

MOONDANCE
CANCER INITIATIVE

Global Scan



Cancer care innovation programmes
from around the world

James Baker

December 2022

Moondance Cancer Initiative find, fund, and fuel brilliant people and brave ideas, to transform and improve cancer outcomes in Wales. We actively support people and projects with potential to transform outcomes across the country, and we undertake research and insight to inform our work.

Published by:

Moondance Cancer Initiative
12 Cathedral Road
Cardiff, CF11 9LJ
Wales, UK

Tel: +44 (0) 2921 113990

Email: info@moondance-cancer.wales

www.moondance-cancer.wales



Introduction

This is an exciting time for cancer innovation across the world.

Here at Moondance Cancer Initiative, we aim to accelerate significant and sustained improvement in cancer survival outcomes over the next 10–15 years and we're regularly scanning for promising ideas that could benefit people affected by cancer in Wales. Through 2022, we have authored a series of blogs, shining a spotlight on exciting developments across the world with potential for Wales.

We're interested in supporting the rapid adoption of innovations that could mean more people in Wales survive cancer. If you are motivated by any of the initiatives covered here, and want to discuss how they could make a difference in Wales, [get in touch](#).

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Initiatives to increase bowel cancer screening adherence in Australia

Australia, where patients have the [one of lowest chances of dying from their cancer in the world](#), has received international acclaim for its [cancer infrastructure and preparedness](#).

However, Australia has a problem: bowel cancer rates are high, and uptake of screening – essential for picking up cancers at the earliest stages when cure is most likely – have recently been at [just over 40%](#) (compared to Wales at around 60%).

In part this may be because a full national bowel screening programme [only fully rolled out in 2020](#) (compared to 2008 in Wales). In response to the problem of low uptake, Australia has embarked in recent years on a multi-pronged programme of research and transformation to address the problem.

'No Australians dying from bowel cancer' initiative

'No Australians dying from bowel cancer' is an initiative hosted within Health Translation South Australia, an accredited centre for translating research into healthcare practice, with workstreams from [community prehabilitation](#) to [digital transformation](#).

The initiative started with research, firstly using modelling to demonstrate the immense number of lives and money which could be saved by an [effective screening programme](#). This research (published before the national screening programme was implemented) was used for advocacy, and generated election commitments for [investment in colonoscopy capacity](#).

The second phase aims to combine digital transformation (a computer assisted FIT+ referral system) and collaboration with lead endoscopists, to [bring down waiting times for FIT+ colonoscopies](#).

Translational research in Victoria

Elsewhere, a multi-pronged research-informed improvement effort is in progress in Victoria, centred around collaborations between Melbourne University, and Cancer Council Victoria, with the principal aim of improving bowel screening.

GPs in Australia have historically been sceptical about FIT testing compared to colonoscopy. So in the first phase of the project, patient and clinician stakeholders were engaged to develop a [risk-communication tool](#), showing why FIT represents the more appropriate risk/benefit profile for the moderately-at risk public.

Taking [GP stakeholders into account](#), another research stream has been opened, to develop a GP consultation-based risk assessment and stratification tool for bowel screening. [The tool](#) supports primary care providers to identify which patients are at higher risk, for whom colonoscopy may be the best screening option. A [decision-support tool](#) is also being developed to help GPs recognise and appropriately refer symptoms of early bowel cancer.

The initiative extends into public engagement, for instance with a trial currently underway in 20 GP surgeries [testing whether SMS-based encouragement and narrative](#) from a GP can increase adherence to bowel screening.

Mass media campaigns have also been implemented and evaluated, showing [impressive results in increasing kit return rate](#). This has been accompanied by more [targeted awareness campaigns in harder to reach groups](#), such as individually tailored sessions for migrant communities, and co-designed awareness campaigns with indigenous communities.

Reflections

Whilst the individual schemes here may not be hugely innovative, two features of the overall programme seem striking.

First is the programme's measurable, specific, and ambitious targets. For example, one of the programme leads in Victoria [states their aim](#) to embark on a: *"five-year programme to increase bowel cancer screening participation by at least 20 per cent to save 25,000 lives and \$A400 million in health care costs for cancer treatment."*

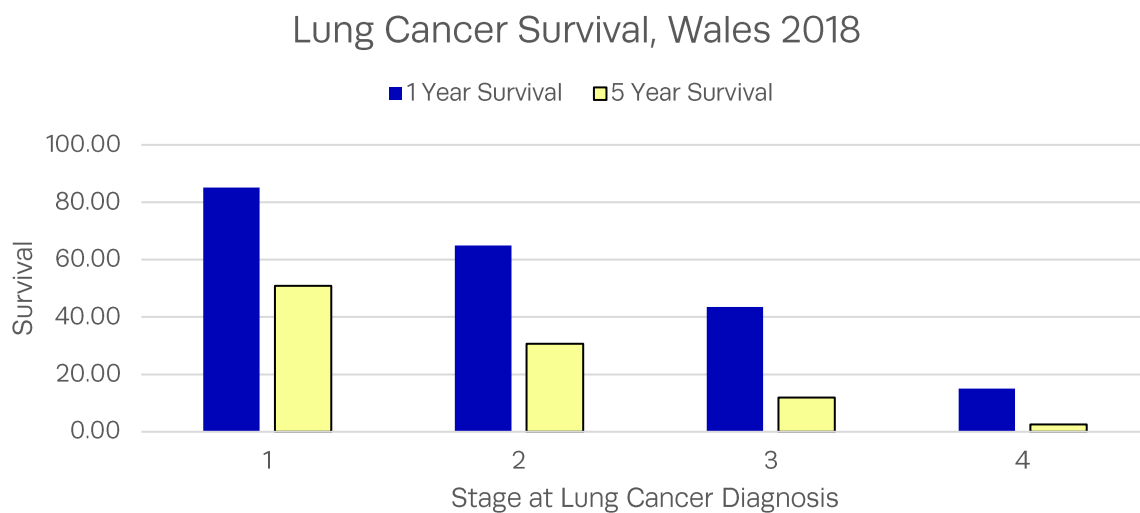
Second, the programmes are notable for their coordinated and multifaceted approach to translational research. This research is conducted by bodies with strong links to healthcare, and with clear paths and commitments to expansion of interventions that are working.

Time will tell if Australia's bowel cancer screening rates improve. But their approach is noteworthy, and we'll be keeping an eye out for further lessons and insight for Wales.

