



**Scotland's
health**

Scottish Burden of Disease study

Diane Stockton , Scottish Burden of Disease Study team

Population and Migration Statistics Conference: Understanding Scotland's population in a data driven future, **20 September 2018, Edinburgh**



**Scotland's
health**

Overview and methods



Why are we carrying out this study?

- Low life expectancy (LE) in Scotland which is improving very slowly
- Even slower improvements in healthy LE
 - We are living longer but spending more time in ill-health
- Global Burden of Disease estimates are modelled
 - Are they 'good' enough for national and local planning?
- Data informed decision making
 - Policies and interventions targeted where they can have the most impact
- Comprehensive local estimates to empower informed local decision making



Why measure burden in this way?

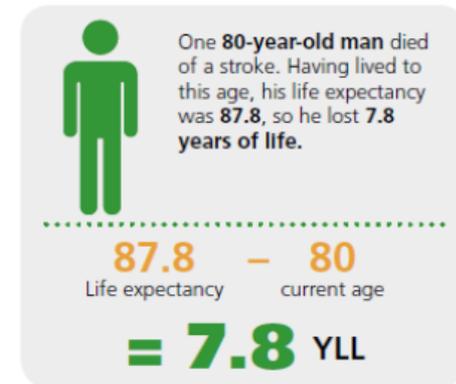
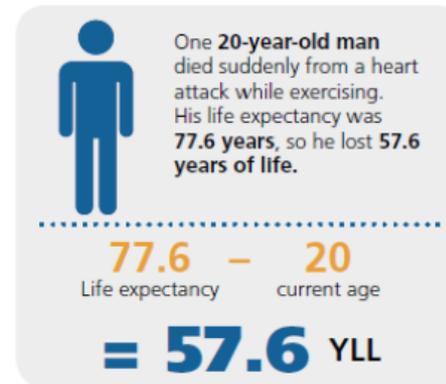
- Causes of disease and injury are complex
 - Heterogeneity (acute, chronic, episodic, or a mixture!)
 - Outcomes (fatal, non-fatal, or a mixture!)
- Traditional measures don't allow for level comparisons
 - Incidence, prevalence, mortality, bed days, length of stay *etc.*
 - *e.g.* depression vs. Lung cancer
- Use of established traditional measures to ensure morbidity and mortality are counting the same thing
- Health loss characterised in terms of **years lost** due to **early death and ill-health (combined = DISABILITY ADJUSTED LIFE YEAR)**



Disability-Adjusted Life Years (DALY) = Years of Life Lost (YLL) + Years Lived with Disability (YLD)

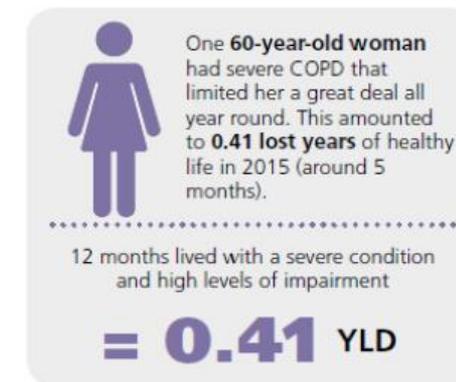
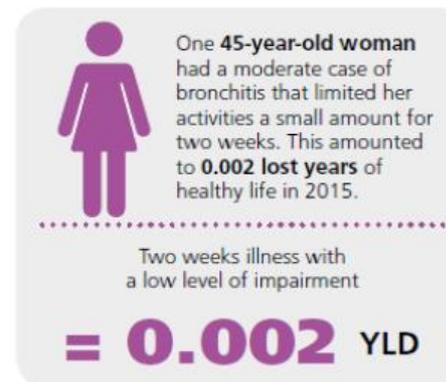
Years of Life Lost (YLL)

- Mortality estimate
- Used with LE tables to estimate the potential lost from dying early (time lost)



Years Lived with Disability (YLD)

- Morbidity estimate
- Adjusts for how debilitating a condition is (time lost)



Differences with GBD methods for fatal outcomes

Life expectancy
tables

- 10% of deaths are garbage code (GC) deaths
- GC deaths redistributed using proportional allocation on GBD cause-specific targets
- Life table customised to Scotland (official results for life expectancy in 2015)
- SBoD life table emphasizes non-fatal outcomes and reduces the gender difference in the final burden

