Valuing Nature in Public Health Economics and the role of Public Goods

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This blog was written to accompany my contribution to Naturally Healthy in Birmingham, March 2017 – an event to improve the availability of methods to demonstrate the cost-effectiveness of addressing local health priorities through increased access to the natural outdoors in the UK. This brought together experts from across the UK in public health, clinical commissioning, health economics, environmental economics, spatial planning and leaders in the provision of natural outdoor spaces.

VALUING NATURE

In this blog I want to talk about:

- My understanding of the origins of **health economics** - have we, in relation to population health, come full circle from public sector economics, through the development of health economics, and back now to the need for a whole system, public sector economics with a focus on health, the environment and wellbeing?
- Remind us of the need to consider **economic theoretical paradigms**, and if necessary challenge them, checking the underpinning assumptions of the analytical tools we are using – such as **cost benefit analysis.**
- Think about how we can share analytical tools between disciplines e.g. health economists, environmental economists and welfare economists
- I want to share my interest in public goods and what economics theory has to say about how we value them in society

Birds are good for your health

There was a report on Radio Four about the positive health benefits of access to watching birds and listening to birdsong. These findings came from a survey of people across the UK; a collaborative research project between the British Ornithological Association, Exeter University and the University of Melbourne Australia, which found that people with access to birds through gardens and parks experienced less anxiety and depression, and better mental health than those with little access to nature.

Below is a link to the research

http://www.exeter.ac.uk/news/featurednews/title_571299_en.html

A walk in the woods

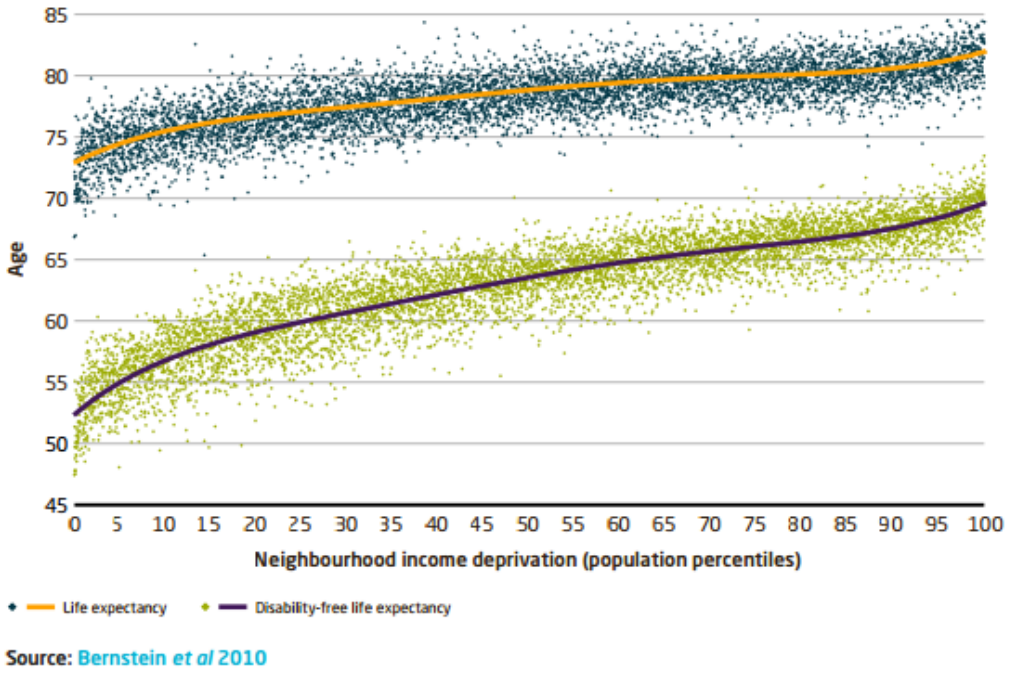
An Atlantic College school reunion led to a walk across Newborough Forest in Anglesey, North Wales. We came out of the trees onto a windswept beach and had a bracing 2 mile walk to a causeway across onto Ynys Llanddwyn, a holy island with the remains of a church, celtic cross and pilot cottages. The effects of the physical exercise and camaraderie of being with old friends in the outdoors, stayed with me ever since, giving a positive lift to my mental health.

