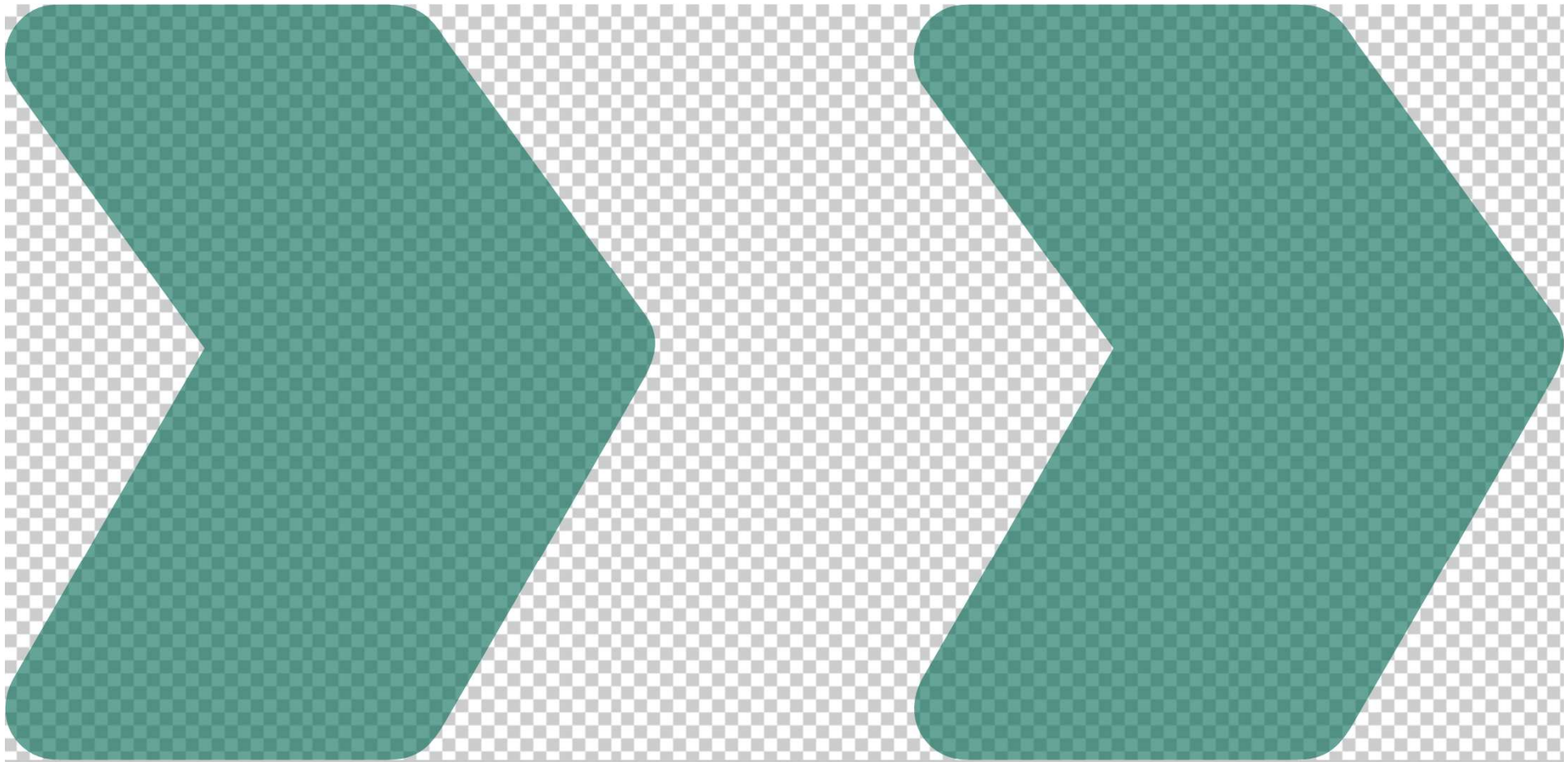




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# Purposes and practical application of accessibility measures

ITF Roundtable on Accessibility and Transport Appraisal





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## Overview

1. How do we define and appraise accessibility in TAG?
2. Accessibility in land use planning
3. Recent findings from DfT research
4. Ongoing and future work: appraisal and modelling strategy
5. Questions?



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# 1: How do we define and appraise accessibility in TAG?



