



# **Pilot Study Results From the 2017 AHRQ Surveys on Patient Safety Culture (SOPS™) Health Information Technology Patient Safety Supplemental Item Set for Hospitals**

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# **1. Purpose and Use of This Document**

The Agency for Healthcare Research and Quality (AHRQ) sponsored the development and pilot testing of supplemental items for hospitals to assess the extent to which their culture is sensitive to how the use of health information technology (IT) affects patient safety from the perspectives of providers and staff working in their hospital. The item set was designed to be administered at the end of the SOPS Hospital Survey.

This document provides results from 44 U.S. hospitals that participated in a pilot study of the AHRQ Health Information Technology Patient Safety Supplemental Item Set for Hospitals in spring 2017. When comparing your hospital's results against the pilot study results provided in this document, keep in mind that these results are from a limited number of hospitals that voluntarily participated in the pilot study. The results summarized here were not derived from a statistically selected sample of U.S. hospitals.

## 2. Item Development

Patient safety culture can be defined as the set of values, beliefs, and norms about what is important, how to behave, and what attitudes are appropriate when it comes to patient safety in a workgroup or organization. The Health IT Patient Safety Supplemental Item Set is intended to help hospitals assess the extent to which their culture is sensitive to how the use of health IT affects patient safety from the perspectives of providers and staff working in their facility. The item set was designed to be administered at the end of the SOPS Hospital Survey.

A survey development team at Westat developed the item set under contract with AHRQ. The team first reviewed the literature on health IT and patient safety, conducted background interviews with more than a dozen hospital experts and researchers, identified key areas pertaining to health IT and patient safety, and drafted survey items to assess those areas. A Technical Expert Panel consisting of health IT and patient safety experts reviewed the draft items and provided feedback. Several iterations of the draft supplemental items were cognitively tested with 21 hospital providers and staff to ensure that the questions were easy to understand and answer and that the items were relevant.

In spring 2017, a pilot test of the Health IT Patient Safety Supplemental Item Set was conducted by administering a web-based survey to providers and staff in 44 U.S. hospitals. The pilot test of the Health IT item set was conducted at the same time as a pilot test of a revised SOPS Hospital Survey (Version 2.0).

In the pilot test, half the staff within each pilot hospital received the original SOPS Hospital Survey (Version 1.0) and half the staff received Version 2.0, with the Health IT items inserted at the end of each version, before the demographic section. Respondents only completed the Health IT items if they answered “yes” to a filter question: “Do you use your hospital’s Electronic Health Record (EHR) system(s) to enter or review patient information?” Respondents who answered “no” to this question were skipped out of answering the Health IT item set.

Because Version 2.0 of the SOPS Hospital Survey is still under development and not ready for release, this report only presents Health IT item set results from respondents who received the original SOPS Hospital Survey (Version 1.0).

Pilot data from the Health IT Patient Safety items were analyzed to examine the psychometric properties (reliability and factor structure) of the items, with the goal of shortening the item set by including only the best items. The final item set includes 16 survey items:

- Initial filter question about using the EHR;
- Six items grouped into two composites (EHR System Training and EHR System Support and Communication; see Table 1) (“Strongly disagree” to “Strongly agree”);
- Three items that measure EHR Workflow/Work Process (“Strongly disagree” to “Strongly agree”);
- Five items that measure EHR Patient Safety and Quality Issues (“None” to “More than 50 times”); and

- One item that measures satisfaction with the hospital EHR system (“Very dissatisfied” to “Very satisfied”).

The item set also includes a “Does not apply or Don’t know” option.

**Table 1. Health IT Patient Safety Composites and Definitions**

Composite	Definition: The extent to which...
1. EHR System Training	Staff are given enough training to use their EHR system, the training is customized to their work area, and they are trained when the system is down.
2. EHR System Support and Communication	Staff are made aware of problems with their EHR system, asked for input on ways to improve their EHR system, and informed of issues that could lead to error.

