

# IHPME Research

## **USERS' GUIDE FOR APPLYING A WASTE FRAMEWORK FOR HEALTH POLICY DEVELOPMENT**

How to identify wasteful spending for  
improving sustainability

Thomas Custers , Patricia Stefanowska, Tai Huynh, Erik Hellsten,  
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ISBN: 978-0-9959304-0-7



Institute of Health Policy, Management and Evaluation  
**UNIVERSITY OF TORONTO**

# Users' Guide for applying a waste framework for health policy development

## How to identify wasteful spending for improving sustainability

*Thomas Custers<sup>1</sup>, Patricia Stefanowska, Tai Huynh, Erik Hellsten, Cynthia Perry, Chaim Bell, Niek Klazinga, Adalsteinn Brown*

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### **POLICY SCENARIO**

You are a policy analyst in a Ministry of Health. You have been asked by your senior manager to develop ideas to increase value and lower costs by eliminating waste. This might be the first time that you have heard this term in the context of healthcare policy. Not really knowing what is meant by waste you start typing in some keywords in a search engine. As a result you might come across an article by Berwick and Hackbarth (2012) that defines waste as “not value-added care”, identifies six categories of waste and estimates that at least 20% of U.S. healthcare costs could potentially be saved by reducing waste. In looking further, you might find other studies from the U.S. and other jurisdictions that paint a similar picture. For example, the United States Congressional Budget Office estimated that as much as 30% of all Medicare spending may be “wasted” on tests and treatments that do not improve the health of recipients (CBO, 2009). Another U.S. study estimated that if all hospitals performed at the average cost of the most efficient 10% of hospitals, national operating expenses would be reduced by US \$73 billion per year (Kelley, 2009). A 2009 report by the Australian National Health and Hospitals Reform Commission found opportunities to improve system efficiency by approximately 10-20% (Hurley et al, 2009). You might also discover the work done by Elshaug and colleagues

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<sup>1</sup> PhD candidate – University of Amsterdam. He can be contacted by email at [custers\\_th@yahoo.com](mailto:custers_th@yahoo.com).

(Elshaug et al., 2012) identifying 156 potentially ineffective and/or unsafe services in Australia, the physician-led Choosing Wisely campaign in the United States and Canada (Cassel and Guest, 2012; Siemens and Finelli, 2014) or a recent report of the OECD (2017) that includes examples of waste, another framework and suggestions about high-level policy levers to address it. You probably will also have come across an increasing number of articles that speak to low-value healthcare rather than waste (Scott and Duckett, 2015; Beaudin-Seiler et al., 2016; Reid et al., 2016).

Reading all these documents, you obtain a better understanding of what is meant by waste and you start thinking about how to synthesize the definitions, creating frameworks and examples into a document that will define waste in the context of a healthcare system, provide examples of waste in your healthcare system and suggest potential avoidable costs.

## **INTRODUCTION**

Inspired by the *Users' Guides to the Medical Literature*, a series of articles in the *Journal of the American Medical Association* that aimed to provide practical, clinician-friendly advice on all aspects of evidence based medicine (Laupacis et al., 1994), this paper offers policy makers an approach to identify opportunities for reducing waste and reflects on how they might use this information for policy and funding decisions. We will help illustrate these points by using empirical data from our previous work in identifying wasteful spending in a publicly-funded healthcare system

We will begin by defining waste in healthcare and by outlining a framework for identifying waste in a healthcare system. Subsequently, we will use a primarily single-funder system as an example for how the framework can be used by policy makers in Ministries of Health or at the

local health system level. Finally, we will provide a critical reflection on the utility of applying the framework to help policy makers identify opportunities to improve the performance of their healthcare systems.

## **DEFINING THE FRAMEWORK FOR FINDING WASTE**

**What do we mean by waste?** – To identify waste in a healthcare system, policy makers need to understand what is meant by waste. This section will provide a brief overview of concepts of waste found in the literature and outline a useful framework for identifying wasteful spending in a healthcare system.

We used a scoping review instead of a systematic review because our purpose was exploratory in nature, aimed at providing policy makers with various concepts and a current state of knowledge about healthcare waste (Grant and Booth, 2009). We used Pubmed and a multi-disciplinary database called ProQuest that includes academic journals from various subject areas, including health, medical, business and social sciences.<sup>2</sup>

In addition to the electronic database search, relevant papers were identified by searching the Internet, applying the same keywords used to search the databases, and we consulted with two health economists to identify missed or unpublished papers. The review resulted in a number of definitions and conceptualizations of waste (*see table 1*).

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<sup>2</sup> The following search terms in various combinations were used: *health care waste, waste framework, efficiency/inefficiency, overuse/underuse/misuse, value, value for money, costs of poor quality, quality costs*. These search terms were also combined with variations of the following search terms: *framework, health, healthcare, health system, healthcare providers, and hospitals*.

