Errors in prescriptions and medications are the most common mistake made in hospitals. On average, hospitalized patients experience one medication error per day [1]. While some of these errors may be harmless, far too many can cause significant harm or even death. The annual Leapfrog Hospital Survey rates how well hospitals use technology to safely order and administer medication to patients. Two measures included in the Survey are Computerized Physician Order Entry (CPOE) and Bar Code Medication Administration (BCMA), both of which help reduce the potential of human error in providing medication to hospitalized patients.

There is a substantial body of evidence that validates the use of these technologies. In one study, adoption of CPOE reduced medication errors by 55% [2]. A study on bar code medication administration showed a 50% reduction in potential adverse drug events [3] as a result of implementing the technology.

On behalf of its constituency of employers and other purchasers across the country, Leapfrog sets standards for effective hospital adoption of these lifesaving technologies. In addition to implementation of the technology to administer and order medications, Leapfrog has standards for the effectiveness of the technology in achieving patient safety goals as well-intended technology will not realize its potential to benefit patients if deployed unwisely.

The data shown in this report is from the 2018 Leapfrog Hospital Survey. The results for each measure are presented in aggregate. Individual hospital responses can be found at www.LeapfrogGroup.org/Compare.

Report Highlights

• 66% of responding hospitals fully met Leapfrog's standard for Computerized Physician Order Entry (CPOE).

• Hospitals that fully met Leapfrog's CPOE standard are more likely to be teaching than non-teaching (72% vs 62%) and more likely to be urban than rural (68% vs. 47%).

• Slightly less than half of all types of hospitals—urban, rural, teaching, and non-teaching—fully met Leapfrog's Bar Code Medication Administration standard.

Purchasers can use this data on medication safety to identify the highest value hospitals and work to steer employees towards that care.

Computerized Physician Order Entry Systems

Medication errors have serious consequences, resulting in an estimated 7,000 deaths annually [4]. In addition, there is a tremendous financial costs associated with these errors. One adverse drug event (ADE) adds more than $2,000 on average to the costs of hospitalization; this translates to over $7.5 billion per year nationwide in hospital costs alone [5].

Potential errors can include administration of the wrong drug, drug overdoses, and overlooked drug interactions and allergies. They can occur for many reasons, including illegible handwritten prescriptions and decimal point errors.

Specific benefits of CPOE can include:

• Prompts that warn against the possibility of drug interaction, allergy or overdose.

• Accurate, current information that helps physicians keep up with new drugs as they are introduced into the market and a hospital's formulary.

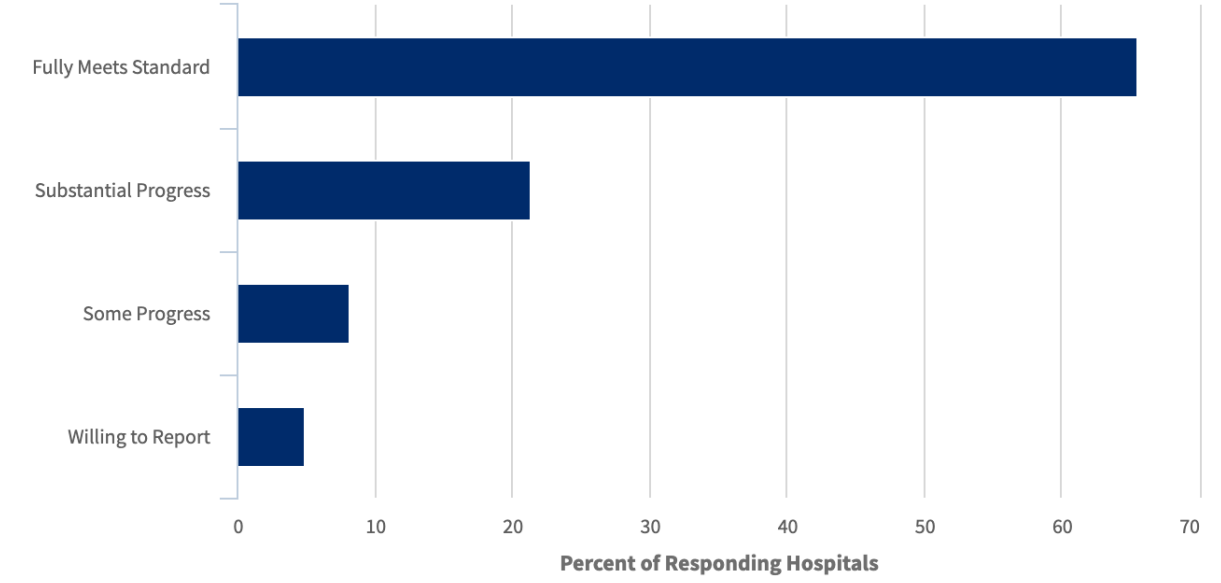
• Drug-specific information that eliminates confusion among drug names that sound alike.

