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Surveying the Cost Effectiveness of the 20 Procedures with the Largest Public Health Services Waiting Lists in Ireland: Implications for Ireland's Cost-Effectiveness Threshold

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ABSTRACT

Objectives: To survey the cost effectiveness of procedures with the largest waiting lists in the Irish public health system to inform a reconsideration of Ireland's current cost-effectiveness threshold of €45,000/quality-adjusted life-year (QALY). **Methods:** Waiting list data for inpatient and day case procedures in the Irish public health system were obtained from the National Treatment Purchase Fund. The 20 interventions with the largest number of individuals waiting for inpatient and day case care were identified. The academic literature was searched to obtain cost-effectiveness estimates from Ireland and other high-income countries. Cost-effectiveness estimates from foreign studies were adjusted for differences in currency, purchasing power parity, and inflation. **Results:** Of the top 20 waiting list procedures, 17 had incremental cost-effectiveness ratios (ICERs) lower than €45,000/QALY, 14 fell below €20,000/QALY, and 10 fell below €10,000/QALY. Only one procedure had an ICER higher than the current threshold. Two procedures had ICERs reported for different patient and indication groups that lay on either side of the threshold. **Conclusions:** Some cost-effective interventions that have large waiting lists may indicate resource misallocation and the threshold may be too high. An evidence-informed revision of the threshold may require a reduction to ensure it is consistent with its theoretical basis in the opportunity cost of other interventions foregone. A limitation of this study was the difficulty in matching specific procedures from waiting lists with ICER estimates from the literature. Nevertheless, our study represents a useful demonstration of a novel concept of using waiting list data to inform cost-effectiveness thresholds.

Keywords: cost-effectiveness analysis, cost-effectiveness threshold, ICER, Irish health care, waiting list.

Introduction

Ireland is one of the few countries worldwide to have an explicit cost-effectiveness threshold. Although this brings some welcome clarity to health care resource allocation decisions, the threshold has been criticized for a number of reasons [1]. The current threshold of €45,000/quality-adjusted life-year (QALY) applies only to pharmaceutical interventions. Recent guidance from Ireland's national health technology agency, the Health Information and Quality Authority (HIQA), notes that the threshold for nondrug interventions has varied between €20,000 and €45,000/QALY [2]. This lack of clarity and parity between drug and nondrug interventions poses problems of inconsistency and consequent inefficiency and inequity. Furthermore, the current threshold is not based on evidence of the opportunity cost of other interventions foregone. This failure to base the threshold on the opportunity cost of other services means that its application may hinder rather than advance the objective of improving the effectiveness of Irish health services.

A lack of an empirical basis for the threshold is not unique to Ireland. The National Institute for Health and Care Excellence (NICE) in England and Wales has an explicit threshold that ranges between £20,000 and £30,000/QALY, but this is also not supported by evidence [3]. Notably, a large research project estimated a cost-effectiveness threshold for the United Kingdom on the basis of the opportunity cost of other services of approximately £13,000/QALY [4]. This threshold is markedly lower than NICE's current threshold range, and when converted to purchasing power parity (PPP) euro values for Ireland at approximately €20,000/QALY, it is also lower than Ireland's headline threshold.

The cost-effectiveness threshold is most immediately relevant to pharmaceuticals because they are the interventions that have the most clearly defined and routinely applied explicit rationing frameworks. Nondrug interventions can be subject to

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another form of rationing in terms of waiting lists for access to services. The size of such waiting lists for procedures within Ireland's public health system has long been recognized as a problem [5,6]. The recent Euro Health Consumer Index report ranked Ireland as the worst of 35 countries in terms of waiting times [7]. The National Treatment Purchase Fund (NTPF) is the statutory body with the responsibility of compiling national waiting lists in Ireland. The NTPF data for 2017 show that the total number of people on outpatient and inpatient waiting lists stood at more than 570,000, which is approximately 12% of the most recent census estimate of the Irish population [8–10]. The NTPF data show that not only are waiting lists large in size relative to the population, but waiting times can also be very long. The number of people on outpatient waiting lists for more than a year for surgical specialties stand in thousands, and even tens of thousands, at 14,622, 18,044, 1,852, and 8,851 for orthopedics; ear, nose, and throat; general surgery; and ophthalmology, respectively [11]. This far exceeds the 2012 policy goal of having patients wait no longer than 9 months for elective treatment in hospitals as set by the Special Delivery Unit, a unit with the Department of Health tasked with improving health services [12].

A previous critique of the Irish cost-effectiveness threshold noted that three procedures with long waiting lists—cataract removal, hip replacement, and knee replacement—had incremental cost-effectiveness ratios (ICERs) far lower than the current cost-effectiveness threshold [1]. That analysis concluded that the presence of long waiting lists for highly cost-effective interventions was indicative of a need to reduce the cost-effectiveness threshold. The rationale for this conclusion is that a reduction of the threshold would reduce expenditure on new interventions and permit a reallocation of resources to existing constrained services to reduce waiting lists, thereby improving the aggregate effectiveness of the Irish health system.

