Low carbon transition for future urban planning

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ESRC workshop
13 June 2016

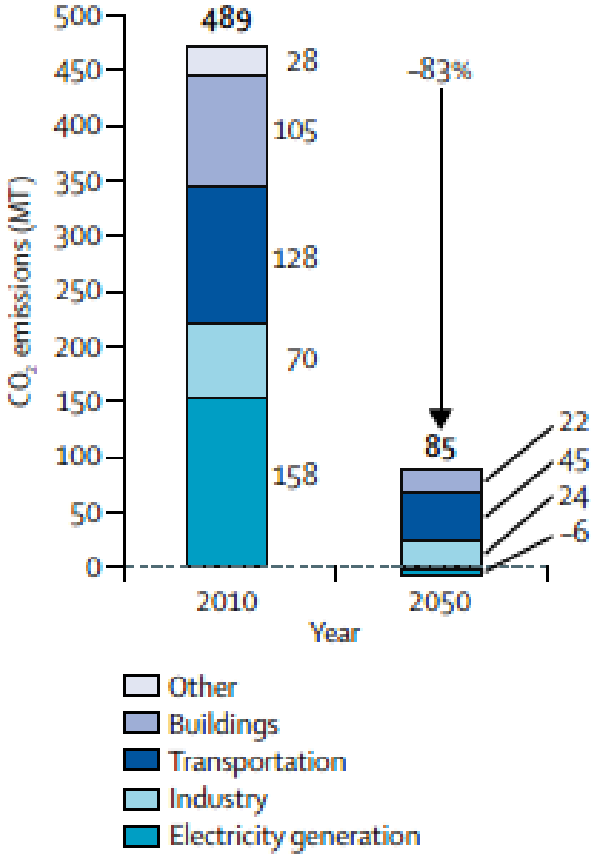
Observations

1. Meeting climate change objectives requires transformative changes in all sectors of the economy, and offers an unprecedented opportunity for tackling global health goals;
2. Most strategies for reducing greenhouse gas (GHG) emissions (the 'low carbon transition') have the potential for appreciable net benefit to population health;
3. Benefits are not always automatic, however, and care is needed to avoid unintended adverse consequences;
4. Interventions in high income settings have the greatest need and potential to reduce GHGs but more moderate potential for gains in health: the converse is generally true for low income settings;
5. In the UK, the greatest opportunities for health tend to arise through changes that relate to personal choice and behaviour, but such changes have comparatively modest impact on GHG reductions which mainly depend on infrastructure change;
6. The greatest challenge is *how* to achieve the required scale and pace of change – technology, efficiency, social desirability, freedom of choice, and political inertia all tend to act to increase unhealthy consumption

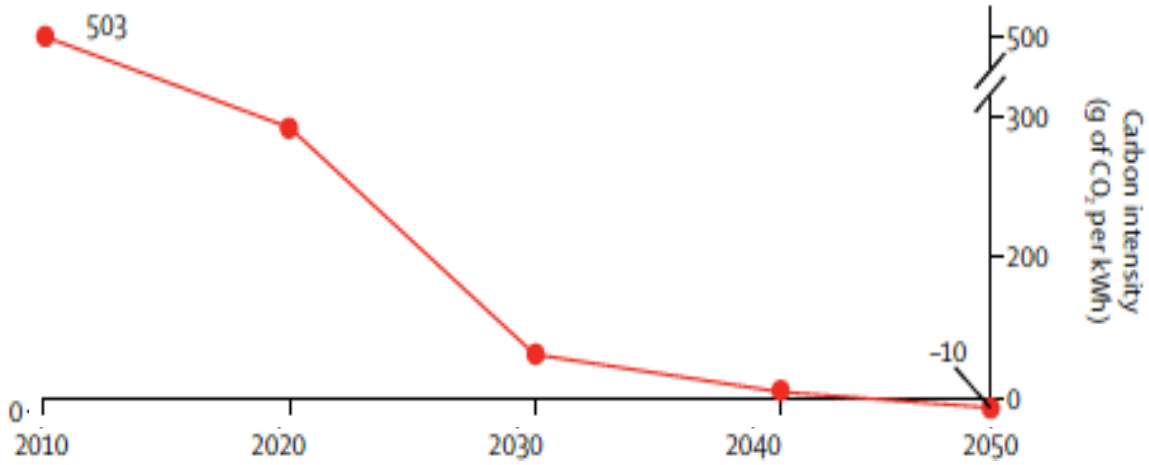
Principle

Transition to a ‘low carbon’ economy presents opportunities for improving population health through reduction of harmful exposures (e.g. air pollution) and promotion of healthier behaviours (e.g. active travel, improved diet)

