The 3x3 Performance Matrix
A Visualisation-based approach to Public Health Performance

HEALTH AND CARE ANALYTICS Conference 2024

WALSALL Council

Authors:
Lee Harley[1], Dr. Claire J. Heath[1], Dr. Nadia Inglis[2]
Business Insights[1] and Public Health[2] Services, Walsall Council, The Civic Centre, Darwall Street, Walsall, WS1 1TP

Contact
lee.harley@walsall.gov.uk
www.walsallintelligence.org.uk
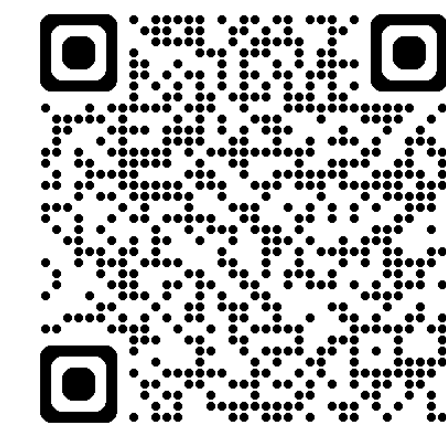
Background

The Public Health Outcomes Framework (PHOF)[1] is a curated collection of indicators that monitors health and wellbeing outcomes, produced by the Office for Health Improvement and Disparities. It enables local areas to benchmark themselves against regional and national comparators. We have collated PHOF indicators into an elegant 3x3 visualisation, that provides high-level, 'at-a-glance', information to strategic decision makers: highlighting successes and areas of risk, and identifying where deeper analysis or additional resources may be warranted.

Objectives

To produce an effective visualisation for displaying Walsall's PHOF performance that is:

1 Relative to Statistical Neighbours

2 Relative to Recent Trend

3 Easily Communicable

4 Reproducible with Automation

Methodology

PHOF indicators are arranged as a 3x3 matrix across two dimensions: how an area compares to CIPFA[2] statistical neighbours (better/similar/worse) and the linear regression modelled trend over time (improving/similar/deteriorating). A cartesian chart (Fig. 1) arranges indicators by their proportionate difference, to visually identify outliers such as areas where Walsall may be Worse and Deteriorating, or Better and Improving. The process utilises R throughout: for data retrieval (FingertipsR[3] API library), engineering, modelling and visualisation, and is presented through Power BI (Fig. 2) dashboards (and as a ShinyApps[4] app), allowing self-service, user interactivity and data exploration – in addition to select animations of relative performance over-time (Fig. 3). The process was developed as an automated statistical data pipeline.

Reproducible Analytical Pipeline using the R statistical programming language

API Data Retrieval — Data Engineering — Modelling and Comparators — Visualisation and Insights

