Public Health Scotland

Scottish Stroke Statistics

Presented by: Michael Kustra

Last updated: June 7th, 2022

Objective

Identify what types of stroke are most prevalent in Scotland and what demographics are most affected by these.

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My Process

Days 1 - 3

Select brief, explore data and what conclusions were expected from the analysis

Days 3 - 6

Complete analysis on each on the 5 client questions

Days 6 - 8

Check over analysis to ensure that processes were followed correctly. Choose relevant plots that best answer the questions.

Days 8 - 10

Complete presentation of key findings for the client.

Useful Jargon

Crude Rate

(Total number incidences / Total population) * 100 000

EASR

The European Age-Sex Standardised Rate per 100,000 population.

TIAs and related syndromes

aka "mini stroke", caused by a temporary disruption in the blood supply to part of the brain

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Subarachnoid Haemorrhage

uncommon type of stroke caused by bleeding on the surface of the brain

The Data

Stroke Activity by Health Board

43200 rows

Stroke Activity by Council Area

95040 rows

Stroke Mortality by Health Board

8100 rows

Stroke Mortality by Council Area

17820 rows

Most Common Stroke Diagnosis

This was between Subarachnoid Haemorrhage and TIAs and related syndromes

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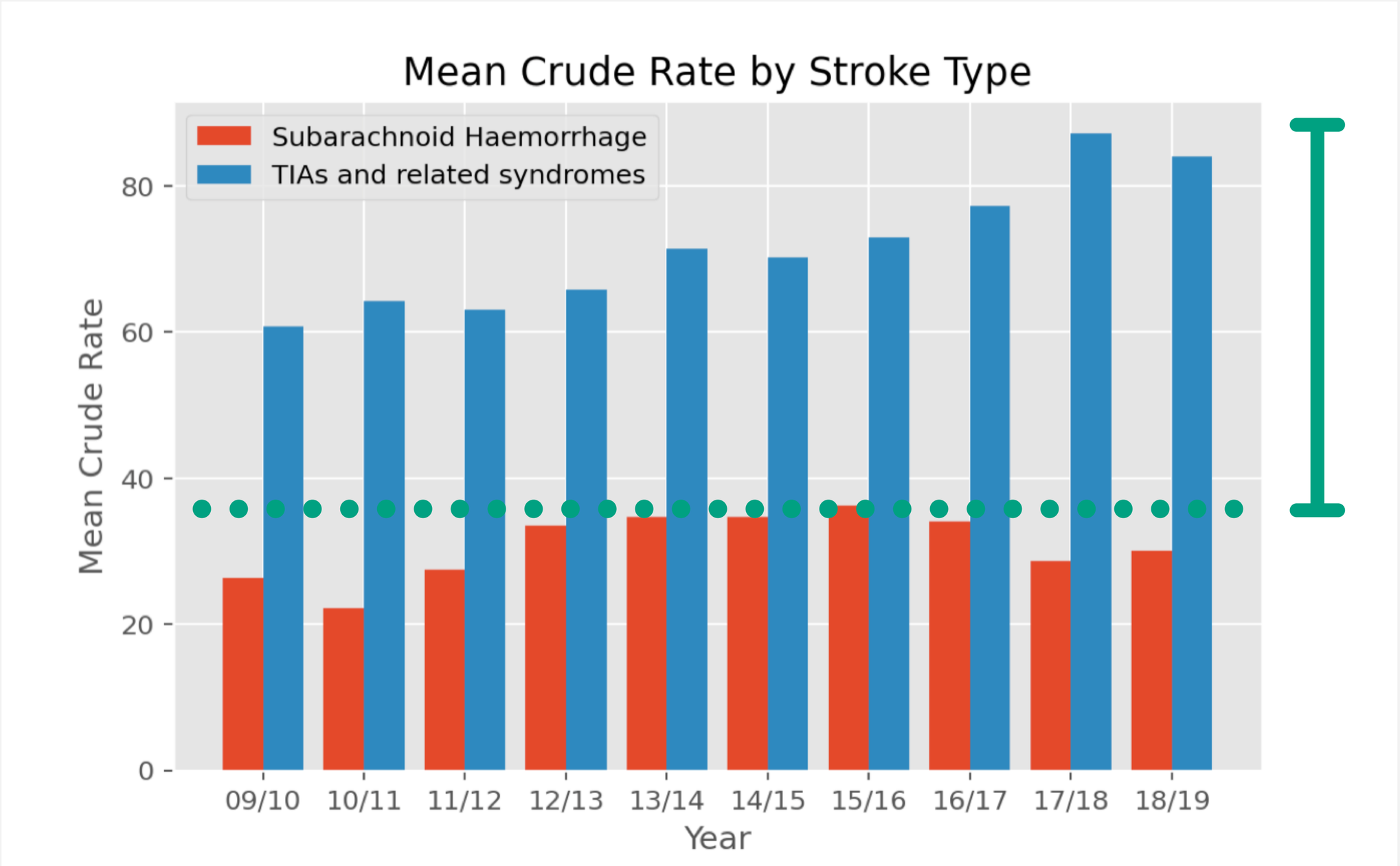
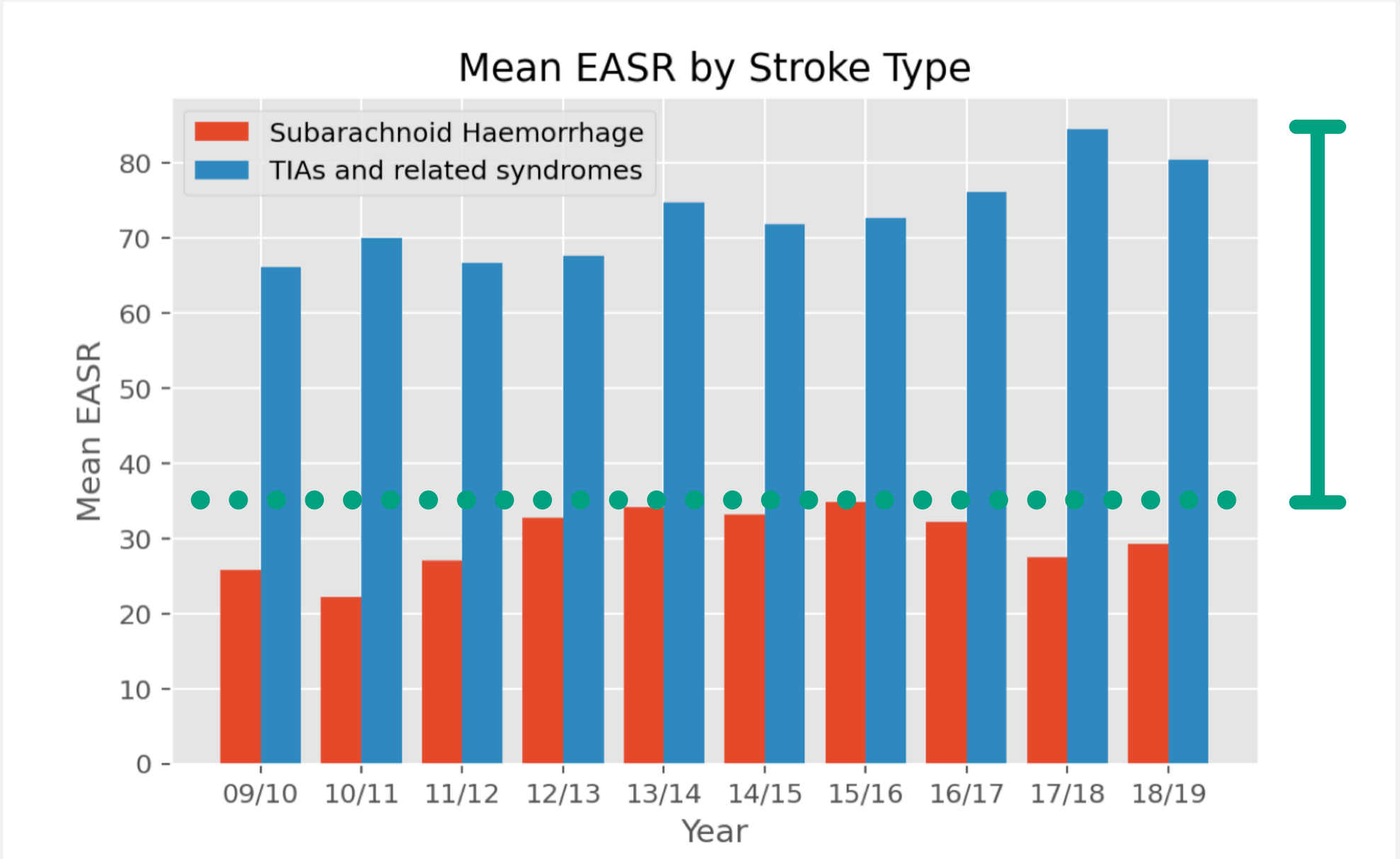
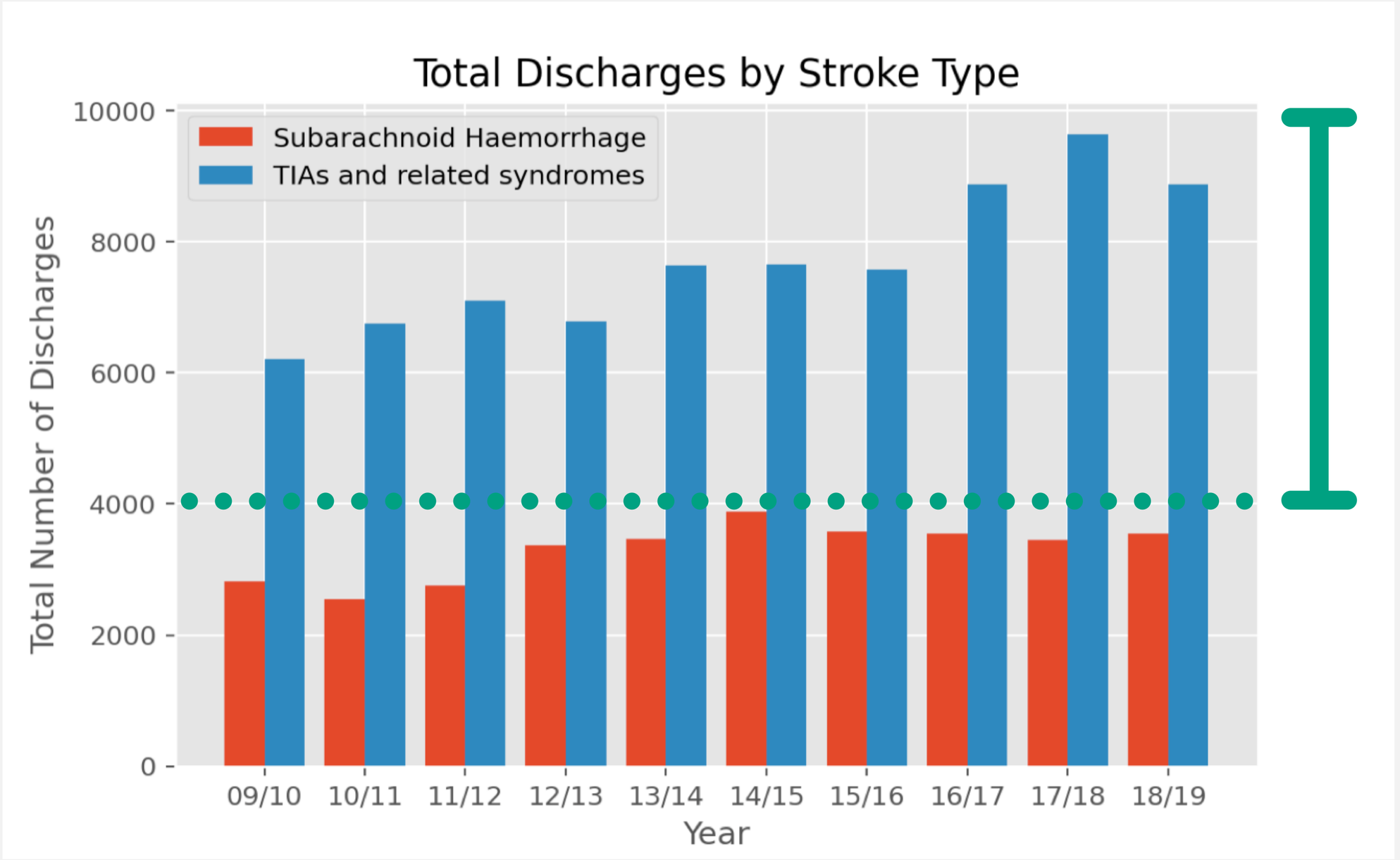
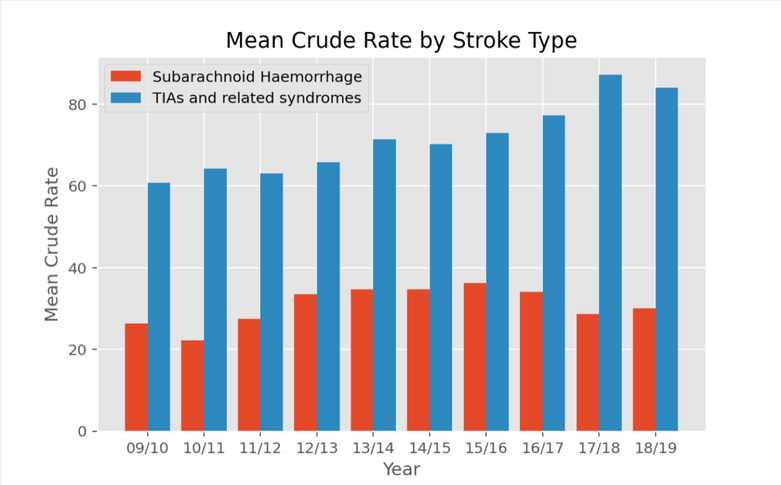
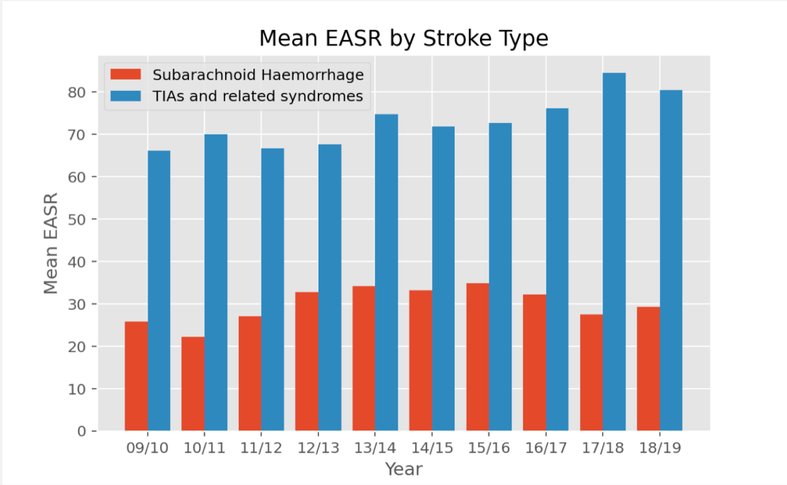
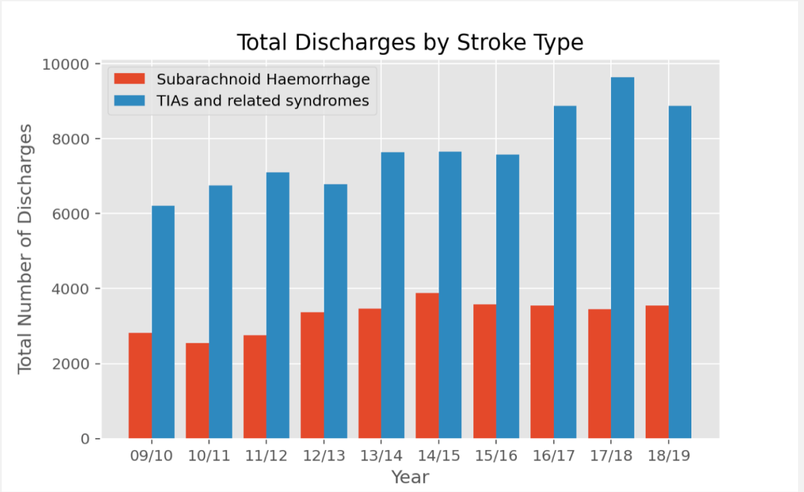

