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Global Burden of Disease Study: overview and experience from England

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Disclosure of potential conflict of interest: none

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London, England

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Politicians like simple messages ….

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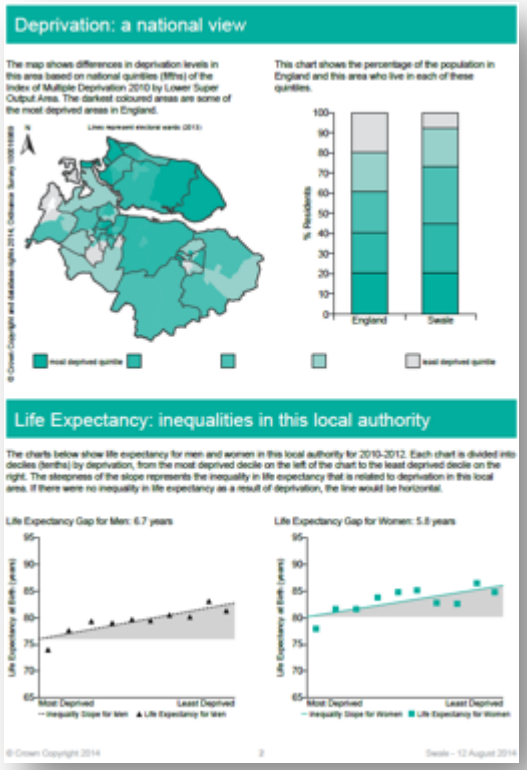
Health Profiles

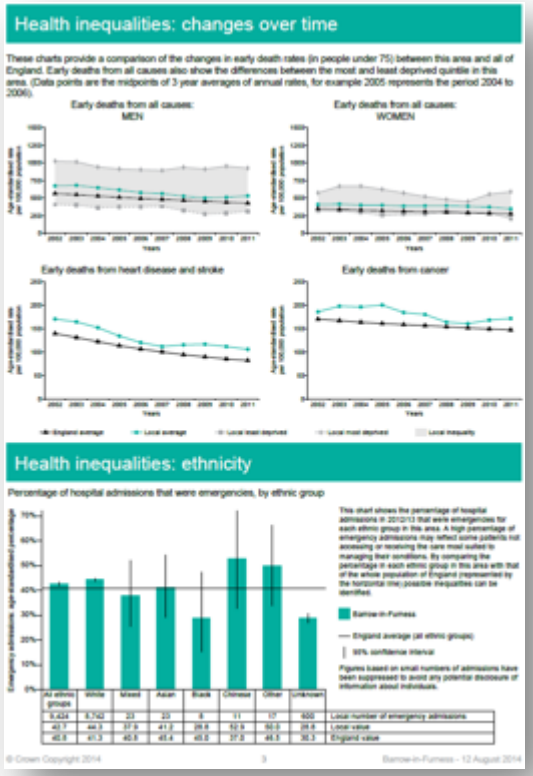
Text summary with charts of important local data

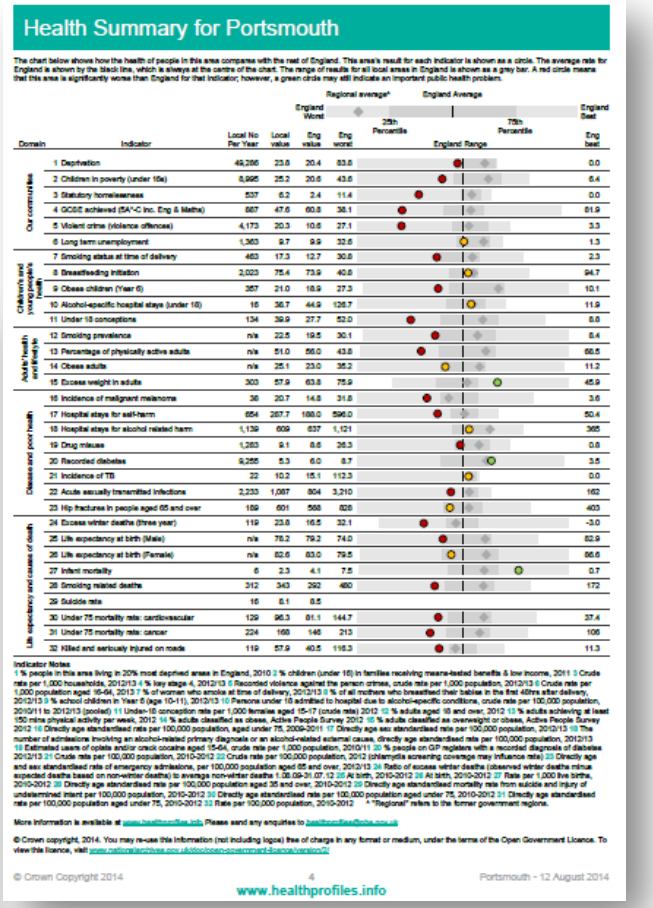
Spine chart comparison to England averages

Accompanied by interactive online display

To support local Strategic Needs Assessments







Does quantity have a quality all of its own?

Charles Booth's Poverty Map 1898

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Getting the message across

Theresa May delivered her first statement as Prime Minister - 13th July 2016

“That means fighting against the burning injustice that, if you’re born poor, you will die on average 9 years earlier than others.”

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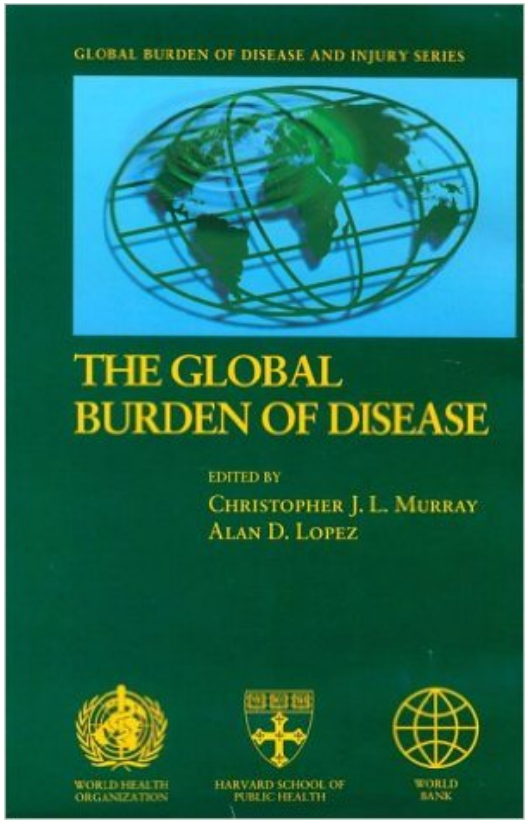
Global Burden of Disease



1996

2012

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GBD: a huge and ambitious project

- A project of extraordinary ambition: to create a ‘comprehensive, comparable measure’ of ill-health everywhere
- Hundreds of millions of individual results for 315 diseases and injuries, 79 risk factors in 188 countries.
- Results from 1990 to present, annually updated.
- Global scientific collaboration: 1,800 researchers in 120 countries involved.

January 25, 2017

Bill & Melinda Gates Foundation boosts vital work of the UW's Institute for Health Metrics and Evaluation

News and Information

$279 million pledged for IHME to expand its work, highlighting UW's position as global hub for improving population health worldwide

The Bill & Melinda Gates Foundation and University of Washington's Institute for Health Metrics and Evaluation (IHME) announced today the foundation's commitment to invest $279 million in IHME to expand its work over the next decade.

The investment will allow IHME to build on its work providing independent health evidence to improve population health. The award complements other investments from the Gates Foundation to further the work of the University of Washington's Population Health Initiative, which was launched in May 2016 and is establishing a university wide, 25-year vision to advance the health and well-being of people around the world.

