Screening interval: a public health blind spot

See Articles page e189

A preventive strategy of cardiovascular disease is the identification and treatment of high-risk individuals.[1,2] One major challenge with this strategy is that it requires tools to discriminate high-risk individuals from other individuals by appropriate screening tests and stratification methods. Furthermore, once individuals have been categorised by risk, it might seem that everything has been decided: high-risk individuals should be treated whereas others should not. However, there follows another major issue: should patients initially not categorised at high risk be rescreened? And, if yes, in which time interval?

In *The Lancet Public Health*, Joni Lindbohm and colleagues help to address this question. Using data on 6964 individuals followed up for a mean of 22·0 years (SD 5·0) with biomedical measurements taken at 5-year intervals, the authors estimated the optimal screening intervals for cardiovascular disease risk based on progression rates from low-risk and intermediate-risk categories to the high-risk category.[3] They concluded that the commonly recommended 5-year screening intervals to detect individuals at high risk of major cardiovascular events are unnecessarily frequent for low-risk individuals and insufficiently frequent for intermediate-risk individuals. On the basis of their analyses, they propose to tailor screening intervals according to initial risk estimates—that is, 7 years for low-risk individuals, 4 years for intermediate-low-risk individuals, and 1 year for intermediate-high-risk individuals. Their model suggests that such a strategy would improve prevention of major cardiovascular events without raising health-care costs.

This study suggests that a one-size-fits-all screening interval is not optimal and that personalised risk-based screening intervals could be more efficient for the prevention of cardiovascular disease. Conceptually, the idea is very simple: patients' information on cardiovascular disease risk gathered at each screening is used to tailor the interval until the subsequent screening. With this information, prediction of cardiovascular disease risk progression is improved, hence allowing shortening or lengthening of the time until the next screening depending on the expected speed of change in risk category.

Surprisingly, very few studies have been designed to determine optimal screening intervals for cardiovascular disease risk and related risk factors, including blood lipid or blood pressure.[4] For instance, blood lipids are measured at an initial screening visit: if the level is satisfactory, no treatment is initiated, but because blood lipid tends to increase with age, rescreening will eventually be necessary. The question is how often should rescreening take place? Annually? Less or more frequently? A major challenge is to account for random variability inherent to the individual, which makes it difficult to identify long-term changes in lipid (or risk) level—ie, the signal upon which the decision to intervene is based—given the short-term within-person variation—ie, the noise.[5,6] Hence, in the absence of treatment, most differences in blood lipid readings within a 3-year period have been shown to be due to random biological variability or measurement error.[7] Based on this finding, the ideal blood lipid rescreening interval among untreated patients could be at least 3 years, a longer interval than usual practice.[4]

For hypertension, the standard is routine blood pressure screening at every visit, regardless of patient complaint, previous measures, or the interval since the last measures; this blind, uninformed approach is simple but surely not efficient, calling for a more informed, data-driven, screening strategy.[8] One study suggests that the optimal interval could be 3 years or more for patients with systolic blood pressure less than 130 mm Hg and 2 years for those with systolic blood pressure of at least 130 mmHg;[9] this is a risk-based strategy to tailor screening intervals.

In practice, many physicians tend to screen too often for cardiovascular disease risk.[4,10] Although personalising cardiovascular disease risk screening intervals, as suggested by Lindbohm and colleagues, is very appealing, it is complex because it requires adequate tools to estimate cardiovascular disease risk at the point of care and an efficient information system to record this risk and track its progression over the life course. This process seems difficult to implement in most clinical settings. The growing use of electronic health records, coupled with appropriate algorithm and cardiovascular disease risk estimators, will surely open new avenues in this field.

Meanwhile, we have to keep in mind that the public health issues at stakes are huge as the burden and cost

of screening and lifelong monitoring of cardiovascular disease or other chronic diseases and related risk factors is growing exponentially in ageing populations.

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