

Interim Report of the Evaluation of Rapid Cancer Diagnostic Services

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Executive Summary

The Centre for Sustainable Delivery (CfSD) has invited the University of Strathclyde to conduct an interim evaluation of Scotland's Rapid Cancer Diagnostic Services (RCDS). The establishment of RCDS person-centred fast-track diagnostic pathways aims to provide primary care professionals with a new route to refer patients with non-specific symptoms, such as unexplained weight loss, pain or fatigue that may be suspicious of cancer. The implementation of the RCDS principle is timely, given that the Covid-19 pandemic has demonstrated the need for local delivery of diagnostics, where feasible, and a reduction of footfall within secondary care. The first three RCDS pathways were established in NHS Ayrshire & Arran, NHS Dumfries & Galloway and NHS Fife, respectively, in summer 2021.

This interim report analyses the nationally agreed minimum datasets collected by each of the three early-adopter Health Boards to date. It also presents data from the patient and primary care surveys, respectively, developed by CfSD and administered by the three Boards. Finally, the report discusses findings from an initially limited set of qualitative interviews conducted by the University of Strathclyde in summer and autumn 2022 with RCDS patients and a range of healthcare professionals.

It is widely accepted by healthcare policy makers and professionals that healthcare in the 21st century should be based on the following six quality dimensions: safety, clinical effectiveness, patient-centredness, timeliness, equity and efficiency (or cost effectiveness). The early evidence from the combined quantitative and qualitative analysis in this interim report suggests that the overall outcomes and experience of the three RCDS pathways are likely to meet at least the first five criteria in this list.

The patient surveys and interviews indicate high appreciation of the rapid nature of the RCDS pathways. The one-to-one contact with dedicated healthcare staff and the timeliness of cancer or non-cancer diagnosis are particularly valued. In consequence, overall patient satisfaction with the new service is high. Based on the surveys and interviews with professional healthcare staff, patient safety and clinical effectiveness (not least in terms of cancers detected) appear to be good. The overall impression is that the respective pathways are fulfilling their primary purpose; that is, a comparatively rapid service to rule out or rule in cancer for patients that do not directly qualify for referral to a site-specific pathway. So far, the mean waiting time from referral to diagnosis in this study is 14 days and the aggregate cancer incidence rate is 12.1%, which is well in line with studies of similar pathways or centres elsewhere in the UK and the rest of Europe (7.2% to 12.6%).

Although staff generally hold favourable views of the new RCDS pathways, feedback indicates that further investigation is required to ascertain their equity and cost effectiveness – for example, in comparison with current site-specific cancer pathways. In particular, more micro-level analysis is needed of resource inputs & costs, as well as quality-of-life benefits accruing to patients from rapid diagnosis, so that the efficiency and cost effectiveness of the new RCDS pathways can be accurately evaluated. This will be a key objective of the second year of evaluation.

The University of Strathclyde team will also continue to explore the patient and professional experiences of the RCDS pathways, including their equity, accessibility and value. Research will focus on the optimal components of the RCDS pathways, in addition to a more in-depth health economic analysis.

Interim Report

Introduction

The Centre for Sustainable Delivery (CfSD) has invited the University of Strathclyde to begin an evaluation of Scotland's Rapid Cancer Diagnostic Services (RCDS) – previously known as Early Cancer Diagnostic Centres (ECDC). The first three RCDS pathways are located in:

- NHS Ayrshire & Arran;
- NHS Dumfries & Galloway;
- NHS Fife.

Prior to the establishment of the RCDS pathways, patients who do not meet the Scottish Referral Guidelines for Suspected Cancer criteria or who present with non-specific but concerning symptoms, could cause their primary care professional staff concern, especially if the latter's 'gut instinct' is of a malignancy. In such cases, Primary Care would have to coordinate a number of diagnostic tests, while retaining full clinical responsibility for the patient, or choose to refer to a single cancer speciality that may not be the most appropriate. This process can result in delayed diagnosis, onward referrals to multiple specialties, as well as unnecessary or inconclusive examinations with resulting poorer patient experience and outcomes.

The establishment of RCDS person-centred fast-track diagnostic pathways aims to provide Primary Care with an alternative route to refer patients with non-specific symptoms, such as weight loss, fatigue and nausea that are suspicious of cancer. Similar Rapid Diagnostic Centres (RDCs) have been set up, with compelling evidence, in Denmark, England and Wales in recent years e.g., (Dolly et al., 2020), (Naesar et al., 2017). The implementation of the RCDS principle is timely, given that the Covid-19 pandemic has demonstrated the need for local delivery of diagnostics, where feasible, and a reduction of footfall within secondary care. Lengthening waiting lists and backlogs for urgent and routine patients across a number of specialties, caused by the COVID-19 pandemic, add to the urgency of this new referral pathway. The RCDS pathways will ensure that those identified as higher risk of cancer are expedited into the appropriate system, so that they receive the required treatment and care earlier than would otherwise have been feasible.

In line with the Scottish Government's National Cancer Plan – [Recovery & Redesign: An Action Plan for Cancer Services](#), three early-adopter RCDS pathways were established Spring/Summer 2021. The high-profile nature of this work requires independent evaluation to enable adaptive evidence-based policy decision-making, which can help to inform wider roll-out. The policy commitment already exists in regards to introducing RCDS pathways across NHS Scotland, to ensure equitable access ([A Fairer, Greener Scotland: Programme for Government 2021-22](#)). In light of this, it is important to understand the best model or most effective components of an RCDS. This will help ensure that all patients, regardless of where they are referred into an RCDS pathway, receive consistently high quality care. After consideration by the national multi-disciplinary RCDS Oversight Group (chaired by NHS Dumfries & Galloway's Chief Executive, Jeff Ace), an application process was undertaken late 2020 across NHS Scotland. Three Boards were independently identified as the early adopters of the RCDS model; namely, NHS Ayrshire & Arran, NHS Dumfries & Galloway and NHS Fife. While all three Boards have adopted somewhat different pathways (see pathway visuals in Appendix A), they all embed the nationally agreed RCDS key principles, as follows:

- Excellent patient coordination and support with patients having an assigned 'navigator' throughout their diagnostic pathway alongside access to accurate resources, to inform decision-making.

