



Public Health
England

Inequalities in life expectancy: Harnessing data, statistical modelling and data visualisation to gain insight into what is driving changes

Stephen Yeung

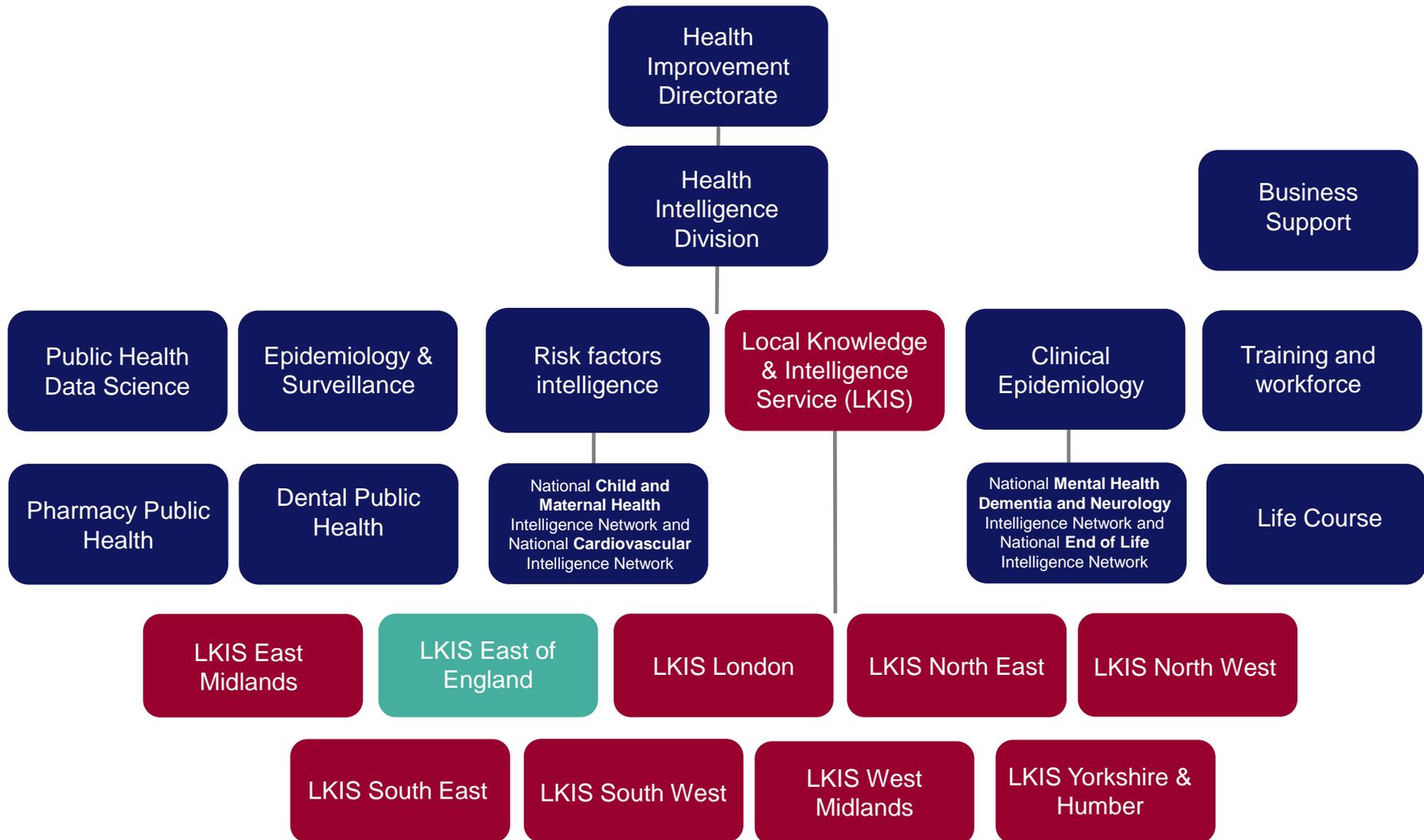
3 October 2018

Public Health England

PHE exists to protect and improve the public's health and wellbeing and reduce health inequalities.

We do this through world-class science, advocacy, partnerships, knowledge and intelligence, and the delivery of specialist public health services.

