

## The cancer wars 1



# Global cancer patterns: causes and prevention

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Cancer is a global and growing, but not uniform, problem. An increasing proportion of the burden is falling on low-income and middle-income countries because of not only demographic change but also a transition in risk factors, whereby the consequences of the globalisation of economies and behaviours are adding to an existing burden of cancers of infectious origin. We argue that primary prevention is a particularly effective way to fight cancer, with between a third and a half of cancers being preventable on the basis of present knowledge of risk factors. Primary prevention has several advantages: the effectiveness could have benefits for people other than those directly targeted, avoidance of exposure to carcinogenic agents is likely to prevent other non-communicable diseases, and the cause could be removed or reduced in the long term—eg, through regulatory measures against occupational or environmental exposures (ie, the preventive effort does not need to be renewed with every generation, which is especially important when resources are in short supply). Primary prevention must therefore be prioritised as an integral part of global cancer control.

### Introduction

We have three main goals in this Series paper: to show that cancer is a global problem, although not a uniform one, with an increasing proportion of the burden falling on low-income and middle-income countries; to describe some of the successes and failures in addressing of cancer prevention at a population level; and to argue that primary prevention is a particularly effective approach to tackle the impending increases in cancer on a global scale. We limit our focus to primary prevention, and only tangentially discuss early detection and screening, albeit recognising that primary prevention should be a complement to secondary prevention and treatment in overall cancer-control strategies. We make these points in view of the political focus on the control of non-communicable diseases (NCDs) after the high-level meeting of the UN General Assembly in September, 2011.<sup>1</sup>

One strong argument in favour of primary prevention is that the cause could be removed or greatly reduced in the long term. This potential is especially important when resources are scarce, and represents a marked distinction from early detection, screening, and therapies. Primary prevention might also have an effect for people other than those who are directly targeted by it. A typical instance is herd immunity, in which vaccination can prevent the disease in many more individuals than only those vaccinated. Similarly, banning of smoking in public places has a positive effect not only on the target population—those potentially exposed to second-hand smoke—but also on smokers, who will tend to smoke less, or quit.<sup>2</sup> This situation is less evident with therapies or screening, when inclusion of many individuals is generally necessary for preventive success,<sup>3</sup> although wider benefits of screening could result from increased awareness in a population, and the potential for such collateral benefits merits assessment. Additionally, primary cancer prevention can have benefits in addition to those for cancer, in view of the shared risk-factors with several other NCDs.

### Globalisation of cancer

The Human Development Index (HDI) is a useful classifier for the globalisation of cancer,<sup>4</sup> because it takes into account education and life expectancy as well as national income, with countries categorised into one of four levels of development: low, medium, high, and very high. Although communicable diseases and nutrition-related disorders are still the most common causes of death in low-HDI countries, they are projected to be overtaken by NCDs, including cancer, by 2030.<sup>5</sup> The projected increase in global cancer burden—from 12·7 million new cases in 2008, to 22·2 million by 2030<sup>4</sup>—indicates population growth and an evolving age distribution together with other important changes in underlying incidence, allied to the prevalence and distribution of risk factors. For example, the spread of tobacco use in low-income and middle-income countries will exert a major effect on cancer burden in the coming decades.<sup>6</sup> In relation to obesity, for the first time more people are overweight than are underweight worldwide. By 2015, NCDs associated with over-nutrition are estimated to surpass under-nutrition as the leading causes of death in low-income countries.<sup>7</sup>

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This is the first in a **Series** of three papers about the cancer wars

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### Key messages

- Primary prevention is the most effective way to fight cancer
- Prevention needs to be integrated with early diagnosis and therapies
- A considerable increase in the absolute numbers of cancer cases and deaths is foreseen in low-income countries in the next decades; therefore urgent action is needed
- Cancer is a heterogeneous group of diseases with causes spanning from infectious agents to behavioural and environmental exposures—a one-size-fits-all strategy for cancer control will not succeed
- Primary prevention has the advantage of preventing other (communicable and non-communicable) diseases that have risk factors in common with cancer; by contrast with therapies, prevention (in some cases) does not need to be renewed at each generation, which is an advantage in low-resource settings