• Improved communication between physicians and pharmacists.

• Reduced long-term healthcare costs.

Figure 1: Hospital performance on Leapfrog's Computerized Physician Order Entry standard

Source: Leapfrog Hospital Survey



In order to fully meet Leapfrog's CPOE standard, hospitals must:

• Assure that physicians enter **at least 85%** of inpatient medication orders via a computer system that includes prescribing-error prevention software; and

• Demonstrate, via a test—the **CPOE Evaluation Tool**—that their inpatient CPOE system can alert physicians to at least 60% of common, serious prescribing errors. *(Applies to adult hospitals only.)*

Progress towards meeting Leapfrog standards:

- Fully meets standard
- Substantial progress
- Some progress
- Willing to report

Figure 2: Percent of inpatient medication orders entered through a CPOE system

Source: Leapfrog Hospital Survey

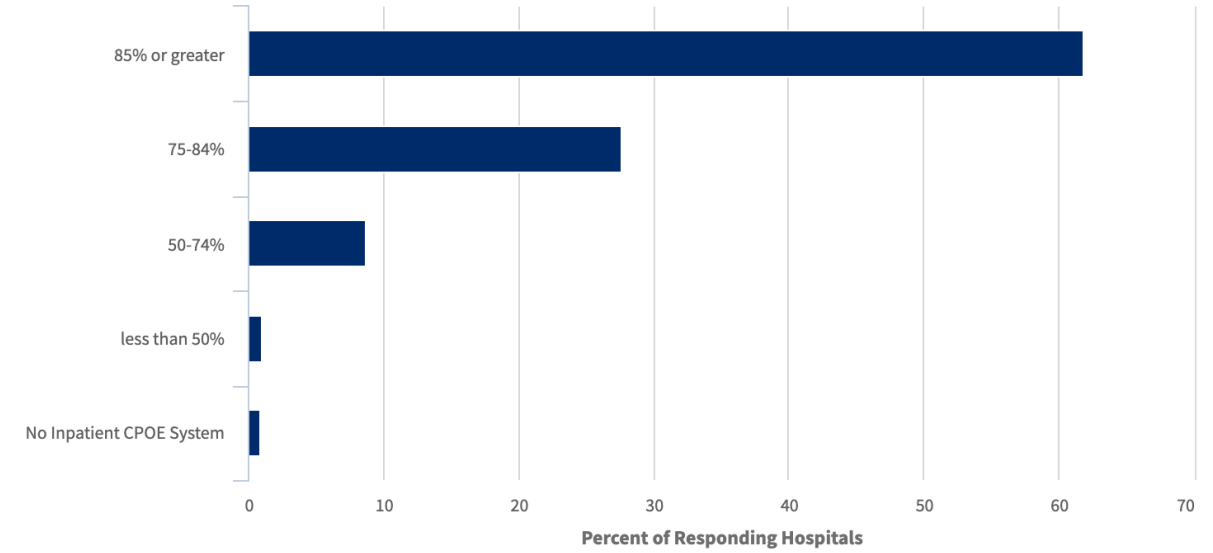
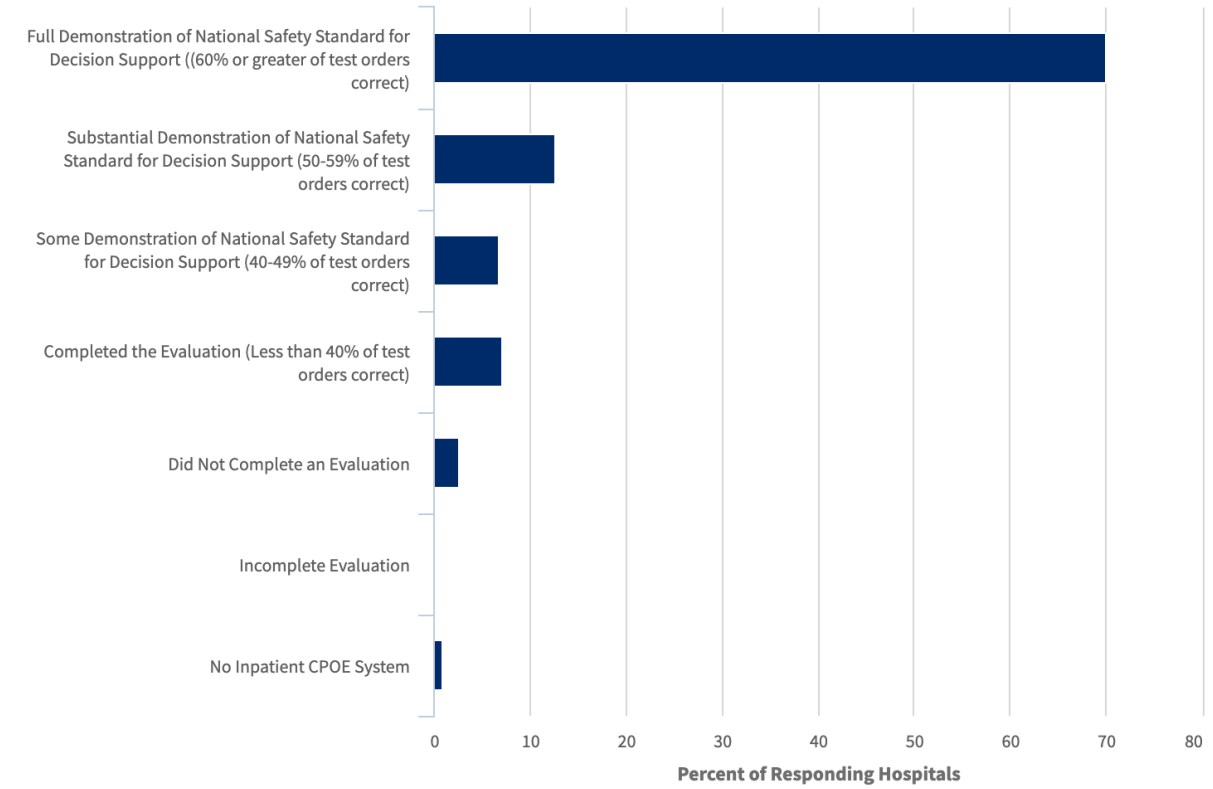


