London School of Hygiene & Tropical Medicine

Improving Health Worldwide

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

CENTRE FOR GLOBAL CHRONIC CONDITIONS

New sources of data and methods for public health

Thursday 21st June 2018 – afternoon session

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

CENTRE FOR GLOBAL CHRONIC CONDITIONS

Thursday 21st June – Afternoon Agenda

Time	Theme/title	Presenter
14.00-14.20	A world of data: an overview	Martin McKee
	New sources of data: I	Chair: Martin McKee
14.20-14.40	What people really think: On our radar	Ben Palafox
14.40-15.00	Health and the build environment. Google Street View	Harry Rutter
15.00-15.30	Break	
	New sources of data: II	Chair: Harry Rutter
15.30-15.50	Behind the words: quantitative textual analysis	Aaron Reeves
15.50-16.10	The use of advances in technology to collect spatial and population data in complex situations	Chris Grundy
16.10-16.30	Imaginative uses of health care data	Liam Smeeth
16.30-17.15	Round table: How are Schools of Public Health making use of new data sources?	Facilitator: Martin McKee
17.15-17.30	Closing Remarks Day 1	Bettina Borisch (WFPHA)

A world of data: an overview
New sources of data: 1

Speaker: Martin McKee

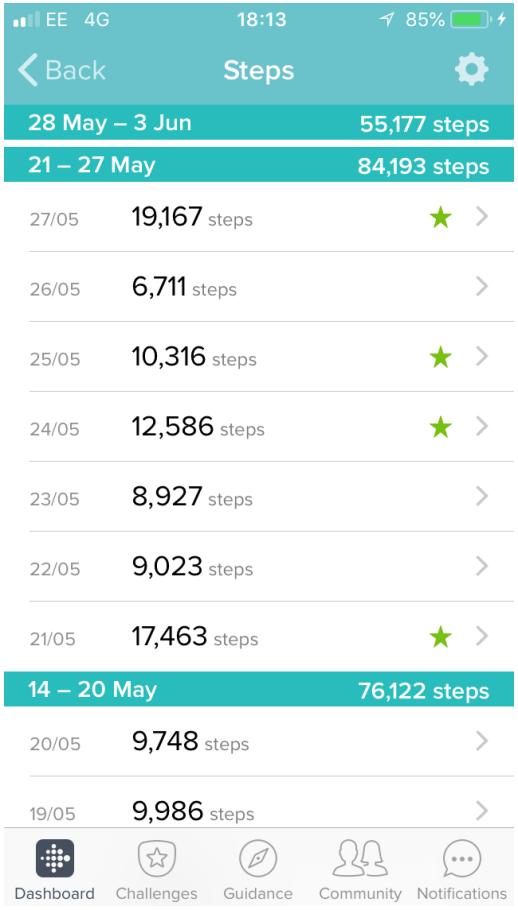
Innovative sources of data

Martin McKee

London School of Hygiene and Tropical Medicine

European Observatory on Health Systems & Policies

@martinmckee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23/05 8,927 steps
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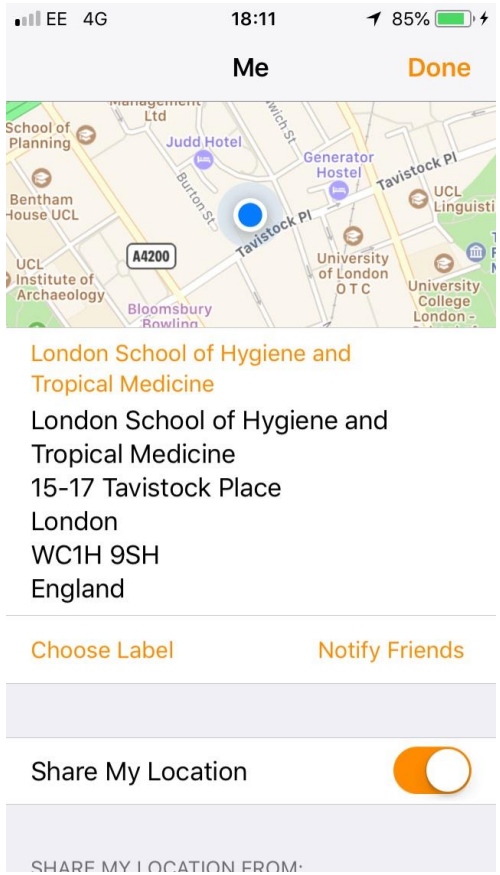
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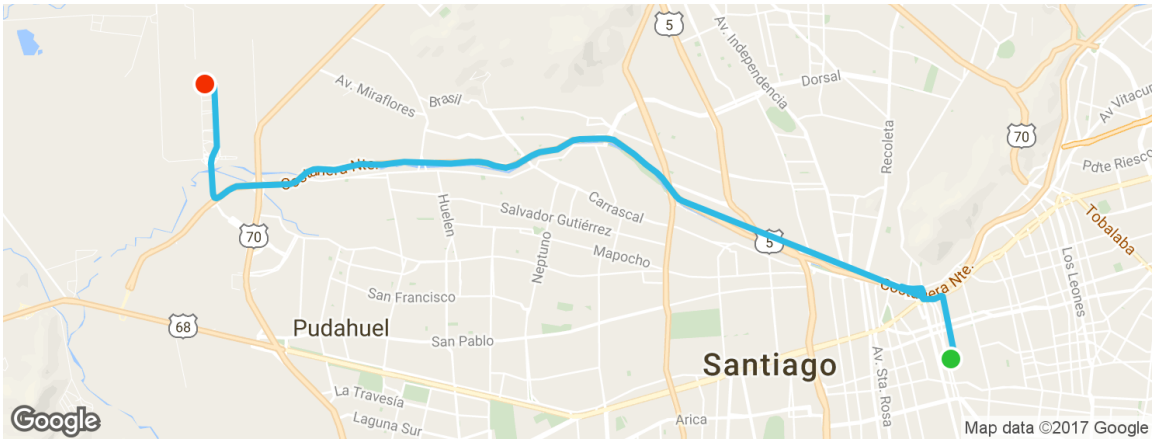
Date / Time	Journey / Action	Charge	Balance	
Tuesday, 20 October 2015		**£2.90** daily total		
18:12 - 18:31	Warren Street to Finsbury Park [London Underground / National Rail]	£2.90	£41.00	+
Sunday, 18 October 2015		**£3.80** daily total		
10:03	Bus journey, route W3	£1.50	£43.90	
09:29 - 09:56	Paddington (Bakerloo, Circle/District and H&C) to Finsbury Park [London Underground / National Rail]	£2.30	£45.40	+
09:29	Auto top-up, Paddington (Bakerloo, Circle/District and H&C)	+£40.00	£47.70	
Tuesday, 13 October 2015		**£2.30** daily total		
15:29 - 15:46	Kings Cross (Met, Circle, H&C lines) to Paddington (Bakerloo, Circle/District and H&C)	£2.30	£7.70	+
Monday, 12 October 2015		**£5.10** daily total		
08:15 - 09:38	Heathrow Terminal 5 [London Underground] to Kings Cross (Piccadilly, Victoria lines)	£5.10	£10.00	+
Wednesday, 07 October 2015		**£3.30** daily total		
07:30 - 08:22	Finsbury Park [London Underground / National Rail] to London City Airport DLR	£3.30	£15.10	+
Tuesday, 06 October 2015		**£6.40** daily total		
21:31	Bus journey, route W3	£0.00	£18.40	
21:06 - 21:30	Piccadilly Circus to Finsbury Park [London Underground / National Rail]	£0.00	£18.40	+
18:49 - 19:05	Russell Square to Piccadilly Circus	£2.00	£18.40	+
08:25 - 08:39	Finsbury Park [London Underground / National Rail] to Kings Cross (Piccadilly, Victoria lines)	£2.90	£20.40	+
08:15	Bus journey, route W3	£1.50	£23.30	
Monday, 05 October 2015		**£6.40** daily total		
18:35 - 18:59	Waterloo (Jubilee line entrance) to Finsbury Park [London Underground / National Rail]	£0.00	£24.80	+
16:48 - 17:01	Regent's Park to Waterloo [London Underground / National Rail]	£2.00	£24.80	+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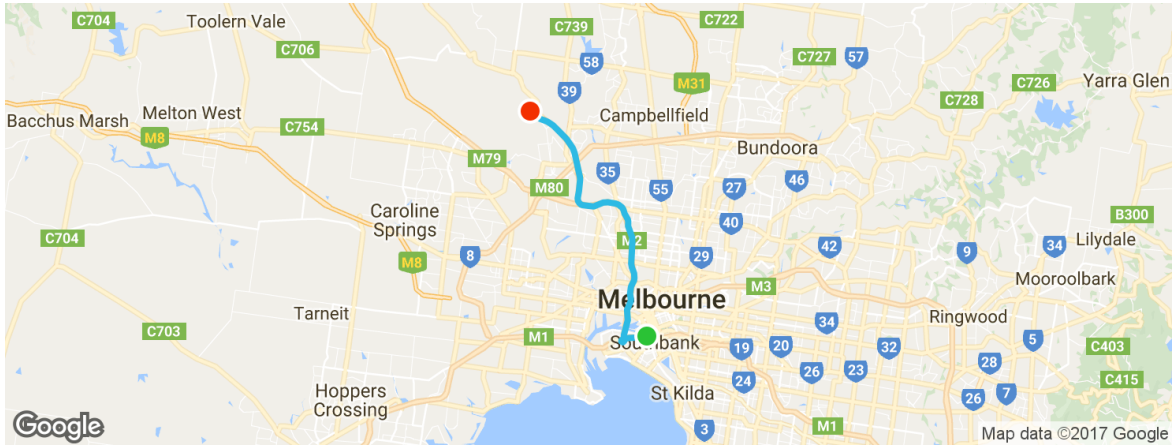
UBER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Yarra Glen
Caroline Springs
Lilydale
Mooroolbark
Melbourne
Tarneit
Ringwood
Hoppers Crossing
St Kilda
Google
Map data ©2017 Google

Impact of human mobility on the emergence of dengue epidemics in Pakistan

Amy Wesolowski[a,b], Taimur Qureshi[c], Maciej F. Boni[d,e], Pål Roe Sundsøy[c], Michael A. Johansson[b,f], Syed Basit Rasheed[g], Kenth Engø-Monsen[c], and Caroline O. Buckee[a,b,1]

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Edited by Burton H. Singer, University of Florida, Gainesville, FL, and approved August 6, 2015 (received for review April 2, 2015)

The recent emergence of dengue viruses into new susceptible human populations throughout Asia and the Middle East, driven in part by human travel on both local and global scales, represents a significant global health risk, particularly in areas with changing climatic suitability for the mosquito vector. In Pakistan, dengue has been endemic for decades in the southern port city of Karachi, but large epidemics in the northeast have emerged only since 2011. Pakistan is therefore representative of many countries on the verge of countrywide endemic dengue transmission, where prevention, surveillance, and preparedness are key priorities in previously dengue-free regions. We analyze spatially explicit dengue case data from a large outbreak in Pakistan in 2013 and compare the dynamics of the epidemic to an epidemiological model of dengue virus transmission based on climate and mobility data from ∼40 million mobile phone subscribers. We find that mobile phone-based mobility estimates predict the geographic spread and timing of epidemics in both recently epidemic and emerging locations. We combine transmission suitability maps with estimates of seasonal dengue virus importation to generate fine-scale dynamic risk maps with direct application to dengue containment and epidemic preparedness.

dengue | human mobility | Pakistan | mobile phones | epidemiology

Dengue is the most rapidly spreading mosquito-borne disease worldwide (1, 2). Half the global population now lives in at-risk regions for dengue virus transmission, due to the wide distribution of the mosquito vector, *Aedes aegypti*, which thrives in peri-urban areas and transmits the virus between humans (3). Dengue virus can cause acute febrile illness and carries the risk of severe disease, hospitalization, and shock syndrome, especially in clinical settings with little experience treating dengue patients. There is currently no specific therapeutic protocol for, or vaccine against, infection (1). Current control measures focus on vector control, although these measures are often logistically difficult and have shown varying efficacy in controlling epidemics (4). In the absence of effective prevention and treatment, public health system preparedness remains the single most important tool for minimizing morbidity and mortality as dengue epidemics spread beyond endemic areas (5, 6).

The introduction of dengue into new populations is mediated by travel of infected individuals to areas that can support transmission, because mosquito vectors move only short distances during their lifespans (3, 7–12). International travel to endemic countries has resulted in imported cases and outbreaks in Europe and the Americas (2, 8, 10, 13). Local variation in transmission, within a single city for example, is also driven by mobility patterns of individuals on short timescales (7). Forecasting methods are needed to spatially target interventions and epidemic preparedness measures that reflect both the changing temporal risks of importation and environmental suitability that go beyond solely climate-based methods (14).

Dengue has long been endemic in most Southeast Asian countries (1), but has more recently emerged in parts of the Middle East and South Asia, including Pakistan (15, 16). In Pakistan, the transmission of dengue viruses was largely confined to the southern city of Karachi until 2011 when a large dengue epidemic with over 20,000 cases occurred in the northeastern city of Lahore (16), causing significant morbidity and mortality. In 2013, a second large epidemic occurred in northeastern Pakistan in Punjab and Khyber-Pakhtunkhwa (KP) provinces, establishing the region as an emerging focus of seasonal dengue epidemics. It has been hypothesized that the recent geographic expansion of *A. aegypti* mosquito vectors, changing environmental suitability, and human importation of dengue from endemic regions all contributed to the emergence of dengue in northern areas (17). Pakistan is therefore representative of many countries that are on the verge of countrywide endemic dengue transmission and are struggling to contain its emergence into previously dengue-free regions.

Measuring changing risks of importation events that spark epidemics has been extremely challenging on the refined temporal and spatial scales necessary to inform local policies (18). Being able to predict when to prepare surveillance systems and health facilities for dengue outbreaks could dramatically reduce the morbidity and mortality associated with epidemics and would allow policy makers to pinpoint regions that are particularly vulnerable to imported cases, for vector control. Mobile phone data offer direct measures of human aggregation and movement

Significance

Dengue virus has rapidly spread into new human populations due to human travel and changing suitability for the mosquito vector, causing severe febrile illness and significant mortality. Accurate predictive models identifying changing vulnerability to dengue outbreaks are necessary for epidemic preparedness and containment of the virus. Here we show that an epidemiological model of dengue transmission in travelers, based on mobility data from ∼40 million mobile phone subscribers and climatic information, predicts the geographic spread and timing of epidemics throughout the country. We generate fine-scale dynamic risk maps with direct application to dengue containment and epidemic preparedness.

Author contributions: A.W. and C.O.B. designed research; A.W., T.Q., M.F.B., K.E.-M., and C.O.B. performed research; A.W., M.F.B., M.A.J., S.B.R., and K.E.-M. contributed new reagents/analytic tools; A.W., T.Q., P.R.S., S.B.R., and K.E.-M. analyzed data; and A.W., T.Q., M.F.B., P.R.S., M.A.J., S.B.R., K.E.-M., and C.O.B. wrote the paper.

Conflict of interest statement: M.F.B. has worked as a paid consultant to Visterra, Inc. in Cambridge, MA.

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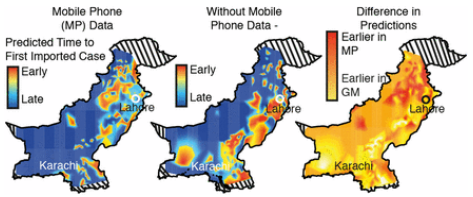
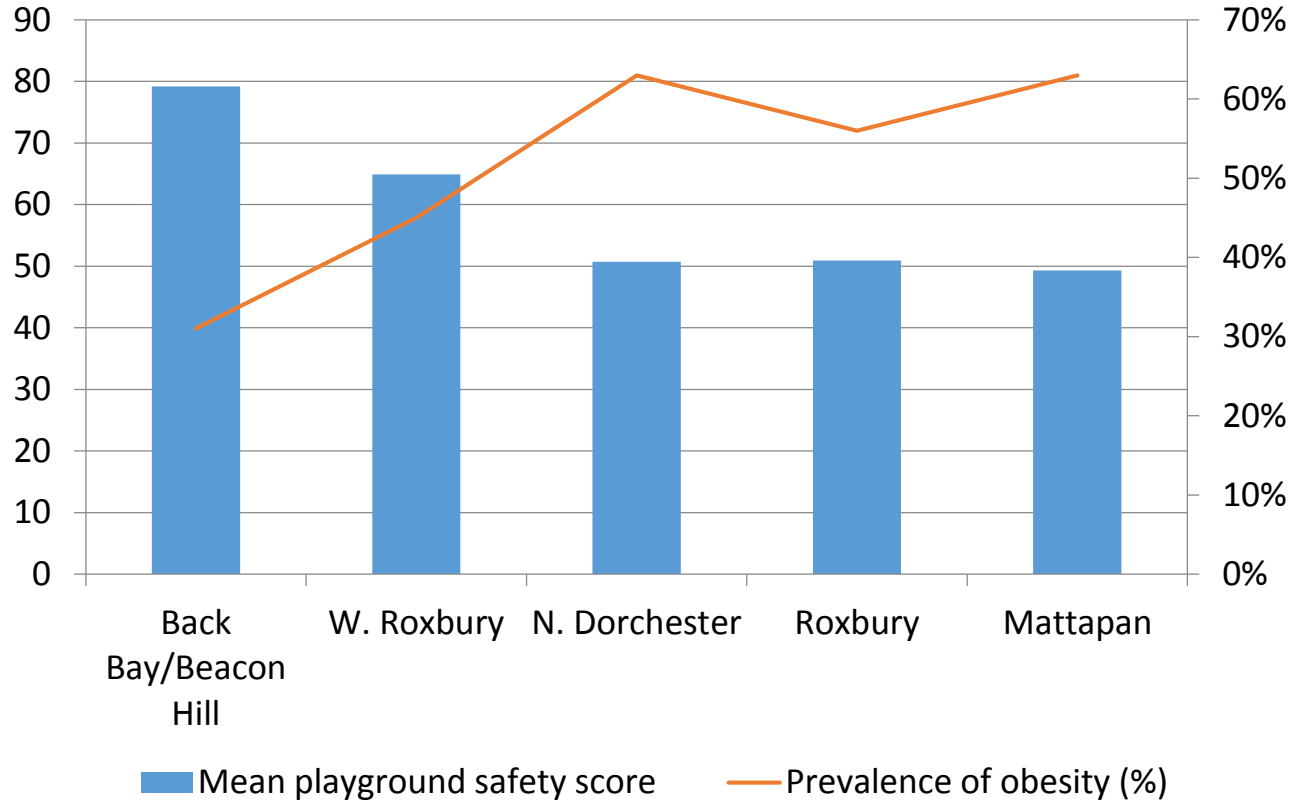
This article contains supporting information online at www.pnas.org/lookup/suppl/doi:10.1073/pnas.1504964112/-/DCSupplemental.

ECOLOGY

"mobile phone-based mobility estimates predict the geographic spread and timing of epidemics in both recently epidemic and emerging locations."



