Closing the deadly cancer gap:

Detect early
Diagnose fast
Save lives

August 2020

Actions needed to diagnose people with lung, liver, brain, stomach, pancreatic and oesophageal cancers earlier and faster as part of the Covid-19 recovery
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The Less Survivable Cancers Taskforce is made up of the following member charities
Covid-19 has brought unprecedented challenges to the health service, unlike anything we have experienced. This has had a serious and worrying effect on people with cancer with an alarming drop in cancer diagnoses and, in many places, backlogs building for vital diagnostic tests, treatments and surgery.

For people who have one of the six less survivable common cancers (lung, liver, stomach, pancreatic, oesophageal or brain), early and fast diagnosis is absolutely critical to detecting the cancer at a stage when curative treatment is possible. However, these cancers often present with vague symptoms or are asymptomatic and are therefore hard to diagnose. As a result, three quarters of people with these cancers are diagnosed at a late stage and less than 16% of people diagnosed will survive five years or more.

This was a serious problem before the pandemic. Covid-19 has now exacerbated this problem and we know that people will be diagnosed with cancer even later due to the disruption to health services. Urgent referrals for possible cancer were 25% of the normal rate at the peak of the pandemic and, even now, are only at 75% the expected rate.

However, there is hope: NHS England and NHS Improvement remain committed to diagnosing three quarters of all cancers at stages 1 and 2 by 2028 and governments in Wales, Scotland and Northern Ireland have all identified the need to focus on earlier diagnosis of cancers. We know that, with targeted and sustained action across the health service for the less survivable cancers, we can make the step change we need. Rapid Diagnostic Centres (RDCs) are being rolled out across most parts of the UK and have the potential to dramatically speed up the diagnostic process for some patients; lung cancer screening for targeted groups has proved very successful in pilots; and promising steps are being made in the research community to find easier tests for pancreatic, oesophageal, stomach and brain cancers.

Progress in these areas has never been more needed. Finding biomarkers in blood or saliva tests could ensure we reserve the use of invasive or complex diagnostic tests for those where there is a high degree of certainty that cancer is present and more diagnostic information is needed. As we reconfigure health services to minimise Covid-19 transmission risk, this would reduce hospital appointments and save time.

Translating these promising developments into tangible differences in outcomes for patients will take focus, prioritisation and investment. In addition, we know that all of these developments rely on people coming forward when they have symptoms – and for that, targeted awareness campaigns are needed.

Everyone is now talking about how we adapt to the ‘new normal’, both in the health service and wider society. This ‘new normal’ must include increased awareness of symptoms of these hard to diagnose cancers and rapid routes to diagnosis for people who present with potential symptoms. It must also encourage investment in areas that can make a huge difference, for example better surveillance of people with liver disease, lung cancer screening for at-risk groups and support for promising trials for new, simple saliva or other tests.

We urge ministers, health service leaders, researchers and healthcare professionals to work with us and our patients to make the recommendations in this report a reality.

Anna Jewell, Chair of the Less Survivable Cancers Taskforce
1. Restart cancer awareness campaigns with a focus on raising awareness of symptoms of less survivable cancers.

2. The increased focus by primary care networks (PCNs) on early diagnosis must ensure GPs are well equipped to recognise the vague and non-specific symptoms of the less survivable cancers and refer appropriately.

3. Rapid Diagnostic Centres should be rolled out across the UK, working closely with GPs, to ensure people with non-specific symptoms that could be cancer have access to fast and efficient diagnostics.

4. A clear strategy should be implemented by health services in England, Scotland, Wales and Northern Ireland for surveillance of people with liver disease for hepatocellular carcinoma liver cancer with robust mechanisms for recall.

5. Targeted screening for lung cancer should be rolled out across the UK, learning from the UK Lung Cancer Screening Trial.

6. UK governments and research institutes should support trials of new early diagnostic biomarkers and help embed into pathways when successful.

