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Towards a South African Injury Costing Model

A Review of the Literature for the Development of a Process Path

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Abstract

The costs of injury are of obvious importance for the purposes of priority setting in prevention planning by policy makers and stakeholders in general. The economic costs of injury and death have been the focus of considerable international attention in recent years. Localisation of these studies and their methods to the South African injury context, however, remains largely underdeveloped. The costing of fatal and non-fatal injuries in South Africa consists of a number of initiatives undertaken by various segments of both the public and private sectors. This article will review the existing literature devoted to the estimation of costs in various sectors of the South African morbidity and mortality contexts, with a view to illustrating the manner in which this information informed both provisional processes and structure for the implementation of a nationwide South African injury costing project. The literature is examined across three primary dimensions: the precise object of the study, the method employed in the costing of that object, and the sample coverage of the method.

The findings of the review indicated a number of significant entry-points for the development of a local South African costing model. A preponderance of direct medical costing, significantly discrepant expenditure figures between the public and private health care systems and blurring of distinct costing concepts are problematic themes throughout the review of the literature. This article illustrates the manner in which the identification of the problems and promises of these existing costing studies informed the sites, injury types and methodology selected for development and implementation of a National South African Injury Costing Project.

Introduction

South African attempts to measure the direct, indirect and human value costs of fatal and non-fatal injuries derive from a number of public and private sector initiatives. Although these projects have successfully listed and economically evaluated selected cost items, a comprehensive study of the cumulative costs of injury has yet to be performed.

Most of the national costing projects identified in South Africa measured the direct costs as incurred by individuals, institutions or the state. This contrasts with the almost complete absence of studies examining indirect and human value costs of injury.

The significance of health care costing has been firmly illustrated by the widely disseminated calculations of the social and economic costs and consequences of HIV/AIDS to South Africa (Lovelife, 2001). The costing of HIV/AIDS at macro- and micro-economic levels has provided South Africans with single compact economic units (Miller, 2000) with which to measure the effects of HIV/AIDS (Lovelife, 2001).

The National Injury and Violence Surveillance Consortium injury-costing component seeks to provide a comprehensive cost description of the indirect and direct economic costs as well as of the human value costs resulting from fatal and non-fatal injuries in South Africa. This article critically reviews the published and grey literature on the costs and costing of injury in South Africa with a view to illustrating how results of past costing studies informed processes and strategies for implementation of the impending nationwide study.

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Three dimensions provide the basis for the review and appear to be common throughout the costing techniques surveyed. These are:

- Method, or *how the costs were calculated;*
- The items of cost, or *what was costed,* and
- The sample size, or *coverage of the costing projects.*

By reviewing the existing literature in terms of these three dimensions the promises and shortfalls of previous costing attempts were identified. These in turn provided a baseline from which recommendations for the development of a preliminary injury costing model for South Africa were made.

Scope of the Literature

This paper reviews 18 articles with dates of publication ranging from 1990 to 2000. Sixteen of the 18 studies (89%) are concerned with the direct costs of injury only. Department of Health (1998) and Phillips (1998) are the only studies calculating costs in the fatal injury category. The remaining studies are devoted to measuring the direct economic costs of non-fatal injury.

Items Costed in the Literature

Price (1990), Ijsselmuiden and De Beer (1990), and Boyce and Bartlett (1990) calculated the direct costs of medication in differing sectors and injury categories. De Beer and Broomberg (1990), Kane-Berman and Taylor (1990), and McIntyre and Dorrington (1990) reported trends of expenditure in both the private and public health sectors. Dickinson, Rodriques and Bass (1990), and Schutte (1991) measured the direct costs of motor vehicle collisions. Both Nedcor (1995) and the Centre for the Study of Violence and Reconciliation (CSVR) (2000) calculated costs of crime. Quarmby (1999) measured the direct costs of burn injuries, while the costs of poison-related injuries were calculated by de Wet et al. (1994). Peden and Van der Spuy (1998) quantified the direct treatment costs of firearm-related injuries.

The objects costed ranged from discreet and specific health aspects such as medicines, motor vehicle collisions, firearm-injuries, post-mortem activities, burns and poisonings, to the broader economic burdens of macro-categories such as crime. The following section provides a brief characterisation of the study of each of these items.

