LEAPFROG
HOSPITAL
SAFETY GRADE

Scoring Methodology

SPRING 2019

LEAPFROG
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WHAT IS THE HOSPITAL SAFETY GRADE?

The Leapfrog Hospital Safety Grade indicates how safe general acute care hospitals are for patients. The Safety Grade includes data that patient safety experts use to compare hospitals. Publicly available data from the Centers for Medicare & Medicaid Services (CMS), the Leapfrog Hospital Survey, and secondary data sources such as the American Hospital Association's Annual Survey and IT Supplement are weighted and then combined to produce a single, consumer-friendly composite score that is published as an A, B, C, D or F letter grade.[1]

With the Leapfrog Hospital Safety Grade, The Leapfrog Group aims to educate and encourage consumers to consider safety when selecting a hospital for themselves or their families. In addition, we believe the grade will foster strong market incentives for hospitals to make safety a priority. Leapfrog Hospital Safety Grades are publicly reported at www.HospitalSafetyGrade.org.

ELIGIBLE HOSPITALS

The Leapfrog Group calculates a Safety Grade for over 2,600 general acute care hospitals for which there is sufficient publicly available data. Because publicly available data is limited for a variety of reasons, Leapfrog is not able to calculate a Safety Grade for every hospital in the U.S.

The Leapfrog Group is not able to calculate a Leapfrog Hospital Safety Grade for the following types of hospitals due to missing data:

- Critical access hospitals (CAH)
- Long-term care and rehabilitation facilities
- Mental health facilities
- Federal hospitals (e.g., Veterans Affairs, Indian Health Services, etc.)
- Specialty hospitals, including surgical centers and cancer hospitals
- Free-standing pediatric hospitals
- Hospitals in U.S. territories
- Hospitals that are missing data for **more than seven** (7) process/structural measures or **more than five** (5) outcome measures

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[1] The Leapfrog Hospital Safety Grade uses the below-described data and reflects expert opinion as to the relative importance of each category.

Leapfrog publicly reported Hospital Safety Grades for general acute care hospitals in Maryland for the first time in Fall 2017. Previously, Leapfrog had not been able to calculate Hospital Safety Grades for hospitals in the state of Maryland due to a federal waiver that exempts hospitals in Maryland from participating in the CMS Inpatient Quality Reporting Program. The Maryland Health Care Commission (MHCC) has again agreed to generate the calculations for the Hospital-Acquired Condition measures and PSI measures used in the Hospital Safety Grade, and provide Leapfrog with the following data:

- The three HAC measures used in the Hospital Safety Grade:
    - Foreign Object Retained
    - Air Embolism
    - Falls and Trauma
- The seven PSI measures used in the Leapfrog Hospital Safety Grade:
    - PSI 3: Pressure Ulcer Rate
    - PSI 4: Death Rate among Surgical Inpatients with Serious Treatable Conditions
    - PSI 6: Iatrogenic Pneumothorax Rate
    - PSI 11: Postoperative Respiratory Failure Rate
    - PSI 12: Perioperative PE/DVT Rate
    - PSI 14: Postoperative Wound Dehiscence Rate
    - PSI 15: Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate

The Maryland Health Services Cost Review Commission (HSCRC) Hospital Inpatient Discharge Data set for Medicare Fee-for-Service patients was used to generate all results. The data collection periods used to calculate the HAC rates are consistent with the data collection periods used by CMS for all hospitals.

Important Note: Although the MHCC has provided data for the last several grading cycles, the Leapfrog Group will begin using the PSI and HAC data that is publicly reported by CMS starting with the Fall 2019 grading cycle. Preview reports are made available in QualityNet in May/June and the data is publicly posted by CMS in July/August. **We highly encourage you to review your data for these measures when the QualityNet preview reports become available.**

MEASURES

The Leapfrog Hospital Safety Grade utilizes 28 national performance measures of patient safety that are collected and publicly reported by The Leapfrog Group and the Centers for Medicare & Medicaid Services (CMS) to produce a single composite score that represents a hospital's overall performance in keeping patients safe from preventable harm and medical errors. In addition, supplemental data from secondary data sources such as the American Hospital Association (AHA) and the Maryland Health Care Commission (for hospitals in Maryland only) are used to give hospitals as much credit as possible towards their Safety Grades.

The measure set is divided into two domains: (1) Process/Structural Measures and (2) Outcome Measures. Each domain represents 50% of the Leapfrog Hospital Safety Grade. The following table lists the 28 measures included in the Safety Grade, as well as the data source and reporting period for each measure. In some cases where a hospital's information is not available for a certain measure, Leapfrog uses supplemental data from a secondary data source (as indicated in the table). In cases where a hospital's information is not available from any data source, Leapfrog has outlined a methodology for dealing with the missing data.

PROCESS AND STRUCTURAL MEASURES (13)				
Measure Name	Primary Data Source	Reporting Period	Secondary Data Source	Reporting Period
Computerized Physician Order Entry (CPOE)	2018 Leapfrog Hospital Survey	2018	AHA Annual Survey Information Technology Supplement	2018
Bar Code Medication Administration (BCMA)	2018 Leapfrog Hospital Survey	2018	AHA Annual Survey Information Technology Supplement	2018
ICU Physician Staffing (IPS)	2018 Leapfrog Hospital Survey	2018	AHA Annual Survey Database	2017
Safe Practice 1: Leadership Structures and Systems	2018 Leapfrog Hospital Survey	2018	N/A	N/A
Safe Practice 2: Culture Measurement, Feedback & Intervention	2018 Leapfrog Hospital Survey	2018	N/A	N/A
Safe Practice 4: Identification and Mitigation of Risks and Hazards	2018 Leapfrog Hospital Survey	2018	N/A	N/A

PROCESS AND STRUCTURAL MEASURES (13)

