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# Measuring healthcare expenditure: different methods, different results

Conor Keegan , Sheelah Connolly , Maev-Ann Wren

## 1. INTRODUCTION

Accurate information on healthcare expenditure is essential for a number of reasons, not least of which is that it facilitates an assessment of returns for that expenditure, as well as allowing comparisons to be made across healthcare sectors, over time and across countries. Traditionally in Ireland at least, healthcare expenditure data have been limited, especially data that facilitate comparable analysis through time and across particular programmes or services. As a result, there is some uncertainty about how Ireland's healthcare expenditure compares internationally and how it has been changing through time [1].

While it might be anticipated that measuring healthcare expenditure is a relatively straightforward task, this is not always the case and there are a number of potential difficulties that may arise. The way in which healthcare estimates are presented can influence how expenditures compare across countries as well as through time. Cullen [2], for example, discussing findings from the OECD that Ireland spends relatively less than other countries on healthcare and findings from the European Commission that Ireland spends relatively more than other countries (in a similar time period) explained the difference by the fact that the OECD measured Ireland's spending as a proportion of gross domestic product (GDP), while the Commission calculated spending against gross national income (GNI) – while the difference between the two is relatively small in many countries, this is not the case in Ireland, resulting in significantly different estimates of healthcare expenditure depending on whether GDP or GNI is used<sup>1</sup>.

Even within a country accurately measuring healthcare expenditure can be challenging due to uncertainty about what constitutes expenditure on health. For example, is social care expenditure on services such as meals on wheels for older people to be included in estimates of healthcare expenditure? Is health related expenditure outside of traditional health departments and agencies on services such as developing public awareness of radon risks and monitoring homes for radon to be included in healthcare expenditure estimates? In addition, while measuring public or government expenditure on healthcare should be relatively straightforward due to national accounting systems, at least in high income countries, the same may not be the case for private (non-government) expenditure. Knowledge of private healthcare expenditure is essential for government and policy makers in order to identify how much and what kind of healthcare is being financed privately and for determining whether there might be problems with the accessibility of care [3]. This is especially important in light of increasing private healthcare expenditure in some countries following the recent economic downturn and subsequent reductions in public healthcare expenditure and entitlements [4].

Detailed information on private healthcare expenditure is not always readily available since most sources of information are private and data are usually not collected at an aggregate level [3]. Household surveys that include questions on different types of healthcare expenditures and total healthcare expenditure are often used to

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<sup>1</sup> GDP measures domestic output of a country. GNI, in contrast, refers to income of a nation whether derived domestically or abroad. In Ireland, GDP tends to exceed GNI due to the large presence of multi-national companies, which may repatriate profits that do not therefore form part of national income.

estimate private expenditure in the absence of other sources; however, the estimates of expenditure arising from these surveys will be influenced by the design of the survey. One feature that varies greatly between different surveys is the period over which people are asked to recall expenditure [5] with a recent review of health surveys reporting that recall period can range from two weeks to 14 months with a significant proportion of surveys using either one or 12 months [6]. Different recall periods can give rise to different estimates of healthcare expenditure with Lu et al. [7], for example, finding that a shorter recall period leads to a higher mean estimate of health spending. Another potential concern with survey data is the representativeness of survey respondents, especially for those with the greatest health needs (and possibly largest expenditure on healthcare). Exploring this issue by comparing health expenditure estimates from survey and claims data, Aizcorbe et al. [8] found that survey estimates were lower on average than estimates from claims data which they found to be a function of underrepresentation of high expenditure cases and underreporting across the remaining distribution of spending.

Valid interpretation and analysis of healthcare expenditure data in Ireland has been challenging due to differing definitions across sources and through time, and limited data for many categories of expenditure. Until recently, estimates of Irish total healthcare expenditure have been returned by the Central Statistics Office (CSO) to the Organisation for Economic Co-Operation and Development (OECD), which have sought to differentiate between expenditure on health and social care programmes but these returns have not been adequate to meet OECD accounting requirements therefore limiting the validity of international comparisons. Moreover, these healthcare expenditure estimates provided limited disaggregation of expenditures beyond capital/current and public/private breakdowns. Furthermore, despite an increase in private activity in the Irish healthcare system, there remains relatively little information on private healthcare expenditure. Another difficulty in the Irish context relates to variations in how healthcare expenditure is measured through time. Wren et al. [1] note that fundamental changes in the structure and organisation of the public health system in Ireland, including the formation of the Health Service Executive (HSE), its subsequent sequence of internal re-organisations and the establishment of the Department of Children and Youth affairs have resulted in discontinuity in administrative entities, accounting rules and consequently in data series. Additionally, while the Department of Health reports programme-level expenditure, accounting methodologies have changed over time preventing valid longitudinal analysis of expenditure through time [1].

A major development in Irish healthcare expenditure estimates was the publication of Irish healthcare current expenditure estimates for 2013 according to the international standard of the OECD System of Health Accounts (SHA) [9]. This international standard defines a common boundary for healthcare expenditure and facilitates cross-country comparisons of healthcare expenditure across an increasing number of OECD countries. Already attention has been drawn to the implications these estimates may have for understanding of Irish healthcare system expenditure [10]. However, while certainly a useful starting point for cross-national comparisons, questions may arise about whether an internationally developed methodology can capture the complexities surrounding healthcare expenditure within particular countries.

