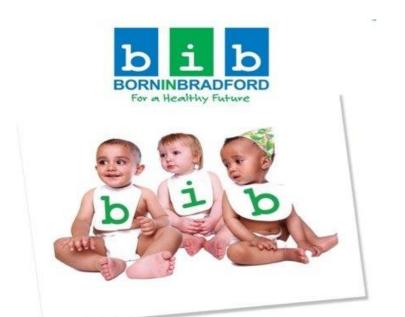
From Physics to Astronomy: adopting a complex systems approach to improving health





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Bradford Institute for Health Research









BORNINBRADFORD

For a Healthy Future



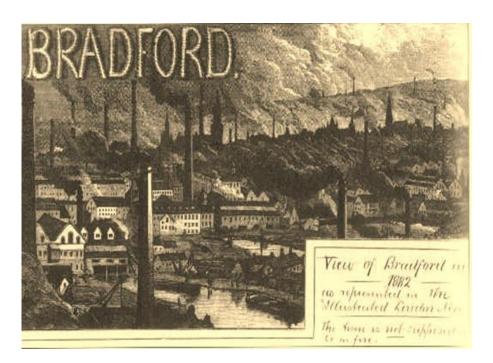


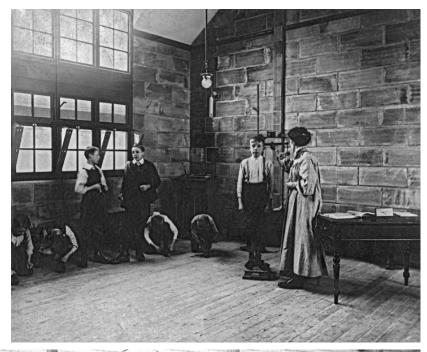




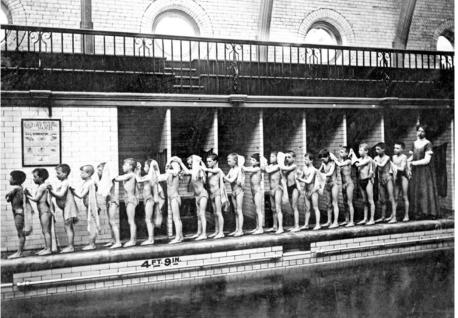












Health summary for Bradford

The chart below shows how the health of people in this area compares with the rest of England. This area's result for each indicator is shown as a circle. The average rate for England is shown by the black line, which is always at the centre of the chart. The range of results for all local areas in England is shown as a grey bar. A red circle means that this area is significantly worse than England for that indicator; however, a green circle may still indicate an important public health problem.

