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Evaluation Report

LUMEN: Lung Cancer Symptom Assessment Line Final Evaluation Report

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Abbreviations

AF	Atrial fibrillation
GP	General Practitioner
HDdUHB	Hywel Dda University Health Board
IG	Information Governance
IT	Information Technology
MCI	Moondance Cancer Initiative
MDT	Multi-Disciplinary Team
NHS	National Health Service
PREM	Patient Reported Experience Measure
PROM	Patient Reported Outcome Measure
R&D	Research and Development
RIW	Respiratory Innovation Wales
SBAR	Situation Background Assessment Recommendation
VBHC	Value Based Health Care
WCP	Welsh Clinical Portal
WPAS	Welsh Patient Administration System

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Who We Are

In 2021 the TriTech Institute was launched. We are a team based in a bespoke facility within Hywel Dda University Health Board comprising of industry-leading engineers, scientists and clinicians.

Our Institute

Here at the TriTech Institute, we support the development of healthcare solutions on a local, national, and global level offering designers and manufacturers a single point of access to the NHS through a collaborative and agile approach.

What We Offer

The team's advanced skills in clinical and research design are combined with technical engineering expertise to manage the whole innovative pathway from early unmet need, through to concept design, prototyping, clinical investigations, and real-world service evaluations.

Our Services

We provide specific services and solutions for clinical engineering, research and innovation and Value-Based healthcare, and can also support with grant writing and submission.

1. Introduction

1.1 National context

Lung cancer is the leading cause of cancer death in Wales, with approximately 1900 people dying from the disease every year.[1] In Wales, over 2300 people are diagnosed with lung cancer every year, however, more than 45% of cases are not diagnosed until stage 4 when treatment options are limited.[1] Earlier diagnosis and rapid access to potentially curative treatments such as surgery and radiotherapy are crucial to improve survival. [2] Despite the poor diagnosis rate, more than 90% of patients with lung cancer are symptomatic at diagnosis, with a cough being the most common presenting symptom.[3,4]

1.2 Local context

During the first wave of the COVID-19 pandemic, there was a reduction of up to 70% in new lung cancer diagnoses across Wales and overall numbers of cancers diagnosed in Hywel Dda University Health Board (HDDdUHB) fell by 20% in the years 2020-21 compared to 2019-20. The most recent Wales Cancer Information Surveillance Unit (WCISU) figures (2018 – 2020), demonstrated that HDDdUHB has the highest late-stage presentation of lung cancer in Wales, at 72% (Wales average 67%), and the lowest early-stage presentation at 22% (Wales average 25%).[1]

Prior to the COVID-19 pandemic, a feasibility research study, entitled 'PLUS – Pharmacy Referral for Lung Cancer Symptoms' had been undertaken.[5] The aim of PLUS was to investigate whether community pharmacies could identify individuals meeting the National Institute for Clinical Excellence (NICE) [6] guidelines for the referral of suspected lung cancer, as a way of reducing GP workload and promoting awareness amongst the public (see Appendix 1 for the NICE guidelines). As a result of the COVID-19 pandemic, the study and the alternative pathway closed earlier than planned, but findings showed that patients and pharmacists welcomed the service, which did not create additional work for local GPs.

The PLUS study

A previous study, PLUS, helped to guide and understand some of the principles for the current work. As part of PLUS, focus groups were conducted with Cardiff University to identify the best ways to reach people, particularly in high-risk, deprived areas. As a result, the PLUS study had several recommendations for engaging the general public. These included:

- **Pharmacy inserts and prescription add-ons**
- **Campaign stands to be held at public events and locations in the local area, such as rugby matches, shopping centres and community hubs**
- **Posters and leaflets**
- **Social media campaigns**

This previous work identified the need for an easily accessible pathway, as is already available for breast cancer and other high prevalence cancers.



1.3 Aim of this project

In December 2021, HDdUHB was awarded funding by Moondance Cancer Initiative to develop, launch and evaluate a nurse-led telephone triage service for lung cancer, the Lung Cancer Symptom Assessment Line (LUMEN).

Anecdotally it has been demonstrated that nurse-led triage of patients with cancer symptoms may be useful in establishing appropriate investigation. The aim of such services being to reduce wait times from referral to investigation and consultation, in some cases expanding to include a wider remit, by providing a link between patients and clinicians and assessing additional patient support requirements. This approach has the potential to positively impact the patient experience, in addition to improving clinical efficiency. Examples of nurse-led triage pathways have been implemented for colorectal cancer [7,8] and lung cancer [9,10]

The LUMEN project would be an entirely new service, and as such, a key aim would be to understand the potential demand. No literature exists for a similar service, however, based on experience and previous awareness campaigns, it was expected that the service would identify a new cohort of patients with relevant symptoms. These patients would then be referred for chest x-rays and where necessary referred onto the Rapid Access Lung Cancer (RALC) Clinic. As part of the new service an evaluation would be carried out to determine its potential for wider adoption across NHS Wales.

2. A New Service

2.1 Rationale of the LUMEN service

Patients often present with vague symptoms that they may not associate with lung cancer, or they may not seek timely help, leading to late-stage diagnosis. Access to healthcare can also be a significant barrier to timely diagnosis and treatment. This has worsened due to the workload of primary care teams since the COVID-19 pandemic, impacting negatively on those patients who need to contact their GPs. The LUMEN service is designed to address these issues by offering an accessible nurse-led assessment

service, providing direct access for patients, and, by eliminating geographical barriers, sought to provide equal access for all. For ease of access the LUMEN service would use a telephone-based assessment system to triage individuals with potential lung cancer symptoms.

The LUMEN service was designed to allow patients to be diagnosed earlier and improve lung health, leading to improved survival outcome, patient health and wellbeing and reduced GP and secondary care needs in the longer term. Key tenets of the LUMEN service included supporting the delivery of care closer to home and reducing inappropriate variation by allowing more flexible access to interventions and healthcare. LUMEN also sought to raise awareness of lung cancer symptoms and associated risk factors in the wider population by engaging people in community and hospital settings and encouraging them to seek timely medical attention.

2.2 The aims of the LUMEN service

The key aims of the service included:

- Develop and launch a nurse-led assessment service for lung cancer integrated into current lung cancer pathways.
- Promote and deliver a nurse-led assessment service and determine acceptability, feasibility, safety and cost-effectiveness of the pathway.
- Explore patient and healthcare professional views and experiences of the service and modify/adapt in response.
- By increasing patient access to diagnostic testing, increase early diagnosis and improve patient outcomes.

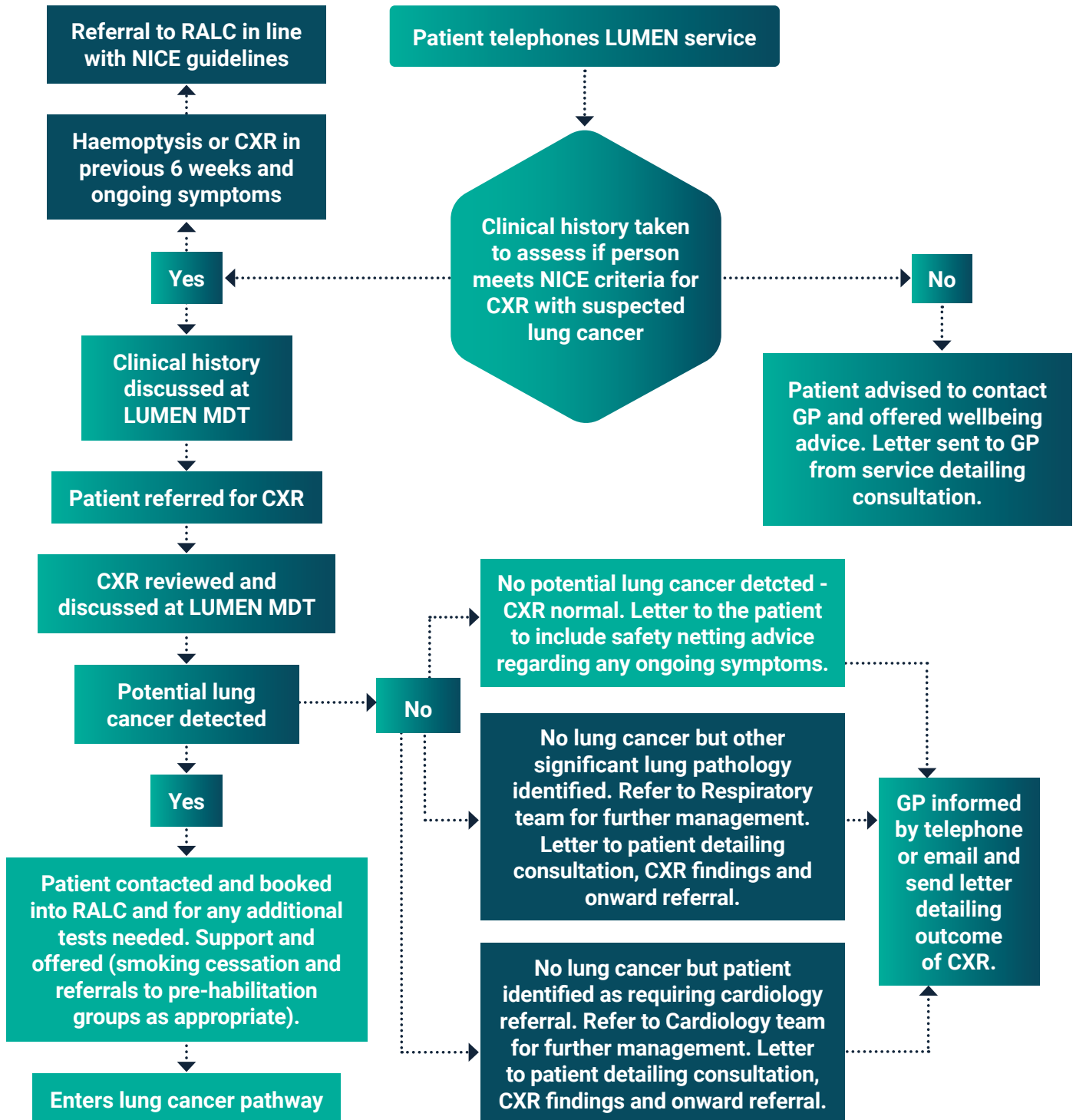
2.3 Description of the LUMEN service

Delivery of a safe, effective and accessible nurse-led lung cancer symptom assessment service was achieved by:

- Developing detailed service specification documents, including service pathway (Figure 1) and patient eligibility criteria (Appendix 2), to ensure appropriateness, consistency and safety.
- Ensuring all staff involved in the service were aware of service guidelines.
- Ensuring that appropriate safety-netting procedures were followed for all patients contacting the service.

- Working effectively with Primary and Secondary care teams,
- Developing a full communication strategy to raise awareness of the LUMEN Service across HDdUHB.
- Collecting data and patient and staff feedback to enable the service evaluation.

Figure 1: Flow Diagram showing the LUMEN service Pathway
The LUMEN pathway allowed individuals reporting symptoms in line with NICE guidelines,[6] to self-refer to the service. A Clinical Nurse Specialist experienced in managing patients with lung cancer, trained in telephone triage and with certification to request chest x-rays (CXRs) for patients fulfilling NICE criteria for suspected lung cancer, was appointed as LUMEN Triage Specialist Nurse (LUMEN TSN).



The LUMEN Triage Specialist Nurse (TSN) assessed individuals' need for a chest x-ray (CXR). A history sheet recording and detailing concerns as per NICE criteria for urgent CXR for suspected lung cancer was used, with individuals contacting the service either referred for further testing as necessary, or back to their GP if they were found to not meet the service inclusion criteria.

After initial contact from the patient, the LUMEN TSN discussed the case with the dedicated LUMEN Respiratory Consultant, and eligible patients were offered a walk-in CXR appointment at any of the four general hospitals within HDdUHB. CXRs were reported promptly by Radiology and reviewed by the LUMEN TSN and LUMEN Respiratory Consultant, so that a clinical plan could be formulated and conveyed promptly to the patient and their GP. Lung cancers identified through the LUMEN service would be followed up in the Rapid Access Lung Clinic (RALC), fulfilling the requirements of the single cancer pathway.

Any patient who needed to be followed up for a non-cancer condition was referred onwards to the respiratory team or GP, as appropriate. The LUMEN TSN contacted all patients by telephone to inform them of their CXR findings, and as part of the safety netting process, followed up the telephone call up with a detailed letter to the patient summarising the symptoms, investigation findings and plan. A copy of the letter was also sent to their GP [Appendix 3]. The LUMEN TSN supported the individual on their journey through the pathway, offering referral to smoking cessation and well-being, dietetic or community nursing teams as needed. The principles of safety netting follow: [11]

S = What serious causes and complications do I need to make the patient aware of?

A = What alternative diagnoses do I need to make the patient aware of?

F = What specific findings do I need to make the patient aware of that would mandate the need for a medical re-assessment?

E = What early/atypical presentations of serious illnesses do I need to make the patient aware of?

R = What red flag symptoms and signs do I need to make the patient aware of?

2.4 Setup & launch of the LUMEN service

The project set-up phase lasted seven months (January 2022 to July 2022). During this period, significant stakeholder engagement was undertaken with primary and secondary care teams, specifically respiratory, lung cancer and radiology services. In addition, the team engaged with community pharmacies and optometrists to explain the LUMEN service and promote its benefits. Engagement was also undertaken with the local Community Health Council by the LUMEN project team.

