CodeClan

Public Health Scotland

PHS Dashboard Project

Kirsty Anderson

David Craig

Cailean Smith

Stuart Stenhouse

What is the “Winter Crisis”?

Many health conditions, including respiratory diseases such as asthma, can be caused or worsened by cold weather.

Together with higher incidences of so-called ‘seasonal illnesses’ including flu and norovirus, this means the NHS often faces much greater pressure in winter, both in the community and in secondary care in hospitals.

The Health Foundation

But does the data agree?

What Data was Used?

All data was collected from Public Health Scotland

- **Activity by Board of Treatment**
  - → Number of admissions and length of stay.
  - → Per health board and speciality.
  - → Demographics such as age, deprivation, gender.

- **Beds by NHS Board of Treatment**
  - → Percentage of beds occupied across health boards.
  - → Broken down by and medical specialties.

- **Current NHS Hospital Locations**
  - → Geographical hospital locations.

What Are the Key Performance Indicators?

- **Number of Hospital Admissions (Episodes)**

  “An admission marks the start of an inpatient episode or day case episode.”

- **Average Length of Hospital Stays (Length of Stay)**

  “Length of stay is the length of an inpatient episode.”

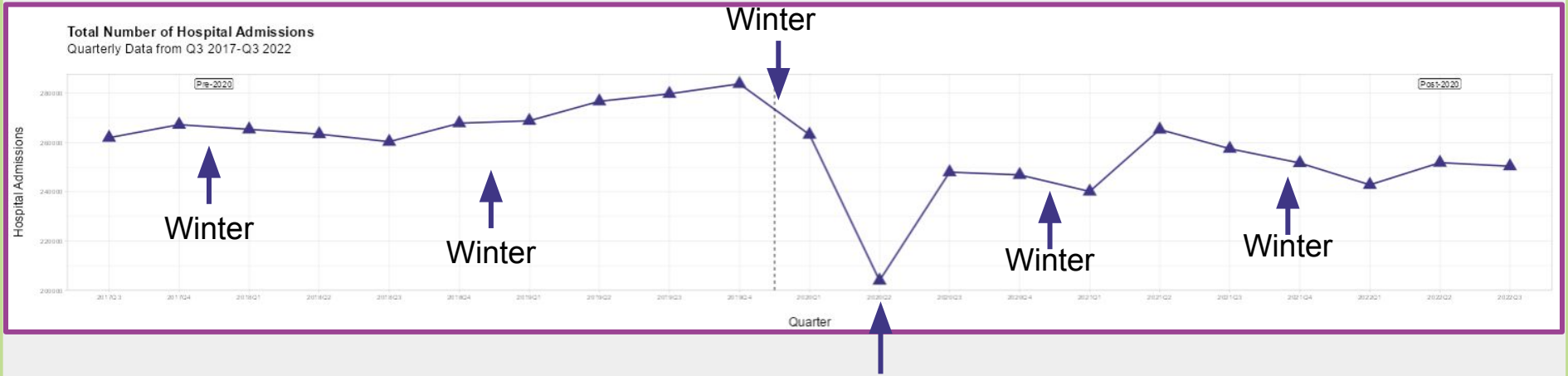
- **Percentage of Bed Occupancy**

  “An occupied bed is an available staffed bed which is either being used to accommodate an inpatient or reserved for a patient on pass."

Definitions taken from ISD Scotland

How has the winter crisis changed over time?

- **Hospital Admissions Over Time**



Prior to 2020:

- Steady increase over time
- No obvious seasonal variation

2020 onwards:

- Huge drop in admissions at 2020 Q2
- Much more varied
- Overall admissions reduced
- Still no obvious seasonal variation

How has the winter crisis changed over time?

- **Length of Patient Stay Over Time**

Prior to 2020:

