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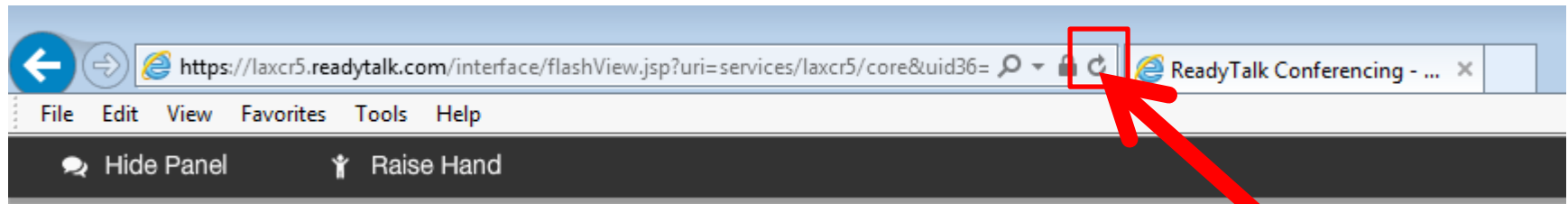**Audio from computer speakers breaking up?**

Audio suddenly stop?

Click Refresh icon
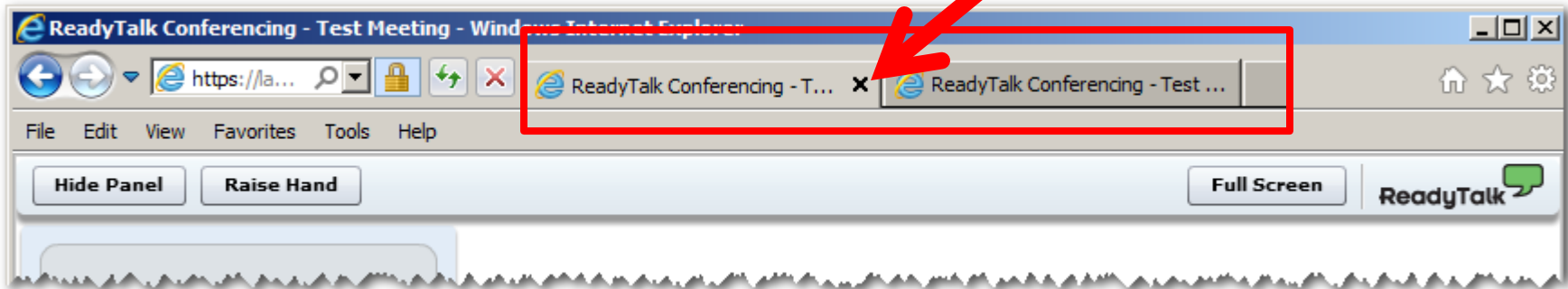**-or-**
Click F5

F5

F5 Key
Top Row of Keyboard

Location of Buttons

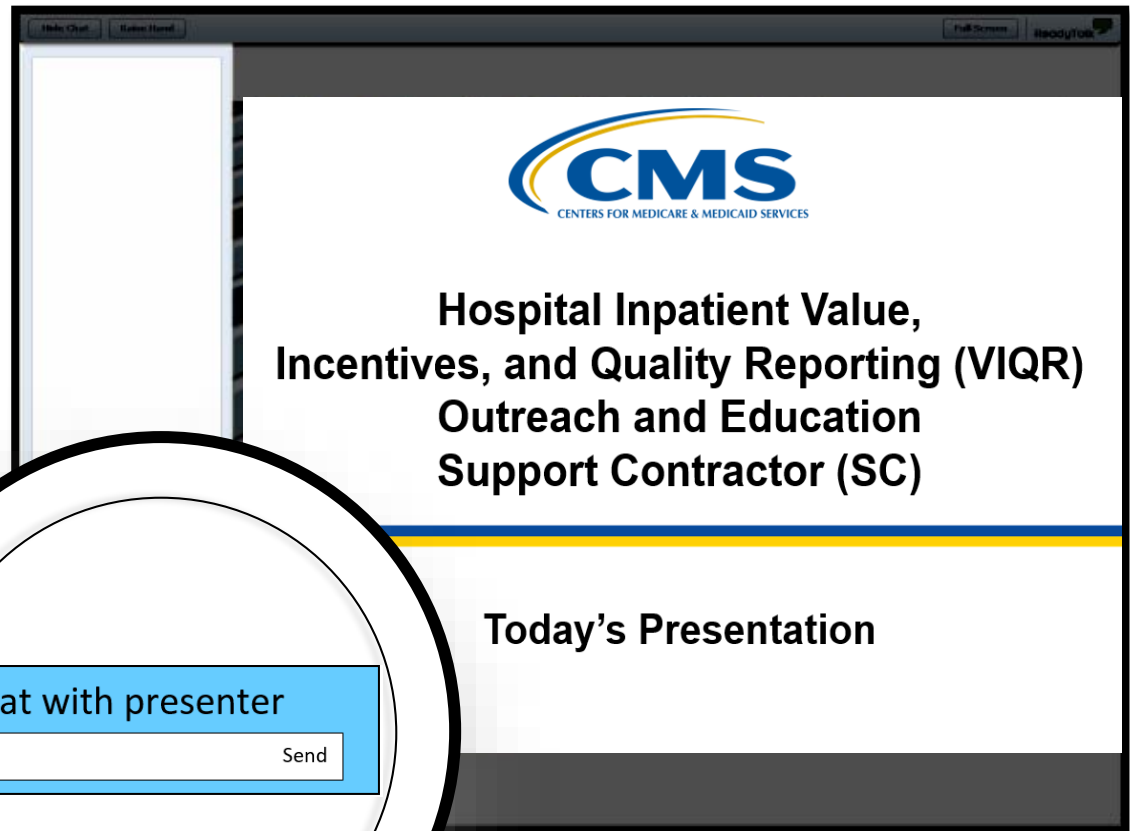Refresh

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- **Echo is caused by multiple browsers/tabs open to a single event (multiple audio feeds).**
- **Close all but one browser/tab and the echo will clear.**

Example of two browsers/tabs open in same event

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Hospital Inpatient Value, Incentives, and Quality Reporting (VIQR) Outreach and Education Support Contractor (SC)

Today's Presentation

Chat with presenter

Send

Hospital Quality Star Ratings on *Hospital Compare*
December 2017 Methodology Enhancements

November 30, 2017

Speakers

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Director, Division of Quality Measurement, Quality Measure & Value Incentives Group
Center for Clinical Standards & Quality, CMS

Moderator

Candace Jackson, RN
Project Lead, Hospital Inpatient Quality Reporting (IQR) Program
Hospital Inpatient Value, Incentives, and Quality Reporting (VIQR)
Outreach and Education Support Contractor (SC)

Agenda

1. Introduction
2. Stakeholder engagement activities
3. Previous methodology
4. Methodology enhancements for December 2017
   - Complete convergence
   - Removal of Winsorization
   - Resequencing of public reporting threshold
   - Quadrature enhancement
5. Impact analyses

Introduction

- The Overall Hospital Quality Star Ratings ("Star Ratings") publicly launched in July 2016.

- Star Ratings aims to fulfill the following guiding principles while utilizing a scientifically valid methodology:
  - Alignment with *Hospital Compare* and CMS programs
  - Transparency of methodological decisions
  - Being responsive and inclusive to stakeholder input
- *Hospital Compare* reports measures on 4,000+ hospitals.
- Hospitals receive 1–5 stars for an "overall rating."

Stakeholder Engagement Activities

Stakeholder Engagement Activities

- Stakeholder engagement efforts
  - Technical Expert Panels (TEP)
    - Comprised of stakeholders and experts who contribute direction and thoughtful input to methodology development and maintenance
    - Four TEP meetings since 2015
  - Patient and Patient Advocate Work Group
    - A work group comprised of patients, patient advocates, and family caregivers used to discuss patient and consumer priorities and usability of information
  - Provider Leadership Work Group (PLWG)
    - A new work group comprised of hospital leaders and hospital associations to discuss real-world implications of Star Ratings and suggestions for improvement

