

Economic benefit of the impact of the National Cycle Network on obesity and overweight

Introduction

We estimate that the National Cycle Network (NCN) saves the UK economy over £160 million each year by reducing the impact of obesity and overweight. Of this saving, more than £22 million is saved from the NHS budget.

The NCN offers a wide range of benefits to its users, including the opportunity to improve their health by taking part in physical activity. This report estimates potential economic benefits to the UK from the physical activity (PA) that takes place on the National Cycle Network in a typical year.

This report focuses on the impact of the NCN on obesity and overweight in the UK. Other health benefits of the NCN may include impacts on mental illnesses such as depression and anxiety, as well as injury and illness prevention and rehabilitation, but these are beyond the remit of the current study.

Methodology

The methodology used is as follows:

- Identify a per capita cost for the condition
- Identify the number of individuals who, through their use of the NCN, can be assumed to have reduced their risk of developing the condition
- Assign factors which account for the limits to this risk reduction
- The product of these values is the estimated saving to the UK and the NHS.

The NCN usage data in this report comes from the 2014 annual usage estimate (AUE) for the NCN and from survey data collected on the NCN between 2011 and 2013. Additional data sources are referenced throughout.

The 2014 AUE estimates that over 764 million trips were made on the NCN in 2014. Using data collected on trip frequency, it is estimated that these trips were made by 2.2 million cyclists and 2.7 million pedestrians.

Per capita cost of obesity and overweight

- The Office for National Statistics estimates the population of the UK in mid-2014 to be 64.5 million¹
- NHS spending on obesity and overweight in the UK in 2015 is estimated to be £7 billion²
- The same research estimates that the economic burden of obesity and overweight on the UK is 3% of GDP, or £51 billion per year³
- These values give per capita costs of £108.53 and £797.31 respectively.

Number of individuals who, through the NCN, have reduced their risk of obesity and overweight

- 48% of cyclists and 31% of pedestrians stated that using the route increased their level of physical activity (PA) by a large amount.

¹ <http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=National+Population+Projections#tab-data-tables>

² McKinsey Global Institute (2014) Overcoming obesity: An initial economic analysis

³ McKinsey Global Institute (2014) Overcoming obesity: An initial economic analysis

- 38% of cyclists and 44% of pedestrians stated that using the route increased their level of physical activity (PA) by a small amount.
- These are taken to be the individuals who, through the NCN, have reduced their risk of obesity and overweight. It has been assumed that all individuals are equally at risk of obesity and overweight.
- These users were split by the amount of physical activity they had done in the previous week (Table 1-1 and table 1-2).

Table 1-1 NCN cyclists who stated that using the route increase their level of PA, split by levels of physical activity

Number of days in the previous week the individual has completed 30 minutes or more physical activity that was enough to raise their breathing rate	<1 day	1-4 days	5-7 days
	Low activity	Some activity	Meeting recommendations
Proportion of NCN cyclists who state that using the route increased their level of PA by a large amount who partake in different levels of PA	2.1%	43.5%	54.3%
Number of NCN cyclists	22,632	468,805	585,198
Proportion of NCN cyclists who state that using the route increased their level of PA by a small amount who partake in different levels of PA	1.7%	45.5%	52.7%
Number of NCN cyclists	14,284	382,297	442,792

Table 1-2 NCN pedestrians who stated that using the route increase their level of PA, split by levels of physical activity

Number of days in the previous week the individual has completed 30 minutes or more physical activity that was enough to raise their breathing rate	<1 day	1-4 days	5-7 days
	Low activity	Some activity	Meeting recommendations
Proportion of NCN pedestrians who state that using the route increased their level of PA by a large amount who partake in different levels of PA	3.4%	36.8%	59.8%
Number of NCN pedestrians	28,110	304,255	494,414
Proportion of NCN pedestrians who state that using the route increased their level of PA by a small amount who partake in different levels of PA	3.3%	43.8%	52.9%
Number of NCN pedestrians	38,913	516,479	623,784

⁴ Townsend N, Bhatnagar P, Wickramasinghe K, Scarborough P, Foster C, Rayner M (2012). Physical activity statistics 2012. British Heart Foundation: London.

⁵ Townsend N, Bhatnagar P, Wickramasinghe K, Scarborough P, Foster C, Rayner M (2012). Physical activity statistics 2012. British Heart Foundation: London.

Assumptions and factors

An increase in levels of PA is not sufficient to entirely eliminate any risk of suffering obesity or overweight. Factors need to be applied to account for the appropriate reduction in the risk of obesity and overweight that can be attributed to different levels of PA, and also the proportion of PA that can be attributed to the NCN.