7. UK governments should work with research partners to speed up the trials of Cytosponge and roll out its usage to help diagnose Barrett’s oesophagus.
Introduction to the less survivable cancers

There has been impressive progress in outcomes and survival rates in many cancer types over the last few decades. However, for the six less survivable common cancers, survival rates have barely improved.

These six cancers are lung, liver, brain, stomach, pancreatic and oesophageal cancer. Over 90,000 people will be diagnosed with one of these cancers in the UK each year.

These six cancers account for 67,000 deaths a year – around a half of all cancer deaths. The average five-year survival rate for these six cancers is just 16%. This compares to a five-year survival rate of 69% on average for other common cancers. This is the deadly cancer gap.

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number of people diagnosed with each cancer type annually in the UK</th>
<th>Number of deaths from each cancer type annually in the UK</th>
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<tbody>
<tr>
<td>Lung cancer</td>
<td>47,800</td>
<td>35,300</td>
</tr>
<tr>
<td>Brain, head and neck tumours</td>
<td>12,100</td>
<td>5,300</td>
</tr>
<tr>
<td>Pancreatic cancer</td>
<td>10,000</td>
<td>9,200</td>
</tr>
<tr>
<td>Oesophageal cancer</td>
<td>9,200</td>
<td>7,900</td>
</tr>
<tr>
<td>Stomach cancer</td>
<td>6,600</td>
<td>4,400</td>
</tr>
<tr>
<td>Liver cancer</td>
<td>6,100</td>
<td>5,400</td>
</tr>
</tbody>
</table>

Age-standardised percentage of cancer patients alive five years after diagnosis, in England 2013-2017

![Graph showing age-standardised percentage of cancer patients alive five years after diagnosis, in England 2013-2017](image)
Why early diagnosis matters

Out of 100 women diagnosed with lung cancer, how many would still be alive 5 years after diagnosis, depending on the stage of their cancer at diagnosis?

Why is there a deadly cancer gap?

Late diagnosis of cancer usually leads to poorer outcomes. Less survivable cancers are far more likely to be diagnosed at a late stage than other more survivable cancers. In England, for the four less survivable cancers with complete stage at diagnosis data (pancreatic, stomach, oesophageal and lung) 24% are diagnosed at an early stage compared to 56% of other common cancers for which there is staging data.

Around one third of patients with a less survivable cancer will only be diagnosed after an emergency admission to hospital when symptoms include vomiting or coughing up blood\(^3\). For other common cancers, the proportion diagnosed at such a late stage is just 15%.

For the less survivable cancers, the stage at which cancers are diagnosed across nations of the UK is broadly similar, meaning each nation needs to adopt considerable changes to the rate of cancer diagnosis.

Percentage of cancers diagnosed at stage 1 or 2, England, 2017\(^4\)

The red bar represents the target in NHS England’s Long Term Plan to diagnose 75% of all cancers at an early stage by 2028.
In the early stages, the symptoms of less survivable cancers tend to be non-specific. They do not present with noticeable lumps or changes in moles. For example, the typical symptoms of pancreatic cancer are indigestion, abdominal pain and unexplained weight loss. For brain tumours, two of the most common symptoms are headaches and nausea. Liver cancer usually has no symptoms at all in the early stages, making regular surveillance of people with liver disease vital.

The fact symptoms may be non-specific often mean patients delay going to see their GP. There is therefore a need to increase public awareness of the symptoms of these cancers.

Even when a patient goes to their GP with vague and non-specific symptoms like these, there is often a lack of specific pathway to quickly confirm whether or not these patients have cancer. Due to the nature of these symptoms and the fact they could be caused by a variety of conditions, people can end up going back and forth to their GP many times before being referred for tests for cancer.

If a patient presents with ‘red flag’ symptoms which are judged to be extremely urgent, they are referred to see a specialist within two weeks to investigate their symptoms. When it comes to non-specific symptoms, not all of those which could indicate cancer are covered by guidelines for urgent referrals. People can also be sent to see a variety of different specialists before the cancer is confirmed, which can also delay the diagnosis.