"IHME provides critical data about global health trends that can empower policymakers worldwide to identify better solutions in the fight against disease," said Bill Gates, co-chair of

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GBD: Why it matters

- GBD helps us understand and track the scale of the health challenge: quantifies relative burden
- Integrates data on disparate diseases (e.g. cancer, heart disease, back pain, depression) into a common framework
- Integrates sources on length of time, severity, and assessment of impact of burden into this framework

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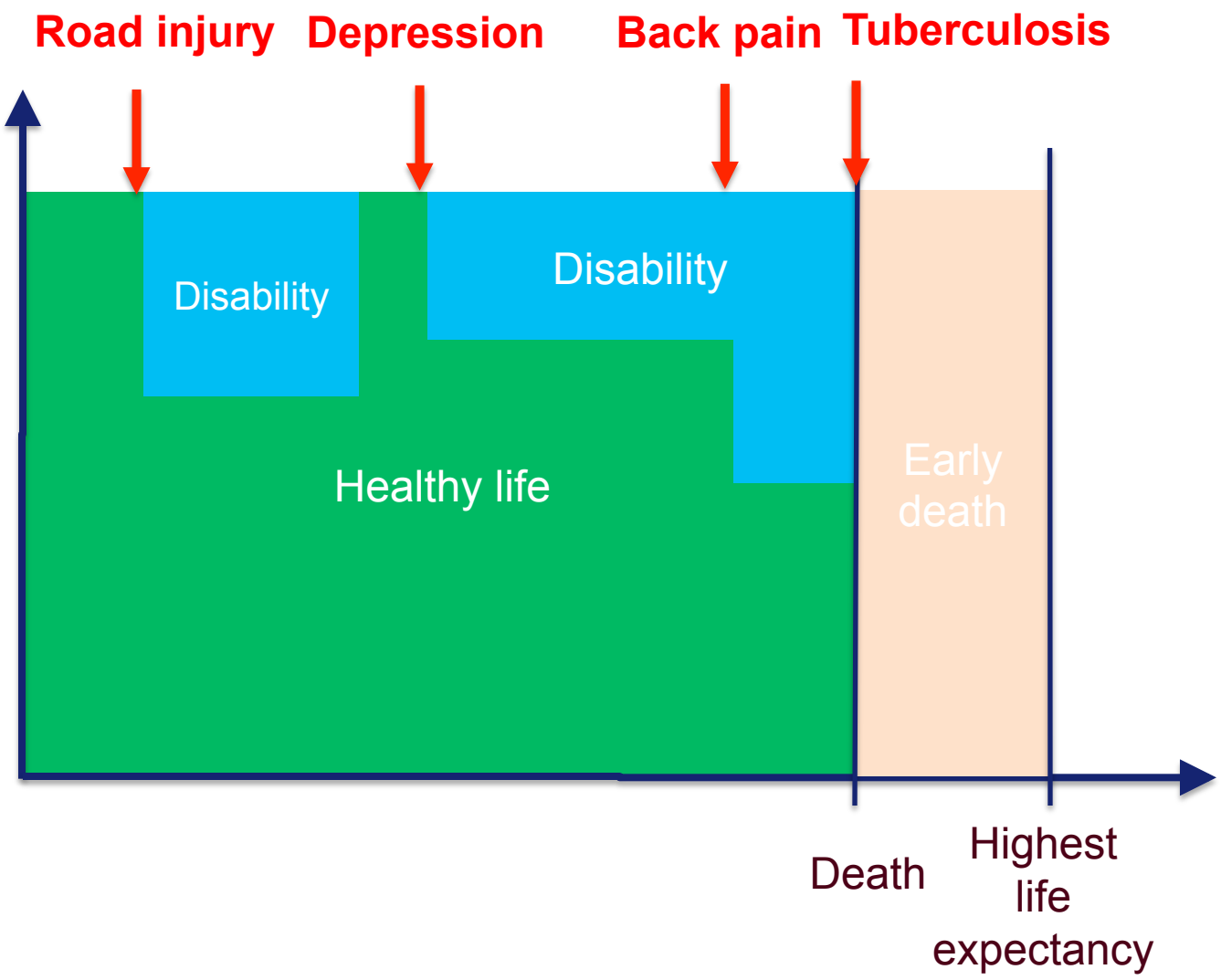
Background on GBD concepts

- Measures both health loss due to early death and due to disability
- Makes health conditions comparable



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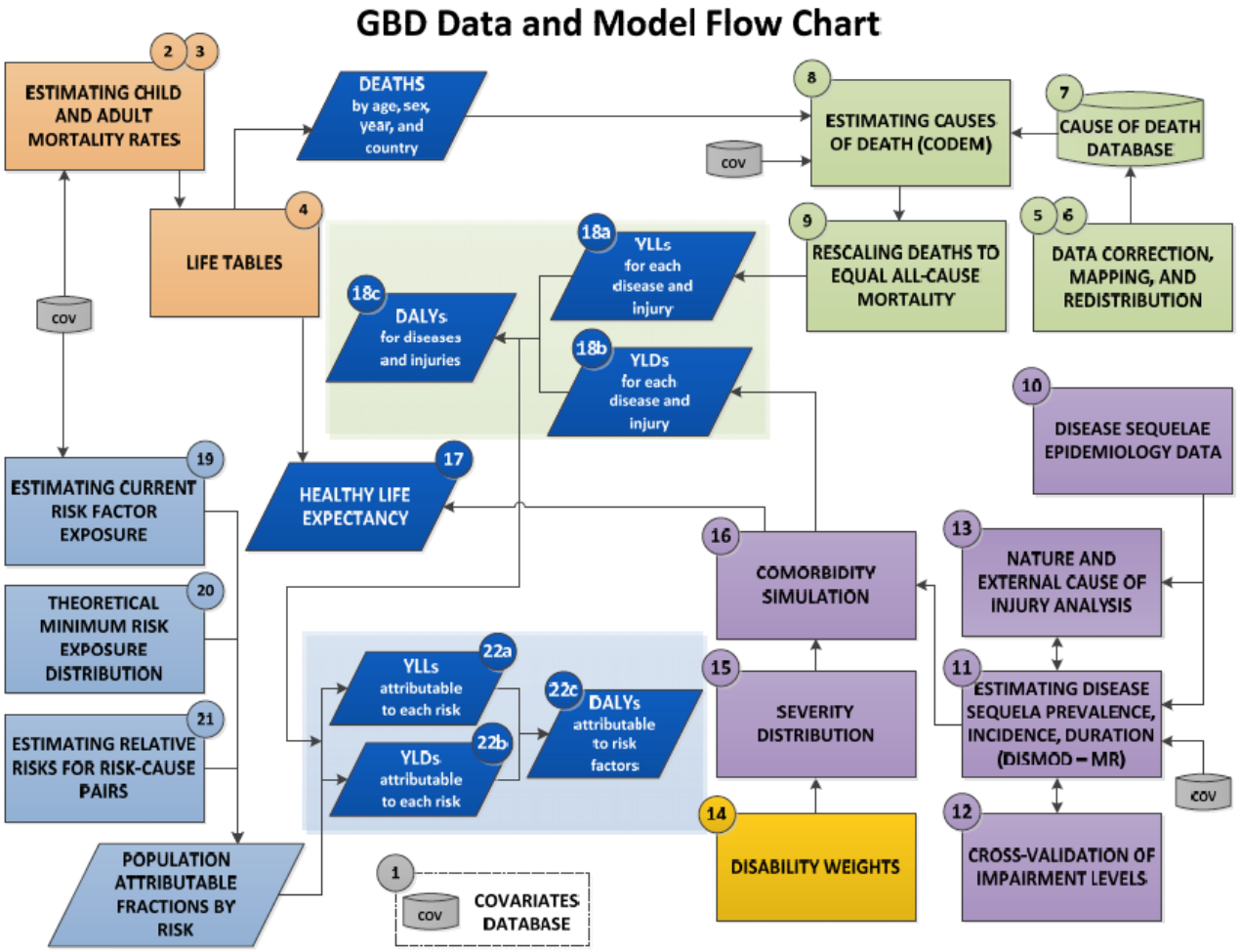
The data flow chart



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GBD: The South East by cause

