

iWalk

Innovations in Inclusive Walking

to deliver co-benefits in transport and public health

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About this project

The iWalk project is an exploratory collaboration between Bristol City Council and the University of Bristol to identify innovative transport practices which could enable the large scale uptake of walking for transport.

The project takes an equalities approach by focusing on the needs of children, older adults and Disabled people to define the quality standards of these innovations.

The iWalk project was funded by an ESRC impact acceleration grant from the University of Bristol and hosted as a position within the Bristol City Council Transport Team.








Bristol is a great city!

449,300 people call Bristol home. An additional 20,839 people commute daily into Bristol. 526,000 international visitors come each year as well as around 10 million day visitors, that's equivalent to another 28,838 people in the city each day. Our local economy is worth £13.6 bn. And ask anybody, we love living here!

SOURCES: Bristol City Council (2011, 2016, 2017), Destination Bristol (2015).

But our health could be better.

14 ▼		Crystal Palace
15 ▲		Swansea City
16 ▼		Burnley
17 ▼		Watford
18 ●		Hull City
19 ●		Middlesbrough
20 ●		Sunderland



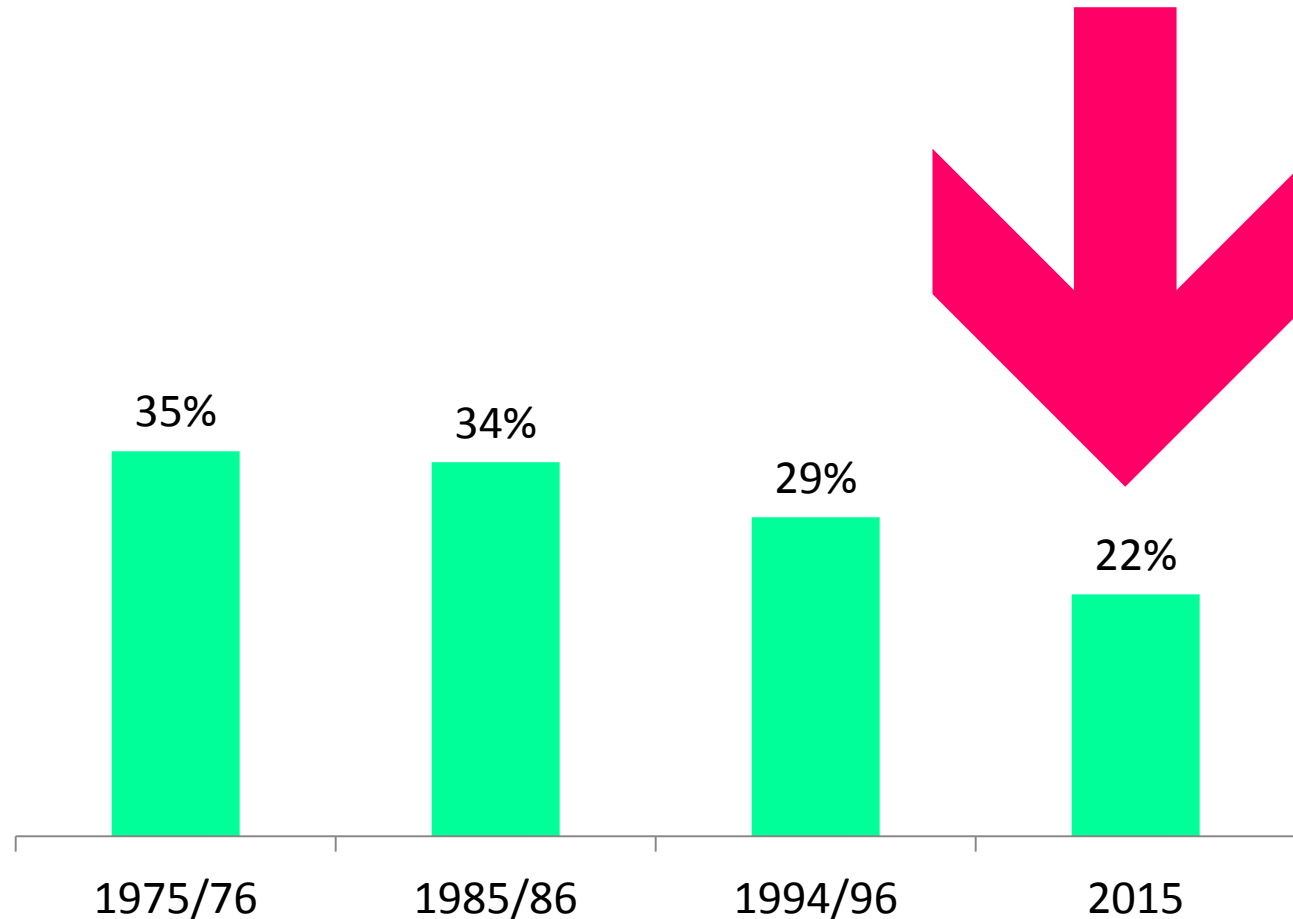
A good team in constant danger of relegation.

We are in the bottom third of the league in terms of premature mortality.

SOURCES: Public Health England (2017).

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Levels of walking are at a historic low in England.



SOURCES: DETR Environment Transport Regions (1998).

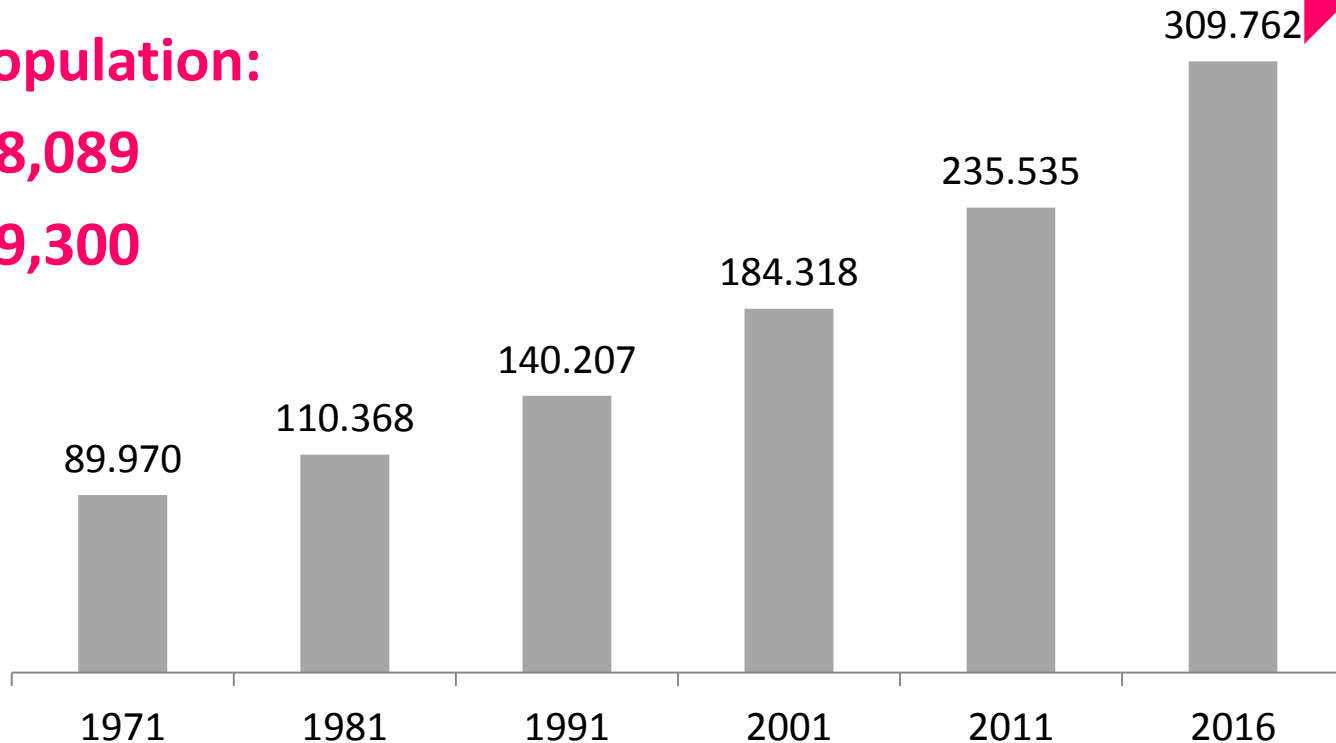
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The number of cars and vans owned in Bristol has tripled over the same period.

Bristol population:

1971: 428,089

2015: 449,300



The number of cars and vans owned in Bristol has tripled over the past 40 years. The percentage of households without a car has dropped from 49% to 29% in the same period, well below the core city average of 38%.

SOURCES: BCC (2016), Department for Transport (2017), National Census (2011).

These are **10 innovations in inclusive walking** which could help everybody walk more:

1. Healthy ambition with scaled investment – **strategy**.
2. Include walking and cycling in transport models – **strategy**.
3. Ban pavement parking – **strategy**.
4. Inclusive walking lane widths – **infrastructure**.
5. Continuous level crossings – **infrastructure**.
6. Good walking infrastructure, with win-wins for cycling – **infrastructure**.
7. A child-relevant response to air pollution (PM2.5s) – **safety**.
8. Amend the highway code to protect people walking – **safety**.
9. Add near misses and street harassment to Fix-my-Street – **safety**.
10. Raise the status of walking – **culture**.