Rapid access lung clinics – a worldwide innovation

Lung cancer is the most common, and by far the biggest, cancer killer in [Wales](#). Symptoms are often difficult to recognize (and this has been exacerbated by [confusion with COVID-19 symptoms](#)), leading to most patients being diagnosed at a later stage: in Wales, [67.3% of lung cancer cases are diagnosed at stages 3/4](#).

Diagnosis at a later stage is associated with [significantly worse outcomes](#).



Delays to lung cancer diagnosis can have serious consequences; modelling of delays to diagnosis in England suggest that a [3 month delay in diagnosis](#) of lung cancer can reduce 10-year survival by 6.7–18.3%, depending on the patient's age.

The innovation

In response, numerous countries worldwide have implemented innovative rapid access lung clinics (RALCs). Generally built around referral of symptomatic suspected lung cancer from primary care, these pathways differ slightly in design, but are universal in their success in diagnosing lung cancer faster than standard care.

The following schemes have been profiled in academic literature and present good examples of what is possible:

| Location/Study | Design | Outcomes |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Toronto: Time to Treat (2004–2006) | Referrals sent to patient navigator, who, based on a risk-stratified algorithm, booked appointments in protected time to treat CT clinics in a hospital. | Median time between lung cancer suspicion and diagnosis decreased from 128 to 20 days. |
| Australia: Rapid-access respiratory clinic (2018) | Physician-led one-day diagnostic clinic, aiming to deliver all diagnostic information to an MDT within 14 days of suspicion. | 77% of patients started treatment within 7 weeks of first CT scan, compared to 33% in standard care. |
| Ireland: Rapid-access lung cancer clinic (2012–2018) | Fast-track CT scan before physician-led RALC clinic, using protected time, within 10 days of suspicion. | Median time to diagnosis decreased from 34.5 to 21 days. |
| New Zealand: Respiratory fast track clinic (2015–2016) | Three protected-time clinics per week for CT and bronchoscopy, selected via MDT appraisal of clinic lists. | Time from first clinic appointment decrease from 15 to 0 days, and first appointment to first definitive treatment from 37 to 24 days. |
| Ontario: Standardized triage process (2018) | New small-nodule clinic, with routine nurse/physician-led triage, and preordered staging tests. | Time to diagnosis decreased from 39.9 to 28.1 days. |
| England: RAPID programme (2016–2019) | Next-day CT scanning with same-day reporting in a protected clinic, leading to fast-track diagnostics, facilitated by a nurse navigator, and workforce/infrastructure optimization. | Increased proportion of patients having their first CT scan within 3 days (0–56%), 7 days (27–91%) and 14 days (74–99%) of referral. |

Evidence is also emerging that these clinics, as well as delivering benefits for lung cancer patients, do not detrimentally affect broader health services. During the RAPID programme, time to referral for patients outside of the pilot [did not](#)

[increase](#) after the programme was initiated. In fact, countries such as [Norway](#) and [Denmark](#) which have implemented a rapid diagnostic philosophy across various cancer sites have successfully reduced diagnostic waiting times at a national scale.

Interestingly, despite some of these schemes dating back to 2005, all of these clinics utilize entirely elective, planned care, protected from acute care needs, with a rapid-access philosophy. These characteristics underpin the [rapid diagnostic centres](#) and [community diagnostic hubs](#) being proposed today including in [Wales](#).

Reflections

With this growing body of international evidence, RALCs are emerging as an impactful, practical application of a rapid diagnosis philosophy – with significant potential to reduce the burden of the largest cause of cancer deaths.

Following a [pilot over 2017–18](#), we're aware that some RALC clinics have been established in [Hywel Dda health board](#). It's unclear to what extent this innovation has been adopted elsewhere in Wales.

A small-scale implementation pilot for [lung health checks](#) is planned for 2022–23 in Wales and is gaining momentum, alongside some further local initiatives such as a [nurse led lung cancer diagnosis pathway](#) in west Wales.

Te Aho O Te Kahu – making inequities structurally impossible to ignore

Inequalities have an enormous impact on who suffers most from cancer. Environmental and lifestyle factors, and access to fast, high-quality diagnosis and treatment, are all key to good outcomes.

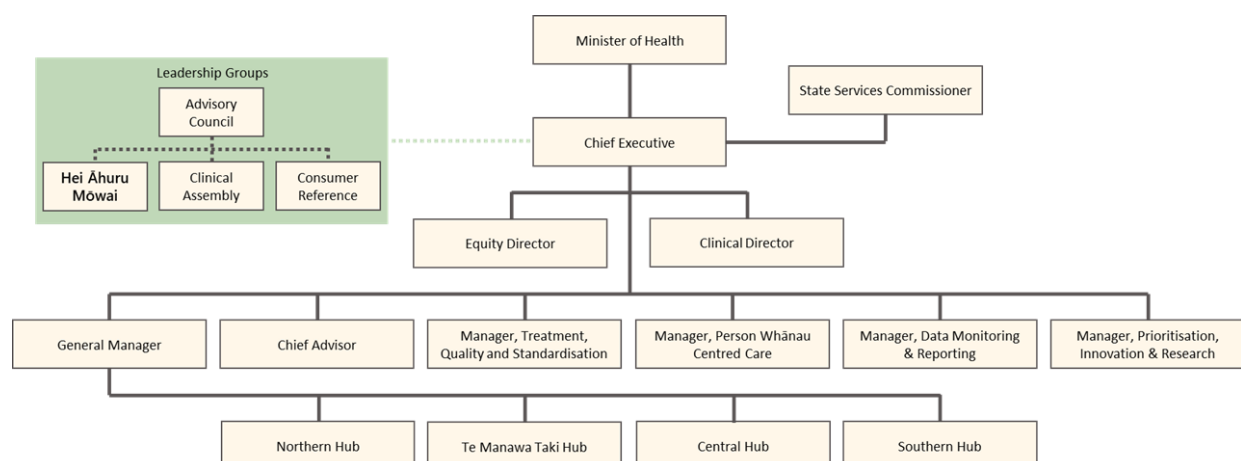
In New Zealand, relative to most ethnic groups other than Pacific Islanders, the Māori are disadvantaged socially and economically. Owing to a combination of [social determinants and inequalities within healthcare](#), Māori also suffer considerably [higher rates of the deadliest cancers, higher mortality rates amongst cancer patients](#), and are more likely to be [diagnosed at a later stage](#).