Percentage of total disability adjusted life years

Low back and neck pain • 10%

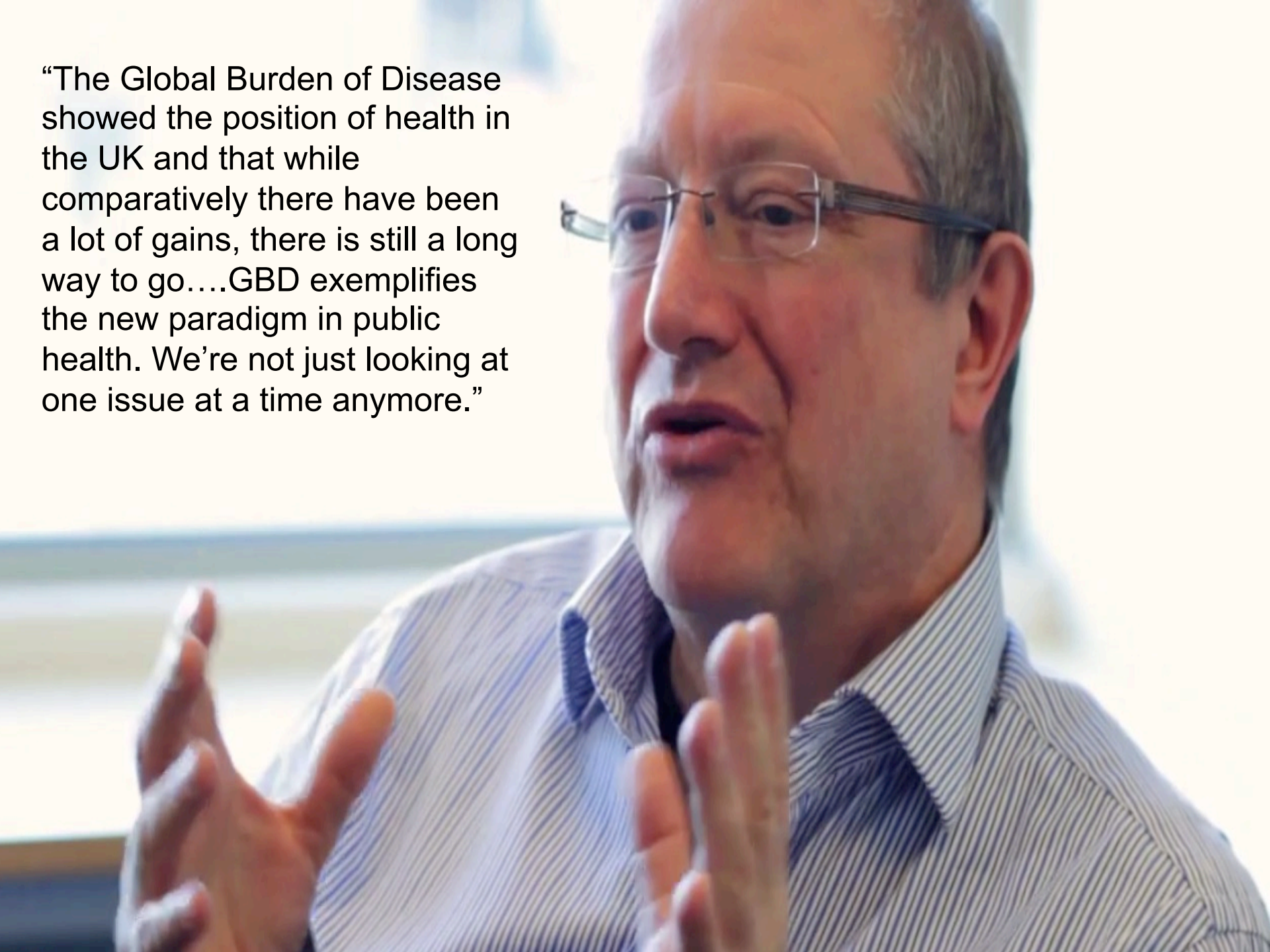
Ischaemic heart disease • 7%

Cerebrovascular disease • 4%

Alzheimer disease and other dementias • 4%

Chronic obstructive pulmonary disease • 4%

Tracheal, bronchus, and lung cancer • 3%


“The Global Burden of Disease showed the position of health in the UK and that while comparatively there have been a lot of gains, there is still a long way to go….GBD exemplifies the new paradigm in public health. We’re not just looking at one issue at a time anymore.”

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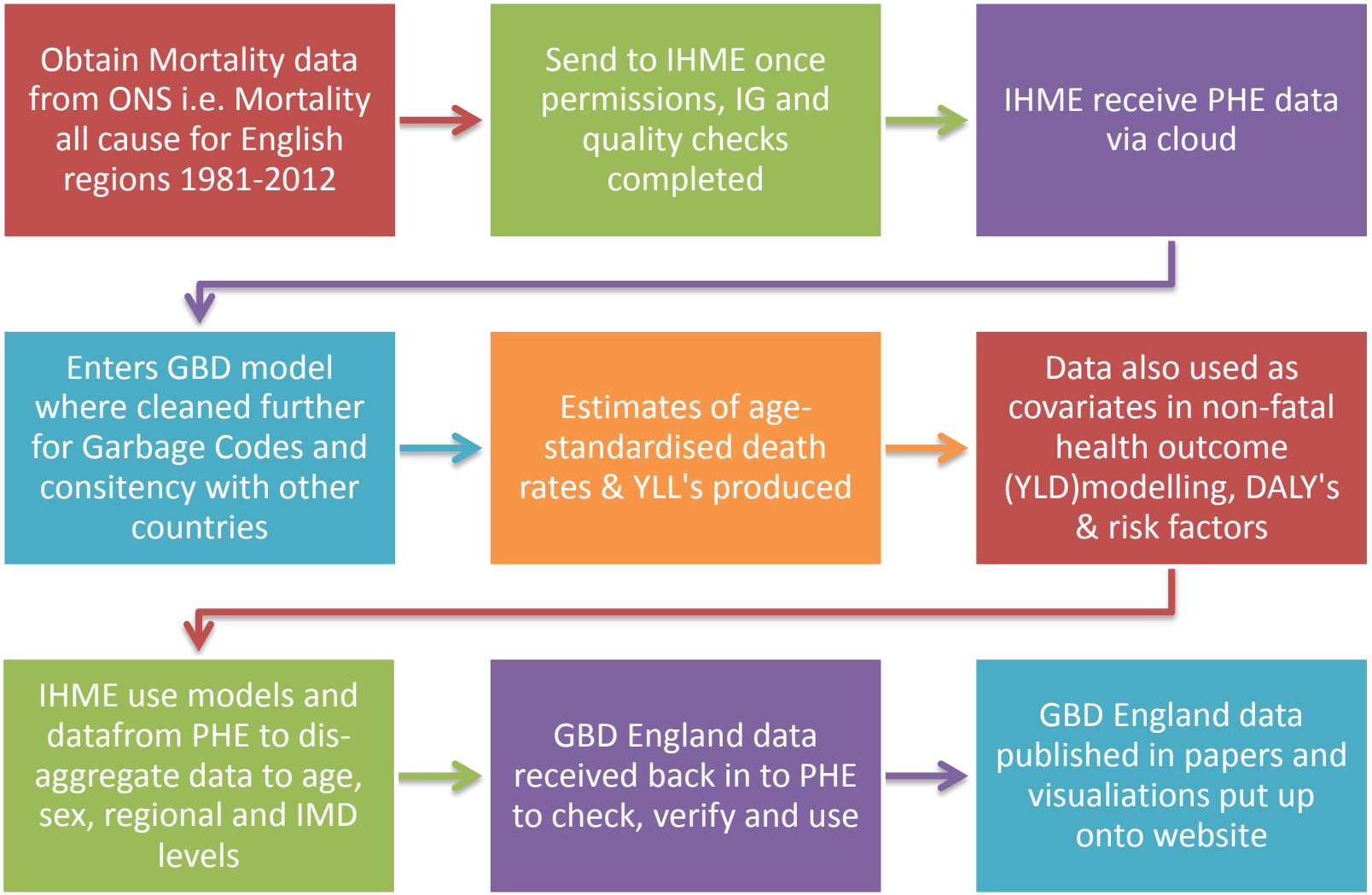
GBD England Mortality Data Flow



	Description	UK data sourced	Region	Years	Age	Sex	IMD
Mortality and Patient Data	Live births, all-cause mortality, mortality by cause morbidity data & population denominators	Office of National statistics (ONS)	Yes	Yes	Yes	Yes	No
	Cancer Incidence	Cancer registries	Yes	Yes	Yes	Yes	Yes
	Renal replacement therapy	UK Renal registry	Yes	Yes	Yes	Yes	No
	Hospital treatment by deprivation groups	Hospital Episode Statistics (HES)	Yes	Yes	Yes	Yes	Yes
	Common psychiatric conditions	Adult Psychiatric Morbidity Survey	Yes	Yes	Yes	Yes	No
	Dementia estimates	Cognitive Ageing and Function Study	UK only	Yes	Yes	No	Yes
	Programme Budgeting	NHS England	Yes	Yes	No	No	No
	GP patient survey	GP patient survey for England	Yes	Yes	Yes	Yes	Yes
Covariates	Education (years per capita)	Labour Force Survey	Yes	Yes	No	No	No
	Gross domestic product per capita	Quarterly National Accounts	Yes	Yes	No	No	No
	Litres of alcohol per adult	HMRC & General Lifestyle Survey	Yes	Yes	No	No	No
	Measles vaccination coverage & DTP3 coverage	Public Health England (PHE)	Yes	Yes	No	No	No
	Smoking prevalence & Cigarettes consumed per adult	Health Survey for England (HSE)	Yes	Yes	Yes	Yes	Yes
	Mean BMI, total cholesterol & systolic blood pressure	HSE	Yes	Yes	Yes	Yes	Yes
	Diabetes prevalence	HSE/Quality Outcomes framework (QOF)	Yes	Yes	Yes	Yes	Yes
	Mean estimated salt intake (g/day)	National Diet and Nutrition Survey (NDNS)	Yes	Yes	Yes	Yes	Yes
	Kcal & grams of nuts and seeds/ fruit/ whole grains/ vegetables/ red meat/ milk/ sugary drinks consumed per capita per day	NDNS	Yes	Yes	No	Yes	YES
	Total Kcal & grams consumed per capita per day	NDNS	Yes	Yes	No	No	No
	Population density	ONS	Yes	Yes	No	No	No
	Air pollution	GOV.UK	UK Only	Yes	No	No	No
	Number of 2 & 4 wheeled vehicles per capita	GOV.UK	Yes	Yes	No	No	No

