

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

Dr Ruth Jepson and Dr John McAteer



THE UNIVERSITY of EDINBURGH<sup>1</sup>

Wellington, Jan 2018





## Scottish Collaboration for Public Health Research and Policy *\*Pronounced SHURP*

*Funders: UK Medical Research Council, and Chief Scientist Office  
of the Scottish Government*

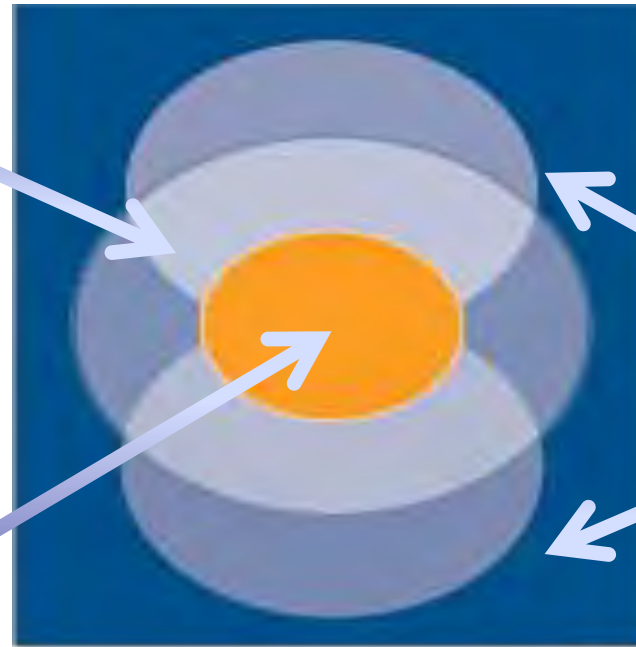
# SCPHRP vision

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

SCPHRP core  
team



Wider public  
health and  
related  
community



**HERE  
WE  
ARE**



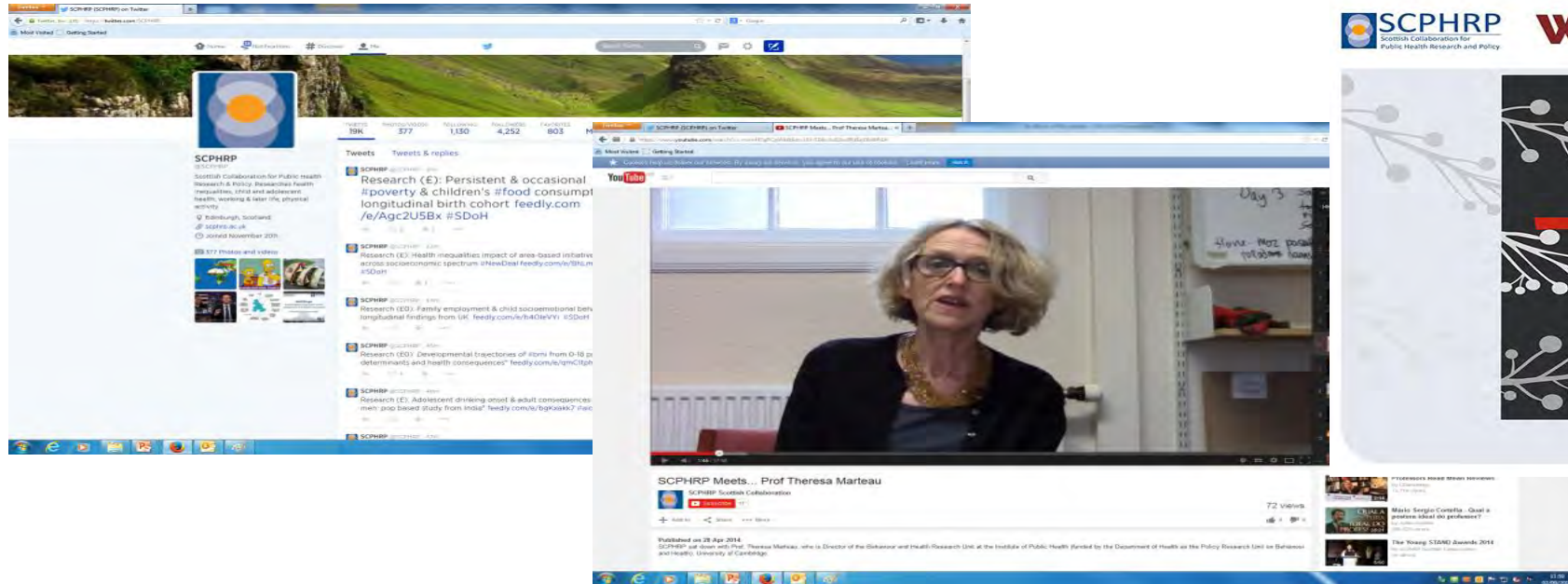
# Main Role

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](http://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



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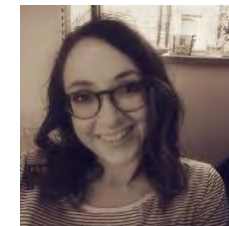
# Study team



**Dr Ruth Jepson;**  
**Principal Investigator**



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of EDINBURGH



**Nicole Porter;**  
**Administrator**



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**Dr Ruth Hunter**



**Dr Andrew Williams**



**Dr Glenna Nightingale**



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**Dr Andy Cope**



**Dr James Woodcock**



**Dr Graham Baker**



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**Mr Kieran Turner**



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**Prof Mike Kelly**



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**Dr Charlie Foster**



University of  
BRISTOL



**Dr Karen Milton**



**Dr Neil Craig**



**National Institute for  
Health Research**



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# 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.





