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PUBLISHED COSTS OF MEDICATION ERRORS LEADING TO PREVENTABLE ADVERSE DRUG EVENTS IN US HOSPITALS

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OBJECTIVES: Medication errors (ME) are defined as any preventable event that may cause or lead to inappropriate medication use or patient harm. ME are garnering national attention as evidenced by the National Action Plan for Adverse Drug Event Prevention to drive prevention strategies for high-risk drug classes. We sought to understand the economic burden of ME that lead to preventable adverse drug events (pADEs) in US hospitals. **METHODS:** From a broader literature review on injectable ME in Medline and Embase (2003-2014), we identified eleven articles related to the incidence and economic impact of pADEs arising from all ME. A supplemental PubMed search identified four additional articles dating back to 1995. All cost estimates were converted into 2014 dollars. **RESULTS:** Published estimates of ME cost varied based on population, setting of care, methodology and study period. Three studies estimated the annual cost of pADEs for the inpatient setting at the national level. A 1999 study estimated that annual national costs of pADEs were $4.8 billion, while a 2012 study showed that injectable-related pADEs alone cost $2.8-5.2 billion. For Medicare beneficiaries, pADEs cost $617 million annually. At the individual hospital level, the total annual cost of pADEs ranged from $0.9 to $5.6 million. Costs per individual pADE differed based on severity, and ranged from $3408 to $6931. Key cost drivers included increased length of stay, additional laboratory testing, routine care, surgical, and other ancillary charges. **CONCLUSIONS:** This literature review highlights the economic burden of ME in the US. Cost estimates varied considerably due to different definitions, study methodologies, and analytic scope. Given the emergence of pADE harm reduction as a national priority, there is a need for updated research aimed at evaluating the economic impact of medication errors using standardized definitions for types of errors, their severity and the ensuing financial impact.

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THE FINANCIAL IMPACT OF BLOOD SPECIMEN REJECTION DUE TO THE POOR PRE-ANALYTICAL QUALITY IN HEALTHCARE FACILITY IN CHINA

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OBJECTIVES: To quantify the financial impact of poor blood specimen quality on treatment and hospital costs in a healthcare facility in China, using institution specific data. **METHODS:** The data were collected from six hospitals (beds≥500) in Beijing, Shanghai and Guangzhou by interviewing institution staff, including operational data such as total operating costs, medical treatment data such as probability of a low, medium or high impact of a rejection, laboratory data such as total number of blood tests. The patients were divided into three categories: critical inpatients, routine outpatients, and elective surgery inpatients, since the costs of an error vary greatly among the three categories. Finally, the data were entered into a model to calculate the possible financial impact of blood specimen rejection. **RESULTS:** The estimated average costs of a blood specimen rejection were $56, $250 for critical inpatient, $31 for other inpatient, and $39 for outpatient, respectively. On average, pre-analytical specimen error costs were $494, 422, accounting for 0.12% of total hospital operational costs. The impact of errors on efficiency can be assessed by hours lost, there is an estimated 16,913 total patient hours was lost in one year, equaling to short of 4029 patients treatment. 3.62% (612) of hours lost was due to laboratory redraw and retest, and 96.38%(16,301) was due to patient treatment. In a healthcare facility, patient treatment costs represent the largest cost category at 92.18%, redraw costs at 3.21%, instrument downtime costs at 2.99%, lab investigation costs at 1.57%, and blood collection consumables at 0.05%. **CONCLUSIONS:** Blood specimen rejections due to the poor pre-analytical quality increase operational costs and decrease the efficiency of hospitals, healthcare facility should monitor pre-analytical blood processes and use high-quality device to decrease pre-analytical errors.

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REGIONAL VARIATION IN CATASTROPHIC HEALTH CARE SPENDING IN PAKISTAN

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OBJECTIVES: This analysis investigates regional variation in catastrophic health care spending in Pakistan. **METHODS:** The study draws data from three rounds of Pakistan Living Standards Measurement Survey (PLSM) conducted in both rural and urban areas of Pakistan in 2005-06, 2007-08 and 2010-11. A household is classified as incurring catastrophic health expenditure if 10% or more of its annual expenditure is on health care. Household economic status is measured using household annual consumption expenditures and households are categorized into quintiles. **RESULTS:** The proportion of households incurring catastrophic health care expenditure has declined from 7.5% in 2005-06 to 3.2% in 2010-11. The decline has been slightly more in case of rural households than in urban (4.9% urban and 9.1% rural households in 2005-06 vs. 2.0% urban and 3.8% rural households in 2010-11 incurred catastrophic health care spending. Of poorest households, 7.5% incurred catastrophic health expenditure in 2005-06, 5.4% in 2007-08 and 3.5% in 2010-11 whereas, of richest, the proportion was 6.2%, 5.4% and 2.7% for respective periods. Further, significantly more households in Punjab are incurring catastrophic health care expenditure compared to Sindh. There is regional variation across regions and remarkable decline in catastrophic health care spending. South Punjab had the highest proportion (13.6%) while south Sindh had lowest proportion (2.4%) of households incurring health care expenditure in 2005-06. South Sindh still has the lowest proportion (0.4%) whereas, north Punjab replaces south Punjab having the highest proportion (5.4%) of households incurring catastrophic health expenditure in 2010-11. **CONCLUSIONS:** Pakistan has registered a decline in catastrophic health care spending over the period. It could be associated with a decline in morbidity over the period. However, cost of health care remains an important impediment to access health care particularly in rural areas.