Measure Name	Primary Data Source	Reporting Period	Secondary Data Source	Reporting Period
Safe Practice 9: Nursing Workforce	2018 Leapfrog Hospital Survey	2018	N/A	N/A
Safe Practice 19: Hand Hygiene	2018 Leapfrog Hospital Survey	2018	N/A	N/A
H-COMP-1: Nurse Communication	CMS	04/01/2017 – 03/31/2018	N/A	N/A
H-COMP-2: Doctor Communication	CMS	04/01/2017 – 03/31/2018	N/A	N/A
H-COMP-3: Staff Responsiveness	CMS	04/01/2017 – 03/31/2018	N/A	N/A
H-COMP-5: Communication about Medicines	CMS	04/01/2017 – 03/31/2018	N/A	N/A
H-COMP-6: Discharge Information	CMS	04/01/2017 – 03/31/2018	N/A	N/A

OUTCOME MEASURES (15)

Measure Name	Primary Data Source	Reporting Period	Secondary Data Source	Reporting Period
Foreign Object Retained	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
Air Embolism	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
Falls and Trauma	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017

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[2] The Maryland Health Services Cost Review Commission (HSCRC) Hospital Inpatient Discharge Data set for Medicare Fee-for-Service patients was used to generate all results. The data collection periods used to calculate the HAC rates are consistent with the data collection periods used by CMS for all hospitals. **Important Note:** Although the MHCC has provided data for the last several grading cycles, the Leapfrog Group will begin using the PSI and HAC data that is publicly reported by CMS starting with the Fall 2019 grading cycle. Preview reports are made available in QualityNet in May/June and the data is publicly posted by CMS in July/August. **We highly encourage you to review your data for these measures when the QualityNet preview reports become available.**

OUTCOME MEASURES (15)

Measure Name	Primary Data Source	Reporting Period	Secondary Data Source	Reporting Period
CLABSI	2018 Leapfrog Hospital Survey	07/01/2017 - 06/30/2018	CMS	04/01/2017 – 03/31/2018
CAUTI	2018 Leapfrog Hospital Survey	07/01/2017 - 06/30/2018	CMS	04/01/2017 – 03/31/2018
SSI: Colon	2018 Leapfrog Hospital Survey	07/01/2017 - 06/30/2018	CMS	04/01/2017 – 03/31/2018
MRSA	2018 Leapfrog Hospital Survey	07/01/2017 - 06/30/2018	CMS	04/01/2017 – 03/31/2018
C. Diff.	2018 Leapfrog Hospital Survey	07/01/2017 - 06/30/2018	CMS	04/01/2017 – 03/31/2018
PSI 3: Pressure Ulcer Rate	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
PSI 4: Death Rate among Surgical Inpatients with Serious Treatable Conditions	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
PSI 6: Iatrogenic Pneumothorax Rate	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
PSI 11: Postoperative Respiratory Failure Rate	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
PSI 12: Perioperative PE/DVT Rate	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
PSI 14: Postoperative Wound Dehiscence Rate	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017
PSI 15: Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate	CMS	10/01/2015 - 06/30/2017	MHCC[2]	10/01/2015 - 06/30/2017

MEASURE DESCRIPTIONS

PROCESS/STRUCTURAL MEASURES

For Process/Structural Measures, a higher score is always better because these are measures of compliance with best practices in patient care.

COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE)

The CPOE measure is collected by The Leapfrog Group on the Leapfrog Hospital Survey. It measures a hospital's progress toward (1) implementing a CPOE system and (2) the efficacy of that system in alerting prescribers to common medication errors such as drug-drug interactions and drug-allergy interactions via the CPOE Evaluation Tool. CPOE is a categorical measure: hospitals receive either "fully meets the standard," "substantial progress," "some progress," "willing to report," "declined to respond," or "unable to calculate score" based on the information they submit via the Leapfrog Hospital Survey. A numerical score is assigned to each performance category from the Leapfrog Hospital Survey for the purposes of calculating a Hospital Safety Grade:

Leapfrog Performance Category	Measure Score
Fully Meets the Standard	100
Substantial Progress	70
Some Progress	40
Willing to Report	15
Declined to Respond	See Uses of Secondary Data
Unable to Calculate Score	Not Available (See Scoring Terms)

For hospitals that did not submit a Leapfrog Hospital Survey by December 31, see Using Secondary Data Sources for detailed information on assigning a CPOE score to hospitals using the AHA Annual Survey Information Technology Supplement as supplemental data to the Leapfrog Hospital Survey.

BAR CODE MEDICATION ADMINISTRATION (BCMA)

The BCMA measure is collected by The Leapfrog Group on the Leapfrog Hospital Survey. It measures a hospital's progress toward 1) implementation of BCMA throughout the hospital, 2) compliance with patient and medication scans during administration, 3) types of decision support that the hospital's BCMA system offers and 4) structures to monitor and reduce workarounds. BCMA is a categorical measure: hospitals receive either "fully meets the standard," "substantial progress," "some progress," "willing to report," "declined to respond," or "does not apply" based on the information they submit via the Leapfrog Hospital Survey. A numerical score is assigned to each performance category from the Leapfrog Hospital Survey for the purposes of calculating a Hospital Safety Grade:

Leapfrog Performance Category	Measure Score
Fully Meets the Standard	100
Substantial Progress	75
Some Progress	50
Willing to Report	25
Declined to Respond	See Uses of Secondary Data

For hospitals that did not submit a Leapfrog Hospital Survey by December 31, see Using Secondary Data Sources for detailed information on assigning a BCMA score to hospitals using the AHA Annual Survey Information Technology Supplement as supplemental data to the Leapfrog Hospital Survey.

ICU PHYSICIAN STAFFING (IPS)

The IPS measure is collected by The Leapfrog Group on the Leapfrog Hospital Survey. It measures a hospital's use of intensivists in ICUs. IPS is a categorical measure: hospitals receive either "fully meets the standards," "substantial progress," "some progress," "willing to report," "declined to respond," or "does not apply" based on the information they submit via the Leapfrog Hospital Survey. A numerical score is assigned to each performance category from the Leapfrog Hospital Survey for the purposes of calculating a Hospital Safety Grade:

Leapfrog Performance Category	Measure Score
Fully Meets the Standard	100
Substantial Progress	50
Some Progress	15
Willing to Report	5
Declined to Respond	See Uses of Secondary Data
Does Not Apply	Not Available (See Scoring Terms)

For hospitals that did not submit a Leapfrog Hospital Survey by December 31, see Using Secondary Data Sources for detailed information on assigning an IPS score to hospitals using the AHA Annual Survey Database as supplemental data to the Leapfrog Hospital Survey.

