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Impossible to know in advance

PERSPECTIVES

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Although incidental findings can be crucial for some patients, incidental testing is a poor diagnostic method.

In 2016, the Norwegian Medical Association published a report on medical overactivity (1), in line with the growing awareness of unwarranted geographical variation in health services. Overactivity has also been highlighted internationally (2–5), with initiatives implemented to reduce waste and overuse in health care, such as *Gjør kloke valg* (6), which is the Norwegian version of the Choosing Wisely initiative (7).

One area where considerable overactivity has been documented is medical imaging. Some types of examination have been shown to have no clinical value (8). On average, it is estimated that 20–50 % of all radiological examinations are unnecessary (9, 10).

> ***«It leads to poor quality, violates fundamental ethical principles and undermines professional integrity»***

Substantial efforts have been made to reduce medical overactivity in general, and radiological examinations in particular (11), but it is a difficult problem to solve (12, 13). One contributing factor is the perception that *it is impossible to know in advance whether a diagnostic test will be useful* for a given patient. In principle, this is correct; we cannot know in advance what an examination will

reveal – and therefore cannot foresee the consequences of the examination. Most clinicians have at some point received results with incidental findings that are significant for the patient. Moreover, studies show that the prevalence of clinically relevant incidental findings can be high (14).

However, the statement is deeply problematic for three reasons: it leads to poor quality, violates fundamental ethical principles and undermines professional integrity.

Incidental testing, poor-quality results

Although incidental findings can be life-saving, incidental examinations yield poor-quality results. Carrying out an examination 'just in case' (15) because you never know what you might find, results in low pretest probability. Low diagnostic probability before the test means low validity of the test results. In technical terms: the test has a low predictive value (16). This means that the test result is most likely incorrect (17). If an examination is performed 'just to see', it is therefore more likely that the uncertainty will increase than decrease.

One reason for not performing incidental examinations (in the hope that they may yield significant incidental findings) is that the quality of the examination will be poor. This is because diagnostic tests are good for testing specific hypotheses but can be hopelessly inaccurate when used exploratively.

Whether using a hypotheticodeductive model (in which examinations are used to test specific diagnostic hypotheses) or a probabilistic (Bayesian) approach to rule out well-founded tentative diagnoses, the pretest probability will be crucial for determining the usefulness of the test result (18). Testing 'just to see' is therefore diagnostically ineffective because there can be countless reasons why a patient might have specific symptoms. Anatomical, physiological, biochemical and (epi)genetic factors vary, and those that might explain symptoms and provide a basis for diagnosis in one person may occur randomly in another.

There is therefore a kernel of truth in the statement that 'there are no healthy people – just people who have not been sufficiently examined'. You will always find something if you look. The question is what the finding means (19). While testing 'just to see' might give the impression of decisive action, it will normally increase uncertainty, delays or complications in the diagnostics and potentially have harmful ramifications.

So, if it is impossible to know in advance whether a diagnostic test will be useful, it is most likely not useful and should not be carried out.

Violates ethical principles

A further problem with the statement about it being impossible to know in advance is that the risks may outweigh the benefits. Unnecessary examinations are associated with a number of risks. Imprecise referrals lead to unclear results, thereby increasing (rather than reducing) uncertainty. False positive

test results can cause concern and anxiety, unnecessary follow-up examinations and incorrect treatment, and the examinations themselves entail certain risks (reactions to contrast agents, radiation, complications etc.). False negative test results can lead to false reassurance ('but nothing was found on the recent images you took'), delayed diagnosis and poorer prognosis.

Incidental (true) positive findings that would not have caused symptoms or illness can lead to overdiagnosis and overtreatment and the negative consequences these entail.

We can therefore say that the opposite of the statement is also true: if it is impossible to know in advance whether a test will be useful, it is also impossible to know whether it will be harmful. Or more precisely: if it is impossible to know in advance whether a diagnostic test will be useful, it is also impossible to know whether it is more useful than harmful. This is a violation of utilitarian ethics and the fundamental principle of beneficence in medical ethics. Then you do not know if what you are doing is best for the patient.

In addition, unnecessary examinations violate the principle of justice, as they cause unnecessary waiting times and waiting lists for health services (20), which can lead to displaced, delayed or poorer prognoses for patients with a more immediate need for such examinations. The fact that patients may be harmed by unnecessary examinations and are not informed about the uncertainty of whether they might be beneficial or harmful is also a violation of the principles of non-maleficence and respect for autonomy.

Examinations that are performed 'just to see' can therefore violate all four principles of medical ethics, which, along with the risk of reducing professional standards, points to a third problem.

Undermines professional integrity

Testing without prior knowledge of the benefits or risks of a diagnostic test raises concerns about professional integrity. Medicine is full of uncertainties (21), particularly in relation to diagnostics (22). Dealing with uncertainty is a challenging but important part of clinical work (23). It requires proficiency and expertise in the field of medicine.

> ***«Overactivity is just as big a problem as underactivity in health care»***

Professional integrity is defined as 'the ability to act in accordance with norms and values considered central to professional practice' (24). As explained above, there is no professional or ethical justification for performing an examination 'just to see' or 'just in case' (15), and such examinations are therefore a violation of fundamental norms and values of professional practice.

Furthermore, it can lead medicine 'astray', resulting in unnecessary screening and radiological examinations, delayed diagnoses for those in need, and poorer prognosis (20). Overactivity is just as big a problem as underactivity in health care (1).

Strong drivers

Why then are so many unnecessary examinations carried out ('just to see'), when it is neither professionally nor ethically justified and undermines professional integrity? One reason is the multitude of strong underlying drivers of medical overactivity (25–27).

Risk aversion (28) and aversion asymmetry, i.e. being more afraid of overlooking than of overdoing something, are strong drivers. There is also a strong belief that examinations do more good than harm (29), and that early detection is better than late detection (27). Imaging examinations are frequently performed to demonstrate that something is happening, often based on a belief that it is better to do something than to do nothing. This is in line with the ancient Latin tenet *ut aliquid fiat* (something must be done). Examinations are also performed to reassure anxious patients (15). The problem here is that diagnostic tests for somatic illnesses are being used to treat psychological conditions (in patients and clinicians), despite the lack of evidence to support this.

We cannot examine everyone for everything

This practice is not sustainable. Literature reviews have shown that general health checks for healthy individuals do not provide any health benefits (30), particularly not for those at low risk of illness (31). Even though we cannot know in advance whether a diagnostic test will be beneficial or detrimental for a particular patient, there are still good reasons to avoid tests and examinations that yield results with a low predictive value.

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