

# Cancer in Scotland

Lessons from death for life

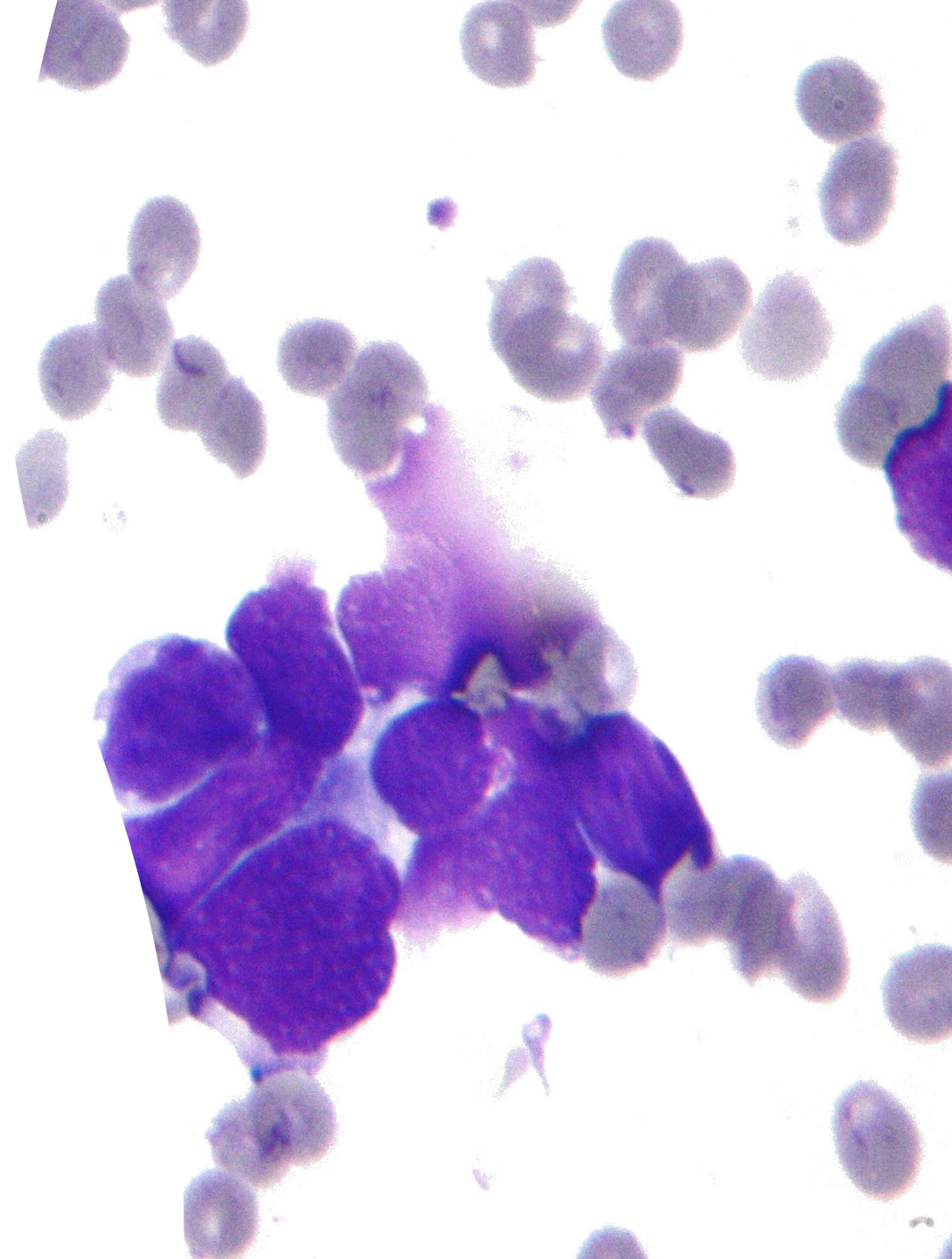
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CodeClan DR22



October is Breast Cancer  
Awareness Month

# Understanding cancer data

- **Death**  
Long-term effectiveness of public health campaigns and medical treatments and prevention.
- **Incidences**  
New cases. Tracking existing and emerging issues
- **Screening programmes**  
Early detection, take-up by citizens
- **Waiting times for treatment**  
Better outcomes, shorter = better



# Challenges

- Lack of domain knowledge – jargon to learn.  
“malignant neoplasm”/”cancer site” / ICD-10 etc
- Multiple sources, many available – which to choose?
- Public Health Scotland – some relevant content still on 'old' ISD website.
- Excel format files more designed for readability by humans than programmatic access



# ICD-10

"... International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases"

- Wikipedia

NHS Scotland uses version **ICD-10** to categorise different medical conditions.