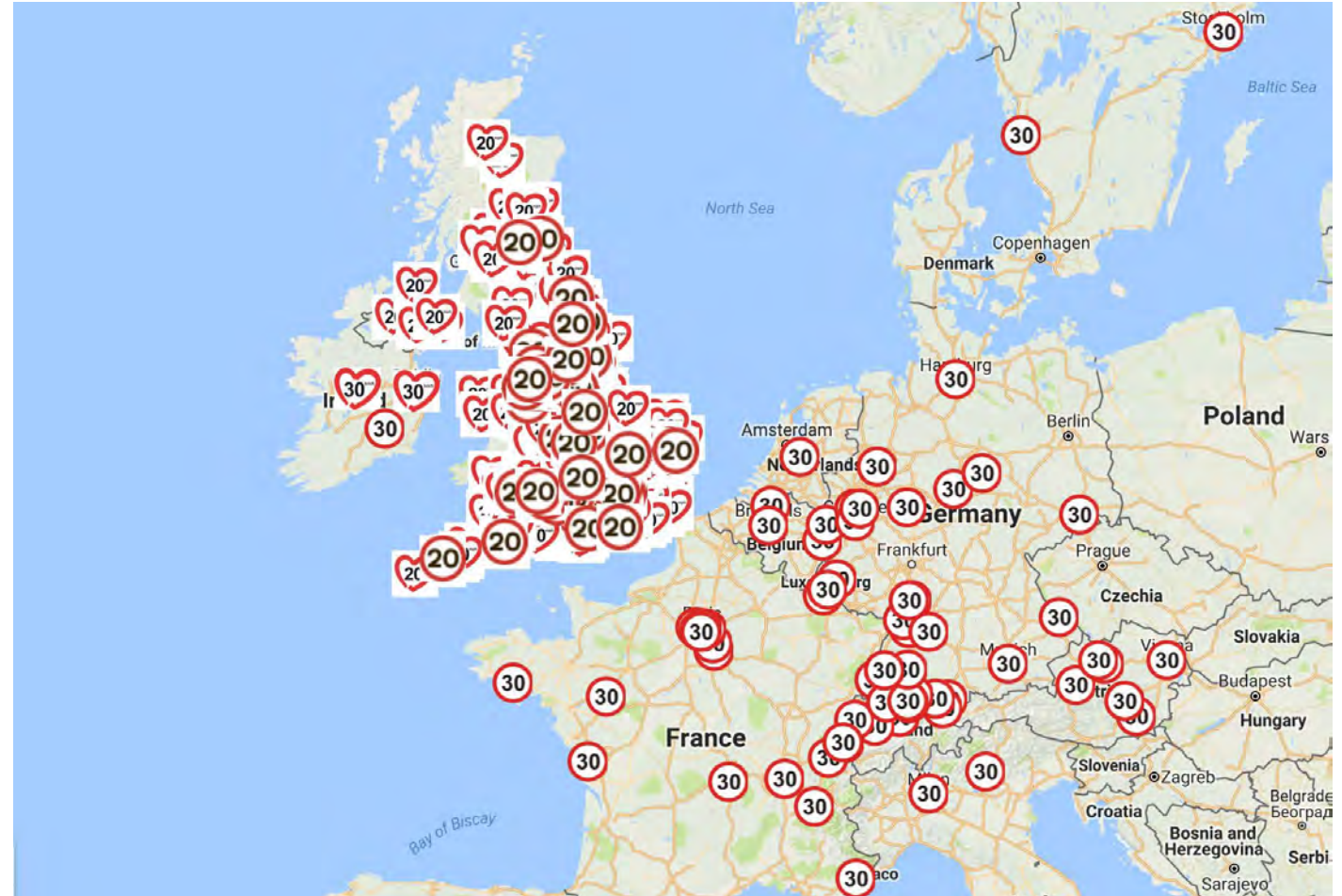


Prevalence of 20mph speed limits in UK and elsewhere increasing (30km in Europe)

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).

# Background



[http://www.2osplenty.org/20mph\\_places](http://www.2osplenty.org/20mph_places)



**National Institute for  
Health Research**





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## 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



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# 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



**NHS**

**National Institute for  
Health Research**



# Intervention

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







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# 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.



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## 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





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# 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.

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# Status of implementation

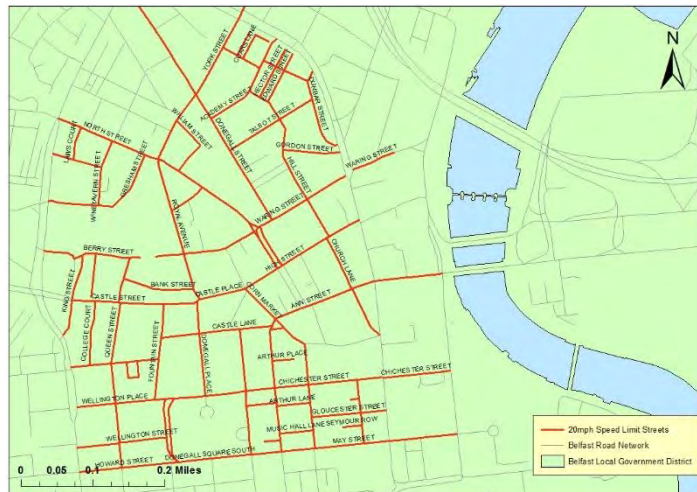


Edinburgh:

Zone 1-3 – Jul 2016/Feb 2017

Zone 4-5 – Aug 2017

Zone 6 – Feb 2018

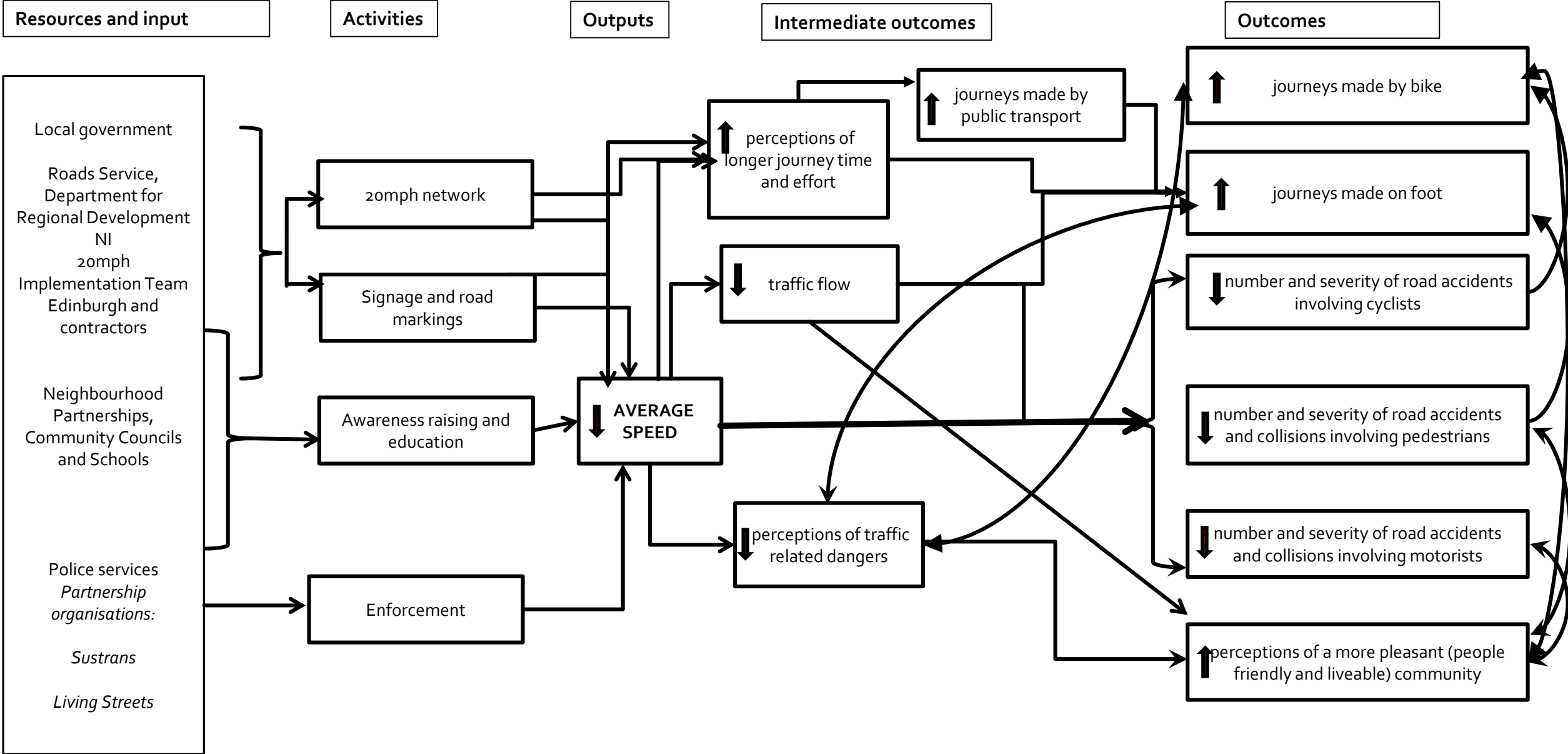


Belfast:

City centre – Feb 2016



# Initial programme theory for 20mph speed limits



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

↑  
journeys made by  
public transport

Outcomes

↑  
journeys made by bike

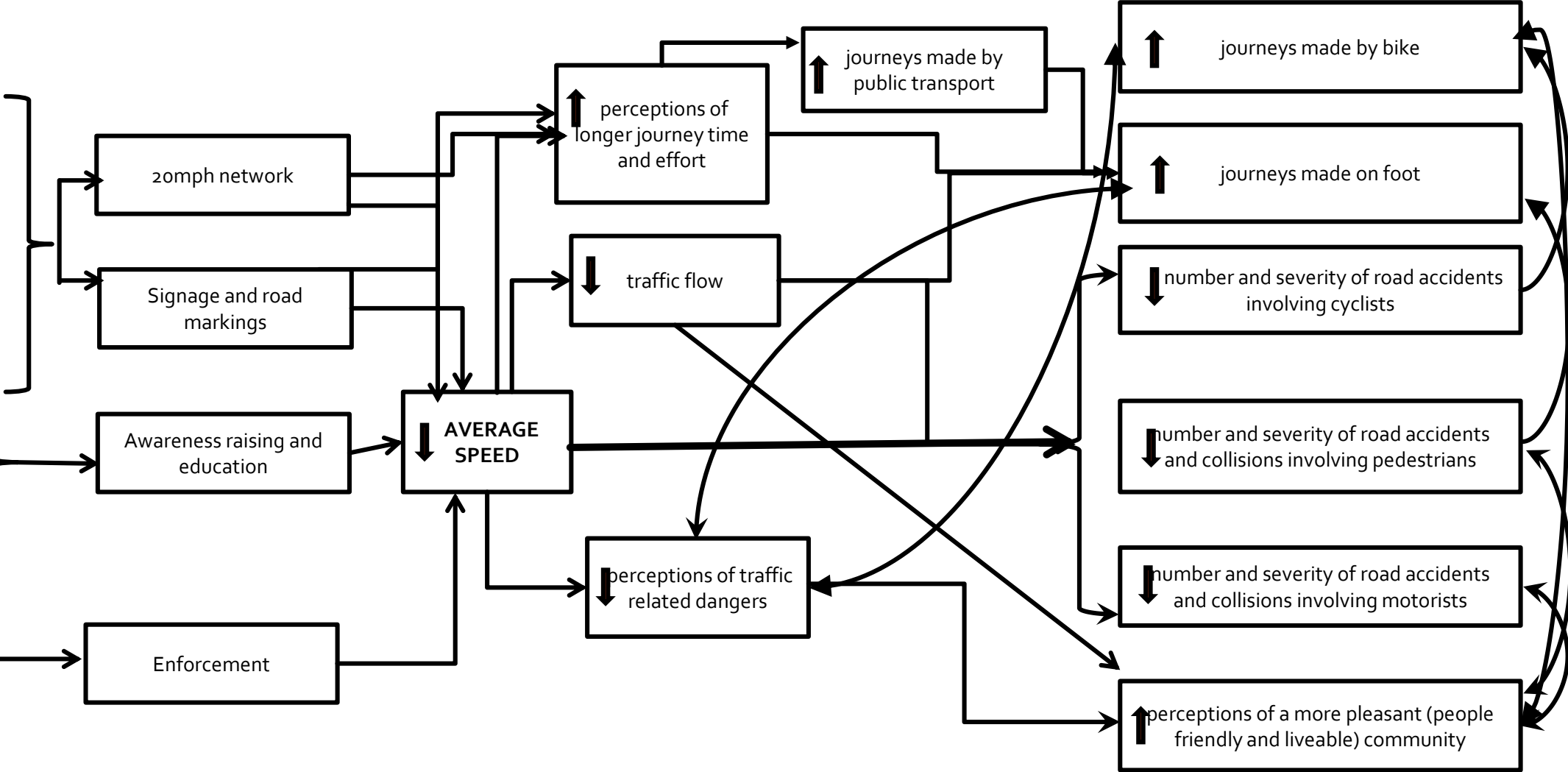
↑  
journeys made on foot

↓  
number and severity of road accidents  
involving cyclists

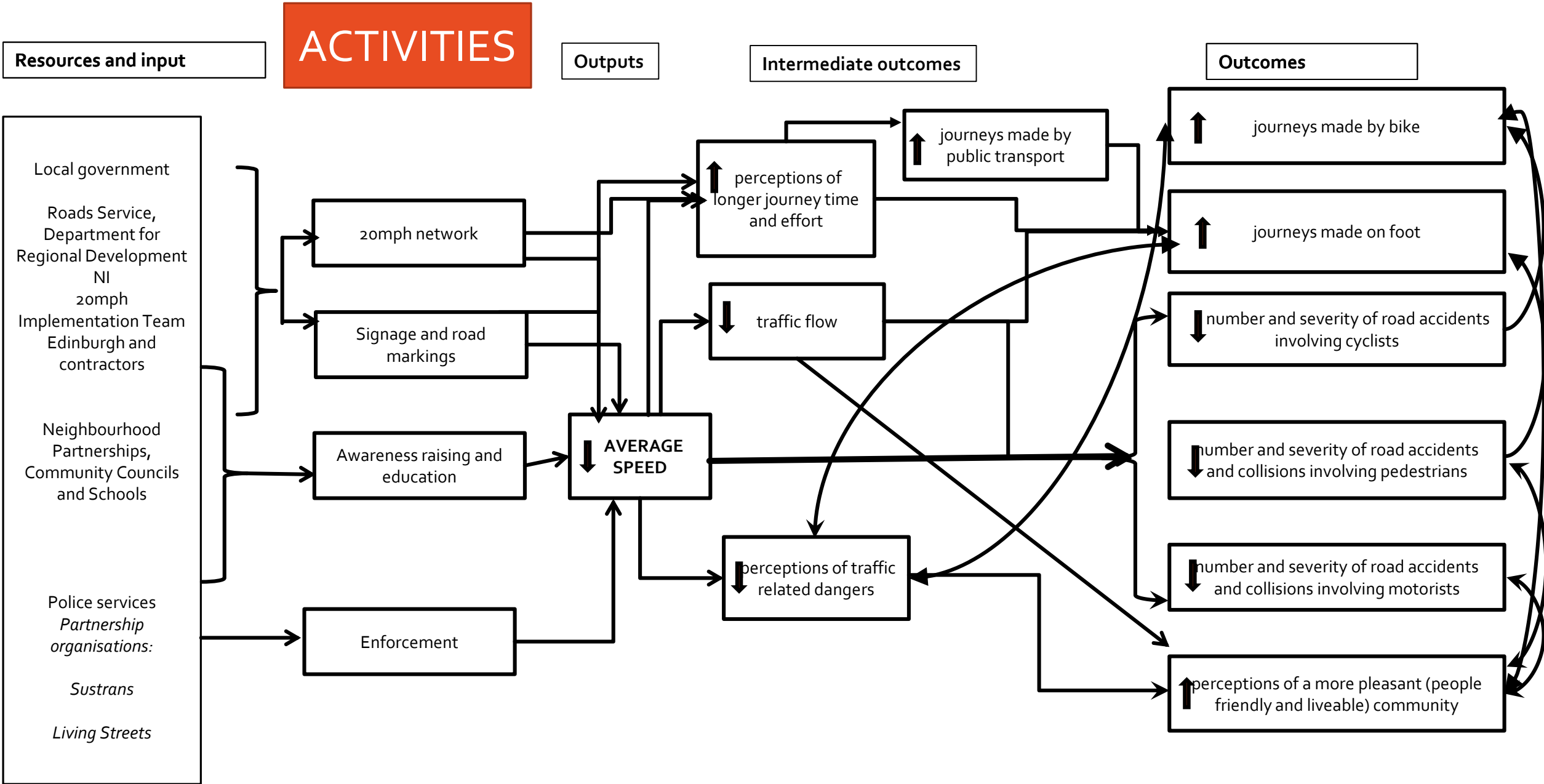
↓  
number and severity of road accidents  
and collisions involving pedestrians