NQF SAFE PRACTICE SCORES

Five (5) NQF Safe Practice measures are collected by The Leapfrog Group on the Leapfrog Hospital Survey. They measure a hospital's progress in implementing NQF-endorsed processes and protocols that promote safe patient care. The maximum possible score for each NQF Safe Practice ranges from 60 – 120. Individual scores for each Safe Practice are used to calculate the Leapfrog Hospital Safety Grade.

Leapfrog Performance Category	Possible Measure Score
SP 1: Culture of Safety Leadership, Structures and Systems	0 - 120
SP 2: Culture Measurement, Feedback and Intervention	0 - 120
SP 4: Risks and Hazards	0 - 100
SP 9: Nursing Workforce	0 - 100
SP 19: Hand Hygiene	0 - 60

There is no secondary data source for the NQF Safe Practice Scores. Therefore, hospitals that did not submit a 2018 Leapfrog Hospital Survey by December 31 will not have these measures included in their Safety Grade and the measure will be scored as "Declined to Report".

HOSPITAL CONSUMER ASSESSMENT OF HEALTHCARE PROVIDERS AND SYSTEMS (HCAHPS) LINEAR MEAN SCORES

The Centers for Medicare & Medicaid Services (CMS), along with the Agency for Healthcare Research and Quality (AHRQ), developed the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) Survey, also known as Hospital CAHPS®, to provide a standardized survey instrument and data collection methodology for measuring patients' perspectives on hospital care. The HCAHPS Survey is administered to a random sample of patients continuously throughout the year. CMS cleans, adjusts and analyzes the data, then publicly reports the results. Five of the seven composite topics are used in the Leapfrog Hospital Safety Grade. The composite topic linear mean score for each measure is calculated by CMS.

HCAHP Composite Topic	Possible Measure Score
H-COMP-1: Nurse Communication	0 - 100
H-COMP-2: Doctor Communication	0 - 100
H-COMP-3: Staff Responsiveness	0 - 100
H-COMP-5: Communication about Medicines	0 - 100
H-COMP-6: Discharge Information	0 - 100

OUTCOME MEASURES

For Outcome Measures, a lower score is always better because these are measures of harm experienced by patients (e.g., central line-associated blood stream infections).

HEALTHCARE-ASSOCIATED INFECTIONS

The Leapfrog Hospital Safety Grade includes five (5) healthcare-associated infection measures collected on the Leapfrog Hospital Survey: Central line-associated bloodstream infections (CLABSI) in ICUs and select wards, Catheter-associated urinary tract infections (CAUTI) in ICUs and select wards, Surgical site infections from colon surgery (SSI: Colon), Facility-wide inpatient MRSA Blood Laboratory-identified Events, and Facility-wide inpatient C.diff. Laboratory-identified Events. Hospitals were required to 1) join Leapfrog's NHSN group by December 20, 2) provide an accurate NHSN ID in the Profile section of the Online Survey Tool, and 3) submit Section 7 Managing Serious Errors by December 31.

Leapfrog pulled the CMS IQR reports from NHSN for reporting time period 07/01/2017 - 06/30/2018 on December 21, 2018. NHSN Data Download Dates are published at the beginning of each Survey Cycle and can be reviewed in the Section 7B Measure Specifications of the 2018 Leapfrog Hospital Survey at: http://www.leapfroggroup.org/survey-materials/2018-hospital-survey-and-scoring-algorithm.

CMS IQR reports should be pulled on the same day as Leapfrog to ensure the data matches. Any changes made to infection data (observed infections or device/patient days) or to surveillance data (pulled from the NHSN Annual Hospital Survey and used to risk-adjust SIRs) after Leapfrog downloaded data from NHSN on December 21 will not be reflected in Leapfrog's NHSN data.

Data from CMS IQR reports downloaded after December 21 may also NOT match Leapfrog's NHSN data if the hospital updated its 2018 NHSN Annual Survey when it became available in early 2019 as this can affect the predicted number of infections used to calculate the standardized infection ratio.

The standardized infection ratio (SIR) for each infection measure is used to calculate the Leapfrog Hospital Safety Grade. Information regarding the CDC's SIR methodology can be found at http://www.cdc.gov/nhsn/acute-care-hospital/index.html.

As Reported by Leapfrog	Measure Score	Notes
Standardized Infection Ratio (SIR)	SIR	Measure is **included** in calculating the Leapfrog Hospital Safety Grade.
Does Not Apply	Not Available (See Scoring Terms)	Measure is **not included** in calculating the Leapfrog Hospital Safety Grade. No use of Secondary Data.
Unable to Calculate Score	Not Available (See Scoring Terms)	Measure is **not included** in calculating the Leapfrog Hospital Safety Grade. No use of Secondary Data.
Declined to Respond	See Uses of Secondary Data	Secondary Data source is used.

HOSPITAL-ACQUIRED CONDITION (HAC) RATES

The Leapfrog Hospital Safety Grade contains three (3) measures of Hospital-Acquired Conditions: Foreign Object Retained after Surgery, Air Embolism, and Falls/Trauma. CMS calculates these rates based on the claims it receives from hospitals that participate in the Inpatient Prospective Payment System (IPPS). The HAC measures are reported as a rate per 1,000 inpatient discharges by CMS, where zero is the best possible rate. This rate is used to calculate the Leapfrog Hospital Safety Grade.

The Maryland Health Services Cost Review Commission (HSCRC) Hospital Inpatient Discharge Data set for Medicare Fee-for-Service patients was used to generate results for the HAC rates for hospitals in Maryland. The data collection periods used to calculate the HAC rates are consistent with the data collection periods used by CMS for all hospitals. **Important Note:** Although the MHCC has provided data for the last several grading cycles, the Leapfrog Group will begin using the PSI and HAC data that is publicly reported by CMS starting with the Fall 2019 grading cycle. Preview reports are made available in QualityNet in May/June and the data is publicly posted by CMS in July/August. **We highly encourage you to review your data for these measures when the QualityNet preview reports become available.**

AHRQ PATIENT SAFETY INDICATOR (PSI) RATES

The Leapfrog Hospital Safety Grade contains seven (7) AHRQ Patient Safety Indicators: PSI 3 Pressure Ulcer Rate; PSI 4 Death Rate among Surgical Inpatients with Serious Treatable Conditions; PSI 6 Iatrogenic Pneumothorax Rate; PSI 11 Postoperative Respiratory Failure Rate; PSI 12 Perioperative PE/DVT Rate; PSI 14 Postoperative Wound Dehiscence Rate; and PSI 15 Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate.