Playground Safety and Obesity in Boston

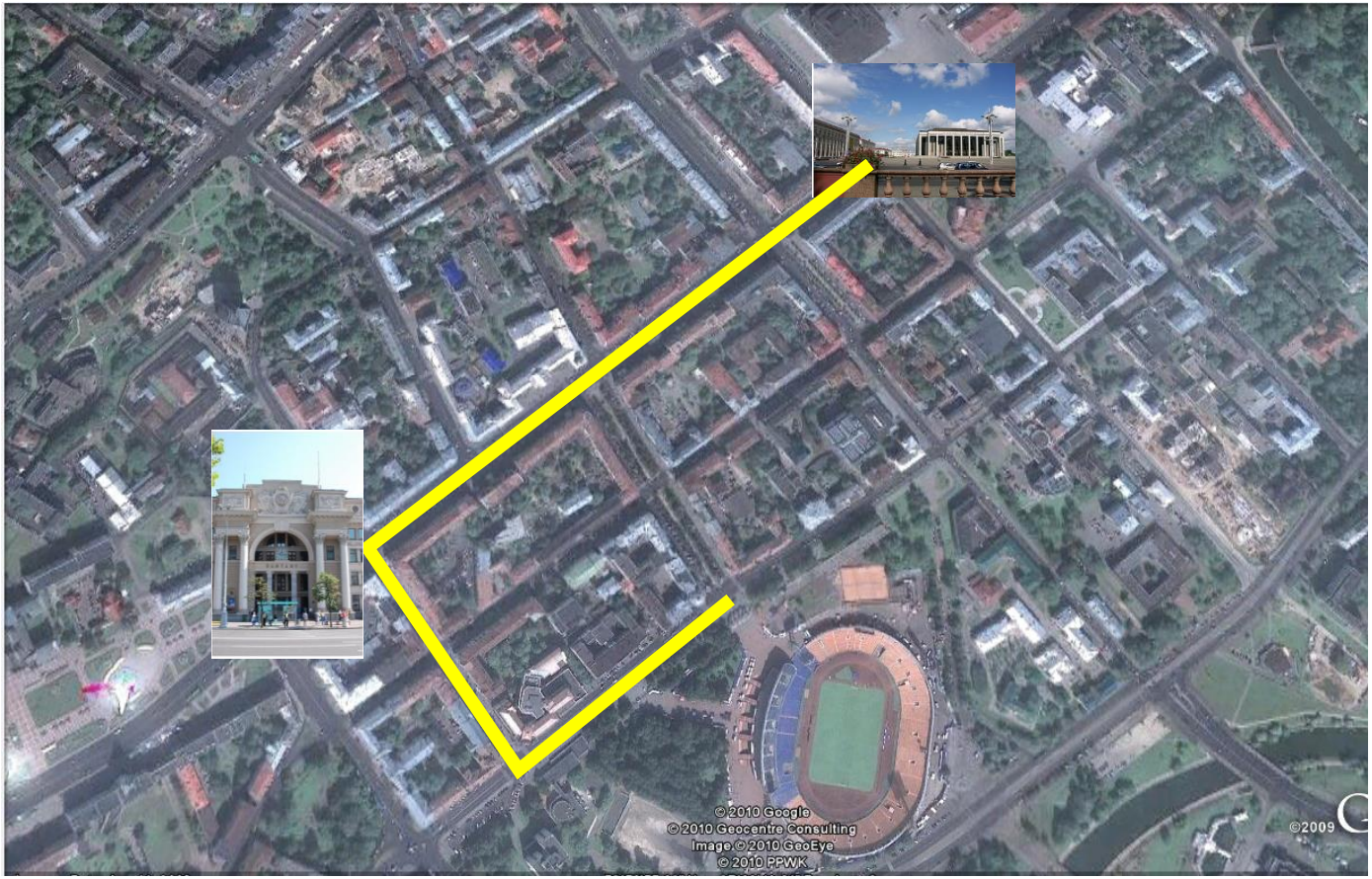


Cradock, Kawachi et al. *Am J Prev Med* 2005

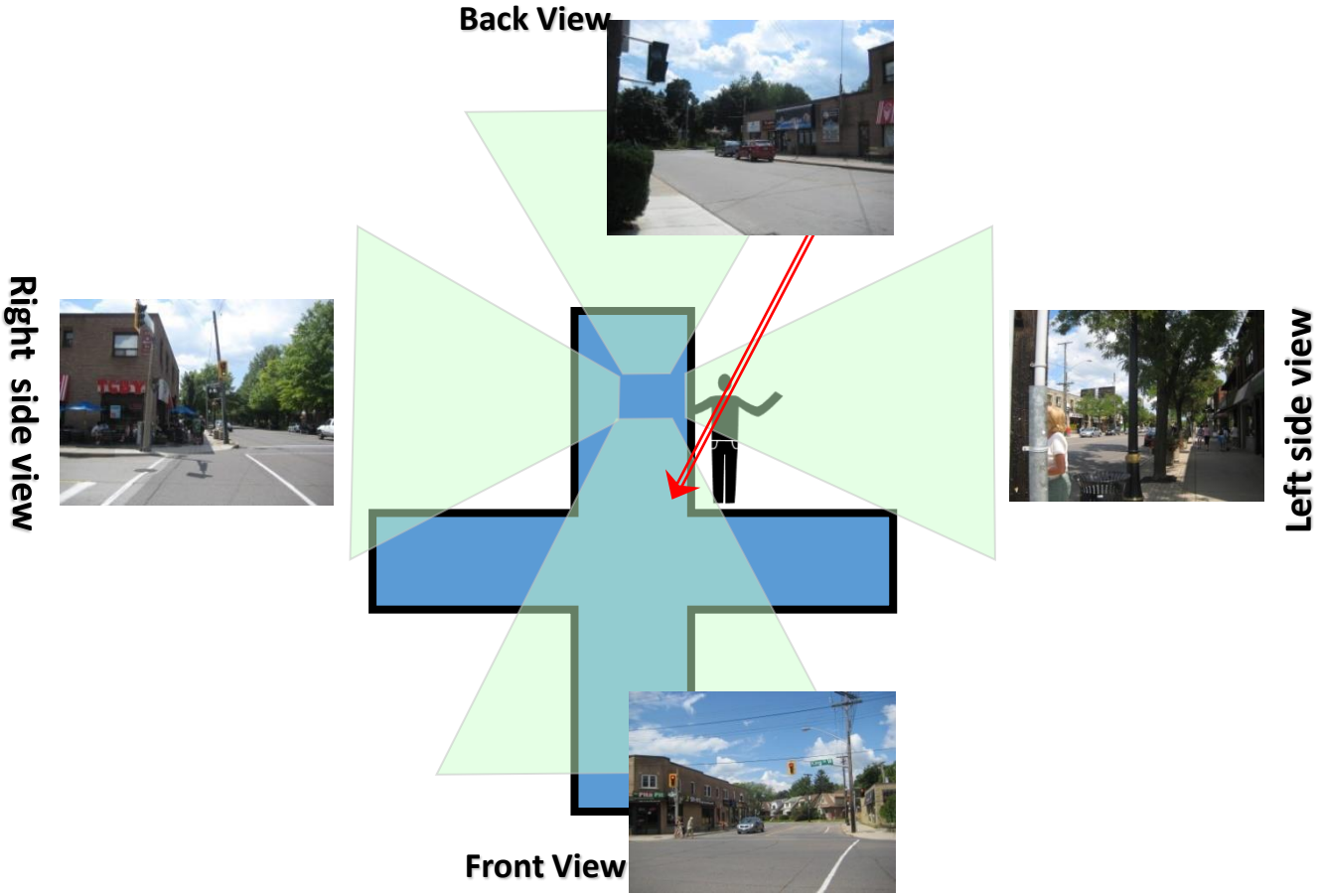
Broken window theory

- “Consider a building with a few broken windows. If the windows are not repaired, the tendency is for vandals to break a few more windows. Eventually, they may even break into the building, and if it's unoccupied, perhaps become squatters or light fires inside. Or consider a sidewalk. Some litter accumulates. Soon, more litter accumulates. Eventually, people even start leaving bags of trash from take-out restaurants there or even break into cars.”
- A "broken windows" index measured housing quality, abandoned cars, graffiti, trash, and public school deterioration.
  - In high-poverty neighborhoods, block groups with high broken windows scores had significantly higher gonorrhea rates than block groups with low broken windows scores (46.6 per 1000 vs 25.8 per 1000; $P < .001$).
  - The broken windows index explained more of the variance in gonorrhea rates than did a poverty index measuring income, unemployment, and low education.

A possible route in Minsk



Stand at the starting point and take photos in each direction



Keeping a tally of shops and advertisements

16a) Advertisements	Tally of Advertisements	Total
i) Cigarette/tobacco product		00
ii) Signs that prohibit smoking	𝍸 𝍸 𝍸 II	17
iii) Health promotion (smoking cessation)	II	02
iv) Health promotion (alcohol cessation)		00
v) Junk food	𝍸 𝍸 III	13
vi) Sweet drink (eg Coke, juices, sports drink)	𝍸 𝍸 𝍸 𝍸 I	21
vii) Non-commercial Health promo (diet)	I	01
viii) Commercial Health promo (diet)	II	02
ix) Non-commercial Health promo (Phys Act)		00
x) Commercial Health promo (Phys Act)	I	01
xi) Alcoholic drinks	𝍸 II	07

SPOTLIGHT

The SPOTLIGHT virtual audit tool, Standard Operation Procedure (SOP)

ELSEVIER

Health & Place

Volume 25, January 2014, Pages 1–9

HEALTH & PLACE

Review Essay

Using remote sensing to define environmental characteristics related to physical activity and dietary behaviours: A systematic review (the SPOTLIGHT project)

H. Charreire[a, b], J.D. Mackenbach[c], M. Ouasti[a], J. Lakerveld[c], S. Compernolle[d], M. Ben-Rebah[a], M. McKee[e], J. Brug[c], H. Rutter[e], J.-M. Oppert[a, f]

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Health & Place 27 (2014) 205–211

Contents lists available at ScienceDirect

Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Using multi-level data to estimate the effect of an 'alcogenic' environment on hazardous alcohol consumption in the former Soviet Union

Adrianna Murphy [a,*], Bayard Roberts [a], George B. Ploubidis [b], Andrew Stickley [a,c], Martin McKee [a]

- "Our findings suggest that a high number of beer, wine and spirit advertisements and high alcohol outlet density may work together to create an 'alcogenic' environment that encourages hazardous alcohol consumption in the fSU."

Cycle lanes?

Graffiti?

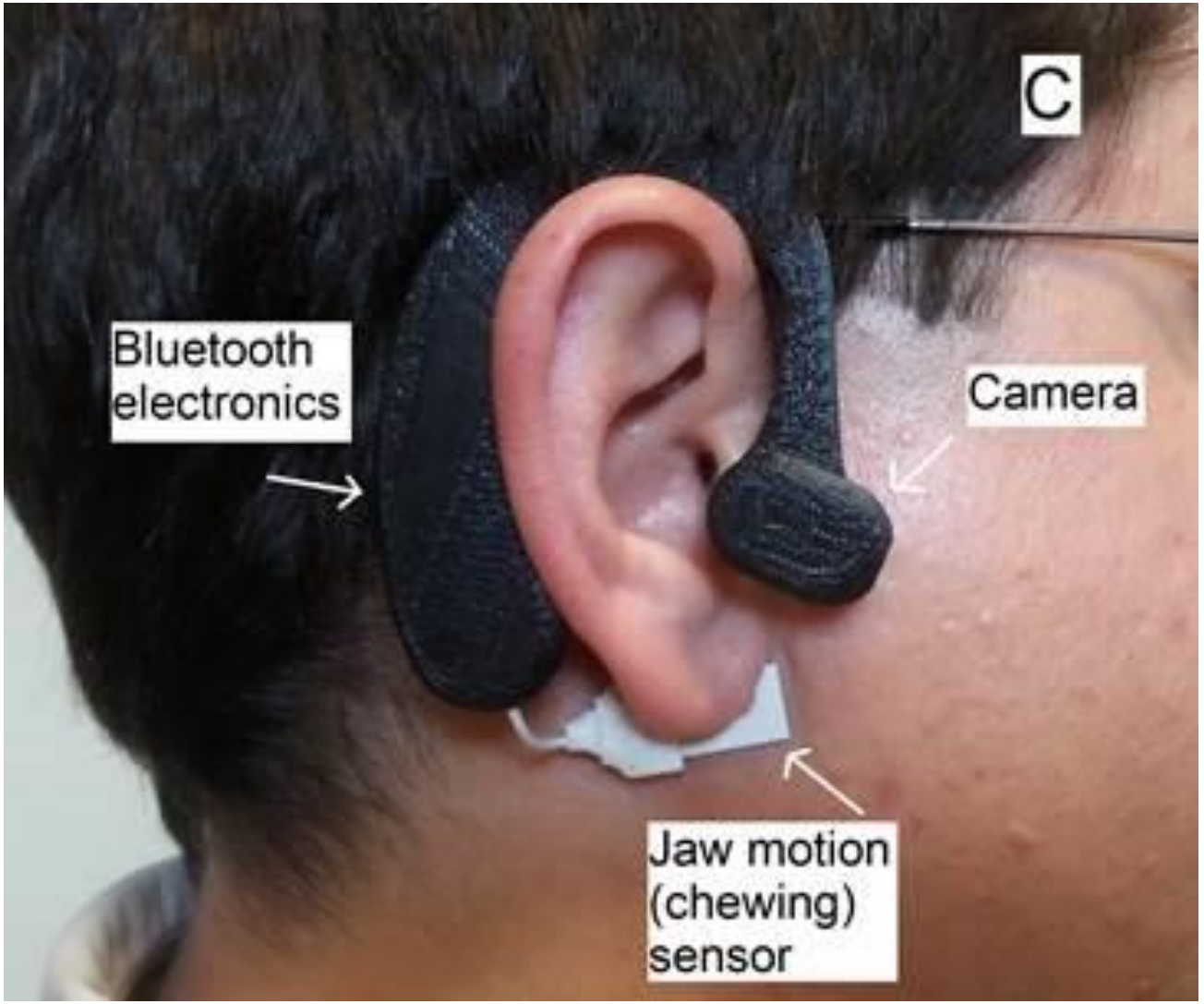
IMAGINE

CANCELLED
DREAMS
Go to work, send your kids to school, follow fashion, act normal, walk on the pavements, watch T.V, save for old age, obey the law, then repeat after me: I am free!

the past year.

DAIRY FOODS	Never, or less than once per month	1–3 per mo	1 per week	2–4 per week	5–6 per week	1 per day	2–3 per day	4–5 per day	6+ per day
Skim or low-fat milk (8 oz glass)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Whole milk (8 oz glass)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Cream, e.g. in coffee, or whipped cream (1 Tbs)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Sour cream (1 Tbs)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Non-dairy coffee whitener (1 tsp)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Sherbet or ice milk (½ cup)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Ice cream (½ cup)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Cottage or ricotta cheese (½ cup)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Cream cheese (1 oz)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Other cheese, e.g. American, cheddar, etc. plain or as part of a dish (1 slice or 1 oz serving)	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Margarine, added to food or bread (1 pat); exclude use in cooking	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Butter, added to food or bread (1 pat); exclude use in cooking	○	○	Ⓦ	○	○	Ⓓ	○	○	○
Yogurt (1 cup)	○	○	Ⓦ	○	○	Ⓓ	○	○	○

FRUITS	Never, or less than once per month	1–3 per mo	1 per week	2–4 per week	5–6 per week	1 per day	2–3 per day	4–5 per day	6+ per day
Raisins (1 oz or small pack) or grapes	○	○	Ⓦ	○	○	Ⓓ	○	○	○


C
Bluetooth electronics
Camera
Jaw motion (chewing) sensor

Greece's health crisis: from austerity to denialism

Alexander Kentikelenis, Marina Karanikolos, Aaron Reeves, Martin McKee, David Stuckler

Lancet 2014; 383: 748–53

Department of Sociology and King's College, University of Cambridge, Cambridge, UK (A Kentikelenis MPhil); European Centre on Health of Societies in Transition, London School of Hygiene and Tropical

Greece's economic crisis has deepened since it was bailed out by the international community in 2010. The country underwent the sixth consecutive year of economic contraction in 2013, with its economy shrinking by 20% between 2008 and 2012, and anaemic or no growth projected for 2014. Unemployment has more than tripled, from 7·7% in 2008 to 24·3% in 2012, and long-term unemployment reached 14·4%. We review the background to the crisis, assess how austerity measures have affected the health of the Greek population and their access to public health services, and examine the political response to the mounting evidence of a Greek public health tragedy.

Macroeconomic conditions and problem drinking

- Current recession coincided with 20% increase in alcoholism related searches
- 5% increase in unemployment associated with 15% increase in searches within 12 months

(Frijters et al. 201

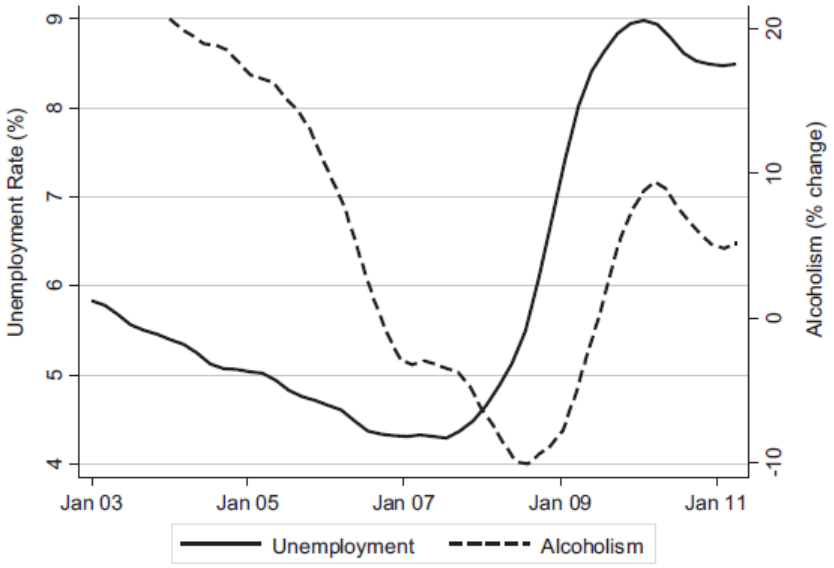


Fig. 1. Unemployment and alcoholism-related Google searches across time.

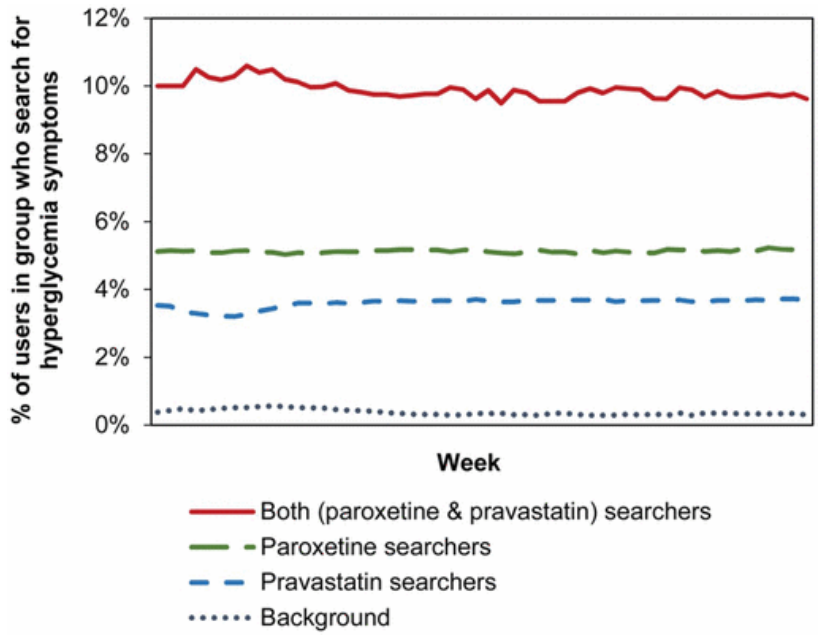
Brief communication

Web-scale pharmacovigilance: listening to signals from the crowd

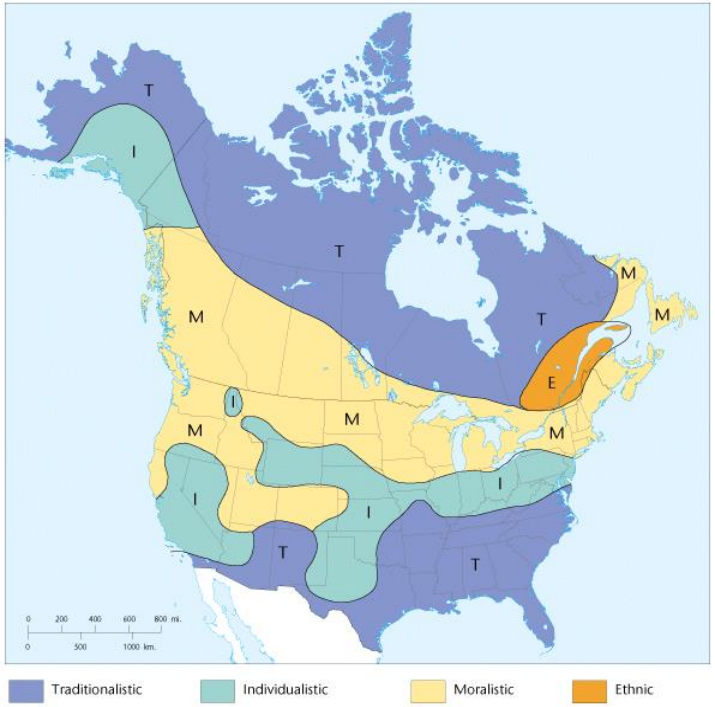
Ryen W White,[1] Nicholas P Tatonetti,[2] Nigam H Shah,[3] Russ B Altman,[4] Eric Horvitz[1]

- Isolated reports suggested that combination of paroxetine and pravastatin may be associated with hypoglycaemia
- Rare event, in people taking combination of drugs unlikely to be combined in trials
- People much more likely to search for hypoglycaemia + both drugs than + either alone

(JAMA, 2013)



Political culture and racial differences in mortality

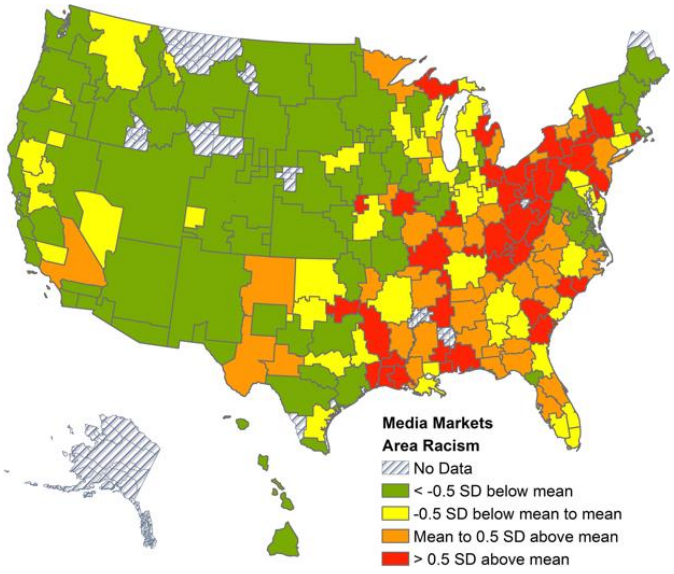


Source: Elazar, 1972

- **Moralistic:** Puritans & Scandinavians, emphasising social justice
- **Individualistic:** Scots-Irish, Germans, emphasising individual responsibility
- **Traditional:** slave-owning elites
- Rates of avoidable mortality among African Americans vary by dominant state culture
- Highest where culture is traditionalist, lowest where it is moralistic
- No difference for Native Americans

Source: Kunitz S, McKee M, Nolte E. State political cultures and the mortality of African Americans and American Indians. Health & Place 2010; 16: 558-566.

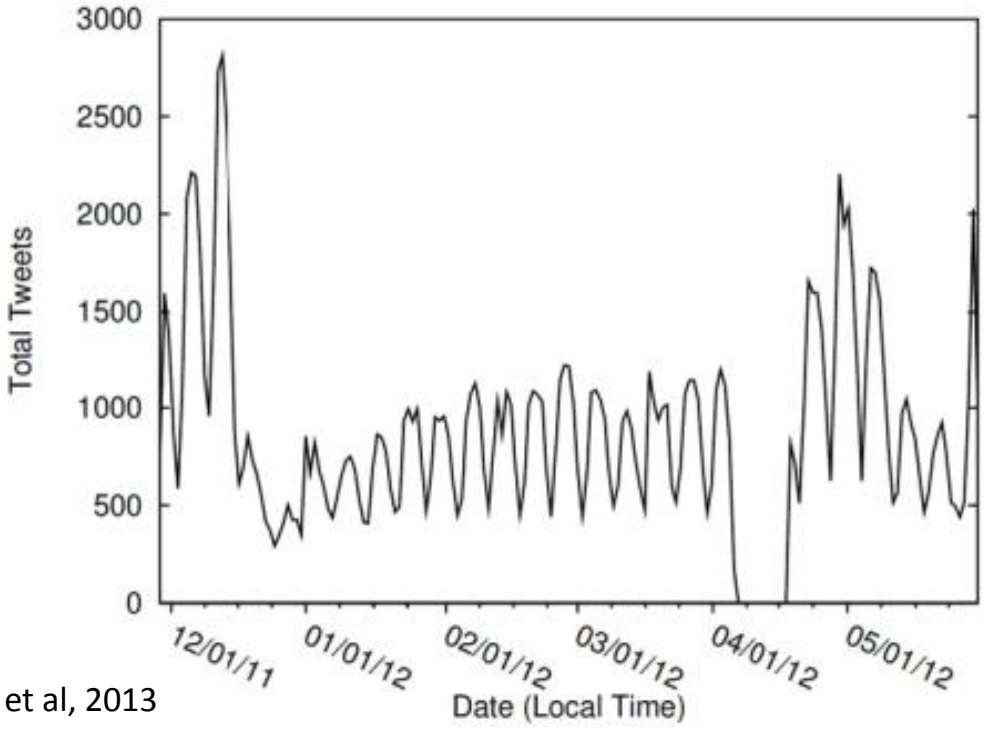
Uncovering hidden racism



"… area racism, as indexed by the proportion of Google searches containing the "N- word", is significantly associated with not only the all-cause Black mortality rate, but also Black-White disparities in mortality."

