GIG CYMRU NHS WALES
Iechyd Cyhoeddus Cymru
Public Health Wales

# Heat Morbidity Monitoring in Wales

# Annual Surveillance Report 2024

13th November 2025

# Key Messages

**Heat periods associated with increased emergency healthcare demand, even without national heatwaves.**
Localised heat episodes in 2024 were associated with increased 999 calls, A&E attendances, and GP consultations, especially for psychological and gastrointestinal conditions. However, these were not statistically significant. Moreover, this does not imply a causal relationship between heat exposure and health impact.

**Children, older adults, and urban residents show signs of vulnerability.**
A&E attendances for gastrointestinal issues rose 83% among children aged 0-16, and psychological/psychiatric attendances increased 90% in urban areas during the heat period.

**Enhanced surveillance is needed to detect early signals of heat-related illness.**
While many trends were not statistically significant, consistent patterns suggest that even moderate heat can strain health services. Improved data collection and modelling will help guide public health action.

# Executive Summary

| Indicator | Overall significance of immediate heat effect in general population* | Overall significance of delayed effect of heat effect in general population* | Demographics with statistically significant incidence rate ratio | Demographics to monitor (elevated incidence rate ratio, not statistically significant) |
|---|---|---|---|---|
| 999 – Cardiac/Respiratory Arrest | | | - | Aged 17 to 64, 65 and over, Males |
| 999 - Drowning | | | - | - |
| 999 - Fitting | | | - | Aged 65 and over |
| 999 – Heat exposure | | | - | - |
| 999 - Stroke | | | - | Males |
| 999 - Unconscious | | | - | Aged 0 to 16 |
| 999 – Psychiatric/Suicide attempt | | | - | Aged 0 to 16, 65 and over |
| Accident and emergency attendance(A&E) - Cardiac | | | - | WIMD Quintile 2 and 5, Rural areas |
| A&E - Gastrointestinal | | | Aged 0 to 16 | Aged 65 and over, and WIMD Quintile 4 and 5 |
| A&E – Heat exposure | | | - | - |
| A&E - Neurological | | | - | WIMD Quintile 2 and 3 |
| A&E - Respiratory | | | - | - |
| A&E – Psychological/Psychiatric | | | Urban areas | Males, Females, Aged 17 to 64 and WIMD Quintile 1, 4 and 5, Rural areas |
| GP Consultation - Heatstroke | | | - | - |

* There were no national heatwaves declared in Wales in 2024, however localised heatwave thresholds were met in Aneurin Bevan, Cardiff and Vale and Swansea Bay University Health Board areas between the 29th of July and the 1st of August.

Elevated incidence rate ratio, statistically significant

Monitor (Elevated IRR, no significance)

No increase

Not tested due to small numbers or Insignificant IRR -

## Heat periods

- There were no national heatwaves declared in Wales in 2024, however localised heatwave thresholds were met in Aneurin Bevan, Cardiff and Vale and Swansea Bay University Health Board areas **between the 29th of July and the 1st of August**.
- We compared 999 calls and Accident & Emergency (A&E) attendances in Wales during this heat period with two reference periods: the preceding 5 days (baseline) and the 14 days following the heat period (lag), to detect immediate and delayed health impacts.

## Statistically significant outcomes

- There were no statistically significant increases in incident rate ratio (IRR) at the population level in Wales, when comparing each of the heat and lag periods with the baseline.
- However, some demographic groups showed an increase in some of these outcomes (see below).

## Outcomes to monitor

- Comparing the **heat** with baseline periods, though not statistically significant, there were increased IRRs for:
    - 999 calls related to fitting:
    - A&E attendances categorised as 'psychological/psychiatric' (and while this was not statistically significant at a population level, it did show significance in urban areas);
    - GP consultations for heatstroke.
- Comparing the **lag** with baseline periods, though not statistically significant, there was an increased IRR for A&E attendances categorised as 'psychological/psychiatric'.

## Demographic groups with statistically significant outcomes

- There were many outcomes not significant at a population level, however certain demographic groups may warrant further monitoring:
    - Gastrointestinal A&E attendances increased **83%** in children aged 0-16.
    - Psychological/psychiatric A&E attendances increased by **90%** in Urban areas.

# Contents

# 1. Background

Climate change is increasingly impacting public health, with rising temperatures posing a significant threat to human life. In Wales, as in other parts of the United Kingdom, heat periods have become more frequent and intense, leading to increased emergency hospital admissions [1, 2]. The summer of 2024 in Wales was cooler than average since 2015 with a mean temperature of 14.25°C, which is 0.38°C below 1991-2020 average, primarily due to a south-shifted jet stream bringing cold Artic air to the UK in June and July [3]. In addition to strengthening efforts to address climate change, it is crucial to prioritise adaptation measures to safeguard public health, prevent fatalities, and minimise the health impacts of extreme heat events and the broader effects of climate change. The Well-being of Future Generations (Wales) Act 2015 provides a crucial legislative framework for addressing climate adaptation across the health and social care sector [4].

During the summer of 2024, national temperatures in Wales did not meet the criteria for a heatwave or heat period threshold. However, three health boards, Aneurin Bevan University health board (UHB), Cardiff and Vale, and Swansea Bay UHBs recorded localised heatwave episodes between 29th July and 1st August, with Swansea Bay's episode ending on 31st July. As a result, the heat period for Wales was defined as 28 July to 2 August 2024 in this report.

This report aims to assess the impact of heat period on emergency healthcare demand in Wales by comparing the number of 999 calls to the Welsh Ambulance Service Trust (WAST), accident and emergency (A&E) department attendances, and general practitioner (GP) consultations for heatstroke during the heat period, baseline, and lag periods. The analysis focuses on incident types potentially related to heat exposure and stratifies findings by age, sex, socioeconomic status (Welsh Index of Multiple Deprivation), and rural-urban classification. Additionally, the report evaluates geographical distribution across Welsh health boards for 999 calls and applies statistical methods to compare incidence rates across the three periods.

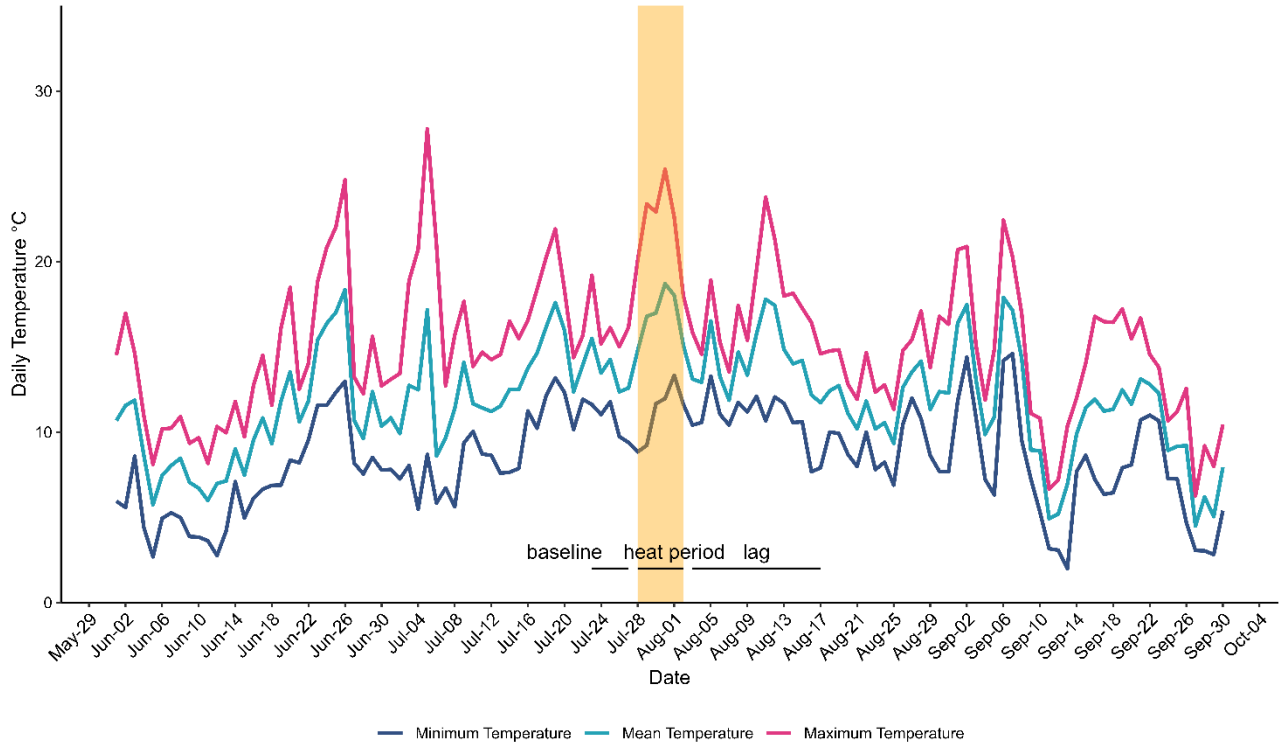


Figure 1 – Daily minimum, mean and maximum temperatures (°C) in Wales for the summer months, depicting the heat episode defined in the report. The orange shading depicts the heat episode, and the black bars at the bottom also define the baseline and lag periods.[1]

[1] During the summer of 2024, national temperatures in Wales did not meet the criteria for a heatwave or heat period threshold. However, three health boards, Aneurin Bevan University health board (UHB), Cardiff and Vale, and Swansea Bay UHBs recorded localised heatwave episodes between 29th July and 1st August, with Swansea Bay's episode ending on 31st July. As a result, the heat period for Wales was defined as 28 July to 2 August 2024 in this report.

# 2. Syndromic Surveillance

The effects of extreme heat on health are well documented [5, 6, 7], signalling the need for timely surveillance of such events. The validity of ambulance dispatch call data for rapid syndromic surveillance of the health impacts of severe weather events has previously been established [8].

Accordingly, we compared the number of 999 calls to the Welsh Ambulance Service Trust (WAST) during the heat period with the number of 999 WAST calls during a 5-day period preceding each heat period (baseline). To detect any potential delayed health effects, we also measured call rates in a 14-day period after each heat period (lag). To capture possible heat-related health effects, calls with the following incident descriptions were collected: Cardiac/Respiratory Arrest, Drowning, Fitting, Heat exposure, Stroke, Unconscious and Psychiatric/Suicide attempt.

In addition, we measured attendance at accident and emergency (A&E) departments during the three episodes (baseline, heat period, lag). Using A&E diagnostic codes (NHS Wales Data Dictionary), we categorised the following possible heat-related attendances at A&E:

**Cardiac**: Myocardial infarction (16A), Vascular condition(16B), Cardiovascular Conditions, other or unspecified (16Z).
**Gastrointestinal**: Gastrointestinal Conditions (18Z).
**Heat Exposure**: Sunburn (07E), Hyperthermia (07F).
**Neurological**: Seizure/convulsion (17A), Cerebrovascular event (17B).
**Respiratory**: Asthma (14A), COPD (14B), Respiratory conditions, other or unspecified (14Z).
**Psychological/Psychiatric**: psychological/psychiatric (21Z)

As susceptibility to the effects of extreme heat may be related by subgroup, we examined the incidence of heat-related 999 calls, and A&E attendance by sex and age-category (0-16, 17-64 and 65 and over), socioeconomic status as measured by Welsh Index of Multiple Deprivation (WIMD) quintile, and rural urban classification and calculated stratified rates. For this report it was possible to compute only data from A&E for WIMD and rural urban classification. The geographical distribution of 999 calls by Welsh health boards was also determined. Finally, we collated GP consultations for heatstroke during the same episodes (baseline, heat period, lag).

