NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

HealthTech Programme

GID-HTG10176 Clinical decision support technologies for identifying possible cancer during primary care consultations: early-use assessment

Final scope

1. Introduction

The technologies included in this NICE HealthTech evaluation are digital cancer case finding automated clinical decision support (CDS) technologies that identify symptoms and signs of possible cancer during primary care consultations to support earlier recognition of cancer.

The technologies are assessed for early use. Early-use assessment considers HealthTech products that could address a national NHS unmet need. It rapidly assesses products early in the lifecycle (but that have appropriate regulatory approval for use in the UK) or that have limited use in the NHS and need further evidence to support wider use. Technologies considered for early use can be conditionally recommended for use while further evidence is generated during the evidence generation period. This enables early access to promising new technologies for patients. Conditional recommendations are for a fixed period of time and the technologies will be reassessed for routine use using the evidence generated.

This scope document describes the context and the scope of the assessment. The methods and process for the assessment follow the NICE HealthTech programme manual.

2. The condition

Cancer is a leading cause of death in the UK and remains a major public health challenge, especially late detection of cancer. Each year more than 400,000 people are diagnosed with cancer and around 170,000 people die from cancer (CRUK, 2026). Cancer outcomes in the UK are worse than in many comparable countries, largely attributed to delays in diagnosis (OECD, 2023).

Outcomes depend on cancer type and stage at diagnosis. Cancers diagnosed at an early stage (stages 1 or 2) are generally associated with improved survival rates and fewer complications. Earlier diagnosis and treatment may also reduce the physical and psychological impact on people and improve quality of life.

Most people with cancer are diagnosed after presenting with symptoms and signs, usually in primary care (CRUK, 2025). While national screening programmes for bowel, breast, cervical and increasingly, lung cancer are effective, they account for less than 10% of all new cancer diagnoses by this route (Routes to Diagnosis, 2025). Across all cancers, around 20% of people are diagnosed following an emergency presentation, and around one-third of these individuals report multiple GP consultations beforehand (Abel, 2017).

Cancers that present with site-specific symptoms (such as breast or skin cancer) or a more overt clinical sign are more likely to be identified earlier and referred at the first primary care consultation. In contrast, cancers associated with more subtle, non-specific, or vague symptoms (such as pancreatic, ovarian, and some haematological cancers) often require multiple primary care encounters before referral thresholds are met. By the time more definitive symptoms and signs present, these cancers are frequently already at an advanced stage.

3. Current practice

In the NHS, cancer detection typically begins in primary care when people present with symptoms and signs. During a consultation, the healthcare professional assesses whether cancer may be possible using clinical evaluation, patient-reported symptoms and signs, and diagnostic testing where appropriate. If cancer is possible, the healthcare professional decides whether referral to a suspected cancer pathway is needed, or whether another action such as further investigation, safety netting or follow up is more appropriate.

3.1 Referral

Urgent suspected cancer referrals can be made by a range of primary care healthcare professionals, including general practitioners (GPs), general dental practitioners (GDPs), and optometrists. Other primary care healthcare professionals (such as Advanced Nurse Practitioners) may also initiate urgent referrals where this has been locally agreed between commissioners and providers. In some locally commissioned pathways, community pharmacists may have a role in the direct referral to secondary care diagnostics or rapid diagnostic services for people with possible symptoms and signs of cancer (NHS England, 2024).

NICE's guideline on suspected cancer: recognition and referral (NG12) recommends urgent cancer referral for people who present with symptoms and signs of cancer and meet the criteria threshold. People meeting these thresholds are typically referred to site-specific urgent suspected cancer pathways (see section 3.1.1) or non-specific symptoms pathways (see section 3.1.2). Where NICE NG12 cancer referral guideline thresholds are not met but suspicion of cancer remains, referral to direct access testing (see section 3.1.3) may be considered for further investigation.