All this additional time means that 67% of people with non-specific symptoms are diagnosed at a late stage in comparison to 45% for people with site-specific symptoms.

**What can we do?**

We need a whole system approach to diagnosing the less survivable cancers earlier and faster. This involves focusing on two key areas: improving NHS systems to diagnose earlier and faster, in terms of facilitating increased public awareness and developing faster pathways; and technical improvements and innovations which could allow faster diagnosis, and targeted screening programmes for people at most risk.
Part 1: Improving health systems to diagnose earlier and faster

A. Increasing awareness of symptoms

Significant energy and resource must be invested in helping people to recognise possible vague and non-specific symptoms, and to encourage them to come forward to their GP for referral. This was the case before the Covid-19 pandemic and has been made even more urgent by the crisis. Cancer has not stopped, but the number of people coming forward for diagnosis has decreased dramatically. At the time of writing, referrals for cancer diagnostic testing are at 75% of the number before the crisis.

We know that well-researched and targeted campaigns, developed in partnership with people with experience, can increase awareness, GP referrals and diagnoses for specific cancers. For example, the Public Health England evaluation of Be Clear on Cancer national and regional lung cancer campaigns between 2011 and 2014 found that:

- The number of urgent GP referrals (also known as two-week wait referrals) for suspected lung cancer doubled;
- The numbers of new lung cancers detected overall increased significantly in the periods following the regional and first national campaign;
- There was a long-term decreasing trend in the proportion of patients diagnosed as a result of an emergency presentation;
- There was evidence of a significant and positive stage shift (towards earlier stage disease) in patients diagnosed after all three of the national campaigns, and a trend towards such a shift after the regional campaign.

Symptoms of the less survivable cancers

- Pancreatic cancer symptoms include: pain in the back or stomach area; unexpected weight loss; change in bowel habit; yellowing of the skin and whites of the eyes (jaundice).
- Liver cancer is usually asymptomatic. Symptoms at a late stage of disease include: unintentional weight loss; loss of appetite; feeling very full after eating; feeling and being sick; pain or swelling in the abdomen; jaundice; itchy skin; feeling very tired and weak.
- Brain cancer symptoms can include: headaches; nausea or vomiting; vision or speech problems; fits (seizures); mental or behavioural changes, such as memory problems or changes in personality.
- Oesophageal cancer symptoms include: difficulty swallowing; persistent indigestion or heartburn; loss of appetite and weight loss; vomiting, pain or discomfort in the stomach, chest or back; a persistent cough; hoarseness; tiredness; shortness of breath.
- Stomach cancer symptoms include: indigestion; trapped wind; heartburn; feeling full very quickly when eating; feeling bloated after eating; nausea; stomach pain; difficulty swallowing (dysphagia).
- Lung cancer symptoms include: a cough that does not go away or gets worse; coughing up blood; chest pain that is often worse with deep breathing, coughing, or laughing; hoarseness; weight loss and loss of appetite; shortness of breath; feeling tired or weak.
The Brain Tumour Charity’s HeadSmart programme is a good example of how awareness-raising activity for both healthcare professionals and the public can have a considerable impact in decreasing diagnosis times.

Brain tumours are staged differently compared to other cancers. There are also a greater range of brain tumours than other cancers. This means that the benefits of early diagnosis and treatment are much less proven than other cancers and likely varies depending on the tumour type. In the longer term, a bigger time delay between symptoms starting and diagnosis is associated with increased risk of life-threatening complications and increased disability.\(^8\)

Like other less survivable cancers, brain tumour symptoms are non-specific. In the UK, children and young adults experience a longer than average time between the onset of symptoms and diagnosis than in other countries. For example, in 2007 the USA diagnosed patients three times faster than the UK.\(^8\)\(^9\)

HeadSmart was a campaign led by The Brain Tumour Charity to change this. Before the launch of HeadSmart, the average diagnosis times for children with brain tumours in the UK was 13 weeks, a period which had not decreased in the past 20 years.