Meeting climate change objectives requires transformative changes in all sectors of the economy, and offers an unprecedented opportunity for tackling global health goals



Energy-related CO_2 emissions, 2010 & 2050, and carbon intensity pathway, UK



Source: Watts N *et al*, Health and climate change: policy responses to protect public health. *The Lancet* 2015; **386:** 24 Jun

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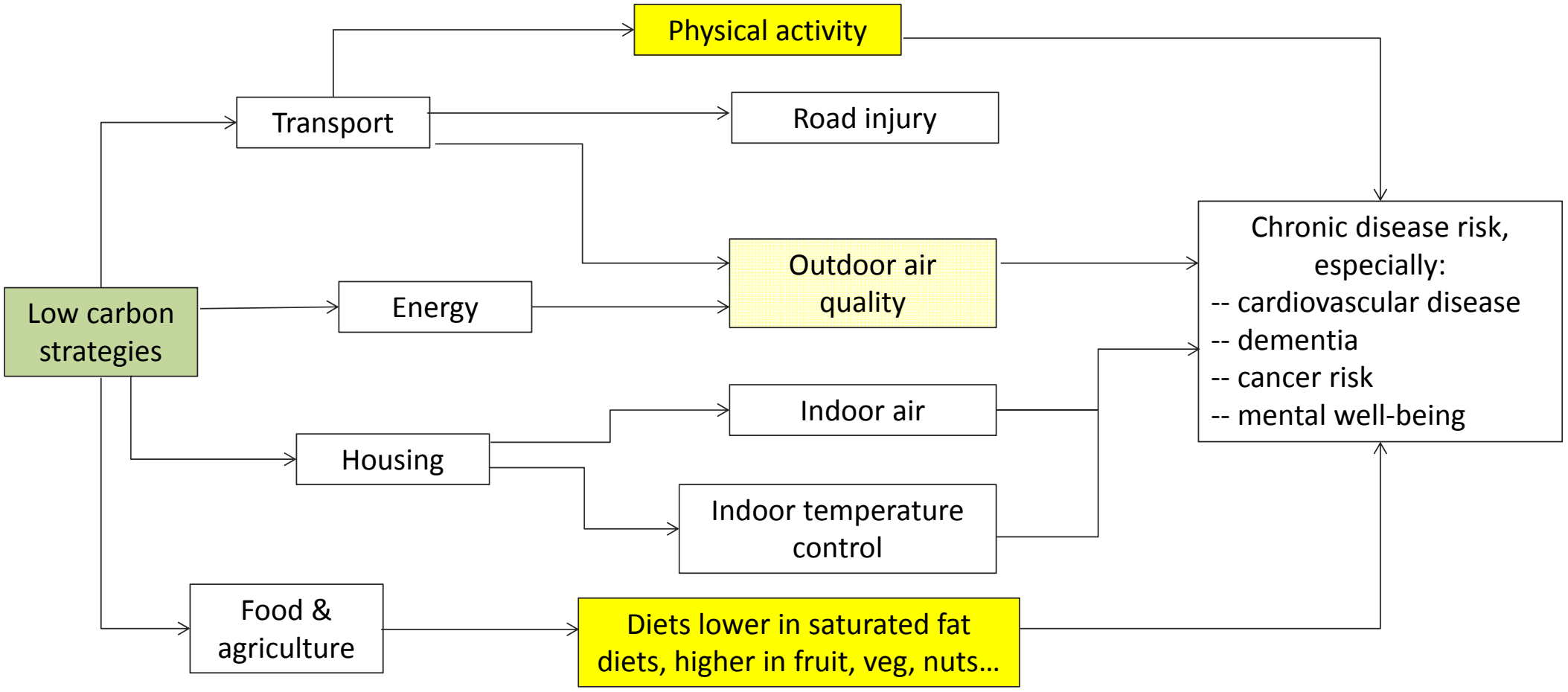