As there is considerable day to day fluctuations in 999 calls and A&E attendances, generally peaking around the weekend, we smoothed out this day effect by depicting the median, interquartile range and full range of daily call numbers with box plots. To compare incidence between the three episodes, we calculated incident rate ratios and 95% confidence intervals. Total counts fewer than five for 999 calls and A&E attendances were suppressed in this report to maintain confidentiality and data reliability. Heat exposure and drowning-related 999 calls were excluded from stratified analyses due to low numbers. A&E attendances for heat exposure were similarly suppressed.

# 3. Summary of findings

## 3.1 999 Calls

As seen in Figure 2, while there was an increase in fitting 999 calls in the heat period versus baseline [incidence rate ratio (IRR) of 1.15 (95% CI: 0.96–1.37, $p$ = 0.13)], this was not statistically significant. There were no significant delayed increases (lag period versus baseline) in any of the 999 call types.

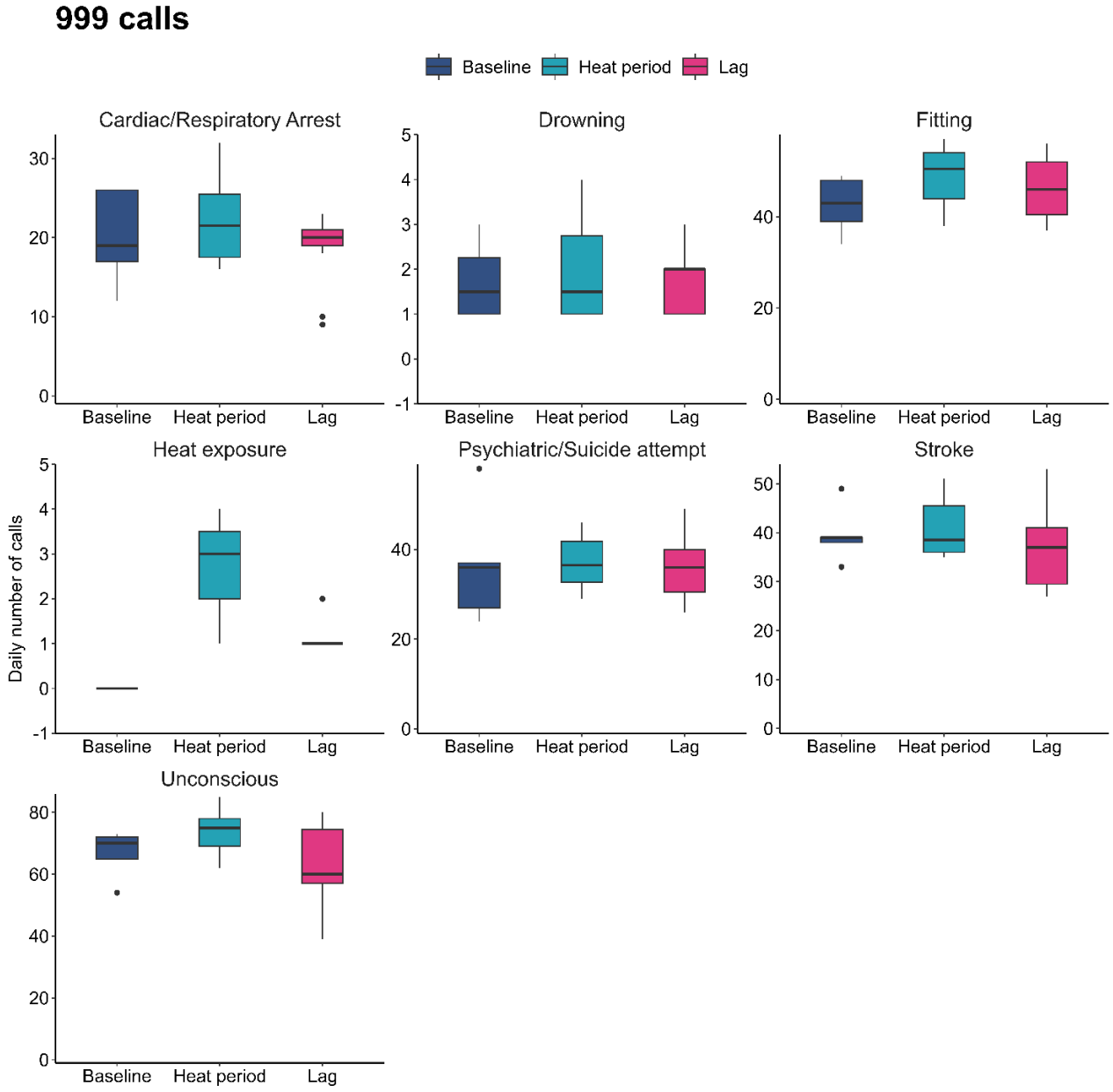


Figure 2 – Daily number of 999 calls for possible heat-related incidents during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

### 3.1.1. 999 calls by age group.

Calls categorised as 'Cardiac/Respiratory arrest' rates were higher during the heat period relative to baseline among those aged 17–64 with an IRR of 1.36 (95% CI: 0.86–2.14, $p$ = 0.18) and among those aged 65+ with an IRR of 1.30 (95% CI: 0.85–1.97, $p$ = 0.22). During the lag period relative to baseline, there was an increase in those aged 65+ with an IRR of 1.31 (95% CI: 0.91–1.88, $p$ = 0.15) (Figure 3).[2]

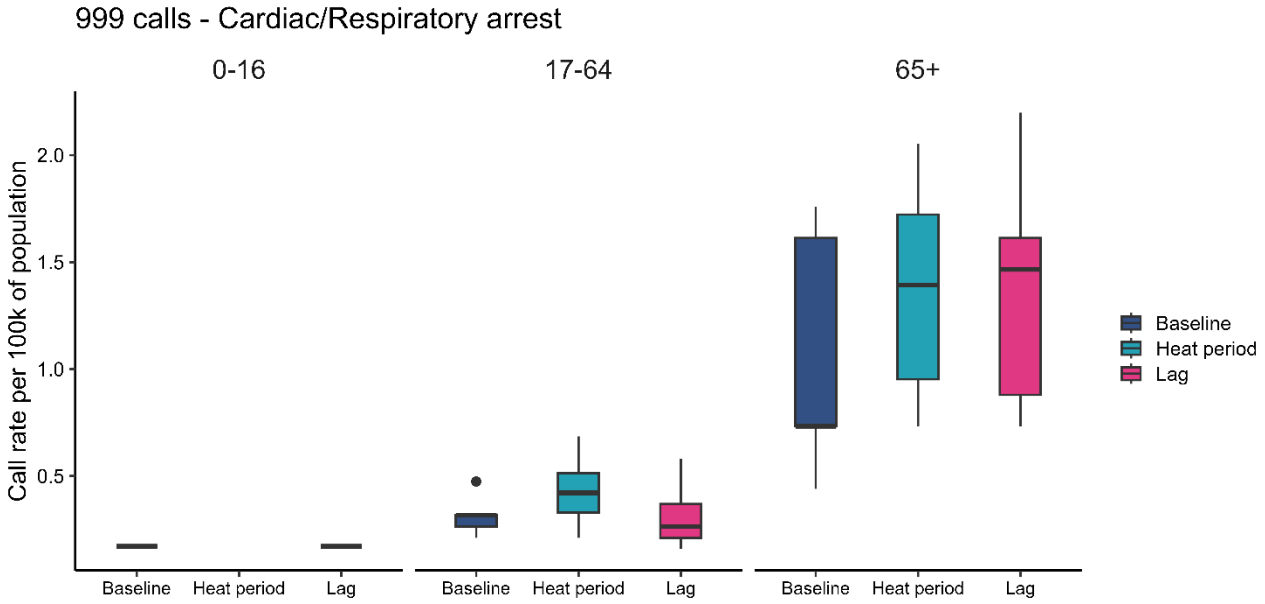


Figure 3 – Age-stratified daily 999 call rates (per 100,000 population) categorised as 'cardiac/respiratory arrest' during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

Also, for calls categorised as 'Fitting', the rates were higher among those aged 65+ during the heat period relative to baseline with an IRR of 1.44 (95% CI: 0.95–2.16, $p$ = 0.08) and during the lag period relative to baseline with an IRR of 1.20 (95% CI: 0.83–1.74, $p$ = 0.32) (Figure 4). Although these increases were not statistically significant, they suggest a potential trend worth monitoring in older adults.

[2] *Age information was not documented for 1,520 (5.2%) of the 29,359 calls recorded during this period.*

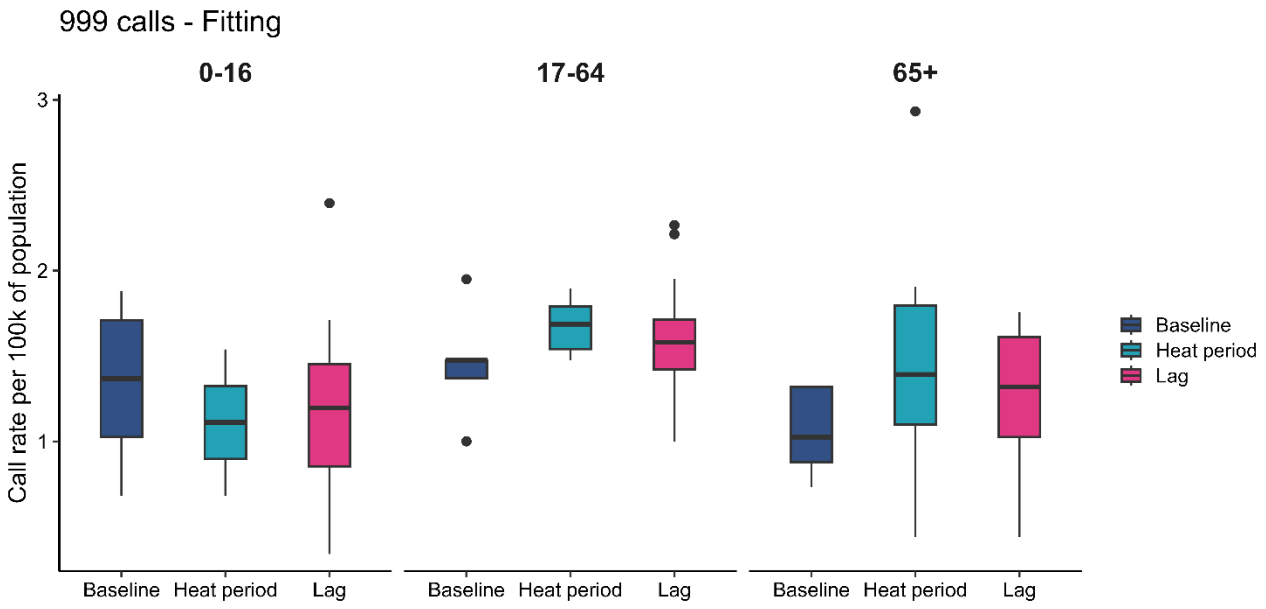


Figure 4 – Age-stratified daily 999 call rates (per 100,000 population) categorised as 'fitting' during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

There was no evidence in the increase in incidence of calls categorised as 'Stroke' during this period (Figure 5).

