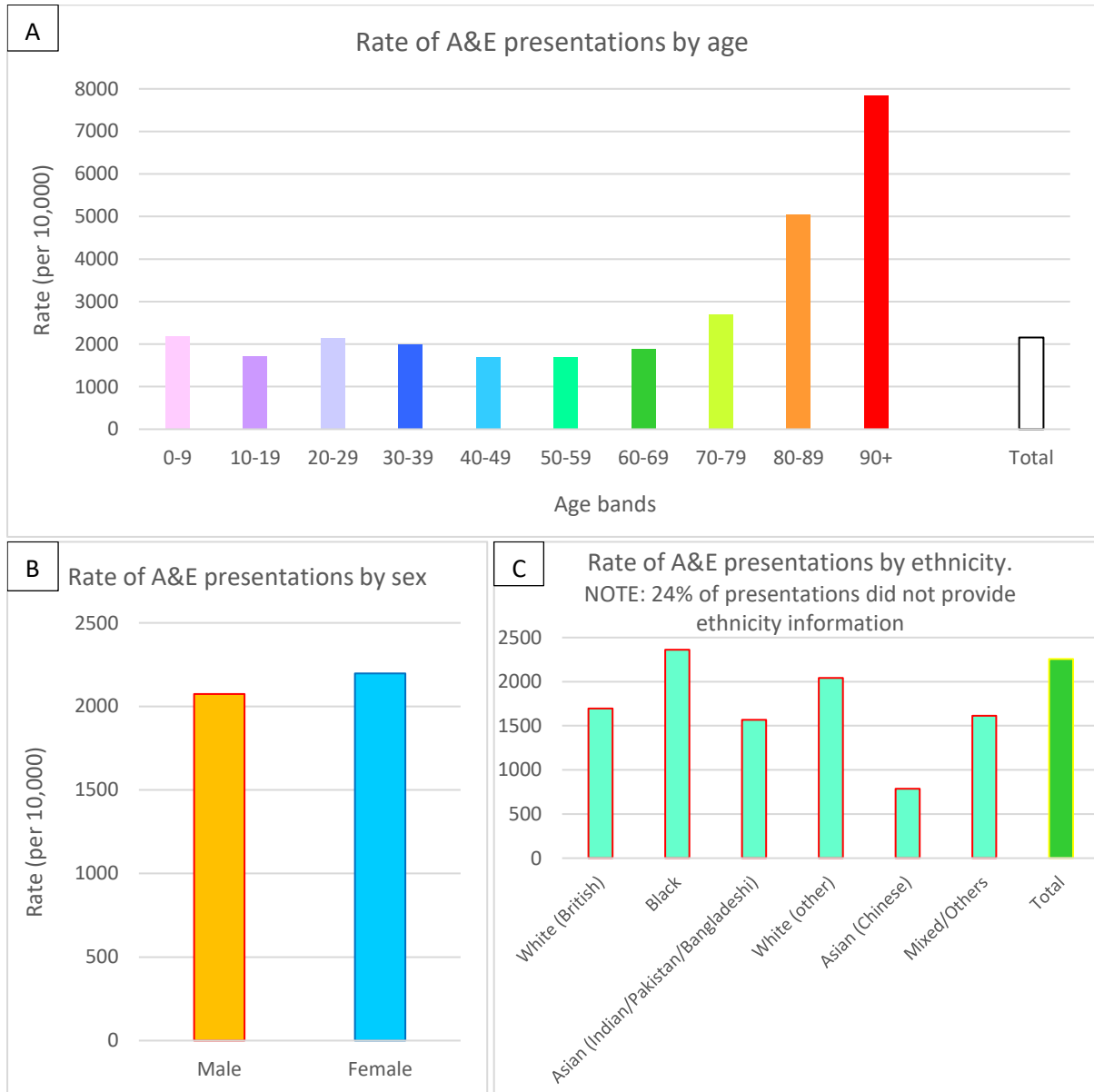


Figure 2. Analysis of A&E presentations in Cambridgeshire and Peterborough by age (A), sex (B) and ethnicity (C) between September 2019 and August 2020. The highest rates of presentations in A&E occur among elderly people. Rates for male and females are comparable. Interestingly, individuals with a black ethnic background display higher rates than white British and also of other ethnic minorities. In contrast, Chinese people show the lowest rates of presentations (**however, this data should be considered with caution as 24% of presentations did not provide ethnicity information**).

