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## Multi-cancer early detection tests for cancer screening: a behavioural science perspective

Identifying circulating cell-free tumour DNA in blood offers the potential for multi-cancer early detection (MCED) tests. Several trials assessing the effect of MCED tests on early asymptomatic cancer detection are underway (ISRCTN91431511 and NCT04213326). MCED tests differ substantially from existing cancer screening tests (appendix p 1). If MCED tests are shown to improve cancer outcomes, careful consideration of other potential benefits and harms will be essential before these are made available to the general population.<sup>1</sup> Many of these are psychological or behavioural, making theory-driven behavioural research indispensable to successful implementation.

Acceptability and informed decision making are crucial for population-based screening. Supporting informed decision making about MCED screening will be more challenging than for single-cancer screening programmes because results could reflect one of many cancers, each with different profiles. Uptake will be influenced by multiple determinants, including delivery (eg, by invitation or appointment, location, accessibility, and familiarity), community-level (eg, cultural norms), and individual factors (eg, sociodemographic, attitudes, and beliefs). Although blood tests are familiar and less invasive than other screening tests, their use to detect multiple cancers might not be intuitive, and needle phobia might deter some people. Recommended screening frequency will probably influence attitudes and repeated uptake over time.

Low uptake has implications for cost-effectiveness and can contribute to discontinuation of screening programmes. Barriers vary across existing screening programmes, and inequalities in uptake are well documented.<sup>2</sup> Uptake is far from universal, and understanding and addressing barriers and facilitators specific to MCED screening ahead of rollout is crucial.

Delivering MCED screening results (eg, estimated cancer risk) clearly and recommending adequate diagnostic tests will be essential. Behavioural science can inform optimal result communication and the development of educational resources. Training for health-care professionals and shared decision-making resources will also be important, particularly in cases

where multiple possible tissues of origin are identified and clinical pathways are complex or unclear.

Communication and delivery of results is likely to influence patient understanding and psychological responses to MCED screening, including generalised and cancer-specific anxiety and distress, which need to be assessed.<sup>3</sup> The unexpectedness of cancer detected by screening can cause more distress than a symptomatic diagnosis, but can also bring relief when early detection improves prognosis.<sup>4</sup> Because emotional reactions are more likely if positive screening results are misinterpreted as a cancer diagnosis, accessible information is crucial to support comprehension. For people receiving false-positive results in single-cancer screening, cancer-specific worry can linger, especially without a differential diagnosis,<sup>3</sup> which might be exacerbated by MCED screening if no cancer is found, and no alternative explanation is provided. False-positive results could increase cancer risk perceptions and anxiety, and the invasiveness of unnecessary follow-up tests might reduce future screening uptake.<sup>3,5</sup> Conversely, residual worry associated with false-positive results might prompt increased self-checking behaviours<sup>6</sup> and use of health-care services.<sup>7</sup>

Behavioural effects, including attendance at follow-up, and the influence of MCED screening results on health-related behaviours should be assessed and optimised. Individuals with positive results need to be motivated and enabled to attend follow-up, since early cancer detection leads to better health outcomes if results are acted upon. Negative results from MCED tests might offer greater reassurance and reduced risk perceptions compared with other cancer screening options. The potential for false reassurance,<sup>5</sup> reinforcing healthy self-perceptions,<sup>3</sup> and subsequent reductions in symptomatic presentation or attendance at screening programmes are important considerations. Furthermore, false-negative results can reduce trust in screening.<sup>6</sup> The psychological and behavioural impact of MCED screening on individuals will vary with pre-existing representations of cancer,<sup>8</sup> personal factors (eg, age and social support), and previous experiences (eg, of cancer and diagnostic tests).



See Online for appendix

In conclusion, MCED tests offer promise for accelerating early cancer diagnosis and improving patient outcomes, but behavioural science research designed around relevant theory will be necessary to address crucial questions related to acceptability and uptake, communication of results, and psychological and behavioural impact.<sup>8–10</sup> Marginalised and clinically vulnerable groups who are often under-represented in research need to be considered. MCED tests might revolutionise the way cancer is detected, but successful implementation requires a shift in communication and public understanding, which needs to be strongly informed by behavioural science.

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