Age	GBD Both	SBoD Men	SBoD Women
0	86.02	77.07	81.15
1	85.21	76.35	80.41
...
5	81.25	72.4	76.45
...
21	65.36	56.61	60.57
...
35	51.53	43.27	46.9
...
40	46.64	38.65	42.12
...
65	23.29	17.37	19.74
...
90	5.05	3.87	4.38
...
100	2.23	1.7	2.1
...
105	1.63	1.7	2.1

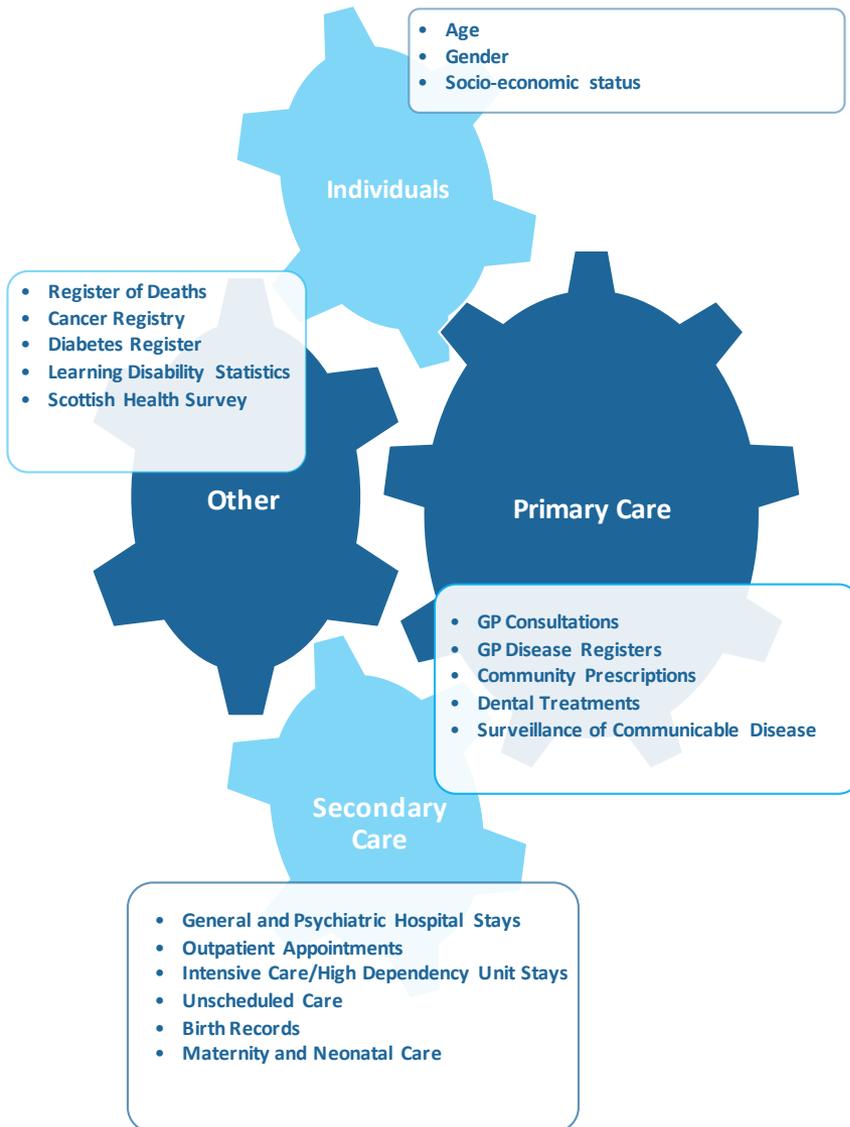


Redistributed causes of death in 2014-16 (the table shows the different re-allocation to the causes with the highest number of re-allocated deaths)