Medicines

The cost of providing medicines to outpatients at the Alexander Health Clinic (AHC) was described in 1990 (Price, 1990). The aim of the analysis was to assess the degree to which direct medical costs (prescribed medicines) could be contained through the practice of cost-effective prescribing. The costs of medicines and their distribution are essential to the accurate description of the direct medical costs of treating injury. However, the distribution of medication requires personnel and time - the cost of the medication is only a partial cost in the broader economics of outpatient medication distribution.

The omission of these direct costing categories is not infrequent in the costing of medication. In another costing of outpatient medications by Hukins and Boyce (1990), medicines were subjected to a cost description via the scripts of general practitioners. The medication was costed alone, without the inclusion of other necessary variables such as transport and practitioner time (Hukins & Boyce, 1990). Despite time and personnel being absent cost variables in both of these studies, the literature indicates that both components have been costed items in other South African costing projects.

Personnel, time and operational costs

Personnel and operational costs were included in an assessment of hospital spending at Groote Schuur provincial hospital in Cape Town (Kane-Berman & Taylor, 1990, p. 155). Practitioner time and costs of the maintenance and general upkeep of hospitals are important factors to any injury costing concern. An audit of expenditure was required for system assessment and as a basis for cost containment recommendations. The categories of direct costs included in the study were personnel time, consumables, non-consumables and operations (Kane-Berman & Taylor, 1990, p. 155). While these factors do appear to be fairly comprehensive, further inspection does not yield particularly accurate data. This discrepancy may be due to various conceptual and terminology problems. An examination of expenditure is not necessarily an accurate expression of cost. This conceptual distinction will be addressed more critically later.

Health expenditure: A public versus private comparison

Health care costing in general and the costing of injuries in particular must recognise the division between the public and private health care sectors



(McIntyre & Dorrington, 1990, p. 125). There are extreme disparities of expenditure between these two sectors, as illustrated by McIntyre and Dorrington's 1990 study. The study collated and analysed health care expenditure data for the years 1971-1988 in an attempt to highlight its varying distribution patterns by sector and population groups. This characteristic of the South African health system poses perhaps the greatest challenge to the development of a strategy best representing the costs of injury in South Africa.

Total public health sector spending for 1987 was R5196.6 million, significantly less than the R9215.6 million spent on health by the private sector (McIntyre & Dorrington, 1990, p. 125). This is largely due to differences in the detail and organisation of fiscal information in the two sectors (McIntyre & Dorrington, 1990, p. 125). These findings indicated the need to employ different strategies for the extraction of costing data in these very distinct health care divisions (Broomberg, de Beer & Price, 1990; de Beer & Broomberg, 1990).

Private health care facilities in South Africa make use of sophisticated databases that contain cost information at both individual and injury type level (A. Cutler, personal communication 14 May 2001). Access to this information demanded that collaboration with Netcare, a private health company, be established. This partnership should ensure that the costs of injury to the private health sector will be accurately described.

Costing studies in South Africa have not been strictly confined to macro-oriented environments. While expenditure studies focus on the macro aspects of health economy such as expenditure by government and the private sector (McIntyre & Dorrington, 1990), other studies have examined the costs of very specific objects such as burns (Quarmby, 1999, p. 1), firearm injuries (Peden & Van der Spuy, 1998, p. 4) and motor vehicle collisions (MVCs) (Dickinson, Rodriques & Bass, 1990).

Motor vehicle collisions

The economic costs of children involved in MVCs were calculated as early as 1990 (Dickinson, Rodriques & Bass, 1990). It appears that in this case true costs were calculated through the implementation of a method concerned primarily with costs, not the expenditure or the budgets commonly used as economic indicators of the costs of injuries. An extensive study of the economic impacts of MVCs was conducted by the Schutte (1991). Both non-fatal and fatal costs of MVC injuries were included in the investigation (Van der Spuy, 1996, p. 5). The costs associated with the treatment and consequences of non-fatal injury were identified as far outweighing the cost of fatalities resulting from MVCs. Costs of fatal injuries resulting from road collisions were measured at R2.28 billion in 1993, or R5.95 million per day. This figure pales in comparison to the total daily costs arising from MVC-related non-fatal injuries, which were calculated at R29.96 million per day for the same year.