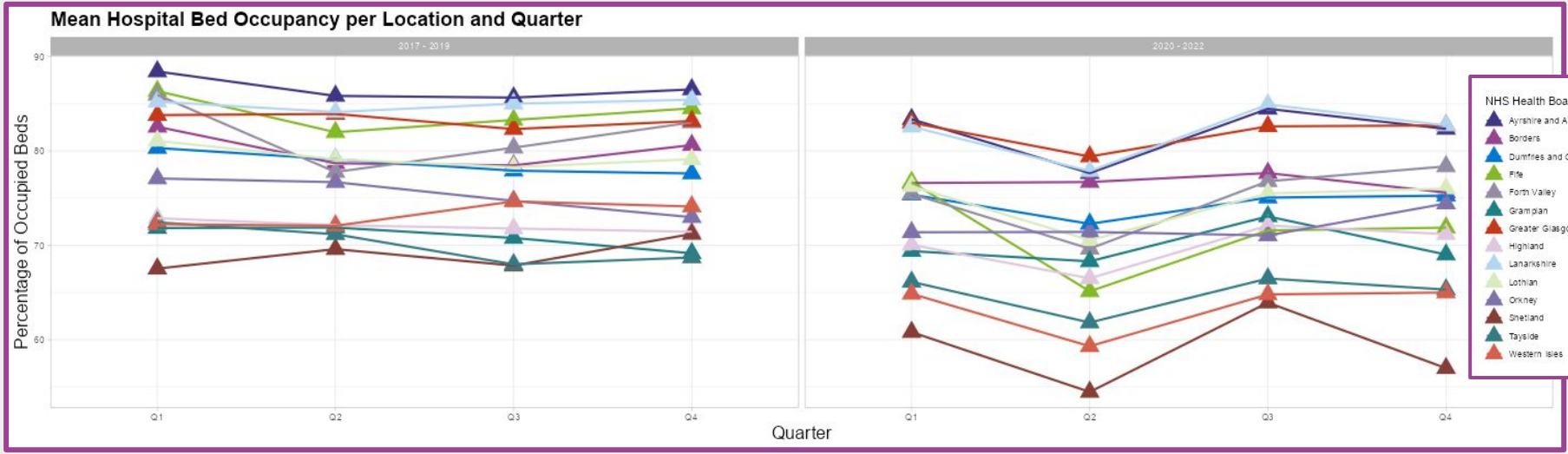
- **Peaks at Q1 and Q4 (Winter)**
- **Seasonal effect**

2020 onwards:

- **Overall increase in length of stay**
- **Exaggerated increase/decrease**
- **Seasonal effect still evident**

How does the winter crisis differ across Scotland?

- **Percentage of Occupied Beds by Health Board**



<u>Prior to 2020:</u>

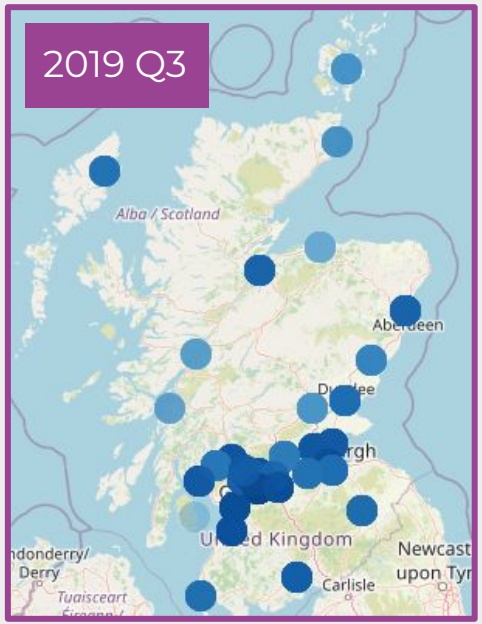
- Occupancy higher across all healthboards
- Limited evidence of seasonal effect