PHE Health Improvement/Intelligence



Background

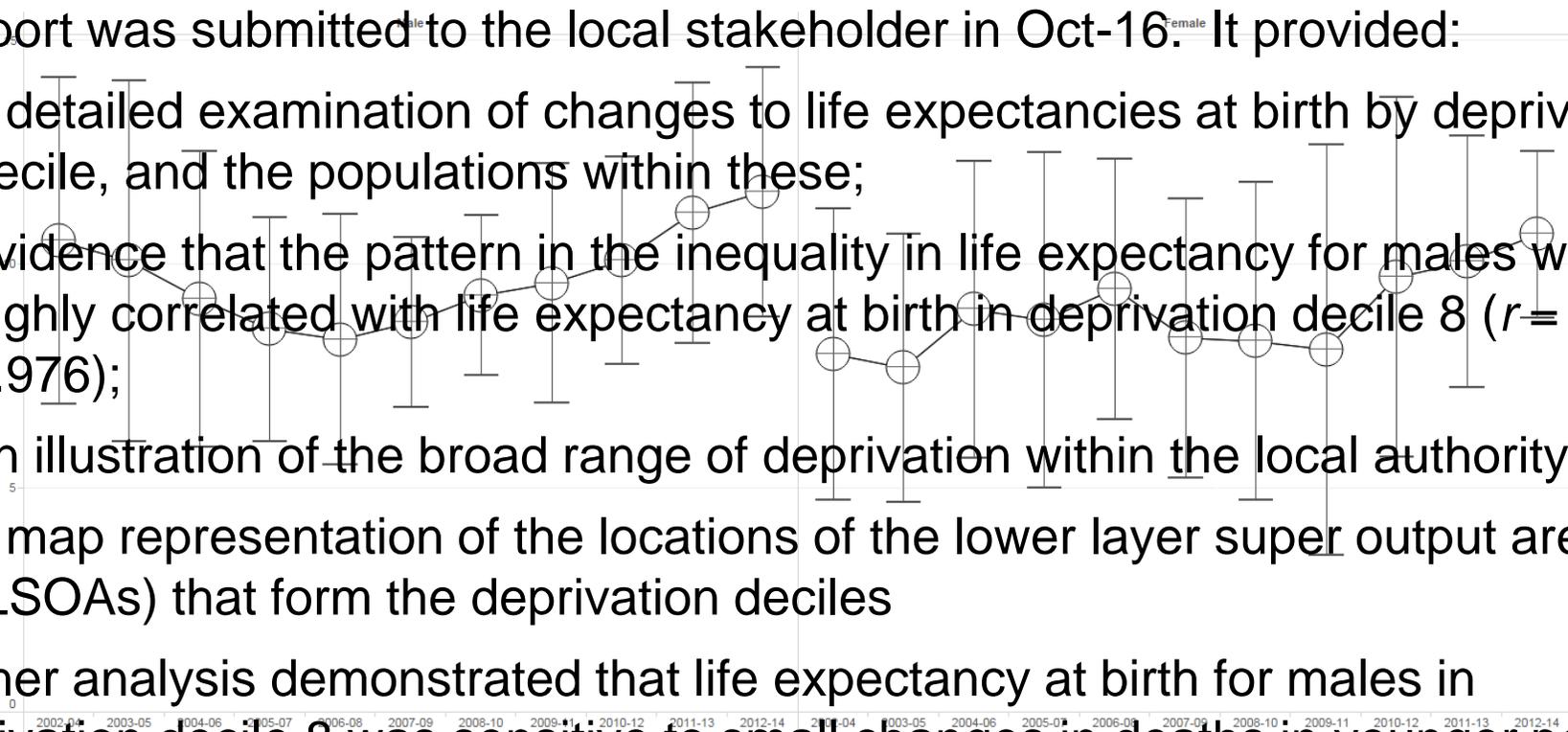
In Sep-16 a local stakeholder requested LKISEast's assistance to examine changes to their inequality in life expectancy at birth

The analysis sought to explore what was driving changes to their SII

A report was submitted to the local stakeholder in Oct-16. It provided:

- a detailed examination of changes to life expectancies at birth by deprivation decile, and the populations within these;
- evidence that the pattern in the inequality in life expectancy for males was highly correlated with life expectancy at birth in deprivation decile 8 ($r = 0.976$);
- an illustration of the broad range of deprivation within the local authority; and
- a map representation of the locations of the lower layer super output areas (LSOAs) that form the deprivation deciles

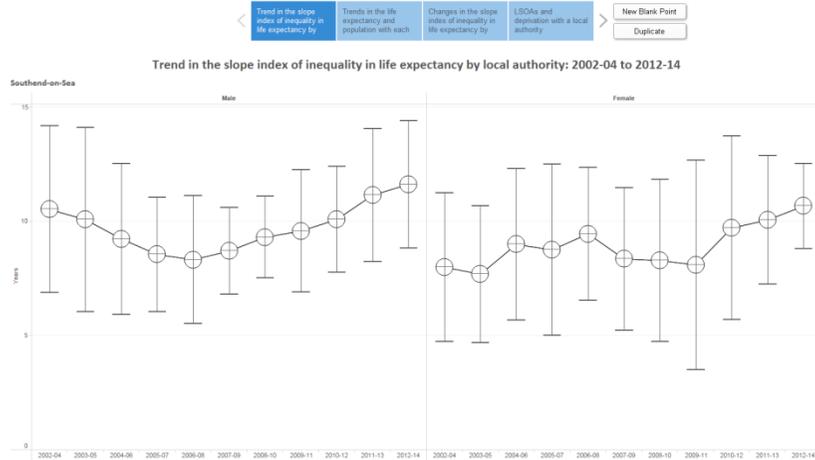
Further analysis demonstrated that life expectancy at birth for males in deprivation decile 8 was sensitive to small changes in deaths in younger people



