

Ten best resources for conducting financing and benefit incidence analysis in resource-poor settings

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Accepted 24 August 2014

Many low- and middle-income countries are seeking to reform their health financing systems to move towards universal coverage. This typically means that financing is based on people's ability to pay while, for service use, benefits are based on the need for health care. Financing incidence analysis (FIA) and benefit incidence analysis (BIA) are two popular tools used to assess equity in health systems financing and service use. FIA studies examine who pays for the health sector and how these contributions are distributed according to socioeconomic status (SES). BIA determines who benefits from health care spending, with recipients ranked by their relative SES. In this article, we identify 10 resources to assist researchers and policy makers seeking to undertake or interpret findings from financing and benefit incidence analyses in the health sector. The article pays particular attention to the data requirements, computations, methodological challenges and country level experiences with these types of analyses.

Keywords Benefit incidence, financing incidence, progressivity, health systems financing

KEY MESSAGES

- The push towards universal health coverage has resulted in greater emphasis on measuring the equity impact of health care financing reforms using the techniques of financing and benefit incidence analysis (BIA).
- We present 10 resources (9 peer reviewed articles and 1 report) that explain and discuss data requirements, computations, methodological challenges and country level experiences with financing and BIA.

Introduction

In 2013, we commenced the Sustainable Health care financing in Fiji and Timor-Leste (SHIFT) study to measure equity in health systems financing (<https://research.unsw.edu.au/projects/sustainable-health-financing-fiji-and-timor-leste-shift-study>) using the tools of financing and benefit incidence analysis (BIA). This article is a compilation of the resources we found to be most useful in designing and implementing the SHIFT study. Articles were selected based on their comprehensiveness, clarity

and level of insight into: the methods of financing and benefit incidence; their application in low- and middle-income countries (LMICs); methodological challenges; and factors influencing the results of these analyses. The article begins with an overview of the policy context in which health financing equity has grown in prominence followed by a summary of the 10 recommended resources that include conceptual, methodological and empirical studies. As with

most articles in this series, it represents a place to begin reading on a topic rather than a systematic review of the evidence.

Equity in health care financing

A principal objective for measuring health equity is to gauge progress towards Universal Health Coverage (UHC), where ‘people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship’ (World Health Organization (WHO) 2014). UHC has become a major goal for health reform in many countries (Lagomarsino *et al.* 2012; Mills *et al.* 2012; Victora *et al.* 2013). The World Health Report 2010 on universal coverage of health care and the associated declaration of the World Health Assembly urged member states to ‘aim for affordable universal coverage and access for all citizens on the basis of equity and solidarity’ [WHO 2010; World Health Assembly (WHA) 2011]. Financing—the ways in which funds for health care are raised, pooled and allocated—is recognized as a key driver of universal coverage (Mills *et al.* 2012; Kutzin 2013). Many LMICs are currently seeking to modify their financing systems so they can move more quickly to UHC (WHO 2010; Fryatt and Mills 2012; Kutzin 2013). Equity is at the heart of UHC. For financing, this implies that the health system should be financed in accordance with people’s ability to pay while for service use, this means benefits are received based on the need for health care (Mills *et al.* 2012). In the following sections, we identify 10 resources to assist researchers and policy makers seeking to undertake or interpret financing and benefit incidence analyses in the health sector. These are summarized in the Table 1.

Explaining the techniques of financing and benefit incidence analyses

Analytical methods are available to assess equity in health systems financing and service use, most notably in the form of financing incidence analysis (FIA) (also known as progressivity analysis) and BIA. Financing incidence studies examine who pays for the health sector and how these contributions are distributed according to living standard or socioeconomic status (SES). A health financing system is deemed progressive if the rich contribute a relatively higher proportion of their income to health care financing than the poor, and regressive if the opposite is the case. It is proportional if the same percentage of income is contributed by everyone regardless of level of income. Progressivity is typically measured for each source of finance as well as for the overall health system (O’Donnell *et al.* 2008). The measurement of overall progressivity requires macro weights (often obtained from Government Reports or National Health Accounts) to be assigned to each financing source. The two key variables for FIA are health care payments and ability to pay. Data on these are most commonly sourced from Household Income and Expenditure Surveys (see ‘methodological challenges’ for the pros and cons of different data sources for FIA). BIA assesses the distribution of benefits from health care spending. This involves ranking a population according to their relative living

standard or SES and estimating the utilization of different health services by individuals or socioeconomic groups. Total benefits from using health services are calculated by multiplying utilization rates by unit costs for each type of health service. For public sector analyses, health services will include health centres, district hospitals and regional hospitals while ‘whole of health system analyses’ (Mills *et al.* 2012) will also include private sector services such as retail pharmacies, private health centres and hospitals. The distribution of total health service benefits (or of public subsidies) across individuals/groups is then evaluated against a target distribution. This ‘target’ distribution could simply be based on population size but it could also be weighted for socioeconomic disadvantage (Gwatkin *et al.* 2004). The data required for BIA includes household surveys that measure both health service utilization and SES. The other data requirement is the unit cost of different health services which can be derived from many different sources including costings of health services conducted by governments and donors or from datasets of total expenditure such as the National Health Accounts (McIntyre and Ataguba 2011). (See ‘methodological challenges’ for the pros and cons of different data sources for BIA).