Although NICE's guideline on suspected cancer provides a national framework, there is variation in how referral pathways are implemented locally. Local pathways may adapt or extend NICE recommendation based on

the availability of diagnostic services in the region and system capacity. This can include differences in pathway routing, such as the use of straight-to-test pathways, requirements for additional triage steps (for example, requesting faecal immunochemical testing before referral), and lack of availability of direct access testing in some regions.

3.1.1 Site-specific suspected cancer referral

A person presenting to primary care with symptoms or signs suspicious of cancer, who meets the criteria threshold for referral under the NICE NG12 cancer referral guideline for a specific cancer site, is referred for specialist assessment using the urgent suspected cancer pathway referral.

3.1.1.1 Straight-to-test pathway

Some trusts have implemented a straight-to-test (STT) pathway, where the person referred for an urgent site-specific suspected cancer referral is sent directly for diagnostic testing before being seen by a specialist. This is to help speed up diagnostic testing for certain cancers and reduce delays in treatment. If cancer is no longer suspected after diagnostic testing, the team advises the referring healthcare professional of appropriate alternative pathways.

3.1.2 Non-specific symptoms referral

People may present with symptoms or signs that are vague or not specific to a certain type of cancer. People with ‘non-specific’ symptoms or signs may still have serious disease (including cancer), but do not fit into any site-specific suspected cancer referral pathway. NHS England has core referral criteria for non-specific symptoms for referrals through the Non-Specific Symptoms (NSS) pathway, to support early diagnosis for these people. Core referral criteria for NSS are designed to complement NICE NG12 cancer referral guideline.

Historically, this cohort often saw their GP multiple times before referral, presented more often in an emergency setting, presented with late stage

cancer, and were referred onto multiple urgent pathways with resulting inefficiencies in healthcare provision (Faster Diagnosis Framework, 2022). Since 2019, NHS England has rolled out new Rapid Diagnosis Services across England as part of NHS's Faster Diagnosis Framework (see section 3.2) dedicated for people referred to the NSS pathway.

NHS England also recommends for healthcare professionals to carry out a set of investigative tests known as filter function tests in primary care prior to making a NSS pathway referral. Once filter function test results are returned, the GP reviews the results and proceeds with the NSS pathway referral, where the person will be assessed at a Rapid Diagnostic Centre (RDC) and undergo a range of investigations to rule a cancer diagnosis in or out. If cancer is ruled in, the person may be routed to a site-specific cancer pathway. If cancer is ruled out, they may be directed to alternative pathways for benign conditions.

3.1.3 Direct access investigations

As part of the NHS Long Term Plan ambition to improve early diagnosis, NHS England has introduced guidance on urgent direct access testing for people who do not meet the criteria for an urgent suspected cancer referral under the NICE NG12 cancer referral guideline, but where a healthcare professional's clinical judgement indicates that investigation of a concerning symptom is still warranted. NICE's cancer referral guideline outlines the direct access test for each cancer site.

In practice, there is some regional variation in the availability of imaging modalities, and variations in local pathways. This may limit appropriate use of diagnostic investigations, contributing to inequalities across the UK.

3.1.4 Safety netting

NICE NG12 cancer referral guidelines note safety netting advice is offered when there is diagnostic uncertainty for people presenting with concerning symptoms but are at low risk (but not no risk) of cancer. If symptoms are persistent or recurring, or new symptoms have developed, the primary care

consultation is repeated to re-assess if an urgent referral for suspected cancer is needed. If an urgent referral is not warranted, an alternative referral route is considered and the person is actively monitored through either planned follow up or patient-initiated re-presentation to primary care, until the symptoms and signs are explained or resolved.

3.2 Diagnosis and Treatment

Once referred onto either a site-specific or non-specific suspected cancer pathway, diagnostic work-up is then carried out in secondary care, and the person is either seen by a specialist consultant (or their team) to carry out subsequent diagnostics.