# Story of insights





# Insights - Death

“The underlying **cause of death** is defined as the disease or injury which initiated the chain of morbid events leading directly to death, or the accident/act which produced the fatal injury. “ - NRS

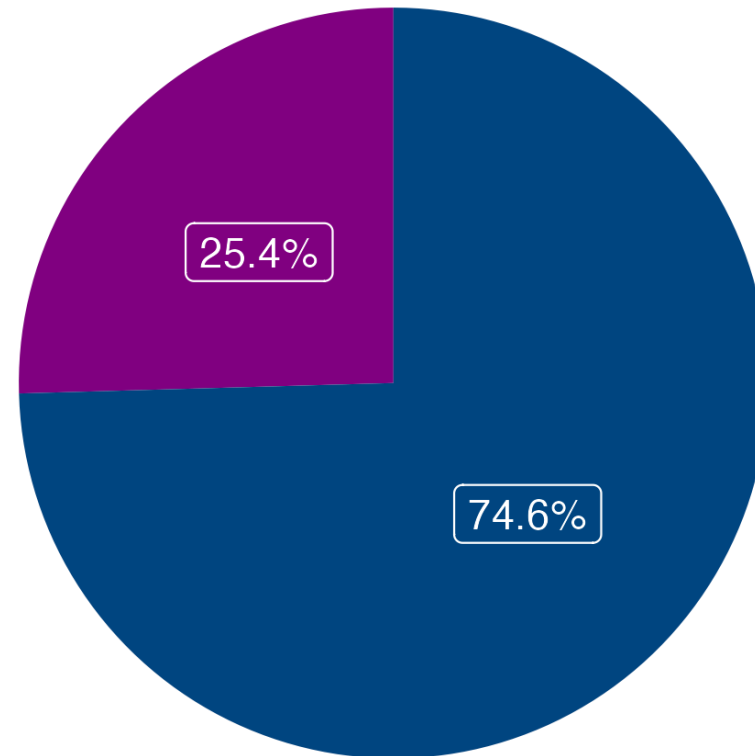
“All ages age-standardised death rates for all causes and certain selected causes, Scotland, 1994 to 2022”

Definition: rate is deaths per 100,000 people in Scotland using using the European Standard Population.

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Death rate from cancer as percentage all causes  
Latest year: 2022