1. Healthy ambitions for transport.

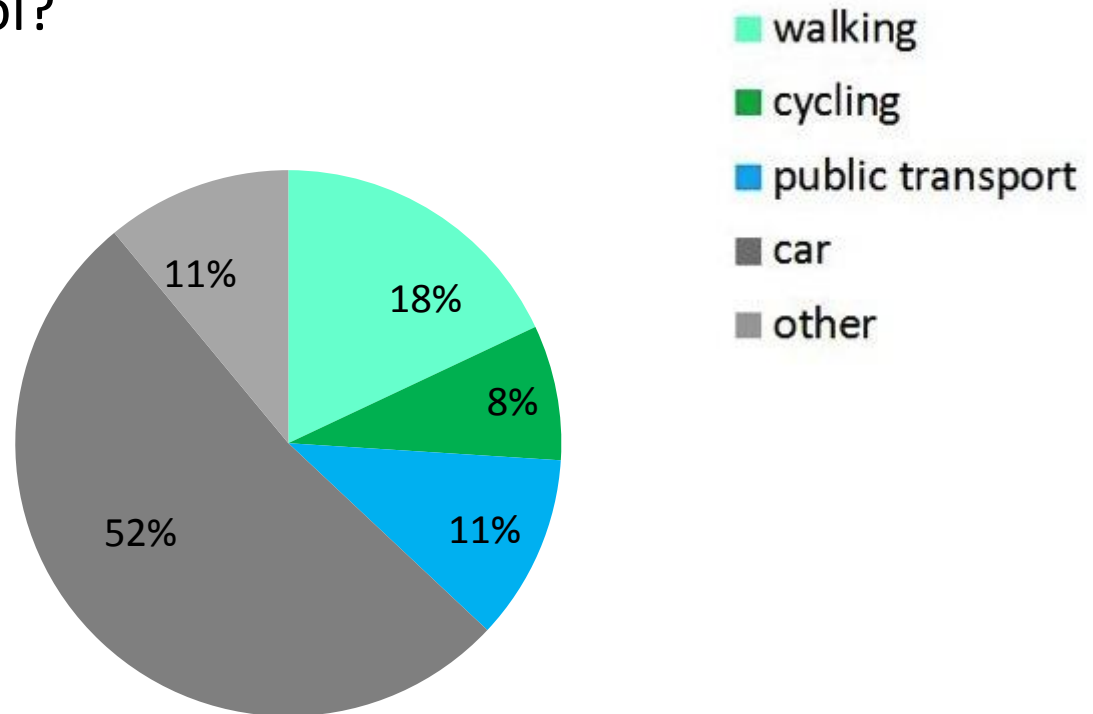
Healthy transport is defined as walking, cycling and public transport. This definition is based on the number of minutes of healthy physical activity and health outcomes associated with these forms of transport.

SOURCES: Rissel et al. (2011), Department for Transport (2017), Department of Health (2011).

1. Healthy ambitions for transport.

How are we doing in Bristol?

Can we do better?

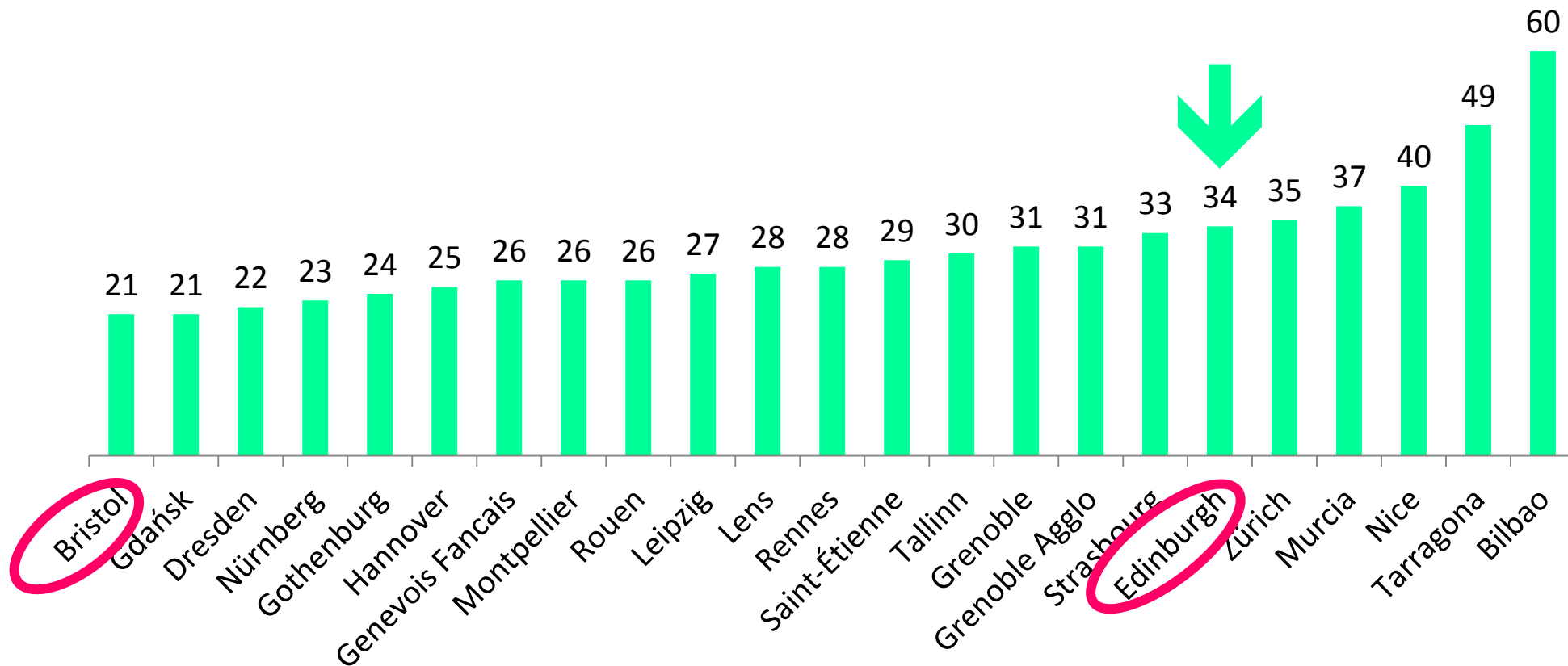


Modal share of main mode travel to work in Bristol.

Healthy Transport = 37%

SOURCES: National Census (2011).

1. Healthy ambitions for transport.

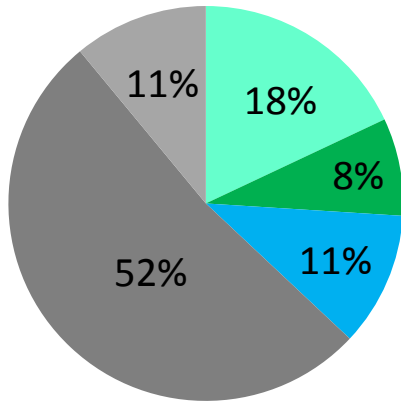


Modal share % of walking for transport in other European cities with populations between 350,000 and 550,000 and comparable to Bristol. Other cities are doing better, for example in Edinburgh walking is 34%.

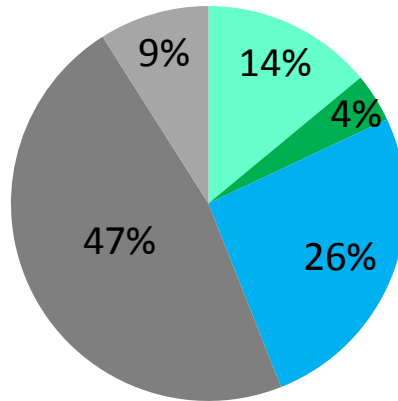
SOURCES: EPOMM (2017)

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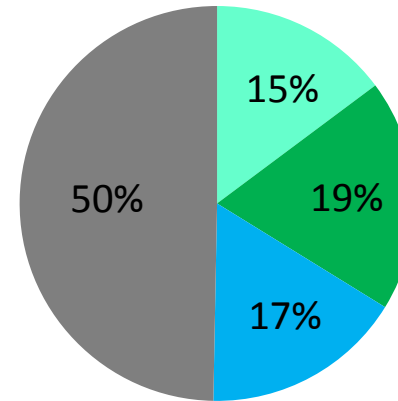
1. Healthy ambitions for transport.