The aim of the analysis presented in this paper is to examine how alternative methodologies for measuring healthcare can influence the estimate(s) of healthcare expenditure. This will be done with reference to recently published SHA data for Ireland and an alternative methodology for measuring healthcare expenditure developed by Wren et al. [1] before the publication of the SHA data. The following section compares the similarities and differences between the two approaches; section 3 highlights the different estimates for total healthcare expenditure and components of that expenditure derived from the two methodologies and identifies reasons for these differences. Finally, section 4 will discuss the implications of applying alternative methodologies for estimating healthcare expenditure in Ireland and beyond.

## 2. A COMPARISON OF METHODS

This section provides a brief overview of the SHA methodology and details the method adopted by the CSO in applying the SHA methodology for Ireland; it also provides an overview of the method used by Wren et al. [1] to arrive at an estimate of healthcare expenditure for Ireland prior to the publication of the SHA data for Ireland.

### *System of health accounts*

The SHA 2011 Edition is a revision of A System of Health Accounts (SHA 1.0) published by the OECD in May 2000. The SHA provides common concepts, definitions, classification and accounting rules to allow for comparability of reporting expenditure on health and its financing over time and across countries [11], and as such one of the primary aims of the SHA is to facilitate cross-country comparisons. The SHA tracks all health spending in a given country over a defined period of time regardless of the entity or institution that financed and manages that spending and therefore aims to capture the total cost of healthcare to society.

The SHA produces estimates of both current and capital expenditure in a country over a fixed period of time, typically a fiscal year. The emphasis of this analysis will be on comparison of current healthcare expenditure estimates (as distinct from capital expenditure). Most healthcare expenditure is current in nature, particularly in the Irish system, and the focus of SHA returns to date has been on the provision of detailed current expenditure estimates.

Under the SHA methodology current healthcare expenditure is classified in terms of financing (who finances care), provision (where the expenditure goes) and function (what kind of services and goods are purchased)<sup>2</sup>. Here healthcare functions relate to groups of healthcare goods and services with a specific health purpose (for example, curative and rehabilitative care). The healthcare functions classification defines the boundary of care [9]. Overall it is set to capture “*All activities with the primary purpose of improving, maintaining and preventing the deterioration of the health status of persons and mitigating the consequences of ill-health through the*

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<sup>2</sup> A full and detailed breakdown of category codes and descriptions related to these classifications are provided by the Central Statistics Office [12-14].

*application of qualified health knowledge*” [9pg. 52]. Captured within this boundary is administration and financing of healthcare goods and services. This relates to, for instance, the costs incurred in formulating and administering government policy or the administrative costs incurred by health insurers [14]. As such this dimension of the SHA boundary helps to capture a more societal view of the costs of healthcare over and above direct expenditure on healthcare goods and services. In setting this boundary, however, the SHA distinguishes between healthcare functions and healthcare-related functions. Healthcare-related functions refer to functions closely linked to health but, where possible, should be excluded from activities measuring healthcare functions. A good example of such activity is the case of long-term social care services that may follow the provision of healthcare services but should not be captured within the healthcare boundary.

Healthcare providers relate to organizations and actors that deliver healthcare goods and services (such as hospitals and residential long-term care facilities). Many different organisations and actors can provide some form of healthcare under the SHA boundary and the SHA provider classification strives to capture them all regardless of whether healthcare is considered their primary or secondary activity. Primary providers of healthcare are those whose principal activity (defined as greater than 50 per cent of the value added from outputs relating to healthcare activity) is to deliver healthcare goods and services.

Healthcare financing schemes relate to the type of financing of health services. Largely these relate to Government and compulsory health insurance schemes, voluntary healthcare payment schemes, and household out-of-pocket schemes. Voluntary healthcare payment schemes capture not only voluntary health insurance schemes but also less recognised classifications of private financing in the form of non-profit institution financing schemes (e.g. charitable contributions) and enterprise financing schemes (e.g. employer-provided healthcare) [12].

#### *National application of the SHA standard*

The primary concern of the CSO was to apply the international SHA methodology to Irish healthcare expenditure data. As noted by the OECD et al. [9] the availability of data, or the approach to data collection, within a specific country may raise difficulties in aligning with the international SHA standard. Therefore, a certain level of ambiguity over classification or under/over estimation of certain aggregates may occur. The mapping of the Irish health care services to the SHA standard was undertaken by the CSO, the Department of Health (DoH) and the HSE and organised through a project which operated from 2013 to 2016. In this context, some issues were identified in applying the SHA standard to the Irish system [11]. First, a key output of this project was a review of the healthcare boundary and which services to include as healthcare and which services to exclude as social care. This resulted in many services previously defined as social care within the Irish system being reclassified to healthcare. However, separating out health-related social care within a defined package of services has proved difficult and may have resulted in healthcare expenditure being over-stated in some areas. Secondly, there was some difficulty in applying the broad definition of private healthcare expenditure (which includes non-profit institution financing schemes) and voluntary funding by charities is currently under-represented in the data; although work is on-going to better capture this financing source [11].

### *An alternative method of estimating healthcare expenditure in Ireland*

Prior to the publication of the SHA data for Ireland, Wren et al. [1] estimated components of Irish health system expenditure and financing.