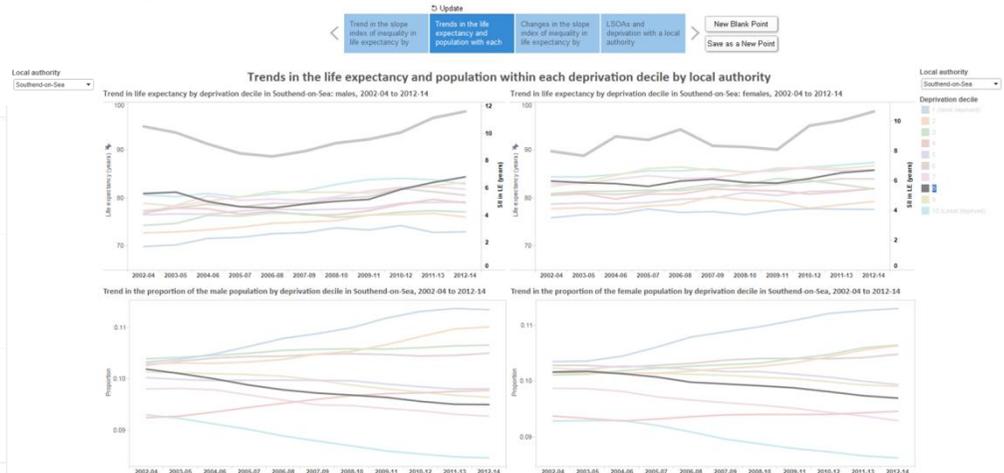
Initial prototype dashboard

Fully working interactive dashboard developed in Tableau by Mar-17

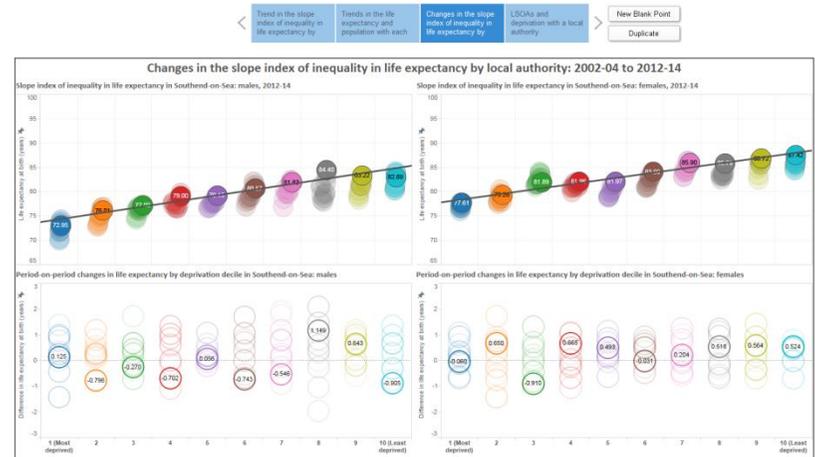
SII dashboard



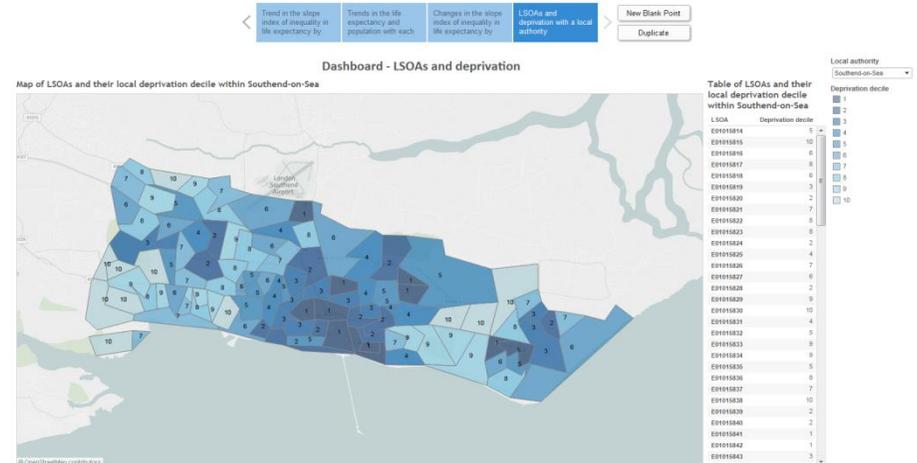
SII dashboard



SII dashboard

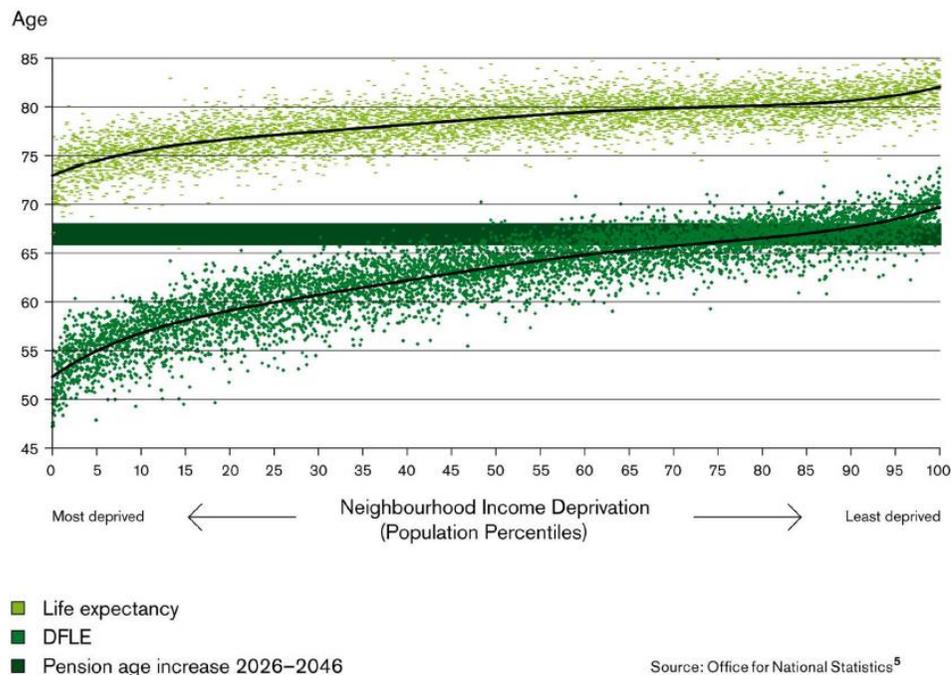


SII dashboard



Some inspiration for the dashboard

Figure 1 Life expectancy and disability-free life expectancy (DFLE) at birth, persons by neighbourhood income level, England, 1999–2003



Han's Rosling's 200 countries, 200 years, 4 minutes, BBC, <https://www.bbc.co.uk/programmes/p00cgkfk>

Marmot, M. (2010) *Fair Society Healthy Lives (The Marmot Review)* UCL Institute of health equity. Marmot, M. (2010). Available at: <http://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review>

Exploring inequalities in Stockton-on-Tees

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Health

Dying young in Stockton - England's most unequal town

By Richard Bliton
Reporter, BBC Panorama

30 July 2018

f t Share



The life expectancy gap between rich and poor people in England has been widening for nearly two decades.

The rich stay healthy longer. The poor die younger.

That bleak assessment is based on national data.

Stockton-on-Tees is the town with England's biggest gap in life expectancy, according to Public Health England, and resident Rob Hill, who is only 46, is getting ready for his death.

<https://www.bbc.co.uk/news/health-44985650>

Key messages

"...Town with the biggest health gap, where the rich enjoy old age, while their poorer neighbours die 18 years younger..."

