

## POTENTIAL BENEFITS OF NATIONAL IMPLEMENTATION OF LEAPFROG HOSPITAL REWARDS PROGRAM

By now, we understand that between the health care we have and what we could have "lies not a gap but a chasm."<sup>1</sup> The Leapfrog Group has designed a manageable tool for purchasers and payers to work with hospitals on closing that chasm. The Leapfrog Hospital Rewards Program™ (LHRP) has begun to define optimal hospital performance for five common admissions and helps the hospital and payer community invest in incentives for hospital improvement to those optimal levels. What is the potential for improvements in the health care system through Leapfrog Hospital Rewards Program? This paper begins to quantify the benefits to the nation as implementation of the Leapfrog Hospital Rewards Program begins to narrow the gap between current and optimal hospital performance.

If all hospitals performed as well as the best 25% of hospitals for key Leapfrog Hospital Rewards Program measures, we estimate the nation will benefit from the following every year:

- 66,000 lives saved;
- \$18.5 billion saved;
- 145,000 readmissions avoided; and
- 187,000 medication errors avoided.

The methodology for developing these estimates is explained below. Limitations on available data constrain the certainty of these estimates. However, even allowing for a significant margin for error, these figures demonstrate that a narrowing of the "quality chasm" is within reach.

### Background

Leapfrog Hospital Rewards Program measures and makes transparent hospital quality and efficiency. The program serves as a solution to help purchasers and payers obtain more value from their inpatient care in collaboration with their hospital community by creating incentives and rewards for high-value care. LHRP is a customizable hospital incentive and reward program that addresses clinical needs prevalent in the commercial population. Employers and health plans can help improve the quality of care their beneficiaries receive and reduce their hospital cost trend by implementing the LHRP in their own environments.

- Leapfrog Hospital Rewards Program ranks hospitals in five clinical areas based on their performance along two dimensions: quality and resource efficiency;
- The rankings are used by The Leapfrog Group, health plans, data vendors and others to publicly recognize hospital performance and in network management; and
- For rankings are used by purchasers and payers implementing the LHRP to recognize and reward hospitals.

Leapfrog Hospital Reward Program rewards payout focus on five clinical areas that collectively account for 20% of commercial spending on inpatient services and 33% of commercial admissions to hospitals. The program measures how often patients receive the proper care for these five clinical areas:

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<sup>1</sup> Committee on Quality of Health Care in America, Institute of Medicine. Crossing the Quality chasm: A New Health System for the 21<sup>st</sup> Century. Washington, DC: National Academy Press, 2001.

- Coronary artery bypass graft (CABG), commonly known as bypass surgery;
- Percutaneous coronary intervention (PCI), commonly known as angioplasty;
- Acute myocardial infarction (AMI), commonly known as a heart attack;
- Community acquired pneumonia (CAP); and
- Deliveries/newborn care.

Actuarial work conducted by Towers Perrin demonstrates that not only do these five clinical areas comprise a significant percentage of commercial inpatient spending, but they also represent a significant opportunity for quality and efficiency improvement. Only 5-8% of hospitals nationwide achieve excellent performance in both quality and efficiency for these areas. These top performers also have average payments of 25-35% lower than the national average payment for the respective clinical area. Driving hospital improvement through performance rewards not only improves care but also can create savings on inpatient spending as care is provided more effectively and efficiently.

For the purpose of this analysis, we estimate the following number of annual hospital admissions nationally for each of the Leapfrog Hospital Rewards Program clinical areas:

Condition	# of Admissions
Acute myocardial infarction (AMI)	775,000 <sup>2</sup>
Coronary artery bypass graft (CABG)	394,000 <sup>3</sup>
Percutaneous coronary intervention (PCI)	678,000 <sup>4</sup>
Community acquired pneumonia (CAP)	1,300,000 <sup>5</sup>
Deliveries/newborn care	3,976,000 <sup>6</sup>

## Methodology

Leapfrog Hospital Rewards Program ranks hospitals according to their scores on quality and efficiency measures. For each axis of quality and efficiency separately, hospitals with scores in the top 25% are denoted as “top performance” hospitals. This group of top performance hospitals becomes the benchmark against which all hospitals are measured, and hospitals are placed into other performance groups based on their performance differential from the top quartile.

This analysis<sup>7</sup> addresses the question, “What if all hospitals performed at the level of the top performing hospitals?” What would happen if, for some of the key Leapfrog Hospital Rewards Program measures, all hospitals performed as well as the top 25%? To be sure, this is a best-case analysis that represents a probable upper limit for overall hospital improvement. Not every hospital will be able to achieve top performance. On the other hand, the top quartile of hospitals has shown that it is possible for hospitals to perform at an expected level. Why shouldn’t other hospitals be able to at least approach this level?

<sup>2</sup> Ryan TJ, et al. ACC/AHA Guidelines for management of patients with acute myocardial infarction: Executive summary. 1999.