CMS calculates these rates based on the claims it receives from hospitals that participate in the Inpatient Prospective Payment System (IPPS). The PSIs are reported as a rate per 1,000 patient discharges by CMS. This rate is used to calculate the Hospital Safety Grade.

The Maryland Health Services Cost Review Commission (HSCRC) Hospital Inpatient Discharge Data set for Medicare Fee-for-Service patients was used to generate results for the PSI rates for hospitals in Maryland. **Important Note:** Although the MHCC has provided data for the last several grading cycles, the Leapfrog Group will begin using the PSI and HAC data that is publicly reported by CMS starting with the Fall 2019 grading cycle. Preview reports are made available in QualityNet in May/June and the data is publicly posted by CMS in July/August. **We highly encourage you to review your data for these measures when the QualityNet preview reports become available.**

USING SECONDARY DATA SOURCES

Thirteen (13) of the 28 measures that make up the Leapfrog Hospital Safety Grade are derived from the 2018 Leapfrog Hospital Survey. The Leapfrog Hospital Survey is voluntary, and as such, hospitals may choose not to submit a Survey. To address this gap in available data, the Leapfrog Hospital Safety Grade Methodology utilizes supplemental data from secondary data sources when available. This section describes the methods developed for using supplemental data from secondary data sources and dealing with missing data. For information on how to complete a free Leapfrog Hospital Survey, visit www.leapfroggroup.org/survey

COMPUTERIZED PHYSICIAN ORDER ENTRY (CPOE)

The Leapfrog Hospital Survey is the **primary data source** for CPOE. Hospitals that report their progress in meeting the CPOE Standard on the 2018 Leapfrog Hospital Survey by December 31, 2018 will receive a measure score based on their Leapfrog performance for the CPOE measure.

The AHA Annual Survey Information Technology Supplement provides supplemental data on a hospital's use of CPOE and is used as the **secondary data source** for this measure. A hospital's response to question 1 regarding the use of Computerized Provider Order Entry (CPOE) for medications is used to assign the following score (refer to Table 1.1).

Table 1.1 Points Earned for Hospitals That Did Not Submit a 2018 Leapfrog Hospital Survey by December 31, 2018

AHA Annual Survey Informaton Technology Supplement Response	Measure Score	Notes
1 – Fully implemented across all units	45	Score reflects the supplemental information regarding CPOE available from the secondary data source when compared to the Leapfrog Hospital Survey. See details regarding Leapfrog's CPOE standard.
2 – Partially implemented	15	
3 – Not implemented	5	

If a hospital did not report to the Leapfrog Hospital Survey or AHA Annual Survey Information Technology Supplement on their use of CPOE for medications, the hospital receives a score of, and is publicly reported as, "Declined to Report." This measure is then **not included** in calculating the Leapfrog Hospital Safety Grade.

BAR CODE MEDICATION ADMINISTRATION (BCMA)

The BCMA measure was added to the Hospital Safety Grade in the fall of 2018. The Leapfrog Hospital Survey is the **primary data source** for BCMA. Hospitals that report their progress in meeting the BCMA Standard on the 2018 Leapfrog Hospital Survey by December 31, 2018 will receive a measure score based on their Leapfrog performance for the BCMA measure.

The AHA Annual Survey Information Technology Supplement provides supplemental data on a hospital's use of BCMA and is used as the **secondary data source** for BCMA. A hospital's response to question 1 regarding the use of Bar Coding or Radio Frequency Identification (RFID) for Closed-loop Medication Tracking for medication administration is used to assign the following score (refer to Table 2.1).

Table 2.1 Points Earned for Hospitals That Did Not Submit a 2018 Leapfrog Hospital Survey by December 31, 2018

AHA Annual Survey Information Technology Supplement Response	Measure Score	Notes
1 – Fully implemented across all units	45	Score reflects the supplemental information regarding BCMA available from the secondary data source when compared to the Leapfrog Hospital Survey. See details regarding Leapfrog's CPOE standard.
2 – Partially implemented	15	
3 – Not implemented	5	

If a hospital did not report to the Leapfrog Hospital Survey or AHA Annual Survey Information Technology Supplement on their use of BCMA for medication administration, the hospital receives a score of, and is publicly reported as, "Declined to Report." This measure is then **not included** in calculating the Leapfrog Hospital Safety Grade.

ICU PHYSICIAN STAFFING (IPS)

The Leapfrog Hospital Survey data is the **primary data source** for IPS. Hospitals that report their progress in meeting the IPS Standard on the 2018 Leapfrog Hospital Survey by December 31, 2018, will receive a measure score based on their Leapfrog performance for the IPS measure.

The AHA Annual Survey Database provides supplemental data on a hospital's use of intensivists in ICUs and is used as the **secondary data source** for IPS. A hospital's responses to Section E, question 13b.1 and question 13b.4, and Section C, question 4 and question 8 in the AHA Annual Survey Database regarding the number of Med/Surg and/or Pediatric ICU beds, the open/closed status of the Med/Surg ICU and/or Pediatric ICUs, and number of intensivist FTEs in Med/Surg and/or Pediatric ICUs, are used to assign the following measure score (refer to Table 3.1).

Note 1: If a hospital reported zero (0) Med/Surg **AND** zero (0) Pediatric ICU beds, the hospital will receive a score of "Not Available" and this measure will not be included in calculating the Leapfrog Hospital Safety Grade.