[Te Aho o Te Kahu](#), the New Zealand Cancer Control Agency, was founded in 2019 in response to [persistent poor cancer outcomes](#). It has put equity front and centre, with a determination to move from rhetoric to action.

Chief Executive Diana Safarti is blunt about the “decade or two of failure” in rectifying the differences in access to and through cancer services for Māori people, despite near-universal recognition of the problem.

Structure

The ambition at the heart of Te Aho O Te Kahu is to make equity concerns in cancer services “structurally impossible to ignore”. This is primarily reflected in their structure:



The Chief Executive reports directly to the advisory council, Hei Ahuru Mowai, and the consumer reference group, both of which are composed at least 50% Māori or other ethnic minorities adversely affected by unequal cancer outcomes. In Diana Safarti's words, "Some of the advice I get from these groups is difficult, it's uncomfortable. But it means I have to be thinking about equity all the time".

The Equity Director is the second-most senior member of Te Aho O Te Kahu, and has overseen the active recruitment of Māori and Pacific people into the organization, creating pipelines to bring them into leadership. In addition, they ensure that every project undertaken by the agency has a detailed equity plan.

Engagement first

Te Aho O Te Kahu then embarked upon an ambitious programme of Māori Cancer Community Hui (community meetings).

Held in every district health board in New Zealand, with a cumulative input from over 500 Māori, and with control of their design handed to local Māori leaders, these Hui looked to understand how cancer services could best be adapted to better engage and serve Māori communities.

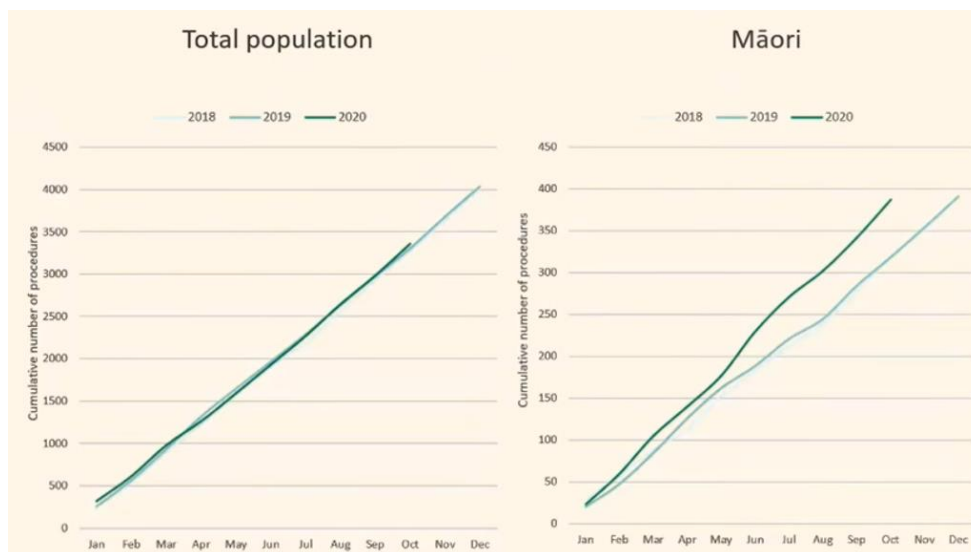
This input was then fed into a series of regional Hui, with Māori and non-Māori clinical stakeholders working to develop a [series of recommendations and forward steps for cancer services in Māori communities](#), which can feed directly into Te Aho O Te Kahu objectives. Additionally, the Hui helped to directly engage the Māori attending – and data gathered indicated that Encouragement from Whanau (family/community) and Hui would be the most effective tool for engaging Māori with health promotion.

Some reflections

In [England, Wales](#), and across [wider healthcare systems](#), inequalities in cancer outcomes have long been acknowledged as a chronic problem in need of improvement.

The inequalities experienced by New Zealand's Māori people are culturally distinct from those in Wales, and solutions proposed there would not directly translate. However, the governance approach adopted by Te Aho o Te Kahu, moving from rhetoric to action by making inequalities impossible to ignore, is an admirable and translatable strategy.

Early evidence suggests that it may be working already. Whereas New Zealand maintained the same number of curative-intent surgeries for cancer in 2020 compared to 2019 (an impressive feat considering the COVID-19 pandemic), the number of surgeries performed on Māori patients actually [increased in 2020](#).



Implementation of innovation – Penn Centre

In cancer care, the initial innovation can sometimes be the easy part – while encouraging the adoption of proven solutions at any scale or pace is often fraught with difficulty.

In contrast to medicines, where bodies such as NICE lay a clear framework for testing and adoption of new treatments, the road to implementing a new service, pathway, or technology can often be unclear, plagued with 'pilot-itis', not adoption at scale.

Penn Centre

The [Penn Centre for Cancer Care Innovation](#) (PC3I) is an organization with a novel approach to improvement. It is a community of researchers and healthcare professionals who work across 3 states, 6 hospitals, 12 oncology clinics and more, representing 19,000 new cancer patients per year. PC3I aims to interconnect all these settings, producing a huge 'real-world laboratory'. It boasts an impressive [portfolio of service innovation projects](#), such as:

- [Integrating optimal cancer pathways and trial opportunities into EHRs.](#)
- [Automated nudges from EHRs to screen young people at risk of early-onset bowel cancer.](#)
- [An authoritative body of work on whether financial incentives increase bowel screening, and crucially, why.](#)

These innovations are set within a create-test-scale framework, which has a track record of innovation from pilot to wider practice (to be discussed below).

Implementation Science

This backdrop made PC3I the ideal contenders for a grant given as part of the 'Cancer Moonshot' programme – [establishing the Penn Implementation Science Center in Cancer Control](#) (ISC3) in 2020.

These centres provide a team integrated into a healthcare setting, with implementation expertise, such as logistics, demonstrating value, and monitoring and adjusting a phased implementation. [They aim](#) both to generate new implementation research (for example, [how connected are cancer clinicians, and why do they collaborate](#)), but also, crucially, to increase institutional confidence to innovate and adopt.