The Faster Diagnosis Standard (FDS) Framework sets out the national waiting times for cancer diagnoses after an urgent referral is made for suspected cancer. It requires that cancer is confirmed or ruled out within 28 days of the referral. The 28-day FDS remains the standard for wait times to diagnosis of cancer, but some types of cancers are particularly aggressive and so pathways for these cancers are designed to achieve diagnosis more rapidly than 28 days (typically within 21 days). Nationally developed Best Practice Timed Pathways (BPTPs) outline FDS timelines for each type of cancer, and are designed to optimise pace of diagnosis, improve patient experience, and meet the FDS. The NHS target is that 80% of patients should meet this timeframe.

For suspected cancer in children and young people or adults suspected to have late stage cancer, the NICE NG12 cancer referral guideline typically recommends making a ‘very urgent’ referral (person should be seen by a specialist within 48 hours) or ‘immediately’ (an acute admission or referral occurring within a few hours, or even quicker if necessary).

4. Unmet need

Experts note that healthcare professionals in primary care may not always ‘think cancer’ and there is a need to support healthcare professionals to

consider cancer as a possible diagnosis. Around 20% of people are diagnosed following an emergency presentation, which is associated with more advanced disease and poorer outcomes (NHS England Digital, 2023).

There are several reasons for cancer not being considered a possible diagnosis, particularly when patients present with symptoms and signs that do not clearly meet NICE NG12 cancer referral guideline thresholds. Some cancers (such as leukaemia) may present with symptoms that individually are associated with a relatively low risk of cancer but may still warrant further investigations. Cancers with non-specific or vague symptoms (for example, pancreatic or ovarian cancer) often require multiple consultations before referral thresholds are met, and by the time more obvious symptoms present, the cancer is likely to be at a more advanced stage. Symptoms associated with cancer are often non-specific and can also occur in people with or without other health conditions or comorbidities and may be overlooked or attributed to other causes when patients first present.

Additionally, healthcare professionals may experience challenges in recognising cancer symptoms when relevant symptoms, risk factors or clinical information are not fully captured or documented appropriately during consultations. Important indicators of cancer risk, such as family history, previous symptom presentations or other contextual factors, may not always be communicated fully at the consultation. Some risk factors may also be more difficult to identify during remote consultations, potentially limiting opportunities to recognise people who may benefit from earlier investigation.

Experts note that continuity of care can be limited when patients are seen by different healthcare professionals over time, making it more difficult to identify patterns of repeat consultations, evolving symptoms or accumulating risk factors that may indicate cancer.

Improving early cancer diagnosis is a priority for the NHS. The NHS Long Term Plan (2019) set out its ambition that by 2028 the proportion of cancers diagnosed at early stage is to increase to 75% from the current 55% in

England. Additionally, the National Cancer Plan aims to reduce the proportion of cancers diagnosed in an emergency setting by 2035. To achieve this, NHS England has implemented the new Faster Diagnosis Standard (see section 3.2), and the roll out of rapid diagnostic services (see section 3.1.2) for people with concerning, but non-site-specific presentations. In 2020/21, for the first time, the GP contract in England included a dedicated quality improvement domain for cancer, encouraging audits for referral practice and quality improvement activity.

5. The technologies

This section describes the technology properties based on information provided to NICE by manufacturers and experts, and publicly available information. NICE has not carried out an independent evaluation of these descriptions.

The assessment focuses on the prospective use case, in which the technology is used in real time by a primary care healthcare professional during an individual patient encounter, when a person presents with symptoms and signs that may be associated with cancer. This is particularly important for encounters where the healthcare professional may not suspect possible cancer during the conversation.

The technologies included in this assessment are automated clinical decision support (CDS) technologies that help identify possible symptoms and signs of cancer during primary care consultations. The technologies should operate without active user initiation during an individual consultation and generate prompts based on relevant information in the patient record and consultation. When a person presents to primary care, the technology reviews relevant information from their past clinical history, alongside clinical information entered during the consultation. This typically includes coded data, and some technologies can also analyse free text clinical notes.