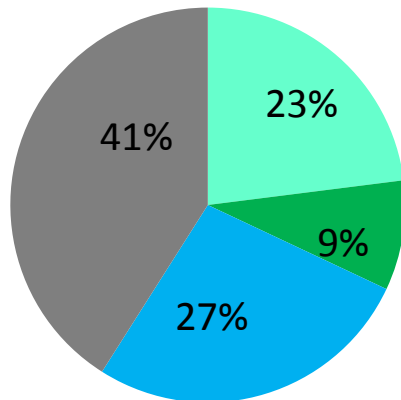
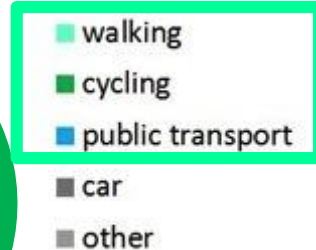
Bristol Healthy Transport = **37%**
(Population: 428,234)



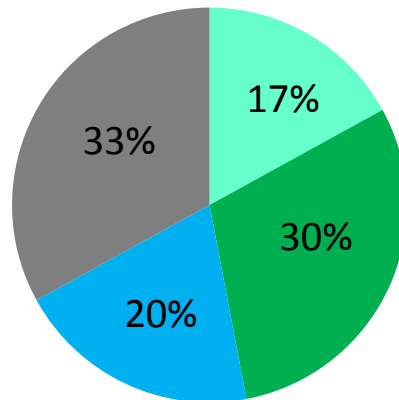
Manchester Healthy Transport = **44%**
(Population: 503,127)



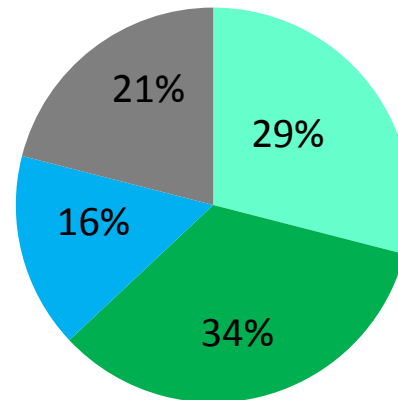
Boston Healthy Transport = **50%**
(Population: 645,966)



Vancouver Healthy Transport = **59%**
(Population: 593,341)



Copenhagen Healthy Transport = **67%**
(Population: 562,379)



Freiburg Healthy Transport = **79%**
(Population: 224,079)

Healthy Transport = combined walking + cycling + public transport

2. Include walking and cycling in transport models.



Is this approach valid for city and residential junctions?

2. Include walking and cycling in transport models.

- Traditional transport modelling software does not count walking and cycling.
- Counting vehicles and not people results in inefficient junctions with road geometries which focus on the movement of vehicles at speed.
- This often does not improve congestion.
- Such junctions are typically unpleasant and challenging for people walking, creating more congestion as people prefer to drive than walk.

2. Include walking and cycling in transport models.



Newer software models people in all modes of transport, including walking, cycling and public transport.

SOURCES: Azalient (2017)

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JUNCTIONS DESIGNED FOR MORE PEOPLE:

Space for benches, trees and wayfinding.

Crossings simplified.

Corner radii tightened, footway widened.

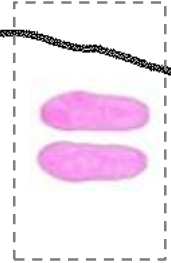
Walking is a feasible option for everybody.

Carriageway widths reduced.

3. Ban pavement parking.

1 car storage = 10 m² or 15 m³

Equivalent to storage for >500 pairs of shoes.



3. Ban pavement parking.

Cars and vans are stationary more than
95% of the time.

That is equivalent to **>300,000 cars and vans parked**
in Bristol at any given time.

SOURCES: Own calculation based on Department for Transport (2015, 2017).

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3. Ban pavement parking.



Is the footway the right place to store cars?

3. Ban pavement parking.

Need to rethinking parking, and how we use this space in cities to support our mental and physical health:

→ Re-allocate 20% modal share of “park” ing space to walking assets e.g. benches, trees, social areas/cafes.

Or

→ 1 tree and 1 bench per 100 inhabitants.

4. Inclusive widths for walking lanes.

Should two people be able to pass each other on the footway **without stepping into the road?**

Stepping into the road to let someone else pass, or crossing the road to let someone else pass could be described as “doing a Bristol”. This “give and take” is indicative of poor walking infrastructure.

SOURCES: Department for Transport (2017).

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4. Inclusive widths for walking lanes.

What supports people walking?

- Walking with a dog [2]
- Walking with a friend [3]
- Modelling walking as a normal behaviour to a child [4]
- Mobility aids such as a guide dog, a stick, walking frame, wheelchair, scooter, personal accompaniment etc. [5]
- Good infrastructure [6]

What **stuff** do you need to support different journey types?

- Shopping - shopping bag, sholley or shopping caddy
- Work - computer bag, change of clothes/shoes
- School journeys - with children, possibly on scooters
- Recreational - sports bag, other equipment

4. Inclusive widths for walking lanes.



1.2 m

person with guide dog



1.2 - 1.4 m

with someone you love



1.5 m

adult with child

What is our bottom line for inclusive walking lane widths? A basic minimum provision should include someone walking with a guide dog or with a child. Being able to walk beside someone you love or a friend would help make walking a more realistic choice for everybody. For many people, accompaniment might be essential to getting out.

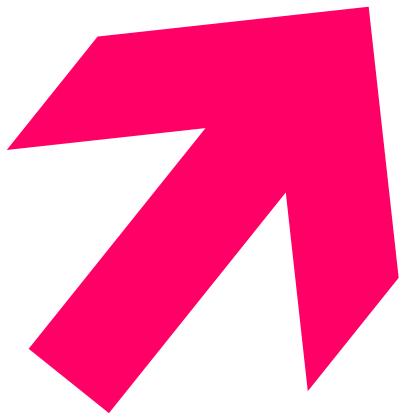
4. Inclusive widths for walking lanes.

Based on demographic data for Bristol.

>49% of walking journeys likely accompanied

>49% of walking journeys likely at ≤ 2 mph (0.9 m/s)

Mobility diversity is standard



4. Inclusive widths for walking lanes.

2 m is typically cited as a basic inclusive footway width by the Department for Transport (2005) Inclusive Mobility Guidance, section 3.1 and Manual for Streets (2007) page 68. This is based on two wheel chairs being able to pass one another.

The 2 m refers explicitly to 2m clearway, not a 2m footway.

Additional allowances need to be made for placement of street assets, frontage buffers, level of pedestrian flow, and carriageway flows including cycling lanes.

SOURCES: Department for Transport (2005, 2007)

4. Inclusive widths for walking lanes.



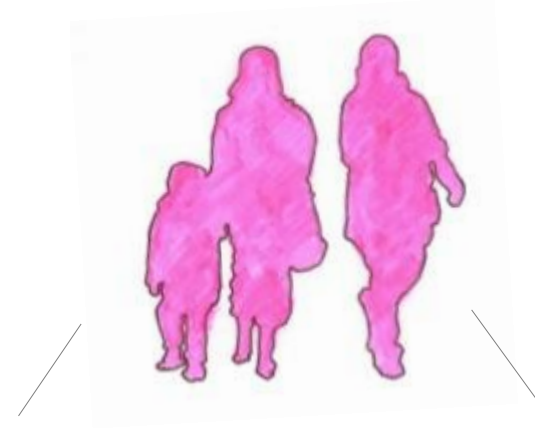
2.5 m

SOCIABLE WALKING



2.5 m

FAMILY WALKING



2.5 m

PRACTICAL WALKING

A basic minimum provision should allow **sociable walking** so that we can walk with friends, family and children because we know this helps us walk more. **Practical walking** is important for both safety and comfort so that we can pass other people on the footway without having to step into the road. A footway width of 2.5m is a basic, robust standard to achieve this.

2.5 m footway is a basic standard.



5. Continuous level crossings

Traffic remains the leading cause of death for children aged 5 to 19 in the UK.

How can we make walking safe for everybody?

SOURCES: Royal College of Paediatrics and Child Health (2015), Office of National Statistics (2015).