<sup>3</sup> 2000 National Inpatient Sample (NIS)

<sup>4</sup> 2000 NIS

<sup>5</sup> NCHS, FastStats website <http://www.cdc.gov/nchs/faststats/pneumonia.htm>; accessed 9/27/04

<sup>6</sup> AHA Hospital Statistics, 2005 Edition.

<sup>7</sup> Data source for this analysis is JCAHO core measure data & Leapfrog Survey data

## Lives Saved

We estimate the following potential for lives saved each year from hospital improvements in the five conditions measured by Leapfrog Hospital Rewards Program:

Condition	Lives Saved
AMI	33,832
CABG	4,089
PCI	2,800
CAP	2,673
Delivery	12,749
ICU Staffing <sup>8</sup>	9,596
<b>TOTAL</b>	<b>65,738</b>

For AMI and newborn deliveries, Leapfrog Hospital Rewards Program directly measures actual mortality rates. In this analysis, we compared each hospital's actual mortality rate to its severity-adjusted "expected" mortality rate and then computed how many lives a hospital "saves" per admission. That is, how many fewer (or more) deaths will the hospital experience per admission compared to expectations? Hospitals were then ranked according to this measure, so that hospitals with the fewest deaths compared to expectations were the top performers.

We then computed weighted averages of lives saved for the top quartile of hospitals and for all hospitals. Taken together, all hospitals slightly outperformed expectations, experiencing 1.3 fewer deaths per thousand admissions than predicted. The top quartile of hospitals had 45 fewer deaths per thousand admissions than predicted. The 43.7 additional lives saved per thousand admissions by top performing hospitals represent the opportunity if all hospitals improved. Given that there are 775,000 admissions for AMI each year in the U.S., the total national opportunity for lives saved is about 34,000.

A similar analysis was conducted for deliveries/newborn care. Average hospitals had approximately 0.9 fewer than expected neo-natal deaths per 1,000 deliveries, while top quartile hospitals had about 4.1 fewer than expected deaths per 1,000. There are close to 4,000,000 deliveries in hospitals each year in the U.S., yielding a total opportunity of almost 13,000 saved lives. (This estimate applies to newborn infants only; we do not have any data upon which to base mortality estimates for mothers.)

For CAP, Leapfrog Hospital Rewards Program does not directly measure mortality rates, so these data were not used in this analysis. However, one of the Leapfrog Hospital Rewards Program measures – administration of initial antibiotic within 4 hours of hospital admission – correlates very strongly to mortality rates. This practice reduces the mortality rate from 81 per thousand admissions to 68.9 per thousand.<sup>9</sup> We ranked hospitals according to this measure and found that the top quartile hospitals administer antibiotics within 4 hours 81.3% of the time, while the average for all hospitals is 64.3%. Given that there are 1,300,000 hospital admissions annually for CAP, we can calculate that about 1.056 million CAP patients would receive antibiotics within four hours, instead of the 836,000 that would receive such care based on current average

<sup>8</sup> Note that ICU staffing is not one of the Leapfrog Hospital Rewards Program conditions. It is one of the measures used to calculate the Leapfrog Hospital Rewards Program quality score. We have included it here because there is research to support the mortality effect of ICU staffing, and this effect is not otherwise captured in our condition-by-condition analysis (with the exception of AMI).

<sup>9</sup> Meehan TP, Fine MJ, Krumholz HM, et al. 1997. Quality of care, process, and outcomes in elderly patients with pneumonia. JAMA. 278: 2080-2084.

performance. Given the difference in mortality rates, we can predict that 2,673 lives would be saved by such improvement.

For CABG and PCI, there are no Leapfrog Hospital Rewards Program measures for which we currently have data upon which to base mortality calculations. However, Birkmeyer and Dimick<sup>10</sup> have estimated that the use of evidence-based hospital referral – one of the Leapfrog patient safety measures included in Leapfrog Hospital Rewards Program – would prevent 4,089 CABG deaths and 2,800 PCI deaths annually. In the absence of other data, we have used these estimates in this report. If anything, these estimates are likely to underestimate the total mortality benefits of Leapfrog Hospital Rewards Program for these conditions, since the other Leapfrog Hospital Rewards Program measures will likely have some beneficial impact on mortality rates.

Birkmeyer and Dimick also estimate that full implementation of Leapfrog's ICU staffing model would prevent 53,031 adult deaths each year in the U.S. Given that Leapfrog Hospital Rewards Program admissions (excluding newborn deliveries) account for about 18.1% of all hospital admissions, we have converted Birkmeyer's estimate to 9,956. This estimate assumes that mortality benefits from intensivist staffing in ICUs accrue equally across all hospital admissions. Also, note that the introduction of ICU staffing creates the possibility of some double-counting with lives saved for AMI (since Leapfrog-compliant ICU staffing may have accounted for some of the lower AMI mortality rates at better-performing hospitals).