Signit	icantly worse than England average				Regional average [^]		England Average	
O Not s	ignificantly different from England average			England Worst	•	0511		Englan Best
Signif	icantly better than England average	Local No	Local	Ena	Eng	25th Percentile	P	75th ercentile Eng
Domain	Indicator	Per Year	value	value	worst		England Range	best
Our communities	1 Deprivation	238,172	45.2	20.4	83.8		• •	0.0
	2 Children in poverty (under 16s)	29,225	23.9	19.2	37.9		• •	5.8
	3 Statutory homelessness	346	1.7	2.3	12.5		0	0.0
	4 GCSE achieved (5A*-C inc. Eng & Maths)†	2,545	44.0	56.8	35.4	•	*	79.9
	5 Violent crime (violence offences)	5,955	11.4	11.1	27.8		4	2.8
	6 Long term unemployment	5,293	16.1	7.1	23.5	•	*	0.9
Children's and young people's health	7 Smoking status at time of delivery	1,258	15.8	12.0	27.5		•	1.9
	8 Breastfeeding initiation	5,408	69.8	73.9				
	9 Obese children (Year 6)	1,330	22.3	19.1	27.1		• •	9.4
	10 Alcohol-specific hospital stays (under 18)†	45.0	32.5	40.1	105.8		0	11.2
	11 Under 18 conceptions	299	27.9	24.3	44.0		•	7.6
Adults' health and lifestyle	12 Smoking prevalence	n/a	22.6	18.4	30.0		• •	9.0
	13 Percentage of physically active adults	275	53.6	56.0	43.5		O	69.7
	14 Obese adults	n/a	26.7	23.0	35.2		O 🔷	11.2
	15 Excess weight in adults	808	67.7	63.8	75.9		O 🔷	45.9
Disease and poor health	16 Incidence of malignant melanoma†	48.3	12.2	18.4	38.0		• •	4.8
	17 Hospital stays for self-harm	1,420	261.7	203.2	682.7		• •	60.9
	18 Hospital stays for alcohol related harm†	3,700	787	645	1231		• •	366
	19 Prevalence of opiate and/or crack use	4,441	13.1	8.4	25.0		• •	1.4
	20 Recorded diabetes	33,280	7.8	6.2	9.0	•	*	3.4
	21 Incidence of TB†	167.3	31.9	14.8	113.7		•	0.0
	22 New STI (exc Chlamydia aged under 25)	1,486	441	832	3269		•	172
	23 Hip fractures in people aged 65 and over	424	532	580	838		♦ ○	354
Life expectancy and causes of death	24 Excess winter deaths (three year)	299.7	22.1	17.4	34.3		• •	3.9
	25 Life expectancy at birth (Male)	n/a	77.7	79.4	74.3		• •	83.0
	26 Life expectancy at birth (Female)	n/a	81.4	83.1	80.0	•	*	86.4
	27 Infant mortality	46	5.6	4.0	7.6			1.1
	28 Smoking related deaths	825	353.7	288.7	471.6		•	167.4
	29 Suicide rate	51	10.8	8.8				
	30 Under 75 mortality rate: cardiovascular	380	106.4	78.2	137.0	•	*	37.1
	31 Under 75 mortality rate: cancer	543	151.1	144.4	202.9		(O)	104.0
	32 Killed and seriously injured on roads	209	39.8	39.7	119.6		•	7.8

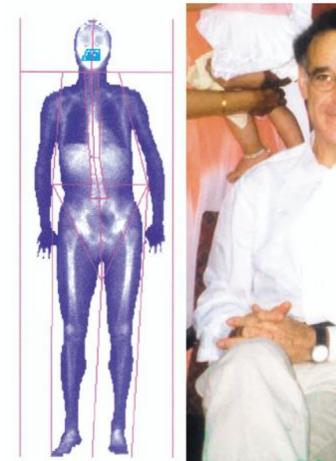




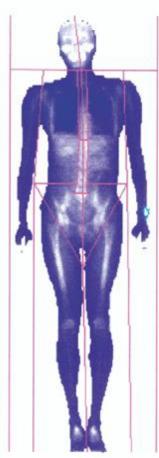
- Describe health and ill-health and their causes
- Design and evaluate interventions to promote health
- Provide a model for integrating research into practice
- Build and strengthen local research capacity