### 3. Pilot Study Survey Administration Statistics

To ensure the pilot study included a diverse sample, hospitals were recruited to vary by bed size, ownership, teaching status, and region in the United States. The pilot survey was administered to providers and staff in participating hospitals between March and May 2017. Overall, 14,917 respondents from the 44 hospitals participated in the pilot study. Overall and average response rate statistics for the 44 pilot study hospitals are shown in Table 2.

**Table 2. Overall and Average Response Statistics for 44 Pilot Study Hospitals**

<b>Overall Response Rate Information</b>	<b>Overall Statistic</b>
Number of respondents	14,917
Number of surveys administered	35,245
Overall response rate	42%
<b>Average Response Rate Information</b>	<b>Hospital Statistic</b>
Average number of respondents per site	339 (range: 42 to 1,189)
Average number of surveys administered per site	801 (range: 68 to 3,622)
Average site response rate	46% (range: 20% to 74%)

**Table 3. Respondent Use of EHR for 44 Pilot Study Hospitals**

<b>Do you use your hospital's Electronic Health Record (EHR) system to enter or review patient information?</b>	<b>Pilot Hospital Respondents</b>	
	<b>Number</b>	<b>Percent</b>
Yes	9,351	69%
No	4,282	31%
Total	13,633	100%
Missing	1,284	
Overall Total	14,917	



## 4. Characteristics of Pilot Study Hospitals

Table 4 presents characteristics of the 44 pilot study hospitals compared with hospitals registered with the American Hospital Association (AHA).

**Table 4. Pilot Hospitals by Hospital Characteristics**

Hospital Characteristics	U.S. AHA-Registered Hospitals <sup>i,ii</sup> (N = 6,251)		Pilot Hospitals (N = 44)	
	Number	Percent	Number	Percent
<b>Region</b>				
New England	251	4%	2	5%
Mid-Atlantic	552	9%	7	16%
South Atlantic/Associated Territories	1,009	16%	9	20%
East North Central	912	15%	5	11%
East South Central	501	8%	2	5%
West North Central	789	13%	4	9%
West South Central	1,066	17%	5	11%
Mountain	521	8%	3	7%
Pacific/Associated Territories	650	10%	7	16%
<b>Bed Size</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
Very small (6-49 beds)	2,215	35%	—	—
Small (50-99 beds)	1,237	20%	16	36%
Medium (100-299 beds)	1,909	31%	20	45%
Large (300 or more beds)	890	14%	8	18%
<b>Teaching Status</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
Teaching	2,087	33%	11	25%
Nonteaching	4,164	67%	33	75%
<b>Ownership</b>	<b>Number</b>	<b>Percent</b>	<b>Number</b>	<b>Percent</b>
Government	1,476	24%	4	9%
Nongovernment not for profit	3,099	50%	37	84%
Investor-owned (for profit)	1,676	27%	3	7%

NOTE: (1) No hospital with fewer than 50 beds was included in this pilot study; (2) column percent totals may not add to exactly 100 percent because of rounding.

<sup>i</sup> States and territories are categorized into AHA-defined regions as follows:

- New England: CT, MA, ME, NH, RI, VT
- Mid-Atlantic: NJ, NY, PA
- South Atlantic/Associated Territories: DC, DE, FL, GA, MD, NC, SC, VA, WV, Puerto Rico, Virgin Islands
- East North Central: IL, IN, MI, OH, WI
- East South Central: AL, KY, MS, TN
- West North Central: IA, KS, MN, MO, ND, NE, SD
- West South Central: AR, LA, OK, TX
- Mountain: AZ, CO, ID, MT, NM, NV, UT, WY
- Pacific/Associated Territories: AK, CA, HI, OR, WA, American Samoa, Guam, Marshall Islands, Northern Mariana Islands

<sup>ii</sup> Data for the U.S. AHA-registered hospitals were obtained from the 2015 AHA Annual Survey of Hospitals Database, © 2015 Health Forum, LLC, an affiliate of the American Hospital Association.

## 5. Characteristics of Pilot Study Respondents

Tables 5 to 8 present the characteristics of pilot study respondents. Only respondents who answered “Yes” to the question about EHR use are included.