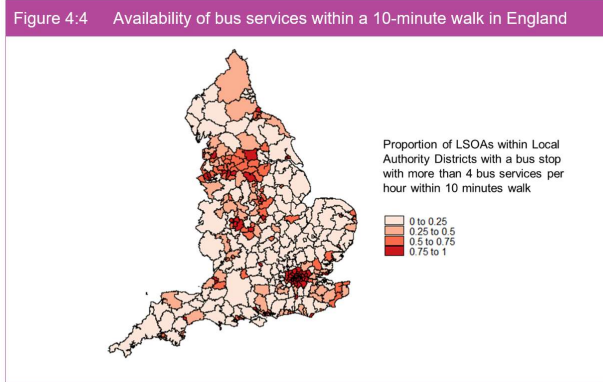


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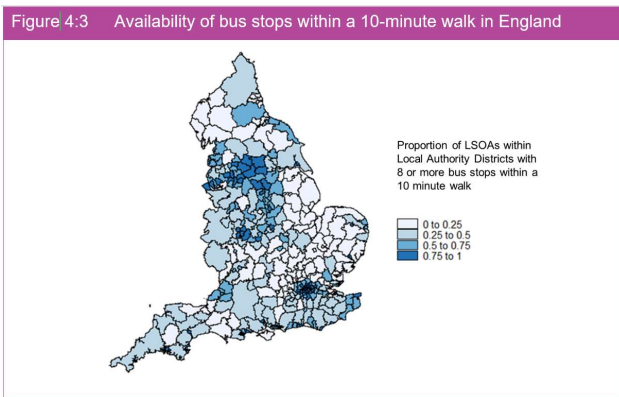
# Accessibility has a multitude of meanings, but two main themes

Two headline conceptions:

1. Accessibility as the ease with which people and place are connected
2. Accessibility as usability of the transport system for people with physical and hidden disabilities



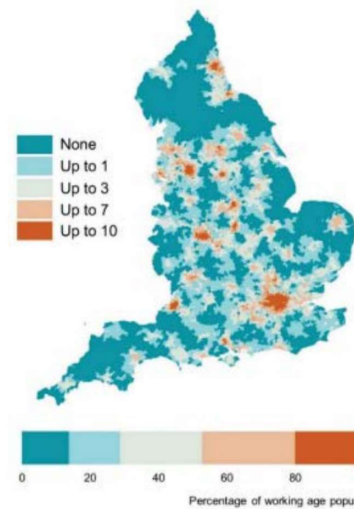
Source: Department for Transport



Source: Department for Transport

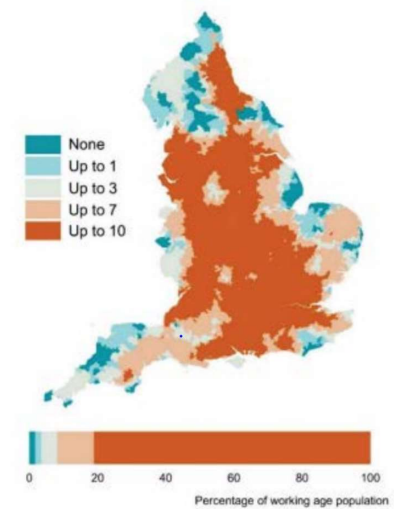
We can use accessibility statistics to help identify weaknesses in the UK's transport infrastructure

Fig 1.4 Major employment centres accessible by public transport  
Centres with 5,000+ jobs accessible in less than 45 min



Source: DfT Journey Time Statistics 2014

Fig 1.5 Major employment centres accessible by car  
Centres with 5,000+ jobs accessible in less than 45 min





# Idealised measures of accessibility and user benefits are essentially identical

## ***Bates & Simmonds, 1997***

- 1. Composite utilities provide a measure of accessibility (from that place, for that group and purpose) which can take the best practical account of their preferences and constraints....; and hence*
- 2. Changes in composite utility, from one situation to another, may provide measures both of the perceived benefit conferred on users by the change and of the change in accessibility*

Source: Bates & Simmonds (1997) 'Accessibility as a criterion for project and policy analysis'. A report to the Department of the Environment, Transport and the Regions



Idealised measures of 'user benefits' and 'origin accessibility' completely double count each other



Additional 'flexibility value' in areas with an unusual population mix and/or pattern of accessibility

