

S343 Rail travel and disability: an international perspective on accessibility

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ANALYSIS



Rail travel and disability: An international perspective on accessibility (S343)

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Executive Summary

People with disabilities (PwD) are proportionally low users of public transport. To better understand how public transport use by PwD could be improved, this report was conducted by RSSB, under a memorandum of understanding with the Australasian Centre for Rail Innovation (ACRI) and the CQ University. Public transport systems in five countries are examined to identify good practice and current shortcomings around accessibility. Examples of good practise from other sectors within those countries were also identified, where they had applicability to rail.

- The top priorities for PwD using rail transport as anyone else: **value for money; getting a seat; trains arriving on time**. Beyond those, their needs differ and include: **step-free access; seating; reliable and accessible information; accessible toilets; quiet routes; clear audiovisual information; and easy ticket purchase**.
- Many PwD have experienced **abuse and discrimination** using public transport, both from passengers and staff. Transport for London's '*not all disabilities are visible*' **public awareness campaign** and 'please offer me a seat' **disability badge scheme** reportedly improved the treatment of PwD by other passengers. **Disability awareness training for staff** has been introduced as an important initiative on many transport networks.
- **Easy access to reliable information** is critical for PwD to plan manageable journeys. Many ongoing improvements to information availability and access were seen across all countries studied, particularly in the form of **mobile apps designed specifically for PwD**. Catering to different types of disability, these were primarily **designed by third parties using open access transport data**, rather than by transport companies themselves.
- There is no one system by which countries can currently be rated by the quality of their accessibility for people with disabilities. **Key Accessibility Indicators (KAI's)** were suggested in a small-scale study of a university campus, and could be scaled up to rate cities or even countries.
- There was a notable **disparity in the level of accessibility to public transport reported between urban and rural areas** in the UK, USA and Australia. Immediate plans to tackle this were limited, but included **shuttle pods** between common destinations, **ride-sharing services**, and optimistic plans to solve the problem with **driverless cars**. Currently, a reliable plan to improve rural public transport use and utility for PwD is lacking.

There were two pervading message throughout the literature on improving accessibility:

1. **Designing transport to be accessible to all has benefits far beyond making the transport network accessible to people with disabilities**; It improves the experience of tourists, shoppers, families, people with temporary disabilities and pregnant women. Taking visible steps towards improving accessibility itself encourages more people to use the service.
2. It is critical to **engage PwD in the choice, design, and implementation of accessibility improvements to ensure they are appropriate and effective**. Not only does this increase the confidence of PwD that the transport network cares about catering to them, it can avoid costly investments in inadequate solutions.

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Introduction

Approximately 15% of people live with some form of disability¹. In many countries the proportion of people living with disabilities associated with old age is predicted to increase in line with increased life expectancy.

According to the Convention for Rights for Persons with Disabilities (CRPD), “Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others”². The degree impairment experienced by the individual can range from mild to severe. Many disabilities are ‘hidden’, i.e. it is not immediately obvious to others that the person has any impairment. Other disabilities can be temporary: motor impairments, for example, can arise from injury or medical conditions.

Research consistently shows that people with disabilities experience a greater quality of life and better wellbeing when they are able to interact with the community around them, whether to work, socialise, or access amenities^{3,4}. An accessible public transport system can be crucial to enabling people with disabilities (PwD) to perform those activities.

Despite the importance of public transport to PwD, what is provided is often woefully inadequate. Some places simply have an inadequate or inefficient public transport system overall. Others may have a system which is inaccessible at a particular point, for instance having no step free access. Even on systems which advertise themselves as accessible, people with disabilities often experience problems with these accessibility provisions being inadequate or unreliable⁵. There are frequent reports of PwD experiencing abuse on public transport from both passengers and staff⁶.

As a result of actual or perceived difficulty using public transport, many PwD rely on private vehicles, taxis, or designated paratransit services to travel. In Australia, the Australasian Centre for Rail Innovation (ACRI) based in Canberra and CQUniversity are conducting research to better understand what could be done to improve use of public transport by PwD. Under a memorandum of

¹ [World Report on Disability](#), World Health Organisation (2011)

² [The United Nations General Assembly](#) (2006)

³ Sze, N.N. and Christensen, K.M., 2017. [Access to urban transportation system for individuals with disabilities](#). *IATSS research*, 41(2), pp.66-73.

⁴ [Addressing loneliness in disabled people](#), Jo Cox Commission on Loneliness

⁵ [Compensation for Paralympian unable to use toilet on train](#), The Guardian (2017)

⁶ [Comedian 'humiliated' for using disabled space on train](#), BBC News (2018)

understanding, ACRI and the Rail Safety and Standards Board (RSSB) of Great Britain regularly share knowledge to add value to the research and innovation activities of both countries. This report is the first joint initiative between ACRI and RSSB, which aims to conduct a global horizon scan of accessibility innovations and practices in sectors including transport, retail and hospitality that may aid the rail travel experience for people with a disability.

ACRI and its strategic research partner CQUniversity provided strategic input into the scan, particularly in the selection of countries to include. They will subsequently extend this review with further research to identify a selection of innovations to explore pilot trial potential in an Australasian context with a range of rail operators, disability advisory groups and assistive technology professionals. This report, written by RSSB in partnership in ACRI, provides a background for that project from an international perspective. In five countries with good track records on accessibility, the report identifies examples of good practice or opportunities for improvement in accessible transport. Innovations to improve accessibility from other industries, which could be applied to transport networks, are also explored. These findings have been compiled through web-based research. Sources include government white papers, academic research, information from transport providers, disability charities and companies who have developed accessibility aids. Public polls published online were examined for insights about public perceptions of transport accessibility, and occasionally newspaper articles provide illustrative examples of transport accessibility issues. As much as possible, sources have been limited to those produced within the last ten years to ensure currency of findings.

1.1 Designing Transport for Accessibility

An ‘accessible’ transport system is one that can be used by anybody. The degree to which a transport system can be considered accessible depends on:

- Physical ease of movement through the system
- Distance between destinations
- System connectivity
- Affordability
- Convenience
- Social acceptability

Many countries have taken steps to make their transport system accessible, and have further improvements planned. However, there are circumstances under which these investments do not see an accompanying rise in use by PwD. This can happen when accessibility measures are inconsistent or unreliable, when they fall short of the actual needs of PwD, or when information about accessibility is poor.

‘**Accessible design**’ generally means that a system complies with the minimum accessibility standards of the country it operates in. For instance, having designed a means for wheelchair users to access a train (a lift to the platform, a ramp that can be deployed for entry to the train, a means to signal when the ramp is needed, space for the chair). Most countries measure degrees of accessibility (inaccessible, partially accessible, highly accessible, etc.).

‘Universal design’ is “*the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design*”⁷. Presently, many private companies and governments are beginning to employ principles of universal design for their facilities instead of simply making them accessible. For instance, under universal design principles, a station might be entirely step-free from train to platform, and from platform to train, allowing a person in a wheelchair and a person with no mobility impairment to use the system in the exact same way. Other features would also be designed to allow easy use by people with sensory or cognitive impairments.

There are significant benefits to providing either an accessible or universally accessible system⁸. As well as increasing ridership by PwD, these systems can increase satisfaction among regular visitors and tourists. Clear signage, pictograms and announcements which are designed to accommodate the needs of persons with sensory or cognitive impairments can also aid anyone unfamiliar with the system in navigating through it. Accommodations for motor disabilities can help all users navigate the environment easily, particularly if they have heavy bags or small children with them. By making public transport an attractive option for all these groups, ridership, revenue, and customer satisfaction can all be increased. Tourist destinations may see increased visitation, particularly by the elderly and families as the result of improving the accessibility of public spaces. Following a recent accessibility upgrade of Newtown Station, New South Wales, patronage of the station increased by 12%⁹.

This knowledge search identifies countries which have good accessibility to extract insights about what a highly accessible transport system should look like. Lessons are also drawn from innovative designs by other sectors within these countries, to identify where those can be applied to rail. The future of accessible or universal design is then considered from the perspective of emerging technological trends, to identify how transport can continue to provide a highly accessible service in years to come.

1.2 What do PwD need?

Surveying the needs of passengers with disabilities has shown that their top priorities are similar to those of people without disabilities. Transport Focus in the UK reported that both passengers with and without a disability had the same top three priorities for improving the UK rail network¹⁰. These were: **value for money; getting a seat; trains arriving on time**. Below these three priorities, differences between the two groups became more apparent. **Sufficiently frequent trains, fewer cancellations, and high standards of cleanliness** were ranked higher as priorities by people with disabilities than people without. Providing a reliable and pleasant service is a goal most transport networks are aiming for to increase all passenger numbers, disabled and not. To increase the current proportion of PwD using the service, focus groups have identified several specific inadequacies within current systems which limit use of the network by PwD disproportionately:

Step free access: critical for persons who use a wheelchair or have severe mobility impairments. It is desirable for people with less severe mobility impairments.

Seating: PwD may have a greater need for seating in public spaces and on public transport. PwD who need a seat or a wheelchair space may face difficulties using crowded transport where a space or seat

⁷ Centre for Universal Design, 1997

⁸ [Economic Benefits of Improving Transport Accessibility](#), International Transport Forum, OECD (2017)

⁹ [Disability Inclusion Action Plan 2018-2022](#), Transport for New South Wales (2017)

¹⁰ [Rail passengers’ priorities for improvement](#), Transport Focus (2017)

is not guaranteed. PwD who have hidden disabilities are particularly affected by this, as they are less likely to be offered a seat by another passenger and can face judgement by passengers or staff who don't believe their request for a seat is valid.

Clear signage and audio and visual guidance: audio guidance is beneficial to people with visual impairments, and visual guidance to people with hearing issues. Beyond that, an easily navigable system is beneficial to all users, particularly those with cognitive impairments and to help people with mobility issues avoid journeys they don't need to make (for instance clear signage to the toilets would prevent them having to move around looking for them). Generally, a system which telegraphs itself as clear and simple to use can reduce travel anxiety, which is often higher in PwD.

Access to clear, reliable information: People with disabilities may need to spend more time planning their journey in advance than others, in order to ensure they can make connections on transport modes which cater to their needs, use routes which are step free, or where accessible toilets are available. Clear and reliable sources of information facilitate this. People with disabilities may require more time and effort to get to their designated platform, so incorrect or late departure information may impact them more than other rail users.

Easy ticket purchase: navigating complex ticket purchasing systems can be challenging for people with cognitive disabilities, autism, or sensory impairments.

Accessible toilets are a key concern. Worrying about a need to be within easy reach of a toilet can contribute to social isolation among older people¹¹. People with disabilities are also affected. Where accessible toilets are reportedly available, PwD report frequent experiences where these facilities are locked, used for storage, or otherwise unfit for purpose¹². Their concerns about whether toilets are available, as well as whether or not they are accessible, may preclude these people from travelling on the rail network. In the UK, the Office of Rail and Road (ORR) recommends that fleet maintenance staff consider keeping universal accessible toilets (UATs) operational a high priority task. Changing Places toilets for people with severe disabilities are being introduced.

Quiet routes: people with sensory sensitivities (experienced by some people with autism or cognitive impairments) can find loud, busy environments difficult to deal with. The UK National Autistic Society recommends that tourism venues provide quiet routes, or designated quiet times, to help cater to the needs of visitors with autism¹³.

Affordability: In Australia, the median gross weekly income for PwD aged 15-64 (\$465) is less than half that of people without disabilities (\$950)¹⁴. In the United Kingdom, 28% of working age disabled people live below the poverty line, compared to 18% of non-disabled people. PwD in the UK are also more likely to be unemployed¹⁵. At these income levels, the price of public transport is a significant concern for PwD.

The experience of each person with a disability is unique, and it is unlikely any rigid set of demands will appropriately cover the needs of every user. The most important requirement transport needs to meet in catering to people with disabilities is to ask them what they need, and listen to and respond to their feedback. This sentiment has been echoed by many passenger and disability groups, and is

¹¹ Wyman JF (1994) [The psychiatric and emotional impact of female pelvic floor dysfunction](#). Current Opinion in Obstetrics Gynaecology 6(4): 336–337.

¹² [Improving public services through open data: public toilets](#), ICE (2012)

¹³ [Welcoming Autistic People: A Guide for Tourism Venues](#), National Autistic Society (2018)

¹⁴ [The Impact of Disability in Australia](#), Finder (2018)

¹⁵ [Disability Facts and Figures](#), Scope (2019)

crucial not only to ensuring new provisions are necessary and effective, but to make PwD feel they are valued customers¹³.

1.3 Selecting countries with good records on accessibility

This knowledge search sought to identify accessibility improvements which could be leveraged by the rail industry by identifying countries with a good record on accessibility and the innovations that exist there. To select these countries, multiple criteria could be used as a benchmark for good accessibility. While no universally accepted rating system appears to have been proposed, several different rankings have been published. Performance over these rankings was used as a proxy for good accessibility, and used to select the five countries to examine in detail for insights into serving passengers with disabilities.

Based on ratings by The **World Policy Analysis Centre**, **The Zero Project**, **EU Accessibility Awards**, and journal publication data from **Scopus**, the five countries selected based on multiple mentions in these rankings are:

- **Spain**
- **United Kingdom**
- **Australia**
- **Sweden**
- **United States**

Details of these indicators of disabled accessibility are available in **Appendix 1** of this report.



Section 2: Examples of good practice in accessibility from Spain

- Spain ranks 6th in the 2016 analysis of disability ranking published by the World Policy Analysis Centre, scoring 40/50 for the strength of its legislation to support accessibility.
- Spanish cities have featured in the EU Accessibility Awards eight times between 2011 and 2018 (winner, runner up, or honourable mention).
- In a search for publications on Scopus for documents related to disabled travel, Spain ranked third as the region of authorship.