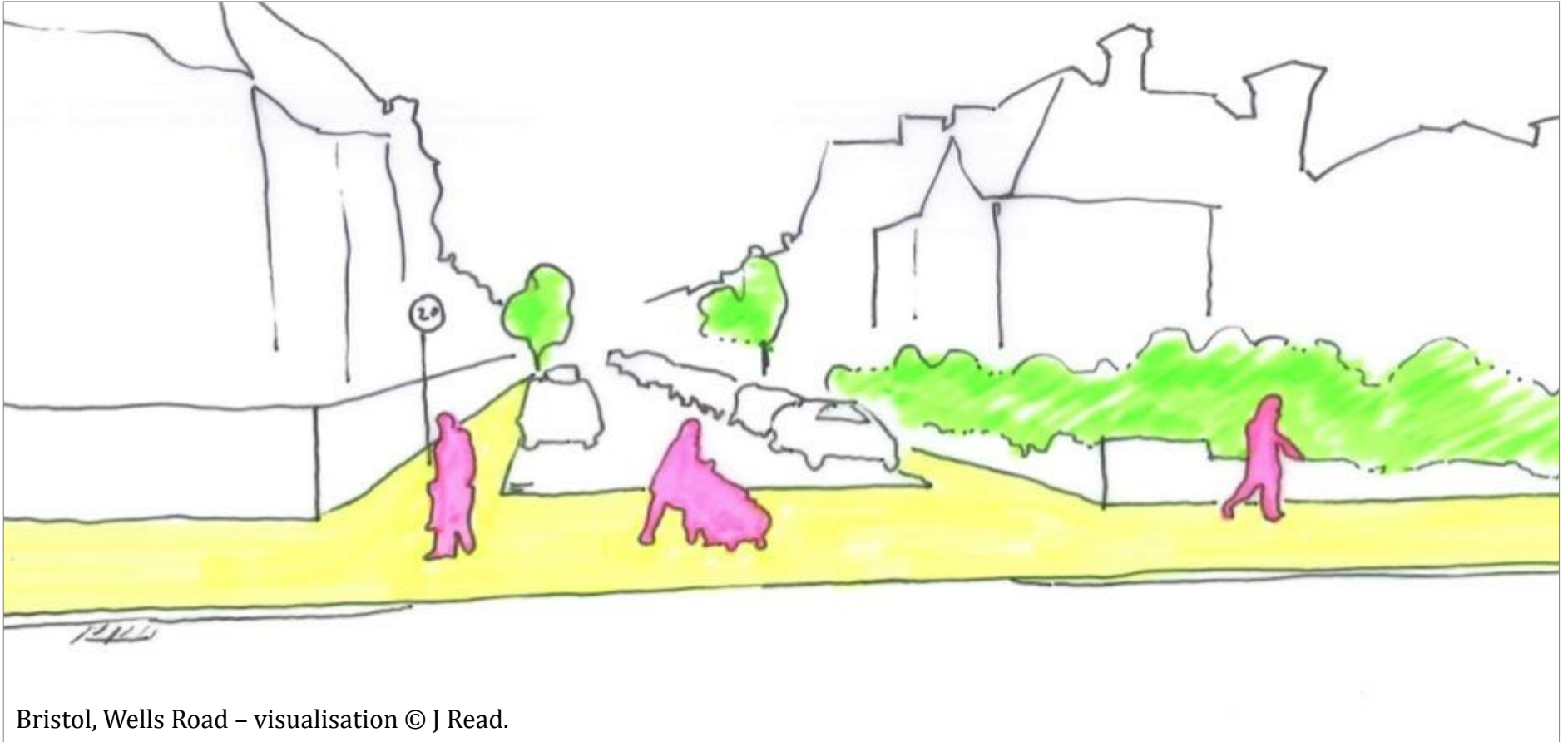
Absolute traffic risk as killed or seriously injured (KSI) per billion miles CHILDREN

Great Britain	KSI/bn miles		Denmark	KSI/bn miles	
<u>Girls 0-16 years [11]</u>			<u>Girls 10-15 years [6]</u>		
Pedestrians	352	→	Pedestrians	75	X 5
Cyclists	595	→	Cyclists	54	X 11
Car occupants	9				
<u>Boys 0-16 years [11]</u>			<u>Boys 10-15 years [6]</u>		
Pedestrians	641	→	Pedestrians	127	X 5
Cyclists	1411	→	Cyclists	73	X 19
Car occupants	8				

Walking and cycling is much safer in Denmark, the Netherlands and Sweden, particularly for children.

SOURCES: Department for Transport (2013) and own calculations, DTU Transport (2012).

5. Continuous level crossings



Bristol, Wells Road – visualisation © J Read.

- Footway is continuous, and load-bearing at junction.
- Increased safety – 2 step yield for drivers.
- Supports slower turning at junctions.
- Use at secondary road junctions.
- Rolled out across London in variations, and individual cases in Bristol.
- Used internationally e.g. Boston, Copenhagen, Amsterdam, Melbourne.

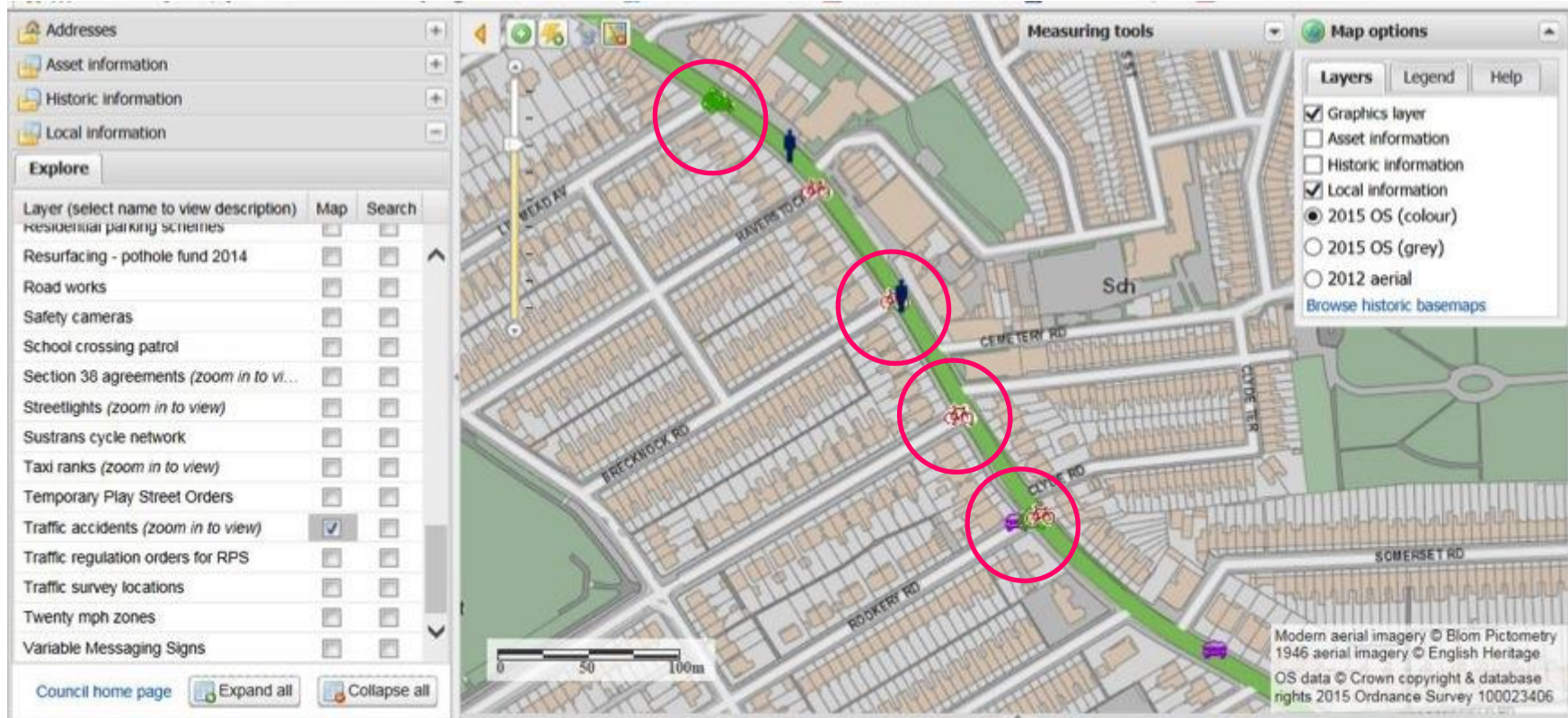
5. Continuous level crossings



Clapham Old Town, London. Image: googlemaps.

- Footway material is continuous, and load-bearing at junction.
- Increased safety – 2 step yield for drivers.
- Supports slower turning at junctions.
- Use at secondary road junctions.

5. Continuous level crossings



In Bristol, most pedestrian and cyclist traffic risk, but also risk for motorcycle and car occupants occurs at secondary junctions, similar to national patterns. Improving safety here would be a targeted approach to reducing traffic risk at these key danger spots. Traffic deaths are the leading cause of death for children nationally .

SOURCES: Bristol City Council (2017, 2017), Transport Research Laboratory (2009)

5. Continuous level crossings



Copenhagen, Gammel Kongevej is a major road artery into the city centre. The continuous level crossing was developed in response to the question **“how can my child walk to school without crossing the road?”**. The use of a load-bearing footway material preserves the linear integrity of the footway, and also gives a clear threshold treatment to the quiet residential street beyond. Image: googlemaps.

