Chess, not chequers

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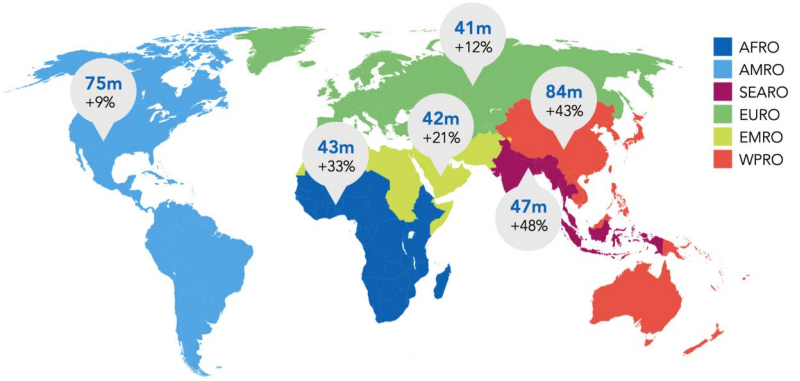
Figure 1: Number of children aged 5-19 living with overweight or obesity in 2016, and the increase in prevalence from 2010 to 2016, by WHO region

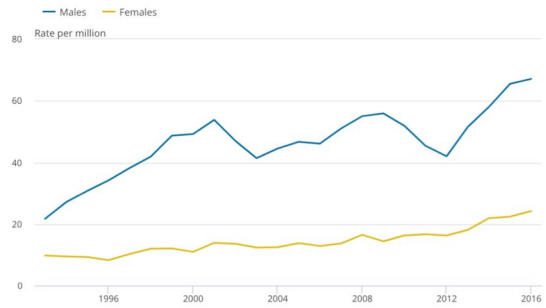


Source: NCD-RisC (2017)[3]

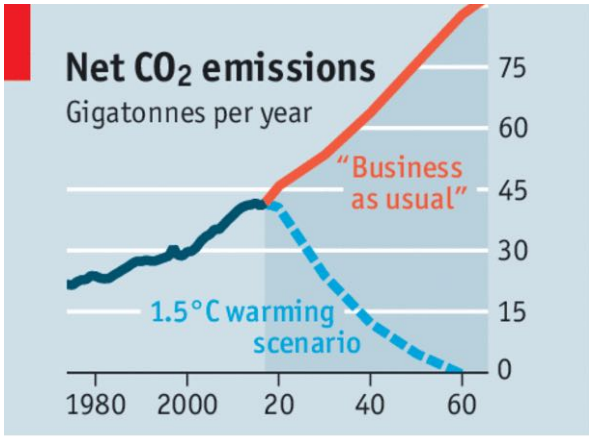
NCD Risk Factor Collaboration (NCD-RisC) (2017) Lancet 16;390:2627-2642.

Figure 1: Age-standardised mortality rates for deaths related to drug misuse, by sex, deaths registered in 1993 to 2016

England and Wales



Source: Office for National Statistics

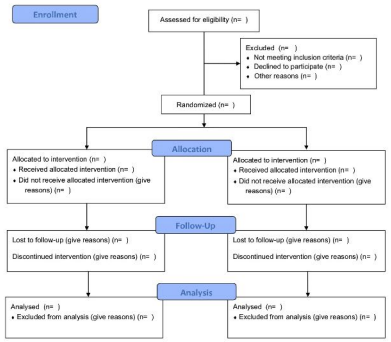


The Economist

13 Oct 2018

CONSORT
TRANSPARENT REPORTING of TRIALS

CONSORT 2010 Flow Diagram



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Research report

OPEN ACCESS

'Nothing can be done until everything is done': the use of complexity arguments by food, beverage, alcohol and gambling industries

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► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/jech-2017-209710).