Cause of death	SBoD (N)	IHME %	SBoD %
Alzheimer's and other dementias	623	0.97%	11.04%
Ischaemic heart disease	550	10.59%	9.75%
Chronic obstructive pulmonary disease	378	9.76%	6.70%
Lower respiratory infections	364	3.65%	6.45%
Chronic kidney disease	317	2.81%	5.62%
Stroke	287	5.81%	5.09%
Diabetes mellitus	230	0.73%	4.08%
Atrial fibrillation and flutter	218	0.12%	3.86%
Lung cancer	173	5.11%	3.07%
Other cardiovascular/circulatory diseases	145	4.37%	2.57%
Endocrine, metabolic, blood, and immune disorders	124	0.36%	2.20%
Colorectal cancer	110	4.23%	1.95%
Chronic liver disease	108	1.17%	1.91%
Urinary diseases and male infertility	98	0.72%	1.74%
Alcohol use disorders	95	0.22%	1.68%
Drug use disorders	95	10.06%	1.68%

Note: this shows the N and % of IDD's re-allocated to each specific cause of death (i.e. 623 (11.04%) of IDD's were re-allocated to Alzheimer's disease and other dementias, whereas in using IHME algorithm only 0.97% of IDD's were re-allocated to this cause of death).

SBoD design for non-fatal outcomes



- Extensive range of electronic health records available (EHR) on contacts with health services
- Unique patient identifier widely available
- Crosstalk between coding systems (ICD, READ/SNODMED, British National Formulary, OPCS – Classification of surgical procedures)
- Datasets can be linked to search for clinical contacts indicative of patient burden in an extensive manner through developing EHR phenotypes of disease *e.g.* CALIBER (University College London)
- Correction for data source bias, e.g. neck and low back pain



