momentum
transport consultancy

An Inclusive 3D 15-Minute Cities

18/07/2024

Agenda

- Introduction
- Existing Research
- Methodology
- Findings
- Summary

Introduction

Aims

Assess Bishop’s Stortford’s accessibility using FMC principles, considering different levels of mobility through active travel and public transportation.

History

Jane Jacobs (1960)
Carlos Moreno (2015)
Key Categories: Housing, Health, Education, Culture and Leisure

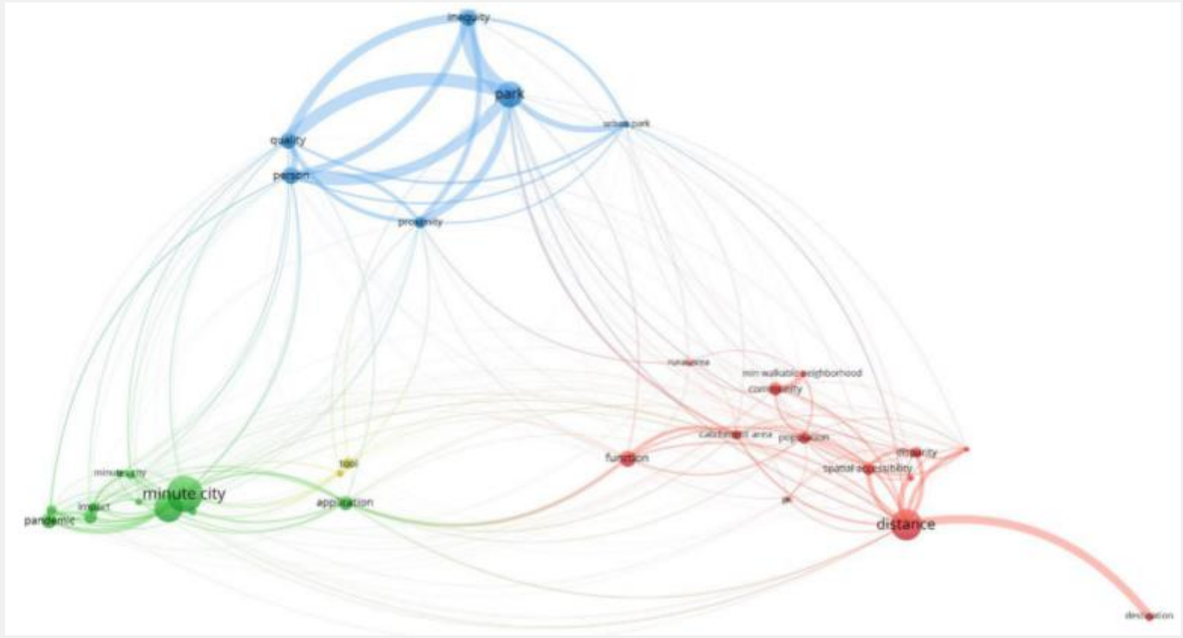
Pandemic

Local Communities, Lockdowns and Conspiracies

Existing Research

Categories

Topography



Visualisation of academic literature networks

Gaps in Research

Assessing 15-minute cities

Existing Research

Alternatives to the 15-minute City

15-minute City Paris
20-minute City Melbourne
15-minute City one-way trip
10-minute City Seoul
1-minute City Sweden

70% of the world's population will live in urban areas by 2050
(UN, 2015)