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ABSTRACT

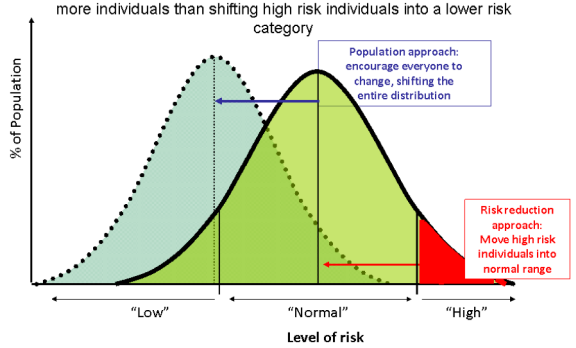
Background Corporations use a range of strategies to dispute their role in causing public health harms and to limit the scope of effective public health interventions. This is well documented in relation to the activities of the tobacco industry, but research on other industries is less well developed. We therefore analysed public statements and documents from four unhealthy commodity industries to investigate whether and how they used arguments about complexity in this way.

Methods We analysed alcohol, food, soda and gambling industry documents and websites and minutes of reports of relevant health select committees, using standard document analysis methods.

on apparently scientific concepts and methods in this way has the goal of changing how policy issues are understood and debated. It also tends to manufacture uncertainty and undermine scientific consensus, thereby curtailing the potential for effective public health policy responses.[1] Such discourses can exert an impact on the real world of policymaking. For example, the tobacco industry fostered the use of the concepts of psychological stress as an alternative explanation for coronary heart disease (CHD), sponsoring researchers and conferences and using the concepts in litigation to argue that these acted as unmeasured confounders in the relationship between smoking and disease.[6 7]

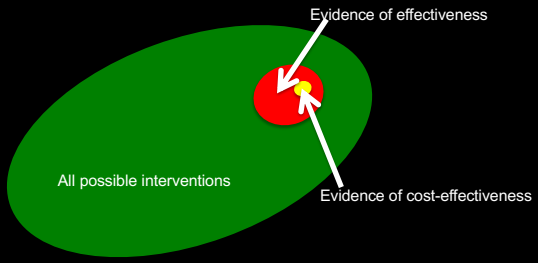
The Bell-Curve Shift in Populations

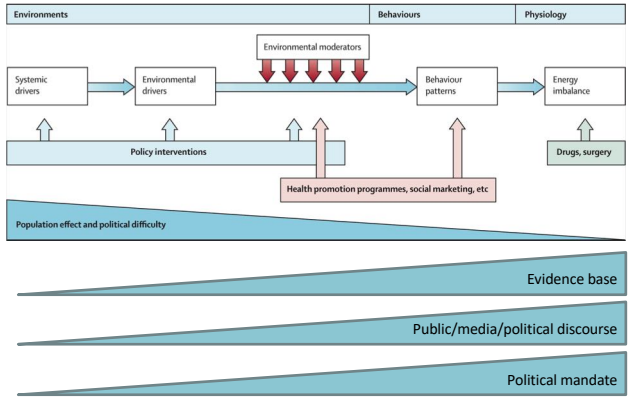
Shifting the whole population into a lower risk category benefits more individuals than shifting high risk individuals into a lower risk category



Source: Rose G. Sick Individuals and sick populations. *Int J Epidemiol.* 1985; 12:32-38.

The dangerous olive of evidence…





Source: Swinburn et al, Lancet 2011

bit.ly/ComplexityViewpoint

Viewpoint

The need for a complex systems model of evidence for public health

Harry Rutter, Natalie Savona, Ketevan Glonti, Jo Bibby, Steven Cummins, Diane T Finegood, Felix Greaves, Laura Harper, Penelope Hawe, Laurence Moore, Mark Petticrew, Eva Rehfuess, Alan Shiell, James Thomas, Martin White

Despite major investment in both research and policy, many pressing contemporary public health challenges remain. To date, the evidence underpinning responses to these challenges has largely been generated by tools and methods that were developed to answer questions about the effectiveness of clinical interventions, and as such are grounded in linear models of cause and effect. Identification, implementation, and evaluation of effective responses to major public health challenges require a wider set of approaches[1,2] and a focus on complex systems.[3,4]

A complex systems model of public health which require high levels of individual agency, have low reach and impact, and tend to widen health inequalities.[5–11] Shifts within multiple elements across the many systems that influence obesity are required, some of which might only have small effects on individuals but can drive large changes when aggregated at population level.[12]

Although randomised controlled trials of individual-level interventions are relatively straightforward to do, it is often impossible to randomise a population-level intervention, such as the introduction of a national tax on sugar-sweetened beverages, or the multiple factors that support cycling, such as physical infrastructure, spatial

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A Community Based Systems Diagram of Obesity Causes