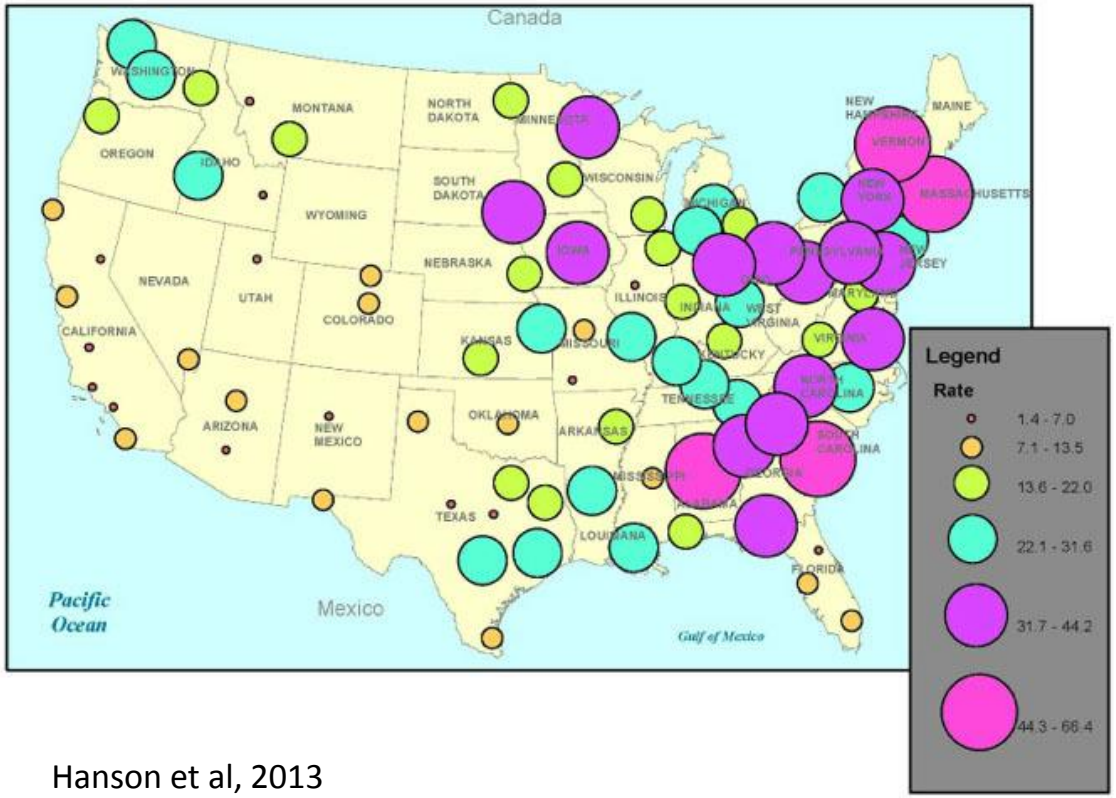
Chae et al. Association between an Internet-Based Measure of Area Racism and Black Mortality. PLOS One 2015

Tweeting about Adderall, a commonly used stimulant among students



Hanson et al, 2013

Where are people tweeting about Adderall from?



Hanson et al, 2013

theguardian

Gavin Barwell in 'date Arab girls' Twitter storm

Croydon cen
appeared ac

When Gavin Barwell tweeted about his invitation to 'date Arab girls', he was met with an explanation of how Google Adsense functions. Photograph: Robert Galbraith / Reuters/REUTERS

Conservative MP Gavin Barwell thought he was exposing a particularly shameless piece of political moneyspinning when he clicked on a link tweeted by Labour and found a press release accompanied by an advert saying "date Arab girls".

News › UK › UK Politics

Theresa May's Chief of Staff Gavin Barwell says he 'regrets' replying to porn tweet

Downing Street says former MP responded to explicit message 'in error'

Benjamin Kentish Political Correspondent | @BenKentish | Wednesday 14 February 2018 15:17 | 104 comments

ch ads
bsite,
display

In addition to seeing ads based on your interests, you may also see ads based on the types of sites you visit."

A sign of loyalty?

Long distance pregnancy testing?

“[Pole] ran test after test, analyzing the data, and before long some useful patterns emerged. Lotions, for example. Lots of people buy lotion, but one of Pole’s colleagues noticed that women on the baby registry were buying larger quantities of unscented lotion around the beginning of their second trimester.

Another analyst noted that sometime in the first 20 weeks, pregnant women loaded up on supplements like calcium, magnesium and zinc. Many shoppers purchase soap and cotton balls, but when someone suddenly starts buying lots of scent-free soap and extra-big bags of cotton balls, in addition to hand sanitizers and washcloths, it signals they could be getting close to their delivery date.”

Even before your family know?

““My daughter got this in the mail!” he said. “She’s still in high school, and you’re sending her coupons for baby clothes and cribs? Are you trying to encourage her to get pregnant?”

The manager didn’t have any idea what the man was talking about. He looked at the mailer. Sure enough, it was addressed to the man’s daughter and contained advertisements for maternity clothing, nursery furniture and pictures of smiling infants.

The manager apologized and then called a few days later to apologize again.

On the phone, though, the father was somewhat abashed. “I had a talk with my daughter,” he said. “It turns out there’s been some activities in my house I haven’t been completely aware of. She’s due in August. I owe you an apology.”

Contents lists available at SciVerse ScienceDirect

Health Policy

journal homepage: www.elsevier.com/locate/healthpol

Commentary

Ethical issues in using social media for health and health care research

Rebecca McKee

Institute for Social Change, University of Manchester, 2.11 Humanities, Bridgeford Street, Manchester M13 9PL, United Kingdom

ARTICLE INFO

Keywords:
Social media
Ethics

ABSTRACT

The dramatic growth of social media in recent years has not gone unnoticed in the health sector. Media such as Facebook and Twitter are increasingly being used to disseminate information among health professionals and patients but, more recently, are being seen as a source of data for surveillance and research, for example by tracking public concerns or capturing discourses taking place outside traditional media outlets. This raises ethical issues, in particular the extent to which postings are considered public or private and the right to anonymity of those posting on social media. These issues are not clear cut as social media, by their nature, blur the boundary between public and private. There is a need for further research on the beliefs and expectations of those using social media in relation to how their material might be used in research. In contrast, there are areas where the ethical issues are more clear cut, such as when individuals are active participants in research, where traditional considerations apply.

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Umar Farouk Abdulmutallab

- Abdulmutallab's father had alerted US authorities previously
- Separately, his name was added to the 550,000 on the National Counterterrorism Database
- But no-one informed the FBI no-fly list
- Abdulmutallab :
  - bought ticket, with cash
  - boarded without a passport
  - noted to be acting suspiciously at gate

- Janet Napolitano (Secretary of Homeland Security)
  - Day 1: "once the incident occurred, the system worked" She cited "
  - Day 2: the system "failed miserably"

Problem: lost needle in haystack
Solution: get more hay

Conclusion

- New sources of data offer many opportunities
- *But* we need to address the complicated ethical issues
  - In a world where people are happy to post their most intimate details on line
  - And where those seeking to make the world a better place are severely disadvantaged to those whose products kill
- *And* remember that:
  - Data are not stamps, to be collected for the sake of it (with apologies to philatelists)
  - We should learn from the (very many and frequent) mistakes of others (recognising their liberal use of official secrecy to cover them up)
  - No matter where we get our data from, the same principles of avoiding bias apply

London School of Hygiene & Tropical Medicine

Improving Health Worldwide

Health and the built environment: Google Street View and the SPOTLIGHT project

Harry Rutter
@harryrutter

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

Breezewood, Pennsylvania, 2008 http://www.edwardburtynsky.com/

Spotlight project
500 km
300 mi
© d-maps.com
Greater London
Randstad (Amsterdam...)
Ghent/suburbs
Paris/suburbs
Budapest/suburbs

Lakerveld et al. BMC Public Health 2012, 12:793
http://www.biomedcentral.com/1471-2458/12/793

BMC Public Health

STUDY PROTOCOL Open Access

Sustainable prevention of obesity through integrated strategies: The SPOTLIGHT p conceptual framework and design

Jeroen Lakerveld[1*], Johannes Brug[1], Sandra Bot[1], Pedro J Teixeira[2], Harry Rutter[3], Euan V Oddrun Samdal[5], Lynn Stockley[6], Ilse De Bourdeaudhuij[7], Patricia van Assema[8], Aileen R Jean-Michel Oppert[11], Róza Ádány[12] and Giel Nijpels[1] on behalf of the SPOTLIGHT cons

Abstract

Background: The prevalence of overweight and obesity in Europe is high. It is a major ca many of the main chronic (or non communicable) diseases in this region and is character socio-economic distribution within the population. Obesity is largely determined by modi such as low physical activity levels, sedentary behaviour and consumption of energy dens being recognised that effective responses must go beyond interventions that only focus social or environmental level and instead embrace system-based multi-level intervention both the individual and environment. The EU-funded project "sustainable prevention of o strategies" (SPOTLIGHT) aims to increase and combine knowledge on the wide range of d a systematic way, and to identify multi-level intervention approaches that are strong in te Adoption, Implementation and Maintenance (RE-AIM).

Methods/Design: SPOTLIGHT comprises a series of systematic reviews on: individual-level behaviour change obesity interventions; social and physical environmental determinants RE-AIM of multi-level interventions. An interactive web-atlas of currently running multi-lev developed, and enhancing and impeding factors for implementation will be described. At these elements will inform the development of methods to assess obesogenicity of diver remote imaging techniques linked to geographic information systems. The validity of thes evaluated using data from surveys of health and lifestyles of adults residing in the neighb both the micro- and macro-levels (national and international) the different physical, econo socio-cultural elements will be assessed.

Discussion: SPOTLIGHT offers the potential to develop approaches that combine an und obesogenicity of environments in Europe, and thus how they can be improved, with an a individual factors that explain why people respond differently to such environments. Its fi governmental authorities and professionals, academics, NGOs and private sector stakehol development and implementation of policies to tackle the obesity epidemic in Europe.

Keywords: Obesity, Prevention, Adults, Environment, Lifestyle behaviour

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Mackenbach et al. BMC Public Health 2014, 14:233
http://www.biomedcentral.com/1471-2458/14/233

BMC Public Health

RESEARCH ARTICLE Open Access

Obesogenic environments: a systematic review of the association between the physical environment and adult weight status, th SPOTLIGHT project

Joreintje D Mackenbach[1*], Harry Rutter[2], Sofie Compernolle[3], Ketevan Glonti[2], Jean-Michel C Helene Charreire[6], Ilse De Bourdeaudhuij[3], Johannes Brug[7], Giel Nijpels[1] and Jeroen Lakervel

Abstract

Background: Understanding which physical environmental factors affect adult obesity, and h them, is important for public health and urban planning. Previous attempts to summarise the systematically assessed the methodological quality of included studies, or accounted for envir between continents or the ways in which environmental characteristics were measured.

Methods: We have conducted an updated review of the scientific literature on associations o environmental factors with adult weight status, stratified by continent and mode of measuren a detailed risk-of-bias assessment. Five databases were systematically searched for studies pub and 2013.

Results: Two factors, urban sprawl and land use mix, were found consistently associated with although only in North America.

Conclusions: With the exception of urban sprawl and land use mix in the US the results of th confirm that the available research does not allow robust identification of ways in which that influences adult weight status, even after taking into account methodological quality.

Keywords: Review, Physical environment, Overweight, Obesity, Adults, Quality assessment

Background

Obesity prevention is a global public health priority as a result of the worldwide increase in obesity prevalence [1] and its associated chronic diseases [2]. Although genetic factors may underlie the propensity of individuals to become obese [3], the pace at which obesity prevalence has grown at population level during recent decades points to social and environmental causes [4,5]. An individual's body mass index (BMI) is mainly determined by energy intake (eating) and energy expenditure (physical activity/sedentary behaviour). These energy balance related behaviours (EBR range of determinants [6]. One determinants is the opportunitie calorie expenditure or a lack the vironment. For example, dietary fluenced by access to different types of outlets and services. Sin levels may be influenced by ac sports facilities, green spaces or port infrastructure and land use. may be more 'obesogenic' than are more likely to promote weig individuals or populations [5], bu to identify the physical environ greatest impacts on (the develo and obesity.

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[1]The EMGO Institute for Health and Care Research, Department of General Practice and Elderly Care Medicine, VU University Medical Center, Amsterdam, The Netherlands
Full list of author information is available at the end of the article

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Health & Place 25 (2014) 1–9

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Health & Place

journal homepage: www.elsevier.com/locate/healthplace

Review Essay

Using remote sensing to define environmental characteristics related to physical activity and dietary behaviours: A systematic review (the SPOTLIGHT project)

H. Charreire [a,b], J.D. Mackenbach [c], M. Ouasti [a], J. Lakerveld [c], S. Compernolle [d], M. Ben-Rebah [a], M. McKee [e], J. Brug [c], H. Rutter [c], J.-M. Oppert [a,f,*]

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[b] Paris Est University, Lab-Urba Urban Institute of Paris, UPEC, Créteil, France
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Remote sensing
Free geospatial services

ABSTRACT

We performed a systematic literature review on the use of free geospatial services as potential tools to assess built environmental characteristics related to dietary behaviour and physical activity. We included 13 studies, all published since 2010 and conducted in urban contexts, with Google Earth and Google Street View as the two main free geospatial services used. The agreement between virtual and field audit was higher for items related to objectively verifiable measures (e.g. presence of infrastructure and equipment) and lower for subjectively assessed items (e.g. aesthetics, street atmosphere, etc.). Free geospatial services appear as promising alternatives to field audit for assessment of objective dimensions of the built environment.

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1. Introduction

There is increasing interest in identifying the characteristics of built environments that are potentially related to health-promoting or unhealthy dietary and physical activity patterns, which are associated with prevention of excess weight and chronic diseases (Chow et al., 2009; Feng et al., 2010; Townshend and Lake, 2009). The built environment is generally understood as the totality of places built or designed by humans, including buildings, spaces around buildings, layout of communities, transport infrastructure, and parks and trails (Transportation Research Board, 2005).

In explaining dietary and physical activity behaviours in terms of the environment it is important to capture both its objective physical characteristics and subjective assessments of it, in other words how the environment is perceived by those who inhabit it (Chow et al., 2009; Saelens and Glanz, 2009). Subjective measures are usually obtained from surveys of those who inhabit the environment in question, using questionnaires or in-depth interviews. Field audits, which involve observers with checklists documenting specific aspects of the built environment (Chow et al., 2010; Pomerleau et al., 2013), and geocoded data from geographic information systems (GIS), are usually considered as providing objective measures (Brownson et al., 2009).

Direct observation ('on foot' environmental audit or 'field' audit) requires a visit to each area, facility or street to observe and rate characteristics of the built environment. These tools assess environmental dimensions such as land use, presence of infrastructure for active transport, and aesthetics, using differing numbers of items (from about 20 to more than 120 depending on the instrument). The time needed to administer them ranges from 75 to 115 min. A list of commonly used audit instruments can be found at http://activelivingresearch.org/. Especially for broad-scale, or geographically dispersed, studies field audit may be an expensive, time-consuming and cumbersome method. However, the advent of new, freely available, remote sensing technologies provided by Google and more recently by Microsoft has been seen as offering new possibilities to obtain geo-spatial data collection,

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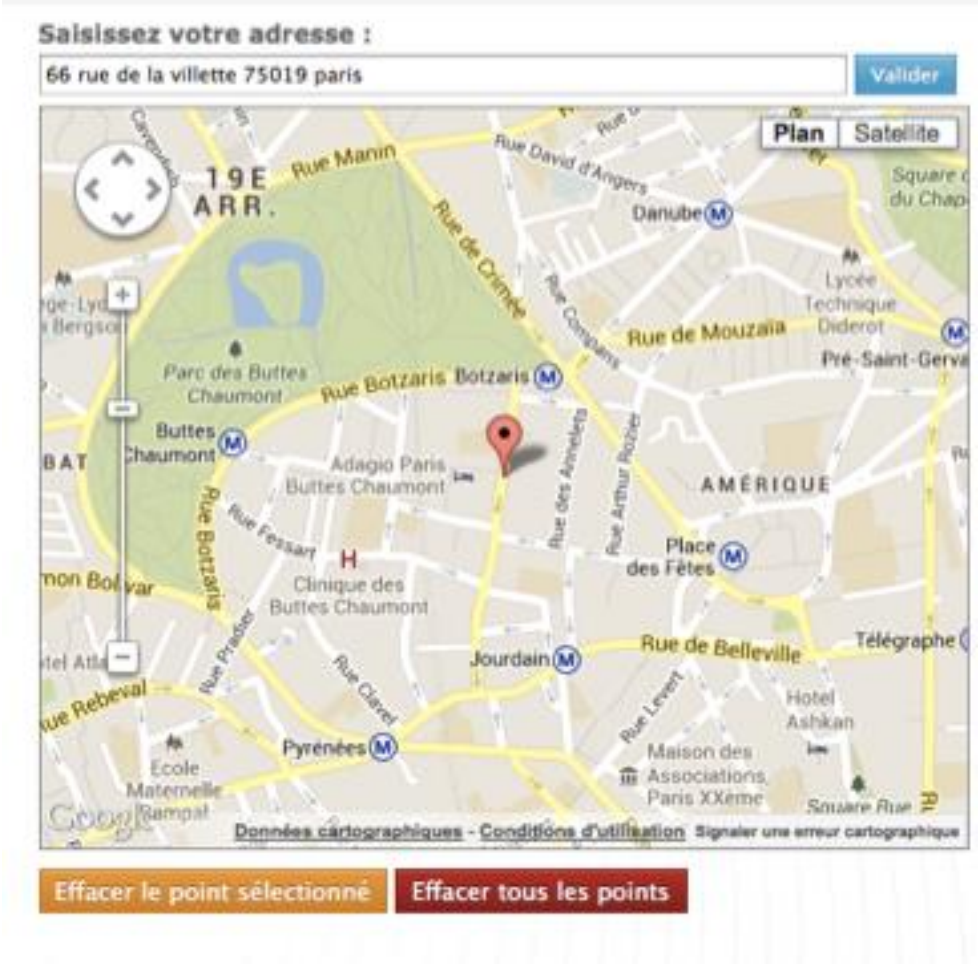
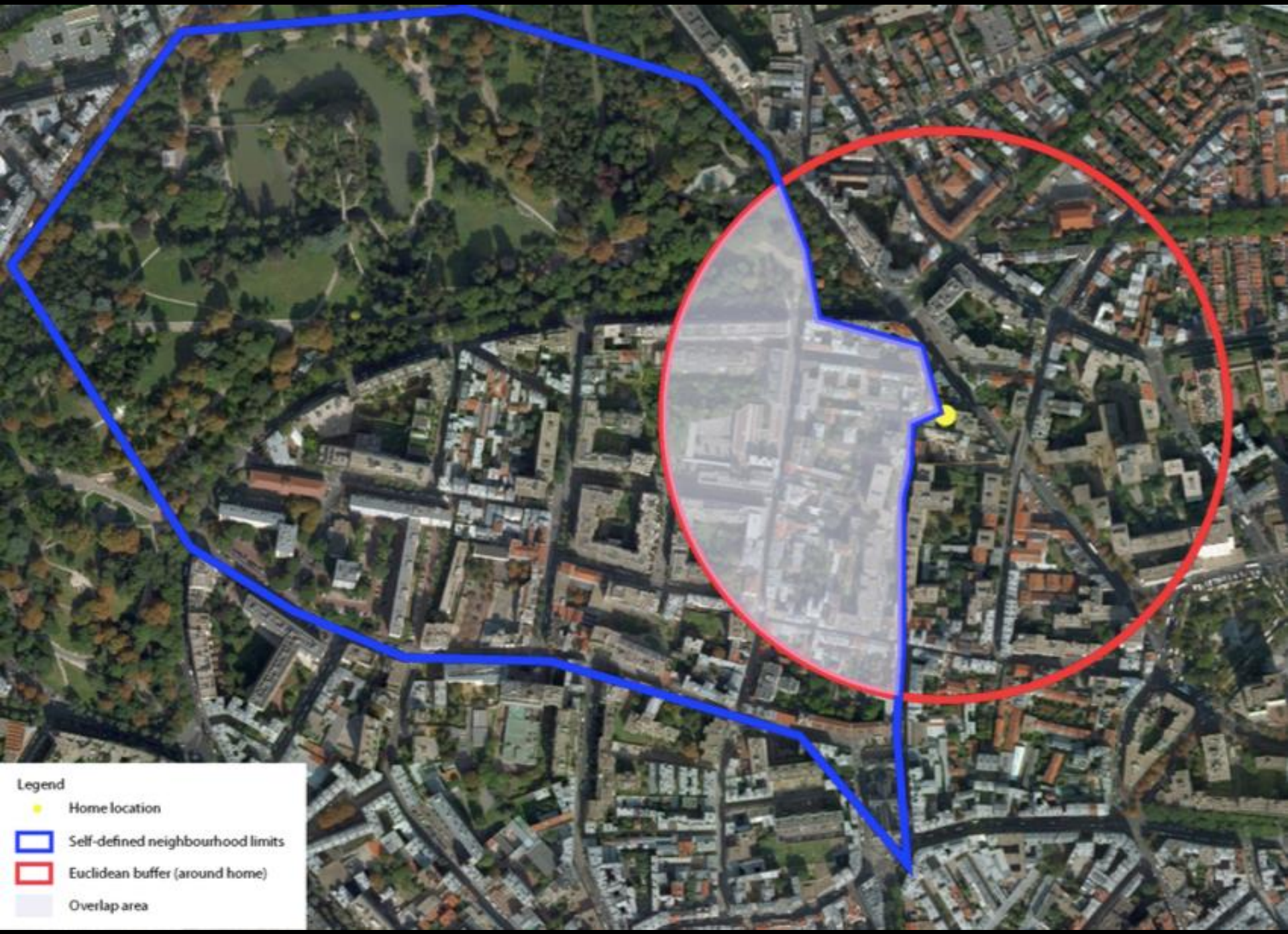
Self-defined neighbourhood tool

