

Commentary: Inequalities in cancer screening programmes

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Screening for cancer is intuitively attractive. Well-run cancer screening programmes can save lives, reduce morbidity, provide reassurance to individuals about their health and encourage a focus on prevention and early detection. Despite the intuitive appeal, the harmful effects of screening (both potential and actual) are well documented.^{1–4} Harm to an individual includes over-diagnosis and treatment of questionable abnormalities, anxiety for those with false positive results and false reassurance for those with false negative results. One of the important, but often not well articulated, harmful effects at a population level is the potential for cancer screening to increase health inequalities between population groups.

Screening can be divided into two types. First, there are 'organized screening' programmes, which work within pre-agreed structures, policies and standards, and typically focus on mortality reduction for screened individuals. Secondly, there is 'opportunistic screening' where screening occurs either as a result of a request from an individual or from contact with a health professional who offers the screening test.⁵ In this issue, Palència *et al.* combine individual-level data from the WHO World Health Survey covering 22 European countries, with information about the organizational structures of breast and cervical cancer screening programmes within countries, to examine in multi-level analyses whether socio-economic disparities in breast and cervical screening participation are affected by the type of screening offered.⁶ They found that for breast cancer screening, there was higher participation in screening in countries with organized programmes, but no such pattern was seen for cervical cancer screening. For both breast and cervical cancers, socio-economic inequalities in participation measured both on relative and absolute scales were more likely to be found in countries without organized screening programmes.

One of the arguments for organized screening is that participation rates are likely to be optimized.⁵ Therefore, the finding that cervical cancer screening participation was not affected by the type of screening was surprising.⁷ It is worth noting that, while in the study by Palència *et al.* participation in cervical screening was measured using a cut-off point of screening in the previous 3 years, all five countries with national (organized) cervical screening programmes recommend intervals of 5 years for at least some women (in the UK, Denmark and Sweden recommendations vary by age).⁸ In contrast, almost all of the countries included in this study with opportunistic screening recommend screening intervals of 1–3 years. As a consequence, it is possible that screening participation was underestimated in countries with organized screening. This is not true for breast cancer screening as almost all countries, regardless of how screening is organized, recommend screening at either a 2- or 3-year interval.

Four other important points should be made. First, while the paper by Palència *et al.* focuses on socio-economic inequalities determined by education level, such inequalities can occur on many axes e.g. ethnicity, gender, geography, age, sexuality and disability. Although most social determinants of health are not controlled by the health sector, there is increasing evidence that health-care systems, including screening programmes, can actively alter inequalities in health outcomes.^{9–11} The 'inverse equity hypothesis' describes how inequalities in health care occur as new health interventions are introduced.¹² This theory suggests that as a new intervention is introduced into a population, those that are most deprived, and usually most in need of the intervention, are most likely to take it up later and at a lower rate than more privileged groups. An example of this hypothesis in action occurred with the introduction of the breast cancer screening programme in

New Zealand. Māori and Pacific women had higher rates of breast cancer mortality, but, despite this, non-Maori/non-Pacific women took up screening earlier following initiation of the programme and have had consistently higher participation rates since then.^{13–15}

Secondly, when we talk about inequalities in relation to cancer screening programmes, our main concern is actually inequalities in cancer outcomes (incidence, mortality and survival). Screening participation is a proxy measure for these more distal outcomes. These outcomes are often time lagged and affected by social, economic, environmental and health service factors and hence the precise impact of screening on these outcomes is challenging to determine.

Thirdly, screening involves a pathway of activities from promoting and inviting potential participants undergoing the screening test procedure, recall after the appropriate time lapse for those who screened negative and for those that screen positive, to providing timely diagnostic procedures and treatment. Inequalities can (and do) arise at any point along the pathway, and inequalities in outcomes are likely to be the result of cumulative effects of multiple experiences of inequalities. For example, an investigation of women who had been diagnosed with cervical cancer was carried out in New Zealand (which has an organized cervical screening programme). Māori women with cervical cancer were found to have had a smear within 6–42 months prior to diagnosis, and were more likely to wait longer for investigation, diagnosis and treatment of cervical abnormalities. The authors of the report stated that ‘while not all the differences between Māori and non-Māori women reached statistical significance, there was an impression that at all steps of the screening pathway, Māori women were less well served’.¹⁶ Hence, as a starting point from which to target action to reduce inequalities in a screening programme, meticulous monitoring of inequalities at all steps along the screening pathway is required.

Fourthly, in addition to the usual ethical concerns familiar to clinicians dealing with individual patients, such as beneficence, non-maleficence, autonomy and justice, public health programmes such as screening must also focus on the health of entire populations. Most people who undergo cancer screening will not directly benefit, and usually many more will be harmed through over diagnosis and false positive (or negative) tests. Therefore, there is an ethical obligation on those offering screening to ensure that the overall benefit at the population level is greater than the overall harm.⁵ Inequalities are undesirable, and therefore can be considered to cause harm at the population level.¹⁷ Hence, careful consideration should be given to the ethical imperative to minimize or eliminate inequalities between population groups that arise as a result of screening.

In conclusion, the factors underlying inequalities in cancer screening are complex and, sometimes, context specific, but the paper by Palència *et al.* adds further weight to the evidence that inequalities are generally less marked in countries with organized screening programmes compared with those with opportunistic screening. Countries should carefully consider the role of inequalities in both existing programmes and in the design of new screening programmes, to ensure that all steps along the screening pathway are closely monitored from an equity perspective, and to investigate and evaluate interventions that have been successful in improving participation and reducing inequalities in cancer outcomes.

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