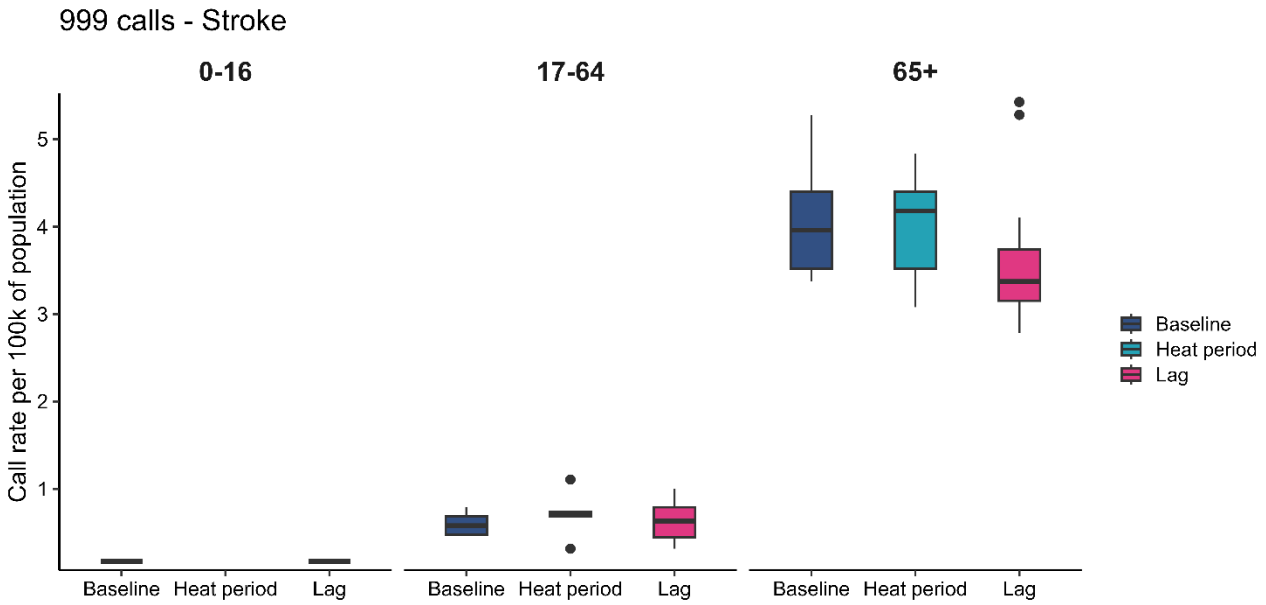


Figure 5 – Age-stratified daily 99 call rates (per 100,000 population) categorised as 'stroke' during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

For calls categorised as 'Unconscious' in children aged 0–16, there was a non-statistically significant increase in the call rates during the heat period relative to baseline with an IRR of 1.25(95% CI: 0.59–2.67, $p = 0.56$), and during the lag period relative to baseline the IRR was 1.37 (95% CI: 0.73–2.58, $p = 0.33$) as shown in Figure 6.

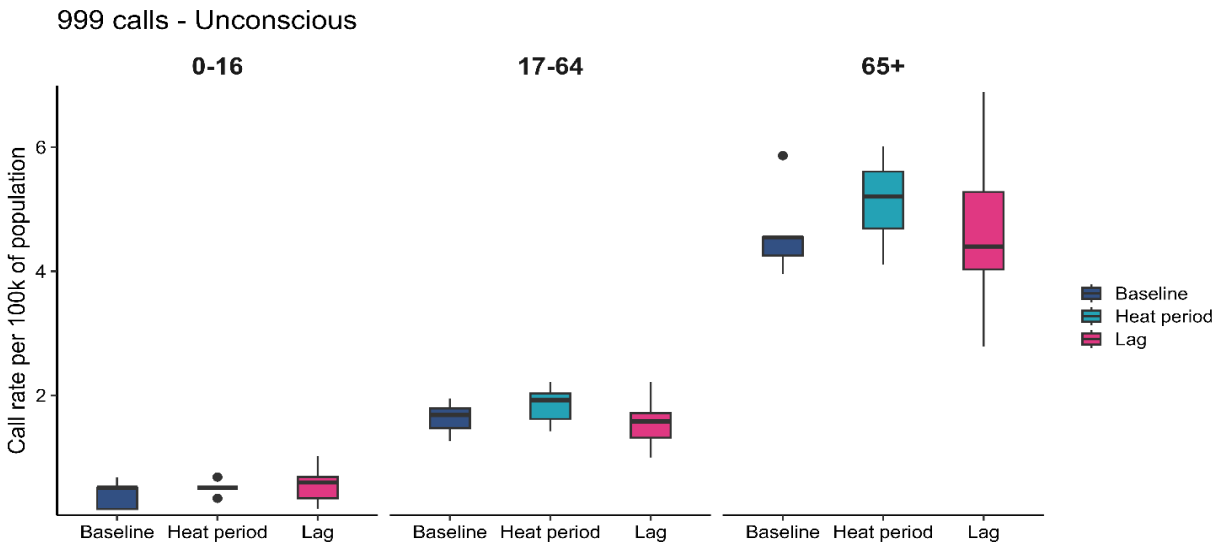


Figure 6 – Age-stratified daily 999 call rates (per 100,000 population) categorised as 'unconscious' during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

Finally, calls categorised as 'Psychiatric/suicide attempt', call rates were higher during the lag period relative to baseline among those aged 65+ with an IRR of 1.26 (95% CI: 0.76–2.09, $p = 0.36$) and among children aged 0–16 with an IRR of 1.56 (95% CI: 0.37–6.60, $p = 0.54$) as shown in Figure 7. Again, these were not statistically significant.

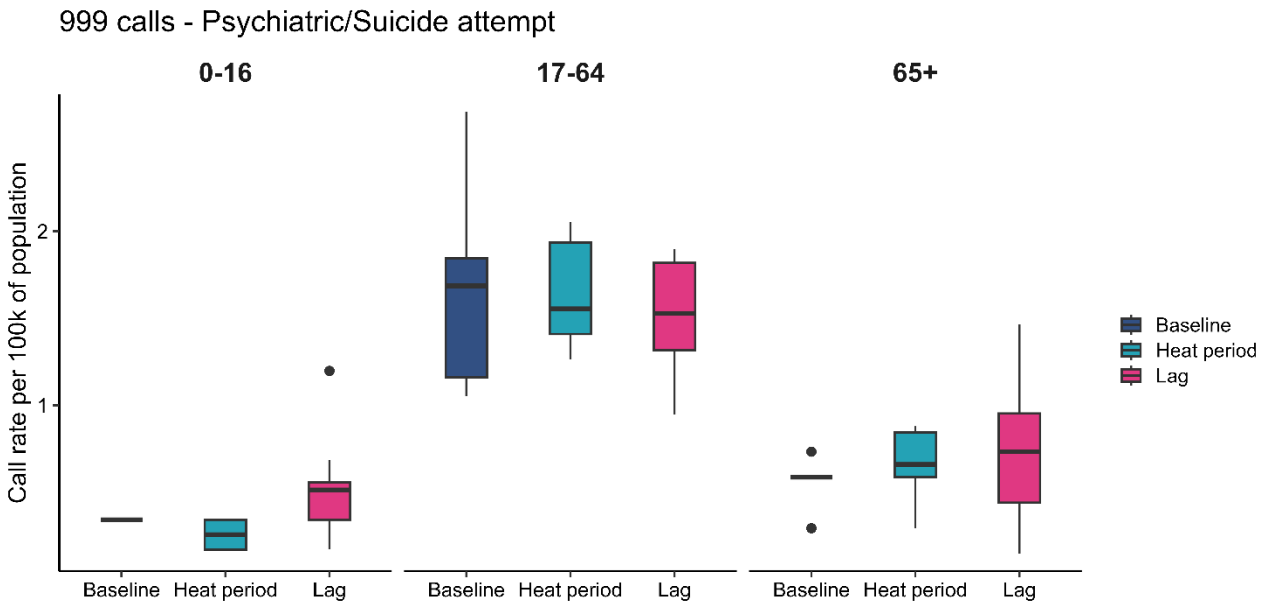


Figure 7 – Age-stratified daily 999 call rates (per 100,000 population) categorised as 'psychiatric/suicide attempt' during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

### 3.1.2. 999 calls by sex

For calls categorised as "Cardiac/respiratory arrest" among males rates were elevated during the heat period relative to baseline period with an IRR of 1.46 (95% CI: 0.97–2.2, *p* = 0.07) and during the lag period relative to baseline with an IRR of 1.31 (95% CI: 0.91–1.9, *p* = 0.14), although these were not statistically significant.[3]

Among males, stroke-related calls were more frequent during the lag period relative to baseline with an IRR of 1.24 (95% CI: 0.97–1.59; p = 0.07) as shown in Figure 8, though this increase was not statistically significant.

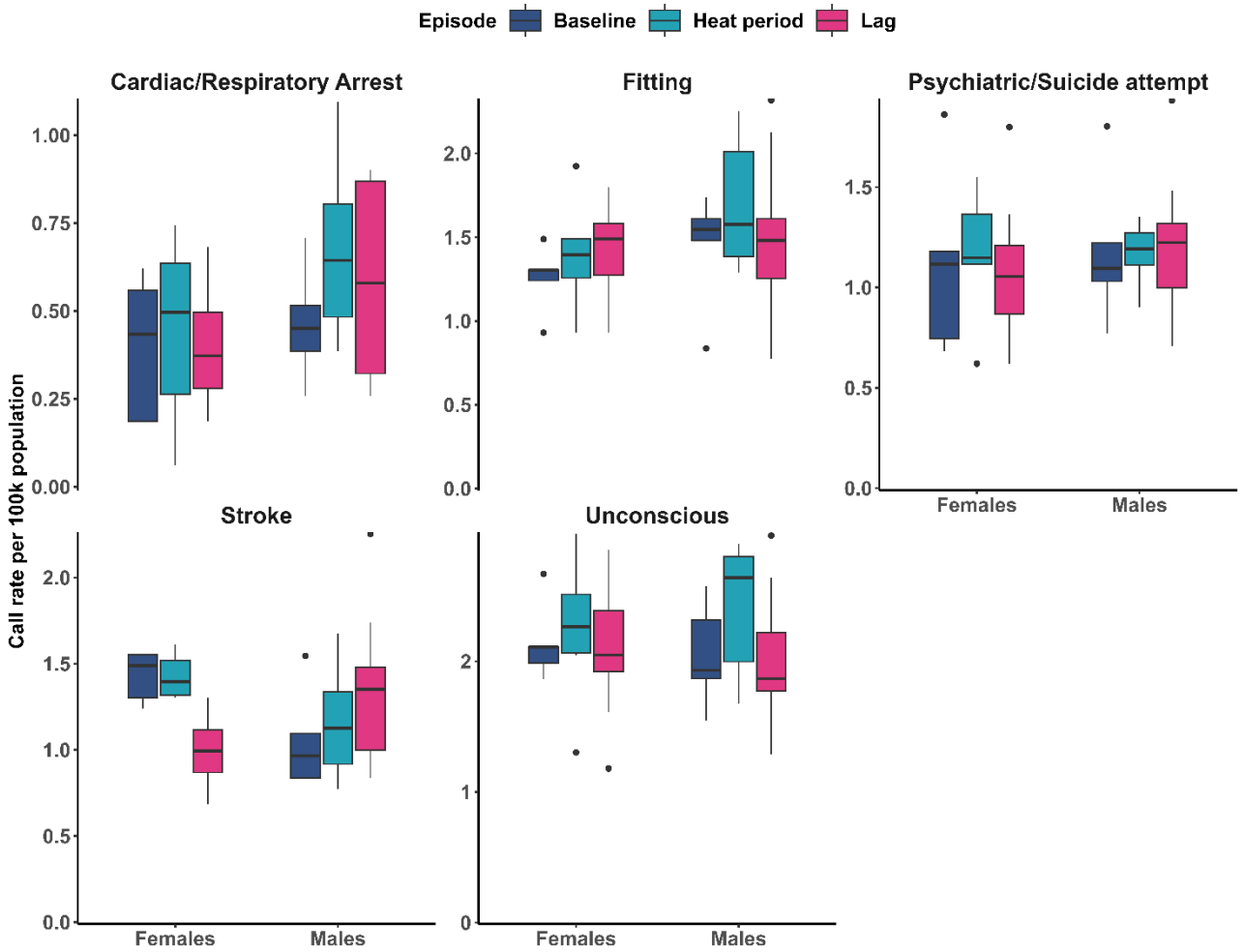


Figure 8 – 999 call rates (per 100,000 population) by sex during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5x IQR, dots denote outliers beyond this range.