Figure 3: Score on Adult Inpatient Test via the CPOE Evaluation Tool

Source: Leapfrog Hospital Survey

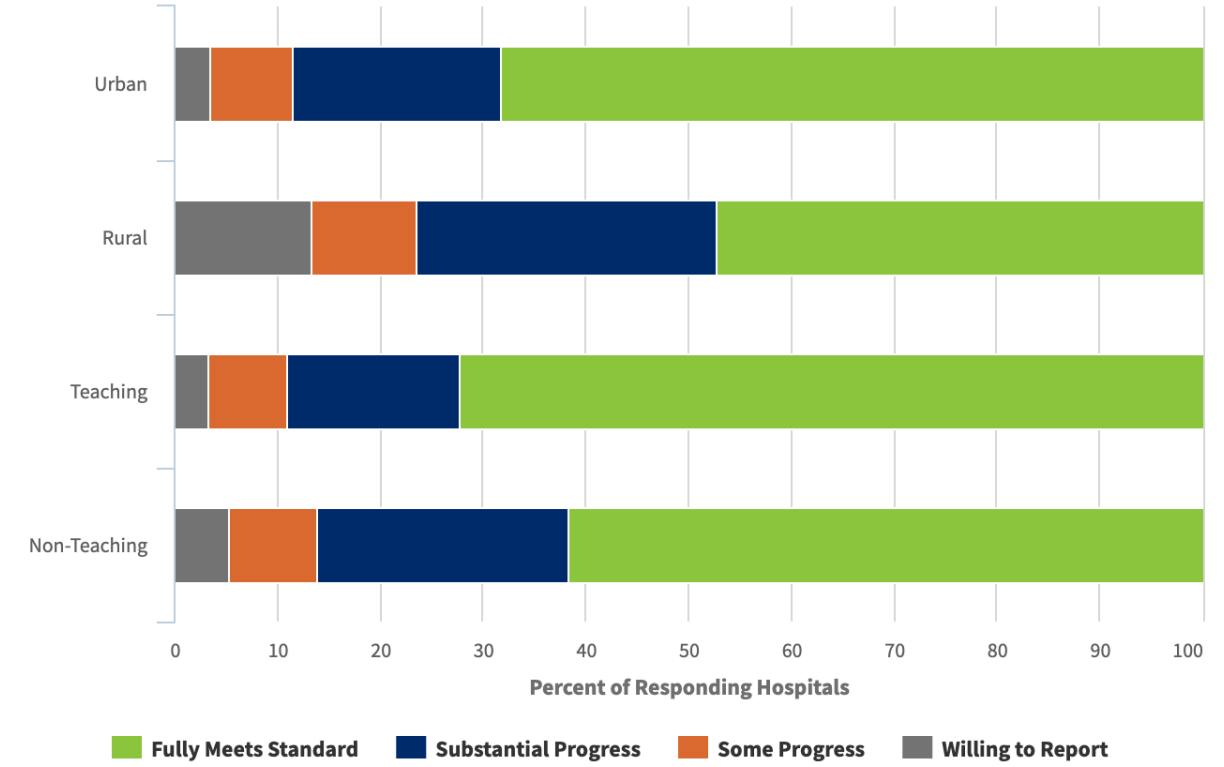


A hospital's score on the tool is the percentage of correct alerts they received in specific categories. Hospitals are required to test their CPOE system utilizing the tool and score well on the test in order to fully meet Leapfrog's standard.

The chart below shows the overall CPOE results broken down by hospital characteristics.

Figure 4: Performance differences between types of hospitals

Source: Leapfrog Hospital Survey



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Bar Code Medication Administration Systems