While the CSO applied an existing international methodology to estimate healthcare expenditure for Ireland, the starting point for the analysis by Wren et al. [1] was an attempt to measure the total cost to Irish society of health and social care, however financed or delivered. Similar to SHA methodology, the analysis included public and private current healthcare expenditure capturing current and capital publicly-funded expenditure, private health insurance funded expenditure, private out-of-pocket expenditure, expenditure by private corporations on healthcare and the financing costs of insured expenditure. In addition to these aggregate health expenditure categories, there was an additional requirement for disaggregated estimates of expenditure on services of relevance to the UHI funding model (e.g. hospital care, GP care, prescribed medication).

The analysis adopted a broad definition of public healthcare, including expenditure on the public health and social care programmes funded by the DoH, the HSE and the Department of Children and Youth Affairs (DCYA). The programmes funded by the DCYA were included because of overlaps between the remit of this new Department and the HSE [1]. A small amount of public healthcare expenditure on healthcare funded through the Department of Social Protection was also included.

The analysis also included the two major components of private healthcare expenditure in Ireland - out-of-pocket (OOP) payments and private insurance. Returns to the OECD (by the CSO) prior to the implementation of the SHA methodology calculated OOP expenditure as a residual, where total expenditure was estimated and OOP expenditure was then determined as the remainder having accounted for other sources of financing. In the absence of an alternative, this residual was necessarily used as an estimate of overall OOP expenditure on healthcare in Ireland in the analysis by Wren et al. [1]. Private health insurance financed expenditure in the analysis equated to claims incurred by insurance companies but, to estimate the full cost to society of insurance-financed expenditure, the analysis further included the insurers' margin. This was defined as the margin of private health insurers' earned premium over the cost of the claims they incur. The mean market margin was calculated by subtracting from earned premium income both claims incurred and the net cost to the industry of risk equalisation credits [1]. As well as estimating total expenditures, the analysis separately developed detailed estimates of the components of both public and private healthcare expenditure.

Table 1 below provides an overview of the methods adopted in the two approaches.

**Table 1: A comparison of approaches – summary points**

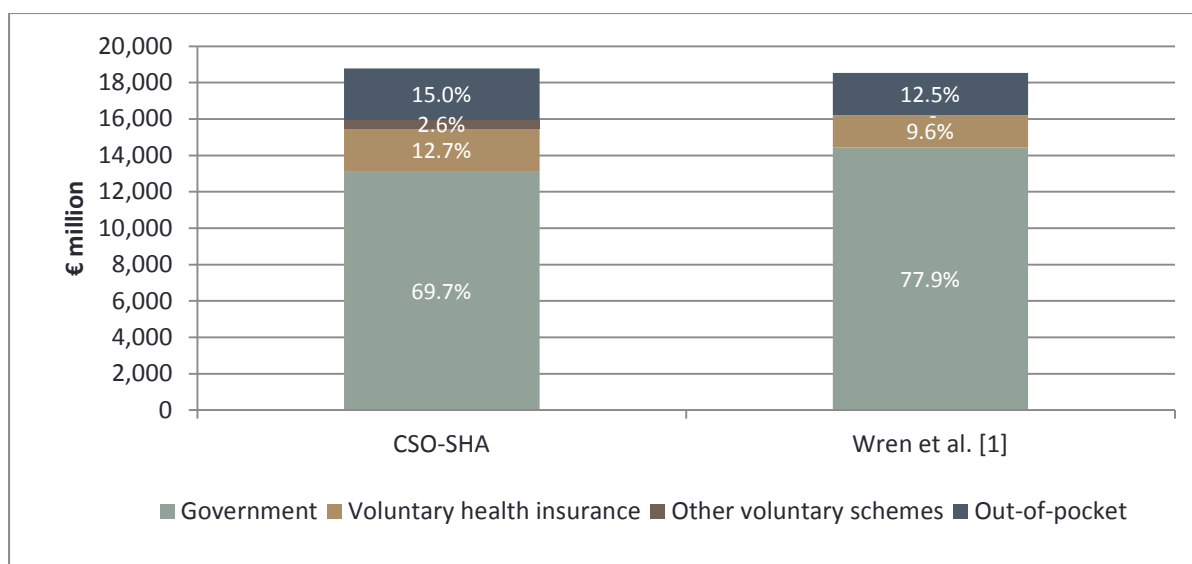
	CSO application of the SHA methodology	Wren et al. [1]
<i>Boundary of current public healthcare expenditure</i>	The SHA approach employs a narrower definition of current healthcare expenditure making the distinction between healthcare	Applies a broad definition of current healthcare expenditure capturing both health and social care.

	and healthcare-related functions (which fall outside the boundary of healthcare).	Seeks to capture the total cost of healthcare to society (including administration and financing) rather than exclusively direct expenditures on healthcare goods and services.
	Seeks to capture the total cost of healthcare to society (including administration and financing) rather than exclusively direct expenditures on healthcare goods and services.	Seeks to capture the total cost of healthcare to society (including administration and financing) rather than exclusively direct expenditures on healthcare goods and services.
<i>Boundary of current private healthcare expenditure</i>	In addition to private health insurance expenditure and out-of-pocket payments, the SHA framework also captures private healthcare funded through additional voluntary sources (e.g. voluntary donations and contributions).	Private current expenditure includes private health insurance expenditure and out-of-pocket payments.
<i>Breakdown of estimates</i>	The SHA framework provides for comprehensive and detailed breakdowns of healthcare expenditure organised around a tri-axial relationship of function, provider and financing classifications.	The approach focused on providing breakdowns of healthcare expenditure by financing source. Some expenditure classifications by provider source were also captured.

