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RESEARCH NETWORKS

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Improving cancer diagnostics

Professor Willie Hamilton CBE
Diagnosis of Symptomatic Cancer Optimally (DISCO)

Improving cancer diagnostics

BACKGROUND

The UK has come bottom in most European studies of cancer survival for decades, with much of the problem ascribed to diagnostic delays. According to a 2009 estimate, 5,000 more lives were lost annually in the UK from cancer when compared with average European rates.

The policy response to this needed two broad research questions to be answered:

- WHO needed urgent investigation for possible cancer?

- HOW should they be investigated?

Our Exeter DISCOVERY team tackled these questions systematically in many interlocked programmes of research: the WHO question meant identifying all features of cancer for all main adult and childhood cancers, and calculating just how risky each is. The HOW question 'tested the tests', in that we systematically examined what tests GPs can use to diagnose cancer – do they work? Not just does a positive test mean cancer is likely, but does a negative test mean cancer is unlikely? Are the tests acceptable to patients and doctors? Finally, do the tests provide value for money – as over £1bn is spent on cancer diagnostics annually in the NHS?

KEY FINDINGS

Our studies identified all the symptoms of all 18 major adult cancers (including finding some new features of cancer like a raised platelet count). More importantly we put numbers on these cancer features.

For example, an adult reporting coughing up blood to their GP has a 2.4% risk of lung cancer, rising to 12% if s/he reports it a second time, or to 6.9% if s/he also reports shortness of breath.

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Since the introduction of our tools, there has been a 10% increase in cancers diagnosed at stage 1 or 2, equating to over 30,000 more potentially curable patients annually.

These studies were presented as conventional research papers in high-profile journals and are very heavily cited. The next phase was to 'test the tests,' so we now know the accuracy, patient and clinician acceptability and health-economics of the main cancer tests, such as chest X-ray, CA125 (for ovary) and MRI of the prostate.

Multiple follow-on studies have looked at the effect of implementing our work, including directly policy relevant studies of the potential impact of changing National thresholds for cancer investigation (this latter an urgent request from the Number 10 Policy Unit).

POLICY OUTCOMES

Our research directly informed the revised NICE cancer guidelines, NG12: Suspected cancer, recognition and referral (2015), with Hamilton being the clinical lead of the Guideline Development Group. Eleven publications from Exeter contributed evidence for 89 of the 210 recommendations, with seven sole evidence for 41 of the 210 recommendations.

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Risk Assessment Tools (RATs)

These tools summarised the cancer risks for four cancers in mousemat form, followed by a combined Department of Health/Macmillan initiative, which generated software for seven RATs (lung, colorectal, ovarian, oesophagus, stomach, kidney and bladder). This software has now been incorporated in the two main clinical records software and is therefore available for use by over 90% of general practices in the UK, covering more than 50 million registered patients.

Improvements in cancer referral and diagnosis

Since the introduction of RATs, many positive developments have arisen:

a) Increased number of two-week-wait referrals for suspected cancer, from 1.5 million annually in 2013/14 to 2.3 million in 2019/20

b) Increased proportion of cancers diagnosed using the two-week-wait referral from 47.4% to 53.7%

c) Decreased time between first symptom presentation of cancer to primary care and diagnosis (the 'diagnostic interval')

d) Decreased proportion of cancers diagnosed as an emergency, falling from 20.2% to 18.8% between 2013 and 2018

e) Improved cancer stage at diagnosis. Stage 1 or 2 (i.e. more curable) cancer at diagnosis has risen from 47% to 57% between 2013 and 2022 equating to over 30,000 more potentially curable patients annually.

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TEAM

Many researchers have made a considerable contribution, with the DISCOVERY team expanding from 1 to 15 researchers from its beginning in 2010 to date: these include Profs Hamilton, Neal, Bailey, and Drs Shephard, Price, Mounce, Walker and several others. Many other institutions have contributed, including Universities of Oxford, Cambridge, Leeds, QMUL and overseas.

RESEARCH

This work was underpinned by three large programme grants: NIHR-funded Discovery Programme (DISCO) (£2m: Hamilton, principal investigator, 2010 to 2015); the Department of Health-funded Policy Research Unit in Cancer (£12.5m: Hamilton: co-investigator, 2011 to 2023), and CRUK's first Catalyst award (£5m: Hamilton co-PI 2017-22), supplemented by many NIHR and charity project grants.

CONTACT

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