



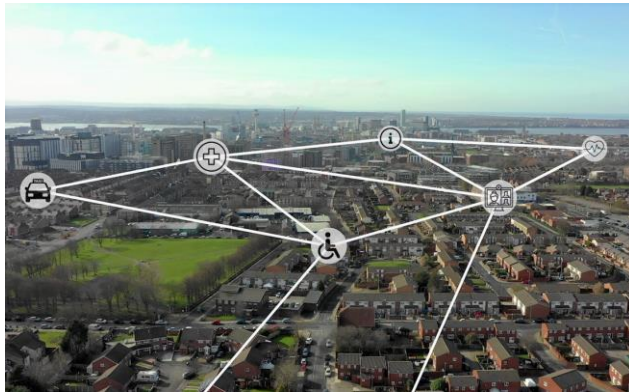
Liverpool 5G Create – Connecting Health and Social Care

November 2021



Presentation Overview

- The Liverpool 5G Project
- The impact demonstrated
- Devices used





The City of Liverpool

Population and age profile

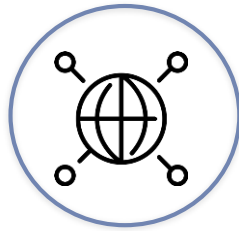
Total population	500,500
10 year population growth	7.5%
Population forecast 2030	531,000
Aged 0-15	87,500 (17.5%)
Aged 16-64	339,100 (67.8%)
Aged 65+	73,800 (14.7%)



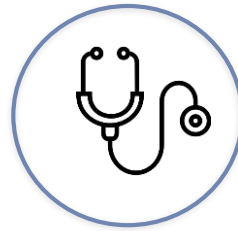
Key challenges we are addressing:



Many households do not have access to affordable, reliable connectivity



The digital divide has increased exponentially during COVID-19. The impact of Digital Poverty is widely recognised



The city region faces vast, complex health challenges, increasing health inequalities



Slow adoption of tech solutions in community and social care services



Increasing National Health Service and Local Authority spend on connectivity within services



Liverpool 5G – The journey to date

Pre 2018:

- Established eHealth Cluster, engagement with care homes, home care providers, supporting living, Local Authority commissioners
- Innovation Network established within Local Authority
- City Council accessed EU funding to enable Digitisation of home care services



Liverpool 5G Testbed (Apr 2018-Nov 2019) Funded by DCMS:

- Challenge:
“Can 5G connectivity be sufficiently cheap and effective in health and social care provision that it will be cost effective to give free access to those unable to afford either phone or broadband access?”
- Deployed private network in Kensington (8,237 properties, population 17,770)
- Largest mmWave mesh network in Europe, incorporating LoRaWAN and Wi-Fi
- 8 different Use Cases deployed across Health & Social Care
- Demonstrated improved health outcomes for service users
- Estimated potential cost savings to services of £248k per 100 users per year
- Improved collaborative working : > 60 collaborations and partnerships