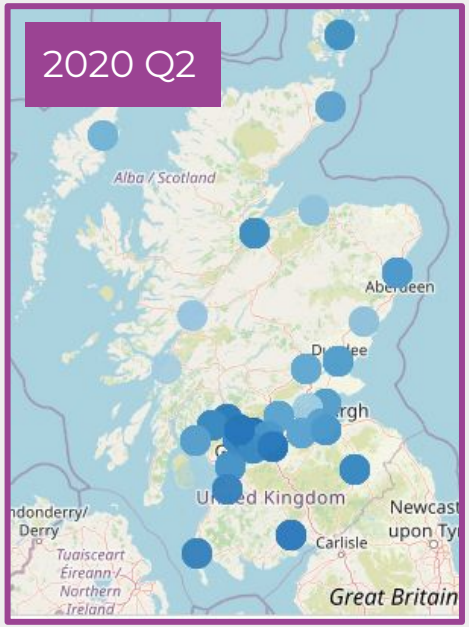
<u>2020 onwards:</u>

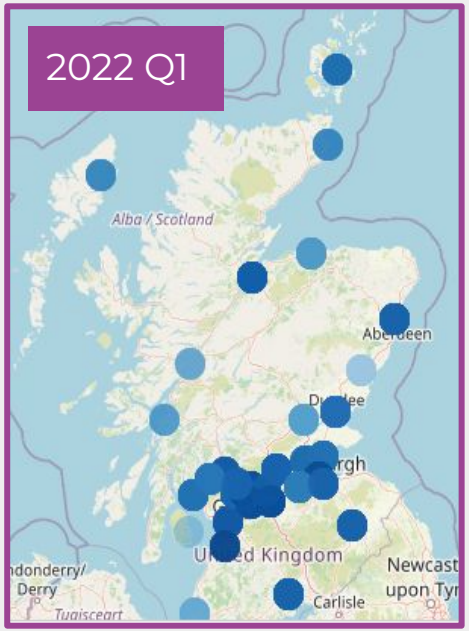
- Overall lower occupancy
- Varied distribution
- No evidence of winter strain

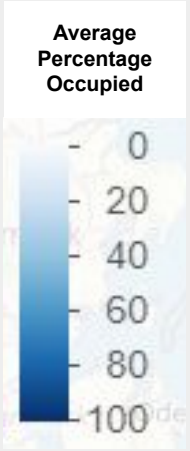
How does the winter crisis differ across Scotland?

- **Percentage of Occupied Beds by Hospital**





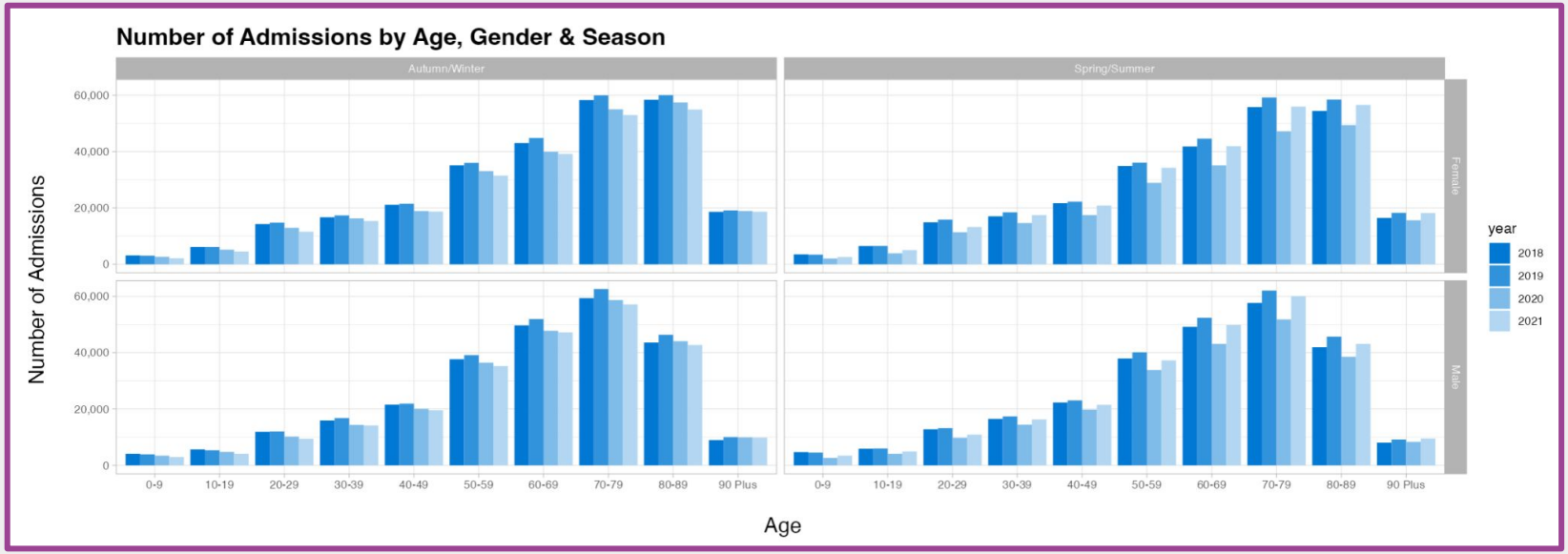




- Darker plots show higher occupancy in densely populated areas
- Percentage occupancy greatly reduced around the beginning of the pandemic
- Not much difference between Summer 2019 and Winter 2022

Who is most affected?