However, after the publication of the guidelines for healthcare professionals in 2011, this period reduced to 9.1 weeks. Following the public launch, it was reduced further, to 7.5 weeks in 2012, 6.9 weeks in 2013, and most recently (2017) 6.5 weeks.\(^10\)

**Recommendation 1:** Restart cancer awareness campaigns with a focus on raising awareness of symptoms of less survivable cancers.
B. Supporting GPs and primary care networks to diagnose early

GPs play a pivotal role in diagnosing cancer earlier. This has been specifically recognised in the update to the GP contract deal 2020/21-2023/24 with ‘supporting early cancer diagnosis’ being listed as a new enhanced service.

As part of this, primary care networks (PCNs) must review referral practice for suspected cancers, including clinical decision support tools; practice-level data to explore local patterns in presentation and diagnosis of cancer; and, where available, the Rapid Diagnostic Centre pathway for people with serious but non-specific symptoms.

Decision aid tools that are embedded in the GP software can help to flag symptoms for referral. It is vital that the increase in telephone consultations and telemedicine necessitated by Covid-19 does not result in a reduction in people with potentially cancerous symptoms being referred for testing.

Steve’s story

Steve is from Kent. Shortly after being diagnosed with liver cancer he had a liver transplant in 2017.

“My story is probably like a number of others, I never really had any obvious symptoms but I was actually very ill. Over the years, I had a number of blood tests and a scan of my abdomen which highlighted nothing of concern at the time. My stomach had grown but I’d put that down to ageing and over-eating. In April 2017 I had a bad case of diarrhoea and vomiting. I was taken to A&E but I was discharged without a diagnosis.

A few months later I was on holiday when I passed out at the airport. I went to hospital but they couldn’t pinpoint the cause.

Back in the UK, investigations led to the diagnosis that I had liver cirrhosis and also liver cancer with a number of tumours. Unfortunately, the disease had progressed so far that my only option was a liver transplant. After that, everything happened very quickly and I had a transplant. Afterwards, a biopsy of my liver showed that the extent of the cancer was greater than they’d thought. If I had been delayed in getting the new liver, or had been diagnosed any later, I would have died.

My biggest regret is my GP not taking it seriously when I first saw him 8/9 years ago. I’m not saying the damage might not have already been done, but a change of lifestyle could have made a big difference and I at least would not have had to go through the near fatal experience I had.”
Tony’s story

Gill’s husband Tony was a fit and healthy 64-year-old and had not been to see a doctor for at least seven years. In March 2018 he began to get terrible indigestion that would not shift. He believed that ‘no-one bothers a doctor’ with indigestion and he persevered until May when finally, at Gill’s insistence, he decided he needed to see a doctor. He was prescribed medication but this didn’t work and Tony took to doing research himself, requesting a test for helicobacter pylori from the GP, wondering if this could be the source of his problem and whether it could be a stomach ulcer.

Still the indigestion, pain and feeling of always being full and not being able to eat and drink persisted. Tony’s test for h. pylori had come back positive – but unfortunately this fact was never communicated to Tony until later. He eventually began to take antibiotics. Though he felt better he knew he still wasn’t right so went back to the GP’s surgery where he saw another, different doctor. This doctor was concerned about Tony’s pallor and after an examination she said he had an enlarged prostate and sent him for tests. “But what about my stomach?” asked Tony. “This can be much more important”, said the doctor. Tests for his prostate came back negative so Tony returned to his stomach symptoms. The GP said “Well, let’s have a look at your gastroscopy results, shall we?” Tony hadn’t yet had a gastroscopy.

On October 15th 2018 Tony, who was at worst expecting he had a stomach ulcer, was told he had cancer “through all four walls of the stomach” and that there was no surgery on offer. He died, at home with Gill, on December 15th 2019.