This institutional confidence to innovate is already evident at the Penn Center, where, for example, a [project looking at new strategies for smoking cessation in](#)

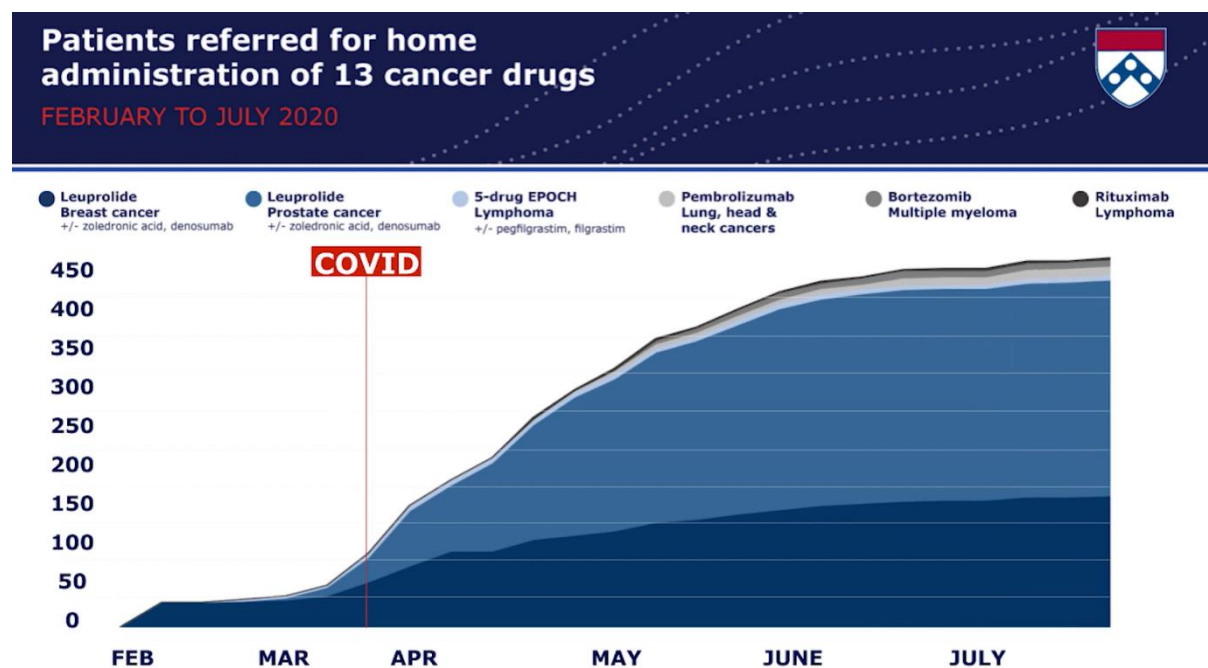
[cancer patients](#) has been designed with implementation success metrics, iterative cycles of adaption, and mixed-method consultation, plus a clear path to rollout upon success.

Such experience also cross-pollinates other innovation projects – for example at Penn Medicine, there's the parallel [Acceleration Lab](#), with a detailed vision for scale-up of innovation, currently running a program to [increase bowel screening adherence to 80%](#).

What success looks like: cancer care at home

For a striking example, we can look at PC3I's [cancer care at home](#) programme. The programme was already underway when, in early 2020, PC3I were able to rapidly and pre-emptively scale the project in response to the COVID pandemic and subsequent lockdown.

They had already begun to demonstrate benefits relating to patient-centred care and quality of life of 'cancer care at home', but also had the institutional resources, knowledge, and confidence to act quickly:



Reflections

We are facing a wave of innovations in cancer care today, especially given the explosion of new digital platforms. The US National Cancer Institute (NCI) alone

currently lists [over 200 research-proven service innovations](#). In Wales too, from [LHCs](#) to [RDCs](#), this is clearly a crucial time for implementing and scaling solutions for cancer care.

As with most subjects in *Global Scan*, this approach might not directly translate – to take one example, Wales has a very different relationship with primary care to contend with, which is crucial for cancer outcomes. However, a number of transferable ideas jump out:

- Capacity, available across the network, available specifically to provide expert support in implementing and scaling solutions.
- Innovative project design, with attention paid to asking *how* implementation will occur, building in iterative improvement cycles, and with a clear vision to scaling.
- An interoperable digital EHR infrastructure, enabling roadblock-free access to intelligence and research for PC3I members across institutions and states.
- A culture encouraging improvement and experimentation – asking *where* and *how* to deliver innovations, not whether to do them.

Oncology hospitals at home

In traditional cancer care, patients spend a lot of time in hospital – with both planned inpatient and outpatient procedures, such as receiving treatment and scans, and unplanned interactions, such as emergency admissions.

[Hospitals at Home](#) (HaH) are service models where patients receive hospital-level treatment, monitoring, and support within their own homes. Established for years in conditions such as heart failure, HaH have delivered planned procedures in a more patient-centred manner, and reduce unplanned interactions, freeing up capacity overall. One [HaH programme in Victoria](#), Australia, has delivered the equivalent of 500 beds capacity, with lower overall expenditure.

Now, some innovative centres have started applying the HaH philosophy [to cancer care](#). A cancer HaH typically includes a number of services, such as:

- Patients receiving or self-administering treatments at home
- Monitoring patients during treatment at home (sometimes via wearable tech), predicting and preventing adverse events and emergency admissions
- Taking bloods at home for analysis in a hospital
- Logging patient-reported outcomes and performing e-consultations from home

For example, Penn State have developed separate programmes for delivering [intravenous chemotherapy](#), and [post-operative care](#) at home, preventing hundreds of immunocompromised patients from the risk of infection in a hospital.

Another oncology HAH established by the [Huntsman Cancer Institute](#) in Ohio has showcased this service's benefits, with at-home monitoring enabling a [55% reduction](#) in unplanned hospitalizations, and lower overall costs. The programme continues to develop, with a modified [rural HaH programme](#) being rolled out.

NHS England have provided guidance for establishing [hospitals at home](#), and are now providing funding to facilitate swaps to cancer treatment [being received at home](#).

Technology is also developing to support HaH monitoring, for example with the [Whzan Blue Box](#) enabling measurement of key health indicators at home, and the [Careology](#) app allowing remote monitoring of PROMs, available to view as a virtual ward by clinicians. A similar app, [VineHealth](#), has been extensively tested in England, indicating [high patient uptake and satisfaction](#), and increasing quality of life.

Opportunities in Wales

Wales hosts a huge amount of innovation – and many of the attributes of an oncology HaH have been developed here.