### 3. COMPARISON OF EXPENDITURE ESTIMATES

Applying the SHA methodology, total current healthcare expenditure (TCHE) in Ireland in 2013 was estimated to be €18,776 million [11]; while Wren et al. [1] estimated TCHE of €18,533 million. While at the aggregate these figures are very similar, Figure 1 shows that the breakdown of total expenditure by their public and private components, differs significantly. Applying the SHA methodology, the CSO estimates total government (public) expenditure to be €13,096 million, accounting for 69.7 per cent of TCHE. In contrast, the analysis by Wren et al. [1] estimated total current government expenditure to be €14,429 million, accounting for 77.9 per cent of TCHE. In relation to private expenditure, applying the SHA methodology, the CSO estimated private current expenditure of €5,680 million, comprised of €2,376 million through voluntary private health insurance (12.7 per cent of TCHE), €482 million through other voluntary schemes (2.6 per cent of TCHE) and €2,822 million (15.0 per cent of TCHE) through OOP payments. In contrast, Wren et al. [1] estimate private current healthcare expenditure of €4,104 million. This is composed of €1,788m private health insurance expenditure (9.6 per cent of THCE) and €2,316m of OOP expenditure (12.5 per cent of THCE). The following sections examine the comparative breakdown of these estimates in more detail and identifies some reasons for the differences between the two methodologies.

**FIGURE 1** Comparative estimates of Irish current healthcare expenditure, 2013



Source: Central Statistics Office [11], Wren et al. [1]

#### *Current public healthcare expenditure*

In an attempt to explain the differing estimates of current public expenditure, Table 2 uses the CSO's template of reconciliation between HSE and Government-funded current healthcare expenditure under the SHA framework [11]. The HSE is taken as the starting point as it is responsible for the provision of Ireland's public health and social care services with the vast majority of public expenditure on healthcare allocated to the HSE to perform this function. Both the CSO application of the SHA methodology and the analysis by Wren et al. [1] begin with similar estimates of HSE expenditure. The CSO report a total HSE expenditure figure of €13,642 million compared to the Wren et al. [1] estimate of €13,563 million. The difference here is explained by the different source of data - the CSO source their data from the HSE Annual Financial Statements (AFS) while Wren et al. [1] estimates are obtained from HSE voted expenditure.

Based on the SHA framework, a net figure of €780m is removed from gross estimates. This relates to a removal of €1,317m of expenditure on services, which the HSE has defined as non-healthcare applying the SHA definition. The major excluded components relate to child services funded by the HSE in 2013<sup>3</sup> (€69m), superannuation (€81m), State Claims Agency (€135m) and exclusions related to allied healthcare professionals (€25m)<sup>4,5</sup>. It is noteworthy that little adjustment is made to account for social care services for older people and those with disabilities funded by the HSE which might be considered as non-healthcare services. In this context,

<sup>3</sup> This figure fell to €1.8m in 2014 due to the formation of the Child and Family Agency which now assumes responsibility for a range of child services previously funded by the HSE. As such only €699m worth of HSE expenditure was removed in 2014 under the heading of 'non-healthcare services'.

<sup>4</sup> Personal communication with the CSO.

<sup>5</sup> Superannuation relates to pension-related expenditures deemed suitable for removal from estimates. The HSE makes payments to the State Claims Agency under the Clinical Indemnity Scheme. The Clinical Indemnity Scheme is the main scheme under which the State Claims Agency manages all clinical negligence claims taken against healthcare enterprises, hospitals and clinical, nursing and allied healthcare practitioners covered by the scheme [15].



the HSE advised the CSO that most of their services should be defined as health rather than social care. The SHA allows for a ‘majority’ classification whereby if more than 50% of the expenditure of a provider relates to healthcare then all expenditure can be classified as healthcare. Thus, in cases where it is difficult to separate out social care from healthcare in a defined package of services, an inclusive approach is adopted (which, as noted, may have led to some over-estimation of expenditure). This inclusive approach is not applied by all countries in their OECD returns [16]. An additional €538m is also added to estimates of HSE gross expenditure. This relates mainly to healthcare expenditure on voluntary agencies not included in the AFS<sup>6</sup>. Reflecting the historical inclusion in the same budget and under the same system of administration of health and social care services in Ireland, so that expenditures on both are regarded as “health” expenditures, no similar adjustments are made by Wren et al. [1]. The Wren et al. [1] study therefore was inclusive of all programmes funded from the budgets of the HSE or DoH and did not exclude any aspect of expenditure on such programmes from healthcare expenditure estimates even if it could be explicitly regarded as financing social care. The same approach was adopted to private expenditures.