Key results and messages

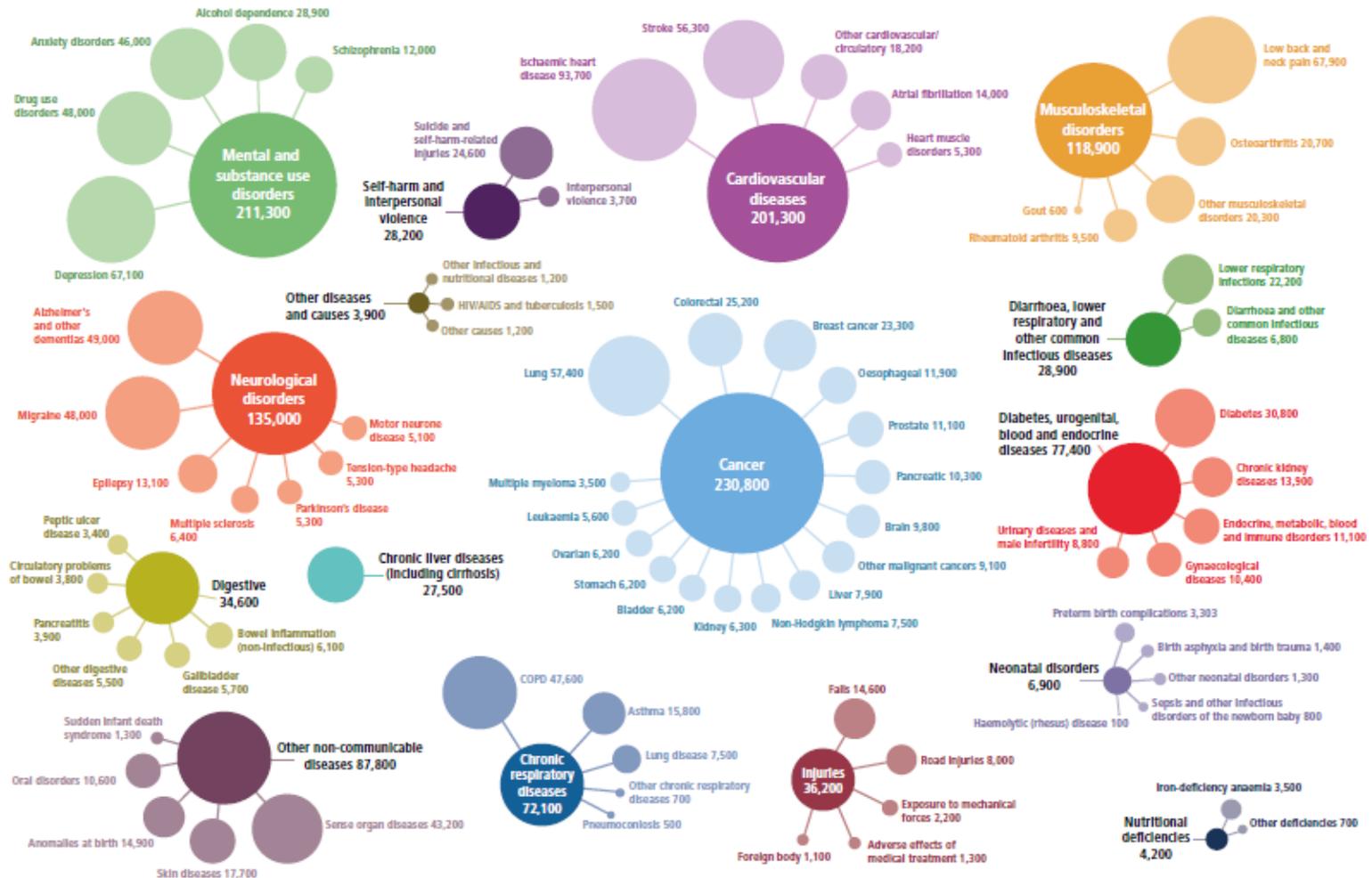


SBOD 2016 publication – Socioeconomic inequalities

- SBOD 2015 illustrated what conditions are affecting the population the most
 - SBOD 2016 improved on initial estimates, revised estimates (used more relevant data sources, updated model assumptions)
- SBOD 2016 sought to look at inequalities across socioeconomic groups
 - Implications for national and local planning
- What we already know
 - Lower LE in most deprived areas
 - Multi-morbidity is more prevalent in early in life in the most deprived areas
 - The conditions which people suffer from vary by their socioeconomic status
- What is the effect of this on DALYs, YLL and YLD?

Report Reference – <https://www.scotpho.org.uk/media/1656/sbod2016-deprivation-report-aug18.pdf>