The detail behind these computations has been the subject of a number of World Bank publications. The World Bank report, ‘Analysing Health Equity Using Household Survey Data’ by O’Donnell *et al.* (2008) is one of the most comprehensive step-by-step guides to the measurement of health equity. Chapters 14 and 16 explain the calculations behind BIA (for publicly funded health services) and FIA, respectively. The article titled ‘How to do a Benefit Incidence Analysis’ by McIntyre and Ataguba (2011) is another useful resource for those wishing to gain practical guidance on how to conduct a BIA across the health care system. Both of these introductory guides consider the data required, potential sources of data, deficiencies in data frequently available in LMICs and approaches to analysing these data.

Practical application of financing and benefit incidence analysis

To understand how the methods of FIA and BIA can be applied in practice, it is useful to look at country-level examples, of which there are many. Single country studies are useful insofar as they often contain a lot of detailed information on context and methods. However, interpreting and positioning the results at a regional or global level can be challenging. Individual country level studies typically use different methods which can make it difficult to identify the broader economic, political and health system characteristics that explain a country’s success in targeting health spending to the poor (O’Donnell *et al.* 2007). For example, BIA and FIA involve measuring disparities in health service utilization and payments for health care across people with different standards of living (O’Donnell *et al.* 2007). There are many different ways to measure living standards and findings have been shown to be sensitive to the choice of measure (this is discussed further under ‘methodological challenges’). Moreover, some studies focus on the public sector (Mahal *et al.* 2000; O’Donnell *et al.* 2007; Onwujekwe *et al.* 2012) while others take a ‘whole of system’ approach including both public and private sectors (Limwattananon *et al.* 2012;

Table 1 Ten best resources for financing and benefit incidence analysis

	Resource	Focus
1	O'Donnell O, Doorslaer E, Wagstaff A <i>et al.</i> 2008. Analysing Health Equity Using Household Survey Data. World Bank: World Bank Institute	Explanation of techniques—including computation Methodological challenges
2	McIntyre D, Ataguba J. 2011. How to do (or not to do) ... a benefit incidence analysis. <i>Health Policy and Planning</i> 26 : 174–82	Explanation of techniques—including computation Methodological challenges
3	Mills A, Ataguba JE, Akazil J <i>et al.</i> 2012. Equity in financing and use of health care in Ghana, South Africa, and Tanzania: implications for paths to universal coverage. <i>Lancet</i> 14 : 126–33	Practical application: comparative study from Africa
4	O'Donnell O, van Doorslaer E, Rannan-Eliya RP <i>et al.</i> 2007. The incidence of public spending on healthcare: comparative evidence from Asia. <i>World Bank Economic Review</i> 21 : 93–123	Practical application: comparative study from Asia
5	Borghi J, Ataguba J, Mtei G <i>et al.</i> 2009. Methodological challenges in evaluating health care financing equity in data-poor contexts: lessons from Ghana, South Africa and Tanzania. <i>Advances in Health Economics and Health Services Research</i> 21 : 133–56	Methodological challenges
6	Vyas S, Kumaranayake L. 2006. Constructing socio-economic status indices: how to use principal components analysis. <i>Health Policy and Planning</i> 21 : 459–68	Explanation of techniques Methodological challenges
7	Limwattananon S, Tangcharoensathien V, Tisayaticom K <i>et al.</i> 2012. Why has the Universal Coverage Scheme in Thailand achieved a pro-poor public subsidy for health care? <i>BMC Public Health</i> 12 : S6	Exploring factors influencing financing and benefit incidence
8	Macha J, Harris B, Garshong B <i>et al.</i> 2012. Factors influencing the burden of health care financing and the distribution of health care benefits in Ghana, Tanzania and South Africa. <i>Health Policy and Planning</i> 27 : i46–i54	Exploring factors influencing financing and benefit incidence
9	Wagstaff A. 2012. Benefit Incidence Analysis: are government health expenditures more pro-rich than we think? <i>Health Economics</i> 21 : 351–66	Methodological challenges
10	Munge K, Briggs A. 2013. The Progressivity of health care financing in Kenya. <i>Health Policy and Planning</i> 1–9	Methodological challenges

Mtei *et al.* 2012; Ataguba and McIntyre 2012; Akazili *et al.* 2012; Mills *et al.* 2012).