**Table 5. Respondent Staff Position**

Staff Position	Pilot Hospital Respondents	
	Number	Percent
<b>Nursing Staff</b>		
Advanced Practice Nurse (NP, CRNA, CNS, CNM)	150	2%
Licensed Vocational Nurse (LVN), Licensed Practical Nurse (LPN)	141	2%
Patient Care Aide, Nursing Assistant	519	6%
Registered Nurse (RN)	3,849	41%
<b>Medical Staff</b>	<b>Number</b>	<b>Percent</b>
Physician Assistant	50	1%
Resident, Intern	62	1%
Physician, Attending, Hospitalist	470	5%
<b>Other Clinical Staff</b>	<b>Number</b>	<b>Percent</b>
Dietitian	54	1%
Pharmacist, Pharmacy Technician	257	3%
Physical, Occupational, or Speech Therapist	307	3%
Psychologist	19	<1%
Respiratory Therapist	242	3%
Social Worker	120	1%
Technologist, Technician (e.g., EKG, Lab, Radiology)	685	7%
<b>Department Managers, Senior Leaders</b>	<b>Number</b>	<b>Percent</b>
Manager, Department Manager, Administrator, Director	535	6%
Senior Leader, Executive, C-Suite	42	<1%
<b>Support Staff</b>	<b>Number</b>	<b>Percent</b>
Facilities Staff	27	<1%
Food Services	17	<1%
Housekeeping Staff, Environmental Services	16	<1%
Information Technology Staff, Health Information Services Staff, Clinical Informatics Staff	276	3%
Security	5	<1%
Transporter	6	<1%
Unit Clerk, Secretary, Receptionist, Office Staff	679	7%
<b>Other</b>	<b>Number</b>	<b>Percent</b>
Other	797	9%
Total	9,325	100%
Missing	26	
Overall Total	9,351	

NOTE: Column percent totals may not add to exactly 100 percent because of rounding.

**Table 6. Respondent Unit/Work Area**

Unit/Work Area	Pilot Hospital Respondents	
	Number	Percent
Many different hospital units/No specific unit	934	10%
<b>Medical/Surgical Units</b>	<b>Number</b>	<b>Percent</b>
Combined Medical/Surgical Unit	599	6%
Medical Unit (Nonsurgical)	265	3%
Surgical Unit	213	2%
Transplant Unit	15	<1%
<b>Patient Care Units</b>	<b>Number</b>	<b>Percent</b>
Cardiology	210	2%
Emergency Department, Observation, Short Stay	597	6%
Gastroenterology	27	<1%
ICU (all adult types)	365	4%
Labor & Delivery, Obstetrics & Gynecology	453	5%
Oncology, Hematology	261	3%
Pediatrics (including NICU, PICU)	670	7%
Psychiatry, Behavioral Health	194	2%
Pulmonology	26	<1%
Rehabilitation, Physical Medicine	318	3%
Telemetry	228	2%
<b>Surgical Services</b>	<b>Number</b>	<b>Percent</b>
Anesthesiology	51	1%
Endoscopy, Colonoscopy	52	1%
Pre-Op, Operating Room/Suite, PACU/Post-Op, Peri-Op	452	5%
<b>Clinical Services</b>	<b>Number</b>	<b>Percent</b>
Pathology, Lab	241	3%
Pharmacy	216	2%
Radiology, Imaging	422	5%
Respiratory Therapy	99	1%
Social Services, Case Management, Discharge Planning	108	1%
<b>Management/Administration</b>	<b>Number</b>	<b>Percent</b>
Information Technology, Health Information Management, Clinical Informatics	293	3%
Management, Administration, Quality, Risk Management, Patient Safety, Human Resources, Training	334	4%

**Table 6. Respondent Unit/Work Area, continued**

Unit/Work Area	Pilot Hospital Respondents	
	Number	Percent
<b>Support Services</b>		
Facilities	22	<1%
Food Services, Dietary	32	<1%
Housekeeping, Environmental Services	9	<1%
Patient Financial Services, Billing, Admitting/Registration	315	3%
Security Services	4	<1%
Transport	14	<1%
<b>Other</b>	<b>Number</b>	<b>Percent</b>
Other	1,244	13%
Total	9,283	100%
Missing	68	
Overall Total	9,351	

NOTE: Column percent totals may not add to exactly 100 percent because of rounding.