Spain is considered an attractive destination for accessible tourism due to its track record on disability rights, and because it has a favourable climate. Spain has long been a favoured destination for wealthy, elderly tourists and expats from countries such as the UK. As a result of the substantial contribution tourism makes to the Spanish economy, there has been significant investment in infrastructure to support this revenue¹⁶. Spain has the world's biggest public-private partnership between the government and civil society concerning universal accessibility (between the Institute of the Elderly and Social Services (IMSERSO), and Fundación ONCE for the Cooperation and Social Inclusion of Persons with Disabilities). Spain champions and funds universal design projects, provides financial and technical support from universities, non-profits and public entities, and monitors and evaluates project proposals.

2.2 Examples of good practice from Spanish cities

Barcelona: The city has been commended as an accessible city by the EU Network for Accessible Tourism¹⁷. Barcelona has committed to improving accessibility, recognising it as “*an enabler for the social wellbeing of the city but also for growth*”. Most examples given for this commendation relate to physical accessibility within the city. These include:

- Barcelona Airport:
 - Free assistance for disabled passengers at (requiring 48hrs notice)

¹⁶ Vila, T.D., Darcy, S. and González, E.A., 2015. [Competing for the disability tourism market—a comparative exploration of the factors of accessible tourism competitiveness in Spain and Australia](#). *Tourism Management*, 47, pp.261-272.

¹⁷ [List of Accessible Cities in the EU, Accessible Tourism.org](#)

- Accessible signage
- Step free access and automatic doors
- Barcelona Port:
 - The city port has step free access and a shuttle bus adapted for travellers with disabilities
- Barcelona rail and metro:
 - Spanish rail offers a personalised service called ATENDO to help PwD or anyone else who needs assistance board and alight from trains.
 - The Barcelona Sants station provides an assistance service (requiring 30mins notice) and features tactile pathways on the floor picking out routes through the station.
- Buses:
 - The Barcelona bus fleet has been adapted to accommodate users with reduced mobility

Madrid: EMT Madrid is undertaking work to improve public bus transport accessibility for persons with visual or auditory impairments, and by extension those with other physical, cognitive or sensory conditions¹⁸. The project focuses on providing **visual and acoustic information** both inside and outside vehicles. Visual and acoustic information sources have been installed on 1,900 buses and at 800 stops showing bus position, line number, direction, and route information. Audio information is made available by pressing a button at the stop, or via a Bluetooth connected mobile device.

An **Open Data Platform** has been developed to allow third parties to create their own apps to provide the information. EMT Madrid have themselves produced a [smart watch application](#) which uses the data for journey planning. The smartphone Mi Transporte app integrates data from 40 transport providers to assist journey planning and execution. The app features **Augmented Reality to guide users** on how to use the bus system with audio instructions and visual annotation of images on the user's phone screen. Holding a mobile device up will locate all existing stops and stations within 300 meters, service information, distance to them, and arrows to indicate how to get there^{19,20}. The website has been created in an accessible way, implementing the INCLUSITE tool, which includes features like handling by voice, noise or gesture. Transport information in EMT's Open Data Platform is accessed 30 million times per month via a range of applications.



Figure 1 Using augmented reality features of the Mi Transporte app to navigate the Madrid transport network

¹⁸ <https://zeroproject.org/practice/public-buses-in-madrid/>

¹⁹ [Annual Report](#), Consorcio Transportes Madrid, 2015

²⁰ [An App unifies all information on Madrid public transport in real time](#), Metro Madrid blog, 2015

Work to improve the accessibility of EMT buses is ongoing. Challenges which have been identified during the programme include:

- Updating the data and information systems they provided to align with new operating systems
- Poor integration with other apps, or inclusion of data from other urban systems (other transport modes, parking and traffic) (EMT are responsible for some bus and bike systems in the city, but not the rest of the transport network).
- EMT have identified greater collaboration with stakeholders and the disability community as objectives for future work.

In 2012 PREDIF (Spain and Accessible Portugal) and Fundación Vodafone developed an **accessibility information platform** for Spain, then extending to Portugal called Tur4All²¹. A common web platform and information tool was developed to provide citizens and tourists with information on the accessibility of venues and attractions. In 2016, the project was extended beyond providing basic accessibility information to developing a **community of users** contributing their own information on accessibility. This was implemented to improve the depth of information provided on the site, to empower users to share their experiences and give others the confidence to travel, and to raise awareness at tourist destinations about the business advantages of being accessible.

²¹ <https://www.tur4all.es/>



Section 3 United Kingdom

- The UK ranks 9th in the 2016 analysis of disability ranking published by the World Policy Analysis Centre, scoring 38/50 for the strength of its legislation to support accessibility.
- The City of Chester won the EU Accessibility Award in 2018.
- In searches for publications on Scopus for documents related to both general disabled access and specifically transport accessibility, the UK ranked second as the region of authorship.

The City of Chester in the UK recently won an EU Accessibility Award for investing in making the town centre and tourist features more accessible. A major attraction in the city is its ancient walls and elevated walkways called *rows*. These have been made fully wheelchair accessible with ramps, lifts and escalators to ensure people with mobility issues can still enjoy these historic sites. Chester is also implementing a 15-year regeneration strategy with accessibility of new developments a core principle. One such development, the Northgate Shopping Centre, will feature stores, restaurants and a hotel which are accessible. The hotel will include Changing Places bathroom facilities, six of which are already available in the city, including in the bus interchange.

The UK, like many countries, has a very variable degree of accessibility between different regions, and between rural and urban environments. On the UK rail network, following the Government's **Access for All Scheme** in 2006²², **81% of stations have become step-free accessible and portable ramps are available at over 99% of UK stations**. However, step-free stations are disproportionately localised to London, with accessibility overall substantially poorer in some areas. Within London, 78/270 (29%) underground stations are step-free accessible, 58 of 102 overground stations are step-free accessible, and all DLR stations are step free. A **free Passenger Assist service** is mandatory for all rail companies to offer with, at maximum, 24 hours advance notice. Assistance can take various forms and is available to anyone who might experience difficulty using the network, with no proof of any disability required. A recent review of Passenger Assist by the ORR found that of surveyed users, **63% would not have been able to make their journey without Passenger Assist and 35% could have completed their journey, but with more difficulty**²³. Most users reported they were satisfied with the service, although 16% had experience staff being late or absent for booked assistance, and some suggested further

²² [Access for All: funding to improve accessibility at rail stations](#), Gov.UK (2013)

²³ [Research into passenger experiences of Passenger Assist](#), ORR (2017)

training for identifying and helping with disabilities would improve the assistance staff provide. Indeed, a survey by Scope of passengers with disabilities found 25% of respondents had experienced discrimination by train staff, 31% from bus staff, and 29% from taxi drivers in the UK²⁴. Evidently among some transport staff, disabilities and the responsibilities they have to passengers that have them, are poorly understood. **Concerns about abuse from staff** or other passengers have been highlighted as a key reason PwD have anxiety about using public transport, or avoid doing so. Department for Transport (DfT) plan to address this through training, expansion of disability badges, and passenger awareness campaigns. SCOPE, a UK charity who have conducted research on this subject report:

Disabled people frequently say that one of the biggest barriers to using public transport can be the attitudes of others. Whether it's a non-disabled person refusing to offer a priority seat to someone who needs it, or a bus driver ignoring a wheelchair user at a bus stop, the attitudes of passengers and staff can make or break disabled people's experiences of public transport.

Scope (2018)²⁵

As the number of unstaffed stations and driver-only operated trains on the network grow²⁶, serious consideration will be required in how to keep the network accessible for all. A survey published by the ORR recently showed that **lack of confidence in service provision was the single largest deterrent to using public transport among older and disabled respondents**, followed by lack of access to stations and ticket prices²⁷. While physical access to the network is gradually improving, users with sensory or cognitive disabilities may still experience difficulties using the transport network, particularly unstaffed stations. A survey by Transport Focus found that both elderly people and people with a disability experience greater anxiety and fear more for their safety when negotiating unstaffed stations than those without mobility issues.

In the UK rail industry, there is a strong drive to increase accessibility. The UK government has pledged an investment of £300 million in improving station access for 2019-2025. Improvements at 73 stations, ranging from small improvements to major overhauls are part of the Department for Transport's Inclusive Transport Strategy. The Access for All programme, of which this funding is a part, has created over 200 accessible routes since it launched in 2006. On Track for 2020, The Future of Accessible Rail Travel (Published by the Office of Rail and Road in 2015) identifies many important issues with the current state of the network that this funding will address²⁸. **Accessible toilets** are a key concern. The ORR recommends that fleet maintenance staff consider keeping universal accessible toilets (UATs) operational a high priority task.

3.1 The Inclusive Transport Strategy

The Inclusive Transport Strategy²⁹, launched in 2018, aims to make the entire transport network accessible by 2030. The document, developed following consultation with disability groups, will tackle awareness and enforcement of passenger rights, staff training, physical infrastructure, and

²⁴ [Almost half of disabled people faced discrimination on public transport](#), Transport for All

²⁵ [Plans for more inclusive transport](#), Scope (2018)

²⁶ Future of Accessible Travel

²⁷ [Disabled Travellers awareness of rights](#), ORR (2014)

²⁸ [On Track for 2020? The Future of Accessible Rail Travel](#), Rail Accessibility Ltd, MWW Transport Consultants, Ann Frye Limited (2015)

²⁹ [Inclusive Transport Strategy](#), DfT (2019)

governance, monitoring and evaluation. Steps being undertaken to achieve an inclusive transport network include:

Rail:

More staff on the network available to assist passengers. As many new trains no longer require crew to operate the doors, this frees them up to assist passengers. All rail staff will be fully trained in disability awareness and able to support passengers. A more reliable Passenger Assist service will be provided, and where this does not happen, passengers will receive compensation. The ORR has also recommended more training for staff to improve the quality of this service.

By 2020, 95% of existing rail rolling stock should be compliant with accessibility standards. Newly built trains must meet accessibility standards and offer opportunities for innovations to improve independent travel. The Greater Anglia franchise, for instance, will take on new trains fitted with automated platform gap fillers operated by on-board staff.

Rail ombudsmen will be introduced to investigate customer complaints and advocate for those with disabilities, and issue decisions binding to the industry.

Road:

Improvements will be made to the regulations governing **taxis and private hire vehicles to ensure they can accommodate PwD** in booking and boarding cars and providing wheelchair accessibility. Presently, around 58% of vehicles are wheelchair accessible, but these are concentrated in urban locations, and the national average is around 2%. Private vehicle owners with disabilities will benefit from extension of the eligibility criteria for the blue badge system for disabled parking to include people with hidden disabilities. For motorway services, a pool of £2 million has been made available for the creation of **changing places accessible toilets**.

Buses:

Buses have long been considered to be a particularly accessible part of the UK transport network. Most buses are equipped with a wheelchair ramp, bays and priority seating. In 2017, it became law that these adjustments be in place, along with regulations for drivers stipulating:

- All guide and assistance dogs must be allowed on buses
- Drivers cannot ask a passenger to leave the bus because of their disability
- Wheelchairs up to a certain size must be accommodated
- Drivers must be familiar with the wheelchair adjustments on their vehicle

The bus company Stagecoach has introduced new policies to better accommodate passengers with sensory impairments:

- All drivers must stop for any person waiting at any designated stop
- Drivers must inform passengers with a vision impairment of their service number and destination, and inform them when the bus reaches their desired stop
- Drivers must assist with payments.

3.2 Accessibility Ratings on the UK Rail Network

In anticipation of the need to establish which stations on the network are most require upgrading to improve accessibility, ATOC (now the Rail Delivery Group (RDG)) published a **5 category accessible rating system**²⁸. Public data on station accessibility was collected and from a variety of sources such

as their 'stations made easy' web pages, and the accuracy of that data verified at a random sample of 40 sites. ATOC then classified those stations into the following categories:

- A- New build standard
- B- Considered usable
- C- Sub-optimal access to all platforms
- D- Step free to some platforms
- E- No step free access

Category B is particularly important in this ranking. Although these stations may not be marked as 'step-free accessible', subjective judgement showed that many people with reduced mobility still considered these stations usable. However, others might face issues using the stations. This discrepancy is a major concern for disabled users, who may either unnecessarily limit themselves by assuming they cannot access stations they would be able to use, or finding issues at stations they expected to use without problems. While moving a station from category D to A might be a serious undertaking, there are also benefits in moving stations from E-D, B-A, or anywhere else in between which may be considerably cheaper. From the perspective of travellers, it may be better to prioritise getting a larger number of stations to at least category B, rather than making a subset of stations category A. In the UK, minor works programs were found to have been used to create a large number of small improvements. However, the benefit of these improvements at stations may not be fully realised if the state of their accessibility remains unclear to users. The Transport Select Committee have highlighted the lack of a quantitative methodology for determining the best allocation of funds between such projects as an issue which needs addressing.

Network Rail, which owns and operates Britain's rail infrastructure, has recently developed an **Inclusive Design Strategy**³⁰. The strategy focusses on designing and managing spaces in a way that allows all their users to move around them **with minimal effort and maximum confidence**. Diversity Impact Assessments will also be introduced to ensure the strategy is clear and well understood and adhered to. The inclusive design strategy could become the basis of a standard for stations across the UK (Network Rail only manages the largest hub stations).