"...Life expectancy here is 85 years, 4 years above the national average..."

"... In his two mile drive, life expectancy will fall by 16 years..."

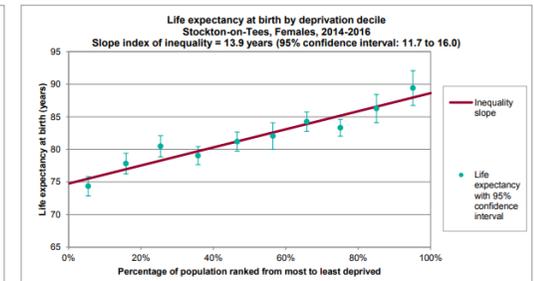
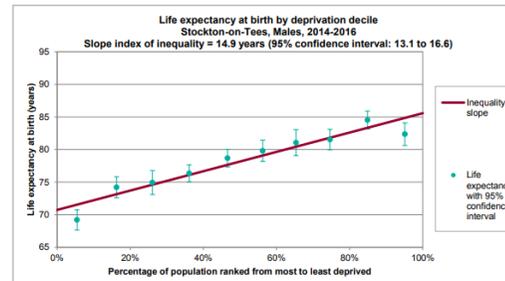
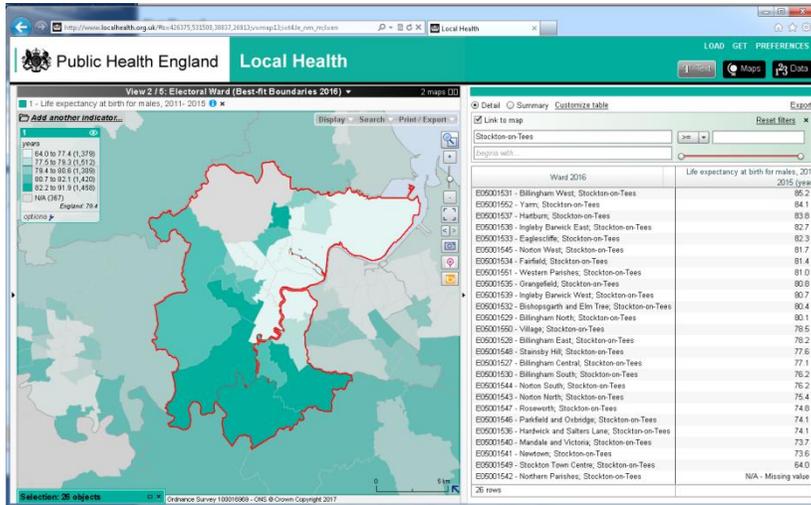
"...Eaglescliffe, where your life expectancy can be 82, and you come into Stockton, and your life expectancy is dropping towards the 60's..."

"...Stockton town centre, where life expectancy for men is 64. That's the same as Ethiopia..."

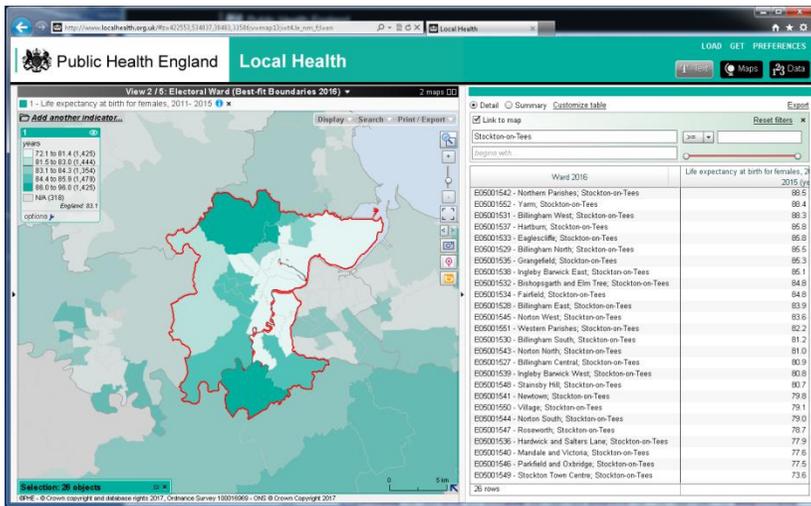
"...This is Yarm, just 4 miles from the town centre. Life expectancy here is 86..."

Panorama: Get Rich or Die Young,
<https://www.bbc.co.uk/programmes/b0bdm7zm>

Using PHE's existing tools and resources to explore inequalities in Stockton-on Tees



Public Health Outcomes Framework (PHOF) Further Information,
<https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/supporting-information/further-info>



PHOF Fingertips Profile,
<https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>

Local Health, www.localhealth.org.uk

Latest version of dashboard (beta version)

Inequality in life expectancy dashboard

Introduction

This dashboard has been developed to help local authorities explore their data around inequalities in life expectancy at birth and at 65 in more detail. It contains data for both upper tier and lower tier local authorities, most of which is already contained within the Public Health Outcomes Framework (PHOF) Fingertips profile [1], but provides additional visual representations to enable key insights to be uncovered.

