

Ultrasound diagnostics
over 5G

Healthcare



5G Case Study

Connected Ambulance trial



West Midlands
Combined Authority



Department for
Digital, Culture,
Media & Sport



EUROPEAN UNION
European Regional Development Fund



HM Government

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Synopsis

West Midlands 5G (WM5G) has collaborated with University Hospitals Birmingham NHS Trust (UHB) and technology partner BT to showcase how 5G can transform paramedic services in a Connected Ambulance.

The trial in 2019 was the UK's first showcase of how 5G and virtual augmented reality could offer remote diagnostic solutions for the healthcare sector. Using a commercial 5G service, a remotely located clinician was able to conduct an ultrasound using a haptic glove worn by one of the medical responders on site, and could interpret the findings seen in real-time.

The trial was a clear demonstration of how 5G technology can improve the range of diagnostic procedures available to paramedics and ultimately improve patient care.

This 5G connected ambulance trial is the first of many use cases for West Midlands 5G (WM5G) and illustrates the potential of the technology to improve public services and citizen wellbeing.





Problem

As with all parts of the NHS, Ambulance funding often struggles to keep pace with the ever increasing need and workload.

The latest independent demand and capacity review modelling commissioned for ambulance trusts in England forecasts an annual funding gap of £237.5 m.¹

This has an inevitable negative impact on patient experience and clinical outcomes, as well as the mental health and wellbeing of ambulance service staff.



Solution

The Connected Ambulance trial, delivered via a commercial 5G service, utilised a range of 5G capabilities to enable an off-site ultrasound.

The greater speed, low latency (or lag), capability and bandwidths of the commercial 5G network makes real-time assessment possible.

With speeds of up to 1Gbps, 5G can manage large file transfers, such as ultrasound images, in seconds, as well as providing secure, highly reliable real-time communications between paramedics and clinicians.



Benefit

UHB undertakes 113,500 ambulance conveyances a year. 5G technology supporting a Connected Ambulance service could assist with a wealth of observations, tests and lifesaving treatments to reduce the number of patients attending hospitals unnecessarily and to improve the speed of diagnosis.

5G makes it possible to support remote delivery of complex treatments and assessments, enabling healthcare staff to provide care at the scene of an incident, in transit or on arrival at hospital. This will save time and resources while improving patient outcomes.

¹ <https://nhsproviders.org/securing-the-right-support-for-ambulance-services>

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Paramedics are an extraordinarily well trained and highly-skilled group of individuals but ultrasounds are not something they would undertake every day.

The Connected Ambulance trial extends the arm of a consultant in the hospital all the way into the ambulance, allowing our colleagues to conduct ultrasounds in real time and utilise the skills of a paramedic.

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Dr Tom Clutton-Brock, University Hospital
Birmingham

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Thanks to the collaborative effort by University Hospitals Birmingham (UHB), BT and West Midlands 5G (WM5G), 5G coverage has been brought to the Institute of Translational Medicine (ITM) building at UHB.

This innovation will enable the creation of a ground-breaking 5G remote controlled ultrasound demonstrations and enable thousands of possibilities for the future of healthcare technology.

”

Robert Franks, West Midlands 5G

Ultrasound diagnostics using 5G technology

WM5G's Health & Social Care team worked with University Hospital Birmingham (UHB) and BT to showcase a real-life example of how 5G technology can be applied to reduce the number of patients attending hospitals unnecessarily and to improve the speed of diagnosis.

Sonography is the second most common diagnostic test, with more than 9.5 million carried out each year.

Enabling paramedics to seek medical opinion for patients from hospital specialists remotely, could result in fewer patients being conveyed to hospital for diagnostic tests, with support for people closer to where they are based and safely cared for out-of-hospital.

In addition, initial on-site diagnostic tests could highlight a clinical emergency and those patients could be more swiftly and accurately conveyed to the most appropriate hospital setting for treatment.

The trial enabled clinicians to experience first-hand the capabilities of 5G technology and testing at UHB to prove the benefits and establishing the foundation for subsequent scaling across the region.

An ultrasound is just one application of 5G technology that a Connected Ambulance can provide, with other 5G applications to be trialled in the future. Together there is a collective desire to engage the industry by showcasing how the deployment of 5G can effectively remove barriers, provide benefits to health and care services and accelerate wider adoption.

Connected ambulance care will ultimately provide patients with specialist care and testing sooner, which will help improve care and improve care efficiency.



**University Hospitals
Birmingham**
NHS Foundation Trust



Takeaways

Sustain



Engagement, conversation and collaboration between WM5G, BT and UHB will continue to empower healthcare professionals to make accurate diagnostics, saving both industry and patient time and decreasing the risk of serious illness.

Learnings



Using a 5G network allows for connectivity that will empower healthcare professionals to make accurate on-site diagnostics utilising remote expert support. This means swifter diagnosis, better care planning and outcomes.

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