Table 3.1 Points Earned for IPS for Hospitals That Did Not Submit a 2018 Leapfrog Hospital Survey by December 31, 2018

AHA Annual Survey Database Response	Measure Score	Notes
If Med/Surg ICU is "Closed" and the number of intensivist FTEs is >6	85	Score was imputed based on an analysis comparing hospital performance on Leapfrog and AHA surveys
If Med/Surg ICU is "Closed" and the number of intensivist FTEs is <=6 and >0	65	Score was imputed based on an analysis comparing hospital performance on Leapfrog and AHA surveys
If Med/Surg ICU is "Open"	5	

If Pediatric ICU is "Closed" and the number of intensivist FTEs is >6	85	Score was imputed based on an analysis comparing hospital performance on Leapfrog and AHA surveys
If Pediatric ICU is "Closed" and the number of intensivist FTEs is <=6 and >0	65	Score was imputed based on an analysis comparing hospital performance on Leapfrog and AHA surveys
If Pediatric ICU is "Open"	5	
If Med/Surg ICU beds and Pediatric ICU beds is 0	Not Available (See Scoring Terms)	Measure is **not included** in calculating the Leapfrog Hospital Safety Grade.

EXAMPLE 1:
Med/Surg ICU is closed and staffed with 10 FTEs = 85
Pediatric ICU is open and staffed with 6 FTEs= 5
*Overall IPS Score calculation: 85 + 5 = 90 / 2 = **45***
Overall IPS Score used to calculate Leapfrog Hospital Safety Grade = 45

EXAMPLE 2:
Med/Surg ICU is closed and staffed with 20 FTEs = 85
Pediatric ICU is closed and staffed with 5 FTEs = 65
*Overall IPS Score calculation: 85 + 65 = 150 / 2 = **75***
Overall IPS Score used to calculate Leapfrog Hospital Safety Grade = 75

If a hospital did not report to the Leapfrog Hospital Survey or AHA Annual Survey on the use of intensivists in ICUs, the hospital receives a score of, and is publicly reported as, "Declined to Report." This measure is then **not included** in calculating the Leapfrog Hospital Safety Grade.

HEALTHCARE-ASSOCIATED INFECTIONS

The Leapfrog Hospital Survey data is the **primary data source** for CLABSI, CAUTI, MRSA, C. Diff., and SSI: Colon. Leapfrog will use standardized infection ratios (SIRs) obtained directly from the CDC's National Healthcare Safety Network (NHSN) application for hospitals that 1) joined Leapfrog's NHSN group, 2) provided an accurate NHSN ID in the Profile section of the Online Survey Tool, and 3) submitted Section 7 Managing Serious Errors of the Leapfrog Hospital Survey by December 31, 2018. If a hospital did not report to Leapfrog for this measure, CMS data will be used as a secondary data source.

Table 4.1 Hospitals That Did Not Submit a 2018 Leapfrog Hospital Survey by December 31, 2018

As Reported by CMS	Measure Score	Notes
Not Available (no locations or low volume)	Not Available	Measure is **not included** in calculating the Leapfrog Hospital Safety Grade.
Standard Infection Ratio (SIR)	SIR	Measure is **included** in calculating the Leapfrog Hospital Safety Grade.

WEIGHTING INDIVIDUAL MEASURES

Each measure included in the Leapfrog Hospital Safety Grade is assigned a standard weight. The methodology to assign standard weights includes three criteria that reflect the quality of the measure. These criteria are: (1) Impact, (2) Evidence, and (3) Opportunity. These three (3) criteria are then combined using the following equation to compute a standard weight for each measure that represents the measure's relative importance within the composite score: **[Evidence + (Opportunity x Impact)].**

EVIDENCE

The Evidence Score for each individual measure is assigned a value of one (1) or two (2) using the following criteria:

- 1 = Supported by either suggestive clinical or epidemiological studies or theoretical rationale
- 2 = Supported by experimental, clinical, or epidemiological studies and strong theoretical rationale

OPPORTUNITY

The Opportunity Score for each individual measure is based on the Coefficient of Variation (Standard Deviation/Mean) of that measure, using the following formula: **[1 + (Standard Deviation/Mean)]**. The Opportunity Score is on a continuous scale that is capped at three (3). Any measure with an Opportunity Score above three (3) is assigned a three (3).

IMPACT

The Impact Score for each individual measure is comprised of two (2) parts, each of which is assigned a value from one (1) to three (3):

1. Number of patients affected
2. Severity of harm

The *number of patients affected* score is determined by the following:

- 0 = Extremely rare event (e.g., Air Embolism)
- 1 = Rare event (e.g., Foreign Object Retained After Surgery)
- 2 = Some patients in hospital affected (e.g., ICU Physician Staffing)

- 3 = All patients in hospital affected (e.g., Hand Hygiene Safe Practice)

The *severity of harm* score is determined by the following:

- 1 = No direct evidence of harm or harm reduction (e.g., Hand Hygiene Safe Practice)
- 2 = Clear documentation of harm or harm reduction; adverse events (e.g., Foreign Object Retained After Surgery)
- 3 = Significant mortality reduction (more than 1,000 deaths or a 10% reduction in hospital wide mortality) (e.g., ICU Physician Staffing)

The values from each part are then added together to arrive at the overall Impact Score using the following criteria:

- 1 = Score of 2 (Low Impact)
- 2 = Score of 3-4 (Medium Impact) (e.g., Foreign Object Retained After Surgery; Hand Hygiene Safe Practice)
- 3 = Score of 5-6 (High Impact) (e.g., ICU Physician Staffing)

SPRING 2019 STANDARD MEASURE WEIGHTS

Measure	Evidence Score	Opportunity Score	Impact Score	Measure Weight
Process/Structural Measure Domain (50%)				
CPOE	2	1.38	3	5.8%
BCMA	2	1.35	3	5.7%
IPS	2	1.84	3	7.1%
SP 1	1	1.06	2	2.9%
SP 2	1	1.12	2	3.1%
SP 4	1	1.09	2	3.0%
SP 9	1	1.09	3	4.0%
SP 19	2	1.10	2	4.0%
H-COMP-1	1	1.02	2	2.9%
H-COMP-2	1	1.02	2	2.9%
H-COMP-3	1	1.04	2	2.9%
H-COMP-5	1	1.04	2	2.9%
H-COMP-6	1	1.04	2	2.9%
Outcome Measure Domain (50%)				
HAC: Foreign Object	1	3.00	2	4.3%
HAC: Air Embolism	1	3.00	1	2.5%
HAC: Falls and Trauma	2	1.86	3	4.6%
CLABSI	2	1.80	3	4.5%
CAUTI	2	1.75	3	4.5%
SSI: Colon	2	1.81	2	3.4%
MRSA	2	1.80	3	4.5%
C. Diff.	2	1.51	3	4.0%
PSI 3	1	1.91	3	4.1%
PSI 4	1	1.10	2	2.0%
PSI 6	1	1.19	2	2.1%
PSI 11	1	1.35	2	2.3%
PSI 12	1	1.25	2	2.2%
PSI 14	1	1.30	2	2.2%
PSI 15	1	1.19	3	2.8%