Table 1: Definitions and concepts of waste

Author	Definition / conceptualization
Williams (1988)	<ul style="list-style-type: none"> <li>▪ There is no waste when healthcare resources are being used to get the best value for money.</li> </ul>
Economic theory (Palmer and Torgenson, 1999)	<p>There is no waste when:</p> <ul style="list-style-type: none"> <li>▪ The same level of output/outcome cannot be produced with fewer inputs (“technical efficiency”).</li> <li>▪ There is maximization of output/health outcome for a given cost, or minimisation of cost for a given output/outcome (“productive efficiency”).</li> <li>▪ Resources are allocated in such a way that no further maximization of the welfare of the community is possible (“allocative efficiency”).</li> </ul>
Institute of Medicine (2001)	<ul style="list-style-type: none"> <li>▪ The opposite of efficiency is waste - the use of resources without benefit to the patients a system is intended to help. There are at least two ways to improve efficiency: (1) reduce quality waste, and (2) reduce administrative or production costs.</li> </ul>
Severens (2003)	<ul style="list-style-type: none"> <li>▪ Use of resources for no (or very little) benefit or a failure to use resources on clearly beneficial activities.</li> </ul>
Bentley et al. (2008)	<ul style="list-style-type: none"> <li>▪ Administrative waste is any administrative spending that exceeds the spending necessary to achieve the overall goals of the organization or the system as a whole.</li> <li>▪ Operational waste refers to the inefficient and unnecessary use of resources in the production and delivery of services.</li> <li>▪ Clinical waste is spending to produce clinical services that provide marginal or no health benefit over less costly alternatives.</li> </ul>
The New England Healthcare Institute (2008)	<ul style="list-style-type: none"> <li>▪ Healthcare spending that can be eliminated without reducing the quality of care.</li> </ul>
McGlynn et al. (2008)	<ul style="list-style-type: none"> <li>▪ Developed a typology of efficiency in health care. The framework reflects Palmer and Torgenson (1999) and the AcademyHealth’s (2006) definitions and includes the following components: (1) from whose perspective efficiency is evaluated</li> </ul>

Author	Definition / conceptualization
	(purchaser, health plan, or provider); (2) which outputs are used (such as a unit of service, episode of care, or unit of quality outcome); and (3) which inputs or resources are used to produce outputs.
Hoffman and Pearson (2009)	<p>Suggest the term ‘marginal medicine’ instead of ‘waste’ and use the following categories:</p> <ul style="list-style-type: none"> <li>▪ Inadequate evidence of comparative net benefit for any indication.</li> <li>▪ Use beyond boundaries of established net benefit.</li> <li>▪ Higher cost when established benefit is comparable to other options.</li> <li>▪ Relatively high cost for incremental benefit compared to other options.</li> </ul>
Berwick and Hackbarth (2012)	<p>Defines waste as ‘not value-added care’ and identifies six categories of waste:</p> <ul style="list-style-type: none"> <li>▪ Failures of care delivery</li> <li>▪ Failures of care coordination</li> <li>▪ Overtreatment</li> <li>▪ Administrative complexity</li> <li>▪ Pricing failures</li> <li>▪ Fraud and abuse</li> </ul>
OECD (2017)	<p>Defines waste as health care spending that can be reduced without undermining the achievement of health system objectives. The OECD developed a framework that includes three categories of waste (wasteful clinical care, operational care, and governance-related waste) mapped to actors involved (patient, clinician, manager and regulator).</p>

Across these definitions, waste is most commonly conceptualized as a measure of inefficiency, referring to activities and services not necessary to the overall outcome of care. Therefore, waste provides a useful target for cost containment but does not involve any level of healthcare rationing (Kelley, 2009).

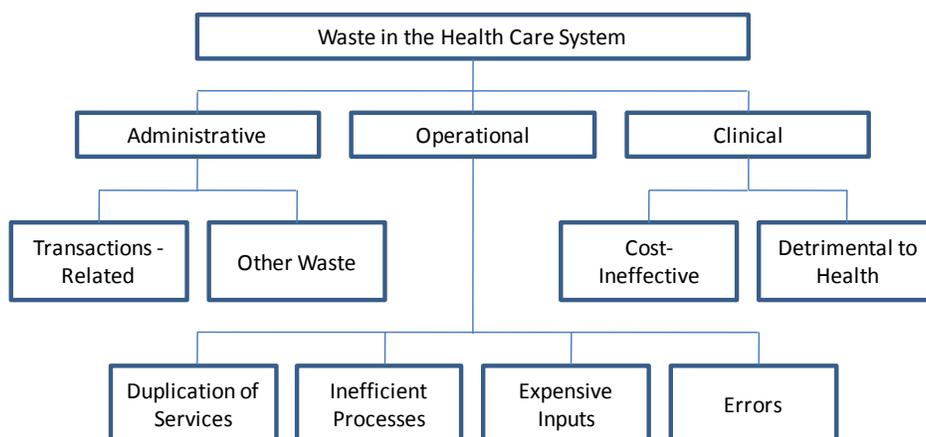
**What framework is most useful for policymakers to identify examples of waste?** – As part of the scoping methodology, we consulted with the previously mentioned health economists and a few other experts in health policy research to discuss and contextualize the findings of the review. The consultative process was a free-form discussion designed to foster a focussed dialogue, resulting in a decision to select Bentley’s framework as the most useful method at the time when the study was conducted in 2009 to illustrate how policy makers can identify examples of waste in their healthcare systems.<sup>3</sup>

A key rationale for choosing Bentley’s approach was the comprehensiveness of the framework and the extent to which it allows for the classification of examples of waste into clear, distinct and mutually exclusive categories. Similar to other definitions and concepts, the framework builds on the traditional understanding of waste as a measure of inefficiency and distinguishes between productive and allocative inefficiency. Since productive and allocative inefficiency are often difficult to separate, Bentley et al., (2008) translated them into three distinct categories: 1) administrative; 2) operational; and 3) clinical, and further subdivided each main category (see figure 1). Administrative and operational waste are examples of productive inefficiency, while clinical waste is a form of allocative inefficiency (Bentley et al., 2008).

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<sup>3</sup> Of course, other frameworks may be more applicable in different circumstances.

Figure 1: A framework for waste in health care (Source: adopted from Bentley et al., 2008)



Because of the clear and distinct categorization of waste, Bentley's framework provides a useful guide to identify activities unnecessary for care outcomes. This information can help inform the strategic policy prioritization process within a ministry or local health system and subsequent policy or programmatic interventions. These interventions can include negotiating better prices and improving substitution of care (productive efficiency) or delisting services that do not lead to health improvements (allocative efficiency). The framework further strengthens accountability between health-system actors on spending and achieving outcomes. The experts in health policy research we consulted also felt that it could facilitate meaningful discussions among policymakers within a ministry or regional health authority and between policy makers and external stakeholders which may result in the identification of additional topics.