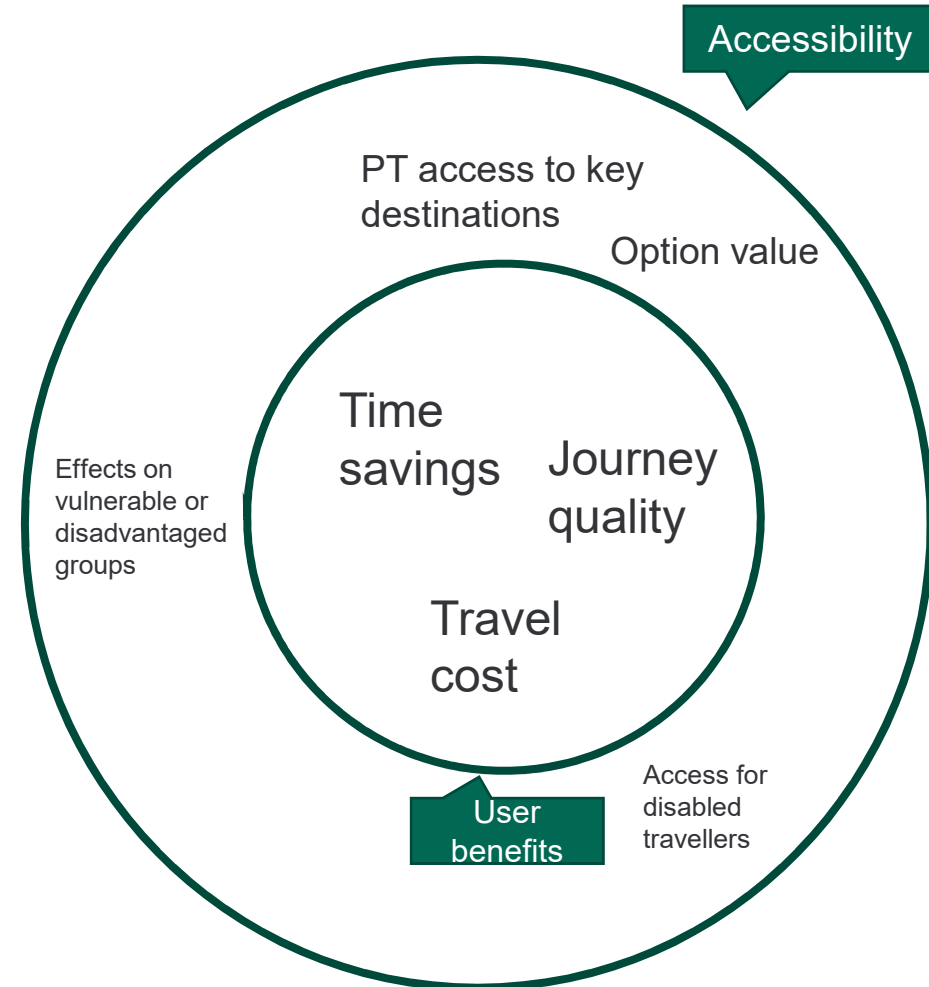
## **Caveats:**

- ▶ Simplifications made in modelling (size of study area, coverage of modes,
- ▶ Incomplete data
- ▶ Resource versus behavioural VTTS?



# Accessibility is a broader concept than user benefits

- ▶ While user benefits capture the value individuals and businesses place on quicker, more reliable and higher quality journeys, a more holistic set of considerations are considered in accessibility appraisal:
  - ▶ Availability and physical accessibility of transport
  - ▶ Cost of transport
  - ▶ Services and activities located in inaccessible places
  - ▶ Safety and security
  - ▶ Travel horizons