Both the CSO application of the SHA methodology and the analysis by Wren et al. [1] remove non-governmental funding from estimates of current public healthcare expenditure. The CSO make a substantially greater adjustment (€20 million) than the analysis by Wren et al. [1] (€402 million). The CSO exclude voluntary health insurance payments, OOP financed care and HSE funding derived from the provision of enterprise services (e.g. hospital car-parking charges, canteen receipts)<sup>7</sup>. The analysis by Wren et al. [1] excluded voluntary health insurance payments and OOP financed care.

**TABLE 2** Comparison of current public healthcare expenditure estimates, 2013

		CSO-SHA estimates	Wren et al. [1]
		2013 €m	2013 €m
<b>1</b>	<b>Total HSE Expenditure</b>	<b>13,642</b>	<b>13,563</b>
2	Excluded Non-Healthcare Services	-1,317	0
3	Include non-AFS Gross Expenditure (mainly related to voluntary agencies)	538	0
<b>4= 2 + 3</b>	<b>Total Adjustments to HSE Gross Expenditure</b>	<b>-780</b>	<b>0</b>
<b>5= 1 + 4</b>	<b>Gross Expenditure of HSE included in SHA Expenditure</b>	<b>12,863</b>	<b>13,563</b>
6	Non-Government funding of HSE	-920	-402
<b>7= 5 + 6</b>	<b>Total HSE HF.1 funded Healthcare Expenditure</b>	<b>11,943</b>	<b>13,161</b>

<sup>6</sup> This relates mainly to the inclusion of voluntary Section 38 hospitals not included in the HSE Annual Financial Statements. Section 38 hospitals are those funded, under Section 38 of the Health Act 2004, to provide a defined level of services on behalf of the HSE.

<sup>7</sup> Personal communication with the CSO.

<b>Additional Government Healthcare Expenditure</b>			
8	DSP Transfer Payments	659	0
9	Treatment Benefits from Social Insurance Fund	56	21
10	Department of Health	82	232
11	Tax Relief on Medical Expenses	136	129
12	Tax Relief on Health Insurance Premia	0	473
13	Expenditure on Other Governmental Department and Agencies	220	413
<b>14=</b> <b>8+9+10</b> <b>+11+12</b>	<b>Total Additional Government Funded Expenditure</b>	<b>1,153</b>	<b>1,268</b>
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<b>15 = 7 +</b> <b>14</b>	<b>Government Funded Current Healthcare Expenditure</b>	<b>13,096</b>	<b>14,429*</b>
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Source: Central Statistics Office [11], Wren et al. [1]

Notes: \* the figure for current public healthcare expenditure given in Table 24 (pg 100) of Wren et al. [1] is €14,229m. However, the figure in Table 2 of this analysis has already made adjustments for expenditure on tax reliefs (€602m) and insurance and out-of-pocket financed public expenditure (€402m).

Both approaches make adjustments to include additional government expenditure not attributable to the HSE. Although both approaches capture similar volumes of additional healthcare expenditure (CSO applying SHA methodology €1,153 million; Wren et al. [1], €1,268 million), significant variation exists within this category of expenditure. Most notably, the CSO includes €659 million of Department of Social Protection Transfer Payments to carers (e.g. domiciliary care allowance<sup>8</sup>); these transfers were not included by Wren et al. [1] as part of their public healthcare expenditure estimation since the definition of the cost of healthcare to society in this study did not extend to include informal care. Wren et al. [1] did however allocate tax relief on health insurance premia to estimates of public healthcare expenditure. This adjustment is not undertaken by the CSO and as a consequence this increases Wren et al. [1] estimates of public healthcare expenditure relative to CSO estimates and at the same time decreases Wren et al. [1] estimates of private healthcare expenditure relative to CSO estimates (see Table 3).

The total voted expenditures of the DoH (€232 million) and the DCYA (€413 million) are included in Wren et al. [1] estimates. CSO estimates attribute only €82m to the DoH. In addition, the €220m attributable to Other Government Departments and Agencies in the CSO estimates is not primarily related to healthcare spending by the DCYA but rather to departments and agencies such as Defence, Prison Services, Probation Services, Gardai, Education and Local Authorities<sup>9</sup>.

<sup>8</sup> Domiciliary Care Allowance (DCA) is a monthly payment for a child aged under 16 with a severe disability, who requires ongoing care and attention, substantially over and above the care and attention usually required by a child of the same age. It is not means tested [17].

<sup>9</sup> Personal communication with the CSO.

Differences between the two methods in terms of current public healthcare expenditure can largely be considered definitional. This takes place along two dimensions. Firstly, in terms of the boundary adopted to define healthcare. Overall Wren et al. [1] define a broader boundary of healthcare including expenditure on public health and social care programmes funded by the DoH, the HSE and the DCYA. In contrast the CSO application of the SHA boundary removes a net €780 million from HSE expenditure (which is a conservative adjustment given the difficulty separating out health and social care) but does include €659 million in DPS transfers not capture by Wren et al. [1]. Secondly, Wren et al. [1] allocate a greater amount of healthcare expenditure to Government. Particularly, Wren et al. [1] make less adjustments to remove non-government funding of the HSE and, in contrast to the CSO, allocate tax relief on health insurance premia to government funding of healthcare. Finally, data availability and sources appear to be a relatively minor factor in explaining difference in estimates given that data on public healthcare expenditure is well-recorded and assessable.