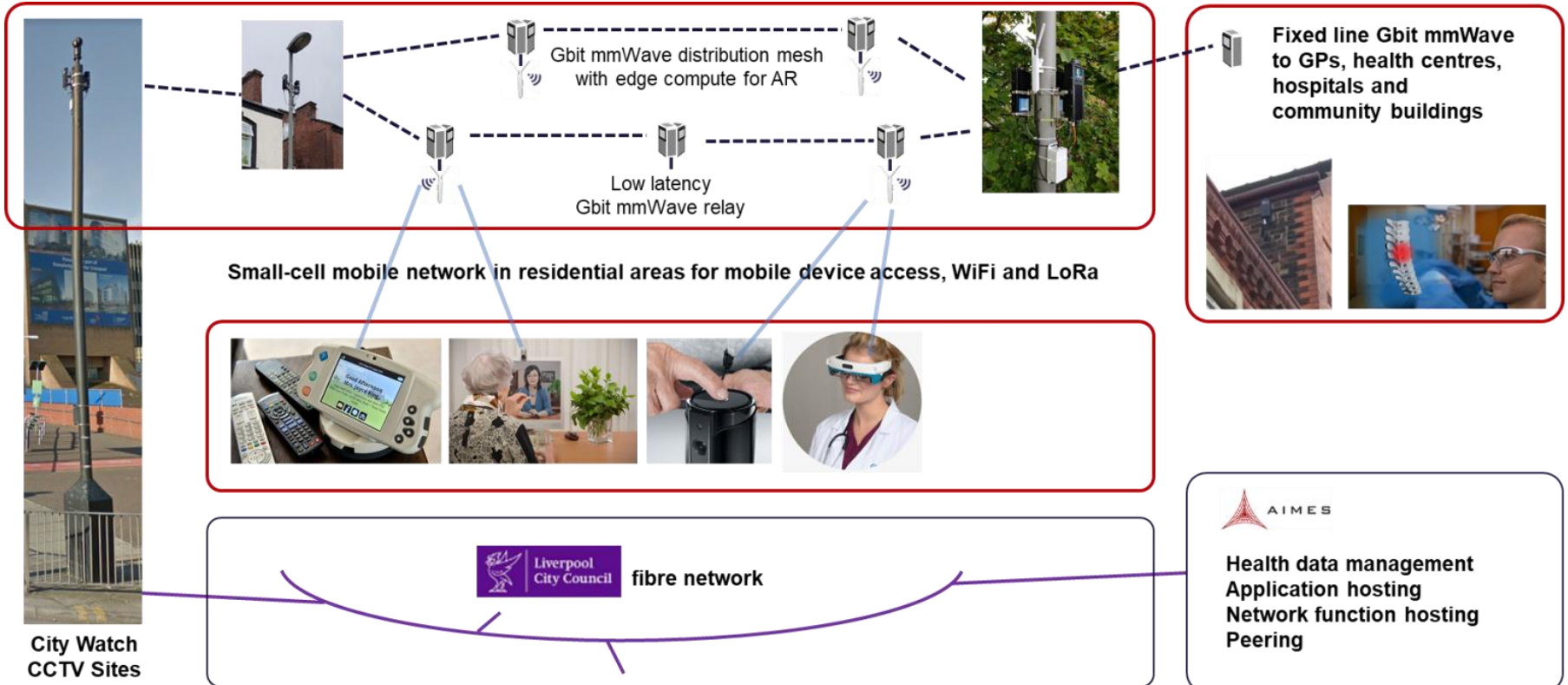


Liverpool 5G Create (Sep 2020 - March 2022) Funded by DCMS:

- Creating an independent 5G stand alone network
- Extending coverage, incorporating cellular capability, 9 new Use Cases across Health & Social Care plus home connectivity for school pupils
- Producing an independent business model and blueprint for other municipalities to implement private networks



Technical Solution



Fixed line Gbit mmWave to GPs, health centres, hospitals and community buildings

AIMS

**Health data management
Application hosting
Network function hosting
Peering**



Liverpool 5G Lessons Learnt To Date

Don't treat as a technology trial:

- The technology is the easy part
- Human factors more challenging

Avoid pilots that have no route to being embedded in services:

- Plan to incorporate in mainstream services
- Treat as a programme of change
- Consider adoption early in the programme – we developed the ARL (Adoption Readiness Level) self assessment tool to filter out products that have not considered adoption thoroughly www.ehealthcluster.org.uk
- Full range of stakeholders involved as early as possible

Be clear on the needs you are addressing:

- Understand the challenge from all stakeholder perspectives
- Use cases need to have measurable benefits and realistic methods of data collection
- Individuals more concerned about benefits rather than the enabling technology

Access to affordable, reliable connectivity in the home is key :

- Digital services need good connectivity at both ends of the connection
- Covers care homes, supported living and individuals homes
- Brings specific challenges and huge variety of settings



Improving
quality of life

Reducing
loneliness



Improving health

Reducing need for
health and social
care services



Reducing digital
exclusion



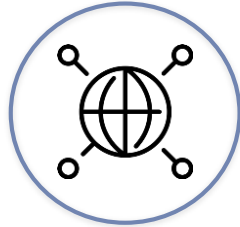
Impact from the project



Residents have access to **free connectivity** in their home for public services



Save LA's and the NHS money. Connectivity for services, e.g. GPs, care homes, supported living, housing associations