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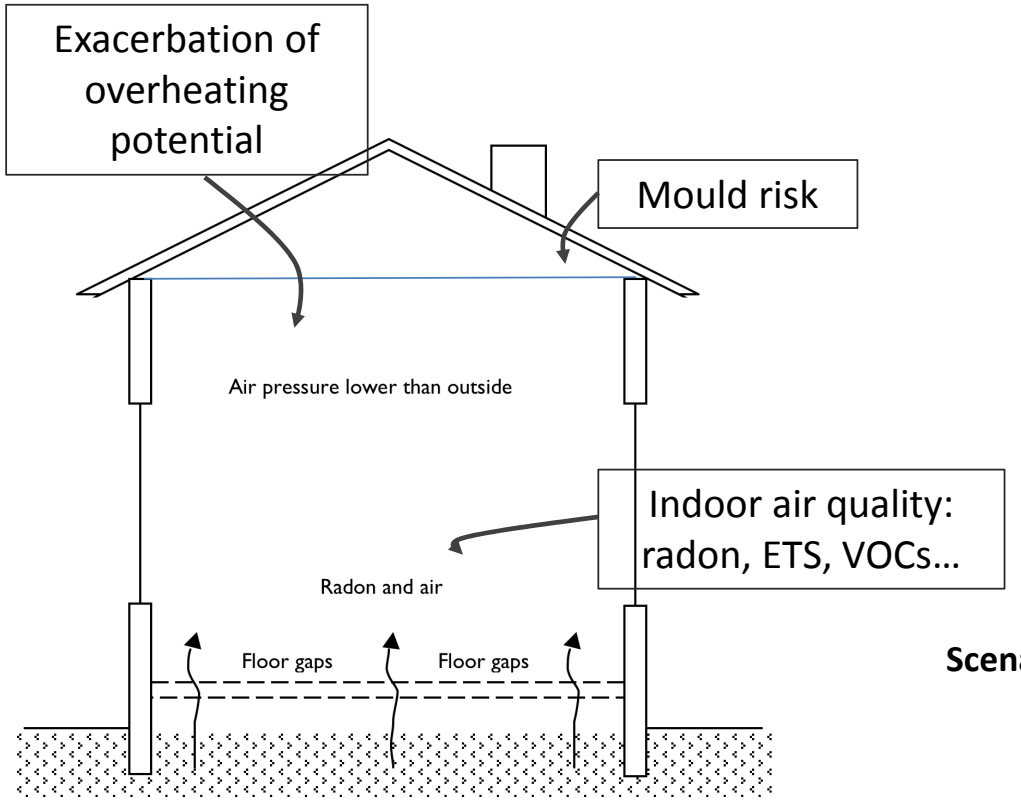
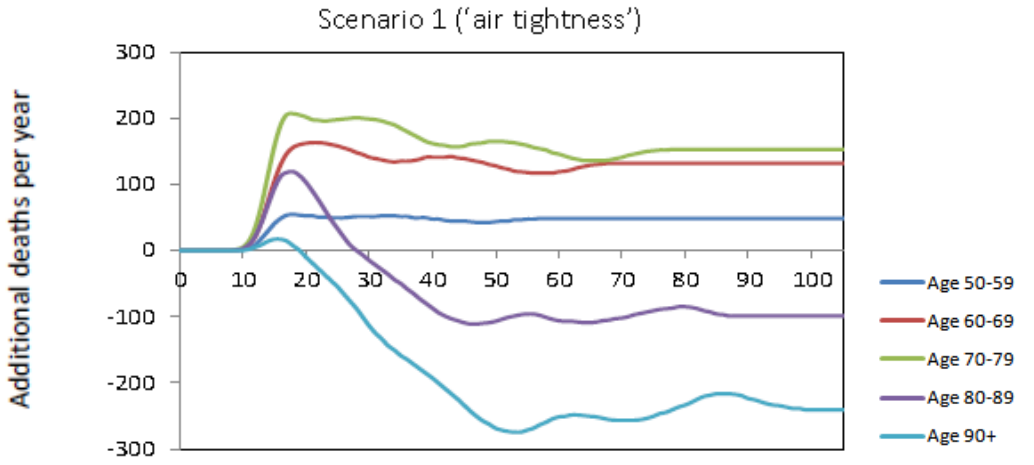