вмі

22.3 22.3

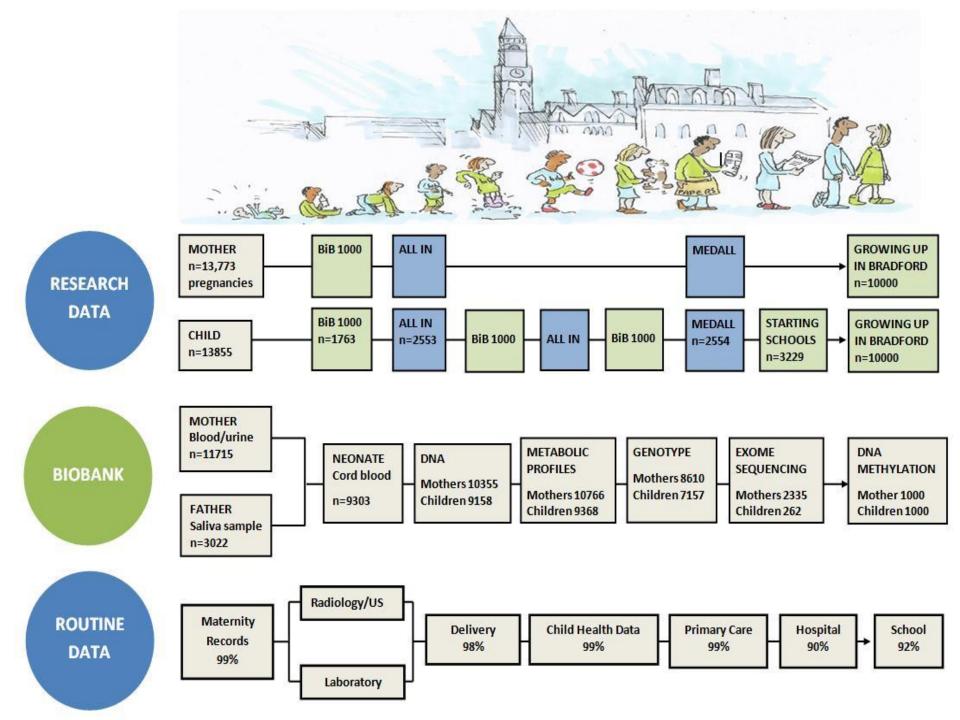






Body fat

9.1% 21.2%









































How to access data Research Publications **Documents & Data** Grants QUEEN



Data Dictionary

NMR METABOLOMICS PREGNANCY SAMPLE NMR metabolomics pregnancy samples

per pregnancy. There are 2 variables with a total of 11479 observations.

This source is measured at the pregnancy level. It contains data from 11479 pregnancies with one observatio

Description

Participant Information

Metabolomics assays by nuclear magentic resonance (NMR) spectroscopy on all available maternal pregnance

serum samples. Where serum samples were not available, EDTA plasma was provided

Ouestionnaires

Variable Variable Label Details metabolnmrbarcode NMR metabolomics sample Administrative: Text value NMR metabolomics - originating lab sample barcode

11479 non-missing values Biobank material: BiB samples at ALL IN 12m Child

11479 unique values

Biobank material: BiB samples at ALL IN 24m Child

Biobank material: MeDALL, child

Biobank material: Baby bloods

Biobank material: Mother

Overview RESEARCH

BiB Data Digest

An overview of each dataset containing counts of records relative to child lifecourse.

BiB Data Summary (slide deck) BiB data summary slide deck. Basic descriptions and counts for all data sources. Best for on-

screen viewing, particularly small screens.

BiB Data Summary (printable)

Printable BiB data summary. Similar to slide deck: basic descriptions and counts for all data sources, but formatted for printing.

Baseline questionnaire

Baseline questionnaire data dictionary

Questionnaire completed by mothers at baseline recruitment. Also a shorter version completed by fathers at baseline recruitment.

Child Growth

Child growth (all sources) data dictionary Child growth data from all sources, including primary research and routine data linkage.

Child growth (BiB 1000) data dictionary

Child growth data from all BiB 1000 follow-ups.

School nurse measured blood pressure and growth Observations of blood pressure, height and weight taken in school by school nurses.

Child growth (HCR) data dictionary Child growth data from various healthcare record sources.

Education Record

Starting School

ALL IN

Education record data dictionary

Starting School data dictionary

ALL IN 12 month data dictionary

ALL IN 24 month data dictionary

ALL IN 12 month questionnaire

ALL IN 24 month questionnaire

in Bradford cohort and the total in Starting School.

Standardised assessments and contextual data from the school education record.

Data from cognitive and behavioural assessments in the child's Reception year at school. Measures included CKAT, SDQ, BPVS and Letter ID. Starting School included many children who

were not in Born n Bradford. This data dictionary counts separately children who were in the Born

Yorkshire and Humber Congenital A

BiB data linked from the Yorkshire and Hum

BiB 1000

Cohort information

Cohort administrative information

Information about the cohort and the partic

Subcohort indicators: who has wha

Indicators of which data types are present f

Indicators of which biobank sample types a

Bioinformatics linkage information Indicators for linking cohort data records to

Pregnancy Eclipse data dictionary

Pregnancy data obtained from the Eclipse e Neonatal Eclipse data dictionary Neonatal data obtained from the Eclipse ele