Mean Crude Rate by Stroke Type
Subarachnoid Haemorrhage
TIAs and related syndromes
Mean Crude Rate
0
20
40
60
80
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
Year


Mean EASR by Stroke Type
Subarachnoid Haemorrhage
TIAs and related syndromes
Mean EASR
0
10
20
30
40
50
60
70
80
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
Year


Total Discharges by Stroke Type
Subarachnoid Haemorrhage
TIAs and related syndromes
Total Number of Discharges
10000
8000
6000
4000
2000
0
09/10
10/11
11/12
12/13
13/14
14/15
15/16
16/17
17/18
18/19
Year







Conclusion

- In each measure, TIAs and related syndromes outnumber Subarachnoid Haemorrhage

Actionable Insight

- Target TIAs in order to decrease numbers of full stroke victims in the future. Adverts/marketing/online prescience of symptoms of TIAs

Differences in Demographics

Specifically looking at gender and age groups.

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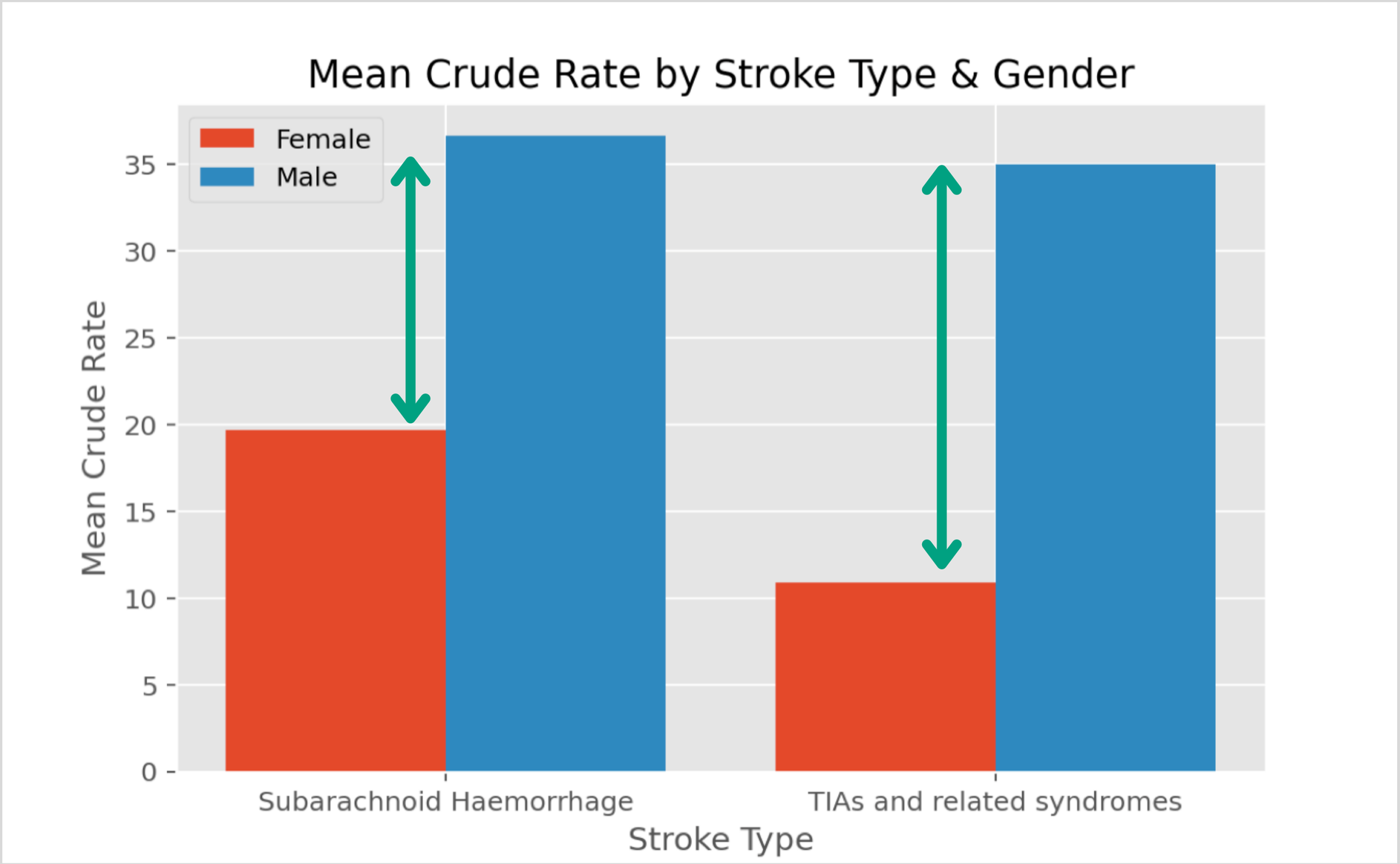
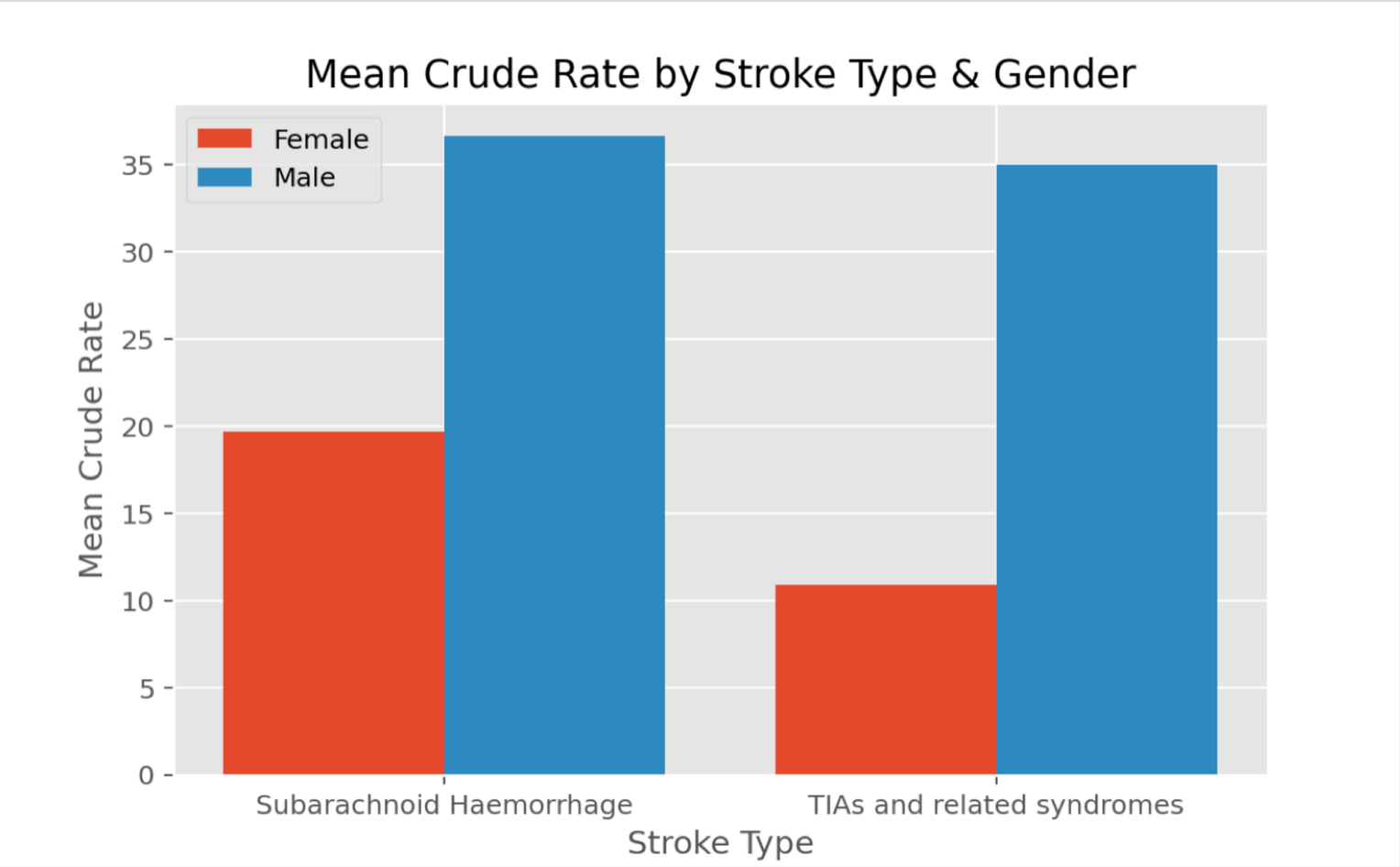