Need for caution arises in (almost) all sectoral programmes: housing, energy, transport



Scenario	Radon exposure (Bq m^{-3})			% above 200 Bq/m^3
	Mean	Median	95th centile	
Present *(baseline)*	21.2	12.5	73.3	0.6%
Scenario 1 *(air tightness)*	33.2	19.5	121.2	2.0%

Source: **Milner J et al, *BMJ* 2014**

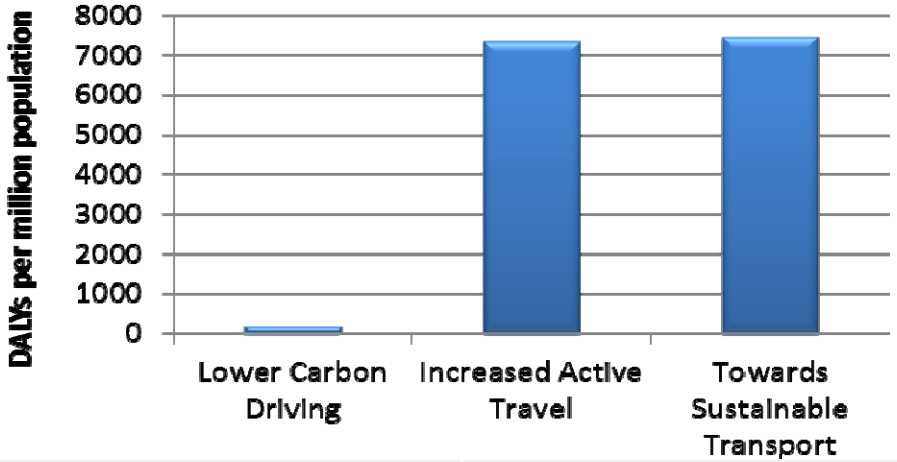
Interventions in high income settings have the greatest need and potential to reduce GHGs but more moderate potential for gains in health: the converse is generally true for low income settings

Impact per million of population in 1 year	UK household energy efficiency (combined improvements)	India programme of improved cookstoves*
DALYs saved	850	12,500
Deaths averted	90	990
Mt-CO_2 (CO_2e) saved	0.7	0.1 - 0.2

* Results based on comparison of fixed population with and without full implementation of programme

The greatest opportunities for health tend to arise through changes that relate to personal choice and behaviour, but such changes have comparatively modest impact on GHG reductions which mainly depend on infrastructure change

Transport scenarios: health impacts



	Change in disease burden	Change in premature deaths
Ischaemic heart disease	10-19% ↓	1950-4240
Cerebovascular disease	10-18% ↓	1190-2580
Dementia	7-8% ↓	200-240
Breast cancer	12-13% ↓	200-210
Road traffic crashes	19-39% ↑	50-80

Source: Woodcock et al, *Lancet* 2009

The greatest challenge is how to achieve the required scale and pace of change – technology, efficiency, social aspirations, freedom of choice, and political inertia all tend to act to increase unhealthy consumption