3.3 Accessible Information

The UK transport network has numerous issues concerning how it makes information available to passengers in an accessible way. Most stations and trains now use both **audio and visual announcements** to indicate route information, platform information, or upcoming stops, but further improvements are necessary. Different types of rolling stock often have incompatible Passenger Information Systems (PIS) installed, meaning that units which themselves are compliant with information accessibility standards can be combined and result in a train which does not meet that standard, because the systems in different carriages can't talk to one another. At stations, there is no standard method of informing passengers which part of the platform a train will stop at. The variability in train design means that doors and designated accessible sections of the train may sometimes be in different places.

³⁰ [Inclusive Design Strategy 2015-2019](#) Network Rail

Chatbots and natural language processing could help provide fast access to real-time, accessible, personalised information for transport users with disabilities. Transport for London (TfL) recently launched a passenger information chatbot which operates through Facebook Messenger³¹. The bot uses natural language processing to process queries submitted in plain English and answer them in easy to understand language. As the sophistication of such software improves, the ability to provide **tailored information** to disabled passengers is likely to improve also. However good the software is at communicating; however, the success of these systems is dependent on adequate and accurate information on disabled access being made available to application developers.

Wayfindr enables people to **receive audio instructions on their smartphone to help them navigate through public spaces**, such as train stations³². Wayfindr is an open code that can be used as a set of instructions and, for example, built into the Transport for London (TfL) app. When someone using the app passes a strategically placed Bluetooth beacon, they will receive audio instructions and directions via their smartphone to reach their destination. The instructions are detailed, to the point of telling users the number of steps in an approaching staircase.

3.4 Passenger assistance

There are various freely available Passenger Assist systems in place in different parts of the UK. Many operators request 24 hours' notice to provide assistance. Merseyrail requires just an hour's notice, and London Overground advertises a 'Turn Up and Go' policy, which has received mixed reviews. Most assisted passengers do not book. Exact percentages for these cases are not known, but estimated by Network Rail to be approximately 50% unbooked at major stations and 75% unbooked at smaller stations²⁶. The degree of assistance provided by staff, and training given to staff, varies considerably. As mentioned previously, some stations are unstaffed, and assistance may not be available. Furthermore, a recent ORR survey found that only 9% of a sample of PwD and those who assisted them were aware that Passenger Assist services exist³³.

The Disabled Persons Transport Advisory Committee (DPTAC) suggests that staff training should equip staff with:

- An understanding of barriers faced (including the environment and attitudes)
- How to identify accessibility and inaccessibility
- Information on all disabilities, including hidden disabilities
- Practical skills, such as how to push and brake manual wheelchairs
- Communication and interpersonal skills for communicating particularly with those with hearing impairments or with learning disabilities (including etiquette and language)
- Problem solving capabilities to help staff think on their feet and help passengers with disabilities deal with unexpected circumstances

³¹ [TfL launches new social media 'TravelBot'](#), TfL (2017)

³² [Tech Innovations driving Accessibility in 2019, Digileaders \(2019\)](#)

³³ Disabled Passengers Awareness of Assistance from Train Operators, ORR, March 2014

3.5 Disability badges

Most UK trains offer priority seating for those less able to stand. This is typically indicated by signage above the seats and on the seats³⁴. However, other passengers are also free to use the seats. Issues with the system include people without disabilities refusing to give up their seats or being unaware there is a person they should offer their seat to. **PwD report feeling uncomfortable asking for a seat, because they fear confrontation, find it uncomfortable, or are unsure if the person already using the seat might also have a disability**³⁵. To combat this issue, TfL offer badges and cards to anyone



Figure 2 A 'Please offer me a seat' card, issued by TfL. Cards and badges are available to anyone who is less able to stand for any reason.

using public transport which signal to other users that the wearer may struggle to stand. **'Baby on board' and 'Please offer me a seat' badges** are both available, and the wearer does not need to provide TfL with any explanation of their disability to be issued with one.

A survey by TfL found that **23% of passengers feel awkward offering their seat to someone who might not need it** and thus causing offense. The badge scheme enables other users to confidently offer seats to those who need them, however it does not obligate anyone to offer the wearer a seat and staff are not expected to intervene to secure one for them. In a survey **78% of users found it easier to get a seat and 95% would recommend the scheme to a friend**³⁶. The scheme has since been adopted by other regions of the UK.

3.6 Ticketing

UK has **subsidies for PwD travelling on public transport**, but the system is not universal. Devising a means to make this discount available to the temporarily disabled, perhaps also pregnant women, and to tourists visiting areas would reassure those people that the public transport system is designed to fit their needs and encourage them to use it.

Smart Ticketing, currently in operation in London as the Oyster network and planned in other parts of the country, will also improve access to the network for all passengers. Such systems simplify the ticketing system considerably and reduce the need to access and operate ticket machines, while ensuring users get the best ticket price option available.

³⁴ [Priority Seating](#), Transport Focus (2014)

³⁵ [My disabilities are invisible. I shouldn't have to prove them to strangers](#), Isabelle Jani-Friend, The Guardian (2019)

³⁶ ['Priority Seating Week' launch marks first anniversary of the 'Please Offer Me A Seat' badge](#), TfL (2018)



Section 4 Australia

- Australia ranks 36th in the 2016 analysis of disability ranking published by the World Policy Analysis Centre, scoring 30/50 for the strength of its legislation to support accessibility.
- In searches for publications on Scopus for documents related to general disabled access and specifically transport accessibility, Australia ranked fifth, and third, as the region of authorship.

In 2013-14, **79% of travel within Australia was done by road**, 17% by air, and 4% by rail. Most travel occurs within cities (55%), and of that, 80% is done by private vehicle³⁷. Australia presently has the eighth highest national transport emissions in the OECD, which are predicted to rise. Factors contributing to the large proportion of journeys by car include lack of proximity to transport terminuses, and the disruptive impact of extreme weather on transport systems³⁸. Projects are underway to increase use of the public transport network, including to improve access to the network for PwD. The Australian government has issued technical requirements to public transport providers to ensure their services are accessible to PwD³⁹. Requirements specifically directed at accessible bus stops have also been produced⁴⁰.

A government review of transport accessibility conducted in 2012⁴¹ found that the states of New South Wales, Victoria, Queensland, South Australia and Western Australia were close to meeting governmental targets of attaining **55% accessibility of all rail and bus services**. Several lines, including the Sydney light rail service and South Australian electric trains in the metropolitan area were fully accessible. Approximately 10% of taxis in all regions were accessible in 2012. Ninety-one percent of wheelchair accessible taxis (WATs) arrived within an 'acceptable wait time', mostly taking slightly longer than standard taxis. In New South Wales, incentive programs are in place to encourage uptake of WAT licenses. Despite these averages, rural customers still faced prohibitive difficulty in booking taxis, and found their cost high.

³⁷ [A dozen facts about transport in Australia](#), Australian Gvt Dept for Infrastructure and Regional Development information sheet (2016)

³⁸ [Trends > Transport and Australia's Development to 2040 and Beyond](#), Australian Gvt Dept for Infrastructure and Regional Development (2016)

³⁹ [Disability Standards for Accessible Public Transport](#) Gov.Au (2002)

⁴⁰ [Guideline for promoting compliance of bus stops with the Disability Standards for Accessible Public Transport 2002](#), Australian Human Rights Commission (2010).

⁴¹ [Review of Disability Standards for Accessible Public Transport](#) Australian Govt Dept for regional infrastructure and development (2015)

There are several areas where PwD in Australia report that transport accessibility needs to be improved. In Australia over 100 different parking permits are used to access disabled spaces in different areas. On trains, **usage of space allocated for disabled passengers by others was an issue**. In some locations, tur- up-and-go services were not available and passengers with disabilities needed to contact rail authorities in advance to get assistance on their journeys. In rural areas, infrequent services and old, inaccessible rolling stock were identified as problems. In some regions, rail passengers who require direct assistance to board and alight trains need to do so via ramps in the front carriage deployed by the driver. People with disabilities dislike the lack of independence and occasional unreliability of this system. Where stations were only accessible via lifts, users reported that lifts were occasionally out of service or had been vandalised, leaving passengers with disabilities stranded on platforms. The review suggests that **design requirements should stipulate that platform access must be possible by ramps or at least two lifts in addition to stairs**. Disabled toilets were often locked at night to prevent vandalism and were inadequate in serving the entire spectrum of people with disabilities.

The **Australian National Disability Strategy 2010-2020 (NDS)**⁴² was launched in 2011. The strategy has the ambition of making all public transport fully accessible by 2022 through application of the principles of universal design. Milestones for progress every five years are set out in the Disability Discrimination Act (DDA) and Transport Standards. As part of this initiative, the Australian Government embarked on a '**whole journey approach**' to accessibility in 2017, to modernise the existing 2002 Disability Standards for Accessible Public Transport⁴³. [The Whole Journey: A guide for thinking beyond compliance to create accessible public transport journeys](#) is a high-level guide released to help transport operators identify means to improve the degree to which the service they provide allows accessible door-to-door travel.

- Presently, New South Wales is **upgrading the accessibility of numerous rail stations** as part of its Transport Access Program⁴⁴. However, rolling stock accessibility in the region lags behind due to issues fitting legacy trains with wheelchair spaces and ramps.
- In Brisbane two thirds of train stations are fully accessible or offer assisted access for people using mobility aids. **New lifts, ramps, access paths, toilets, signs and seating are being introduced to less accessible stations** to meet the requirements of the DDA.
- In Perth all transperth trains are currently accessible. Work is underway to make **all buses and bus stops accessible**. The regions bus fleet is also being replaced with accessible vehicles. Off peak, the current 50% of buses which are accessible provide the majority of service. Upgrades of 600 bus stops to make them accessible are also underway.
- In Melbourne **all metropolitan trains are accessible with assisted access via a portable ramp**, however, the Victorian system requires people using mobility aids to give a note with the destination to the driver.

4.1 Sydney Metro Accessibility

The Sydney Metro opened as 'Australia's first fully accessible railway' in 2019. Lifts and escalators will provide an entirely step-free journey to users. Wheelchair spaces and priority seating will be available

⁴² [National Disability Strategy 2010-2020](#), Australian Government Department for Social Services (2011)

⁴³ <https://www.infrastructure.gov.au/transport/disabilities/>

⁴⁴ [Transport Access Program - current](#) (2019)

in each carriage. Platform doors will prevent people or objects falling onto the tracks. On the Sydney Metro website, no information was available about additional provisions for disabilities outside those which affect mobility. No mention was made online of provisions for accessibility for people with sensory or cognitive disabilities. Whether provisions will be made for these passengers is currently unknown.

4.2 Disability Inclusion in New South Wales (NSW)

The Disability Inclusion Action Plan 2018-2022 published by Transport for NSW⁹ outlines improvements to transport accessibility both planned and underway in the region. These activities are centred around the five outcome areas:

- Liveable Communities.
- Accessible Systems and Processes.
- Accessible Customer Information Technology and Research.
- Inclusive Customer Service and Feedback.
- Inclusive Employment.

More than 450 projects have been completed across multiple transport modes, including upgrades to train stations to introduce lift access, accessible toilets, kiss and ride zones, and more accessible interchanges. Accessible improvements to rail rolling stock include allocated accessible spaces and priority seating, accessible emergency help points, audio and visual destination information, and colour-contrasted doors and handrails. Accessibility is being validated via user testing. To ensure audio announcements are accessible, 3,000 staff have undertaken radio training at the Australian Film, Television and Radio school. A standard operating procedure for assisting passengers with disabilities across all NSW transport modes has been implemented. This appears to be a turn-up-and go service bookable in advance by phone.

Several notable advances have been made in information technology solutions towards improving accessibility. Information is now available online to help plan accessible journeys, including a location facilities tool to inform users about what facilities are available at what stations, and live updates about when these are out of service. Various trip planning apps for PwD are available, and existing real-time travel apps have improved their accessibility features. Bluetooth beacon-guided wayfinding technology apps (see WayFindr in section 3.3 Accessible Information) are also being explored

NSW has introduced the Opal electronic ticketing system. This system simplifies ticketing for PwD who may have cognitive impairments or sensory impairments that make using old-fashioned ticket purchasing systems challenging. The cards automatically calculate the cheapest fare, are designed for easy purchase and top-up, and can be used by PwD eligible for free transport to pass through ticket barriers independently.

4.3 Travellers Aid Australia

In Melbourne and Victoria, the Travellers Aid Australia (TAA) organisation operates from three stations (Southern Cross, Flinders Street, and Seymour Railway Stations) to help people with mobility

challenges participate with their community through the use of public transport⁴⁵. The workforce is 75% volunteers and 25% staff.

Services TAA provides include:

- Community Travel Training presentations
- Staff training on disability awareness
- Companion Service: providing journey companions to people who lack confidence in or are unfamiliar with using the public transport system. Community health services often put users in touch with the service.
- Crisis travel support: Available from Southern Cross Station to assist people needing to travel in an emergency (subsidising travel for medical emergencies, family crises, court matters, employment opportunities), or to reunite with support services/family/friends while experiencing a crisis such as homelessness.
- Courtesy buggy support
- General assistance

TAA also provides station lounges, funded by fee-paying services using the station. The facilities are a place to rest, but also have accessible toilets and baby and adult change facilities, and staff trained to assist people experiencing difficulties with their journeys.

⁴⁵ <https://www.travellersaid.org.au/about-us/>

4.4 Accessibility research by the DRC

The DRC Accessible Public Transport Project⁴⁶ was developed to identify good practice and areas for improvement in the Victorian public transport system. An online survey, as well as in-depth interviews with a smaller number of participants were conducted to inform the report of how PwD experienced the transport network. The key recommendations identified in the document are listed in Box 1 1.

