Patient pathway proposal for Connected Yorkshire

Showcase the utility of healthcare data linkage, by using routinely collected and/or research healthcare datasets to improve care pathways. They should be focused around key NHS priorities, be innovative and disruptive, and have potential for scalability to another Hub within Yorkshire.

1. **Title:**
   Promoting healthier child growth

2. **Principal Organisations involved:**
   Bradford Teaching Hospitals NHS Trust,
   Bradford City and District CCGs,
   Bradford City Council

3. **Clinical Lead(s) (primary / secondary care):**
   Dr John Wright (Director, Bradford Institute for Health Research)
   Dr Taz Aldawoud (Clinical Board Member, Bradford Districts Clinical Commissioning Group)

4. **Academic/Research Lead(s) and roles:**
   Dr John Wright (Director, Bradford Institute for Health Research)

5. **Technical/IT lead(s) and roles**
   Dan Mason (Programme manager, Research Analytics, Born in Bradford);
   Alex Newsham (Senior database manager, Better Start Bradford)

6. **Background & Need: (max 350 words)**
   The epidemic of childhood obesity in the UK is associated with a major burden of physical and psychological morbidity and early mortality. This epidemic is one of the most daunting public health threats facing the UK and presents a potential health time bomb that threatens to reverse gains made in longevity made over the last 100 years. Two recent reports (Wanless and Foresight) have provided dire warnings that without significant improvements in efforts to tackle childhood obesity, the future of the NHS is in jeopardy. The Foresight report concluded that preventing obesity requires major change in the environment, behaviour; in organisations, communities, families and individuals.

   Impact on health. Childhood obesity has major impact on health and wellbeing in childhood and through to adult life. Obese children experience poor health related quality of life and low self-esteem and are at increased risk of hypertension, hyperlipidaemia and diabetes. Half of obese children grow up to be obese adults at greater risk of heart disease, diabetes, stroke and cancers. The National Audit Office estimated in 2001 that obesity is responsible for 9,000 deaths each year in England and reduces life expectancy by on average 9 years.
Children of South Asian origin in the UK are growing up with particularly high risks of developing central obesity, cardiovascular disease and diabetes. It is estimated that approximately 40% of South Asian adults have diabetes or impaired glucose tolerance and there is evidence to suggest that this higher risk begins in childhood or even from birth. In addition to ethnic disparities, social class differs significantly in the prevalence of obesity, particularly in women. The Health Survey for England showed that 14% of men and women in professional groups were obese compared to 28% of women in unskilled manual occupations.

7. **Aim and objectives: (max 300 words)**
   **Aim:**
   To improve the early identification of overweight and obesity in children and promote improved self-monitoring and school and health care support

   **Objectives:**
   i) To link routine maternity data (birthweight), health visitor data (child growth), National Child Measurement data (BMI age 4 and 10 years) with primary care data (opportunistic BMI measurements)
   ii) To describe growth trajectories in different ethnic groups
   iii) To identify early life predictors of later childhood obesity
   iv) To embed an electronic Healthy Weight index in clinical and school records
   v) To test the potential of self-monitoring of weight and lifestyle factors (exercise, diet, sleep and screen viewing) through a smart phone app.

8. **Brief outline of implementation plan providing (i) overall key steps (ii) technical/IT activities to include linkage plan (500 words)**
   **Overall key steps:**
   i) Stakeholder engagement and obtaining support from senior leaders
   ii) Recruitment of key staff to establish a project team
   iii) Signing data sharing agreements with data providers
   iv) Design, implementation and management of a database to hold pseudonymised datasets in a safe haven
   v) Data extract from data providers
   vi) Linkage and analytics of pseudonymised datasets
   vii) Implementation of Healthy Weight index and testing of self-monitoring smart phone app

   **Technical/IT activities:**
   We will need to design a database in a safe haven to store our data. Our database manager will lead the design, implementation and management of this database. We will work closely with our data providers to determine frequency of data extracts and to maintain data quality. Our senior analyst will analyse and interpretate of the data, and produce data visualisations that for care providers and families.

   Any data that is identifiable will require explicit opt-in consent. We will be using pseudonymised data for linkage and analytics, which will not require consent from individual patients. Patient and public engagement is a key part of this project. We
will consult with members of the public, communicate the benefits of data linkage, and provide reassurance that their data is used responsibly.

9. **Target population:**
   Children in the Born in Bradford study will provide the initial sample for demonstrating feasibility and validity using an existing dataset. Children in the whole of Bradford and Airedale district will provide the wider population sample. Children in the Born in Bradford Better Start will provide the smart phone app testing sample.

10. **Data sources:**
    Born in Bradford dataset; health visitor records (SystmOne); primary care (SystmOne) and National Child Measurement Service

11. **Statement of likely intervention/care pathway improvement in lay terms**
    Childhood obesity causes poor health in childhood and later life, and research has shown it is one of the biggest public health threats facing this country. By harnessing technology and the power of data, we can find new ways to address this problem. We will analyse routinely collected data to identify patterns in childhood to help us understand how obesity affects our population in Bradford. We will also use mobile phones to allow children to monitor their weight and activity levels, including exercise, sleep and screen viewing.

12. **Briefly describe how the project meets cYorkshire criteria: (max 500 words)**
    a. Data link-ability is a pre-requisite (consent) in both the context of:
       i. Research (de-identified)
       ii. Improving care (identified)
    b. Addresses the NHS Priorities, as defined in the Five Year Forward View
    c. Citizen-centred
    d. Project is scalable to other sites
    e. Success would result in disruptive change, not an incremental one
    f. Builds on existing/early research or infrastructure
    g. Should connect at least two cYorkshire partners/sites.

    De-identified data, linked from the Born in Bradford dataset, health visitor records, primary care and National Child Measurement Service will be used, for baseline analysis and to evaluate impact of our interventions. Identifiable data will be used to deliver interventions but will not be shared without appropriate consent and pseudonymisation.

    The sustainability of the NHS, and the health of millions of children depends on a radical upgrade in prevention and public health. This project will address the health and wellbeing gap described in the Five Year Forward View. Our approach is intended to be disruptive and will empower families to utilise their healthcare data, allowing them to take ownership of their health and wellbeing.

    This project builds on the existing research and infrastructure from the Born in Bradford birth cohort, which has seen nearly 30,000 mothers, fathers and children have their records linked and extensively validated across primary care, hospital,
community, laboratory, radiology, and education. We will work with the Leeds Institute for Data Analytics, drawing upon their expertise in data linkage and analytics. There is potential for scalability to other sites by utilising datasets that are commonly available such as health visitor and primary care records through SystmOne and National Child Measurement Service data.

13. Intervention resulting – key steps to successful intervention
   Feedback (audit for individuals, learning health systems for public health); embedded computerised support tools; smart phone self-care and support

14. Main outcome measures:
   BMI age 4 and 10 years

15. Principal evaluation criteria
   Linkage and availability of complete child growth datasets
   Development of predictive model and electronic index
   Use of electronic index
   Uptake of smart phone data collection
   BMI trends

16. Opportunities for industry engagement: (partners in this project or potential partners after the outcome of the project)
   TPP (EHR provider) and Vitricare (mobile app developer) as partners in this project