Some technologies estimate the risk of possible cancer by analysing coded symptoms and signs, risk factors and investigation results. They generate an

automatic prompt that displays a risk score equivalent to the positive predictive value of cancer. This risk score is independent of the NICE NG12 cancer referral guideline criteria but has been designed to be automatically triggered when it approaches the NICE NG12 recommended threshold of 3%. The threshold for triggering the prompt is deliberately kept below NICE's 3% threshold to allow healthcare professionals to check if additional clinical features increase the risk. The prompts are only intended to alert the healthcare professional to consider cancer as a possible diagnosis and the healthcare professional is responsible for interpretation and to consider the appropriate next steps in clinical management which may be, further investigation, or referral to the urgent cancer pathways.

Some technologies analyse the patient record and assess the relevant clinical information against guideline criteria (such as NICE NG12 cancer referral guidelines or locally adapted pathways), to help prompt healthcare professionals if thresholds for referral are met. The technologies are intended to support, but not replace, clinical judgement.

Retrospective case finding, in which technologies are used to conduct batch analyses of past patient records to proactively identify asymptomatic people at an increased risk of cancer, is outside of the scope of this assessment.

The technologies are intended for use by primary care healthcare professionals with access to patient records who are the first point of contact for people presenting with possible cancer symptoms and signs. This primarily includes GPs, but in some cases, other primary care healthcare professionals (such as Advanced Nurse Practitioners and allied healthcare professionals) may also be able to initiate urgent referrals depending on local practice agreements and governance.

These technologies integrate within primary care EHR systems. In England, most general practices use 'EMIS Web' or 'TPP SystmOne' EHR systems. Capabilities for integration with EHR systems can be through various ways, where some tools are built into the EHR clinical system, so the healthcare

professional is alerted with a possible cancer risk prompt within their normal workflow for each individual attending a consultation. Other CDS technologies integrate with EHR systems through the NHS Interface Mechanism (IM1), which sets constraints and requirements for how third-party tools can safely access and interact with patient data.

All technologies included for assessment must meet the following inclusion criteria:

- Technologies must be integrated within a EHR system where they are automatically initiated during individual patient encounters;
- Technologies must prompt healthcare professionals to consider cancer as a possible diagnosis and may also support decision making on next steps in management, for example suggesting which cancer(s) to investigate for;
- Technologies should be used by primary care healthcare professionals;
- Technologies must have appropriate regulatory approval or be in the process of obtaining this; and
- Technologies must be available to the NHS or be in the process of preparing to enter the UK market.

Table 1 summarises the 6 included technologies.

Table 1. Technologies in scope

Technology and Company	Regulation	Intended use	Cancer types supported	Algorithm	Safety netting and follow up features	EHR system
Ardens Clinical NG12 Analyser Ardens Health Informatics Ltd	CE marked class I DTAC approved IM1 pairing approved	CDS technology that provides background case finding tools that use information from patient records during consultations to automatically identify people who may warrant cancer referral	All NG12 cancer sections	Not AI supported Cannot analyse free text entries, but relies on coded data	Safety netting letter for patients and tracking dashboard feature. Offers scheduled case finding reports to identify missed opportunities for referral	SystmOne, EMIS, and Medicus
C the Signs (point-of-care decision support) C the Signs Ltd	UKCA class I DTAC approved (NHSX 2021) IM1 pairing approved	AI-supported CDS technology that analyses structured and free-text patient information to identify possible cancer risk and recommend appropriate investigations or referral pathways. It can be passively triggered through automated assessment of the patient's record	All cancer types, and has been validated for over 100 different cancer types	Decision tree logic algorithm. Fixed. Only updated when pathways or new guidance applies	Prompts safety netting action if patient does not meet criteria for referral People referred onward, or those who do not meet criteria for referral or investigation, can be added to a practice dashboard for safety netting and ongoing tracking	SystmOne, EMIS, and Vision
Clinical Digital Resource Collaborative	Not considered a medical device	CDS resources that interrogate coded patient record data and newly entered consultation information to generate	All cancer types	Search algorithm is developed by using the embedded report	All resources are hazard reviewed by the North East Commissioning	SystmOne, EMIS