- Early identification of patients that meet RCDS referral criteria, with timely referral to the service and a suite of preliminary tests completed.
- Prompt Active Clinical Referral Triage (ACRT) undertaken.
- Coordinated testing, based on the patient's needs in a 'one-stop' environment where possible, with live or rapid reporting, shortening the diagnostic pathway.
- Earlier diagnosis of cancer, or other condition(s), shared appropriately with the patient and the outcome speedily communicated back to primary care along with next steps.
- Appropriate onward referral for further support, treatment or care.
- Adoption of the principles of Realistic Medicine throughout.

A relatively small number of complex patients will move through the RCDS pathways at any one time – this limits the complexity of evaluation that can be undertaken so soon after the first three pathways have been established, given the small sample size. Additional evaluation will be required by the RCDS Oversight Group as this work progresses over the entire time of the two-year evaluation period.

All three early-adopter Boards committed to establishing a fast-track diagnostic pathway for patients with non-specific symptoms suspicious of cancer. The pathways have a navigator role at the heart of them, supporting patients and their families from the point of referral. Each Board developed the navigator's role separately, so this differs across the pathways. Further (albeit slight) variation can be identified within the referral criteria and suite of preliminary tests to be completed within primary care- at the point of referral. Furthermore, in two out of the three RCDS pathways, primary care has direct access to diagnostic CT scanning

- NHS Ayrshire & Arran** has established a virtual RCDS. The Board works towards a 21-day model, from referral to communication of results to the patient. Referrals went live on 21 June 2021 in one GP cluster with the remaining clusters coming on stream by the end of August 2021. The Board opened to referrals from the Combined Assessment Unit (CAU) in November 2021. Haematologist Clinical Lead.
- NHS Dumfries & Galloway** has established a 7-day pathway (from referral to communication of results to the patient) with 'hot' clinics and 'hot' reporting. Referrals went live on 17 May 2021, adopting a phased approach by GP cluster. Haematologist Clinical Lead.
- NHS Fife** is working towards a 21-day pathway (from referral to communication of results to the patient). Referrals went live on 7 June 2021. Colorectal Surgeon as Clinical Lead but is now a nurse-lead service. The Board is now expanding learning from their RCDS into gastro-intestinal pathways (UGI and colorectal).

Across RCDS pathways, patients can be referred by primary care professional staff with the main aim of identifying non-specific symptoms suspicious of cancer. Patients can also be redirected from site specific pathways if they meet RCDS criteria. In each case, primary care physicians also have the option to refer patients to a site-specific cancer pathway. In each of the three pathways, patients will have an initial set of tests (which may differ somewhat between the pathways) at primary care level, prior to referral to the RCDS. At this point, patients are also offered access to a nationally agreed resource to provide them with information on the RCDS that was developed in collaboration with the third sector and patient representatives. Patient referrals are then vetted for pathway suitability and either accepted into the RCDS or redirected to another service or back to the primary care clinician. Patients accepted onto the RCDS pathway will be contacted within 48 hours of receipt of referrals and will have further diagnostic tests (normally including a CT scan) to determine a final outcome (cancer, non-cancer, no diagnosis or other) and will be redirected at the completion of that stage. Modes of delivery of the pathway vary between virtual and in person clinics, and all have an associated Multi-Disciplinary Team (MDT) of healthcare professionals to support clinical decision making. There are also differences with regard to the precise nature of the patient contact between the three RCDS pathways.

Evaluating the RCDSs – Methods

Study objectives

The objectives of the overall evaluation of RCDS over the commissioned period of two years are to:

- Determine the impact of the initial three pathways, while providing recommendations for the wider delivery of the RCDS model across NHS Scotland;
- Identify the optimal components of the RCDS model in NHS Scotland;
- Report on findings and provide recommendations to inform evidence-based decision making.

This interim report is based on the first year of the services running. It will provide summaries of the nationally agreed minimum datasets collected by each of the three early-adopter Boards to date, giving an overview of the impact of the RCDS initiative. In addition, this report will show findings from the surveys developed by CfSD and administered by Boards regarding the RCDS pathways, including results from the patient and primary care professional surveys. Finally, information will be presented on patient and professional experiences & perceptions of RCDS to date, based on an initially limited number of qualitative interviews conducted by the University of Strathclyde in the Summer and Autumn of 2022.

Study Setting

The interim evaluation took place within NHS Ayrshire & Arran, NHS Dumfries & Galloway, and NHS Fife.

Study Design and Methods

The evaluation adopted a concurrent mixed methods approach informed by a realistic evaluation framework (Pawson and Tilley, 1997) that questions ‘what works, for whom, in what respects, to what extent, in what contexts and how?’.

Analysis of RCDS Minimum Data Sets

The first stage of the quantitative analysis, as detailed in this interim report, is based on an analysis of the agreed minimum datasets collected by each of the three early-adopter Boards to date. The anonymised minimum data sets were shared with University of Strathclyde by each of the Boards, based on formally approved Data Sharing Agreements (DSA) and Data Protection Impact Assessments (DPIA). The quantitative analysis includes the following key measures that are aggregated across all three pathways:

- RCDS referral decisions;
- Number of RCDS patients over time;
- RCDS patient outcomes;
- Cancer types diagnosed;
- Tests performed;
- RCDS patients by gender (cancer and non-cancer);
- RCDS patients by age (cancer and non-cancer);
- RCDS patients by clinical frailty score (cancer and non-cancer);
- RCDS patients ECOG performance score (cancer and non-cancer);
- Presenting symptoms (cancer and non-cancer);
- Comorbidities (cancer and non-cancer);
- GP practice referrals by SIMD (cancer and non-cancer).