Stakeholder Engagement Activities

- Stakeholder engagement efforts
  - Public input periods
    - January 2015, July 2015, and August 30 to September 27, 2017
    - Generated broad stakeholder input on development and re-evaluation
  - Dry run
    - Summer 2015
    - Allowed hospitals to review their Star Ratings data prior to public reporting
  - National Provider Calls
    - August 2015 and May 2016
    - Used to disseminate information about Star Ratings methodology or updates to the methodology
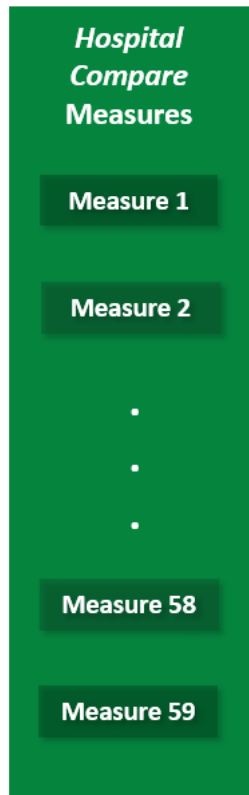
Previous Methodology
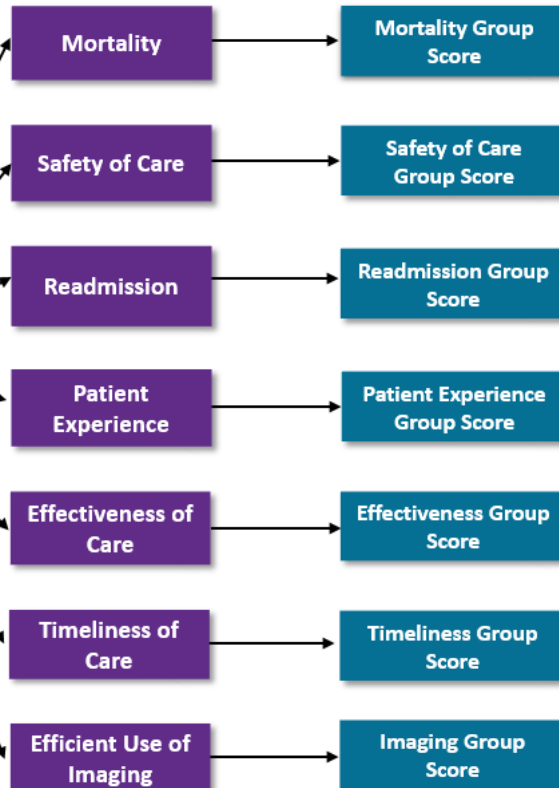
Previous Overall Star Ratings Methodology

- Five steps
    1. Selection and standardization of measures for inclusion
    2. Assignment of measures to measure groups
    3. Calculation of group scores from latent variable models (LVM)
    4. Generation of hospital summary scores as a weighted average of group scores
    5. Application of clustering to assign hospitals to one of five Star Ratings categories

Previous Overall Star Ratings Methodology

Step 1: Select Measures
Apply measure selection criteria each quarter

Hospital Compare Measures

Measure 1

Measure 2

•

•

•

Measure 58

Measure 59

Step 2: Group Measures
Similar to HVBP and existing *Hospital Compare* display

- Mortality
- Safety of Care
- Readmission
- Patient Experience
- Effectiveness of Care
- Timeliness of Care
- Efficient Use of Imaging

Step 3: Calculate Group Score
Use 7 latent variable models

- Mortality Group Score
- Safety of Care Group Score
- Readmission Group Score
- Patient Experience Group Score
- Effectiveness Group Score
- Timeliness Group Score
- Imaging Group Score

Step 4: Generate Summary Score
Policy-based weighted average of available hospital group scores

Hospital Summary Score

Step 5: Calculating Star Ratings
Winsorize hospital summary scores and use k-means clustering to categorize hospitals
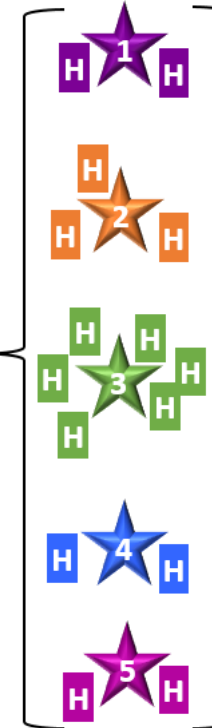
H 1 H
H 2 H
H 3 H
H 4 H
H 5 H

Apply Reporting Thresholds
Hospitals must report 3 measures in at least 3 measure groups (1 outcome group)

