

Is the NHS 'Heart Age Test' too much medicine?

INTRODUCTION

The NHS 'Heart Age Test' has expanded cardiovascular disease (CVD) risk assessment in the UK to include younger people (<40 years). Public Health England's (PHE) Healthy Heart campaign, launched in September 2018, encourages all adults aged >30 years to do the test, stating: '*Having a heart age older than your chronological age means that you are at a higher risk of having a heart attack or stroke.*' But does older heart age really mean high risk? The calculator will give you an older age if at least one CVD risk factor is higher than the level set as 'optimal'; but this does not necessarily mean you are at high risk of a CVD event in the next 10 years. Is there evidence to support PHE's promotion of the Heart Age Test? To find out, we evaluated the Heart Age Test according to PHE's own UK National Screening Committee (UK NSC) criteria. This analysis suggests heart age is not a good screening test.

EVALUATING PHE'S HEART AGE TEST

1. The condition should be an important health problem as judged by its frequency and/or severity. CVD is an important health problem. The rate of death from CVD has declined throughout the UK in the last 3 decades,¹ but CVD remains the leading cause of death in males and second leading cause of death in females, with around 160 000 people in the UK dying from CVD every year.

2. There should be a simple, safe, precise, and validated screening test. Though the Heart Age Test calculator is simple and physically safe to use, it is not precise or validated. Heart age is estimated from the lifetime risk of CVD, relative to people of the same age, sex, and ethnicity who have 'optimal' risk factor levels (for example, non-smoker, systolic blood pressure <120 mmHg).² The authors of the last update of the National Institute for Health and Care Excellence guidelines on CVD risk assessment in 2014 found insufficient evidence to recommend lifetime risk as a validated screening test. There is even less evidence for indirect measures of lifetime risk, such as heart age.

3. The distribution of test values in the target population should be known and a suitable cut-off level defined and agreed. The Heart Age Test targets everyone aged >30 years,

and is disproportionately used by younger people <40 years.² In contrast, formal CVD risk assessment as part of NHS Health Checks targets people ≥40 years. According to PHE, of 2 million Heart Age Test users, the majority (78%) had older heart age.³ All are prompted to visit a GP and described as having 'increased risk of heart disease', but there has been no assessment on the suitability of (heart age – chronological age) >0 as a cut-off level to prompt further testing.

4. The test, from sample collection to delivery of results, should be acceptable to the target population. The acceptability of heart age depends on whether it matches users' expectations. A 'think aloud' study found that older heart age was confronting and discredited by users if it did not match prior risk perception, whereas younger heart age was viewed as positive but unrealistic.⁴ A randomised trial confirmed that heart age was perceived as less credible and elicited more negative emotions compared with absolute CVD risk.⁵ Further acceptability issues are highlighted by public responses.

5. There should be an agreed policy on the further diagnostic investigation of individuals with a positive test result and on the choices available to those individuals. There is no agreed policy on further investigation of individuals with older heart age results (that is, 78% of users). It prompts people to have an NHS Health Check, which is recommended for those >40 years and which itself is controversial. A Cochrane review found no evidence that these checks are beneficial, and they may even cause harm through the diagnosis and treatment of conditions unlikely to cause symptoms or death (that is, overdiagnosis and overtreatment).⁶ Encouraging large numbers of asymptomatic young people to have their blood pressure and cholesterol measured is not an agreed policy with the RCGP or the UK NSC.

6. There should be agreed evidence-based policies covering which individuals should be offered interventions and the appropriate intervention to be offered. Convincing patients with CVD risk factors to change their lifestyle is important at any age, and heart age could be used for this.⁷ A randomised controlled trial (RCT) found that online assessment of heart age can improve risk factor management compared with verbal

counselling about absolute risk.⁸ However, direct experimental comparisons between heart age and absolute risk have found no effect on lifestyle intentions or behaviour.⁴ Where heart age has motivated lifestyle change, this has been within a clinical context. This is quite different from a pre-consultation screening test, where existing lifestyle and circumstances are not taken into account, resulting in implausible heart age estimates that discredit the results (for example, older heart age in very fit people, or younger heart age in people who are obese).³ Medication guidelines recommend assessing the absolute risk of a CVD event and prioritising treatment to those at highest risk who are most likely to benefit.⁹ Absolute risk is preferred for treatment decisions, rather than single risk factors such as blood pressure¹⁰ or cholesterol. Heart age is an ill-defined measure of risk, relative to others of the same age, sex, and ethnicity with optimal risk factor levels.^{4,11} As it is not a measure of absolute risk, it is not helpful for medication decisions.^{5,11}