Two regional studies that compare evidence from a group of countries are included in our top 10 list of resources. The O'Donnell *et al.* (2007) study compares the incidence of public healthcare across 11 Asian countries and shows the overall distribution of public health care provision is pro-rich in most Asian countries. This is most pronounced in the poorest countries in the region due to a greater share of the health care subsidy being allocated to hospital care, which in turn is the most costly care to provide but least accessible to the poor. Similarly, the Mills *et al.* study (2012), which assesses the equity of health system financing and service use across both public and private sectors in Ghana, South Africa and Tanzania, found the distribution of health care benefits favoured wealthier groups in all three countries. In contrast, in all three countries, health-care financing [including direct and indirect taxes, insurance premiums and out-of-pocket (OOP) payments] was progressive but OOP payments on their own were regressive. Both multi-country studies identified a range of policy responses that facilitate greater equity in health care utilization and spending including: limiting the use of user fees (or providing more effective protection from them for the poor); building a wide geographic network of health facilities to maximize access to services; and ensuring hospital care, which absorbs most resources, is sufficiently targeted at the poor.

Methodological challenges

Many studies reporting the results of FIA and BIA highlight methodological challenges, the most pervasive of which relate to data sources for health care utilization and OOP payments, and to measuring living standards. We discuss these below along with accompanying references that we found useful in teasing apart the issue and identifying solutions.

Data sources

The analysis of equity in health care utilization and health care spending typically involves the use of secondary data sets. National surveys such as Demographic Health Surveys (DHS), Living Standards Measurement Surveys (LSMS) and similar household surveys that national statistical offices routinely conduct, do not allow for the calculation of accurate utilization rates for BIA (McIntyre and Ataguba 2011). These surveys typically measure the percentage of the population that visited a health service within a certain period of time, typically the past month. An accurate utilization rate requires a measure of the average number of outpatient visits per person or inpatient days per 1000 people per year (McIntyre and Ataguba 2011). McIntyre and Ataguba (2011) warn that existing surveys often fail to disaggregate by level of care (e.g. district hospital, tertiary hospital), which prevents the estimation of subsidies going to users at these different levels.

For FIA, other national surveys such as the Household Income and Expenditure Survey (HIES) and National Health Accounts can be useful sources of information on income and consumption expenditure and health sector finances, respectively. But again, these data sources suffer some deficiencies. For example, they often lack detailed information on OOP payments for health services and contributions to health insurance schemes (Borghi *et al.* 2009). For their evaluation of health care financing equity in Ghana, South Africa and Tanzania, Borghi *et al.* (2009) found that national data sets such as the Income and Expenditure Survey in South Africa, the Ghana Living Standards Survey and the Household Budget Survey in Tanzania collected total OOP payments in the last year but did not allow for attributing expenditure to particular providers.

McIntyre and Ataguba (2011) and Borghi *et al.* (2009), provide a critique of existing data sets and highlight several limitations for their use in BIA and FIA. They advocate, resources permitting, that researchers complement secondary data sets with their own cross-sectional household survey to compile detailed information on health service utilization in the public and private health sectors and health related expenditure (especially OOP payments) that can be linked to SES.

Measuring living standards

BIA and FIA seek to measure disparities in health service utilization and financing, respectively, across people with different standards of living. A measure of living standard or SES is required to rank a population from poorest to richest. According to O'Donnell *et al.* (2008), the most direct approach is to measure income or consumption expenditure. Both of these have pros and cons. Income, for example, is subject to fluctuations, which may not be captured in a one-off survey; and non-cash forms of income, common in LMICs where there is a thriving informal sector, are not accounted for (Deaton and Zaidi 2002). Individuals can also decline to disclose income levels (McKay 2000). Consumption data are less subject to fluctuations and can capture non-monetary forms of consumption but are also subject to recall bias (Deaton and Zaidi 2002). Borghi *et al.* (2009), in their article exploring methodological challenges in evaluating health financing equity in data-poor countries, compare per capita income and consumption expenditure and show that per capita expenditure was ~35% greater than income in South Africa. They argue, along with O'Donnell *et al.* (2008) that given the widely reported uncertainties about income, the primary methods of living standards measurement for FIA should be per capita expenditure which should include the value of subsistence consumption.

It is widely recognized that both income and consumption data are expensive and difficult to collect and this has prompted researchers to look for alternative 'proxy' measures that use data on household assets and other characteristics to rank populations from poorest to richest (Montgomery *et al.* 2000; Filmer and Pritchett 2001; Vyas and Kumaranayake 2006). Data for asset indices are simple to collect and less prone to the sorts of measurement problems mentioned above. They require data that can easily and quickly be collected in a household interview but they also have some limitations. For example, their results have been shown to be sensitive to the

choice of assets and household characteristics that are included in the index—see section below on 'sensitivity of results'.

