NATIONAL QUALITY FORUM
Driving measurable health improvements together

MEASURE WORKSHEET

This document summarizes the evaluation of the measure as it progresses through NQF's Consensus Development Process (CDP). The information submitted by measure developers/stewards is included after the Brief Measure Information, Preliminary Analysis, and Pre-meeting Public and Member Comments sections.

To navigate the links in the worksheet: Ctrl + click link to go to the link; ALT + LEFT ARROW to return

Brief Measure Information

NQF #: 0431

Measure Title: Influenza Vaccination Coverage Among Healthcare Personnel

Measure Steward: Centers for Disease Control and Prevention

Brief Description of Measure: Percentage of healthcare personnel (HCP) who receive the influenza vaccination.

Developer Rationale: Use of this measure to monitor influenza vaccination among HCP is envisioned to result in increased influenza vaccination uptake among HCP, because improvements in tracking and reporting HCP influenza vaccination status will allow healthcare institutions to better identify and target unvaccinated HCP. Increased influenza vaccination coverage among HCP is expected to result in reduced morbidity and mortality related to influenza virus infection among patients, as described above in Section 1a.

Numerator Statement: HCP in the denominator population who during the time from October 1 (or when the vaccine became available) through March 31 of the following year:

a) received an influenza vaccination administered at the healthcare facility, or reported in writing (paper or electronic) or provided documentation that influenza vaccination was received elsewhere; or

b) were determined to have a medical contraindication/condition of severe allergic reaction to eggs or to other component(s) of the vaccine, or history of Guillain-Barré Syndrome within 6 weeks after a previous influenza vaccination; or

c) declined influenza vaccination

Each of the three submeasure numerators described above will be calculated and reported separately, alongside the overall numerator calculated as the aggregate of the three submeasure numerators.

Denominator Statement: Number of HCP in groups(a)-(c) below who are working in the healthcare facility for at least 1 working day between October 1 and March 31 of the following year, regardless of clinical responsibility or patient contact.
Denominator is reported in the aggregate; rates for each HCP group may be calculated separately for facility-level quality improvement purposes:

a) Employees: all persons who receive a direct paycheck from the reporting facility (i.e., on the facility's payroll).

b) Licensed independent practitioners: include physicians (MD, DO), advanced practice nurses, and physician assistants only who are affiliated with the reporting facility who do not receive a direct paycheck from the reporting facility.

c) Adult students/trainees and volunteers: include all students/trainees and volunteers aged 18 or over who do not receive a direct paycheck from the reporting facility.

Denominator Exclusions: None

Measure Type: Process

Data Source: Other

Level of Analysis: Facility

IF Endorsement Maintenance – Original Endorsement Date: 7/31/2008

Most Recent Endorsement Date: 1/17/2017

Preliminary Analysis: Maintenance of Endorsement

To maintain NQF endorsement, endorsed measures are evaluated periodically to ensure that the measure still meets the NQF endorsement criteria ("maintenance"). The emphasis for maintaining endorsement is focused on how effective the measure is for promoting improvements in quality. Endorsed measures should have some experience from the field to inform the evaluation. The emphasis for maintaining endorsement is noted for each criterion.

Criteria 1: Importance to Measure and Report

1a. Evidence

Maintenance measures – less emphasis on evidence unless there is new information or change in evidence since the prior evaluation.

1a. Evidence. The evidence requirements for a ***structure, process or intermediate outcome*** measure are that it is based on a systematic review (SR) and grading of the body of empirical evidence where the specific focus of the evidence matches what is being measured. For measures derived from patient report, evidence also should demonstrate that the target population values the measured process or structure and finds it meaningful.

The developer provides the following description for this measure:

- This is a maintenance process measure at the facility level that measures the percentage of healthcare personnel (HCP) who receive the influenza vaccination.
- The developer provides a logic model that depicts that monitoring of influenza vaccination among healthcare personnel will result in increased influenza vaccination uptake among healthcare personal. Improved tracking and reporting on healthcare personal influenza vaccination status will allow healthcare institutions to better identify and target unvaccinated healthcare personal and with the expected outcome of reduced morbidity and mortality related to influenza virus infection among patients, and healthcare personal.

The developer provides the following evidence for this measure:

- Systematic Review of the evidence specific to this measure? ☒ Yes ☐ No
- Quality, Quantity and Consistency of evidence provided? ☒ Yes ☐ No
- Evidence graded? ☒ Yes ☐ No

Summary of prior review in 2017

- The developer stated that the measure was based on 2010 Centers for Disease Control and Prevention guidelines: Prevention and control of influenza with vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP), which states:
    - "All HCP and persons in training for health-care professions should be vaccinated annually against influenza. Persons working in health-care settings who should be vaccinated include physicians, nurses, and other workers in both hospital and outpatient-care settings, medical emergency-response workers (e.g., paramedics and emergency medical technicians), employees of nursing home and long-term care facilities who have contact with patients or residents, and students in these professions who will have contact with patients."
- The developer also presented results of four randomized trials that were not conclusive because the primary outcome of mortality used in these studies was nonspecific and was not laboratory confirmed influenza. The developer noted the consistency of the findings on reduced mortality among long-term care residents across these four studies provided evidence of the beneficial effect of vaccinating healthcare personnel.