“Tony’s legacy has to be the question he asked after going through all this; why do they not begin to look at the worst potential outcome and work backwards?” says Gill. “They were looking for other cancers – prostate – but why did the GPs not even consider stomach cancer?”

Recommendation 2: The increased focus by PCNs on early diagnosis must ensure GPs are well equipped to recognise the vague and non-specific symptoms of the less survivable cancers and refer appropriately.
C. Rolling out Rapid Diagnostic Centres across the UK

Rapid Diagnostic Centres (RDCs) are designed to speed up cancer diagnosis by taking referrals from GPs for people with non-specific but potentially concerning symptoms, such as unexplained abdominal pain or weight loss, and coordinating symptom assessment, testing and timely diagnosis and referral.

NHS England and NHS Improvement’s Long Term Plan commits to the roll-out of two RDCs in each Cancer Alliance area – one for patients with non-specific symptoms and one for a cohort of patients with site-specific symptoms who are currently underserved by an existing two-week wait pathway or 62 day pathway. The NHS in Wales is also running a pilot RDC.

RDCs minimise the number of locations and appointments a patient must attend and should have fast access to diagnostic testing such as upper and lower GI endoscopy, phlebotomy and associated blood testing, and imaging (CT, MRI, and ultrasound). They should link with existing provider patient record systems. All diagnoses should be confirmed or reviewed through an RDC multi-disciplinary team (MDT) or other relevant multi-disciplinary meeting and appropriate referrals made.

RDCs have the potential to be a game-changer for diagnosing people with many less survivable cancers faster and potentially earlier. However, they are not suitable for diagnosing liver cancer as the vast majority are asymptomatic – effective surveillance of patients with cirrhosis is therefore essential (see subsection D of this chapter).

RDCs will also have an important role in the Covid-19 recovery planning. NHS England and Cancer Alliances are developing ‘Covid-free’ diagnostic hubs, with the acceleration of the adoption of Rapid Diagnostic Centre principles as a solution to get through the diagnostic backlog and accrued demand due to the Covid-19 pandemic\textsuperscript{11}. They are also considering ways to use straight to imaging, one-stop-shop clinic models and same day tests to minimise patient visits to hospitals. RDCs can also act to reduce hospital visits and bring diagnostic technologies together in a Covid-negative environment.
Pilots of Rapid Diagnostic Centres

Cancer Research UK and Macmillan Cancer Support supported a pilot of Multidisciplinary Diagnostic Centres (MDCs) from 2015, which RDCs are based on\textsuperscript{12}.

Forty-four per cent of all cancers diagnosed through the MDCs were less survivable cancers, showing that the MDC model is geared towards detecting hard to detect cancer, such as the less survivable cancers. Twenty-two per cent of cancers diagnosed at these MDCs were upper gastrointestinal which include pancreatic, stomach and oesophageal cancer whilst a further 22% were cancers of the lung.

The MDC pilot found that 79% of cancers diagnosed had staging data and of those 26% were diagnosed at an early stage (I/II). When looking only at upper GI and lung cancers diagnosed, 29.8% were diagnosed at an early stage (25.5% for upper GI and 34.0% for lung cancer), suggesting that the MDC model may start to have a positive stage shift for these cancers.

Results from the MDC pilot indicate that a long wait to diagnosis is not inevitable if patients have non-specific symptoms. Patients diagnosed with cancer through the centres had a median wait of 19 days to diagnosis. This is roughly comparable to the two week wait target for urgent referrals from GPs to hospital specialists for potential cancer. Additionally, MDCs had a similar cancer ‘conversation rate’ – the proportion of people referred to them diagnosed with cancer – compared to people referred through the existing urgent referral system.

A study of an RDC in Wales found that it reduced the mean time to diagnosis from 84.2 days in usual care to 5.9 days if a diagnosis is made at clinic, or 40.8 days if further investigations are booked during a patient attending an RDC\textsuperscript{13}. Crucially, if the RDC saw enough patients it was cost effective compared to standard practice.