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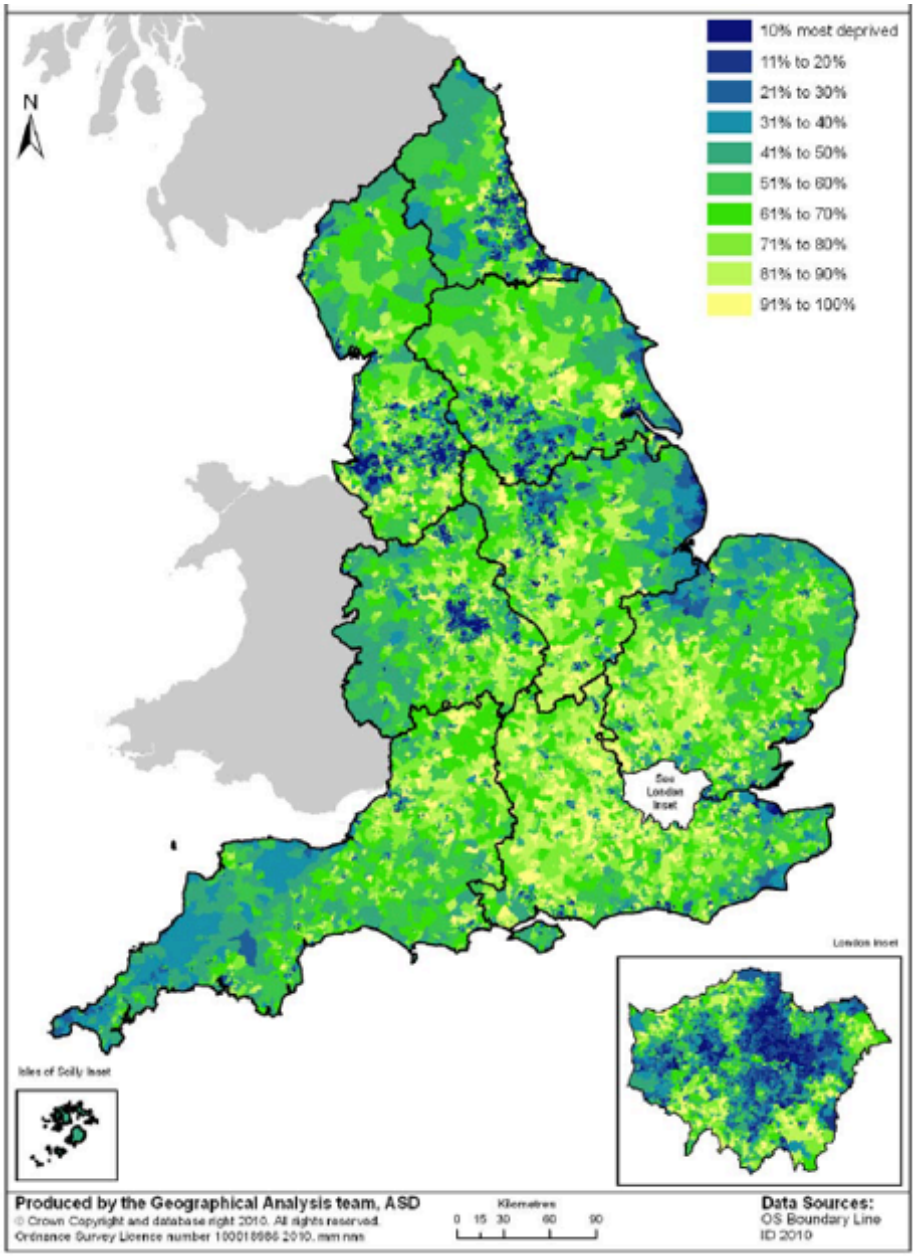
- LSOA-based deprivation
- Administrative regions,
- 45 subnational areas



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Results

Changes in health in England, with analysis by English regions and areas of deprivation, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013

John N Newton*, Adam D M Briggs, Christopher J L Murray, Daniel Dicker, Kyle J Foreman, Haidong Wang, Mohsen Naghavi, Mohammad H Forouzanfar, Summer Lockett Ohno, Ryan M Barber, Theo Vos, Jeffrey D Stanaway, Jürgen C Schmidt, Andrew J Hughes, Derek F J Fay, Russell Ecob, Chris Graves, Martin McKee, Harry Rutter, Ibrahim Abubakar*, Rajnish Alli*, H Ross Anderson*, Amitava Banerjee*, Derrick A Bennett*, Eduardo Bernabé*, Kamaldeep S Bhui*, Stanley M Biryukov*, Rupert R Bourne*, Carol E G Brayne*, Nigel G Bruce*, Trasias C S Brugha*, Michael Burch*, Simon Capewell*, Daniel Casey*, Rajiv Chowdhury*, Matthew M Coates*, Cyrus Cooper*, Julia A Critchley*, Paul H Durgan*, Mukesh K Dherani*, Paul Elliott*, Majid Ezzati*, Kevin M Fenton*, Maya S Fraser*, Thomas Fürst*, Felix Greaves*, Mark A Green*, David J Gunnell*, Bernadette M Hannigan*, Roderick J Hay*, Simon I Hay*, Harry Hemingway*, Heidi J Larson*, Katharine J Looker*, Raimundas Lunevicius*, Ronan A Lyons*, Wagner Marcenes*, Amanda J Mason-Jones*, Fiona E Matthews*, Henrik Møller*, Michele E Murdoch*, Charles R Newton*, Neil Pearce*, Frédéric B Piel*, Daniel Pope*, Kazem Rahimi*, Alina Rodriguez*, Peter Scarborough*, Austin E Schumacher*, Ivy Shiue*, Liam Smeeth*, Alison Tedstone*, Jonathan Valabhji*, Hywel C Williams*, Charles DA Wolfe*, Anthony D Woolf*, Adrian C J Davis

Summary

Background In the Global Burden of Disease Study 2013 (GBD 2013), knowledge about health and its determinants has been integrated into a comparable framework to inform health policy. Outputs of this analysis are relevant to current policy questions in England and elsewhere, particularly on health inequalities. We use GBD 2013 data on mortality and causes of death, and disease and injury incidence and prevalence to analyse the burden of disease and injury in England as a whole, in English regions, and within each English region by deprivation quintile. We also assess disease and injury burden in England attributable to potentially preventable risk factors. England and the English regions are compared with the remaining constituent countries of the UK and with comparable countries in the European Union (EU) and beyond.

Methods We extracted data from the GBD 2013 to compare mortality, causes of death, years of life lost (YLLs), years lived with a disability (YLDs), and disability-adjusted life-years (DALYs) in England, the UK, and 18 other countries (the first 15 EU members [apart from the UK] and Australia, Canada, Norway, and the USA [EU15+]). We extended elements of the analysis to English regions, and subregional areas defined by deprivation quintile (deprivation areas). We used data split by the nine English regions (corresponding to the European boundaries of the Nomenclature for Territorial Statistics level 1 [NUTS 1] regions), and by quintile groups within each English region according to deprivation, thereby making 45 regional deprivation areas. Deprivation quintiles were defined by area of residence ranked at national level by Index of Multiple Deprivation score, 2010. Burden due to various risk factors is described for England using new GBD methodology to estimate independent and overlapping attributable risk for five tiers of behavioural, metabolic, and environmental risk factors. We present results for 306 causes and 2337 sequelae, and 79 risks or risk clusters.

Findings Between 1990 and 2013, life expectancy from birth in England increased by 5·4 years (95% uncertainty interval 5·0–5·8) from 75·9 years (75·9–76·0) to 81·3 years (80·9–81·7); gains were greater for men than for women. Rates of age-standardised YLLs reduced by 41·1% (38·3–43·6), whereas DALYs were reduced by 23·8% (20·9–27·1), and YLDs by 1·4% (0·1–2·8). For these measures, England ranked better than the UK and the EU15+ means. Between 1990 and 2013, the range in life expectancy among 45 regional deprivation areas remained 8·2 years for men and decreased from 7·2 years in 1990 to 6·9 years in 2013 for women. In 2013, the leading cause of YLLs was ischaemic heart disease, and the leading cause of DALYs was low back and neck pain. Known risk factors accounted for 39·6% (37·7–41·7) of DALYs; leading behavioural risk factors were suboptimal diet (10·8% [9·1–12·7]) and tobacco (10·7% [9·4–12·0]).

Interpretation Health in England is improving although substantial opportunities exist for further reductions in the burden of preventable disease. The gap in mortality rates between men and women has reduced, but marked health inequalities between the least deprived and most deprived areas remain. Declines in mortality have not been matched by similar declines in morbidity, resulting in people living longer with diseases. Health policies must therefore address the causes of ill health as well as those of premature mortality. Systematic action locally and nationally is needed to reduce risk exposures, support healthy behaviours, alleviate the severity of chronic disabling disorders, and mitigate the effects of socioeconomic deprivation.