- The Health Impact of Physical Inactivity (HIPI) model was developed by the Network of Public Health Observatories (now Part of Public Health England)
- This model identifies a risk reduction of 22% for all-cause mortality for populations meeting the recommended levels of PA compared with inactive populations
- This value is used as the level of risk reduction of obesity and overweight for those individuals who are achieving their recommended levels of PA.
- It is assumed that the risk of obesity and overweight and levels of PA have an approximately inverse linear relationship⁶.
- It is therefore assumed that those users that state that the route has increased their level of PA have reduced their risk of obesity and overweight.
- It is not assumed that the level of PA is the only factor that contributes towards a risk of obesity and overweight nor that the risk is eliminated entirely.
- Therefore a factor is applied to account for the reduced risk of suffering obesity or overweight as a result of each of the three levels of PA identified in this study, with a maximum risk reduction of 22% as identified above.
- This is termed the “assumed level of risk reduction of obesity and overweight of this level of PA”.

- The levels of PA reported by NCN users are taken to be their current levels of PA and not their levels of PA prior to their NCN usage.
- It is therefore assumed that a proportion of their current PA takes place on the NCN.
- It is assumed that the proportion of an NCN user’s PA that takes place on the NCN and the overall level of PA partaken by that user have an approximately inverse linear relationship
- For example, person A and person B both take a walk on the NCN once a week. Person A also does a non-NCN walk on the other six days of the week, while person B does a non-NCN walk on another two days in a week. Both people do the same amount of exercise on the NCN, but the NCN walk accounts for a larger proportion of person B’s overall activity than of person A’s overall activity.
- Therefore for each level of PA identified in this study, a factor is applied to account for the proportion of PA that is assumed to take place on the NCN.
- This is termed the “assumed proportion of PA taking place on the NCN”.
- It is assumed that the proportion of PA that takes place on the NCN is greater for NCN users who state that using the route has increased their level of PA by a large amount than users who state that using the route has increased their level of PA by a small amount.

These assumptions mean that there is a different set of factors for each of the three levels of PA identified in this study split by whether the users stated that using the route increased their level of PA by a large or a small amount.

⁶ Lee IM and Skerrett PJ (2001). Physical activity and all-cause mortality: what is the dose-response relation? *Med Sci Sports Exerc.*

Results

We estimate that the National Cycle Network (NCN) saves the UK economy over £160 million each year by reducing the impact of obesity and overweight. Of this saving, more than £22 million is saved from the NHS budget.

Table 1-3 Economic benefit of the impact of the National Cycle Network on obesity and overweight (£millions per annum)

	Reduction in the cost of obesity to the NHS in the UK	Reduction in the economic cost of obesity in the UK
Users who state that using the route increases their level of PA by a large amount	11.4	83.6
Users who state that using the route increases their level of PA by a small amount	10.7	78.7
Total	22.1	162.3

Tables 1-4 and 1-5 show how these savings are split between the different types of NCN user, and how the factors outlined above are used in the estimation. The values highlighted in orange are the values used in the final estimation and sum to the values in Table 1-3.

The estimate makes use of conservative assumptions where appropriate, so it is possible that the values reported understate the savings to the NHS.

This report uses the most recent data available to estimate an annual value for the economic benefit of the impact of the NCN on obesity. This figure should not be used to derive an estimate of the value of the NCN over multiple years as other variables beyond the scope of this study are required to make an estimate of this nature.

Table 1-4 Reduction in the cost of obesity to the UK economy as a result of physical activity on the NCN (£million per annum)

