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Estimating the health economic benefits of cycling

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ABSTRACT

This paper examines the health and economic benefits from the construction of a new segregated cycleway in Ireland. The health economic benefits were estimated using the World Health Organisation's (WHO) Health Economic Assessment Tool (HEAT). This tool can be used to calculate the health economic benefits from an intervention (such as construction of a new cycling facility). The HEAT tool also offers research a transparent, coherent and standardized method of evaluating the health economic benefits of cycling investments. The data used for this tool was retrieved from a survey that was undertaken between December 2012 and January 2013 in a study area near Dublin, Ireland. In total, there were 845 responses to this survey. The results show that, if constructed, the cycleway would yield significant health and economic benefits.

1. Introduction and background

Internationally many countries and cities are reporting increases in cycling (Caulfield, 2014; Pucher et al., 2011a, 2011b). Cycling has many benefits, which have been well documented including reducing emissions and congestion, and health benefits (Wegman et al., 2012; Börjesson and Eliasson, 2012; Sælensminde, 2004; Jäppinen et al., 2012; de Nazelle et al., 2010). Using the HEAT tool and a case study of a cycleway, this paper seeks to examine the health benefits of cycling via a new cycling infrastructure planned in Ireland. The HEAT model was specifically developed to measure the economic health benefits of cycling (WHO, 2011). The purpose of the tool is to create an economic assessment of cycling infrastructure and policies. The HEAT approach is an effective and user-friendly method of valuing and incorporating health benefits into transport appraisals (Rutter et al., 2013).

In many cases, the benefits derived from increased cycling from a new policy or new piece of cycling infrastructure may not have direct tangible economic benefits. The calculation of the return on a potential investment from increased health can be a very difficult aspect to assess (Börjesson and Eliasson, 2012), however HEAT provides a methodology to measure these economic benefits. Improving the health of a population as a whole usually leads to several marked improvements in many areas. For instance, if the working population is healthier, then there are less sick days taken annually and therefore the population becomes more productive (WHO, 2011).

1.1. The cycleway examined

The HEAT analysis conducted in this study was applied to the area surrounding the proposed cycle route. The cycle route that is planned is along a disused towpath of a canal. The cycle route will be fully separated from any vehicular traffic. The proposed route is approximately 60 km long and varies greatly in condition. Some sections of the route are presently used as local roads whereas other sections are overgrown and have become flooded by the canal.

A map outlining the study area can be seen in Fig. 1. The specific course of the cycle route is displayed in blue. A buffer zone of 5 km was placed around the preferred route. The edges of this zone are displayed in red. This zone encompasses most of the major settlements in the area. The population densities of each electoral district in the area can also be seen. Each green dot represents two people. As expected, the population density increases with proximity to Dublin City. It can be observed how there are many settlements along the preferred route that have high densities relative to the surrounding countryside. The road infrastructure is shown in yellow on the map.

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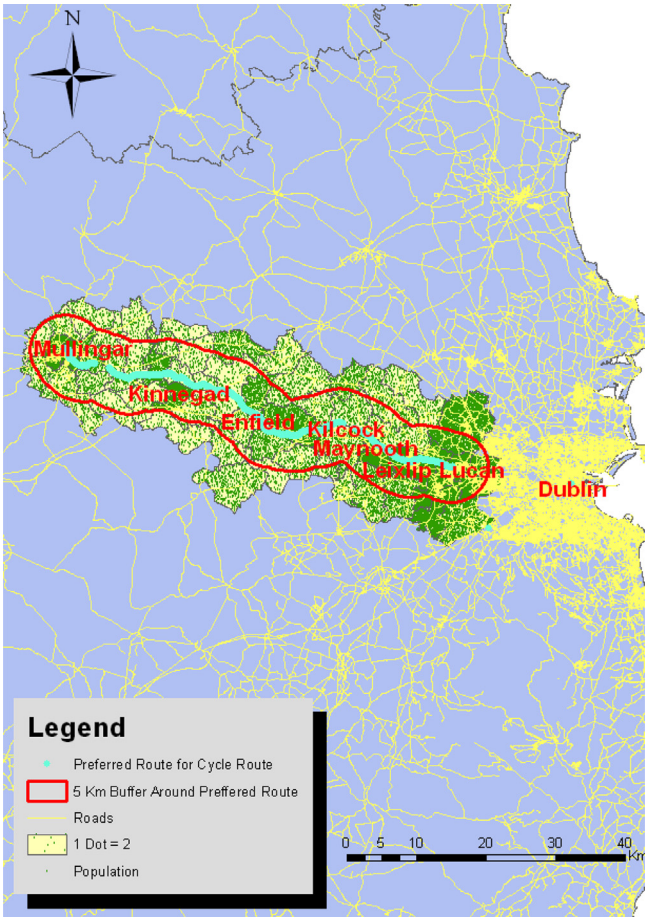

Fig. 1. Indicative map of preferred route with buffer zone, population density and roads. (For interpretation of the references to colour in this figure caption, the reader is referred to the web version of this paper.)

The approach adopted in this paper seeks to apply the model developed by the WHO and show how it can be used to derive the health benefits from a cycling investment. By applying this model one can see some of the limitations of the approach as it currently stands and then focus on areas for future development of the HEAT model. Currently in the field of economic analysis of investment in cycling infrastructure the industry is seeking to demonstrate the benefits of cycling to policymakers and the general public. The findings of the paper add to the research on estimating the benefits of investment of cycling infrastructure and show how including health benefits can demonstrate the positive economic benefits.

2. Examining the economic and health benefits of cycling

2.1. Health benefits of cycling

It is well documented that cycling has a very positive impact on both personal and public health (Rojas-Rueda et al., 2013; Unwin, 1995; Wang et al., 2005). Many of these studies conclude that any form of increase in the cycling mode share for commuting and for other purposes would result in a corresponding improvement in the health of an individual who cycles. This also results in an increase in health benefits of the country's population as a whole where there is a reduction in the mortality rate of the cycling population. From the World Health Organisation (2011), it is known that physical inactivity in the world is one of the leading causes of ill health.

Cavill et al. (2007) found that physical activity was a fundamental way of improving mental and physical health of individuals. The authors also demonstrate how increased physical activity leads to a reduction in cardiovascular disease, stroke, cancer, and type II diabetes. Increased activity also leads to a reduction in anxiety and depression. Rojas-Rueda et al. (2011) and de Hartog et al. (2010) both found that the health gains from increased activity from a higher level of cycling far outweigh the potential negatives from the increased risk from a traffic accident and the increased exposure to pollution.

Anderson et al. (2000) documented 13,375 women and 17,265 men over a 14 and a half-year period cycling. Over this period 2881 women and 5668 men died. This research found that those who cycle to and from their places of work and education had 40% reduction in their mortality rate. This reduction in mortality rate was the same for both men and women, with no statistically significant difference between the genders. Mindell et al. (2011) looked at how various different transport modes affect human health in an urban environment. It was found that the benefits of transport (access to work, leisure, education, social contacts) were most experienced by the healthy and the affluent. The harmful effects (air pollution, community severance, injuries) of transport are mostly experienced by the poor, young and old in society. It surmised that a modal shift away from cars in favour of walking and cycling would reduce the harmful aspects of transport and improve the health of individuals in society and would also improve the environment and society.

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