Building the NHS Lothian Public Health Indicators Dashboard in R Shiny

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Acknowledgements are given to my colleagues in the NHS Lothian Public Health Intelligence Team

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1. Context

- The **NHS Lothian Public Health Core Indicators (LPHCI)** is a core intelligence output produced and maintained by the **NHS Lothian Public Health Intelligence Team**.
- The **LPHCI** is split into two separate, self-contained R Markdown reports that present a range of public health indicators that provide a snapshot of the health and wellbeing of the Lothian population.
- The intelligence contained in the reports inform **public health interventions**, **service provision**, and the **Joint Strategic Needs Assessments (JSNA's)** for each local authority within the Lothians, to name a few use cases.
- The end users are **public health colleagues** and **clinicians** e.g., Partnership & Place teams, Healthcare Public Health teams, Screening & Immunisation teams, Primary Care and Secondary Care teams.

2. Rationale and aims

- The LPHCI have existed within the R Markdown ecosystem throughout their lifespan, and over time had developed a few minor niggles. There had been ongoing debate around the presentation of the LPHCI and the breadth and scope of intelligence it provides.
- I sought to address these challenges by testing the feasibility of repackaging the LPHCI into a dashboard while consolidating my newly gained R Shiny competency. **The overarching philosophy of improving the value that this intelligence product brings to our users.**
- **The aims of this project were to:**
  - Deliver a proof-of-concept LPHCI R Shiny dashboard that provides a refreshed, structured user interface,
  - Initiate a team-wide quality assurance review of the LPHCI that are directly influenced by my findings
  - Consolidate my R Shiny skills to further enhance my competencies as a Public Health Intelligence Analyst.

3. Process

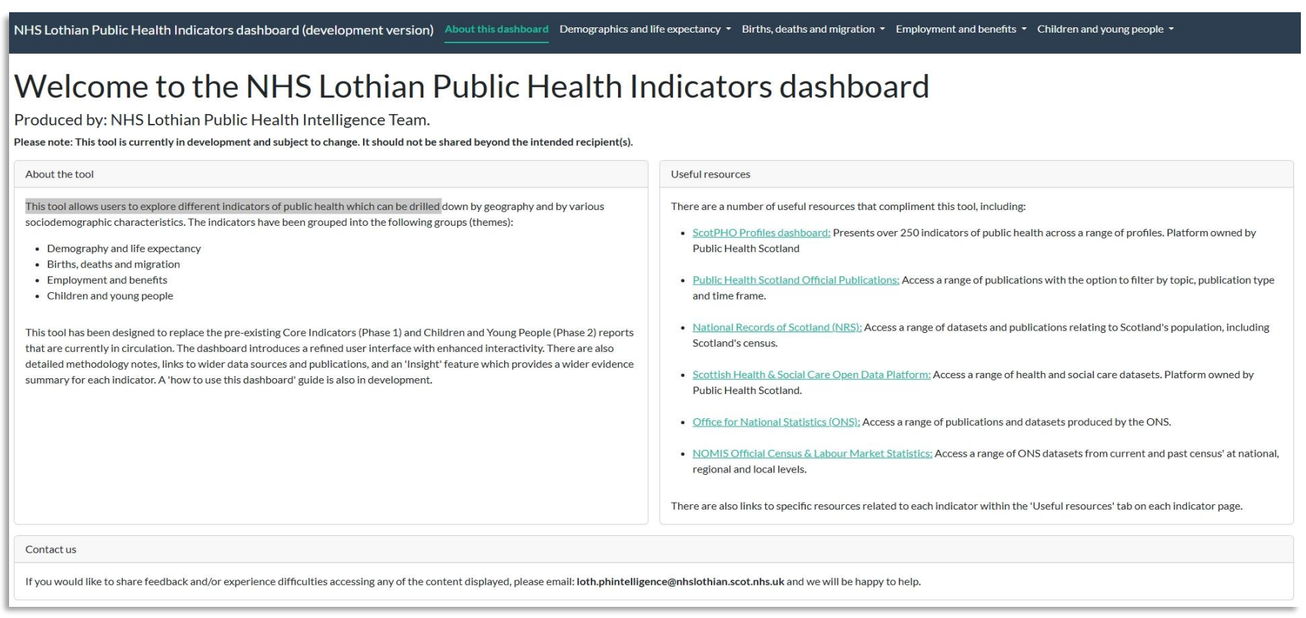
- **Approach:** Building a dashboard is akin to software development which relies on flexibility and iteration. I fostered an agile project management approach where I set a series of milestones to achieve at each stage of the project lifecycle, broken down into sprints.
- **Scoping exercises shapes and informs** the the key ingredients of the dashboard. Key questions include:
  - how you want it to look like (user interface),
  - what content it will communicate,
  - which features you want it to have.
- **Most importantly**, this exercise gets to the heart of **why** your dashboard is unique in what it has to offer to users so that its existence is suitably justified and doesn't just replicate what is already available.
- **Documentation** keeps you on track and is vital if you are working as part of a team, or if someone who is quality assuring your work is unfamiliar with certain components.
- **Tools used**