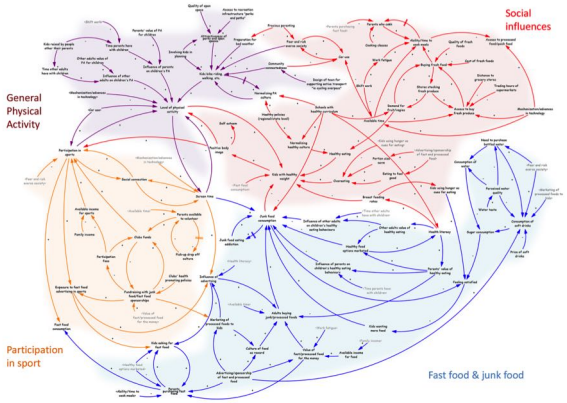
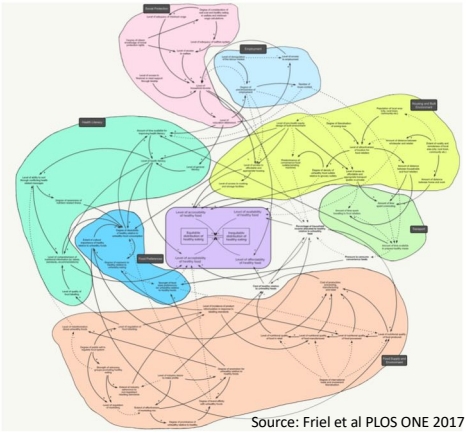


Fig 3. Causal loop diagram of cause of childhood obesity in community.

doi:10.1371/journal.pone.0129683.g003

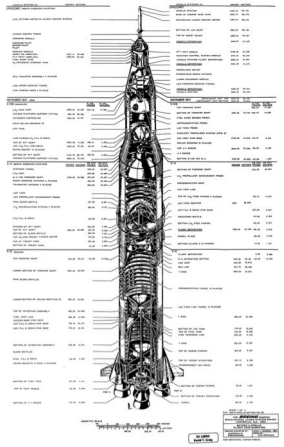
Source: Allender et al PLOS ONE 2015

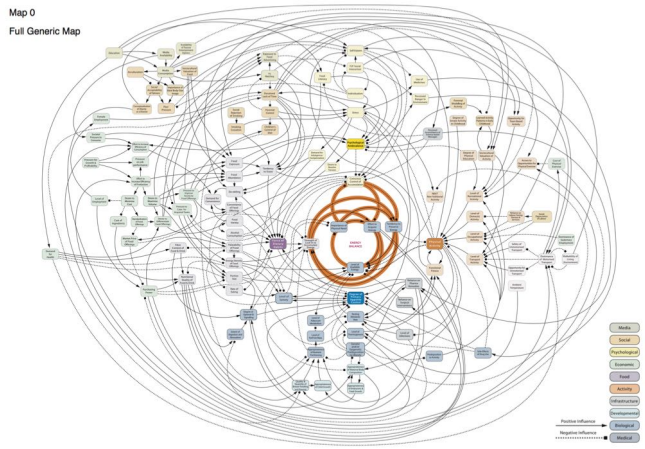
Using systems science to understand the determinants of inequities in healthy eating

