What Price to Pay?
The Cost of Everything and the Value of Nothing

Justin A. Ezekowitz, MBBCh, MSc

What is a cynic? A man who knows the price of everything and the value of nothing.
—Oscar Wilde, Lady Windermere’s Fan

Myocardial infarction and heart failure often combine at a deadly intersection defined by the natural history of the disease on one hand and the safety and benefit of available treatments on the other. Patients presenting acutely with these concomitant disorders are at high risk defined by the earliest and simplest clinical classification schema, static and dynamic risk models, and inclusion criteria for contemporary trials.

Millions of North Americans (and the larger global population) suffer these events. The residual sequelae of outpatient and emergency department visits, hospitalizations, procedures, and loss of function extract a heavy toll of diminished quality and quantity of life. As clinicians and scientists, our goal is to favorably alter this course when possible at all “costs” for our patients. Yet we cannot disregard all financial costs because even high-income countries do not have an endless supply of healthcare resources. This dilemma is especially dire in low-income countries where clinicians must necessarily choose between standard-of-care agents rather than assume their presence as background to promising new options (see the Figure). Hence, selecting those higher-risk patients likely to incur the greatest cost to the healthcare system while at the same time altering their cycle of rehospitalization is sure to be a winning ticket.

In the current issue of Circulation, Chan and colleagues present useful data from the Eplerenone Post-Acute Myocardial Infarction Heart Failure Efficacy and Survival Study (EPHESUS) to support using quality of life as a measure to predict the 1-year costs in post–myocardial infarction patients with heart failure. The quality of life questionnaire chosen (Kansas City Cardiomyopathy Questionnaire) has a proven track record with good validation, reliability, and responsiveness and has previously been shown to predict outcomes when used serially in the EPHESUS trial. Using 1-month postdischarge (a typical time when a patient might be seen after myocardial infarction) baseline data, they estimated the next 12 months of costs. The Kansas City Cardiomyopathy Questionnaire provides a numerical score from 0 to 100 divided into quartiles representing worst, poor, fair, and good health status. These divisions roughly respond to the New York Heart Association class IV through I, respectively, per the original validation cohort. Importantly, in the setting of excellent medical care with high penetration of evidence-based therapies, those with poor health status cost nearly $9000 per annum more than those with good quality of life. In evaluating the Kansas City Cardiomyopathy Questionnaire as a predictor of costs, a stepwise gradation of costs is seen, demonstrating a “dose–response” effect, with each lower quartile of quality of life associated with higher costs, and a linear relationship between the overall score on the questionnaire and costs, with a 4% increase in costs for each 5-point drop. This relationship persisted even after adjustment for traditional covariates (including New York Heart Association class), whether death was accounted for or not, and was consistent across geographic regions (ie, not just the effect of higher costs in the United States). Caveats exist with any cost analysis. Hence, the authors appropriately identify limitations to their analysis, including that of the perspective taken (societal versus other [eg, hospital]), the absence of costs for devices (such as implantable cardioverter-defibrillators and drug-eluting or bare-metal stents), loss of productivity, or that of multidisciplinary clinics.

What else showed an association with lower 1-year costs in the analysis by Chan and colleagues? Key clinical variables easily measurable in the clinic (a history of diabetes mellitus or prior myocardial infarction and systolic blood pressure) were associated with higher 1-year costs—easily the most readily available way of identifying those at higher risk for incurring costs. Once again, aspirin use was associated with fewer costs; it remains the most cost-effective short- and long-term treatment for myocardial infarction. Not surprisingly, the method of revascularization did not alter 1-year costs on this within-trial analysis, but it would have been useful to characterize the nature of myocardial infarction, type of stent, and number of events that were related to necessary intervention in the first year. This is particularly important in the current era in that drug-eluting stents were not associated with a reduction in mortality or morbidity when tested in 18 randomized controlled trials of >6000 patients but incur higher baseline costs and medication costs; bare metal stents are marginally cheaper at baseline but have a greater requirement for revascularization in the subsequent year. In fact, a recent analysis from a societal perspective estimates that the overall US healthcare budget
would increase by $600 million if all bare metal stenting were replaced with drug-eluting stents, a cost potentially recouped only if multivessel drug-eluting stenting replaces bypass surgery as a treatment of choice. As in the Figure, the cost to the society must be weighed against the risk and benefit to the individual, keeping in mind the central role of value. As an example, in the Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation (COURAGE) trial, no difference was seen in the quality of life between 2 strategies, PCI and medical therapy. Given the longer duration of the trial, year of enrollment and completion of the trial, and completeness of medical therapy in COURAGE, it is important to validate the current results in a broader population and with a variety of other quality-of-life tools. Because the costs in the EPHESUS analysis are driven in part by procedures and medications, COURAGE provides an excellent model and perhaps the perfect paradigm to further explore the relationship between quality of life and cost.