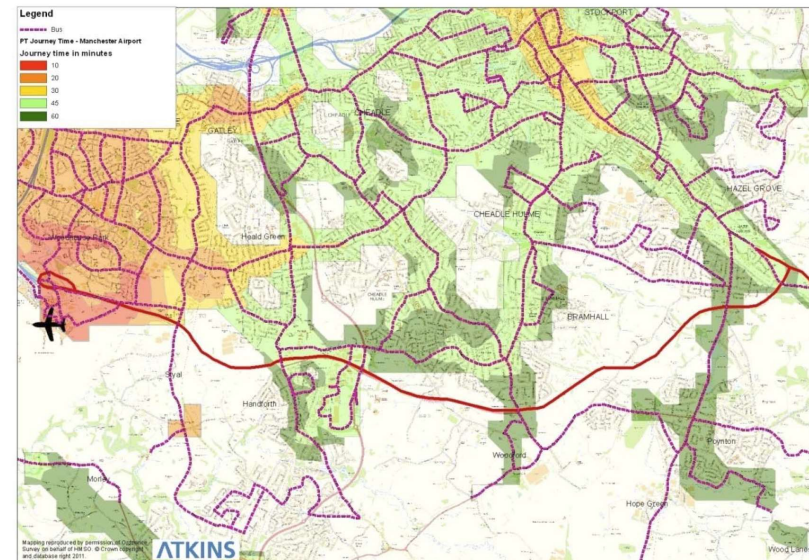
# Appraisal process according to TAG

1. **Screening** to consider changes in services, routings or timings of current public transport services within the impact area. Considers young people, older people, disabled people, Black and Minority Ethnic communities and carers. Looks at direct (travel time, bus stops) and indirect impacts on accessibility to services (land use change).
2. **Identifying**
  - a) public transport corridors and key destinations served;
  - b) groups that are particularly vulnerable to the effects of poor accessibility; and
  - c) amenities in the impact area such as town centres, major employment areas, hospitals, and schools.
3. **Appraisal**
  - a) **Strategic accessibility assessment** using accessibility mapping (GIS) to develop contour maps showing accessibility to the specified destinations within selected time periods
  - b) **Accessibility audit** to consider the other elements of the intervention that will have impacts on accessibility for different users such as service frequency, boarding, provision for disabled passengers and interchange.

| Table 15 Strategic Accessibility Assessment Appraisal Criteria |                              |
|--|------------------------------|
| Proportionate Changes  | Accessibility Analysis Score |
| > +16%   | Large Beneficial             |
| +6% to +15%  | Moderate Beneficial          |
| +2% to +5%   | Slight Beneficial            |
| -1% to +1%   | Neutral                      |
| -2% to -5%   | Slight Adverse               |
| -6% to -15%  | Moderate Adverse             |
| > -16%   | Large Adverse                |

Source: TAG Unit A4-2

Figure 3-17- Public Transport Accessibility to Manchester Airport – AM Peak



Source: Published business case analysis



# Appraisal of accessibility is primarily a distributional question

**Table 16 Example of a Strategic Accessibility Assessment Worksheet**

| Public Transport accessibility of population in the impact area to nearest Gen. Hospital (07.30 – 09.30) weekday | Without scheme |                   | With scheme    |                   | % Change       |                   | Overall Score       |                   |
|--|----------------|-------------------|----------------|-------------------|----------------|-------------------|---------------------|-------------------|
|  | Car Households | No Car Households | Car Households | No Car Households | Car Households | No Car Households | Car Households      | No Car Households |
| 0 – 10 mins  | 250            | 300               | 290            | 360               | 16%            | 20%               | Large Beneficial    | Large Beneficial  |
| 11 – 20 mins   | 450            | 600               | 500            | 700               | 11%            | 17%               | Moderate Beneficial | Large Beneficial  |
| 21 – 30 mins   | 850            | 950               | 969            | 1,121             | 14%            | 18%               | Moderate Beneficial | Large Beneficial  |
| 31 – 40 mins   | 3,500          | 4,500             | 4,270          | 5,625             | 22%            | 25%               | Large Beneficial    | Large Beneficial  |
| 41 – 50 mins   | 5,200          | 6,500             | 6,396          | 8,064             | 23%            | 24%               | Large Beneficial    | Large Beneficial  |
| 51 – 60 mins   | 6,500          | 6,000             | 7,930          | 7,860             | 22%            | 31%               | Large Beneficial    | Large Beneficial  |
| Total Households with 60 mins  | 16,750         | 18,850            | 20,355         | 23,730            |                |                   |                     |                   |
| Impact Area Household Totals   | 25,200         | 26,250            | 25,200         | 26,250            |                |                   |                     |                   |

**Accessibility Assumptions**

**Journey Purpose:** Access to the nearest General Hospital

**Travel Time:** Travelling on a weekday between 07.30 – 09.30 am (no maximum travel time)

**Default Walk Distances:** 400m walk to public transport stop from origin/400m walk from public transport stop to destination

**Assessment Criteria:** Car and No Car Households within study area

**Overall Score:** Large Beneficial

**Qualitative Statement:** The transport intervention has a large beneficial affect on both households with and without a car, however the impacts are slightly more beneficial for households without a car. The greatest positive impact is achieved for those living within a no car household and located a 50 – 60 minute journey time of their nearest General Hospital.