Maternity records data dictionary Data from a manual abstraction of blood pri

information from the written maternity note

Pregnancy ultrasound data diction

Observations from ultrasound scans taken of

Fetal renal ultrasound data diction

Ultrasound scan observations from the Feta

Pregnancy blood biomarkers data of

Blood biomarkers obtained from blood sam

Blood biomarkers obtained from blood sam

Healthcare record linkage

Baby bloods biomarkers

Biobank material indicators

Pregnancy & neonatal

BiB 1000 6 month data dictionary BiB 1000 6 month questionnaire

BiB 1000 12 month data dictionary

BiB 1000 12 month questionnaire

BiB 1000 18 month data dictionary

BiB 1000 18 month questionnaire

BiB 1000 24 month data dictionary

BiB 1000 24 month questionnaire

BiB 1000 36 month data dictionary

BiB 1000 36 month questionnaire

MeDALL

MeDALL questionnaire data diction Main MeDALL questionnaire MeDALL green space data dictiona

Neighbourhood green space, NDVI and gree

Residential information data dictionary

Residential and GIS

Residential information and sources for GIS analysis.

Biobank material: Pregnancy baseline

GWAS Linkage: Mother-Pregnancy replicates

Child cord blood DNA methylation linkage

Exome seq linkage: Mother-Pregnancy

GWAS Linkage: Child replicates

GWAS Linkage: Child

Exome seq linkage: Child

Exome seq linkage: Mother

Mother pregnancy bloods DNA methylation linkage

GWAS Linkage: Mother GWAS Linkage: Mother-Pregnancy

Exome seq linkage: Mother-Pregnancy replicates





Novel cohorts











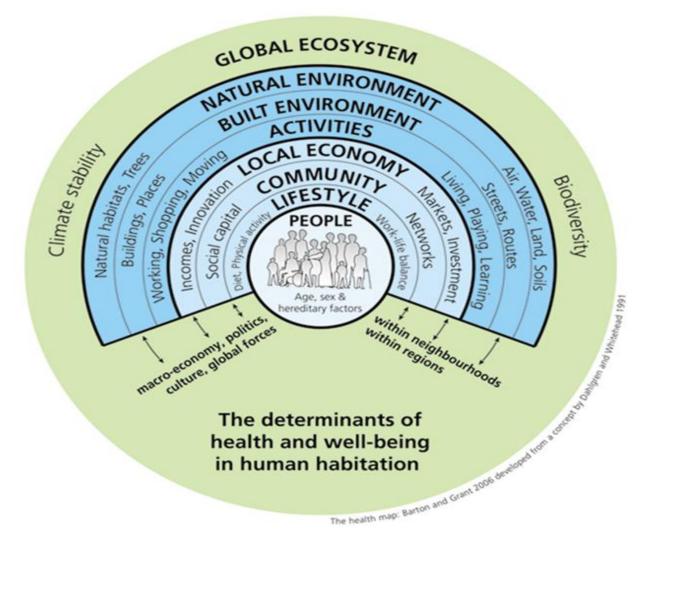




Connected Bradford data tapestry



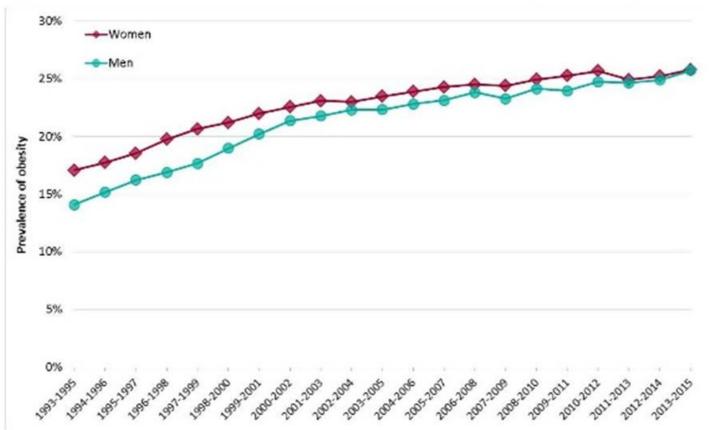






Trend in obesity prevalence among adults

Health Survey for England 1993 to 2015 (three-year average)