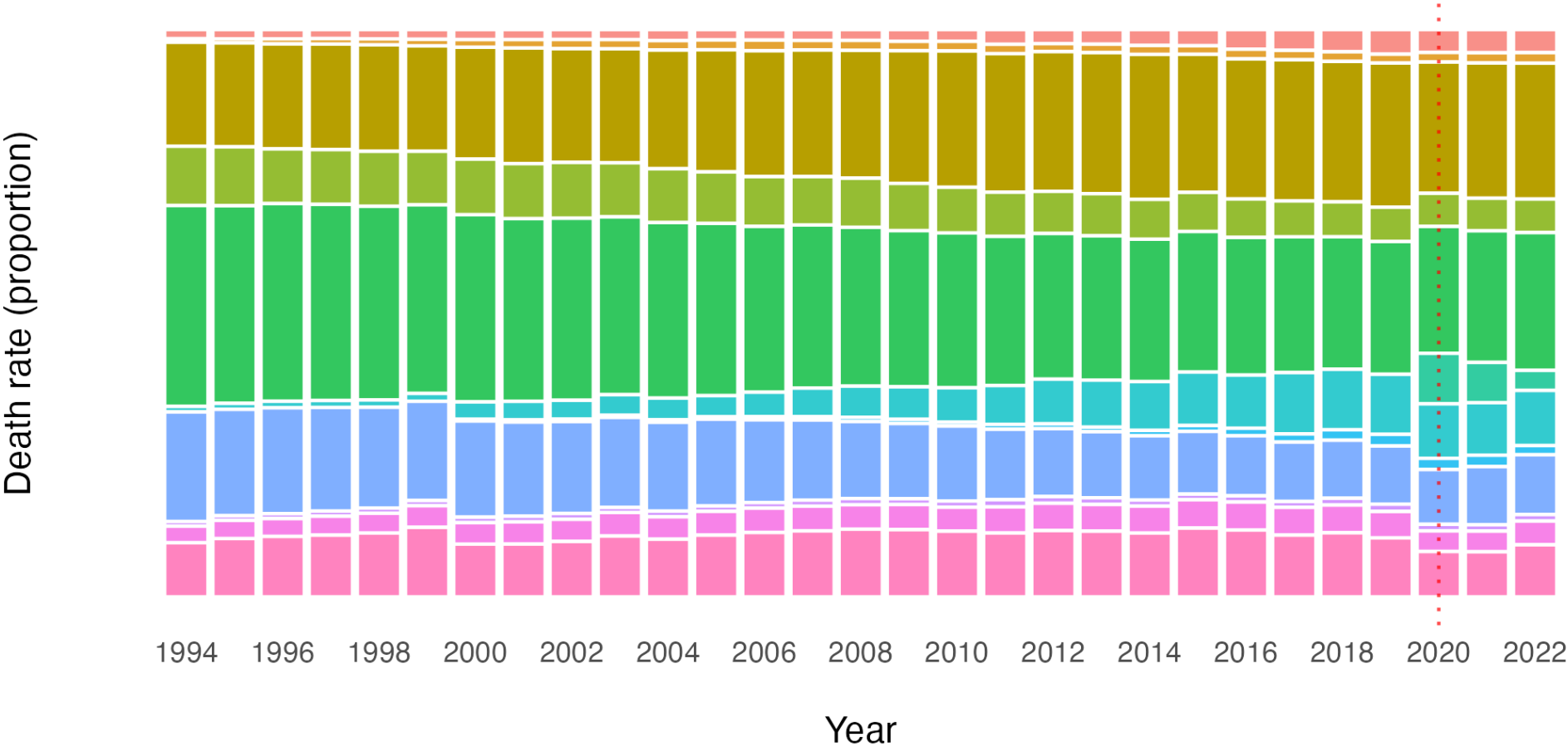
Death from  
cancer in  
Scotland  
compared to  
other causes?