User Surveys (CfSD Evaluation)

Patient Survey

All patients that moved through a RCDS pathway in Scotland, were given the opportunity to complete a questionnaire that was developed by the national RCDS Oversight Group. The survey builds on previous Scottish Cancer Patient Experience Survey questions, as well as the questions asked in the Wales' Rapid Cancer Diagnostic Centres' patient experience survey, with key input from third sector organisations and patient representatives. A single system was set-up to coincide with Scotland's first Rapid Cancer Diagnostic Services being established, to ensure a consistent approach was taken to capturing, storing and analysing patient experience across NHS Scotland. Boards that host an RCDS pathway could determine at which point their patients are offered the opportunity to complete the questionnaire – some questions may be asked when the patient is in a physical clinic waiting, while others are completed at home once they've completed the pathway.

Primary Care Professional Survey

A link was issued to all GP practices in the Health Boards with a RCDS, via Lead Cancer GPs, with everyone encouraged to participate in the survey - both those that have referred patients to an RCDS and those that have not. The link was also shared ad-hoc on other occasions by the RCDSs as a reminder based on participation levels. The survey builds on questions asked in the Wales' Rapid Diagnostic Centres' Primary Care survey, with input from third sector organisations, patient representatives and NHS Scotland Lead Cancer GPs. Using the same single system (Smart Survey) that was set-up to capture, store and analyse patient experience, the RCDS primary care survey was launched in April 2022, in advance of the RCDS pathways reaching their one-year milestone. Twelve questions are asked; not all questions are mandatory and Primary Care clinicians can skip those they do not want to answer, so there may be variance in the number of responses between questions. While not reflected in this document, results can be broken down by Health Board, allowing individual RCDS pathways to act on feedback provided. For the purposes of this interim report, aggregated results from both the patient and professional surveys are included across the three RCDS pathways and qualitative results removed to avoid the possible identification of any participants.

Qualitative interviews

Qualitative interviews were conducted with 8 patients and 10 professionals, from across primary and secondary care, involved in the RCDS pathway. Ethical approval for the work conducted was obtained through the University of Strathclyde's University Ethics Committee (UEC), application number **UEC22/37**. After this approval was obtained, the documentation was shared with each of the three study sites. Each of the three study sites has confirmed that this work constituted a service evaluation and therefore did not require an NHS REC approval. NHS R&D departments from the participating Boards were subsequently contacted and the study approved before data collection commenced. A convenience and purposive sampling approach was used for both the patient and professional interviews.

Study sample

Patients and Professionals - Inclusion and Exclusion Criteria

The evaluation approach encouraged the inclusion of participants with a wide variety of different experiences.

Patients eligible for participation had to:

- Be aged 18 and over;
- Have used the RCDS pathway;
- Be able to provide informed consent;
- Be able to read, write and understand English.

Patients were not eligible for recruitment if they were unable to provide informed consent.

Professionals eligible for participation had to:

- Be involved in the delivery of the RCDS pathway;
- Be able to provide informed consent;
- Be able to read, write and understand English.

Professionals were not eligible for recruitment if they are unable to provide informed consent.

Results

Analysis of RCDS Minimum Data Set

The analysis of the agreed minimum datasets showed that 1436 patients were referred to the RCDS pathway up to October 2022, of these, 962 (70%) of patients were accepted onto the pathway, and 99.4% of pathway referrals originated from primary care. Figure 1 illustrates RCDS patient arrivals over time, whilst also showing the additional referrals that are not accepted to the pathway during vetting.

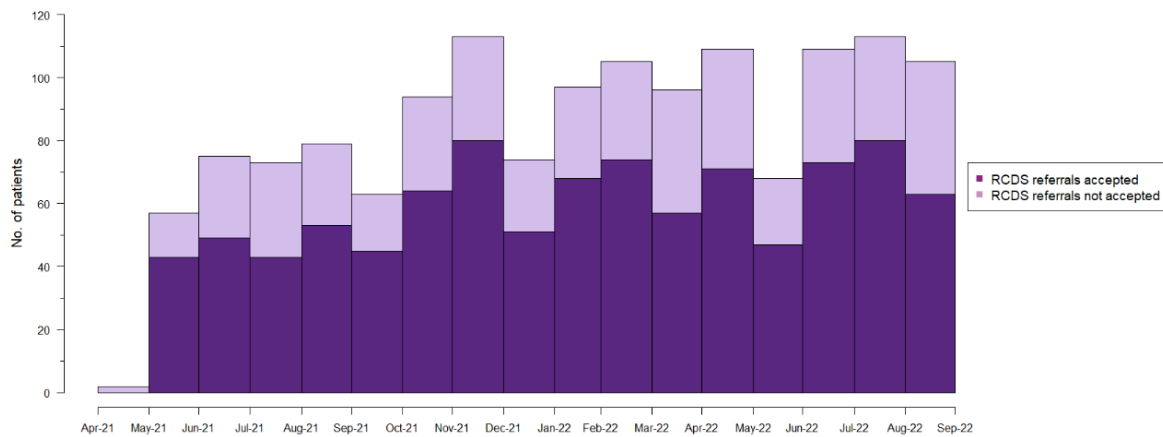


Figure 1: Number of RCDS referrals accepted over time

CT scanning was offered to the vast majority of RCDS patients (~93%). However, the pathways had access to a wide range of other tests to use for diagnosis.