Recommendation 3: Rapid Diagnostic Centres should be rolled out across the UK, working closely with GPs, to ensure people with non-specific symptoms that could be cancer have access to fast and efficient diagnostics.
D. Improved surveillance programmes for people with liver disease

More than 80% of people with liver cancer have pre-existing liver disease. People who are diagnosed with cirrhosis should receive ultrasound scans and blood tests every six months to monitor for primary liver cancer (HCC). This is called surveillance. Having these tests regularly can pick up hepatocellular cancers earlier, when they are smaller and surgery may be possible.

Currently, surveillance for HCC is centre-based rather than there being a national strategy. This has resulted in wide variation of practice across the UK. Practice is more or less consistent in liver units, but many patients who are treated outside of liver units in district general hospitals are missed. As a result, only 20-25% of patients with HCC are diagnosed at BCLC Stage 0 or BCLC Stage A; when curative or radical treatments can be provided.

A robust system is needed so that all those defined to require surveillance undergo a six-monthly ultrasound scan. This must be coupled with robust mechanisms for recall and further investigation if an abnormality is found through this scan.

An issue of increasing importance is that HCC occurs in patients with non-alcohol related liver disease who do not have cirrhosis. The numbers who would require surveillance are potentially extremely large. This underlines the absolute importance in the development of biomarkers for the early detection of HCC. This is an important goal if we are to attain the 75% rate of early stage diagnosis for liver cancer.

During the early stage of the Covid-19 outbreak, surveillance had been postponed until it was deemed safer for patients to attend hospital. Most hospital teams planned to restart surveillance from June 2020 and will be planning to ‘catch up’ with the missed scans over the coming months.

Recommendation 4: A clear strategy should be implemented by health services in England, Scotland, Wales and Northern Ireland for surveillance of people with liver disease for hepatocellular carcinoma liver cancer with robust mechanisms for recall.
Part 2: Innovating for a step change in early diagnosis

A. Targeted screening for people at higher risk

Screening high-risk population groups could help diagnose people with some cancers earlier. The lung cancer screening trial has been very successful and we urge a roll out across the UK.

There are interesting learnings from Japan on targeted screening for stomach cancer. Incidence of this cancer is rising in the UK and the five-year survival is 17% (see below), yet 60% of people with this cancer in Japan survive for five years or more, largely due to the screening programme.

Case study: Lung Health Checks

Lung cancer is the UK’s biggest cancer killer, killing more than breast, bowel, bladder and uterine cancer combined. A third of patients are only diagnosed after an emergency admission. Increasing the rate of early diagnosis is key to saving people’s lives.

A number of screening programmes have looked at using low-dose CT scans to detect cancers. Whilst thousands of people get lung cancer without having ever smoked, these programmes have been aimed at people who have previously smoked and are therefore most at risk of developing lung cancer.

The UK Lung Cancer Screening Trial found that 85.7% of lung cancers detected through the screening programme were detected in stage 1 and 2. In 2014, only 22% of lung cancers in England were diagnosed at stage 1 and 2. The five year survival rate for patients diagnosed with cancers at these stages is 57% and 34%. This compares to 12.6% and 2.9% for cancer diagnosed at stages 3 and 4.

Results of one local pilot of CT screening in Liverpool found that “The stage distribution of lung cancer indicated a reduction in mortality with 26% five-year survival in the cancers diagnosed in the programme, compared to the 10% which would be expected without the programme, more than a doubling of the five-year survival rate in cancers.” It has been estimated that screening could prevent 3,000-5,000 deaths from lung cancer in the United Kingdom every year.

Data from similar trials in the Netherlands and Belgium found that lung cancer deaths were 24% lower in men who underwent CT screening compared to those who did not in the 10 years follow-up.