[3] *Sex information was not documented for 1,884 (6.4%) of the 29,359 calls recorded during this period.*

### 3.1.3. 999 calls by health board

During the heat period, compared with the baseline, the highest call rates were recorded in Betsi Cadwaladr UHB (increasing from 7.8 to 9.0 per 100,000 of population), Swansea Bay UHB (5.8 to 7.5 per 100,000), and Cardiff and Vale UHB (6.8 to 7.1 per 100,000). Additional increases were observed in Aneurin Bevan UHB, Powys THB, and Cwm Taf Morgannwg UHB, whereas Hywel Dda UHB experienced a reduction.

When comparing the baseline to the lag period, the largest relative increases occurred in Powys THB (5.2 to 6.4 per 100,000), Swansea Bay UHB (5.8 to 6.5 per 100,000 of population), and Cwm Taf Morgannwg UHB (5.9 to 6.1 per 100,000 of population).

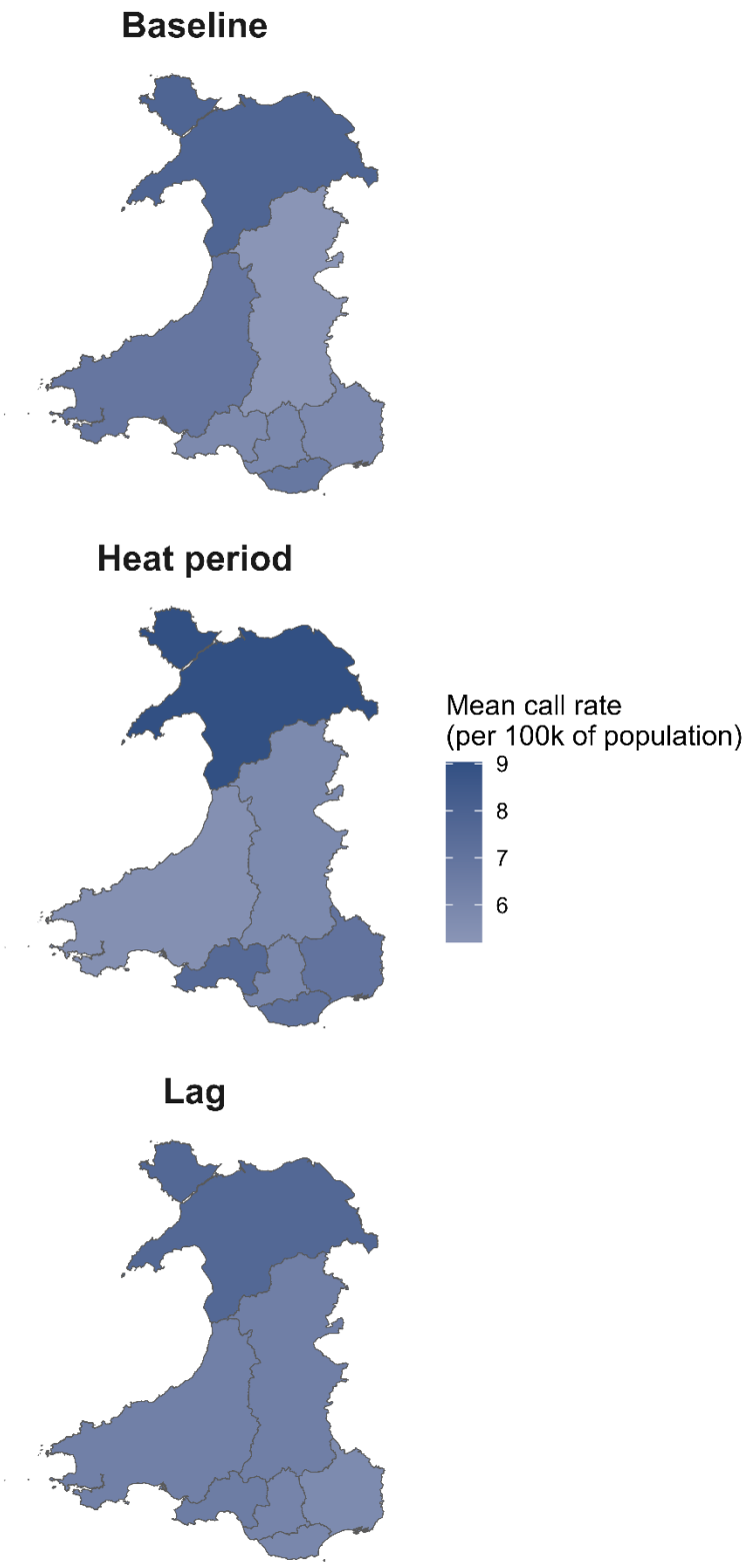


Figure 9 – Mean 999 call rate by health board (per 100,000 population) during the baseline, heat period and lag period.

## 3.2. Accident and emergency attendance.

A total of 3,242 A&E attendances for the conditions monitored were recorded within this period. There was little evidence that attendance at A&E for possible heat-related conditions increased during the heat period relative to baseline (Figure 10). This may reflect the considerable variance in the data. However, attendance for psychological/psychiatric presentations were higher during the heat period relative to baseline, IRR of 1.40 (95% CI: 0.95–2.06, $p$ = 0.09), and during the lag period relative to baseline with an IRR of 1.20 (95% CI: 0.85–1.70, $p$ = 0.29) as a shown in Figure 10. These increases in attendance were not statistically significant.

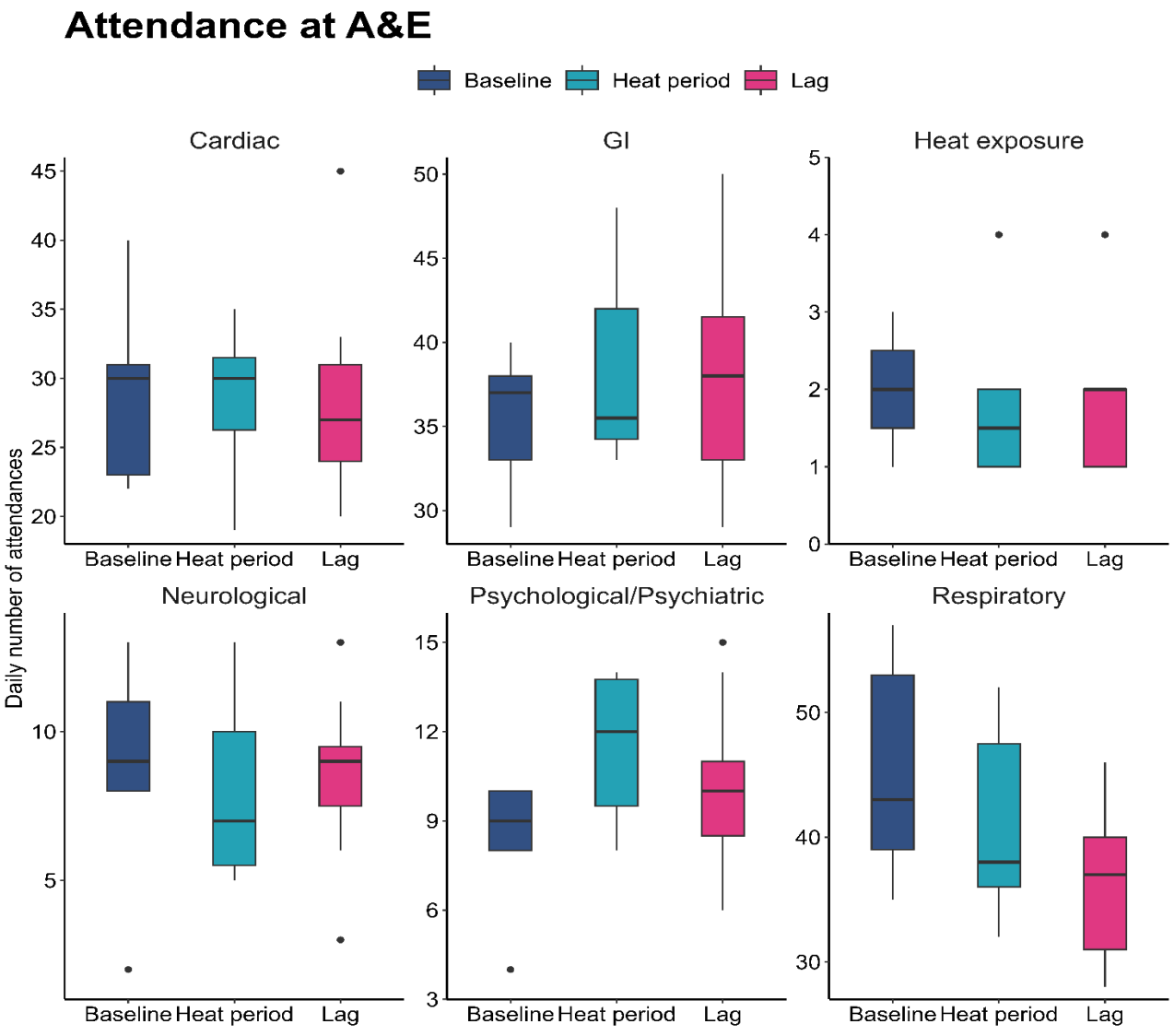


Figure 10 – Daily attendance at A&E for possible heat-related incidents during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

### 3.2.1. Accident and emergency attendance by age group

There were no statistically significant IRRs for cardiac-related A&E attendances in any age group, when comparing heat or lag periods with baseline (Figure 11).