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- England performs above average vs other high income countries on key health outcomes
- Life expectancy from birth +5.4 years 1990-2013 from 75.9 years to 81.3 years
- Big improvements in rates of premature mortality but not in morbidity: we're living longer but spending more years in ill-health
- Morbidity and especially multiple morbidity a major challenge
- Persistent health inequalities – largely driven by deprivation; important within regions as well as between regions
- **40% of ill health in England is due to potentially preventable risk factors**

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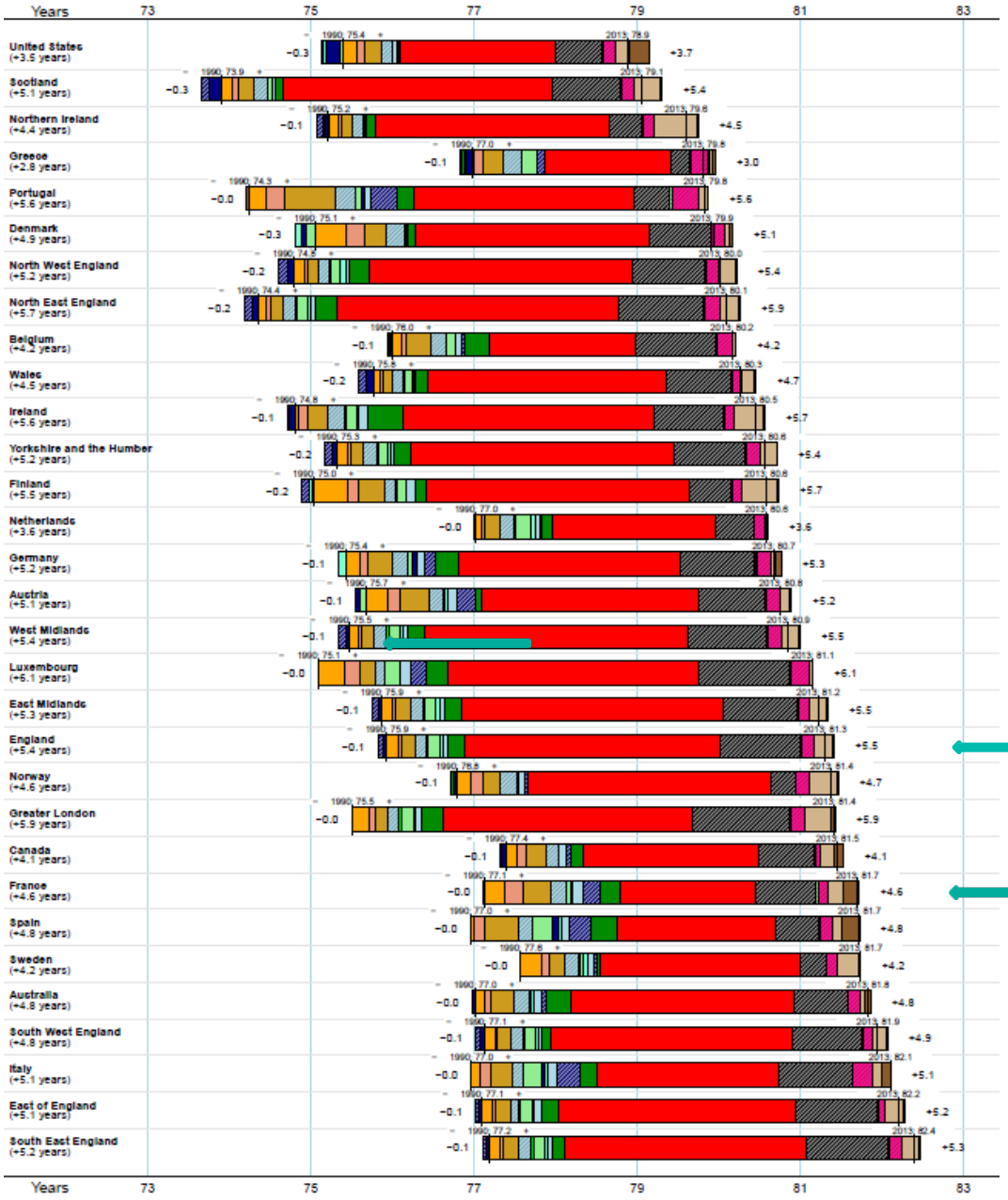
Change in life expectancy at birth for EU15+, British Nations, and English regions - both sexes from 1990–2013 by broad cause group



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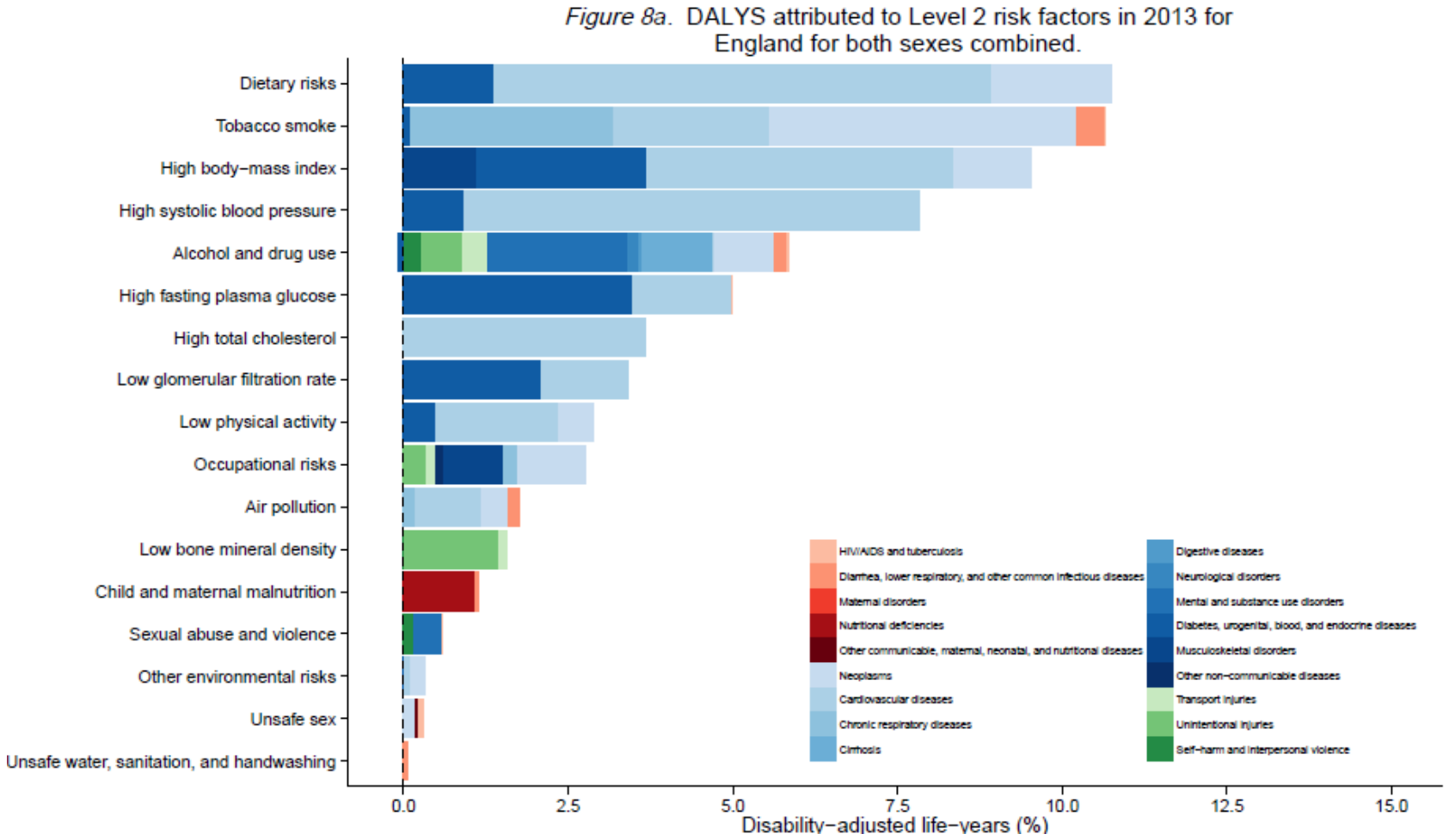
GBD 2013: Risk factors in England