A project communications package was developed to promote the service using a range of approaches, including posters, flyers and social media posts. Using strategies developed in the PLUS study, the LUMEN service was publicised locally via bilingual information materials, with posters displayed in local GP surgeries, community pharmacies and prominent areas within district general hospitals. Information was also shared via social media, and on Primary Care surgery websites. The fast-track nature of the service, and the message that appointments were not necessary to access the service, was emphasised.

A telephone line was established using an 0300 number which enabled callers to contact the service for the cost of a local phone call from landlines or mobiles. The telephone line was open on weekdays between 9am and 2pm. In addition, in case a phone call was received and was unable to be taken for any reason, an answer phone message with times of availability of service 09.00am-14.00hrs, and information to leave (name, telephone number and information about symptoms) was also provided.

2.4.1 Pilot phase and start of the full service

The LUMEN service launched on 15th August 2022, initially accepting self-referrals from patients registered with a GP in the Carmarthenshire area. On 7th December 2022, based on positive feedback from patients using the service and agreement from secondary care teams, the LUMEN service was made available across the entire HDdUHB area, including the Ceredigion and Pembrokeshire regions (see Figure 2). In addition, on Tuesdays from January to May 2023, access to the service was also made available in

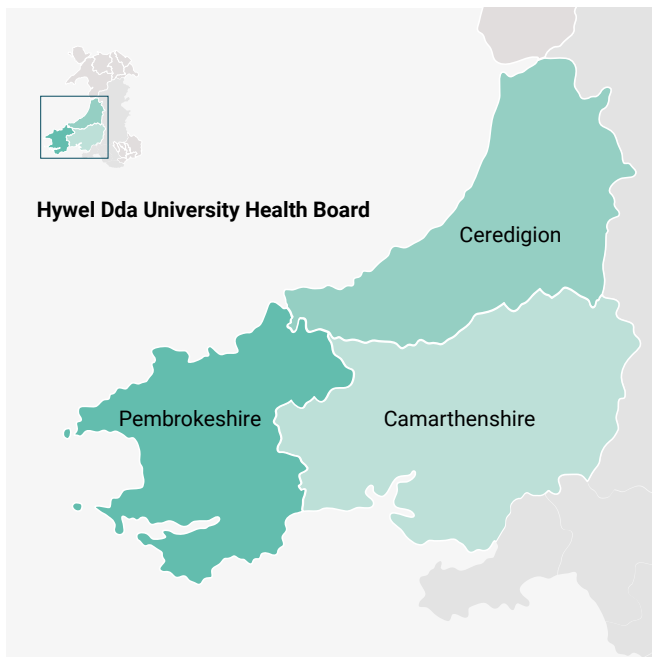


Figure 2 - The counties within HDUHB that were part of the LUMEN Service.

the Respiratory Innovation Wales (RIW) Mobile Respiratory Hub when it visited towns across Carmarthenshire, Ceredigion and Pembrokeshire.

2.4.2 Extension of the LUMEN service

The LUMEN service was due to end on 31st March 2023, but additional funding secured from Moondance Cancer Initiative (MCI) and the HDdUHB Regional Innovation Coordination Hub, enabled continuation of the service for an additional six months (until September 2023). During the last six months of the pilot, the additional funding from Moondance Cancer Initiative also enabled the introduction of targeted Facebook posts to publicise LUMEN more widely. Funding was also secured from the Wales Cancer Network to support targeted SMS messages to patients registered with GP practices in three GP clusters within HDdUHB, who were recorded as being smokers or ex-smokers. In addition to the support provided by MCI and Wales Cancer Network the LUMEN project was supported by, Community Pharmacy Wales, Wales Cancer Alliance, Lung Cancer Campaign Carmarthenshire and HDdUHB Primary Care and Community teams.

2.5 Promotion and awareness activities

Increasing the awareness and profile of the LUMEN Service was recognized as a key goal for the success of the service from the beginning. A

key part of the LUMEN TSN's role was to engage with the public and staff across the health board, to raise awareness of the service and of lung cancer symptoms. This was achieved via several different methods which included:

2.5.1 Radio

An awareness campaign with radio advertising and HDdUHB social media (partly funded by the Lung Cancer Campaign Carmarthenshire contribution of £6000) was undertaken in November 2022 during lung cancer awareness month. The radio campaign started on the 7/11/2022 and ran for 3 weeks, with 8 spots every day Monday-Friday per station, then 6 and 4 respectively for Saturday and Sunday.

2.5.2 Posters

During the pilot phase, all GP surgeries and pharmacies in the pilot phase area (Carmarthenshire) were provided with bilingual posters to promote the LUMEN Service and raise awareness of lung cancer symptoms. In addition, all 4 DGH's (District General Hospitals) were also visited and provided with posters to display in prominent areas and an overview of the aims of the LUMEN Service. Posters were placed in general and outpatient areas to try and attract attention. Following the extension and expansion of the service, digital versions of the posters were sent to every GP cluster and pharmacy across the regions for dissemination (see Appendix 4).

2.5.3 Roadshows

As part of their outreach activities, the LUMEN team held several events across Hywel Dda. They visited Prince Phillip Hospital Llanelli on 04/11/2022 and Glangwili General Hospital Carmarthen on 02/12/2022 to showcase their work. The other main hospitals in the Hywel Dda area (Withybush and Bronglais Hospitals), did not engage with requests to host an event. The team also reached out to some large employers in Carmarthenshire, such as Trostre, the last Tinplate works in the UK. Trostre welcomed LUMEN to come and talk to their staff along with the Smoking Cessation team. They did four events at Trostre on: 09/09/2022, 16/09/2022, 21/10/2022 & 28/10/2022. Another event took place at the

Parc Y Scarlets Roadshow on 27/01/2023 before the United Rugby Championship Round pool stage match between the Scarlets and the Bulls.

More events took place at libraries throughout Carmarthenshire where over 300 people received leaflets. These libraries were: Llanelli Library (21/11/2022), Carmarthen Library (22/11/2022), Ammanford Library (24/11/2022) and Llandeilo Library (2/12/2022).

The roadshow events had posters, a quiz to check people's knowledge of lung cancer symptoms, and support from the LUMEN TSN. The number of people who participated in the events was not recorded, however 84 people filled out a pop quiz about their awareness of lung cancer symptoms during the events, the questions and answers can be seen in Appendix 5.

Table 1: Location and dates when the LUMENService accompanied the RIW Hub

ASDA Pembroke Dock 24/01/2023	ASDA Pembroke Dock 21/03/2023	Parc Y Scarlets, Llanelli 25/04/2023
Leekes Crosshands 31/01/2023	ASDA Pembroke Dock 28/03/2023	Morrisons Haverfordwest 02/05/2023
Morrisons Haverfordwest 21/02/2023	Carmarthen Leisure Centre 04/04/2023	
TESCO Cardigan 07/03/2023	Parc Y Scarlets, Llanelli 18/04/2023	

2.5.4 RIW hub visits

The RIW hub is a mobile unit that travels to different locations in HDdUHB community and offers services and health knowledge to the public. The LUMENService joined the RIW hub on various dates and reached a wide area within the HB (see table 1).

2.5.5 Facebook campaign

The HDdUHB Communications team worked closely with the LUMEN team. Bilingual messages were scheduled regularly on HDdUHB's Facebook page from January 2023 to July 2023 to raise awareness of the symptoms of lung cancer and inform patients of the ways to access the service via telephone or at the Mobile Respiratory Unit.

2.5.6 SMS text message campaign at Selected Practices

Eligible patients (age 40 years and over who were current smokers or ex-smokers) from the surgeries in the pilot received 2,383 text messages in total. The messages were bilingual and included the potential symptoms of lung cancer and a phone number for LUMEN (Figure 3).

EARLY DIAGNOSIS SAVES LIVES. If you have had a cough for more than 3 weeks, shortness of breath, losing weight without trying, coughing up blood or blood in your phlegm, or more tired than usual, call Hywel Dda LUMEN lung cancer symptom assessment line on 0300 3036142 and speak to a Specialist Nurse, service open Monday to Friday 9 AM to 2 PM.

MAE DIAGNOSIS CYNNAR YN ACHUB BYWYDAU. Os i chi wedi cael peswch am mwy na 3 wythnos, diffyg anadl, colli pwysau heb geisio, pesychu gwaed neu waed yn eich fflem, neu yn fwy blinedig nag arfer, ffoniwch Hywel Dda LUMEN, llinell asesu symptomau canser yr ysgyfaint ar 0300 3036142 i siarad a Nyrs Abenigol, gwasanaeth ar agor Dydd Llun i Dydd Gwener 9yb i 2yh.

Figure 3: SMS text messages sent to patients in specified Surgeries in Carmarthenshire.

2.5.7 Staff and health board engagement

Throughout the LUMEN project multiple staff engagement activities and events were also undertaken by the LUMEN team across the health board and community practices, to raise awareness of the pilot across primary, secondary and community care. This included a meeting with the Senior Nurses and Ward Managers in Hywel Dda on the 16/11/2022, to explain and promote the LUMEN service. Over the duration of the LUMEN service the HDDUHB communications team supported the promotion of the service in a number of ways, including several press releases (see below), mail drops and social media posts on the health board's Facebook and Twitter pages. Furthermore, a guide was produced (Appendix 6) that clearly set out the goals and rationale behind the LUMEN service.

On the 28/10/2022 the LUMEN service was presented to Mrs Judith Hardisty (interim Chair HDDUHB), Dame Nia Griffiths (the local MP), and Baroness Eluned Morgan (Health Minister on 28.10.2022) (see Figure 4), the feedback was very positive from all, and all three subsequently highlighted and promoted the service via their Twitter and Facebook pages.

2.5.7.1 Press releases

15.08.2022

[New lung cancer symptom assessment line \(LUMEN\) pilot to launch in Carmarthenshire - Hywel Dda University Health Board \(nhs.wales\)](#)

02.11.2022

[Learning more about LUMEN - Hywel Dda University Health Board \(nhs.wales\)](#)

12.12.2022

[LUMEN service extends across Hywel Dda University Health Board sites - Hywel Dda University Health Board \(nhs.wales\)](#)

20.01.2023

[Respiratory Innovation Wales Bus provides LUMEN Service across Hywel Dda - Hywel Dda University Health Board \(nhs.wales\)](#)



Figure 4: Picture showing the meeting. From left to right: Mrs Patricia Rees (LUMEN Triage Specialist Nurse); Dame Nia Griffiths (MP for Llanelli); Dr Savita Shanbhag, (LUMEN Project Lead and GP Cancer Lead); Baroness Eluned Morgan (Health Minister); Mrs Judith Hardisty (interim Chair HDDUHB), Claire Hurlin (Strategic Head Community and Chronic Conditions) and Richard Davies (Research and Innovation Coordinator)

2.5.8 Other engagements within Hywel Dda

The LUMEN Team presented at/to several other key events/stakeholders across HDdUHB to raise awareness. These events included:

- North Ceredigion GP Collaborative Meeting 23/02/2023
- South Ceredigion GP Collaborative Meeting 23/02/2023
- Mesothelioma and A.A.S.C. Morfa Social Club, LLANELLI 01/03/2023
- Llanelli Multicultural Network (LMCN) International Women's Day 2023 10/03/2023
- HDUHB Contact Centre for LUMEN Presentation 16/03/2023.
- Research & Innovation in Healthcare for West Wales, Department of International Politics, Aberystwyth University 29/03/2023.
- LUMENProject, Future Workforce Team (Volunteering) 03/04/2023
- GP Collaborative meeting Llandybie Hall, Carmarthenshire 11/05/2023
- West Wales Respiratory Day LUMEN Presentation, Narberth 16/06/2023
- LUMEN Presentation, John Burns Centre, Burns, Kidwelly 28/06/2023
- MediWales Connects Conference, LUMEN Presentation, Cardiff 29/06/2023.
- Meeting Chemotherapy Day Unit PPH, LUMEN Presentation 18/07/2023



3. Evaluation

3.1 Evaluation introduction

The LUMEN team alongside the TriTech Institute and Innovation Division, Research and Innovation Department, HDdUHB were tasked with carrying out a robust evaluation of the LUMEN Service. The evaluation focused on the implementation of the service, how the service was managed, patient outcomes and acceptability amongst patients and staff.

This report covers the evaluation period between March 2022 and September 2023.

3.2 Evaluation aims and objectives

The aim of this real-world evaluation was to understand the emerging benefits to patients, staff, and the health board of the LUMEN Service across HDdUHB.

3.3 Evaluation plan

A mixed-methods approach was undertaken to meet the aims of the evaluation. The evaluation was led by the HDdUHB TriTech Institute, as part of the wider LUMEN team. The LUMEN evaluation sought to capture both data from the LUMEN pilot, and valuable insights from HDdUHB on its implementation, incorporating:

- Quantitative assessment of numbers assessed and associated outcomes.
- Qualitative assessment of the service from patients who were referred and from healthcare professionals involved in its delivery

3.4 Evaluation areas

The evaluation collected data in five main areas and compared them to see if there were any possible benefits for our patients:

- 1. Initial referral and assessment data –** assessed via data recorded by the LUMEN nurse as part of the pilot service delivery model.
- 2. Patient engagement and outreach –** assessed via data collected on the referrals to the LUMEN service and data collected from the various outreach campaigns.

3. Clinical outcomes for patients – assessed via data recorded by the LUMEN nurse as part of the pilot service delivery model.