Railway injury

The direct medical costs of treating 115 railway-related admissions to Groote Schuur Hospital were calculated in 1995 (Lerer & Matzopoulos, 1995). The final figure was R1 966 700 (Lerer & Matzopoulos, 1995). This figure tracked the passage of the patients through the various sections of the hospital. It was calculated by multiplying the average cost of a stay in a particular section of the hospital by the number of days' occupancy in that section. The figure is therefore an appropriate direct costing measure, but sheds little light on the indirect and human value costs resulting from railway injury.

Occupational-related injuries

Information released from the National Occupational Safety Association (NOSA) indicates a growing awareness of the frequently undetected indirect costs of injury. Treating injuries and the repair of damaged equipment caused by injury "represent only the tip of the iceberg, the hidden losses are much, much greater" (Van der Spuy, 1996, p. 5). The detection of these undetected lost productivity and lost earnings costs were therefore prioritised by the costing consortium.

Trauma patients

The bills of 120 trauma patients were analysed. Direct medical treatment of trauma patients results in massive cost recovery shortfalls, with only 5.5% of the accounts settled by the patient him/her self. Extrapolation of this data to the entire Cape Metropole estimated the costs of these shortfalls to the public sector to be at least R150 million (Van der Spuy, 1996, p. 9).

Burns

The direct medical cost of treating burns was estimated at R6.9 million (Quarmby 1997). Although limited to 460 cases, this was an indicator of the



severity of this category of injury. Quarmby (1997) responded to this study by using its costing measure to assess the cost consequences of alternative treatments using different materials. Using polyurethane film in place of the conventional gauze dressings on which the baseline costs were established, a saving of R285 per patient was obtained (Quarmby, 1997, p. 2). This pilot illustrates the strategic efficacy of the establishment of baseline costs in specific injury sectors. Without broad descriptions of the economic costs of injury, subsequent comparative, cost-benefit studies would not be possible.

Poison

The costs of injury due to paraffin ingestion were retrospectively analysed in 1990 (De Wet et al., 1994, p. 735). The study examined the expenditure of six Cape hospitals on a cost per patient per day basis.

Firearm-related injuries

The direct costs of hospital treatment for firearm-related injuries were calculated through the analysis of victims' folders at Groote Schuur Hospital in Cape Town (Peden & Van der Spuy, 1998). The direct treatment costs amounted to R3 858 331 for the 969 patients. Estimates by American economists suggest that the direct medical costs account for only 13% of the total costs of firearm injury. Inclusion of the estimated productivity losses and other indirect costs for the 969 patients would then amount to R29 679 315 per annum for a single Cape Town hospital.

This analysis of costs, which took place in 1995, relied on surveillance carried out in 1993. This is a significant time lapse in economic and more specifically costing terms due to rising inflation and general cost increases. Although this may be rectified through the use of an index (such as the consumer price index or CPI) that adjusts for changing economic states, retrospective costing may still be regarded as subject to subtle inaccuracies.

Crime

Nedcor (1995) calculated the economic impact of crime on business. The study made use of both the direct and indirect categories of costing in its calculations. Using interviews and surveys, the projects estimated that the direct medical costs, loss of earnings and extra insurance provisions resulting from a crime-related injury perpetrated against an individual had cost those individuals R1.7 billion (or R5000 per person) in the first eight months of 1995 (Nedcor, 1995, p. 9).

The economic impact of a violent crime on any business was estimated to be R42 300 in 1995. If the damage/loss figure is multiplied by the number of formal business in South Africa, the direct costs of crime to business is estimated at R15.8 billion in 1995. According to the Nedcor survey, 60 percent of big businesses and 68 per cent of small businesses had experienced a robbery in 1995.

Crime as a broad item for costing contained subcategories, which have recently been re-examined by the CSVR under assignment from the South African Law Commission (CSVR, 2000). Costs of crime were necessarily calculated to inform an investigation into the feasibility of the establishment of a Victim Compensation Scheme (VCS). Costs were measured through calculation of the direct medical costs for the treatment of injury and subsequent loss of income incurred by the victim.

Homicide

Costing of death due to homicide in the Cape Metropole was undertaken in 1998 (Phillips, 1998, p. 1). This study makes a significant contribution to the literature as both the direct and indirect costs of homicide were calculated. Phillips combines a willingness to pay approach (WTP) with the traditional Human Capital (HK) formulation (Phillips, 1998, p. 15) to account for both the indirect and human value costs of fatal injury. This appears to be the first measure of human value costs in the South African literature. The study estimates the costs of homicide in the Cape Metropole to be R111 881 329 in 1998. This figure does not include intangible human costs such as pain and suffering, and is therefore not a complete picture of the long-term costs of injury. Although the measurement of direct, indirect and human value costs seems to provide an optimal platform for accuracy in nationwide injury costing, quantifying these costs is difficult in low-income settings. Human value costs will therefore be investigated through selected case studies by the costing consortium, with a view to including the results in the total final costs of injury.