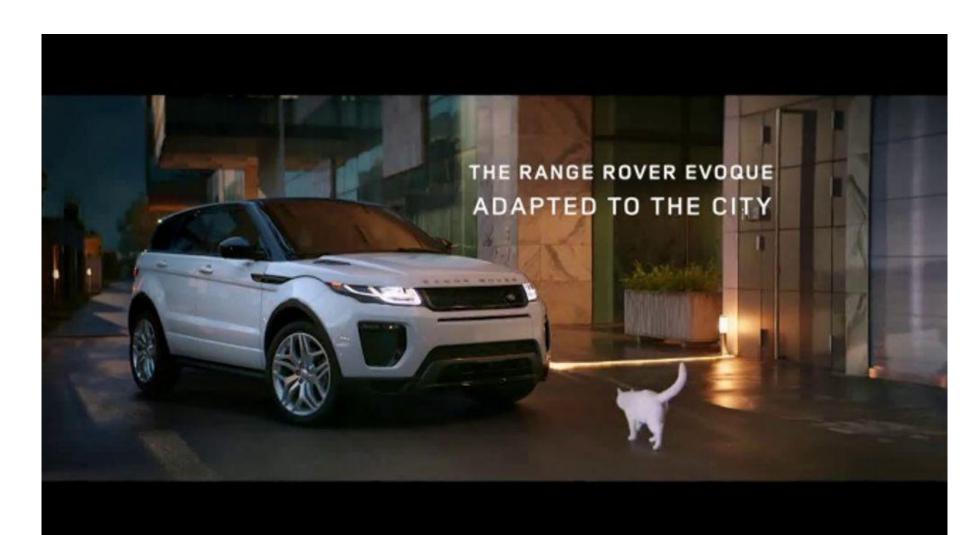


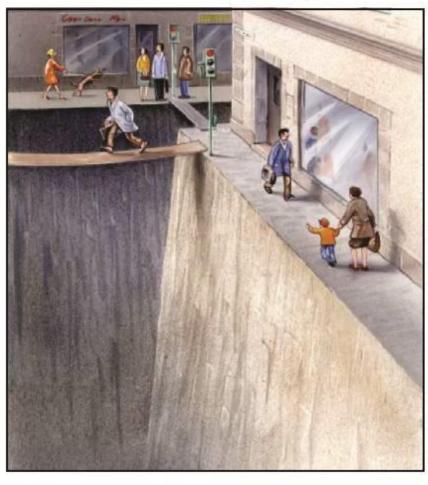
Figure 5: How we might view roads had we more time to evolve with them.

The wrong way to see a road



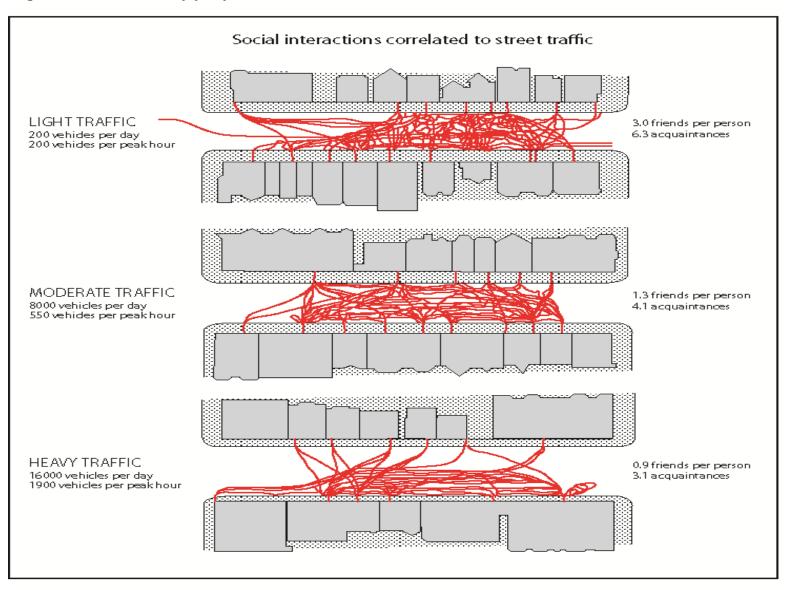
Note: We have learnt to be afraid of heights because those people who were not afraid of heights got to become parents a little less often than those who were afraid. Being hit by a car is a little like falling horizontally. Not something we have evolved to fear.

How to view the relative risk correctly



Source: Johansson, R., (2009) Presentation: Chief Strategist, Road Safety Division, Swedish Road Administration, Improving Road Safety in Scotland: Prevention and Best Practice. Edinburgh, Tuesday 3rd of February.