4. Acceptability to patients – assessed via questionnaires completed by patients who accessed the LUMEN service.

5. Acceptability to staff – assessed from responses to interview questions, either delivered in person or via email.

3.5 Evaluation methodology

3.5.1 Initial referral and assessment data

As part of the initial process of accepting the referral, the LUMEN TSN gathered data about the patient's background, characteristics and history. In line with NICE criteria, all relevant symptoms described by the patient were recorded. An Excel spreadsheet was developed to record data relating to both referral data and the clinical outcomes described below.

3.5.2 Patient engagement and outreach

The referral process for patients into the LUMEN service was documented alongside any feedback, surveys or questionnaires. For digital parts of the advertisements of the service, where possible, data was gathered on how people interacted with the service.

3.5.3 Clinical outcomes

Clinical outcome data was collected by the LUMEN TSN as the patients travelled through the LUMEN pathway. Following initial assessment and acceptance onto the LUMEN service, dates for follow up appointments (CXR, CT scan, RALC) and any other referrals or investigations required were recorded. For all patients, any lung cancer diagnosis was recorded. Other relevant clinical outcomes were recorded for all patients without a lung cancer diagnosis.

3.5.4 Acceptability to patients

To assess the acceptability of the LUMEN service and inform any changes or adjustments needed for future service delivery, the views of patients who went through the pathway and healthcare professionals who delivered or were involved in it, were evaluated. A questionnaire was sent to all patients as a paper copy and also offered as an

online Microsoft Forms version to gather patient feedback. A copy of the questionnaire is included at Appendix 7. Questions included multiple choice, Likert scales and open-ended questions.

3.5.5 Acceptability to healthcare professionals

Healthcare professional feedback was collected after the pilot had ended. A short interview script was developed and, to aid completion, staff were given the opportunity to respond in writing. A copy of the interview script is included at Appendix 8. Staff known to have been involved in delivering the service were sent the questions and asked to share with relevant colleagues.

4. Findings

4.1 Initial referral and assessment data

4.1.1 Number of individuals contacting LUMEN

A total of 166 patients contacted the LUMEN service. 16 patients were found to be ineligible following initial assessment by the LUMEN TSN: Four patients were ineligible as they were aged under 40; one patient was aged under 40 and also registered at a GP practice outside HDdUHB; nine patients were ineligible as they had received a recent CXR (six of these patients were advised to seek advice from their GP, while the other three were already under the active care of hospital teams) and two patients were ineligible as they had received recent CT scans. All were advised to seek further advice from their GP or care teams.

4.1.2 Number of LUMEN patient triages

The service stopped after triaging 150 eligible patients as this was a predetermined target number set by the clinical leads. This was because it was a sufficiently large number to be able to assess the service. Once the agreed cohort of patients had been triaged, the service was put 'on hold' for review. All GP surgeries and pharmacies in HDdUHB were informed and posters were removed from general hospitals and community areas. A message with safety netting advice was recorded bilingually on the LUMEN telephone line advising people to contact their GP Surgery to discuss any symptoms of concern.

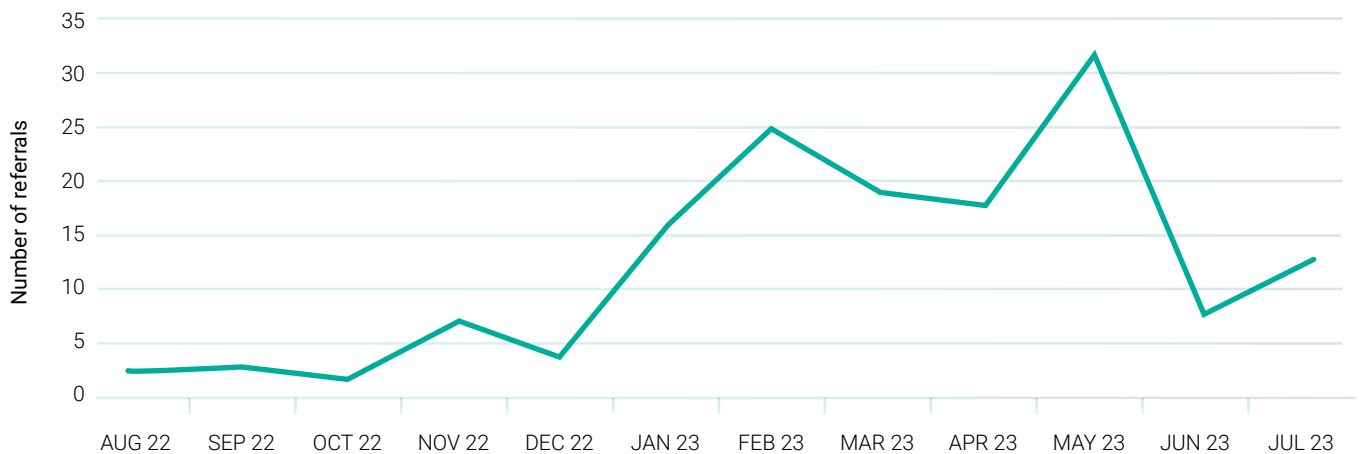


Figure 5: Graph showing the number of referrals into the Lumen Service per month.

4.1.3 Referrals into the LUMEN service

Referral rates were initially low between August 2022 and December 2022 when the LUMEN service was running as a pilot in Carmarthenshire. Numbers rose sharply in January 2023, following the expansion of the service to the whole of the HDdUHB area and remained high until May 2023 when the highest monthly referral rate was seen (see Figure 5). In June 2023 referral rates dropped sharply and remained low until the service closed in July 2023. This was partly due to the winding down of all activities (including all promotional activities) within the project as it was due to close in July.

The different types of referrals into the LUMEN service can be seen in Figure 6. Most patients heard about LUMEN through the Facebook advertisements (63%), with those referred to the service via healthcare workers being second (18%). The advent of the Facebook advertisements via the HDdUHB Facebook page, in January 2023, also coincided with a sharp increase in the number of referrals into the service (Figure 5). In addition to the generic Facebook post on the HDdUHB page, a boosted (targeted) Facebook post was also used on the 11th April 2023, the targeted post included times where patients could visit the RIW bus and its location(s). In total 56 (60%) of the 93 patients who contacted LUMEN via Facebook, had seen the targeted Facebook advert which prompted them to contact LUMEN for assessment and advice. A breakdown of the difference between the generic and targeted Facebook posts can be seen in Figure 7 & 8 and reveal very similar demographics.



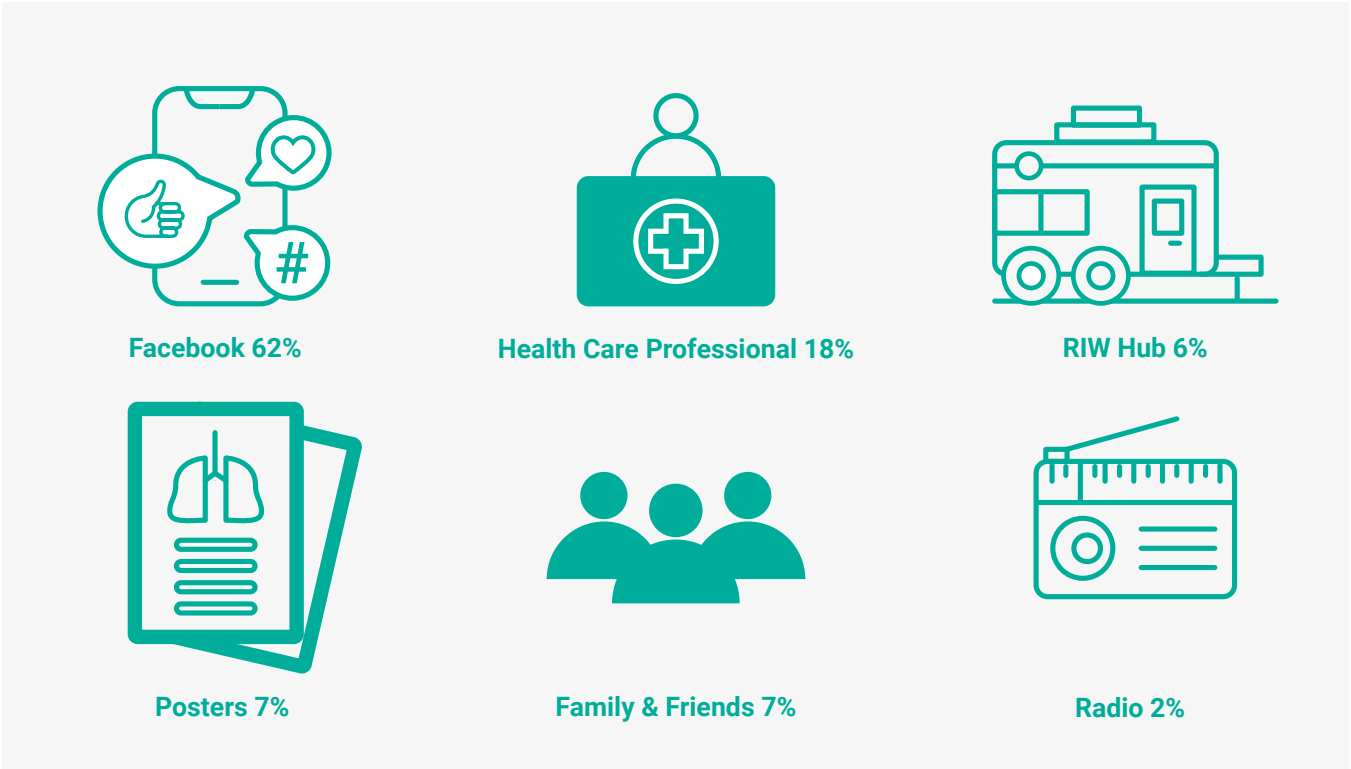


Figure 6: Infographic Showing where the referrals into the LUMEN service originated.

Patients contacted LUMEN via Facebook Adverts

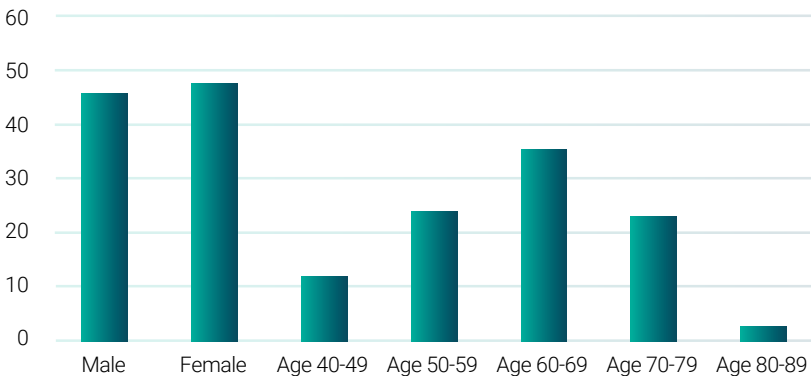


Figure 7: Graph showing referral numbers from Facebook Adverts, by age and sex.

Patients contacted LUMEN via targeted Facebook Adverts

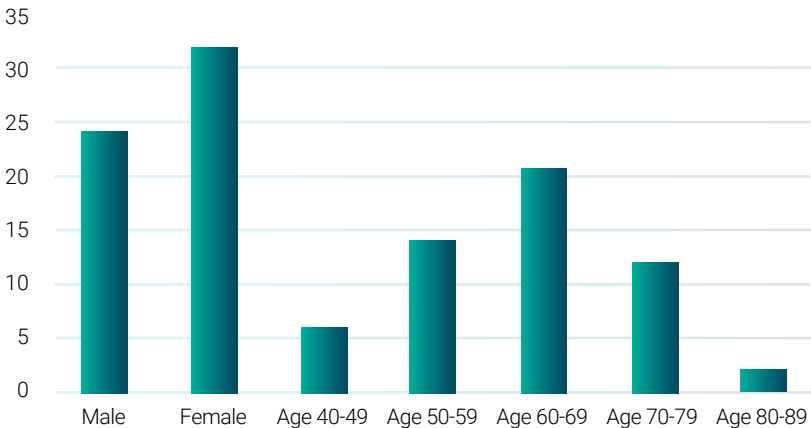


Figure 8: Graph showing referral numbers from Facebook Targeted Adverts, by age and sex.

4.1.4 Patient demographics

An infographic of the patient demographics can be seen in Figure 9. There was an almost equal gender split in the number of referrals with 76 females and 74 males. Most referrals were from patients in the 60-69 age range, followed by the 70-79 age range. The vast majority of users of the LUMEN service were of Welsh origin (in addition to English, Irish, North American, South African, Indian, Iranian and the Philippines).

Figure 10 is an infographic which shows the smoking status of the patients referred into the LUMEN service. 22% of the patients screened were still current smokers and 15% of the group had been exposed to asbestos. All current smokers were offered a referral to smoking cessation services. Two patients were already accessing support via smoking cessation services, nine declined a smoking cessation referral. The remaining 21 patients accepted and were referred to smoking cessation services.