LEAPFROG
HOSPITAL
SAFETY GRADE

SCORING METHODOLOGY

Once all data elements have been collected for a given hospital, the Leapfrog Hospital Safety Grade can be calculated using the methodology described below.

CALCULATING Z-SCORES

Z-Scores are used to standardize data from individual measures with different scales. This allows for the comparison of individual scores from different types of data. For example, a score of 90 on H-COMP-1: Nurse Communication cannot be compared to a CLABSI SIR of 0.87, as they are reported on different scales. In addition, Z-Scores can indicate to a hospital whether their score on a particular measure is above, below, or equal to the average hospital.

In the Scoring Methodology, a Z-Score is calculated for each measure that is applicable to a hospital. A Z-Score is calculated using a hospital's actual measure score, the national mean for that measure, and the standard deviation for that measure. The Z-Score for each measure is calculated using the following formulas:

- **For Process/Structural Measures: [Hospital Score – Mean) / Standard Deviation]**
- **For Outcome Measures: [(Mean – Hospital Score) / Standard Deviation]**

The following table includes the national mean and standard deviation for each measure. These values are used to calculate your hospital's Z-Score using the formulas above. Please note, for display, means and standard deviations shown below are rounded to two or three decimal places. For scoring, these values are not rounded.

Process and Structural Measures	Mean	Standard Deviation
Computerized Physician Order Entry (CPOE)	74.03	28.05
Bar Code Medication Administration (BCMA)	71.28	24.88
ICU Physician Staffing (IPS)	52.66	44.40
Safe Practice 1: Leadership Structures and Systems	117.46	6.51
Safe Practice 2: Culture Measurement, Feedback & Intervention	115.73	14.31
Safe Practice 4: Identification and Mitigation of Risks and Hazards	97.24	8.50
Safe Practice 9: Nursing Workforce	97.66	8.40
Safe Practice 19: Hand Hygiene	58.03	5.97
H-COMP-1: Nurse Communication	90.82	2.21

Process and Structural Measures	Mean	Standard Deviation
H-COMP-2: Doctor Communication	90.88	1.97
H-COMP-3: Staff Responsiveness	84.31	3.48
H-COMP-5: Communication about Medicines	78.01	3.40
H-COMP-6: Discharge Information	86.71	3.06

Outcome Measures	Mean	Standard Deviation
Foreign Object Retained	0.02	0.06
Air Embolism	0.001	0.005
Falls and Trauma	0.44	0.37
CLABSI	0.77	0.61
CAUTI	0.83	0.63
SSI: Colon	0.86	0.70
MRSA	0.88	0.70
C. Diff.	0.75	0.38
PSI 3: Pressure Ulcer Rate	0.38	0.35
PSI 4: Death Rate among Surgical Inpatients with Serious Treatable Conditions	161.64	16.97
PSI 6: Iatrogenic Pneumothorax Rate	0.29	0.05
PSI 11: Postoperative Respiratory Failure Rate	8.22	2.89
PSI 12: Perioperative PE/DVT Rate	3.84	0.97
PSI 14: Postoperative Wound Dehiscence Rate	0.85	0.25
PSI 15: Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate	1.29	0.25

A NOTE ABOUT NEGATIVE Z-SCORES

To ensure that a single measure does not dominate a hospital's overall score in an unintended way, Leapfrog truncates negative Z-scores at -5.00. Hospitals that have a calculated Z-score below -5.00 on a measure will receive a modified Z-score of -5.00 on that measure.

A NOTE ABOUT EXTREME VALUES

For hospitals that have an "extreme" value for a particular measure (i.e. a value that <u>exceeds</u> the 99th percentile) Leapfrog "trims" the reported value to the 99th percentile. For example, if CMS has reported a rate of 0.50 per 1,000 patient discharges for the Foreign Object Retained measure for your hospital, Leapfrog has "trimmed" this rate to 0.357 (e.g. the 99th percentile). Therefore, on the Leapfrog Hospital Safety Grade website, you'll see the measure score for Foreign Object Retained displayed as 0.357. Please see the table below for a list of the "trim" values for the Spring 2019 Leapfrog Hospital Safety Grade.

Measure	99th Percentile
Foreign Object Retained	0.357
Air Embolism	0.045
Falls and Trauma	1.747
CLABSI	2.943
CAUTI	3.01
SSI: Colon	3.067
MRSA	3.352
C. Diff.	1.94
PSI 3: Pressure Ulcer Rate	1.91
PSI 4: Death Rate among Surgical Inpatients with Serious Treatable Conditions	204.76
PSI 6: Iatrogenic Pneumothorax Rate	0.47
PSI 11: Postoperative Respiratory Failure Rate	17.91
PSI 12: Perioperative PE/DVT Rate	7.32
PSI 14: Postoperative Wound Dehiscence Rate	1.9
PSI 15: Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate	2.15

Note 1: Percentiles are rounded to reflect the precision of the raw data.

DEALING WITH MISSING DATA

The weight of any measure that is missing for a hospital is redistributed to the other measures in the same measure domain. The new weight for each measure is determined by summing the weights of all available measures in the domain and then dividing each measure weight by the total weight. The result is the new measure weight within that domain. Note that each domain contributes to 50% of the overall letter grade and therefore must be divided in half to find the final measure weight. For more information about how the measure weight redistribution is calculated and affects the overall score, please see the Leapfrog Hospital Safety Grade Calculator, which can be found on the last page of the Safety Grade Review Website.