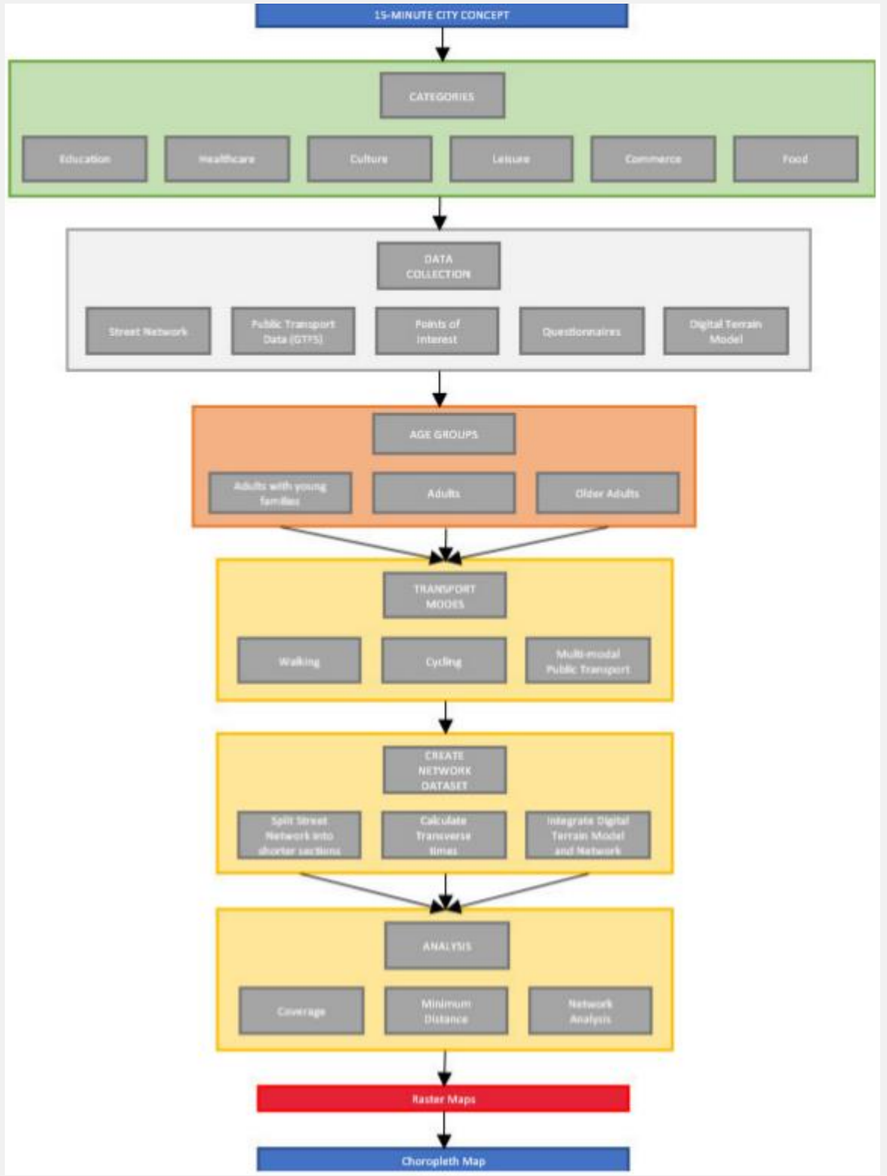
Methodology

	Categories						
	Education	**Healthcare**	**Culture**	**Leisure**	**Commerce**	**Food**	**Transport**
Subcomponents	Nurseries Primary School	GP Practice	Place of Worship	Greenspace	Restaurant	Supermarket	Railway Station
	Secondary School / College	Dentist	Theatre	Sports Facilities	Café	Grocery Shops	Bus Stop
	University	Pharmacy	Community Centre	Playgrounds	Retail Shops Indoor places where people pay for access	Speciality food shops (Butchers, Bakeries)	
	Libraries	Hospital					

Categories and subcomponents

User Groups	Age Bracket (Years Old)
Adults with young families	Has children under 16 years old
Adults	18 – 60 years old
Older Adults	Over 60 years old

Defining Age Groups



Methodological framework

Methodology

Data Collection: Primary Data

UWE Bristol | University of the West of England

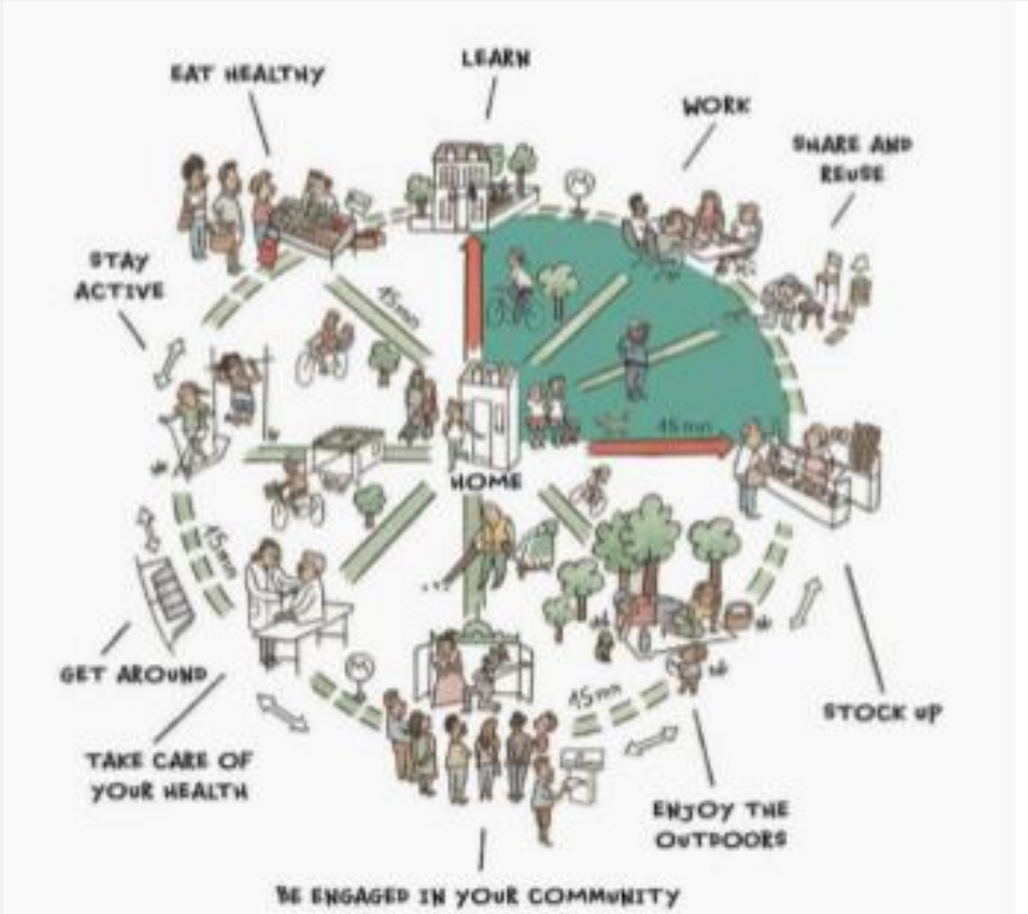
Default Question Block

I'm doing a research project to find out what facilities and services people want to have easy access to in their neighbourhood, and how they prefer to travel to them.

Your inputs will help me develop a series of maps to visualise the accessibility of points of interest by walking, cycling and using public transport.