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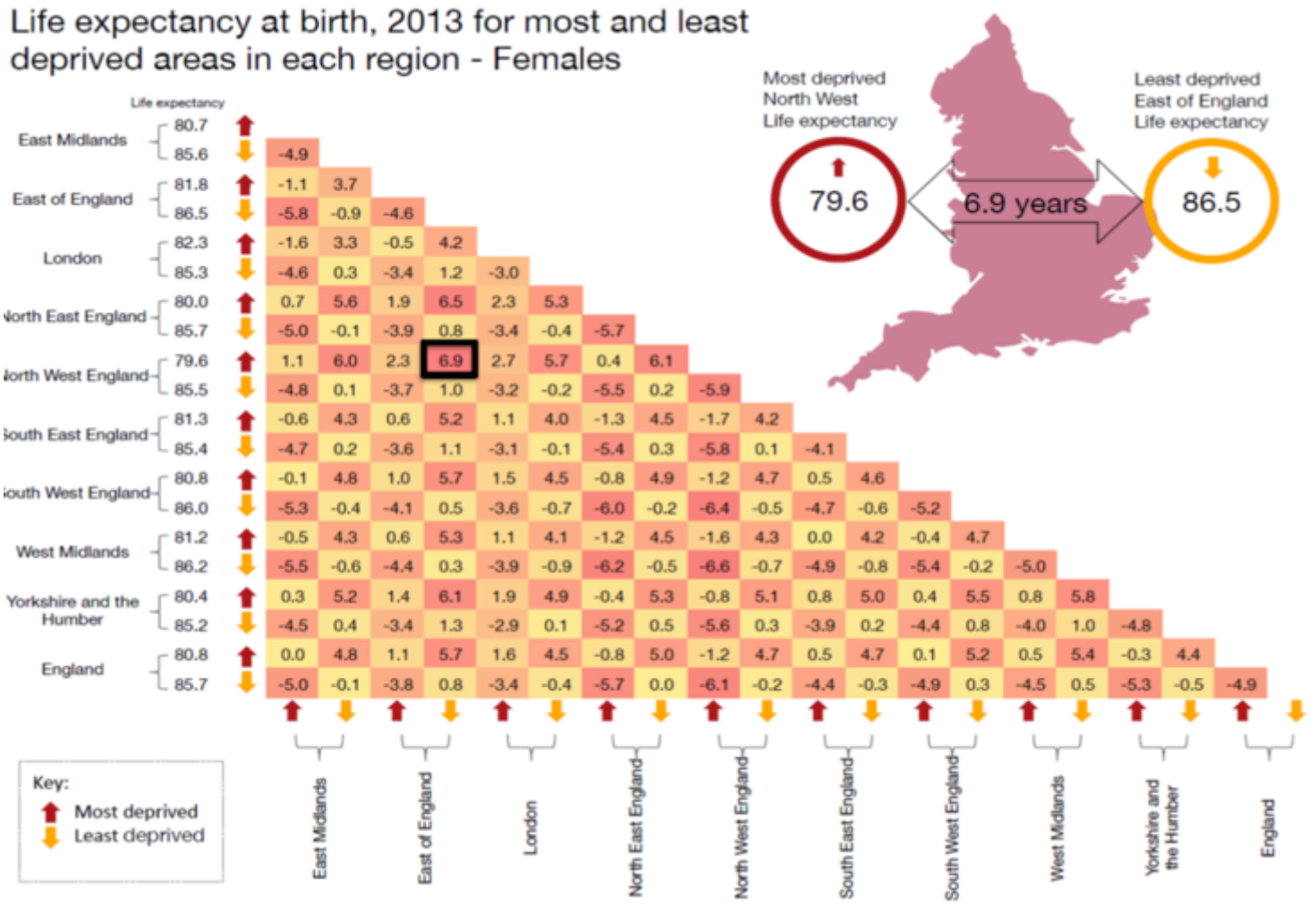
GBD Infographics



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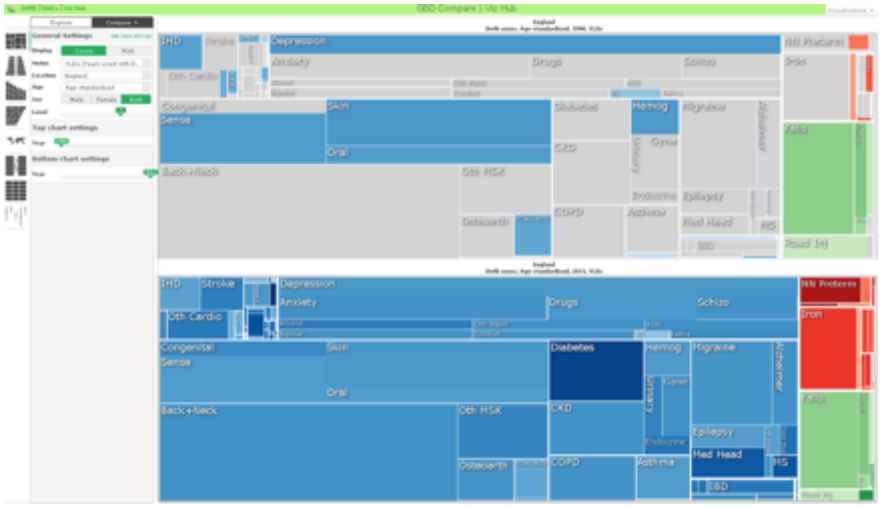
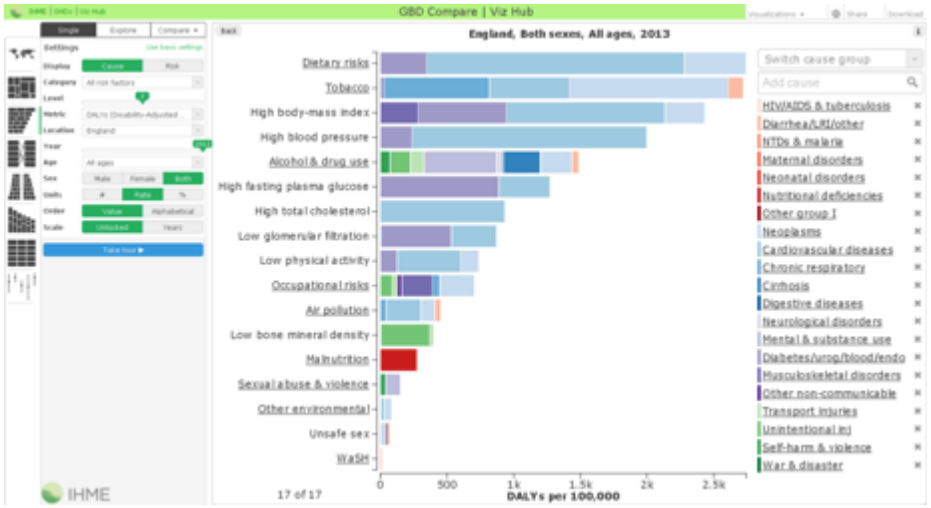
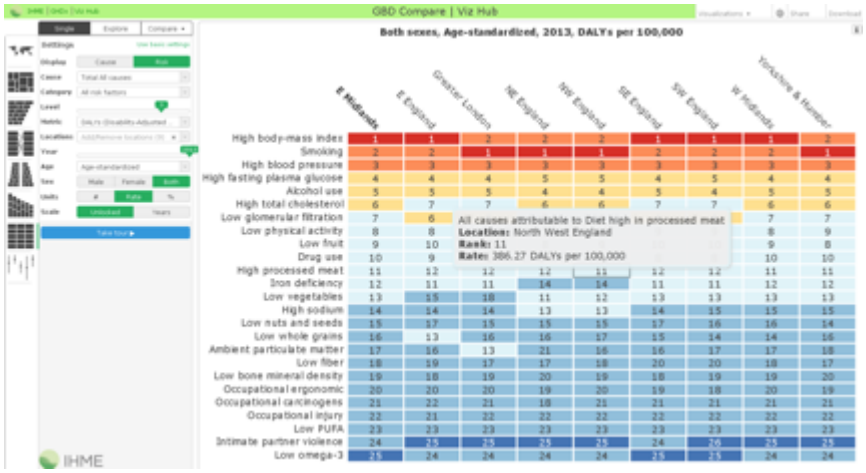
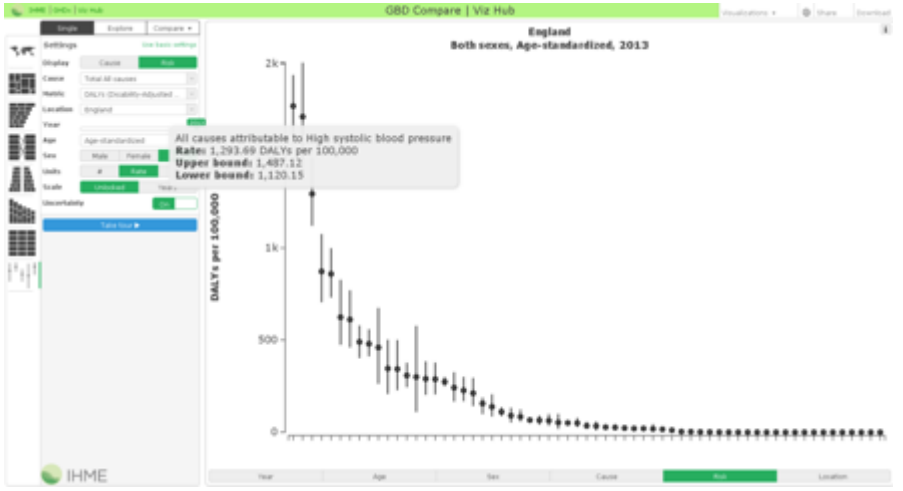
GBD England compare









Health drivers: how we live and the circumstances of our lives

The way we live our lives has a major impact on our experience. The *Global Burden of Disease* study demonstrates the impact on our health of poor diet, obesity, lack of exercise, smoking, high blood pressure and too much alcohol. The study also demonstrates that mental illness is the largest single cause of disability and represents 23% of the national disease burden in the UK.