Figure 10: Infographic: smoking status

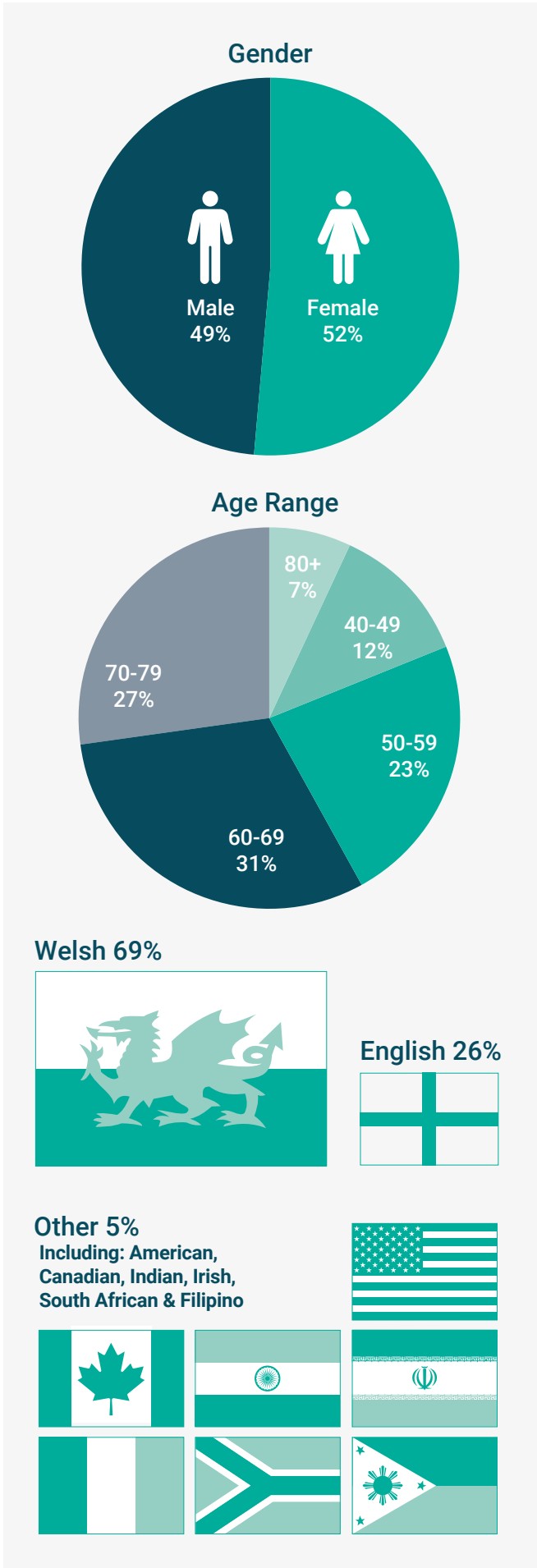


Figure 9: Infographic: Patient Demographics

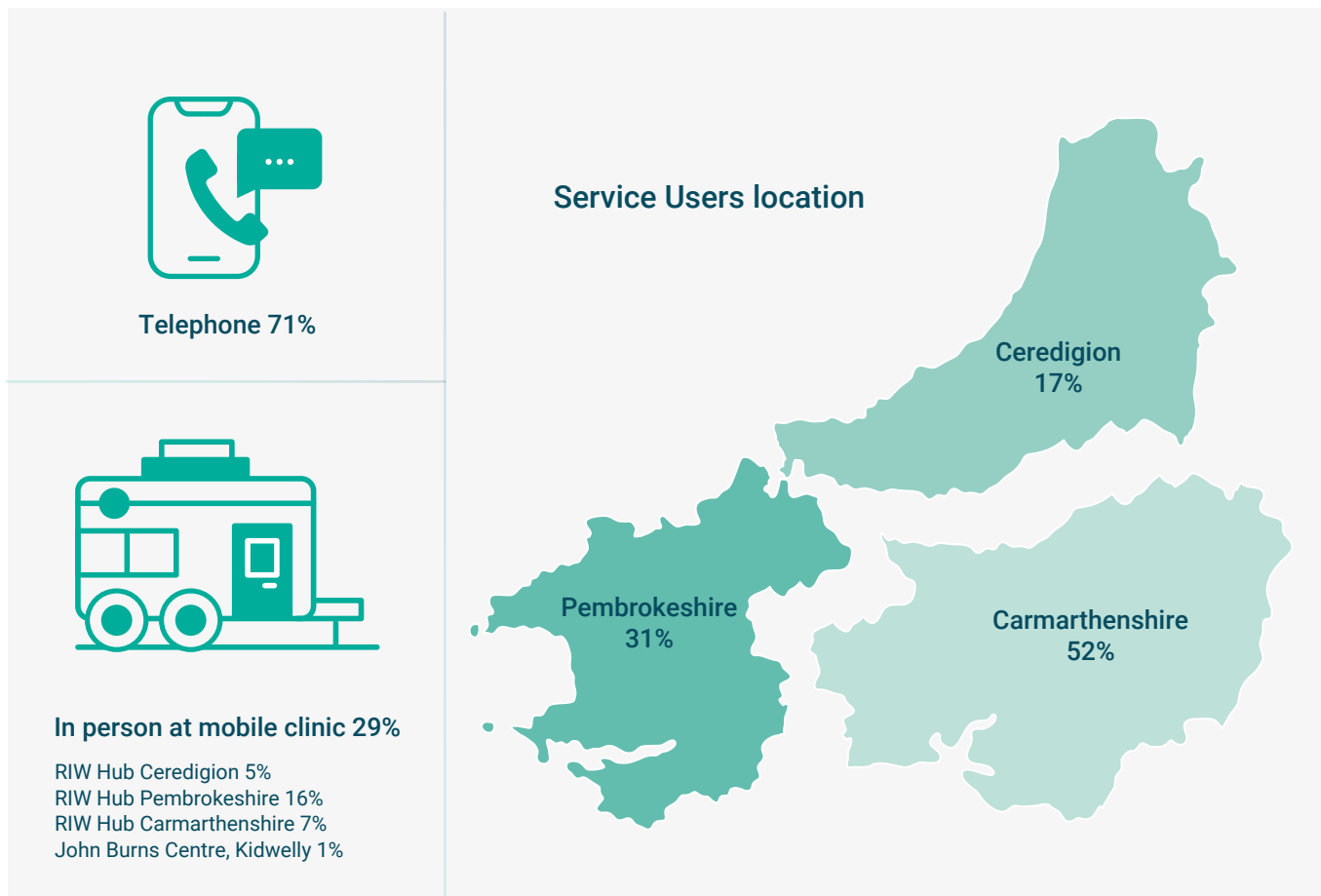


Figure 11: Infographic: Patient engagement and location

4.1.5.1 Face to face

For the face-to-face (FTF) meetings the largest percentage of patients seen were those in Pembrokeshire. With the majority of these visits originating from one RIW clinic held at the Morrison's Car Park, Haverfordwest, Pembrokeshire on the 2nd May 2023 (see Table 2). In Pembrokeshire 24 people attended overall, compared to 12 in Carmarthenshire and 8 in Ceredigion. The RIW Hub was available in Pembrokeshire and Carmarthenshire the same number of times, but the Hub was only available in Ceredigion on two occasions, this was mainly due to logistical issues related to where the Hub was able to be sited for that period of time. It was felt that there was a definite advantage of the RIW Hub being available in supermarkets, which have a high footfall, rather than other facilities such as rugby stadiums and furniture stores.

4.1.5.2 Telephone

For referrals handled over the phone, the average call length between the LUMEN TSN and the patient on the initial referral was recorded for the first 70 patients. The average call length was 29 minutes (SD 8 minutes) with the shortest call length being around 15 minutes and the longest taking 45 minutes. No patients had to call multiple times as they were kept informed throughout. In addition, the answer phone system set up with the telephone line ensured all patients who contacted the service were contacted in a prompt fashion, this was indicated through the patient experience feedback which was very positive (see section 4.4). The average time spent for each person (including contact, referral, safety netting, follow up) was not captured but was dependent on the individual needs and some patients required more contact than others. In future, understanding the average amount of resource that is required per patient is something that should be investigated.

Table 2: Dates and location of all the FTF visits at the RIW Hub including number of patients seen

Morrison's, Haverfordwest, Pembrokeshire	24/01/2023 3 patients
LEEKES, Crossheads, Carmarthenshire	31/01/2023 4 patients
Morrison's, Aberystwyth, Ceredigion	07/02/2023 8 patients
Morrison's, Haverfordwest, Pembrokeshire	21/02/2023 2 patients
TESCO, Cardigan, Ceredigion	06/03/2023 0 patients
ASDA, Pembroke Dock, Pembrokeshire	21/03/2023 5 patients
ASDA, Pembroke Dock, Pembrokeshire	28/03/2023 0 patients
Carmarthen Leisure Centre, Carmarthen	04/04/2023 0 patients
Parc Y Scarlets, Llanelli, Carmarthenshire	18/04/2023 1 patient
Parc Y Scarlets, Llanelli, Carmarthenshire	25/04/2023 5 patients
Morrison's Car Park, Haverfordwest, Pembrokeshire	02/05/2023 14 patients
F2F John Burns Centre Kidwelly	28/06/2023 1 patient

4.1.6 Patient symptoms upon presentation

4.1.6.1 Previous engagement with Healthcare:

Following referral into the service it was important to understand how patients had already engaged with the healthcare system about their symptoms. Nearly 75% of patients had not seen their GP prior to contacting the LUMEN line, reasons for this varied between not being able to get through or get an appointment with their GP at the Surgery. 2 patients stated they did not have a good relationship with their GP at the Surgery. 17% of patients had spoken to their GP about their symptoms with some being signposted to the LUMEN line by their GP. A small number of patients had been given information on the LUMEN service by the pharmacist and one said they had contacted the LUMEN line after seeing a poster in their GP surgery. Responses to the question about symptoms taken by the LUMEN TSN can be seen in Table 3.

Table 3: How patients in the LUMEN service had already engaged with the healthcare system about their symptoms.

Have you contacted your GP about your symptoms?	Number of patients
Yes	23
Yes, and GP gave LUMEN information	3
Not recently	12
No	105
No, saw pharmacist who gave LUMEN information	5
No, but saw LUMEN poster in GP practice	1
Question not answered	1

4.1.6.2 Types of Symptoms presenting to the LUMEN service:

A total of 636 individual symptoms were listed by the 150 eligible patients referred through the service. The most frequently reported symptom was cough (94% of patients), followed by shortness of breath (74%), and then fatigue (67%). The full list of symptoms can be seen in Table 4. In addition, the majority (66%) of patients presented with between 3-5 different symptoms, and one patient had 10 individual symptoms (see Table 5).

Table 4: A full list of the different types and number of individual symptoms that were presented to the LUMEN service that could indicate lung cancer.

Cough	141
Shortness of breath	111
Fatigue	100
Hoarseness of voice	64
Chest pain	55
Shoulder pain	44
Recurrent chest infections	42
Weight loss	24
Appetite loss	23
COPD with changing symptoms	17
Haemoptysis	13
Finger clubbing	2
Grand Total	636

4.2 Patient engagement and outreach

During the initial set up of the LUMEN service, when it was being used only in Carmarthenshire (from August to Dec 2022), a targeted SMS direct phone message service was used at additional cost to the service. Only 2 surgeries out of 3 participated, the feedback was 'mixed', some found it very helpful, others were concerned that the Surgery was informing them they had cancer and caused needless worry. 1 patient who was sent SMS texts was aggrieved that he had been contacted and how his information had been obtained which required explanation. The cost of

Table 5 The number of symptoms that patients presented with to the LUMEN service.

Number of symptoms presented	Number of patients
1	5 (3%)
2	16 (11%)
3	35 (23%)
4	31 (21%)
5	33 (22%)
6	12 (8%)
7	12 (8%)
8	5 (3%)
9	0
10	1 (<1%)
Total	150 (100%)

Table 6: Cost of the SMS texts

Borth Surgery SMS Costs
5p per SMS, message was 5 SMS long
Sent 741 texts.
Total Cost £185.25.

Ashgrove medical centre SMS Costs
5p per SMS, message was 5 SMS long
Sent 1642 texts.
Total Cost £410.5

the SMS service can be seen below (Table 6). In general, there seemed to be poor engagement from the SMS campaign resulting in very few, if any direct referrals. There were several issues with the targeted SMS campaigns such as the campaign may not have reached all segments of the population it was intended to reach, especially those who may have changed their contact information. This limitation introduces the risk of excluding certain demographic groups from the identification process.

Table 7: Facebook Ads and the engagement generated.

Post	Budget	Spend	Duration (days)	Clicks	Reactions	Shares	Comments
Lumen generic ad with all 3 dates Welsh	£150.00	£150.00	15	480	21	6	3
Lumen generic ad with all 3 dates English	£150.00	£150.00	15	1052	138	76	15
Scarlets - Bus English	£70.00	£69.96	5	256	31	20	0
Scarlets - Bus Welsh	£70.00	£69.97	5	168	8	2	2
H'west - Bus Eng	£70.00	£69.99	7	309	21	11	3
H'west - Bus Welsh	£70.00	£69.97	7	169	3	1	2
Lumen Carousel Welsh	£150.00	£38.59	39	171	2	0	1
Lumen Carousel English	£250.00	£150.00	7	924	73	35	26
Lumen Post (Pat - boost) Welsh	£250.00	£250.00	14	607	25	3	12
Lumen Post (Pat - boost) Eng	£250.00	£250.00	14	1034	71	25	8
Totals	£1,480	£1,268	128	5170	393	179	72

4.2.2 Facebook campaign statistics (January - July 2023)

5857 clicks onto the website were recorded with 1,052 clicks coming from a boosted post with all three dates for the RIW mobile clinics. The overall reach and reactions resulted in 316,038 visitors to the posts on Facebook. The most popular post was in English and included a boosted photo featuring Pat Rees, Lung Cancer Triage Nurse. It reached 43,948 visitors, generating 1,034 clicks to the link on to the website. The second most popular post was a generic advert with all three dates for the RIW bus which reached 36,944 unique visitors and generated 1,052 clicks to the website. Table 7 shows the number of ads and the engagement they generated and the cost. The additional funding provided by Moondance Cancer Initiative to extend the service had a positive impact, especially through the Facebook Campaign. This form of communication with the public seemed to provide the best engagement with a small amount of resource and time. The Facebook post used for the ad campaign can be seen in Appendix 9.

