Working towards a world where all brain tumours can be overcome

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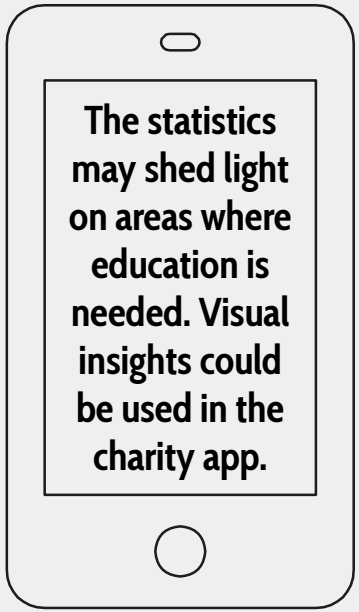
THE BUSINESS QUESTION

The charity would like to increase awareness of brain tumours and provide support for those living with a brain tumour. To achieve this, the charity wanted a comprehensive collection of statistics and insights about brain tumours in Scotland to increase awareness and encourage fundraising.

AREAS OF FOCUS

- ➔ Incidences
- ➔ Survival
- ➔ Mortality
- ➔ Patient experience

I also touched on how these compare to leukaemia or how the data varies within Scotland



INITIAL CHALLENGES

FINDING RELEVANT AND RECENT DATA

Identifying the most suitable data to meet the task demands was the first hurdle. Some data was simply not available. For this reason the task brief questions about emergency diagnosis and the impact of brain tumours on working age individuals were not answered.

HANDLING MISSING DATA

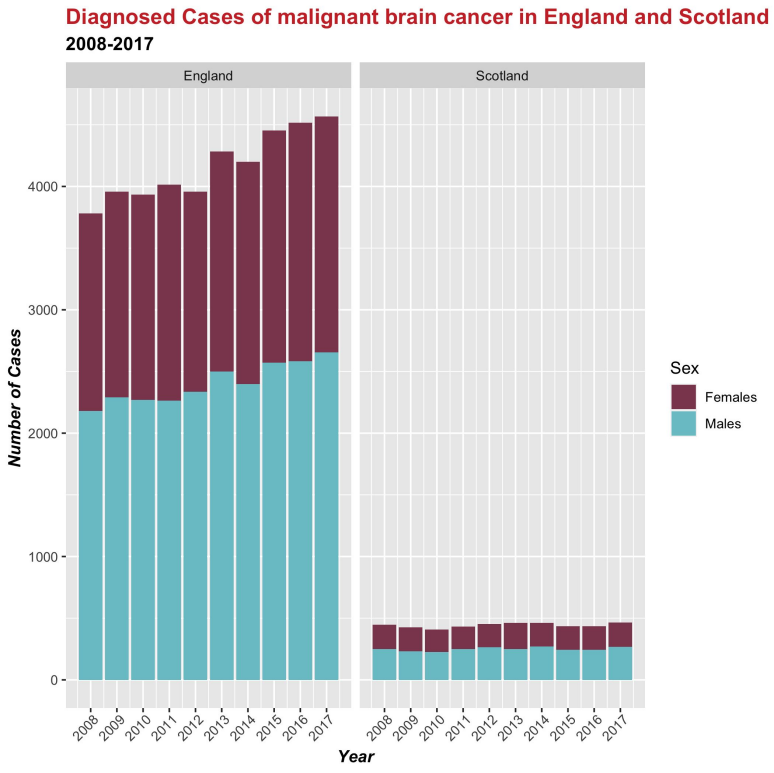
Wu, Khorshidi, Aickelin, Edib and Peate (2019) found mean imputation to be a better method of handling missing data than deletion in breast cancer data. Given this I chose to impute by the mean in most cases.

