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Review

The reality of economics for oncologists

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ABSTRACT

This article outlines the historical development of health economics and its present role in oncology related health technology assessments (HTAs). Despite concerns about the prices and immediate costs of new anticancer medicines for indications such as breast cancer overall spending on such treatments is affordable and offers long term value for money in countries such as the US, Canada and those of Western Europe. Oncologists wishing to protect the interests of current and future patients with both advanced and earlier stage cancers may be regarded as having a responsibility to understand the nature of health economic evaluations, and to be actively involved in decisions affecting access to current treatments and future levels of investment in incrementally improving therapies.

1. Introduction

Worldwide, human health has been transformed since the Second World War. At the end of the 1940s, in what were then still the poor, non-industrialised, countries that had in most instances been subject to European, Japanese and American colonisation, average life expectancy at birth was still no more than 40 years. Even in the richest parts of the world it was in aggregate little more than 65 years. Today world average life expectancy at birth – including the experiences of the most vulnerable populations of sub-Saharan Africa and South Asia – is almost 70 years. In the economically advanced nations it is about 80 years [19].

Progress against infectious disorders and the prevention of potentially fatal or disabling vascular events like strokes and myocardial infarctions is still far from complete. Assuring consistent access to good quality health care for all remains an aspiration rather than a reality at the global level. Yet almost all countries are healthier and richer than ever before, and are spending more of their increased wealth on health and allied care services than in the past. Despite the rising world population it is realistic to hope that – global warming and environmental sustainability permitting –before the end of the current century more or less everyone will be able to live in relatively good health to over 80 years, baring accidents and other exceptional events [20].

Against this background the prevention and treatment of cancers of all types is gaining importance. In countries like the US and regions such as Western Europe age standardised cancer death rates have fallen by about 25% in the last 25 years. However, because people are living longer cancer has now overtaken heart disease as the most common cause of death in many developed countries.

In the case of breast cancer (which currently accounts for around 15% of all cancer deaths amongst women in North America and Western Europe) early stage disease survival improvements have been even more dramatic in the more affluent OECD nations. Age standardised death rates have since the early 1970s fallen by 35–40% in the US and the UK (see Refs. [4,17]). This is despite the fact that as a sex hormone linked disease breast cancer is a condition that (independently of population ageing, but subject to factors such as variations in the use of HRT) occurs more frequently as communities grow prosperous and their citizens become better fed than in the past. In developed societies women are also able to choose to start their families relatively late in life and – if they wish – to enjoy habits like drinking alcohol more freely than was previously often the case.

If adequate investment is put into further improving cancer prevention, detection and treatment additional, even more significant, gains should be possible in the coming decades. It is reasonable to hope that by 2050 breast cancer will in the 'rich world' at least be little more of a threat to longevity than infections such as TB are in economically developed countries today.

Yet some commentators question whether or not it will be possible to go on increasing the percentage of Gross Domestic

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Product (GDP) spent on health care in even the most prosperous of communities at the rates recorded in recent decades. This could inhibit therapeutic innovation and/or innovative treatment usage. Progress in poorer nations could also prove slower than optimists believe is potentially possible, especially if insufficient priority is given to improving cancer detection and providing early treatment to women because it is not seen as an economically desirable development goal.

Such fears, coupled with specific concerns about the cost of anticancer medicines such as, for instance, trastuzumab emtansine or palbociclib (the 2017 global market for anticancer medicines is worth about $125 billion and is projected to rise to $150 billion by 2020 – [11]) and other forms of medical advance, help to explain the increasing attention paid to health economics by policy makers and health service managers. As the proportion of national wealth spent on health care has climbed, health economists and service managers have come to exercise growing power over medical decision making and the therapeutic choices made by clinicians such as oncologists. Although medicines account for little more than a fifth of total oncology service costs in the developed world high individual product prices frequently serve as a focus for concern about inadequate patient access to optimally effective care.

At their best, cost effectiveness analyses (CEAs) and allied studies inform reflective practice and help maximise the benefits generated by health services. But against this they can in some circumstances impede the provision of good quality personal care, and counter-productively curb clinical choice and therapeutic innovation. The arbitrary imposition of relatively low cost effectiveness thresholds (affordability limits) could on occasions prevent access to treatments which should be funded. In other instances inadequately informed economic assessments channel resources into areas that are less valuable, leaving more important opportunities neglected.