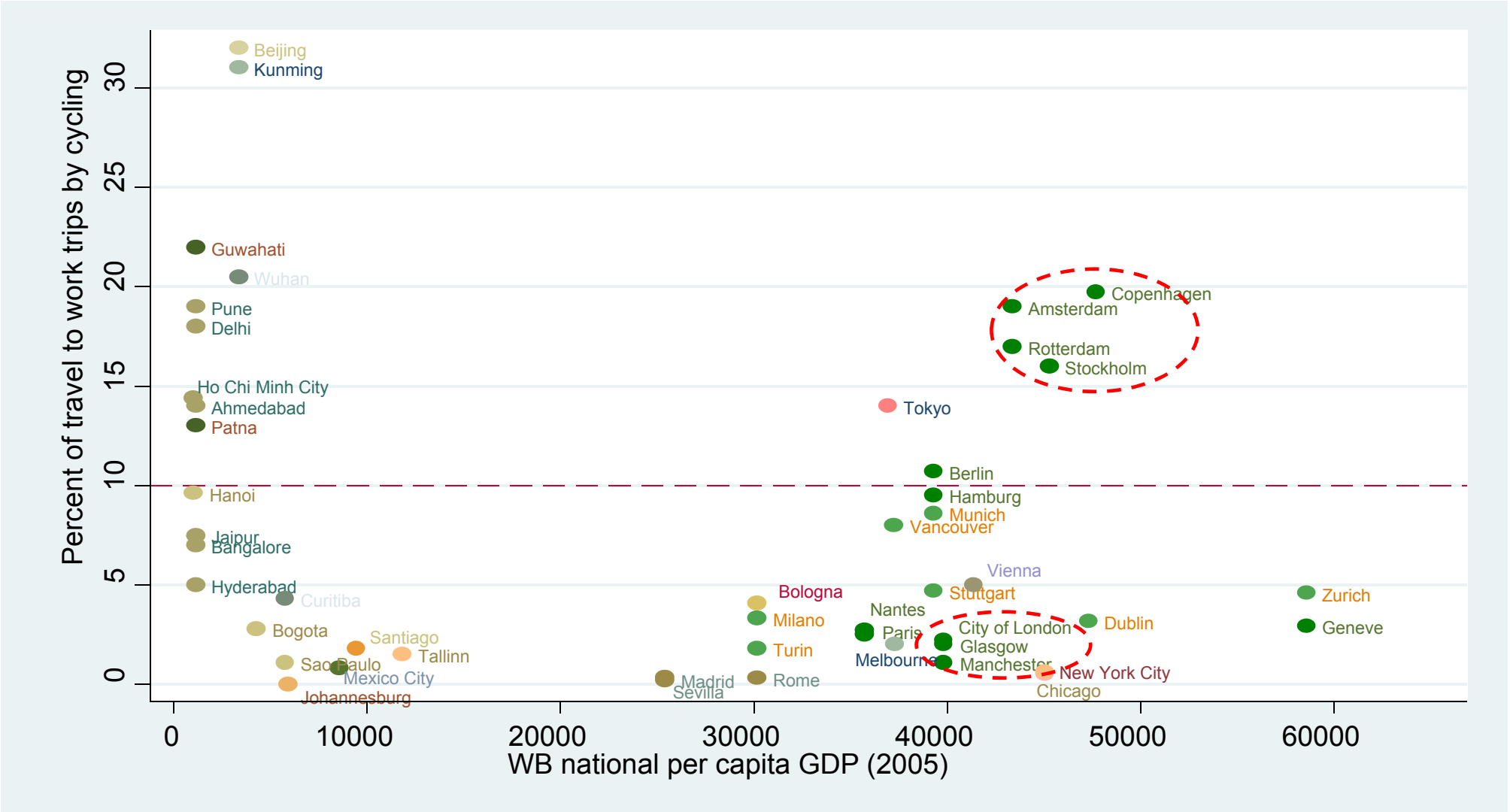
Hypothetical impact of selected mitigation scenarios for London on pollutant emissions, concentrations and years of life gained

	'Baseline'	*Scenario 1*	*Scenario 2*	*Scenario 3*	*Scenario 4*
Description	Business as usual	Bus fleet +20% of cars to H_2* or electric	40% lower building emissions	Half journeys <10km by walking/ cycling (50%) or publ trans	Combined
Emissions difference$ (%)	(tonnes/yr)				
PM	(3564)	-4.5%	-3.1	-3.4%	-10.6%
NO_x	(78994)	-7.9%	-11.6	-1.5%	-20.8%
CO_2	($39.5x10^{6}$)	-5.3%	-15.1	-2.2%	-22.1%
Change in concentrations	(µg.m-3)				
PM_{10}	(23.7)	-0.4%	-0.4%	-0.4%	-1.3%
NO_2	(36.8)	-4.6%	-7.0%	-0.5%	-12.0%
Gain in life years over 10 yrs:					
PM_{10} Total YLG	(baseline)	2527	1389	1736	5532
YLG per 100,000 pop		35	19	24	77
NO_2 Total YLG		26445	38223	3970	68834
YLG per 100,000 pop		366	529	55	953