5. Continuous level crossings



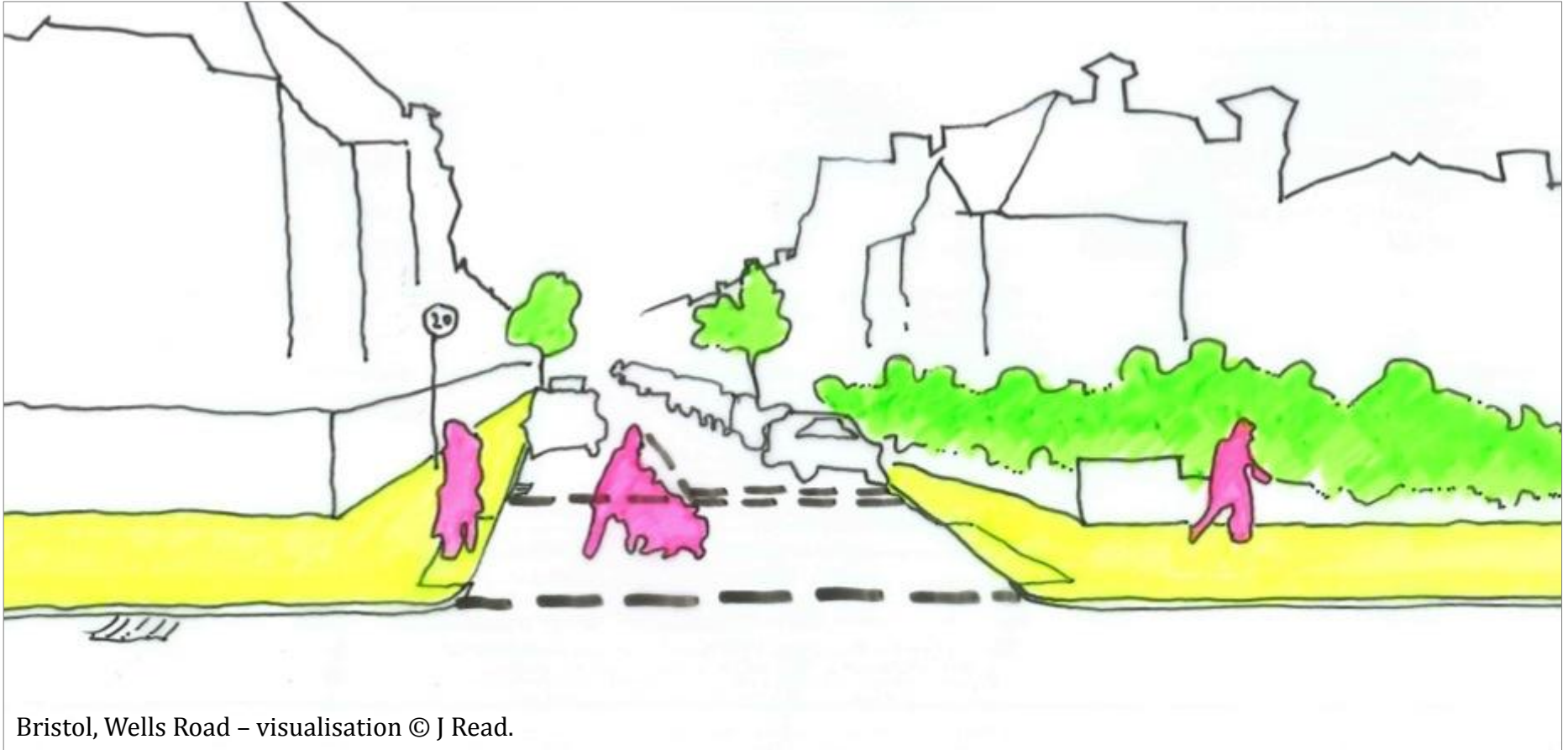
Lavender Hill, London. Image: J Read.

5. Continuous level crossings



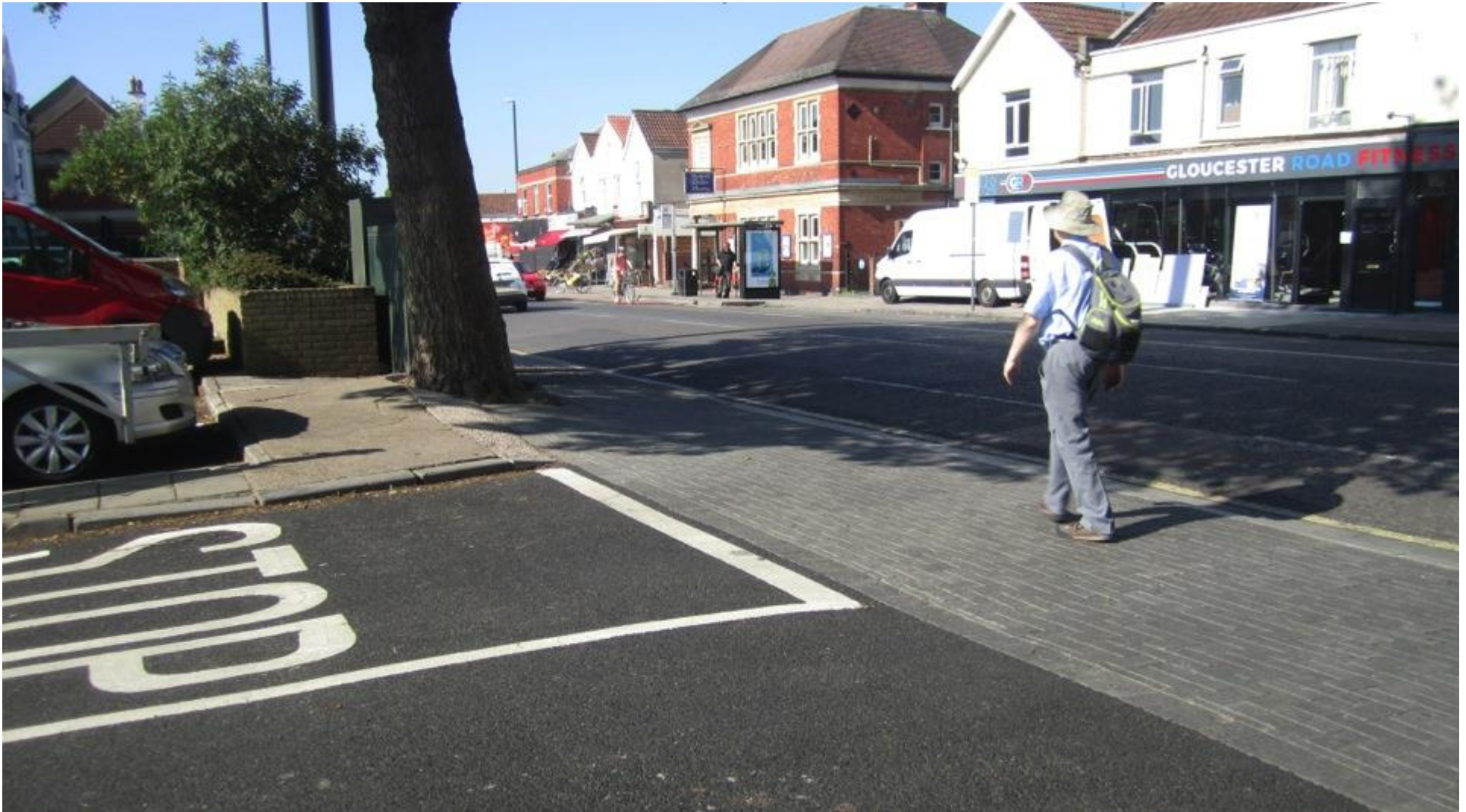
Waltham Forest, London– 48 continuous level crossings have been installed in the borough [9]. Image: Waltham Forest.

5. Plan B – pulled back road markings



- **Can be rolled out during micro-asphalting.**
- Strengthens the legal duty of care to give way to people walking.
- In use across UK in individual contexts, e.g. Bristol, Weston-super-Mare, Hove, Oxford etc.
- Cited in Irish National Cycle Manual.

5. Plan B – pulled back road markings



Gloucester Road, Bristol. Image: J Read.

5. Plan B – pulled back road markings



Montreal. Image: Lucy Saunders.

6. Good walking infrastructure with win-wins with cycling.

National data shows us clearly **walking is transport**.

Walking isn't free, but walking infrastructure does have the greatest return on investment.

Good infrastructure supports more walking.

SOURCES: National Census 2011, Department for Transport (2014, 2016, 2017), Pilkington et al. (2017).

Raised level loading/parking bays

Camden High Street



Vans unload here early morning, rest of the time available for people/customers.

Image: J Read.

Raised level footway crossovers

Roderick Road, London



No adverse camber for people!
Cars can handle this.

Image: J Read.

Good cycling infrastructure “Cycle Street”

Don't just plonk cycles on the footway



Innovations which work within
the road cross section

Image: J Read.

Integrated road layouts

Deventer, Netherlands



Simple robust solutions which work well for all users.

6. Good walking infrastructure with win-wins with cycling.

→ Good inclusive cycling infrastructure – must deliver win-wins with walking.

- **New cycling infrastructure must be inclusive** – that is enabling to all transport users, including people in cargo bikes, wheelchair bikes, mobility scooters and other mobility forms **whose journeys start and end on the footway.**
- New inclusive cycling infrastructure must **strengthen rather than compromise the walking environment**, otherwise this a double injustice to children, older adults, and Disabled people.
- Please see the full report for 10 key walking infrastructure upgrades which could be transformational in making walking for transport a genuine transport choice for more people.