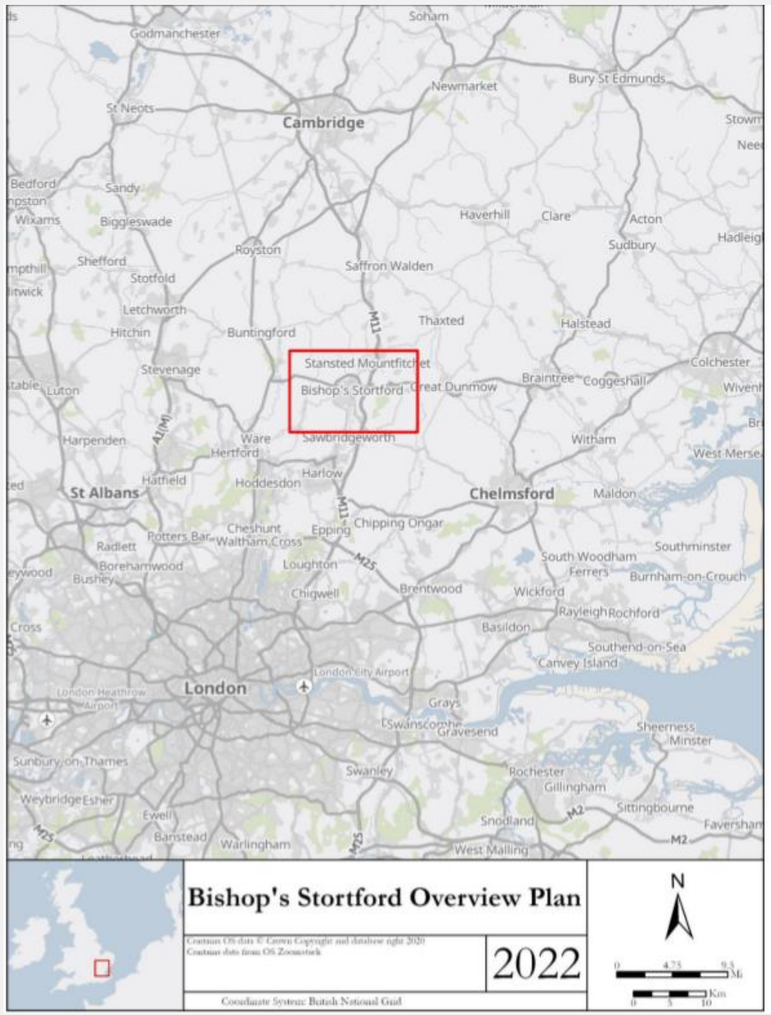
Thank you very much for your contribution – the survey should take less than 5 minutes to complete 😊