The circumstances in which we find ourselves also have an impact on our health - they impact on the opportunities we have to make healthy choices. While individuals' behaviours do matter (for example, studies show around half of the health inequalities between rich and poor are the result of smoking), the reality is that our health is impacted by a range of wider determinants including:

- good employment
- higher educational attainment
- safe, supported, connected communities

And also:

- poor housing and homelessness
- living on a low income
- social isolation, exclusion and loneliness
- stigma and discrimination

Improving health and closing the gap between those with the most and those with the least requires action across all of these. And we must recognise the link between mental illness and physical health. Essentially, those with mental illness die on average 15-20 years earlier than those without. The life expectancy of people with serious mental illness in 2011 was comparable to that of the general population in the 1950s.

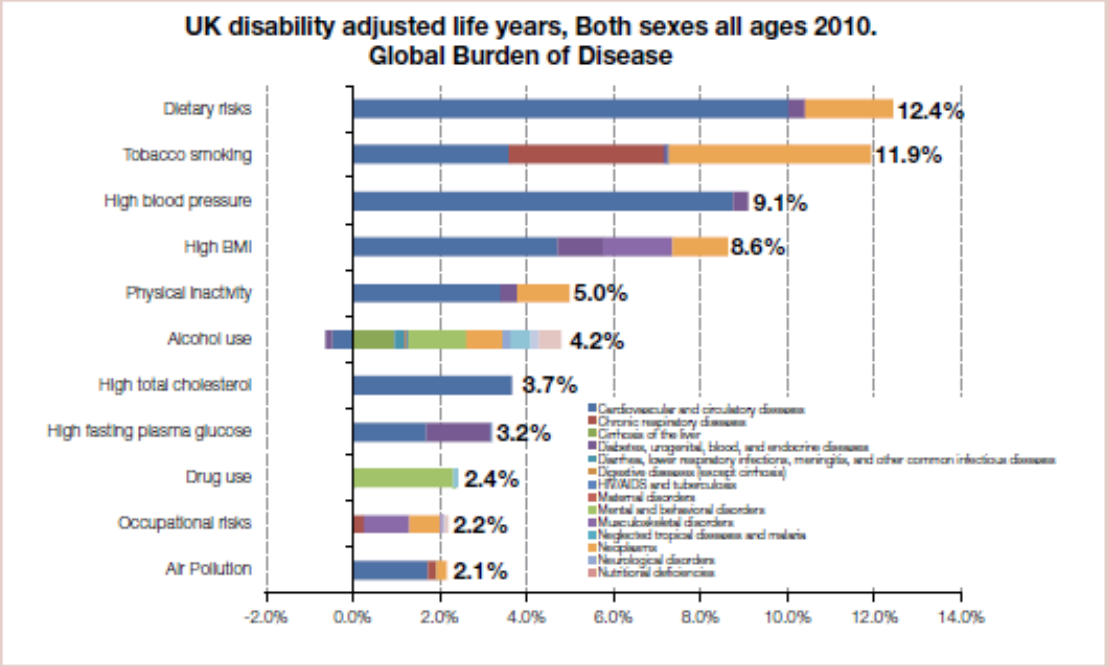


Figure 3 The way we live has a significant impact on our health. Good diet and more exercise would help us live healthier lives. United Kingdom, Disability adjusted life years, both sexes all ages 2010, Global Burden of Disease.

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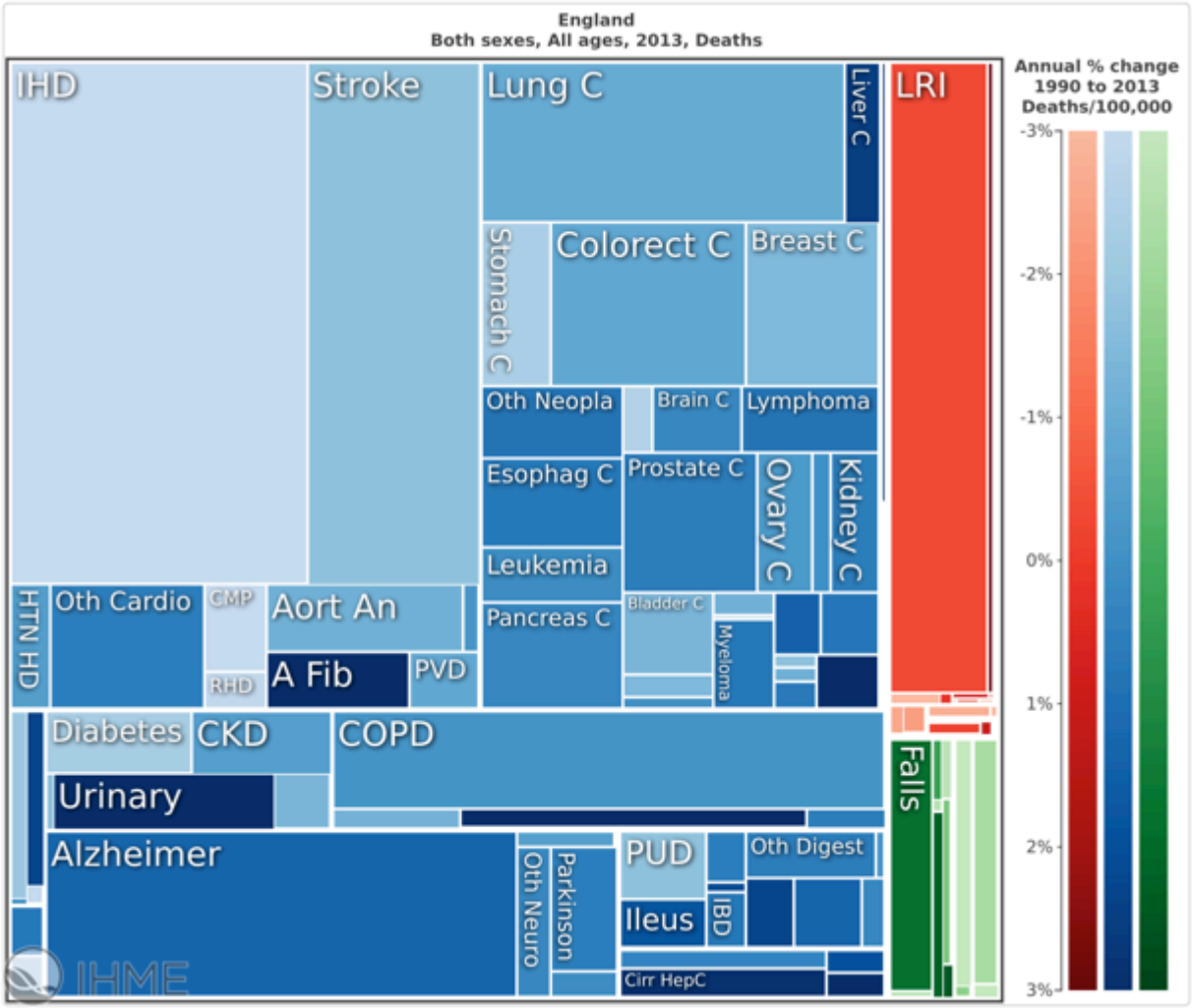
GBD England 2013: deaths by cause



MSK ⟶

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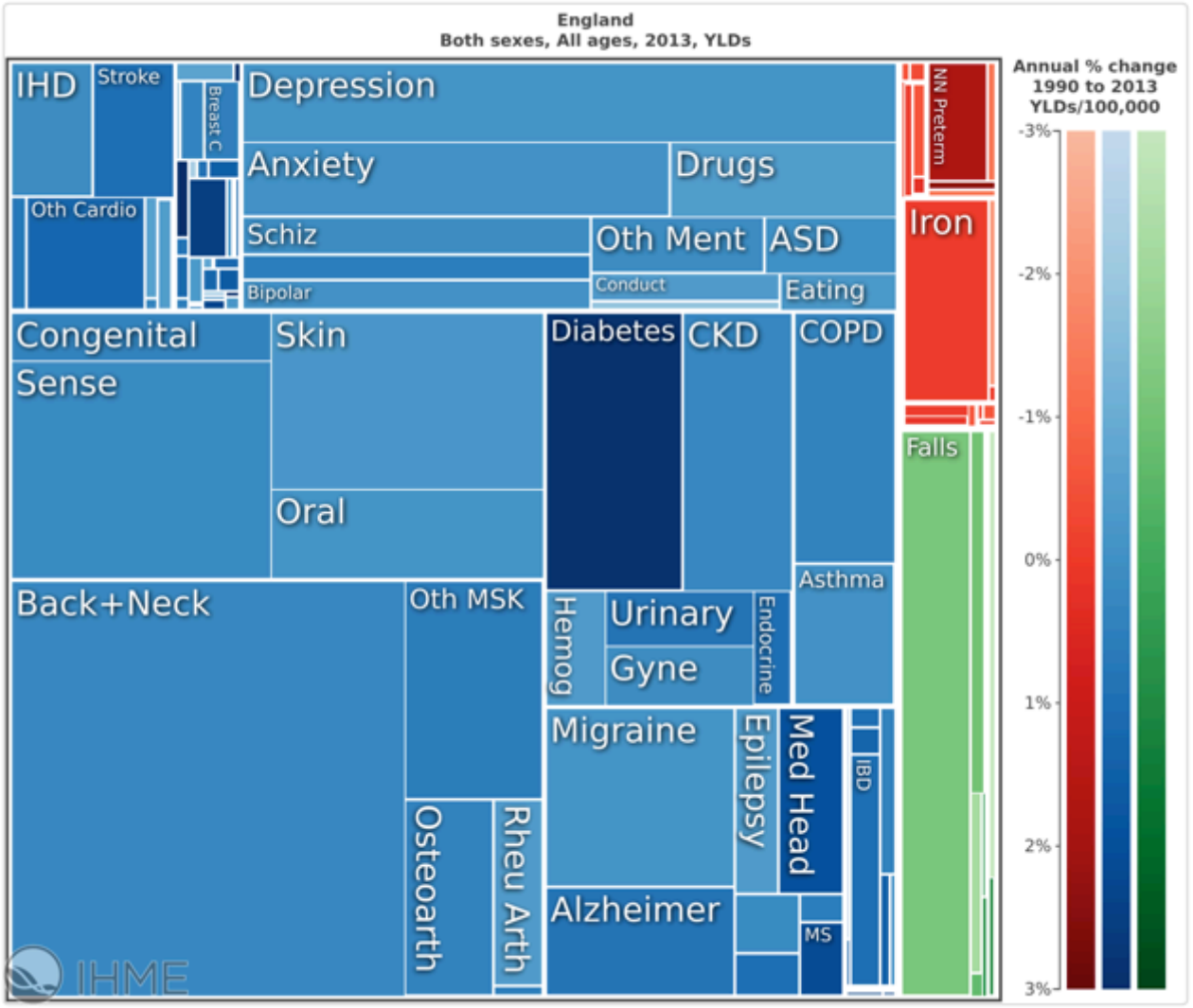
GBD England 2013: Years lived with disability