The Leapfrog Hospital Survey also asks hospitals about their use of Bar Code Medication Administration systems in administering medications at the bedside to reduce medication errors across specific inpatient units.

Hospitals that use Bar Code Medication Administration give patients an ID bracelet with a unique bar code. Every time a nurse or other provider gives that patient a medication, they should scan both the patient's ID bracelet and the bar code on the medication to ensure they match. If they don't, this signals that the wrong medication could be given to the patient.

Specific benefits of Bar Code Medication Administration can include:

• Assurance that patients receive the right medication in the right dosages, when needed.

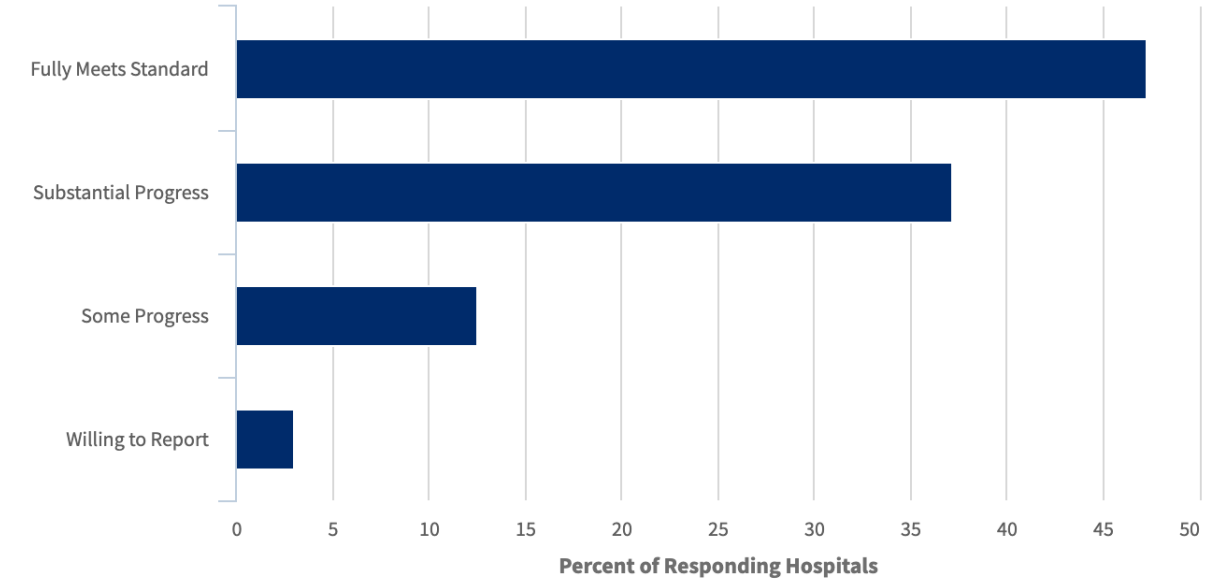
• Valuable double check on the clinical reasoning of pharmacists and nurses.