7. A child-relevant response to air pollution

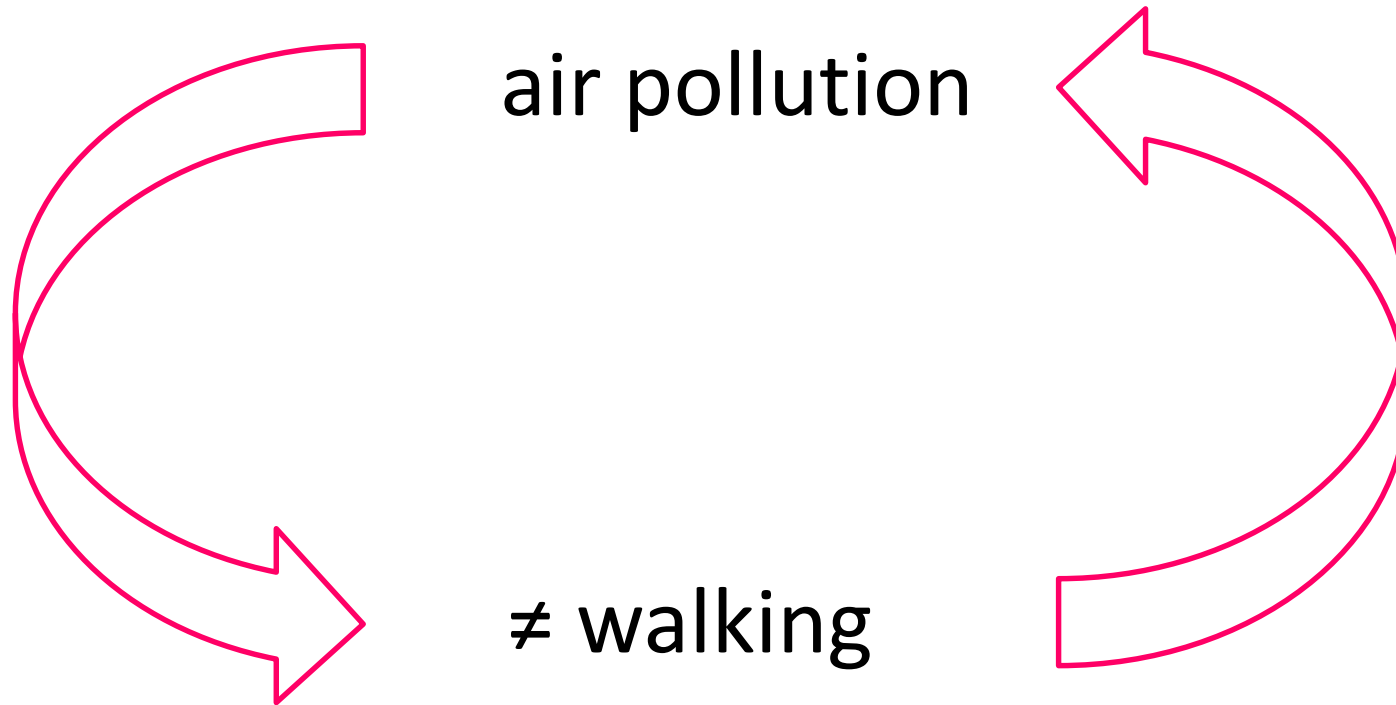


Air pollution in Bristol is equivalent to
1-2 cigarette/day.

For children & babies too.

SOURCES: DEFRA (2017), Pope et al. (2009)

7. A child-relevant response to air pollution



Community groups have told us that air pollution puts them off walking.
Less walking means more driving and more pollution.

SOURCES: Bristol Walking Alliance (2017), Playing Out, Knowle West Media Centre, Knightstone Housing (2017)

7. A child-relevant response to air pollution

In Bristol, 200 of 300 deaths attributable to air pollution are due to $PM_{2.5}$.

$PM_{2.5}$ stands for small particulate matter which are so small they enter our blood, brain and heart directly.

Recent research shows that in city and road settings, most fine particulate pollution (PM_{10} and $PM_{2.5}$) originates mostly from **brakes, tyres and road wear** which gets re-suspended again and again.

SOURCES: Air Quality Consultants (2017), Royal College of Physicians (2016), Baden-Württemberg Ministerium für Verkehr (2017)

7. A child-relevant response to air pollution

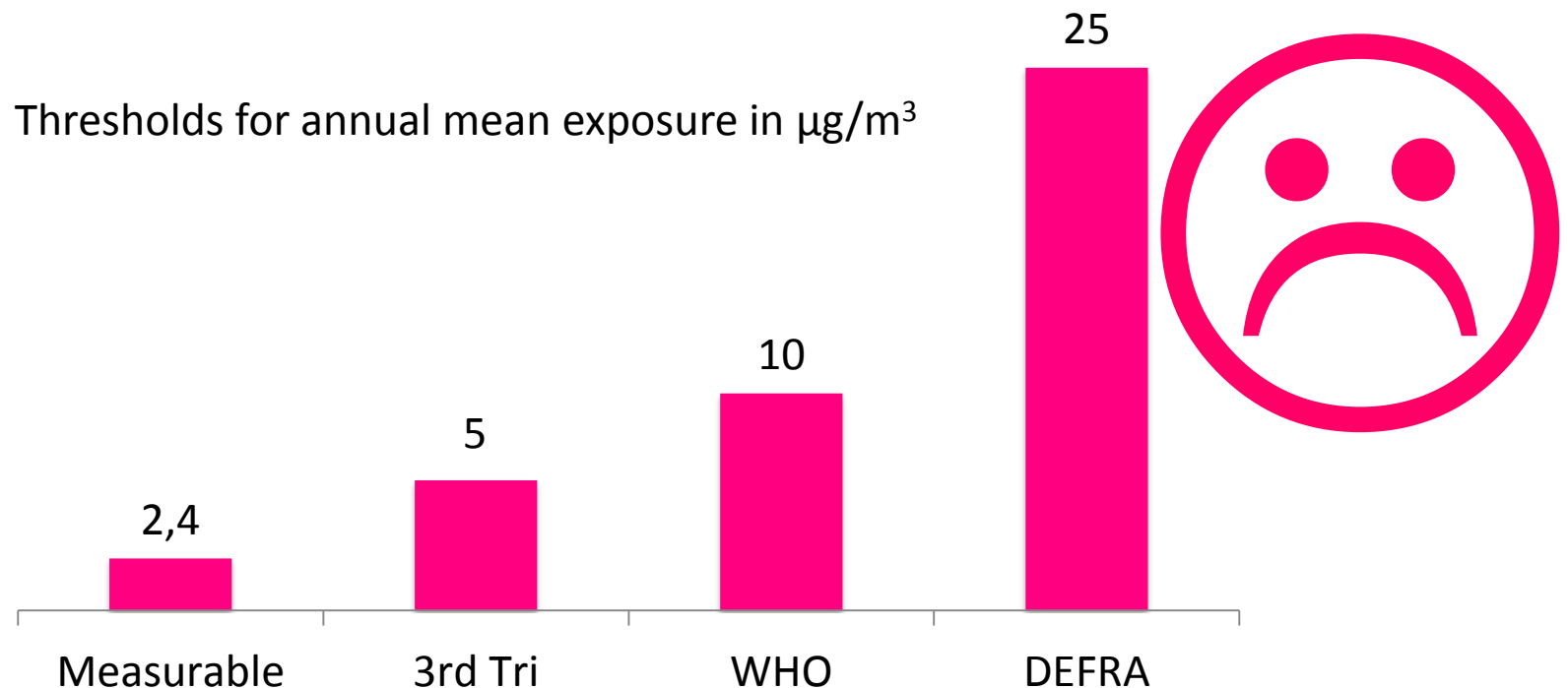
Exposure to air pollution can be highest in cars or vans as they are in the centre of the road.

Professional drivers such as taxi, ambulance and van drivers can have some of the highest exposure to PM_{2.5}

SOURCES: Kings College London (2012), Barrat (2013), House of Commons Environmental Audit Committee (2014) .

