The Scottish Collaboration for Public Health Research and Policy; and 20mph speed limits

Dr Ruth Jepson and Dr John McAteer
Scottish Collaboration for Public Health Research and Policy

*Pronounced SHURP*

Funders: UK Medical Research Council, and Chief Scientist Office of the Scottish Government
To develop Scotland as a leader, in Europe and the world, in public-health intervention research for equitable health improvement, through catalysing strong researcher/research-user collaborations that ensure timely, robust, policy relevant research that is created with, and used by, key decision-makers.
Structure of SCPHRP

Working Groups:
Early years, Adolescence, Adulthood, Old Age

Wider public health and related community

SCPHRP core team
Main Role

To develop and evaluate complex public health interventions, working collaboratively with policy makers and practitioners

- Involvement in a number of national policies in Scotland, including
- 20 MPH speed limits, Tobacco control strategy, & National Parenting Strategy
More info

Twitter: @SCPHRP
Website: www.scphrp.ac.uk
YouTube: SCPHRP1
Is 20 Plenty For Health?

Methods for an evaluation of the 20 mph speed limit networks in Edinburgh and Belfast on a range of public health outcomes

Dr Ruth Jepson, Lead Investigator
Reader in Public Health, University of Edinburgh

Wellington, NZ January 2018
Background

- Transport can have positive and negative impacts on health.
- Traffic speed is an important determinant of health (WHO, 2017).
  - casualties, air and noise pollution, levels of cycling and walking.
Background

Prevalence of 20mph speed limits in UK and elsewhere increasing (30km in Europe)

Already more than 50% of the largest 40 urban authorities in UK have a policy of setting 20mph as the default for all their streets.

Call for natural experiments (Cairns, 2015; Brown, 2017).

[Map showing speed limits across Europe]

http://www.2osplenty.org/20mph_places
Natural experiments

Many definitions, but a common theme is the exposure to the intervention (e.g. 20mph/30kmph limit) has not been manipulated or influenced by the researcher.

May be only option when it is impossible to manipulate exposure to the intervention

All natural experimental studies require a comparison of exposed and unexposed groups
Terminology: zones or limits?

**Zones** – often refer to specific streets. Have to include one traffic calming device such as speed humps, rumble strips

**Speed limits** – refer to wider areas such as a whole city centre (Belfast) or city (Edinburgh). Usually only includes ‘signs and lines’

In the UK, both need a Traffic Regulation Order and meet the Traffic Signs Regulations and General Directions
Intervention

• Legislation
• Infrastructure (signage and road markings)
• Awareness-raising and education
• Enforcement
Legislation

• Speed Limit Order (or Traffic Regulation Order) – Edinburgh

• In 2015, Transport and Environment Committee (Edinburgh City Council) approved an implementation plan for the roll-out of the citywide 20mph network

• Committee also authorised commencement of the statutory procedures (Traffic Regulation Order) required to introduce a 20mph speed limit for the approved road network.
Infrastructure

20 mph road markings and traffic signs installed at the places where the speed limit changes. Smaller '20' repeater signs placed at regular intervals.
Awareness-raising and education

- Media
- Campaigns
- Competitions
Enforcement

- Penalties: Drivers caught speeding will face the threat of £100 fines and three penalty points (1/4 of total points).
- Enforcement has been fairly limited. Warnings issued to drivers in the initial days of the new zones.
- Focus on areas of vulnerability, for example near schools, and areas where the force receives complaints.

*If after one year there has been no reduction in speeds, tickets will be issued*
Specifics of Edinburgh and Belfast

Edinburgh

• City Council implementing phased scheme (six geographical areas), from 2016-2018; signage-only.
• 80% of city’s streets with legally enforceable 20mph limits. Some arterial roads remain at 30 or 40mph

Belfast

• Northern Ireland Department for Infrastructure introduced scheme in Feb 2016; signage only
• Scheme covers city centre only.
Status of implementation

Edinburgh:
Zone 1-3 – Jul 2016/Feb 2017
Zone 4-5 – Aug 2017
Zone 6 – Feb 2018

Belfast:
City centre – Feb 2016
Initial programme theory for 20mph speed limits

**INPUTS**
- Local government
  - Roads Service, Department for Regional Development NI 20mph Implementation Team Edinburgh and contractors
- Neighbourhood Partnerships, Community Councils and Schools
- Police services Partnership organisations:
  - Sustrans
  - Living Streets

**Activities**
- 20mph network
- Signage and road markings
- Awareness raising and education
- Enforcement

**Outputs**
- Average speed

**Intermediate outcomes**
- Perceptions of longer journey time and effort
- Traffic flow
- Perceptions of traffic related dangers