Finally, Bentley's et al. (2008) framework has already been adopted by researchers in Australia and the U.S. to inform policymakers about potential solutions to wastage in their health systems (Hurley et al., 2003; Eibner et al., 2009).

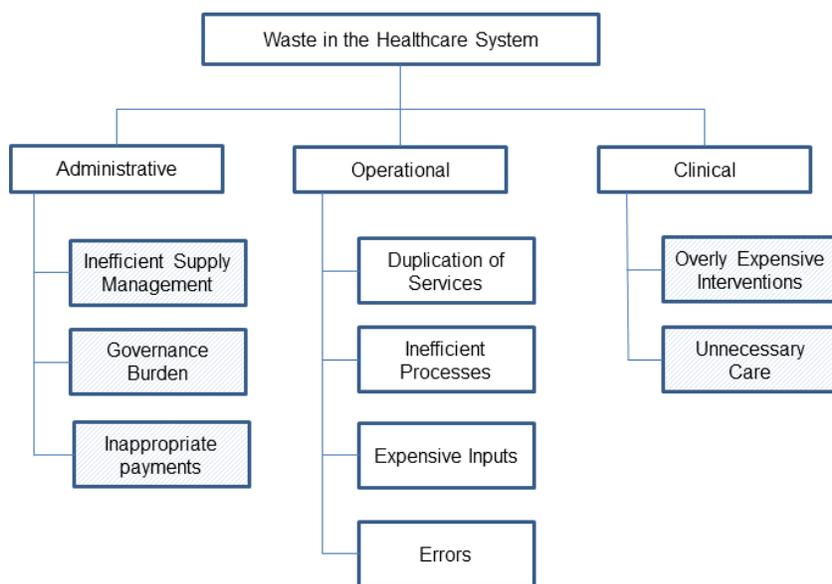
Following our discussions with the experts, we modified the framework (specifically the categorization of administrative waste) to fit a primarily single-funder healthcare system. Instead

of “transaction waste” associated with several payers, we suggest the following three sub-categories to identify administrative waste:

- Inappropriate payments: payment for services or level of services not rendered.
- Inefficient supply management and support services: waste resulting from inefficient execution of procurement and management of equipment, capital and supply (including drugs), administrative support and other non-direct care-related activities at the provider level.
- Governance burden: wasteful activities resulting from inefficient administration of the healthcare system that cause redundancies in roles and responsibilities and a disproportionate number of complexities in compliance demands.

With regard to clinical waste category, instead of the sub-category ‘detrimental to health’ we introduced ‘unnecessary care’, reflecting waste resulting from healthcare that provides no benefit or for which the expected risks or negative effects significantly exceed the expected benefits for the average patient with a specific clinical scenario. Finally to make the distinction between ‘unnecessary care’ and ‘cost-ineffective care’ clearer, we decided to use the term ‘overly expensive interventions’ instead of the term ‘cost-ineffective care’. The sub-categories ‘unnecessary care’ and ‘overly expensive interventions’ speak to a term that is being used more recently: low-value care which is defined as the use of an intervention where evidence suggests it confers no or very little benefit, or more broadly, the added cost of the intervention do not provide proportional added benefits (Scott and Duckett, 2015). Figure 2 shows the revised framework. The shaded categories are the revised ones.

Figure 2: Revised Bentley Framework for use in single-funder healthcare system



## APPLYING THE FRAMEWORK TO IDENTIFY WASTE

**How to identify examples of waste?** - Where do I find examples of waste in my healthcare system? A starting point for identifying examples of waste is a literature review. For our study we conducted a search in PubMed and identified additional material through bibliographies.<sup>4</sup> In addition, we searched the Internet for information on waste in healthcare systems, applying the same keywords used in the database searches as well as searching for additional initiatives mentioned in articles identified through the literature search. In applying the framework, we identified 29 examples of waste. Of the 29 identified examples, 15 related to operational waste, 8 to clinical waste and 6 to administrative waste. Table 2 shows an example

<sup>4</sup> We used the following search terms: *adverse events, clinical waste, administrative waste, administrative inefficiency, operational waste, medical error, duplication, preventable error, preventable hospitalization, overuse, unnecessary utilization, inefficient/ inefficiency, ineffective treatment, health care waste, supply-driven demand, supply-sensitive care, overtreatment, inappropriate use/utilization, mistreatment, excessive administrative costs, inappropriate/unnecessary elective surgery and inappropriate/unnecessary supply management*

for each type of waste, though we did not locate any examples of wasted related to governance burden.

*Table 2: Selected examples of waste identified in the literature by waste category and type*

Category	Type of waste	Example	Reference
Administrative waste	Inappropriate payments	1. Fraudulent billing for physician services	National Health Care Anti-Fraud Association (2007)
	Inefficient supply management and support services	2. Inventory stocks too high	Bush, 2007
	Governance Burden	No examples found	
Operational waste	Duplication of waste	3. Unnecessary repeat testing / imaging	You et al., 2008
	Inefficient processes	4. Sub-optimal supply-chain management processes	Conly and Johnson, 2006
	Overly expensive inputs	5. Generic vs. Brand name drugs	Health Quality Ontario, 2009
	Errors	6. Hospital adverse events / Hospital acquired infections	Baker et al., 2004 / Zoutman et al., 2003
Clinical waste	Inappropriate care	7. Unnecessary self-monitoring blood glucose levels	Gomes et al., 2010
	Overly expensive interventions	8. Arthroscopic lavage of the knee alone (without debridement)	Royal College of Physicians, 2008

Once policy makers have completed their literature review, they need to assess the results in the context of their respective healthcare system. Helpful guiding questions include: is it possible that this might happen in our health system? What is the feasibility of quantifying relevant examples of waste? What metrics are tracked and could they be used to exemplify

current levels of waste? Our assessment of examples involved discussing the results with several clinical and academic experts to determine its relevance for the healthcare system we looked at and to gain context for our decision-making.