 Cancer  Non-cancer

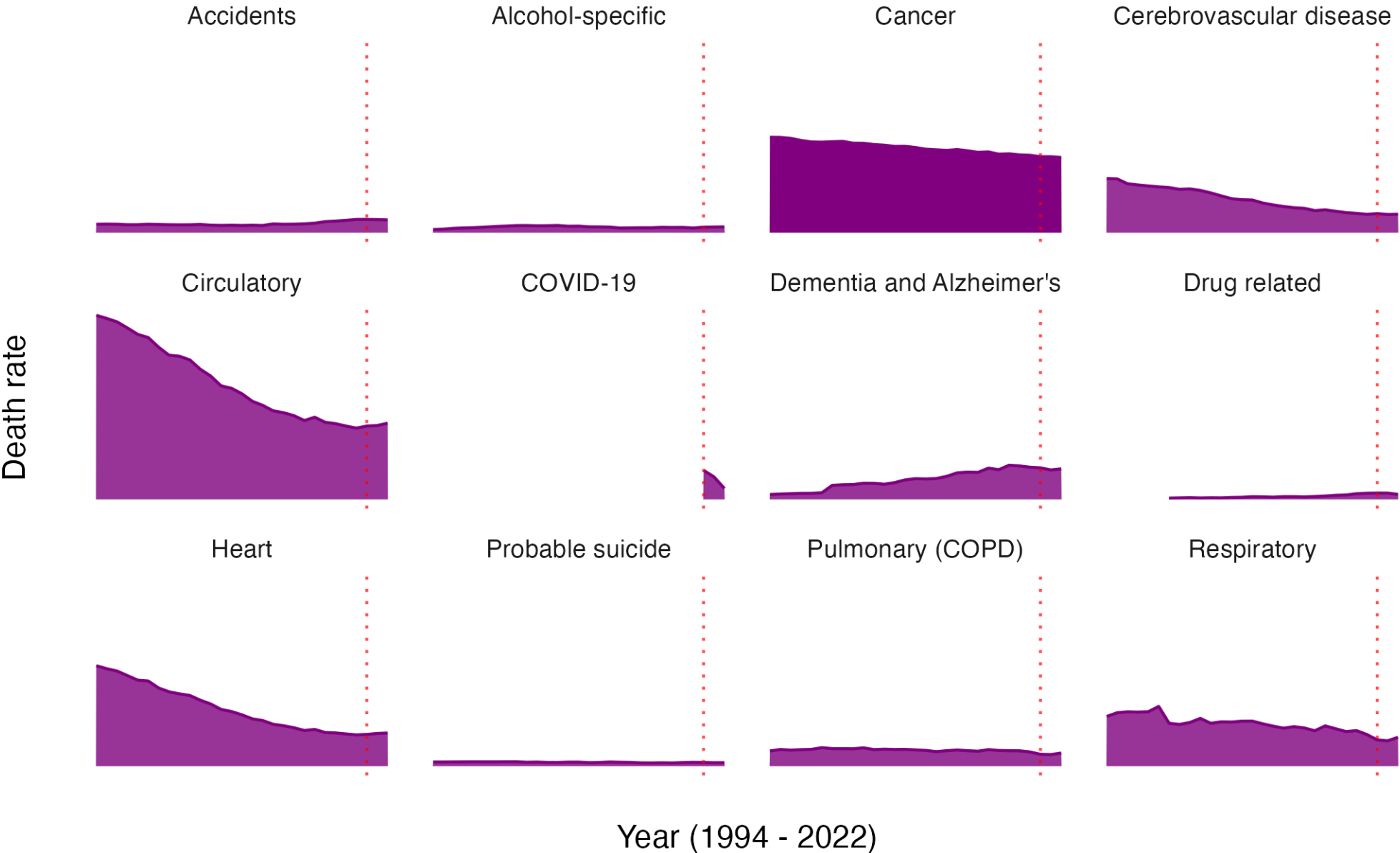
Data Source: National Records of Scotland

Death rate from cancer - all causes  
Scotland. Age-standardised





Death rate - all causes  
Scotland. Age-standardised



## Improving since previous year available - 2021

These are what got 'better' in terms of death rate between the latest two years of data.

	cause_simple		rate_change_pct
1	COVID-19		-105
2	Drug related		-26.3
3	Accidents		-2.2
4	Cancer		-1
5	All causes		-0.8