Mean Crude Rate by Stroke Type & Gender
Female
Male
Mean Crude Rate
0
5
10
15
20
25
30
35
Subarachnoid Haemorrhage
TIAs and related syndromes
Stroke Type

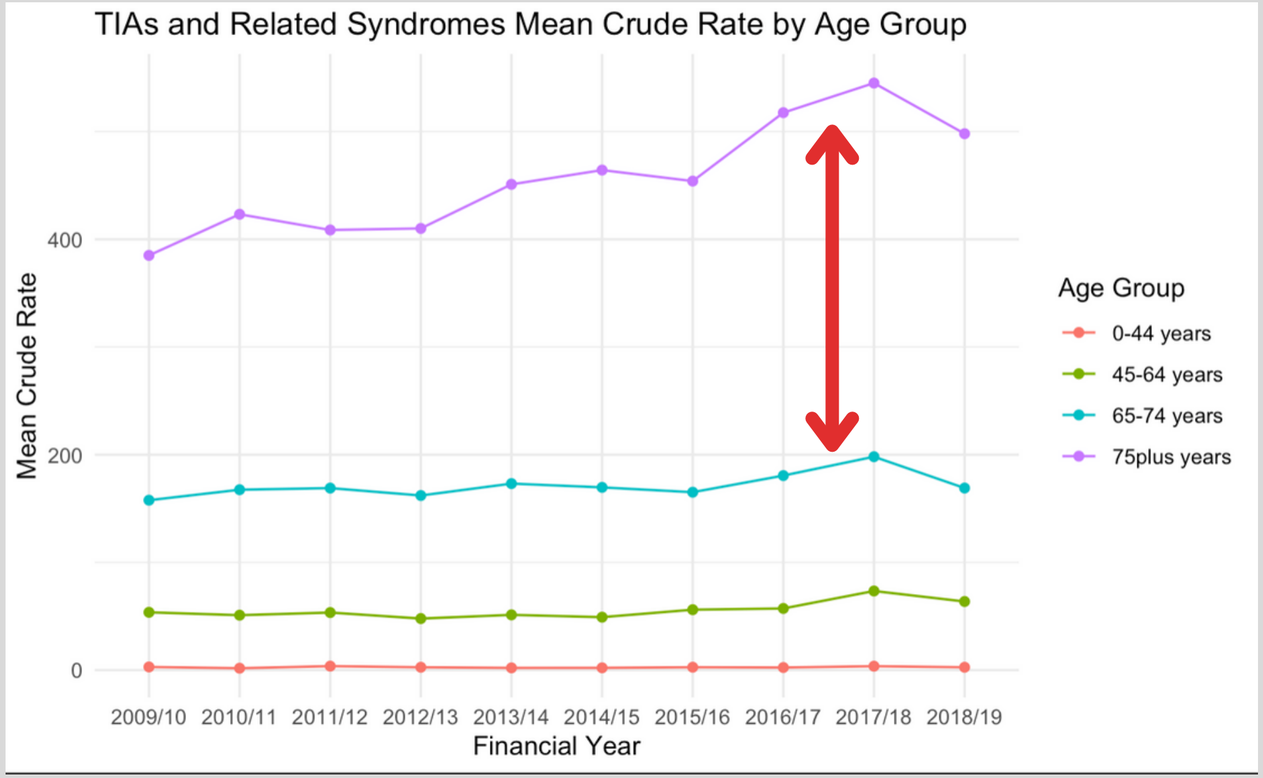


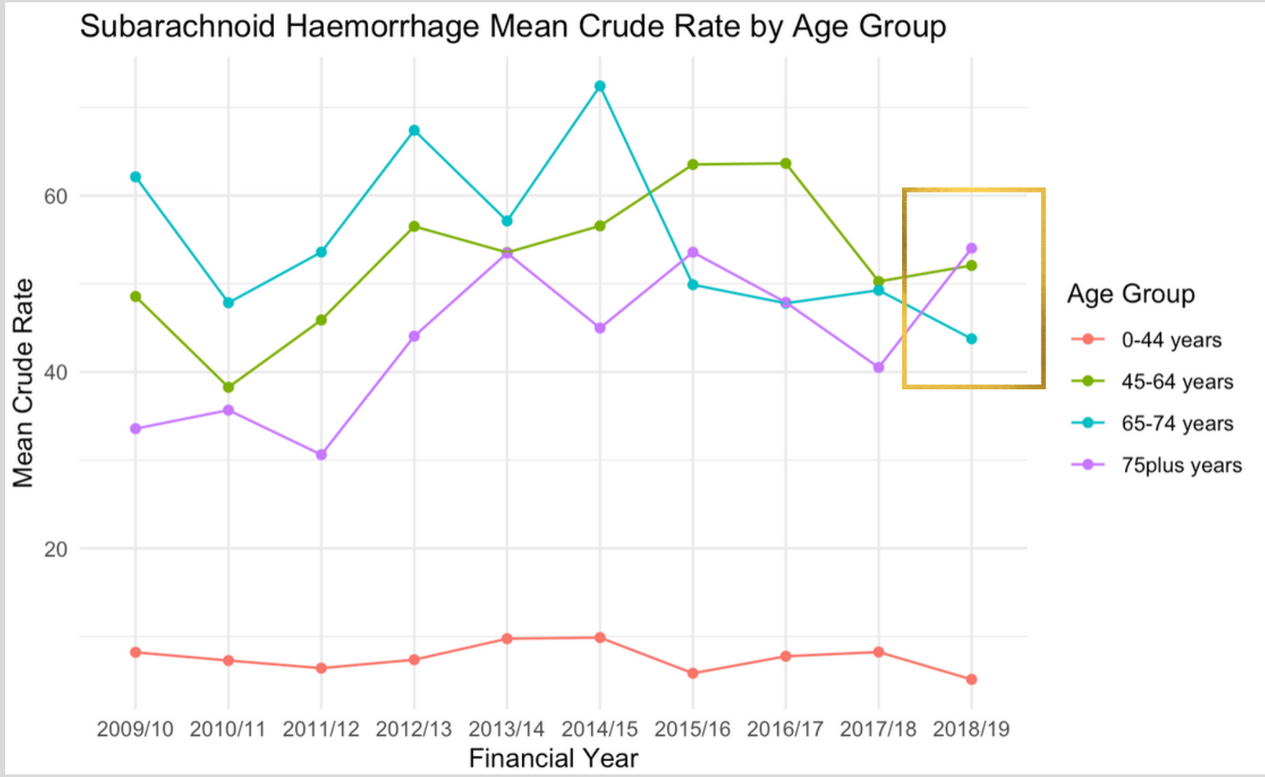
Conclusion

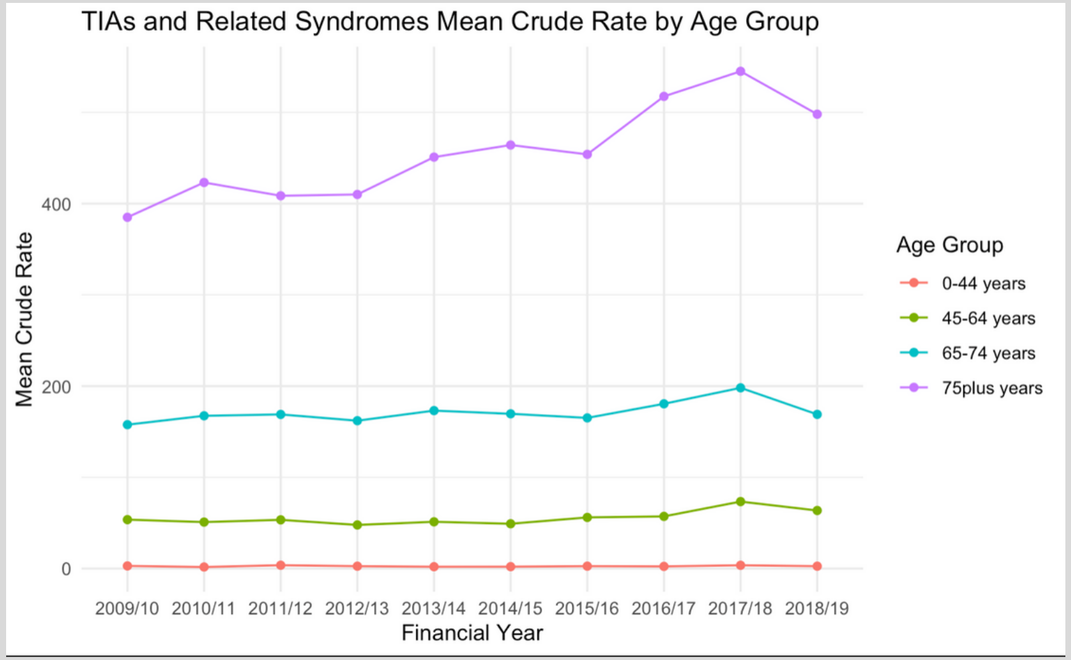