Methodology Enhancements for December 2017

Methodology Enhancements

- Main enhancements occur within step 5 of the previous methodology.
  - K-means clustering with complete convergence
  - Hospital summary score Winsorization
  - Resequencing reporting thresholds
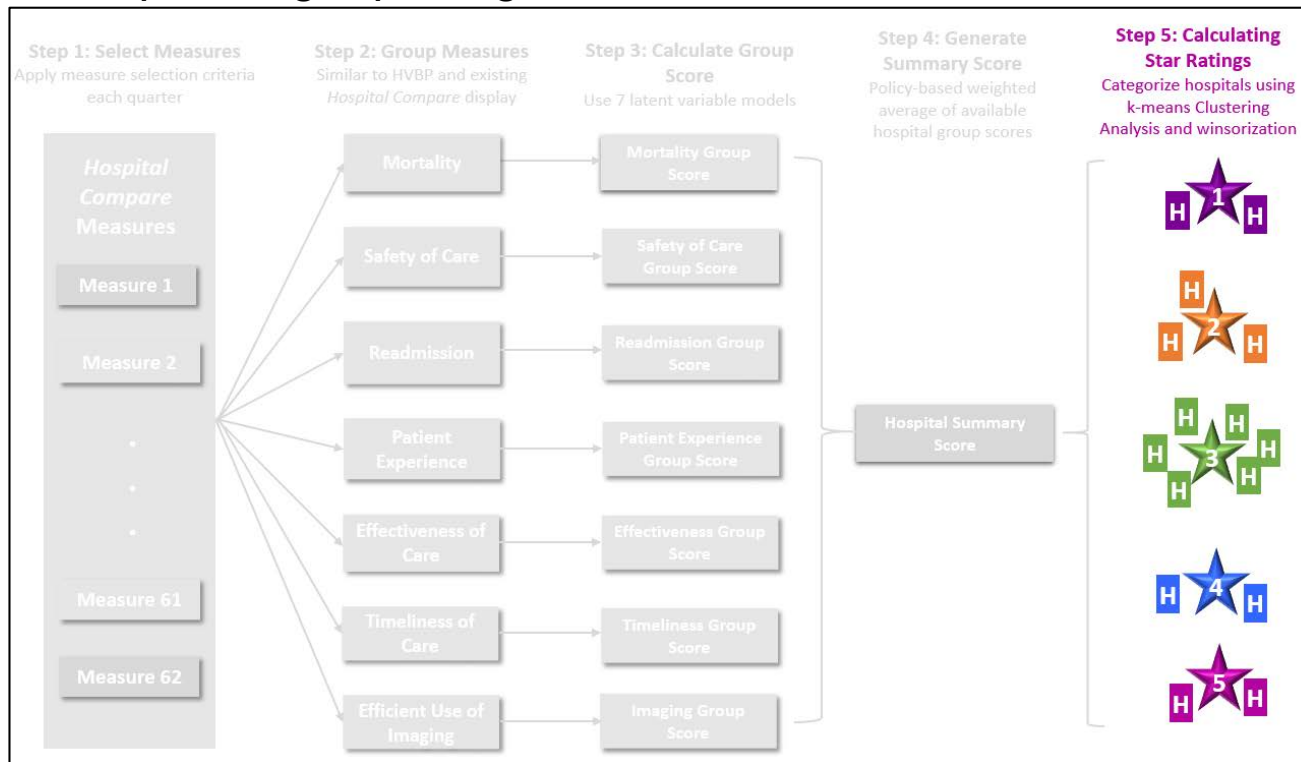
K-Means Clustering to Complete Convergence

- K-means clustering is a statistical method used to create and assign hospitals to five Star categories.

  o Hospital summary scores in the same star category are more similar to each other and more different than summary scores in other star categories.

- Previous SAS procedure utilizes the default setting (one iteration) to identify Star categories.

- **The enhancement will utilize multiple iterations to maximize stability of clustering.**

Removal of Hospital Summary Score Winsorization

- Hospital summary scores were previously Winsorized prior to k-means clustering to minimize the effect of a few extreme outliers.
  - The decision to Winsorize was based on policy and consumer preferences for a broader Star Ratings distribution.
- **With clustering enhancements, Winsorization is no longer necessary.**

Resequencing of Public Reporting Thresholds

- Current public reporting threshold
  - Three measure groups (at least one outcome) with three measures
  - 80% of hospitals met the thresholds in December 2017.
- Previously, Star Ratings were assigned to hospitals, and then the public reporting thresholds were applied.
  - Maximized information available for Star Ratings
  - Provided private performance information to hospitals that did not reach the threshold for Star Ratings
- **Since k-mean clustering is a comparative analysis, the enhancement will apply the reporting thresholds <u>before</u> clustering.**