Source: TAG Unit A4-2





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## 2: Accessibility and land use planning





## Local plans for development require a detailed accessibility assessment

- ▶ Following MHCLG guidance, local planning authorities will need to consider the demographics of the area and also the desired or perceived changes likely to take place in the life of the local plan as they might affect the transport network.
- ▶ This includes information on:
  - ▶ the potential options to address the issues identified and any gaps in the networks in the short, medium and longer term covering, for example, **accessibility**, congestion, mobility, safety, pollution, carbon reduction
  - ▶ solutions to support a pattern of development that, where reasonable to do so, facilitates the use of sustainable modes of transport
  - ▶ **accessibility** of transport nodes such as rail/bus stations to facilitate integrated solutions
  - ▶ walking and cycling facilities and movements including future predicted tripsparking facilities, including any park and ride and existing under-provision of off-street parking spaces
  - ▶ parking facilities, including any park and ride and existing under-provision of off-street parking spaces



# Transport for London use an accessibility indicator to inform housing density

- ▶ PTAL is a measure of connectivity by public transport, which has been used in various planning processes in London for many years – developed in 1997.
- ▶ About access *to* rather than *by* public transport.
- ▶ For any selected place, PTAL suggests how well the place is connected to public transport services. It does not cover trips by car.
- ▶ A location will have a higher PTAL if:
  - ▶ It is at a short walking distance to the nearest stations or stops
  - ▶ Waiting times at the nearest stations or stops are short
  - ▶ More services pass at the nearest stations or stops
  - ▶ There are major rail stations nearby
  - ▶ Any combination of all the above.

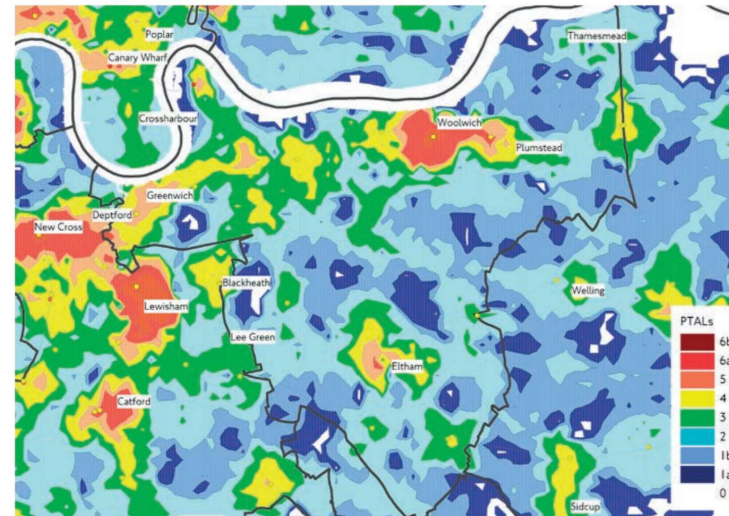


Figure 2.5: A PTAL map for a single borough  
Source: TfL 'Assessing Transport connectivity in London', p.9, available at: <http://content.tfl.gov.uk/connectivity-assessment-guide.pdf>

- ▶ PTAL is a weighted sum of inverse PT access time, accounting for the service interval and a reliability factor
- ▶ 0-5 is 'low', 25+ is 'high'



# Transport for London use an accessibility indicator to inform housing density

| Setting         | Public Transport Accessibility Level (PTAL) |                      |                       |
|-----------------|---|----------------------|-----------------------|
|                 | 0 to 1                                      | 2 to 3               | 4 to 6                |
| <b>Suburban</b> | <b>150-200 hr/ha</b>                        | <b>150-250 hr/ha</b> | <b>200-350 hr/ha</b>  |
| 3.8-4.6 hr/unit | 35-55 u/ha                                  | 35-65 u/ha           | 45-90 u/ha            |
| 3.1-3.7 hr/unit | 40-65 u/ha                                  | 40-80 u/ha           | 55-115 u/ha           |
| 2.7-3.0 hr/unit | 50-75 u/ha                                  | 50-95 u/ha           | 70-130 u/ha           |
| <b>Urban</b>    | <b>150-250 hr/ha</b>                        | <b>200-450 hr/ha</b> | <b>200-700 hr/ha</b>  |
| 3.8-4.6 hr/unit | 35-65 u/ha                                  | 45-120 u/ha          | 45-185 u/ha           |
| 3.1-3.7 hr/unit | 40-80 u/ha                                  | 55-145 u/ha          | 55-225 u/ha           |
| 2.7-3.0 hr/unit | 50-95 u/ha                                  | 70-170 u/ha          | 70-260 u/ha           |
| <b>Central</b>  | <b>150-300 hr/ha</b>                        | <b>300-650 hr/ha</b> | <b>650-1100 hr/ha</b> |
| 3.8-4.6 hr/unit | 35-80 u/ha                                  | 65-170 u/ha          | 140-290 u/ha          |
| 3.1-3.7 hr/unit | 40-100 u/ha                                 | 80-210 u/ha          | 175-355 u/ha          |
| 2.7-3.0 hr/unit | 50-110 u/ha                                 | 100-240 u/ha         | 215-405 u/ha          |