- In Swansea Bay, an MDT-based [virtual ward](#) monitoring [vulnerable people in the community](#) has received [significant praise](#) for avoiding hospitalisations – and similar models are in place elsewhere, for example in [Powys](#).
- Digital technology for monitoring patients at home is being established, from [Aparito](#), linking to consumer devices for heart rate, oxygen saturation, and other factors in North Wales, an [app](#) to monitor heart patients at home in Hywel Dda, and even an [ehealth device](#) to monitor cancer patients on chemotherapy in Betsi Cadwaladr.
- [TEC Cymru](#) have helped to establish [Attend Anywhere](#), a virtual consulting platform available across Wales.
- Providers of cancer therapy in Wales have shown a willingness and ability to innovate to deliver treatment outside of hospital, for example with University Hospital Wales' [chemotherapy backpacks](#), and the Moondance Award winning [virtual assessment pathway](#) at Velindre.

Reflections

Evidence suggests that HaH benefits healthcare, through reducing demand for beds/unplanned admissions, and allowing reduction in delays to other unplanned care, and benefits patients, with increased satisfaction, and quality of life.

In Wales, our landscape of innovation indicates we have the expertise, experience, and motivation, to establish a world-leading oncology HaH service. What, then, would be required to do it on a national scale?

If you'd like to find out more about HaH, and other digital solutions for cancer care, please attend our [webinar on digital health](#) on July 12th. You can sign up [here](#).

Chatbots and Cancer Awareness

Effective public engagement is essential for cancer prevention and early detection. In-person engagement is often seen as the gold standard, but is intensive and not always possible or in fact needed.

Traditionally, when informed professionals aren't available to advise members of the public, their alternative sources are in the form of static text information (leaflets, websites) which may be overly complex, or too nonspecific to answer the questions they may have.

To bridge this gap, [interactive chat bots](#) have emerged in recent years as an easy-to-use tool to engage with cancer patients, for example to provide assistance for [patients on chemotherapy](#).

Now, when deployed as part of a multi-channel exercise, evidence is growing for the use of chatbots in engaging patients at *risk* of cancer: signposting cancer symptoms, reducing risk behaviours, and encouraging screening attendance:

- In the UK, the addition of a [chatbot](#) to a smoking cessation app led to significant increases in engagement, and patients with access to the chatbot had more than double the chance of successfully quitting;
- In France, a [chatbot-based decision aid](#) for participation in cervical cancer screening is being trialled, with the aim of increasing the number of women performing self-sampling at home, targeted at [more deprived populations](#);
- A [chatbot-based tool](#) which takes a family history, to advise on your risk of hereditary cancer has been developed and is being tested in the US;
- Also in the US, a [similar tool](#) for patients due for routine appointments has been tested in over 61,000 participants, and informed over 14,000 patients of their eligibility for genetic testing.

Chatbots can also be accessed 24/7, and integrated with more visible digital platforms, such as Messenger or Whatsapp, for example with a [project](#) aiming to increase engagement with breast screening in England.

An example of national-scale use of a cancer information chatbot is the [Angie](#) service, introduced over WhatsApp in Singapore in 2021. Targeted at women suspected of having a risk of hereditary breast and ovarian cancer, Angie gives information on the syndrome, and how genetic testing can help. It can also take a family history, a process which can otherwise take an hour with a clinician, and leave patients overwhelmed by the information, and unable to make a decision to give consent for testing.

Reflections for Wales

Evidence such as the [COVID Awareness and Beliefs Study \(CABS\)](#) indicates that Wales currently faces a significant challenge in engaging people at risk of cancer to participate in screening, and present to healthcare when appropriate.

Wales has some experience in implementing chatbots. The [RiTTA programme](#), a collaboration between Cardiff University, Velindre Trust, and Life Sciences Hub, has created an oncology assistant chatbot for cancer patients.

UK cancer charities also have experience developing these apps, for example with Bowel Cancer UK's [website chatbot](#), and the Cancer Research UK [WhatsApp chatbot](#).

Wales also has a wealth of expertise and resource to develop and support the use of these tools, through organizations such as [TEC Cymru](#), and [DHEW](#).

Chatbots are not of course the sole answer to the problem of public/patient engagement facing NHS Wales, but with the potential for 24/7 access to information and responsive public health messaging, could they be part of the mix?

Improving continuity in cancer care

"If continuity of care was a pharmaceutical product" [writes](#) Phil Whitaker, GP and journalist for the New Statesman, "NICE would be mandating its deployment".

He cites an [enormous Norwegian study](#) of 4.5m people, demonstrating that longer relationships with the same GP are associated with up to 28% reductions in emergency hospital admissions, and 25% reductions in mortality.

The benefits of continuity extend especially to cancer patients, with various studies finding:

- Loss of primary care continuity associated with [risk of cancer metastasis](#).
- Primary care continuity associated with lower rates of [hospitalization and death](#) from cancer
- Better continuity in secondary care associated with [lower mortality](#) in breast cancer patients with comorbidities
- [Lower risk of hospitalization](#) post-cancer treatment with better continuity between oncology and primary care
- Primary care continuity associated strongly with [survival of poor-prognosis cancers](#)

Continuity for cancer patients can be described under [three main themes](#):

- Relational continuity (RC): ongoing relationships between patients and providers, e.g. seeing the same CNS over a period of time.
- Information continuity (IC): availability and use of information relating to a patient across various settings, e.g. a GP using genetic test results from secondary care.
- Management continuity (MC): provision of timely services within a shared management plan, e.g. rapid coordination between radiology, pathology, and an MDT to deliver diagnosis.

Continuity of care is challenging in cancer, especially given the multiple interfaces between [primary/secondary care](#) and [diagnostic services](#). Unsurprisingly, this difficulty [disproportionately affects](#) cancer patients from more deprived backgrounds.

For such an important facet of cancer care, continuity has been historically under-investigated, for example with a [2012 Cochrane review](#) citing a lack of good quality evidence backing any approach to improving continuity in follow-up care.

However, with growing recognition of the issue, several predominantly nurse-led interventions have been deployed internationally to improve continuity:

- An intervention in [Kentucky, USA](#) involved a nurse being employed to deliver a standardized report of patient status, and a list of relevant secondary care contacts, back to a patient's primary care provider, as the

patient started treatment. This was able to increase patient-reported continuity.

- A nurse-coordinator service in [Quebec, Canada](#), delivering standardized patient reports back to primary care, encouraging and prioritizing patients to attend primary care post-treatment, and incorporating information from primary care into clinical decisions, improved informational and management continuity as perceived by patients and primary care.
- A fast-track programme in [Valencia, Spain](#), involving regular facilitated meetings between primary and secondary care to discuss cancer referrals achieved an impressive median time from suspicion to treatment of 34 days, over 10 years of implementation.
- A [systematic review](#) of nurse navigators for patients in cancer care found strong evidence for improvement in RC, IC, and MC, and consequently better patient satisfaction and standard of care.