PA in the last week	Number of NCN users who state the route increases their level of PA by a large amount	Assumed proportion of PA taking place on the NCN	Assumed level of risk reduction of obesity and overweight of this level of PA					Number of NCN users who state the route increases their level of PA by a small amount	Assumed proportion of PA taking place on the NCN	Assumed level of risk reduction of obesity and overweight of this level of PA				
			5%	10%	15%	22%	30%			5%	10%	15%	22%	30%
<1 day	50,742	10%	0.2	0.4	0.6	0.9	1.2	53,196	5%	0.1	0.2	0.3	0.5	0.6
		30%	0.6	1.2	1.8	2.7	3.6		15%	0.3	0.6	1.0	1.4	1.9
		50%	1.0	2.0	3.0	4.5	6.1		25%	0.5	1.1	1.6	2.3	3.2
		70%	1.4	2.8	4.2	6.2	8.5		35%	0.7	1.5	2.2	3.3	4.5
		90%	1.8	3.6	5.5	8.0	10.9		45%	1.0	1.9	2.9	4.2	5.7
1-4 days	773,060	10%	3.1	6.2	9.2	13.6	18.5	898,776	5%	1.8	3.6	5.4	7.9	10.7
		30%	9.2	18.5	27.7	40.7	55.5		15%	5.4	10.7	16.1	23.6	32.2
		50%	15.4	30.8	46.2	67.8	92.5		25%	9.0	17.9	26.9	39.4	53.7
		70%	21.6	43.1	64.7	94.9	129.4		35%	12.5	25.1	37.6	55.2	75.2
		90%	27.7	55.5	83.2	122.0	166.4		45%	16.1	32.2	48.4	70.9	96.7
5-7 days	1,079,612	10%	4.3	8.6	12.9	18.9	25.8	1,066,577	5%	2.1	4.3	6.4	9.4	12.8
		30%	12.9	25.8	38.7	56.8	77.5		15%	6.4	12.8	19.1	28.1	38.3
		50%	21.5	43.0	64.6	94.7	129.1		25%	10.6	21.3	31.9	46.8	63.8
		70%	30.1	60.3	90.4	132.6	180.8		35%	14.9	29.8	44.6	65.5	89.3
		90%	38.7	77.5	116.2	170.4	232.4		45%	19.1	38.3	57.4	84.2	114.8

Reduction in the cost of obesity to the NHS as a result of physical activity on the NCN (£million per annum)

PA in the last week	Number of NCN users who state the route increases their level of PA by a large amount	Assumed proportion of PA taking place on the NCN	Assumed level of risk reduction of obesity and overweight of this level of PA					Number of NCN users who state the route increases their level of PA by a small amount	Assumed proportion of PA taking place on the NCN	Assumed level of risk reduction of obesity and overweight of this level of PA				
			5%	10%	15%	22%	30%			5%	10%	15%	22%	30%
<1 day	50,742	10%	0.0	0.1	0.1	0.1	0.2	53,196	5%	0.0	0.0	0.0	0.1	0.1
		30%	0.1	0.2	0.2	0.4	0.5		15%	0.0	0.1	0.1	0.2	0.3
		50%	0.1	0.3	0.4	0.6	0.8		25%	0.1	0.1	0.2	0.3	0.4
		70%	0.2	0.4	0.6	0.8	1.2		35%	0.1	0.2	0.3	0.4	0.6
		90%	0.2	0.5	0.7	1.1	1.5		45%	0.1	0.3	0.4	0.6	0.8
1-4 days	773,060	10%	0.4	0.8	1.3	1.8	2.5	898,776	5%	0.2	0.5	0.7	1.1	1.5
		30%	1.3	2.5	3.8	5.5	7.6		15%	0.7	1.5	2.2	3.2	4.4
		50%	2.1	4.2	6.3	9.2	12.6		25%	1.2	2.4	3.7	5.4	7.3
		70%	2.9	5.9	8.8	12.9	17.6		35%	1.7	3.4	5.1	7.5	10.2
		90%	3.8	7.6	11.3	16.6	22.7		45%	2.2	4.4	6.6	9.7	13.2
5-7 days	1,079,612	10%	0.6	1.2	1.8	2.6	3.5	1,066,577	5%	0.3	0.6	0.9	1.3	1.7
		30%	1.8	3.5	5.3	7.7	10.5		15%	0.9	1.7	2.6	3.8	5.2
		50%	2.9	5.9	8.8	12.9	17.6		25%	1.4	2.9	4.3	6.4	8.7
		70%	4.1	8.2	12.3	18.0	24.6		35%	2.0	4.1	6.1	8.9	12.2
		90%	5.3	10.5	15.8	23.2	31.6		45%	2.6	5.2	7.8	11.5	15.6

Comparison with HEAT tool

The values estimated in this report are separate from those estimated through the World Health Organisation's HEAT tool for walking and cycling. HEAT calculates the answer to the following question: if x people cycle or walk y distance on most days, what is the economic value of mortality rate improvements? Using the HEAT tool in 2013 the annual value of health (mortality) benefits of the NCN were estimated to be £277m for cyclists and £526m for pedestrians.

This is substantially different to the analysis conducted in this report, which focuses specifically on the cost of a specific condition, and the impact of the NCN on reducing those costs. These costs will have some overlap with those identified by the HEAT tool, but there will be substantial independence.

This report also takes into account differences in the extent to which the NCN impacts on different individuals, rather than (as HEAT does) assuming that all users get the same level of health benefit.