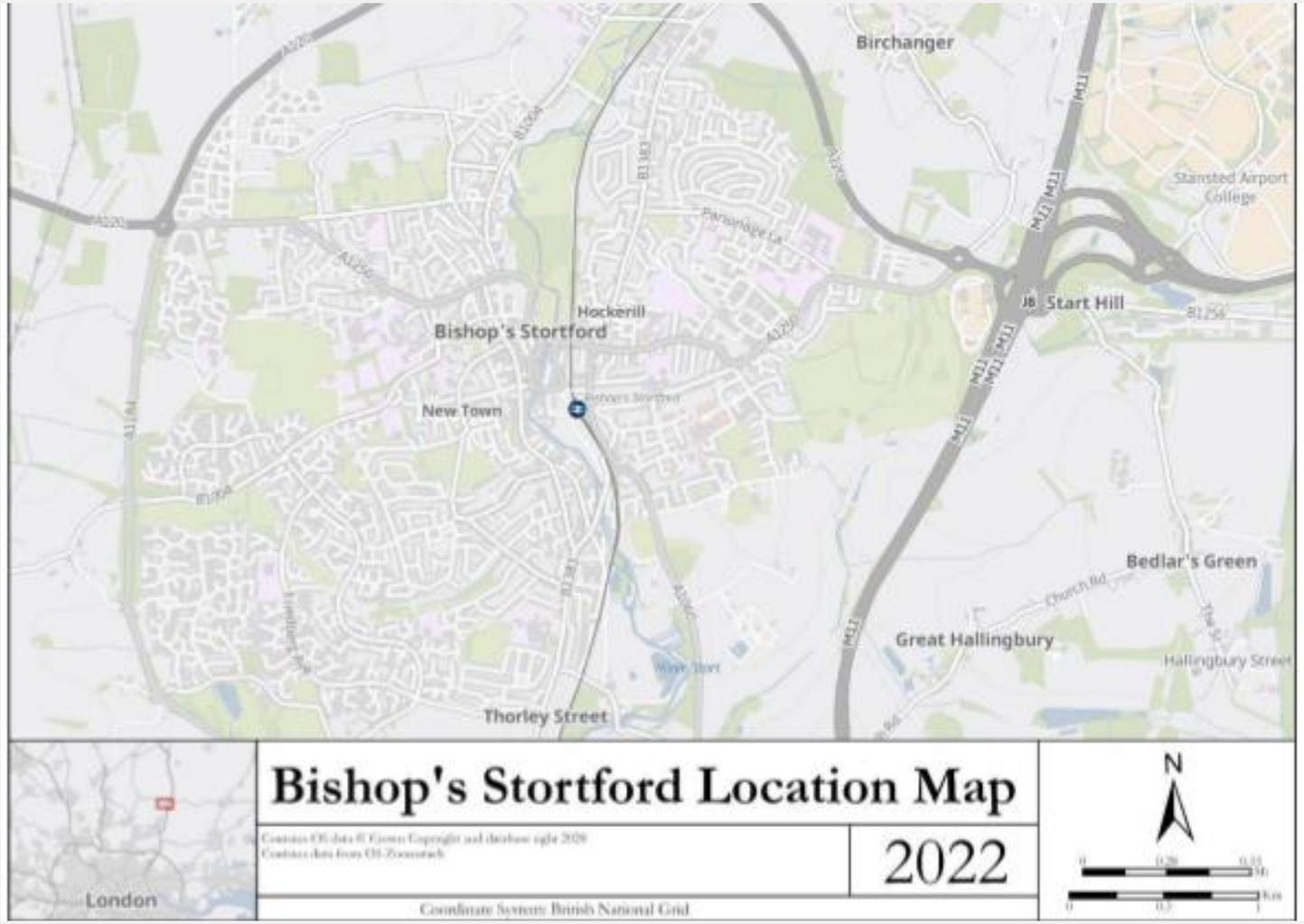
143 respondents



Methodology

Case Study Area



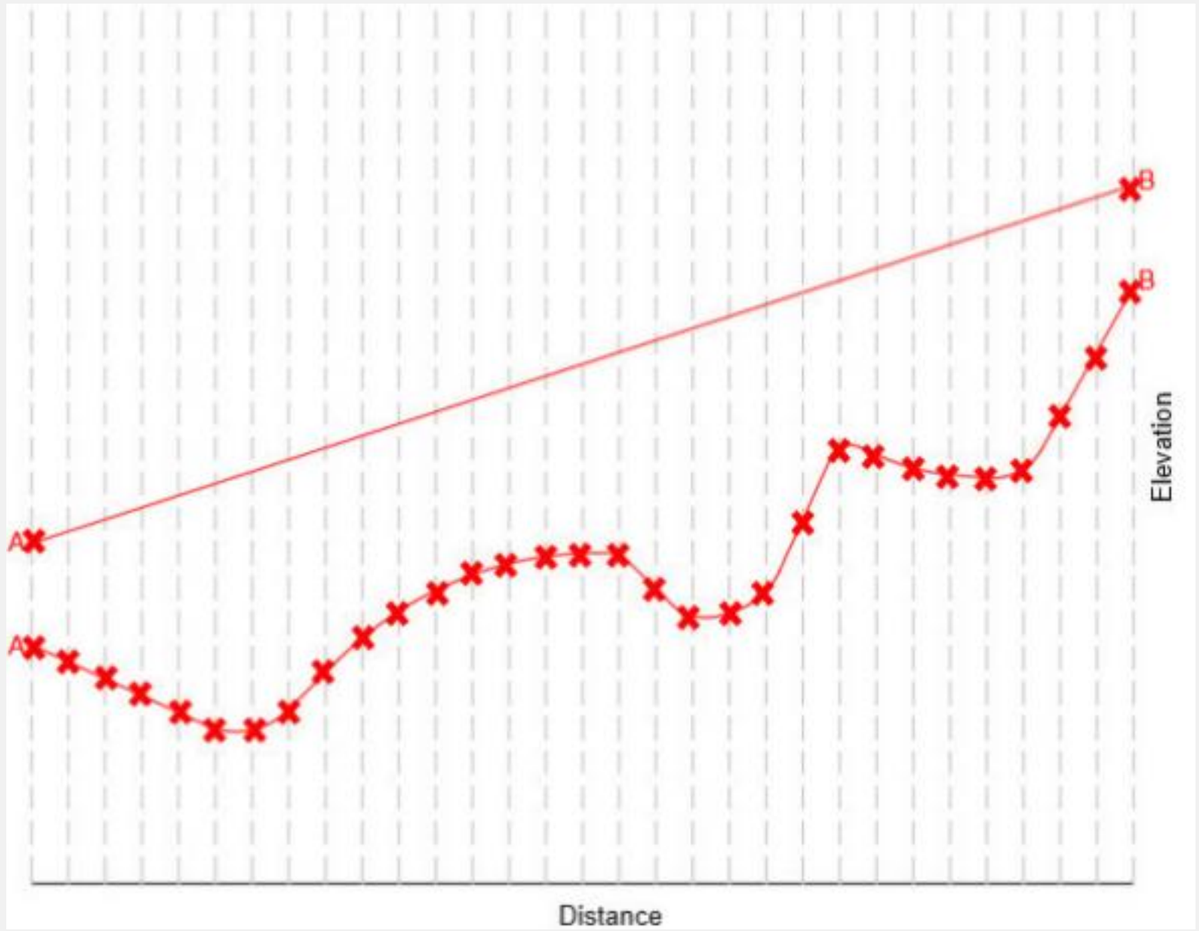


Methodology

Data Collection: Secondary Data

Data	Selection
Destinations	Amenities: Accommodation, Eating and Drinking Attractions Commercial Services Education and Health Manufacturing and Production Public Infrastructure Retail Sport and Entertainment Transport
Street Network	Road Link Road Node Highways_Road_Full Highways_Streets_Full
Digital Terrain Model	England 50cm
Greenspace Access Points	OS MasterMap Sites Layer - FileGeoDatabase
Walking Speed	Adults: 4.53kph
	Older Adults: 3.05kph
	Adults with young families: 3.79kph
Cycling Speed	Adults: 23.30kph
	Older Adults: 13.90kph
	Adults with young families: 15.25kph
Public Transport Data	United Kingdom – Modelled on Tuesday at 8am