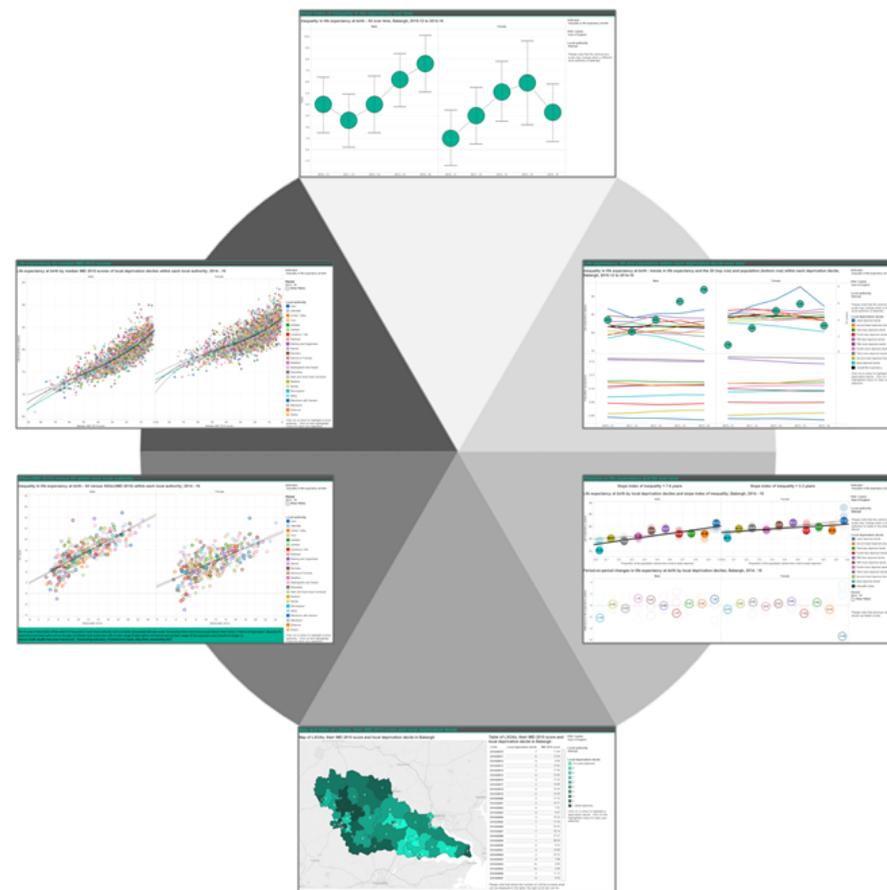
The slope index of inequality (SII) is a measure of health inequality. [2] The SII in life expectancy is a measure of the social gradient in life expectancy, i.e. how much life expectancy varies with deprivation, and is a key high-level health inequalities outcome. It is available in the PHOF.

There is a natural tendency to focus attention on increasing overall life expectancy within an area. However, this may not result in reducing inequalities. If interest lies in inequalities within an area, it is important to recognise that the life expectancies in an area's deprivation deciles, as well as the population within these deciles, are used to calculate its SII in life expectancy. Changes over time to either of these measures can have an impact on the SII in life expectancy. This dashboard therefore contains data for these measures and provides visual representations to highlight this impact.

It has been developed jointly by Public Health England (PHE) Local Knowledge and Intelligence Service East of England (LKISEast) and the national Epidemiology and Surveillance team.

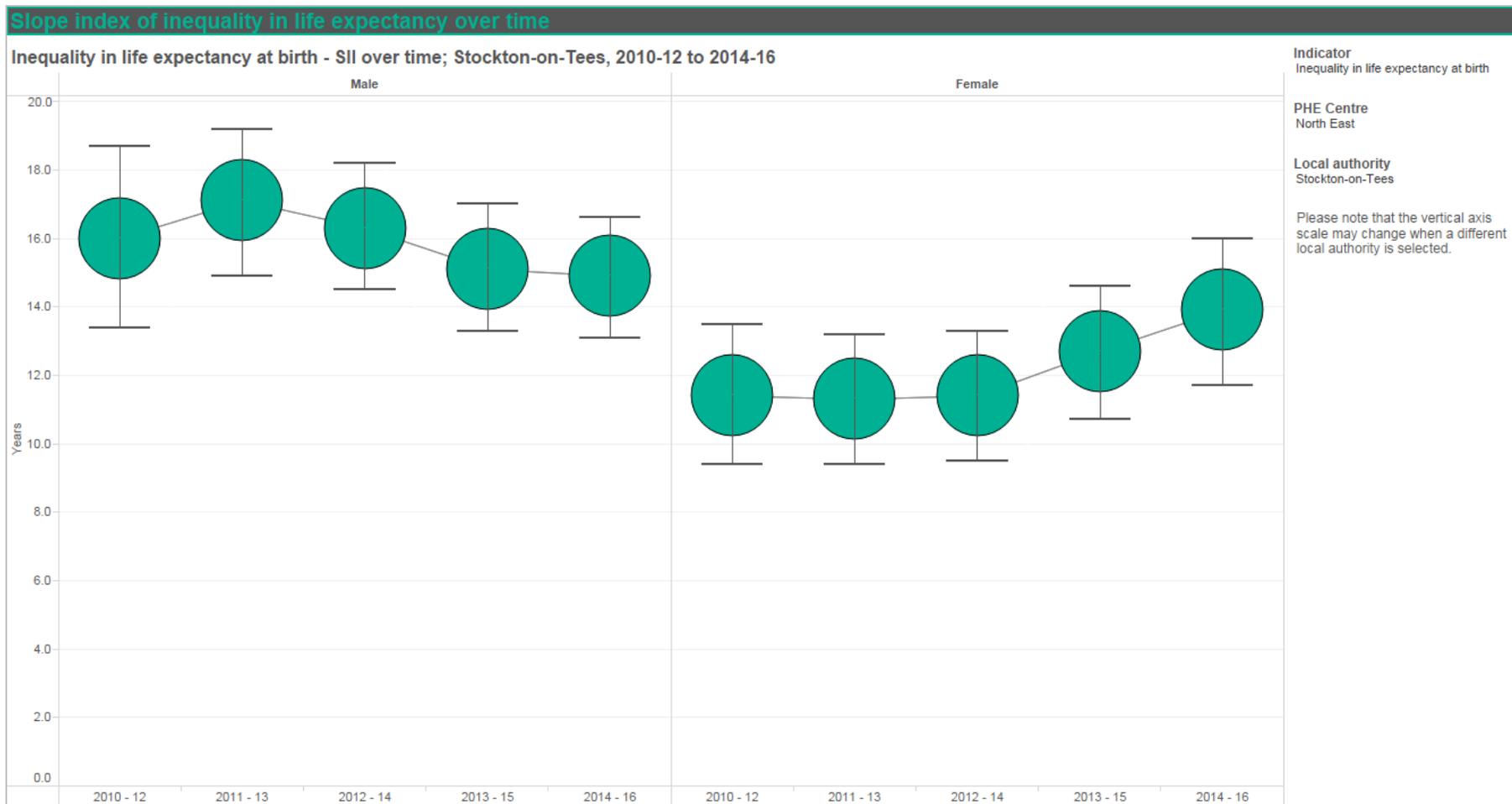
The content from this dashboard can be downloaded. Clicking on the "Download" button in the bottom right corner of the toolbar gives the user the option to download the entire workbook. LKISEast@phe.gov.uk