- Males far outnumber Females in each stroke diagnosis, as measured by *Crude Rate*

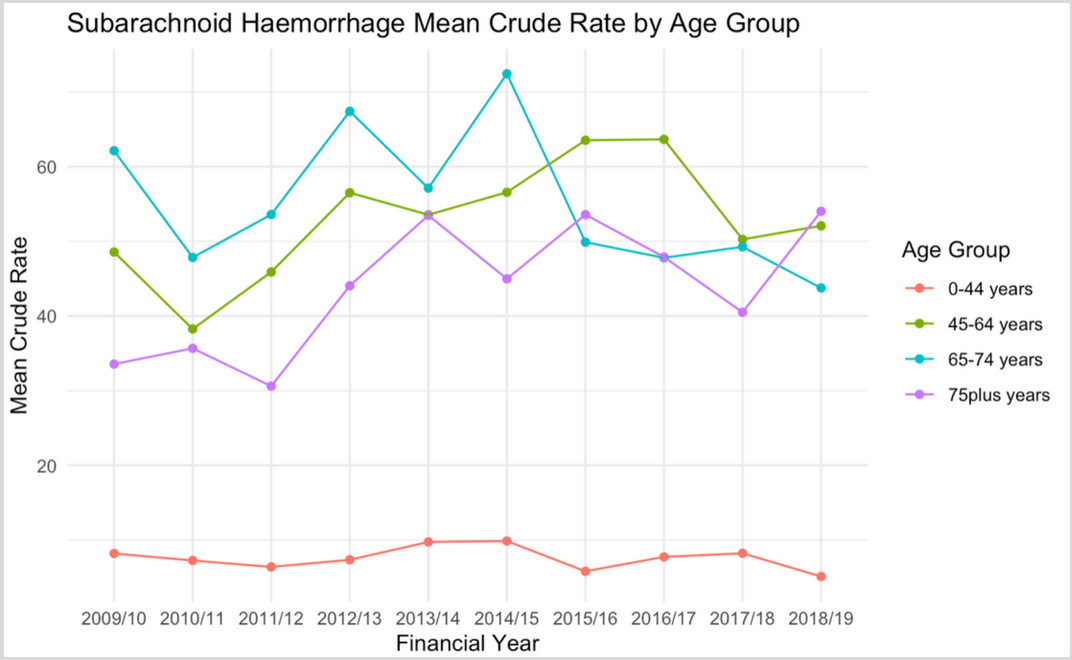
Actionable Insight

- PHS target Males who suffer from a TIA in order to limit the number of those that progress to a full stroke later in life. Adverts aimed at males, potentially during sports events to get yourself checked out.