4.3 Clinical outcomes

Chest X-rays were required for 146 (97%) of the 150 patients referred into the LUMEN Service (see Figure 12). Two patients were already scheduled to receive or had recently received a Chest X-ray because of a GP request, and two patients had recently had CT scans. One patient did not attend for Chest X-rays after being accepted onto LUMEN.

4.3.1 Number of patients diagnosed with lung cancer

Following their Chest X-Ray, of the 146 patients who received an x-ray from the LUMEN referral, five patients were found to have suspicious scans worthy of follow up for lung cancer. All were referred for CT scan and on to RALC. One of these five patients was diagnosed with lung cancer (T4 N0 M0 Squamous cell cancer). Another patient was referred for endobronchial ultrasound (EBUS), with the results being negative for malignancy. Three patients did not have any lung malignancies on their CT's. They were referred to a Respiratory CNS and were referred to Smoking Cessation.

4.3.2 Number of patients diagnosed with other respiratory conditions

Following their chest X-Ray and assessment, eight patients were diagnosed with COPD and two with asthma, with COPD being a risk factor for lung cancer. One patient appeared to have sarcoidosis and was referred to the respiratory consultant. Two were also noted to have 'nodules' within the lung and were referred for CT scans and to a respiratory consultant for further follow up. Therefore, including the patient diagnosed with lung cancer a total of 14 (out of a possible 150, 9%) new respiratory conditions were diagnosed through the LUMEN service (see Figure 13).

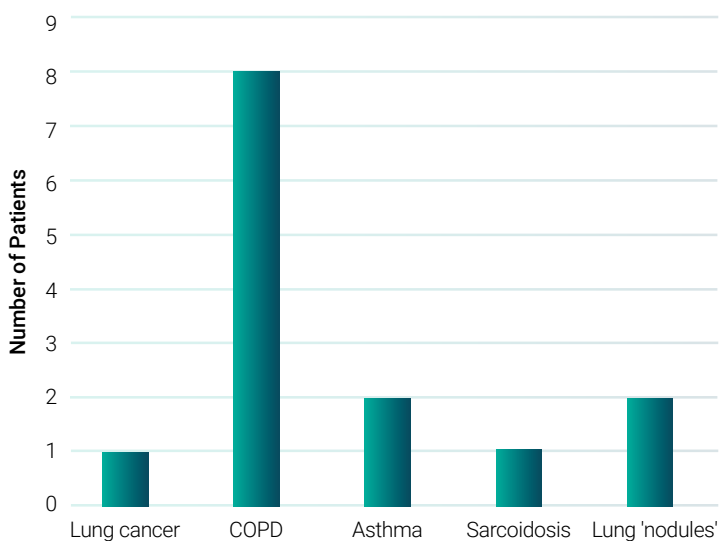


Figure 12: Graph showing the number of conditions diagnosed following referral from the LUMEN service for Chest x-ray.

4.3.3 Impact on radiology services

A key consideration of this new service is the impact it may have had on the current radiology service. The radiology access for CXR for the LUMEN service involved the use of a walk-in service on Monday to Friday in Llanelli, Carmarthen and Withybush hospitals. In Bronglais Hospital, there was limited time from 1400 – 1600 Monday to Friday where patients could attend. The number of patients did not cause a vast increase in demand for chest x-rays across the health board, furthermore, the patients who met the criteria for NICE would have needed a CXR in their pathway irrespective of whether they saw their GP or came via the self-referral service.

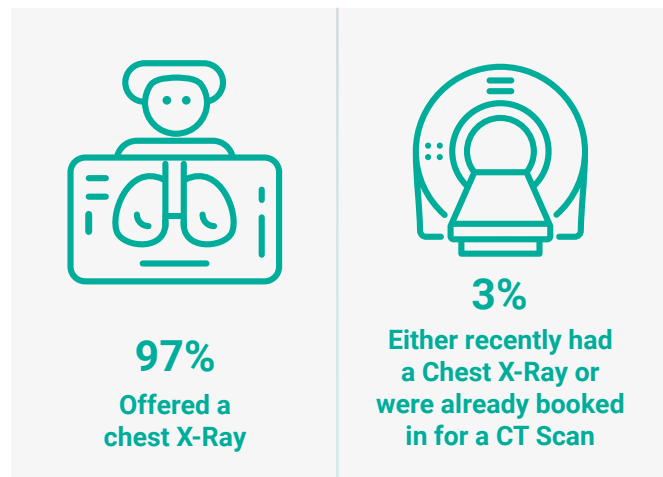


Figure 13: Infographic percentage of patients referred for a chest X-ray.

The LUMEN service provided a new access point for patients who meet NICE criteria to be referred for CXR.

The LUMEN service has paved the way for electronic requesting of chest x-rays by a respiratory nurse across all hospital sites, so gathering audit data in the future would be easier for Radiology.

4.3.4 Referrals to other services in the health board

An important part of the LUMEN service was onward referrals for patients to the most appropriate services or care pathway if outside the scope of LUMEN. Nine patients were referred onto other secondary care departments. This included 4 patients being referred to respiratory consultants for further investigation and management; 2 patients were referred to the gastroenterology team; one patient was referred to the cardiology team; one patient was referred to the Breast Team as scattered foci was seen on CT scan; and finally, one patient was referred to Oncology following diagnosis of lung cancer. In addition, there were 11 referrals to different CNS within the health board for further investigation. This included: 5 referrals to the respiratory CNS teams for further tests and management; two patients were referred to the Asthma Interface CNS for further investigation and management; two patients were referred to the dietician team although one patient refused the referral; one patient was referred to the Parkinsons CNS for follow up; and one patient was referred to the Pulmonary Rehab team.

In addition to the referrals to other services, the LUMEN service identified 33 current smokers. 2 of the patients were already being seen by the smoking cessation team. Of the remaining 31 patients, all were offered a referral into the smoking cessation service. 10 patients declined the invitation, but the remaining 21 accepted. 38 of the 150 patients (25%) interacting with LUMEN had unresolved health conditions which were identified and actioned due to being involved in the service, resulting in 41 referrals to other specialists within the health board.

4.4 Acceptability to patients

4.4.1 Patient feedback questionnaire

To understand the patient's perspective of using the LUMEN service all participants were asked to fill out a questionnaire (Appendix 7). 61 of the 150 (40%) patients seen by the LUMEN service returned feedback questionnaires, a relatively high return rate for questionnaire exercises like these. In addition, feedback showed a strong positive response towards the service. The responses from participants have been broken down into three sections:

- **Why did patients refer themselves into the LUMEN service?**
- **What were the patients' experiences of the LUMEN service?**
- **What would patients recommend to improve the service?**

4.4.2.1 Reasons for using the LUMEN service

The first question asked patients why they had rung the LUMEN line about their lung symptoms and provided a list of possible options. Patients were able to choose as many options as they felt were relevant. The answers can be found in Table 8. The key finding was the convenience of the LUMEN service. In addition, 81% of respondents said they had talked to a family member or friend about their symptoms as a result of seeing the information about LUMEN and before contacting the LUMEN line.

4.4.2.2 Patient experience of the LUMEN service

The next block of questions sought to understand patients' experience of using the LUMEN line.

- When asked if they were happy to talk to the LUMEN TSN about their symptoms, 84% of respondents said, 'strongly agree' and 16% said 'agree'.
- When asked if the LUMEN TSN listened to their concerns about their symptoms 85% of respondents chose 'strongly agree', and 15% of chose 'agree'.
- When asked if the LUMEN TSN made them feel like they could ask any questions about their symptoms 89% of respondents chose 'strongly agree', and 11% chose 'agree'.
- When asked if they felt comfortable about

Table 8: Table showing the answers to the question around the reason for patients ringing the LUMEN line

Reason for ringing LUMEN about lung symptoms	Number of patients
The LUMEN Line was easy to contact	24
I did not need to make an appointment with the LUMEN Specialist Nurse to talk about my symptoms	17
It is difficult for me to make an appointment with my doctor	16
I saw the posters advertising LUMEN	17
A friend or family member told me to contact LUMEN	11
I do not like going to the doctors	6
Other	22

Patient experience

Experience of speaking to LUMEN nurse

Helpful, understanding, easy, calming

Experience of LUMEN service

"Very satisfied with the quick and efficient service"

Excellent service

"An easy and effecient way of speaking to someone who could really help and had extended knowledge on the condition"

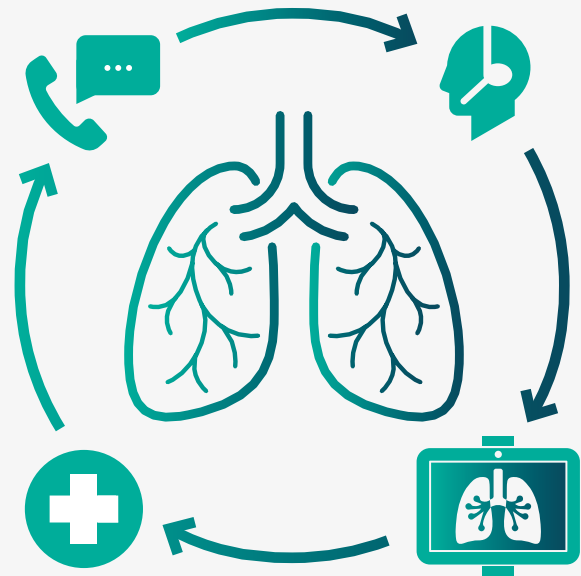


Figure 14: Infographic summarising the patient feedback for the LUMEN service.

the LUMEN TSN giving them advice about their symptoms 87% of respondents chose 'strongly agree', and 13% chose 'agree'.

- When asked if they were happy for the LUMEN TSN to refer them for a CXR 85% of respondents chose 'strongly agree', and 13% chose 'agree'. 2% of respondents answered this question with 'Don't know'.
- When asked if they would recommend the LUMEN service to someone, they knew 82% of respondents chose 'strongly agree', and 16% chose 'agree'. 2% of respondents did not answer this question.
- When asked if they were happy to be contacted and receive communication, results and a plan via the LUMEN telephone-based service, 76% of respondents chose 'strongly agree', and 22% chose 'agree'. 2% of respondents answered this question with 'Don't know'.

4.4.2.3 Patient recommendations for the LUMEN Service

The final three questions were open-ended and asked patients to comment on aspects of the LUMEN service that they felt should be retained, aspects that should be changed,

and provide any suggestions for the future.

4.4.2.3.1 Factors about the LUMEN service to be retained.

The role of the LUMEN TSN was repeatedly referred to, with comments about them being supportive, reassuring, easy to talk to and knowledgeable. Several respondents referred to how important their non-judgemental approach was in helping smokers be open and honest, while struggling to stop smoking.

The ease of access to a health professional, without an appointment, and the fast and efficient follow up process was seen as a key positive feature of the service. Many responses also referred positively to the walk-in service offered via the RIW hub.

4.4.2.3.2 Factors about the LUMEN service to be changed.

Most responses indicated that nothing needed to change. Two respondents noted that there had been a delay in receiving written feedback and one suggested that advising patients of an expected timeframe for this would be helpful.

What do we need to...

Keep doing?	Improve?
Giving advice, support and reassurance	More publicity
Listening and understanding	Promote LUMEN in public information correspondence eg. local and/or central government
Trying to help people who struggle to stop smoking	Nothing, just keep doing what you're doing!
Keep doing the same Keep the service	

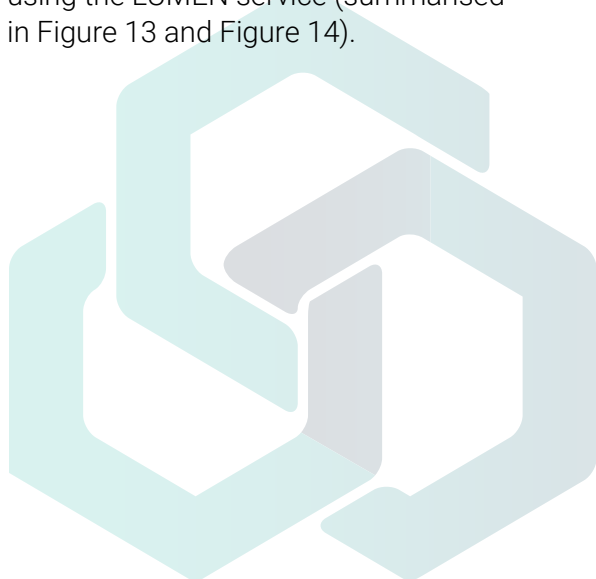
Figure 15: Infographic summarising the things patients think worked well and ways to improve

4.4.2.3.3 Suggestions to improve the LUMEN service.

The most frequently seen suggestion was better promotion of the service, including reaching out further to access more people. More accessible publicity materials were also suggested. Some responses referred to the potential of extending the approach to other specialties.