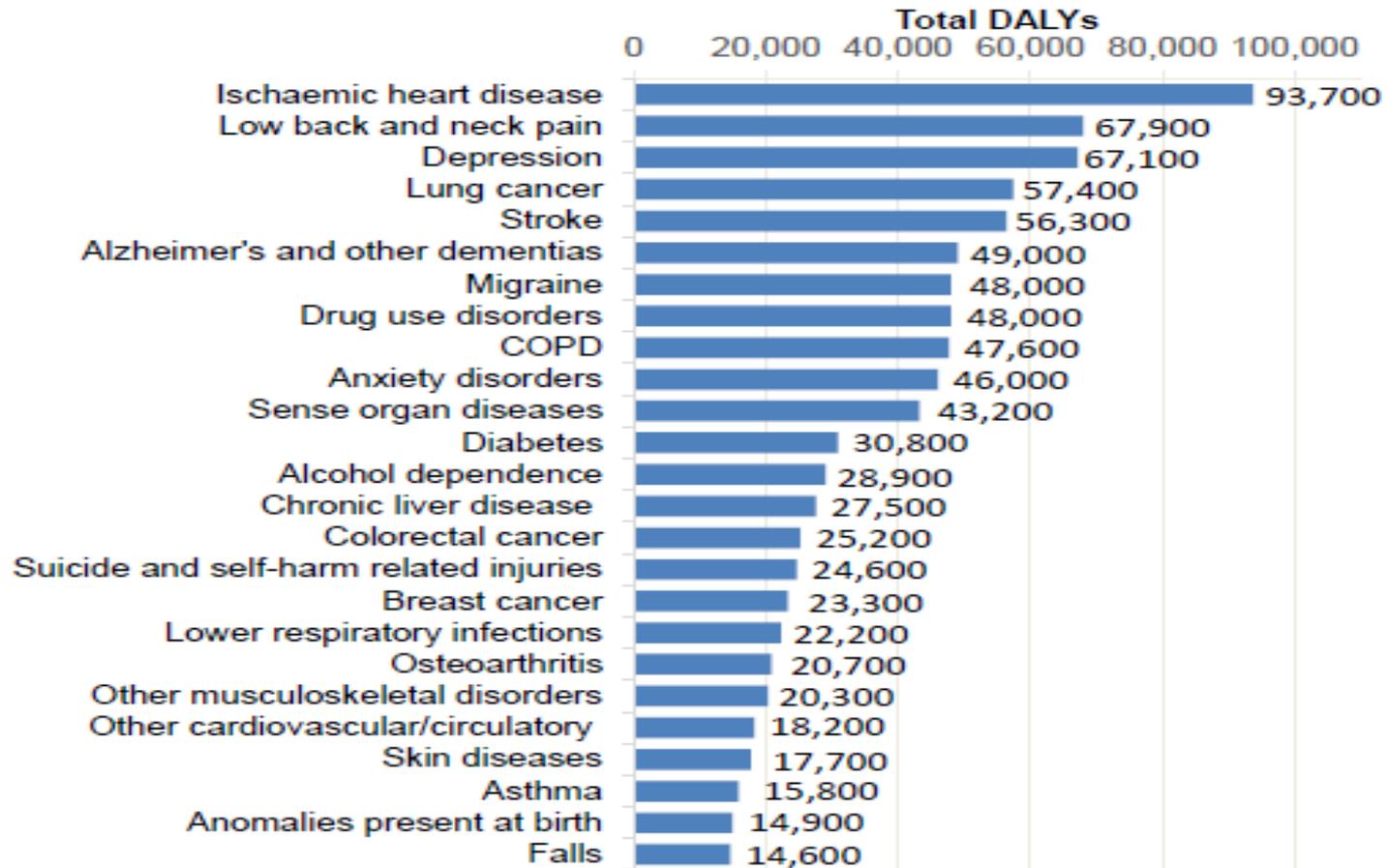
Burden of disease In Scotland, 2016



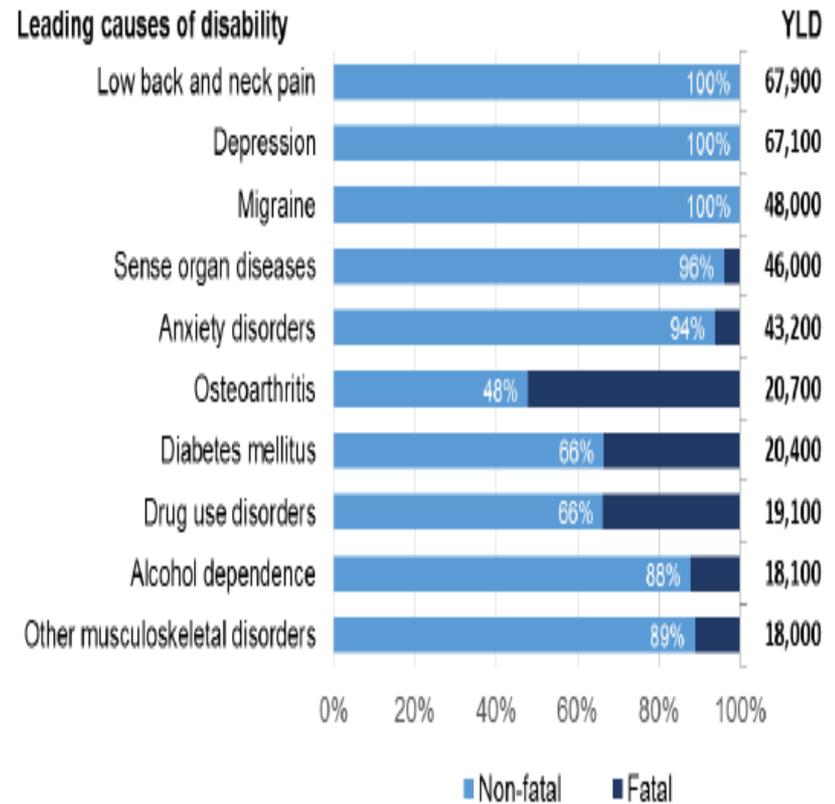
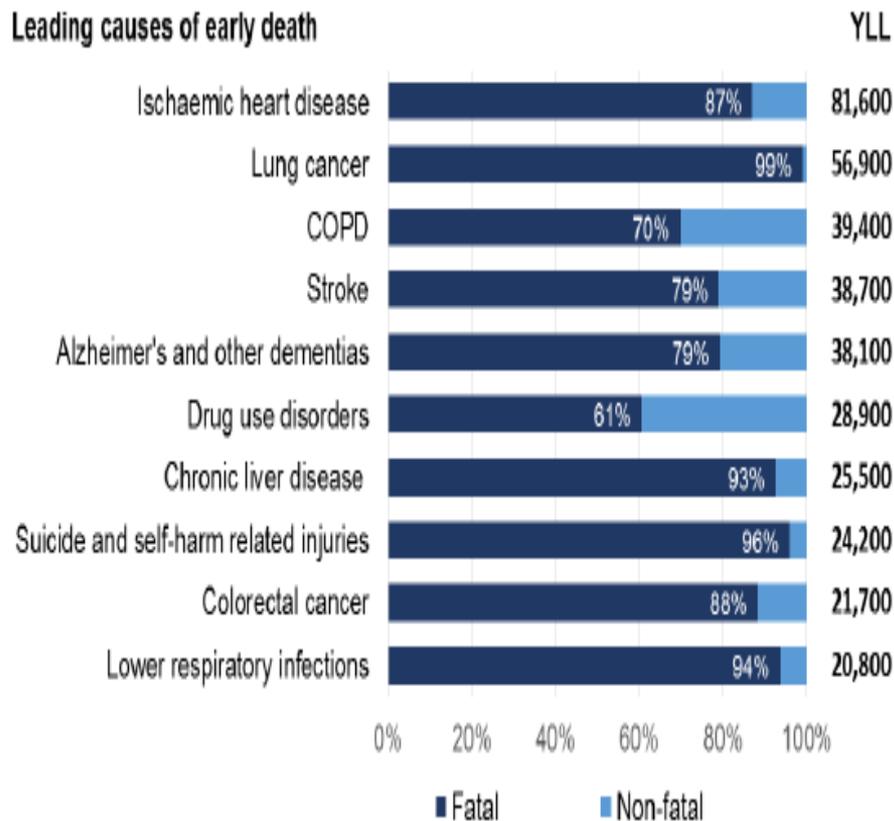
Note: The small bubbles show only the top 5 illnesses/diseases unless 80-90% of the total DALY, or a high-profile illness, was not captured. • DALY rounded to the nearest 100.