Box 1 Recommendations for the Victoria Transit System from the DRC Accessible Public Transport Project

1. The Public Transport Access Committee (PTAC) include regular representation by key Disability Advocacy Groups who have the opportunity to advise the Minister on Public Transport accessibility matters.
2. Public Transport Victoria and Commercial Passenger Vehicles Victoria establish a program of ongoing consultation with people with disabilities and key disability advocacy organisations to plan, implement and review the development of accessible public transport in Victoria.
3. In consulting with people with disabilities, multi modes of engagement and communication are utilised to enable meaningful participation.
4. In collaboration with a key disability resource and training organisation, a comprehensive disability education and training program be developed for all public transport providers in Victoria. Successful completion of this training should be a prerequisite for all staff prior to any roles and responsibilities related to working with the public.
5. 100% completion of the disability education and training program for all staff dealing with the public becomes a Key Performance Indicator (KPI) for government public transport provider contracts and an ongoing registration requirement for Commercial Vehicle Provider operators.
6. A multi-media community education program be conducted to raise awareness about the diverse nature of disability, the critical role of accessible public transport for the study, work and life aspirations of people with disabilities, and to highlight the key components of accessibility in daily public transport.
7. The Victorian Government develop and publish its forward plan detailing the steps, key milestones, timelines and key performance indicators to deliver a fully accessible public transport system which complies with the Disability Standards for Accessible Public Transport (DSAPT) by 2032.
8. A Public Transport Feedback and Complaints Register (PTFCR) for all modes of public transport be established to promote accountability, transparency and continuous quality improvement. The PTFCR be managed by the Public Transport Ombudsman and include the production of annual audit reports identifying the nature and category of complaints, and the outcome and timeline for resolution of all complaints.

⁴⁶ [Accessible Public Transport Project Report](#), DRC (2018)



Section 5 Sweden

- Sweden ranks 12th in the 2016 analysis of disability ranking published by the World Policy Analysis Centre, scoring 40/50 for the strength of its legislation to support accessibility
- Swedish cities have won the EU Accessibility Awards twice and rank fourth for overall ranking in this scheme.
- In a search for publications on Scopus* for documents related to disabled travel, Sweden ranked fifth as the region of authorship

Numerous accessibility projects are underway in Sweden. As part of the 'Nordic Region for All' initiative, efforts are being made by Sweden, Denmark, and Finland to ensure that travelling across country borders does not create an accessibility issue for PwD. A coordinated, universal design-based approach is in development to ensure escorting, assistance, and digital accessibility and support services are consistent and effective between neighbouring Nordic countries. In 2013 Norway launched 'Regulation on Universal Design of Information and Communication Technological (ICT) Solutions to ensure all new websites catered to the general public are universally designed. Building on this, in Sweden, the National Post and Telecom Authority (PTS) organizes innovation competitions. Their purpose is to increase participation when it comes to digital solutions, by promoting innovations that focus on universal design and design for all.

In 1999 the **Easy Access in Stockholm project was launched to transform Stockholm into "the world's most accessible city" by 2010**. Design for All principles were applied to improving the urban environment for all, as the City Council's policy mandates that accessibility improvements be made to improve quality of life for all the city's residents. The drivers for this were Swedish ratification of the UN Convention of Rights for People with Disabilities and the city's strategic vision for 2030. Improvements to the urban environment carried out under this project have seen the city receive accessibility awards including the EU Accessibility Award. Public spaces, retail, accommodation and restaurants were targeted through building legislation, as well as raising awareness about the economic gains which come with accessibility. Improvements to public spaces and transport which led to Stockholm receiving the EU Accessibility Award included: **Audio signals at pedestrian crossings**, more **seats** around the pedestrian environment to provide points for people with reduced mobility to

sit, removal of old gutters in pavements to **eliminate them as a trip hazard**, and **adapting public toilets to make them accessible**.

Stockholm aimed to become ‘the world’s most accessible city’ through implementing these measures but has yet to receive recognition as such. It has been suggested that the reason for this is a lack of co-ordinated information and marketing to promote the city as such⁴⁷. Following the 12-year accessibility improvement programme, numerous other ventures have continued to improve accessibility in Sweden. Detailed information on public transport for the whole of Sweden is available online. Design, accessibility, station and bus terminal information is all available, along with details about disabled parking, taxi links and accessible toilets.

5.1 Accessible Transport in Stockholm

The Stockholm Public Transport Company (SL) has an **accessibility guarantee** in place to help travellers with disabilities reach their destination in the event that something unforeseen happens. This means that if a means of access such as a lift, ramp, or visual information system is out of order or absent, SL will help you reach your station or an alternative station. Stockholm has also invested in becoming a ‘**walkable city**’ with easy means of navigation throughout, and physical barriers to mobility removed. The number of pedestrian tunnels through the centre has been increased.

SL’s objectives from 2011-2021 include that *"SL's public transportation should be seen as the most attractive option for travellers with disabilities"*⁴⁸. During this program, step-free accessible metro trains, stations, and trams have been introduced. These feature low steps, tactile markings, ramps, and electronic passenger information systems delivering relevant information in visual and audio formats. Standardised design across different transport modes has been identified as an excellent measure to improve the predictability of trips and thus the confidence of PwD to use these services. A special 24hr contact line has also been established for disabled people to access via phone text or mail, which can help them with every stage of their trip. Staff receive training about disability, whether they work with passengers or in offices to ensure they understand difficulties PwD face travelling.

5.2 Accessibility in Göteborg

In Göteborg, Sweden, Public Transport for All has created several initiatives to develop a special transport service to enhance accessibility for PwD. A Special Transport Service (STS) operates in the city, but Public Transport for All aims to **reduce reliance on the booked buses and taxis that program runs by 50%**, with those journeys being met by public transport services instead.

Under this program, the existing Flexline bus network (accessible vehicles with step free access and ramps) was expanded to cover most of the city. In 2017 the municipality of Göteborg financed the development of a Flex tram by Sparvagar. A test model of the vehicle was built in advance of rolling out the design onto the network, and a group of passengers with mobility restrictions were invited to test the design. Following this trial, several adjustments were made to the layout of the vehicles (including changing the handle position in wheelchair spaces and modifying the contrast markings on the floor) prior to rollout. Outside these specifically designed vehicles, over 60% of buses and trams have been modified to have a low floor.

⁴⁷ [Case Study: Stockholm, Sweden](#) European Network for Accessible Transport (2015)

⁴⁸ [Accessibility for people with disabilities in the Stockholm public transportation system](#), SL (2019)



Section 6: United States

- In searches for publications on Scopus for documents related to both general disabled access and specifically transport accessibility, the USA ranked first as the region of authorship.
- San Diego was rated one of the top five most accessible cities by wheelchairworld.org
- In a survey by the Zero Project, the USA was the top ranking region for responses to the question *Are all modes of urban public transport (bus, metro, tram and train) accessible to all persons with disabilities?*

Some American cities have public transit systems which are well-regarded, and also praised for the level of disabled access they provide. Examples include Washington DC, New York, San Francisco and Seattle. However, in less densely populated areas, public transport is lacking overall, and most residents travel around by car. **In 2016, only 11% of Americans reported that they use public transport on a daily or weekly basis, the rest primarily travelling by car.** City dwellers are the biggest users of public transport (25% use it regularly), compared to just 6% of suburban residents and 3% of rural residents. For PwD who cannot travel by car or cannot afford a car, transport options are severely limited. In America more than the other countries discussed in this report, current research into improving transport accessibility for PwD focusses on how ride hailing services are currently changing that landscape, and how driverless cars might do this in the future.

In the United States, the accessibility requirements of public and private transport services are outlined by the Americans with Disabilities Act (ADA), published in 1990. The U.S. Department of Transportation (DoT) regulates the rules within the act which apply to transport. An overview of those requirements, taken from the ADA network website⁴⁹, is shown in Box 2. The content of the requirements is similar to that described of other countries accessibility regulations, focussing primarily on **physical accessibility**. Work has been ongoing since 1990 to bring transport standards in line with these regulations, although government funding was not made available for the purpose.

Despite widespread improvements to the public transport system being reported following the ADA⁵⁰, the system across the United States still has many shortcomings. In 2003 after 13 years of

⁴⁹ [Accessible Transport Factsheet](#) ADA

⁵⁰ National Council on Disability NCD (2005).

improvements to the system, it was estimated that **560,000 people with disabilities in the United States still did not leave home as the result of transportation difficulties**⁵¹. The National Council for

Both public and private organizations must meet ADA requirements: A public entity entering into a contract or agreement with a private entity to operate transportation services must ensure that the private entity meets all ADA requirements for the public entity. Specific requirements for private transportation providers like airport shuttles, hotel shuttles, private buses, and taxis are reviewed later in this document.

Rider information: A public transportation system must provide adequate information on services in accessible formats for persons with different types of disabilities (e.g. information in large print, braille or alternative and electronic format).

Assistance equipment and accessible features: Equipment and facilities such as lifts, ramps, securement devices (straps for securing wheelchairs on board), signage, and communication devices must be in good operating condition. If a feature is out of order, it must be repaired promptly. In the interim, an alternative accessible vehicle or option must be available.

Adequate time to board: Public transit operators must allow adequate time for people with disabilities to board and exit from vehicles.

Service animals allowed: Service animals may accompany people with disabilities in vehicles and facilities. The DOT ADA regulations define a service animal as any guide dog, signal dog or other animal individually trained to provide assistance to an individual with a disability, regardless of whether the animal has been licensed or certified by a state or local government.

Priority seating and signs: Fixed-route systems (those operating along a prescribed route) must have signs designating seating for passengers with disabilities. At least one set of forward-facing seats must be marked as priority seating (for people with disabilities).

Operator training: Each public and private transportation operator must ensure that personnel are trained to operate vehicles and equipment safely; properly assist individuals with disabilities in a respectful, courteous way; and recognize that individuals with disabilities have different abilities and needs requiring different types of assistance.

Box 2 The ADA & Accessible Ground Transportation Overview of Requirements

Disability (NCD) identifies problems commonly encountered by PwD from a range of US cities on fixed route buses and trains. Bus transport frequently presented barriers to people with mobility issues including inoperable ramps and lifts. Steep slopes impeding ramp use, failure to clear wheelchair securement zones for PwD were reported. Other issues included a failure to stop when flagged by PwD, attitudinal barriers among drivers, including falsely reporting lifts/ramps were inoperable to avoid boarding PwD, failure to announce stops or route identification. On fixed rail, common issues include lack of step free access to vehicles and stations, issues with reservations, and lack of dual-mode communication.

In 2017, 4,161 people with disabilities responded to a survey about barriers to public transport in the USA. The ADA-mandated paratransit systems were also examined. **Public transport was rated as**

⁵¹ U.S. Department of Transportation & Bureau of Transportation Statistics, 2003).

inadequate by 47.9% of respondents, failing to get them where they needed to go, when they needed to go, in reasonable time. A quarter of respondents reported **issues with routes to stops and stations, or the facilities themselves, being inaccessible**. Drivers not calling out stops, inappropriate driver attitudes, and lack of accessible routes to stops and stations (including gaps, steps, broken lifts and full vehicles) were all issues. The study noted that urbanized areas exhibited a different range of problems to rural areas: namely, in urban areas: drivers failing to call out stops, vehicles being to full, drivers lacking knowledge; and inappropriate driver attitude. In rural areas: being ineligible for paratransit services was the most pressing concern for PwD. **People with visual or mobility impairments reported the highest number of barriers to using public transport.**

The attitudinal issues PwD reported encountering in this study are something which could potentially be addressed quickly and inexpensively through staff training. Multidimensional strategies have been identified which have been successful in decreasing the impact of negative attitudes on people with disabilities, namely by increasing contact, education, social profile and impression management. **Disability simulation** has also been suggested as a part of this strategy. This has traditionally involved participants trying to navigate a station in a wheelchair or with a blindfold. With virtual reality platforms becoming more widespread, there is also an opportunity to use these to create an understanding of a foreign experience such as autism⁵². Amtrak has been praised by the NCD for its training for staff to provide a service to people with disabilities. This **involves face-to face training between staff and individuals with disabilities** (including individuals with hidden disabilities). A pocket guide was also produced to help staff deal with situations which may arise in the field when assisting a disabled passenger. The program was praised for opening a frank dialogue about disability⁵³. The **Transit Access Training Toolkit** produced by the World Bank Group⁵⁴, primarily directed at bus drivers, is one example of a means to improve attitudinal issues on the USA network.

6.1 Public Transport in San Francisco

In San Francisco, 27% of PwD use public transport on a daily basis⁵⁵. **Ridership of fixed route public transit by PwD is increasing, and far exceeds use of paratransit services in the city.** Respondents to the 2018 Muni Rider Survey rated accessibility for PwD on the network as ‘Good’ or ‘Excellent’⁵⁶. All Muni system vehicles are considered to be ‘fully accessible’, in that they are step-free accessible (via low flows, lifts and deployable ramps), have areas to secure wheelchairs, and audible stop announcements. Muni operators are trained to provide reasonable accommodations to passengers with disabilities, and Free Muni passes are available for low-to-moderate income older adults and PwD⁵⁷.

SFMTA also provides a paratransit service which, in compliance with the ADA, provides a door-to-door service for eligible individuals who are unable to access the public transport system. Riders are required to make a reservation 1-7 days in advance to use the service. Users of this service have an average age of 75, and an annual average income of \$US19,000.