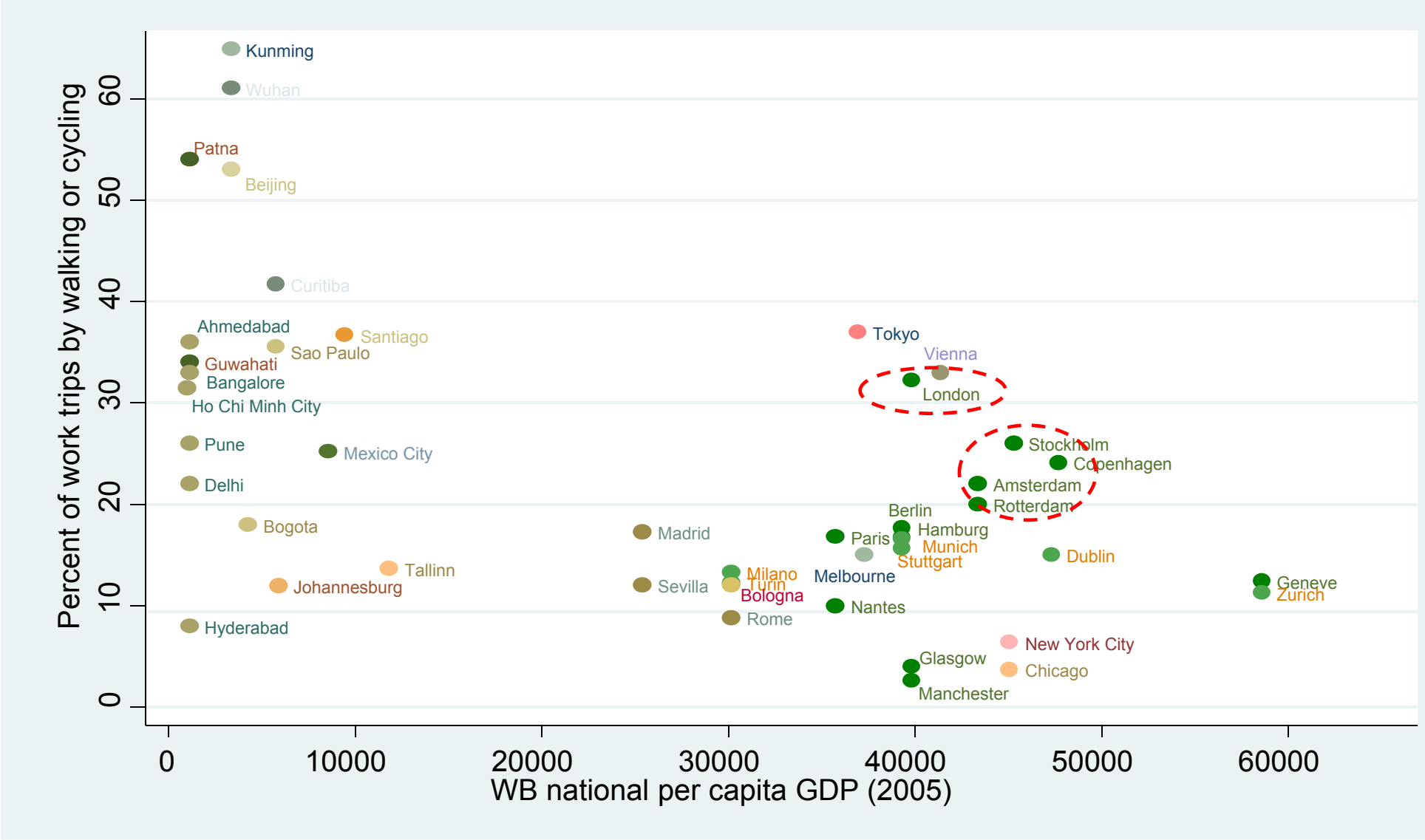
** -- assumed to be hydrogen fuel cell*
$ -- difference from baseline

Source. Wilkinson et al., Lancet 2007

Percent of travel-to-work journeys by cycling *vs* national GDP



Percent of travel-to-work trips by walking *or* cycling *vs* national GDP



Conclusions

- The low carbon transition offers important opportunities for health
- Capitalizing on them isn’t simple