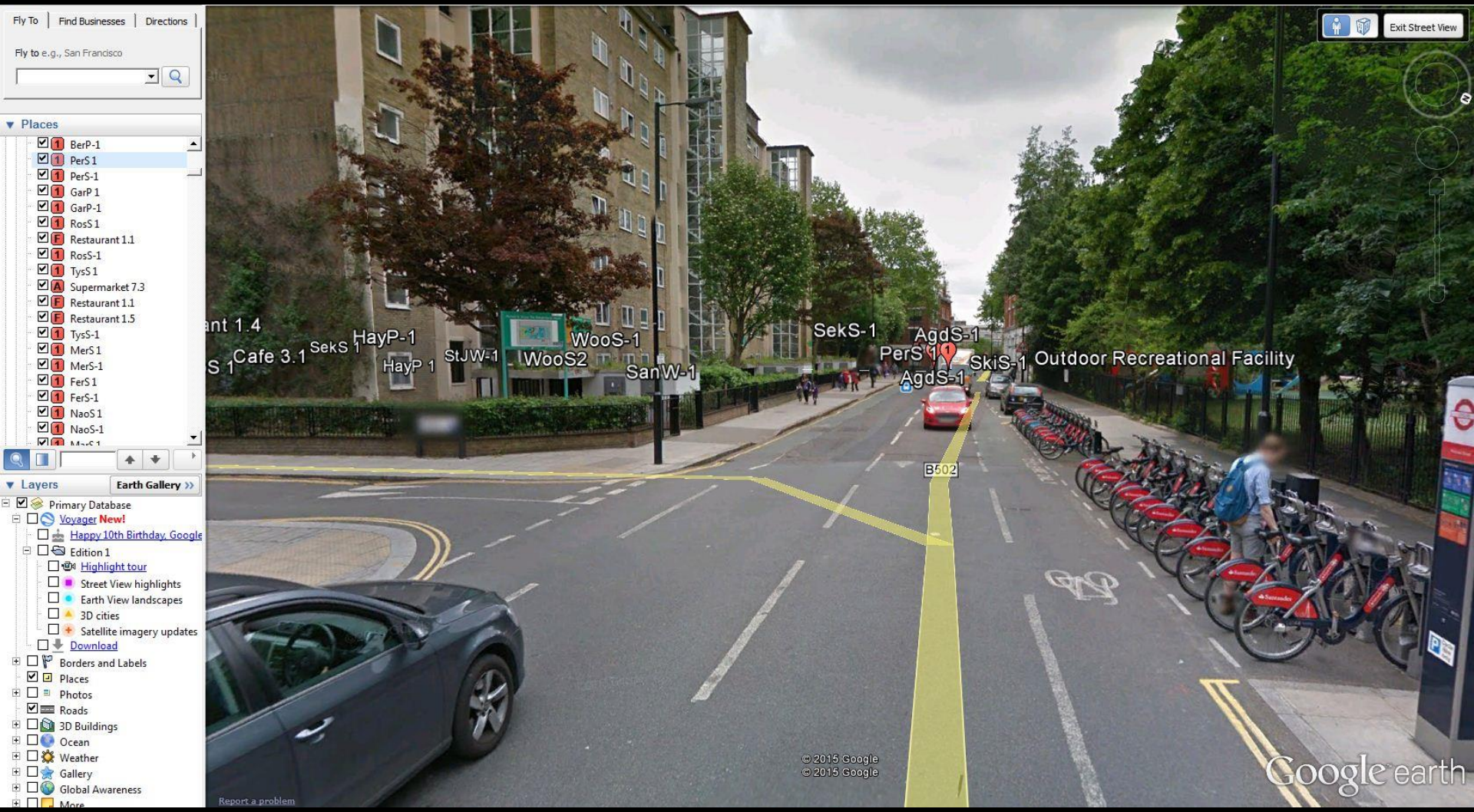
"Please draw the boundaries of what you consider as your neighbourhood on the map below"



- Click to create points on the map
- All geographical points were recorded as feature attributes in a GIS
- All the points were combined to form an enclosed area


Legend
Home location
Self-defined neighbourhood limits
Euclidean buffer (around home)
Overlap area

Places
MawR 5
Supermarket 7.3
Take away restaurant 6.1
Take away restaurant 6.3
Convenience store 8.4
MawR-5
MawR 6
MawR-6
MawR 7
Outdoor recreational f...
MawR-7
MawR 8
MawR-8
KGC 1
KGC-1
LinC 1
LinC-1
ColR 1
ColR-1
Layers
Earth Gallery
Primary Database
Voyager New!
Happy 10th Birthday, Google
Edition 1
Highlight tour
Street View highlights
Earth View landscapes
3D cities
Satellite imagery updates
Download
Borders and Labels
Places
Photos
Roads
MAWNEY FISH BAR
PIZZA BURGERS KEBABS FRIED CHICKEN
Cloves
V&S NEWSAGENTS
EaAW-5
Take away restaurant 6.3
Take away restaurant 6.1
Convenience store 8.4


Fly To
Find Businesses
Directions
Fly to e.g., San Francisco
Places
BerP-1
PerS 1
PerS-1
GarP 1
GarP-1
RosS 1
Restaurant 1.1
RosS-1
TysS 1
Supermarket 7.3
Restaurant 1.1
Restaurant 1.5
TysS-1
MerS 1
MerS-1
FerS 1
FerS-1
NaoS 1
NaoS-1
Layers
Earth Gallery
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3D cities
Satellite imagery updates
Download
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Exit Street View
ant 1.4
Cafe 3.1
SekS 1
HayP-1
HayP 1
StJW-1
WooS-1
WooS2
SanW-1
SekS-1
AgdS-1
PerS 1
AgdS-1
SkiS-1
Outdoor Recreational Facility
B502
© 2015 Google
© 2015 Google
Report a problem
Google earth

Online survey

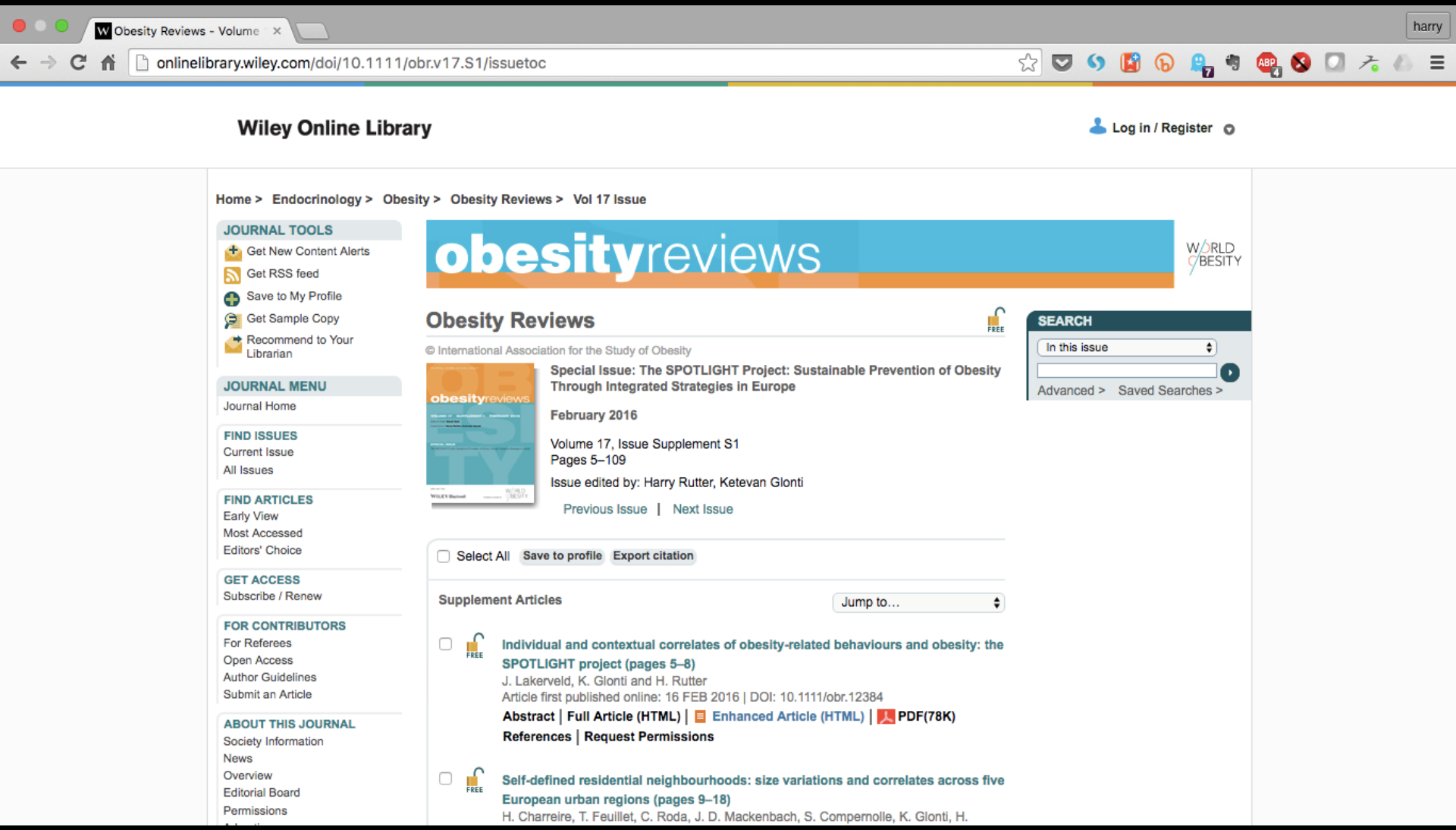
- 12 neighbourhoods per country in 5 countries
- Aimed for 100 respondents/neighbourhood
- Sample of 6,000
- Approx 40 questions, some in multiple parts
- Average completion time around 30 minutes
- Paper version available on request
- Overall response rate around 10%

These questions are about how you ***commute to and from work (or school).***

- During the last 7 days, on how many days did you commute to and from work by public transport, car / moped / motorbike, bicycle or on foot?
- On average, how much time did you usually spend on one of those days commuting to and from work by public transport, car / moped / motorbike, bicycle or on foot?
- Why did you choose this mode of transport for commuting to and from work?

Mode of transport	Days per week communting in the last seven days	Time spend on commuting on an average day		Most important reason
		Hours	Minutes	
Public Transport	2	1	less than 10	The environment is unpleasant or unsafe to walk / cycle in
Car / moped / motorbike				
Bicycle				
Walking				

bit.ly/SPOTLIGHTEU



"Our home neighbourhoods, along with the places where we work, study, shop, travel and spend the rest of our time, have complex influences on our behaviour, with multiple factors acting in different ways, on different people and in different contexts. These factors only rarely follow a simple linear causal chain in which a single determinant is directly associated with a single outcome."

Rutter et al, Obesity Reviews 2016

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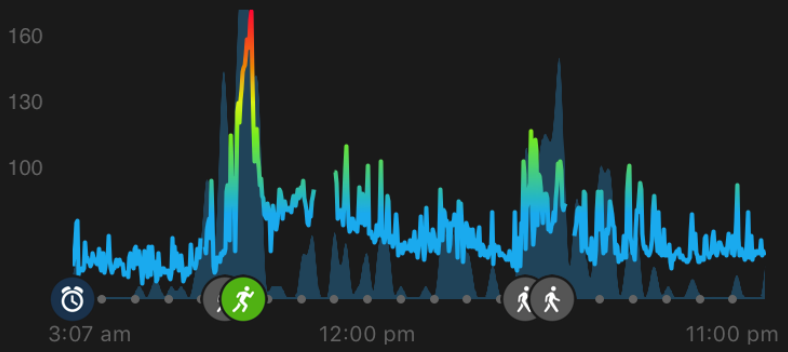
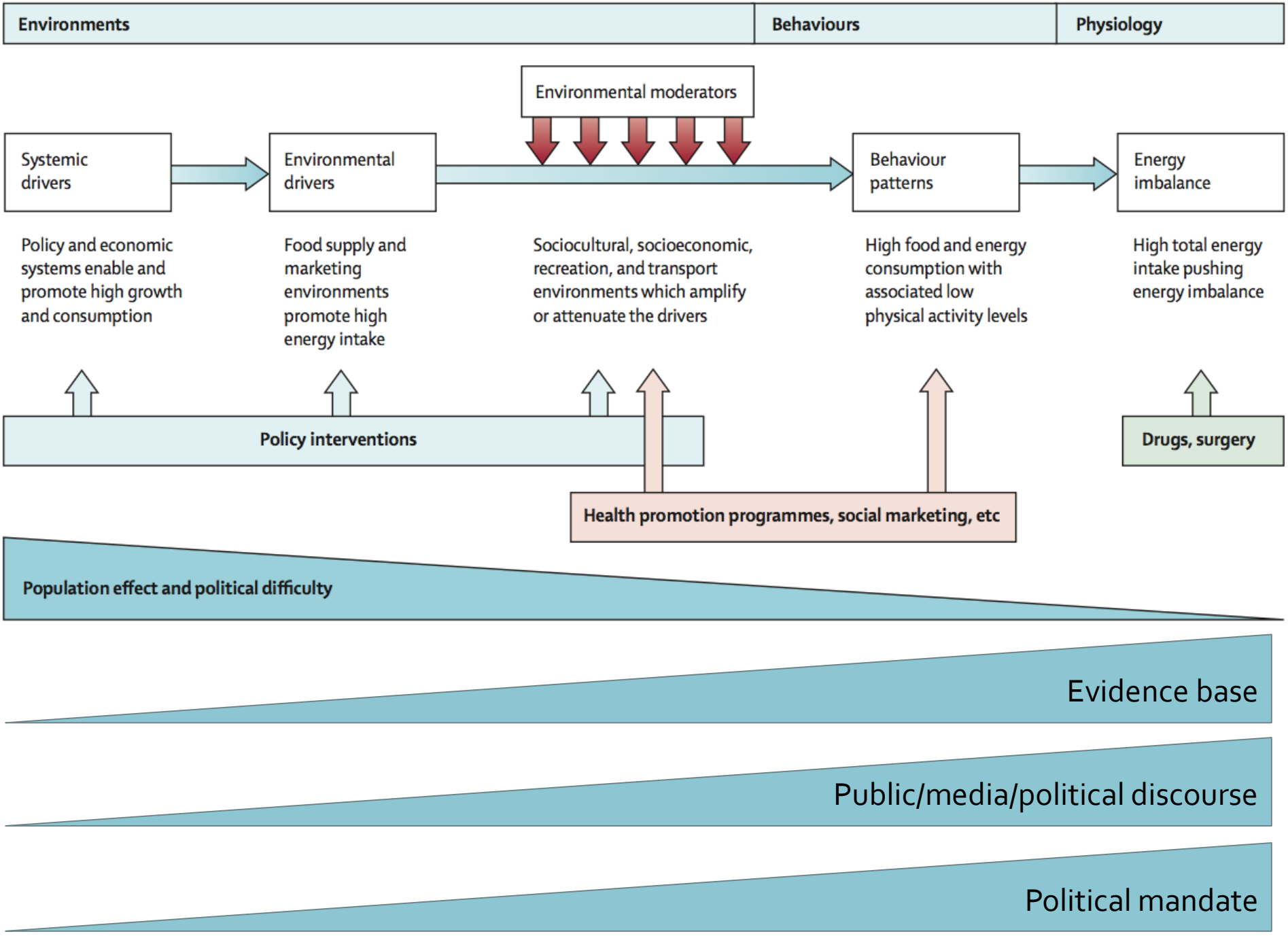
Daily Details

12 May 2018

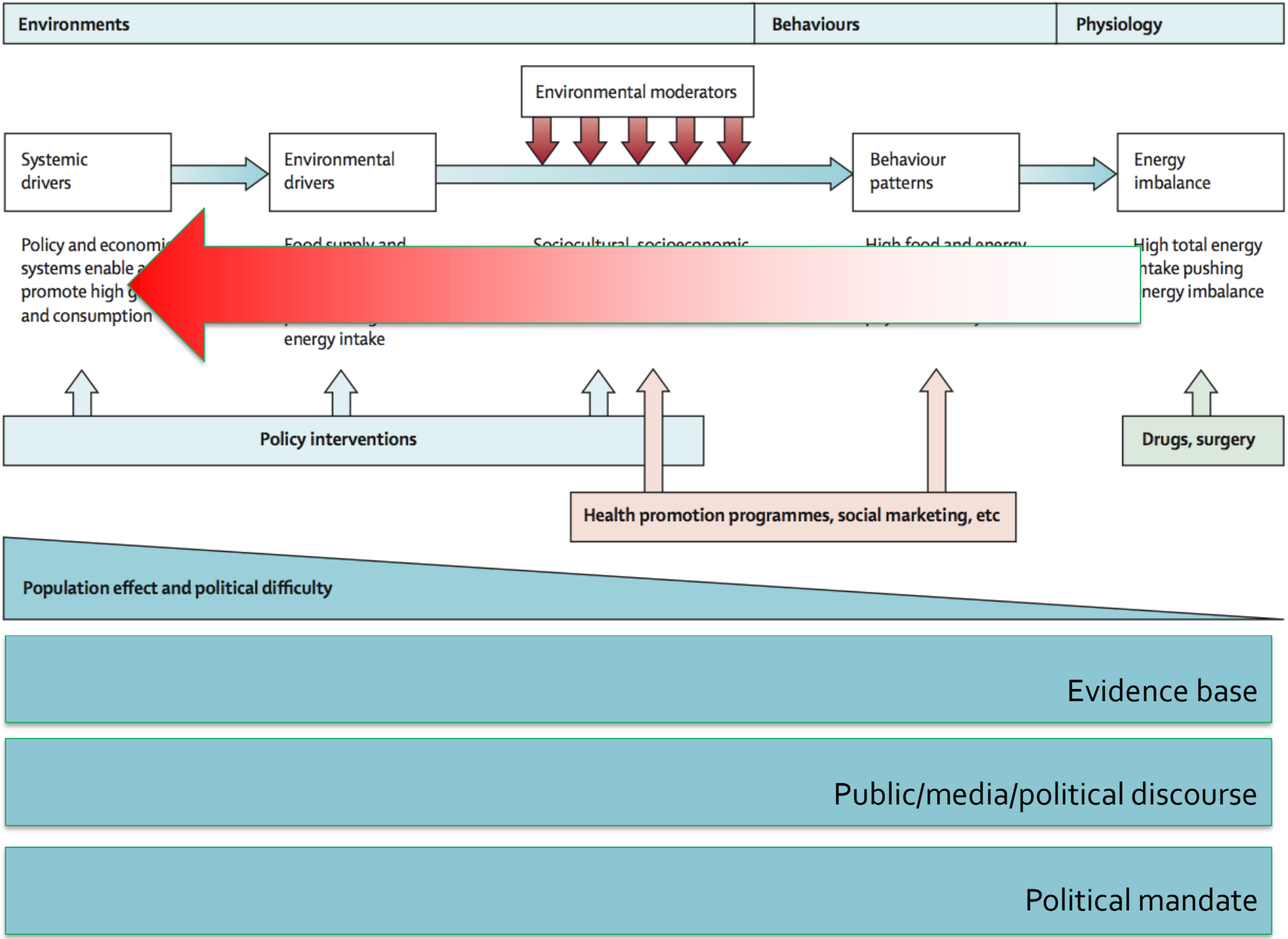


- **Steps**
  18,257 • Goal 181%
- **Sydney Running**
  5.00 km • 28:04
- **Walking**
  22:00
- **Walking**
  11:00
- **Walking**
  34:00
- **Sleep**
  7 hours 10 min
- **Heart Rate**
  53 bpm - 172 bpm

Google

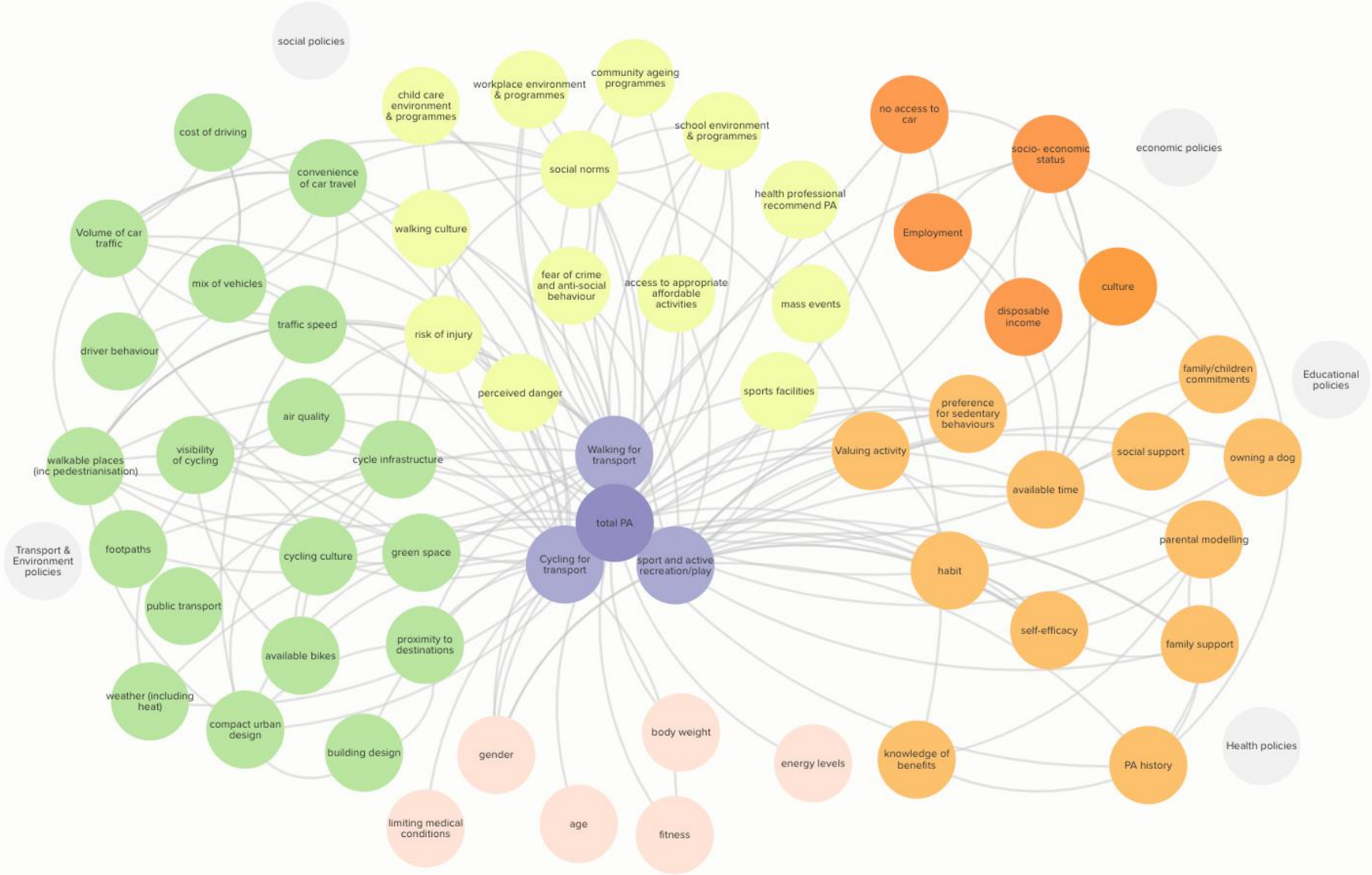


Source: Swinburn et al, Lancet 2011



Source: Swinburn et al, Lancet 2011

WHO Global Action Plan for Physical Activity: the physical activity system



Conclusions

- Our understanding of the interactions between individuals and their environment is growing, but there's still much to learn
- Huge problem of recruitment to studies
- Need new tools, methods, and approaches
- Technology may help with some problems
- Need to grapple with complex systems
- Focus on policy-relevance of research