City taxis are required to participate in the paratransit program, meaning that drivers must undergo **sensitivity training** for the elderly and PwD, including learning communication skills and how to handle

⁵² [Virtual reality could show others what autism feels like—and lead to potential treatments](#), Musser, Sciencemag (2018)

⁵³ [The Current State of Transportation for People with Disabilities in the United States](#) National Council on Disability (2005)

⁵⁴ [Transit Access Training Toolkit](#) World Bank (2009)

⁵⁵ San Francisco Office of the Controller. 2017 San Francisco City Survey.

⁵⁶ [SF Municipal Transportation Agency Rider Survey 2018](#), SFMTA (2018)

⁵⁷ [TNCs and Disabled Access](#), San Francisco Municipal Transportation Agency (2019)

mobility aids. Financial incentives are offered to ensure an adequate number of ramped wheelchair accessible taxis are in operation (and drivers of these vehicles require additional training in safe boarding and transport of their passengers and additional sensitivity training). Ramped taxis can be hailed using the Flywheel app.

6.2 Innovations for Public Transport for PwD

Ridesharing services such as Uber and Lyft, particularly popular in cities in the USA, have been a mixed blessing for PwD. In the press, these have been widely regarded as a solution to first and last mile journeys and inadequate and inaccessible public transport, where the majority of the population already relies on transport by car. The reality is more complicated. According to research by the SFMTA, **ridesharing services have been transformative for people with a vision impairment** (particularly following legislation requiring Uber drivers to accommodate service animals). However, **few vehicles accommodate wheelchairs**. People with a disability, the elderly or those on low-to-medium incomes are also less likely to use these services due to the **need for a smartphone, and the cost of the services**. Competition from ride hailing services is likely to see the number of taxis in operation fall, and with that, potentially the number of vehicles with special accommodations for PwD. It has also been pointed out that Uber and Lyft do not provide any direct training to their drivers. Voluntary training resources, such as videos on accessibility such how to fold wheelchairs, are available. Uber does offer access to a third-party specialist training course on serving passenger with disabilities to top rated drivers. The program, UberASSIST, is available in 40 cities. There is no public data on how many drivers have received training, or the effect of that training on quality of service⁵⁷.

The ADA does not make great mention of technological innovations which transport could adopt to help PwD. However, later guidelines (the [ADA Accessibility Guidelines](#), ADAAG, 2002) do make suggestions for how to **ensure technologies put in place to assist mobility are accessible to all**. While these are not a law, many of the recommendations are now widely implemented in the United States. In 2005 one such project, “Mobility for All” used GPS to provide mobile prompts for bus stops to allow people with cognitive disabilities to use transport with more independence.

In 2019 the US Department of Transport (USDOT) launched an Accessible Transportation Technology Research Initiative⁵⁸ to develop technologies to improve mobility in five different areas:

The United States, like other countries discussed in this document, has accessibility design standards and guidelines. These all include similar mandates, including providing step free access, wheelchair spaces, and clear signage. Although efforts to make public transport in the USA accessible have been underway since 1990 and progress has been made, a survey of the ADA (Americans with Disabilities Act) National Network found that significant barriers still remain. Both physical and attitudinal barriers were identified by the survey.

When the ADA was published in 1990, it provided a basic outline of how transport could be made more physically accessible, and reflects similar directives in the UK. These ADA rules did not make great mention of technological innovations which transport could adopt to help PwD. However, subsequent guidelines (the ADA Accessibility Guidelines, ADAAG) do suggest how to ensure technologies put in place to enhance mobility are accessible to all. While these are not a law, many of the recommendations are now widely implemented in the United States.

⁵⁸ [Accessible Transportation Technologies Research Initiative](#) (ATTRI)

In 2019 the US Department of Transport (USDOT) launched an Accessible Transportation Technology Research Initiative (ATTRI)⁵⁹ to develop technologies to improve mobility in five different areas outlined in Box 2. The ATTRI vision for the ‘Complete trip’ is explained in the graphic overleaf (Figure 3).

Innovations funded under the US DoT Accessible Transportation Technology Research Initiative			
Wayfinding and navigation	Pre-trip concierge and virtualisation	Safe intersection crossing	Robotics and automation
<p>City College of New York – Smart Cane for Assistive Navigation (SCAN), integrated with a smart phone application</p> <p>AbleLink Smart Living Technologies – An open wayfinding media standard and related infrastructure to support the creation of geographically-specific, cloud-based libraries of routes that adhere to the SMART standard for users in different metropolitan or rural areas.</p> <p>Pathways Accessibility Solutions – A wayfinding tool for wheelchair users and people with visual impairment that guides routes tailored to the user’s preferences.</p> <p>TRX Systems – A smart wayfinding and navigation system to obtain real-time location, en-route assistance, and situational awareness</p>	<p>AbleLink – A suite of assessment, self-directed learning, and trip execution technologies to support independent travel for individuals with cognitive disabilities.</p>	<p>Carnegie Mellon University – Connect pedestrian travellers with disabilities to the traffic signal systems (and by extension to nearby connected vehicles and infrastructure) and use this connectivity to develop assistive services for safe intersection crossing and increased independent mobility.</p>	<p>Technologies being considered include fully automated vehicles for those unable or unwilling to drive, solving first mile/last mile issues, providing connections to existing public transportation or other transportation hubs, and addressing “door to door” travel needs.</p>

Box 1 Research projects underway in the US DoT Accessible Transportation Technology Research Initiative

⁵⁹ [Accessible Transportation Technologies Research Initiative](#), ATTRI (2017)

THE COMPLETE TRIP

After his doctor's appointment, Andy decides to take a spontaneous trip to meet a friend at a coffee shop in an unfamiliar part of town. Using ATTRI's **pre-trip concierge**, **wayfinding and navigation**, **robotics and automation**, and **safe intersection crossing** applications, Andy can travel with confidence throughout his trip.



Figure 3 'The Complete Trip' envisioned by the ATTRI⁵⁸(2017), reproduced with permission.

Historical data showed that the elderly and PwDs are among several groups of users who are less likely to use shared mobility services such as bike hire and ridesharing. USDOT developed a framework to understand the technology and policy implications of new developments in transport on their users, including PwD, called **STEPS to Transportation Equity**⁶⁰ to improve the accessibility of these services to these individuals, and other lower-usage groups such as rural communities or people with low income. As these shared mobility services are being increasingly used to cover first and last mile journeys – a frequent barrier to public transport use by people with disabilities, these regulations could be an important factor in improving the overall accessibility of the US transport network.

An example of an innovation which was developed in accordance with this policy is the **LA Metro Transit Access Pass (TAP) program**. TAP cards can be used to pay for multiple modes of transport. To improve the accessibility of the scheme, provisions were made to allow these cards to be loaded with cash, rather than requiring the user to have a bank account, and for discount rates to be applied to the cards.

Among the countries discussed in this report, America has one of the most limited public transport systems for serving rural communities, although these make up a large proportion of the population. Despite there being over 100 million nondrivers in the USA, the transport systems of many communities require people to drive to access economic and social opportunities. In many cities,

⁶⁰ [Equity And Accessibility: Steps Framework And Data Analysis](#), UC Berkley (2018)

buses, metros, micromobility solutions and ride sharing services are in operation. However, rural communities may only be served by occasional buses, if anything at all.

In a 2013 study of the transport needs of individuals with low mobility in an urban town in Utah, 56% of individuals surveyed had difficulty accessing the local bus network from their residence, with only 15% of individuals living within walking distance to the bus stops. It was found that **people with low mobility often relied on their social networks to get around**. Those who did not have this opportunity had their quality of life impacted by the inaccessibility of local resources⁶¹.

The lack of public transport in parts of America has made it a hotbed for innovation in the development of driverless car technology. In both cities and rural areas, these vehicles could significantly improve public transport for many users, including PwD. There is concern around how AV's could serve the whole spectrum of PwD and their transport needs, considering that some may have issues boarding safely, docking mobility devices, or in navigating their journey. Although the technology is still far from deployment, there have been calls to ensure PwD are accommodated^{62,63}. Within cities, ridesharing services hailing autonomous vehicles may become very popular once the technology has advanced sufficiently. However, population density is a key factor in the viability of on-demand services, and rural areas – those most in need of alternative transport to driving – may benefit least from these innovations.

⁶¹ Jansuwan, S., Christensen, K.M. and Chen, A., 2013. [Assessing the transportation needs of low-mobility individuals: Case study of a small urban community in Utah](#). *Journal of urban planning and development*, 139(2), pp.104-114.

⁶² Douglas Gettman, Ph.D., J. Sam Lott, Gwen Goodwin, Ph.D. and Tom Harrington, "Working Paper #3: Workforce Deployment – Changes and Provisions of Future Policy and Contracts," prepared for National Highway Cooperative Research Program (NCHRP) project 20-102 (02): [Impacts of Laws and Regulations on CV and AV Technology: Introduction in Transit Operations](#), March 2017, , page 8

⁶³ [Preparing for the Future of Transportation: Automated Vehicles 3.0](#), USDOT (2018)



Section 7 Accessibility innovations beyond rail

7.1 Aerospace

Modern airports are generally highly physically accessible, and terminals are designed to make passage as easy as possible for all users. These spaces are often held up as excellent examples of inclusive design, which allows easy physical passage through departures and arrivals. The reason for this may be in part due to the amount of luggage many passengers bring with them, rather than being specifically targeted at being inclusive of PwD. Indeed, people with non-physical disabilities have criticised the service provided to them at airports. The stress, stimuli, crowds and security procedures can make airports intimidating for those with cognitive or sensory disabilities. Following calls to improve the accessibility of airports for people with hidden disabilities, aerospace has made considerable advances in this space. In the UK, the Civil Aviation Authority (CAA) published guidance in 2016 recommending that 30 major UK airports improved the provisions they made for passengers with hidden disabilities.

Following the [CAA's recommendations regarding hidden disabilities](#), most major UK airports now provide at minimum the following four services to improve their accessibility to people with hidden disabilities:

- **Familiarisation visits:** people with autism often experience anxiety encountering unfamiliar places or situations. Familiarisation visits are available at many airports to give travellers an idea of what to expect when they fly, including how the security process works and the layout of terminals
- **Lanyards and cards:** people with hidden disabilities are given the option to wear a discreet badge or lanyard to indicate to staff that they have a disability. Gatwick airport reported that the number of passengers with hidden disabilities requesting assistance rose by 47% following the introduction of lanyards. The lanyard informs staff that the wearer may:
 - Require extra time to process information or prepare themselves at security.
 - Need to remain with family/companion at all times.
 - Have sensory sensitivities.
 - Need staff to use clear verbal language, as it may be difficult to understand facial expressions and/or body language. Alternatively, may need staff to be visual with

instructions and use closed questions to assist passengers effectively through the airport.

- Benefit from a more comprehensive briefing on what to expect as they travel through the airport.

(NB: staff are trained to apply these rules and considerations to any person who identifies themselves as a person with a hidden disability, whether they have chosen to wear a lanyard or not)

- **Training:** Key front-line staff are given awareness training to understand the needs of passengers with conditions such as autism and dementia.
- **Advance information:** most airports in the UK have downloadable guides available to prepare passengers for their visit. Some provide separate guides for children and adults.

In addition to these basic requirements, some airports have gone further and introduced further accessibility measures which have been applauded for their inclusivity for passengers with autism.

Quiet rooms have been introduced in Heathrow Airport in the UK, Shannon Airport in Dublin, Ireland, and Pittsburgh Airport in the USA⁶⁴. A common difficulty experienced by people with autism (although the severity varies from person to person) is difficulty processing everyday sensory information and feeling overloaded by highly stimulating environments. Quiet rooms with sound-proofed walls, low lighting, and relaxing visuals (the Pittsburgh quiet room has bubble tubes) can help relieve the stress that an otherwise busy airport environment may induce. The Pittsburgh quiet room also features a replica of the cabin space in an aircraft, allowing autistic passengers to get a feel for the aeroplane experience in advance, and ease their anxiety about entering an unfamiliar environment.

Birmingham airport has introduced a **quiet route** through the airport to accommodate people who would prefer a slower, quieter path through security⁶⁵. The 'sunflower route' compliments the sunflower badges and lanyards available to people with hidden disabilities. The path can be used by anyone, so those who prefer not to identify themselves can still benefit from this facility. At Heathrow Airport, staff who have received special training to assist people with autism wear '**helping hands**' badges to identify themselves to passengers who may require extra assistance⁶⁶.

Airports in the UK have joined the **Dementia Friends** scheme, rolling out training to frontline staff to recognise and understand more about dementia, in order to offer support to passengers and their travel companions. In 2016 Heathrow pledged to become the world's first 'dementia friendly' airport, working with the Alzheimer's Society. This will be achieved by ensuring all staff are given Dementia Friends training sessions, training, and online resources. A **frontline special assistance team**, STAAR (Senior Trained Additional Assistance Role), will be given additional training. These staff will also be trained to assist passengers who are deaf, blind, or autistic. Brisbane was pronounced Australia's first dementia-friendly airport in 2017, after launching a [guide](#) for passengers with dementia developed by the Queensland University of Technology's Dementia Centre for Research.

For people with sensory impairments, most airports investigated provided **assistants** to help guide visually impaired passengers through the airport, or who could accompany passengers with a hearing impairment wishing to communicate via sign language. Additionally, induction hearing loops,

⁶⁴ [Sensory Room](#), Services, Pittsburgh Airport

⁶⁵ [Assisted Travel Information](#), Birmingham Airport

⁶⁶ [Special Assistance](#), Heathrow Airport

information boards, and verbal announcements ensure information is delivered by a variety of channels to help most customers. The **Aria wayfinding app** is available at Gatwick airport to assist travellers with a vision impairment. Pittsburgh international airport recently held a [trial](#) to evaluate the improvements in navigation experienced by passengers with a vision impairment using a 'smart suitcase' to sense impending collisions combined with a wayfinding app to navigate the airport. Accessible check-in kiosks have been introduced at numerous USA airports, and the technology is also used in voting terminals, shops and restaurants. [Storm interface kiosks](#) feature an accessible keyboard with tactile surfaces and an audio headset, designed to provide equal information access to those with sensory impairments, reading difficulties, or limited dexterity.