Against this background, this review briefly outlines the evolution of health economics and describes some of its key concepts in relation to valuing and funding health services and medicines use. It discusses cancer care from an economic perspective and considers the costs and benefits of breast cancer treatment and the likely affordability of future pharmaceutical and other innovations for people threatened by the disease. Its objective is to provide insight into economic issues impacting on oncologists and cancer care provision in not only the richer nations, but also in emergent economies such as India and Brazil and less developed nations like those of sub-Saharan Africa.

1.1. Avoiding exaggeration

Before this, however, three introductory points are worth emphasis. The first is that although population ageing is often said to be a major cause of increasing health care costs, naïve interpretations of the impacts of increased survival can be damaging to public interests in cancer prevention and care. Some additional health and social care costs are associated with greater numbers of older individuals. But these can be exaggerated because as life expectancy increases so the costs of 'final years' care tend to be incurred later in the typical individual's life span, rather than rising absolutely.

The reality is that in wealthier nations the main cost drivers in health care are increased spending on health sector wages (which rise with living standards) coupled with the financial impacts of providing fundamentally new medical technologies to populations. Failing to recognise this can lead to undue negativism about the value of extending the lives of people in their 60s, 70s and 80s through improving cancer outcomes. In advanced societies, in which intellectual skills rather than physical labour are key to generating income, achieving economic growth without a potentially counter-productive reliance on immigration from relatively poor regions demands retaining older people in the workforce. Further improving cancer prevention and treatment offers important economic contributions, particularly when extending life reduces age specific disability rates.

A second point to highlight is that cancer prevention and early stage treatment is normally much more cost effective than advanced disease treatment. The latter is usually relatively expensive, while the survival gains it generates are – at least to date with regard to most solid cancers – comparatively limited [22,25]. But here again naïve, static rather than dynamic, interpretations of the available data should be avoided. A key economic property of expensive new medicines is that they typically become lower cost generic or bio-similar products within two or three decades of their initial marketing.

From an equity oriented perspective it is also worth stressing that there is an ethical case for investing more per QALY (see below) gained amongst people with advanced life threatening diseases than in providing similar levels of (narrowly defined) health benefit for individuals in less severe distress. From a long term viewpoint effective ways of treating conditions such as late stage breast cancer will also become increasingly cost effective as outcomes improve, and the prices of pioneering therapies fall. Fundamental advances in understanding areas like cancer biology will also in time open up other bio-science based opportunities for generating additional value outside the narrow health arena.

Further, there is a danger of underestimating the utility of the outcome improvements that better anti-cancer treatments are currently delivering – see Refs. [10,21]. Treatment costs are rising. But so too is survival, even in the advanced disease context. It is in addition possible that as outcomes improve people will become less likely to deny the possibility of their having cancer, and so more willing to adopt preventive behaviours and early stage detection opportunities – see Fig. 1.

Finally, economics is a social rather than a physical science. Economists often express their findings in monetary units like US dollars or Euros. This can make them seem like 'hard' observations, comparable to those made by epidemiologists or cell biologists. Yet in welfare economics 'money figures' do not necessarily reflect anything more than theory based quantifications that are much closer to the assertions made by moral philosophers and sociologists than is commonly realised. From an oncology oriented standpoint one conclusion to take from this is that if health care decision making becomes unduly dependent on elaborate evaluations that, although well intended, do not and cannot fully reflect the 'real world', there will be a danger of distorting patterns of activity in potentially counter-productive ways [23]. In medicine this might have unwanted consequences no less lethal than unwanted drug side-effects.

2. The origins of health economics

Economics as it exists today did not start to emerge until the 'enlightenment' of the eighteenth century. In northern European countries like Britain the 'God given' powers of Kings and the religious and military institutions supporting them to allocate societies' resources began to fade as innovative ways of producing goods and services evolved. As a result moral philosophers like Adam Smith started to seek new answers to questions about how wealth can best be pursued and used to promote the prosperity of nations and wellbeing of people.

The fundamental offer of market economics is that it provides a robust theory based approach to aligning different interests within communities in ways that encourage efficiency (defined in terms of