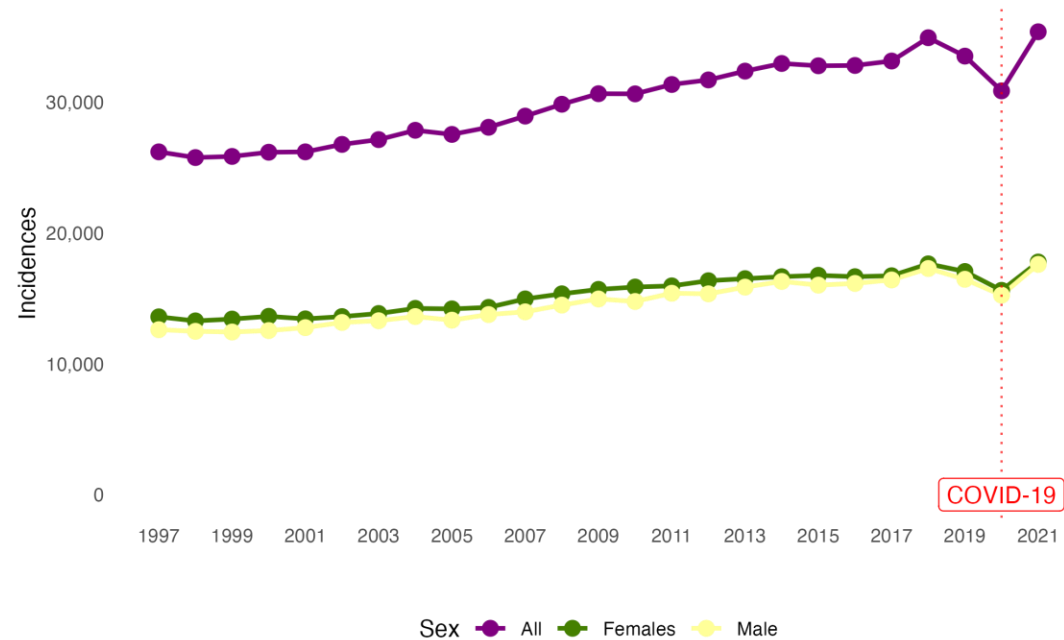
Showing 1 to 5 of 5 entries

Conclusion: **rates of cancer deaths have improved for the most recent year.**

It's not possible to tell from our data whether any of the screening or vaccination programmes contribute in any way to the improvement. And the improvement is so small it's almost static.

# Insights – Incidences

Number of Cancer Incidences by Year and Sex  
1997-2021



Data Source: Public Health Scotland

## Years with highest/lowest cancer incidences

Data between: 1997 and 2021

Result	Incidences	Year
Highest	35,379	2021
Lowest	12,432	1999

Data Source: Public Health Scotland



# Age Range

## Top Incidences by Cancer Site, Age Range and Sex

This is a list of those cancer sites, age groups and sexes most at risk of having a new cancer diagnosed.

Top 10 All			
Cancer Site	Age Range	Sex	Incidences
Prostate	70-74	Male	15,828
Prostate	65-69	Male	14,738
Breast	50-54	Females	13,552
Breast	60-64	Females	13,517
Prostate	75-79	Male	13,275
Breast	65-69	Females	13,122
Trachea, bronchus and lung	70-74	Male	12,911
Breast	55-59	Females	12,368
Trachea, bronchus and lung	75-79	Male	11,904
Trachea, bronchus and lung	70-74	Females	11,126
Data Source: Public Health Scotland			

Top 5 Females 20-29			
Cancer Site	Age Range	Sex	Incidences
Uterus	25-29	Females	647
Cervix uteri	25-29	Females	635
Malignant melanoma of the skin	25-29	Females	514
Breast	25-29	Females	354
Malignant melanoma of the skin	20-24	Females	322
Data Source: Public Health Scotland			

Top 5 Hodgkin lymphoma			
Cancer Site	Age Range	Sex	Incidences
Hodgkin lymphoma	20-24	Females	192
Hodgkin lymphoma	25-29	Male	192
Hodgkin lymphoma	20-24	Male	187
Hodgkin lymphoma	40-44	Male	184
Hodgkin lymphoma	30-34	Male	183
Data Source: Public Health Scotland			

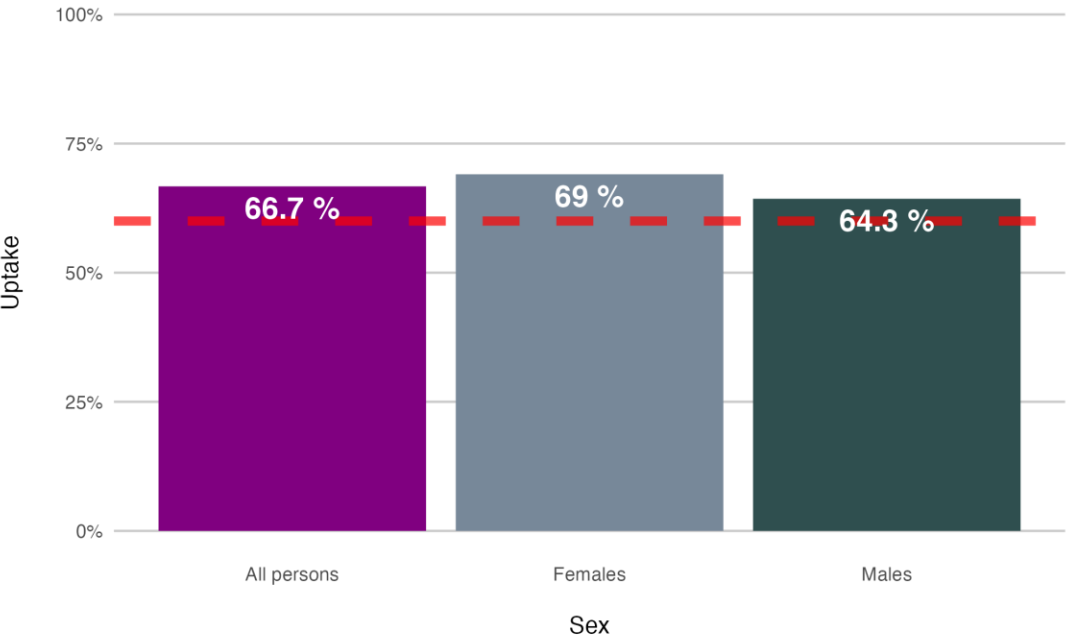
# Incidences by Age Range, Sex and Cancer Site