NHS		automated prompts when NG12 or local guideline criteria are met		functionality within SystmOne or EMIS	Service to ensure they are safe for use	
Electronic Risk Assessment Tools (eRATs) **(MacMillan Cancer Support)**	UKCA class I	CDS technology for people aged 40 and over that uses coded symptoms and laboratory results to calculate cancer risk for 7 cancer types and prompts healthcare professionals when the estimated risk is 2% or higher	Lung, colorectal, pancreas, oesophago-gastric, bladder, kidney and ovarian cancer	Fixed algorithm based on NG12 Cannot analyse free text entries, but relies on coded data	Can be switched off for specific cancer sites if prompts are repeatedly triggered by non-cancer conditions. Prompts provide links to relevant cancer guidance	SystmOne, EMIS
LEO Mizaic Ltd	UKCA class I DTAC approved IM1 integration in progress	CDS technology that analyses structured and free-text patient record information to identify people who meet NG12 or local guideline criteria for further investigation or referral	All NG12 cancer types	Uses a mixture of NLP and LLMs to extract and verify the information from free text consultation notes, but guideline matching is deterministic	An off-hours scheduled run where the technology is run retrospectively to identify patients who were not flagged during live consultations	Planned to be integrated with EMIS and SystmOne by end of 2026
QCancer Endeavour Predict CIC	UKCA class I No DTAC obtained	CDS technology that estimates absolute risk of undiagnosed cancer using symptoms and risk factors, and prompts healthcare professionals when risk reaches 2% or above, to support consideration of further investigation, referral or safety netting	Colorectal, gastro-oesophageal, pancreatic, blood, lung, renal tract, prostate, testicular, breast, uterine, ovarian, cervical (plus rarer cancers not listed).	Algorithms give an absolute risk of cancer broken down by type	Safety netting statement	EMIS

5.1 Ardens Clinical (Ardens Health Informatics Ltd)

Ardens Clinical is a class I CE-marked clinical decision support tool, integrated with EMIS Web, TPP SystmOne and Medicus EHR systems. Core functionality is available across all EHR systems, although implementation differs depending on the capabilities of each system. The technology analyses structured coded clinical information using SNOMED CT terminology.

Ardens provides background case finding tools that help healthcare professionals identify people who may warrant consideration of cancer referral despite cancer not being the original focus of the consultation. Selected background protocols can automatically generate real time consultation prompts based on coded information already present in the patient record. These protocols refer to predefined clinical scenarios where targeted prompts are used to support earlier consideration of cancer, rather than alerts for every possible NG12 referral criterion.

Ardens also provides case finding reports that can be scheduled at practice level. They serve as a secondary safety netting mechanism to help identify people who could meet, or are close to meeting suspected cancer referral criteria. This is based on coded clinical information already entered into the record, but where no referral has been recorded. These reports can use information originating from routine consultations, online consultation submissions, administrative coding or centrally imported data.

5.2 C the Signs – point-of-care decision support (C the Signs Limited)

C the Signs (CTS) is Class I UKCA marked, point-of-care clinical decision support platform that helps healthcare professionals identify people who may be at risk of cancer and suggest the appropriate clinical management. It is integrated into EMIS, SystmOne and Vision EHR systems. CTS uses a fixed AI algorithm based on NICE NG12 cancer referral guideline criteria, as well as other relevant local guidelines.