## **QUANTIFYING WASTE IN YOUR HEALTH SYSTEM**

**How do I calculate waste in my healthcare system?** - Calculating waste and the associated potential avoidable costs depends on the information available to policymakers, in particular the sophistication of local clinical and administrative databases. For our study we used three sources:

1. **Administrative and clinical databases** to quantify the prevalence of operational and clinical waste events:
  - a. A national database that captures administrative, clinical and demographic information on hospital discharges.
  - b. A physician billing system that captures all the services performed by physicians and other registered providers.
2. **Existing published studies** – in instances where we found prevalence and/or cost numbers for locally or nationally wasteful activities, we used those numbers.
3. **Case-costing information** to obtain patient-level costing information.

Because we worked within very narrow timelines for our study, we were dependent on existing information and data sources. As a result we were not always able to quantify the examples found in the literature for our local health system. In particular, we encountered this problem in our attempts to quantify administrative waste. We did not find any studies that provided us with

an estimate of potential avoidable costs related to inappropriate payments, inefficient supply management and support services or governance, nor was it possible to obtain any of this information from our administrative and clinical databases.

In calculating wasteful spending, policymakers need to be mindful that some activities should always be considered wasteful, yet other activities might sometimes be considered wasteful or valuable depending on context.

*Activities that are always wasteful*

These activities result from poor quality or inefficiency and can always be considered non-value added (James and Bayley, 2006). Costs associated with poor quality can result from the additional resources required to repair an initial failure (rework) or to discard the defective output and start again (scrap). Treating a preventable medical complication is an example of rework and consumes more healthcare resources than if the complication had never occurred.

Repeating an X-ray when the initial image is unreadable or making multiple attempts to track down a missing laboratory result are examples of scrap (i.e., wasted images and unnecessary telephone calls) (James and Bayley, 2006).

Inefficiency means that outputs unnecessarily consume additional resources which do not add value. Examples include: reports and reporting systems that generate information not used in decision-making processes, repetitive collection of patient histories and time during which a piece of expensive equipment is inactive. To estimate waste for activities that are always wasteful, multiply the total number of wasteful events per year by the average estimated cost of the event. Below is an example of how we estimated the potential avoidable costs in our study

of Clostridium difficile (*C. difficile*) infection in the hospital setting; an activity that can be seen as always wasteful.

**Example of estimating the potential avoidable costs of an activity that is always wasteful:**

**Hospital Acquired Infections – Clostridium difficile (*C. difficile*)**

Category: Operational waste / Errors

*Potential avoidable cost of C. difficile hospitalization= total number of C. difficile cases hospitalized X the average total cost per day of the Most Responsible Diagnosis (MRDx) of C. difficile hospitalized X the increased hospital stay due to C. difficile.*

- a) Total number of *C. difficile* cases in the year of analysis was 3,081 (self-reported by hospitals)
- b) Average total cost per day of the most responsible diagnosis of *C. difficile*:
  - Average cost for a case with MRDx *C. difficile* was about \$14,000 (case costing data)
  - Average length of stay (LOS) of MRDx *C. difficile* was 12.5 days resulting in an average cost per day of about \$1,120
- c) Increased hospital stay:
  - The average LOS of patients with MRDx *C. difficile* is 18.4 while the average LOS of all other patients is 6.7 (all ICD-10 CA codes excluding *C. difficile* and excluding pregnancy and childbirth) meaning that on average, patients who contracted *C. difficile* stay in the hospital an additional 11.7 days

Total potential avoidable crude costs of *C. difficile* hospitalization = \$40.4M (3,081 *C. difficile* cases X \$1,120 X 11,7 days)

This is just one approach. Another example of estimating the potential avoidable costs of *C. difficile* infections can be found in a recent U.S. study by Zimlichman et al. 2013. In estimating

the costs associated with *C. difficile* infection and other health care-associated infections (HAIs), the authors first estimated the incidence of the respective HAIs via a database that collects data on major device-associated and procedure associated HAIs except for *C. difficile* which they estimated from high-quality studies obtained through systematic literature review. Costs associated with each HAI were identified via a systematic review of the literature only including studies from the U.S. and subsequently they conducted a sensitive analysis of costs and resource utilization. Finally, the authors estimated the financial impact of HAIs for the U.S. health care system based on the largest publicly available all-payer inpatient database.

*Activities that are occasionally wasteful*

Some activities are wasteful in certain contexts and valuable in others. The context hereby can be either clinical needs or local circumstances that shape the way healthcare is organized. An example of the first is the appropriateness of elective surgeries especially for procedures known to have highly subjective indications such as cataract. A study of Wright et al. (2002) found that 13% of cataract surgeries in the Vancouver/Richmond should not have occurred at all. Another example is X-ray repetition. There may be instances where it is legitimate for a physician to repeat an X-ray. Local circumstances are also an important contextual factor for determining whether an activity is wasteful. An example here would be ambulatory care sensitive conditions (ACSC), described in more detail below.

The challenge for policymakers is that, without detailed contextual information, it is difficult to determine which activities can be classified as waste and which are legitimate.

There are various approaches policymakers can apply to estimate the potential avoidable costs of activities in this situation. One approach is to compare current utilization with national or international clinical guidelines or benchmarks.