↓  
number and severity of road accidents  
and collisions involving motorists

↑  
perceptions of a more pleasant (people  
friendly and liveable) community

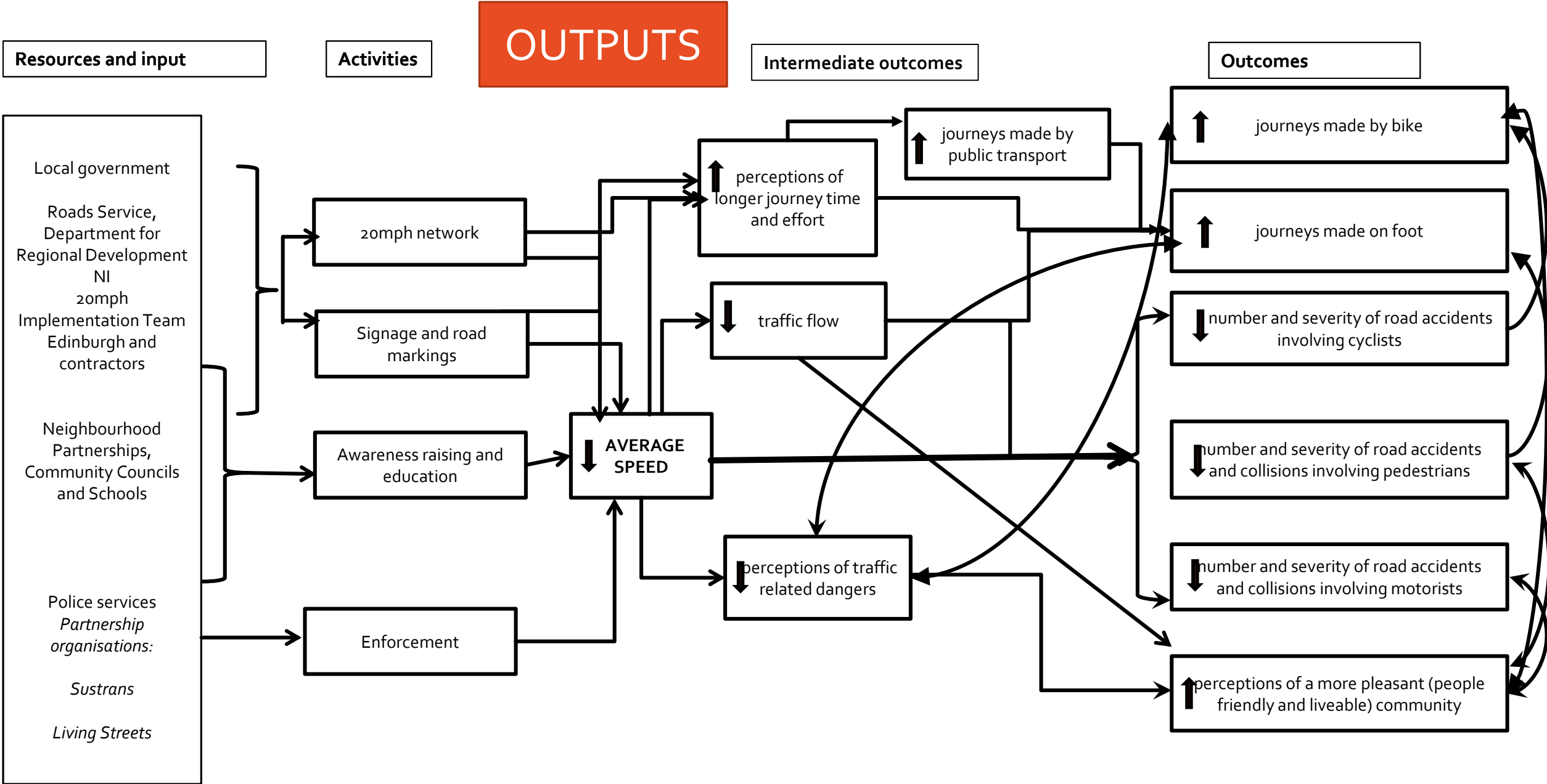