During a patient consultation, CTS can be passively triggered through automated assessment of the patient's clinical record. The platform analyses both structured patient record data, such as coded risk factors, symptoms, test results, weight trends, drug history, past medical history and diagnoses, as well as unstructured information, such as free-text clinical notes, using natural language processing. It is designed to detect potential indicators of all cancers and has been validated across more than 100 different cancer types. Where a person's clinical presentation suggests a possible risk of cancer, the platform recommends the most appropriate investigations or referral pathway. Patients referred onward, or those who do not meet criteria for referral or investigation, can also be added to a practice safety netting dashboard, enabling ongoing monitoring, follow-up, and proactive management until an appropriate clinical outcome is reached.

5.3 Clinical Digital Resource Collaborative (NHS)

The Clinical Digital Resource Collaborative (CDRC) is an NHS-owned initiative, delivered through Health Innovation North East North Cumbria, that develops digital clinical resources for use in TPP SystmOne and EMIS Web. They provide GP clinical systems with clinical decision support tools which can automatically be initiated during individual patient encounters. CDRC resources can interrogate coded clinical information, pathology results, demographics, diagnoses, medications, and other relevant data from historic data recorded in the patient record along with newly entered consultation information and generate automated prompts when NICE NG12 cancer referral guideline or local guideline criteria is met, to support investigation, referral, safety netting, or other actions.

5.4 eRATs (MacMillan Cancer Support)

The electronic Risk Assessment Tools (eRATs) are a Class I UKCA-marked clinical decision support tool developed for 7 major cancers (lung, colorectal, pancreas, oesophago-gastric, bladder, kidney and ovary) and are embedded in SystmOne and EMIS. The technology calculates individual cancer risk overnight for people aged 40 and over, using coded symptoms and laboratory

results recorded in the patient's record over the past year. The risk score reflects data available up to the hours before the consultation. If a healthcare professional adds new symptoms or other relevant information during the consultation, the algorithm will not automatically rerun until the next overnight update. However, the healthcare professional can open the eRATs after adding the new information to check whether this changes the estimated cancer risks. The tool generates a risk score equivalent to the positive predictive value of the cancer features for each cancer. A prompt appears on screen when a person has a risk of 2% or higher for any of the included cancers. On reviewing the risk score from the prompt, the healthcare professional decides the most appropriate course of management, depending on NICE NG12 cancer referral or local guideline criteria.

5.5 LEO (Mizaic Limited)

LEO is a Class I UKCA marked, clinical decision support technology. It is planned to be integrated with EMIS and SystmOne systems through the IM1 pairing framework by end of 2026. The technology reviews the past patient record along with newly entered clinical information from the patient consultation, and analyses both structured and free-text data using natural language processing and large language models which maps extracted clinical details to SNOMED-CT codes and assesses them against guideline criteria (NICE NG12 cancer referral and local guidelines). Patients are flagged to the healthcare professional if their clinical information meets the guideline criteria. Outputs are presented as structured summaries highlighting relevant clinical findings and recommendations. All outputs are reviewed by a healthcare professional who remains responsible for any subsequent actions.

LEO also offers a scheduled run function which runs outside clinic hours to identify people who meet the NICE NG12 cancer referral or local guideline criteria for referral but were not flagged during the live consultation.

5.6 QCancer (Endeavour Predict CIC)

QCancer is a Class I UKCA marked clinical decision support technology that estimates a person's absolute risk of undiagnosed cancer using symptoms and risk factors. It provides an overall cancer risk score and risk estimates for specific cancer types, including colorectal, lung, breast, blood, pancreatic, gastro-oesophageal, ovarian, renal tract, uterine, cervical and other cancers. The risk score incorporates factors such as age, sex, smoking status, family history, postcode, comorbidities, and the person's symptoms and signs. The QCancer algorithm generates a risk score independently of NICE NG12 cancer referral guideline criteria but is designed to alert healthcare professionals at NICE NG12 recommended thresholds. A prompt is displayed if the QCancer risk score is 2% or higher for any specific cancer type. If the score has increased by 0.1% or more since it was last recorded, the alert updates automatically. When a prompt appears, the user is offered a structured template to support next steps in clinical management, such as referral, investigation or safety netting advice. QCancer is currently used in the NHS and is planned for inclusion in the EP-Predict multi-engine. The tool is integrated into the EMIS Web foundation and does not require IM1 integration. Its alert system has been deployed in EMIS Web in an inactive form and must be activated before it can run during consultations.