Burden of disease (DALY) ranked by 25 individual diseases with the highest burden, Scotland, 2016



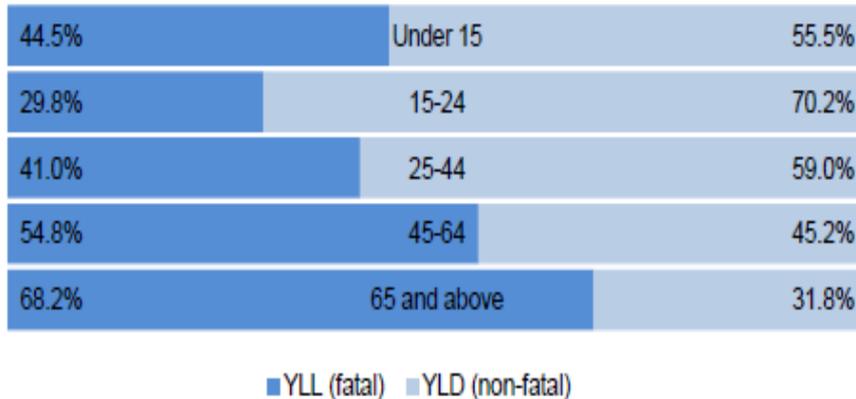
Leading causes of early death (total years of life lost: YLL) and disability (total years of life with disability: YLD), Scotland 2016



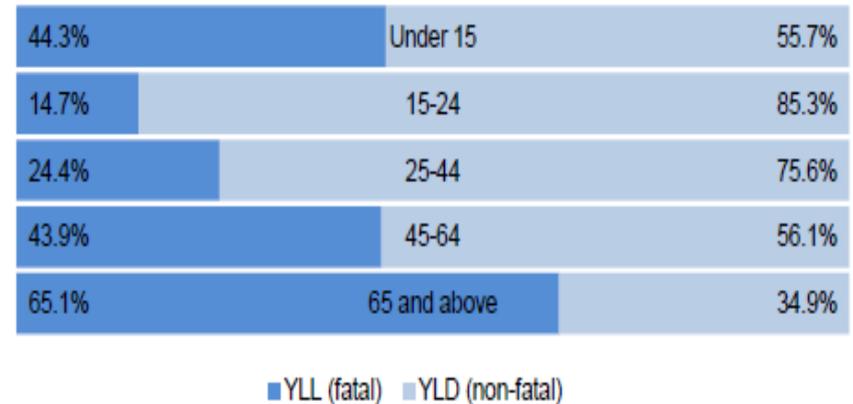


Percentage contribution of YLL (fatal) and YLD (non-fatal) by gender and age group, Scotland 2016