Public Health Outcomes Framework Summary Chart
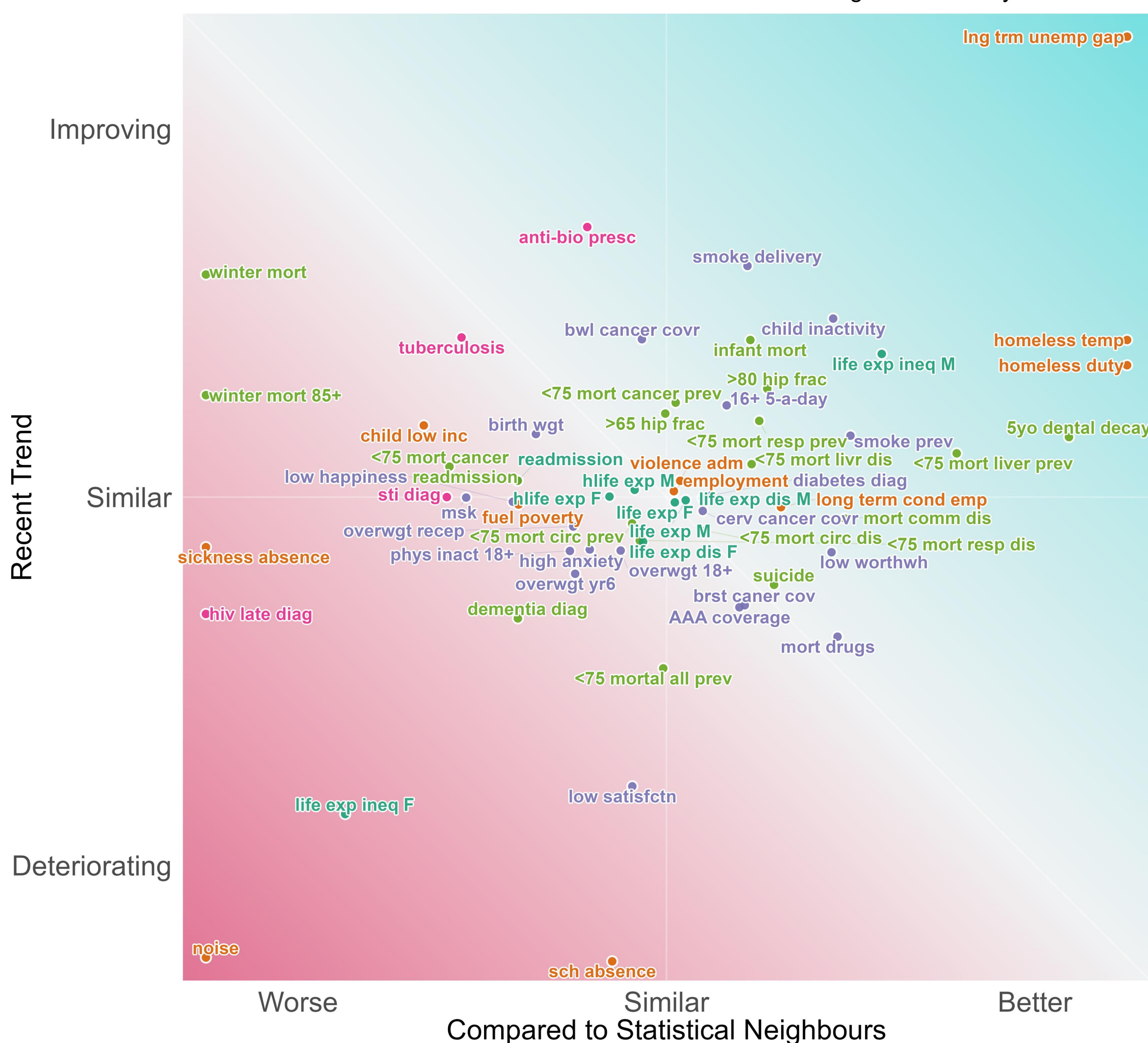How Walsall fares on each indicator relative to it's statistical neighbours and by recent trend

Fig. 1 — Cartesian Chart plotting indicators by their linear trend over time and comparison to statistical neighbours

Fig. 2 — Power BI Matrix of indicators arranged by trend over time and comparison to statistical neighbours

Walsall Life Expectancy at birth
Years change relative to England and recent trend

