Computer-based tool to improve diagnosis and prognosis for cancer patients

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A computer-based tool could help GPs to speed up the diagnosis and treatment of patients suffering from two of the most common forms of cancer, potentially saving thousands of lives every year.

Researchers at The University of Nottingham and ClinRisk Ltd have shown that the algorithm is successful in identifying those suffering with gastro-oesophageal cancer and lung cancer at an earlier stage by 'red-flagging' potentially worrying combinations of symptoms and risk factors.

Their results, published in the *British Journal of General Practice* on Monday October 31, showed that the 10 per cent of the patients that the algorithm predicted as most at risk of developing one of the two diseases accounted for 77 per cent of all the gastro-oesophageal and lung cancers diagnosed over the following two years.

The research was led by Professor Julia Hippisley-Cox, in the University's Division of Primary Care. She said: "Earlier diagnosis of cancer is a major challenge and we hope this new research will help doctors identify patients for earlier referral and investigation."

The tool could help GPs to improve their record on early diagnosis in line with current Government policy and the National Awareness and Early Diagnosis Initiative (NAEDI) — a public sector/third sector partnership between the Department of Health, National Cancer Action Team, and Cancer Research UK. Evidence suggests that simply raising

awareness of symptoms and speeding up diagnosis could save 5,000 lives a year without any new advances in medicine.

Two simple web calculators have been produced — one for lung cancer and the other for gastro-oesophageal cancer — which are designed for use by doctors but a simpler version could also be made available on the internet to raise awareness among the general public and to prompt patients with high risk factors or symptoms to seek advice from their doctor.

Lung cancer is the most common cancer worldwide, with 1.3 million new cases diagnosed every year. It has one of the lowest survival rates because two-thirds of patients are diagnosed too late to be successfully treated.

It presents a huge challenge for family physicians because the symptoms can be common and non-specific. While smoking is a well-known risk factor, evidence suggests that other factors including age, social deprivation, and chronic obstructive airways disease also have an important part to play.

The presence of the disease can be indicated by 'red flag' symptoms such as new onset of coughing, coughing up blood (haemotypsis), weight loss, loss of appetite and anaemia. Currently, doctors focusing on just one of these symptoms without taking into account other risk factors are likely to miss 80 per cent of current lung cancer cases.

Similarly, gastro-oesophageal cancer is one of the most common cancers worldwide and earlier diagnosis could improve treatment options and improve five-year survival.

Alarm symptoms for gastro-oesophageal cancer include vomiting blood (haematemesis), difficulty swallowing (dysphagia), appetite loss, weight

loss, or abdominal pain but focusing on one symptom alone in diagnosis can mean that up to 40 per cent of cases are missed. Other underlying factors which could also alert doctors to patients at risk include heavy smoking.

The study aimed to develop and test the success of a computer algorithm that would incorporate both the symptoms and underlying risk factors of patients to flag those in need of urgent investigation or referral.

It used 375 general practices in the UK already using the QResearch® database system — a not-for-profit partnership between The University of Nottingham and leading GP systems supplier EMIS — to collect anonymised patient information.

It included patients aged 30 to 84 years who were free from a diagnosis of the cancers at the start of the study. For lung cancer it ruled out those patients who had previously seen their GPs within the previous 12 months with symptoms of coughing up blood, loss of appetite or weight loss, while the gastro-oesophageal study looked at those patients at the beginning of the study free from difficulty swallowing, vomiting blood, abdominal pain, appetite loss or weight loss.

The study then identified those patients with the highest associated risk factors for the cancers to predict which were most likely to develop the disease and then validated their results by looking at which patients had been diagnosed with the cancers at the end of two years.

The study found that the new algorithm worked so well it could identify 10 per cent of the population in which around 77 per cent of all new cases of cancer arose over the two years.

The algorithm could be incorporated into existing GP computer records to alert doctors to patients who are potentially at a higher risk of

developing the diseases.

In the case of the lung algorithm, it could also be used to inform National Institute of Clinical Excellence (NICE) guidelines on investigation and referral of patients with suspected cancer. For example, NICE guidance recommends an urgent referral for a chest x-ray for patients with persistent symptoms such as coughing up blood, chest pain, shortness of breath, cough or weight loss but not for appetite loss, despite the fact that the study showed that patients with this symptom is four or five times more likely to develop the cancer.

Dr Clare Gerada, Chair of the Royal College of General Practitioners that publishes the BJGP, said: "The University of Nottingham studies will create great excitement for those of us working in primary care. Early diagnosis has a huge impact on the treatment and survivorship of patients with lung and stomach-related cancers. Incorporating this simple calculation into the consultation could give GPs a two-year headstart on investigation and treatment, with the potential to save thousands of lives.

"This is exactly the sort of research that the *British Journal of General Practice* was set up to highlight — practical measures that GPs can take to improve the care they give to their patients. The publication of these vitally important studies by Professor Julia Hippisley-Cox, Dr Carol Coupland and their colleagues could prove a defining moment for cancer diagnosis. I hope the Department of Health and others will take heed."

Similar QResearch® tests have already proven effective in previous research in identifying patients at most risk of developing heart disease, fracture, kidney disease and serious blood clots.

Provided by University of Nottingham