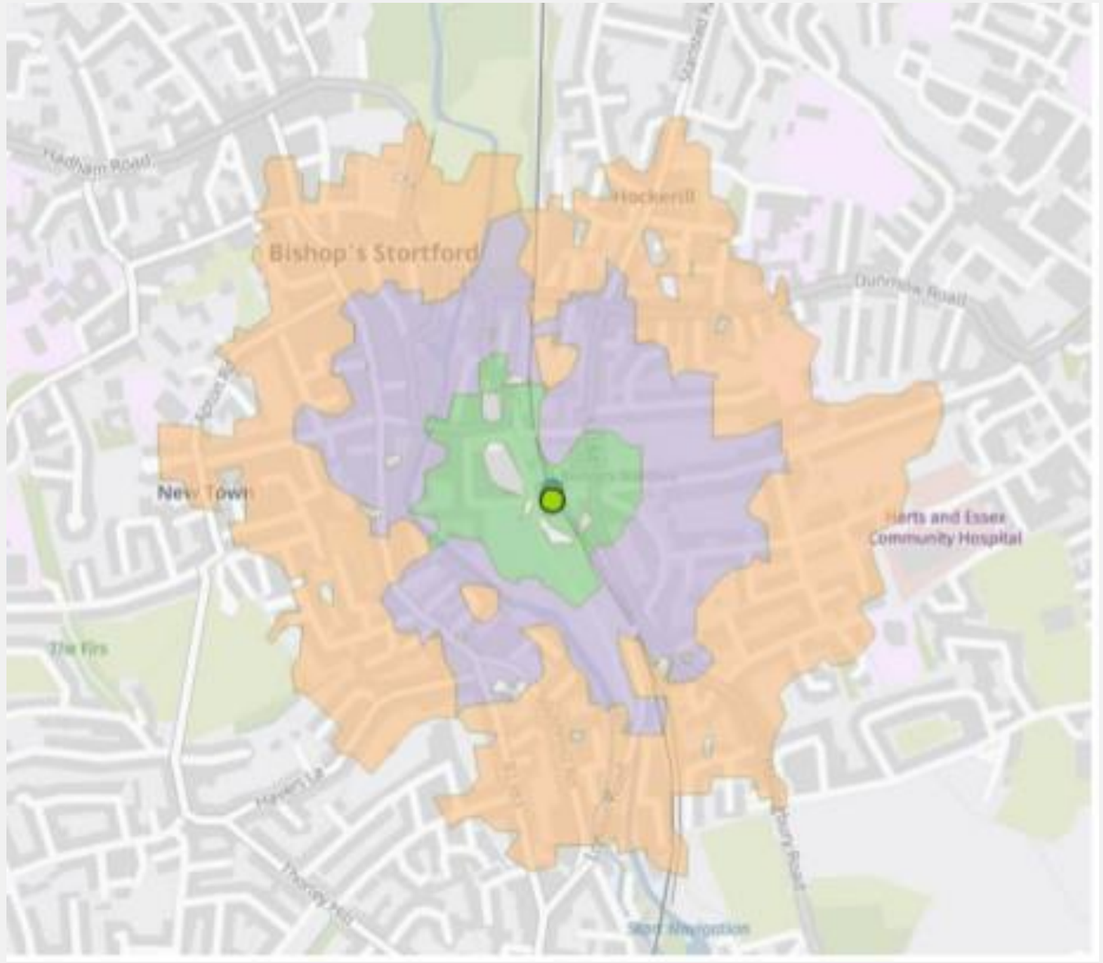
Methodological framework



Variations in elevation between longer and shorter segments

Methodology

Modelling



Example catchment area – adults walking 15-minutes from station

$$\left(!\frac{Length3D!}{\left(\alpha * \left(math.exp\left((-3.5) * \left(math.fabs\left(\frac{!\,End_{z!} - !\,Start_{z!}}{!\,shape.length!} + 0.05\right)\right)\right)\right) * 1000\right)}\right) * 60$$

α = Speed to be assessed

3D Transverse calculation formula

Methodology

Visualising

Mode	Group	Values					
Walking	*Adults*	8.945	7.006	5.259	3.512	1.765	0
	Young Families	8.295	6.497	4.877	3.256	1.636	0
	Older Adults	8.535	6.685	5.018	3.351	1.684	0
Cycling	*Adults*	9.295	7.280	5.464	3.649	1.834	0
	Young Families	9.862	7.724	5.798	3.872	1.945	0
	Older Adults	9.122	7.144	5.363	3.581	1.799	0
Public Transport	*Adults*	8.787	6.882	5.166	3.450	1.733	0
	Young Families	8.560	6.704	5.032	3.360	1.689	0
	Older Adults	9.495	7.437	5.582	3.728	1.873	0
Scoring		**A**	**B**	**C**	**D**	**E**	**F**