O'Donnell *et al.* (2008) provide a comprehensive overview of these alternative measures of living standards including an explanation of how they can be constructed from survey data and their relative merits. Given the increasing interest in the use of 'proxy' measures of living standards, we also recommend the article by Vyas and Kumaranayake (2006) which provides a detailed discussion of how to construct asset indices.

Understanding the factors influencing the results of BIA and FIA

It is useful to see how the results of BIAs and FIAs have been interpreted and complemented by other forms of relevant information in the context of health system financing. A study by Limwattananon *et al.* (2012) examining trends in health budget distribution and the different factors contributing to pro-poor subsidies in Thailand, found that pro-poor utilization was the result of improved access to district health services by the poor, the majority of whom reside in rural areas. The close proximity of a fully functioning district health system acted as a 'strategic hub' for achieving pro-poor utilization for both outpatient and inpatient services. Other factors that reduced OOP payments and in turn pro-poor utilization of health services included a comprehensive benefit package including both inpatient and outpatient services for all members of the Universal Coverage Scheme.

Another study by Macha *et al.* (2012) examined the factors influencing the distribution of service benefits and the progressivity of health care financing in Ghana, Tanzania and South Africa. The study showed, for example, that flat-rate contributions contributed to the regressivity of informal sector voluntary schemes, either by design (in Tanzania) or due to difficulties in identifying household income levels (in Ghana). In all three countries, the regressivity of OOP payments was explained by difficulties in enforcing exemption and waiver policies, partial or no insurance cover among poorer segments of the population and limited understanding of entitlements among these groups. Generally, the pro-rich distribution of benefits was a result of limited access to higher level facilities among poor and rural populations, who rely on public primary care facilities and private pharmacies. Several barriers to accessing health care were identified including medical and transport costs, poor staff attitudes and lack of confidence in the skills of health workers. Service availability problems, including frequent drug stock-outs, limited or no diagnostic equipment, unpredictable opening hours and insufficient skilled staff, also undermined access to services.

These studies indicate that the quantitative results of BIA and FIA analyses can be greatly enriched by the collection of contextual information. Qualitative data, collected through, for example, focus group discussions and in-depth interviews, can be extremely useful in identifying the factors influencing the burden of health care financing and the distribution of health care benefits (Macha *et al.* 2012).

Sensitivity of results

It is important for analysts to be aware of the sensitivity of any findings to the assumptions and methods used in FIA and BIA.

For instance, Wagstaff (2012) examines the implications of a key assumption of BIA, namely that the unit cost of a government-provided service bears no relation to the OOP payments paid by the patient. This article compares the standard constant-cost assumption with alternative assumptions including that the cost of care in a specific episode of utilization is proportional to the amount of money paid OOP by the patient. The article reveals that under the constant-cost assumption, subsidies are pro-poor while they are pro-rich under the proportionality assumption.

FIA and BIA studies have also highlighted the sensitivity of findings to choice of 'direct' measures of living standards such as income, consumption and expenditure (O'Donnell *et al.* 2008; Munge and Briggs 2013). Munge and Briggs (2013) in their FIA of health care financing in Kenya, compared consumption and reported income (gross of taxes and contributions to National Hospital Insurance Fund) and found that for the Kenyan health care system, overall financing remained regressive even when different measures of living standards were used. They did however show that using different measures can result in changes in progressivity and on this basis advocate the use of the bootstrap method to test for this change (Munge and Briggs 2013). 'Proxy' measures of living standards based on asset indices have also been shown to be sensitive to the choice of assets and household characteristics (Houweling *et al.* 2003).

Articles such as those by Wagstaff (2012) and Munge and Briggs (2013) are useful in reminding researchers about the level of uncertainty that exists around the estimation of a range of variables used in BIA and FIA. How such analyses may be undertaken range from simple one-way analyses that assess the impact of changing a single variable to more sophisticated approaches such as the bootstrap method which tests whether any observed differences are statistically significant. Best practice is to always make key assumptions explicit and to check the potential sensitivity of findings to these assumptions.

Conclusions

The push towards UHC in many LMICs has resulted in greater emphasis on health care financing reforms and their equity impact. Financing and benefit incidence analyses, quantitative techniques used to measure who benefits and who pays for health care, have grown in popularity over the past decade and with this has come a wealth of knowledge about how these techniques are best undertaken and their practical limitations. In this article, we identify 10 resources that we recommend for the design and computation of financing and benefit incidence in resource-poor settings where data sources are often limited.

Funding

This research was funded through a grant from the Australian Government under the Australian Development Research Awards Scheme (ADRAS). This document is an output from research funded by the Department of Foreign Affairs and Trade (DFAT). The views and opinions expressed in this document are those of the authors and do not necessarily reflect the views of DFAT or the Australian Government.

Conflict of interest statement. None declared.

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