Figure 2.1: Recommended housing densities in the London Plan

hr = habitable rooms  
u = a dwelling unit, i.e. a flat or a house  
ha = hectare

Source: TfL 'Assessing Transport connectivity in London', p.6



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# 3: Recent findings from DfT research





# Access to transport and life opportunities

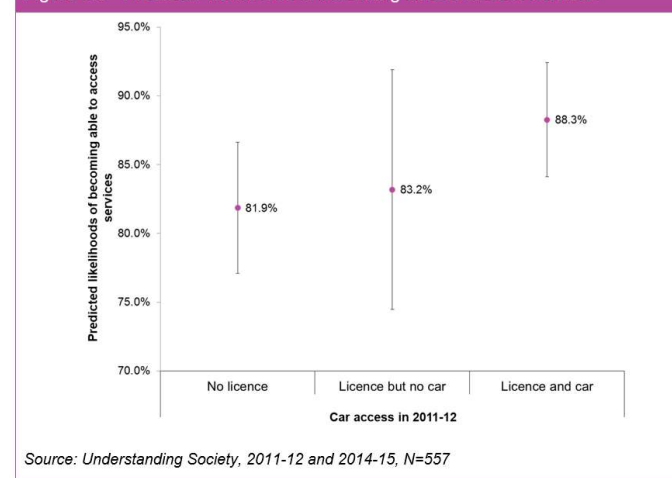
- ▶ The majority (69%) of the population have personal access to cars and an even larger proportion of the population (87%) are frequent (weekly) car users.
- ▶ But a significant minority – nearly a third of the adult population, do not have personal car access and are reliant on public transport or other modes to support their lives.
- ▶ Lack of personal car access is more prevalent amongst young people, those with health-related mobility difficulties, those who are unemployed and those with low incomes.
- ▶ Personal car access makes it twice (2.0 times) as likely that someone can access services.
- ▶ Personal car access has greater importance in relation to accessing services for those with health-related mobility impairments and those living in rural areas.
- ▶ Rating local public transport as good rather than poor makes it nearly three times (2.8 times) more likely that someone can access services.
- ▶ Short journeys by public transport to town centres (10 minutes or less) make it 1.7 times more likely that someone can access services (compared to journeys of over 30 minutes).

## Access to Transport and Life Opportunities



Authors: Kiron Chatterjee, Ben Clark, Anyika Nguyen, Robert Wiskart, Kathryn Gallop, Neil Smith, Sarah Topping  
Date: August 2019  
Prepared for: Department for Transport

Figure 5:3 Predicted likelihoods of becoming able to access services



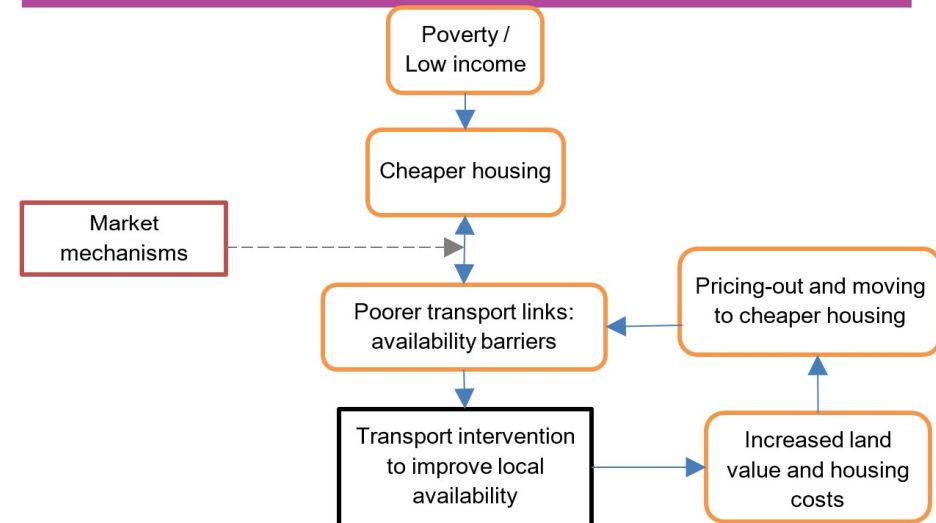
Source: Understanding Society, 2011-12 and 2014-15, N=557