Reflections

Several measures being taken forward in Wales should contribute to better continuity in cancer care over coming years.

- Initiatives across primary care such as [ThinkCancer](#), bridging the gap between primary and secondary care, and safety netting patients discharged from secondary care, will serve to better coordinate management continuity.
- Ongoing improvements to data and IT architecture will increase the accessibility of patient-level data across multiple care settings, making informational continuity more feasible.
- Welcome increases in the visibility of value-based healthcare principles will increase focus on patient-reported measures of care.

However, there is a real risk that continuity of cancer care will worsen in the short-term owing both to well-documented workforce shortages across primary and secondary care, and because other urgent demands on the system mean it is not monitored as a priority.

Opportunities remain to improve continuity of cancer care however. Including:

- Clinics which facilitate faster coordination, and bridge the management and communication divide between care settings, such as rapid diagnostic clinics (RDCs) are being delivered in Wales now. How can we ensure they deliver the maximum benefit in continuity of care to the patient?
- Nurse-led care coordination has been validated internationally as effective in improving continuity. But in the face of a [cancer nursing crisis](#), how can we effectively value and deliver these programmes?
- With the mismatch in primary care demand and capacity, and the rise of telehealth, how can we preserve the relational continuity of GPs with their patients?

OPTIMISTICCC – International Collaboration for Trials and Research

When it comes to preventing, detecting, and treating bowel cancer, we have a great number of tools in our arsenal: health optimization for prevention, screening and accurate diagnostic tests, effective surgery and therapies, to name just a few.

However, there is still much that we don't know. Who's risk of bowel cancer might be reduced by aspirin? Could we detect more bowel cancers by developing our methods of testing? Why are some cancers more aggressive than others? Effective research into bowel cancer, in the lab and in the clinic, is essential to understand and take advantage of these unknowns.

OPTIMISTICCC

Opportunity To Investigate the Microbiome's Impact on Science and Treatment In Colorectal Cancer ([OPTIMISTICCC](#)) are a leading example of impactful, international research in this space. They are a group investigating links between [bowel cancer and the microbiome](#) (all the bacteria, fungi, and viruses that live in your gut) – and how we might take advantage of them for better bowel cancer care.

The group has already published some potentially impactful research. These are just a few examples of a wide-ranging research [portfolio](#):

Following from the observation that microbiome signatures in faecal tests were [remarkably similar](#) in bowel cancer patients across the world, an [add-on to faecal testing was developed](#), which might have potential to identify more people at risk of bowel cancer, or save unnecessary colonoscopies in those with a positive test, but no cancer.

[Two](#) bacterial [species](#) have been implicated as potentially driving bowel cancer development, and a new [biomarker](#) identified for aggressive cancers, all potentially leading to new drug or detection targets.

A link has been uncovered between a [cancer-associated bacteria, and cancer prevention by aspirin](#), potentially opening up opportunities for [targeted prevention](#) in the future.

So what enables OPTIMISCC to be so successful?

OPTIMISTICCC is funded within the Cancer Research UK and National Cancer Institute '[Grand Challenges](#)' programme, and a few features stand out to enable the impact of their research:

Research teams draw on [international expertise](#). For example, the OPTIMISTICC team draw on leadership from the UK, the Netherlands, Spain, the USA, and Canada.

Cross-disciplinary working opens up the [translation of research to practice](#), for instance in translating microbiome research to a screening application.

Attention is paid to cultivating leadership skills in members of research groups, like in the organization of [future leaders' conferences](#).

[Patient engagement](#) (not just communication) is taken seriously, by employing patient advocates as co-investigators, giving them autonomy and influence the research project in areas such as recruiting advocates, writing grants, and presenting research.

Reflections

OPTIMISTICC's work demonstrates that there is much to be gained in impactful knowledge of bowel cancer through research. Better detection, reduced demand for intensive services, and targeted treatment are available to institutions with strong research activity. This is one of several opportunities we explore in our programme: [Towards Zero Deaths from Bowel Cancer in Wales](#).

To maintain clinical research, cancer teams need capacity and resource to look beyond their day-to-day demands. Moondance have helped to fund an increased focus on research-active units in Wales – but what could we do to ensure this opportunities is afforded across Wales into the future?

Wales has some strong resources, for example in terms of centralized healthcare data, and organizations such as the [Centre for Trials Research](#). The new [Wales cancer research strategy](#), authored through the Wales Cancer Research Centre, should provide a strong direction to overcome our challenges: disproportionately low research funding, participation, and leadership resource. There are already some positive steps, such as Cardiff academics joining an international consortium on [multi-cancer detection tests](#).

With this positive momentum, what can we do in Wales to ensure that we have the resource and expertise, and our clinicians have the capacity, to deliver the benefits of impactful international research to patients?

Early Detection Conference 2022

The Early Detection of Cancer Conference 2022 displayed the incredible potential of early detection (ED); if even a fraction of the innovations presented make their way to effective clinical practice, they could vastly transform cancer outcomes.

It also starkly set the challenge. Cancer detection requires more than a test. Only with well designed and implemented programmes and pathways will this potential be realised.