Improvements in early diagnosis and mortality due to lung cancer screening has now been replicated in many different countries. Due to the strength of this evidence base, lung cancer scans figured prominently in the NHS Long Term Plan and in February 2019 the UK Government announced lung health checks would be piloted in ten Clinical Commissioning Group areas in England with a high prevalence of lung cancer, using mobile testing trucks. After four years, the results of these projects will be used to evaluate further roll-out of lung screening programmes.

There are indications lung health checks are also a ‘teachable moment’ with those targeted likely to stop smoking and improve their diet, even from the point of receiving an invitation to a lung health check.
Case study: Targeted screening for stomach cancer in Japan

Prevalence of stomach cancer is much higher in Japan which has a stomach cancer screening programme delivered through an interview and a double contrast radiography. People who are screened for the cancer have a 25% higher five-year survival rate than patients who are not screened\textsuperscript{17}.

Japan has also developed a better understanding of the very early stage gastric cancer, known as intramucosal gastric cancer\textsuperscript{18}, and how to treat this condition through endoscopic surgery. If detected and treated, the five year survival rate for this type of cancer is 90\%\textsuperscript{19}. This understanding of intramucosal gastric cancer alongside screening has contributed to Japan having a five-year survival rate for stomach cancer of nearly 60\%, over three times that of the UK’s\textsuperscript{20}.

Whilst widespread screening in the UK for stomach cancer might not be judged cost-effective at the moment, the experience of Japan shows that if prevalence of stomach cancer rises, and the costs of screening reduce, a screening programme alongside early treatment could have a dramatic impact.

Recommendation 5: Targeted screening for lung cancer should be rolled out across the UK, learning from the UK Lung Cancer Screening Trial.
B. Improved biomarkers: Breath, saliva and blood tests

The development of new tests for cancer biomarkers could be truly transformational in helping to diagnose people with less survivable cancers earlier and faster.

Biomarkers are small molecules in body fluid such as the blood, urine or saliva which indicate the presence of a cancer in the body. Testing for these biomarkers could therefore be a useful way of detecting cancers at an early stage through screening but they could also be used to help doctors make a diagnosis once a patient has presented with symptoms or to triage patients so those most likely to have cancer are prioritised for further tests.

These tests are still being researched and none are currently in use for diagnosing less survivable cancers outside clinical trials. However, testing and monitoring different biomarkers is done to determine the best treatment and disease prognosis. Whilst we are at an early stage, there are promising signs that such tests could be successful.

Pancreatic Cancer UK Early Diagnosis Research Alliance

A current study at UCL with Dr Steve Pereira aims to develop a prospective biobank of patients with vague symptoms and an early diagnostic tool that can differentiate early pancreatic cancer. Through combining an early symptom electronic clinical decision support tool (e-CDST) with blood and urine biomarkers of early disease, the study aims to allow surveillance of high risk populations and triage of patients with non-specific symptoms which could indicate pancreatic cancer.

Research into blood test biomarker for brain cancer

A research team led by Dr Matthew Baker at the University of Strathclyde have developed a novel blood test that could aid early brain tumour detection. The test uses attenuated total reflectance (ATR)-Fourier transform infrared (FTIR) spectroscopy to characterise the biochemical profile of a blood sample, alongside machine learning algorithms, which learn the differences in ATR-FTIR signatures that are indicative or exclusive to cancer.

In a prospective clinical validation study of 104 patients who were either referred from their GP for brain imaging to exclude a brain tumour or had received a recent diagnosis of a brain tumour, the team reported that it identified 83% of patients with a brain tumour and returned a false positive result (saying someone had a tumour when they didn’t) 13% of the time.

The test is not intended to be used as an absolute diagnostic, but as a tool to help GPs refer people to the right service. Preliminary data suggest this tool can effectively identify those patients who urgently need a brain scan, offering the opportunity to identify and treat brain cancer early. In addition, the low number of false positives the test returns suggests that introducing such a test into primary care would deliver significant cost savings to the health service.