Age band (years)	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+	Total
Presentations count	24625	17852	23813	23380	19761	20356	17506	20097	18226	6785	192,401
Percentage	12.8%	9.3%	12.4%	12.2%	10.3%	10.6%	9.1%	10.4%	9.5%	3.5%	100%
Age group population	112,921	103,640	110,510	116,755	117,198	119,798	92,519	74,481	36,161	8,644	892,627
Rate (per 10,000)	2180.7	1722.5	2154.8	2002.5	1686.1	1699.2	1892.2	2698.3	5040.2	7849.4	2155.4
CI (upper)	2208.1	1748.0	2182.4	2028.3	1709.8	1722.7	1920.4	2735.8	5114.0	8038.4	2165.1
CI (lower)	2153.6	1697.3	2127.5	1976.9	1662.7	1675.9	1864.2	2661.1	4967.3	7663.7	2145.8

Table 1. Percentages and rates of A&E presentations in Cambridgeshire and Peterborough by age group between September 2019 and August 2020. The percentages are relative to the overall number of A&E presentations while the rate is taking into consideration the population size of that age group (crude rate). CI = confidence interval.

There is no marked difference in the sex of the people presenting in A&E in Cambridgeshire and Peterborough in the last 12 months as the percentage of male and females presentations was 49% and 51%, respectively (and the rates were 2,074 and 2,197, respectively) (Figure 2B).

	Male	Female	Total
Presentations count	92,591	98,054	190,645
Percentage	48.6%	51.4%	100%
Population	446,414	446,213	892,627
Rate (per 10,000)	2074.1	2197.5	2135.8
CI (upper)	2087.5	2211.3	2145.4
CI (lower)	2060.8	2183.7	2126.2

Table 2. Percentages and sex-specific rates of A&E presentations in Cambridgeshire and Peterborough between September 2019 and August 2020. The percentages are relative to the overall number of presentations while the crude rate takes into consideration the population of the sex group. CI = confidence interval.

In the last year in Cambridgeshire and Peterborough, **the vast majority of A&E attendances occurred among white (British) people** with 61.1% of overall presentations (table 3). However, to better appreciate the contribution of presentations from ethnic minorities, we calculated the rate by dividing the number of presentations for the population size of each ethnicity group. Consequently, the rate of white (British), which comprises the majority of the population in our CCG, is in line with other ethnicities (1,696 patients per 10,000) (figure 2C and table 3). The highest rate is noticed among black patients with of 2,360 presentations per 10,000 population, while Chinese people have the lowest rate with 786 patients per 10,000. However, this data should be taken into consideration with caution as almost a fourth of presentations (24%) did not have the ethnicity information recorded. For the full list of ethnicity groups see table 3.

	White (British)	Black	Asian (Indian/Pakistani/Bangladeshi)	White (other)	Asian (Chinese)	Mixed /Others	Not stated	Total
Presentations count	117,633	2,182	4,869	14,170	632	6,645	46,270	192,401
Percentage	61.1%	1.1%	2.5%	7.4%	0.3%	3.5%	24%	100%
Population	693,645	9,244	31,044	69,398	8,045	41,146		852,522*
Rate (per 10,000)	1695.9	2360.5	1568.4	2041.8	785.6	1615.0		2256.8
CI (upper)	1705.6	2461.6	1613.1	2075.7	849.3	1654.3		2266.9
CI (lower)	1686.2	2262.4	1524.7	2008.4	725.5	1576.4		2246.8

*The population size (and hence the rates) from table 1-2 and table 3 are estimates and differ due to the fact that the recording of ethnicity was calculated by the Cambridgeshire Public Health Intelligence Team from the ONS Census 2011 (table QS211EW) and applied to ONS Mid-2018 population estimates (1).

Table 3. Percentages and ethnicity-specific rates of A&E presentations in Cambridgeshire and Peterborough between September 2019 and August 2020. The percentages are relative to the overall number of presentations while the rate is adjusted for the population of that ethnicity group. CI = confidence interval.

Summary

- In Cambridgeshire and Peterborough, in the last year (between September 2019 and August 2020) **there was a noticeable socio-economic inequality in A&E presentations** when analysed by deprivation quintile.
- There was a reduction in presentations around April 2020 for all quintiles of deprivation probably due to the Covid-19 lockdown measures. However, the number of presentations increased again since May 2020 and **the inequality gap has widened since then from 1.5 to 1.7 times higher attendance rates when the most deprived quintile is compared with the least deprived.**
- **The age group with the highest rate of A&E attendances is the elderly aged over 90 years old, followed by patients aged 80-89 years.**
- **The proportion of male to female presentations is comparable.**
- **Individuals with an ethnic black background have the highest rate of A&E presentations, followed by people with 'Irish and any other white background' and white British (although 24% of presentations were missing ethnicity information).**

Methods:

In order to assess whether between September 2019 and August 2020 there were differences linked to inequality in rates of A&E presentations across the Cambridgeshire and Peterborough population, we obtained the raw ECDS data with the number of daily A&E presentations (for Addenbrooke's Hospital, Hinchingbrooke, Peterborough City Hospital and The Queen Elizabeth Hospital). To detect any deprivation-linked differences, patient presentations in A&E were cross-referenced with the deprivation score of the LSOA from the patients' registered home addresses. LSOAs were first ranked by their deprivation score using the Index of Multiple Deprivation (IMD) Score from 2019 and then split into quintiles of comparable populations. Data was split into monthly presentations and for comparison reasons we calculated (directly standardised) rates per 100,000 population and their confidence intervals (see table S1 in the appendix). The European population was used as reference (ESR) and data was age-standardised by treating each quintile as a different population using formulas from the PHE analytical tool (2). Population estimates for analysis by deprivation at LSOA-level were from ONS Mid-2019 population estimates (3).