# Insights - Screening

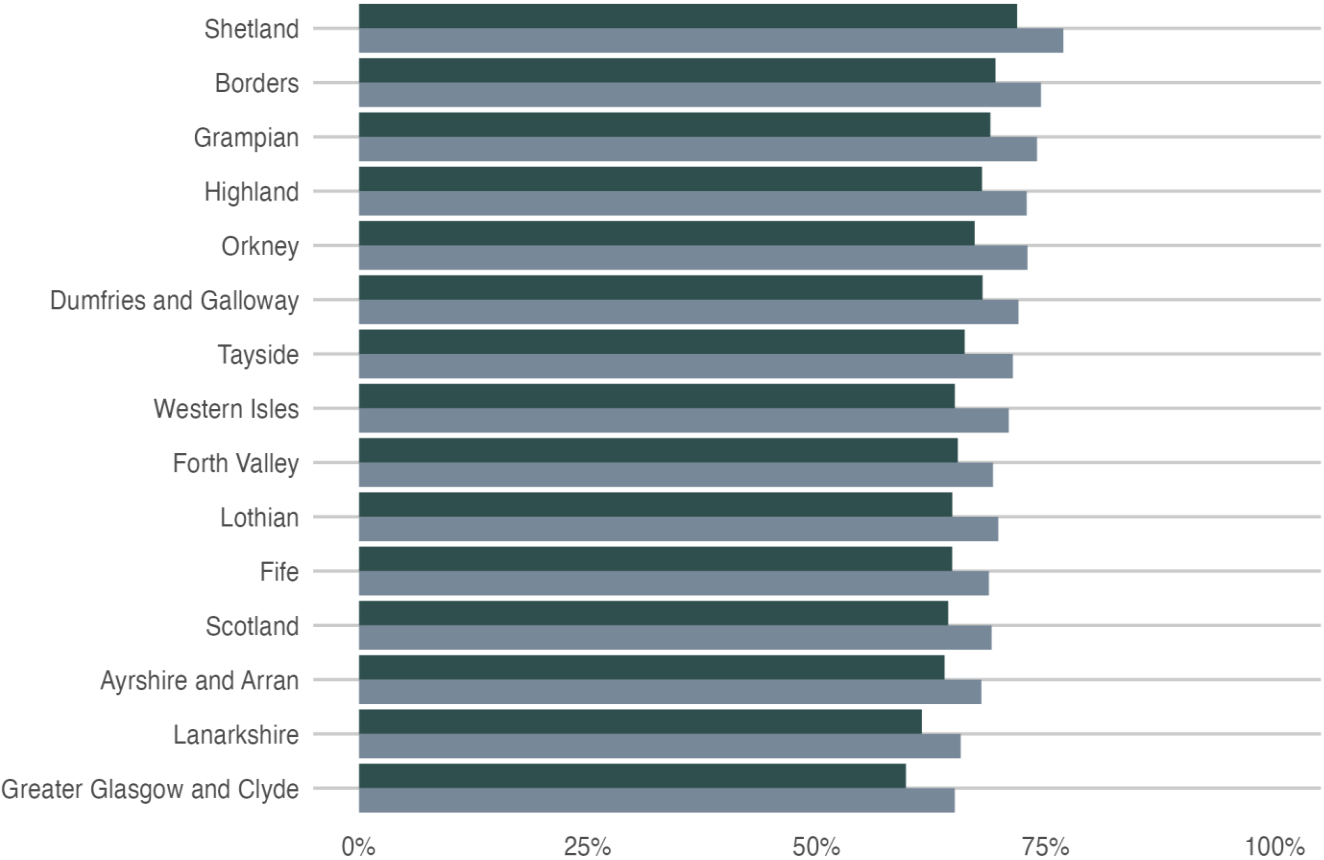
## Bowel Cancer Screening uptake

Completed a home bowel cancer screening test May 2020 to April 2022



Data Source: Public Health Scotland

## Health Board



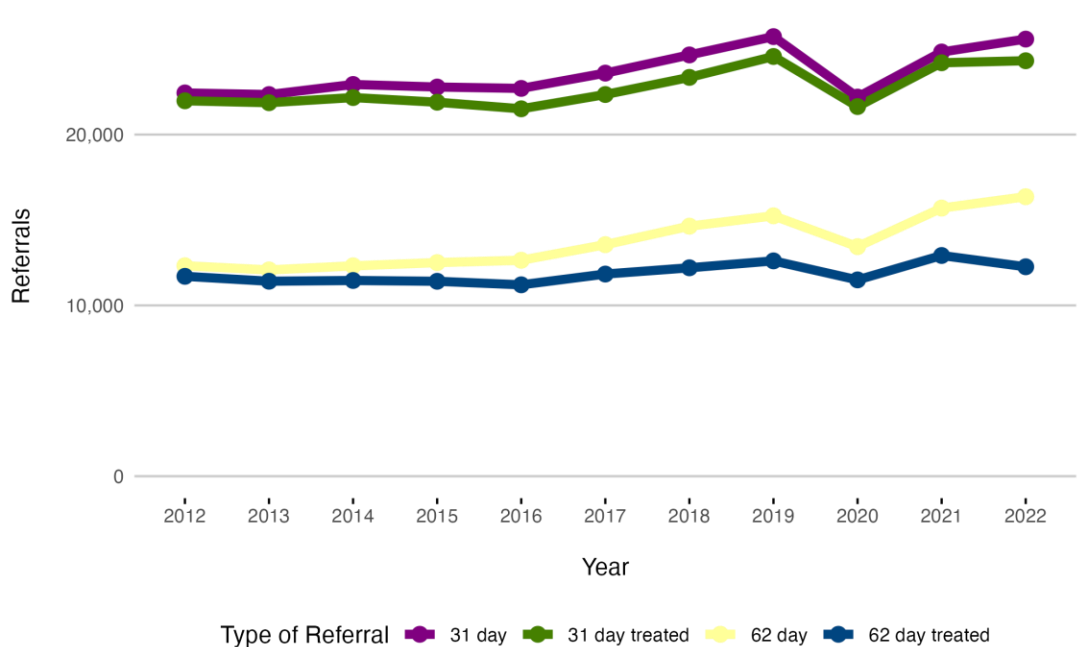
Sex Females Males

Data Source: Public Health Scotland



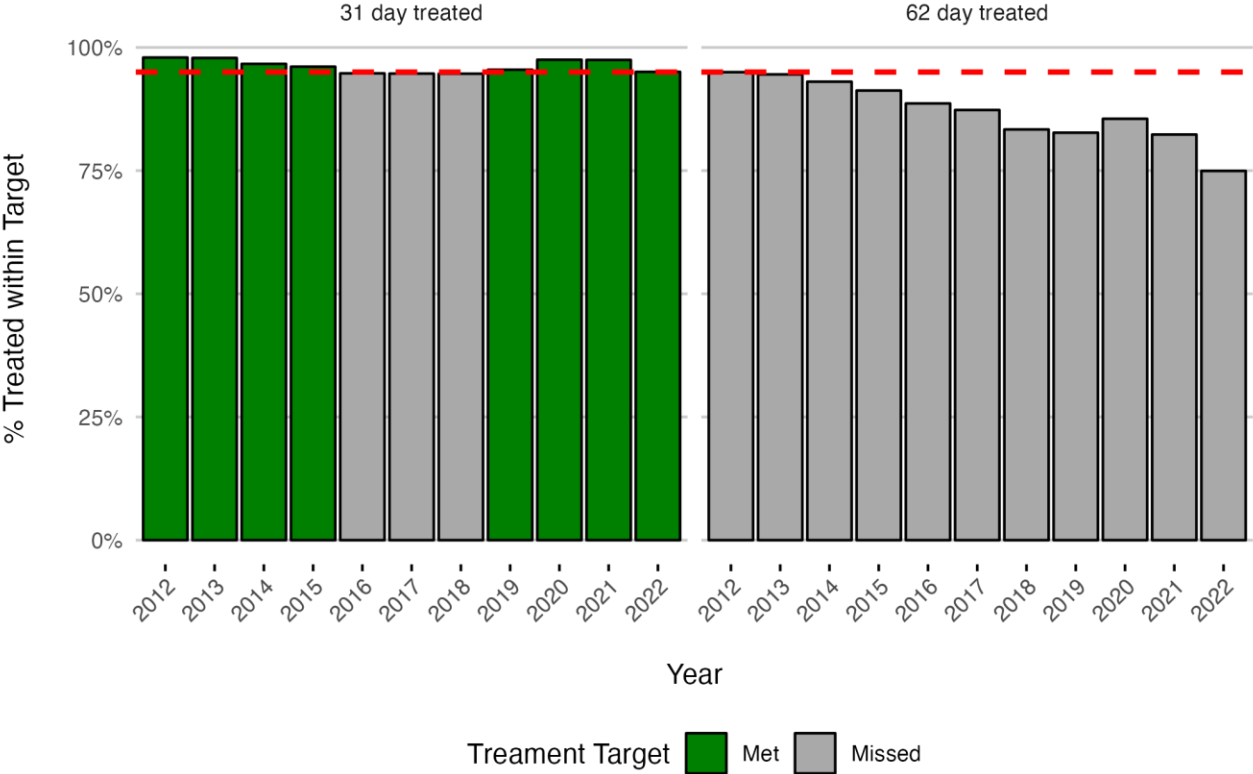
# Insights Waiting Times

Cancer Waiting Times in Scotland  
Number of Referrals: 2012-2022



Data Source: Public Health Scotland

Waiting Time Targets  
2012-2022



# Implementation

- Another data in cancer registry that could be opened to a wider audience?
- Treatment needs to start sooner. Rethink strategy?