PHOF Domain
- Overarching indicators
- Wider determinants
- Health improvement
- Health protection
- Healthcare and mortality
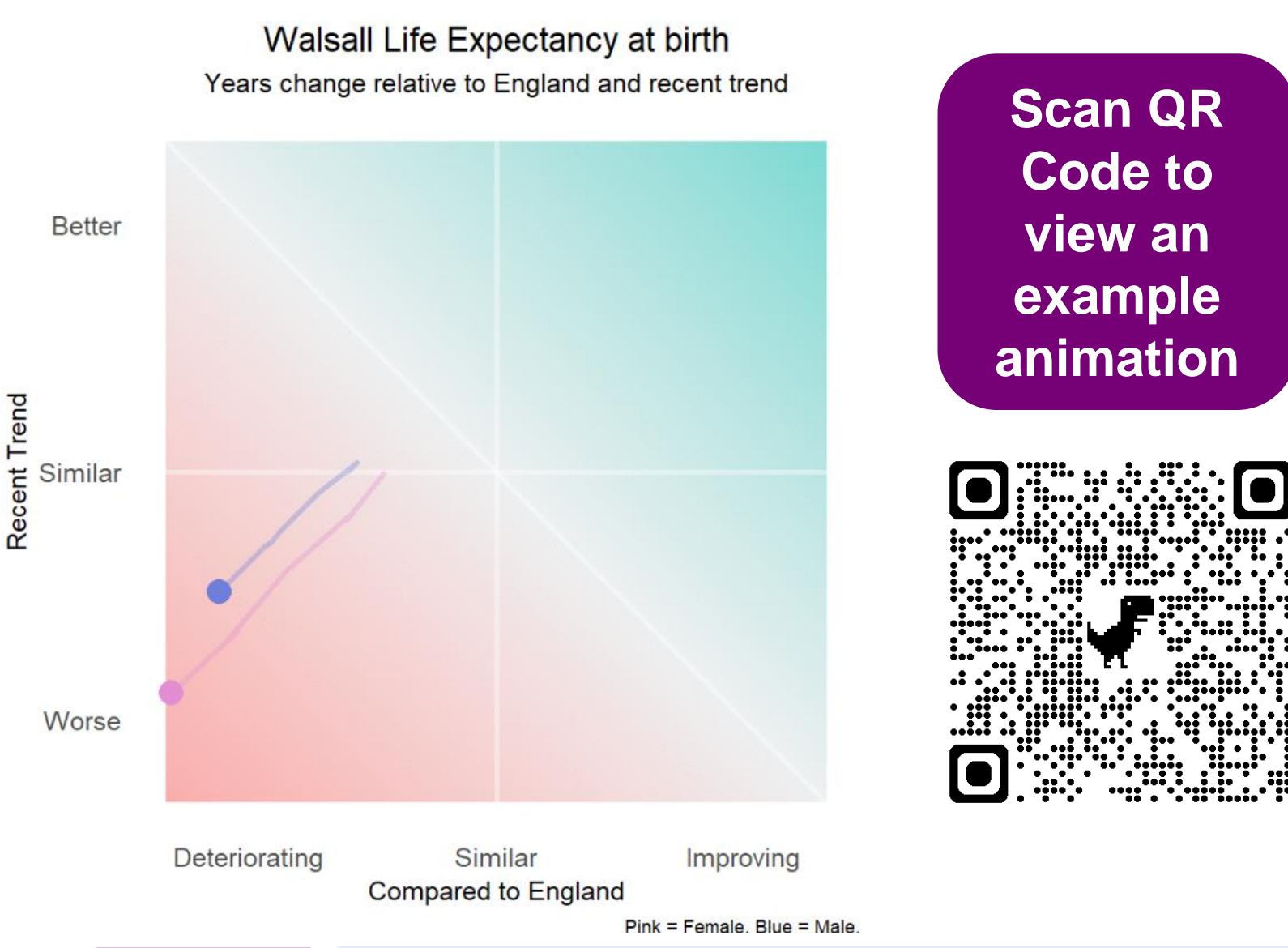
Scan QR Code to view an example animation

Fig. 3 — Animated change in relative performance over time

Outcomes

- **High-level View:** The 3x3 Matrix has introduced high-level oversight of general state of health and wellbeing. As such, it is used within Walsall to guide and inform the priorities of strategic decisions makers, such as the Health and Wellbeing Board.
- **Operational Performance:** It has also been valuable at an operational level by providing a current and dynamic view of corporate and public health performance.
- **Focusing Analytical Resources:** It has worked best as part of a suite of performance tools at differing resolutions, and particularly in prompting deeper analytical dives, directing the focus of limited analytical resources toward appropriate areas.
- **Widespread Interest:** Having been demonstrated at multiple analytical events for local authorities, partners, and regional bodies.
- **Future Development:** Plans to add additional datasets, and to develop as a broader analytical tool to support service areas and partners across the borough. Further technical development includes intent to add an optional predictive modelling element.

Recommendations

- **Balanced View:** It provides a strong visual for drawing focus toward extremes (worse and deteriorating), however it is relative, and indicators clustered around the centre (similar and similar) also require attention i.e. it could be that indicators are equally deteriorating across all comparator areas, or are unchanged over time.
- **Data-driven Development:** Engagement and open discussion and involvement of partners helped shape its development and utilisation, ensuring usable insight is provided, and in-turn improving performance reporting processes.
- **Data Science Skillset:** This product was made possible through data science methodology and proficient use of R, for the custom building of visualisations, modelling and automated data engineering. It has been problematic for partners to implement without having such expertise within their teams: a skillset that is recommended for this approach. We are actively exploring options around this.

References

1 Office for Health Improvement and Disparities (OHID) - https://fingertips.phe.org.uk/profile/public-health-outcomes-framework
2 CIPFA - https://www.cipfa.org/services/cipfastats/nearest-neighbour-model
3 FingertipsR R Package - https://github.com/ropensci/fingertipsR
4 Shiny Apps - https://www.shinyapps.io/