4.4.2.4 Overall patient acceptability of the LUMEN Service

In general, most patients have reported a very positive experience of interacting and using the LUMEN service (summarised in Figure 13 and Figure 14).



4.5 Acceptability to healthcare professionals

To understand the staff's perspective of the LUMEN service, 5 members of staff were asked to take part in an interview and were asked standard questions (Appendix 8). The five members of staff working in various roles across respiratory medicine, radiology and smoking cessation responded to a request for feedback via interview (in some cases via a written response). Full feedback from staff can be found in Appendix 8. The responses from staff have been broken down into three sections:

- What were staff attitudes towards the principles and design of the LUMEN Service?
- What were staff's experiences of the LUMEN service?
- What were the limitations and recommendations for improving the service?

4.5.1 Staff attitude towards the LUMEN service

Staff attitudes towards the service were positive, with it being described as 'efficient', 'world-class' and 'a brilliant idea and opportunity for residents of Hywel Dda'. Its potential value in reassuring and diagnosing and treating lung cancer with minimum delay was highlighted, although the limited scope and ability of CXR to be used as a screening tool for early lung cancers was also noted.

While only a single malignant diagnosis was made because of LUMEN, the potential value of the LUMEN line as a tool for screening patients not only for cancer but also general lung health was recognised, with new referrals to smoking cessation, pulmonary function tests and diagnoses of obstructive airways disease noted.

Direct access to a specialist nurse and the role of the LUMEN TSN in ensuring rapid access to further investigations and close liaison between different clinical teams was considered excellent for patients. Responses from staff indicated that they had also focused on aiding patients' rapid progress through the lung cancer pathway, and other referral pathways (e.g. smoking cessation) which was in alignment with the principles behind the LUMEN service.

4.5.2 Staff experiences with the LUMEN service

Communications between the LUMEN TSN and other specialities, and the use of electronic requesting for CXRs, were praised for their efficiency. The LUMEN TSN was a key point of contact for patients as they moved through the pathway, staff commented that this was a significant bonus of the service and was seen as benefitting patients by improving communication and the patient experience. The rapidity of access and progression through the pathway was also seen to support patients by minimising delays, meaning patients spent less time worrying. It was noted that current long reporting times for CXRs meant that having a more targeted approach as addressed by the LUMEN service was necessary.

4.5.3 Staff limitations and recommendations for the LUMEN Service

Some comments noted that despite promotion of the service, many people remained unaware

of the LUMEN line. There was a perception that this may have been due to the focus on a specific type of cancer. One comment suggested that with time increased awareness amongst staff and the public would boost uptake and another suggested broadening the service to target more cancers. The potential of exploring the development of more services that interfaced between primary and secondary care, to alleviate pressures in both areas and speed up appropriate referrals for specialist review and investigations was also mentioned.

4.5.4 Reflections from the LUMEN TSN

In addition to the other staff engagement an important part of the evaluation was to capture the perspectives and experiences of the CNS who was employed as the LUMEN TSN.

'LUMEN has been a fantastic service for engagement within the community settings in raising awareness of the symptoms of lung cancer and early diagnosis, also picking up obstructive airway's disease, and other respiratory and cardiac diseases'

'and having the RIW bus for spirometry and Respiratory Nurse review has been very positive and useful'

Quotes from the LUMEN TSN

With any service, reflection helps to understand what could and should be changed to improve the service to ensure it remains viable and meets the needs of the patients. The LUMEN TSN pointed out that the service did sometimes put pressure on radiology, as there is no 'control' of how many people contact LUMEN, resulting in the influx of people requiring chest x-rays.

The LUMEN TSN praised the engagement within the community settings which was always well attended. The LUMEN TSN thought the LUMEN service achieved one of its goals of raising awareness of the symptoms of lung cancer to allow people to be proactive with their health and seeking advice for symptoms of concern, either via LUMEN or their GP. The LUMEN TSN identified that it is important to reflect on how to best engage with the public to pick up more Stage 1 disease rather than emergency presentations with Stage 4 via secondary care.

It was recommended by the LUMEN TSN that continued work would be needed to strengthen the communication between the teams in primary and secondary care to ensure patients were getting the best care possible and ensuring no duplication of work was being carried out. LUMEN had a radio campaign, which resulted in contact from people, unfortunately this was an expensive undertaking for few contacts overall when compared to the Facebook campaign, for example. The LUMEN TSN commented that it would be important to look at all methods of communication to determine their effectiveness to ensure that the right people are targeted. The LUMEN TSN made a point that within the consultation, safety-netting, which is considered best practice, and often an expected clinical standard, particularly in primary and emergency care was easily administered via LUMEN. They also praised the communications team who were excellent with the targeted Facebook campaign, which resulted in the majority of contacts.

5. Discussion

5.1 Key barriers and facilitators of the LUMEN Service

The implementation of the LUMEN service uncovered several barriers and facilitators to setting up an innovative nurse-led service.

5.1.1 Barriers

- **Organizational challenges:** Establishing a secondary care-based telephone service for patients with symptoms of suspected lung cancer presented organizational hurdles. These included the need for administrative support within the pathway to develop a new service specification and appoint the LUMEN TSN and relied on collaboration between the lung cancer team, specialist nurses and the project team. These barriers were overcome but required a longer set-up time and delayed the project launch.
- **Technological challenges:** HDdUHB covers a large geographical area with multiple dialing codes for landlines across the three counties. In order to ensure equitable access for patients

a 0300 number was established, meaning a call to the LUMEN line was the cost of local call from any geographical location, and included in most mobile packages, but this took more time than expected to set up.

- **Primary care concerns:** There were some concerns from primary care colleagues relating to increased workload due to the LUMEN line. This was mitigated by reassurance that the LUMEN TSN and LUMEN clinician would manage the onward referrals to the lung cancer team for all patients diagnosed via this pathway.
- **Patient awareness and impact of the Covid-19 pandemic:** The Covid-19 pandemic had negatively impacted lung cancer diagnosis rates emphasizing the need to develop effective strategies to promote the LUMEN line. This resulted in an approach to educate the public on the possible symptoms of lung cancer: 'Not all coughs are Covid' was used as part of this strategy to promote the importance of ensuring ongoing symptoms such as a cough and shortness of breath were discussed with their GP or via LUMEN.

5.1.2 Facilitators

- **Evidence based practice:** Learning from the earlier PLUS research study, conducted by the same project team, provided a foundation to develop LUMEN.
- **Financial support:** Securing funding from Moondance Cancer Initiative played a pivotal role in planning, launching and delivering LUMEN.
- **Clinical expertise:** The LUMEN TSN was an experienced lung cancer specialist nurse which ensured high-quality remote assessment and support could be provided. This instilled confidence in patients and clinicians and was reflected in the feedback received.
- **Collaboration:** The success of the LUMEN project relied on excellent collaboration between the LUMEN project team, primary and secondary care colleagues, administrative staff and the HDdUHB Communications team.
- **Communications:** Promotion of the LUMEN service relied heavily on the support of the HDdUHB Communications team. Widening the service beyond Carmarthenshire at the end of 2022 aided this as it allowed health board wide communication in relation to the

pilot. Additional funding from Moondance Cancer Initiative enabled the use of targeted Facebook posts from April 2023, with the aim of increasing the reach to a wider audience.

5.2 LUMEN service model

5.2.1 Referral process and diagnosis

The LUMEN service was effective in identifying patients who have symptoms of cancer and ensuring they receive a CXR in a minimum amount of time, as recommended in national guidelines. The service enabled staff to perform a triage of the patients and gather information about their condition and provided a quick and easy pathway to refer the patients to the correct speciality. Of all the patients triaged and found to have symptoms of lung cancer, 97% received an X-ray (the remaining patients were found to not require one or had already had one recently) to check whether onward diagnostic referral was required. In addition, 25% of the patients were also referred to another specialist team within the health board (including 5 to different departments not respiratory related).

The service delivered in HDdUHB, identified one case of lung cancer; however, the diagnosis was made in an advanced stage.

The evaluation found that the overall effectiveness of the service is contingent on factors such as patient outcomes and the potential downstream cost savings associated with diagnosis. However, the model if adopted in the future could be used to run such a service for several Welsh Health Boards as a single nurse could potentially triage 10 patients a day. This would be one way to make such models cost effective.

5.2.2 Reflections on service model – what worked well, what didn't?

Having an experienced nurse who has been qualified for many years and has enhanced knowledge, communication and reflective skills was very beneficial for ensuring the effectiveness of LUMEN and facilitating excellent working relationships within different areas such as radiology. Having a basic knowledge of clinical governance when setting up new services is paramount. The LUMEN TSN has a BSc in

Clinical Governance and this was helpful when looking at specific parts within governance such as communication and safety netting with the patients. Safety netting ensures that the results of investigations are reviewed and acted upon appropriately. In addition, the LUMEN service paved the way for changes and improvements to how CXR are requested and coded within the radiology systems which should have a net benefit in future when auditing or evaluating patients passing through the services.

LUMEN employed 1 full time CNS. During the initial phase of this project, this worked well, there was continuity with patient care and experience, but LUMEN could not run effectively if the nurse was on annual leave, resulting in the nurse manning the telephones on alternate days on her annual leave. Unforeseen sickness occurred towards the end of LUMEN when the service was starting the review stage. If this had occurred during the active part of LUMEN, patient care and safety could have been compromised. The service would require 2-3 nurses (part time) with flexibility to cover the service in times of leave or sickness, to ensure it remains viable and effective.

The LUMEN service, primarily led by a Clinical Nurse Specialist, demonstrates a cost per patient triaged of approximately £522.22. This cost encompasses the salary of the CNS, consultant session fees, administrative costs associated with the service, and costs of promotional activity such as targeted social media posts and printed/distribution costs of promotional materials.

The CNS (or healthcare professional(s)) delivering a service such as this will need to have a broad knowledge base of lung cancer, asthma, COPD and heart failure to manage all respiratory conditions; enhanced communication skills and experience in different fields within nursing. Networking skills to ensure relationships are built within different departments to aid the smooth running of the service. Inclusion of an ANP (Advanced Nurse Practitioner) could be of benefit, but not a necessity as there needs to be a strong working relationship with the Consultant. A non-medical prescribers' course would be of benefit but not a necessity. This would be helpful in face-to-face reviews, where a patient is physically seen and a prescription could be written and handed to a patient, but is less valuable for telephone

assessments due to the inability to physically see the patient and, if medication is required, it cannot be 'given' to the patient and scanning prescriptions to the preferred pharmacy can delay the medication being dispensed. The ability to reflect is paramount when the patient is providing information on current symptoms.

5.2.3 Safety netting advice for patients

Patient letters were the means of communicating the outcome of the assessment and consultation of the patients with the Specialist Nurse, although in-depth, they help facilitate symptom based, safety focused, safety netting advice. Safety netting advice is information that is shared with a patient or carer to help them identify the need to seek further medical help if their condition fails to improve or changes. It is an important way of reducing a clinical risk and is written in a form that is easily understandable, avoiding the use of medical terminology. The GP receives a letter providing an overview of the consultation, a copy of any investigations, and the patient letter. This reduces the time for the GP to review the assessment, plan, and outcome, but having a copy of the patient letter ensures if the patient contacts the GP in the future regarding the assessment, it can be used as a guide to any questions and provides a form of continuity.

5.2.4 Communication and the LUMEN SBAR

The development of bespoke documents providing the Situation, Background, Assessment and Recommendation (SBAR) for each patient triaged by the Specialist Nurse were helpful in ensuring the information received by the Consultant was relevant and kept to a minimum. The SBARs and assessments formed the basis of good communication within LUMEN. The LUMEN Consultant and LUMEN TSN had tried to meet to discuss patients' individual cases, but this proved difficult due to the clinical commitments of the LUMEN Consultant and delayed a decision being made. The SBAR was a supportive tool in providing a quicker and seamless outcome for the patients and provided the possibility of audit. Other Consultants and Specialist Nurses were included in the SBAR feedback as needed to ensure a multidisciplinary approach to supporting the patient.

The LUMEN TSN was able to request CXR's

and CT scans after training and discussion with the Consultant, this allowed the Consultant to utilise his/her time more appropriately, demonstrating prudent use of time.

5.2.5 Patient and staff experience

The findings from the evaluation identified that the patient and staff experience was very positive. Patients identified that they valued the ability to talk through their symptoms with a qualified and knowledgeable professional. The participants identified that they valued the advice and the ability for the nurse to direct them to the correct services and that they would recommend the service to others. Similarly, staff found the LUMEN service very useful, particularly the increased communications between the LUMEN TSN and other specialities, and the increased efficiency when requesting CXRs. In addition, staff identified the role of the LUMEN TSN as a single contact point for patients as they moved through the pathway as a positive improvement on current standards of practice. Both patients and staff praised the rapidity of access and progression through the pathway providing patients with reduced anxiety and worry.

5.3 Patient engagement

5.3.1 Community outreach and engagement

The Roadshow event provided an effective platform for direct community engagement. Through interactive displays, presentations, and informational materials, teams can connect with diverse audiences, fostering a sense of community awareness and involvement in the campaign against lung cancer. By bringing awareness campaigns to public spaces, teams can reach individuals who might not actively seek health information, thus enhancing the potential impact of their message. The interactive nature of roadshows allows teams to provide personalized education and support. Visitors can ask questions, express concerns, and receive real-time guidance, fostering a more personalized and empathetic approach to lung cancer awareness.