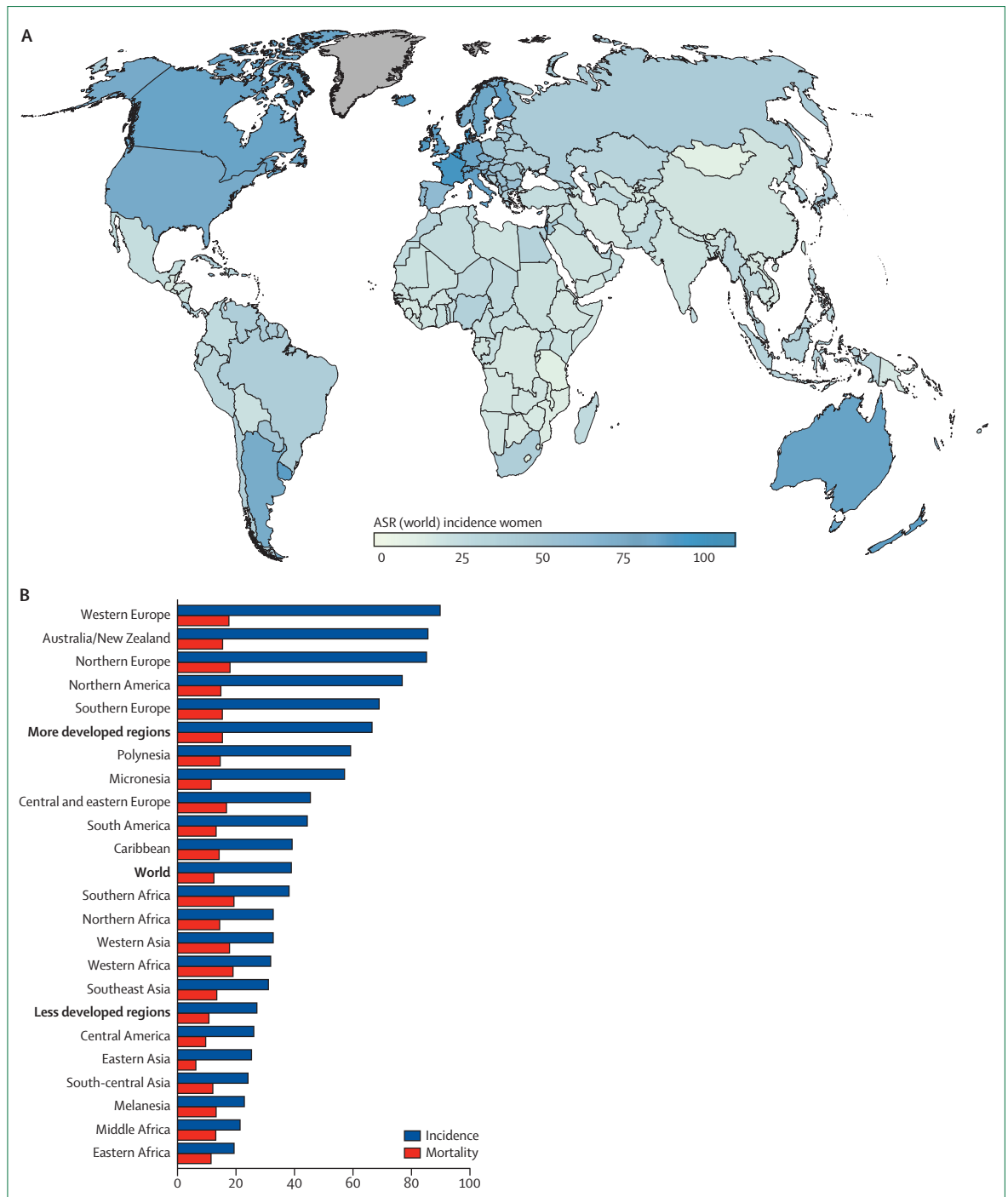


Figure 1: Global distribution of breast cancer (A) and a comparison of incidence and mortality (B), 2008. Rates are age-standardised per 100 000 per year. Data from GLOBOCAN.

For the GLOBOCAN project see <http://globocan.iarc.fr>

### Global patterns and mortality

In 2008, 28.8 million people globally were estimated to be within 5 years of being diagnosed with cancer, with close to half of these living in very high HDI countries, which comprise only a sixth of the world's population.<sup>8</sup> By contrast, the 3.4 billion people living in low-HDI and

medium-HDI countries have only slightly more than a third of the global cancer prevalence (10.8 million cases). This disparity is due to two components: higher rates of newly diagnosed cancers in the high-HDI and very-high-HDI countries, and lower survival rates in medium-HDI and low-HDI countries.

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