MEN

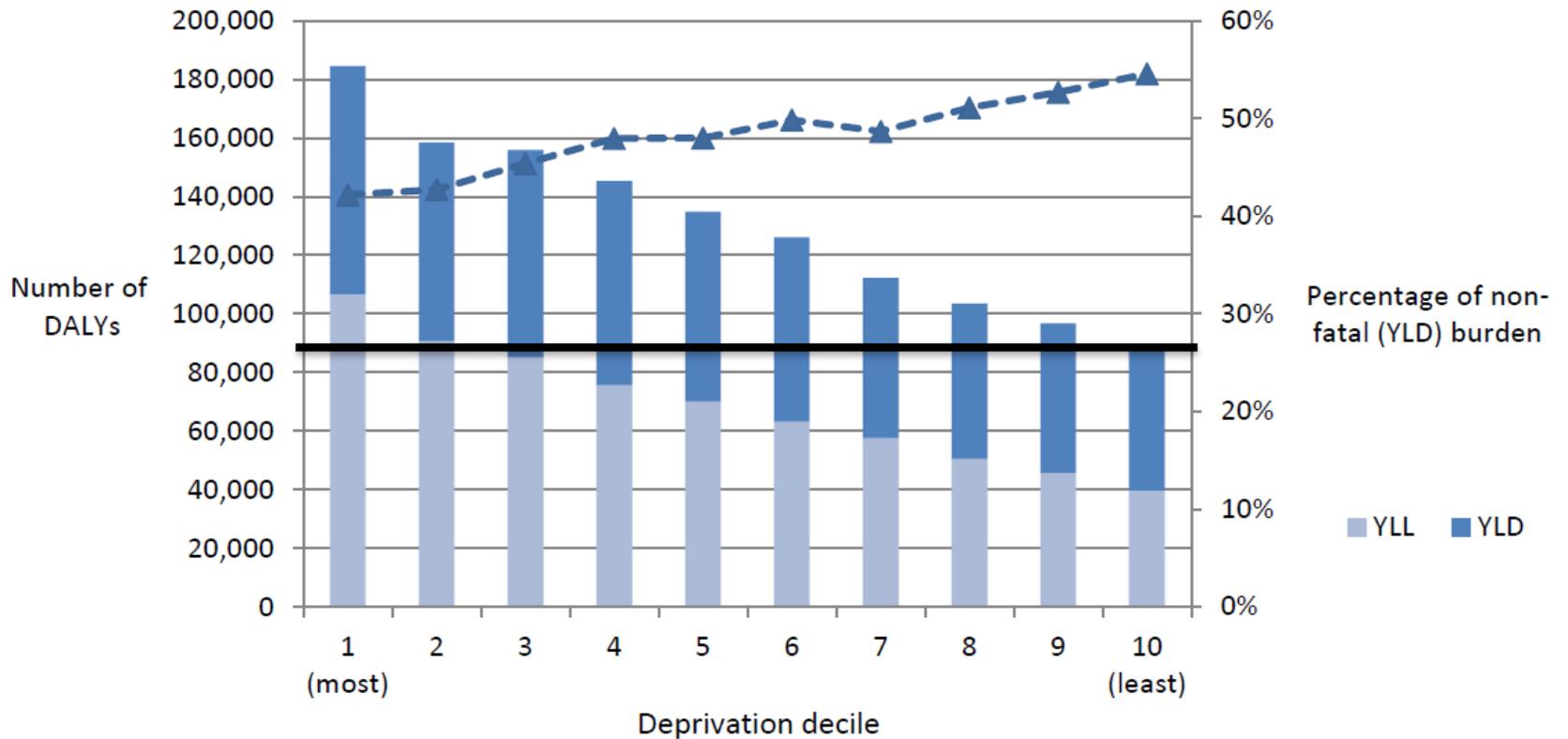


WOMEN





Key results – Burden by deprivation





Key results –

Burden attributable to differences in life circumstances

32.9%

of early deaths and ill health
could **be prevented** if we all had
the same **life circumstances** as
people in our wealthiest areas.