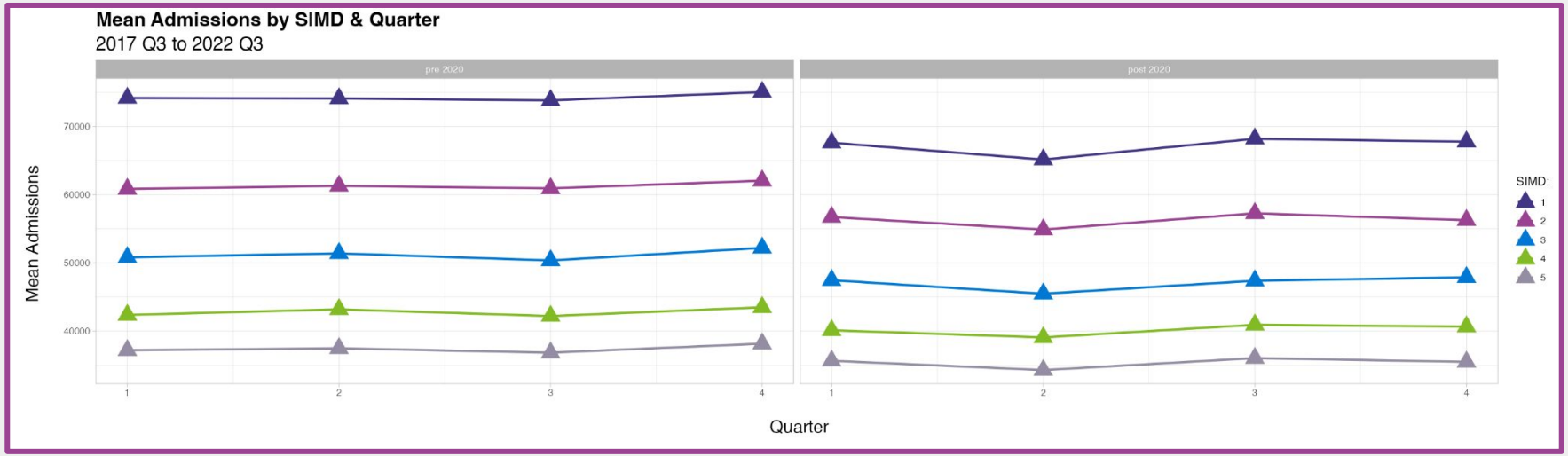
- **Number of Admissions / Length of Stay by Age Group and Gender**



- **Number of admissions & length of stay increase with age.**
- **Males and females follow similar admissions and length of stay trends across all age groups.**

Who is most affected?

- **Number of Admissions / Length of Stay by Deprivation**



Prior to 2020:

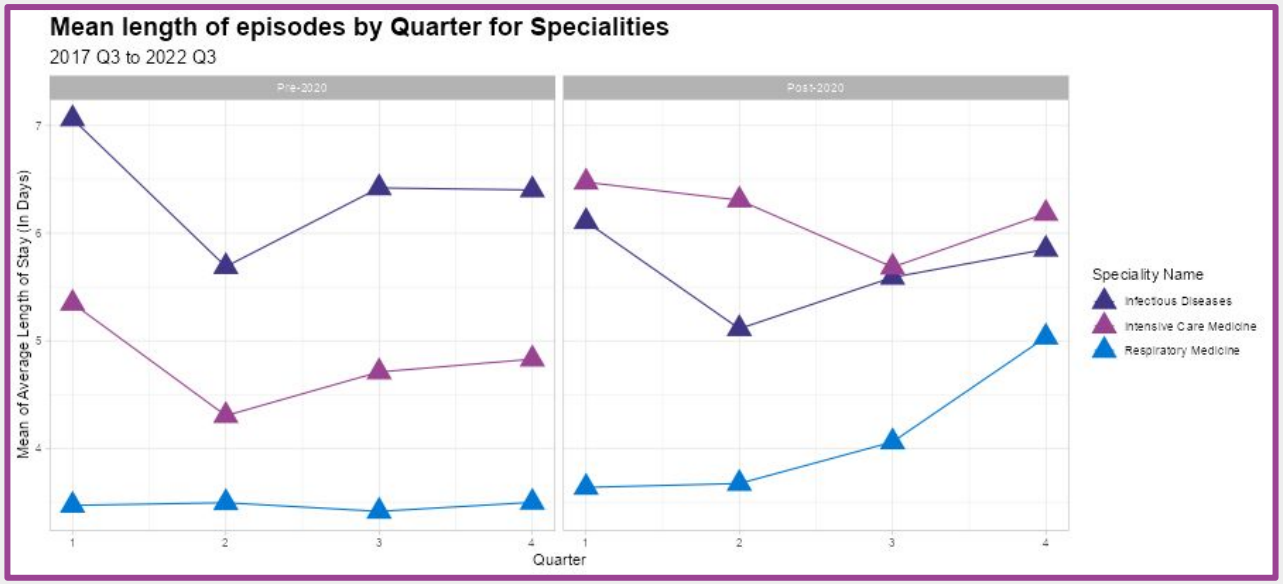
- Increased deprivation, increased admissions.
- Less clear length of stay trend.
- No strong seasonality.