Last updated: September 2018

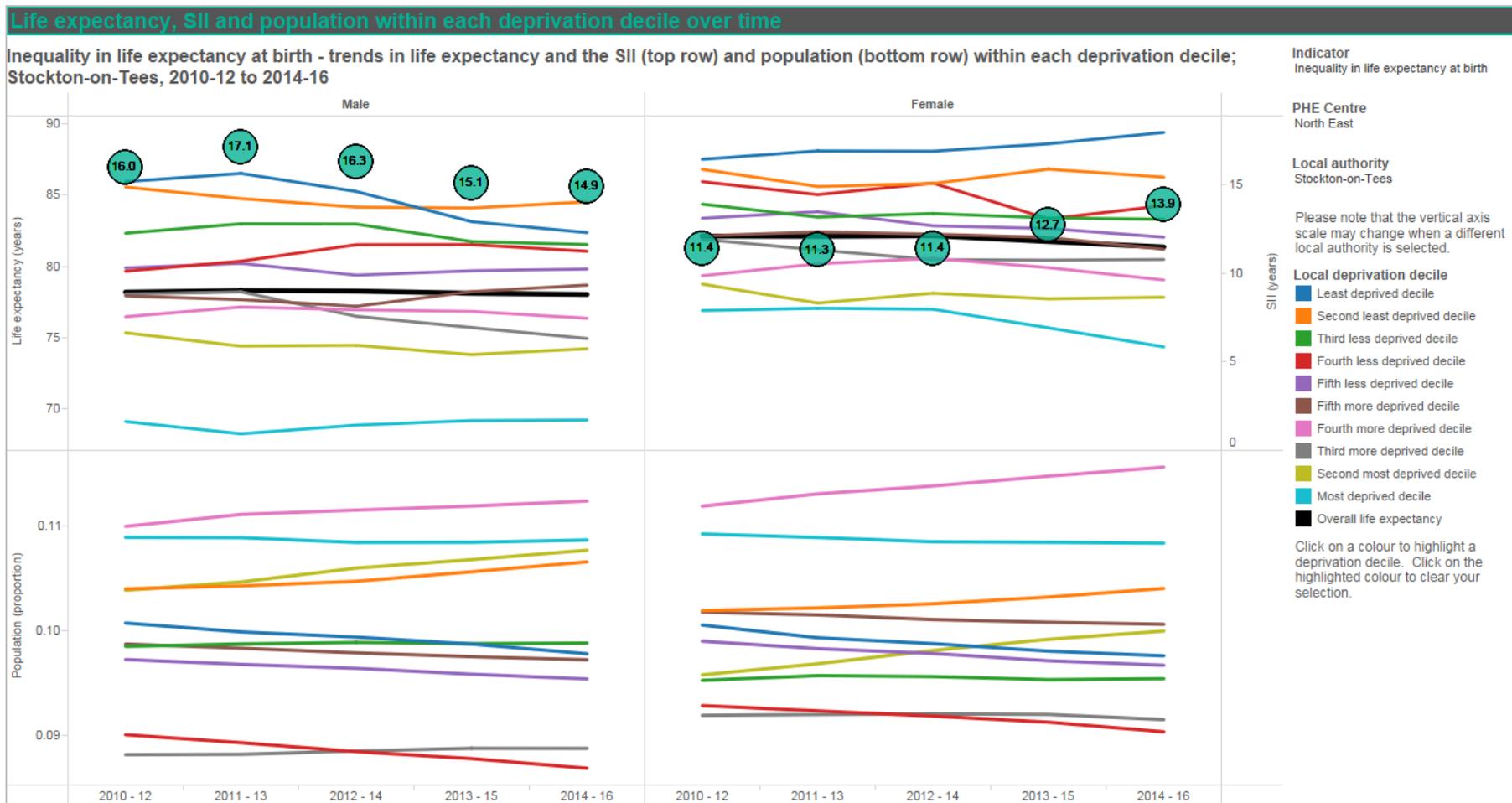


<https://public.tableau.com/profile/population.health.beta#!/vizhome/InequalityinlifeexpectancydashboardpostPS/Introduction>