**Table 7. Respondent Tenure in Work Area**

Tenure	Pilot Hospital Respondents	
	Number	Percent
<b>Tenure With Current Hospital</b>		
Less than 1 year	923	10%
1 to 5 years	3,334	37%
6 to 10 years	1,642	18%
11 or more years	3,209	35%
Total	9,108	100%
Missing	243	
Overall Total	9,351	
<b>Tenure in Current Work Area</b>	<b>Number</b>	<b>Percent</b>
Less than 1 year	1,286	14%
1 to 5 years	3,973	44%
6 to 10 years	1,653	18%
11 or more years	2,173	24%
Total	9,085	100%
Missing	266	
Overall Total	9,351	

**Table 8. Respondent Hours Worked Per Week, Interaction With Patients, and Age**

Other Background Questions	Pilot Hospital Respondents	
<b>Hours Worked Per Week</b>	<b>Number</b>	<b>Percent</b>
Less than 30 hours per week	1,215	13%
30 to 40 hours per week	5,663	62%
More than 40 hours per week	2,228	24%
Total	9,106	100%
Missing	245	
Overall Total	9,351	
<b>Interaction With Patients</b>	<b>Number</b>	<b>Percent</b>
YES, I typically have direct interaction or contact with patients	7,373	82%
NO, I typically do NOT have direct interaction or contact with patients	1,665	18%
Total	9,038	100%
Missing	313	
Overall Total	9,351	
<b>Age</b>	<b>Number</b>	<b>Percent</b>
18 to 24 years	363	4%
25 to 34 years	2,215	25%
35 to 44 years	2,178	24%
45 to 54 years	2,226	25%
55 years and above	1,946	22%
Total	8,928	100%
Missing	423	
Overall Total	9,351	

NOTE: Column percent totals may not add to exactly 100 percent because of rounding.

## 6. Composite-Level and Item-Level Results

This section provides the overall composite-level and item-level results. The methods for calculating percent positive scores are described in the appendix.

Chart 1 shows the average percent positive response for each of the two Health IT Patient Safety Composites (*EHR System Training* and *EHR System Support and Communication*) across hospitals in the pilot study.

Chart 2 provides the average percent positive response on the composite items.