• Elimination of manual recording in a patient's chart.

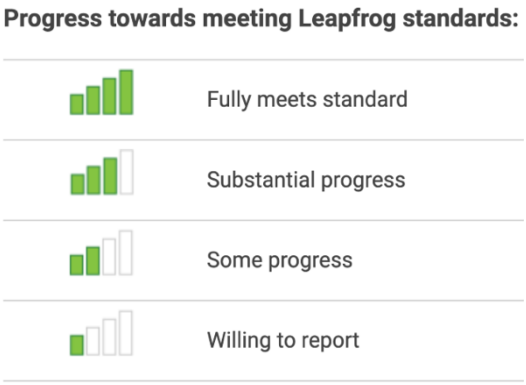
• Updates to the patient's chart in the hospital's electronic health record (EHR) system.

Figure 5: Hospital performance on Leapfrog's Bar Code Medication Administration standard

Source: Leapfrog Hospital Survey



In order to fully meet Leapfrog's Bar Code Medication standard, hospitals must:



• Implement a Bar Code Medication Administration system that is linked to an electronic medication administration record (eMAR) at the bedside in 100% of their intensive care units (adult, pediatric, and neonatal), medical and/or surgical units (adult and pediatric), and labor and delivery units. Nearly all (98 percent) of hospitals reporting to the 2018 Leapfrog Hospital Survey reported they had this in place.

• Achieve **at least 95% compliance** with scanning both patients and medications when administering medications at the bedside in their intensive care units (adult, pediatric, and neonatal), medical and/or surgical units (adult and pediatric), and labor and delivery units.

• Implement a system that includes **all seven of the following types of decision support:** (1) wrong patient, (2) wrong medication, (3) wrong dose, (4) wrong time, (5) vital sign check, (6) patient-specific allergy check, and (7) second nurse check needed. In 2019, based on feedback from hospitals, health systems, and Leapfrog's National Expert Panel, as well as a review of the current literature, Leapfrog will be removing the patient-specific allergy check and vital sign check from the list of required types of decision-support.

• Have **at least six of eight of the following structures in place to monitor and reduce workarounds** that decrease the effectiveness of a Bar Code Medication Administration system: (1) Formal committee to review use, (2) Back-up systems for hardware failures, (3) Help desk to respond to issues, (4) Observation of users using system, (5) Engaging nursing leadership, (6) Using system data to implement/monitor a quality improvement project, (7) Evaluating results from quality improvement projects to show improved/continued adherence, and (8) Communicating back to end users the resolution of any system deficiencies and/or problems.

Figure 6: Hospital compliance with patient and medication scans during administration