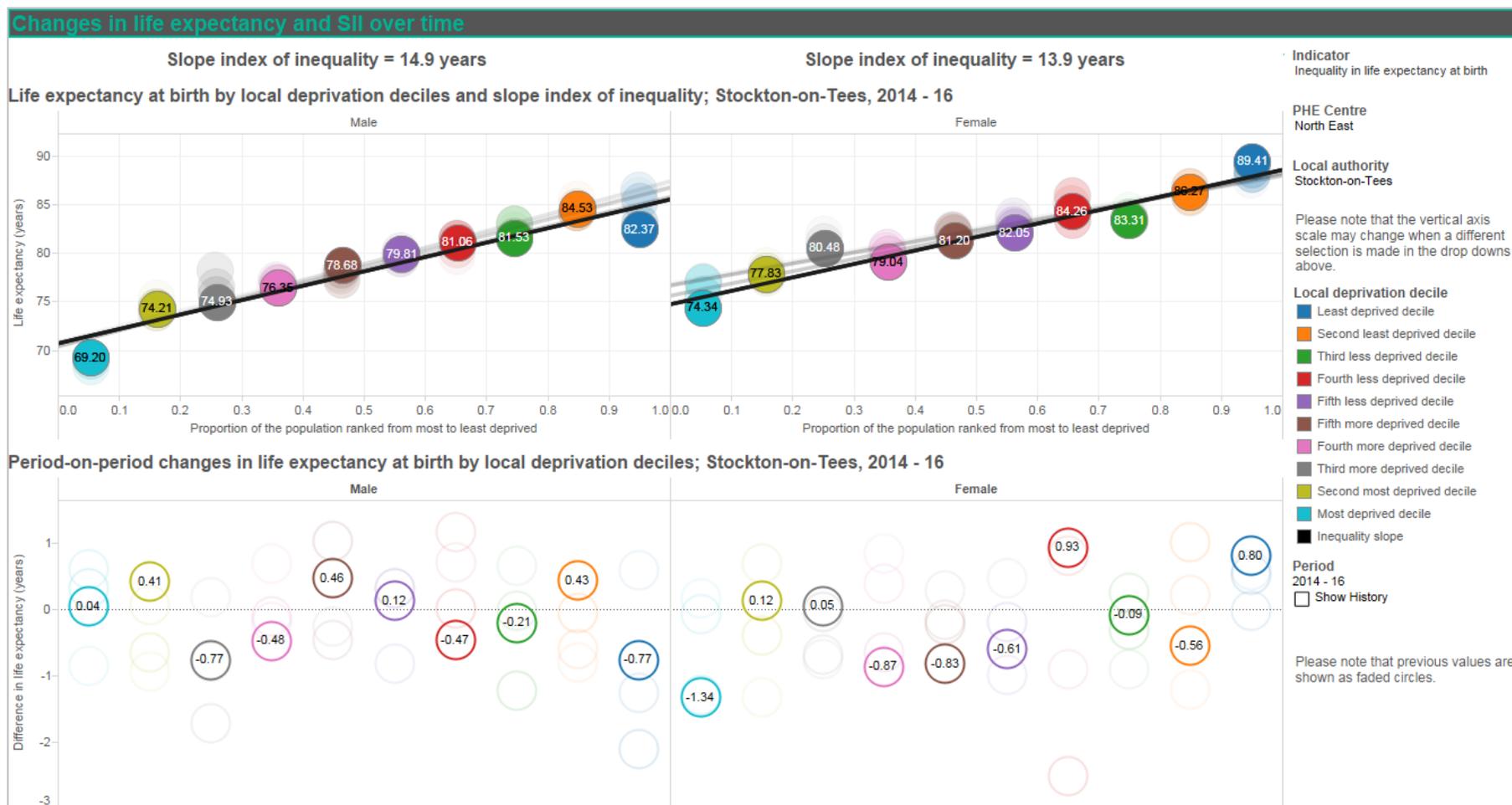
Page 1 Slope Index of inequality in life expectancy over time



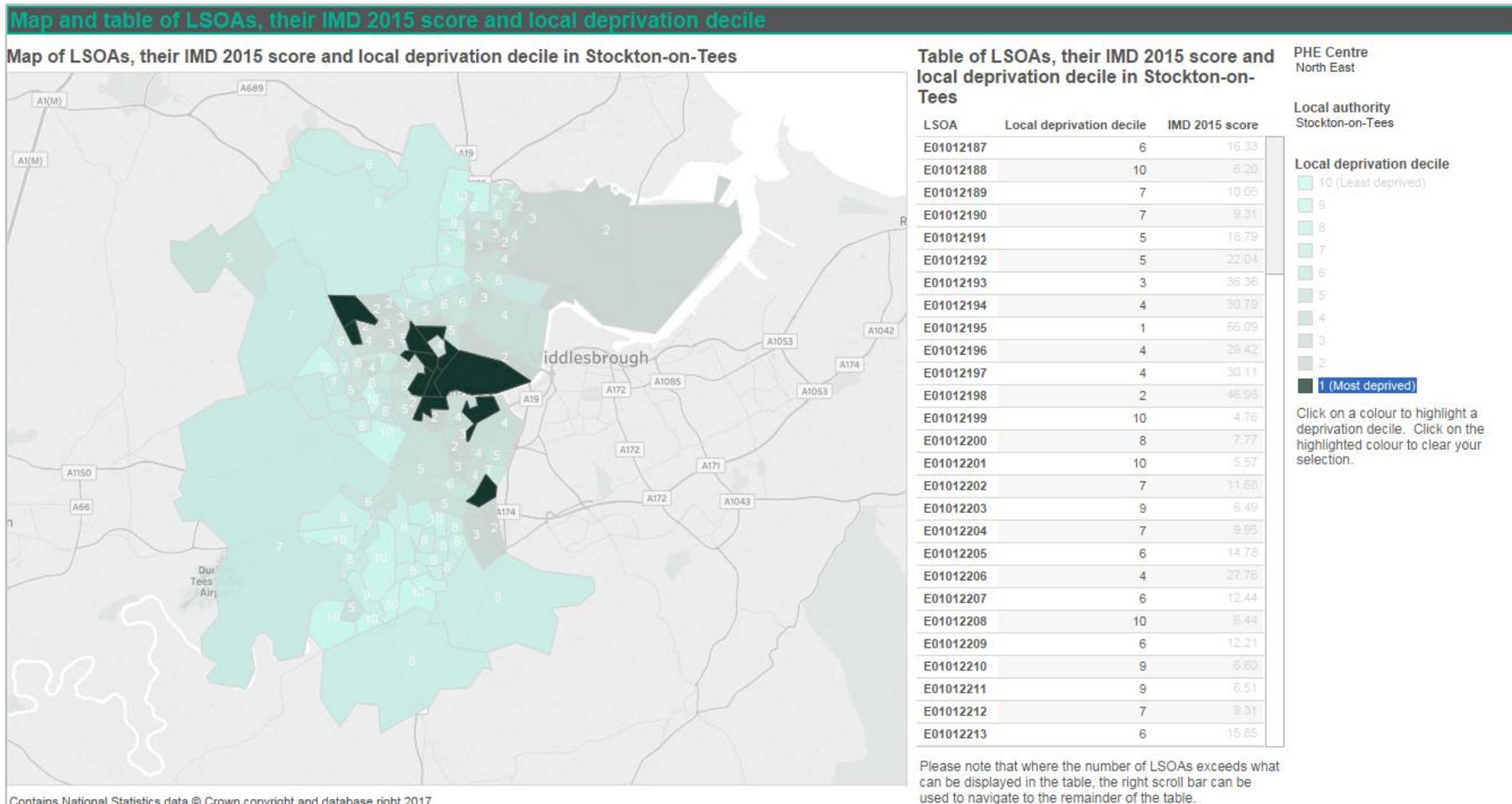
Page 2 Life expectancy, SII and population within each deprivation decile over time