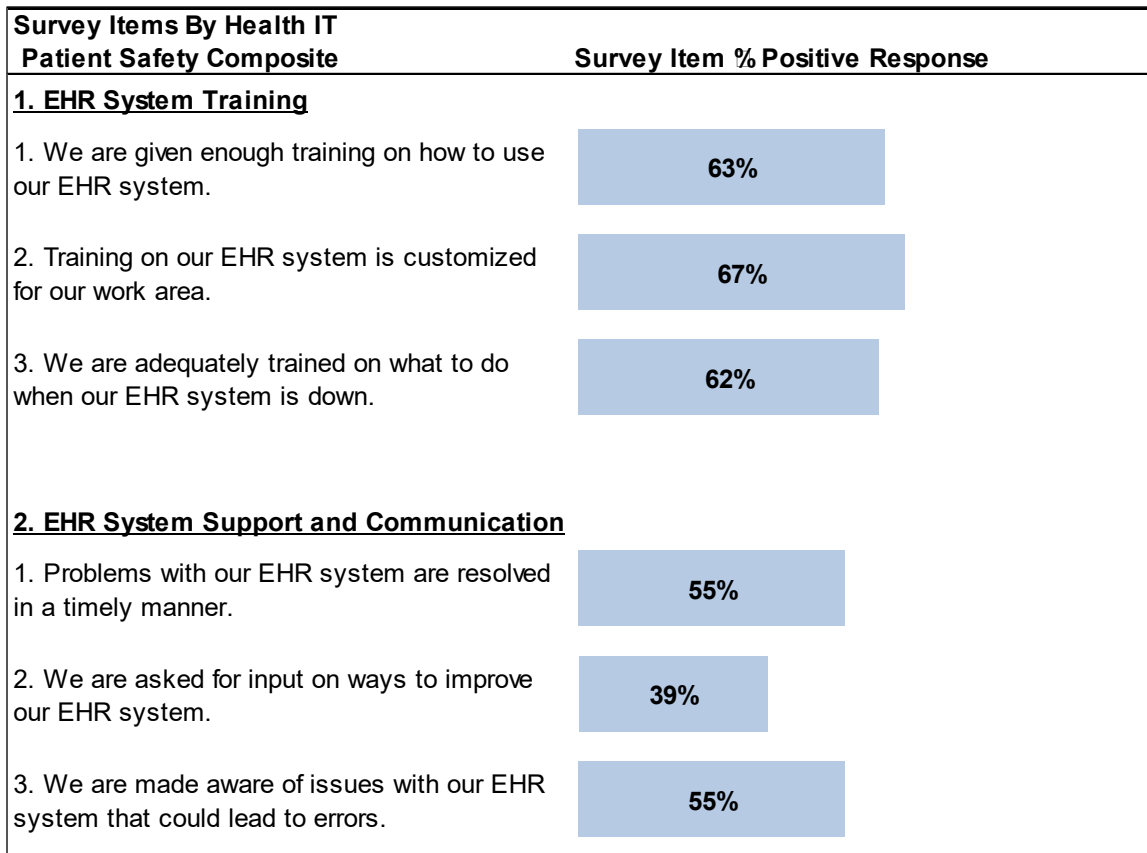
Chart 3 presents the average percent positive response on individual *EHR Workflow/Work Process* items.

Charts 4 and 5 show the average distribution of responses for *EHR Patient Safety and Quality Issues* and *Overall EHR System Rating*, respectively.

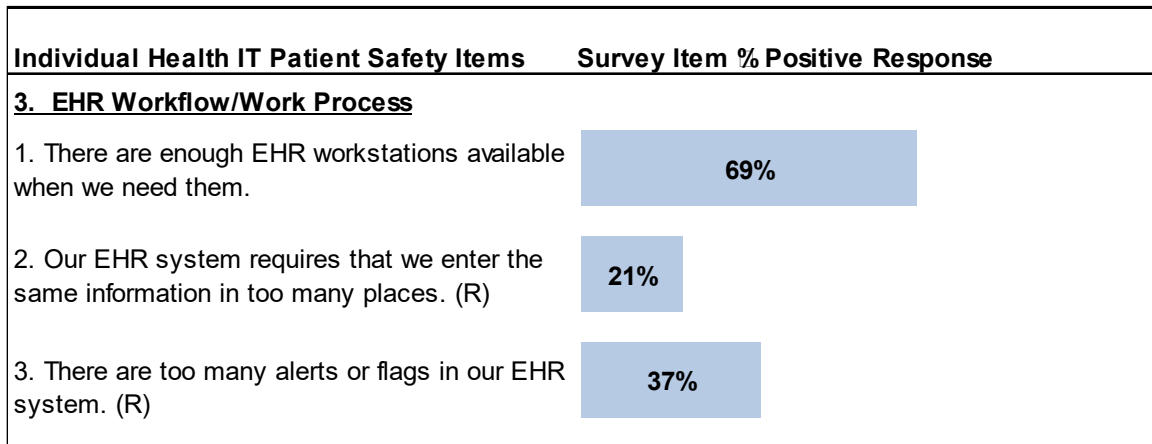
**Chart 1. Composite-Level Results From 44 Pilot Study Hospitals**

Health IT Patient Safety Composites	% Positive Response
1. EHR System Training	64%
2. EHR System Support and Communication	50%