(*Atlantic College Reunion)*

Professor Sir Michael Marmot on his Desert Island

Professor Sir Michael Marmot said on Desert Island Discs that "Medicine is failed prevention". Recent work by the Kings Fund has updated his famous **"Marmot Curve"**, showing the relationship between life expectancy and income deprivation, to show that the relationship between life expectancy and income is more about deprivation and where you live, than income deprivation alone. **'Place'** remains important over and above other findings and relationships (Buck and Maguire 2015). Maybe access to nature, including access to gardens and parks, is a part of this relationship. Buck and Gregory (2013) proposed a number of ways local authorities can encourage better use of green spaces to promote health, for example through involving local residents, through local planning decisions and through working with the private and third sector. However this is at a time when local authorities in England have sustained up to 40% budget cuts. Things are not much better around the rest of the UK.

The Marmot Curve



Source: Bernstein *et al* 2010

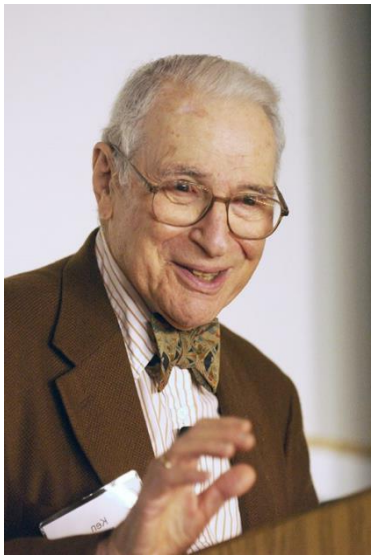
Link to Sir Michael Marmot on Desert Island discs

http://www.bbc.co.uk/programmes/b048j630

Market Failure and Public Health

In thinking about nature in public health economics we start from a position of failure, specifically market failure. **Market failure** occurs when for a particular good or service the price mechanism fails to lead to an efficient level of production and consumption, via the interaction of consumer demand and producer supply of that good or service in the economy. Most developed countries have rejected the market for determining access to, consumption of, and distribution between individuals in society, of health care, education, access to the natural environment and to some extent housing and transport. Public finance and provision of such goods and services requires prioritisation and, by default, some evaluation from a public sector payer perspective of costs and outcomes. As I understand it, historically this led in the 1960s, to the development, away from public sector economics to applied health economics, environmental economics, agricultural economics and education economics. So, picking up a book recently on principles of cost-benefit analysis found me listening to the words of my PhD supervisor at York – Professor Alan Williams - originally a public sector economist - instrumental in the development of the **Quality Adjusted Life Year (QALY)** (Sugden and Williams 1978). In the 1960s and 1970s there was an emerging need to specialise and develop applied methods for identifying, measuring and valuing health benefits, in what **Tony Culyer** referred to as **"Extra-welfarism"** (Culyer 1989).

Now to answer my first question, we seem to be needing to return to public sector economics to grapple with quantifying and valuing inputs and outcomes in public health e.g. The value of nature in public health. In recent months I have found myself turning more and more to the Treasury Green Book as an informative resource for economic evaluation in Public Health (Treasury 2011.) The Green Book provides guidance for central government on the preparation and evaluation of proposed policies, programmes and projects to yield the best public value and manage risks.



Kenneth Arrow

The Death of a Nobel Prize winning economist

In February 2017, Kenneth Arrow died aged 95. Tony Culyer's obituary for Kenneth Arrow reminded us of Arrow's legacy to health economists. He was a Nobel Prize winning giant of an economist whose work on social choice theory amongst other things, provided a foundation to health economics. Arrow went on to work on the economics of climate change, public health and global systems. His work on market failure contributed to the apparatus of social welfare functions and eventually underpinned extra welfarism that has led in health economics to the development of Cost-Utility Analysis and the Quality Adjusted Life Year (QALYs) now used by the National Institute for Health and Care Excellence (NICE) in the UK.

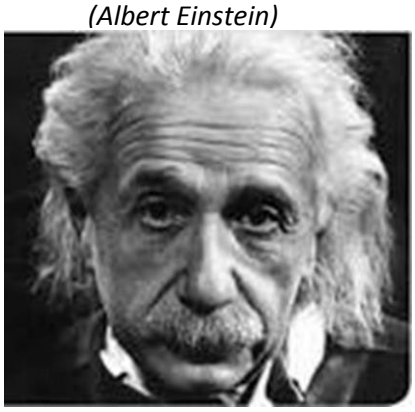
(Obituary by Tony Culyer)

https://www.ohe.org/sites/default/files/Kenneth%20J%20Arrow_0.pdf

Why value nature in health economics?