## Dollars Saved

Towers Perrin conducted an analysis of the average cost per admission for all hospitals and for Leapfrog Hospital Rewards Program top performance group hospitals. Note: To be in the top performance group, a hospital must score in the top quartile in *both* quality and efficiency. Therefore, the cost savings achieved by top performing hospitals did not occur with any reduction in quality.

Condition	Average Cost/Admission for All Hospitals	Average Cost/Admission for Top Performance Group
AMI	\$20,852	\$13,631
CABG	\$34,737	\$24,685
PCI	\$15,170	\$11,050
CAP	\$6,420	\$4,851
Delivery	\$4,113	\$3,071

Since we know the total number of hospital admissions for each condition, we can calculate total costs based on current average costs and total costs if all hospitals performed at the average level of the top Leapfrog Hospital Rewards Program performance group. The difference in these costs is the opportunity for savings.

Condition	\$\$ Saved per Admission	Total \$\$ Saved (billions)
AMI	\$7,221	\$5.596
CABG	\$10,052	\$3.962
PCI	\$4,120	\$2.795
CAP	\$1,569	\$2.039

<sup>10</sup> Birkmeyer, John D., MD, and Justin B. Dimick, MD. "The Leapfrog Group's Patient Safety Practices, 2003: The Potential Benefits of Universal Adoption." February 2004. Also available on The Leapfrog Group Web site: [www.leapfroggroup.org](http://www.leapfroggroup.org).

# Leapfrog Hospital Rewards Program™



Delivery	\$1,042	\$4.142
<b>TOTAL</b>		<b>\$18.536</b>

## Other Leapfrog Hospital Rewards Program Benefits

**Readmissions Avoided.** The Leapfrog Hospital Rewards Program efficiency measure takes into account hospital readmission rates for the five Leapfrog Hospital Rewards Program clinical areas. For each of the five, we ranked hospitals according to their readmission rates and then calculated weighted average rates for all hospitals and for the top quartile hospitals.

	# of Annual Admissions Nationwide	Average Readmission Rate – All Hospitals	Average Readmission Rate – Top Quartile	Expected Readmissions based on All Hospital Rate	Expected Readmissions based on Top Quartile Rate	Readmissions Avoided if All Hospitals Perform at Top Quartile Rate
AMI	775,000	9.2%	6.0%	71,034	46,196	24,838
CABG	394,000	7.5%	5.1%	29,400	20,154	9,246
PCI	678,296	7.2%	5.0%	49,108	33,905	15,203
CAP	1,300,000	8.4%	4.7%	109,534	50,572	48,962
Delivery	3,976,000	2.1%	0.9%	83,151	36,477	46,674
<b>TOTAL</b>						<b>144,923</b>

**Medication Errors Avoided.** Birkmeyer and Dimick estimate that computer physician order entry (CPOE) will help to avoid 567,000 serious medication errors annually. Leapfrog Hospital Rewards Program admissions account for 33% of all commercial inpatient admissions. Therefore, we estimate that if all hospitals complied with the Leapfrog Hospital Rewards Program CPOE measure, 187,000 serious medication errors would be avoided each year in the commercially insured population alone. (This estimate assumes there is an equal probability of medication errors across all admission types).

## Conclusion

This report compares the performance of all hospitals to that of the top quartile of hospitals and estimates the benefits to the nation if all hospitals improved to the level of the top quartile. We believe this represents a reasonable test of the potential for improvement. For example, we are not hypothesizing some ideal world in which there are zero readmissions. Instead, we are using the real world benchmarks established by better-performing hospitals as a system goal.

Using these benchmarks, we estimate the following annual opportunity for each of the five admission types measured by Leapfrog Hospital Rewards Program:

Admission Type	Potential for Lives Saved	Potential for Avoided Readmissions	Potential for \$\$ Saved (billions)
AMI	33,832	24,838	\$5.596
CABG	4,089	9,246	\$3.962
PCI	2,800	15,203	\$2.795
CAP	2,673	48,962	\$2.039

## Leapfrog Hospital Rewards Program™



Newborn Delivery	12,749	46,674	\$4.142
<b>TOTAL</b>	<b>63,953<sup>11</sup></b>	<b>144,923</b>	<b>\$18.536</b>

As noted earlier, the certainty of the estimates are limited by several factors, most prominently the lack of complete data upon which to base the analysis. Readers are encouraged to evaluate the results critically. The Leapfrog Group welcomes suggestions about how to improve these estimates, through either improved methodology or additional data.

Regardless of the exact numbers, the data suggest that a chasm does indeed exist between current hospital performance and the performance we know can be achieved. The performance of the Leapfrog Hospital Rewards Program's top quartile hospitals demonstrates that high quality care that is delivered efficiently is not only possible, but also attainable. The Leapfrog Hospital Rewards Program™ is one way to motivate hospitals to attain these performance levels. By design, the LHRP is an easily implemented tool that can begin closing the performance chasm.

<sup>11</sup> Total includes 7,810 lives saved from ICU staffing.