**Chart 2. Item-Level Results From 44 Pilot Study Hospitals**



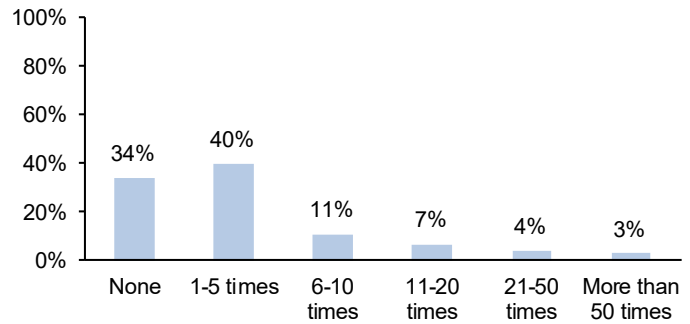
**Chart 3. Item-Level Results From 44 Pilot Study Hospitals**



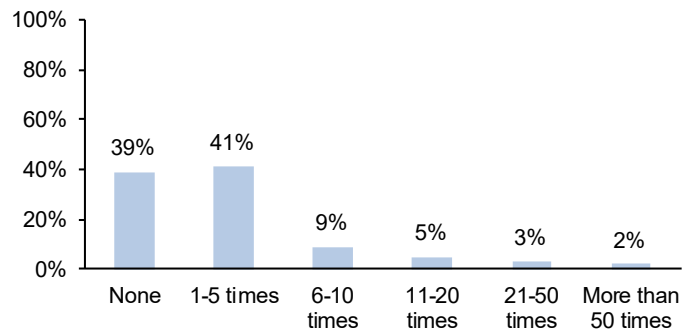
**Chart 4. Results for EHR Patient Safety and Quality Issues From 44 Pilot Study Hospitals**

In the past 3 months, how many times did you discover the following issues with the EHR system in your hospital?