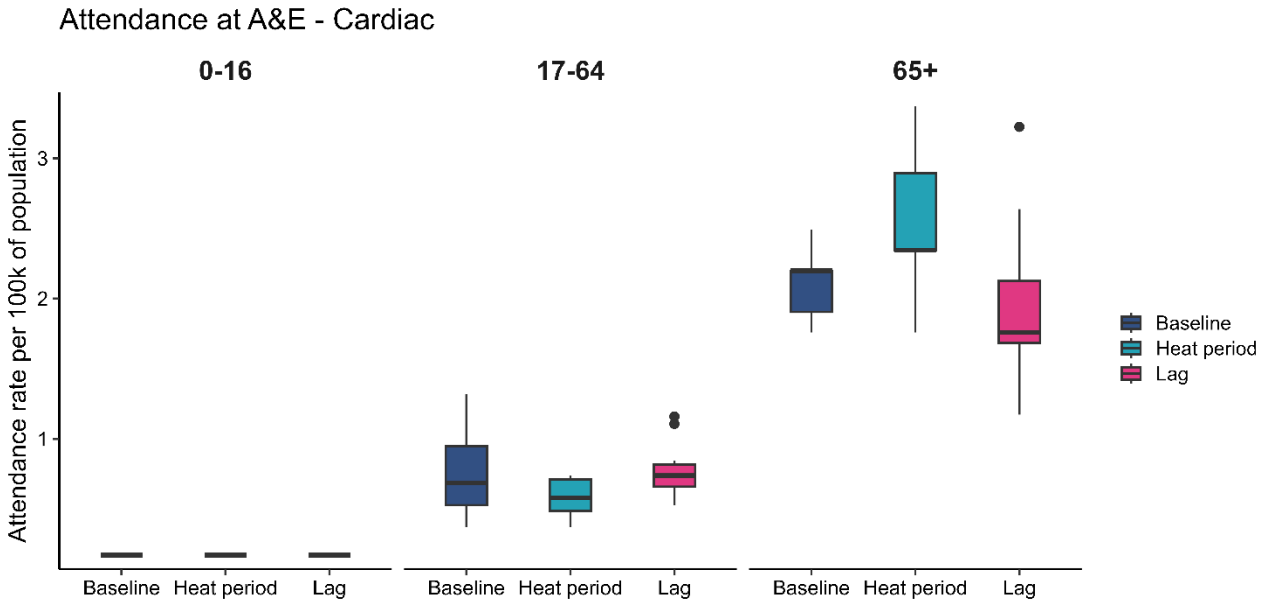


Figure 11 – Age-stratified A&E attendance rates (per 100,000 population) for cardiac conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

Among children aged 0–16 years, gastrointestinal attendances were (Figure 12):

- Statistically significantly higher during the heat period relative to baseline with an IRR of 1.83 (95% CI: 1.08–3.11, $p < 0.05$);
- Higher during the lag period relative to baseline with an IRR of 1.43 (95% CI: 0.88–2.33, $p = 0.15$), but not statistically significant.

Statistically insignificant increases were observed for gastrointestinal attendances among older adults (65+) during the heat period relative to baseline with an IRR of 1.35 (95% CI: 0.95–1.94, $p = 0.10$).

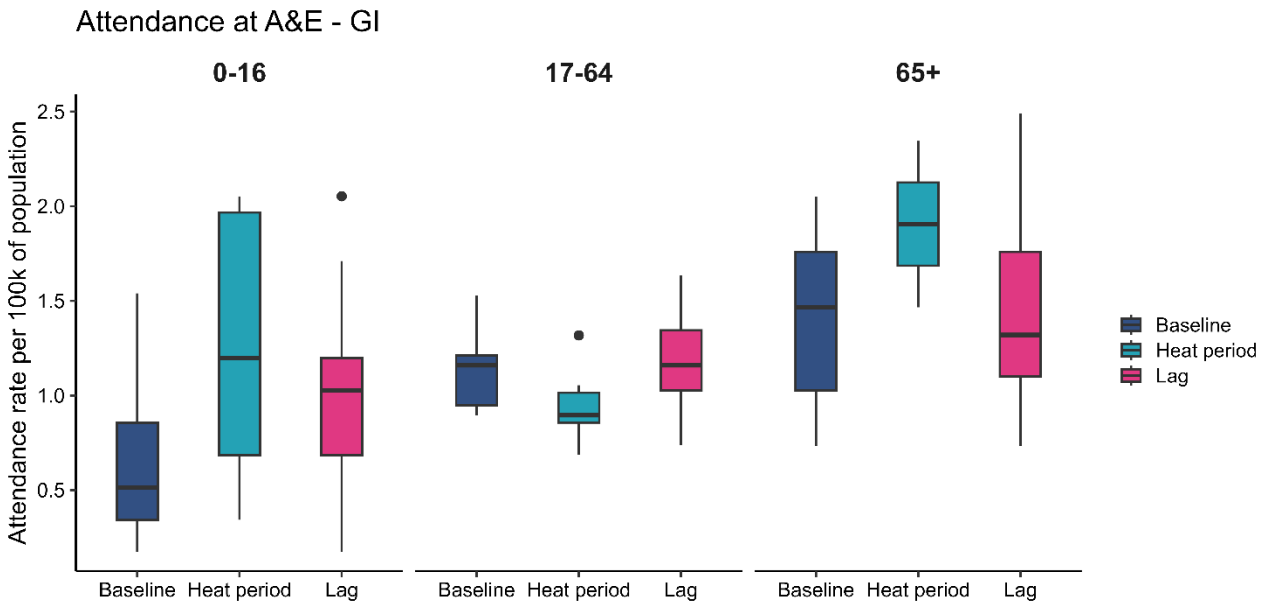


Figure 12 – Age-stratified A&E attendance rates (per 100,000 population) for gastrointestinal conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

Neurological attendances rates were not significantly increased in the heat or lag periods across all age groups (Figure 13).

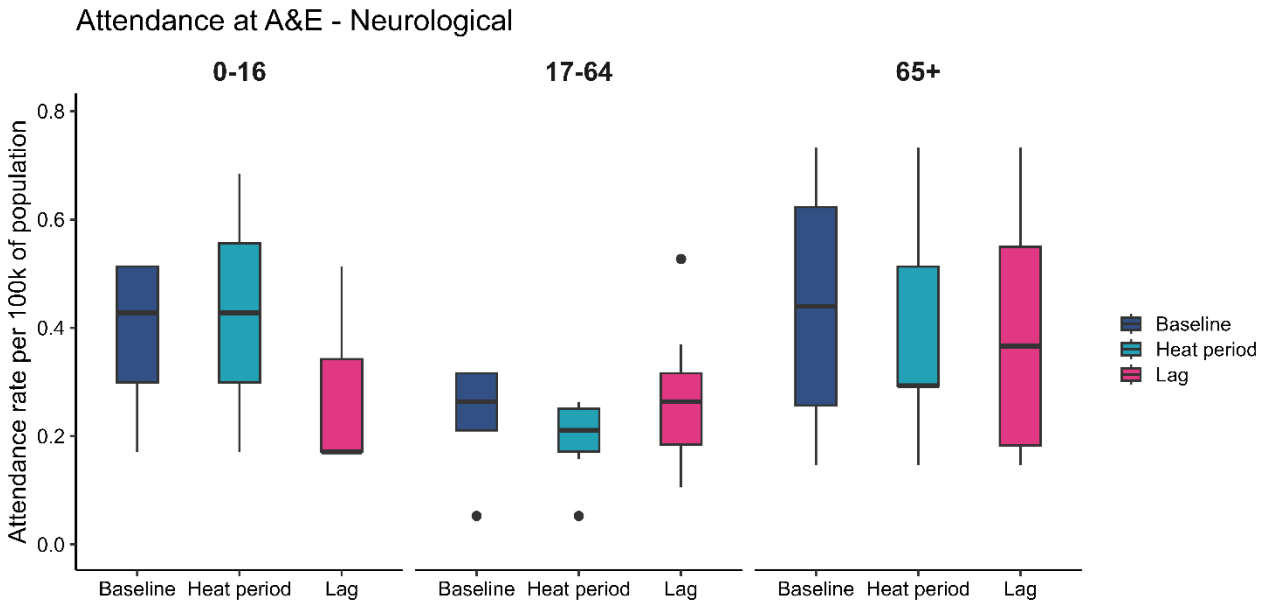


Figure 13 – Age-stratified A&E attendance rates (per 100,000 population) for neurological conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

Respiratory conditions were not significantly increased in the heat or lag periods across all age groups (Figure 14).

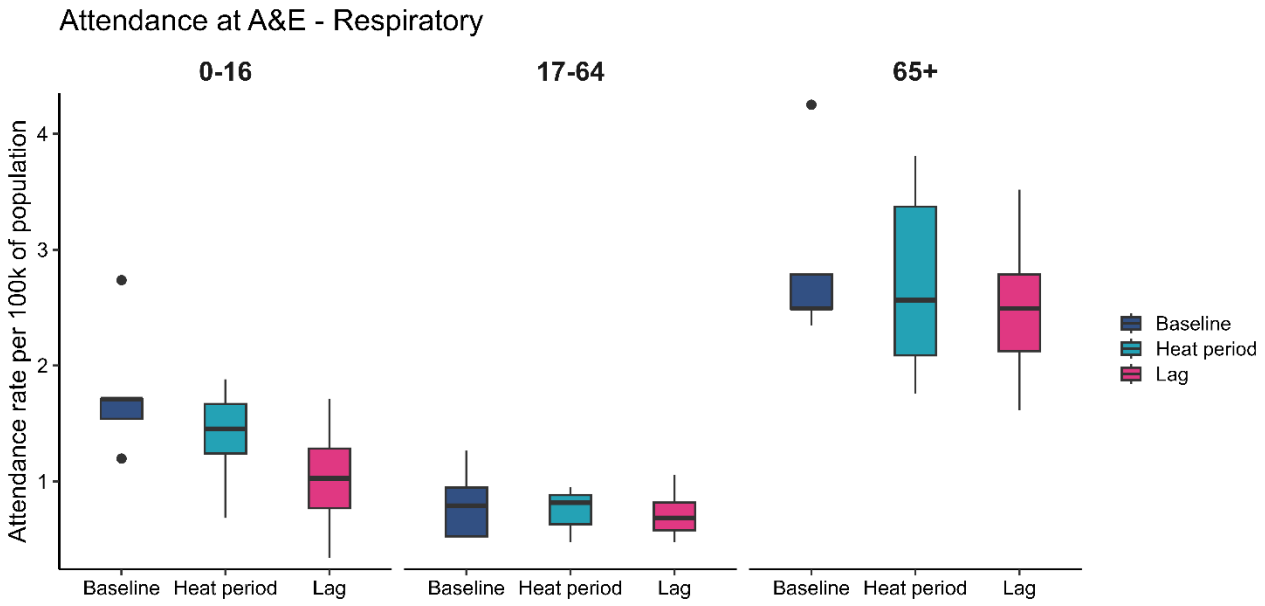


Figure 14 – Age-stratified A&E attendance rates (per 100,000 population) for respiratory conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

Psychological/psychiatric attendances rates among adults (17–64 years) were elevated during the heat period relative to baseline with an IRR of 1.46 (95% CI: 0.94–2.25, $p = 0.09$), but was statistically insignificant as shown in Figure 15.

