

## Written evidence submitted by Cytel (FCR0026)

### INTRODUCTION

Cytel is helping the NHS test for oesophageal cancer and precursor conditions like Barrett's oesophagus by providing a cutting-edge capsule-on-a-string test. Our test is quicker, easier, and less demanding of time, resource, and labour than endoscopy: the current standard of care. Using AI diagnostic pathways, we analyse test results with speed and clarity.

We were spun out of the University of Cambridge by Dr Marcel Gehring and Prof. Rebecca Fitzgerald OBE, Director of the CRUK Cambridge Centre Early Detection Institute. We remain headquartered in Cambridge with a laboratory at Huntingdon. Our technology is used in more than 80 UK hospitals and in community-based clinics, where it can be easily deployed. We have already delivered over 15,000 tests.

We are grateful for the opportunity to respond to this inquiry. We would also be delighted to discuss in person how our UK-based innovative technology is helping the NHS tackle cancer. In the meanwhile, we hope the committee finds the details of Cytel's work helpful in its inquiry.

### SUMMARY

In response to the first question, we have focussed on how innovative diagnostic procedures like ours, can, in the short and medium term, tackle delays and the effects of the pandemic in the NHS. Technology such as ours has the potential to improve cancer outcomes in the long term.

In response to the second question, we show how our test is already being used effectively in frontline settings. Our technology could be rolled out on the frontline even further, improving outcomes at all levels.

Our answer to the fourth question focuses on how the comparative ease and flexibility of implementing our test can reduce strains on NHS workforce planning at all levels.

In response to the fifth question, we provide the example of our technology in use in a mobile testing hub. We propose such innovation could go a long way to tackling health inequalities.

### **What are the innovations with the greatest potential to transform cancer diagnosis and treatment in the short, medium and long term?**

Cancer diagnosis in the UK and across the world is at a decisive moment. On the one hand, the long-term impacts of the pandemic emphasise the necessity of the best possible diagnostic standards. On the other hand, fast-moving new areas of development – like AI – are helping innovators meet many of these demands.

According to research from Macmillan Cancer Support in 2021, there are 50,000 people missing a cancer diagnosis due to the pausing of diagnostic services during the Covid-19 pandemic. 40% of oesophageal cancer diagnoses were missed during the pandemic. Furthermore, 9 out of every 10 patients affected by Barrett's oesophagus – a precursor to cancer – are undiagnosed. This is especially troubling as oesophageal cancer has a survival rate of 15%: one of the lowest for any cancer.

At the same time, rapid technological advances are taking place. We believe these can go a long way to tackling pandemic-related delays in the short-term. In the medium term, these can help the NHS achieve the target of

75% early diagnosis by 2028, as set out in its long-term plan for England. Longer-term, we believe diagnostic innovations can drive up early diagnoses and reduce the mortality rate for all cancers.

Our own technology comprises a simple capsule-on-a-string test as an alternative to endoscopy in testing for oesophageal cancer and its precursor conditions. The test can be completed in 10 minutes and does not require the patient to be sedated. We would be happy to provide the committee with further information on the test or a demonstration of how it is administered.

Cyted then uses AI diagnostic pathways to process results from the test. Much commentary on recent developments in AI has been ambivalent. While this is not the place to discuss its implications elsewhere, AI innovation has, in our case, proven massively effective in cancer diagnosis. We are ready to develop this technology further and believe it has immense potential to improve cancer outcomes in the medium and long-term.

In the longer-term, our early cancer test will be able to help the whole NHS to:

- provide early detection of oesophageal cancer on a national scale through more effective surveillance for Barrett's oesophagus, helping to improve early diagnosis of cancer.
- triage endoscopy referrals across the health service. The test can help quickly inform patients whether they need further tests. It can prioritise those with suspected Barrett's oesophagus and cancer for urgent endoscopies.
- proactively find Barrett's oesophagus cases, which usual care would not otherwise find. This enables earlier cancer detection across an estimated 1.1-2.2m higher risk patients in the UK.

