

Connected Colon Capsule  
Endoscopy

Healthcare



## 5G Case Study

Developing a 5G connected self administered solution  
for at home colon capsule endoscopy

# Synopsis

West Midlands 5G (WM5G) joined forces with leading healthcare organisations, NHS Arden and GEM CSU, University Hospitals Coventry and Warwickshire, and CorporateHealth International on an innovative pilot scheme to deliver a colon capsule endoscopy (CCE) at home under medical guidance.

Developed by a consortium of specialist connectivity partners – the CCE Smartbox solution – IntelliGI - was developed, a device that can be used to deliver a CCE outside of a clinical setting, such as in a patient's home. Supported by 5G, the Smartbox will both capture and transmit images of the bowel without the need for the patient to enter a hospital setting. Supported through a private 5G network, patients have access to a virtual assistant, as well as connectivity to remote care professionals to guide and provide the patients with answers throughout the procedure.

The initial local trial included 20-30 triallists and explores how 5G enables the process involved in the delivery and operation of the Smartbox and supporting equipment utilising the 5G connectivity to connect to a remote expert.

After the evaluation period, the trial will rapidly progress into its second phase with 500 real patients become the first to receive at home CCEs. The first 50 sales have been made in the US to Keck Hospital in Los Angeles and it looks like Denmark will also be adopting the solution soon.



# Colon Capsule Endoscopy in action

Following an initial virtual consultation to confirm the patient's suitability for the procedure, the Smartbox is delivered to the patient's home. This contains all the prep chemicals, camera, recording belt and a 5G-enabled device which will connect the patient remotely with the clinician, who will guide them through the prep and swallowing of the camera.

During the procedure over 500,000 images are collected and sent via 5G directly to a hospital or specialist analysis centre where clinicians can determine any next steps. In future, AI can be paired with the remote endoscopy solution to help speed up the image analysis process relieving the demand on clinicians and supporting staff.

This means even faster identification of polyps, the precursors to cancer and other gastrointestinal issues, all while enabling more patients to get tested sooner, lessening the impact and cost of treating cancer and other gastro-intestinal diseases, and improving patient outcome.

Self-administration is believed to enable the NHS to scale CCE as a viable out of clinic procedure across the whole country. It is also expected to provide a platform and case-for-change for adjacent technologies to rapidly conduct tests in the home of the patient, such as inflammatory bowel disease (IBD) assessments, infection measurements or SARS-CoV-2 tests.





## Problem

Around 2 million patients annually have stomach or digestive complaints investigated through an endoscopy. This procedure sees a camera fed into the bowel or stomach to detect signs of issues such as bowel cancer, which is responsible for nearly 20,000 deaths each year.

Even before Covid there was already a substantial backlog of endoscopies. This has grown to over 500,000 as the pandemic has further hit the capacity of clinics to support the demand.

New channels of care are needed to reduce the backlog and ensure patients are able to be seen more quickly.



## Solution

5G technology offers ultra-fast speeds, greater security, and lower latency (the speed from action to reaction) compared to its predecessors. These improvements have allowed healthcare providers to feel confident that the privacy of patient data is fully maintained while operating remotely.

5G also mitigates the very serious and potentially life-threatening risk of spotty reception or disconnection which with previous generation networks was a barrier to making digital procedures more widespread.

This improvement in connectivity makes it possible to trial an at-home colon capsule endoscopy solution.



## Benefit

Enabling patients to undertake the procedure via guided self-administration at home will increase hospital capacity and the speed of which more patients can be seen, as investigations are not dependent on hospital availability.

Thanks to 5G the procedure is further streamlined with images being sent directly to the specialist for analysis. AI could in future be deployed to increase the speed of analysis relieving demand on clinicians.

As the evidence base for remote procedures grows, a large proportion of endoscopies could be undertaken remotely each year, easing the burden on the NHS, reducing stress and uncertainty for patients and ultimately helping to save lives.

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Technology in healthcare brings safety and freedom. Patients can better manage conditions while clinicians are able to improve patient safety through more efficient provision of care, analysis of data through access to additional expert opinion.

The 5G connected endoscopy trial will contribute valuable insights to help establish other out-of-hospital procedures enabling more patients to receive high quality care without the need to attend a clinical setting. Ultimately this saves lives, reduces waiting lists and improves patient care.

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Adrian Smith, Health and Social Care Lead,  
West Midlands 5G

# Takeaways

## Sustain



The risks linked to loss of connectivity have been a longstanding barrier to the widespread adoption of connected and remote healthcare procedures. Although 5G is powerful enough to provide the stable connectivity necessary for remote procedures, continued testing of new technology and software remains necessary ahead of patient trials to guarantee the highest safety and quality of care.

## Learnings



This trial is an important step in showcasing that it is not only possible to transform how we conduct investigative procedures, but also make the process and analysis of the findings more efficient and intuitive for the clinician.

## Contacts



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## More info



[www.wm5g.org.uk](http://www.wm5g.org.uk)



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