Source: NatCen & UWE (2019) 'Access to Transport and Life Opportunities', unpublished (forthcoming on GOV.UK)



- ▶ **How accessible the transport system is** (in terms of cost, geographic accessibility and the time and reliability of different transport options) has a strong influence on the relationship between transport and inequality.
- ▶ Limited accessibility and mobility can result in decreased quality of life and wellbeing, as well as social exclusion.
- ▶ A metric for evaluating the impact of transport policies on employment-related accessibility may be particularly useful for settings where geographical distribution and socio-economic level are highly related.

Figure 6.2 – Illustration of the relationship between income, housing options and quality of transport links



Source: NatGen (2019) 'Transport and Inequality', unpublished (forthcoming on GOV.UK)



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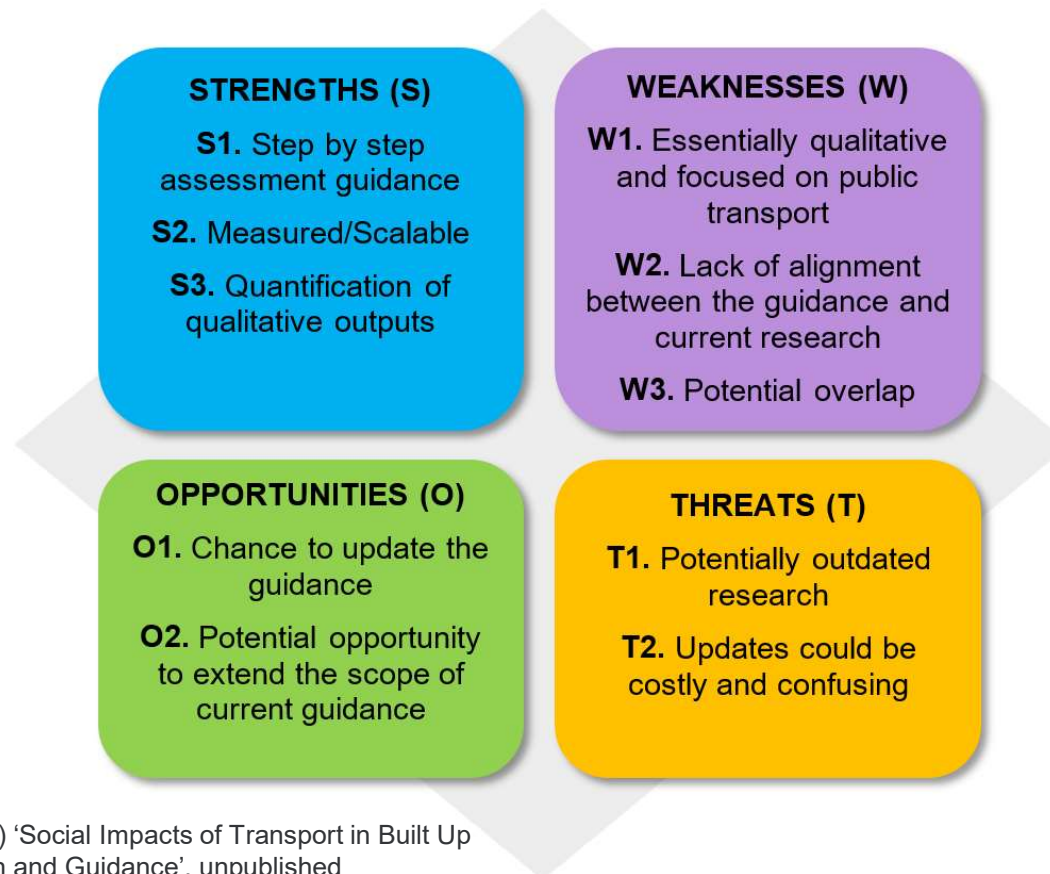
## 4: Ongoing and future work: appraisal and modelling strategy







Figure 9 Summary of the Accessibility SWOT Analysis



Source: Atkins & Jacobs (2019) 'Social Impacts of Transport in Built Up Areas – Baseline of Research and Guidance', unpublished (forthcoming on GOV.UK)