Key results –

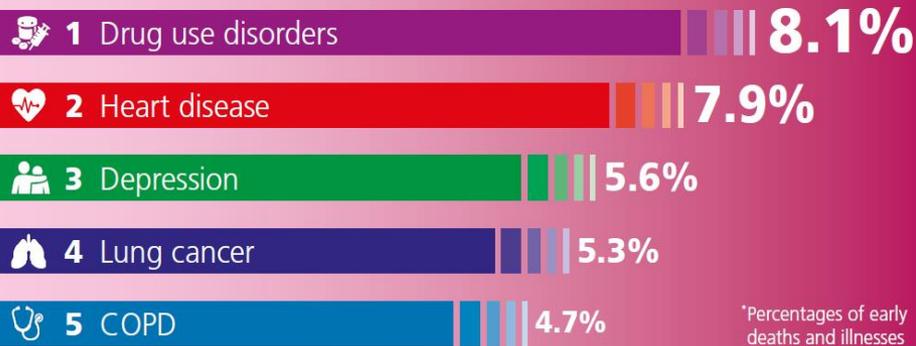
Relative outcomes between poorer and wealthier areas



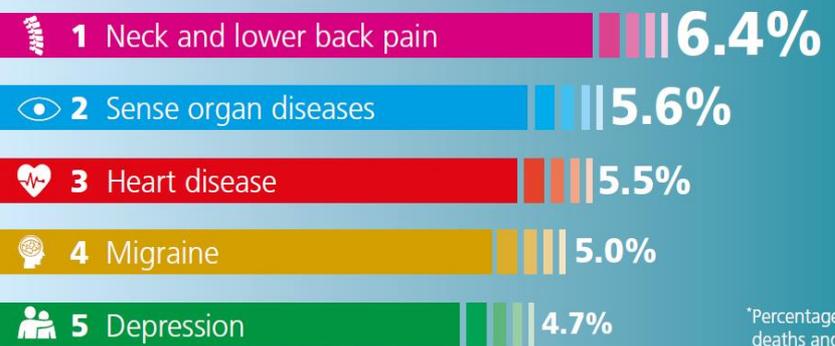


Key messages – Different areas have different priorities

Leading causes of ill health or early death in our **poorest areas***



Leading causes of ill health or early death in our **wealthiest areas***





NHS
Health
Scotland

ScotPHO
Public Health Information for Scotland

Impact, influence and future research



- **Local area results**
 - Information available at a granular level for 32 local council areas
 - Needs assessments
 - Workforce planning
- **10-year projections**
 - “What if” scenario planning (e.g. increasing rates of obesity)
 - Projection of past trends of prevalence and mortality
 - Changes in population
- **Other work-streams**
 - How much burden is amenable to intervention? (How much of the impact of low socio-economic position on the Burden of Disease in Scotland is mediated through behavioural pathways?)
 - What interventions are cost-effective (Health economics work)



Wider implications for policy and planning

- Huge opportunity for preventative public health
 - A large proportion of the disease that leads to illness and early death is preventable
- If levels of health in Scotland matched our least deprived populations, we would have one of the lowest health loss of any developed country
- Preventative action around our mental health
 - focus on the wider determinants of health (employment, income, place, education)
- Policies and actions around substances that harm our health (alcohol, poor diet, cigarettes, drugs)
 - focus on cost, availability and acceptability to have a significant impact
- Self-management of conditions, through the effective use of technology to slow progress of disease, is also essential to reduce burden on health and care services (e.g. for COPD, heart conditions, diabetes and hypertension).
- Workforce and services should be proportionate to need, and this varies by condition.



**Scotland's
health**

SBOD study team

NHS Health Scotland:
Diane Stockton, Elaine Tod, Gerry McCartney

Information Services Division:
Ian Grant, Grant Wyper, Oscar Mesalles-Naranjo, Colin Fischbacher

E-mail: nhs.healthscotland-sbod-team@nhs.net

Reports and data: <https://www.scotpho.org.uk/comparative-health/burden-of-disease/overview/>