7. A child-relevant response to air pollution

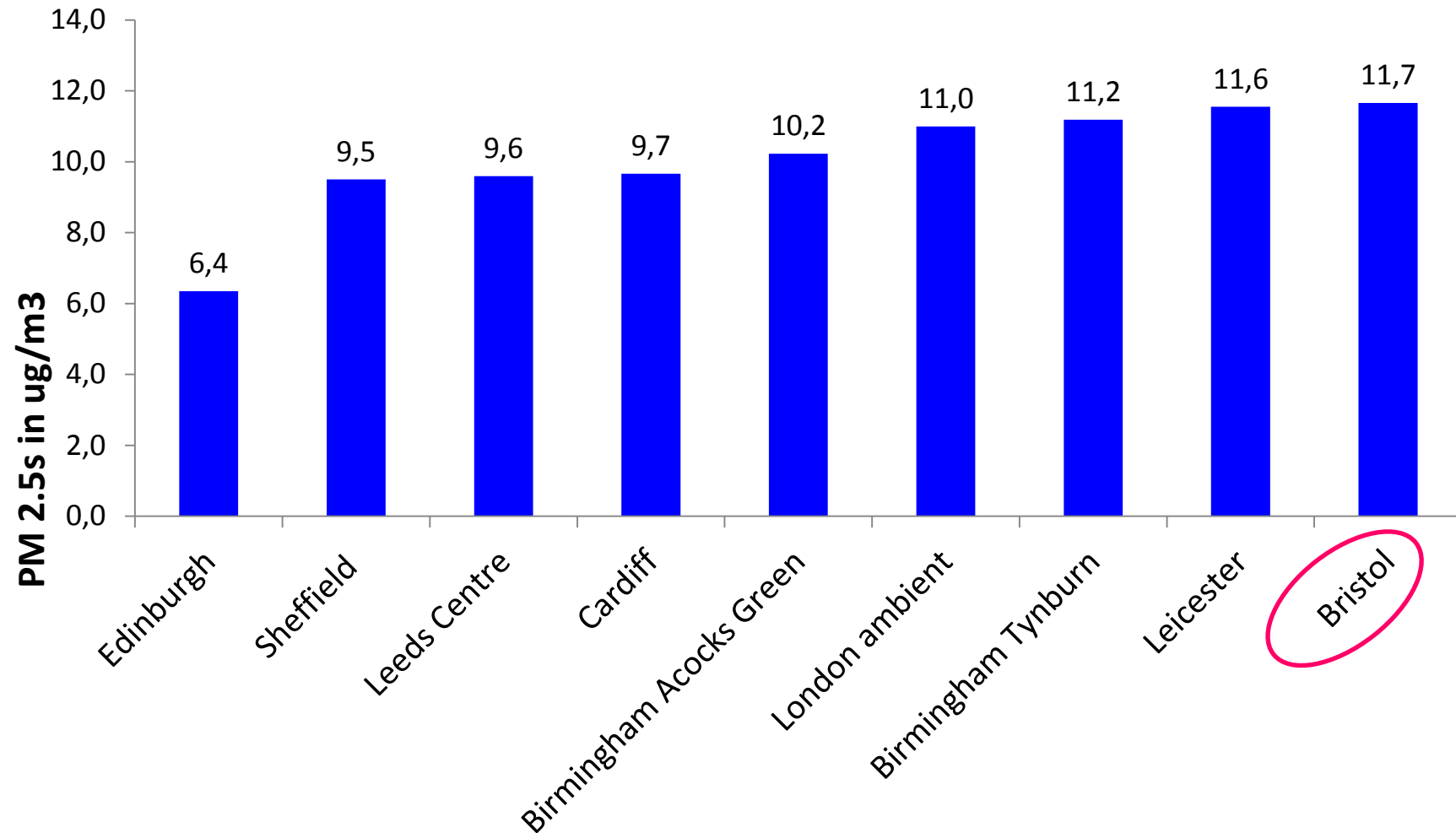
There is large difference between health recommendations for annual mean PM_{2.5} exposure and UK guidelines.



SOURCES: Cohen, A. et al.(2017) Royal College of Physicians (2016), World Health Organisation (2005) , Clemens et al. (2017), DEFRA (2017).

Annual mean ambient PM2.5s – comparison across UK cities.

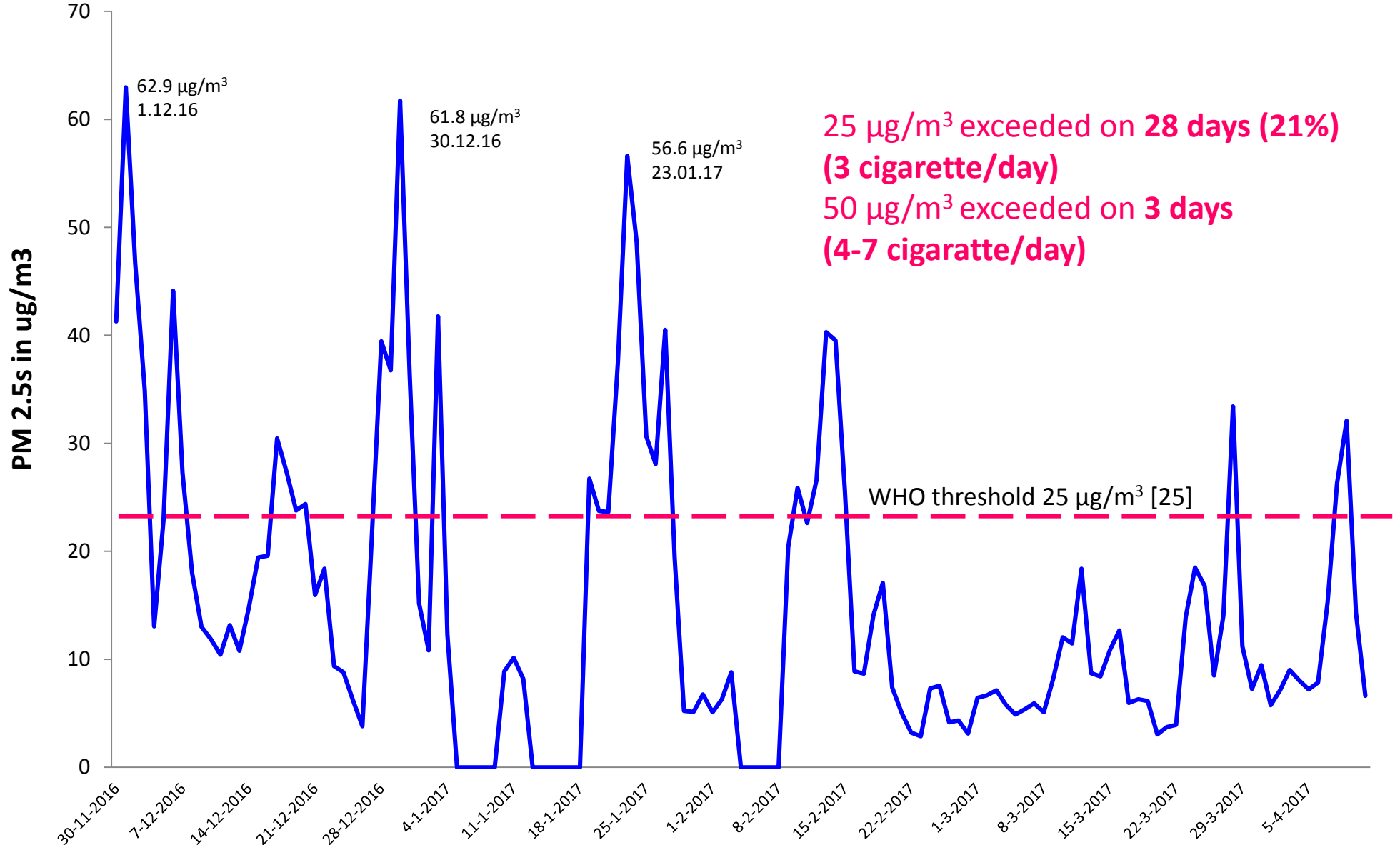
WHO guideline : 10 $\mu\text{g}/\text{m}^3$ annual mean



Data source: DEFRA https://uk-air.defra.gov.uk/data/data_selector?; Data for London from Kings College London <https://data.london.gov.uk/dataset/london-average-air-quality-levels>

Bristol PM_{2.5} – daily 24 hour averages of 24 hour running means.