INCIDENCES

MALIGNANT BRAIN TUMOURS

English cases 2017: 4568

Scottish cases 2017: 466



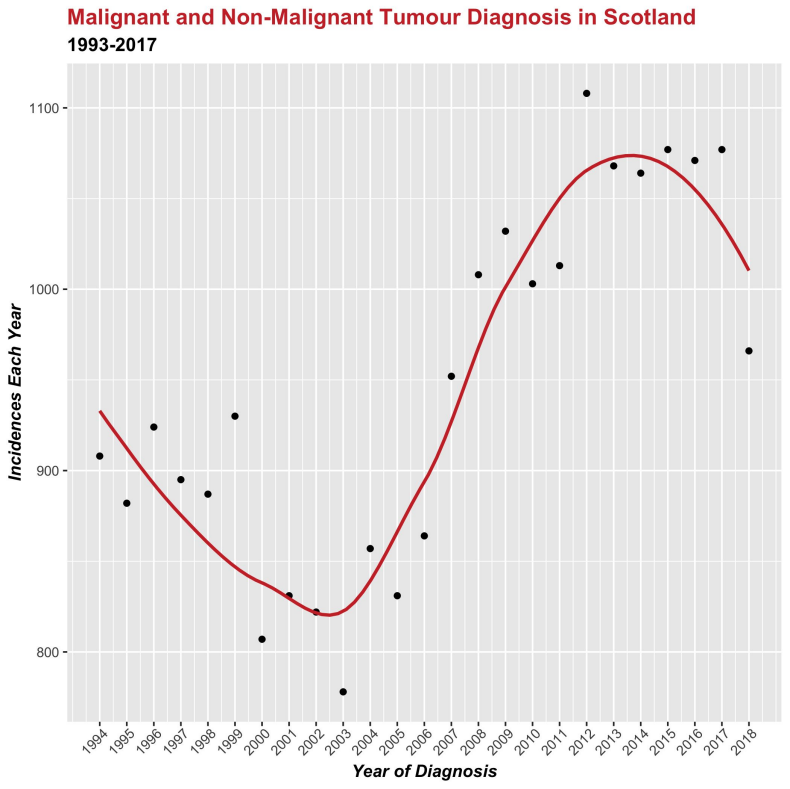
Insights:

- ➔ The divide between females and males is similar across both countries
- ➔ The upward trend in malignant brain tumours is more obvious in England (This trend may not be seen due to the small case numbers in Scotland)

INCIDENCES

MALIGNANT AND NON-MALIGNANT BRAIN TUMOURS

In Scotland, 0.018% of the Population in 2018 were diagnosed with a brain tumour

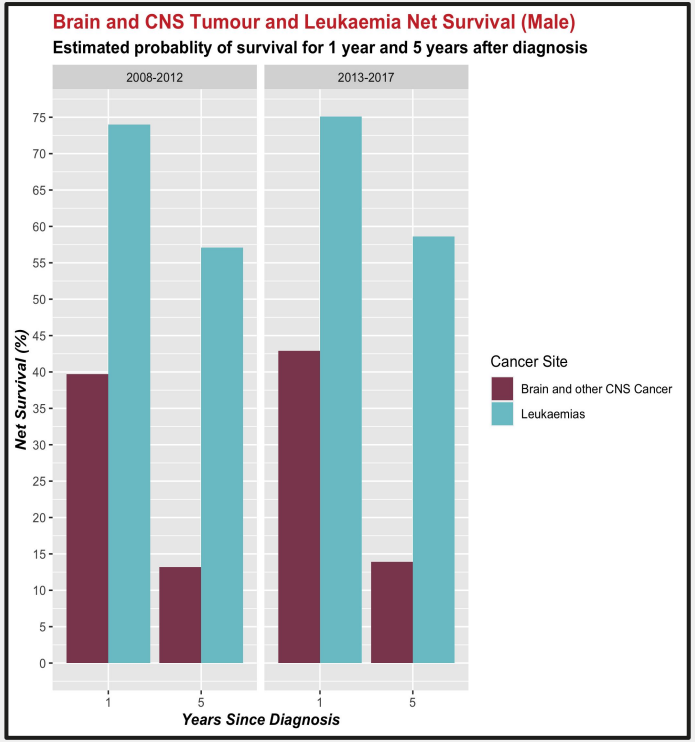


Insights:

- ➔ Incidences of malignant and non-malignant brain tumours appear to sit around 930 cases a year in the 1990's
- ➔ Incidences drop noticeably around 2000 and stay under 900 until 2007
- ➔ Incidences continue to rise up until 2017, reaching over 1100 in 2012