In 2018 Glasgow Airport in Scotland became the first airport to incorporate the '**Autism Reality Experience**' into staff training, and showcase it for passenger awareness⁶⁷. The ARE⁶⁸ is a mobile virtual reality experience designed to show participants what the world might look like from the perspective of a person with autism. Participants must complete a series of tasks within a VR environment designed to overload their vision, hearing and thought process in the same way a busy environment might overload an autistic person. The experience builds empathy and understanding, and ARE hope to deliver training to more transport staff in the future.

In Sweden, the Arlanda Express Airport Link has been commended as an example of best practice by the Transport and Tourism for *Persons with Disabilities and Persons with Reduced Mobility Report*⁶⁹. Notable features of the rail service, which links Stockholm City Centre with Arlanda Airport is specially designed to be wheelchair accessible. Assistants of PwD can travel free of charge. The personal assistant is also available to take passengers with disabilities from the station to their terminal, which is booked either on the train by contacting train staff, or from the airport by airport staff. This service, along with another initiative in Sweden to train taxi drivers to offer the service of assisting PwD through rail stations, can make the end-to-end journey culminating in air travel significantly easier for people with a range of disabilities.

In the UK airports have **changing places toilets** which accommodate people with severe disabilities who cannot use standard accessible toilets. These include people with both severe physical and cognitive disabilities by the provision of changing bench/table and shower facilities, as well as a hoist for transferring to and from a wheelchair.

Aeroplanes themselves are considerably less accessible to people with disabilities than airports. In the USA, the Department of Transport is considering creating regulations to oblige airlines to make improvements. These could include **in-flight entertainment options for people with visual or hearing impairments** and creating standards around service animals. The confined space is a major issue for creating physical accessibility, but new regulations would encourage airlines to reconsider bathroom design. Small planes are increasingly being used for longer flights, and on small aircraft passengers who use wheelchairs are often confined to a folding wheelchair and may have serious issues attempting to use the small bathroom facilities. While some aircraft companies are reluctant to remove seats in order to make a larger toilet, research shows that there is a business case for doing so: **of 11 million travellers with disabilities, 72% experience major obstacles travelling by air**⁷⁰. Airbus

⁶⁷ [Glasgow first UK airport to host Autism Reality Experience](#), ADS Advance (2018)

⁶⁸ <https://www.autismrealityexperience.com/>

⁶⁹ [Persons with Disabilities and Persons with Reduced Mobility Report, TRAN \(2018\)](#)

⁷⁰ [ODO Market Study, third edition](#), Open Doors Organisation (2015)

have fitted new planes with **Space-flex toilets** which have walls that staff can move to convert two compact toilets into a double size cubicle for disabled access when needed⁷¹.

7.2 Retail

The retail market has identified improving the accessibility of shops to people with disabilities as a key priority. This has included shopping malls ensuring all stores are step free and installing Changing Places toilet facilities. Other physical accommodations in these spaces include creating **wide aisles for wheelchairs**, individual stores laying out **access ramps**, and **accessible changing rooms** being available. Guidance for improving physical accessibility of retail spaces include Australia's [Design for Dignity Retail Guidance](#).

Of the 850,000 people living with dementia in the UK, 25% do not shop for themselves. The primary reasons given for this are **anxiety concerning finding their way around stores, difficulty paying, or being misunderstood by staff**. However, 83% of people with dementia who do continue to shop change where they shop depending on how businesses accommodate their condition. In the UK, the Alzheimer's Society have launched the *Becoming A Dementia-Friendly Retailer Practical Guide*, principles of which have already been adopted by major supermarket chains including Sainsbury's and Tesco⁷². These stores have used the guidance to ensure their stores have a sensible, well-designed layout, clear signage, and that dementia awareness training is provided to staff.

The Alzheimer's Society Dementia-Friendly Retail guide recommends the following simple steps to improve the retail environment:

- Identify a colleague to be the dementia champion for your business. These 'champions' may already exist within the framework of your organisation in roles such as community relationship managers, ethics and diversity representatives or community champions.
- Provide all front-line staff with a basic understanding of dementia. This could be part of a wider training programme around supporting disabled and vulnerable customers, as it may not be obvious whether someone has dementia and/or another health condition.
- Encourage employees to complete an online Dementia Friends session (see 'Useful resources' for more details).
- Provide clear signage to and from toilets, cashiers, service desks
- Provide quiet spaces where people can rest
- Avoid confusing or disorientating positioning of mirrors
- Ensure store is well lit, particularly the entrance

To help people with autism shop, supermarkets in the UK (Morrisons) and Australia (Coles) have introduced '**quiet hours**'. During the weekly quiet hours, store lights are dimmed, music is switched off, and announcements are kept to a minimum. Toyshop The Entertainer has also adopted the policy, extending it to prevent noisy toy demonstrations taking place during this time, and training staff to better help the autistic experience. Northlands shopping centre in Melbourne holds **sensory shopping days**, where in addition to low light and noise, staff are trained to greet customers non-verbally, and check out queues request customers keep a metre space between one another. The centre also hired

⁷¹ [Space-flex](#), Airbus

⁷² [Becoming A Dementia-Friendly Retailer](#), Alzheimer's Society

a Santa specifically trained to interact with children with autism. Family's book ten-minute slots to meet him instead of having to wait in a potentially stress-inducing queue. Other shopping centres have copied airport initiatives of providing downloadable guides and wayfinding apps, and adopting the hidden disability lanyard system. Shopping centres in the UK are increasingly making sensory rooms and changing places toilets available for people with cognitive difficulties.

7.3 Banking

The bank HSBC is working to improve the [service it provides to customers with dementia](#) and helping them manage their financial affairs. The bank worked with the Alzheimer's Society and focus groups of people living with dementia and their carers to identify key challenges they faced around financial management. Following this research, the company has published **guidance for people with dementia**, and produced a guide to finances making recommendations which include: keeping a written record of expenditures and receipts, setting up standing orders and direct debits for regular bills, chip and signature cards for people who have difficulty remembering a PIN number.

7.4 Utilities

Retailers have identified **raising employee awareness of dementia** as a key step in creating a more accessible retail experience. This can start with awareness training but be extended for further by encouraging a culture of discussing dementia and sharing stories related to it. British Gas employs [dementia champions](#) who are trained to provide extra assistance to customers with dementia on calls. A **priority service with special additional support** is also available. British Gas also has a caregiver support initiative which helps employees who care for relatives with dementia. Launching the scheme saved the company money through greater employee retention and lower absenteeism, but more importantly contributed to the level of understanding of dementia within the company. British Gas also trains staff as dementia champions and holds monthly drop-in sessions to support people with dementia in using their services.

7.5 Personal Ombudsmen

In Sweden, an NGO works for local governments to provide personal ombudsmen to people with psychosocial disabilities. Their purpose is to establish trusting relationships with individuals who need support in order to help them control their own situations, and advocate for their needs to ensure they receive the care they need. Critical to establishing this trust is that the ombudsmen do not act on what they think is their client's best interest, but rather only do what their client specifically asks them to. In 2017, a BISAM (self-determination co-ordinator) service was set up in the city of Lund to support tenants of group homes for people with psychosocial disabilities⁷³. The success of these services was recognised as an innovative example of Independent Living and Political Participation by the Zero Project⁷⁴ in 2019, and is now being replicated by other countries, and was a recommended action in the DRC Accessible Public Transport Project⁴⁶ for Victoria, Australia.

⁷³ [Personal Ombudsmen Enhance Self-Determination](#), Innovative Practice 2019 on Independent Living and Political Participation, Zero Project

⁷⁴ The Zero Project is an initiative of the Austria Essl foundation, organised jointly with the World Future Council and European Foundation Centre focussing on the rights of people with disabilities globally.

7.4 Technological enablers of the accessible future

There is clear evidence that governments around the world are taking steps to make transport more accessible to people with disabilities. Technologies which are currently in development may be able to greatly enhance transport accessibility if used appropriately. In this section, several new technologies which could improve the transport experience for disabled passengers are introduced.

7.4.1 Crowdsourcing information to improve disabled access

A frequent criticism of attempts to make places more accessible is that PwD are not always consulted during the design phase. This can result in huge investments failing to deliver an improved level of service. Crowdsourcing information directly from the public can provide important insights into how systems can be improved. Several crowdsourcing projects which have directly asked volunteers to provide data have significantly improved understanding of the needs of PwD.

In Spain, a 2017 study used GPS and RFID to track volunteers with and without disabilities around their university campus⁷⁵. The goal was to identify journeys where the route taken by PwD (subcategorised by the type and degree of impairment they experience) was significantly longer than the route available to those without mobility issues. An app was also developed which participants could use to report areas which were inaccessible (e.g. stairs and no ramp), or where accessibility measures were inefficient (e.g. a ramp, but too steep to use). Through this study, insights were created about which areas to prioritise to improve the experience of campus users. The researchers suggest that universities are effective microcosms of cities, and that the study could be **scaled up to provide a city-wide means of evaluating accessibility**. Key Accessibility Indicators (KAIs) identified in this way can, through long-term support of the app, be monitored **over time**. This is a powerful advantage of crowdsourcing over other information collection methods such as surveys, which tend to only provide snapshots of disability issues, while this could show improvements over time, or issues that are temporally affected, such as difficulties which are specifically experienced in rush hour.

In Seattle, Project Sidewalk is being used to collect **crowdsourced data about pedestrian accessibility**⁷⁶. In a gamified version of Google Streetview, participants can walk around the city labelling features that make pedestrian access easier or harder, such as curb ramps, trip hazards and obstructions. One use of this data will be to allow people with mobility issues to navigate through the city using accessible routes. Another will be for the Seattle Department of Transportation to use this information to identify sidewalk maintenance to prioritise. However, as reporting is based on Google streetview which may not provide realtime data, the accuracy of the data this project has generated is limited. The study shows the value that a GPS-based reporting tool could have for improving mobility in the city, providing the information it contained was up to date.

Google's Disability Impact Challenge recently funded Perkins, an app that **integrates GPS data with crowdsourced 'clues' about environments to help blind people with fine navigation** through their environment⁷⁷. Once GPS has brought the user to a destination, Perkins uses crowdsourced data to tell them where they may find, for instance, ticket machines, lifts, or toilets.

⁷⁵ Mora, H., Gilart-Iglesias, V., Pérez-del Hoyo, R. and Andújar-Montoya, M., 2017. [A comprehensive system for monitoring urban accessibility in smart cities](#). *Sensors*, 17(8), p.1834.

⁷⁶ [Project Sidewalk](#)

⁷⁷ [Perkins](#) - Google Impact Challenge for Disabilities

7.4.2 Passenger Assistance and Information

EMT in Madrid, Spain, has already demonstrated the potential of AR to help transport users navigate their environment (see Section 2.2). Hosts of passenger information apps have been developed, and as these continue to provide personalised, accessible, and accurate transport information, their impact on the accessibility of transport systems will grow. Apps are available which assist transport users with vision (such as Wayfindr, and Bemyeyes), hearing, mobility (selectable on Uber in some cities, on TfL travel app, an assistance booking app), and cognitive impairments (WaytoB). Several apps have been developed to help people with autism who are travelling. Orientrip, launched this year by Curtin University, Australia,⁷⁸ helps users choose **less crowded services**, journeys with **fewer interchanges**, and provides **tips for managing anxiety and sensory overload**. A similar app called Aubin is currently in development for use in the UK, funded by RSSB⁷⁹. Apps on the staff side of the equation can also be useful, such as Rail4All, an app under development in the UK to help staff deal with requests from disabled passengers.

Making transport data open enables third parties to develop innovative apps such as these wherever they see the opportunity and need. This means that barriers to accessibility within the transport network which transport operators do not fully understand can be tackled by experts who do, and that new technological innovations of which they are not aware can be leveraged to address existing problems. Transport companies can encourage app development with funding competitions such as RSSB's recent **rail accessibility competition** which funded Aubin, among other innovative projects⁸⁰. The quality of the data provided is also critically important for creating useful apps. While accurate information about train departure times and platforms would be useful to all, other information may be important to PwD. For example, disruption alerts for PwD might include notifying them when a station's lifts are broken. It could be useful to provide information on the step-gaps between the train and the platform, or directions towards a step-free route through a station. Although apps for passengers have great potential to enhance accessibility, it is important to note that **not every transport user with disabilities will own or be able to use a smartphone**. As such, apps should be available as part of a suite of accessibility solutions.

7.4.3 Artificial intelligence and autonomous vehicles

The umbrella term 'artificial intelligence' covers a variety of computational processes which allow computers to make logical decisions in response to new information. This includes visual perception, speech recognition, and problem solving. Several fields of development in AI are likely to have implications for transport accessibility.