Post-mortem investigations

The Gauteng Department of Health (1999) conducted an investigation into the costs of performing a post-mortem. Mortuaries were categorised according to



size and intake, ranging from an M1 to an M6 academic mortuary. Using the budget activity system, costs of processing the annual post-mortems at Diepkloof mortuary (M6 academic) were calculated at R10 543 547.11 for 1998.

Sample Sizes in the Literature

Studies share similar limitations in their sample coverage. The small sample sizes of most studies could be due to the lack of any extensive injury surveillance systems prior to 1998.

There were seven studies in the literature with samples (whether cases, auditors reports or police dockets) of less than 1000. These included 600 auditor general reports (McIntyre & Dorrington, 1990), 436 patient records (De Wet et al., 1994, p. 735), twelve patient records (Quarmby, 1990), 969 patient records (Peden & Van der Spuy, 1998) and 115 patient records (Lerer & Matzopoulos, 1995).

A sample size of 2272 patient records (Dickinson, Rodriques & Bass, 1990) was the next largest sample of the studies. Rationale for sample selection is absent in most of the articles covered in the review. Phillips' sample (N = 2065) represented all homicides recorded in the Cape Metropole, and in this sense her sample was the most representative of those in the South African literature. Costing medicines provided the literature with the biggest reported sample sizes. Gaining access to scripts and pharmaceutical records is perhaps easier than many other data sources. Sample sizes of 404 789 and 110 000 respectively were reviewed by Boyce and Bartlett (1990, p. 147). The remaining studies used other reports as the sources of their data, these other information sources included medical scheme reports, medicine schedules (Broomberg & Price, 1990; Hukins & Boyce, 1990), the South African Hospital Norms (SAHNORMS) report and the *Hospital and Nursing Yearbook* (Kane-Berman & Taylor, 1990). The significance of the coverage of the sample sizes was problematic since although samples covered all patients at particular facilities, the proportion of these cases to injury-type prevalence was relatively unknown. The problems inherent in the variety of sources and methodologies employed by the studies in the literature are addressed in the following section.

Methods of Costing in the Literature

Establishing Expenditure by Hospital Records and Medical Scheme Reports

Analysis of expenditure trends has been a popular method of establishing costs of injury in the literature. This could be due in part to the disparity in spending and health care quality between the public and private health care sectors in South Africa. All of the literature that employed expenditure analyses for an estimation of costs were comparative studies.

These studies highlighted the sharp spending differences between the public and private sectors in South Africa. These articles imply that different methods and information sources may be required for these distinct sectors of a costing model (McIntyre & Dorrington, 1990, p. 125). This concern informed the establishment of a research collaboration with Netcare (a private health company) by the costing consortium.

Of the studies, four (Broomberg, de Beer & Price, 1990; de Beer & Broomberg, 1990; Kane-Berman & Taylor, 1990; McIntyre & Dorrington, 1990) make explicit use of an *expenditure analysis* as their central methodology. In an expenditure analysis of the public sector, the reports of the Auditor-General and spending data generated by the Central Statistical Services were used as estimates for expenditure (McIntyre & Dorrington, 1990, p. 125). Analysis of spending in the public sector appears to be confined to these information sources.

Use of expenditure analysis in hospitals is useful for the establishment of hospital spending trends (Kane-Berman & Taylor, 1990). However, its use as an accurate measure of the real costs of morbidity is problematic. Expenditure is subject to a number of influences. The spending of hospitals is determined by budgetary allowances and may be skewed by a specific hospital's internal policy. Even if total expenditure is broken down into injury clusters, the figures could be distorted by the location, governmental allowance (public sector) and internal policy (private sector) of that hospital. An expenditure figure therefore cannot be regarded as an accurate cost of injury.



Direct Medical Costing Via Prescription Analysis

In an attempt to discover the costs of medicines, doctors' prescriptions were analysed and tabulated to establish the extent to which prescription drug costs could be minimised (Price, 1990, p. 158). Although a component of direct medical costs, these figures do not reflect distribution (personnel and time) costs, and are therefore better captured in the bills at private facilities.