Figure 6: Donald Appleyard's measurements of social interaction in different streets.



Source: http://www.carfreeinbigd.com/2012/01/point.html, in turn from Appleyard, D. (1981), Liveable Streets, Berkley: University of California Press.

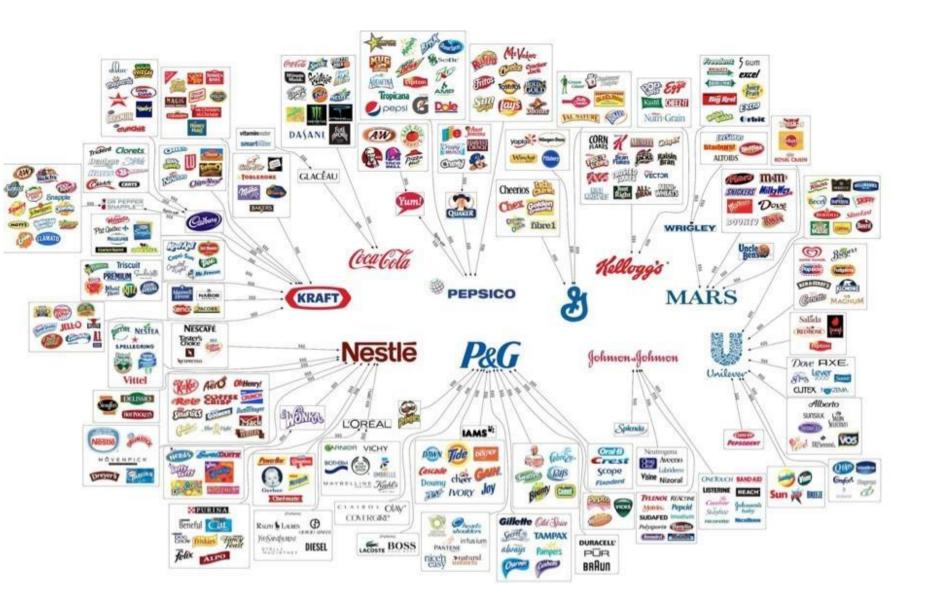




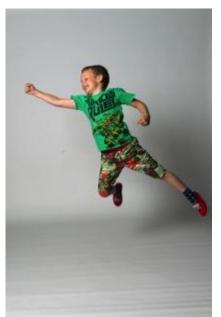






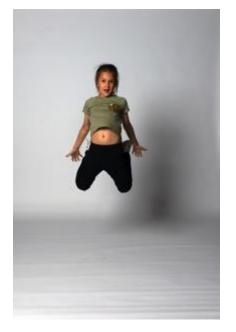


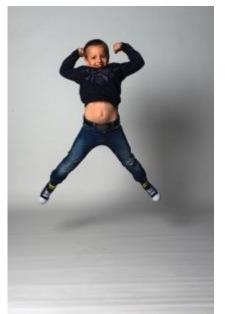








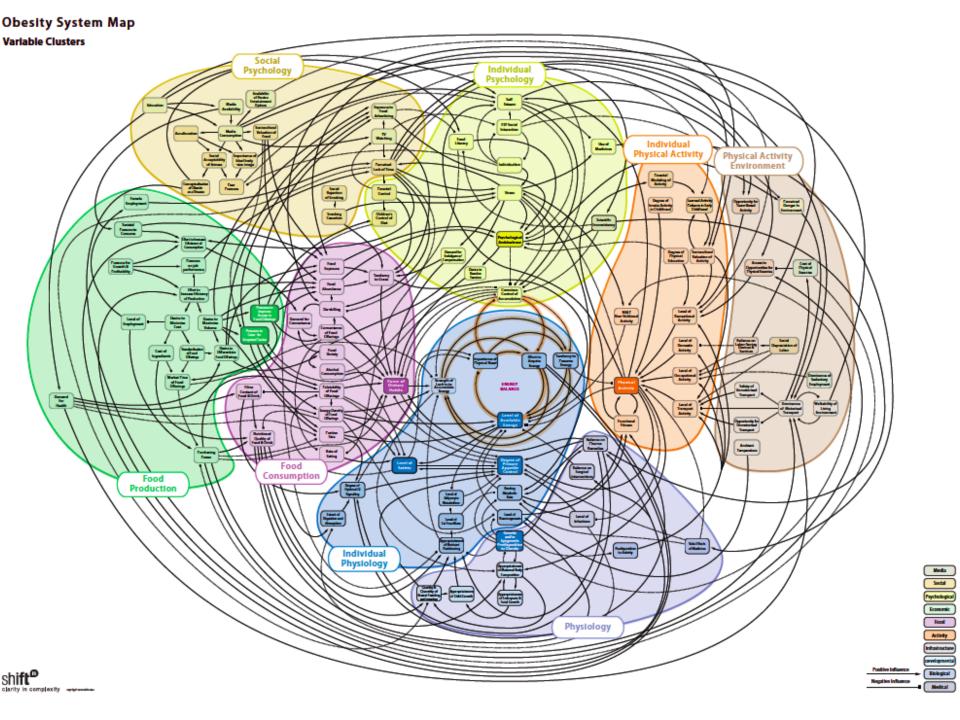
















How Amsterdam is reducing child obesity

By Dominic Hurst BBC News

O 02 April 2018 | Health











Childhood obesity rates are rising in many parts of the world - but in Amsterdam they are





ActEarly: A City Collaboratory approach to promote good health and wellbeing

Health is about much more than avoiding disease—it's about feeling well in mind and body, feeling safe, being part of a community and being able to fulfil your true potential.

Our health is sthaped by:



Our City Collaboratories in Bradford and Tower Hamlets will provide a place where the public, scientists, policy leaders and practitioners work with each other to develop and test whole-system solutions to prevent ill-health.

For the Healthy Places work programme, we'll work with local communities to explore how we can design our neighbourhoods to improve health.