Image recognition and analysis is a field of AI seeing rapid advancement. This is in part due to major investment in this technology for use in driverless cars. Other applications already in use include facial recognition, fault detection in maintenance environments (for instance analysing images of rails to predict where defects will happen⁸¹) and for diagnosis in medicine. Several applications of image recognition and analysis to assist PwD in the future present themselves. Image analysis can be used to **help people with visual or cognitive disabilities navigate their environment**. While GPS can provide some assistance to this end, its accuracy in most consumer devices, or with which destination points are labelled, means users still face difficulty reaching their destination. This is known as the '**last fifty**

⁷⁸ [Deafening sounds and blinding lights: navigating public transport on the autism spectrum](#) Curtin University News (2019)

⁷⁹ [Aubin](#) Junction UK

⁸⁰ <http://www.railtechnologymagazine.com/Rail-News/seven-innovative-schemes-chosen-in-600k-dft-rail-accessibility-competition>

⁸¹ Min, Y., Xiao, B., Dang, J., Yue, B. and Cheng, T., 2018. [Real time detection system for rail surface defects based on machine vision](#). *EURASIP Journal on Image and Video Processing*, 2018(1), p.3.

meters' problem. While GPS might guide a user from their house to a station with reasonable accuracy, at present it would not be able to guide them to the ticket machine, and then to the platform they need. Furthermore, GPS does not work indoors. AI image recognition can improve the degree to which PwD could navigate a dynamic environment by, at its simplest, **detecting obstacles** along a known route. More sophisticated navigation tools will be able to **recognise objects** (which could include people, people wearing staff uniforms, signs for toilets) or read signs. These systems could be enhanced by designing signage within stations to be easily read by artificial visual systems, or by integrating other sensor data such as RFID into the same system. A detailed review of how these systems can be applied to transport was conducted by Fei et. Al. (2017)⁸². With continuous development, these devices are likely to become extremely useful to users with visual impairments or cognitive issues in the future by providing real-time, robust, low cost navigation assistance. The path to achieving this level of access could include intermediate steps such as RFID integration, the placement of navigation signs designed specifically for image recognition systems along routes, or integration with human visual assistance apps such as Bemyeyes.

Facial recognition is increasingly being used to record when specific people enter certain locations. It has been proposed that people who require special assistance with transport could, if they wished, sign up to services which would identify them as needing extra assistance upon their entrance into a station or airport, and dispatch staff to their location. In 2018, a Spanish study found facial recognition systems are an **accessible means of user authentication**⁸³. In the study, participants with a range of different disabilities were asked to withdraw money from a fictitious ATM. The ease with which the participants authenticated the transaction using PIN, pattern recognition, and face, voice or fingerprint recognition was measured. All groups of participants **performed better using biometric authentication**, which didn't require them to memorise a number or pattern passcode. All participants were able to authenticate with facial recognition, but struggled with PIN and pattern recognition, and some of the participants with cognitive impairments struggled with voice recognition. The researchers concluded that **the most accessible authentication methods were those requiring fewer interactions** (e.g. pressing buttons, reading authentication sentences). They noted that numerous participants were initially nervous about using new technology and unfamiliar authentication methods, however and cautioned that clear instructions for any mode would be necessary, and that the most accessible option might be to provide several options for authenticating.

Speech recognition technology is undergoing rapid advancement, fuelled by the market for personal assistant devices such as Amazon Echo. Speech recognition requires both analysis of audio information to identify words, and **natural language processing (NLP)** which allows computers to understand queries that are posed in natural human speech. For users with sensory difficulties, speech recognition could be invaluable for accessing travel information. This could include asking questions on the go (to a linked image recognition device for blind users, or to a travel advice bot), or having audio information around them either from announcements or other people delivered in text form. People with sensory sensitivities who prefer to wear headphones or ear defenders in noisy environments may find these apps to be a particularly useful way to access audio information. Speech recognition technology is also nearing the point where instant translation is becoming a practical possibility, through devices such

⁸² Fei, Z., Yang, E., Hu, H. and Zhou, H., 2017, September. [Review of machine vision-based electronic travel aids](#). In *2017 23rd International Conference on Automation and Computing (ICAC)* (pp. 1-7). IEEE.

⁸³ Blanco-Gonzalo, R., Lunerti, C., Sanchez-Reillo, R. and Guest, R.M., 2018. [Biometrics: Accessibility challenge or opportunity?](#). *PloS one*, 13(3), p.e0194111.

as earphones being developed by Google. Instant translation services would be extremely useful to people with disabilities navigating transport systems which do not use their native language.

Autonomous vehicles are currently seen by many as an important and imminent milestone for artificial intelligence. Estimates for the degree of automation these vehicles can practically achieve, and when they will be deployable, vary widely. Some small instances of automation are already in operation, including an autonomous bus route which was briefly trialled in Luxembourg, and self-drive features in Tesla cars. Truly autonomous vehicles could have enormous benefits for people with disabilities, providing they were affordable and accessible. They could be used for entire **door-to-door journeys**, or to bring users to and from other transport modes. As discussed in Section 6.2, a large amount of the literature published on the future of accessibility in the United States is focussed on the advent of autonomous vehicles, such as the AARP report *Universal Mobility As A Service: A Bold Vision for Harnessing the Opportunity of Disruption*⁸⁴. In countries such as the USA where the vast majority of transport currently uses private vehicles, autonomous vehicles are a very attractive prospect for improving mobility, rather than addressing the host of issues which need to be addressed to meet the needs of the population through public transport. However, for the foreseeable future it is expected that most of these vehicles will require a human driver to be capable of taking over control in the event of certain emergencies or accidents, which may not be possible for some PwD. Furthermore, the necessary **changes to legislation and infrastructure** to support these vehicles are still in their infancy. The likelihood that autonomous vehicles will be able to meet all the transport needs of PwD in the near future is small, considering the current limitations and cost of the technology.

Small-scale applications may, however, offer some benefits to PwD. Self-guided wheelchairs are likely to be available sooner than self-driving cars: the risks inherent in introducing them are far smaller, and they may need far less sophisticated navigation software to complete simple journeys through pedestrianised areas at low speeds. Such chairs could vastly improve the accessibility of public transport to people with mobility issues, the one in ten blind people who also use a wheelchair, and people with cognitive impairments. A number of companies have produced smart wheelchairs in the last two decades, but uptake has been limited, primarily due to the high purchase costs of the devices. However, investments in driverless cars have brought the costs of the technology down. In 2017 self-driving wheelchairs were trialled in a Singaporean hospital and a Japanese airport⁸⁵. The chairs can be hailed and given a destination using a smartphone app. They then navigate to that location using LIDAR and localisation algorithms. Electronic autonomous transport pods now operate at Heathrow airport in the UK⁸⁶, which can assist all passengers in reaching their destinations with minimal effort. The pods are now being trialled by Bristol airport on routes shared with other road transport⁸⁷. The system is being expanded further to connect transport hubs to local destinations, such as shopping centres. An increased roll-out of these small-scale autonomous vehicles could help people with disabilities reach and navigate transport facilities independently.

⁸⁴ [Universal Mobility As A Service: A Bold Vision for Harnessing the Opportunity of Disruption](#), AARP (2018)

⁸⁵ [Self-Driving Wheelchairs Debut in Hospitals and Airports](#), IEEE Spectrum (2017)

⁸⁶

⁸⁷ [Capri Autonomous Vehicle showcased at Bristol Airport](#), Bristol Airport (2019)

Conclusions

This report identified examples of good practice for making transport accessible to PwD in five countries with good general track records on accessibility. It was hoped that there would be a clear means to pick countries to include from an established accessibility ranking, but no such resource was identified. Proxy measures (described in Appendix 1) were instead used to identify Spain, the UK, Australia, the USA and Sweden. **A means of comparing accessibility in different countries might be a useful tool** for governments to evaluate the efforts they are making in relation to their peers. It could also help identify priorities for future improvement plans within countries. In Spain, a study which evaluated the accessibility of a university campus for PwD came up with a list of **Key Accessibility Indicators (KAIs)**, based on dialogue with PwD. This could form a starting point for such a ranking. In the UK, accessibility ratings were recently assigned to many stations on the rail network, which could be incorporated into developing transport-specific KPIs.

In the UK, America and Australia, **a clear disparity was evident in the degree of accessibility of public transport to PwD in rural and urban locations**. KPI's for disability should be developed in such a way to reflect this. The primary problems described by rural transport users were too few services available, and difficulty getting to those services (the first and last mile problem). For these reasons, people with disabilities in rural areas are more likely to travel by car. Where they could not drive themselves, they were dependant on others or on private car services. For many PwD, the **lack of public transport limits their independence and social engagement** in a manner which can negatively impact their wellbeing.

The requirements for making transport physically accessible appear to be fairly well understood, and a common approach is being pursued by all countries examined here: creating step-free routes, ensuring station facilities have adequate seating, and that trains have designated wheelchair areas and designated seating for those less able to stand, accessible toilets in all locations^{29,88}. The problems which remain are actually implementing the necessary changes, and **implementing changes in a consistent, reliable manner** that gives people with mobility impairments the confidence that the system or line is usable to them.

Progress was evident in making transport networks accessible to people with sensory impairments. Across all five countries examined, efforts are being made to ensure adequate audio and visual passenger information is available for customers to carry out their journeys. This is a field where mobile technology has been particularly impactful, with numerous **assistance apps** available and in development.

Although there is now a growing drive to improve transport systems for people with cognitive disabilities, there is a way to go to achieving this. **Training for staff and for customers to help them understand the needs of people with cognitive or sensory impairments is extremely valuable**. Rail could take inspiration from other industries including aerospace and retail to provide training in the experience of autistic people, quiet routes and times, or travel planning apps which avoid crowded times and complex interchanges. For passengers with disabilities themselves, **transport training** has been praised for helping explain the public transport network and available assistance. This training

⁸⁸ [ADA Standards for Transportation Facilities](#), United States Access Board

appears to be particularly valuable for people with cognitive or sensory impairments who may experience a higher level of anxiety around using public transport.

Transport providers in all five countries gave **discounted travel** to people with disabilities. This has been identified by focus groups of passengers with disabilities as an important step to improving transport accessibility for them, a notion supported by economic studies that have shown PwD frequently experience higher than average living costs, alongside lower than average earnings. **Existing subsidy/discount systems should be reviewed to ensure they cover the whole spectrum of disabilities**, including hidden and cognitive impairments.

Technology is having a major impact on the availability, accuracy and accessibility of transport data. It allows **relevant information to be delivered to transport users in a manner suitable to their needs**. For people with disabilities, this is invaluable where it is leveraged to assist them with planning journeys along routes where they are confident their needs will be accommodated, and presented with enough clarity to make those journeys easily. Often, the most widely used apps for transport planning are made by third parties who are experts in information delivery or in the needs of the specific audience they target. **Transport companies who make their data openly available to third party developers are likely to see technology benefit their passengers more quickly and effectively than companies who attempt to keep their data in house**. However, providing accessible data on trains and at stations is still essential rather than assuming everyone who needs data will also possess a smart device.

Staff can be a transformative factor in the shaping the experience people with disabilities have while travelling. Researching this report unearthed dozens of news articles about people with disabilities experiencing poor treatment by transport staff from the UK, Australia and the United States*. While these may represent extreme cases, passenger surveys indicate that **worrying about poor treatment or unreliable service from staff are factors which discourage people with disabilities from using public transport**^{24,46}. Providing staff with comprehensive training that gives them an understanding of disabilities, including hidden disabilities, and how to assist these passengers, is crucial to providing a good service. **Instilling staff with the ability to empathise with their disabled passengers** is critical, so involving PwD in the training process is valuable, as are experiences such as disability simulation. In the utilities sector, providing better support to staff who cared for relatives with disabilities increased awareness and dialogue around the disabled experience among staff, translating to those staff providing a better experience to customers with disabilities. Going further to offer additional **staff or volunteers specifically for passenger assistance**, such as Travellers Aid Australia, would go even further towards ensuring passengers with disabilities feel welcome on the network. Relatedly, another barrier to using transport is abuse or misunderstanding of disability by fellow travellers. Public awareness campaigns, disability cards, and specific seating for people with disabilities are all important measures to address this issue.

Throughout all the literature examined in the collation of this report, two points were made time and again by research articles, government white papers, and news stories. The first, is that **designing transport to be accessible to all has benefits far beyond making the transport network accessible to people with disabilities**; it also makes it more accessible to tourists, shoppers, families, and people with temporary disabilities and pregnant women. Even before the network becomes fully accessible, a transport network being seen to take steps towards improving accessibility is likely to encourage

* It's likely similar stories appear on local news sites in Spain and Sweden, but were less frequently identified during this English language research

more people to use the service. It telegraphs that the network considers its passenger's needs, and may encourage people who are anxious about using public transport that the system is being designed to include them. The second enduring point through literature on accessible transport has been the criticality of **engaging people with disabilities in the choice, design, and implementation of improvements to accessibility**. People with disabilities know best what their needs are, and engaging them in the improvement process can avoid costly mistakes. Furthermore, engaging people with disabilities makes them more invested in using a network which acknowledges their presence. Projects in the future should endeavour to engage PwD throughout the design process in order to effectively make a transport network which is appealing and accessible for all.

Further Reading

www.accessibletourism.org

[Access for All: funding to improve accessibility at rail stations](#), Gov.UK (2013)

[Accessible Public Transport Project Report](#), Disability Resource Centre (2018)

[Becoming A Dementia-Friendly Retailer](#), Alzheimer's Society

[CAA guidelines: Making air travel more accessible for passengers with hidden disabilities](#) CAA (2016)

[The Current State of Transportation for People with Disabilities in the United States](#) National Council on Disability (2005)

Mora, H., Gilart-Iglesias, V., Pérez-del Hoyo, R. and Andújar-Montoya, M., 2017. [A comprehensive system for monitoring urban accessibility in smart cities](#). *Sensors*, 17(8), p.1834.

Vila, T.D., Darcy, S. and González, E.A., 2015. [Competing for the disability tourism market—a comparative exploration of the factors of accessible tourism competitiveness in Spain and Australia](#). *Tourism Management*, 47, pp.261-272.