Source: Leapfrog Hospital Survey

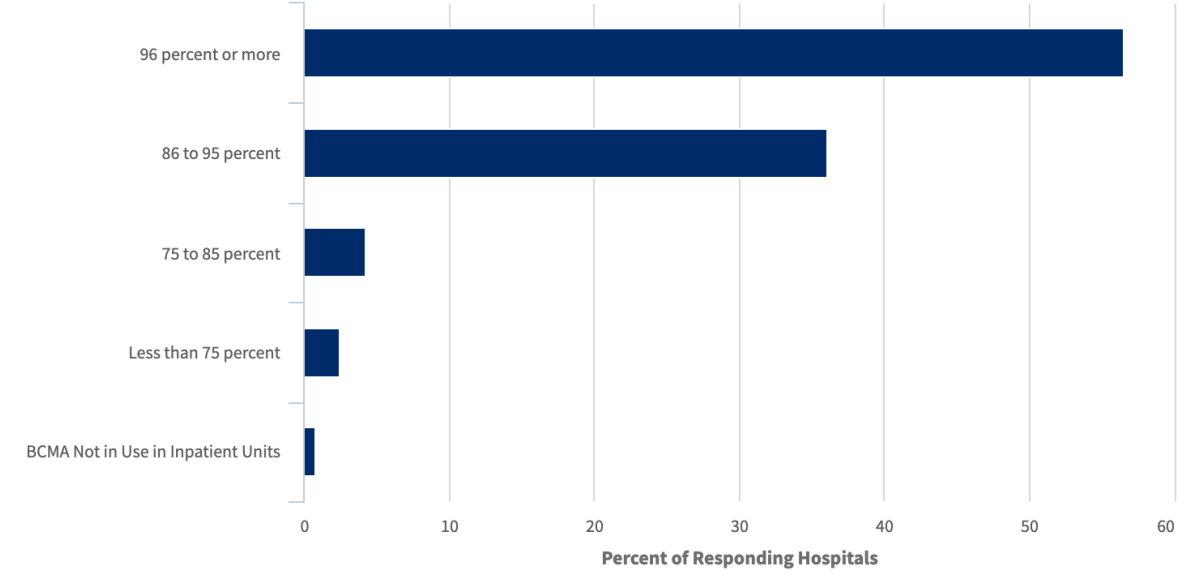


Figure 7: Number of decision support categories that the hospital's bar code