### **How best can innovations in diagnosing and treating cancer be transitioned into frontline clinical settings?**

Our test for oesophageal cancer and precursor conditions provides a great example of how innovation is bringing cancer diagnosis into frontline community health settings rather than just hospitals. We agree with Professor Sir Mike Richards' 2020 report on diagnostics that the roll-out of community diagnostic centres should be accelerated. Primary care professionals, like GPs and pharmacists can themselves conduct parts of the diagnostic and treatment processes that were formerly confined to specialist settings.

Endoscopy – the current standard of care for oesophageal cancer and precursor conditions – can currently be deployed only in certain clinical settings, usually in hospitals. This restriction makes it harder for patients to seek treatment. Deployed in both community health settings and hospitals, Cyted's test can be administered in 10 minutes by a single nurse. Interim results from a real-world implementation of the test showed it was able to triage endoscopy waiting lists effectively.

The test has been able to positively identify around 12.5% of patients on endoscopy waiting lists as having suspected cancer or Barrett's oesophagus. These patients are prioritised for urgent endoscopy. At least 75% of patients have been found to test negative and so could be diverted from endoscopy waiting lists, meaning that their symptoms could be safely managed outside hospital. This helps clinical teams classify their endoscopy waiting lists and make sure patients can get the care they need in time. Cyted's test is an example of how innovation can help more people come forward and be diagnosed.

### **To what extent is workforce planning keeping up with innovations in the diagnosis and treatment of cancer?**

Despite the great efforts of our GPs, we recognise the immense strain on primary care services and access issues experienced by many patients. This has a knock-on effect in cancer diagnosis and treatment. The effects of the pandemic highlighted above show the immense pressures faced by staff who handle the secondary stages of diagnosis and treatment

Even prior to the pandemic, the number of cancer cases diagnosed early had remained at around 54% since 2014 against a target 75% early diagnosis by 2028. In December, 80% of cancer patients received a consultant appointment within two weeks of an urgent GP referral, against an operational standard of 93%. Only 62% received first treatment within two months of an urgent GP referral against an operational standard of 85%.

Here innovation can ease strains on workforce planning. Unlike endoscopy, Cyted's test for oesophageal cancer and precursor conditions can be administered by a single nurse following only a day's training. After the test is taken, our AI pathways streamline the diagnostic process, further reducing the labour required to test for and diagnose oesophageal cancer and its predecessors.

As detailed above, Cyted's test is helping frontline staff more effectively triage patients, reducing NHS workforce pressures at all stages. If more widely implemented, our technology, as with other diagnostic innovations, could minimise personnel strains in the NHS and improve workforce planning. We would be happy to discuss further with the committee how our technology can help NHS workforce planning.

### **Is the impact of innovations in cancer diagnosis and treatment on health inequalities being sufficiently taken into account?**

Other contributors will be able to share with the committee the exact nature of healthcare inequalities in cancer. For our own part, we would like to provide an example of how innovation is tackling inequalities by improving access to cancer diagnosis and treatment.

As addressed above, moving diagnosis to frontline settings is key to improving outcomes. Innovations are making this easier. This move is also key to tackling healthcare inequalities and improving access to diagnosis and treatment for everyone. Individuals who find work, care commitments, personal mobility, or financial means a block to attending hospital appointments can now be diagnosed with greater flexibility, closer to home.

A great example of how innovations like Cyted's test improve the accessibility of diagnosis is the mobile testing unit for those at risk of oesophageal cancer. The unit – funded by Heartburn Cancer UK and Project DELTA, itself funded by Innovate UK – operated in Cambridgeshire in collaboration with local GPs. The unit then moved on to Essex and Suffolk.

The unit's chief value was in overcoming the geographical challenges some patients may face in accessing diagnostic services. It proved that a diagnostic procedure previously confined to hospitals, could now be carried out not only within the community but in a relatively small mobile unit. A focus on innovation like this can go a long way to tackling inequalities in the diagnosis and treatment of cancers.

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