2020 Onwards:

- Reduced admissions across all levels.
- Increased length of stay across all levels.
- Seasonal increases in length of stay in Q1/Q4.

What medical sectors are affected?

- **Mean Length of Stay by Specialty per Quarter**



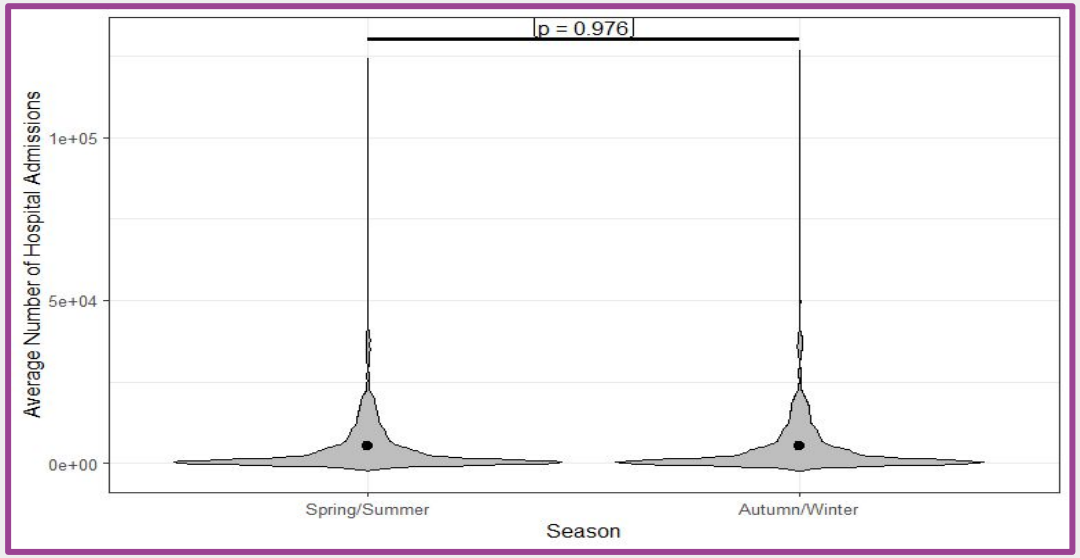
Prior to 2020:

- **Respiratory medicine lowest overall**
- **Peaks in Q1 suggest winter strain**

2020 onwards:

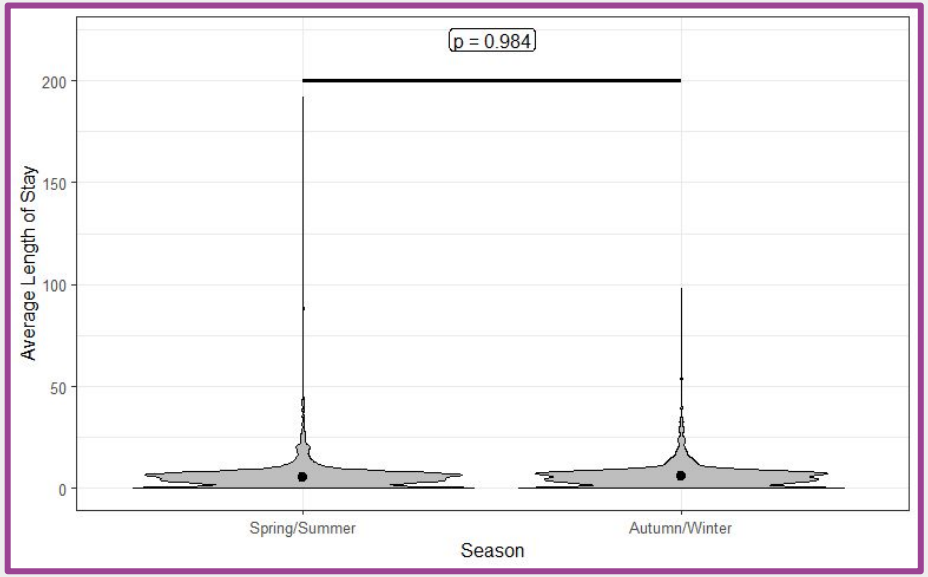
- **All three show an increase in Q4, suggesting winter strain**
- **Sharp increase in length of stay for Respiratory Medicine in Q4**