**Example of estimating the potential avoidable costs of an activity that is sometimes wasteful using guidelines/benchmarks: unnecessary prostatectomies**

Category: Clinical waste / inappropriate care

*The cost of unnecessary prostatectomies in our local health system = the number of prostatectomies X the percentage of unnecessary prostatectomies X the cost of a prostatectomy.*

- a) Number of prostatectomies in 2008: 5,916 of which 5,883 were partial prostatectomies and 33 were open radical prostatectomies (administrative database).
- b) Percentage of unnecessary prostatectomies: a British Columbia study showed that 27% of the clinical indications for a prostatectomy did not match the indications for a prostatectomy outlined in the authoritative guideline (Wright et al., 2002).
- c) Cost of a prostatectomy:
  - o Costs for a partial prostatectomy (about \$4,300)
  - o Costs for an open radical prostatectomy (about \$7,5000)
  - o Average costs of a prostatectomy:  $((5,883 \times \$4,300) + (33 \times \$7,500)) / 5,916 = \$4,318$

The potential avoidable crude costs of unnecessary prostatectomies = \$6.90M (5,916 X 0,27 X \$4,3184)

In the absence of established clinical guidelines or benchmarks, policymakers may look at differences in utilization across regions, building upon work done by Wennberg (Wennberg,

1973; Fisher and Wennberg, 2003), the Codman Research Group (1988) and the Dartmouth Atlas of Healthcare (2009). This approach measures and compares the use of medical care by defined populations to show variation in resource input, utilization of services, expenditures and quality of care that cannot be explained by illness, medical evidence or patient preferences. For our study we used regional health authorities as the unit of intra-health system comparison; for example, we estimated the potential avoidable costs resulting from seven ACSCs: asthma, diabetes, grand mal status and other epileptic convulsions, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF) with pulmonary edema, hypertension and angina. ACSCs are hospital admissions that could have been prevented with appropriate primary and community care, however not all ACSCs are preventable.

**Example of estimating the potential avoidable costs of an activity that is sometimes wasteful using regional comparison: Ambulatory Care Sensitive Conditions (ACSC)**

Category: Operational waste / overly expensive inputs

This approach involves a number of steps:

1. Calculating the prevalence for each ACSC hospitalization
  - Sum of the total number of each ACSC in 2007 in the jurisdiction we looked at in our in study = 37,812 (based on administrative data: Epilepsy (3,046); COPD (10,148); asthma (5,280); CHF (6,673); hypertension (947); angina (6,410); and diabetes (5,308))
2. Calculating the average cost per ACSC component
  - Based on case-costing information we calculated the average cost for each of the seven ACSCs hospitalized (rounded up the numbers for simplicity purposes): Epilepsy (\$10,000); COPD (7,600); asthma (\$3,300); CHF (\$9,400); hypertension

(\$4,400); angina (\$5,500); and diabetes (\$6,600)

3. Calculating the total weighted average cost: about \$6,950
4. Total estimated costs of ACSC at system level is \$263M (37,812 X \$6,950)
5. Calculating potential crude avoidable costs by determining what the total estimated costs of ACSC would be if the system was performing at the lowest regional cost per capita (scenario 1) or at the mid-range regional cost per capita (scenario 2):
  - Identify for every region the prevalence of each of the ACSC
  - Calculate the costs of each ACSC for every region
  - Calculate the cost per capita for each ACSC for every region (costs per ACSC / size of population in region)
  - Determine scenario 1: sum of (lowest per capita cost for each ACSC X prevalence at system level for each ACSC)
  - Determine scenario 2: sum of (mid-range per capita cost for each ACSC X prevalence at system level for each ACSC)

*Potential avoidable crude costs of ACSC*

All ACSCs	Total crude cost at healthcare system level	Total potential savings
Current total estimated costs of ACSC	\$263M	
Scenario 1 – If system was performing as best performer	\$144,8M	\$117,9M
Scenario 2 – If system was performing as middle performer	\$227,1M	\$35,4M

Table 3 shows the 13 examples of waste for which we quantified potential avoidable crude costs calculated in 2009. Again, it is important to note that these are high-level estimates not corrected for the costs of implementing improvement strategies as well as the absence of specific measures in some instances to distinguish clearly between appropriate vs. inappropriate use.

*Table 3: Estimated potential avoidable cost of waste examples*

Category	Type of waste	Example	Crude Potential Avoidable Costs
Operational waste	• Duplication of waste	1. Unnecessary repeat testing / imaging	\$7.M
		2. Ambulatory care sensitive conditions	\$35.4M - \$117.9M
	• Overly expensive input	3. Non-urgent emergency department visits	\$25M - \$64.5M
		4. Alternate level of care	\$75.0M
		5. Hospital adverse events	\$29.8M
	• Errors	6. Hospital acquired infections (C. difficile, MRSA)	\$40.4M
		7. Unplanned readmissions	\$705.0M
Clinical Waste	• Inappropriate care	8. Pre-op testing for cataracts	\$1.0M
		9. Unnecessary hysterectomies	\$5.5M – \$44M
		10. Unnecessary prostatectomies	\$6.90M
		11. Unnecessary caesarean deliveries	\$23.7M
		12. Unnecessary self-monitoring blood glucose levels	\$5.0M
		13. Unused continuous positive airway pressure machines	\$8.5M

## **PRESENTING AND USING THE INFORMATION**

**How do I present the results to my senior management team?** – In presenting the information, we recommend that you start with showing the framework because it will define the problem and establish the parameters of your investigation. The framework provides an easily understandable set of categories and sub-categories to stimulate discussion with senior management and could lead to the identification of other examples of waste for investigation. It also emphasizes that this exercise is not about cost-cutting but about bending the cost-curve by focussing on unnecessary expenditures that do not add value. Following this, present the results ranked according to their potential avoidable cost. We also recommend providing information on how your examples can be addressed through policy levers. These strategies can range from demand-side interventions targeting patients to supply-side interventions aimed at healthcare providers.

Information for addressing examples of waste can be found in the literature, both general strategies or specific ones related to an example like ACSC (Colla et al., 2016; Beaudin-Seiler et al., 2016; Scott and Duckett, 2015; Colla, 2014; Purdy, 2010) or by looking at other jurisdictions (OECD, 2017). Consultation with colleagues responsible for relevant policy levers is also useful. For example, if you are considering de-listing a physician activity (no longer a compensated activity under a fee-for-service payment system), meeting with analysts and managers in the department responsible for physician fees will offer greater clarity about how that might be achieved.