- Cancers vary by type across age groups. Use digital technology to provide tailored risk advice re symptoms for differing age groups/sexes and parents for signs in children.
- Make it easier to access data programmatically for use by dashboards - URLs
- Landscape of multiple organisations different websites – rank poorly in search engines, less online visibility/traffic.



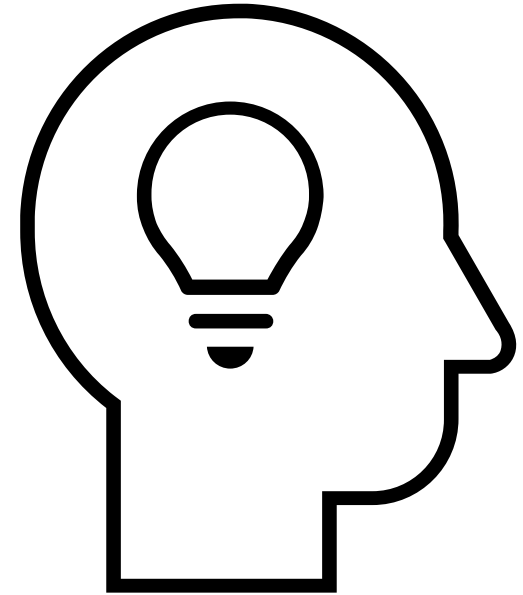
# Enhancements

- Vaccination programme – prevention!
- Breast and Cervical Screening
- R shiny app hosting for Cancer Risk Tool



# Lessons - Cancer

- Death causes other than cancer...dementia looks scary!
- Good news re cancer rates even if small.
- Wide variation in which cancers at which age - how do we inform the public regarding symptoms?
- Major problems with meeting 62 day target. Failing to treat people as soon as possible after diagnosis
- Was not aware that non-malignant skin cancer was excluded. Revisit with climate change?



# Lessons - Data

- Check accompanying reports of datasets – contained essential information **not present in data dictionary**
- Watch for datasets that include totals – can end up double counting if don't filter out
- 'All' ...is it really? Double check if there are exceptions/caveats
- Shiny documents useful for exploratory work
- Reading Excel with multiple tables – use 'range' argument of read\_excel to retrieve
- R 'gt' package helpful for nice tables in markdown

# Demo – Cancer Risk Tool

- Shiny Document
- Introduction to interactive documents  
<https://shiny.posit.co/r/articles/build/interactive-docs/>