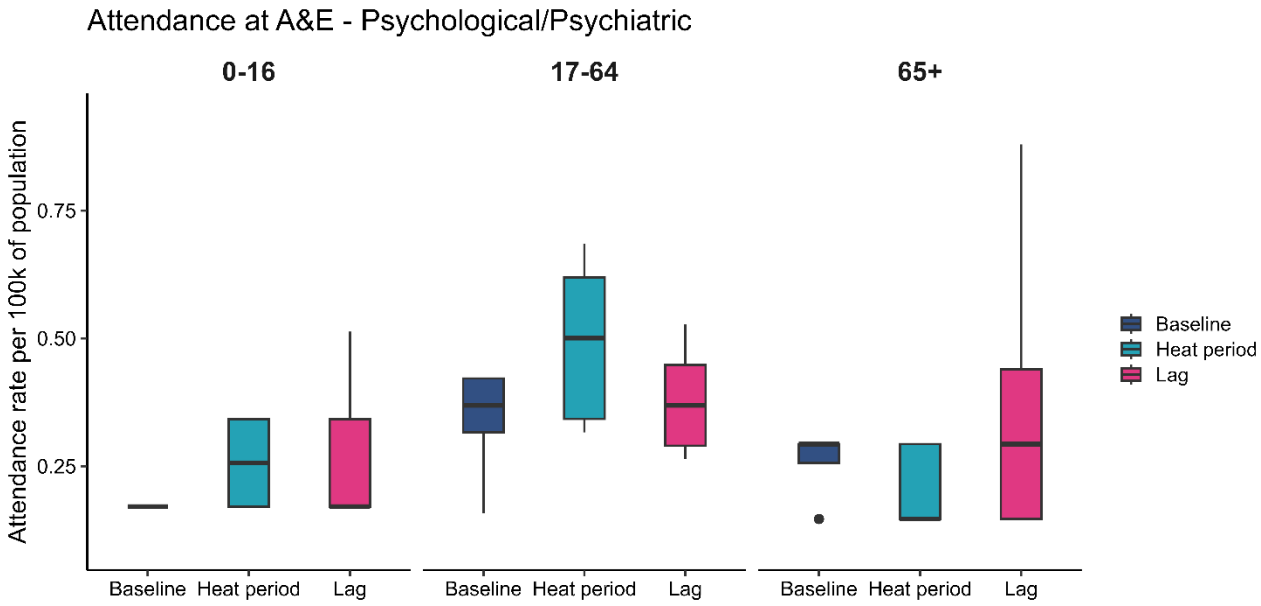


Figure 15 – Age-stratified A&E attendance rates (per 100,000 population) for psychological/psychiatric conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

### 3.2.2. Accident and emergency attendance by sex

Comparing attendance rates during heat period, baseline and lag periods, there was no evidence of a statistically significant increase in heat-related conditions by sex for all A&E attendances. However, some conditions reported higher IRRs, though these were statistically non-significant:

For psychological/psychiatric conditions, males showed elevated attendances during the heat period relative to baseline with an IRR of 1.54 (95% CI: 0.89–2.66, $p = 0.12$), and during the lag period relative to baseline with an IRR of 1.22 (95% CI: 0.74–2.00, $p = 0.44$). Among females, attendances were higher during the heat period relative to baseline with an IRR of 1.27 (95% CI: 0.73–2.20, $p = 0.39$) as shown in Figure 16. All differences were not statistically significant.

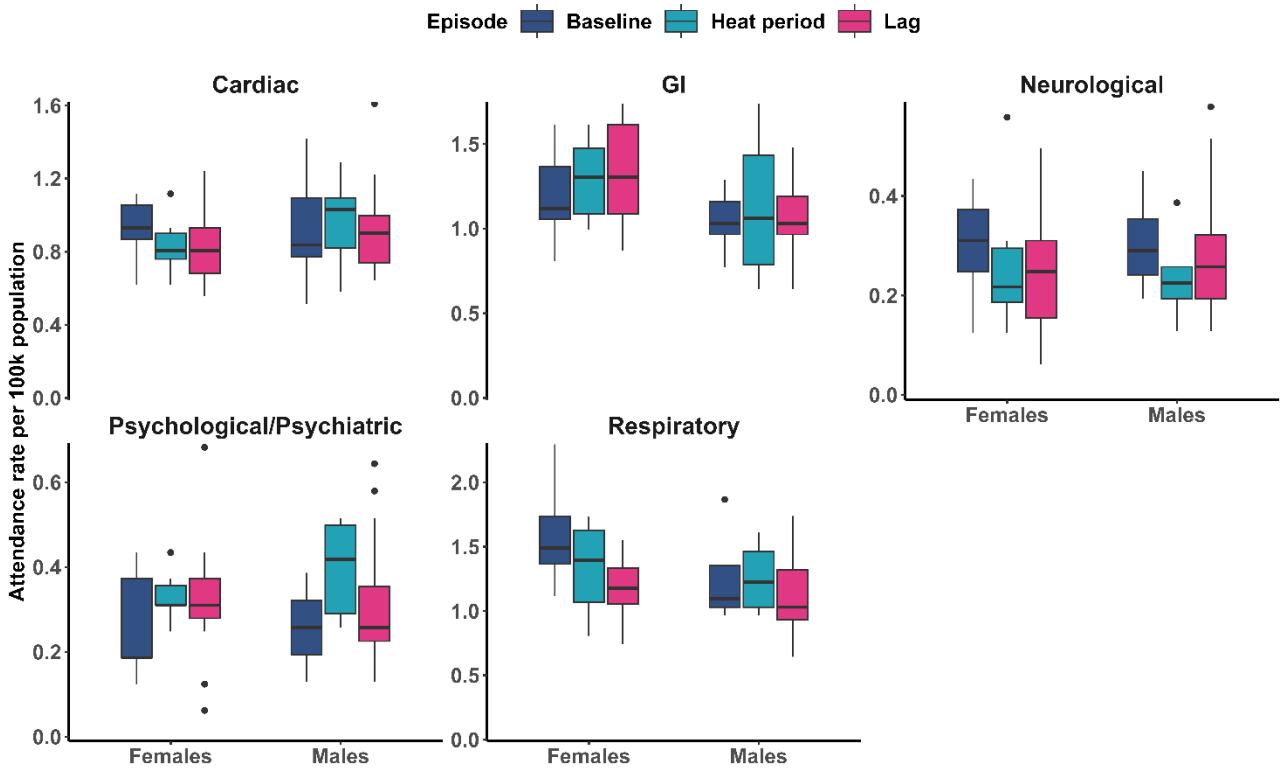


Figure 16 – A&E attendance rates (per 100,000 population) by sex for observed conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

### 3.2.3. Accident and emergency attendance by WIMD.

Within the WIMD quintiles, comparing heat period, baseline and lag periods, there was no statistically significant difference in heat-related A&E attendances across all quintiles.

For cardiac conditions, higher attendances were observed in Quintiles 2 and 5 during the heat period relative to baseline, with an IRR of 1.20(95% CI: 0.72–2.00, $p = 0.48$) and 1.25 (95% CI: 0.71–2.20, $p = 0.44$), respectively, as illustrated in Figure 17.[4] [5]

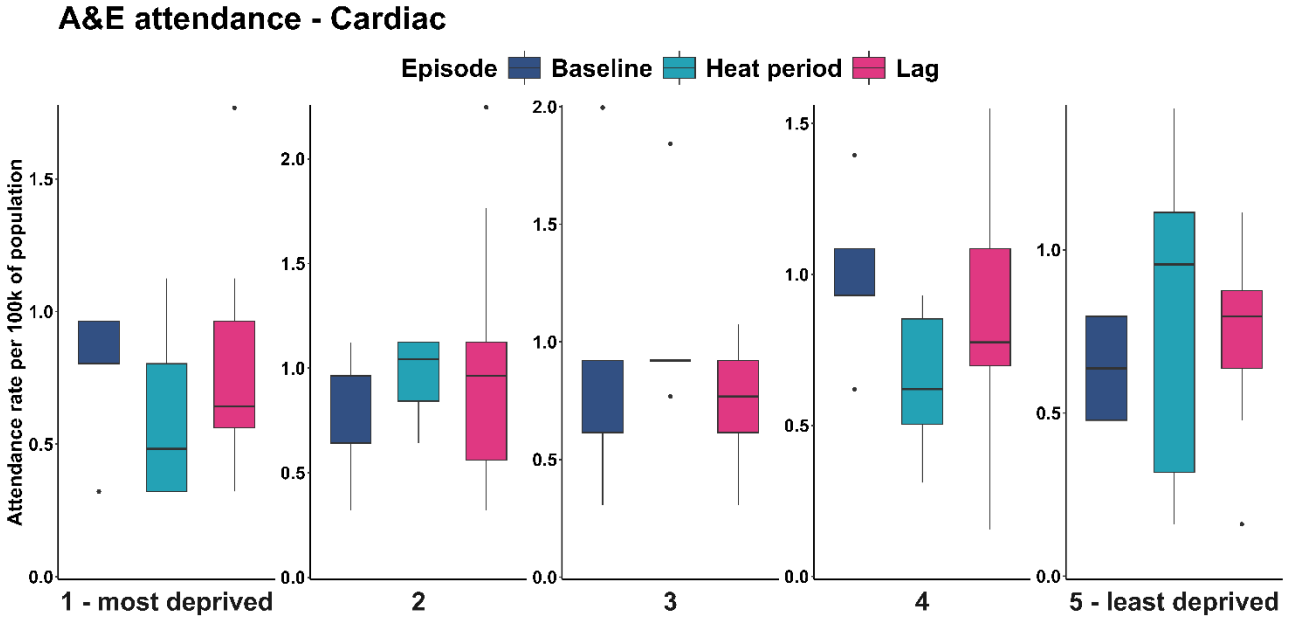


Figure 17 – A&E attendance rates by WIMD (per 100,000 population) for cardiac conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

[4] *Out of the 3242 A&E attendance during this period, documentation for the WIMD was missing for 424 attendees.*

[5] *The 2022 WIMD population estimates were used as the denominator in this analysis, as the 2024 estimates have not yet been published by the Office for National Statistics (ONS). While these estimates provide a reliable basis for analysis, any significant population changes between 2022 and 2024 may influence the precision of the findings.*

For gastrointestinal conditions, increases in attendance rate was observed in Quintile 4 during the heat period relative to baseline with an IRR of 1.36 (95% CI: 0.88–2.10, $p = 0.16$). In Quintile 5, attendances were higher during the heat period relative to baseline with an IRR of 1.52(95% CI: 0.84–2.75, $p = 0.16$) as shown in Figure 18.