Choropleth map output

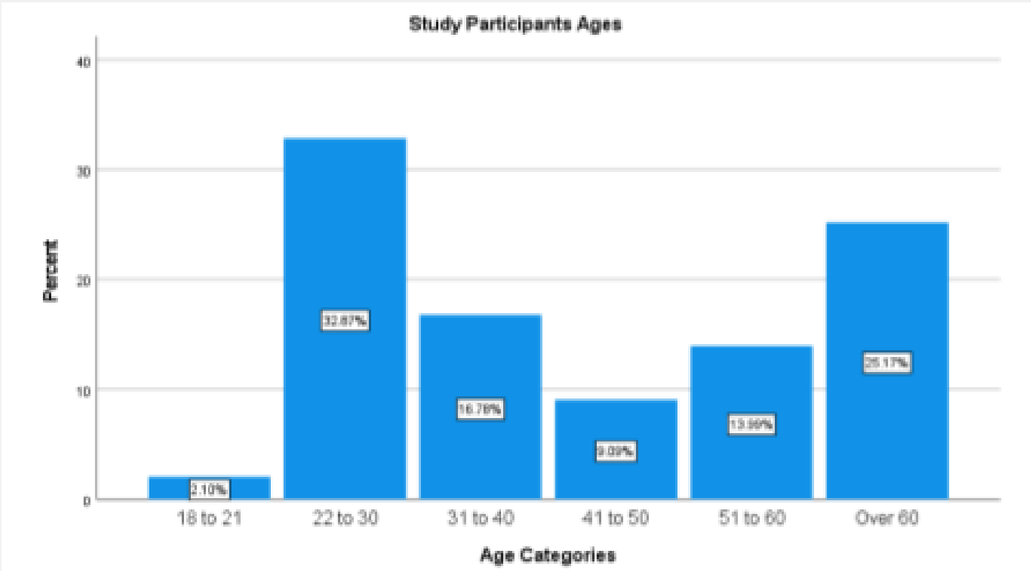
Reclassification

Value	New
0	0
5	10
10	7
15	5
NODATA	NODATA

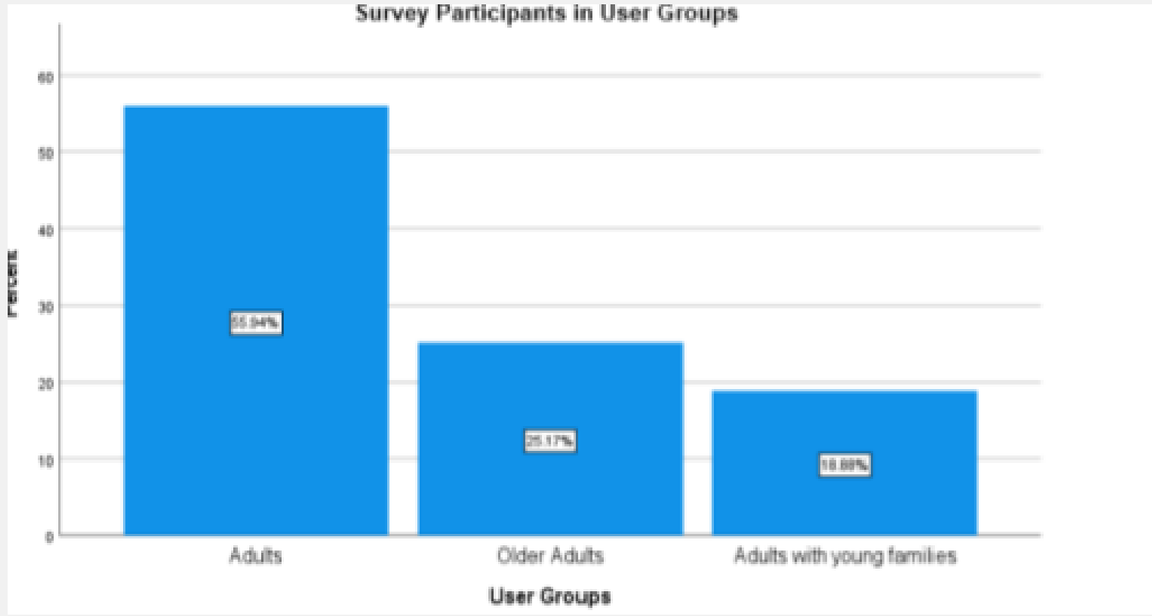
GIS reclassification

Findings

User Groups



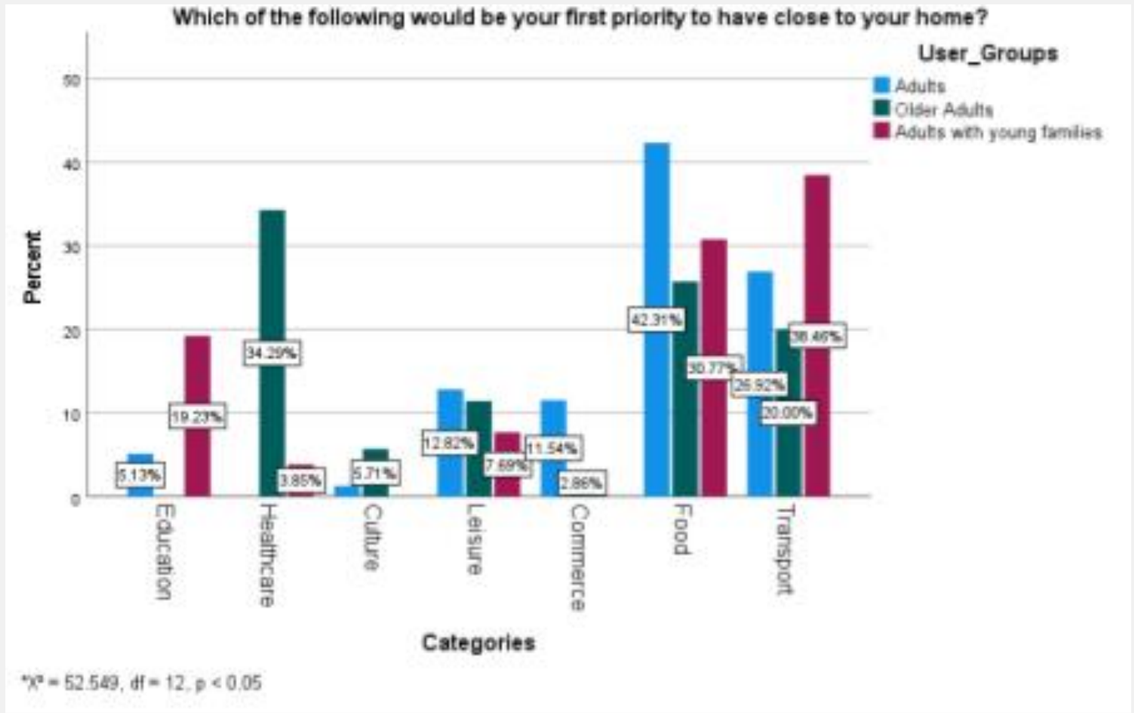
Questionnaire participants by age



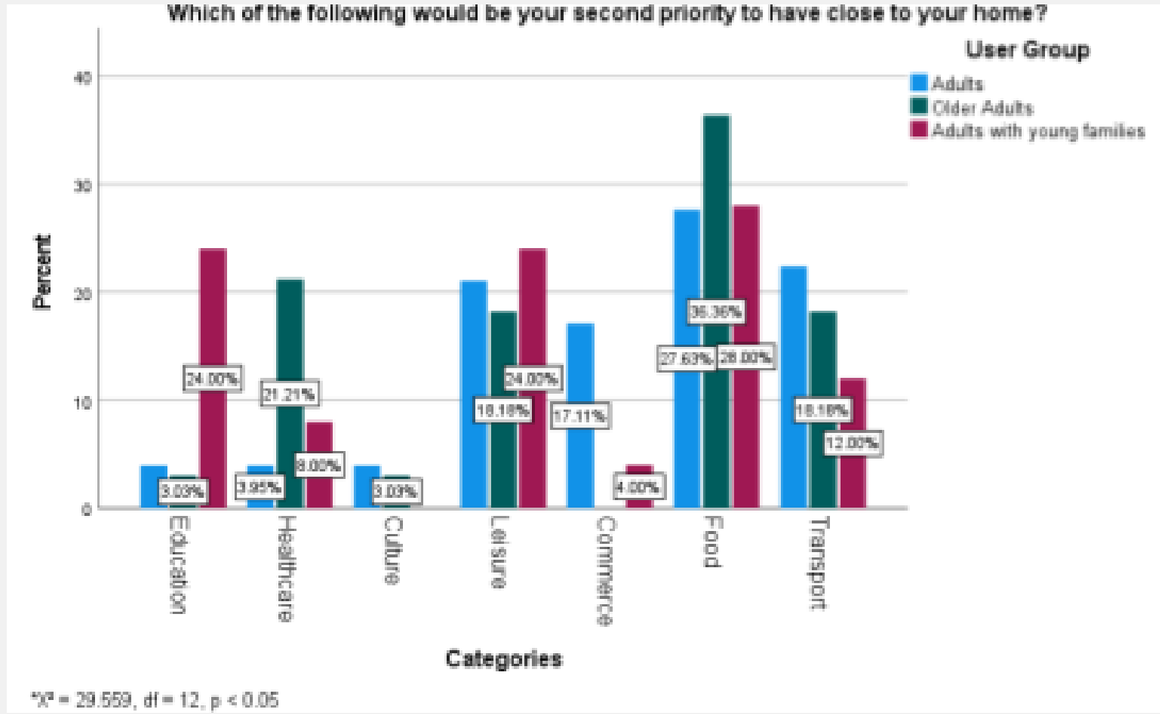
Participants filtered into user groups

Findings

Priorities



Questionnaire first priority results



Questionnaire second priority results

Findings

Use of different transport modes