7. There should be evidence from high-quality RCTs that screening is effective in reducing mortality or morbidity. There is evidence for several interventions that might be prompted through heart age screening, including smoking advice and lowering blood pressure/cholesterol. However, the Cochrane review of health checks shows that promoting these checks in a non-targeted way has no impact on preventing clinical CVD,⁶ possibly because it attracts people at lower, rather than higher, risk. Because predominantly younger (<40 years) people use the Heart Age Test,² it may exacerbate the problem of low-risk people attending health checks. There is no trial evidence that using heart age to screen for CVD risk or prompt absolute CVD risk assessment reduces mortality or morbidity.

8. The benefit gained by individuals from the screening programme should outweigh any harms. The Heart Age Test has no direct evidence of benefit, and there is potential for harm. Heart age results may lead high-risk people to disregard relevant risk information if they do not believe the results, and cause low-risk people to worry and seek unnecessary tests.^{4,5} Other potential harms include negative psychological and behavioural effects of disease labelling,

physical harms and side effects of unnecessary tests or treatment for CVD, hassles (stress and inconvenience) and cost of unnecessary tests and treatments, wasted resources, and opportunity costs to the health system. These harms, which contribute to the overmedicalisation of society in general,¹² should not be underestimated.

9. The opportunity cost of the screening programme (including testing, diagnosis, and treatment, administration, training, and quality assurance) should be economically balanced in relation to expenditure on medical care as a whole. The Heart Age Test tells anyone >30 years to make an appointment with their GP, nurse, or pharmacist to have their cholesterol level or blood pressure measured if this is unknown. This may add to GPs' already overburdened workload, increase waiting times, and detract attention from necessary high-value care and/or treatments for patients who are unwell.

10. Evidence-based information, explaining the purpose and potential consequences of screening, investigation, and preventive intervention or treatment, should be made available to potential participants to assist them in making an informed choice. There is very little published information explaining what exactly heart age represents to enable an informed choice on whether or not to use it. As a GP wrote in *BMJ Opinion*:

*'I've looked at the supporting documents and can't find any answers. Perhaps they're there if you dig deep enough through the JBS3 website [which the tool points you towards], but that's not the point. If I can't find the answer after 20 minutes of looking, who else is going to bother? The public deserve to know how accurate these estimates are. Presenting uncertainty as fact is not what the public, or our patients, want or need.'*¹³

The Heart Age Test provides no information about who should use it, recommends cholesterol and blood pressure testing for everyone who does not enter values for these, and provides no information about the potential benefits, harms, and costs of having these additional tests done and of taking any medication that might subsequently be offered.¹¹ It is therefore not possible to make an informed choice about using it.¹⁴ Furthermore, the Heart Age Test may confuse people when heart age and absolute risk are contradicting (for example, low risk but heart age higher than own age), and convey conflicting messages about the person's risk and the need for medication.³

CONCLUSION

The Heart Age Test is effectively a screening test that expands CVD risk assessment to include younger people (<40 years) without proper consultation or informed consent. It encourages almost 80% of — mostly young — users to see their GP for further medical interventions. Apart from being a test for an important condition (CVD), the Heart Age Test meets none of National Health England's own assessment criteria for a potentially useful screening test. As stated in a recent article about the de-adoption of ineffective clinical practices:

*'We need to take a more cautious approach to technology adoption, and learn from mistakes of early adoption of health care technologies based on little or low-quality clinical evidence. This way we can prevent the need to "break up" with the practice when the high-quality evidence shows that it is ineffective.'*¹⁵

The NHS might do well to take this advice before adopting and promoting online technologies such as heart age calculators. The results of heart age calculators should be limited to lifestyle advice, ideally within the setting of the clinical consultation, to avoid inadvertent population screening for CVD using an unvalidated screening test.

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