

////Title: Overdiagnosis and Overtreatment of Human Cancers

////Stand-first:

As we develop ever more complex medical diagnostic tools and tests with ever increasing sensitivity, detection of disease becomes quicker and easier. However, recent work by Professor Wendy Rogers at Macquarie University in Australia and her team of international colleagues shows that the early detection of some cancers is not as beneficial as we might first think. Their work looks at the negative impact on patients and healthcare services when conditions are overdiagnosed, and they consider the complicated ethical issues surrounding this.

////Body text:

Overdiagnosis refers to the diagnosis of a disease or a medical condition that would never have caused symptoms or difficulties for an individual over the normal course of their lifetime, even though the particular disease or condition usually does need treating. Overdiagnosis is a challenge because, at the time of diagnosis, it is not possible to tell which particular individuals with the condition will benefit from treatment, and which will be overdiagnosed.

Professor Wendy Rogers, based at Macquarie University in Australia, and her group of international colleagues investigate the overdiagnosis of thyroid [thigh-royd] cancer, which is the detection of thyroid cancers that, if left undetected, would not be harmful.

Patients diagnosed with thyroid cancer are advised to have partial or total removal of their thyroid gland. They then need life-long medication, and of course, surgery itself carries risks. Thyroid cancer surgery and follow-up radiotherapy can cause salivary [sa-lie-vuh-ree] gland damage in approximately 2% of patients. Around 5% of patients suffer from damage to the parathyroid [pa-ruh-thigh-royd] glands, which lie close to the thyroid, creating the need for further lifelong medication.

For life-saving treatment, these risks are clearly worthwhile. However, for cancers that are not a danger to life, these interventions create substantial yet unnecessary stresses for a patient. Professor Rogers deems overdiagnosis and overtreatment to be a public health concern given the harm that such diagnosis and subsequent treatment can cause.

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How can a condition like cancer possibly be overdiagnosed? While diagnostics are becoming increasingly sensitive, in some cases it is not possible to tell the difference between harmful and harmless forms of the same condition. Even some cancers may be harmless. Following autopsy in individuals without known thyroid problems, up to 30% of individuals actually have thyroid cancers. This suggests that harmless tumours are present but undetected in a large proportion of the healthy population. Cancer overdiagnosis involves the detection of these harmless cancers. When a patient is overdiagnosed and treated, they do not benefit because their health was not threatened by the overdiagnosis cancer. They suffer harm from invasive treatment but without the associated benefits of a cure.

Large scale clinical studies show that between 10 and 50% of breast cancers that are identified by screening may be overdiagnosed. With these cancers, it is not possible at the time of screening to tell which cases are harmful and which are not, so everyone tends to get treated.

Unlike breast cancer, thyroid cancers can be categorised as low- or high-risk tumours. For very small papillary [puh-pi-luh-ree] thyroid cancers, many medics advise a watch and wait approach, as there is evidence to show that surgical intervention is not necessary.

In a study following patients over fifteen years, patients who had simply been monitored did not have more metastases [muh-ta-stuh-seez] in the lymph [limf] nodes compared to patients who had undergone surgery. Indeed, even if metastases were detected, those patients in the 'watch and wait' group then had surgery and did as well as those who had originally undergone surgery. In other words, actively monitoring patients resulted in outcomes that were as good as patients who had undergone surgery as a first response to the diagnosis.

The aim of screening is to detect smaller cancers, in the hope that earlier detection will lead to a corresponding decrease in advanced cases and improved survival statistics. But unfortunately, this is not the case. With many cancers, we are seeing increased detection of cancers but there are no associated decreases in the rates of advanced disease and death.

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It is critical for the medical community to ensure that the psychological harm associated with a cancer diagnosis is reduced as far as possible. From a patient's point of view, the very idea of having a cancer that does not harm may be incomprehensible. To make the problem worse, it is not possible to identify which patients have been overdiagnosed and which have had a beneficial cancer treatment. This means that patients who have been overdiagnosed view themselves as having been cured, whereas in reality, they have undergone unnecessary and often life interrupting treatments. Sharing appropriate patient information around this difficult and complicated issue to allow each patient to make an informed decision about their health is a major stumbling block for health carers.

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For the patient, cancer diagnosis, intervention, and treatment are accompanied by many consequences, including pain and side effects. The psychosocial [sai-kow-sow-shl] effects must also be considered as a cancer diagnosis can impact on patients' social and personal relationships. A cancer diagnosis is also linked to financial disadvantage, with cancer patients in the US suffering substantially higher bankruptcy rates than the 'normal' population. These consequences of a cancer diagnosis happen with overdiagnosis just as much as with a beneficial cancer diagnosis.

For health services, overdiagnosis is a multi-billion-dollar problem. Thyroid cancer diagnosis is costly, with a predicted spend of three billion dollars forecast in 2019 alone. Rates of surgery for thyroid cancer are increasing, and the need for lifelong medication and the potential cascade of on-going investigation and treatment is equally costly. This money spent on overdiagnosing and treating thyroid cancer could be better used in other areas of healthcare.

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How does overdiagnosis occur? There are pressures on doctors contributing to overdiagnosis. These include anxiety about missing a diagnosis, as well as the potential for personal financial gain when patients receive specific, and possibly unnecessary, screening tests. In some countries with particularly high rates of detection for thyroid cancer, screening is offered although there is no evidence that this leads to health benefits.

Conflict of interest is not limited to financial gain. In the UK for example, there is a requirement for surgeons to perform a minimum number of thyroid surgeries each year. It is possible that patients may be guided towards surgery even if it is not strictly necessary if the surgeon needs to meet this criterion.

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Professor Rogers' work highlights the difficulty in determining where we should set the limits of detection in diagnostic tests and the impact of our ability to detect conditions that are not harmful to the patient. Through her work she has shown that there is no bright line between health and disease, but rather, a spectrum and on that spectrum, we cannot always know which diagnosed conditions, including some cancers, are best left untreated.

Meet the Researcher

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