The overall cancer incidence rate was 12.1%. There was a single case given a 'pre-cancer diagnosis' (0.1%), a non-cancer diagnosis was given for 33.8% of patients and for the remaining patients (54%), no diagnosis was arrived at. The majority of patients that received 'no diagnosis' during the pathway were re-directed to primary care (~90%), though some were referred to secondary care specialist teams for further investigation. Patients receiving a non-cancer diagnosis are usually referred onward to the relevant secondary care speciality team, which varied, and approximately 10% were redirected back to primary care.

Based on the number of cancer patients, a relatively wide variety of cancers were diagnosed. Lung cancer and hepato-pancreato-biliary cancer were the most common types. The cancer types found are illustrated in Figure 2.

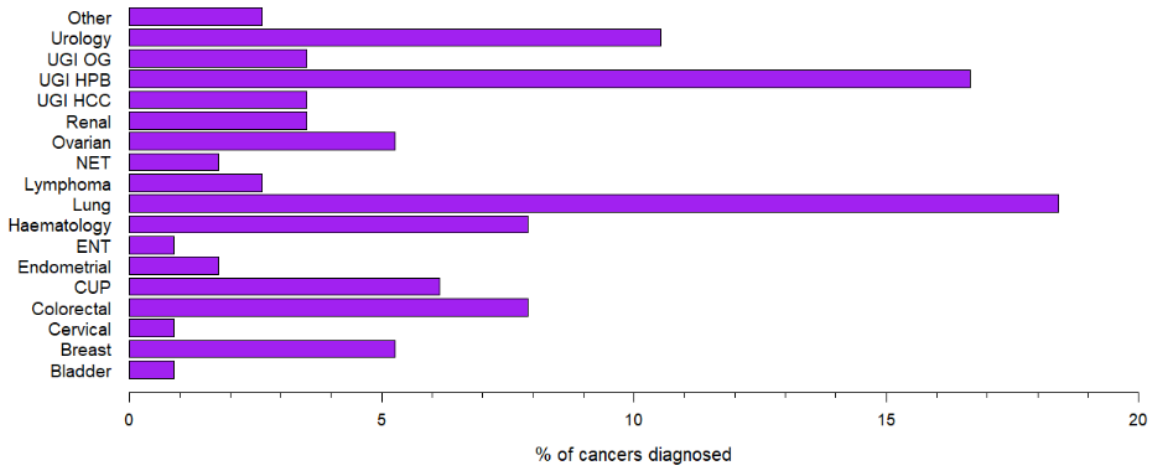


Figure 2: Cancer types diagnosed (%)

The overall gender split of RCDS patients was female 58.4% and male 41.6%. The percentage of females was slightly higher in the cancer group (60.1%) in comparison to patients not diagnosed with cancer (56.1%). The age distribution was similar for the cancer and non-cancer cohorts (generally above 60 years old), although younger patients (i.e., less than 60) are less common in those diagnosed with cancer. The mean age of cancer diagnosed patients was 73.9 years (median 75 years, IQR 69-81 years). For patients not receiving a cancer diagnosis, the mean was 67.3 years (median 69 years, IRQ 60-77 years).

Unexplained weight loss was a common symptom across all RCDS patients (cancer and non-cancer). New unexplained laboratory results are more common in cancer patients, as is a GP’s ‘gut feeling’ of a cancer diagnosis. The symptoms that RCDS patients present with are illustrated in Figure 3, for both cancer patients and non-cancer patients.

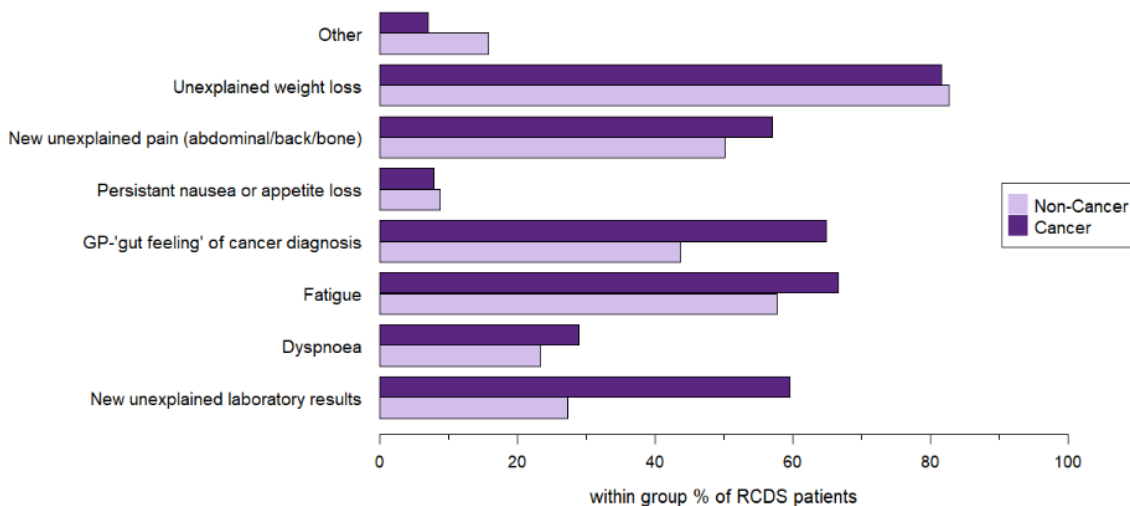


Figure 3: Symptom occurrence (%) in RCDS patients

The number of presenting symptoms of RCDS patients (grouped by cancer Vs non-cancer patients) is illustrated in Figure 4. There is a higher percentage of patients presenting with 3 or more symptoms in patients diagnosed with cancer (75% of cancer diagnosed patients, compared to 60% of patients not diagnosed with cancer).