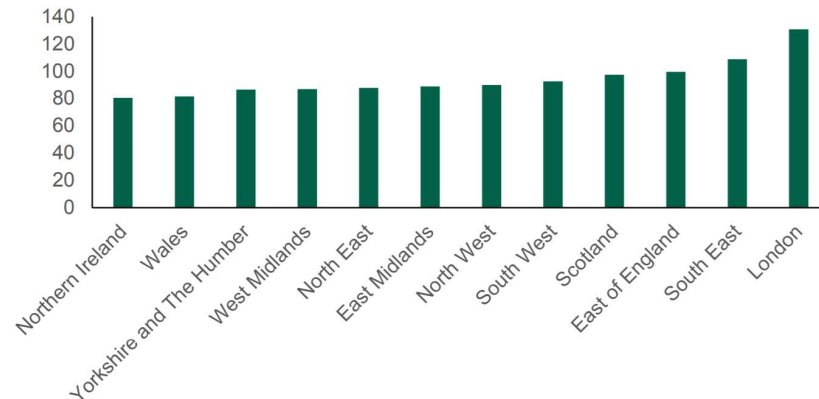


| Distributional Impacts  |
|---|
| Promote greater use of distributional analysis in appraisal.<br>Develop greater understanding of how to appraise distributional impacts, including at the national level. |

- ▶ Person centred analysis: using different metrics and presentation techniques to explain who is affected by schemes and how they are affected on an individual level. For example, time saved per trip, cost per person, or number of people affected. Exploring options for TAG.
- ▶ This might allow us to undertake a richer accessibility distributional analysis in the future
- ▶ Desire to raise the prominence of distributional impact appraisal, which can be fundamental to investments in our towns and cities, in line with Government interest in rebalancing.
- ▶ Land value uplift methodology does not fully capture changes in welfare, having potential distributional implications for investment appraisal.

## Rebalancing the economy

Fig 1.6 – UK GVA per hour worked across regions, 2015, indexed  
GVA per hour worked index (UK = 100)

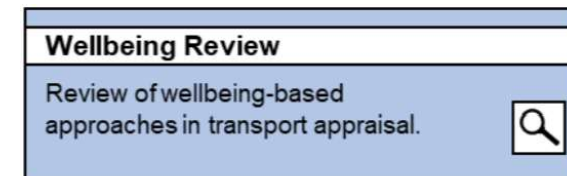


Source: DfT (2017) *Transport Investment Strategy*, p.17. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/624990/transport-investment-strategy-web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/624990/transport-investment-strategy-web.pdf)

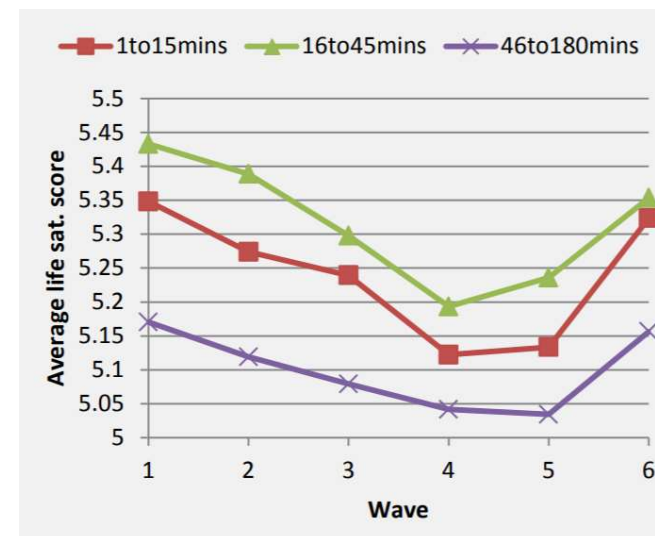


# Wellbeing analysis

- ▶ The Department published the Inclusive Transport Strategy in July 2018, which aims to provide better connections and wellbeing for disabled transport users. As associated Monitoring and Evaluation Framework will provide valuable evidence for policy development and scheme appraisals.
- ▶ Working to develop a methodology to estimate the economic benefits of interventions that make transport more accessible to disabled people, including a new conceptual framework for appraisal and WTP values
- ▶ Exploring use of subjective wellbeing to value accessibility impacts (amongst many others, such as noise) in appraisal
- ▶ Commuting and wellbeing work in 2016/17



## Life satisfaction and commute time



Source: UWE (2017) 'The Commuting and Wellbeing Study', p.34.  
Available at: <https://travelbehaviour.files.wordpress.com/2017/10/caw-summaryreport-onlineedition.pdf>.



# 5: Questions?





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**Thank you!**

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