CALCULATING WEIGHTED MEASURE SCORES

To calculate your hospital's numerical safety score, multiply the Z-Score of each process/structural measure by the measure weight. This results in the weighted process/structure measure score. Remember, if your hospital was missing data for any process/structural measure, the weight assigned to each process/structural measure will differ from the standard weight. Sum the weighted process/structure measure scores. This results in the process/structural measure domain score.

Then, multiply the Z-Score of each outcome measure by the measure weight. Remember, if your hospital was missing data for any outcome measure, the weight assigned to each outcome measure will differ from the standard weight. Sum the weighted outcome measure scores. This results in the outcome measure domain score.

To calculate the overall Leapfrog Hospital Safety Grade for your hospital, sum the process/structural measure domain score and the outcome measure domain score and add 3.0. This is done to normalize scores to a positive distribution.

To assist hospitals in calculating their numerical score, a calculator is available on the Safety Grade Review Website.

ADDITIONAL SCORING INFORMATION

TERMS USED IN SCORING AND PUBLIC REPORTING

"Not Available" means that the hospital does not have data for this measure. Missing data could be the results of not providing a service (i.e. a hospital that does not have an ICU would not be able to report data about ICUs) or too few patients or cases meeting the criteria to be measured (i.e. a hospital with too few patients with central lines would not have a standardized infection ratio for CLABSI). "Not Available" does not mean that the hospital withheld information from the public. Measures publicly reported as "Not Available" are not used to calculate the Hospital Safety Grade.

"Declined to Report" means that the hospital was targeted to submit data via the Leapfrog Hospital Survey and did not. Measures publicly reported as "Declined to Report" are not used to calculate the Hospital Safety Grade.

See Dealing with Missing Data.

SHARED CMS CERTIFICATION NUMBERS

All hospitals that share a CMS Certification Number (CCN) will be assigned the same data as reported by CMS. Affected measures include the HCAHPS measures, Hospital-Acquired Condition measures, Healthcare-Associated Infection measures (for hospitals that did not submit a Leapfrog Hospital Survey), and Patient Safety Indicators.

UPDATES TO DATA USED IN THE LEAPFROG HOSPITAL SAFETY GRADE

The Leapfrog Hospital Safety Grade relies on publicly reported data that hospitals have had the opportunity to review for accuracy. Therefore, Leapfrog does not allow hospitals to make updates to their data following the Data Snapshot Date. In January of each year, Leapfrog publishes the Data Snapshot Dates for each of the two Leapfrog Hospital Safety Grade public releases at http://www.hospitalsafetygrade.org/for-hospitals/updates-and-timelines-for-hospitals. Leapfrog publishes these dates to give hospitals and other stakeholders advance notice so they can be prepared to submit a Leapfrog Hospital Survey, submit supplemental data to a secondary data source such as the AHA Annual Survey Database and/or AHA Annual Survey Information Technology Supplement, and track and review their performance on CMS measures used in the Leapfrog Hospital Safety Grade.

In addition, Leapfrog holds a courtesy three-week Safety Grade Review Period to give hospitals an additional opportunity to review the data that will be used to calculate their hospital's Safety Grade. During the three-week review period, if a hospital finds a data discrepancy (i.e. the measure score on the public report does not match the measure score on the review website) the hospital should contact the Help Desk immediately. Hospitals should double check the data source, measure name, and reporting period before contacting the Help Desk. The Help Desk will need to know which measure and score are in question and will need a copy of the public report that shows a different score than the one Leapfrog has recorded on the Safety Grade Review Website.

Please review the details below which describe Leapfrog's policy for accepting corrections from data sources used in the Leapfrog Hospital Safety Grade after the Data Snapshot Date.

DATA FROM THE LEAPFROG HOSPITAL SURVEY

During the three-week Safety Grade Review Period (March 7 – March 25), Leapfrog will only make corrections to a hospital's data from the Leapfrog Hospital Survey if a recording error is identified (i.e. we have recorded a different measure score than what is posted on our Survey Results website) or a scoring error is identified (i.e. Leapfrog has calculated an incorrect measure score based on the submitted responses and Leapfrog's published scoring algorithms). Updates to Leapfrog Hospital Survey data that are submitted after the Data Snapshot Date will **not** be included in the current Leapfrog Hospital Safety Grade. Hospitals submitting a Leapfrog Hospital Survey are urged to take advantage of the opportunity to review their Survey Results for accuracy and completeness prior to each of the two published Data Snapshot Dates.

HOW HOSPITALS CAN REVIEW LEAPFROG HOSPITAL SURVEY RESULTS PRIOR TO THE DATA SNAPSHOT DATE

The Leapfrog Hospital Survey is open from April 1 to November 30[3] of each year. Following the first reporting deadline (June 30), Survey Results are published monthly on a secure 'Hospital Details' page and a public website (www.leapfroggroup.org/compare-hospitals). Hospitals are urged to review their Survey Results. Hospitals that identify any reporting errors are instructed to log back into the Survey to submit a correction. Hospitals are able to correct and re-submit a previously submitted Survey until the Survey closes for the year. Note that corrections submitted after the Data Snapshot Date are not included in the current Leapfrog Hospital Safety Grade. Leapfrog has several automated processes in place to prevent hospitals from making data entry errors in the Online Survey Tool and to enhance the overall accuracy of the Survey Results. Learn more at http://www.leapfroggroup.org/survey-materials/data-accuracy

SUPPLEMENTAL DATA FROM THE AHA ANNUAL SURVEY DATABASE OR AHA ANNUAL SURVEY INFORMATION TECHNOLOGY SUPPLEMENT

During the three-week Safety Grade Review Period (March 7 – March 25), Leapfrog will only make corrections to a hospital's data from the AHA Health Forum if the correction is issued to all individuals and organizations who license the data from the AHA Annual Survey Database and/or AHA Annual Survey Information Technology Supplement. Hospitals submitting an AHA Annual Survey or Information Technology Supplement to the AHA Health Forum are urged to take advantage of the opportunity to review their survey results for accuracy and completeness prior to and immediately following survey submission.