A world of data: an overview
New sources of data: 2

Chair: Martin McKee

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

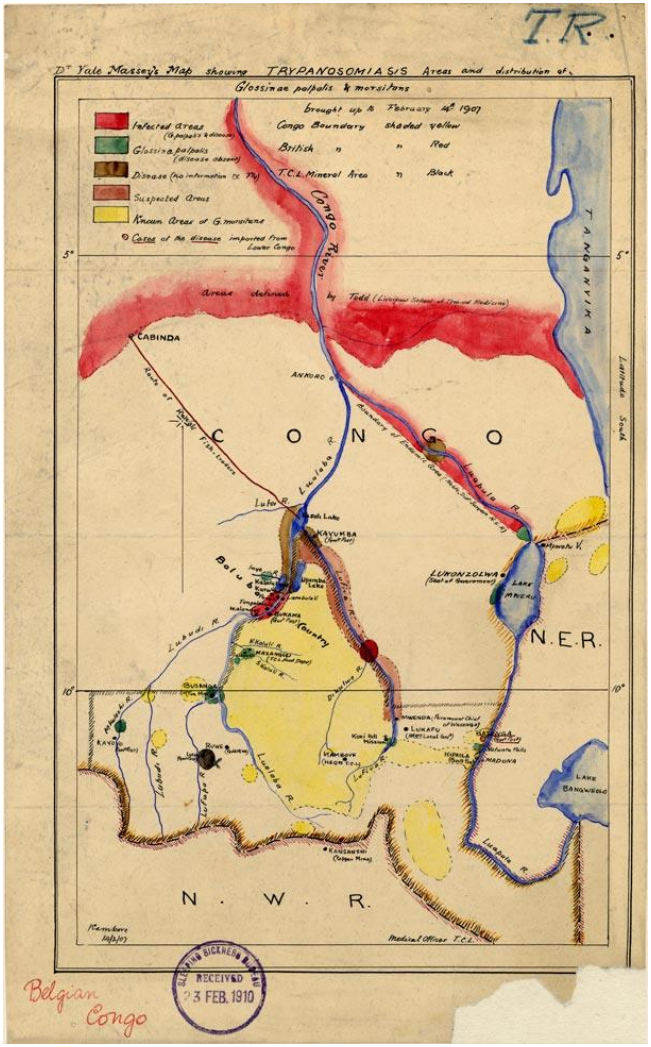
Behind the words: quantitative textual analysis

Speaker: Aaron Reeves

The use technology to collect spatial and population data in complex situation

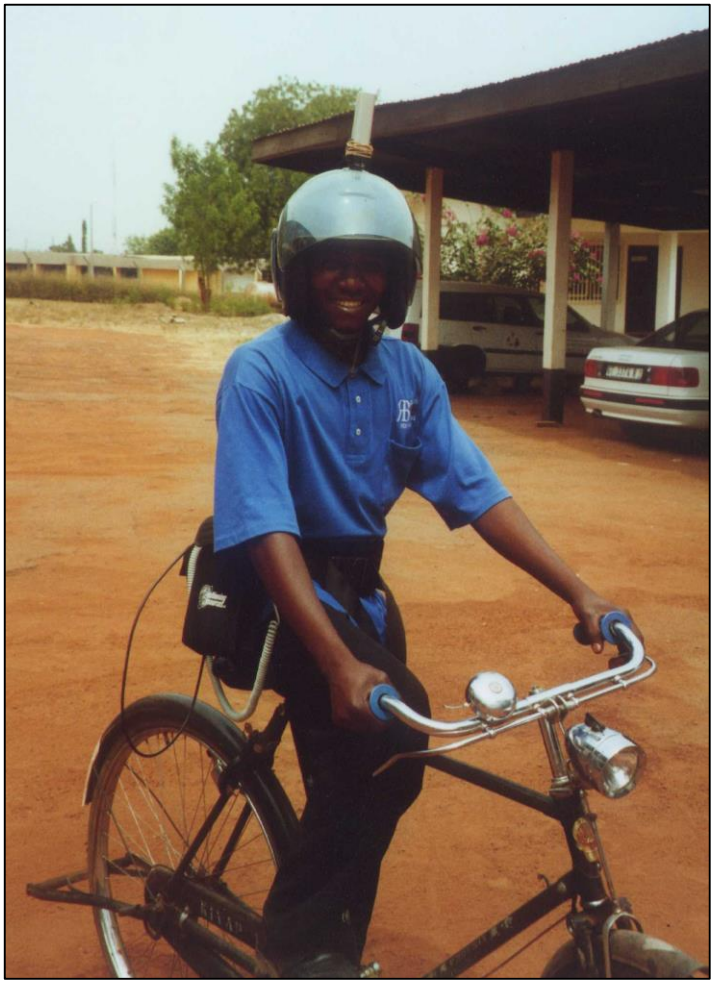
Chris Grundy
Chris.Grundy@lshtm.ac.uk

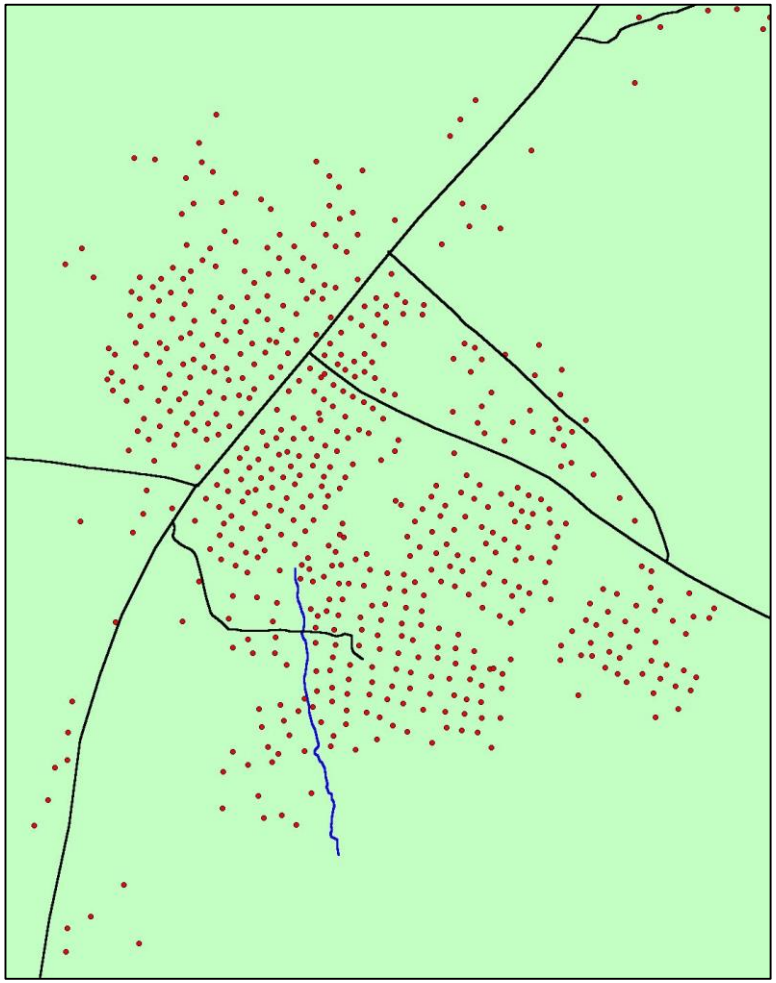
Spatial data in public health: 1907



- Typanosomiasis & distribution of Tsetse fly
- Belgian Congo
- 1907
- Dr Yale Massey
- LSHTM map archive

Spatial data: 1997

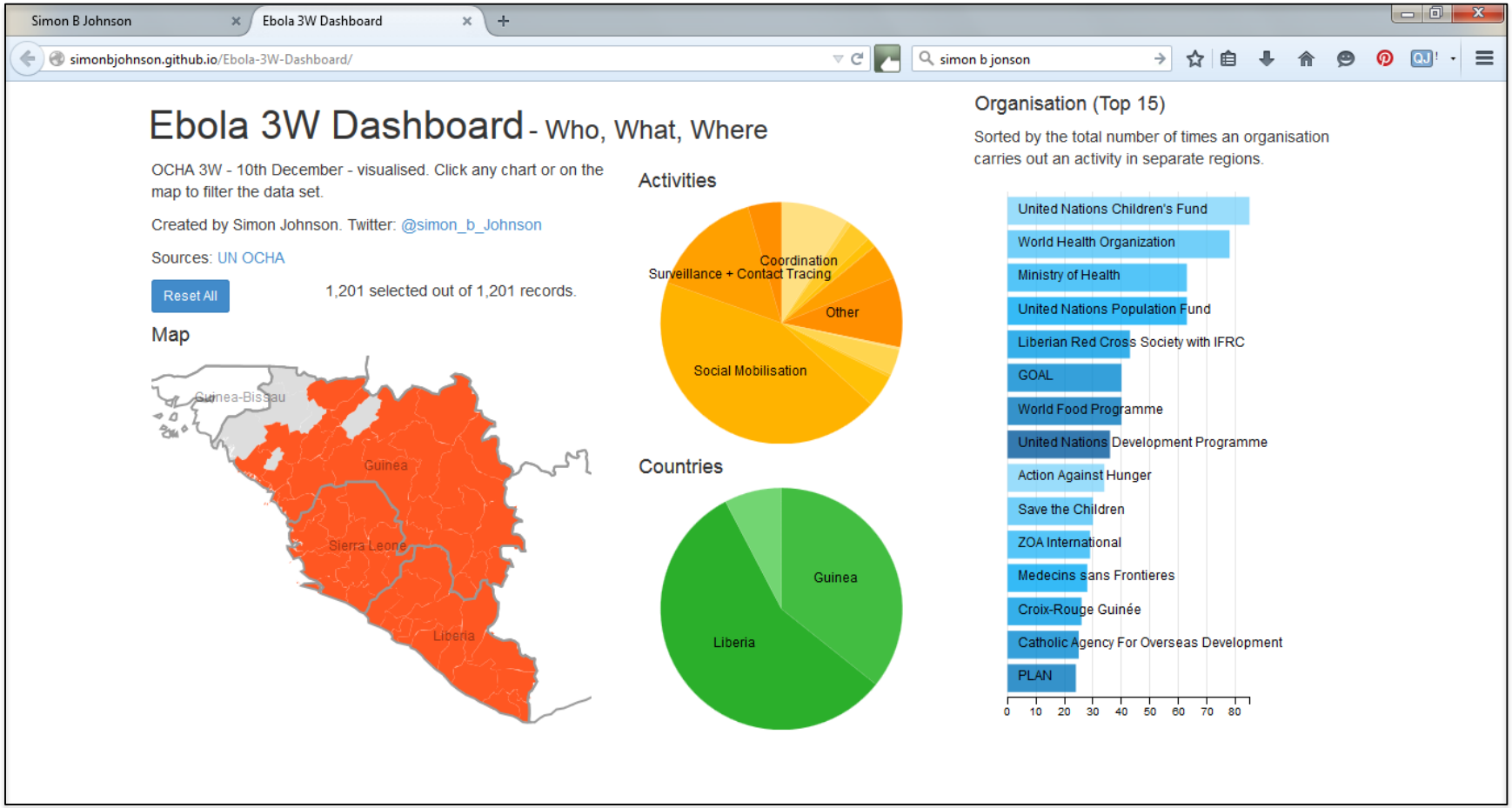




Spatial data: 2017

Advances in technology

Changes in data are viewed

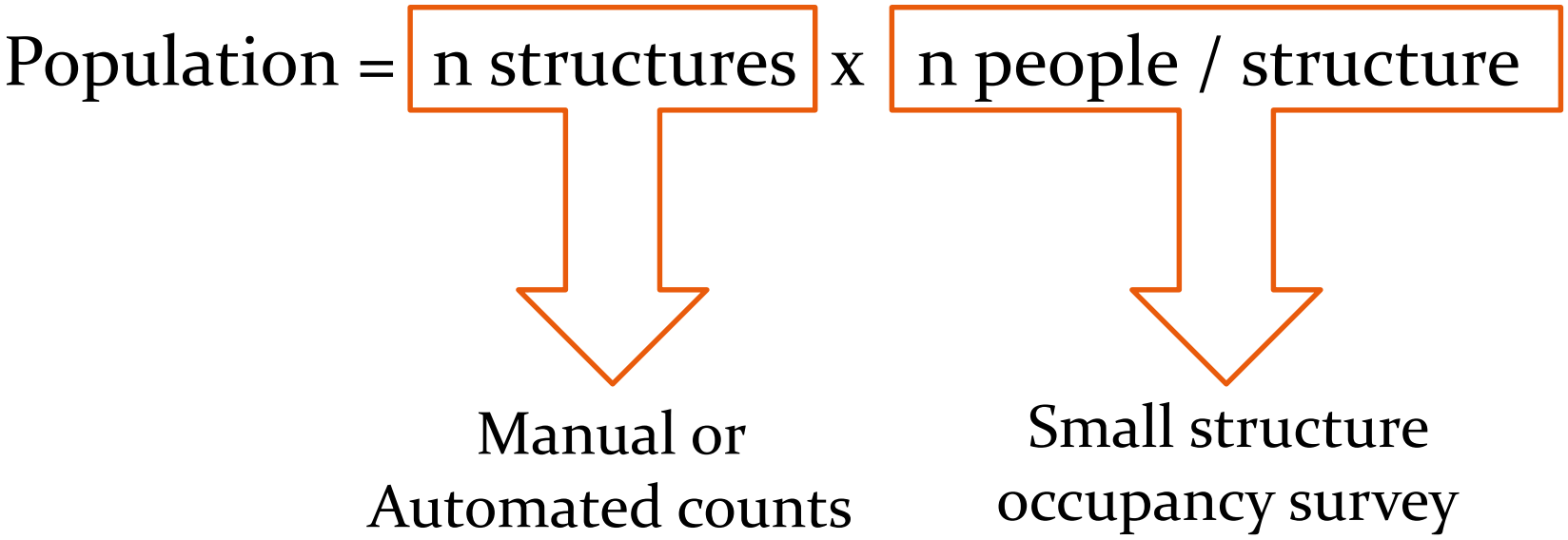


Source: simonbjohnson-github.io

Population estimation & mobility

- Rapid
- Minimal field work
- Easy
- Cheap

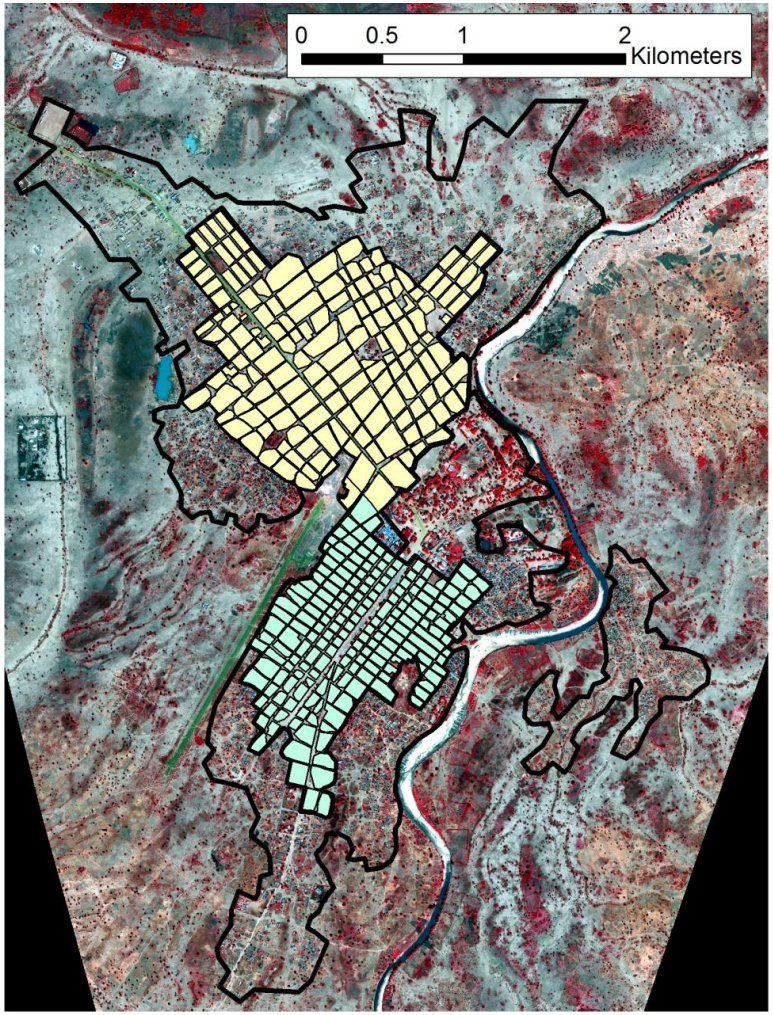
Counting structures



Manual structure count

- Structures located by eye
- Points or polygons
- Different methods
  - On screen
  - Printed images
  - In person

Am Timan, Chad



Population estimation

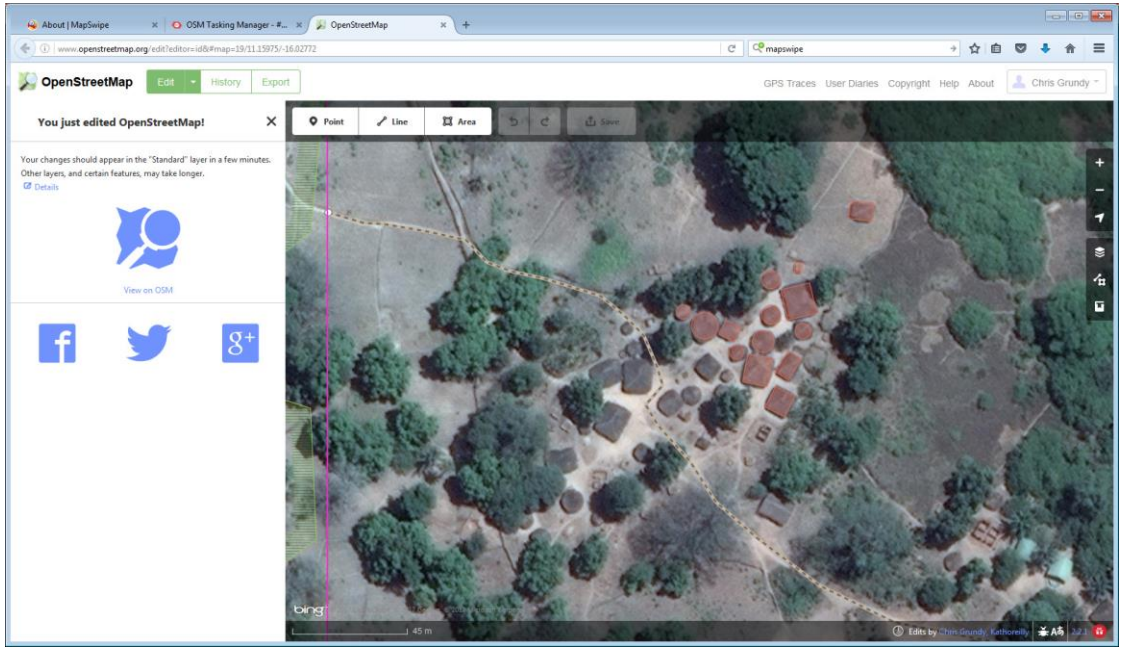
Stratum	Quadrat Survey	Imagery Method	
		Manual Count	Automated Count
1	14337	12996	12229
	(10751 – 19117)	(11655 – 14490)	(10968 – 13635)
2	16877	16920	16802
	(12581 – 22639)	(15175 – 18866)	(15069 – 18734)
3	25176	16709	16369
	(10473 – 60523)	(14986 – 18631)	(14680 – 18251)
Total	49722	46625	45400
	(29 431 – 84003)	(41817 – 51987)	(40718 – 50620)

Problems with counting structures

- Does not work in all settings
- Scalability
- Access to satellite imagery
- Rapidly changing settings

Data sharing / crowdsourcing

- Data sharing
  - Data archives
  - Humanitarian Data Exchange
  - Openstreetmap
- Crowdsourcing
  - HOT
  - Missing maps



Machine learning

- Automated feature extraction
  - Train system to recognise features
  - Improves with more training
- Not cheaper or faster than crowdsourcing
  - Training is expensive & time consuming
  - Still relies on satellite imagery
  - Very specialised skills
- Benefits are longer term

Population mobility

- Different types
  - Daily movement: Exercise, obesity
  - Mobile populations: sex workers, miners
  - Disasters: where do people go
  - Outbreaks: movement between areas
  - Migration: forced, economic

Mobile phone tracking / data

- All use of mobiles is recorded
  - Type of use, location, time / date
- Increasing use for mobility / populations
  - Population movement during emergency
  - Population change through year / week
- Problems
  - When applicable: phone ownership
  - Specialist skills required