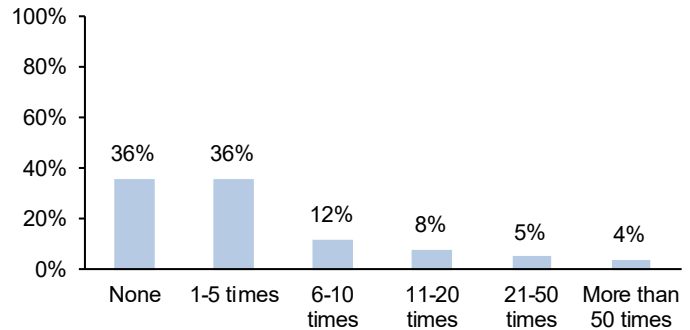
1. Information was not complete



2. Information was not accurate



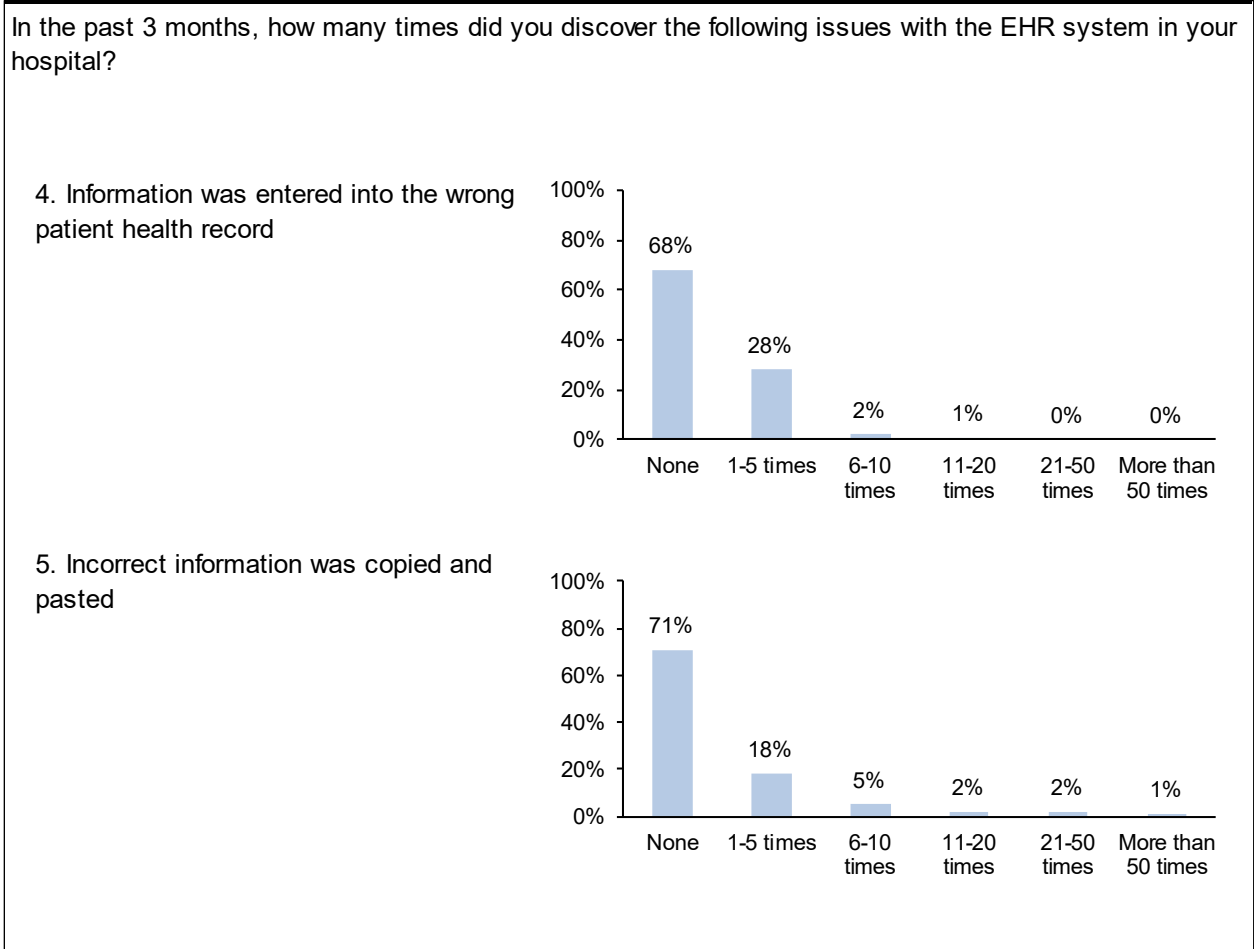
3. Important information was hard to find



NOTE: All six percentages may not add to 100 percent because of rounding.