Recommendation 6: UK governments and research institutes should support trials of new early diagnostic biomarkers and help embed these into pathways when successful.
C. Roll out of Cytosponge to diagnose Barrett’s oesophagus

Barrett’s oesophagus is a condition which increases the likelihood that someone may develop oesophageal cancer. Once Barrett’s oesophagus is diagnosed, a patient can be monitored to detect cancer, or even pre-cancerous cells, and deliver early treatment.

Barrett’s oesophagus is currently diagnosed by endoscopy. Not only is this uncomfortable for patients but it is a resource-intensive process. Currently there are significant waiting lists due to Covid-19 as endoscopy is an aerosol-generating process requiring additional precautions for infection control. This, along with a lack of awareness, means that many people with Barrett’s oesophagus are undiagnosed.

The Cytosponge has been described as a sponge on a string or a ‘chimney sweep’ by Prime Minister Boris Johnson. Delivered in a pill, the sponge expands when swallowed and is then pulled out from the oesophagus. This means it collects cells from along the entire passage through the oesophagus which can then be sent to a lab to be tested. This will determine whether someone has the protein TFF3, a unique identifier factor for Barrett’s oesophagus. Analysis can also detect biomarkers and evidence of adenocarcinoma, squamous cell carcinoma, H Pylori infection and some other conditions.

In a series of trials this test has been shown to be acceptable and feasible in primary and secondary care with very good accuracy. In a recent randomised controlled trial compared to usual care in GP surgeries it was shown to detect ten times more cases of Barrett’s as well as some early, curable cancer.

Testing through the use of a Cytosponge is much less resource-intensive than an endoscopy so can act as a triage test to prioritise patients for further investigation. It has also been found to be an acceptable procedure for patients compared to endoscopy.

Work is ongoing to identify the molecular changes that determine which cases are most likely to progress to cancer. This will be essential to minimise over-investigation of those at low risk and target early intervention to those at highest risk. Endoscopic treatment is highly effective when the disease is detected early and can avoid systemic chemotherapy and oesophagectomy, which have high morbidity and still poor outcomes when the disease is advanced.

Treating Barrett’s oesophagus can reduce the risk of cancer developing but 500,000 people in the UK are thought to have the condition and remain undiagnosed.

Research into the implementation and impact of the Cytosponge is now ongoing with a new study called Project DELTA, funded by UK Research & Innovation, developing systems for its use in clinical practice. Due to Covid-19 limiting the number of endoscopies the NHS can perform, one hospital has already fast-tracked the Cytosponge into use to help identify priority patients with suspected cancer who need further tests urgently.

Recommendation 7: UK governments should work with research partners to speed up the trials of Cytosponge and roll out its usage to help diagnose Barrett’s oesophagus.
Notes


2 Office for National Statistics, August 2019, Cancer Survival in England: adults diagnosed between 2013 and 2017 and followed up to 2018


4 Mesothelioma, an aggressive form of cancer which can start in the lungs and Non-Hodgkins Lymphoma a form of cancer which is often diagnosed at a late stage but has a five-year survival rate of 65% have both been excluded. Compiled from Public Health England, February 2019, National Cancer Registration and Analysis Service, TNM stage group by CCG by tumour type for 10+3 tumour types, 2012-2017, version 3. http://ncin.org.uk/publications/survival_by_stage. Accessed: 28/07/2020

5 Compiled from: National Cancer Registration and Analysis Service, Routes to Diagnosis, 2017 data. Some cancers which have data recorded by type (for example leukemia and sarcoma) have been excluded. http://www.ncin.org.uk/publications/routes_to_diagnosis. Accessed: 07/08/2020


9 Wilne SC et al. 2007. Presentation of childhood CNS tumours: a systematic review and meta-analysis. Lancet Oncology;8:685-95


14 Field JK, Duffy SW, Baldwin DR, et al. 2016. UK Lung Cancer RCT Pilot Screening Trial: baseline findings from the screening arm provide evidence for the potential implementation of lung cancer screening. Thorax;71:161-170