For the Healthy Learning theme, we'll be working with preschools and schools to embed health in education.

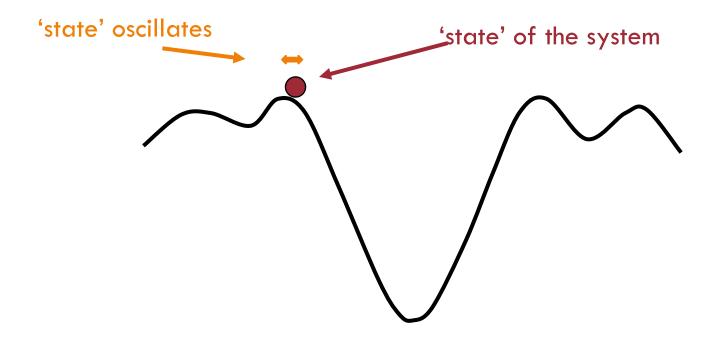
And for the Healthy Livelihoods theme, we'll be developing novel approaches to improve life chances.

Scientists from Yorkshire and London will use our rich data to

- Understand health needs and target upstream causes of ill-health
- Work with communities to develop sustainable solutions
- Develop a 'SimCity' to test the costs and benefits of new policies
- Create and design interventions with our communities
- Measure the impact of these interventions across the whole city system



Tipping points



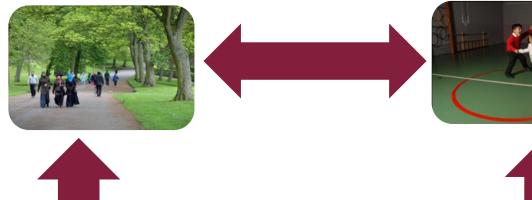
Complex systems can exhibit rapid change when a threshold point is reached. A system can be pushed towards (and past) a tipping point – especially with feedback

Whole system approach

Healthy Places

Healthy Learning

Healthy Streets
Clean Air Strategy
School Super zones
Park Redesign
Traffic calming
Gamification
Housing advice
Incredible edibles
Fast-food outlets



Active travel
Free school meals
Healthy vending machines
Sing Up
Glasses for Classes
Immersive technology
ABRACADABRA
#50thingstodobeforeyou're5

Enhanced learning locations

Early education & care • Welfare advice • Universal basic income • Participatory budgeting

Healthy Livelihoods