Previous Reporting Threshold Sequence
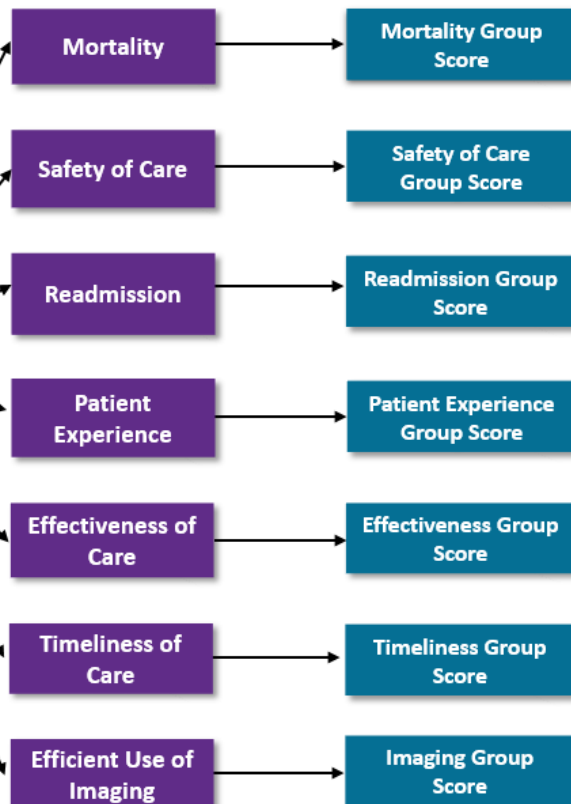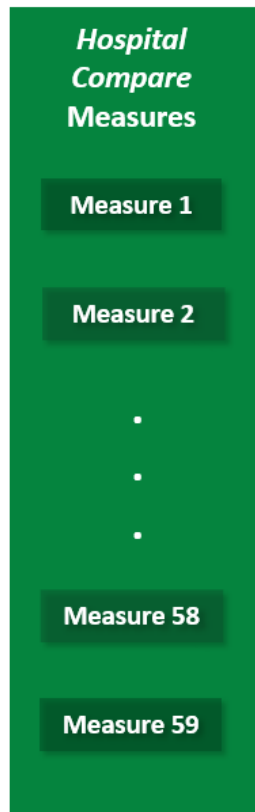
New Reporting Threshold Sequence

*The final Star Ratings calculation will only include hospitals that will ultimately receive a Star Rating.

Combined Enhancement to Step 5

The combined update will:

1. Remove Winsorization.

2. Apply reporting thresholds prior to k-means clustering.

3. Run k-means clustering with multiple iterations until complete convergence.
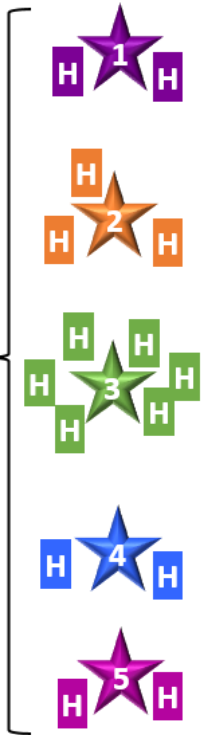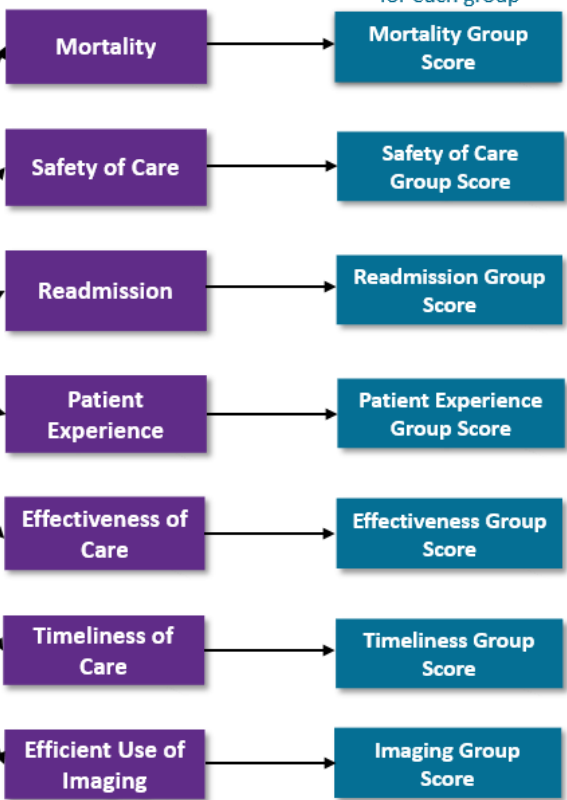
Methodology Enhancement for December 2017