In addition, if Leapfrog identifies reporting scenarios which are logically inconsistent and therefore a likely reporting error with respect to a hospital's ICU Physician Staffing data from the AHA Annual Survey Database, this data will not be used in calculating the Leapfrog Hospital Safety Grade. Examples of reporting scenarios that will result in ICU Physician Staffing data not being used are listed below:

EXAMPLES OF REPORTING ERRORS THAT WILL <u>NOT</u> BE USED IN THE LEAPFROG HOSPITAL SAFETY GRADE

Med/Surg ICU Data	Pediatric ICU Data
Zero (0) Med/Surg ICU beds and greater than zero (0) Med/Surg Intensivist FTE	Zero (0) Pediatric ICU beds and greater than zero (0) Pediatric Intensivist FTE
Zero (0) Med/Surg ICU beds and a 'closed' Med/Surg ICU	Zero (0) Pediatric ICU beds and a 'closed' Pediatric ICU

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[3] The 2018 Leapfrog Hospital Survey was open from April 1 – December 31, 2018. The 2019 Leapfrog Hospital Survey will be open from April 1 – November 30, 2019.

A 'closed' Med/Surg ICU and zero (0) Med/Surg Intensivist FTEs	A 'closed' Pediatric ICU and zero (0) Pediatric Intensivist FTEs

HOW HOSPITALS CAN REVIEW AHA ANNUAL SURVEY AND IT SUPPLEMENT SUBMISSIONS PRIOR TO THE DATA SNAPSHOT DATE

The American Hospital Association's (AHA) Annual Survey and Information Technology Supplement are administered by the AHA Health Forum. Both online and paper submissions are accepted. Online surveys are run through electronic data evaluation routines designed to test the reliability and validity of reported survey values prior to the electronic submission of the completed survey to the AHA. Error checks fall into two categories: (a) compares the hospital's current year response against its response to the same question last year and (b) tests for the internal consistency of related questions across the survey. Where a value fails any test, an error message is immediately returned to the respondent requesting that it either corrects the questionable value or explains in text format why the value is correct. A participant hospital can review its response and make as many changes as many times as deemed necessary prior to final submission. In addition, AHA data analysts apply an even larger version of the routine error checks to all submitted data regardless of online or paper submission. The AHA data analysts review potential problems in the last processing step prior to finalization. A responding hospital is free to modify its submitted survey up until the close of the data collection and data evaluation phases of the Annual Survey process. To correct a survey, hospitals must contact the Health Forum survey support facility.

DATA FROM THE CENTERS FOR MEDICARE & MEDICAID SERVICES (CMS)

During the three-week Safety Grade Review Period (March 7 – March 25), Leapfrog will only make corrections to a hospital's data from CMS if the correction is issued by CMS and posted on either the Data.Medicare.Gov website or the Data.CMS.Gov website. If a hospital has identified an error with a measure score published by CMS, and CMS cannot post a correction within the three-week review period, the measure score will not be used in calculating the hospital's Safety Grade, provided that the hospital can document that CMS has agreed to publicly issue a correction or remove the measure score from public reporting. Hospitals participating with CMS are urged to take advantage of the opportunity to participate in the CMS 30-day review periods.

HOW HOSPITALS CAN REVIEW CMS DATA PRIOR TO THE DATA SNAPSHOT DATE

CMS administers several hospital-based reporting and payment programs including the Inpatient Quality Reporting Program, HAC Reduction Program, and Value-based Purchasing Program. Several measures collected and calculated by CMS via its various hospital-based programs are used in the Leapfrog Hospital Safety Grade. CMS provides hospitals with a 30-day preview period before publishing measure scores on the Data.Medicare.Gov website and the Data.CMS.Gov website. More information is available at https://qualitynet.org.

DATA FROM THE MARYLAND HEALTH CARE COMMISSION (MHCC)

During the three-week Safety Grade Review Period (March 7 – March 25), Leapfrog will only make corrections to a hospital's data from MHCC if the correction is issued by MHCC to Leapfrog within the Safety Grade Review Period. If a hospital has identified an error with a measure score published by MHCC, and MHCC cannot post a correction within the three-week review period, the measure score will not be used in calculating the hospital's Safety Grade, provided that the hospital can document that MHCC has agreed to publicly issue a correction or remove the measure score from public reporting. Hospitals are urged to take advantage of the review period offered by MHCC.

Important Note: Although the MHCC has provided data for the last several grading cycles, the Leapfrog Group will begin using the PSI and HAC data that is publicly reported by CMS starting with the Fall 2019 grading cycle. Preview reports are made available in QualityNet in May/June and the data is publicly posted by CMS in July/August. **We highly encourage you to review your data for these measures when the QualityNet preview reports become available.**

HOW HOSPITALS CAN REVIEW MHCC DATA PRIOR TO THE DATA SNAPSHOT DATE

MHCC currently reports certain Patient Safety Indicators (PSI) measures on the *Maryland Healthcare Quality Reports* consumer website using the HSCRC Inpatient Discharge Data Set. To support Leapfrog's nationwide transparency effort, MHCC agreed to generate similar PSI measure results for Maryland hospitals (Medicare patients only), in accordance with the specifications used by CMS for hospitals nationwide. They also agreed to generate three CMS Hospital Acquired Conditions (HAC) measures for Medicare FFS patients only. Individual hospital rates for each of these measures was sent out via email on February 8, 2019.

HOW TO PARTICIPATE IN THE LEAPFROG HOSPITAL SURVEY

If your hospital did **not** complete a 2018 Leapfrog Hospital Survey by December 31, results from the Survey were not used to calculate your Leapfrog Hospital Safety Grade. Leapfrog will update Leapfrog Hospital Safety Grades again in the fall of 2019. If your hospital would like Leapfrog Hospital Survey Results included in the next Leapfrog Hospital Safety Grade, a 2019 Leapfrog Hospital Survey **must be submitted by August 31, 2019**. For more information about the Leapfrog Hospital Survey, visit http://www.leapfroggroup.org/survey.

LEAPFROG HELP DESK

If you have any questions regarding the scoring methodology, please contact the Help Desk at https://leapfroghelpdesk.zendesk.com.