The objective of this study was to assess whether the previous finding of highly cost-effective interventions being subject to large waiting lists remains when the selection of interventions considered is expanded to a larger and more representative sample of procedures. Accordingly, we investigated the cost-effectiveness of the 20 procedures with the largest inpatient and day case waiting lists in Ireland (henceforth referred to as the top 20 procedures) using NTPF data. The purpose was to see how cost-effectiveness estimates for these procedures compared with the current cost-effectiveness threshold.

The article is organized as follows. The Methods section outlines the waiting list data and describes the process of finding the cost-effectiveness estimates of the top 20 procedures. The Results section details our findings, including a graphical interpretation of the cost-effectiveness ratios and waiting list size of the top 20 procedures. The Discussion section interprets these results in relation to the challenge of determining an evidence-informed threshold.

Methods

We contacted the NTPF to request for data that identified the procedures with the largest inpatient and day case waiting lists in terms of the numbers of patients (as opposed to length of wait). We did not use waiting list data for outpatient services because the NTPF data are currently not disaggregated by procedure for those services. We selected the top 20 procedures with the largest waiting lists in an attempt to sample a sufficient representation of constrained services while keeping the number of cost-effectiveness estimates to be sourced from the literature tractable. Using the procedures identified in the NTPF data we then searched the international peer-reviewed literature for representative cost-effectiveness estimates for these services. Searches were carried out using the National Institute for Health Research Health Technology Assessment database, the PubMed database, the Tufts Medical Center Cost-Effectiveness Analysis (CEA) Registry, and Google Scholar.

We selected CEAs that best corresponded with the procedure descriptions provided by the NTPF data. It was not always possible to definitively match cost-effectiveness estimates to the procedures listed in the NTPF data because descriptions of procedures were broad in some instances. In such cases, we included more than one source for the cost-effectiveness estimates.

We included cost-effectiveness estimates from studies reporting ratios in terms of cost per QALY or cost per life-year gained, with the two metrics being considered comparable. We attempted to find Irish cost-effectiveness estimates for each procedure. Irish estimates were not available in most cases, however, and so we sourced estimates from British studies, because these provided estimates from a health system that is broadly comparable with Ireland's. In the absence of Irish or British evidence, we sourced estimates from other western European countries and the United States.

If ICERs were not explicitly stated within the study, they were calculated using the reported procedure costs and QALYs gained according to the standard interpretation of the ICER [13]. ICERs were adjusted for PPP to Irish costs in euros based on the year of the reported literature and the Organization for Economic Co-operation and Development in accordance with HIQA guidelines [14]. ICERs were subsequently adjusted for health care inflation based on the Central Statistics Office index to 2016 values [15].

Results

Table 1 presents the top 20 procedures from the Irish waiting lists in rank order of total number of patients. The total number of patients on the inpatient waiting lists from the top 20 procedures is 68,938, accounting for 81% (68,939 of 84,838) of the total number of patients on the inpatient waiting lists in Ireland for all procedures [16]. The table also presents the ICER estimates for each procedure as reported in literature, the source of the ICER, the country and year of the source, and the adjusted ICERs. A total of 23 literature sources are used, of which the most common countries of origin are the United Kingdom [12] and the United States [7]. Sixteen of the included studies were published within the last decade.

Figure 1 shows a graphical representation of the ICER estimates and the waiting lists for the 20 procedures. The PPP and inflation-adjusted ICERs are represented by the blue bars as measured on the left-hand scale. The headline threshold of €45,000/QALY is marked with the red horizontal line, whereas the lower of the two thresholds cited by HIQA of €20,000/QALY is shown with the red dotted horizontal line. In the five cases in which there are alternate ICER estimates retrieved from the literature, such as for different patient or indication groups or as quoted as a range, the relevant procedures are marked with asterisks and the alternate ICER estimates are shown as an overlaid bar chart in red. The waiting list numbers for each procedure are represented by the orange bars below the horizontal axis and are measured with reference to the right-hand scale.

Of the 20 top procedures, 17 have adjusted ICERs less than the headline threshold of €45,000/QALY. Thirteen have ICERs that are less than the lower threshold of €20,000/QALY [17]. Nine of these procedures are particularly cost-effective, with ICERs less than €10,000/QALY. Only one procedure has an ICER higher than €45,000/QALY—"surgical tooth removal," with an ICER estimate of €195,155/QALY [18]. Two procedures have two estimates, one of which falls below the €45,000/QALY threshold and the other above it. These are "administration of agent into joint or other