GPS trackers

- Simple GPS devices used since 1990s
  - I-gotU
- Mobile phone apps
  - My coordinates
  - Tracker
- GPS tracking devices
  - Long battery life
  - No on/off switch
  - Encrypted

Lake Victoria fishing communities

New collaborative data models required

- Mapping an emergency
  - OSM crowdsource base map
  - Machine learning
    - Uses OSM data for training
    - Updates OSM
  - Field teams & communities
    - My Coordinates: to locate clinics, schools
    - Information on population per structure
  - Mobile phone data to inform on movement
  - Social media data used to select areas of demand

Imaginative uses of medical data

Liam Smeeth

London School of Hygiene and Tropical Medicine

Thanks to: Anthony Matthews, Krishnan Bhaskaran, Sara Thomas, Emily Herrett, Claire Cook, and many (many) others

Funding: Wellcome, MRC, BHF, NIHR

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The computerisation of health records ➔ extraordinary opportunities for research

- Cheaper research
- Research that couldn't otherwise be done
- Better research

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Measles mumps rubella (MMR) vaccination and autism

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MMR and autism

- 1998 Lancet paper: MMR vaccination might cause autism
- MMR vaccine coverage fell internationally
- Measles outbreaks occurred

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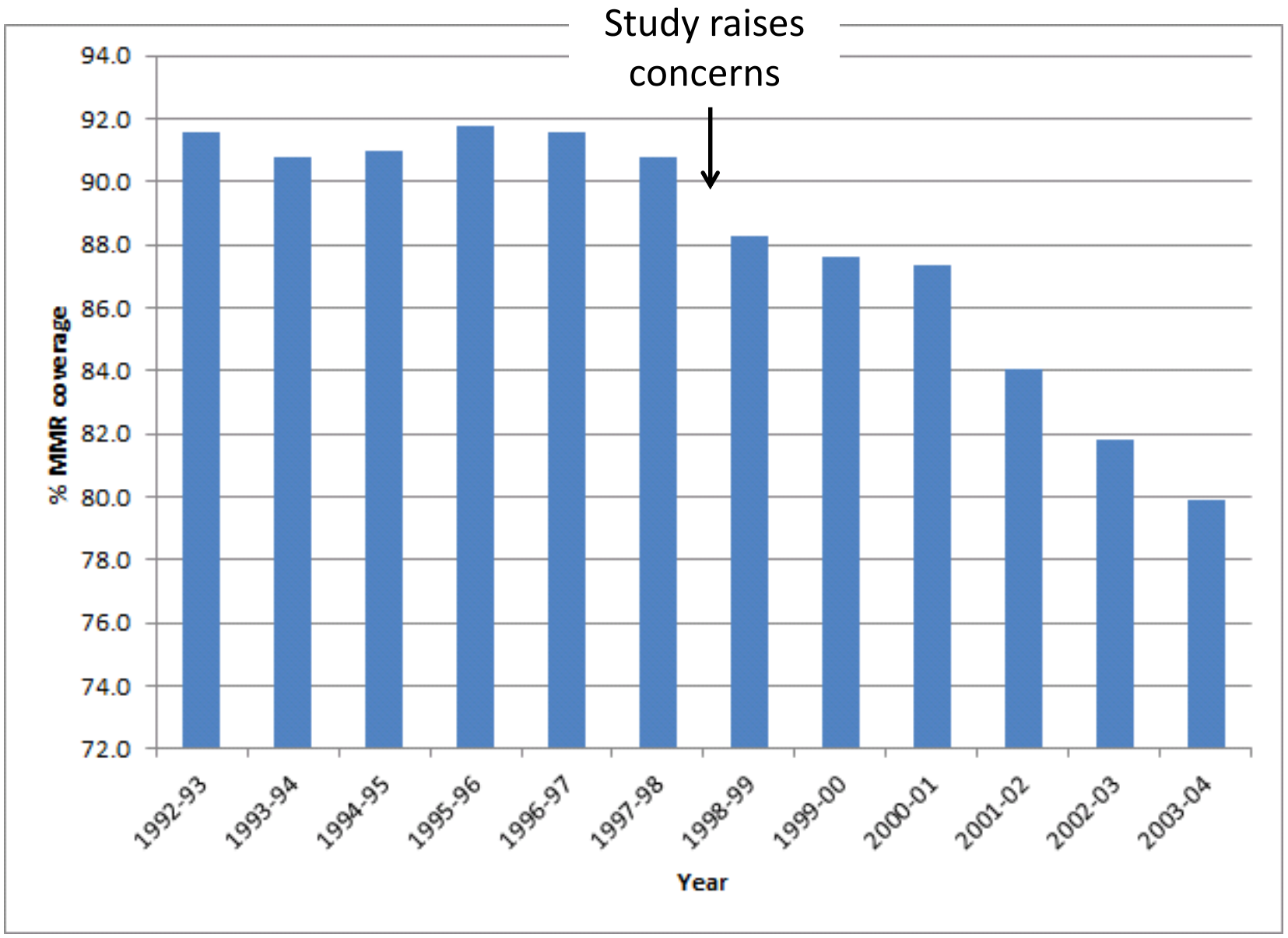

MMR coverage by time of 2nd birthday, England

NHS Immunisation Statistics, HSCIC

Measles mumps rubella vaccination and autism

- United Kingdom Medical Research Council funded case-control study based on several million electronic health records
- Similar large studies in USA and Denmark
- *Only possible because of electronic health records*

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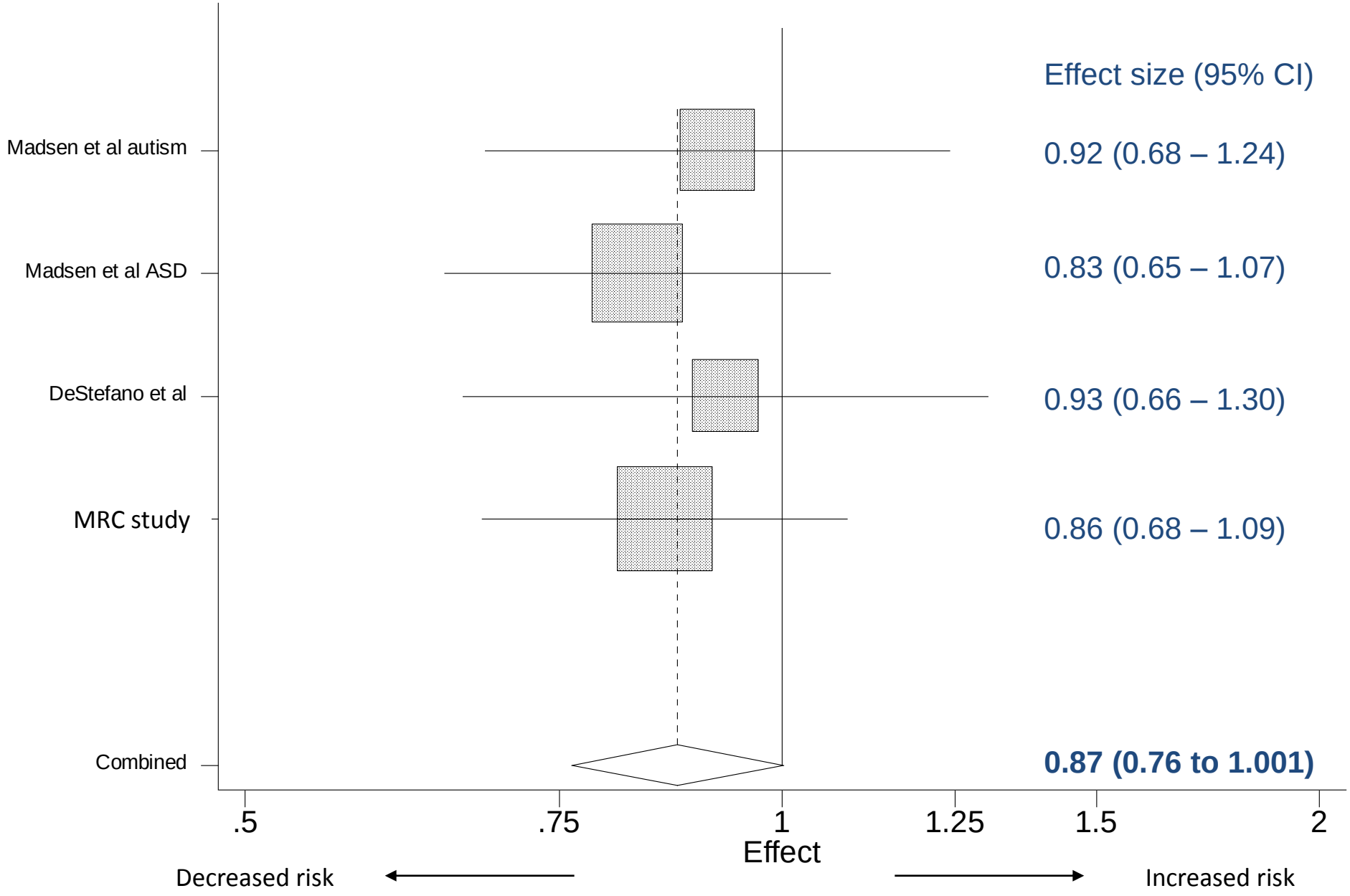
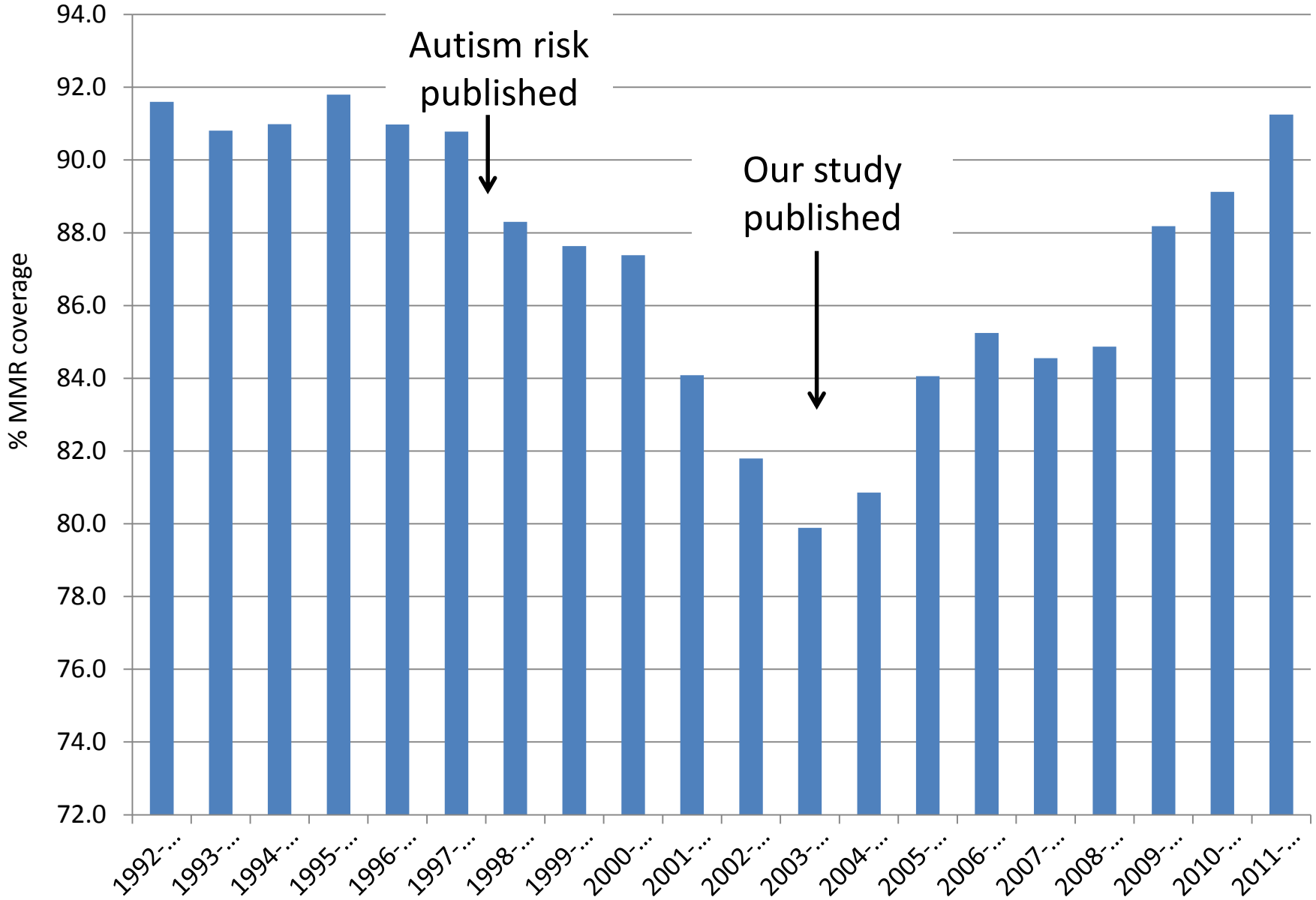


Smeeth et al, Lancet 2004;354;963-9

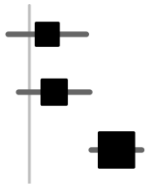


MMR coverage by time of 2nd birthday, England

NHS Immunisation Statistics, HSCIC

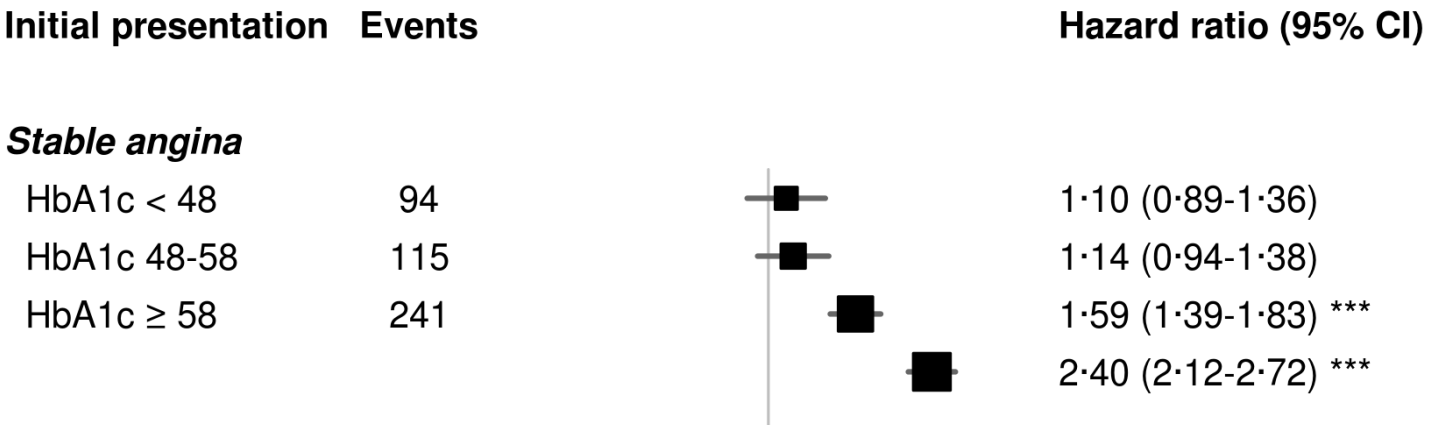
Diabetes control and heart disease

Initial presentation	Events	Hazard ratio (95% CI)
Stable angina		
HbA1c < 48	94	1·10 (0·89-1·36)
HbA1c 48-58	115	1·14 (0·94-1·38)
HbA1c ≥ 58	241	1·59 (1·39-1·83) ***



Shah AD et al. Type 2 diabetes and incidence of cardiovascular diseases: a cohort study in 1·9 million people. Lancet Diabetes Endocrinol. 2015 Feb;3(2):105-13.

Diabetes control and heart disease



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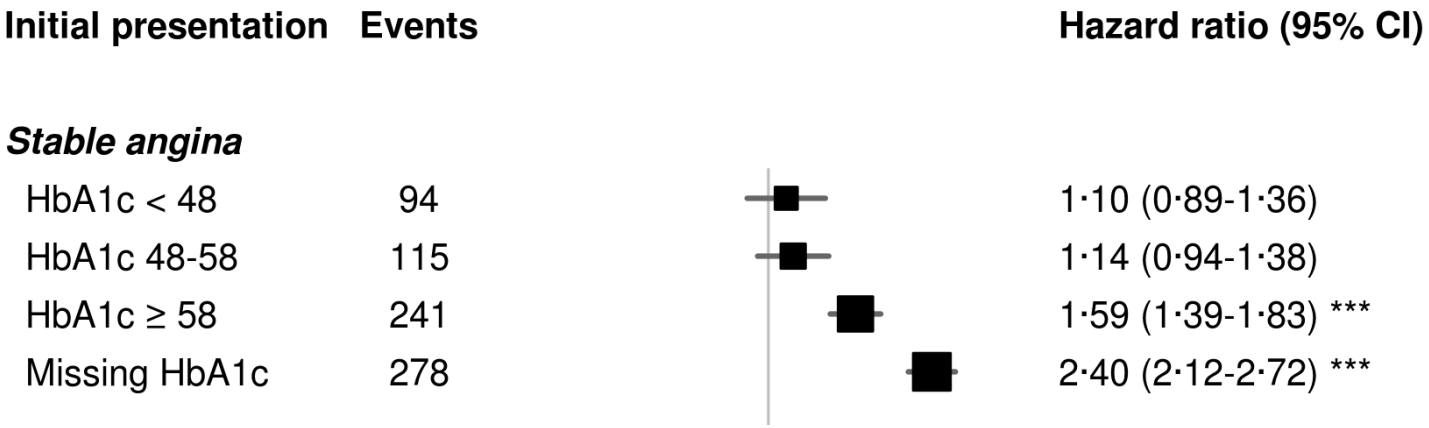
Diabetes control and heart disease



Shah AD et al. Type 2 diabetes and incidence of cardiovascular diseases: a cohort study in 1·9 million people. Lancet Diabetes Endocrinol. 2015 Feb;3(2):105-13.

Impact of statin media coverage on the use of statins in the UK

- Two BMJ articles late 2013 suggesting side effects of statins may outweigh benefits
- Media coverage grew through early 2014

➢ Based on absence of evidence

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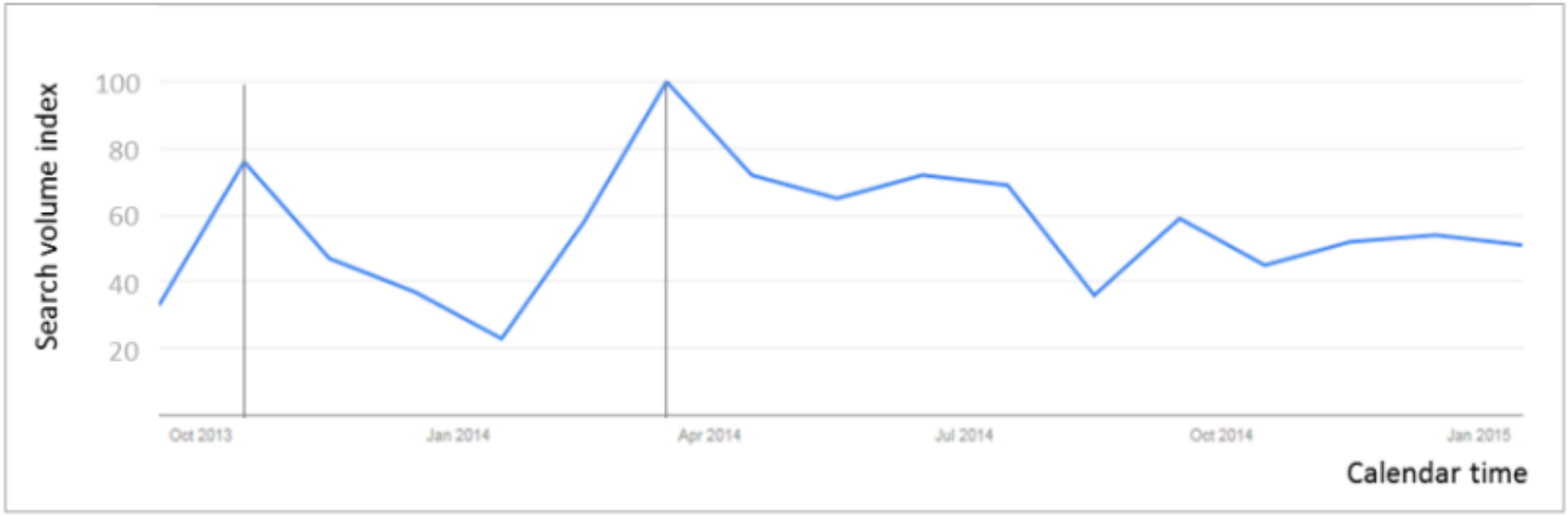
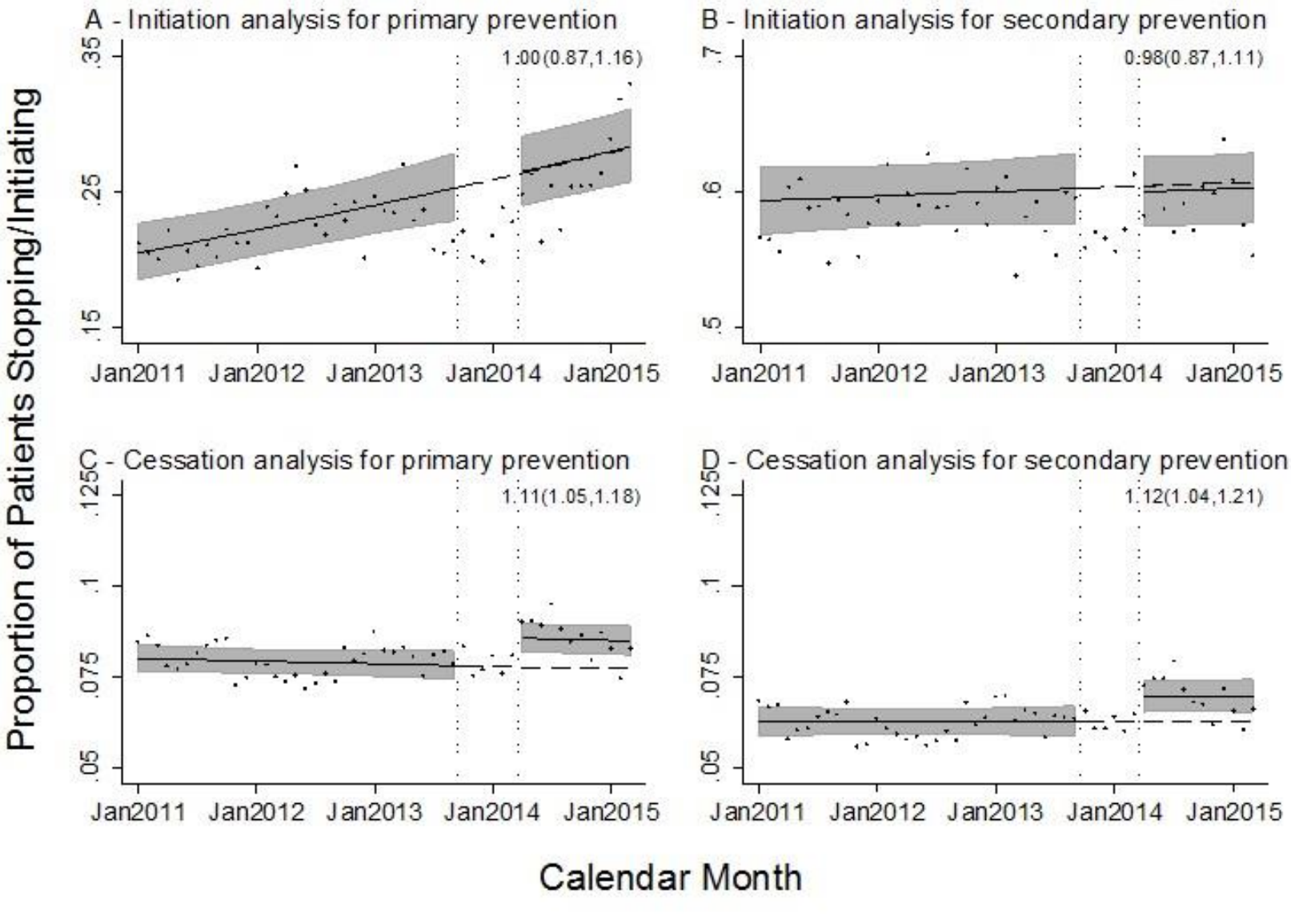
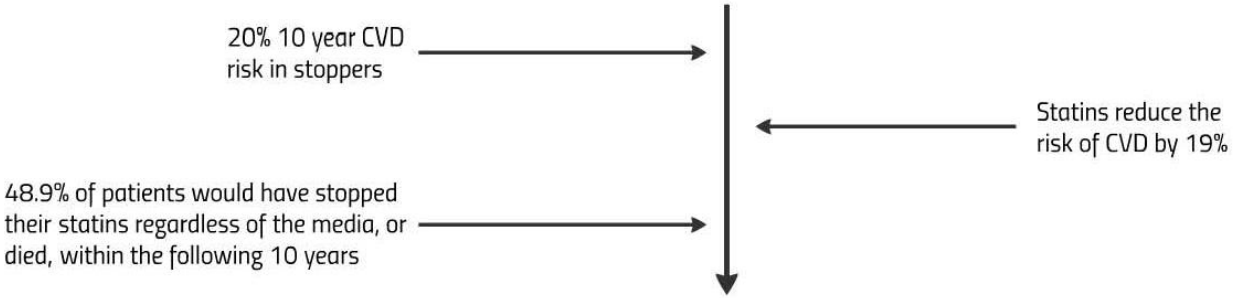
Google analytics search term trends using the search term 'statin side effects'