Roadshows can emphasize the importance of early detection by providing information about risk factors, symptoms, and available screening methods. By promoting proactive

health-seeking behaviors, teams can contribute to the early diagnosis of lung cancer, potentially improving treatment outcomes. Despite this, the roadshows did not seem to coincide with any spikes or significant increases in self-referrals into the LUMEN service. In general, the roadshows were effective in raising awareness and getting engagement with the general public, however, they were relatively expensive (in terms of time and organization) and in-depth consideration on whether to implement these types of events would need to be taken in the future, to balance the cost effectiveness of them. These types of events should likely be more targeted at events where a large footfall would be expected to maximize their exposure.

5.3.2 Targeted SMS campaign

In general, the targeted SMS campaign was not successful and did not seem to result in any significant increase in patient referrals into LUMEN. The effectiveness of SMS campaigns relies heavily on user engagement. Smokers and ex-smokers may exhibit varying response rates, leading to potential response bias. Individuals with lower engagement levels may not respond to the messages, impacting the accuracy of identifying candidates. Using GP systems-based identification methods may not be dynamic enough to capture recent changes in smoking status. Individuals who had quit smoking when the SMS campaign was undertaken may not be accurately identified. Targeted SMS messages may not be equally effective across diverse cultural and linguistic groups. Although we used bilingual messages, differences in language proficiency, cultural attitudes toward healthcare, and varying levels of digital literacy may result in disparities in uptake of the message. Overall, this makes SMS engagement activities not desirable in future.

5.3.3 Poster campaign, radio campaign, clinical/family referrals and RIW Hub

The poster campaign and referrals via family and friends who had seen the posters provided a steady stream of referrals into the service (accounting for 14% of all referrals). This is a relatively low-cost activity however it does rely on the service team ensuring posters are being presented. A second useful engagement tool was through signposting by other healthcare

professionals, including via the RIW mobile Hub (24% of all referrals). Again, this is a relatively cost-effective tool, however, it does rely on constant engagement and education by the service team with other professionals across the health board. The radio campaign did not prove effective with only 2% (3 people) referring into the service via this route.

5.3.4 Facebook campaign

By far the biggest success in increasing referrals to the LUMEN service was through targeted posts on Facebook. Whilst this did come at a cost (£1,405.80) it resulted in a significant increase in referrals with 37% of referrals coming from these targeted posts and 62% of referrals coming from Facebook in total. This method does seem to be the most effective method of attracting people to a service like LUMEN and should be strongly considered for any such services in the future as a primary method for engaging with the general public and raising awareness of a service.

5.4 Limitations

Throughout the evaluation several limitations were observed around the LUMEN service, these include:

5.4.1 Clinical limitations

One key issue with the service is that it did not meet its primary objective, the service was set up to find undiagnosed cancer (preferably in the early stages of disease). It was expected that around 10-15% of the patients who referred into the service with (several) lung cancer symptoms would have lung cancer. This did not turn out to be the case with only 1 in 150 proving to have lung cancer (and they were at an advanced stage of disease).

5.4.2 Variable community response:

The success of roadshows events and other engagement activities are contingent on the responsiveness of the community. Factors such as the location, timing, and local demographics can influence the effectiveness of the outreach. A one-size-fits-all approach may not be suitable for diverse communities.

5.4.3 Difficulty in follow-up

Establishing a mechanism for follow-up after different events can be challenging. Ensuring that individuals who have received information during the event continue to prioritize their lung health and seek medical advice may require additional strategies beyond the roadshow itself.

5.4.4 Staffing

The role was undertaken by one Specialist Nurse. If the role was developed in the future it would benefit from being integrated within a wider specialist team. This would provide peer support, allow development of the whole team by enhancing their current skills as a Lung Cancer Specialist Nurse and a LUMEN TSN and would ensure the service would be available in the event of sickness or annual leave.

5.4.5 Communication within the LUMEN team

As there was one Specialist Nurse and one LUMEN Consultant, annual leave, sickness and clinical commitments of the Consultant could affect the patient flow. Although there was another Consultant available to answer LUMEN queries, their clinical commitments could possibly affect the patient experience.

6. Conclusions

The aims of the LUMEN project were to develop and launch a nurse-led triage service for lung cancer integrated into current lung cancer pathways, determine acceptability and feasibility and explore patient and healthcare professionals' attitudes in relation to the service.

The project ran for total of 14 months. It was originally planned for 8 months but secured additional funding to extend the service for 6 months. Over its duration the LUMEN service received 166 referrals from patients, 16 of which were ineligible. Of the 150 eligible patients triaged through the LUMEN service, 1 was diagnosed with cancer. An important part of the LUMEN service was onward referrals for patients to other services within the health board to address anything outside of its scope. This resulted in 38 patients of the 150 patients (25%) interacting with the LUMEN service being referred elsewhere

in the health board with several unresolved health conditions identified and actioned.

One other positive identified from the LUMEN project was the impact it had on the systems and pathways in the HDdUHB. The LUMEN service paved the way for electronic requesting of chest x-rays by a respiratory nurse across all hospital sites. This has standardised the approach, and enabled better tracking of the patients, enhancing the service's ability for auditing etc. In addition, patients who used the LUMEN service gave very positive feedback. Staff also had very positive views of the service for patients.

Despite the positives, even though the maximum number of referrals was reached, only one lung cancer case was found. Other respiratory conditions like COPD and asthma were diagnosed as new, but most patients did not need any follow-up. There are patients in HDdUHB with early-stage lung cancer and, therefore, presumably, symptoms, but they did not use the LUMEN service and it is important to understand why to inform how to raise awareness better in the future.

At 0.67%, the cancer conversion rate is too low to consider the LUMEN service a cost-effective model for cancer diagnosis. The LUMEN service was, however, effective in identifying other untreated respiratory or other health conditions. There is, therefore, an opportunity to refocus the service as an CNS-led Open Access Respiratory Hub. The Hub should focus on acting as a safety net for people in the community who might have unresolved healthcare needs that are being missed by the healthcare system. The Hub could then direct those patients to the correct people and services in HDdUHB to meet their needs. This is an area for future research/evaluation, as it could improve respiratory care access and patient outcomes and may reduce GP and emergency department visits.

6.1 Key Recommendations

Recommendation 1: Respiratory Hub

A key recommendation from this work is to explore the development of an open access respiratory hub. Through the LUMEN service 14 individuals had new respiratory conditions diagnosed (9% of all eligible individuals triaged), such as COPD, suggesting the value of new easily

accessed routes for symptomatic people to make contact with healthcare professionals.

The type and breadth of symptoms experienced by those who contacted LUMEN supports the need for healthcare professionals with respiratory expertise to staff the hub, ensuring appropriate onward referrals, safety netting and health advice is given. Appropriate communication and administrative support from the health board would be vital in ensuring the hub is successfully incorporated within diagnostic pathways.

Recommendation 2 : Better use of time

Maximise the use of the dedicated healthcare professionals time in being able to respond to referrals and engage with symptomatic patients by establishing a clear communication plan for awareness and promotion at the outset. This plan can be deployed by communication professionals (e.g. promoted targeted Facebook ads), volunteers and/or 3rd sector rather than the healthcare professionals delivering the service (e.g. community awareness events). Factor in time ahead of launching for volunteers to receive any relevant training from the healthcare professionals.

Recommendation 3: Access to healthcare professionals

Create alternative access points to appropriate healthcare professionals that allow patients to discuss symptoms associated with cancer that can result in onward referral for further investigation without the need for GP involvement. Almost 75% of individuals who contacted LUMEN had not spoken to their GP about their symptoms indicating a clear need for alternative access routes for symptomatic patients.

Recommendation 4: Define patient profiles preferences

When designing a new service model, understand the targeted patient cohort and design the service and communication to meet this, e.g. methods of engagement, language, in person vs online.

7. References

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Appendix 1

NICE guidance for best practice:

When should I refer a person with suspected lung cancer?

Refer people using a suspected cancer pathway referral (for an appointment within 2 weeks) for lung cancer if they:

Have chest X-ray findings that suggest lung cancer, or

Are aged 40 years and over with unexplained haemoptysis.

Offer an urgent chest X-ray (to be performed within 2 weeks) to assess for lung cancer in people aged 40 years and over if they have two or more of the following unexplained symptoms, or if they have ever smoked and have one or more of the following unexplained symptoms:

- **Cough.**
- **Fatigue.**
- **Shortness of breath.**
- **Chest pain.**
- **Weight loss.**
- **Appetite loss.**

Unexplained is defined as symptoms or signs that have not led to a diagnosis being made by the healthcare professional in primary care after initial assessment (including history, examination, and any primary care investigations).

Consider an urgent chest X-ray (to be performed within 2 weeks) to assess for lung cancer in people aged 40 years and over with any of the following:

- **Persistent or recurrent chest infection.**
- **Finger clubbing.**
- **Supraclavicular lymphadenopathy or persistent cervical lymphadenopathy.**
- **Chest signs consistent with lung cancer.**
- **Thrombocytosis.**

National Institute for Health and Care Excellence guideline Suspected cancer: recognition and referral [NICE, 2015].

Safety netting

Safety netting involves active monitoring of low risk people presenting with symptoms in primary care.

Explain to people who are being offered safety netting which symptoms to look out for and when they should return for re-evaluation. It may be appropriate to provide written information.

Reassure people in the safety netting group who are concerned that they may have cancer that with their current symptoms their risk of having cancer is low.

Ensure that the results of investigations are reviewed and acted upon appropriately, with the healthcare professional who ordered the investigation taking or explicitly passing on responsibility for this. Be aware of the possibility of false-negative results for chest X-rays and tests for occult blood in faeces.

Consider a review for people with any symptom that is associated with an increased risk of cancer, but who do not meet the criteria for referral or other investigative action. The review may be planned within a time frame agreed with the person or patient-initiated if new symptoms develop, the person continues to be concerned, or their symptoms recur, persist, or worsen.

National Institute for Health and Care Excellence guideline Suspected cancer: recognition and referral.

Appendix 2

Patient Eligibility for LUMEN

Inclusion Criteria

Symptoms meet NICE criteria for urgent CXR for suspected lung cancer:

Age ≥ 40

2 or more of the following unexplained symptoms if non-smoker,

or;

1 or more of the following unexplained* symptoms if they have ever smoked:

- **Cough for three weeks or more (not related to COVID-19)**
- **Fatigue**
- **Shortness of breath**
- **Chest pain**
- **Weight loss**
- **Appetite loss**
- **Thrombocytosis**
- **Coughing up blood (haemoptysis)**
- **Hoarseness of voice**
- **COPD with changing symptoms**
- **Persistent or recurrent chest infections**

*Unexplained in this instance refers to where these symptoms cannot be explained by obvious causes such as current lower respiratory tract infection, COVID-19, known COPD, known heart failure or other known cancer.

Patients with history of haemoptysis should have a CXR, blood tests and referral to RALC, in line with NICE guidance. These patients need to be discussed with the Lung Cancer Lead Consultant.

Exclusion Criteria

- **Pregnancy**
- **Patients who do not have capacity to consent.**
- **Age < 40**
- **Patient not registered a GP surgery in Carmarthenshire (Llanelli, Amman Gwendraeth and Carmarthen 2T clusters). These patients should be advised to see their own GP.**

Patient symptoms do not fit NICE criteria for CXR suspected lung cancer. These patients should be advised to see their own GP.



Appendix 3

GP letter

Department Of Respiratory Medicine

Lung Cancer Symptom Assessment (LUMEN) Service

Clinic Date: DATE HERE

Patient Management Plan

Patient name and address here

Dear ADD PATIENTS NAME HERE

Date: ADD DATE OF LETTER TYPED HERE

It was a pleasure to speak to you by telephone. This is a brief summary of the points discussed.

LUMEN Assessment: You contacted the service on ADD DATE HERE and you spoke to Patricia Rees, LUMEN Specialist Nurse via the telephone contact number 0300 3036142.

The symptoms you mentioned during the assessment over the telephone needed further investigation as they raised concerns that this could be due to an underlying problem such as a cancer as well as other causes.

Having further investigations would also allow a diagnosis to be made and appropriate treatment commenced if required/ needed.

Presenting problems/ symptoms: ADD SYMPTOMS HERE

Medical history: ADD MEDICAL HISTORY HERE

Current medication: ADD MEDICATION HERE

Smoking history: Never smoker/ current smoker and ex smoker (state pack years)

Allergies: Allergies documented here

Performance status: between 0-4, depending on assessment

Asbestos exposure: State here

(Example of what patient could receive)

A CT was arranged on the 28th October 2022 by your GP, which you were able to attend and we did not undertake a chest x-ray today as the pictures from the CT scan show more detail.

Result and Management:**(Example of what patient could receive)**

The CT scan of your chest from the 28/10/2022 has reported that there was a small borderline node seen which was noticed before from 2020.

Red flag symptoms and plan:**(Example of what patient could receive)**

After discussing you with the doctors it was felt that no further follow up of the small node was required at that time. We are therefore able to discharge you from the LUMEN Service today.

You know that you are more than welcome to contact LUMEN in the future, if you do develop new symptoms or have any new concerns or worries such as:

- Change or new cough that is not related to Covid.
- Coughing up blood/ blood mixed in phlegm (haemoptysis).
- Change or increased or new shortness of breath.
- Rapid or intentional weight loss.
- Chest pain.
- Loss of appetite.
- Hoarse voice.
- Change or new tiredness levels.
- Persistent or recurrent chest infections.