**What do I need to consider in prioritizing areas of waste?** – In recommending priority areas based on the framework, policymakers need to consider a few things such as whether

different data sources were used to estimate the potential avoidable costs; data was used from different time periods; and whether for every example of waste the entire scope of potential avoidable costs were included. Variation in data sources, time periods and inclusiveness will limit the ability for comparing potential avoidable costs across your examples of waste.

Another consideration speaks to the previous mentioned issue of being able to distinguish between activities that are wasteful spending vs. activities that are appropriate pending context or clinical need. As such, there is a risk that the incidence of examples of overuse might include some instances of appropriate use. For example, a study from the U.S. showed that with more 'specific measures', the portion of patients receiving inappropriate care fell to 25%, accounting for only 0.6% of total spending (Willson, 2015; Schwartz et al., 2014).

It is also important to keep in mind that, potential avoidable costs identified by the framework are crude costs – as mentioned earlier, they are neither adjusted for the cost of investments needed to avoid or minimize waste activity nor the degree to which potential avoidable costs can be reduced.

Ideally, before prioritizing waste areas for focus, the potential cost of change efforts should be considered because the investments required to effect change might significantly lower – or even negate – any savings achieved through elimination.

Finally it is important to understand that not all savings can be easily monetized for removal from the system. The Institute for Health Improvement differentiates between “dark green dollars” (actual savings on the bottom line) and “light green dollars” which are theoretical cost savings to make better use of existing capacity (Martin et al., 2009). The challenge in creating dark green dollars i.e. true bottom-line savings lies in the rigid cost structure of health care

delivery which is relatively insensitive to small changes in patient volume, resource use, or the severity of patients' health conditions (Rauh et al., 2011). As a result, improved quality typically creates additional capacity i.e. 'light green dollars' (Rauh et al., 2010). To better understand the cost structure of health care delivery, Rauh et al., 2011 identified four cost layers in the health care system based on their sensitivity to change in resource utilization. For example, layer 1 speaks to truly variable costs of patient care. Strategies to reduce waste resulting from layer 1 resource utilization will result in immediate savings. An example of this would be de-listing of an intervention in a fee-for-service schedule so physicians can no longer bill for this service. It should be noted that the concern with de-listing is that physicians might bill other services instead. One way to overcome this would be to "lower the price" instead for a service. Other examples of variable costs include medication and supplies. Strategies that affect cost layers that are increasingly less variable and are more fixed (e.g. costs for salaried labor like nurses, buildings and equipment or nurse-to-patient ratios required to ensure safe care) will not result in a reduction of resource consumption in the short run. As a result, because of these fixed costs, addressing a waste activity might save resources in the future but will not be helpful in addressing immediate budgetary pressures. However, it might lead to a better use of existing capacity. The most meaningful way to achieve actual savings is to focus on overall reductions in utilization rates for health care services and to eliminate the associated unnecessary capacity.

**What do I need to consider in presenting strategies for addressing waste?** – Decision-making timelines in government are often defined by four- or five -year political cycles. These cycles are often not well aligned with longer-term health-system performance goals, which may take several decades to produce savings. The resulting risk is that waste initiatives will focus on delisting services rather than creating meaningful change in the organization and structure of a health care system. This would be a missed opportunity. To avoid this, you might want to

present your findings in the context of broader strategies, objectives and policies your health care system is planning to or might undertake. Linking waste-eliminating strategies to system goals will also overcome some limitations of the framework (discussed below).

### **Example of a how a jurisdiction used waste information**

In Ontario, waste information has been systematically embedded in overall cost-containment and value-adding policies. The information on waste in the Ontario healthcare system has helped create a business case for the government's Excellent Care for All Strategy, including the 2010 Excellent Care for All Act (ECFAA). ECFAA legislated hospital accountability for improving quality of care as well as a more evidence-based approach to public coverage and payment policies. Ontario used waste information to inform its 2012 negotiations with the Ontario Medical Association (OMA). Together with the OMA and Health Quality Ontario (HQO), the Ontario Ministry of Health and Long-Term Care (MOHLTC) identified and agreed upon a number of changes that would promote greater appropriateness of care. (MOHLTC, 2012).

With regard to hospital funding, Ontario introduced a new hospital funding model in 2012 that holds providers financially accountable for the incremental costs of poor-quality care. The Ontario government also supported the creation of Choosing Wisely Canada, a physician-led initiative that began in the United States, to help clinicians and patients engage in conversations about unnecessary tests and treatments and make smart treatments and make smart and effective choices to ensure high-quality care (Choosing Wisely Canada, 2016). Choosing Wisely Canada is an excellent example of how understanding where taxpayer dollars are spent on care that adds little value to care outcomes led to shifts in practice. Choosing Wisely also underscores the significant role physicians and patients play in increasing appropriateness of care.

**What are the limitations of the framework for informing policy decisions?** – A key limitation of the framework is that it provides guidance for isolating examples of waste but not necessarily in identifying critical areas of waste within a healthcare system. From a system-management and improvement perspective, recommendations on how to increase value should be influenced by system goals and priorities. For example, is the reduction of wait times a more pressing issue than reducing pre-operative testing? This is a key limitation of the framework: the absence of a clear relationship between the framework and system goals beyond the reduction of spending. This runs contrary to other prevalent industry models, such as Lean Thinking, Six Sigma, Total Quality Management and Theory of Constraints, which seek to improve organizational effectiveness and efficiency. These models share two important features: focus on the customer and process improvement. Customer needs define which features create value in a product and process improvement implies an ongoing effort to eliminate activities that do not add value (Bozdogan, 2006). Policymakers using the framework risk prioritizing waste issues they perceive to be important instead of areas that may offer system-wide performance improvement.