Step 1: Select Measures
Apply measure selection criteria each quarter

Hospital Compare **Measures**
- Measure 1
- Measure 2
- .
- .
- .
- Measure 58
- Measure 59

Step 2: Group Measures
Similar to HVBP and existing *Hospital Compare* display

- Mortality
- Safety of Care
- Readmission
- Patient Experience
- Effectiveness of Care
- Timeliness of Care
- Efficient Use of Imaging

Step 3: Calculate Group Score
Use a latent variable model for each group

- Mortality Group Score
- Safety of Care Group Score
- Readmission Group Score
- Patient Experience Group Score
- Effectiveness Group Score
- Timeliness Group Score
- Imaging Group Score

Step 4: Generate Summary Score
Policy-based weighted average of available hospital group scores

Hospital Summary Score

Step 5: Apply Reporting Thresholds
Hospitals must report 3 measures in at least 3 measure groups (1 outcome group)

Step 6: Calculating Star Ratings
Use k-means clustering to categorize hospitals

H 1 H
H 2 H
H H H 3 H H H
H 4 H
H 5 H

Quadrature Enhancement

- Quadrature enhancement is the statistical technique used in the process to estimate the group score for each hospital for each of seven measure groups.

- The enhancement is a **technical modification** to utilize adaptive quadrature in addition to the current non-adaptive quadrature approach.
  - Adaptive quadrature utilizes prior calculations at each iteration to find the best solution to the integral calculation of the LVM.

Quadrature Enhancement Step 3
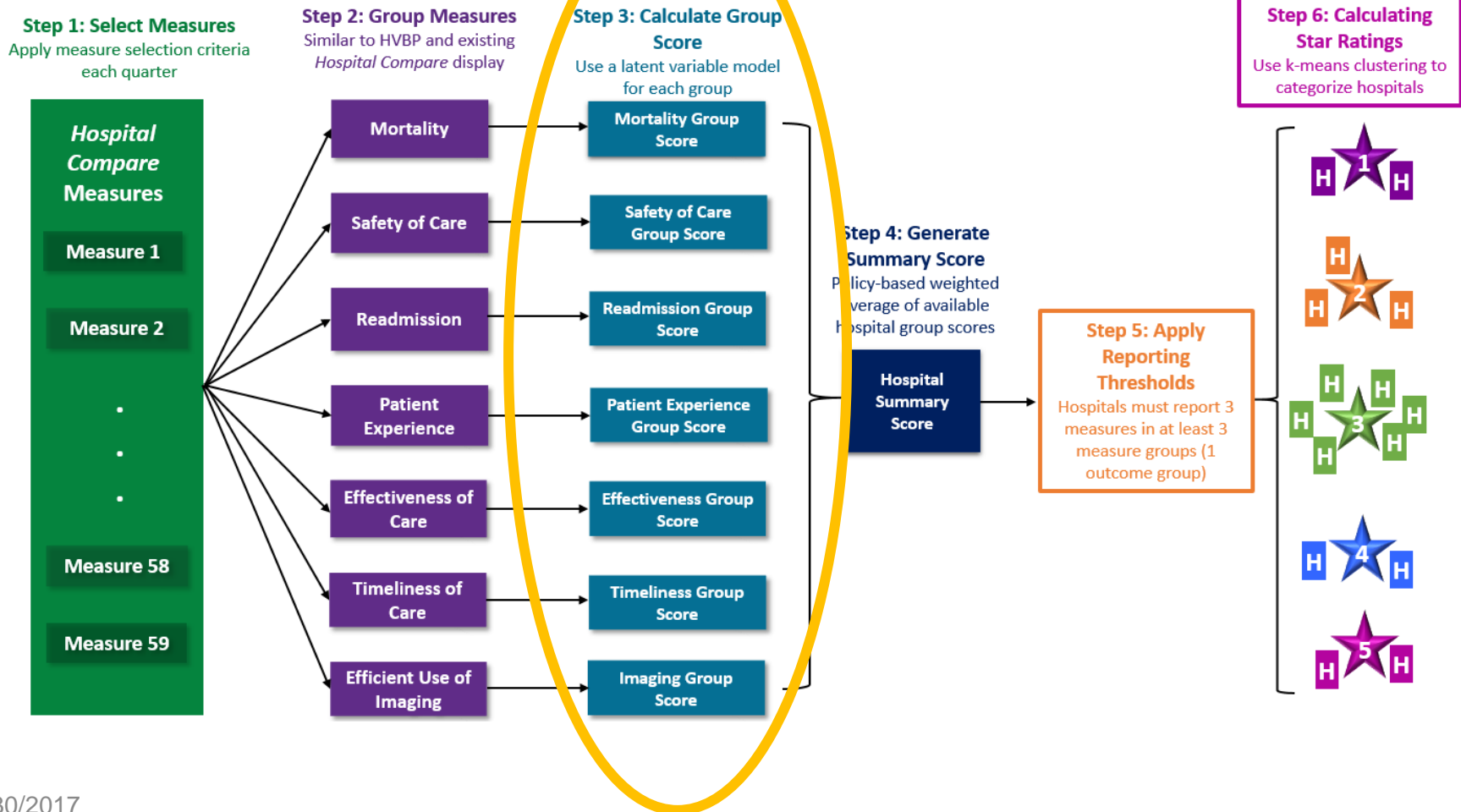
Quadrature Enhancement