MCEDs

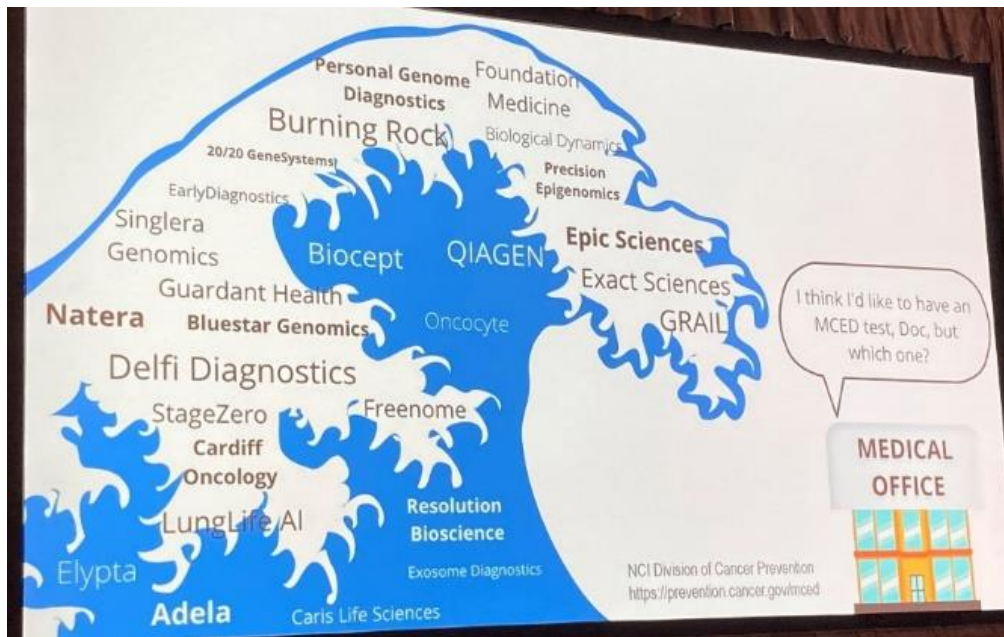
As the preeminent platform in ED of recent years, Multi-Cancer Early Detection (MCED) tests took centre stage. Next generation tests such as the [DELFI](#) fragmentomics platform are displaying impressive sensitivity and specificity for multiple cancers (100%/98% for lung cancer, 89%/98% for ovarian, 81%/98% for gastric, etc). Taking [GRAIL's](#) impressive clinical development pipeline, with >300,000 participants as an example, significant resource is devoted to delivering these tests to patients – and results from the PATHFINDER study suggest MCEDs may reduce time to diagnosis.

With ~70% of cancer deaths coming from cancers without established screening programmes, GPs struggling to promptly refer suspected cancer, and backlogs of undiagnosed cancers, the potential power of these tests is huge.

This potential, however, was met with a high degree of caution, with several important questions to be answered:

- What is the end-to-end pathway resulting from a positive MCED?
- If no disease can be found in an MCED+ patient, how many tests are done before it is assumed safe to discharge them?
- Is reduction in late stage diagnoses a reliable indicator of reduced mortality down the road?
- Will a negative MCED test reduce participation in screening and presentation with symptoms?

Additionally – in a problem best demonstrated by Phil Castle (below), with such a numerous field of providers, how can a health service ensure it provides national service with the 'best' test for its population?



Historical experience from negative trials of Ovarian and Prostate cancer screening are instructive here. Speakers argued in each case that screening did reduce mortality – but limitations in implementation (different diagnostic pathways and treatment options, low uptake) obscured this conclusion. Whether or not they are right – these limitations have clearly hampered the delivery of clinical benefit to cancer patients. Can we avoid this happening again with MCEDs?

Bringing next generation tests to clinical practice

Besides MCEDs, a host of exciting and advanced tests were presented, each of which had tangible potential to improve care:

- Dr. Michael Fadel [reported impressive results of a breath test for bowel cancer](#), delivered simply and easily in primary care, with high sensitivity and specificity.
- [Dr. John Carpten](#) performed spatial transcriptomics to detect cell types more likely to appear in [women of African Ancestry](#) with triple-negative breast cancer: an underserved group with poor outcomes.
- [Prof. Mirabela Rusu](#) presented an impressive system to [overlay radiology images with pathology](#), enabling easy identification of idle vs aggressive prostate cancers, and guiding intervention.

A note of caution on all these tests was given by [Dr. Chris Peters](#), whose work indicates that, regardless of the performance of a diagnostic test, we currently have an extremely poor rate of translating into clinical practice. Of over 2,000 diagnostic biomarkers for bowel cancer identified by his team, just 0.12% ever affected clinical practice. Their [Biomarker Toolkit](#), of factors associated with

successful transfer to clinic, can be invaluable in transforming more tests into everyday practice which benefits patients.

There is clearly a bottleneck in this transfer of tests to practice. Through cross-disciplinary teams, impactful translational and implementation research, and a skilled and integrated diagnostic workforce performing these new tests, could Wales be one of the first to take full advantage of their potential?

Reflections

Earlier detection of cancers in mainstream practice has the potential to be transformed by new tests. However, this can only happen if we recognise that we need more than just a test.

From a coordinated response on MCEs, to concerted effort to overcome the bottleneck stopping tests reaching clinical practice, how could Wales take advantage of the incredible detection platforms becoming available?

Finally, at a time where Rapid Diagnostic Centres (RDCs) and Community Diagnostic Centres (CDCs) are being rolled out in Wales and England, there could be an opportunity to focus on the impact our *service design, accessibility, locality, and delivery* have on early detection. Could knowledge here be crucial in taking full advantage of the next generation of tests?

Planning for success: Scottish Prehabilitation

From systemic therapy to surgery, we know that treatment for cancer takes a toll; it is important for patients to be as equipped as possible, both physically and mentally.

In cancer sites from [bowel](#), to [breast](#) and [lung](#), evidence is emerging that prehabilitation gives patients better functional status, reduces the length of hospital stays, and might even improve survival outcomes in some patient

With growing recognition of this fact, the offer of 'prehabilitation' to patients is entering common practice in cancer care.

The evidence base underpinning prehabilitation is undoubtedly [still maturing](#). Nonetheless, consensus on best practice is emerging. [Macmillan's](#) guidance is representative, describing a multimodal tiered approach, shaped around a patient's health and support needs.

In many countries, including Wales, talented and motivated teams and individuals have established exemplary services in their areas. Focus is now turning to how prehabilitation can scale, and be consistently available across healthcare systems.

Action in Scotland

One country receiving praise for a more scalable, policy-driven approach to rolling out prehabilitation is Scotland. I spoke with [Debbie Provan](#), dietitian and clinical advisor on cancer to the Scottish Government, about their journey over the past few years.

"If we have good prehab, what could that mean? What could safer care mean for patients?"

Getting prehabilitation into cancer services is inherently difficult, Debbie explained to me. Diseases historically regarded as something to 'live with' (e.g. diabetes) have health and wellbeing support built in. As a historically acute and radically treated disease, building wellbeing management into cancer is now much more difficult. Pre-2019, Debbie described a similar situation in Scotland as Wales today: pockets of excellent service, maintained by motivated individuals and teams.

The first step in Scotland was to **baseline**. To understand where services are, how they are supported, and how healthcare providers feel about them. A steering group was formed and a survey ([now published](#)) was conducted, with 295

respondents from across the care spectrum reporting prehabilitation practice in their area, and thoughts on how it might be developed.