What drives the post–myocardial infarction costs? In this analysis, it is heart failure and other cardiovascular hospitalizations, which occurred more often and were longer in duration for those with worse 1- or 3-month quality of life. In fact, nearly three fourths of the incurred costs in the next year were due to longer and more frequent hospitalizations, whereas in those with good or fair health status, the proportion borne by medications was greater. Hence, as post–myocardial infarction care evolves, closer attention should be paid to the events distal to the advanced cardiovascular procedures (such as stent placement or bypass surgery) and extend to longitudinal care after the index event. Now that we have learned lessons regarding the ST-segment elevation myocardial infarction benchmarks of door-to-needle and door-to-balloon times at the front end of care, providers and policy makers alike must ensure that we do not drop the baton in the transition to outpatient care and continue to focus our attention on long-term medical care. The Chan et al analysis targets a key clinical time, 1 month after myocardial infarction, thereby simulating clinical practice when many patients have a clinical outpatient visit constituting an opportunity time to assess quality of life. If the analysis were extended beyond the typical timeframe of clinical trial post–myocardial infarction care, would the ability of quality-of-life ascertainment remain the same if devices, advanced palliative care, or intense disease management were incorporated into the analysis? Perhaps early prediction of those at high risk for recidivism would further aid incorporation of quality-of-life analysis into clinical practice. This remains to be tested; thus, the value is unknown.

Recent ST-segment elevation myocardial infarction trials and epidemiological studies have taught us 3 valuable lessons: (1) death and repeat myocardial infarction occur less often now in the face of excellent early management, which includes invasive and noninvasive therapies; (2) the development of heart failure and heart failure–related hospitalizations is increasing in number (as a result of broader application of early myocardial infarction care with resulting survival of high-risk patients); and (3) high-risk patients must be identified early with clinically useful tools if we are to alter their outcomes by applying the most efficacious therapies with the greatest margin of safety. Post–myocardial infarction care should now advance beyond focusing on the first 90 minutes of care to provide intermediate and long-term value to patients, providers, and payers. All 3 lessons have implications for cost: If methods exist to identify those at either high clinical risk or “cost-risk,” then they should be used before events or costs are incurred. If treatments or strategies are available that can find the optimum balance between cost and risk/benefit and between society and the individual, they would provide optimum overall value (see the Figure). An example of this approach in operation is multidisciplinary heart failure clinics, which have a proven track record in terms of cost-effectiveness and efficacy when tested in randomized clinical trials; early triage of high-risk patients to these clinics (while individually but not systemically costly) will improve patient outcomes for those in the system. Assigning value to this societal cost is relatively easy, but assigning individual resources to what we value is likely to be harder.

In conclusion, although the healthcare system must make tough choices as to where to place vital resources, it should be guided by the best evidence. Those making funding decisions should also understand and incorporate the matrix of quality of life, mortality reduction, and hospitalization rate reduction into their policy decisions and favor therapeutic choices that can deliver on all 3 areas. Choosing therapies or design systems incorporating these choices will have enhanced value if we ask our patients how they feel.

Acknowledgment
Thanks go to Dr Paul Armstrong for review of an earlier draft.

Disclosures
None.

References


Key Words: Editorials | cost-benefit analysis | heart failure | myocardial infarction
What Price to Pay?: The Cost of Everything and the Value of Nothing
Justin A. Ezekowitz

Circulation. 2009;119:368-370
doi: 10.1161/CIRCULATIONAHA.108.830679
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2009 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://circ.ahajournals.org/content/119/3/368

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published
in Circulation can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial
Office. Once the online version of the published article for which permission is being requested is located,
click Request Permissions in the middle column of the Web page under Services. Further information about
this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation is online at:
http://circ.ahajournals.org//subscriptions/