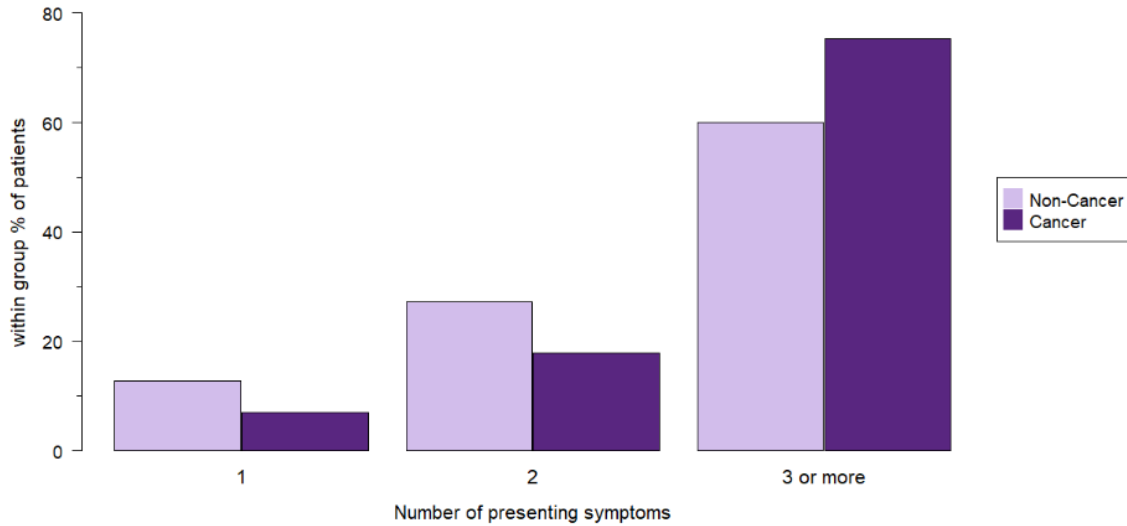


Figure 4: Number of presenting symptoms of RCDS patients within cancer diagnosed patients and patients not diagnosed with cancer (%)

Socioeconomic deprivation was assessed very approximately using SIMD quintiles based on patient GP practice postcodes (1 = most deprived, 5 = least deprived). The modal quintile for RCDS patients was the 2nd quintile (46.2%). A similar distribution was found across both the cancer and non-cancer group, with the mean quintile for both cancer and non-cancer patients being 2.1 (median 2 in both groups).

Similar distributions were also found between cancer and non-cancer groups with regard to both patient clinical frailty scores and ECOG performance status.

Two key indicators for the RCDS pathways are:

- (i) Time from RCDS referral to RCDS outcome
- (ii) Time from RCDS referral to the start of cancer treatment

The overall mean time from RCDS referral to RCDS outcome across the three pathways was 14 days (median 13 days, IQR 9-17 days).

Regarding the time from RCDS referral to the start of cancer treatment, there were a small number of outliers: these included patients requiring treatment for comorbidities or further investigation before starting cancer treatment. With the exclusion of these outliers, the overall mean time across the three pathways was 61.7 days (median 59.5 days, IQR 34.5-80 days).

Results of User Surveys

Patient Survey

A total of 162 patients who had used the RCDS pathway completed the patient survey. Overall, the perceptions of patients throughout the pathway were extremely positive. Over 96% of responding patients rated the service as 8 or more out of 10. Approximately 95% responded positively when asked about the level of care provided by the medical staff working together.

Respondents voted favourably to pathway clarity and having access to the relevant information with ~95% feeling that they could ask questions or get more information as needed while under the RCDS's care and 89% knowing of a named contact that could provide this information. Also, 91% of respondents reported that they were given clear information about next steps.

Patients also responded favourably with regards to pathway timings with 86% of respondents agreeing that their referral to RCDS helped them understand the cause of symptoms more quickly and 96% feeling that the tests were completed in a timely manner.

Primary Care Professional Survey

A total of 50 primary care professionals completed the professional survey. Feedback indicates that respondents generally had a favourable view of the service with >85% reporting a rating of 4 or more (out of 5) for overall RCDS experience. In addition to that, <10% of respondents reported to having any dissatisfaction in any of the following aspects: ease of making referrals, undertaking pre-clinic tests, patient outcomes, patient outcome waiting times and GP/RCDS communication.

In terms of RCDS awareness, ~92% of respondents were aware of the RCDS in their area. >70% of respondents had not attended a service educational session while those that did found it useful (80% agreement).

Referral criteria could possibly still be clearer with only 66% of primary care respondents feeling familiar with referral criteria, though a further 22% reported to having some familiarity.

A clear reason for patient pathway redirection was not always provided to the primary care clinician, with 20% of respondents that had referrals redirected reporting this to be the case.

Qualitative results

The results from patients and professionals come from a total of 18 interviews. Eight of the interviews were with patients, none of whom received a cancer diagnosis and 10 were with professionals involved in the delivery of the RCDS pathway. Due to the small sample size, qualitative findings presented in this interim report are top-level and tentative and will be complemented by a final, more comprehensive report at the end of year 2 of this evaluation. Therefore, the qualitative findings presented here are preliminary and need to be interpreted with a degree of caution.

Patient experiences

Patient Sample

Table 1 below describes the sample of patient interviews. Most participants were white Scottish men. Only two female patients have participated in the evaluation to date. Most patients fell into the age categories 65 to 74 or 75 to 84. All patients received non-cancer diagnoses and rated their experiences of the pathway very positively with scores ranging from 8 to 10. Deprivation scores were calculated from the Carstairs index ([The Carstairs Index](#)). The quintile scale was used, where 1 represents the most deprived areas and 5 represents the least deprived areas. Top level thematic analysis identified 5 top-level, overarching themes: i) Initial referral to the RCDS pathway, ii) Experiences during the RCDS pathway, iii) Patient journey at the end of RCDS, iv) Overall experiences, v) Suggestions for improvement.