Recent trends 30th of November 2016 to 11th of April 2017



7. A child-relevant response to air pollution

→ Real-time transport responses



7. A child-relevant response to air pollution

→ Real-time transport responses

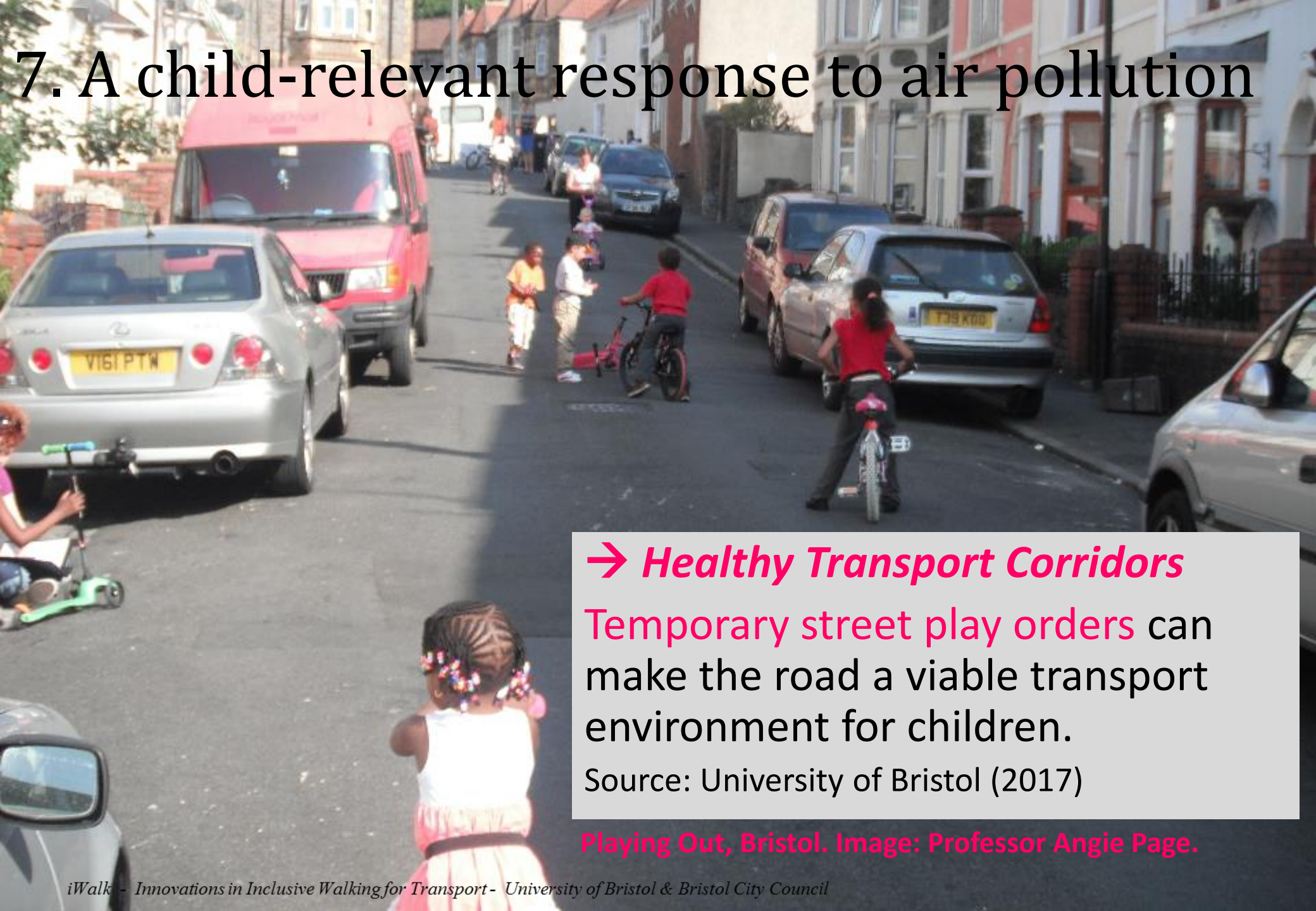


7. A child-relevant response to air pollution

→ Real-time transport responses



7. A child-relevant response to air pollution



→ **Healthy Transport Corridors**

Temporary street play orders can make the road a viable transport environment for children.

Source: University of Bristol (2017)

Playing Out, Bristol. Image: Professor Angie Page.

7. A child-relevant response to air pollution

→ *Healthy Transport Corridors*

Roads can be re-designed to create a child-enabling environment.



Full vehicular circulation is maintained with added blue-green infrastructure functions [33].

Image: Robert Bray Associates.

8. Amend the Highway Code to protect people walking.

EXISTING

170

Take extra care at junctions. You should

- watch out for cyclists, motorcyclists, powered wheelchairs/mobility scooters and pedestrians as they are not always easy to see. Be aware that they may not have seen or heard you if you are approaching from behind
- watch out for pedestrians crossing a road into which you are turning. If they have started to cross they have priority, so give way.
- watch out for long vehicles which may be turning at a junction ahead; they may have to use the whole width of the road to make the turn (see [Rule 221](#))
- watch out for horse riders who may take a different line on the road from that which you would expect.
- not assume, when waiting at a junction, that a vehicle coming from the right and signalling left will actually turn. Wait and make sure.
- look all around before emerging. Do not cross or join a road until there is a gap large enough for you to do so safely.

8. Amend the Highway Code to protect people walking.

PROPOSED

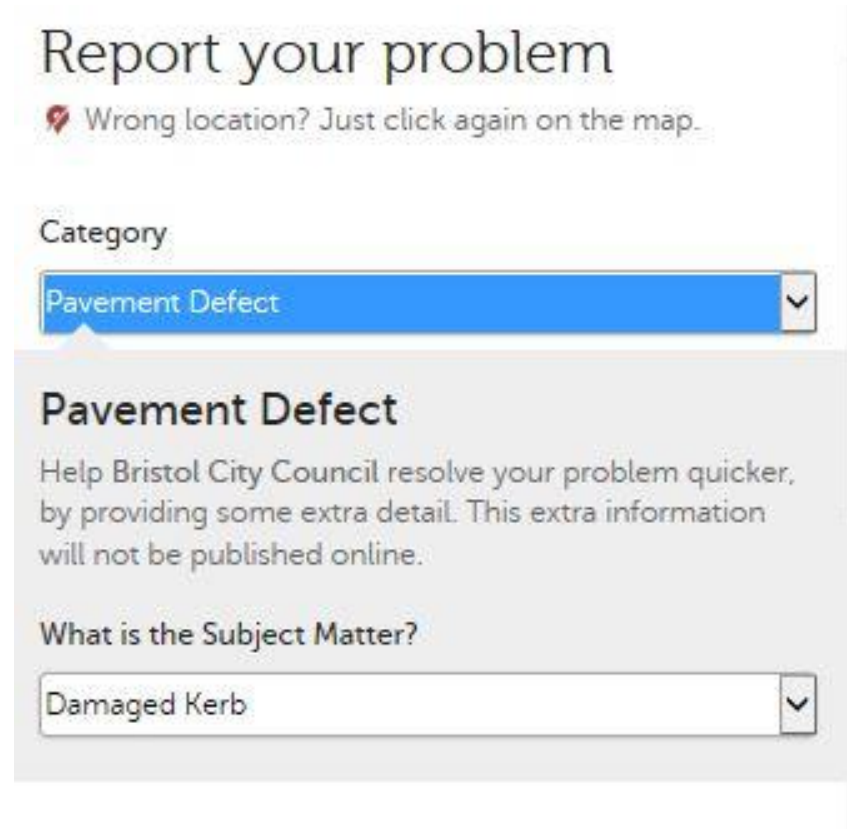
170

Take extra care at junctions. You **MUST**

- watch out for cyclists, motorcyclists, powered wheelchairs/mobility scooters and pedestrians as they are not always easy to see. Be aware that they may not have seen or heard you if you are approaching from behind
- watch out for pedestrians crossing a road into which you are turning. ~~If they have started to cross~~ they have priority, you **MUST** ~~so~~ give way
- watch out for long vehicles which may be turning at a junction ahead; they may have to use the whole width of the road to make the turn (see [Rule 221](#))
- watch out for horse riders who may take a different line on the road from that which you would expect
- not assume, when waiting at a junction, that a vehicle coming from the right and signalling left will actually turn. Wait and make sure
- look all around before emerging. Do not cross or join a road until there is a gap large enough for you to do so safely.

9. Add near-misses and harassment to Fix-my-Street

Fix-my-Street is a national website and app which allows users to log problems in their street. This data is sent directly to local authorities. **Near-misses and street harassment could be added** to this national database, to allow local authorities to identify and target key hotspots.



The screenshot shows the 'Report your problem' form on the Fix-my-Street website. At the top, there is a navigation bar with the FixMyStreet logo and links for 'Report a problem', 'Sign in', 'All reports', 'Local alerts', and 'Help'. The main heading is 'Report your problem', followed by a red location pin icon and the text 'Wrong location? Just click again on the map.' Below this is a 'Category' dropdown menu with 'Pavement Defect' selected. A tooltip for 'Pavement Defect' is visible, containing the text: 'Help Bristol City Council resolve your problem quicker, by providing some extra detail. This extra information will not be published online.' Underneath the tooltip is a 'What is the Subject Matter?' dropdown menu with 'Damaged Kerb' selected.

10. Raise the status of walking

Walking to work reward schemes ^[4] ^[5]:

- Reflective gloves, LED lights, high vis covers.
- Vouchers for shoes, backpacks, waterproofs.
- Umbrellas.
- Local city walking maps.
- Recreational & cultural walking maps.
- Air pollution face mask.
- A sports physiotherapy session.

10. Raise the status of walking



Provide live, fun and relevant information to support walking.

Last thought:

Increasing population levels of walking for transport is not a “campaign” issue, but related to **legal duties placed on local authorities through the Health and Social Care Act 2012 to promote public health through transport.**

This needs further legal clarification to operationalise public health targets through transport practices.

Let's make inclusive walking the norm!



Thank you!

This project was developed through collaboration with stakeholders within Bristol City Council, local community groups and national inclusive stakeholders.

Many thanks for the time and interest of many individuals who have contributed to this discussion. Apologies to anyone who has been inadvertently forgotten!

Bristol City Council – special thanks to Ed Plowden, Service Manager Sustainable Transport – Adrian Davis – Andrew Davies – Andrew Edwards – Chris Mason – Claire Lowman – Dominic Mellon – Ed Plowden – Helen Wiggington – Jacob Pryor – James Coleman – Jane Woodhouse – Jayne Mills – Jenny Kovalaine-Kwan – Jodi Savikas – Karen Daniels – Kate Cooke – Kathy Derrick – Kurt Scheibl – Lauren Curl – Mark Sperduty – Melanie Bufton – Oliver Coltman – Peter Mann – Phil Wright – Sam Kirby – Sally Hogg – Shaun Taylor – Stephen Rockey – Thara Raj – Tom Gosden – Tom Southerby – Trevor Johnson – Vicky Welchman – Victoria Stone.

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University of Bristol – Professor Angie Page, Professor John Henderson.

Disclaimer: The contents of this report do not represent a formal position held by Bristol City Council.

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