Retrospective Costing using Patient Records

This method was the most popular of the costing techniques found in the literature. Retrospective costing using patient records was used in 6 studies. Burns (Quarmby, 1990), MVCs (Dickinson, Rodriques & Bass, 1990), firearm-related injuries (Peden & Van der Spuy, 1998) and poisonings (De Wet et al., 1994) were all costed using patient records.

As mentioned, time lapses threaten the validity of the measures. In addition, the records in public health care facilities do not contain suitable costing data for the patients. In an attempt to remedy this, researchers (trained nurses) will be required to track individuals with specific injury types through the various care sections of South African public hospitals.

Extracting Costs From Existing Reports and Other Documentation

Annual (Johannesburg City Health Department, 1988) and medical scheme reports (Reports of the registrar of Medical Schemes to the Council for Medical Schemes) formed the data sources for cost analyses in three articles from the literature (Ijsselmuiden & de Beer, 1990). As discussed previously, many existing documents report on expenditure rather than on direct costs themselves.

Estimating Costs Through Activity Budgets

This method was employed in estimating the costs of performing a post-mortem (Department of Health, 1998). Activity budgets rely on heavily detailed inventories of costs that are frequently updated. Activity costing is therefore appropriate in service departments, and will therefore be included as a source of costs of services data by the National Costing Project.

Cost Analyses Using Police Dockets

Dockets administrated by the South African Police Services (SAPS) were used by the CSVR to determine both the incidence of crime and the extent of associated injuries. The dockets are stipulated to contain the nature of the crime- related injury, which does give them some credence as an injury information source. However, in practice the dockets are unreliable since they may seldom document the injury, and do not indicate the severity of that injury. Police dockets are not plausible information sources in South Africa as crime is under-reported. According to CSVR research only 9% of all non-fatal violent injuries that present at hospitals are ever reported to the police (J. Rauch, personal communication 20 March 2001). An analysis of police dockets cannot therefore reveal the severity of the injury, nor are they able to deliver any information about costs of treatment of that injury.

Costs of Fatal Injuries

The costing of fatal injury in the Cape Metropole (Phillips, 1998) was the only study in the literature that calculated the direct, indirect and human value costs of violence-related injury. Costing in South Africa had hitherto been exclusively concerned with the direct costs of injury. This must be remedied if a comprehensive estimate of the costs of injury in South Africa is to be obtained. The direct costs of homicide were ascertained using the mortuary budgets for the given sample. Indirect costs were calculated using a combined WTP/HK method that relied on demographic information and other data provided by the Central Statistical Services. While an appropriation of this indirect costing method appears viable, the reliability of budgets as representations of costs is dubious.

The remainder of this article is devoted to describing the measures adopted by the costing consortium. The consortium sought to address the challenges identified in the literature review, via its implementation of the National Costing Project.

Lessons From the Literature

A number of measures are used in an attempt to quantify the economic consequences of an injury. These consequences may be assessed at the level of the victim or individual, the state, or more broadly at the level of the national



economy itself. Indicators of costs incurred at any or all of these levels as disclosed by the literature are budgets, bills, expenditure and costs.

Budgets

The use of budgets as an indicator of the expenses resulting from a given injury or injury cluster is common within the public health sector, where individual billing of patients is not practised. Under this system the budget of a particular department is used to indicate the costs that are probably incurred by that health facility. The budget figure is considered to represent what is spent on care for victims in that facility. This is problematic for a number of reasons.

The budget figure prepared at the beginning of the financial year is an estimate of the expenses of a collective enterprise and cannot therefore be broken down into more detailed and informative categories of economic costs. Budgets are also affected by a number of decisions at management level regarding internal policy and fund distribution. These decisions risk distorting the *actual* economic units consumed by a particular individual or injury. Budgets therefore are suitable preliminary indicators for the distribution of funds in the public health sector, but are invalid sources for accurate measures of direct costs of injury.

Billing

Cost assessment through analysis of patient bills is a useful exercise for the determination of direct medical costs of injury. However, bills tend to underestimate the cost incurred by the patient, since the cost of doctor consultation is not included in the final bill. Bills are therefore a suitable indicator for direct medical costs but cannot be trusted to accurately reflect uniform health costs, and are specific to the hospital from which they are drawn. In addition to being very specific direct cost indicators, billing is exclusively practiced by health facilities in the private sector.