Diagnosis	n	Deprivation Score	n*
Cancer	0	2	2
Non-Cancer	8	3	2
		4	2
Age group	n	5	1
55 to 64	1		
65 to 74	4	Experience	n
75 to 84	3	1	0
		2	0
Gender	n	3	0
Man / Male	6	4	0
Woman / Female	2	5	0
		6	0
Ethnicity	n	7	0
Other White	1	8	1
Other White British	2	9	2
White Scottish	5	10	5

Table 1: Characteristics of patient sample

* Data represent only 7 of the 8 participants as it was not possible to determine which area an individual participant resided in.

Initial referral from primary care level to RCDS pathway: Recollections from patients prior to being referred to the RCDS pathway were often associated with the description of non-specific and vague symptoms such as significant weight loss, pain and/or lack of energy/feeling sick. They described a wide variety of investigations being conducted prior to being referred to the RCDS pathway including blood samples, urine tests and blood pressure checks. In addition, there were often multiple conversations with a GP taking place about an ongoing unresolved healthcare issue and a number of initial tests were conducted without a definitive diagnosis reached. The point of referral to RCDS was frequently described to occur in the presence of troubling symptoms and when initial diagnostic workup had proved inconclusive. The time taken for patients to be initially referred to the RCDS pathway from the time of initial presentation of symptoms ranged from a small number of GP visits to repeat visits over many years. The expedited nature of the referral to the RCDS was well received by patients, particularly when this was compared to their previous experiences and expectations of healthcare.

Experiences during the RCDS pathway: At the point of initial referral to the RCDS, experiences of some of the participants indicate that whilst they knew they were being referred to a service for further investigations – a few still seem surprised when contacted by the RCDS team and their

understanding of the pathway appeared to be limited. When asked if they received any written information (e.g., the nationally developed RCDS patient resource) at this point, some participants indicated that they did not receive any information in this format.

The communication approach by which patients first received more detailed information on the RCDS pathway and took part in the initial assessment varied between face-to-face conversations and telephone calls - where preferences for interaction appeared to be tailored to each individual patient. It was positively noted the way that RCDS staff spent time to assess and understand their health and social background in depth.

Patient experiences of investigations conducted as part of the RCDS were varied and included procedures such as endoscopies, CT scans, X-rays, ultrasounds and MRI scans. No particular concerns were raised by most participants about the prospect of having any additional tests conducted. Many participants expressed willingness to attend appointments or undertake additional tests to better understand their unexplained symptoms. A number also commented on the convenience of virtual communication and the time that it saved – however, one participant did express that in hindsight they may have preferred to have received their non-cancer diagnosis in person as they would have been more likely to ask further questions. Several participants expressed positive experiences of the timeliness of the RCDS and were ‘impressed’ with the rapidity of investigations and results.

Patient journey after referral: Despite the positive feedback on the experiences of RCDS pathways, a few participants expressed frustration at the challenges and timeliness of being seen by the services referred on by the RCDS (not on cancer pathways). A number of patients also spoke about how after being told that they did not have cancer, there was limited or no follow up with the GP once they exited the RCDS pathway and from the interviews there was a sense that they would have welcomed this.

Overall experience: As described above, the patient experience of RCDS overall was largely positive - with the service appeared to meet the expectations of patients’ and where the quality of the service and speed of outcome resulted in high levels of patient satisfaction. A number of patients also extended their praise of the RCDS service through comparison with other experiences in other cancer services in the past.

Suggestions for future improvements: When asked about suggestions for improvement - only a few were made. One participant spoke about the name of the service and how it could be changed to reduce associated patient anxiety and another participant spoke about the importance of rolling the service ‘out elsewhere’.

Note: The name ‘Early Cancer Diagnostic Centres’ was changed to ‘Rapid Cancer Diagnostic Services’ in August 2022 following a review of patient experience feedback.

Professional experiences

The interviews with 10 professionals included medical staff, nursing staff, administrative support, and primary care professionals involved in the referral of patients to the service. Most interviews were conducted with professionals from two of the three participating Boards and not all professional groups/disciplines took part in the interviews; therefore, not all perspectives or Boards are fully represented. Due to the small professional sample, findings have been amalgamated to provide an overview of the professional perceptions of the overall 3 pathways combined. Thematic analysis identified 5 top-level overarching themes: Role and level of involvement within RCDS pathway; Primary care referrals and triage; Assessment, diagnostic tests, results and onward referral; Unintended consequences, resource, equality and cost-effectiveness; and Positive experiences.

Professional Sample

A total of 10 interviews were conducted with professionals delivering the RCDS across the 3 participating Health Boards. Table 2 describes the professional sample interviewed for this interim report including: professional role, age group, gender, ethnicity, and number of years professional experience.

Role	n		Ethnicity	n
Administrative/support roles	2		Other White British	1
Health Professional	8		White Irish	1
			White Scottish	8
Age group	n			
25 to 34	1			
35 to 44	2		Experience	n
45 to 54	5		Up to 1 year	1
55 to 64	2		Up to 2 years	2
			Up to 5 years	2
			Up to 10 years	0
Gender	n			
Man / Male	5		10 Years and more	5
Woman / Female	5			

Table 2: Characteristics of professional sample

Role and level of involvement in the RCDS pathway: Various professionals spoke about their roles in the RCDS. Lead medical clinicians discussed how their role entailed taking overall responsibility of the pathway and providing clinical input and support to nursing staff. Staff in other medical specialities such as surgery described how their role was mostly through their involvement in the MDT. The central role that radiology played in the delivery of the RCDS was also highlighted and how they were fundamental to its success. In terms of primary care, professional such as GPs had two roles – through NHS Board Lead Cancer GP positions and also referring people to the service. Nursing staff included Advanced Nurse Practitioners and Clinical Nurse Specialists and they played a central role in patient communication, liaising with primary care staff and other members of the MDT. Their day-to-day activities included patient assessment and triage, ordering of diagnostic tests, and onward referrals and their skill and ability in undertaking these advanced roles were positively recognised by other members of the MDT. Administrative staff supporting the RCDS were at varying levels. In general, these administrative positions appeared to provide non-clinical support to the RCDS including acting as a single point of contact for patients, providing patients with information on the pathway, organising appointments, tests, and transport etc. The significant value of administrative staff in terms of benefit to patients, reducing the burden on nursing staff and bringing efficiency to the service was highlighted by a number of the professional participants.