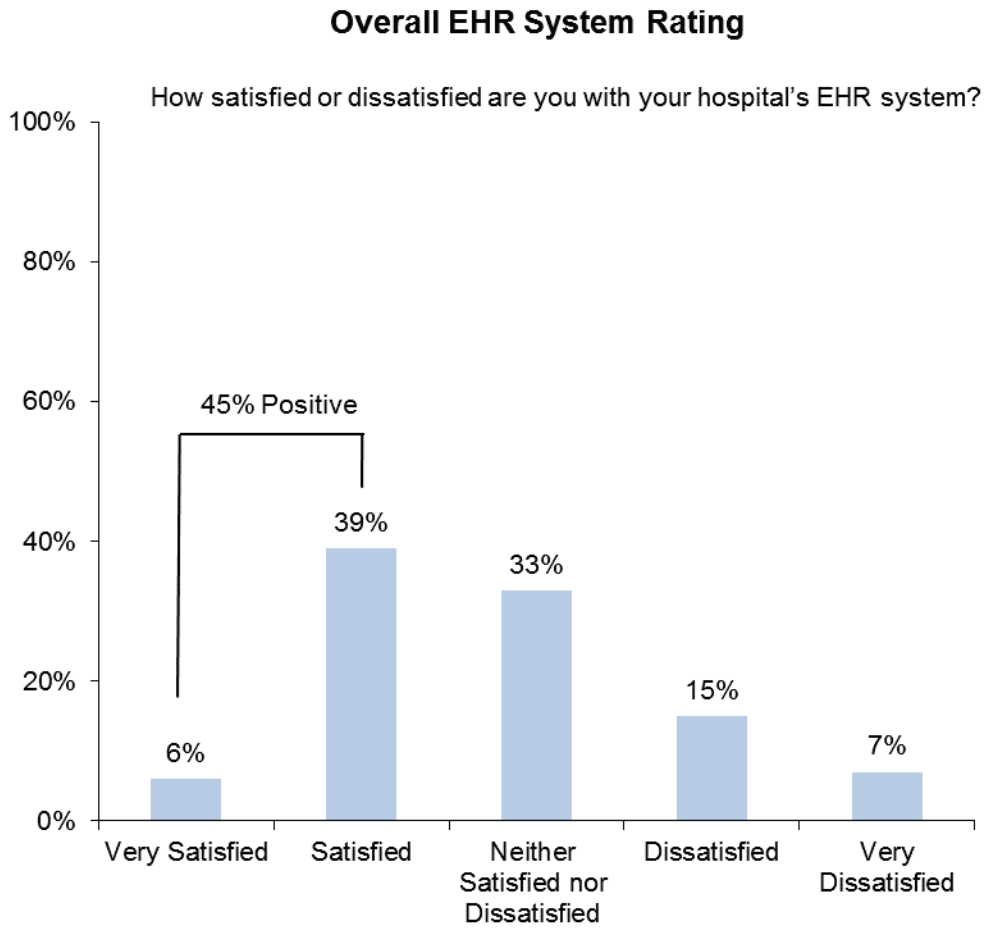


**Chart 4. Results for EHR Patient Safety and Quality Issues From 44 Pilot Study Hospitals, continued**



NOTE: All six percentages may not add to 100 percent because of rounding.

**Chart 5. Results for Overall Rating on EHR System From 44 Pilot Study Hospitals**



## Appendix: Explanation of Calculations

### Calculating Item Percent Positive Scores

Health IT Patient Safety *percent positive scores* are calculated as follows:

- For *positively worded items*, calculate the total percentage of respondents who answered positively—combined percentage of “Strongly agree” and “Agree” responses, or “Very Satisfied” and “Satisfied” responses, depending on the response scale used for the items. The number of positive responses is calculated by dividing the total number of positive responses by the total number of positive, neutral, and negative responses to that item (excluding “Does Not Apply/Don’t Know” and missing responses).
- For *negatively worded items*, calculate the total percentage of respondents who answered negatively—combined percentage of “Strongly disagree” and “Disagree” responses, since a *negative* answer on these items indicates a *positive* response. The number of negative responses is calculated by dividing the total number of negative responses by the total of positive, neutral, and negative responses to that item (excluding “Does Not Apply/Don’t Know” and missing responses).

For example, for the item “There are too many alerts or flags in our EHR system,” if 20 percent of respondents within a hospital “Strongly disagree” and 25 percent “Disagree”, the item-level percent positive response is 45 percent positive (i.e., 45 percent of respondents do not believe there are too many alerts or flags in the EHR system).

### Calculating Composite Percent Positive Scores

Composite scores were calculated for each hospital by averaging the percent positive response on the items within a composite (see Table A-1).

**Table A-1. Example of How To Calculate Item and Composite Percent Positive Scores**

Three items measuring EHR System Training	For positively worded items, the # of “Strongly agree” or “Agree” responses	Total # of responses to the item (excluding Does not apply/ Don’t know and missing responses)	Percent positive response on item
“We are given enough training on how to use our EHR system.”	210	260	210/260 = 81%
“Training on our EHR system is customized for our work area.”	150	250	150/250= 60%
“We are adequately trained on what to do when our EHR system is down.”	180	240	180/240= 75%
<b>Average percent positive response across the 3 items = 72%</b>			

In this example, there were three items with percent positive response scores of 81 percent, 60 percent, and 75 percent. Averaging these item-level percent positive scores ( $81\% + 60\% + 75\% / 3$ ) results in a composite score of 72 percent on EHR System Training. That is, an average of about 72 percent of the respondents responded positively on the survey items in this composite.