**Outcomes**
- Journeys made by bike
- Journeys made on foot
- Number and severity of road accidents and collisions involving cyclists
- Number and severity of road accidents and collisions involving pedestrians
- Number and severity of road accidents and collisions involving motorists
- Perceptions of a more pleasant (people friendly and liveable) community

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**Outputs**
- AVERAGE SPEED
  - Perceptions of traffic related dangers
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**Intermediate outcomes**
- Journeys made by bike
- Journeys made by public transport
- Journeys made on foot

**Outcomes**
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Activities

20mph network

Signage and road markings

Awareness raising and education

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Activities
- 20mph network
- Signage and road markings
- Awareness raising and education
- Enforcement

Outputs
- Traffic flow
- Perceptions of traffic related dangers

Intermediate outcomes
- Perceptions of longer journey time and effort
- Journeys made by public transport

Outcomes
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Evaluation overview

Commenced in March 2017

Funded for 3.5 years by the National Institute for Health Research

Consists of four work packages (WP) looking at different aspects
Study objectives

To assess the impacts and outcomes of introducing a city-wide 20mph speed limit in Edinburgh and a city centre speed limit in Belfast  **WP1**

**Does it work?**

Understand barriers and facilitators to successful implementation  **WP2**

**Was it implemented as intended?**

Explore and refine the causal pathways and mechanisms in the conceptual model.  **WP2**

**Why does it work/not work?**

Explore the transferability of 20 mph speed limit networks to other cities, towns or districts.  **WP3**

**What is needed to make it work elsewhere?**

Carry out an economic evaluation of the 20 mph speed limit policies  **WP4**

**Is it worth the cost?**
Work Package 1

Does it work?

Team: Glenna Nightingale, Andrew James Williams, Paul Kelly, Ruth Hunter, Graham Baker and Andy Cope, Ruth Jepson
Work package objective

To assess the **effectiveness** of introducing a city-wide 20mph speed limit in Edinburgh and a city centre speed limit in Belfast.
1. Does introducing 20mph speed limits result in reductions in the speeds of motorised vehicles?

2. What is the impact of introducing 20mph speed limits on:
   a) number and type of road casualties
   b) attitudes towards, and the number of people (journeys), cycling or walking
   c) driver perceptions, public support, perceptions of the safety and pleasantness of the environment?
Design

Design of outcomes evaluation dependent on the type of data that is available, and the time points at which it is collected:

1) Before and after
2) Observational stepped wedge
3) Controlled before and after

2 and 3 could be classified as natural experimental design
Data

- Primarily making use of existing data from local authorities, Sustrans (transport charity) and routinely collected police data. All partners have agreed to share their data.

- Undertaking primary data collection (survey) on perceptions and behaviours.

- Most of analyses at baseline and 18 months.
# Data: Before and after

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Data source (Collector)</th>
<th>Sample</th>
<th>Sampling strategy</th>
<th>Time points for data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic speed and volume</td>
<td>Automatic sensors 69x20mph &amp; 17x30mph sites (Edinburgh); 23 sites (Belfast) (CEC &amp; DRD, NI)</td>
<td>Edinburgh and Belfast road users</td>
<td>Mix of streets selected from Area Road Managers, public consultation &amp; random selection</td>
<td>Baseline, 2- and 12- month post-implementation in Edinburgh, annual in Belfast</td>
</tr>
<tr>
<td>Casualties</td>
<td>STATS19 accident records (Police Scotland &amp; Police Service NI)</td>
<td>Edinburgh and Belfast road users and pedestrians</td>
<td>All incidents reported to the police</td>
<td>Continuous (combined into tax years to give sufficient power)</td>
</tr>
<tr>
<td>Walking, cycling and attitudes</td>
<td>Edinburgh Household Survey (City of Edinburgh Council (CEC))</td>
<td>1,215 households in Edinburgh</td>
<td>Systematic random sampling: ordered by urban-rural, SIMD and postcode</td>
<td>Baseline and 12 months post-implementation (2019).</td>
</tr>
<tr>
<td></td>
<td>Sport &amp; Physical Activity Survey (Sport NI)</td>
<td>1037 households in Belfast</td>
<td>Stratified random sample of adults aged 16+ years</td>
<td>2011 and repeated in 2017/18</td>
</tr>
<tr>
<td>Public support, behaviour &amp; compliance and liveability</td>
<td>Survey developed by research team</td>
<td>500 residents in Edinburgh/Belfast per time point</td>
<td>Systematic random sampling: ordered by urban-rural classification, SIMD rank &amp; postcode</td>
<td>Baseline, 6- and 18-months post implementation</td>
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Data and methods: observational stepped wedge