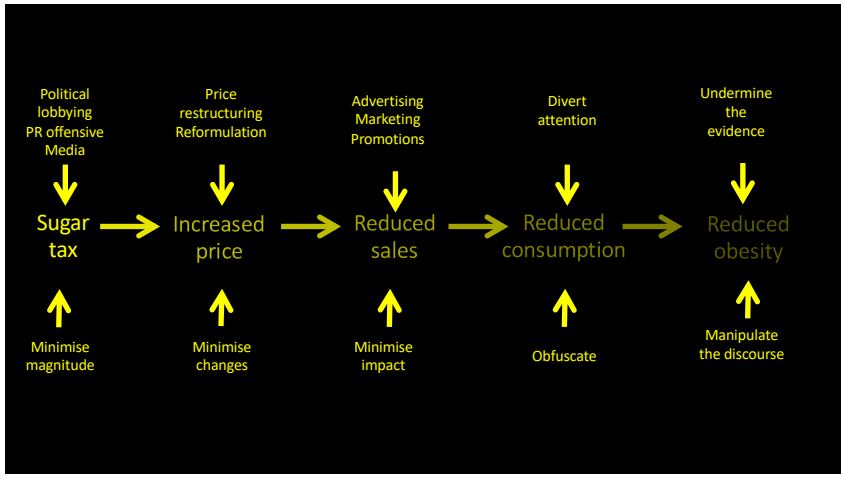


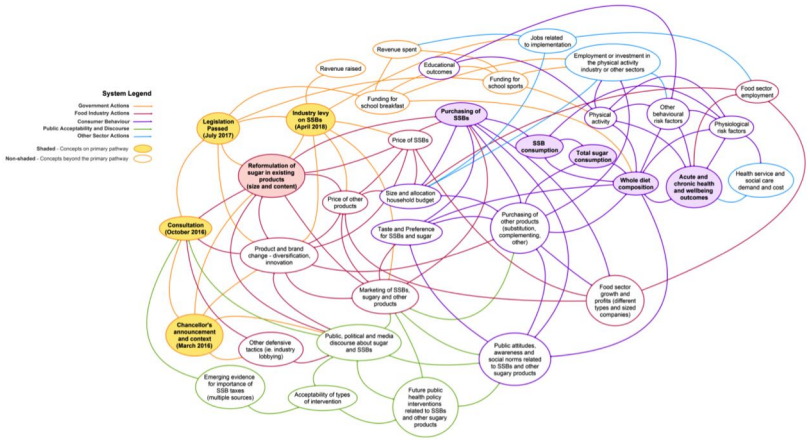
Source: Friel et al PLOS ONE 2017

SATURN V APOLLO FLIGHT CONFIGURATION



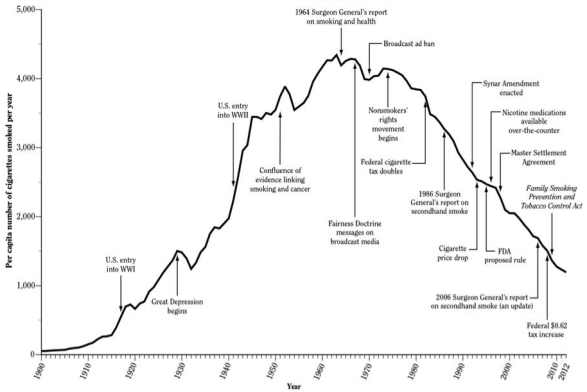






Penney et al Rapid Review Report 2017: https://www.journalslibrary.nihr.ac.uk/programmes/phr/164901/#/

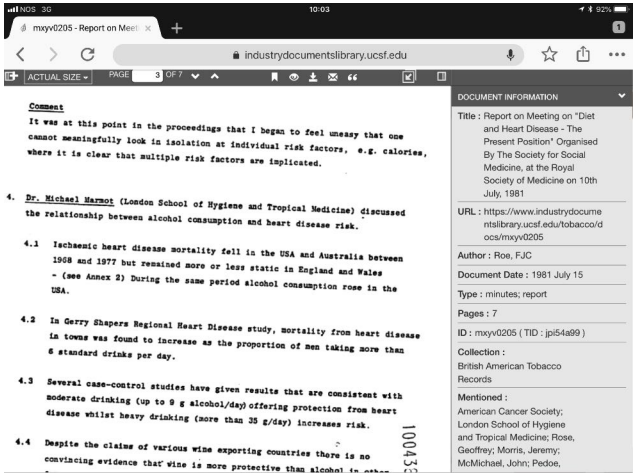
Figure 2.1 Adult* per capita cigarette consumption and major smoking and health events, United States, 1900–2012



Sources: Adapted from Warner 1985 with permission from Massachusetts Medical Society, ©1985; U.S. Department of Health and Human Services 1989; Creek et al. 1994; U.S. Department of Agriculture 2000; U.S. Census Bureau 2013; U.S. Department of the Treasury 2013.

Adults ≥18 years of age as reported annually by the Census Bureau.