5.7 The place of technologies in the care pathway

This assessment will evaluate the impact of the included technologies for use by primary care healthcare professionals for consultations with people presenting with symptoms and signs possible of cancer. The technologies included in the scope are integrated within a primary care EHR system and analyse clinical information entered into the EHR in real time. The technology determines if there is possible risk of cancer, and may also alert the healthcare professional of people who warrant further investigation or urgent referral in line with guideline criteria (such as NICE NG12 cancer referral guideline or locally adapted guideline). Responsibility for final decision making remains with the healthcare professional.

5.8 Innovative aspects

The innovative aspects of the technologies are their ability to automatically analyse information recorded during primary care consultations and identify patterns of symptoms, risk factors or investigation results from historical patient records alongside the consultation conducted in real time to determine the possible risk of cancer. They alert healthcare professionals through prompts to consider cancer as a possible diagnosis and support decisions about further investigations and urgent referral in line with guideline criteria (such as NICE NG12 cancer referral guideline or local guideline). These technologies can potentially support earlier recognition of cancer and timely decision making.

6. Comparator

Primary care consultation by a healthcare professional, without the use of automated clinical decision support technologies for identifying possible cancer symptoms and signs during primary care consultation.

7. Patient issues and preferences

Clinical experts noted that clinical decision support technologies may increase referrals and investigations, particularly for people with vague or non-specific symptoms, who may not ultimately have cancer. This could lead to unintended consequences, including unnecessary diagnostic testing, exposure to risks such as radiation from CT scans, incidental findings, and additional follow up appointments. Over referrals may also cause unnecessary anxiety and distress for people and their families, because being referred on a suspected cancer pathway can create worry and uncertainty even when cancer is later ruled out. Clear communication will be important so that people understand why referral or further investigation is being considered, what the possible outcomes are, and that referral does not necessarily mean they have cancer.

There may be concerns around patient privacy, data use, and transparency of using such technologies in a patient consultation. AI involvement in patient

care is often not apparent to patients, and some may wish to understand how their data is used, how recommendations are generated, and the role of digital technologies in decision making.

8. Potential equality issues

NICE is committed to promoting equality of opportunity, eliminating unlawful discrimination and fostering good relations between people with protected characteristics (Equality Act 2010) and others.

Some technologies are indicated only for an older age group in adults. This may limit their benefit for people outside those age ranges, including younger people with cancers that can occur at earlier ages, such as some blood cancers or testicular cancer. Age restrictions may also disproportionately affect people from more deprived backgrounds if specific risk factors mean they experience cancer at younger ages.

People with disabilities, including people who are blind or visually impaired, people with deafness, people with learning disabilities, and people with serious mental health conditions, may experience additional barriers to accessing primary care services and cancer pathways. These barriers may include difficulties recognising, communicating or describing symptoms, and such barriers may contribute to delays in referral for suspected cancer.

Burden of cancer varies across the UK population, with health inequalities influencing cancer outcomes. These inequalities may affect how people present to primary care and whether symptoms are recognised, coded and escalated. People with learning disabilities are less likely to receive an urgent suspected cancer referral when presenting with ‘red flag’ symptoms compared to the general population (Kennedy, 2025). Cancer mortality rates are nearly 60% higher for people living in the most deprived areas of the UK compared with the least deprived, with around 28,400 cancer deaths each year linked to socioeconomic inequality (CRUK 2025). People experiencing health inequalities may be less likely to have symptoms recognised, fully documented or consistently coded during consultations. Technologies that

rely only on coded data may therefore miss relevant symptoms recorded in free text or not coded at all, reducing the possibility that these people are flagged for further investigation or referral.