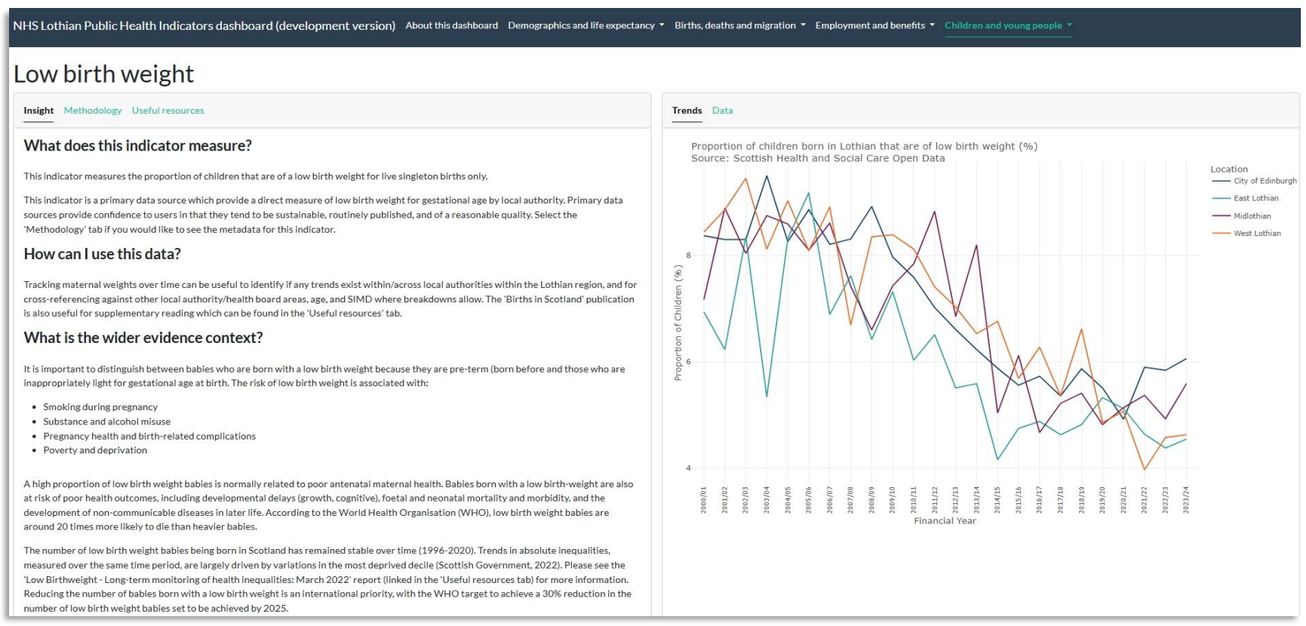
4. The outcome: a prototype LPHCI dashboard