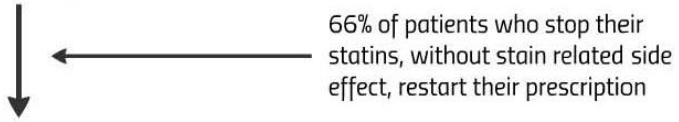

A - Initiation analysis for primary prevention
1.00(0.87,1.16)
B - Initiation analysis for secondary prevention
0.98(0.87,1.11)
C - Cessation analysis for primary prevention
1.11(1.05,1.18)
D - Cessation analysis for secondary prevention
1.12(1.04,1.21)
Proportion of Patients Stopping/Initiating
Calendar Month
Jan2011
Jan2012
Jan2013
Jan2014
Jan2015

Public Health Impact

218,971 excess patients stopping statins in the 6 months following the media coverage



6,372 extra CVD events within the subsequent 10 years following the media coverage



2,173 extra CVD events within the subsequent 10 years following the media coverage

Prezi

Daily Mail

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DETAILS AND VOUCHER: PAGE 25

Victory, vitriol and the craziest few days of my life

SARAH VINE

AKA MRS MICHAEL GOVE SEE PAGE 17

Experts say warnings that made patients stop taking vital drug have put lives at risk

DON'T GIVE UP YOUR STATINS

By **Ben Spencer**
Medical Correspondent

MORE than 200,000 patients stopped taking statins because of fears over side-effects, experts said last night.

They estimate that as a result at least 500 lives will be lost by 2024.

Campaigning medical journals with 'an axe to grind' were blamed for having misled both patients and their doctors.

Taken by up to ten million Britons a year to cut cholesterol and ward off heart disease, statins are said to save around 7,000 lives annually.

However there is controversy over side-effects that include muscle pain, nosebleeds, headaches and higher risk of type 2 diabetes.

The experts from the London School of Hygiene and Tropical Medicine logged a 219,000 drop-off in statin usage from October 2013. That was at the peak of the row about the potential problems with the drugs.

The blip lasted around six months – after which most patients resumed their treatment.

The research team said however even this short period could be responsible for at least 2,200 extra strokes and heart attacks in the decade up to 2024, killing more than 500 people.

They blame papers published by the British Medical Journal in late 2013 that claimed the risks of taking statins were far more serious

Turn to Page 2

New bawls please ... it's little Miss Murray

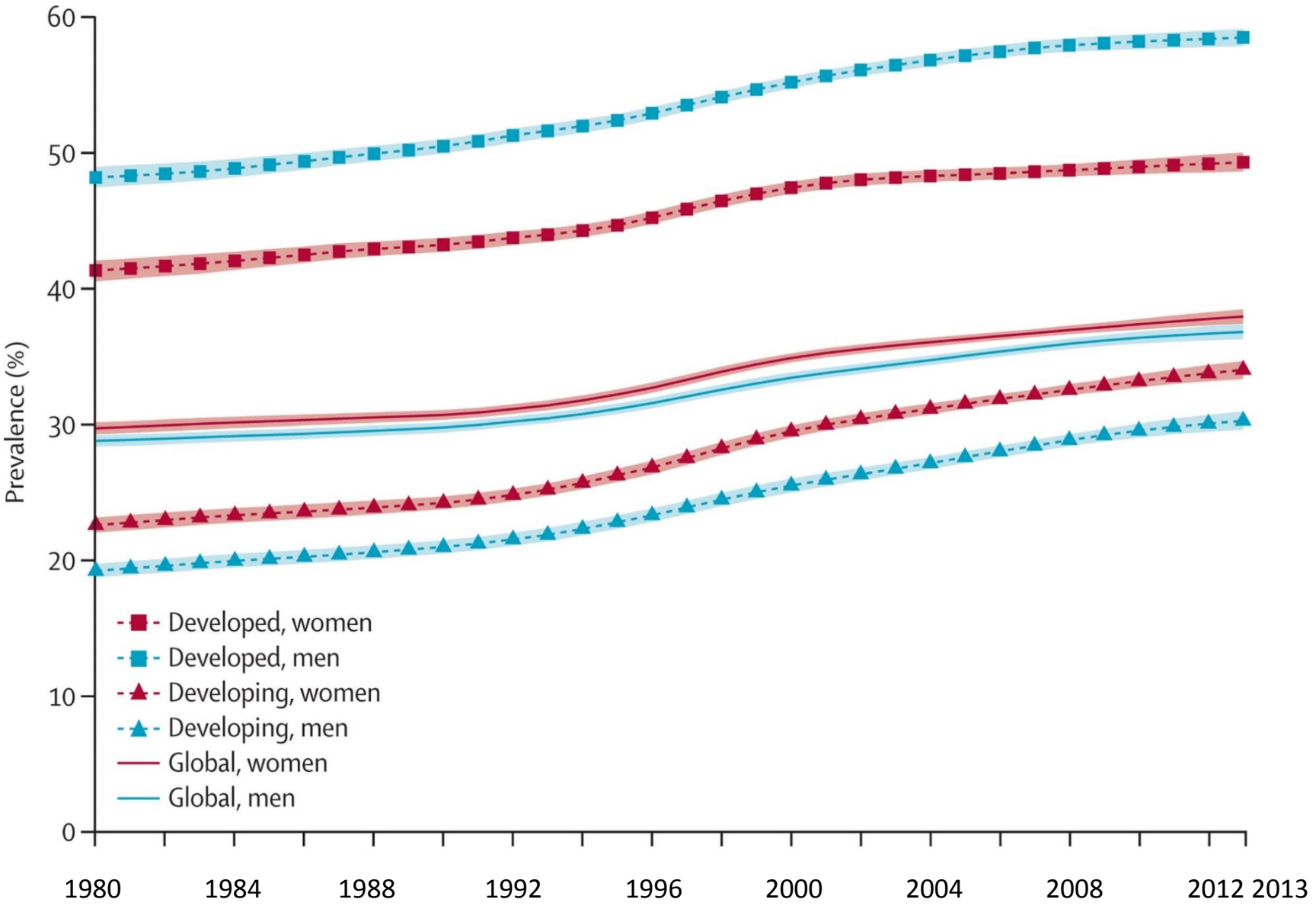
PAGE FIVE

Debut baby: Andy Murray's four-month-old daughter Sophia makes her first appearance at Wimbledon yesterday

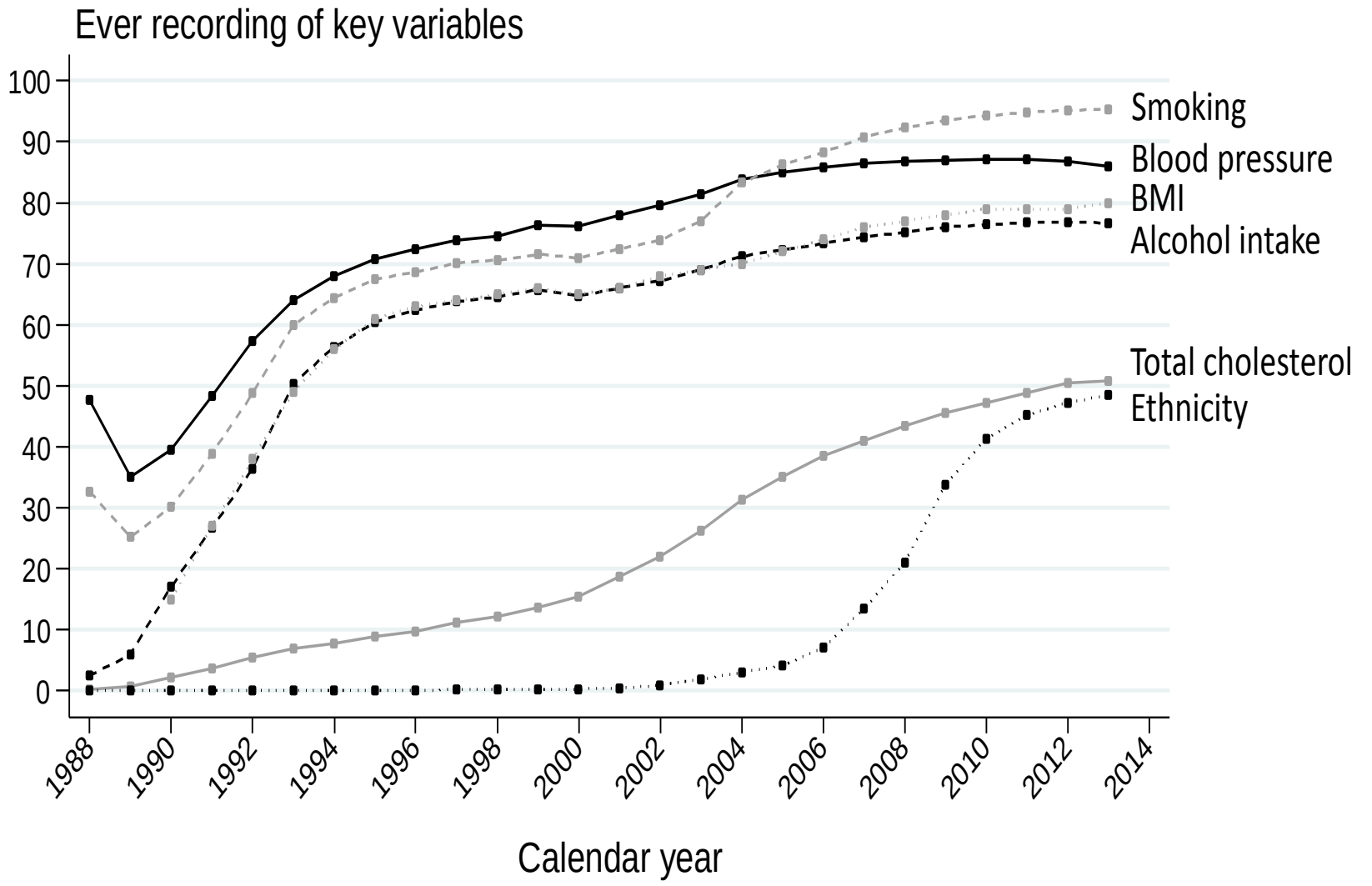
Body mass index and cancer

Bhaskaran K, Douglas I, Forbes H, dos-Santos-Silva I, Leon D, Smeeth L. Body mass index and risk of 22 specific cancers: a population-based cohort study of 5.2 million UK adults. Lancet 2014.

Age-standardised prevalence of overweight and obesity ages ≥20 years, by sex, 1980–2013

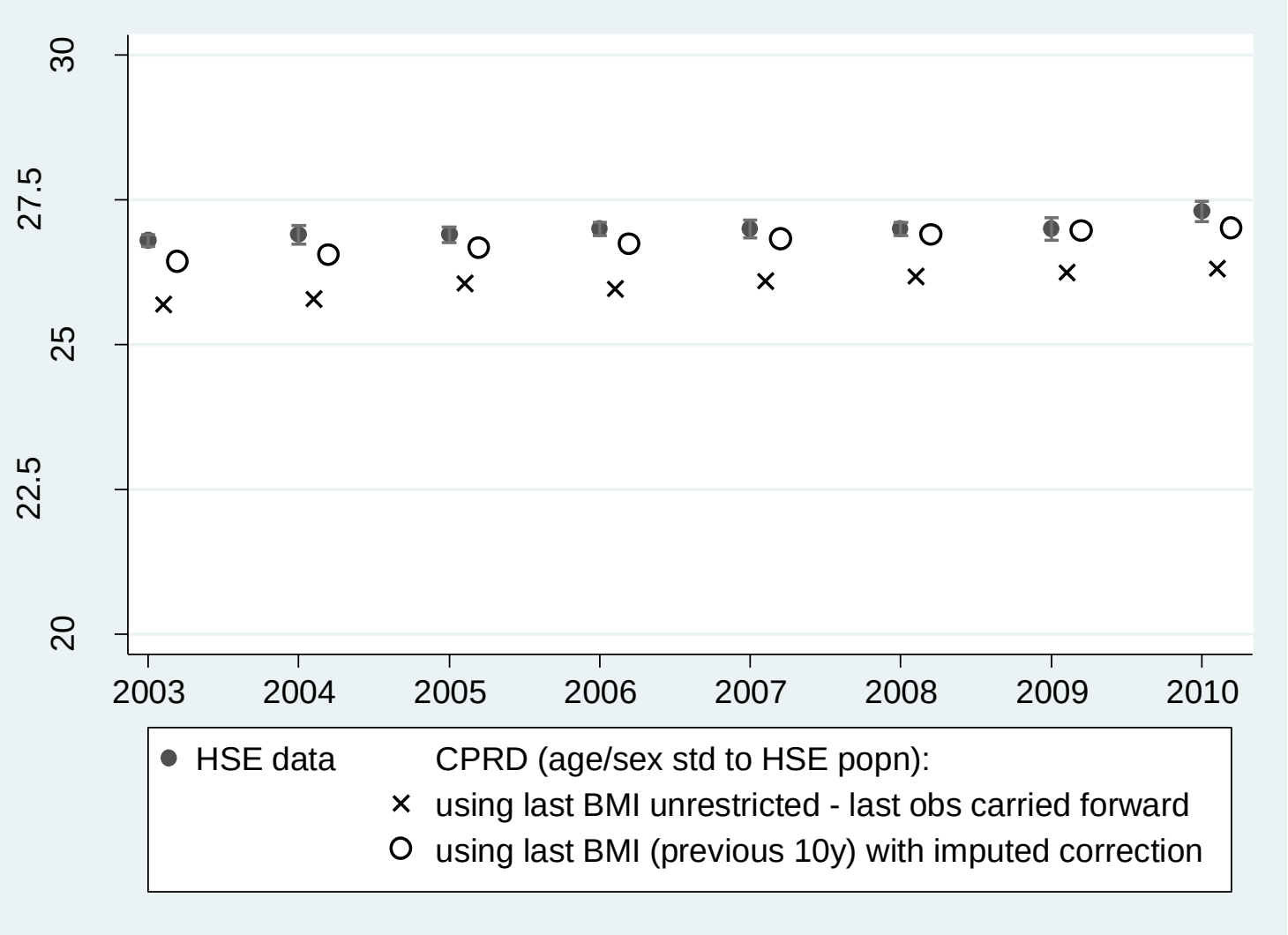


Ng M et al Lancet 2014



1. Herrett et al. Data Resource Profile: Clinical Practice Research Datalink (CPRD). IJE 2015 *In Press.*
2. Mathur R et al. Completeness and usability of ethnicity data in UK-based primary care and hospital databases. J Public Health (Oxf). 2014 Dec;36(4):684-92.

Mean body mass index (BMI) over calendar time comparing CPRD (English practices) with the Health Survey for England 2010 data



Bhaskaran K et al. Representativeness and optimal use of body mass index (BMI) in the UK Clinical Practice Research Datalink (CPRD). BMJ Open. 2013 Sep 13;3(9):e003389.

Body mass index and cancer

- Cohort study within the Clinical Practice Research Datalink (CPRD)
- 5.2 million people with BMI measures
- 33.9 million person-years of follow-up included
- 184,594 people (3.5%) experienced one of the 21 commonest cancers

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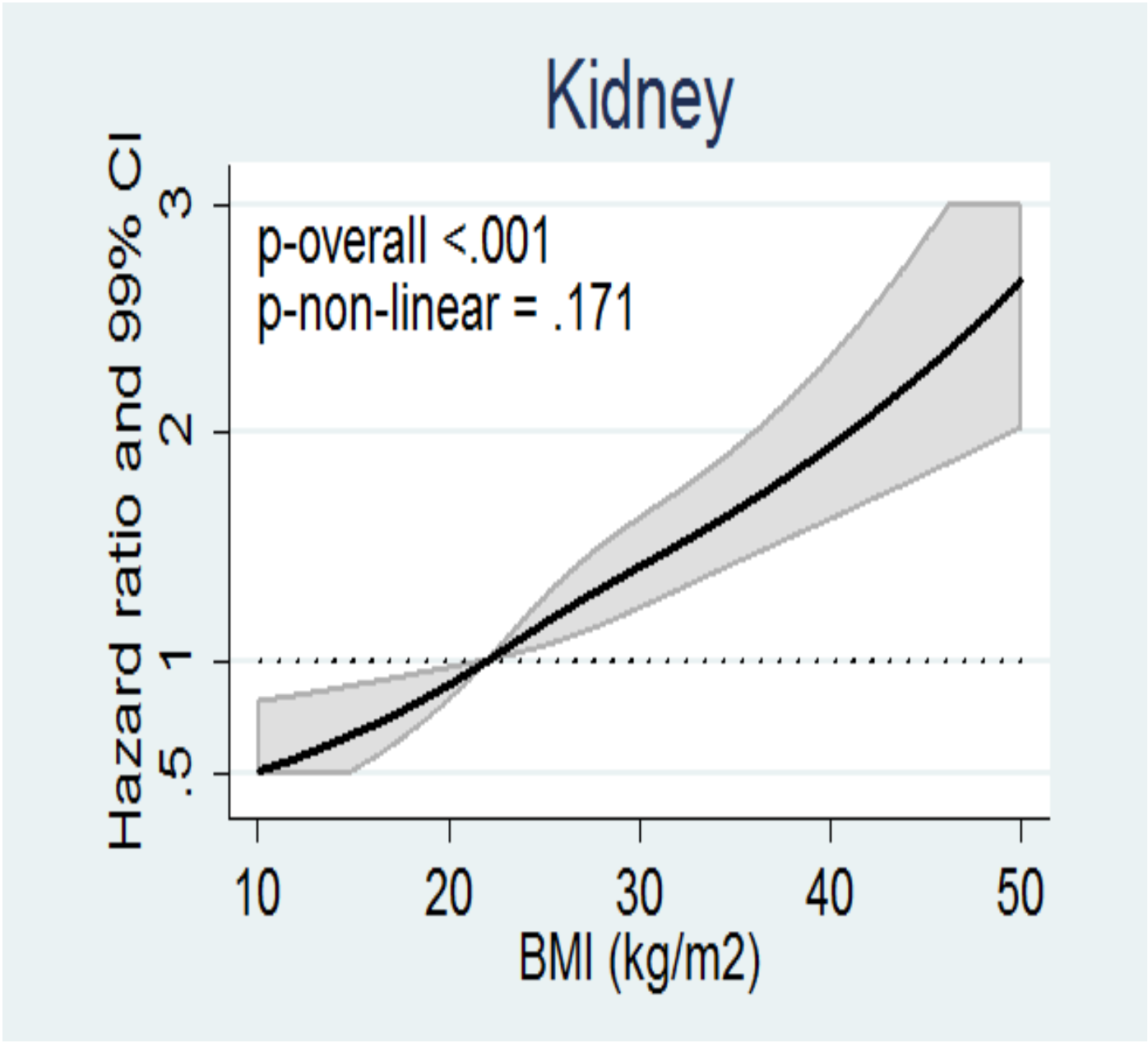
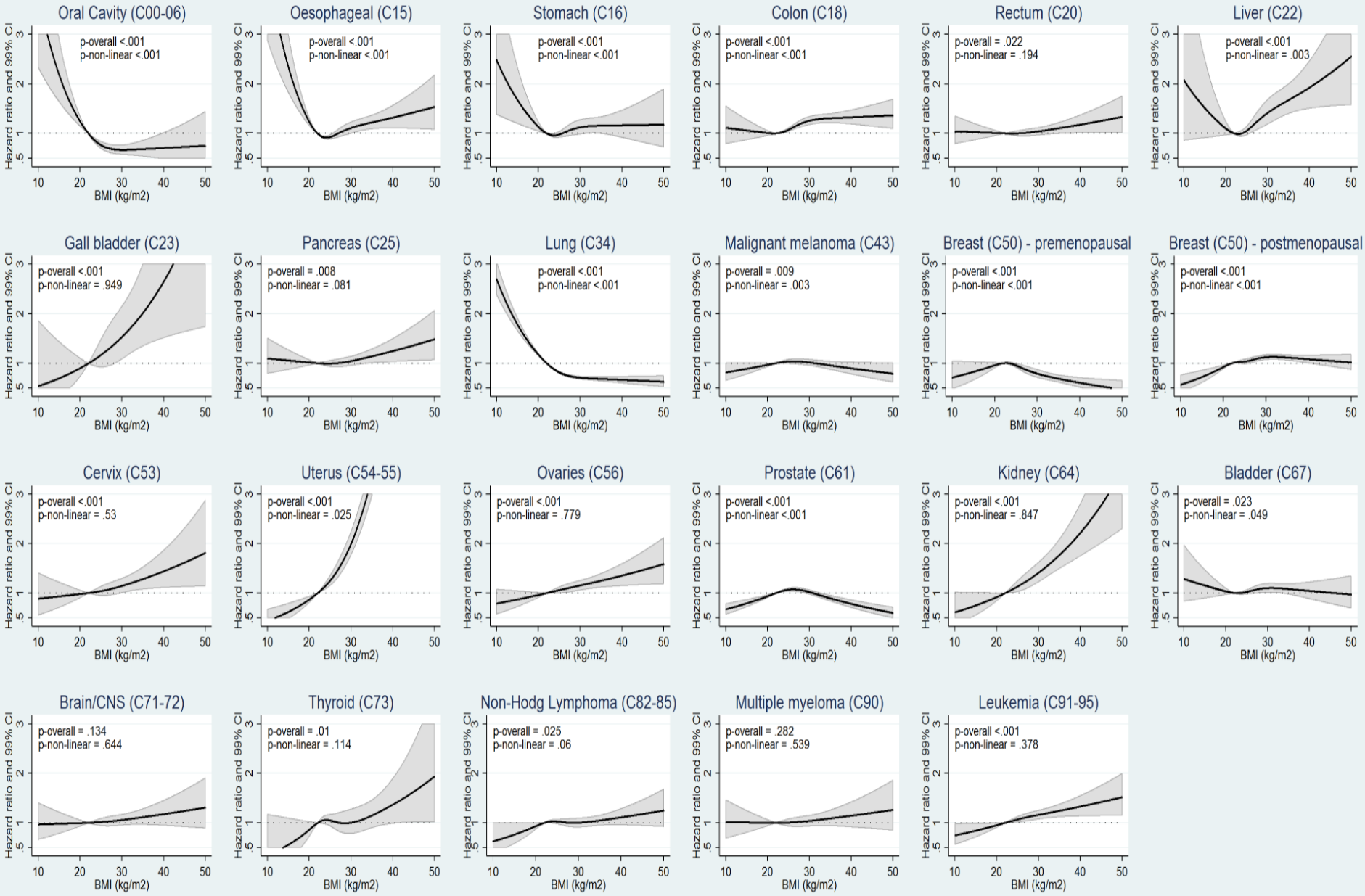