For the age, sex and ethnicity analysis, the population was split, respectively, in ten age groups (0-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80-89 and over 90 years of age), two sex groups (male and females) and six groups for ethnicity: white (British), Black (comprising African, Caribbean and any other black background), Asian (Indian, Pakistani, Bangladeshi), Asian (Chinese), white other Irish and any other white background), mixed/others (any other ethnic group, any other mixed background, white and black African, white and black Caribbean, white and Asian and any other Asian background). The rate per 10,000 was calculated by dividing for the respective population size of that group using the ONS Mid-2019 population estimates (3) - except for ethnicity where population estimates were taken from Cambridgeshire Insight which were calculated by the Cambridgeshire Public Health Intelligence Team from the ONS Census 2011 (Table QS211EW) and applied to ONS Mid-2018 population estimates (1).

Limitations:

Unfortunately, around 2.5% of the A&E attendances were not included in the inequality analysis of figure 1 because they were missing the LSOA registration (2%) or occurred among individuals from outside our CCG (0.5%). In the sex analysis, less than 1% of presentations were recorded under the sex category as 'not known', hence have been omitted from the analysis by sex.

References

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3. **ONS**. Lower layer Super Output Area population estimates (supporting information) . *Office of National Statistics*. [Online] 2019. <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/lowersuperoutputareamidyearpopulationestimates>.

Appendix

2019/20												
	Sep-19			Oct-19			Nov-19			Dec-19		
	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)
Quintile 1	1598.2	1539.8	1658.1	1559.4	1501.9	1618.6	1595.4	1537.1	1655.4	1566.6	1509.0	1625.8
Quintile 2	1600.7	1542.3	1660.7	1683.5	1618.6	1745.0	1626.9	1655.4	1687.3	1636.2	1625.8	1696.7
Quintile 3	1741.9	1681.2	1804.1	1741.9	1781.0	1907.1	1750.8	1690.2	1813.0	1741.0	1680.7	1803.0
Quintile 4	1967.2	1902.0	2034.0	1967.2	1994.2	2129.5	2060.5	1993.9	2128.8	2056.2	1989.6	2124.4
Quintile 5	2259.8	2189.0	2332.2	2259.8	2342.8	2491.5	2345.4	2273.1	2419.3	2422.9	2349.6	2497.7
2020												
	Jan-20			Feb-20			Mar-20			Apr-20		
	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)
Quintile 1	1512.2	1455.5	1570.6	1499.9	1443.3	1558.1	1165.8	1115.9	1217.4	816.3	774.4	859.7
Quintile 2	1559.6	1570.6	1618.7	1440.8	1558.1	1497.7	1212.7	1217.4	1265.1	774.9	859.7	817.0
Quintile 3	1768.6	1707.7	1831.1	1618.6	1560.3	1678.5	1260.8	1209.3	1313.9	914.3	870.4	959.7
Quintile 4	2030.3	1964.0	2098.2	1927.2	1862.6	1993.5	1576.6	1518.1	1636.7	1106.1	1057.0	1156.8
Quintile 5	2416.1	2342.7	2491.1	2173.3	2103.9	2244.5	1831.7	1768.2	1896.9	1362.4	1306.6	1419.9
	May-20			Jun-20			Jul-20			Aug-20		
	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)	Rate	CI (low)	CI (up)
Quintile 1	1096.7	1048.3	1146.7	1153.0	1103.5	1204.1	1283.6	1231.4	1337.5	1343.7	1290.1	1399.0
Quintile 2	1144.8	1146.7	1195.8	1196.5	1204.1	1248.6	1385.6	1337.5	1441.6	1377.4	1399.0	1433.2
Quintile 3	1284.8	1232.7	1338.6	1367.9	1314.2	1423.2	1492.5	1436.2	1550.4	1509.5	1453.0	1567.5
Quintile 4	1526.6	1468.8	1586.0	1743.4	1681.7	1806.8	1802.7	1740.1	1867.0	1817.5	1754.5	1882.1
Quintile 5	1854.0	1789.3	1920.3	2190.6	2120.4	2262.5	2237.5	2166.3	2310.3	2327.8	2255.5	2401.9

Table S1: Directly (age standardised) rates of A&E presentations in Cambridgeshire and Peterborough by deprivation quintiles between September 2019 and August 2020. Deprivation is calculated at LSOA level.

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Source: ECDS data was kindly extracted by M.T. (Business Intelligence);

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