[Disability Inclusion Action Plan 2018-2022](#), Transport for New South Wales (2017)

[Economic Benefits of Improving Transport Accessibility](#), International Transport Forum, OECD (2017)

[Equity And Accessibility: Steps Framework And Data Analysis](#), UC Berkley (2018)

[Improving public services through open data: public toilets](#), ICE (2012)

[Inclusive Design Strategy 2015-2019](#) Network Rail

[On Track for 2020? The Future of Accessible Rail Travel](#), Rail Accessibility Ltd, MWW Transport Consultants, Ann Frye Limited (2015)

[Preparing for the Future of Transportation: Automated Vehicles 3.0](#), USDOT (2018)

[Research into passenger experiences of Passenger Assist](#) ORR (2017)

[Review of Disability Standards for Accessible Public Transport](#) Australian Govt Dept for regional infrastructure and development (2015)

[Welcoming Autistic People: A Guide for Tourism Venues](#), National Autistic Society (2018)



Appendix 1 Identifying countries with a good accessibility record

This knowledge search seeks to identify accessibility improvements which could be leveraged by the rail industry by identifying countries with a good record on accessibility and what innovations exist there. To select these countries, multiple criteria could be used as a benchmark for good accessibility. While no universally accepted rating system appears to have been proposed, several different rankings have been published. Performance over these rankings is used to select countries to include in this report which have a good track record on accessibility.

Based on ratings by The **World Policy Analysis Centre**, the **EU Accessibility Award**, **The Zero Project**, and journal publication data from **Scopus**, the five countries selected based on multiple mentions in these rankings are:

- **Australia**
- **Spain**
- **Sweden**
- **United Kingdom**
- **United States**

Details of the rating systems and results of these reports are explained in the following pages. It is important to note that within each of the countries identified, the degree of accessibility is likely to vary from place to place: between regions under different local authorities, which have different levels of infrastructure and funding, and between rural and urban areas. In countries where good practice is identified, specific regions where that practice is reported will be examined, along with differences between those regions and others within that country. Features of accessible transport systems in these countries, and projects underway to improve accessible transport, will be described.

Source 1: The World Policy Analysis Centre

In 2016 the **UCLA World Policy Analysis Centre** published an analysis of the **constitutional rights of persons with disabilities worldwide** which ranks countries on the strength of legislation within their constitution to protect the disabled⁸⁹. The ranking awards each country 1-5 points (with five being best) on how their legislation rates against the questions in **Error! Reference source not found..** The scores and ranking of the top 60 countries are shown in **Error! Reference source not found..**

Box 2: Factors contributing to the constitutional rights of persons with disabilities

- *Does the constitution guarantee equality and non-discrimination to persons with disabilities?*
- *Does the constitution protect the right to education for children with disabilities?*
- *Does the constitution guarantee the right to work for adults with disabilities?*
- *Does the constitution guarantee equality and non-discrimination to persons with disabilities?*
- *Are benefits available to families with disabled children?*
- *How much financial assistance is available per month to low-income families with one severely disabled school-age child?*
- *How much financial assistance is available per month to low-income families with one severely disabled teenage child?*
- *Is inclusive education available for children with disabilities?*
- *How much paid leave is specifically made available to meet the everyday and disability-specific health needs of preschool children with disabilities?*

Table 1 Rankings by Country (higher scores mean better rankings)

Slovenia	46	Iceland	33	Netherlands, the	30
Portugal	44	Lithuania	33	Belgium	29
Hungary	43	Moldova, Republic of	33	Bolivia	29
Finland	42	South Africa	33	Kenya	29
Czech Republic	41	Switzerland	33	Egypt	28
Spain	41	Armenia	32	Mexico	28
Serbia	40	Austria	32	Nicaragua	28
New Zealand	38	Ireland	32	Paraguay	28
United Kingdom	38	Kyrgyzstan	32	Slovakia	28
Belarus	37	Russian Federation	32	Tunisia	28
Croatia	37	Angola	31	Gambia, the	27
Sweden	37	Argentina	31	Ghana	27
France	36	Israel	31	Luxembourg	27
Bulgaria	35	Latvia	31	Macedonia	26
Dominican Republic	35	Maldives	31	Montenegro	26
Poland	35	Ukraine	31	Morocco	26
Germany	34	Australia	30	Thailand	26
Norway	34	Colombia	30	Albania	25
Romania	34	Ecuador	30	Brazil	25

⁸⁹ Raub A, Latz I, Sprague A, Stein MA, Heymann SJ. [Constitutional Rights of Persons with Disabilities: An Analysis of 193 National Constitutions](#). Harv. Hum. Rts. J.. 2016;29:203.

Source 2: Research into accessibility in the Scopus database

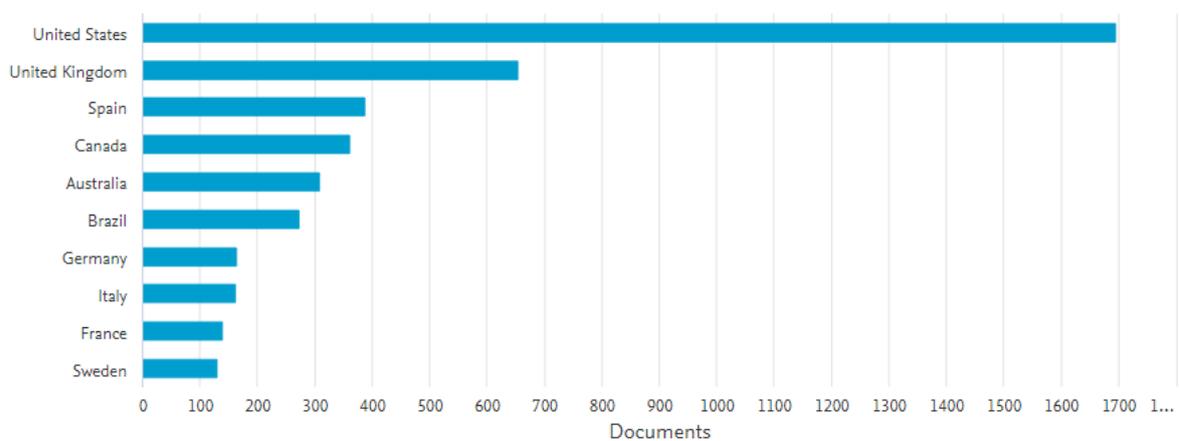
Scopus is an **abstract and citation database** produced by Elsevier⁹⁰. It covers book series, journals and trade journals, which are reviewed yearly to ensure high quality among the collected articles, from >11,000 publishers. Scopus allows analytics to be performed on queries made to the database. Papers in multiple languages are included in the database and translated into English.

Two searches of the database were made to identify countries which conducted a large amount of research into accessibility: one general search; and one including 'transport'. Both searches were limited to 2008-2018.

Search one (TITLE-ABS-KEY (**disability**, AND **accessibility**)) results:

Documents by country or territory

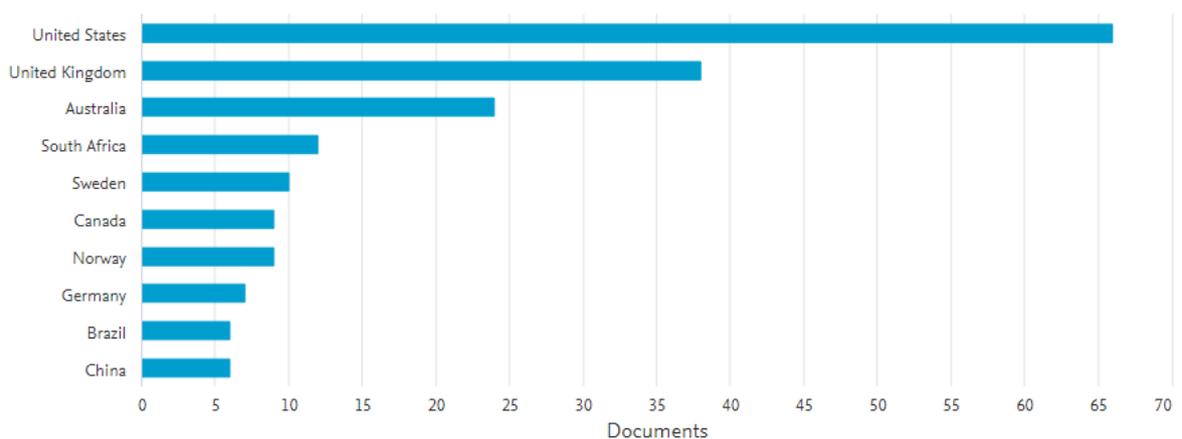
Compare the document counts for up to 15 countries/territories.



Search two (TITLE-ABS-KEY (**disability**, AND **accessibility**, AND **transport**)) results:

Documents by country or territory

Compare the document counts for up to 15 countries/territories.



⁹⁰ <https://www.elsevier.com/solutions/scopus>

* A small number of results in each search are potentially spurious results (for instance related to biological transport), however, querying results in multiple categories showed that the vast majority of publications from both searches were relevant to the topic of this report, and would give a reliable indication of countries heavily involved in this field of study.

Source 3: The EU Accessible City Award

The **EU Accessible City Award** recognises that within a single country, **different cities may have substantially different accessibility**, depending on local policy and investment. The award recognises cities displaying **willingness, ability and efforts to become more accessible**. The competition has run since 2011 and recognises a first, second and third place, plus honourable mention categories. Winners, runners up and honourable mentions have been awarded to cities in European countries are shown in **Error! Reference source not found..**

Rank	Country	1st Place	2nd Place	3rd Place	Hon
15	Spain	1	1		8
12	France	1	2	1	
12	Germany	1	1	2	1
11	Sweden	2		1	1
6	Poland	1		1	1
5	Finland		1		2
5	Italy	1			1
5	UK	1			1
4	Austria	1			
4	Luxembourg		1		1
4	Slovenia			2	
3	Netherlands		1		
2	Hungary				2
2	Latvia			1	
1	Denmark				1
1	Ireland				1
1	Portugal				1



Figure 4 Number of cities which have achieved 1st, 2nd, 3rd place or an honourable mention in the EU Access City Awards, by country

A smaller-scale ranking by the review website wheelchairworld.org rated the following cities as its top five for wheelchair accessibility:

1. Berlin, Germany
2. **Barcelona, Spain**
3. Ljubljana, Slovenia
4. **Sydney, Australia**
5. **San Diego, USA**

Source 4: Transport-specific ranking by the Zero Project

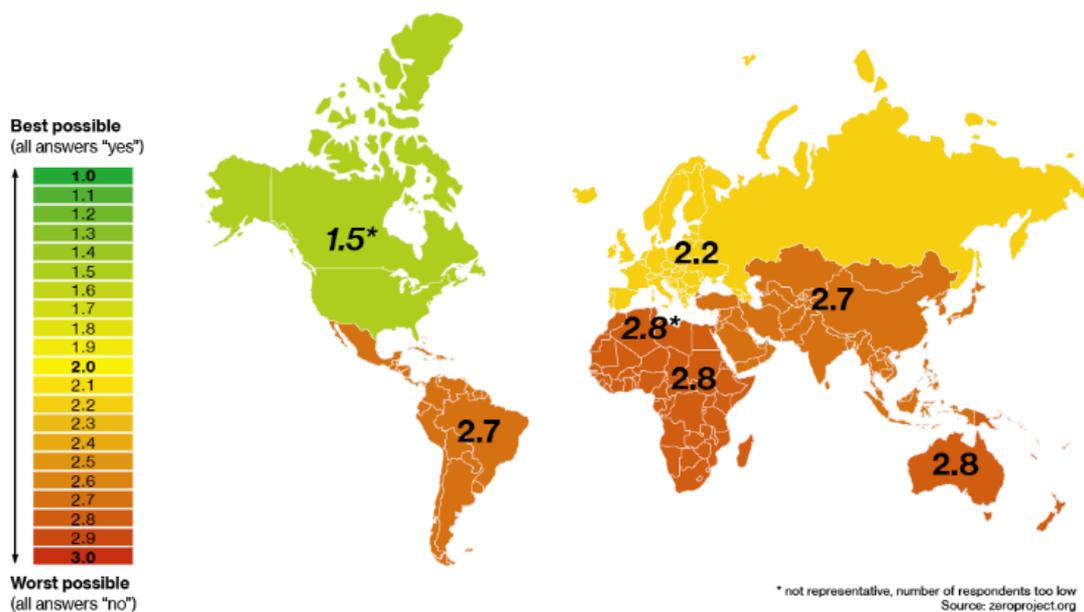
The **Zero Project** is an initiative of the Austrian Essl Foundation and organized jointly with the World Future Council and the European Foundation Centre, focusing on the rights of people with disabilities globally⁹¹. It provides a platform to share solutions to problems that persons with disabilities face.

The Zero Project Social Indicators measure the implementation of the United Nations Convention on the Rights of Persons with Disabilities (UN CRPD). A survey is conducted by the Zero Project along with partnership organisations annually. The survey includes 20 questions, and responses are ranked from 1 (best) to 3 (worst). The full results for all indicators can be found [here](#). Regrettably, they are not broken down further by country and only give an average per continent. The question most pertinent to transport accessibility is question 2.

Q2: Are all modes of urban public transport (bus, metro, tram and train) accessible to all persons with disabilities?

At a world average of 2.6, this Indicator is one of the lowest in the whole survey. Respondents from 78 countries (65 per cent) answer “no.”

Q2: Are all modes of urban public transport (bus, metro, tram, and train) accessible to all persons with disabilities?



⁹¹ <https://zeroproject.org/about-us/>