Bhaskaran K et al Lancet 2014


Oral Cavity (C00-06)
p-overall <.001
p-non-linear <.001
Oesophageal (C15)
p-overall <.001
p-non-linear <.001
Stomach (C16)
p-overall <.001
p-non-linear <.001
Colon (C18)
p-overall <.001
p-non-linear <.001
Rectum (C20)
p-overall = .022
p-non-linear = .194
Liver (C22)
p-overall <.001
p-non-linear = .003
Gall bladder (C23)
p-overall <.001
p-non-linear = .949
Pancreas (C25)
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Lung (C34)
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p-non-linear <.001
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Breast (C50) - premenopausal
p-overall <.001
p-non-linear <.001
Breast (C50) - postmenopausal
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p-non-linear <.001
Cervix (C53)
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p-non-linear = .53
Uterus (C54-55)
p-overall <.001
p-non-linear = .025
Ovaries (C56)
p-overall <.001
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p-non-linear <.001
Kidney (C64)
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p-non-linear = .644
Thyroid (C73)
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p-overall = .282
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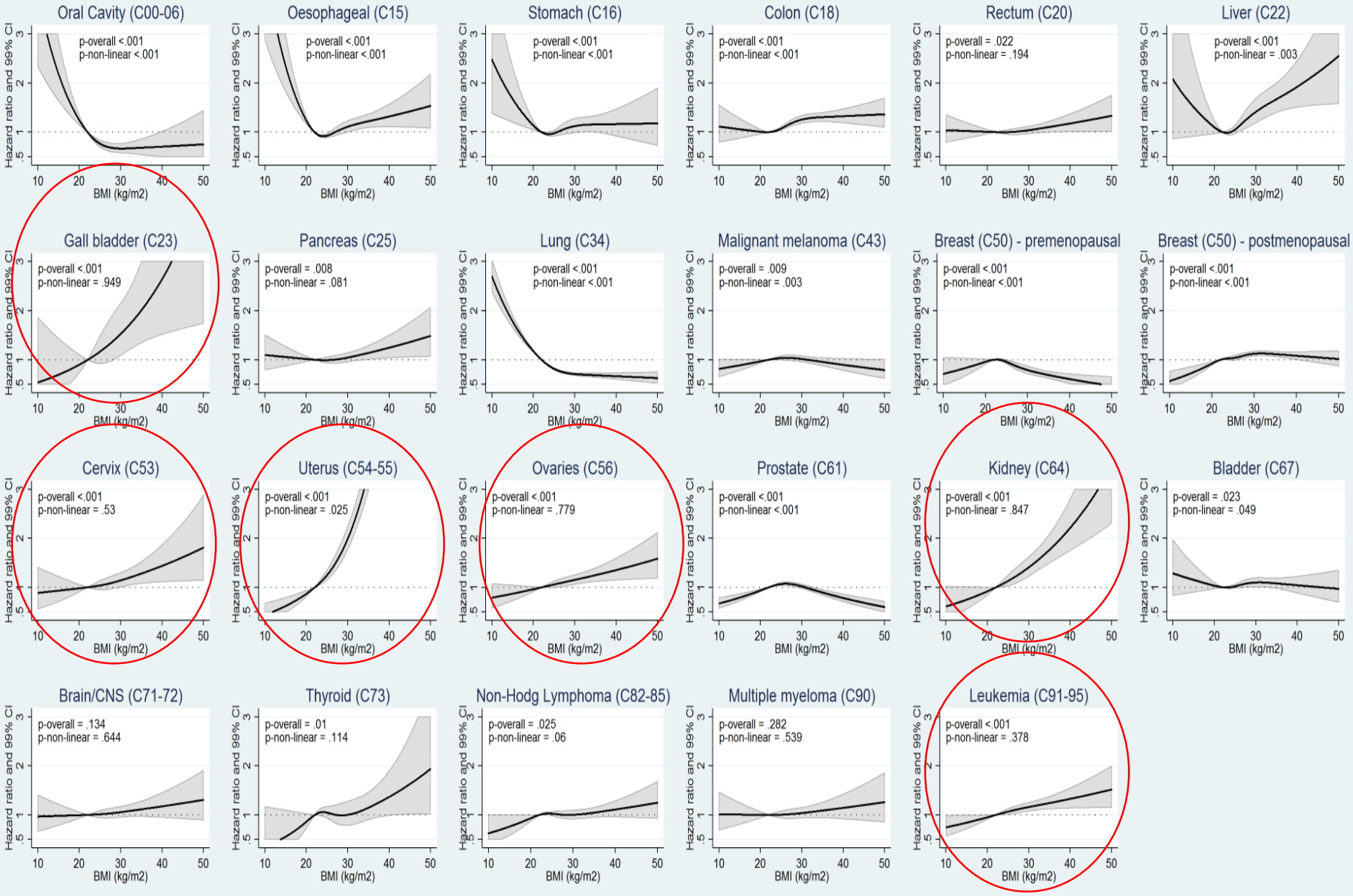
Hazard ratio and 99% CI
BMI (kg/m2)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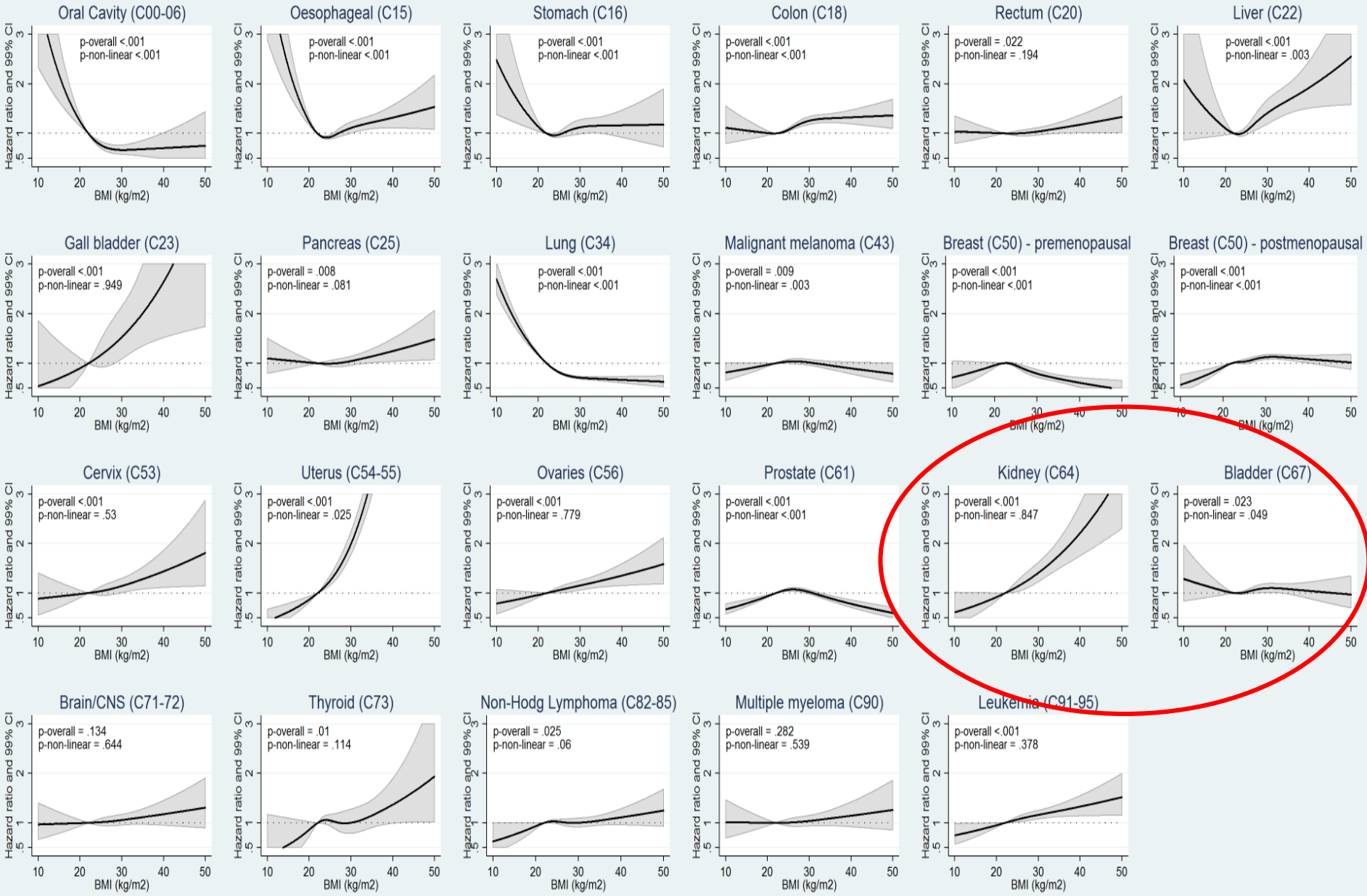
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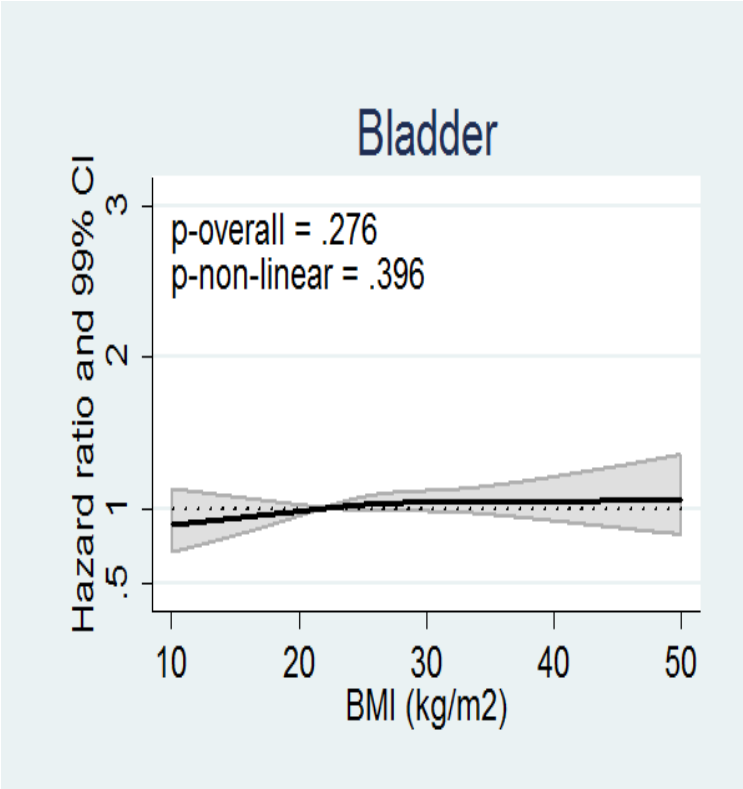
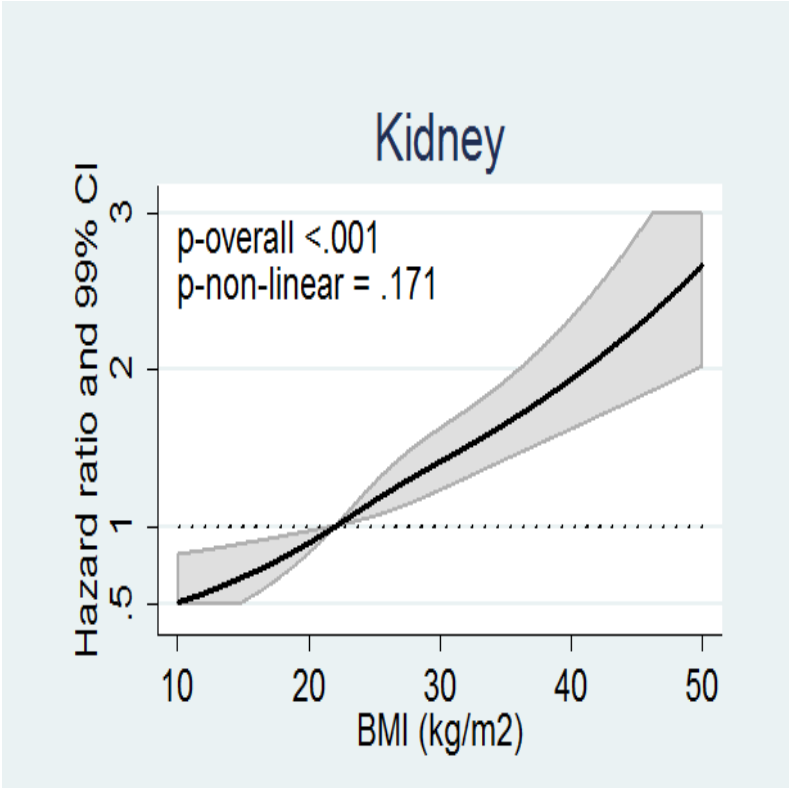
BMI (kg/m2)

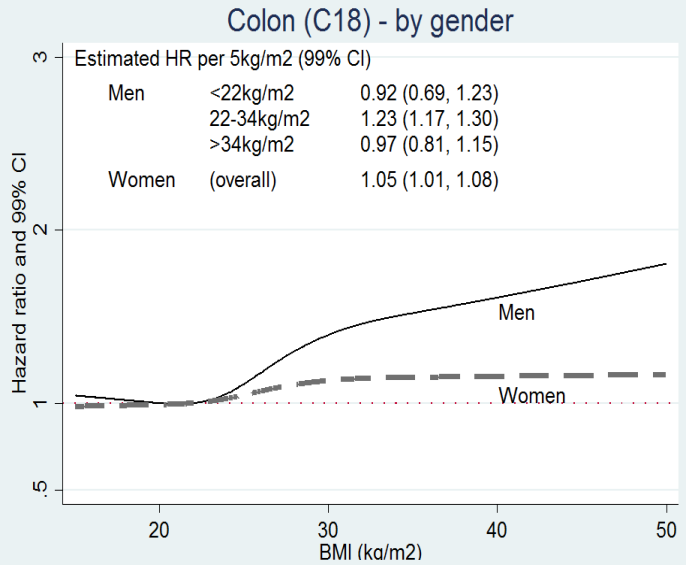
Different causes

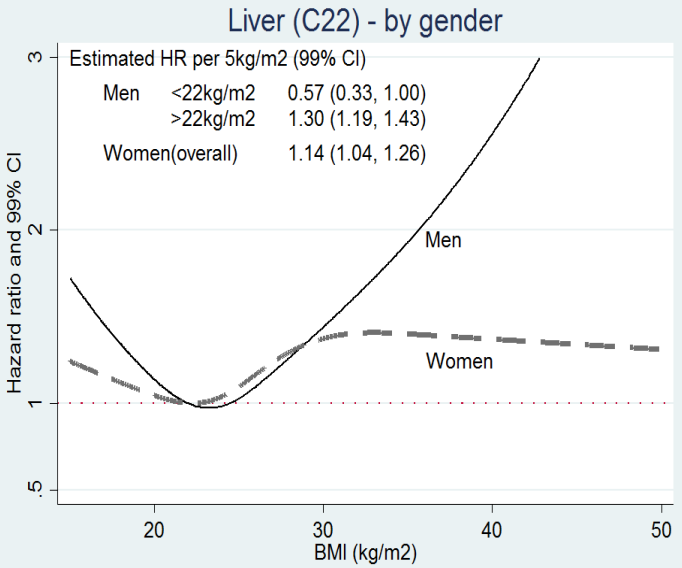


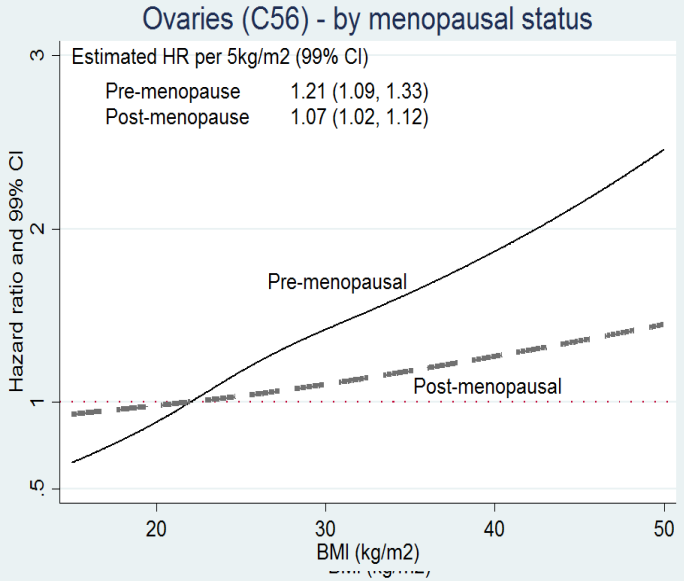


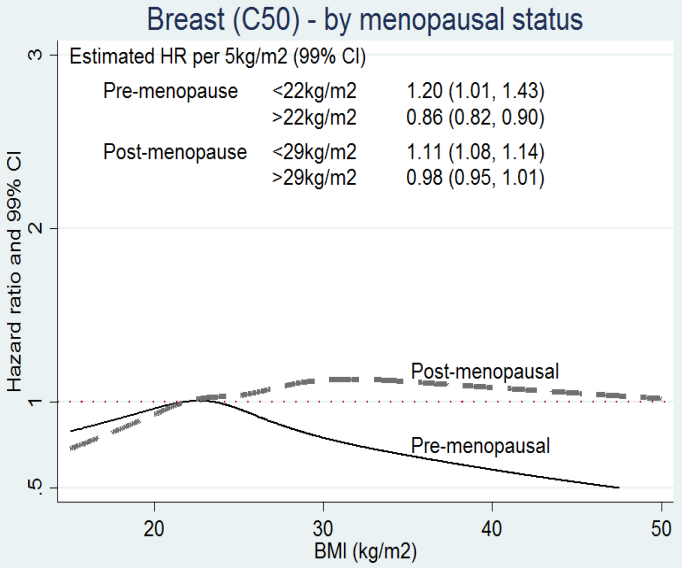
Bhaskaran K et al Lancet 2014

Effect modification by gender, menopausal status









Implications 1: public health

Assuming causality:

- for the 10 cancers showing a clear positive relationship, a 1 kg/m^2 population-wide increase in BMI (about the same as the last 10 years) will lead to:
  - 460,000 extra cancers worldwide

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Implications 2: biology

The heterogeneity in observed effects of BMI strongly suggests that underlying mechanisms vary by:

- gender
- menopausal status
- different tissues and organs

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The computerisation of health records ➔ extraordinary opportunities for research

- Cheaper research
- Research that couldn't otherwise be done
- Better research

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What do we need?

- Expertise, optimal methods, and ensuring high data quality
- Confidentiality and security of data
- Maintaining public trust

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Round table session - 16.30-17.15

How are Schools of Public Health making use of new data sources?

Anna Odone (University Vita-Salute San Raffaele, Italy)

Maurice Zeegers (Maastricht University, Netherlands)

Damir Ivankovic (EuroNet MRPH)

Carmen Varela Santos (ECDC)

Facilitator:
Martin McKee