#### *Current private expenditure*

Estimates of current private healthcare expenditure derived by the CSO and Wren et al. [1] are provided in Table 3. In contrast to current public healthcare expenditure estimates, the CSO records greater levels of overall private expenditure (€5,680 million) than that of Wren et al. [1] (€4,104 million).

**TABLE 3** Comparison of current private healthcare expenditure estimates, 2013

Financing Source	CSO – SHA		Wren et al. [1]	
	€m	Data Source	€m	Data Source
<b>Other Voluntary Schemes</b>	482	Published accounts of non-profit organisations; CSO population data; CSO National Accounts data; CSO Annual Services Inquiry data	No adjustment	
<b>Voluntary Health Insurance</b>	2,376	Data were sourced from a CSO survey of the four private health insurers operating in Ireland	1,788*	Health Insurance Authority Reports analysing and evaluating risk-equalisation returns (2013,2014)
<b>OOP expenditure</b>	2,822	Include HSE financial data, tax files, Revenue Commissioners, data on refunds for medical expenditure, Household Budget Survey, published accounts, price by quantity methods and residual methods	2,316	OOP healthcare expenditure sourced from OECD Health data for 2012, based on CSO returns, and estimated for 2013
<b>Total Current Private Expenditure</b>	5,680		4,104	

Source: Central Statistics Office [11], Wren et al. [1]

Note: \* This figure is net of €473million in tax-relief which has been allocated to Government healthcare expenditure (see Table 2).

#### Other voluntary schemes

A material part of the difference relates to the fact that the SHA-defined boundary of expenditure on healthcare includes €482m whose financing source relates to *Other voluntary schemes*. Specifically, this includes *Non-Profit Institutional Financing* (e.g. voluntary donations and contributions) and *Enterprise Financing Schemes* (e.g. employers providing healthcare and/or occupational healthcare to employees). These categories of financing are not captured as part of the analysis by Wren et al. [1], and had not been captured in previous approaches to estimation of Irish private healthcare financing.

### Voluntary health insurance

Additionally, variation in voluntary health insurance estimates (CSO - €2,376 million; Wren et al. [1] - €1,788m) is partly a function of the allocation of tax relief on health insurance premia to government healthcare expenditure by Wren et al. [1], which was not adjusted for by the CSO. The Wren et al. [1] figure for voluntary health insurance financing increases to €2,261 million if no adjustments are made to account for tax relief, making estimates more comparable.

The remaining expenditure difference is most likely explained by alternative sources of data. The CSO estimates were predicated on a survey of the four-open market private health insurers operating in Ireland, obtained through a statutory instrument. This survey captured detailed expenditure and financials for all insurers between 2011 and 2013 [18]. Estimated expenditures of the seven restricted membership schemes (approximately 5 per cent of total expenditure funded through voluntary insurance) were based on the profile of the four open market insurers [12]. The Wren et al. [1] estimates of voluntary health insurance financing were based on Health Insurance Authority Reports to the Minister for Health analysing risk equalisation returns from insurers for July 2012 to end June 2013 [19,20], which did not include the financing contribution of restricted membership schemes.

### Out of pocket spending

The CSO (€2,822 million) also report greater OOP spending relative to Wren et al. [1] (€2,316 million). Again it is important to consider the data sources used in the calculation of these estimates. The Wren et al. [1] data were sourced from OECD Health data from 2012 and estimated for 2013 assuming that OOP expenditure represented the same proportion of health expenditure in both years. These 2012 data were provided to the OECD by the CSO, based on pre-SHA returns. Limited available information on OOP healthcare expenditure in the Irish system necessitated residual estimation.

Providing estimates of OOP expenditure under the SHA standard still presents difficulty due to data limitations. However, more of a mixed approach is now adopted by the CSO in applying the SHA methodology. OOP estimates are still calculated as a residual, however, data are now compiled by provider and funding source. Estimation of provider totals, necessitated the application of a variety of approaches (e.g. the use of Revenue data, survey information and price by quantity estimation). The CSO note that this is an improvement on previous estimates as it considers healthcare provision across the economy in more detail than previous National Accounts estimates<sup>10</sup>. This change in methodology may be contributing to higher relative OOP expenditure estimates.

In summary, a large proportion of the difference in estimates of private healthcare expenditure can be explained in that the CSO capture the contribution of other voluntary schemes in addition to health insurance and in that Wren et al. [1] allocate tax-relief on health insurance premia to public healthcare expenditure while the CSO do