medication administration system offers

Source: Leapfrog Hospital Survey

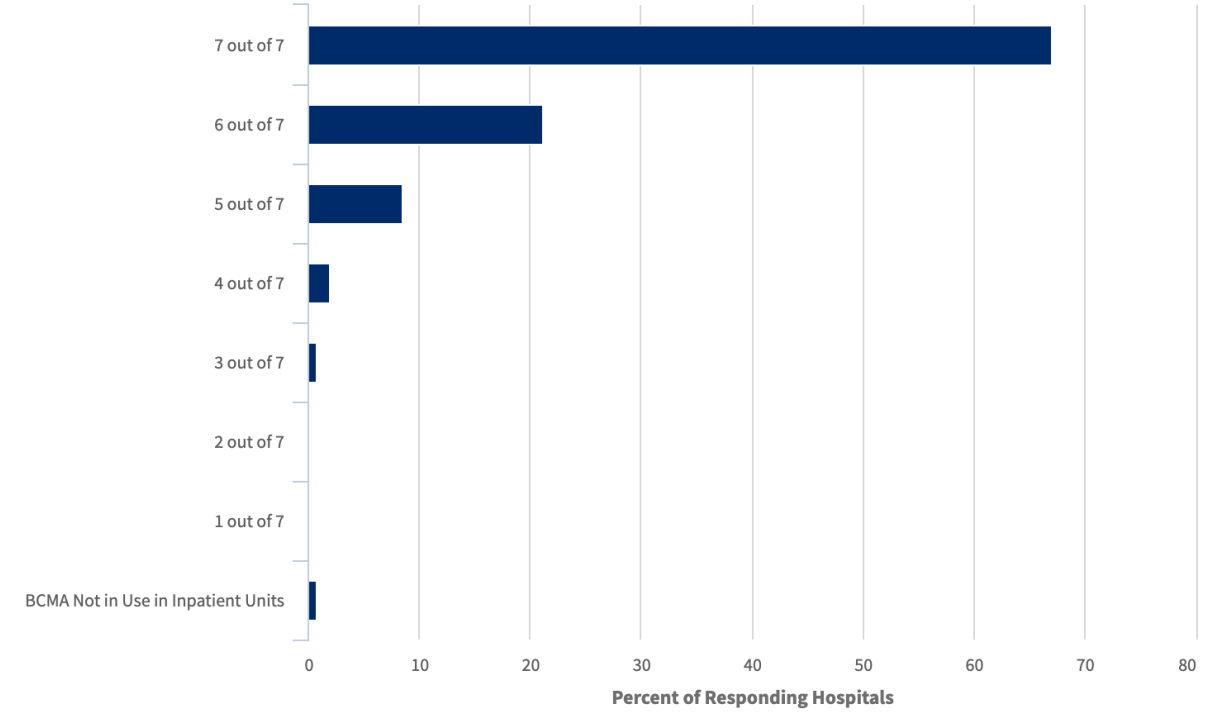
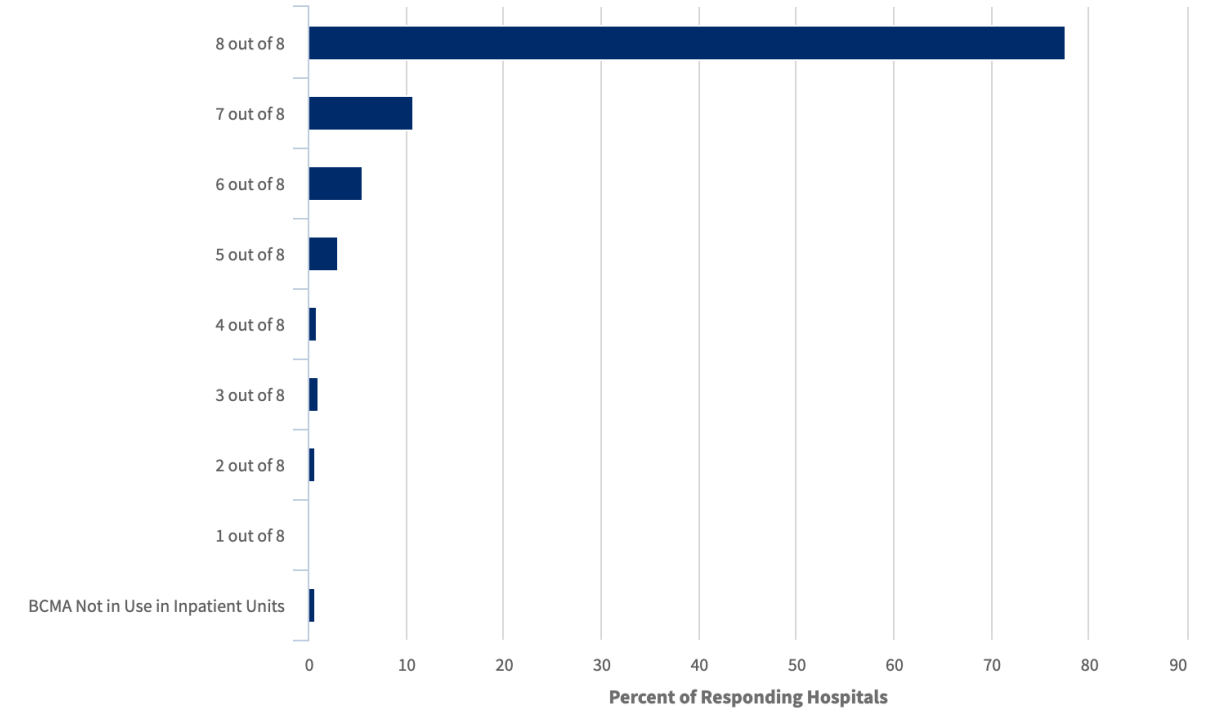