Decrease the digital divide



Services working in harmony to address health inequalities



Liverpool becomes a **world leader** in 5G technology.
Opportunities for businesses



Facilitate a Smart City, including smart housing



Medication Management

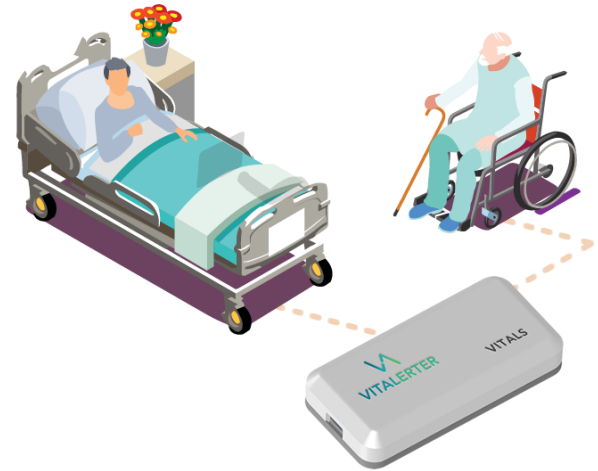
'PAMAN' a pharmacy video link enabling people to take medicine safely at home





Vitalerter

- A monitoring solution; using artificial intelligence and motion sensors; vitalerter detects bed exits, heart and respiratory rates and analyses body movements.
- A sensor is fixed under the bed (with no loss of comfort) to monitor the pattern of residents before they get out of bed, and notifies staff via mobile phones and a dashboard so that staff can provide timely assistance in order to minimise falls.
- The solution also notifies carers when those at risk of pressure sores may need assistance to change position.
- Potential Benefits Realisation: 10% reduction in falls and 10% reduction in costs of hospitalisation - Data obtained from care record review.





Docobo Telehealth Monitoring

- A Care Portal device including a built-in ECG monitor, can report on breathing rate, heart rate variation, and heart health status.
- Use on a 5G network will increase available bandwidth, which will maximise the potential of the device and enable access to high-data usage such as three-way video calls, high-quality remote video consultations, and health related video streaming amongst other services.



Potential Benefits Realisation:

- 20% increase in user satisfaction
- 10% reduction in costs



MySense

- A platform using Artificial Intelligence (AI) to monitor every-day behaviours related to nutrition, hydration & activity via sensors discretely placed around the home. A nominated responder is notified (e.g. family member, healthcare provider) when there is an unusual pattern or cause for concern, such as reduced mobility. Data is recorded through Internet of Things (IoT) with no cameras or microphones in the home.
- Identification of changes in behaviour and habit allow early intervention and supported home living; in turn driving cashable savings by reducing clinical interventions in the home and engaging early to avoid deterioration in health, resulting in hospitalisation and increased interventions.
- Potential Benefits Realisation: 20% increase in perceived levels of wellbeing and safety 25% reduction in costs due to reduced hospitalisations and requirement for carers.





Pressure Ulcer Management System

Mobile technology that uses advanced Artificial Intelligence-based (AI) imaging techniques to categorise pressure ulcers, analyse tissue types and provide standardised reporting for pressure ulcer characteristics.

Using a mobile phone, photographs and videos of pressure ulcers are taken by community nursing staff and analysed to classify pressure ulcers. The increased data rates, and throughput when using the 5G network will allow for much larger resolution images and more detailed analysis of wounds that is not currently possible with 4G. Enhanced bandwidth will facilitate the use of new and emerging camera technologies while providing near real-time clinical diagnosis.

The streaming of 4k video data will further enhance the quality and detail of wounds and this will allow analysis and detection of more complex wounds and their associated features and characteristics. High quality data will increase the sensitivity and specificity of the deep learning models and minimise the likelihood of misclassifications. Potential Benefits Realisation:

- 50% reduction in category 3 & 4 Pressure Ulcers.
- 25% reduction in treatment costs.

Thank You



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Liverpool 5G Create
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