

Using supermarket shopping data to track population health

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What is Digital Footprint Data?



Loyalty cards



Social media



Banking



Apps and wearables



Advantages of Digital Footprint Data



Large scale

Millions of individuals,
billions of entries; highly
granular



Dynamic

Multiple measures per person;
continuous; retrospective



Real world behaviours

Not a self-report or lab-
based measure



Low/no participant burden



Representative at scale

Close to representative
samples



Impact

It can change the way the
evidence for effectiveness of
policies is collected

How can Shopping Data be used in Health Research?



28 days

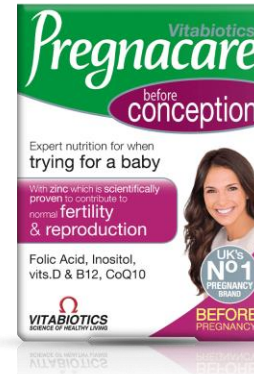
9 months



Cyclic purchasing of menstrual and pain products



Change in everyday behaviours (vitamins, diet)



Change in wellness solutions (sleep, anxiety)

Our Projects

- Data linkage
- Reproductive health
- **Public acceptability and consent**
- Diet, ultra-processed foods, and cancer risk factors
- **Self-medication**
- Chronic pain
- Mental health during COVID-19
- Data visualisation
- Inequalities
- **Mapping the research landscape**



Loyalty Cards in Health Research (44 studies)

What type of data / products?

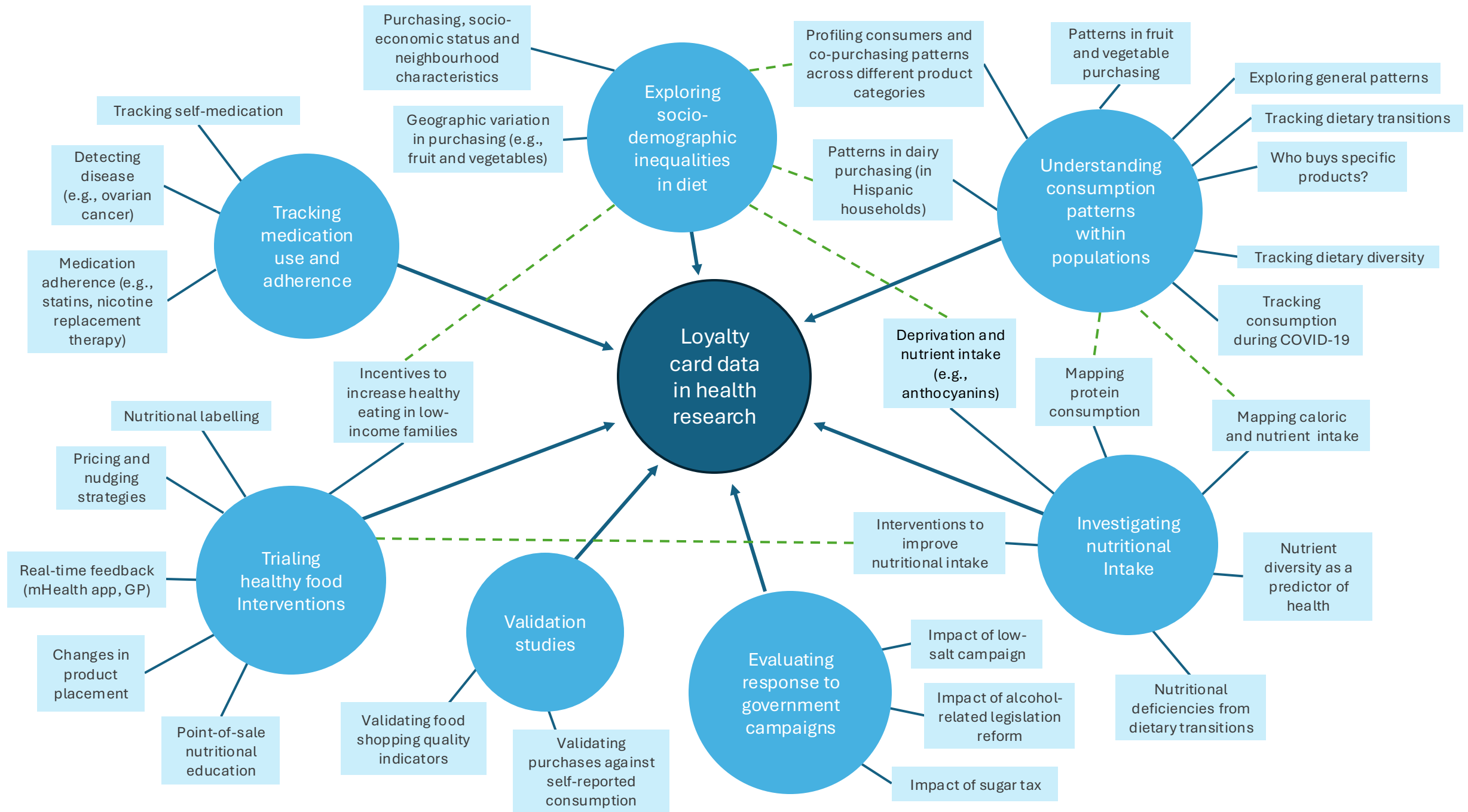
- 27 studies used named retailers, 16 did not specify
- Most studies used grocery products or specific subsets e.g., dairy, fruit and veg
- Some used beverages or medication data