Second, the framework does not guide policymakers to assess which health care activities are undertaken due to the lack of proper disease prevention or health promotion. For example, bariatric surgery may be a necessary intervention to address obesity, but some portion of it could be considered waste if preventable through upstream health promotion interventions.

**Are waste identification projects a waste of time from a health policy perspective?** – Identifying and quantifying waste in a healthcare system is not a waste of time. Even with the caveats and limitations identified, a waste-focused approach helps to draw attention. It can translate a wide range of system gaps, suboptimal outcomes and inefficiencies into a readily-understandable common denominator: monetary value. A waste approach further suggests that

change is possible. It is implicit in the definition of waste that wasteful activity can be eliminated through changes in the system. A waste strategy provides a powerful tool for change by building a business case that government, stakeholders and the general public can readily understand.

**Disclaimer:** The views expressed in this publication are those of the authors and not of the organizations the authors are associated with.

## References

- Baker, G.R., P.G. Norton, V. Flintoft, R. Blais, A.D. Brown, J. Cox, E. Etchells et al. 2004. "The Canadian Adverse Events Study: the Incidence of Adverse Events among Hospital Patients in Canada." *Canadian Medical Association Journal* 170: 1678-1686.
- Beaudin-Seiler B., M. Ciarametaro, R. Dubois, J. Lee and A.M. Fendrick. 2016. "Reducing Low Value Care." HealthAffairs Blog (accessed October 10, 2016: <http://healthaffairs.org/blog/2016/09/20/reducing-low-value-care/>)
- Bentley, T.G.K., R.M. Effros, K. Palar and E.B. Keeler. 2008. "Waste in the US Health Care System: a Conceptual Framework." *The Milbank Quarterly* 86: 629-659.
- Berwick, D.M. and A.D. Hackbarth. 2012. "Eliminating waste in the U.S. health care." *The Journal of the American Medical Association* 307: 1513-1516.
- Bozdogan, K. 2006. *A Comparative Review of Lean thinking, Six Sigma and Related Enterprise Process Improvement Initiatives*. Retrieved November 9, 2009 <[http://lean.mit.edu/index.php?option=com\\_docman&Itemid=776](http://lean.mit.edu/index.php?option=com_docman&Itemid=776)>.
- Bush, R.W. 2007. "Reducing Waste in US Health Care Systems." *Journal of the American Medical Association* 297: 871-74.
- Cassel C., J. Guest. 2012. "Choosing Wisely: Helping Physicians and Patients Make Smart Decisions About Their Care." *Journal of American Medical Association* 307(17): 1801-2.
- Choosing Wisely Canada. Retrieved August 12, 2016 < <http://www.choosingwiselycanada.org/>>.
- Codman Research Group. 1988. *Small Area Analysis: Concepts, Methodology, and Applications*. Lebanon, NH: The Codman Research Group.
- Congressional Budget Office. *Health Care Reform and the Federal Budget*. Washington (DC): Congressional Budget Office: 2009.
- Colla C.H. 2014. "Swimming Against the Current – What Might Work to Reduce Low-Value Care?" *The New England Journal of Medicine* 371: 1280-1283.
- Colla C.H., A.J. Mainor, C. Hargreaves, T. Sequist, and N. Morden. 2016. "Interventions Aimed at Reducing Use of Low-Value Health Services A Systematic Review." *Medical Care Research and Review* Jul 8.
- Conly J, and B. Johnston. 2006. "Physical Plant Designing and Engineering Controls to Reduce Hospital-Acquired Infections." *The Canadian Journal of Infectious Diseases and Medical Microbiology* 17: 151–153.
- Dartmouth Atlas of Healthcare. Retrieved October 10, 2009. < <http://www.dartmouthatlas.org/>>
- Eibner C.E., P.S. Hussey, M.S. Ridgely, and E.A. McGlynn. 2009. *Controlling Health Care Spending in Massachusetts: An Analysis of Options*. Santa Monica, CA: RAND Corp.
- Elshaug G., A. Watt, L. Mundy, C. Willis. 2012. "Over 150 Potentially Low-Value Care Practices: An Australian Study." *The Medical Journal of Australia* 10: 556-560.
- Fisher E.S., and E.J. Wennberg. 2003. "Health Care Quality. Geographic Variations, and the Challenge of Supply-Sensitive Care." *Perspectives in Biology and Medicine* 46(1): 69-79.
- Gomes, T., D.N. Juurlink, B.R. Shah, J.M. Paterson and M.M. Mamdani. 2010 "Blood Glucose Test Strips: Option to Reduce Usage." *Canadian Medical Association Journal* 182: 35 – 38.
- Grant M.J., and A. Booth. 2009. "A Typology of Reviews: An Analysis of 14 Review Types and Associated Methodologies." *Health Information and Libraries Journal* 26(2): 91-108.