Primary care referrals and triage: Prior to referral, primary care staff were requested to undertake several pre-defined tests. Feedback indicated that most of these investigations were ‘pretty straightforward’. A few tests on the list did tend to take longer. However, this did not appear to delay referrals to the service. In terms of the quality of referrals, in general it was perceived that they included lots of relevant information. However, a few participants did describe how on occasion they

would receive referrals with very limited information which could result in patients being redirected from the RCDS. Furthermore, whilst primary care professionals indicated that they did endeavour to complete the required list of pre-tests, feedback from RCDS staff highlighted that there were specific blood tests that tended to be 'the common culprits that can be missing from the bundle'. When tests were missing, feedback indicated communication flows between primary care and patients worked well to ensure that the missing tests were ordered in a timely manner. To try to reduce the amount of missing data, there was also varied discussion about having a dedicated RCDS proforma for primary care staff to optimise the quality of referrals to the pathway.

The process of RCDS triage of referrals from primary care was also discussed – including the appropriateness of referrals. One participant highlighted that having a mixture of appropriate and inappropriate referrals was not uncommon for most pathways and that the process can be helpful in 'clarifying' the correct pathway. There was also further discussion about reasons for inappropriate referrals with one professional highlighting the challenges of locum GPs who tend to move around and may have limited understanding of RCDS. It was also commented that some referral pathways can clash which can result in difficulties for primary care staff in deciding what pathway to refer the patient to. To further support the triage of referrals, it was mentioned by one participant how a proactive approach entailing contacting primary care within 1-2 days of receipt of a referral could quickly help to clarify the correct pathway for the patient. Interviews also highlighted reasons why people were redirected from the RCDS. For some it was redirecting them to a more appropriate site-specific cancer pathway, for others it could be that patients were unfit/too frail for investigation or in rare instances, that on review there appeared to be no indication of suspicion of cancer.

Assessment, diagnostic tests, results, and onward referrals: Feedback indicated that referrals from primary care were picked up quickly by the RCDS team and patients contacted within 24-48 hours. In terms of patient contact following referral, this tended to differ across Boards with regards to approach (virtual/in person) and what types of professionals contacted the patient across different timepoints. In relation to processes followed during this part of the pathway, overall quotes indicated positive perceptions re the rapidity of response, the comprehensiveness of assessment, the clarity of information provided and how patient preference appeared to be considered. Related to patient communication and assessment withing the RCDS, were interview questions directed at identifying issues related to accessibility and inclusivity. Feedback highlighted how professionals tried to overcome challenges and promote the delivery of an accessible service in a number of ways including having dedicated questions related to any visual/hearing impairments as part of the primary care referral process, ensuring that the patient is in the right environment during RCDS assessment (e.g. not working or driving a car), taking time to listen to patients who may be 'cognitively slower' and contacting the patient virtually which could negate accessibility issues due to time, cost and travel. Others spoke about how they used the telephone translation service for patients for whom English may not be their first language.

Relative to diagnostic tests, CT chest-abdomen-pelvis scan was the most common investigation and feedback from participants indicated that the time taken for CT scans to be conducted was relatively quick. However, for cases where further investigations e.g., MRI scans, and/or input from additional clinical specialities were warranted, the timelines could be extended. The timeliness of CT scanning appeared to be influenced by several factors including the allocation of protected slots to RCDS, the high level of patient tracking and RCDS staff communicating with patients to be in a state of readiness should a cancellation occur. However, it was commented by one participant that whilst protected CT slots worked well, if the service was to be extended, then this would have to be reconsidered. The timelines for results of CT scans appeared to be relatively quick with one professional indicating that in most cases results in their service were received within 24 hours. Patients appeared to receive results of diagnostic tests in a few ways. Interviews indicated that most patients preferred a telephone call for results, however in complex or bad news cases, face-to-face consultations were also organised.

Onward referrals, as expected, differed according to patient status. For the majority where no cancer diagnosis was found, a comprehensive discharge letter was written to primary care. For others diagnosed with cancer or a non-malignant disease, they were referred to the appropriate onward services and it was highlighted by one participant that once patients had left the pathway, the RCDS had limited input to the onward referral process.

Unintended consequences, resource, equality, and cost-effectiveness: When asked about unintended consequences of the RCDS, a few participants identified the risk of scanning and incidental findings resulting in further investigations and more referrals. Another highlighted the unintended consequences of delivering the service and having to backfill other positions – particularly when existing services were under pressure: The equity of the RCDS was also mentioned by a few participants and how it compared to other cancer specific pathways and the need to ensure that people on site-specific cancer pathways get access to an equitable service. There was mention about learning the ‘good things’ from RCDS and applying learnings to optimise traditional routes of care. A number of participants also highlighted the resource associated with the RCDS and the need to ensure cost-effectiveness with one participant perceiving the greatest benefits to be accrued from the impact of the pathway in primary care.

Positive Experiences: In the interviews, participants continued to speak about the positive experiences and impacts of the pathway in terms of professional learning, filling a much-needed gap in primary care and ultimately the benefit offered to patients.

Discussion

The authoritative report “Crossing the Quality Chasm” published by the Institute of Medicine in 2001 (Institute of medicine (US) Committee, 2001) argues that healthcare in the 21st century should be based on the following six quality dimensions: safety, clinical effectiveness, patient-centredness, timeliness, equity and efficiency (or cost effectiveness). The early evidence from the combined quantitative and qualitative analysis in this interim report suggests that the overall outcomes and experience of the three RCDS pathways are likely to meet at least the first five criteria in this list.