Expenditure

Expenses incurred by an institution or an individual do not necessarily signify the actual cost of an injury upon that individual. An analysis of expenditure (McIntyre & Dorrington, 1990, p. 125) does not necessarily indicate the costs incurred through sustaining an injury. Expenditure reveals the spending trends and distribution of a particular person or agency, but does not account for discreet subcategories within that spending. An analysis of private sector health expenditure, for example, could reveal the per annum amount *spent* on medical insurance, but that does not reflect a direct cost of injury prevalence.

Implications for Costing

A review of the literature reveals that in many instances expenditure, billing and budgets are used as interchangeable indicators for the estimation of the costs of injury. These indicators are not synonymous, and must therefore be carefully examined with regard to what costs they purport to measure, and those that they actually do measure. Costing, whether direct or indirect, is a process relying on a number of discreet indicators that if correctly used may provide a comprehensive estimate of the economic costs of injury. Direct costs of injuries cannot be accurately estimated by using broad cost indicators such as budgets and expenditure reports. Rather, micro-level item costing of the treatment of an injury should be performed.

The literature does indeed include projects that have attempted to economically quantify a variety of injury items. However, these studies manifest a fragmented and limited approach to the estimation of the costs of injury in South Africa. It is through an integration of existing costing techniques and domains that a more comprehensive picture of the economic costs of injury could be attained.

All of the reviewed studies, except for the costing of violent crime by the CSVR, were conducted prior to the National Injury and Violence Surveillance Consortium's implementation of the fatal and non-fatal injury surveillance system. This may account for the limited sizes of the samples analysed. A representative sample is necessary for an accurate estimation of the economic consequences of the South African injury context. The advent of the surveillance will provide the nationwide costing project with the scope and integrity of data required to determine an accurate estimate of the costs of injury in South Africa.

Preponderance of Direct Costing in the Literature

The dearth of indirect and human value costing may be attributable to the absence of demographic and or epidemiological data in South Africa prior to 1999. Only Phillips (1998) attempted to estimate the indirect and human value costs of injury in the Cape Metropole. Lost productivity and therefore earnings is a significant economic consequence of injury, calculations of which are problematic specifically in low-income settings where unemployment is high.



Estimating Indirect and Human Value Costs in Low-income Settings

Under methods traditionally employed in high-income settings the indirect costs of injury may be measured through ascertaining productivity losses for industry and lost earnings for individuals. In low-income settings, however, these figures are difficult to represent, largely due to high levels of unemployment. While lost productivity to 'Big Business' may be measured, 'lost earnings' is a meaningless concept for an individual that does not earn a regular income. This is not to say that injury does not impact upon the 'economy' of the individual, but implies that traditional high-income methods for quantifying these effects do not appear viable in low-income settings. Other methods for measuring effects of injury on the working capacity of the individual must therefore be found.

Likewise, measuring the willingness to pay (WTP) of individuals in low-income contexts is fraught with challenges. Estimating WTP in Big Business and in those individuals in high earning brackets may be accessed through traditional means, yet measuring the WTP of low-earners or non-earners through traditional measures is not plausible. This sector of the population does seem to be willing to sacrifice certain measures of their lifestyles for their own security, and it is these measures that must be included as WTP indicators for low-income settings.

Transposing traditional high-income methods for the calculation of indirect and human value costs onto low-income settings provides valuable insights into the assumptions that underlie such methods. These challenges are not insurmountable, but imply a specific role for science and for the researcher in low-income contexts. This role includes discovering what aspects of lifestyle are ceded to security, and the time lost to normal activities as a consequence of injury in order to establish indirect and human value costs of injury in these settings. The structure of the family and its reaction to injury-related death are also of grave concern to low-income injury costing research.

Towards a Comprehensive Costing Model For Injuries in South Africa

Provisional Implementation

Processes and structure

This final section delineates the provisional form of the National Injury Costing Project's pilot study as informed by the literature review.

The review of the literature reveals the costing of injury in South Africa to be fragmented, highly specific and limited in scope. These limitations are consequences of highly segmented, locally specific injury profile reports prior to the advent of national injury surveillance. The national injury data generated by the National Violence and Injury Surveillance Consortium have allowed for the drawing of a properly representative injury sample by injury type.