What health outcomes?

- Tracking dietary habits (n=10) and nutritional intake (n=3)
- Government campaigns (n=4)
- Public health interventions (n=10)
- Addressing sociodemographic inequalities (n=5)
- Tracking medication use (n=3)
- Validation studies (n=5)

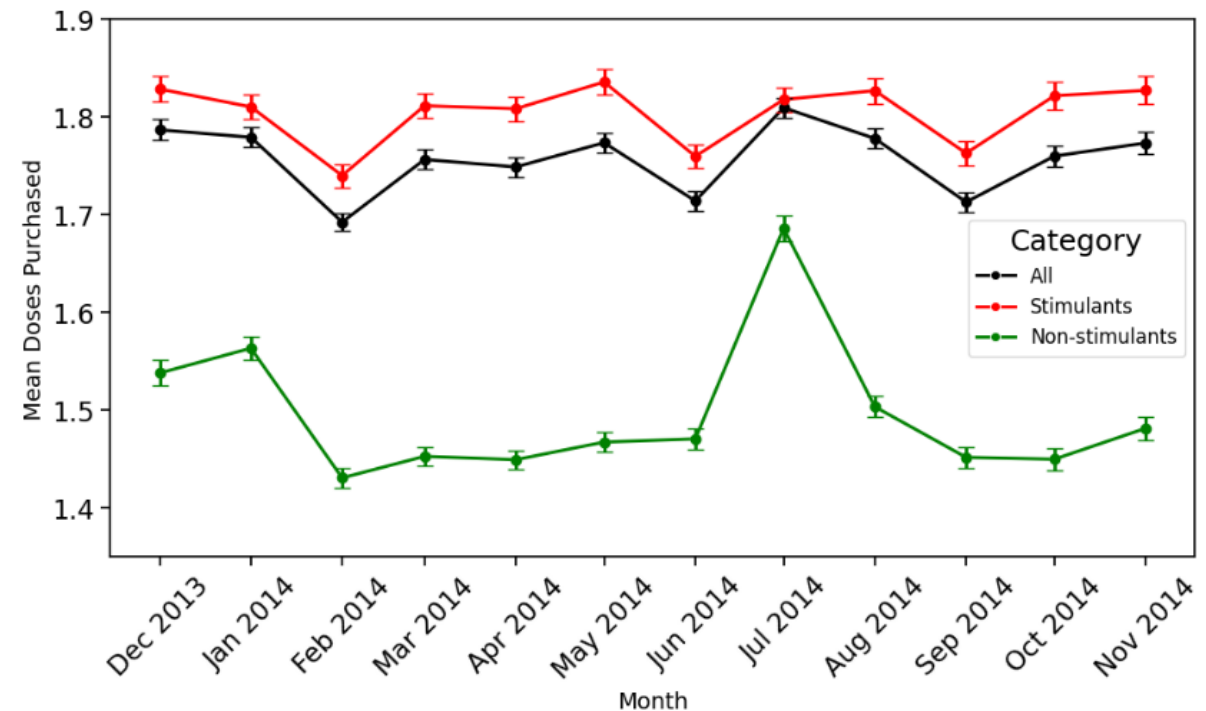
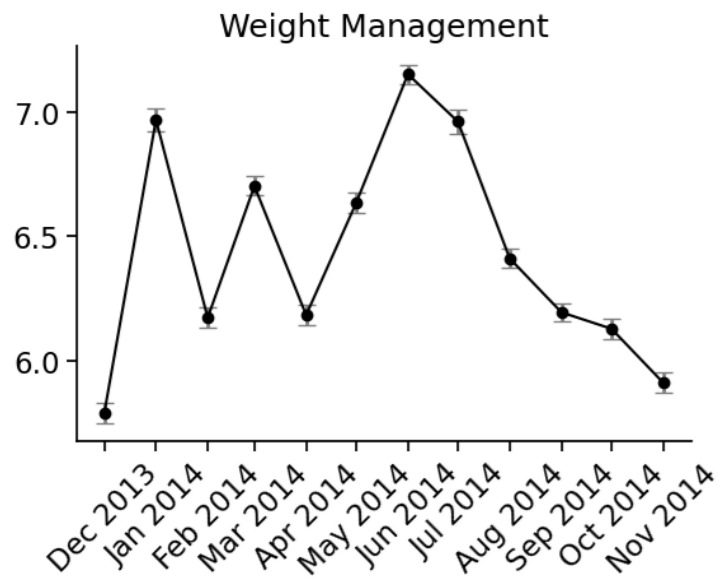
Advantages / limitations of loyalty cards?