MSK



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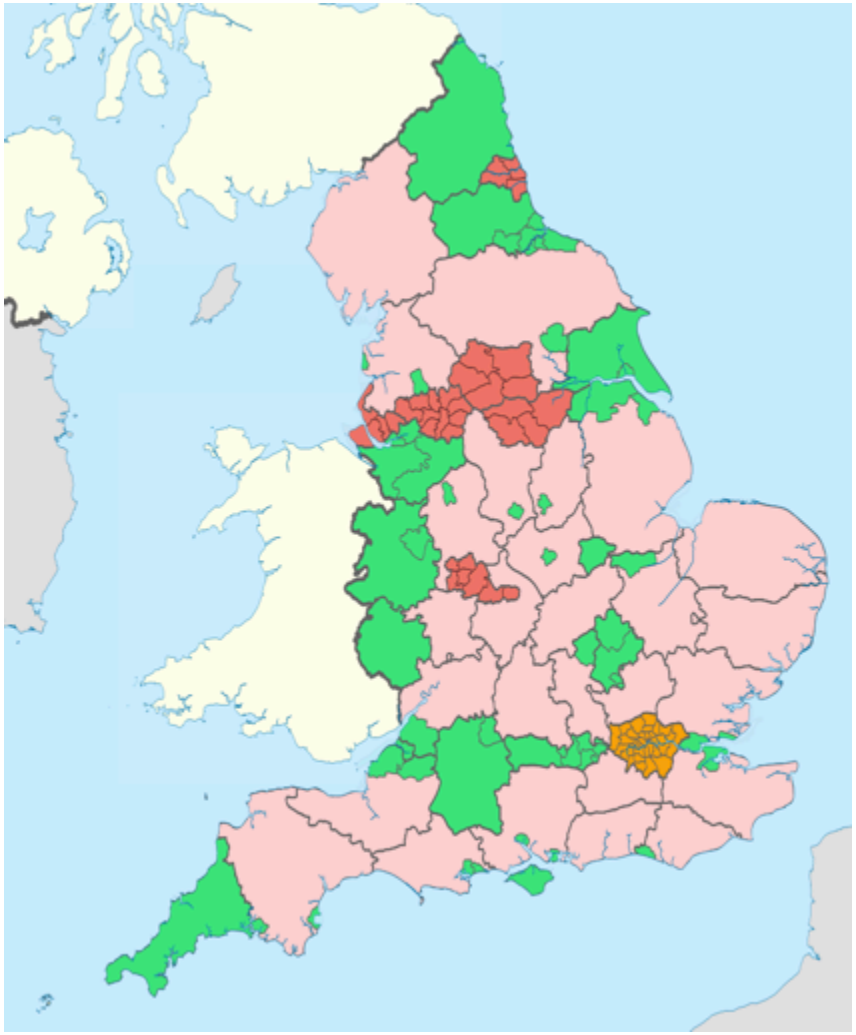
GBD 2016: Sub-national estimates



GBD 2016 will attempt to create burden estimates for 150 sub-national geographies within England.

Complete coverage of data exists for mortality information, but non-fatal estimates and risk factors have limited sub-national data with very few meeting the exact GBD case definitions

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Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER)

Published in June 2016.

Promotes increased understanding of the numbers published through release of data inputs, documentation of analytical steps and making computer code accessible.

IHME is a major participant, supporter and signatory.

Simplified, the major components of GATHER are:

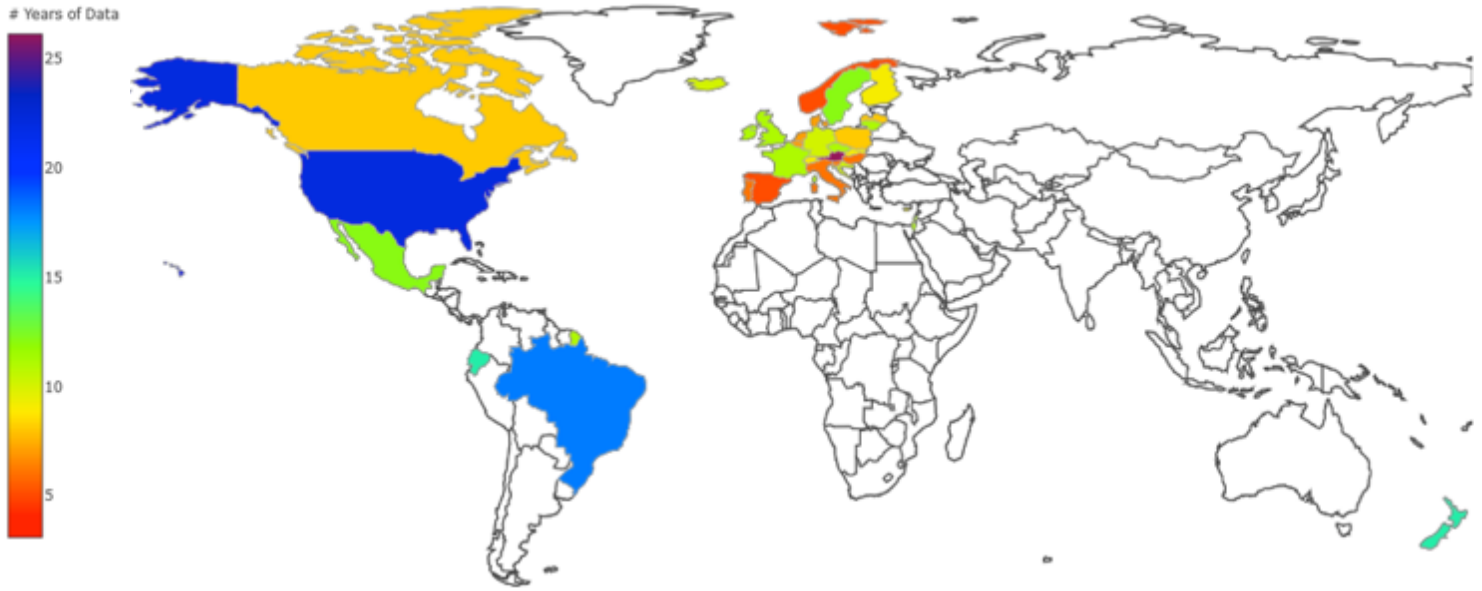
Results

Methodological information

Accessible computer code

Metadata and data used in modeling

Number of years of inpatient hospital data by country



Individual records and tabulated data for inpatient and outpatient /emergency services

- 33 countries
- 325 country-years of inpatient data
- 36 country-years of outpatient data

Individual records for 1.6 billion patient discharges
Individual records for 10 million outpatient visits

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The European Burden of Disease Network

Set up as part of the European Health Information Initiative

First meeting in London in September 2016

17 European countries so far

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The European Burden of Disease Network (EBoDN)

To:

- build capacity and promote good practice,
- establish sustainable national structures and resources,
- harmonise BoD methodologies,
- improve availability, quality and accessibility of national health information for BoD analysis,
- improving reporting and communication of findings, incl. better understanding of health inequalities, including social determinants and access to care

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Summary

- The GBD project provides highly meaningful information for policy makers not available elsewhere
- National studies in England have been widely used and have been influential at national and local level
- Sub national estimates are particularly useful but more demanding in terms of data requirements
- Partnership with IHME has many benefits but inconsistencies and anomalies need careful handling
- The better the input data the better the output estimates – mostly!

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Thank you

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