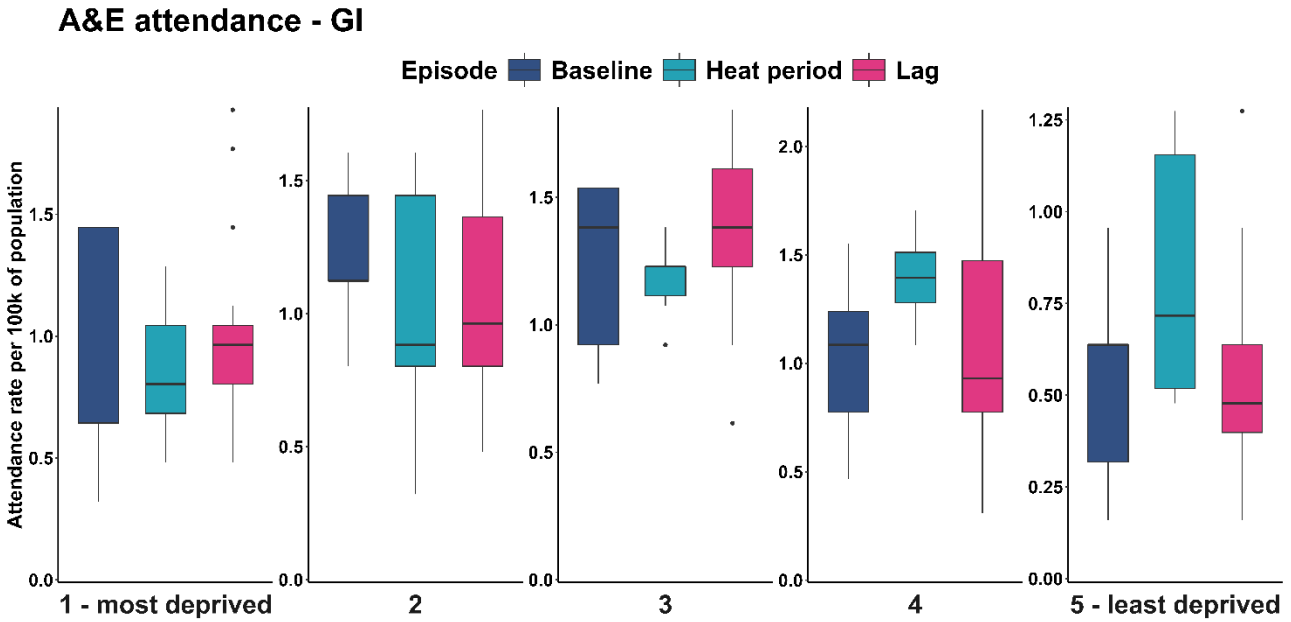


Figure 18 – A&E attendance rates by WIMD (per 100,000 population) for gastrointestinal conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

For neurological conditions, Quintile 2 showed higher attendances, but not statistically significant, during the heat period relative to baseline with an IRR of 1.30 (95% CI: 0.49–3.42, $p$ = 0.60). Quintile 3 also recorded an increase during the lag period relative to baseline with an IRR of 1.20 (95% CI: 0.58–2.49; p = 0.631) as illustrated in Figure 19.

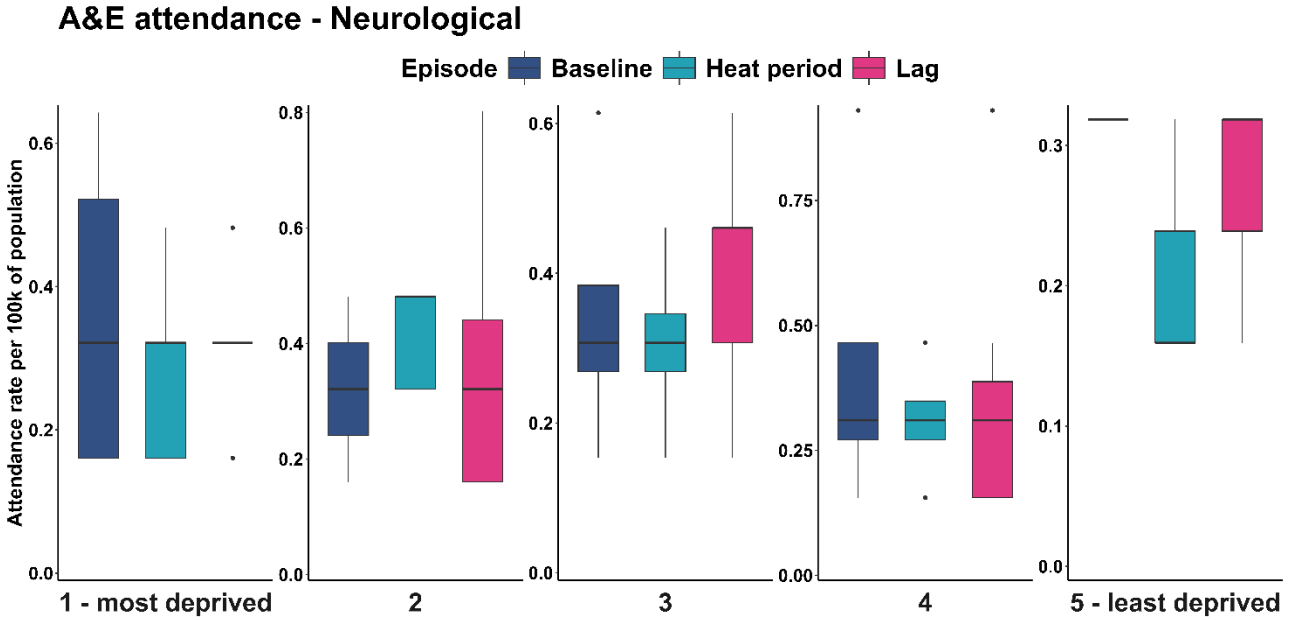


Figure 19 – A&E attendance rates by WIMD (per 100,000 population) for neurological conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

For psychological/psychiatric conditions, higher attendances were observed in Quintile 1 during the heat period relative to baseline with an IRR of 1.60 (95% CI: 0.63–4.09, $p = 0.32$), and during the lag period relative to baseline, the IRR was 1.25 (95% CI: 0.52–3.00, $p = 0.62$). In Quintile 4, increases were reported during the heat period relative to baseline with an IRR of 1.60 (95% CI: 0.60–4.26, $p = 0.34$), and during the lag period relative to baseline, the IRR was 1.23 (95% CI: 0.50–3.01, $p = 0.65$). In Quintile 5, attendances were higher during the heat period relative to baseline with an IRR of 2.00(95% CI: 0.40–9.91, $p = 0.37$) and during the lag period relative to baseline, the IRR was 1.40 (95% CI: 0.32–6.16, $p = 0.66$), as shown in Figure 20.

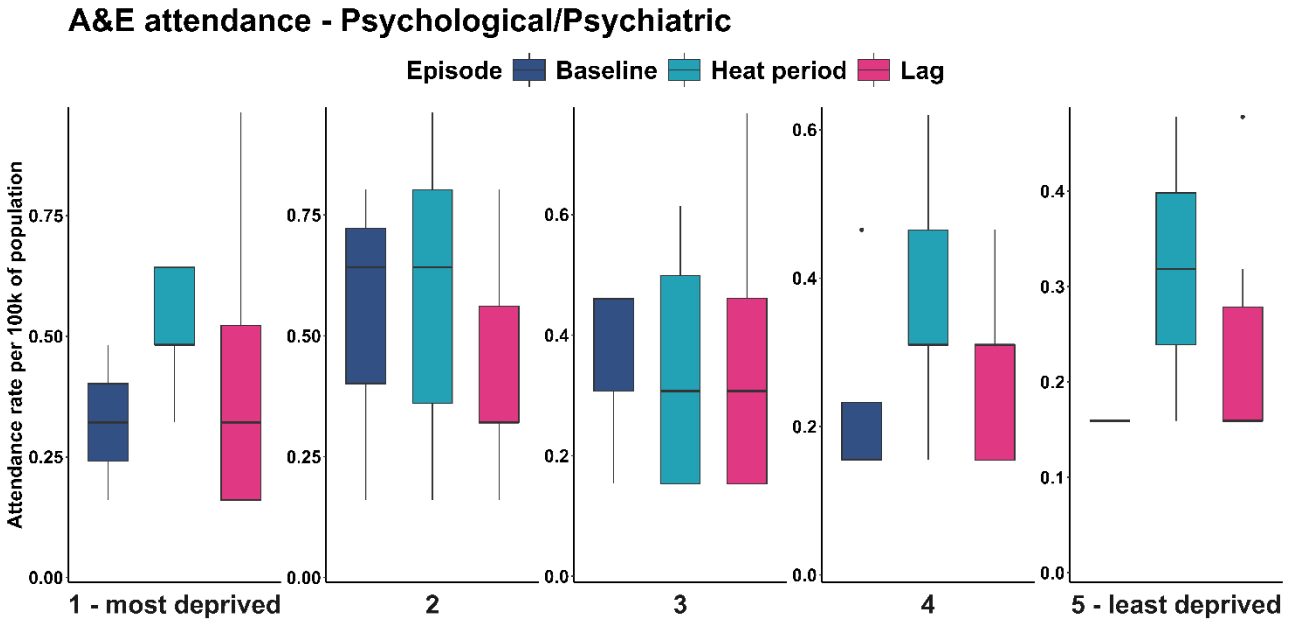


Figure 20 – A&E attendance rates by WIMD (per 100,000 population) for psychological/psychiatric conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

For respiratory conditions, there were no significant increases in A&E attendances in any WIMD Quintile (Figure 21).

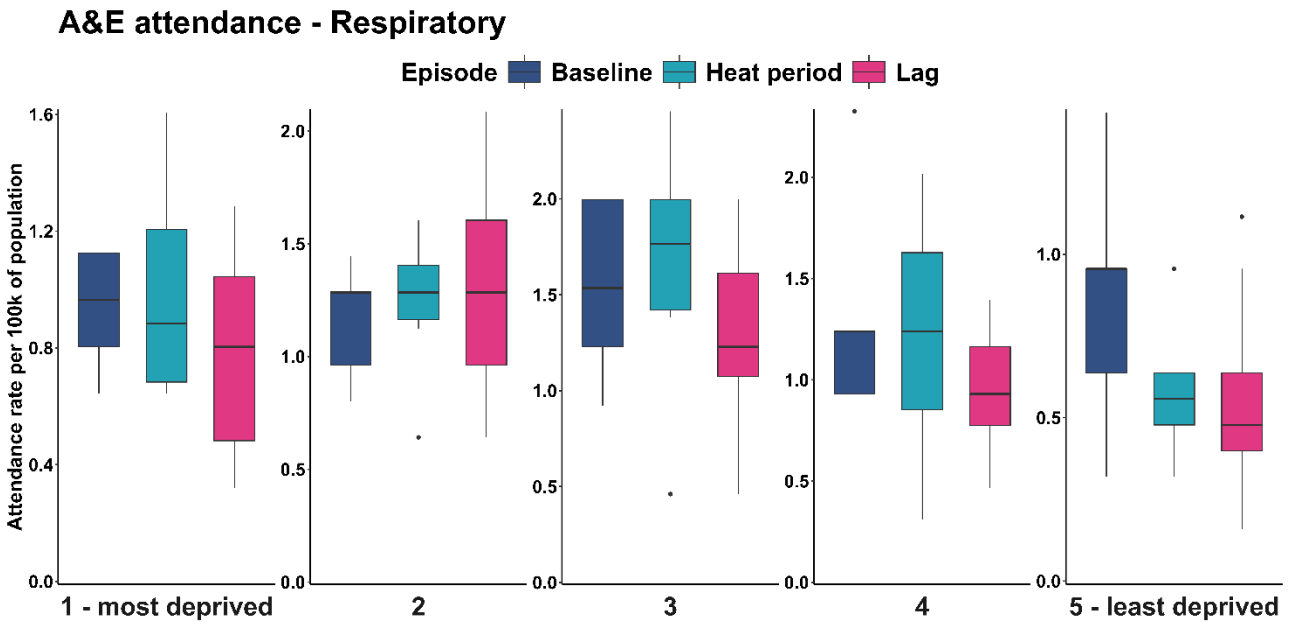


Figure 21 – A&E attendance rates by WIMD (per 100,000 population) for respiratory conditions during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

### 3.2.4. Accident and emergency attendance by Rural Urban classification.

Psychological/psychiatric attendances were significantly higher in urban areas during the heat period relative to baseline with an IRR of 1.90 (95% CI: 1.09–3.30, $p$ <0.05), and not statistically significant during the lag period relative to baseline with IRR of 1.54 (95% CI: 0.92–2.56, $p$ = 0.10), as shown in Figure 22.[6]

In rural areas, psychological/psychiatric attendances were also higher during the heat period relative to baseline, the IRR was 1.23 (95% CI: 0.63–2.42, $p$ = 0.55) as shown in Figure 22. This result is statistically insignificant.[7]

A&E attendance for cardiac conditions in rural areas were higher during the heat period relative to baseline with an IRR of 1.30 (95% CI: 0.88–1.93, $p$ = 0.19), and during the lag period relative to baseline with IRR of 1.28 (95% CI: 0.91–1.81, $p$ = 0.15) as shown in Figure 22. This result is statistically insignificant.