So, why are some health economists now turning to think about the value of nature in public health? Health economists today, I would, argue have three roles. First, as Tony Culyer noted, as the **"dispassionate analyst"** (Rice 2014); second, as proponents of "nudge theory" would call **"choice architecture"** (Thaler and Sunstein 2009), taking an active role in helping decision makers, e.g. policy makers and local service commissioners, to formulate problems, set priorities and incorporate economic evidence of cost-effectiveness in their decision making (Edwards et al 2014). To this end, our role is a normative role, based on a value judgement that "more health is better than less health for society". Third, is an important role of helping with the communication of economic evidence used to underpin policy and spending decisions. This is where we can have a real impact.

(Albert Einstein)



Now we are back at the point where we need to discuss the measurement of costs and outcomes, and where nature fits in. Albert Einstein had a sign hanging in his office in Princeton that read "Not everything that can be counted counts and not everything that counts can be counted". It is the business of the health economist, increasingly working with economists in other applied areas of economics, to identify, measure and value resources and hence costs and outcomes from uses of resources to meet societal goals. Now that attention is turning, due to over burdening costs of health and social care, to the prevention of chronic disease and premature death from inequalities in society and health harming

behaviours, we are searching around in the economic evaluation tool box for analytical tools to advise policy makers and bring evidence to decision making.

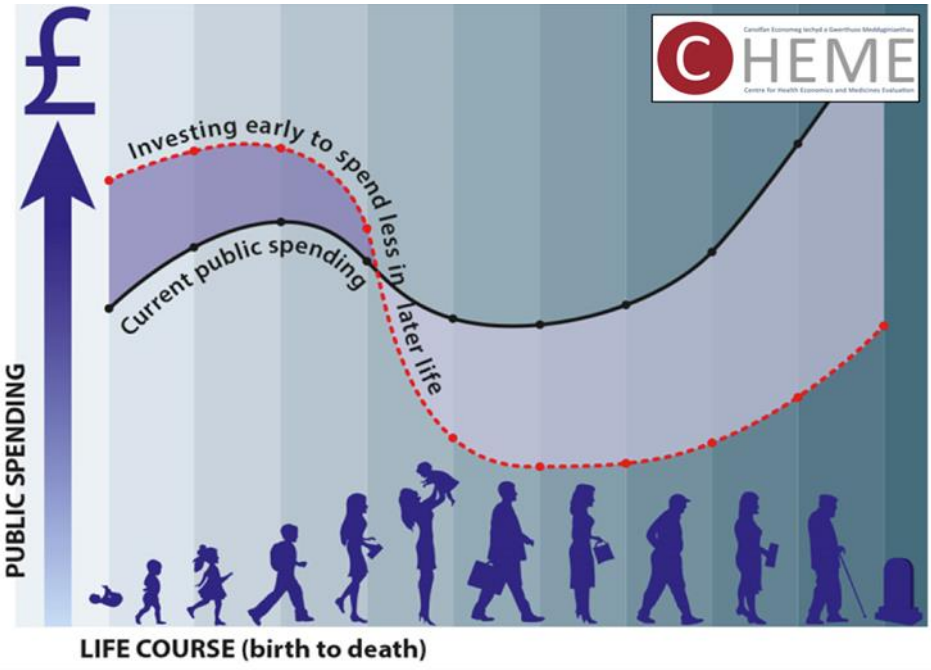
In thinking about the challenge of valuing nature in the economic evaluation of public health interventions, it is helpful to distinguish between the need to understand the relative contribution that different attributes of a health care or public health prevention intervention may hold for patients/consumers, and the eventual outcomes of these interventions. Discrete choice experiments (DCEs) are now widely used to find out what attribute of an intervention patients value and their relative importance or contribution to overall utility of the experience of receiving health care. DCEs have not been widely used in Public Health. One attribute that is commonly included in DCEs of health care processes is "willingness to pay", a stated preference method that aims to find out how patients or consumers value in monetary terms, a particular configuration of an intervention to improve their health. Willingness to pay or contingent valuation, as it is known, offers a way to capture stated preferences in a choice setting. Alongside such hypothetical thought experiments is the need to ask respondents their household or individual income so as to be able to contextualise their stated willingness to pay. A hundred pounds is a lot of money to some people and not such a great sum to those with more wealth or disposable income.