TIAs and Related Syndromes Mean Crude Rate by Age Group
Mean Crude Rate
400
200
0
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Financial Year
Age Group
0-44 years
45-64 years
65-74 years
75plus years


Subarachnoid Haemorrhage Mean Crude Rate by Age Group
Mean Crude Rate
60
40
20
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19
Financial Year
Age Group
0-44 years
45-64 years
65-74 years
75plus years





Conclusion

- TIAs: More prevalent as you move up the age groups, especially 75+ years
- SH: More balanced by 18/19 in terms of Crude Rate

Actionable Insight

- Likelihood of suffering a stroke appears to increase with age, can screening be set up for these age groups to prevent future attacks?

Health Board vs Local Authority

Specifically looking at gender and age groups.

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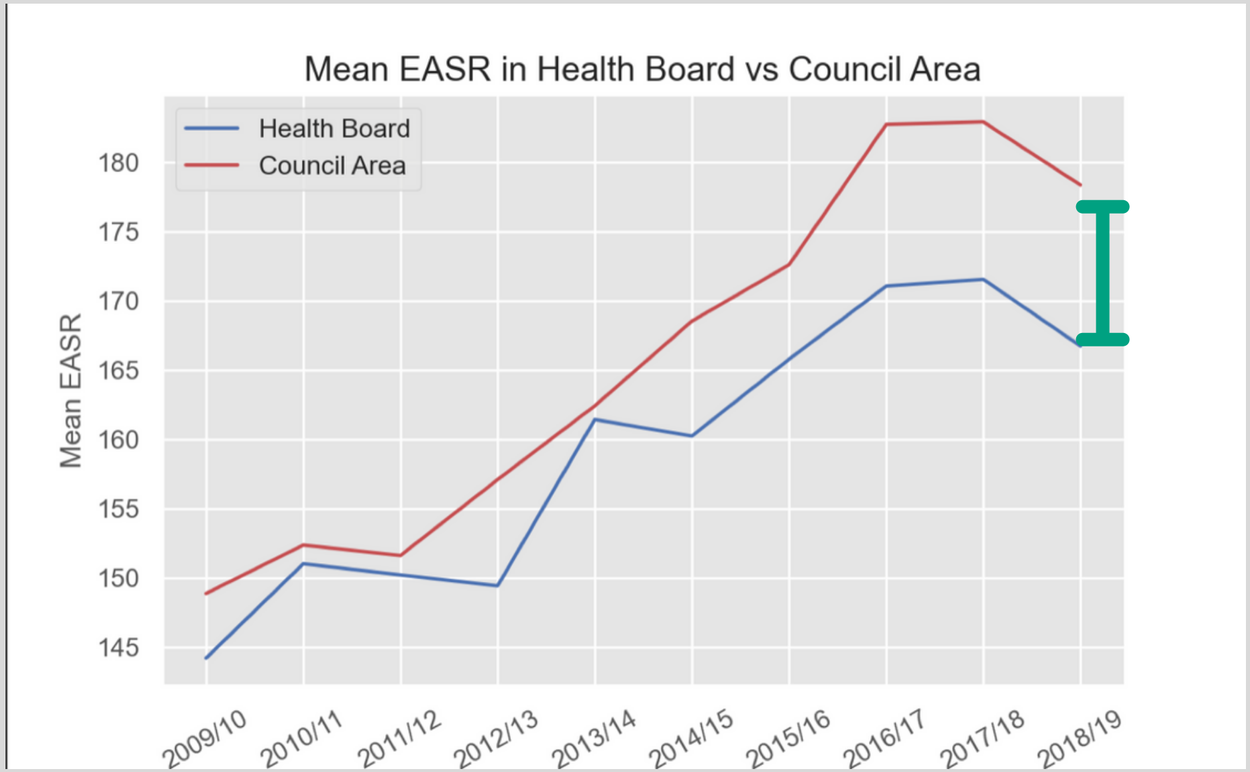
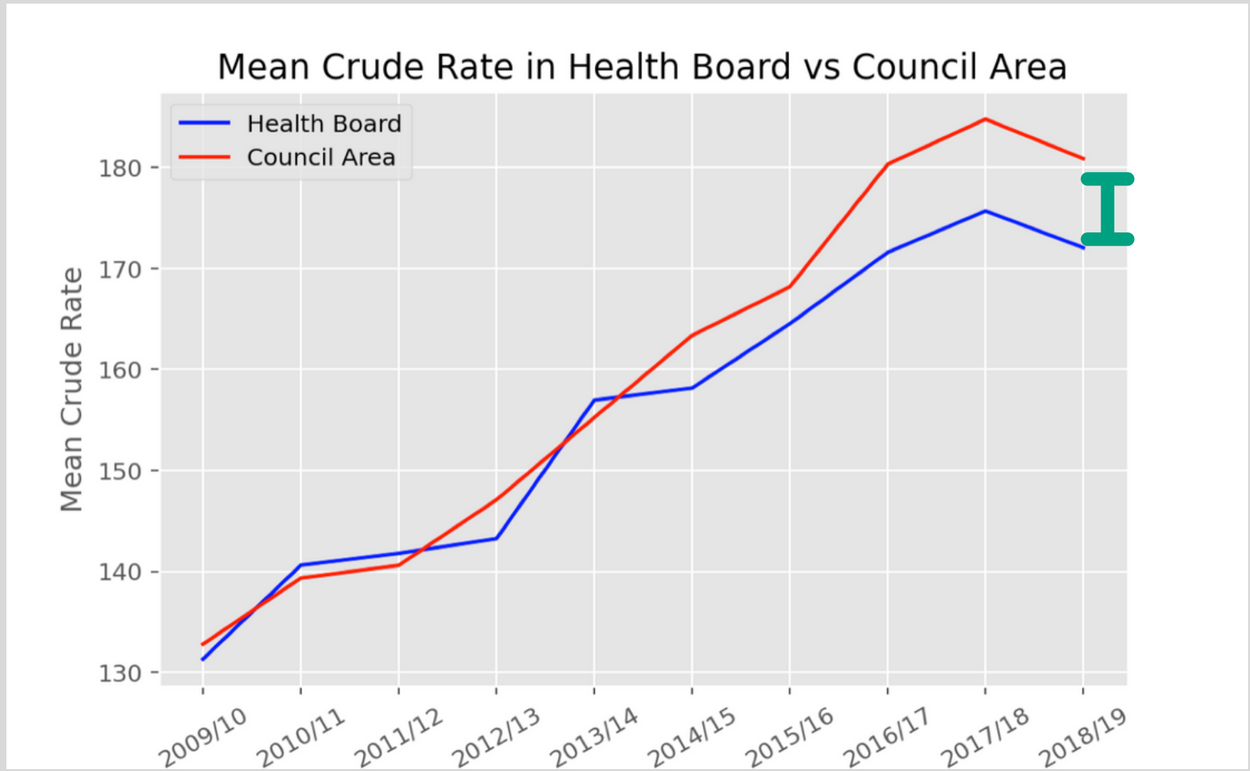
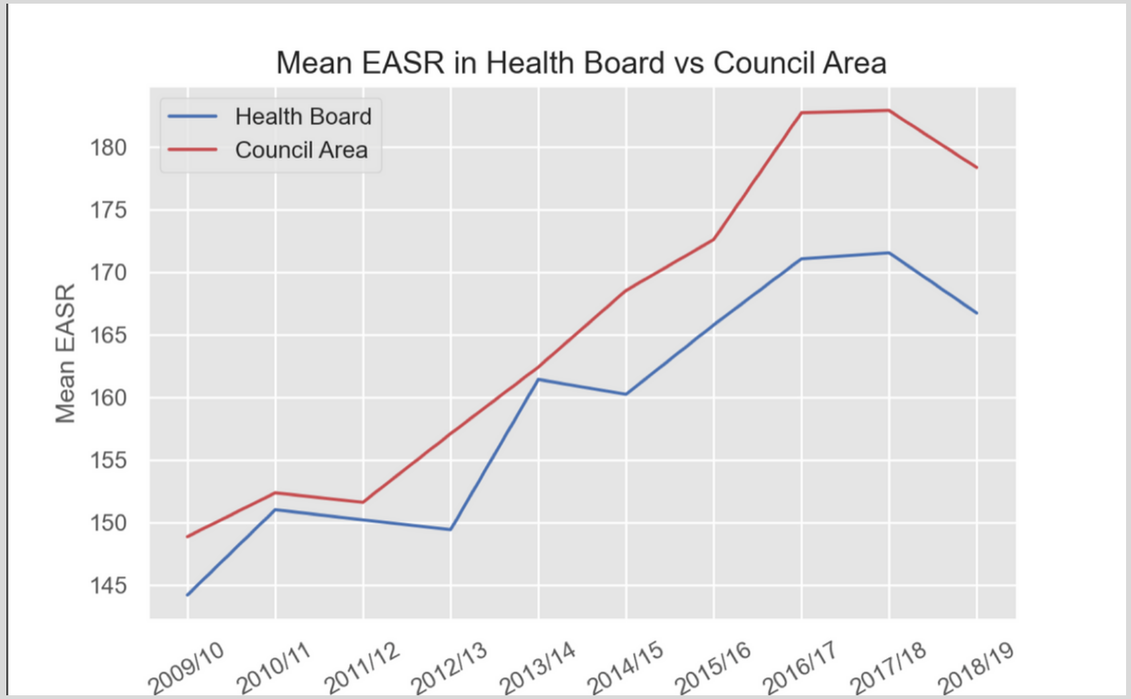
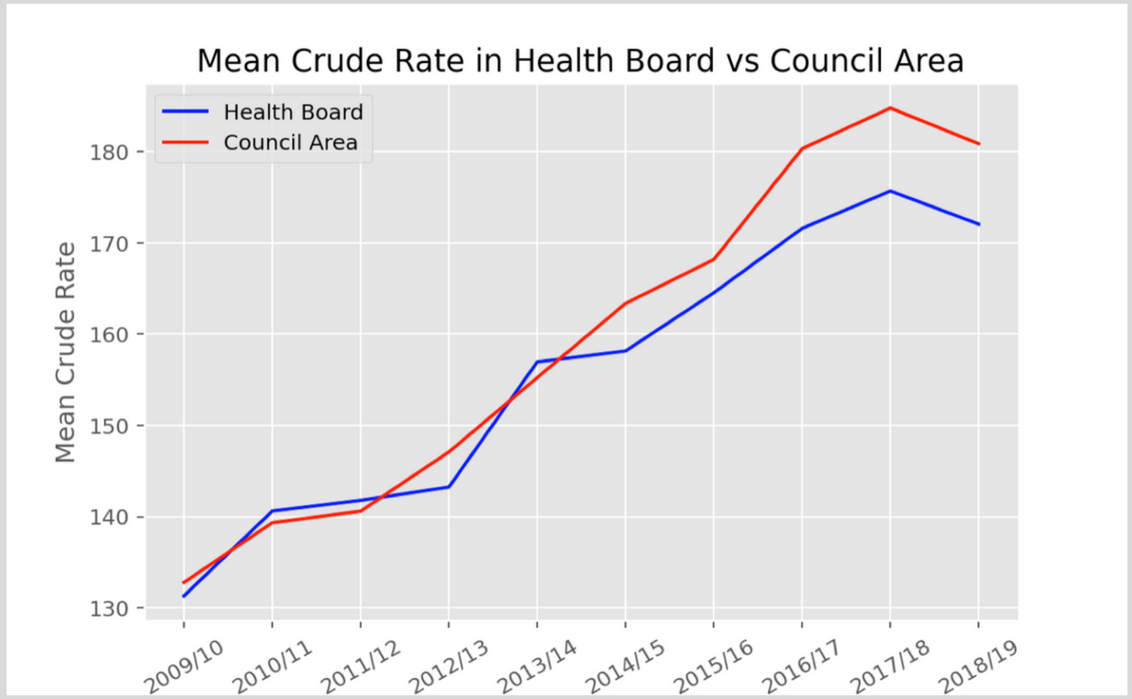