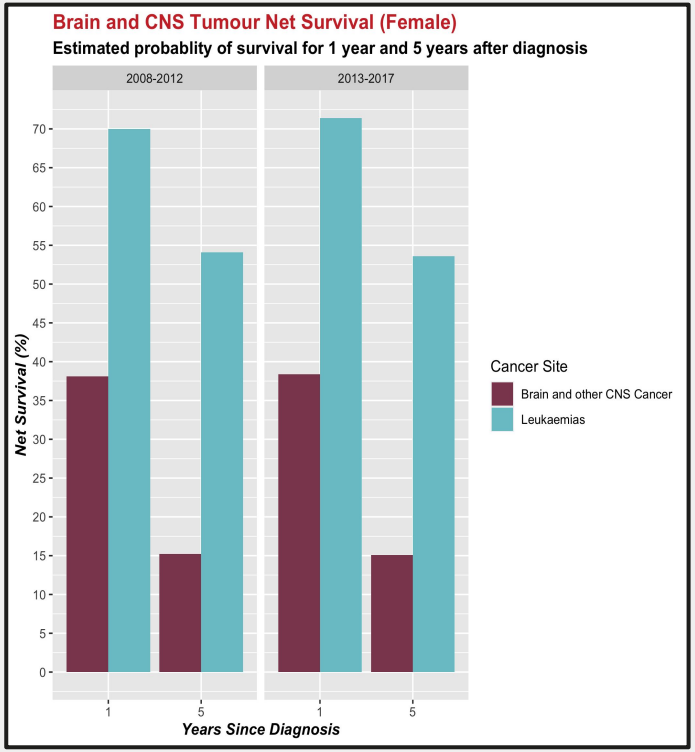
SURVIVAL RATES

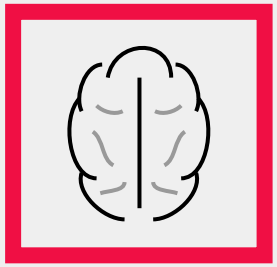
MALIGNANT BRAIN AND CENTRAL NERVOUS SYSTEM TUMOURS VS LEUKAEMIA



Insights:

- ➔ 1 & 5 year survival rates are higher for leukaemia than brain cancer
- ➔ 1 year survival rates for brain cancer slightly increase from the period of 2008-2012 to 2013-2017
- ➔ Survival rates tend to be higher for males





SURVIVAL RATES

WHY MIGHT THIS DISCREPANCY STILL BE SO PROMINENT BETWEEN BRAIN TUMOURS AND LEUKAEMIA

In 2018/2019, brain tumour research accounted for 6.5% of the cancer research budget

In 2018/2019, leukaemia research accounted for 15.4% of the cancer research budget

Between 2012/2013 and 2018/2019 the brain tumour research budget more than doubled

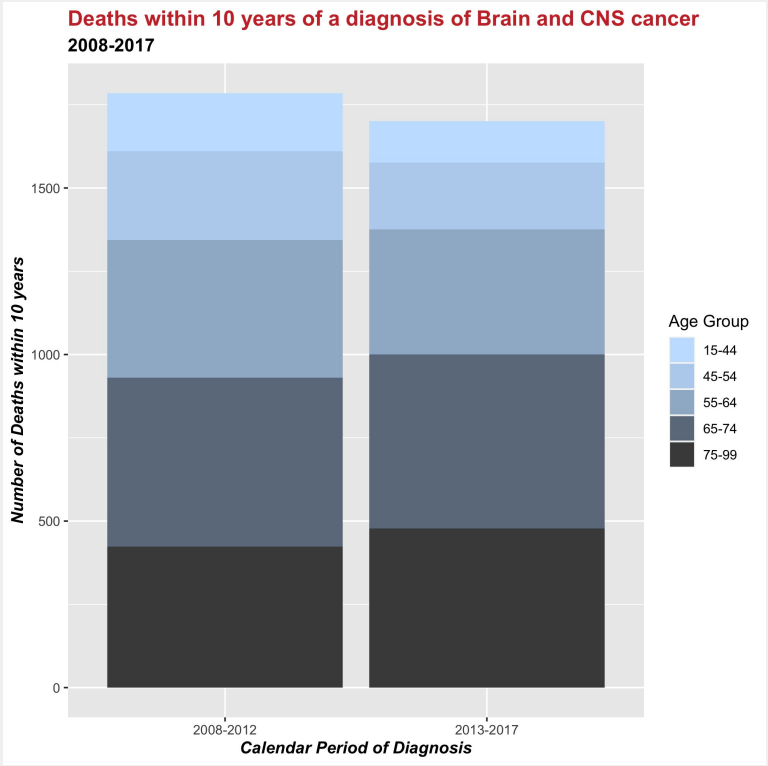
Insights:

- ➔ There is still a bridge to gap between research into brain tumours and other cancers
- ➔ Budget is potentially a factor in reducing preventable deaths due to brain tumours

MORTALITY

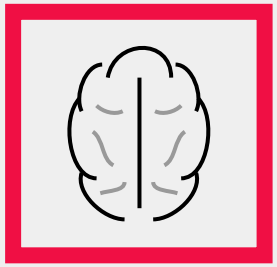
DEATHS WITHIN 10 YEARS OF BEING DIAGNOSED WITH A MALIGNANT BRAIN OR CNS TUMOUR

The slight drop in deaths is interesting - it may suggest the increased research budget is coming into play



Insights:

- ➔ The number of deaths dropped from 1785 across 2008-2012 to 1701 across 2013-2017
- ➔ Across the combined time periods, 78% of deaths occurred in those aged 55 and above
- ➔ It is important to be aware that this may be due to this age groups large representation in the data



MORTALITY

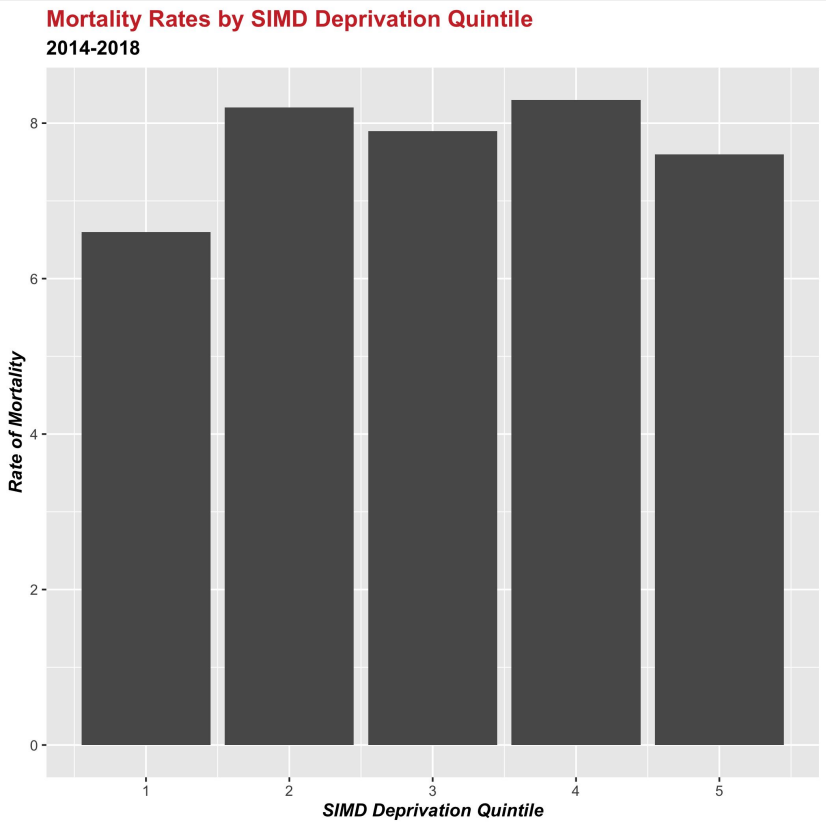
AGE

In 2017, those aged 55 and above accounted for 68% of new brain cancer cases

Older age is one of the biggest risk factors for developing a brain tumour. This suggests a need to increase awareness of early brain tumour symptoms in those over 54. Catching a brain tumour early is one of the best ways to cure the cancer.