To some extent these methods are a second best practical solution to the fact that many goods and services in society do not have a market price, e.g. most health care in the UK at the point of consumption and, for that matter, access to the natural environment such as national parks in the UK. My own recent experience of a £4 parking charge at Newborough Forest on Anglesey that enabled me to walk with friends through the forest and onto the beach, made me think about how we are not used to paying for access to the natural environment and may even resent it. I wonder what, if any, relationship my willingness to pay for parking, bears to my hypothetical valuation of the experience of walking through the forest, along the beach and out onto the island across the causeway.

Llanddwyn Island, Anglesey

How much will we pay for health?

This brings me to the issue of implicit and explicit social willingness to pay for health improvements of relevance to this discussion about valuing nature in public health. The National Institute for Health and Care Excellence **(NICE)** plays an influential role in producing and using evidence of cost-effectiveness, primarily in the evaluation of new drugs and devices, for the purpose of advising the adoption or otherwise of these new drugs and treatments in the UK NHS. NICE takes into account both their cost-effectiveness and likely budget impact, to capture the full potential opportunity cost of health gains that will be forgone through the adoption of a new drug or treatment. With a rule of thumb or threshold of £20,000 - £30,000 per Quality Adjusted Life Year **(QALY)** for most new drugs and treatments, £50,000 per QALY for drugs and treatments used at the end of life, often for the treatment or palliative care of cancer; and up to £100,000 per QALY for drugs and treatments used for patients with extremely rare conditions - drugs that are known as **"orphan drugs".** The routine use of these differential payer thresholds means the proliferation of largely implicit value judgements that to society a QALY is worth, in general £20,000 - £30,000 - about the average household disposable income of a family in the UK (after tax and social security payments); that society values a quality adjusted year of extra life at the end of life more than at any other time in the life course; and that society values or is willing to pay more for the treatment of patients with a very rare condition than for those with a common condition, presumably because however costly, the budget impact will be less than for the treatment of common conditions. Is there an argument for a cost per QALY threshold for preventative interventions being any different to those used in treating patients who are already ill?



Source: Edwards et al 2016

Lesley Owen and colleagues at NICE found that about 85 percent of public health interventions for which NICE had produced guidance had a cost per QALY of less than £20,000 (Owen et al 2012). One of our studies, a collaboration between **DECIPHer** in Cardiff and **CHEME** at Bangor, calculated a cost per QALY of £12,000 for the All Wales Exercise Referral Scheme – an exercise on prescription programme delivered in local leisure centres and gyms (Edwards et al 2013). What puzzles me is that the current focus is on the potential "cost savings", that public health interventions can bring, when we do not place this evaluative bar in front of clinical interventions. We do not say "What cost savings will this hip or knee replacement operation deliver to the NHS or wider economy?" before commissioning orthopaedic services. What has happened has been a shift to advise that a discount rate of 1.5 percent rather than 3.5 percent should be used in the economic evaluation of public health interventions that will often yield health benefits far into the future, but incur up-front costs. I have not talked about Capabilities as an alternative to QALYs in an extra-welfareist paradigm applied to valuing nature in public health economics. The Capability Approach was first developed by the Indian economist and philosopher Amartya Sen in the 1980s. Relating to health economics, the approach differs from the focus on functioning underpinning QALY calculation, and focuses more on "being and doing", ie through better health and achieving the kind of lives people have reason to value. I'm hopeful that there will be publication of studies that include capability measures, as they could have a potential use in public health interventions, including those that take place in the natural environment (Lorgelly 2010).