Changes to evidence from last review

☐ The developer attests that there have been no changes in the evidence since the measure was last evaluated.

☒ The developer provided updated evidence for this measure:

- The 2022 submission included a systematic review and meta-analysis of the direct epidemiological and economic effects of seasonal influenza vaccination on healthcare workers. It included 13 studies: 3 RCTs, 2 prospective cohort studies, and 8 retrospective cohort studies.
    - One study showed pooled results had a significant effect on healthcare workers (HCW) laboratory-confirmed influenza incidence, but not influenza-like illness (ILI), although ILI absenteeism among HCW was significantly reduced (and length of absenteeism was also reduced). These findings reinforce the influenza vaccine effects in reducing infection incidence and length of absenteeism among HCW.
    - The evidence was graded as moderate.
    - For observational studies assessed the risks of bias in ascertainment of exposure and assessment of outcome were assessed as potentially high.
    - For the randomized control trials, risk of selection bias by using Cochrane's tool was found to be "the most uncertain of all biases as there was a lack of information regarding randomization procedures in two of the three studies." Studies did not evaluate harms of vaccination.
- An additional 2022 submission included a systematic review and meta-analysis of 16 studies (19 arms), including 6 RCTs and 10 cohort studies.
    - Of the six RCTs, four had moderate risks of bias and two had low risks of bias.
    - Of the ten cohort studies, three displayed high quality and seven exhibited moderate quality.
    - The studies found that influenza vaccinations could effectively reduce the incidence of laboratory-confirmed influenza, absenteeism rates, and workdays lost among HCWs.
- Two additional studies were submitted there were published since the systematic review.
    - A single-center study from Singapore found no statistically significant association between vaccination coverage and nosocomial influenza incidence rate - although a protective effect

was suggested (IRR 0.89, 95%CI:0.69-1.15, p = 0.37). The developer states the study does not change the conclusions of the systematic review, because of the clinically significant difference and reasons provided in the study why the protective effect was not statistically significant.

- An update to the Advisory Committee on Immunization Practices (ACIP) recommended focusing vaccine efforts on those at higher risk for influenza complications when vaccine supply is limited. The developer states this recommendation does not change the conclusions from the systematic reviews.

Exception to evidence

- NA

Questions for the Committee:

- *The evidence provided by the developer is updated, directionally the same, and stronger compared to that for the previous NQF review. Does the Committee agree there is no need for repeat discussion and vote on Evidence?*
- *What is the relationship of this measure to patient outcomes?*
- *How strong is the evidence for this relationship?*
- *Is the evidence directly applicable to the process of care being measured?*

Guidance from the Evidence Algorithm

Process measure based on systematic review and grading (Box 3) → QQC provided in the submission (Box 4) → Quantity: High; Quality: Moderate; Consistency: Moderate/High (Box 5b) → Moderate

Preliminary rating for evidence: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

1b. Gap in Care/Opportunity for Improvement and Disparities

Maintenance measures – increased emphasis on gap and variation

1b. Performance Gap. The performance gap requirements include demonstrating quality problems and opportunity for improvement.

- The data provided show a gap in measure performance in acute care hospitals, ambulatory surgery centers, and long-term care facilities.
- The average vaccine coverage rate for healthcare personal in acute care hospitals was:
  - Employee vaccination – 91.4% (2019-2020 influenza season); 86.5% (2020-2021 influenza season)
  - Licensed independent practitioner vaccination – 81.2% (2019-2020 influenza season); 76.3% (2020-2021 influenza season)
  - Adult student/trainee and volunteer vaccination –90.2% (2019-2020 influenza season); 88.5% (2020-2021 influenza season)
  - All healthcare personal –89.5% (2019-2020 influenza season); 84.4% (2020-2021 influenza season)
- The average vaccine coverage rate for healthcare personal during the 2020-2021 influenza season in ambulatory surgery centers was:

    - Employee vaccination – 82.7 percent (2019-2020 influenza season); 82.5 percent (2020-2021 influenza season)
    - Licensed independent practitioner vaccination – 84.6 percent (2019-2020 influenza season); 86.7 percent (2020-2021 influenza season)
    - Adult student/trainee and volunteer vaccination – 86.3 percent (2019-2020 influenza season); 84.6 percent (2020-2021 influenza season)
    - All healthcare personal – 79.6 percent (2019-2020 influenza season); 83.2 percent (2020-2021 influenza season)
- The average vaccine coverage rate for healthcare personal during the 2020-2021 influenza season in long-term care facilities was:
    - Employee vaccination – 86.1 percent (2019-2020 influenza season); 81.6 percent (2020-2021 influenza season)
    - Licensed independent practitioner vaccination – 83.3 percent (2019-2020 influenza season); 85.2 percent (2020-2021 influenza season)
    - Adult student/trainee and volunteer vaccination – 91.3 percent (2019-2020 influenza season); 64.2 percent (2020-2021 influenza season)
    - All healthcare personal – 85.8 percent (2019-2020 influenza season); 79.6 percent (2020-2021 influenza season)