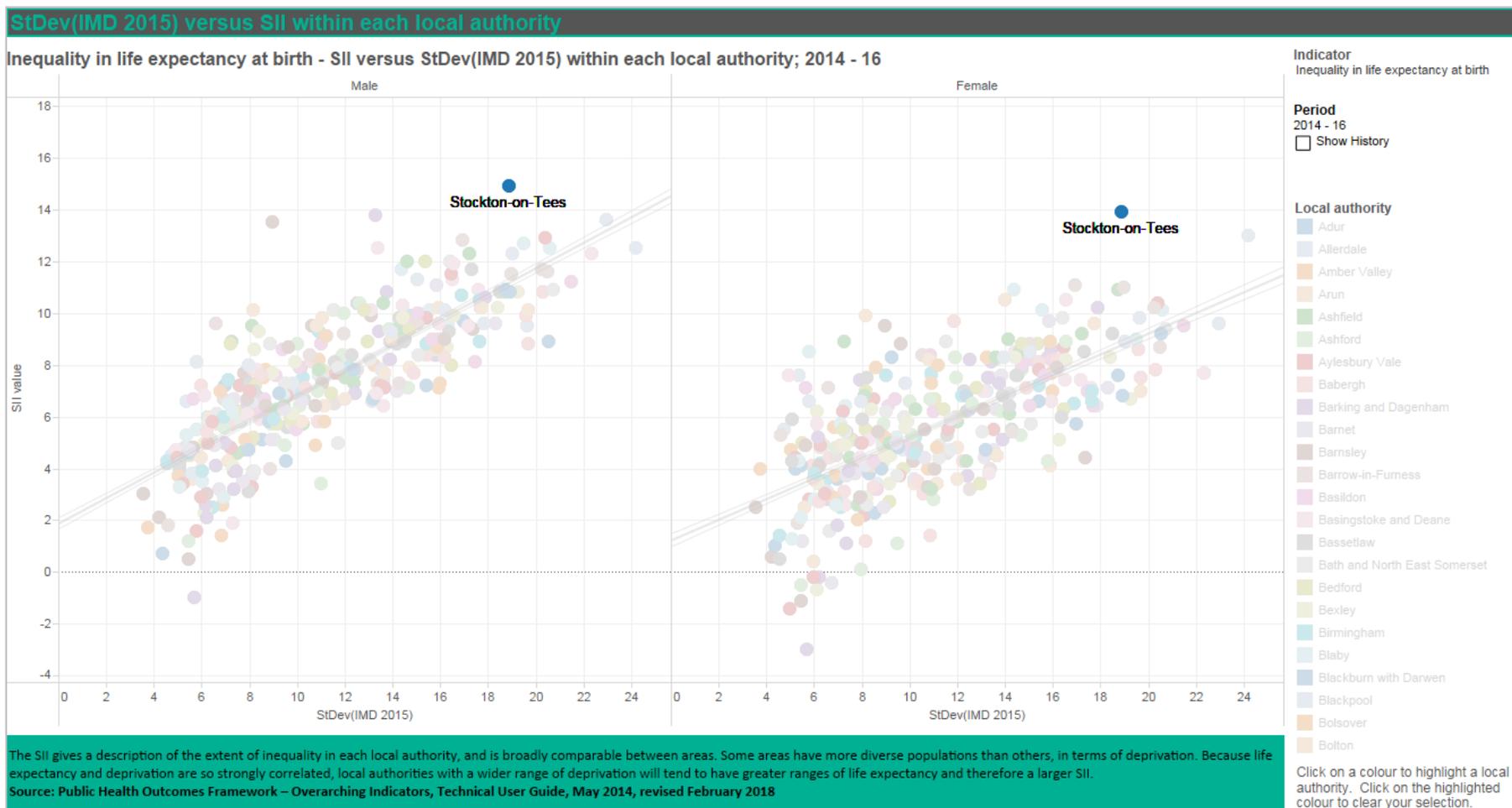
Page 3 Changes in life expectancy and SII over time



Page 4 Map and table of LSOAs, their IMD 2015 score and local deprivation decile



Page 5 StDev(IMD2015) versus SII within each local authority



Page 6 Life expectancy by median IMD 2015 scores



Benefits

- Publically available as a beta version at <https://public.tableau.com/profile/population.health.beta#!/vizhome/InequalityinlifeexpectancydashboardpostPS/Introduction>
- Brings together data pertinent to life expectancies and inequalities in life expectancy into one resource
- Contains data for all upper tier and lower tier local authorities
- Contains visualisations and analyses to enable user to gain insight into their SII, and what might be driving changes to it
- Logical order and interactivity aids story telling
- It can be used to support further analyses, i.e. decomposition by age and causes of death
- It complements existing PHE resources, not replace them

Thank you

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Local Knowledge and Intelligence Service

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