While patients may vary in the number of times they visit their GP practice with complex or vague symptoms, it will tend to be a time of considerable worry. Patients may have had a previous healthcare experience where waiting time had a negative impact on their overall wellbeing. Therefore, they much appreciate the rapid nature of the RCDS pathways. The personalised, attentive and timely communication of each RCDS team is a clear strength of the service. The patient surveys and interviews indicate that one-to-one contact with dedicated healthcare staff and the timeliness of cancer or non-cancer diagnosis are particularly appreciated. In consequence, overall patient satisfaction is high, particularly for pilot services that have only existed for a relatively short time.

As a potential learning point, patient interviews suggest that improvements could be made in terms of expectation management and information provision for the patients exiting an RCDS pathway with a non-cancer diagnosis. These patients may still experience troublesome symptoms. While cancer has been ruled out quickly, there is often still a diagnosis and treatment plan to be addressed going forward.

The surveys and interviews with professional staff highlighted the key roles of different members of the RCDS teams (lead clinicians, advanced nurse practitioners, patient navigators, and administrative staff), as well as their interactions with other professionals (primary care professional staff, radiologists, and staff in other cancer or non-cancer pathways). Overall, the RCDS pathways were considered to have many strengths. Patient safety and clinical effectiveness (not least in terms of cancers detected) appear to be good. The overall impression is that the respective pathways are fulfilling their primary purpose; that is, a comparatively rapid service to rule out or rule in cancer for patients that do not directly qualify for referral to a site-specific pathway. So far, the aggregate cancer

incidence rate in this study is 12.1%, which is well in line with studies of similar centres or pathways elsewhere (7.2% to 12.6%). In addition, the types of cancer found appear in keeping with analogous pathways in other countries – including lung, colorectal, haematological, lymphoma, urological, upper gastro-intestinal cancers and breast cancers. The RCDS also provides an alternative for patients not accepted by site-specific pathways after referrals from primary care.

It is important to note that, since their inception, all of the RCDS pathways have benefited from learning-by-doing. As a result, various operational improvements have been made, none of which altered the essential purpose and nature of the service.

As for the sixth criterion in the IoM list, although staff generally hold favourable views of the new RCDS pathways, there was some uncertainty about their equity and cost effectiveness – for example, in comparison with current site-specific cancer pathways. This aspect requires further investigation. In particular, more micro-level analysis is needed of resource inputs & costs, as well as quality-of-life benefits accruing to patients from rapid diagnosis, so that the efficiency and cost effectiveness of the new RCDS pathways can be accurately evaluated. In any case, additional quantitative and qualitative evidence must be gathered across all six of the IoM criteria, in order to further strengthen the evidence base as the services mature.

As an important limitation of this analysis, it should be noted that – although all three sites of the study are represented – the sample of eight patients and ten professionals is still relatively small. Therefore, these initial findings from patient and professional interviews are tentative and should be interpreted with caution. There are also some potential sources of bias in the current set of interview data; namely, that patient participants identified as white (e.g., Scottish or British) and the majority of the sample is male. Moreover, no patients interviewed to date have received a cancer diagnosis through an RCDS pathway. As for the professional sample, one of the sites had a relatively low level of participation so far, and not all key stakeholders and disciplines were interviewed.

Next steps

Our plans for year two will continue to focus on our overall objectives to:

- Determine the impact of the initial three services, while providing recommendations for the wider delivery of the RCDS model across NHS Scotland.
- Identify the optimal components of the RCDS model in NHS Scotland.
- Report on findings and provide recommendations to inform evidence-based decision making.

For the quantitative aspects of our analysis, we shall construct Discrete Event Simulation (DES) models of each of the three RCDS pathways. Sample data on activity timings and resource inputs & costs as well as more detailed insights into decision rules or protocols will be gathered from routinely available records or as part of our interviews with relevant professionals. Probability distributions will be fitted to the available data to allow sampling of patients flowing through the models. Demand forecasts will take account of current assessments of needs. The DES models are designed to be flexible to show how pathways evolve over time, as learning accumulates and emergent practice develops. An important benefit of DES modelling of the RCDS pathways is that the validated models can be used for experimentation – that is, investigation of alternative options in the models. In this manner, optimal components can be identified and possible areas for improvement can be explored.

To support a more in-depth health economic analysis of the new RCDS pathways, we shall estimate quality-of-life benefits accruing to patients from rapid diagnosis of cancer or non-cancer conditions. In this respect, we shall endeavour, where possible, to identify comparator sets of patients following non-RCDS pathways in each of the three Boards under consideration – which will enable us to follow,

or adapt as appropriate, the approach developed by (Sewell et al., 2018) to perform economic evaluation of a Rapid Diagnostic Centre (RDC) in NHS Wales. Furthermore, to develop a fuller view of the patient pathway from first contacts with primary care to likely treatment outcomes, particularly for cancer patients, we shall need to gather more detailed data on primary care referral patterns as well as cancer staging in secondary care.

Our qualitative interviews during year 2 will continue to explore patient and professional experiences of the RCDS service – including the accessibility, and value of the pathway. In particular, we aim to identify how the pathways in each Board have changed over time and complementing the quantitative analysis detailed above, determine the optimal components of RCDS from a service provision and patient and professional experiences.

We shall focus on recruiting more patients and professionals across all three Boards – ensuring that our patient sample reflects the diversity of people using the service and aim to include individuals from different ethnicities, genders, and importantly those who have received a cancer diagnosis. The same applies to our professional sample, increasing the number of participants and ensuring that perspectives from all stakeholders and disciplines involved in the delivery of the pathway within primary and secondary care and across the three participating Boards are represented.

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