Figure 8: Number of structures a hospital has in place to monitor and reduce workarounds

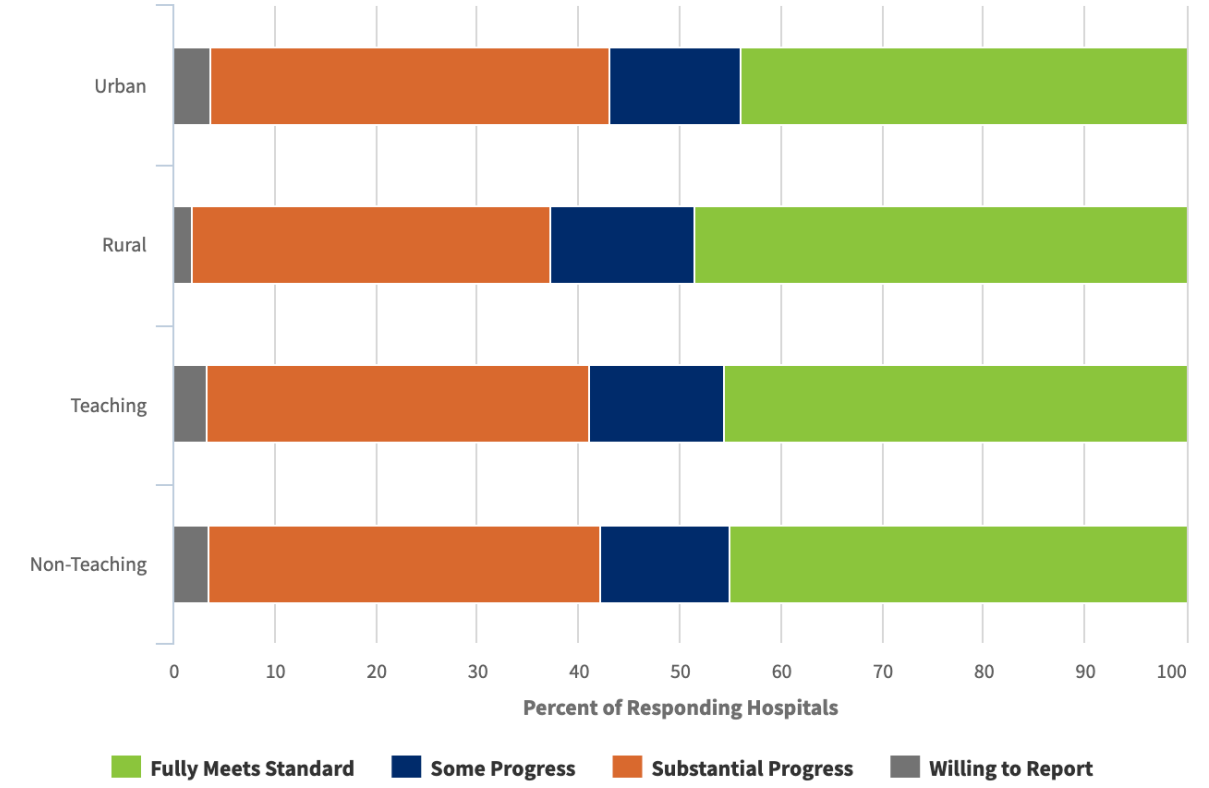
Source: Leapfrog Hospital Survey



The chart below shows the overall Bar Code Medication Administration results broken down by hospital characteristics.

Figure 9: Bar Code Medication Administration performance differences between types of hospitals

Source: Leapfrog Hospital Survey



Progress towards meeting Leapfrog standards:

	Fully meets standard
	Substantial progress
	Some progress
	Willing to report

How Employers and Purchasers Should Use This Information

Purchasers should use results from the Leapfrog Hospital Survey to identify the facilities most effectively using CPOE and BCMA technology to reduce medication errors, and aim to educate and/or steer employees and dependents towards these hospitals for care. Furthermore, purchasers should incorporate these metrics into their value strategy so that the hospitals demonstrating transparency by reporting to the Leapfrog Hospital Survey and fully meeting Leapfrog's standards are rewarded through placement in a narrow network or given a higher reimbursement rate, for example. Initiatives such as the Leapfrog Value-Based Purchasing Program help employers and purchasers identify the highest value hospitals in their network and recognize those facilities accordingly.

About the Data

The Leapfrog Group annually invites all adult general acute care and free-standing pediatric hospitals in the United States to voluntarily report to the Leapfrog Hospital Survey, which collects and publicly reports data by hospital on quality and safety including surgical volumes, maternity care, healthcare-associated infections, medication safety, nursing workforce, and Never Events through its annual Survey. In 2018, 2,021 hospitals submitted a Survey, representing nearly 70% of inpatient beds. Participation is free to hospitals and results are free to the public. This report uses final hospital data from the 2018 Leapfrog Hospital Survey (data submitted through December 31, 2018).

The Leapfrog Hospital Survey includes measures that are endorsed by the National Quality Forum (NQF) and/or aligned with those of other significant data collection entities, including the Centers for Medicare & Medicaid Services (CMS) and The Joint Commission. Leapfrog partners with the Armstrong Institute for Patient Safety and Quality at Johns Hopkins Medicine to review survey measures and standards, and updates them annually to reflect the latest science. Additionally, panels of volunteer experts meet regularly to review the survey measures and recommend performance

standards for each subject area covered in the Leapfrog Hospital Survey. The full list of measures included is available at www.leapfroggroup.org/Survey.

In 2019, Leapfrog will expand its Survey to Ambulatory Surgery Centers (ASCs) via the Leapfrog ASC Survey as well as begin asking hospitals about safety and quality metrics in their outpatient departments via a new section of the Leapfrog Hospital Survey. Results from these Surveys will be summarized in an aggregate report to be released in fall 2019. Individual facility results will be publicly reported beginning in 2020.

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