[6] *Out of the 3242 A&E attendance recorded during this period, rural-urban classification was not documented for 424 attendees.*

[7] *The 2022 rural-urban population estimates were used as the denominator in this analysis, as the 2024 estimates have not yet been published by the Office for National Statistics (ONS). While these estimates provide a reliable basis for analysis, any significant population changes between 2022 and 2024 may influence the precision of the findings.*

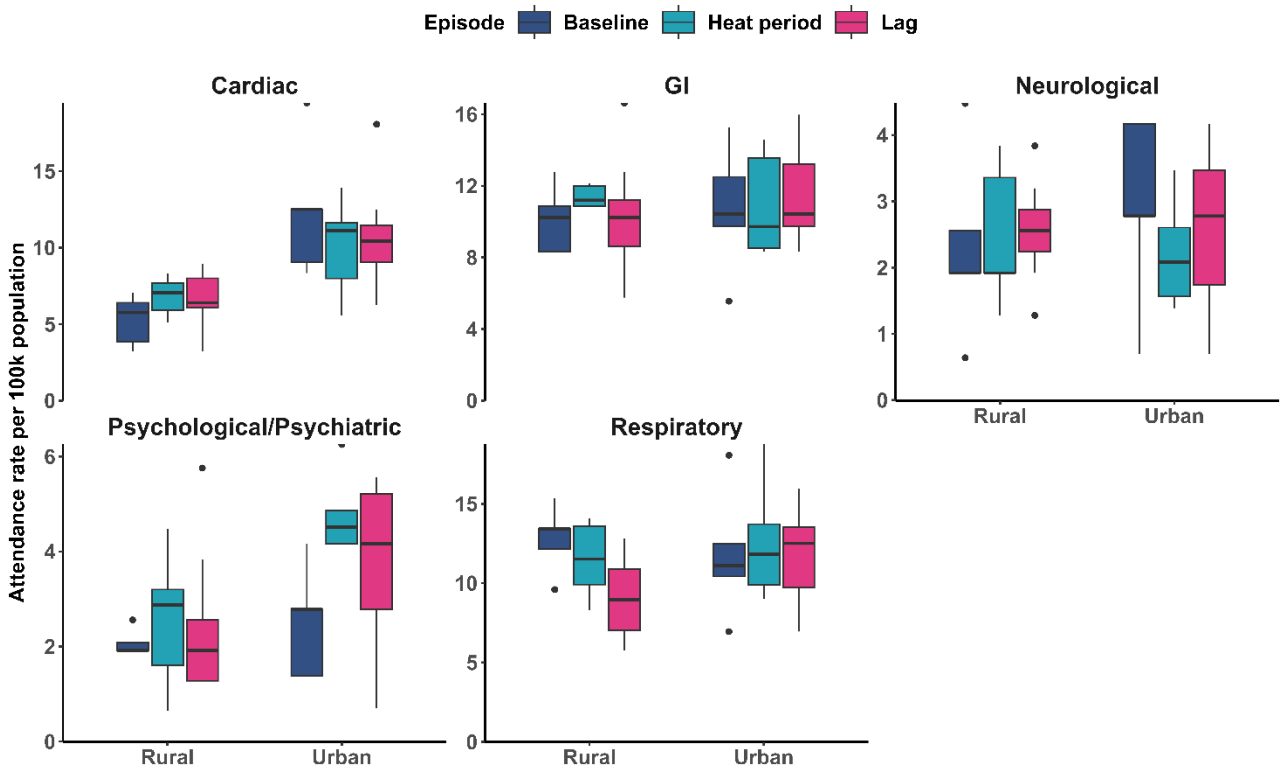


Figure 22 – A&E attendance rates by rural/urban classification (per 100,000 population) during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

## 3.3. GP consultations.

During the reporting period, a total of 26 patients presented to general practice with heatstroke. There were elevated GP consultations for heatstroke during the heat period relative to baseline with an IRR of 1.34 (95% CI: 0.54–3.32, $p = 0.56$). Daily consultations for heatstroke exceeded baseline levels in both the heat period and lag periods (Figure 23).

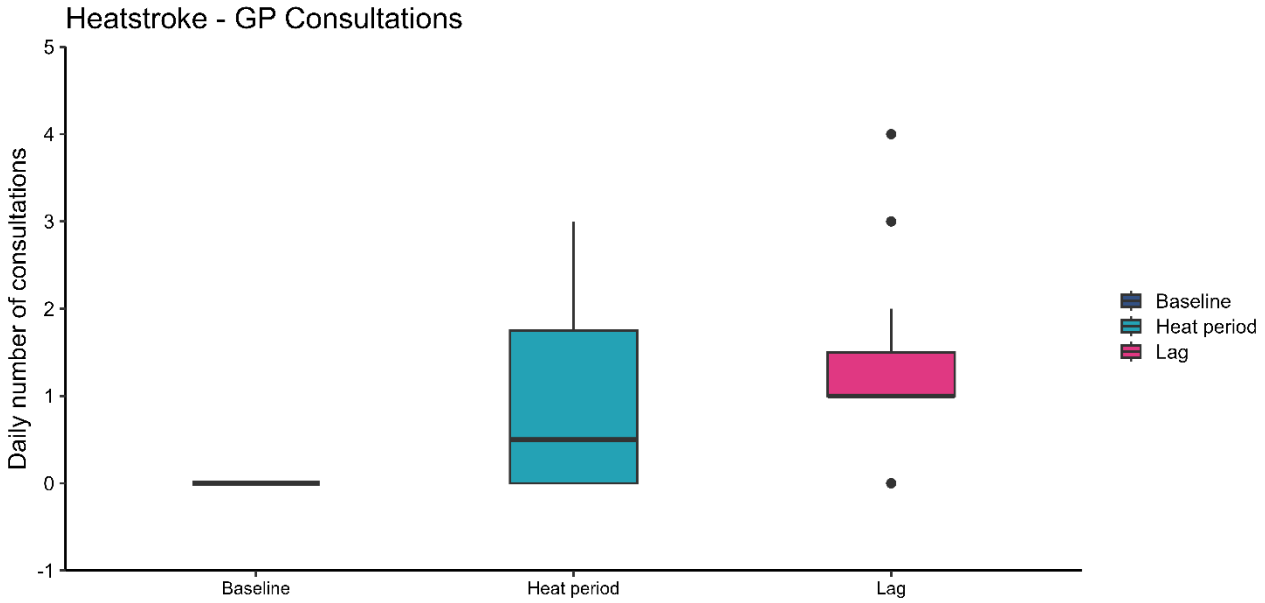


Figure 23 – Daily number of GP consultations for heatstroke during the baseline, heat period and lag periods. The horizontal black lines indicate the median values, boxes represent the interquartile range (IQR), whiskers show the minimum and maximum values within 1.5xIQR, dots denote outliers beyond this range.

# 4. Conclusion

The 2024 summer heat episode in Wales, though brief, had a measurable impact on public health, particularly in areas experiencing localised heat conditions. The analysis of emergency service activity during this period highlights the sensitivity of health systems, and the populations they serve, to even short periods of elevated temperatures.

Patterns observed across 999 calls and A&E attendances suggest that even moderate heat periods can be associated with increased healthcare demand, with certain groups, such as older adults, children, and individuals in more deprived or urban areas, appearing more vulnerable. While not all observed increases were statistically significant, the consistency and magnitude of some trends point to a potential signal that warrants further attention.

Geographic variation in emergency demand also underscores the importance of local context in heat-related health impacts. Some health boards experienced disproportionately higher increases in call and attendance rates, suggesting that regional preparedness and response strategies may need to be tailored accordingly.

Taken together, these findings reinforce the need for enhanced surveillance during heat periods, with a focus on timely detection of emerging health threats. They also support the case for integrating climate resilience into public health planning, particularly as extreme weather events become more frequent and intense.

# 5. Recommendations

1. In addition to sharing publicly, share findings with stakeholders at the PHW Climate Change Surveillance Subgroup, to inform consideration of public health actions.

2. Due to methodological limitations in the current report, we recommend the following improvements to strengthen the epidemiological assessment of heat-related health impacts across Wales:
    2.1. Apply Distributed Lag Non-Linear Models (DLNM): To accurately quantify risk ratios and attributable fractions, DLNM should be used to capture both immediate and delayed health effects of heat exposure, as well as the non-linear nature of temperature-health relationships.
    2.2. Broaden Heat Exposure Metrics: Move beyond the narrow definition of heatwaves to include sustained high temperatures, low night-time cooling, and cumulative heat exposure. These measures better reflect the full spectrum of thermal stress experienced by populations and are critical for identifying vulnerable periods and groups.

# 6. Limitations

- Data from NHS 111 calls were not available for inclusion in this analysis. Consequently, the report may not fully capture the breadth of heat-related morbidity, particularly cases managed outside of emergency services. This limitation could result in an underestimation of the overall healthcare demand associated with heat exposure during the reporting period.
- It is possible that there is an underestimate of the true impact of heat exposure on emergency services, given the few days between the “baseline” and the “heat period” occurred in the first week of the school summer holidays, which may have meant that many individuals had gone on holiday outside of Wales.
- Several findings in this report are based on very low daily case numbers. While incidence rate ratios (IRRs) are presented to illustrate potential trends, these should be interpreted with caution due to limited statistical power and increased sensitivity to random variation. Readers are advised to consider the uncertainty reflected in wide confidence intervals and non-significant p-values.

# 7. References


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# 8. Further information and contact details

## About Public Health Wales

Public Health Wales exists to protect and improve health and wellbeing and reduce health inequalities for people in Wales. We work locally, nationally, and internationally, with our partners and communities.

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## Voluntary Application of the Code of Practice for Statistics

This report by Public Health Wales is not classified as official statistics, but it voluntarily follows the UK Statistics Authority's Code of Practice for Statistics. We apply the principles of trustworthiness, quality, and value to ensure transparency, scientific integrity, and public benefit.

Trustworthiness: Produced by Public Health Wales analysts using reproducible and transparent methods.

Quality: Based on routinely collected 999 calls from Welsh Ambulance Services NHS Trust(WAST), Emergency Department Dataset for Wales and meteorological data, analysed using standard epidemiological techniques.

Value: Provides evidence on the impact of extreme heat on mortality in Wales, supporting public health policy, emergency planning, and climate adaptation efforts.

We welcome feedback to support continuous improvement of future outputs.