How does the mean number of hospital admissions compare statistically?



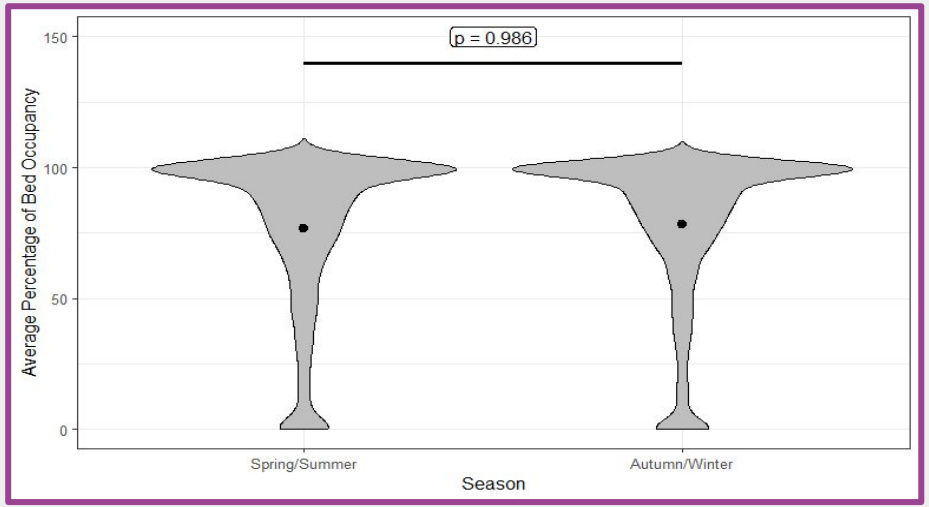
- Question: Does the mean number of hospital admissions differ between the Spring/Summer and Autumn/Winter months for all Health Boards across all quarters?
- Significance level: $\alpha = 0.05$
- Our p-value (0.976) is not less than our significance level so we fail to reject the null hypothesis.
- Based on our data there is not sufficient evidence to suggest that the mean number of hospital admissions differs between the Spring/Summer and Autumn/Winter months.

How does the mean average length of stay compare statistically?



- Question: Does the mean average length of stay for patients differ between the Spring/Summer and Autumn/Winter months for all Health Boards across all quarters?
- Our p-value (0.984) is not less than our significance level so we fail to reject the null hypothesis.
- Based on our data there is not sufficient evidence to suggest that the mean average length of stay differs between the Spring/Summer and Autumn/Winter months.

How does the mean percentage bed occupancy compare statistically?



- Question: Does the mean percentage bed occupancy differ between the Spring/Summer and Autumn/Winter months for all Health Boards across all quarters?
- Significance level: $\alpha = 0.05$
- Our p-value (0.986) is not less than our significance level so we fail to reject the null hypothesis.
- Based on our data there is not sufficient evidence to suggest that the mean percentage bed occupancy differs between the Spring/Summer and Autumn/Winter months.

Where can this data be viewed?

- **PHS Dashboard**

- **Created to show the impact of seasonality and COVID-19 across different pressures on the NHS in Scotland**

- **Investigates several areas of interest including geographic, demographic and statistical differences**

Time for a demo!

Conclusions & Summary

- General decrease in admissions after 2020, no Winter spikes
- Length of stay increases in Winter and overall after 2020
- Decrease in percentage occupancy after 2020, no Winter spikes

Although there is evidence of some annual Winter trends, the overall seasonal difference is not statistically significant in Spring/Summer versus Autumn/Winter.

Thankyou!

Any Questions?