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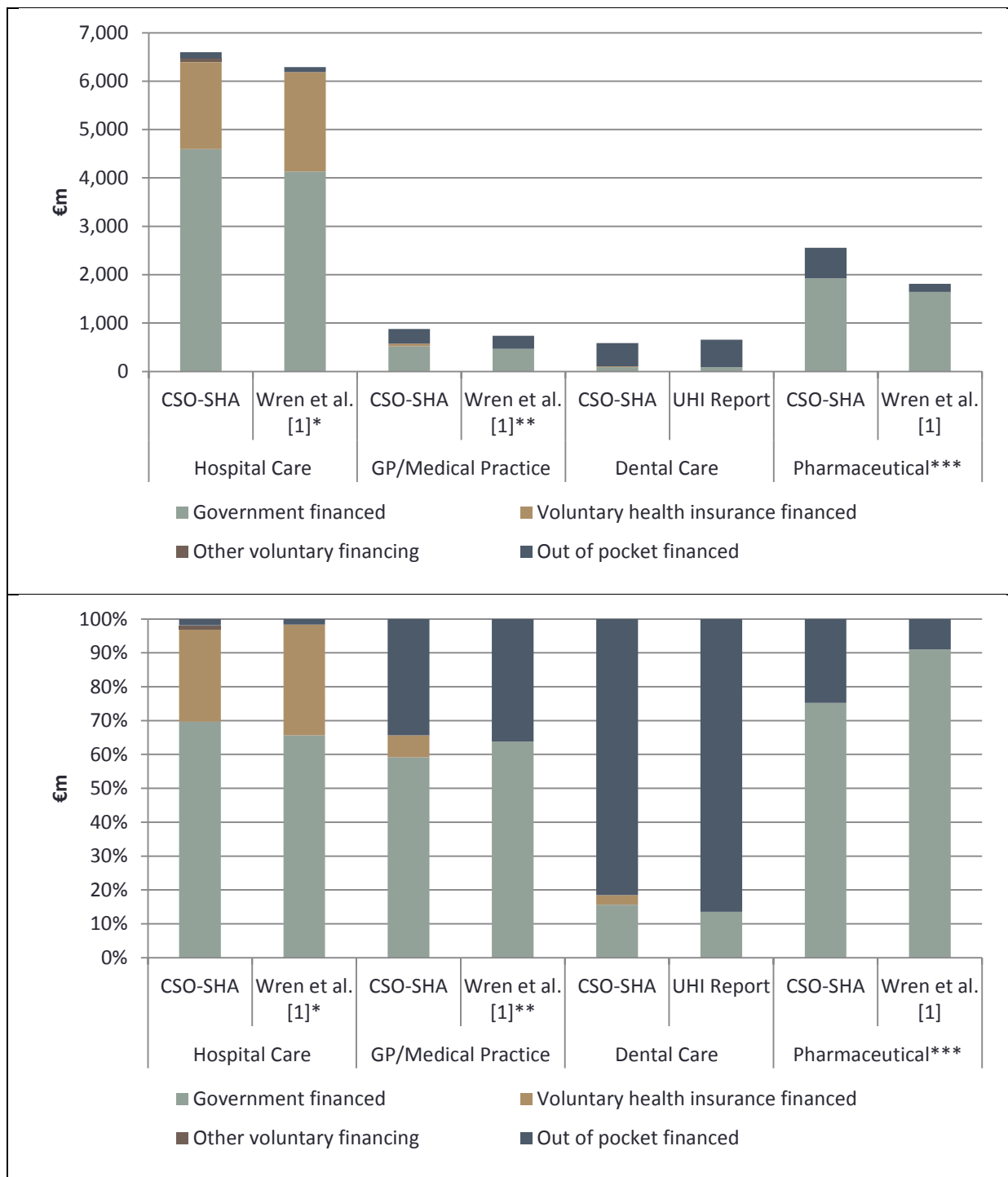
<sup>10</sup> *ibid.*

not. Additionally, estimation of private healthcare expenditure (relative to public healthcare expenditure estimation) is complicated by lack of publicly available data on either voluntary schemes or out-of-pocket expenditure. A consequence of this was that different data sources, and approaches, were adopted in the calculation of private healthcare expenditure. This fact may also be contributing to differences in private healthcare expenditure estimates.

#### *Financing by provider*

This section compares estimates of expenditure on hospital care, GP care, dental care and pharmaceuticals in 2013, as well as the source of financing for these areas.

**FIGURE 3** Volume and percentage comparisons of sources of provider financing, 2013



Source: Central Statistics Office [11]; Wren et al. [1]

Notes: \* This bar includes tax relief on insurance premia as part of voluntary health insurance financed care (taken from the Wren et al. [1], Figure 12, page 102)

\*\* The proportion of out-of-pocket GP fees that was reimbursed by health insurance companies could not be established.

\*\*\* CSO-SHA categorisation captures expenditure by pharmacies, while Wren et al. [1]

categorisation captures spending on prescribed medications.

In volume terms, the CSO application of the SHA methodology approach captures higher levels of expenditure on hospital care (CSO - €6,956 million; Wren et al. [1] - €6,291 million), GP/medical practice care (CSO - €879 million; Wren et al. [1] - €738 million) and pharmaceuticals (CSO - €2,557 million; Wren et al. [1] - €1,810 million). Part of this variation is definitional. For instance, the SHA framework categorises what would be considered GP expenditure between two different sub-categories: part is allocated to 'Medical Practices', which also includes some consultant, some HSE Mental Health, Primary Care and PCRS-funded services [13]; however, where GPs operate as part of a multi-disciplinary team (such as in HSE Primary Care Centres), expenditure is recorded under 'Ambulatory healthcare centres'. In contrast the Wren et al. [1] analysis captured GP expenditure as part of a single provider classification. Additionally, the CSO capture a broad range of community pharmaceutical expenditures including prescribed and non-prescribed medications. In contrast, the Wren et al. [1] analysis examined expenditure on prescribed medications only as non-prescribed medications were outside the scope of the UHI funding model.