Money Talks- Return on Investment on Public Health Interventions

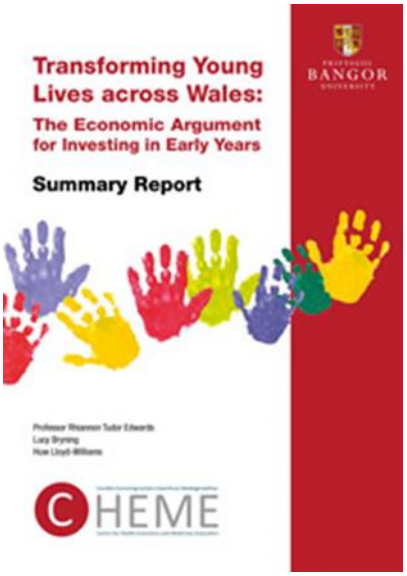
Local authorities in England, facing significant financial cutbacks now find themselves to be also responsible for the public health function that previously sat within the NHS, and so require evidence of potential savings from investment in public health. These are required to be real **"cash release"** savings. It is for this reason that there has been great interest in the production of evidence of return on investment on public health interventions. Return on investment **(ROI)** , or social return on investment **(SROI)** is a pragmatic form of cost-benefit analysis that calculates for every £1 invested, the financial return over a stated period of time. Social return on investment (SROI) methods have been championed by the New Economics Foundation **(NEF** https://www.neweconomics.org), and differ from ROI in taking a bottom up multiple stake holder view of a triple bottom line of financial, economic and environmental returns on investment. ROI and SROI are not standardised, making comparisons difficult. ROI and SROI are attractive to Local Authorities as they use money rather than QALYs to value both costs and outcomes of public health initiatives, and can in principle facilitate discussion about investment across traditional **policy silos** and budgets. Money talks.

Health Assets

In thinking about valuing nature in public health economics it is worth considering the place of **health assets** in all this. Health assets are the collective resources of individuals and communities to generate better health and protect against threats to health. They can be social, financial and physical. They can include skills, opportunities and are again difficult for analysts such as health economists to identify, measure and value. The buzz I got from a walk with friends in Newborough Forest was in part the cameraderie and in part from being in a forest and walking along a beach. Would we have got the same buzz from walking through a city?

Valuing public spaces- playgrounds

I want to turn now to a specific example of outdoor space in the built environment – that of playgrounds. I recently co-authored with colleagues from CHEME at Bangor University, a report for Public Health Wales on the economic case for investing in early years (transforming-young-lives). The only cost per QALY estimate I could find for playgrounds was produced by Matrix and was high - a very expensive adventure playground! (Matrix 2010). We know that play provision provides an important context in which children can counter the effects of poverty and deprivation.



The Commission on Architecture and the Built Environment has raised concerns that Local Authorities list their parks and playgrounds as liabilities, based on their potential resale value, because they do not know or cannot operationalise the potential and actual health, environmental and inter-generational value of such public places (CAB 2009).

More use of cost-benefit analysis

At the beginning of this blog about valuing nature in public health economics I realised the need for us as analysts to be sure we accept the theoretical paradigm underpinning our evaluative tools. More use of Cost-Benefit Analysis **(CBA)** as proposed by NICE in its technical guidance for the evaluation of public health interventions (NICE 2014), implicitly requires an acceptance of the **neoclassical theoretical paradigm.** Proponents argue that CBA takes a truly societal perspective, supported by shadow prices obtained directly from consumers through contingent valuation or willingness to pay or accept - as the most theoretically robust approach in the absence of efficient markets for a good or service (Macintosh, 2010). Critics of CBA argue that the paradigm requires acceptance of the prevailing distribution of income and the means of production, and that democratisation of decision making about resources for current and future generation is more defensible (Anderson, 2015). Anderson argues that markets must be made to serve people and the planet, not the other way round.

Wales Coastal Path- an example of a public good

I have spoken about the wonderful walk we had in Newborough forest and along Llanddwyn beach on Anglesey. This path forms a part of the All Wales Coastal Path – estimated, despite bad weather last summer, to have generated over £16 million to the Welsh economy, through a multiplier effect on tourism . This has made me want to read more about cost-benefit analysis of public goods and services. Something like a coastal footpath may be considered a public good as it is "non-excludable" (one cannot stop individuals using it), and "Non-rivalrous" (the utility gained from its use by one person does not, within reason detract from the utility gained by another person.

Big questions

As health economists working in public health now turning to the need to think about the role and value of nature in all this, we are left asking who pays, who benefits, is compensation in theory or practice an option, how do we best undertake Cost Benefit Analysis of public goods and is the commodification of the national environment the right thing to do in trying to include a value for nature in the evaluation of public health initiatives that aim to improve health? Big questions - thinking about this will keep us out of trouble for quite a while….

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Or respond on twitter @ProfRTEdwards

Reference list

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Acknowledgements

Thanks to Dr Phil Shackley, SchARR, Sheffield, for comments on this blog.

Thanks to Ellen Gilliver, 3rd Year Bangor University media intern at CHEME