Mean EASR in Health Board vs Council Area
Health Board
Council Area
Mean EASR
180
175
170
165
160
155
150
145
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19


Mean Crude Rate in Health Board vs Council Area
Health Board
Council Area
Mean Crude Rate
180
170
160
150
140
130
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
2016/17
2017/18
2018/19





Conclusion

- Measured by Crude Rate & EASR, Council Areas have higher rates of stroke

Actionable Insight

- May be worthwhile allowing councils the autonomy to use resources how they see fit for their area. Future analysis deeper into council areas would be beneficial

Are there differences in mortality rates for different types of stroke?

Does this vary with demographics?

Specifica ng at gender and age groups.

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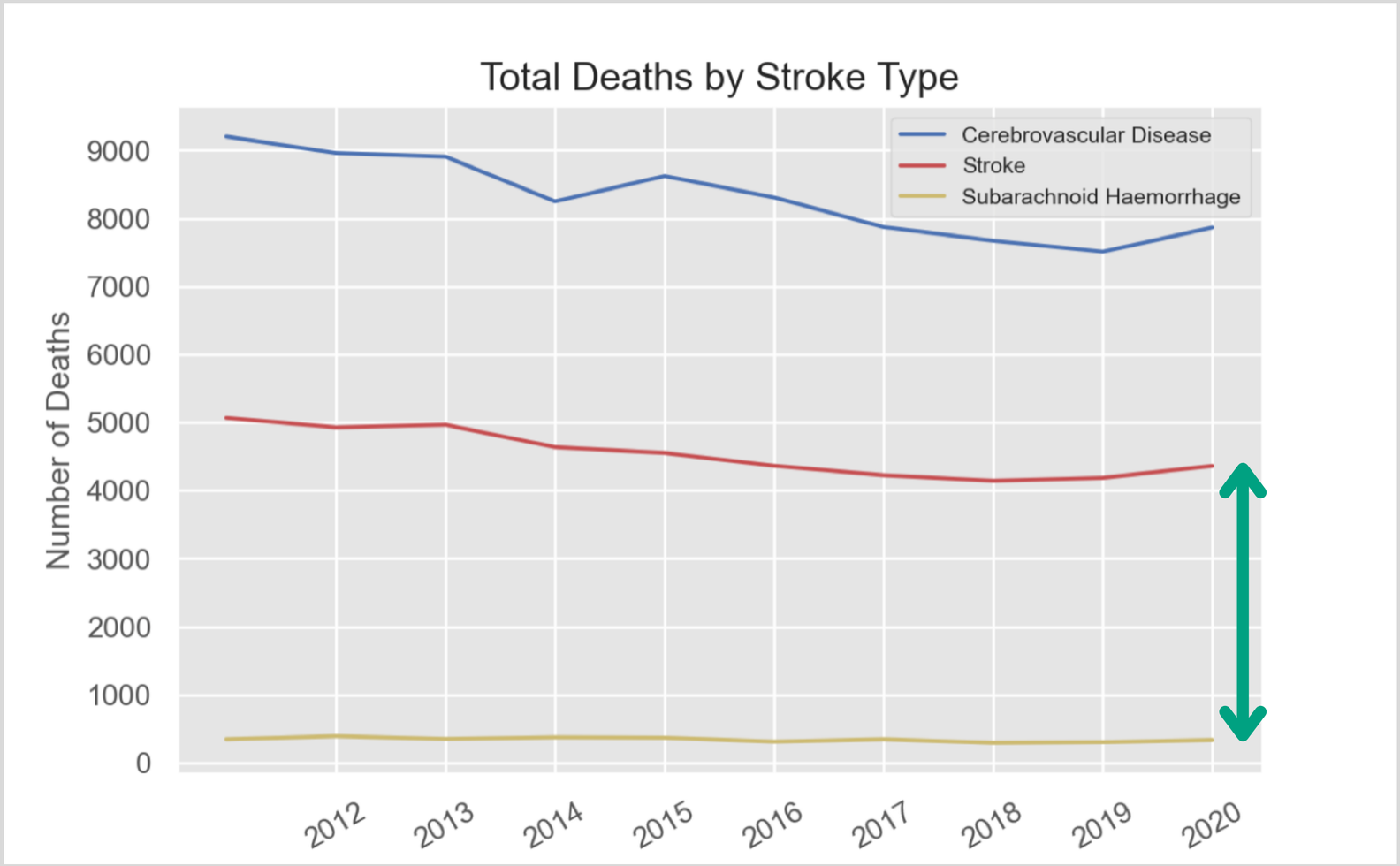
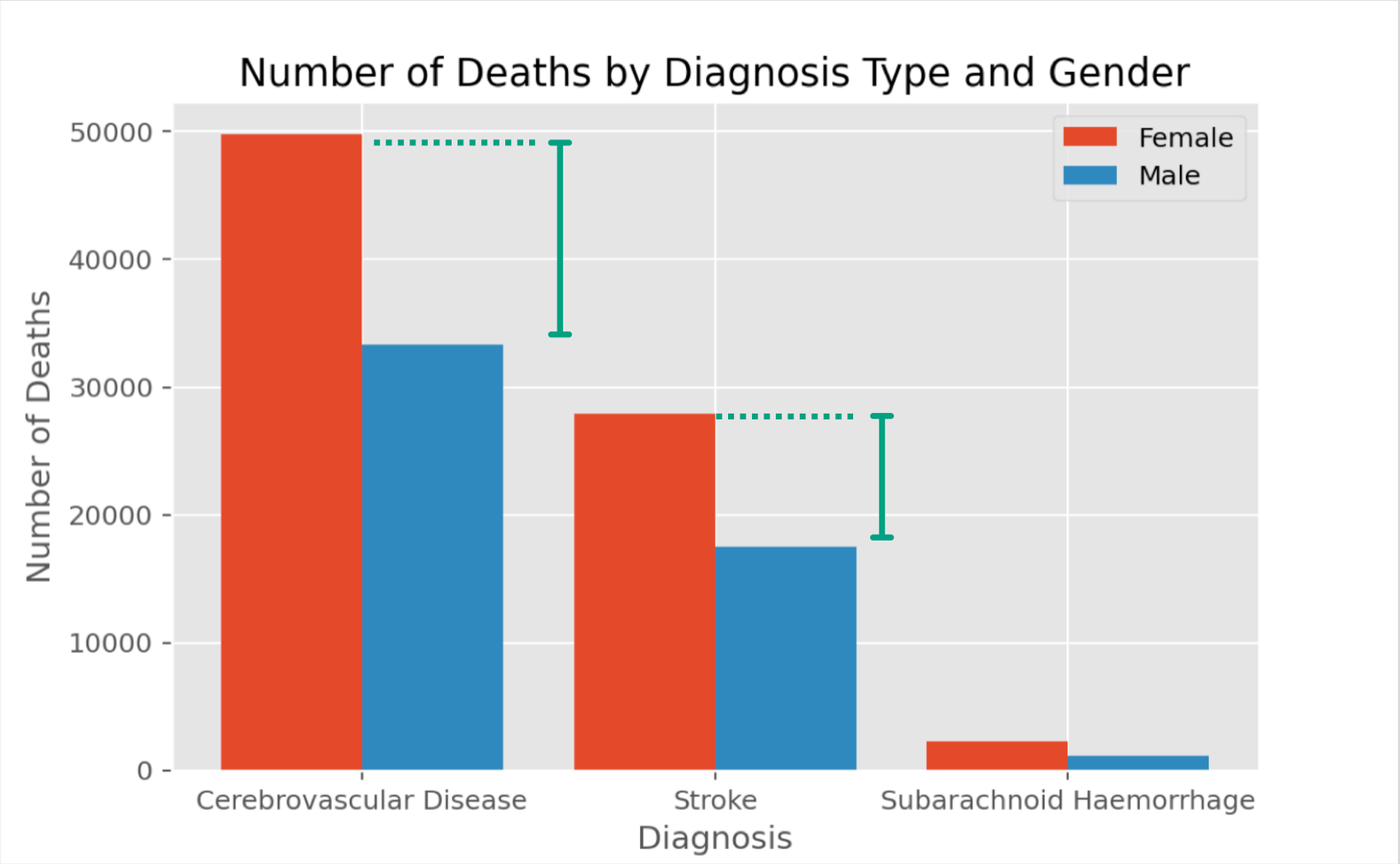


Conclusion

- Cerebrovascular ranks the highest among all years in number of deaths, unsurprising given its broad definition.
- Follows logic that stroke is second greatest. SH is a rare type of stroke and it would be expected to be less frequent than a stroke

Actionable Insight

- Would be worthwhile to gather further data about what other cerebrovascular diseases are driving this number.



Conclusion

- Tells a different story from diagnosis incidence rates where males outnumbered females.

Actionable Insight

- Why are female mortality rates so much greater than those of males? Further research needed into this

Predicting Mortality Rates

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The Model

Number of deaths ~ crude rate + easr + health board + age group + diagnosis

Statistically significant predictors:

Crude Rate

Health Board

Age Group

EASR

Stroke Diagnosis

What does this significance mean?

NHS Greater Glasgow and Clyde has a coefficient of 35.232881

With all other predictors held constant, if you live in the NHS Greater Glasgow and Clyde health board, the number of deaths increases by 35 people (compared to the reference level of NHS Ayrshire and Arran)

Thank you!