Technologies that support only a limited range of cancer types may improve earlier detection for those cancers but may offer less benefit for cancers outside their scope. This could contribute to delayed recognition or referral for some cancers and create inequities in outcomes depending on cancer type.

People who attend primary care less frequently, or have barriers to accessing healthcare, may be less likely to benefit from these technologies.

9. Guidance type

Automated clinical decision support technologies for identifying possible cancer symptoms and signs during primary care consultations are assessed for early use. This approach to guidance development is proposed because:

- the assessed technologies have limited or no current use in the NHS
- limited evidence is available for all technologies
- the technologies have the potential to address a high unmet need in the NHS
- the technologies have recent, ongoing or upcoming appropriate regulatory approval for use in the UK

10. Decision problem

The key decision questions for this assessment are:

- Do automated clinical decision support (CDS) technologies for identifying symptoms and signs of possible cancer during primary care consultations have the potential to be a clinically and cost-effective use of NHS resources for supporting earlier identification and referral of people with possible cancer?
- Are there gaps in the evidence base and what are the key gaps?

Table 2: Decision problem

Type of assessment	Early use
Population	People with symptoms and signs of possible cancer presenting to primary care
Interventions	Automated CDS technologies that identify symptoms and signs of possible cancer in primary care. These include: • Ardens Clinical • C the Signs – point-of-care decision support • Clinical Digital Resource Collaborative (CDRC) • Electronic Risk Assessment Tool (eRATs) • LEO • QCancer
Comparator	Primary care consultation by a healthcare professional, without the use of automated clinical decision support technologies for identifying symptoms and signs of possible cancer during primary care consultation.
Setting	Primary care: general practice services or first point of contact
Outcomes and costs (may include but are not limited to)	**Intermediate outcomes:** • Predictive accuracy of technology (data on performance from validation studies and when used in clinical practice) • Number of cancer referrals (site-specific, NSS) • Number of very urgent cancer referrals • Number of repeat consultations in primary care • Changes in healthcare professional referral behaviour • Time from first contact in primary care to urgent suspected cancer referral made or direct access testing **Clinical outcomes (individual level):** • Number of cancers diagnosed by site, including rare cancers • Number of cancers diagnosed at late stage (stage 3 or 4) • Number of cancers diagnosed at early stage (stage 1 or 2) • Number of emergency presentations resulting in a cancer diagnosis • Number of people having curative treatment intent **Clinical outcomes (pathway/system level):** • Conversion rates (proportion of referrals resulting in cancer diagnosis) • Proportion of patients diagnosed within the Faster Diagnoses Standard (FDS) timelines

	• Clinical utility and acceptability of using the technologies by the healthcare professionals
	
	Patient-reported outcomes:
	• Health-related quality of life
	• Patient acceptability
	
	Costs and resource use:
	• Cost of the technology, including:
	  ○ software licensing or subscription fees
	  ○ ongoing running costs
	  ○ system integration
	  ○ IT support
	  ○ updates
	  ○ data storage
	  ○ training
	• Cost of referrals and investigations
	• Consultation time and primary care resource use before referral, including online triage review time, administrative booking time, and repeat appointments

Economic analysis	A health economic model will be developed comprising a cost utility or cost-comparison analysis. Costs will be considered from an NHS and Personal Social Services perspective. Sensitivity and scenario analysis should be undertaken to address the relative effect of parameter or structural uncertainty on results. The time horizon should be long enough to reflect all important differences in costs or outcomes between the technologies being compared.

11. Other considerations

Implementation may vary across primary care settings because of existing variations in local pathways, Electronic Health Record (EHR) systems, and IT infrastructures. These differences may impact adoption, usability, consultation workflow and whether technologies can be implemented consistently across all settings.

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