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A LITERATURE REVIEW AND MICRO COSTING APPROACH TO DETERMINE THE COST OF ONE HOUR OF OPERATING TIME IN CANADA

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OBJECTIVES: There is little understanding on the true cost of operating room time in Canada despite the fact that surgical care is paid for by a single payer facing increasing cost constraints. The objective of the review was to analyze how OR costs are currently conceived of in Canadian hospitals. Additionally, a micro costing approach was used to estimate the actual cost using a bottom-up approach. **METHODS:** A literature search was conducted to determine how Canadian hospitals perceived the value of one hour of operating time. Studies satisfying the defined criteria were compared in terms of methodology and inclusion and exclusion of specific resources in their perception of their institution's OR expenditure. All costs were adjusted to 2014 Canadian dollars. Additionally, we conducted an independent bottom-up micro-costing analysis of Canadian operating room time. Completion of the literature review prior to micro costing ensured a robust and comprehensive approach was used. Costs were obtained using peer-reviewed literature and from a large Canadian hospital network. **RESULTS:** Specific search and inclusion criteria resulted in the inclusion of 5 studies in our analysis. The cost of OR time ranged greatly from $621.60 to $2288.94 per hour. All studies obtained the cost of OR time using a top-down case-costing approach informed with data from their respective finance departments. Each study was conducted at a different Canadian hospital and OR costs were perceived in strikingly different ways. Additionally, many of the studies lacked sufficient methodological details providing a challenge when comparing approaches. The bottom-up micro case-costing approach incorporated more than 30 individual costs and resulted in an OR hourly cost of $1200. **CONCLUSIONS:** In Canada, there is little consensus between institutions of how to capture the costs of OR time. A bottom-up micro costing approach allowed for a different perspective and a more detailed analysis.

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CURRENT ESTIMATES OF THE PUBLIC PHARMACEUTICAL EXPENDITURE IN MONGOLIA

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OBJECTIVES: In less developed nations public resources are scarce and medicines are often not adequate, nor accessible for much of the population. Only limited quantitative data are available for analysis of the pharmaceutical expenditure in Mongolia. **METHODS:** Retrospective data collection on pharmaceutic expenditure from government issued reports were collected and analysed for the period of six years starting from 2009 until 2014. **RESULTS:** The gross domestic product (GDP) was 11.52 billion USD in 2013 in Mongolia and the proportion of total health expenditure (THE) was 566.5 billion Mongolian National Tugrug (MNT) or 301.4 million USD. For 2014, the total pharmaceutical expenditure (TPE) was 81.3 billion MNT or 11.6% of the THE. The public pharmaceutical expenditure (PPE) per capita was 28727.9 MNT or 15.3 USD in 2013. Mongolia is a developing country and the public expenditure on pharmaceuticals per capita was in the mid-range of developing country expenditure. The funding source of pharmaceuticals in Mongolia was analysed and the external source played a minimal role for TPE (4.8%) whereas government sourced fund (tax) was the highest (80.4%). Currently, no data are available on private health funds in Mongolia. Previous findings reported that out-of-pocket payments for health service has increased from 14.5% of the THE in 1995 to 41.4% in 2010. However, data in regards to out-of-pocket payment for pharmaceuticals were not available. **CONCLUSIONS:** This study provided country specific estimates of expenditure funded by public source at the national level in regards with total pharmaceutical expenditure and per capita. in addition, data on private funding for pharmaceuticals are required in order to conduct the specific policy analyses including different cost items, equity of access, allocative efficiency, therapeutic and operation efficiency. However, the results of this review can be used as a baseline for monitoring future trends in pharmaceutical expenditure over time in Mongolia.

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CROSS SECTION ANALYSIS OF MARGINAL NHS EXPENDITURE BY ENGLAND HEALTH AREA

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OBJECTIVES: The cost-effectiveness threshold applied in the process of recommendation of new health technologies is a central topic of discussion in the UK. A key element in the discussions is the marginal effect that a change on the health expenditure has on mortality per health category; since this is an indication of the opportunity cost of adopting a new technology. The common assumption is that all health areas behave in roughly the same way as each other when faced with a cut in available funds. This suggests that the opportunity cost, and consequently the threshold value, is the same regardless health area. This overlooks potential differences between health areas (e.g. the way in which health services are provided in different localities). If there are such differences then different health areas will be producing health gain in different ways, and will produce different health gains per pound spent. The primary aim of this study is to test the assumption that health areas are similar to one another in the decisions they make. **METHODS:** We applied the Cluster Analysis Methodology. We propose a division in which the health areas within one cluster are those that are similar to each other in terms of the expenditures (adjusted by costs differences and needs) allocated to each health categories. Four clusters partitions are estimated, each one based on a different year. By doing this, we are able to compare the composition of the different groups over time. **RESULTS:** The data indicates that some health areas spent dif-