Mode	Group	Values					
Walking	*Adults*	8.945	7.006	5.259	3.512	1.765	0
	Young Families	8.295	6.497	4.877	3.256	1.636	0
	Older Adults	8.535	6.685	5.018	3.351	1.684	0
Cycling	*Adults*	9.295	7.280	5.464	3.649	1.834	0
	Young Families	9.862	7.724	5.798	3.872	1.945	0
	Older Adults	9.122	7.144	5.363	3.581	1.799	0
Public Transport	*Adults*	8.787	6.882	5.166	3.450	1.733	0
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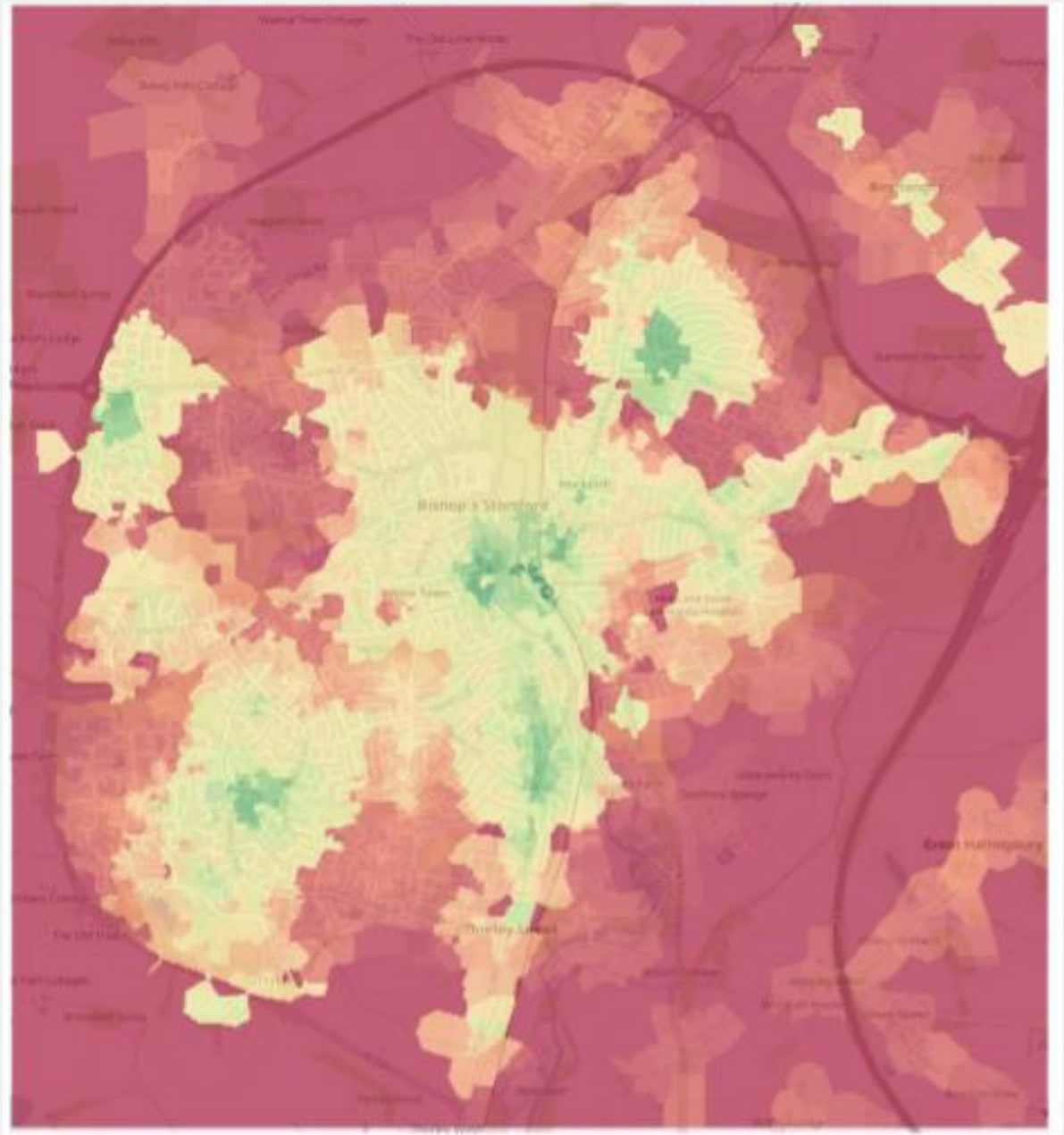
	Older Adults	9.495	7.437	5.582	3.728	1.873	0
Scoring		A	B	C	D	E	F