Initial programme theory for 20mph speed limits

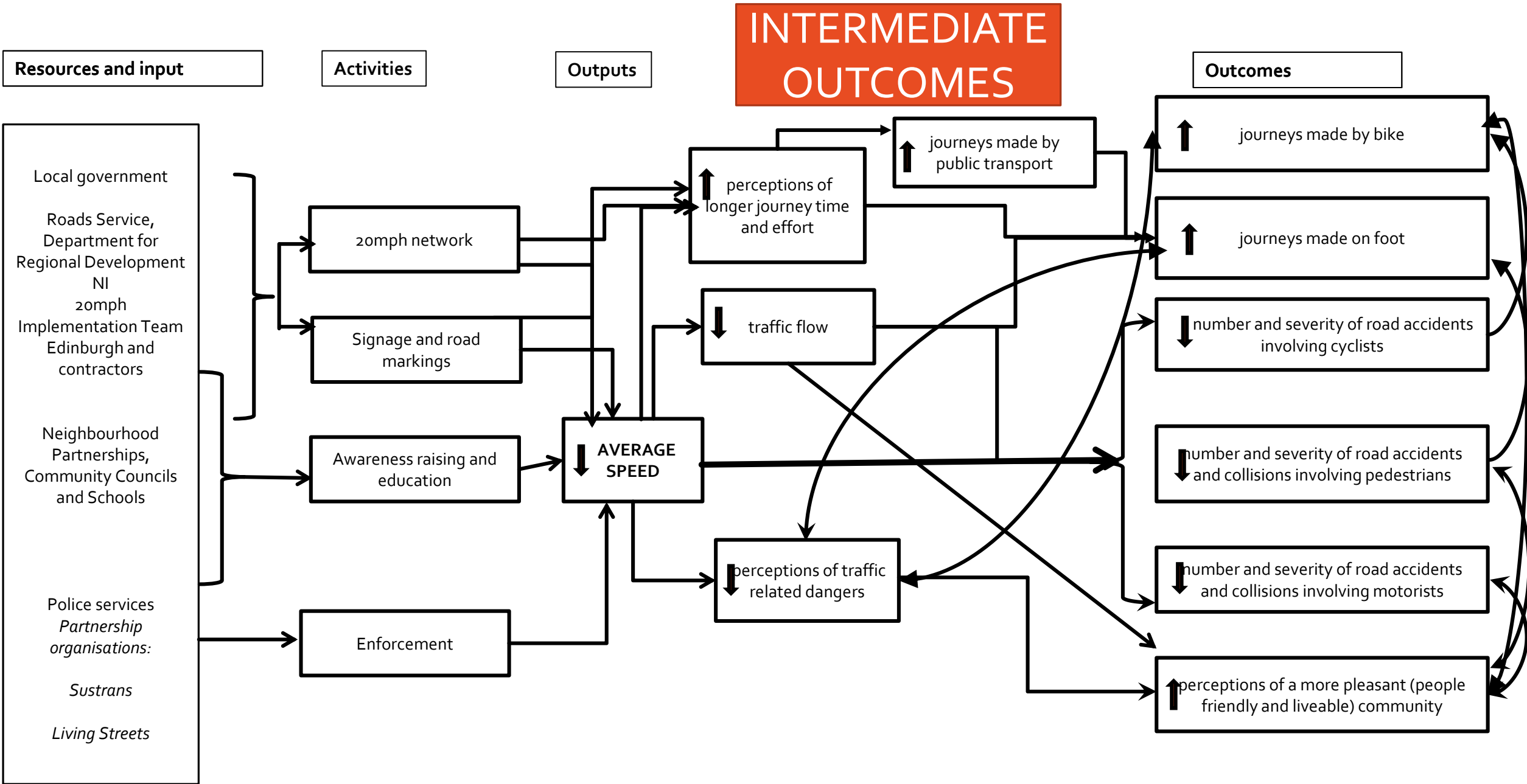




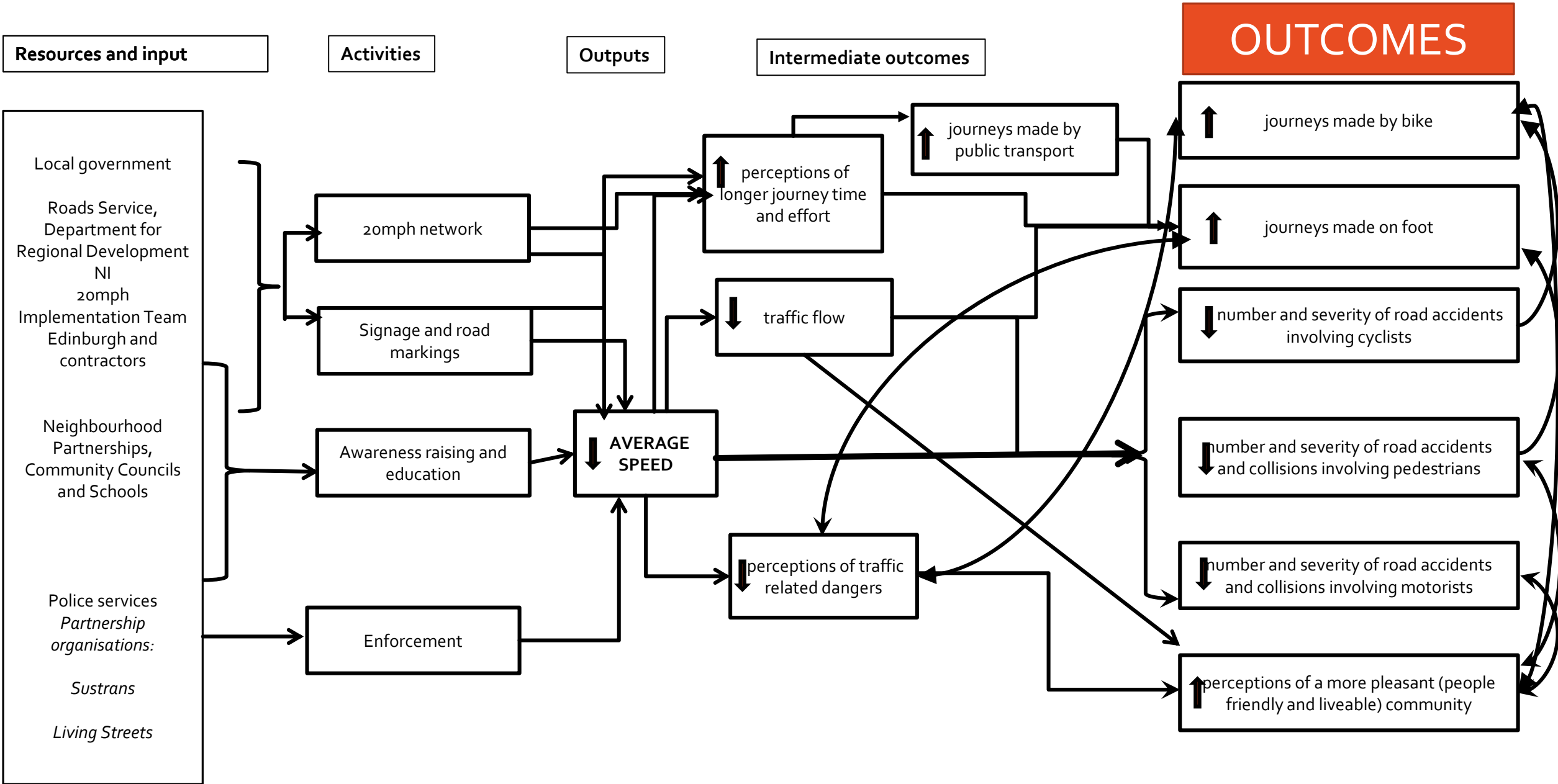
Initial programme theory for 20mph speed limits