- Hoffman A. and S.D. Pearson. 2009. "Marginal Medicine': Targetting Comparative Effectiveness Research to Reduce Waste." *Health Affairs* 28(4) 710-8.
- Hurley E.I., I. McRae, I. Bigg, L. Stackhouse, A.M. Boxall, and P. Broadhead. 2009. *The Australian Health Care System: The Potential for Efficiency Gains. A Review of the Literature*. Commonwealth of Australia: National Health and Hospitals Reform Commission.
- Institute of Medicine (IOM). 2001. *Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century*. Washington D.C.: National Academy Press.
- James B., and K.B. Bayley. 2006. *Cost of Poor Quality or Waste in Integrated Delivery Settings*. AHRQ Publication No. 290-00-0018. Rockville, MD: Agency for Healthcare Research and Quality.
- Kelley R. 2009. *Where Can \$700 Billion in Waste Be Cut Annually from the US Healthcare System?* Ann Arbor: Thomson Reuters, October 2009.
- Laupacis A., G. Wells, W.S. Richardson, P. Tugwell. 1994. "User's Guides to the Medical Literature. V. How to Use an Article About Prognosis." *Journal of American Medical Association* 272 (3): 234-237.
- Martin L.A., C.W. Neuman, J. Mountford, M. Bisognano, T.W. Nolan. 2009. *Increasing Efficiency and Enhancing Value in Health Care: Ways to Achieve Savings in Operating Costs per Year*. IHI Innovation Series white paper. Cambridge, Massachusetts: Institute for Healthcare Improvement. Retrieved October 10, 2016:  
<<https://cdn2.hubspot.net/hub/276565/file-410068373-pdf/docs/856157170.pdf>>
- McGlynn, E., P. Schekelle, S. Chen, G. Goldman, J. Romley, P.S. Hussey, H. de Vries, M. Wang, M. Timmer, J. Carter, C. Tringale and R. Shanman. 2008. *Health Care Efficiency Measures: Identification, Categorization, and Evaluation*. AHRQ Publication No. 08-0030. Rockville MD: Agency for Healthcare Research and Quality.
- National Healthcare Anti-Fraud Association. 2007. *The Problem of Health Care Fraud*. Retrieved September 15, 2009:  
<[http://www.nhcaa.org/eweb/DynamicPage.aspx?webcode=anti\\_fraud\\_resource\\_cent&wpscode=TheProblemOfHCFraud](http://www.nhcaa.org/eweb/DynamicPage.aspx?webcode=anti_fraud_resource_cent&wpscode=TheProblemOfHCFraud)>
- New England Healthcare Institute. 2008. *Waste and Inefficiency in the U.S. Health Care System*. Cambridge, MA: New England Healthcare Institute.
- Health Quality Ontario (Formerly Ontario Health Quality Council). 2009. *Quality Monitor – 2009 Report on Ontario's Health System*. Retrieved January 10, 2010. < [http://www.ohqc.ca/pdfs/ohqc\\_2009\\_report\\_-\\_english.pdf](http://www.ohqc.ca/pdfs/ohqc_2009_report_-_english.pdf)>.
- Ontario Ministry of Health and Long-Term Care (MOHLTC). 2012. Physician Services Agreement. Retrieved September 15, 2016.  
[http://www.health.gov.on.ca/en/pro/programs/phys\\_services/docs/phys\\_services\\_agreement\\_en.pdf](http://www.health.gov.on.ca/en/pro/programs/phys_services/docs/phys_services_agreement_en.pdf).
- Organization for Economic Cooperation and Development (OECD). 2017. *Tackling Wasteful Spending on Health*. Paris: OECD Publishing.
- Palmer, S., D.J. Torgerson. 1999. "Economic Notes: Definitions of Efficiencies." *British Medical Journal* 318: 1136.
- Purdy, S. 2010. *Avoiding Hospital Admissions. What Does the Research Evidence Say?* London: The KingsFund.
- Rauh S.S., E. Wadsworth, and W.B. Weeks. 2010. "The Fixed-Cost Dilemma: What Counts When Counting Cost-Reduction Efforts? A Hospital's Fixed Costs are a Reality That Can Make the Idea of Achieving Savings By Reducing Length of Stay Illusory." *Healthcare Financial Management* 64(3): 60.
- Rauh S.S., E.B. Wadsworth, W.B. Weeks, and J.N. Weinstein. 2011. "The Savings Illusion – Why Clinical Quality Improvement Fails to Deliver Bottom-Line Results." *The New England Journal of Medicine* 365:

- Reid, R.O, B. Rabideau, and N. Sood. 2016. "Low-Value Health Care Services in a Commercially Insured Population." *Journal of American Medical Association Internal Medicine* 176(10): 1567-1571.
- Royal College of Physicians. 2008. Osteoarthritis. National Clinical Guideline for Care and Management in Adults. London: Royal College of Physicians.
- Schwartz A.L., B.E. Landon, A.G. Elshaug, *et al.* 2014. "Measuring Low-Value Care in Medicare." *JAMA Internal Medicine* 174: 1067-76.
- Scott, I.A., S.J. and Duckett. 2015. "In Search of Professional Consensus in Defining and Reducing Low-Value Care." *The Medical Journal of Australia* 203(4): 179-181.
- Severens, J.L. 2003. "Value for Money of Changing Healthcare Services? Economic Evaluation of Quality Improvement." *BMJ Quality and Safety* 12(5): 366-67.
- Siemens, D.R., A. Finelli. 2014. "Choosing Wisely Canada: It's Our Turn." *Canadian Urology Association Journal* 8: 7-8.
- Williams, A. 1988. "Priority Setting in Public and Private Health Care. A Guide Through the Ideological Jungle." *Journal of Health Economics* 7: 173-83.
- Willson A. 2015 "The Problem with Eliminating 'Low-Value Care'". *BMJ Quality and Safety* 0: 1-4.
- Wennberg, J., and A. Gittelsohn. 1973. "Small Area Variations in Health Care Delivery." *Science* 182: 1102-1108.
- Wright C.J., K. Chambers and Y. Robens-Paradise. 2002. "Evaluation of Indications for and Outcomes of Elective Surgery." *Canadian Medical Association Journal* 167: 461-466.
- You, J.J., L. Yun and J.V. Tu. 2008. "Impact of Picture Archiving Communication Systems on Rates of Duplicate Imaging: a Before-After Study." *BMC Health Services Research* 8: 234.
- Zimmlichman, E., D. Henderson, O. Tamir, C. Franz, P.Song, C.K. Yamin, C. Keohane, C.R. Denham, and D.W. Bates. 2013. "Health-Care Associated Infections: A Meta-Analysis of Costs and Financial Impact on the U.S. Health Care System." *JAMA Internal Medicine* 173(22): 2039-46.
- Zoutman, D., E. Bryce, M. Gourdeau, G. Hebert, E. Henderson and S. Paton. 2003. "The State of Infection Surveillance and Control at Canadian Acute Care Hospitals." *American Journal of Infection Control* 31: 266-275.