- **Limitations:** partial view of purchasing, accurate linkage with nutritional data, overrepresentation of women and older adults, ...
- **Advantages:** Objective, real-world, allows large-scale monitoring at national level, longitudinal and retrospective, ...



Self-medication of laxatives for weight loss

- Looking for increased purchasing around **new year and summer**
- To align with patterns in weight management medications
 - 748,375 participants



Problems for Health Research



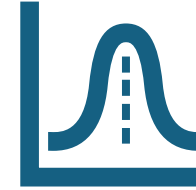
Missing context

Actual consumption,
household composition



Missing health information

No knowledge of actual
diagnoses, treatment



Biases

Sampling and
demographic



Data quality

Card not always scanned;
data can be sparse



Shopping across stores

Missing other retailers, out-of-
home consumption



Ethical and

acceptability issues

Data is not collected for
research

Shopping Trolley Secrets @ We The Curious

- 6-month exhibit
- 30,000 visitors (>16,000 children)
- 3 meet the researcher events
- Discussed ethical issues in an open environment
- Shaped our research practices



Digital Footprints Data in Longitudinal Studies

Stage 1: Participant acceptability

- Acceptability
- Ethical and legal basis
- Expectations

Stage 2: Data linkage

- Communicate with third parties
- Linkage infrastructure
- Data management

Stage 3: Data Quality

- Sampling biases
- Measurement error
- Validating patterns in the data

Stage 4: Data Access & Research

- Secure
- Ethically compliant
- TRE's



Pilot Linkages in ALSPAC



Shopping data for

- 250 participants
- >650,000 items
- from 2013 to 2023

Other Cohorts



Other Digital Footprints Data



Digital Footprints Lab



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Digital Footprints Lab, University of Bristol

Research Lab at Bristol Medical School: Using digital footprints data to study public health & human behaviour

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