Choropleth map outputs (Overall)

Findings

Older Adults: Public Transport



Findings

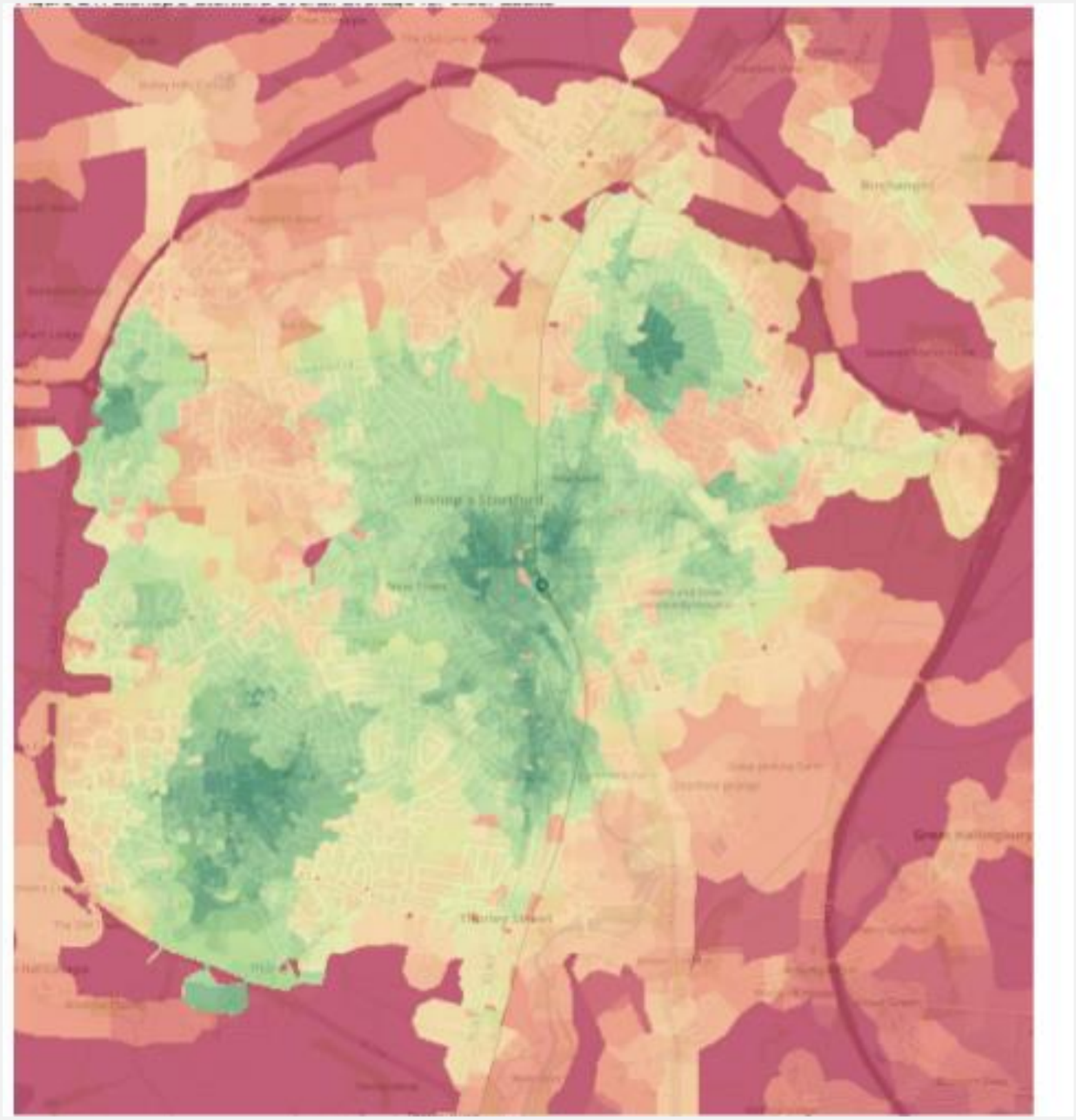
Adults with Young families: Cycling

Findings

Adults: Walking

Findings

Older Adults: Overall Average



Summary

Methodology established

Modelling cyclists

Baselines

Different users needs

Considers terrain

Contact

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