- Results in:
  - Improved "stability" of hospital estimates.
    - The use of adaptive quadrature with the current approach results in virtually no change in group score estimation by the addition of quadrature points.
  - Modest improvement in reliability of each measure group and Star Ratings based on simulation reclassification testing.
    - Specifically, there is higher reliability of the middle star classifications (2–4 stars).
  - Minimally different, albeit broader, distribution of Star Ratings.

Impact Analyses

Distribution

Overall Star Ratings distribution of the previous methodology in December 2017 compared to the enhanced methodology in December 2017.

Star Rating	Previous Methodology (December 2017)	Methodology Enhancements (December 2017)
1	125 (3.39%)	260 (7.04%)
2	710 (19.23%)	753 (20.40%)
3	1,959 (53.06%)	1,187 (32.15%)
4	820 (22.21%)	1,155 (31.28%)
5	78 (2.11%)	337 (9.13%)

Reliability

Reliability (5,000 simulations) of Star Ratings with December 2017 methodology enhancement

Star Rating	1	2	3	4	5
1	86.9%	13.06%	0.04%	0%	0%
2	7.36%	76.21%	15.89%	0.52%	0.02%
3	0.4%	15.97%	66.14%	16.55%	0.95%
4	0.03%	1.4%	20.89%	66.43%	11.25%
5	0%	0.01%	0.48%	17.43%	82.08%

*This analysis determines the percent of hospitals that would receive that same Star Rating if the Star Ratings assignment was randomly simulated 5,000 times.

Reclassification

Reclassification of Star Ratings with previous methodology (down) vs. December 2017 methodology enhancements (across) using December 2017 data

Frequency (%)		Methodology Enhancement (December 2017)					
		1	2	3	4	5	Total
Previous Methodology (December 2017)	1	125 (100%)	0	0	0	0	**125**
	2	135 (19.0%)	575 (81.0%)	0	0	0	**710**
	3	0	178 (9.1%)	1,187 (60.6%)	594 (30.3%)	0	**1,959**
	4	0	0	0	561 (68.4%)	259 (31.6%)	**820**
	5	0	0	0	0	78 (100%)	**78**
	Total	**260**	**753**	**1,187**	**1,155**	**337**	**3,692**

Thank You

- For more information regarding Star Ratings, visit QualityNet.org.

- For additional questions, email cmsstarratings@lantanagroup.com.

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This program has been pre-approved for 1.0 continuing education (CE) unit for the following professional boards:

- **National**
  - Board of Registered Nursing (Provider #16578)
- **Florida**
  - Board of Clinical Social Work, Marriage & Family Therapy and Mental Health Counseling
  - Board of Nursing Home Administrators
  - Board of Dietetics and Nutrition Practice Council
  - Board of Pharmacy

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- Another page will open that asks you to register in the HSAG Learning Management Center.

  - o This is a separate registration from ReadyTalk®.
  - o Please use your **personal** email so you can receive your certificate.
  - o Healthcare facilities have firewalls up that block our certificates.