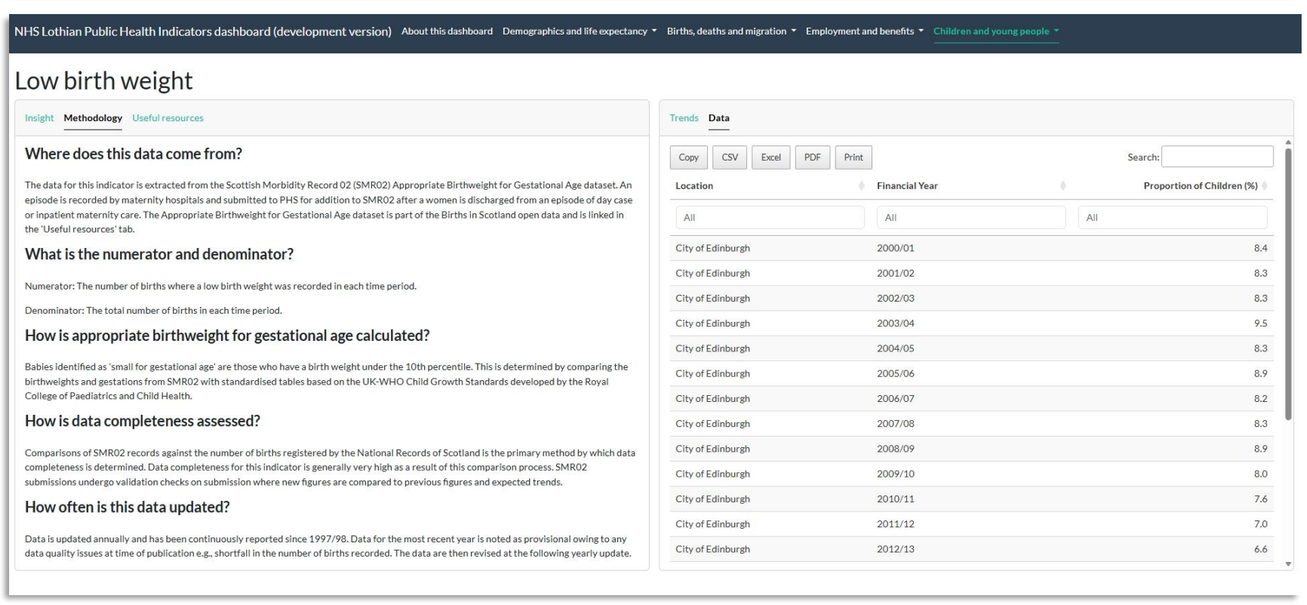
Custom-built user interface (using bslib) with **reactive shiny elements** where **user input influences the output** e.g., sliders, checkboxes, drop-down indicator pages.

Trends and **Data** content tabs house charts and data tables in a consistent format with various toggles e.g., filters, download options,

Insight, Methodology, and **Useful Resources** content tabs highlight **why** these indicators are important to measure, with relevant **methodology** notes.







5. Impact

- The dashboard has been well-received following demonstration to key stakeholders (Head of Intelligence, Public Health Consultants, fellow analyst colleagues).
- Issues were identified with the **robustness and sustainability** of the analysis scripts that underpin each indicator. This has led to a **quality assurance review** of all project files to improve the R Markdown outputs currently in circulation.
- Signals the shift towards our outputs providing greater granularity, equipping colleagues with more actionable health intelligence.

6. Challenges

- Backwards compatibility to **flexdashboard** (which is shareable via email) may be required to circumnavigate limited user access out-with NHS Lothian.
- More user feedback is required to identify **strengths** and **pain points** to further explore future development of the dashboard.
- Learning R Shiny and transitioning to declarative programming can be difficult. Troubleshooting to understand how your code works is essential to developing your skills in this area.

7. Next steps

- The LPHCI prototype dashboard will now be **disseminated to colleagues** to better understand user needs to inform future development.