If you wish to discuss this further, please contact myself, Patricia Rees, LUMEN Clinical Specialist Nurse, on 0300 3036142 (answer phone available)

Yours Sincerely

Electronically signed by

Patricia Rees

Lung Cancer Triage Nurse

CC SURGERY ADDRESS HERE
(Letter is copied and sent to Surgery)

Appendix 4

LUMEN poster

Telephone: 0300 303 6142 @HywelDdaHB



2

37

35

4,877



Appendix 5

Pop Quiz

Q1. Which is the most common type of cancer in the UK?

Answer: Prostate

Q2. What is primary lung cancer?

Answer: A cancer that begins in the lungs

Q3. Primary lung cancer is always associated with smoking?

Answer: False

Q4. What causes can increase your risk of developing lung cancer?

Answer: ALL 6 Smoking, radon gas, 2nd hand smoke, asbestos exposure, family history, air pollution.

Q5. What are the common symptoms of lung cancer?

Answer: ALL 9 persistent cough maybe with blood, change in your breathlessness, unexplained weight loss, new chest pain, pain when coughing or breathing, voice change or hoarseness, a lung condition with changing symptoms, loss of appetite, change in tiredness levels.

Q6. How many people develop lung cancer in the UK every year? Answer:

Answer: 47,000

Q8. There's nothing that people can do to lower their chances of getting lung cancer?

Answer: False

Q7. For people who smoke, much of the lung damage can lead to cancer can be repaired if they stop smoking?

Answer: True

Results of the pop quiz - general public's knowledge of lung cancer handed out at the roadshow events.

Q1. Which is the most common type of cancer in the UK?

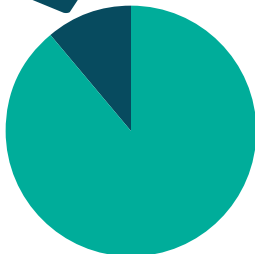
Answer: Prostate



■ Lung ■ Bowel ■ Breast
■ Prostate ■ Melanoma

Q2. What is primary lung cancer?

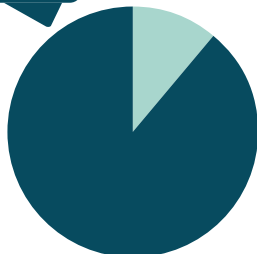
Answer: A cancer that begins in the lungs



■ Begins in the lung
■ Begins somewhere else

Q3. Primary lung cancer is always associated with smoking?

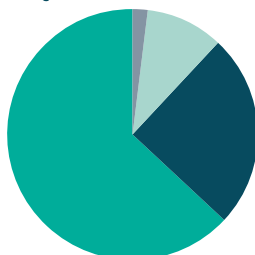
Answer: False



■ True ■ False

Q4. What causes can increase your risk of developing lung cancer?

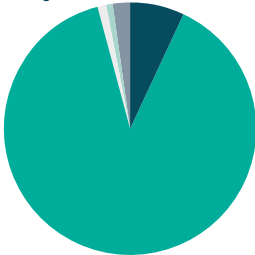
Answer: All



■ Asbestoss ■ Smoking
■ 2nd.H smoke ■ All

Q5. What are the common symptoms of lung cancer?

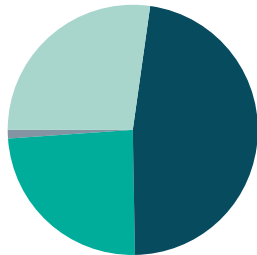
Answer: All



■ Lung condition ■ Chest pain ■ All
■ Persistant cough ■ Breathlessness

Q6. How many people develop lung cancer in the UK every year?

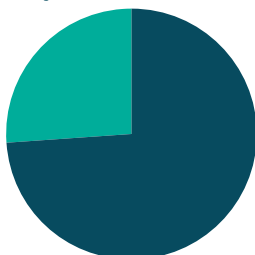
Answer: 47,000



■ Asbestoss ■ Smoking
■ 2nd.H smoke ■ All

Q7. Can lung damage that leads to cancer can be repaired if they stop smoking?

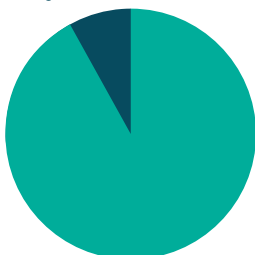
Answer: True



■ True ■ False

Q8. There's nothing that people can do to lower their chances of getting lung cancer?

Answer: False



■ True ■ False

Results of the quiz identify that in general; people's awareness of lung cancer (and cancer in general) is good with the majority of people getting all but one of the questions correct. Most people appreciated that the lung damage can be reversed in people who smoke by stopping smoking (Q7) and that by changing behaviour people can reduce their cancer risk (Q8). Most people also had a good understanding of the risks and causes associated with lung cancer (Q3,4). The one question they did get wrong was that they believed lung cancer to be more prevalent than it is (Q1) although this may have been biased by the fact that they were attending a lung cancer event.

Appendix 6

LUMEN Information sheet for Staff

What is LUMEN?

LUMEN is the Lung Cancer Symptoms Assessment Line, a nurse-led telephone service, where patients with potential lung cancer symptoms can call, speak with a respiratory nurse, be booked for a chest x-ray and be assessed for Lung Cancer. The service was launched in Carmarthenshire on 15.08.2022, as a pilot. Since 07.12.202, LUMEN service is available across all areas of Hywel Dda University Health Board.

What is the purpose of LUMEN?

The purpose of LUMEN is to hopefully, increase early detection of Lung Cancer. Within Wales there are over 2300 patients are diagnosed with lung cancer each year, however less than 20% of these are diagnosed at early stage. The LUMEN service will give the public an additional access point for lung cancer diagnosis and does not replace any current service the health board offers.

How did LUMEN come about?

The LUMEN project was a successful applicant of Moondance Cancer Initiative's Innovation Time Award. Moondance developed a funding call for projects focusing early diagnosis of Cancers. Hywel Dda University Health Board's Research Department had previously developed a similar project called the PLUS study, where selected pharmacies were able to fast track patients with relevant symptoms for chest x-ray. The PLUS project was forced to close early due to the COVID-19 pandemic.

Who is involved in LUMEN?

LUMEN was developed by a team of Research and Innovation Staff led by GP with special interest in cancer care.

Project Lead: **Dr Savita Shanbhag**
– GP Cancer Lead

Nurse Lead: **Pat Rees - LUMEN Clinical Nurse Specialist**

LUMEN Clinician: **Dr Jonathan Fisher Black, Respiratory Consultant**

Project Team: **Dr Rachel Gemine, Richard Davies, Sarah Rees, Research and Innovation Team, Trittech Institute, Hywel Dda University Health Board**

Project Supported by:

Prof Phil Kloer – Medical Director / Deputy CEO
Dr Robbie Ghosal – Respiratory Physician / Hospital Director
Prof Keir Lewis - Respiratory Physician
Respiratory Team at PPH
Radiology Team
Prof Chris Hopkins – Head of Trittech and Innovation

Who can benefit from LUMEN?

This service is available to anyone registered with a GP in HDdUHB area who is aged 40 or over, smokers and ex-smokers with 1 or more of the following symptoms and non-smokers with 2 or more of the following symptoms:

- Cough (more than 3 weeks).
- Losing weight without trying.
- Shortness of breath.
- Hoarse voice.
- Repeated chest infections.
- Chest pain.
- More tired than usual.
- Loss of appetite.
- A lung condition with changing symptoms.

Appendix 7

Patient questionnaire

Why you rang the Lung Cancer Symptom Assessment Line (LUMEN) about your lung symptoms. Please tick all those that apply				
Comment				
Did you talk to anyone about your symptoms before you contacted the LUMEN Line? Please tick one answer				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
If so, who did you talk to? Please tick all those that apply				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
I was happy to talk to the LUMEN Specialist Nurse about my lung symptoms				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
The LUMEN Specialist Nurse listened to my concerns about my lung symptoms				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
The LUMEN Specialist Nurse made me feel like I could ask any questions about my lung symptoms				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
I felt comfortable about the LUMEN Specialist Nurse giving me advice about my lung symptoms				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
I was happy for the LUMEN Specialist Nurse to refer me for a chest X-ray				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
I was happy for the LUMEN Specialist Nurse to give me information about stopping smoking (If you are not a smoker please leave this question blank)				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
If I knew someone with lung symptoms, I would recommend the LUMEN service to them				
Strongly agree	Agree	Neither	Disagree	Strongly disagree
The Nurse I spoke to discussed what they thought my symptoms may be				
Strongly agree	Agree	Neither	Disagree	Strongly disagree

The LUMEN Line is a telephone service, and I was happy to be contacted and receive communication, results and a plan via this route

Strongly agree

Agree

Neither

Disagree

Strongly disagree

What was the one thing about your experience that you think we need to keep on doing?

Comment

What was the one thing about your experience that you think we need to change?

Comment

What would you suggest we did to make it better in the future?

Comment

Appendix 8

Staff questions and answers

Please can you tell us about your experience of the LUMEN project?

- "We received the requests via email, printed them off & put them on the system."
- "I think patients having direct access to a specialist nurse and rapid access to investigations has been excellent for patients. Although no significant malignant diagnoses were picked up it has been a good screening tool for "lung health" and enabled referrals to smoking cessation, pulmonary function tests and diagnoses of obstructive airways disease and onward referrals as appropriate."
- "Always very valuable, swift discussion, diagnostic treatment and liaising with all parties."
- "I reported many CXRs for the LUMEN project. I was emailed by Patricia whenever a patient was either attending for a CXR or one was in need of a report, I endeavored to keep reporting times as low as possible (usually within an hour). I also directed and communicated urgent findings to the relevant people."
- "As a service we have welcomed having a direct link to refer patients and contacts to for any symptomatic and/ or treatment concerns. This has been a symbiotic relationship and we have received referrals

from Pat and were able to fast track these to support quitting or harm reduction to reduce cancer risk or improve treatment success."

What do you think of this project?

- It was efficient from what I saw briefly.
- Essential
- I think it has highlighted the limited scope and ability of CXR as a screening tool for early lung cancers. Obviously with the advent of targeted CT screening that will hopefully change in the coming years.
- I think the LUMEN project was fantastic, I thought it was a great use of resources and what we should be aiming for in the NHS.
- It was a brilliant idea and opportunity for the residents of Hywel Dda.

Please could you describe what you think has worked well with the project?

- Patient had a quick & efficient service.
- Its a fantastic facility to reassure, diagnose and treat symptomatic patients with minimum delay.
- The communication between the Lung Cancer Nurse (Patricia) and myself was very efficient and allowed us to stay on top of

referrals. The use of electronic requesting for the CXRs was fantastic, it minimised delays compared to traditional hand written forms.

- The treatment provided to anyone accessing the service was world class and a vast improvement on timescales offered by traditional routes
- As explained above - it has been useful as a screening tool for non-malignant cardio-respiratory illnesses and more prompt management thereafter.

Please could you describe what you think has not worked well with the project?

- None from what I could see.
- I haven't found any faults from my perspective. Maybe publicity?
- Access and referral to further imaging (CT etc) once an abnormal CXR had been obtained seemed to take too long. These LUMEN CXRs needed to be reported whilst the patient was still in department, then referred for same day CT if required.
- Despite efforts to raise awareness I just don't think people were aware of the availability of the scheme. This may have been due to COVID but also as its about specific lung cancer symptoms. Perhaps linking with gastro for other forms of cancer may be useful (oesophageal etc)
- With the UK Screening service suggesting all nations ought to work towards CT screening, was always going to have a limited lifespan.

What do you think are the components of the project that have helped or supported patients?

- The service for the patient was quick.
- Speaking to Pat personally and having a contact 'within' the pathway.
- Rapid access to a reported CXR allows a patient to have peace-of-mind, and allows us to minimise delays in patient care. I thought having a point of contact (Patricia), having a person who was in charge and well-connected benefitted patients massively.
- Fast access to a specialist nurse, less time

spent worrying, immediate screening.

- Direct access to specialist nurse and the case-review by a specialist doctor allowing more rapid onward referrals to appropriate clinics and secondary care services.

How do you feel about the future of the service? Do you have any recommendations?

- I don't know enough to comment.
- I think it highlights the benefits of potential "interface" services between primary and secondary care to alleviate the pressures in both areas and speed up appropriate referrals for specialist review and investigations.
- It needs to keep going definitely. It's not just about treatment outcomes, it's about mental health and stress reduction too.
- I hope a service like this continues. The reporting time for a CXR can be up to 4 weeks at the moment so a targeted approach is a must!
- I recommend further refinement of the follow up imaging pathway, some of the patients required CT and there seemed to be a significant delay (compared with access to a reported CXR). I understand this is a local issue and maybe outside of the remit of this study, but with patients with suspected malignancy it adds unnecessary delay.
- I would love it to continue. It was innovative and with time I am sure awareness of it amongst professionals and the public will continue to increase uptake.

Appendix 9

Facebook advert

Come see us about your lung symptoms **Early Diagnosis Saves Lives**

Lung Services will be visiting towns in the RfW Mobile Respiratory Unit at the following locations:

07/03/23 - Tesco, Cardigan
21/03/23 - Asda Pembroke Dock
28/03/23 - Asda Pembroke Dock

0300 3036142
9am - 3pm

RESPIRATORY INNOVATION WALES LUMEN



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