JIM Editorial

doi: 10.1111/joim.13216

# When and how to Screen!

In the current issue, the challenges with large-scale screenings are discussed in two reviews dealing with early detection of atrial fibrillation [1] and colorectal cancer [2].

## Definition

The WHO defines screening as the presumptive identification of unrecognized disease in an apparently healthy, asymptomatic population by means of tests, examinations or other procedures that can be applied rapidly and easily to the target population [1]. This definition excludes surveillance and/or opportunistic screening, as those strategies do not adhere to the criteria of 'an apparently healthy and asymptomatic population'. That means that a 'pure' screening programme will approach not patients but members in a defined population, where the absolute majority will submit to a procedure in order to be reassured that they are healthy.

Screening programmes have many stakeholders, and the opinions of the value of such programmes differ. The spectra are wide, from 'screening is good' to 'screening programmes is a curse for any healthcare system'. In the current issue, there are two reviews [2,3], which both make the case that it screening is good, but they also acknowledge difficulties. There are questions, which must be dealt with, before such a screening programme can be launched.

There are certain criteria, which should be fulfilled before a screening programme is launched. The most commonly used is the WHO criteria from 1968 [4].

**1** The condition sought should be an important health problem.

**2** There should be an accepted treatment for patients with recognized disease.

**3** Facilities for diagnosis and treatment should be available.

**4** There should be a recognizable latent or early symptomatic stage.

**5** There should be a suitable test or examination.

**6** The test should be accept.

**7** Able to the population.

**8** The natural history of the condition, including development from latent to declared disease, should be adequately understood.

**9** There should be an agreed policy on whom to treat as patients.

**10** The cost of case finding (including diagnosis and treatment of patients diagnosed) should be economically balanced in relation to possible expenditure on medical care as a whole.

**11** Case finding should be a continuing process and not a 'once and for all' project.

It is obvious that the two conditions, atrial fibrillation and colorectal cancer, fulfil some of those criteria. Both are important health problems, and there is accepted treatment for patients with recognized disease, anticoagulant to prevent stroke and polypectomy. There is also a recognizable latent or early symptomatic stage.

## Tests

However, both diseases also face similar unanswered questions: 'is there a suitable test or examination', and 'is such a test acceptable to the population?'. It is important to remember that we are not talking about patients, and the majority will leave the screening centre still as nonpatients. Thus, the normal reasoning of cost benefit about risk for the patient to get a diagnosis is not applicable in a screening situation. Moreover, the discomfort experienced by the screened will be known by social media or other means in no time, and will affect the uptake in the targeted

population. A decreased uptake will have an impact on the efficacy of the screening programme, because the result of a screening programme should always be a comparison between those invited and those not invited and not a comparison between those who accepted the invitation and those not invited!

A suitable test must fulfil at least partly three important criteria:

**1** The specificity must be high; a high proportion of false positives will create a new 'patient group', which is unique, and we have created the potential for an adverse event, unnecessary fear.

**2** The sensitivity must be high in order to be legitimate in the target population. False negatives will create misunderstandings and in the end affect the uptake.

**3** The procedure or test has to be safe and the discomfort be acceptable for the absolute majority of the screened!

In most screening programme, it is impossible to offer both a 100 % specificity and sensitivity, and even harder to combine that with a test which is 100 % safe and without any discomfort. Thus, it is of utmost importance that the chosen test, which is used, has been subjected to trials in real life. It is reassuring that the two reviews put a great emphasis on this subject. Moreover, it is even more reassuring that the international medical community, both cardiologists and gastroenterologist, presently is striving to provide answers to these outstanding questions. The two reviews nicely sum up where we stand today and what there is in the pipeline.

### Outcome

Does the screening programme really affect the morbidity and/or the mortality in the target population? The undertaking to convince sceptics is probably the hardest part for the proponents of any screening programme. Colorectal cancer screening has been questioned since the 1990s, [5] and there are opponents against screening for atrial fibrillation [6]. In the end of the day, there are no alternatives to a randomized trial with well-defined outcome(s). There have been quite a few for colorectal cancer that clearly indicates a decrease in mortality in that cancer, bur for atrial fibrillation, results from such trials are still lacking. The main obstacle being the long-term follow-up needed to get reliable results. Both reviews also discuss the ethical dilemma one faces in defining an unexposed comparison arm.

The final decision to launch a screening programme lays with healthcare system, political or within an insurance system. Every screening programme known to humankind will have proponents, often stakeholders, where models often from the field of health economics will be arguments. The responsibility of the scientific community is to provide answers to the generic questions for screening. The two reviews make it clear that so far both cardiologists and gastroenterologists fulfil that expectation. However, external causes such as COVID-19 can lead to new priorities, and there should be an awareness amongst stakeholders of a screening programme that the allocation of resources can and must be changed.

Finally, going back to point 10, 'case finding should be a continuing process and not a "once and for all" project'. This is something, which often becomes a real problem after a screening programme has been launched. It is very hard to impossible to change, but the implementation of new preventive measures such as HPV vaccination in the case of cervical cancer and/or changes in the incidence of the disease such as in tuberculosis and gastric cancer underlines the need for a continuous evaluation of the value of such programmes. There is also the same need for continuous quality controls of aspects such as uptake, process, specificity, sensitivity and outcome results. There is an 'old' saying that the most ultimate crimes known to mankind (at least in healthcare systems) are to launch a screening programme without ensuring a continues evaluation of both the process and the outcomes!

### Conflict of interest statement

No conflict of interest was declared.

**A. Ekbom**
*From the Unit of Clinical Epidemiology, Department of Medicine/Solna, Karolinska Institutet, Stockholm, Sweden*

### References

1 Engdahl J, Rosenqvist M. Large scale screening studies for atrial fibrillation – is it worth the effort? *JIM* 2020.
2 Hultcrantz R. Aspects of Colorectal screening, methods, age and gender. *JIM* 2020.

 

3 https://www.who.int/cancer/prevention/diagnosis-screening/screening/en/.
4 Wilson J, Jungner G. *Principles and Practice of Screening for Disease*. Geneva: World Health Organization. Public Health Papers, 1968.
5 Ransohoff DF, Lang CA. Screening for colorectal cancer. *N Engl Med* 1991; **325:** 37–41.
6 Berge T. Wilson and Jungner would not approve of screening for atrial fibrillation. *BMJ* 2019; **365**. https://doi.org/10.1136/bmj.l1416

Correspondence: Anders Ekbom, Unit of Clinical Epidemiology, Department of Medicine/Solna, Karolinska Institutet, Stockholm, Sweden. (e-mail: anders.ekbom@ki.se)