2014 Surgeon General's Report, Fig 2.1. Thanks to Cliff Douglas @cdoug



Places to Intervene in a System (in increasing order of effectiveness)

12. Constants, parameters, numbers (such as subsidies, taxes, standards)

11. The sizes of buffers and other stabilizing stocks, relative to their flows.

10. The structure of material stocks and flows (such as transport networks, population age structures)

9. The lengths of delays, relative to the rate of system change

8. The strength of negative feedback loops, relative to the impacts they are trying to correct against

7. The gain around driving positive feedback loops

6. The structure of information flows (who does and does not have access to what kinds of information)

5. The rules of the system (such as incentives, punishments, constraints)

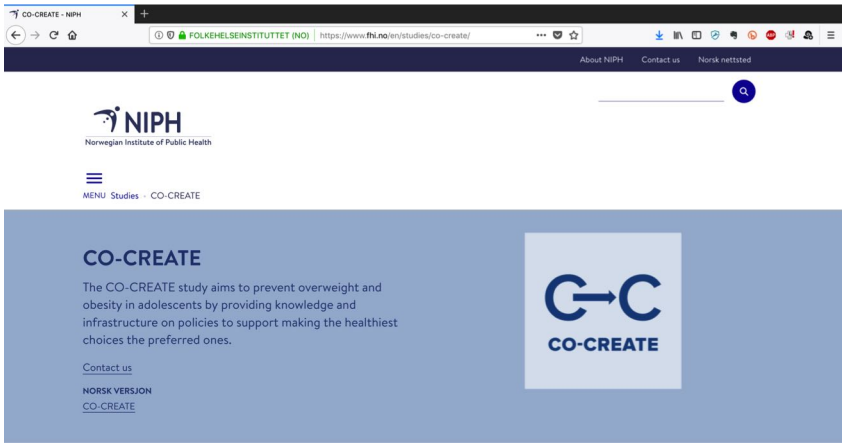
4. The power to add, change, evolve, or selforganize system structure

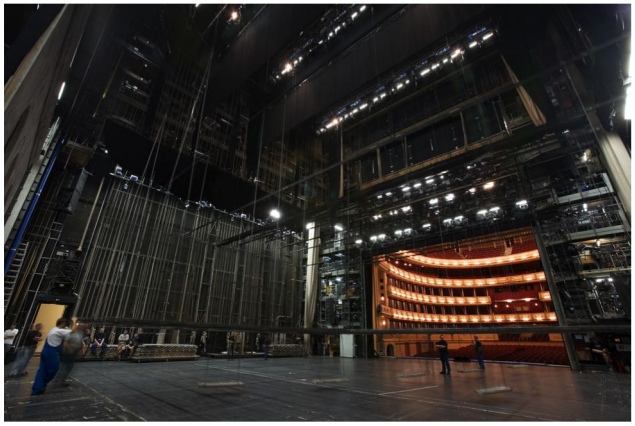
3. The goals of the system

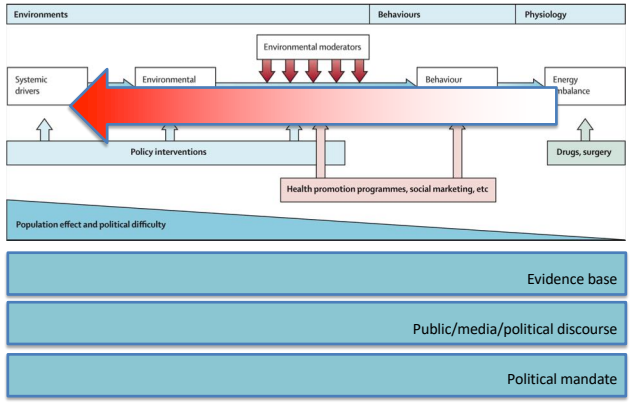
2. The mindset or paradigm out of which the system—its goals, structure,rules, delays, parameters—arises

1. The power to transcend paradigms

Leverage Points: Places to Intervene in a System, Meadows 1999







Source: Swinburn et al, Lancet 2011

Conclusions

- Obesity is a normal response, by normal people, to an abnormal environment. Many other important problems echo this.
- The public health evidence base is structurally biased towards short term impacts of tightly defined, highly agentic, individual level interventions
- This promotes responses aimed at proximal risk factors, may widen inequalities, and ignores the lessons of Geoffrey Rose
- Time dimension is important: 20 year vision, 5 year strategy, 1 year plan
- (Complex) systems approaches can help address some of these problems
- Let's play chess, not chequers