CE Certificate Problems

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- Please go back to the **New User** link and register your personal email account.
  - Personal emails do not have firewalls.

CE Credit Process: Survey

CE Credit Process: Certificate

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New User Link:
https://lmc.hshapps.com/register/default.aspx?ID=da0a12bc-db39-408f-b429-d6f6b9ccb1ae

Existing User Link:
https://lmc.hshapps.com/test/adduser.aspx?ID=da0a12bc-db39-408f-b429-d6f6b9ccb1ae
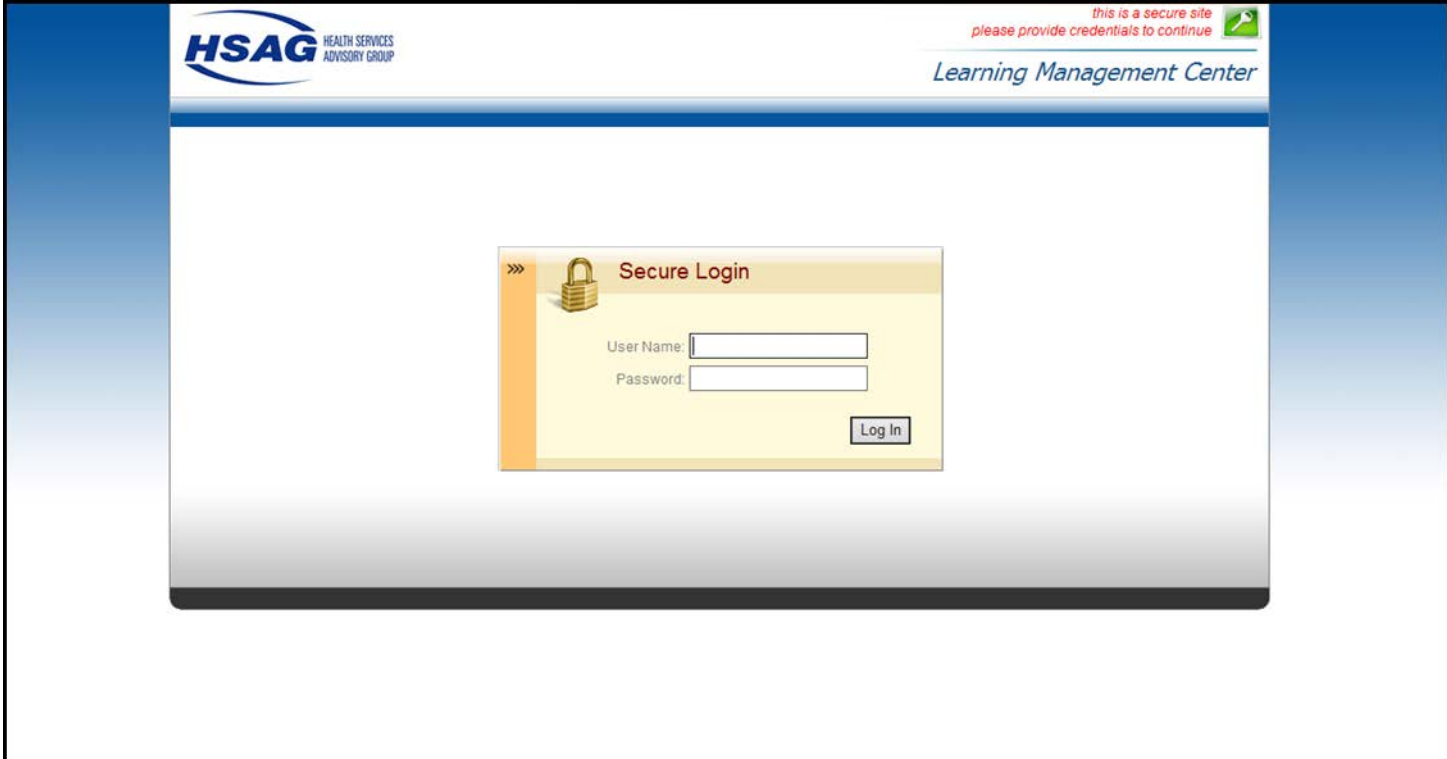
Note: If you click the 'Done' button below, you will not have the opportunity to receive your certificate without participating in a longer survey.

Done

CE Credit Process: New User

CE Credit Process: Existing User

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