# Initial programme theory for 20mph speed limits

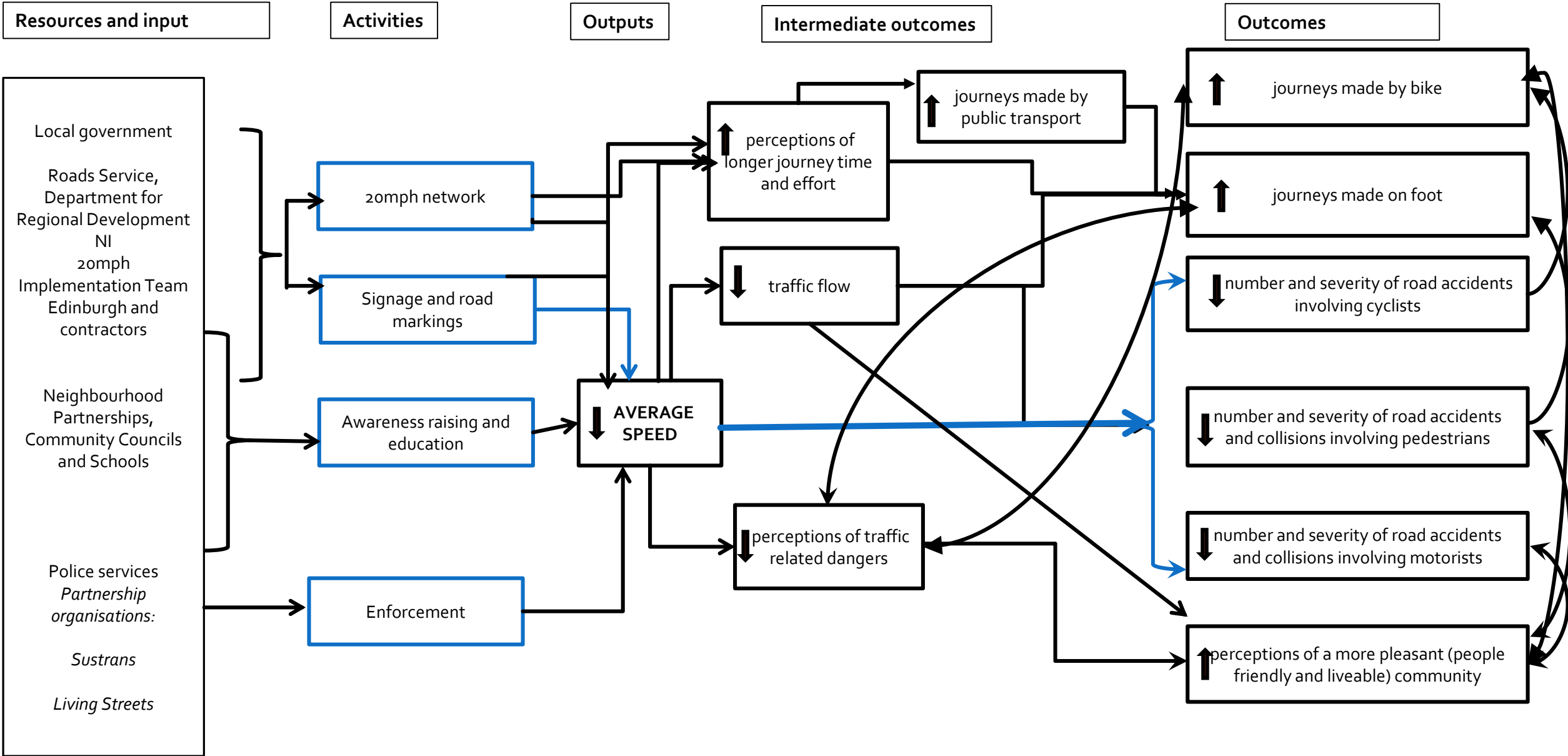


# Initial programme theory for 20mph speed limits

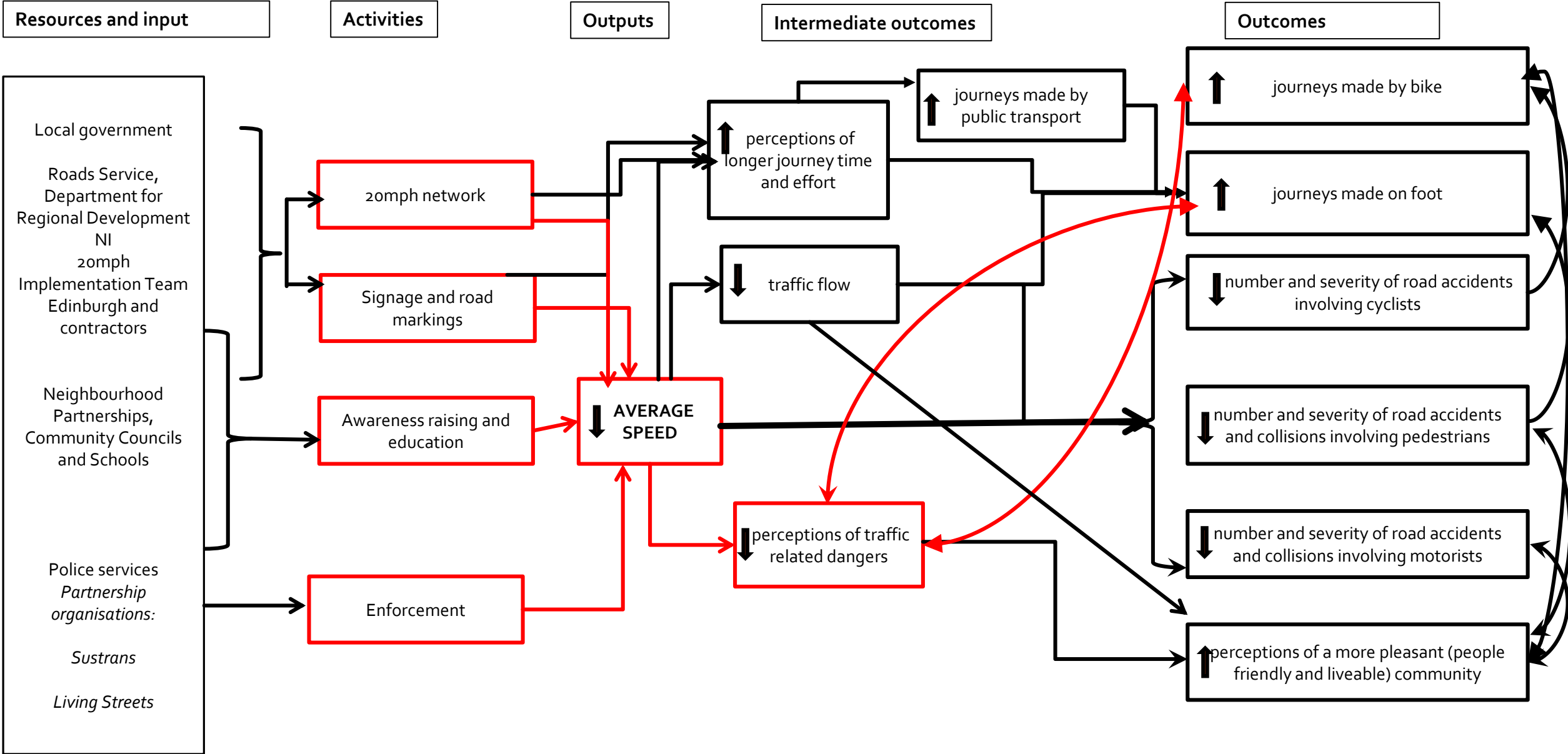




# Initial programme theory for 20mph speed limits



# Initial programme theory for 20mph speed limits



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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

BELFAST

EDINBURGH



**Success of Edinburgh's 20mph road safety limit to be examined**



Edinburgh Council 20mph mascot The Reducer with PC Ben Wray. Picture: Greg Macvean





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# 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



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## 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







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# Research questions

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 18months





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# Data: Before and after

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

# Data and methods: observational stepped wedge

Outcome	Data source (Collector)	Sample	Sampling strategy	Time points for data collection
Walking	30 automatic fixed pedestrian counters (Sustrans)	Edinburgh residents	Previously identified key walking routes	Continuous including several years of historical data
Cycling	Automatic fixed cycle counters (31; Edinburgh 14; Belfast) (Sustrans)	Edinburgh and Belfast residents	Previously identified key cycling routes	Continuous including several years of historical data
Public transport use	Routine bus data (Lothian buses and Translink NI)	Edinburgh and Belfast bus users	All routes in Edinburgh and Belfast	Continuous inc. several years of historical data

# Data: controlled before and after

Outcome	Data source (Collector)	Sample	Sampling strategy	Time points for data collection
Walking, cycling and attitudes	Route User Survey (Sustrans)	7 sites, up to 300 attitudes surveys per site and time point	Count all users (age, mode, gender) passing site, asking maximum for interview	Surveys conducted over both term time school holidays.
Travel behaviour	Scottish Household Travel Survey (Scottish Government)	~31,000 every 2 years across Scotland	Random postcode selection	Data made available every other year



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## 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



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## 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.





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## Project 2

### Objective:

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

### An example:





## Project 2 continued

### 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?



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## 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





**COST  
EFFECTIVE**

?

# Work Package 4

Is it worth the cost?

**Team:** Neil Craig, James Woodcock



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## WP<sub>4</sub> Economic Evaluation

### Aim

- To compare the costs and benefits of the 20mph schemes in Edinburgh and Belfast
- Health and non-health benefits

## WP<sub>4</sub> Economic Evaluation – Costs

### Costs

- infrastructure (design, planning, installation and maintenance)
- marketing and public awareness
- enforcement

## WP<sub>4</sub> 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*





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## '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 zomph operates in a range of different contexts



# Thanks!

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