Data about the frequency of injuries by external cause, severity, patient demographics, and geographical location of the event will be drawn from the national injury surveillance system, from special studies conducted in Durban and the Transkei, and from an eight-year database of injuries in children at the Red Cross Children's Hospital in Cape Town maintained by the Child Accident Prevention Foundation of South Africa (CAPFSA). Based on these patterns, a sample will be drawn which specifies the number of cases per cluster that must be investigated to establish reliable costing figures. The social costs of these cases will then be established through analysis of retrospective data on long-term costs and through prospective studies of new injuries. Policy impact will be measured through ongoing process and impact observations. With a sound and constant information base, integration of the various costing undertakings identified in the literature appears plausible for the production of a national costing matrix tailored to address the intricacies of the South African fatal and non-fatal injury context.



Questionnaire Development

The disconnection between direct, indirect and human value costs in the literature indicated the need for a questionnaire that captured both the direct medical and transportation costs and demographics of the injury. This information will be used to comprehensively estimate the direct and indirect costs of South African injury. Human value costs will be estimated through a number of case studies and will therefore not be included in the questionnaire. The questionnaire would be better presented as a dossier that attempts to capture the direct, indirect and human value costs through the integration of multi-methods.

Bridging the Divides

The literature indicated a number of challenges to the representivity of the National Costing Project. These challenges were manifested as the public versus private health care sector and the rural versus urban socio-economic divides. Provisional site selection across rural and urban health care facilities in the public health care sector suggests appropriate geographical representation of injury costs. The establishment of collaboration with Netcare (a private health care conglomerate) costing centres will provide the project with access to private sector injury costs. In addition to providing database access, these centres are likely to assist with the development of direct costing aspects of the questionnaire, from dealing with stock usage from point of entry at the casualty, trauma or emergency room, through ICU to general wards, and even in outpatient care.

Hands-on Costing

In an attempt to distinguish the blurring of various common cost indicators such as budgets and expenditure in the public sector, the consortium intends to train and locate researchers at the selected sites. These researchers will track the selected injury types across the various sections of the facility, manually recording the costs of direct medical treatment per case. It is hoped that this process will yield 1000 cases containing all the necessary injury-specific information required for inclusion in the final costs total.

Estimating the Indirect Costs of Injury

As highlighted by the literature, lost productivity to 'Big Business' will be measured using conventional survey methods, while lost earnings to the individual will be assessed through the review of a number of case studies. A special workgroup working on the profile of occupation and injury has been assigned to this measure.

Estimating Human Value Costs

The WTP of injury will be accessed through survey methods. The human value costs to low-income individuals and communities will be measured through several representative case studies. This component of the project will be especially examined in the context of the role of science and the researcher in the costing of injury in low-income settings.

Ethics

The ethics of the study and indeed a review of the ethical implications of costing injury in low-income contexts will be conducted throughout the duration of the project. A dedicated workgroup has been assigned this task.

Conclusion

The literature review has presented a number of challenges to both the structure and the processes of the National Injury Costing Project. Conceptual clutter, urban bias, irreconcilable methods of assessing costs in the different health sectors, and measuring human value costs in low-income settings were identified as challenges to the preliminary development of a comprehensive costing matrix for the South African context.

Representative site selection, hands-on public sector costing and private sector research collaboration represent strategies employed by the consortium in the provisional blueprint for the development of a comprehensive costing model. It appears that only through the use of a hands-on approach will accurate and descriptive costing data be extracted from the South African public health sector. Such is the discrepancy in modes and sophistication of data collection between the public and private health care systems in South Africa, that a collaborative effort is required if representative and comprehensive costs of injury figures in the country are to be reached.

The estimation of the indirect and human value costs of injury in low-income settings represent new challenges to injury costing. These challenges to traditional costing methods must be met with a science sensitive to the peculiarities of low-income economics, and subsequently researchers that through case studies are able to accurately describe these contexts and their implications for costing.



Hands-on costing, representative site selection, case study analyses, multi-method approaches and constant ethical reflection are the practical responses to problems in the costing of injury as revealed by the South African literature. These strategies represent an acknowledgement of the difficulties inherent in the transposition of high-income costing techniques to low-income settings. It is hoped that through the deployment of this response, the role of injury costing in South Africa will be more easily defined, and that the costs of injury in low-income settings will be clear, accurate and beyond scientific dismissal.

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