MORTALITY

MORTALITY RATES BY SIMD QUINTILE



This data indicates the areas in Scotland where education needs to be focused on is those regions with an SIMD rating of 2 or 4

Insights:

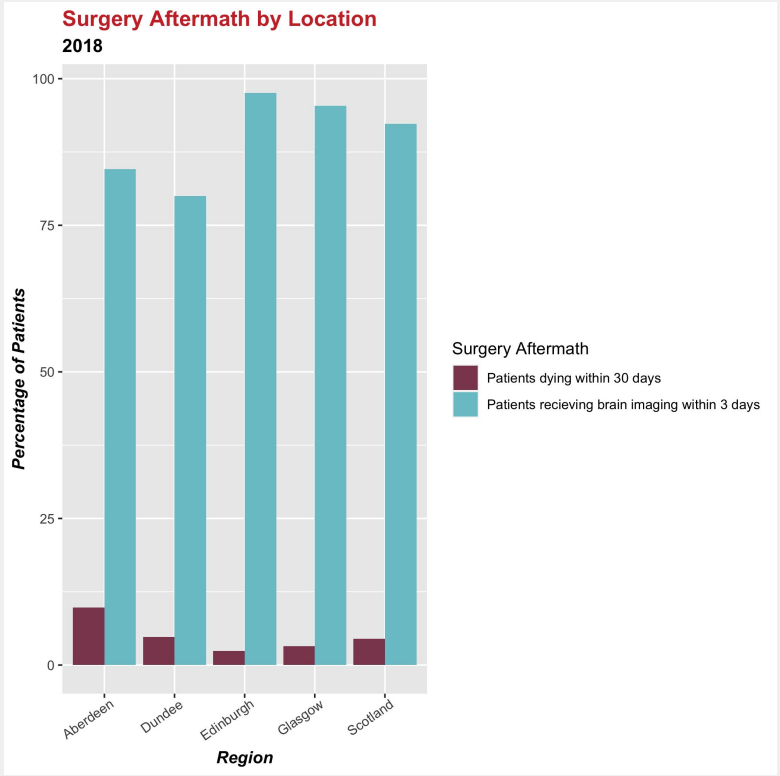
- The mortality rate was lowest at 6.6 per 100,00 people at risk in the most deprived quintile
- The second least deprived quintile had the highest rate of mortality at 8.3 per 100,000 people at risk
- The second most deprived quintile is not far behind at a rate of 8.2 deaths per 100,000 people at risk

PATIENT EXPERIENCES

SURGERY AFTERMATH TARGETS ACROSS SCOTLAND

Insights:

- ➔ The target for the percentage of patients receiving brain imaging within 3 days is 90%
- ➔ Both Aberdeen and Dundee were under the 90% target
- ➔ The target for the percentage of patients dying within 30 days is below 5%
- ➔ The only region above 5% was Aberdeen at 9.8%

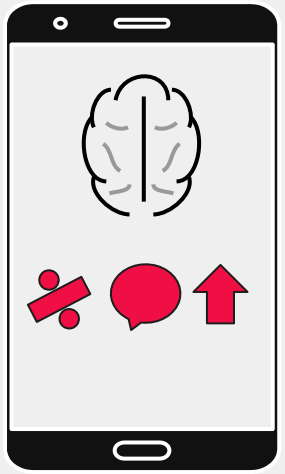


After brain tumour surgery imaging should be conducted within 3 days to measure surgery success and determine further treatment

The 30 day mortality rate is a good indicator of the general brain tumour treatment services in a particular region

THE KEY INSIGHTS SUMMARISED

- There is an upward trend in yearly brain cancer diagnoses in Scotland (and England)
- Survival rates for brain cancer
- 1 year survival rates have improved over the last 10 years
- Pushing for the research budget for brain tumours to be continually increased is extremely important
- 78% of deaths within 10 years of a diagnosis where in those over 54 - age is the biggest risk factor for developing brain cancer
- Education should be improved for those over 54 and in regions of Scotland with an SIMD index of 2 or 4
- Aberdeen and Dundee health services are below the others in certain targets, suggesting more funding and training may be required



FUTURE ANALYSIS AND DATA COLLECTION

FORECASTING

If the incidence or mortality data had been in a daily or quarterly format it would of been possible to perform predictive forecasting on these areas

DATA COLLECTION

The brief asked about visual impairments, impact on working age individuals, route to diagnosis and emergency presentations. None of these could be answered.

TUMOUR GRADES

With more time it would of been useful to look at how the data within the areas of focus vary across the different brain tumour grades

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