The survey findings secured support for prehabilitation in [Scotland's Cancer recovery plan](#) in winter 2020. In the plan the Scottish Government set out a series of actions and committed funding to test and evaluate the concept of delivering prehabilitation across Scotland.

Debbie joined the Scottish government in January 2021 to support the delivery of the prehabilitation actions and a new national Cancer Prehabilitation Implementation Steering Group was convened. Importantly, this steering group contained people from across the cancer care spectrum: nurses, AHPs, surgeons, oncologists and cancer charities.

This steering group, and commitment in the recovery plan, also secured resource to develop an [online resource for prehab](#) – accessible to all patients, giving advice for self-guided care, and signposting for support services.

With funding secured, hard questions began to arise. How do you design prehabilitation for a country, and where do you focus your efforts?

“Do we help make good projects great, or do we try and get something that isn't there started?”

Another familiar problem was resource: where do you source the professionals, space, and time to deliver a new service?

The Scottish team responded to both problems with flexibility.

Understanding that ideas and services might differ from place to place, they chose to ensure each design was underpinned by a set of key principles, adapted from Macmillan guidelines, and cocreated with Scottish service providers. These principles are available [online](#).

Secondly, they used the funding round to capitalize on and enhance existing resource, in spaces designed to be accessible for patients. Funding went to eight [Maggie's centres](#) in Scotland, who are piloting a universal multimodal prehabilitation workshop for all cancer patients and their supporters, with a by referral and walk-in model.

Scottish ambitions keep developing, with aims of integrating prehabilitation fully with MDT-centred care, and exploring a single point of contact across a patient's entire prehab-treatment-rehab journey.

A way forward for Wales?

With so many experienced and motivated teams and individuals across Wales already delivering service and advocating for more in this space, Scotland could provide valuable lessons for moving forward:

- Baselineing is a powerful tool to set the stage for progress.
- **If supported by policy and funding**, working groups can be a fantastic mechanism for accelerating change and improvement.
- In and outside of direct prehabilitation delivery, every stakeholder you consult and bring onboard can help to smooth the path to prehabilitation, and integrate it better other cancer care.
- With difficulties in design and resource, there is a need for flexible and adaptive problem solving, asking for example 'what resource do we have available?'

DNA-Med: a chance to fight the postcode lottery in cancer care

From [Velindre Cancer Centre](#) in Cardiff to the [Christie](#) in Manchester, centers of excellence are an important part of the cancer care ecosystem, pushing at the boundaries of cutting-edge personalised medicine to provide patients with better care into the future.

However, some have observed that resource and expertise (e.g. for genomic testing) tend to be concentrated at centres of excellence in large cities, leading to fears that, for example, development of personalised medicines might [widen disparities](#) in cancer outcomes. We also know that high levels of research participation, which again tend to be concentrated in centres of excellence, [improve cancer outcomes](#).

It is important to consider how to share the benefits of centres of excellence, and prevent a postcode lottery for cutting-edge cancer care.

DNA-Med

Charité Universitätsmedizin, located in central Berlin, is one such institution, being one of the largest academic hospitals in Europe, and boasting an impressive [research portfolio](#).

Prostate cancer is a particular area of excellence, with [computer modelling of genetics](#) to predict disease course, cutting-edge [minimally invasive therapies](#) available, participation in clinical trials of new [immunotherapies](#), and much more.

In 2020, a team of urologists and health systems analysts wanted to devise a system to begin spreading the expertise and resource of the *Charité* to the 3 million residents of the surrounding Brandenburg region.

The Hauptstadt Urologie project, now named [DNA-med](#), was their solution.

[DNA-med is a digital platform](#), available for all urologists within Brandenburg to register. Patients receiving care from registered urologists are invited to register, and along with their care team, fill in their disease status and priorities for treatment. These inputs are automatically interrogated against a [constantly updated database of genetic tests](#), cutting edge treatments, and available clinical trials, with results overseen by specialist urologists.

Patients still receive care locally, but their treating Urologists are armed with a list of possible care pathways, supported to enrol their patients in eligible clinical trials, and genetic testing can be initiated and provided by the DNA-med service.

On top of these benefits, once patients are engaged, DNA-med provides a platform to monitor patient-reported outcomes, and adjust treatment appropriately.

[Professor Thorsten Schlomm](#), a project founder, compares the current methods of treatment selection to navigating a car journey with a paper map: you must plan in advance, using a resource which may be years old, with branches in the journey difficult to navigate. Nowadays, most navigate with sat-nav: a constantly updated system, which can consider how every journey is ongoing to plot the best course for you, and adapt at any moment. Could we achieve the same for cancer care, and open up accessibility of the best treatments at the same time?

Could it work in Wales?

National audits of high volume cancers such as [lung](#), [prostate](#), and [upper GI](#), all show significant differences in uptake of treatments across localities in the UK and Wales. In bowel cancer, our [patient consultation work](#) with Cedar NHS research group revealed frustration at a perceived postcode lottery in treatment and trials.

“I should have the same options as everybody else in this group, regardless of where we live” – Patient Participant

Wales also has the opportunity of being well supported for the establishment of digital solutions, with organizations such as [TEC Cymru](#) and [DHEW](#) supporting the implementation of vide consulting, telehealth, remote monitoring, and more.

With these resources, and with our world-leading centres of excellence, could Wales be in a position to use all of our expertise for every cancer patient, no matter where they live?

Reflections

This collection underlines an important insight: as countries across the world continue developing in their mission for better cancer outcomes, there are enormous opportunities in learning from international examples of innovation.

Vague symptom Rapid Diagnostic Clinics (RDCs), one of the most successful cancer care innovations of recent years, now widely available across Wales, were the result of a collective visit to Denmark in 2015, to study their 'three-legged' cancer referral pathways.

Global Scan has suggested that there may be dozens of other innovations in countries across the world with potential to improve cancer services in Wales. If we engaged with some of these, in the spirit of implementation and improvement, what could this mean for patients?

Moondance Cancer Initiative find, fund and fuel brilliant people and **brave ideas**. If you think any of the examples presented here have potential to make a difference in Wales, get in touch.



MOONDANCE
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Moondance Cancer Initiative helps find solutions so that more people in Wales survive cancer. We actively support people and projects with potential to transform survival outcomes across the country, and we undertake research and insight to inform our work.

www.moondance-cancer.wales

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