Figure 3 also highlights the more granular nature of the CSO provider breakdowns in terms of financing source. The CSO-SHA approach captures hospital care financed through 'other voluntary' (i.e. not insurance-based) (1%) sources and medical practices (7%) and dental care (3%) financed through voluntary health insurance. The Wren et al. [1] report did not include these financing sources since these disaggregated data sources were not available to the analysis.

#### **4. DISCUSSION**

The CSO applying the SHA methodology and the analysis by Wren et al. [1], through different methodological approaches, reached a remarkably similar figure for the total cost of financing current healthcare in Ireland in 2013. However, the similarity in these aggregate estimates is potentially misleading, and a closer look at the components of these expenditures revealed considerable disparities. CSO estimates of current public healthcare expenditure were €1,333 million lower than corresponding Wren et al. [1] estimates. In contrast, the CSO estimated an additional €1,576 million of private expenditures as compared to the Wren et al. [1] estimate. As described, this discrepancy in the estimates of current public healthcare expenditure is largely explained by the broader boundary of healthcare adopted by Wren et al. [1] and through a greater allocation of healthcare expenditures to Government.

Both the Wren et al. [1] analysis and the CSO applying the SHA methodology provided more detailed estimates of private healthcare expenditure in Ireland than have traditionally been captured. The SHA framework, in particular, expanded the definition of private healthcare expenditure to include financing from 'other voluntary sources' such as charitable contributions and employer-provided healthcare and these inclusions better reflect the true contribution of private expenditure in funding healthcare services in Ireland. Moreover, available data on private healthcare has traditionally been relatively scarce and fragmented in the Irish system and it is likely



that the alternative data sources sought out and used to capture both private health insurance and out-of-pocket expenditure also contributed to variance in private expenditure estimates.

Both approaches to expenditure estimation have merits and the more appropriate approach may depend on the purpose for which these statistics are being used. For instance, the objective of the SHA accounting standard is to allow for international comparison and analyses of healthcare expenditures and in that context, the CSO application of the SHA methodology estimates of Irish healthcare expenditure are more suitable for such studies. However, it is important to note that present difficulties in fully applying the SHA standard to estimates of Irish healthcare expenditure may limit comparability. As described, CSO estimates are currently largely inclusive of expenditures on longterm care and disability which may be leading to an over-estimation of public healthcare expenditure, under the SHA definition, relative to other countries. Similarly, some under-estimation of private expenditure from 'other voluntary sources' at present may hinder international comparisons. All else equal, better alignment of estimates with the SHA boundary would likely decrease estimates of public healthcare expenditure and increase estimates of private healthcare expenditure further.

The rationale for analysis by Wren et al. [1] differed from the SHA methodology and was designed to capture the complete cost of health and social care to Irish society and consequently included the full voted expenditure of the DoH, the HSE and the DCYA. While the approach adopted in the Wren et al. [1] analysis may be less relevant for cross-country analysis, it may be more appropriate for Irish-specific analysis of healthcare costs, particularly public healthcare costs. The Irish healthcare budget funds both health and social care and consequently a more inclusive approach may provide a better representation of healthcare expenditure as it applies to the Irish system. This suggests that a definition of public healthcare expenditure more closely aligned with the Wren et al. [1] definition may be better suited for Irish-specific healthcare policy and planning analysis. For instance, any future analysis considering financing reform, or the projection of future resource requirements, may better align with a more inclusive healthcare boundary. This is an important point on which to reflect.

In addition to financing source, the SHA framework also reports detailed breakdowns of expenditure along dimensions of function and provision of healthcare. While Wren et al. [1] did consider certain breakdowns by providers of care, pertinent to the objective of the analysis, it was not comprehensive and no estimates of expenditure by function were considered. The CSO application of the SHA framework therefore represents a major advancement in terms of the divisibility of healthcare expenditures and again provides a foundation for international comparison along these dimensions. However, again, issues with over and under-estimation of expenditures may somewhat limit the usefulness of these breakdowns for cross-sectional comparative purposes at present. Moreover, standardised SHA categorisations may not align with what are considered typical expenditure divisions in the Irish system. For instance, not all consultant expenditure is captured as part of hospital expenditure while no dedicated breakdown exists to capture GP expenditure. These standardisations may present problems for Irish-specific healthcare system analysis.

The analysis presented in this paper highlights that there is no one absolute definition or estimate of healthcare expenditure and different methodological approaches to estimating expenditure will likely yield different results.

Therefore, care is required when making comparisons of expenditure across countries and through time to ensure that similar definitions and methodologies were applied in compiling the figures. However, care is also required when assessing healthcare expenditure estimates for a single country within a given time period to ensure that there is a clear understanding about what is and is not included in the estimate. For example, in relation to public healthcare expenditure, is social care included and if so how is it identified and defined. The analysis has also highlighted the difficulty of measuring private healthcare expenditure. While the two methodologies discussed in this paper have made some progress in this regard in the Irish context, it is still very much a work in progress and more work is required to ensure there are valid estimates of private healthcare expenditure. This is especially important in countries like Ireland where there are relatively high private expenditures, both in terms of private insurance and out-of-pocket payments. It also potentially raises questions about comparisons between countries with different levels of private expenditure, with uncertainty around healthcare expenditure estimates likely to be greater in countries with higher levels of private expenditure.

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**Ethical Approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

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