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<td>Walking</td>
<td>30 automatic fixed pedestrian counters (Sustrans)</td>
<td>Edinburgh residents</td>
<td>Previously identified key walking routes</td>
<td>Continuous including several years of historical data</td>
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<tr>
<td>Cycling</td>
<td>Automatic fixed cycle counters (31; Edinburgh 14; Belfast) (Sustrans)</td>
<td>Edinburgh and Belfast residents</td>
<td>Previously identified key cycling routes</td>
<td>Continuous including several years of historical data</td>
</tr>
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<td>Public transport use</td>
<td>Routine bus data (Lothian buses and Translink NI)</td>
<td>Edinburgh and Belfast bus users</td>
<td>All routes in Edinburgh and Belfast</td>
<td>Continuous inc. several years of historical data</td>
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### Data: controlled before and after

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<tr>
<td>Walking, cycling and attitudes</td>
<td>Route User Survey (Sustrans)</td>
<td>7 sites, up to 300 attitudes surveys per site and time point</td>
<td>Count all users (age, mode, gender) passing site, asking maximum for interview</td>
<td>Surveys conducted over both term time school holidays.</td>
</tr>
<tr>
<td>Travel behaviour</td>
<td>Scottish Household Travel Survey (Scottish Government)</td>
<td>~31,000 every 2 years across Scotland</td>
<td>Random postcode selection</td>
<td>Data made available every other year</td>
</tr>
</tbody>
</table>
Progress and next steps

• Identification of control sites in Scotland and Northern Ireland

• Baseline analyses for most outcomes
Work Package 2

Was it implemented as intended?
Why does it work/not work?

Team: Graham Baker, Kieran Turner, Ruth Hunter, Ruth Jepson
WP2: Objectives and Research Questions

Understand barriers and facilitators to successful implementation

Explore and refine the causal pathways and mechanisms in the conceptual model
Project 1

Who did what activities, when, and how; barriers and facilitators; does this vary by zone; did implementation reflect what was planned?

Interviews with key stakeholders in Edinburgh and Belfast.
Project 2

Objective:
• To understand how, and why the 20mph speed limit schemes change the attitudes and behaviours of the public.

An example:
Education → Attitude towards traffic speed → Reduction in traffic speed
Focus groups in Edinburgh and Belfast

• Include those who’s attitudes/behaviours change/do not change.

• Likely groups to be included: pedestrians, cyclists, motorists, ethnic minorities, lower socio-economic groups, elderly.
Work Package 3

What is needed to make it work elsewhere?

Team: Charlie Foster, Ruth Hunter, Karen Milton, Mike Kelly
Work package 3

Research questions

1. What factors led to the recent rise of 20mph limits on the political and policy agenda in the UK?

2. What processes hindered and enabled agreement and implementation of the 20mph policy in the UK?

3. What are the likely facilitators and barriers to long term successful implementation of the 20mph policy in the UK and elsewhere?

4. What is the potential for implementing the 20mph speed limit in other parts of the UK/elsewhere?
2 Phases

Phase 1
- Qualitative analysis of written materials from different cities
- Media content
- In depth semi-structured interviews with key stakeholders

Phase 2
- Participative workshops and discussion groups
- ‘How to implement’ guide
Work Package 4

Is it worth the cost?

Team: Neil Craig, James Woodcock
WP4 Economic Evaluation

Aim

• To compare the costs and benefits of the 20mph schemes in Edinburgh and Belfast

• Health and non-health benefits
WP4 Economic Evaluation – Costs

Costs

• infrastructure (design, planning, installation and maintenance)
• marketing and public awareness
• enforcement
WP4 Economic Evaluation – Benefits

- Health benefits from modelling work extrapolating from the impacts (if any) identified in the other work packages:
  - reduced road traffic casualties
  - increased physical activity
  - valued in non-monetary and monetary terms

- Non-health benefits from other work packages (e.g. Liveability) - measured as appropriate

- Conditional on ‘significant’ impacts on active travel and casualties
‘Add on’ projects to the 20mph

- MSc project in modelling air pollution
- Intern project on modelling pedestrian/cyclist counter data using linear mixed effects models.
- PhD on active travel within the context of 20mph limits
Discussion

• Undertaking such a project is challenging and requires excellent communication with those who are providing the data.

• Difficult to control for confounding, especially when only small effects are likely to be detected.

• Aspects of the evaluation in WP2 and WP3 are equally important for understanding how 20mph operates in a range of different contexts.
Thanks!

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