Disparities

- The measure analyzes vaccination rates at the facility level, thus the developer advised that this is not possible to assess individual differences in vaccination by racial/ethnic group, gender, age, or other sociodemographic variables.
- There has been variation in performance based on geographic location (state) and in all facility types.
    - Reported vaccination rates for the 2013-2014 influenza season for personnel working in hospitals ranged from 69.0%–97.6% for employees, 33.8%–93.6% for licensed independent practitioners, and 50.3%–96.3% for adult students/trainees and volunteers.
    - In the 2014-2015 season, reported rates ranged from 75.2%-98.3% for employees, 33.5%-95.9% for licensed independent practitioners, and 53.2%-97.2% for adult students/trainees and volunteers.

Questions for the Committee:

- *Is there a gap in care that warrants a national performance measure?*
- *If limited disparities information is provided, are you aware of evidence that disparities exist in this area of healthcare?*

Preliminary rating for opportunity for improvement: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:

1a. Evidence

- Goal is "Increased influenza vaccination coverage among HCP is expected to result in reduced morbidity and mortality related to influenza virus infection among patients" - however, data presented does not address risk for patients, and any benefit demonstrated is in long-term facility

patients (and does not show benefit in clinics, etc) Data also show higher workforce attendance, but this was not stated goal of measure.

- There is evidence to support this measure. The measure continues to meet the NQF endorsement criteria.
- Evidence is relevant to the measure. Applies directly. Relates to desired outcomes.
- Rating: Moderate, seems like we should review the relationship of this established measure to patient outcomes, not really seeing that data/evidence cited so far
- Directly
- There was strong evidence, based on systematic reviews and practice guidelines, in support of annual influenza vaccines for health care workers (HCWs), and the evidence base has been strengthened since this measure was last approved. It should be noted, however, that the numerator includes individuals who declined influenza vaccination essentially as successes. The guidelines, on the other hand, recommend that all providers be vaccinated, and some states require it. Thus, the measure is not consistent with the guidelines.
- Strong evidence provided
- This is a process measure at the facility level that measures the percentage of healthcare personnel (HCP) who receive the influenza vaccination. The evidence is report by Systematic Review of Evidence, Quality, Quantity and Consistency of Evidence is report and evidence is graded.

1b. Gap in Care/Opportunity for Improvement and Disparities

- See above- I would support this measure if goal was stated as benefit of retaining a healthy workforce, instead of outcome on patient risk (for which no data provided)
- The measure is collected by employment type but there is very little about disparities. It seems possible to collect disparities data within the workforce which could help with messaging and process improvement.
- Gap in care persists.
- Rating: Low, Gap & disparities evidence offered is > 5 years old
- Students vs employed, some geographic variation
- Overall performance is below universal coverage. In addition, the develop cites evidence of disparities by type of practitioner.
- Moderate evidence of PG; Geographic inequity at facility level, could have looked at inequities based on other facility-level characteristics, though
- The data provided show a gap in measure performance in acute care hospitals, ambulatory surgery centers, and long-term care facilities.

Criteria 2: Scientific Acceptability of Measure Properties

Complex measure evaluated by Scientific Methods Panel? ☐ **Yes** ☒ **No**

Evaluators: Staff

2a. Reliability: Specifications and Testing

For maintenance measures – no change in emphasis – specifications should be evaluated the same as with new measures.

2a1. Specifications requires the measure, as specified, to produce consistent (reliable) and credible (valid) results about the quality of care when implemented.

For maintenance measures – less emphasis if no new testing data provided.

2a2. Reliability testing demonstrates if the measure data elements are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period and/or that the measure score is precise enough to distinguish differences in performance across providers.

Specifications:

- No changes have been made to the measure specifications since the last endorsement date.
- Measure specifications are clear and precise.

Reliability Testing:

- Reliability testing has not been updated since the last review.
- Reliability testing conducted at the Patient/Encounter Level:
    - The developer conducted reliability testing at the patient or encounter level at 93 randomly selected facilities (i.e., 78 acute care hospitals, 59 long-term care facilities, 16 ambulatory surgical centers, 43 dialysis clinics, and 38 physician practices).
        - Inter-rater reliability was assessed via a review of 60 records using systematic sampling or simple random sampling. Smaller institutions may have assessed fewer than 60 records.
        - Site visits were conducted by the developer's project staff in Jurisdictions A and B, whereas facilities were asked to mail or fax records to the project staff in Jurisdiction C. Project staff compared the categorization of numerator and denominator status between facility staff and project staff and calculated a kappa statistic, as well as percent agreement, to evaluate consistency of using measure definitions.
        - The developer assessed the percentage of correct responses from facility staff across jurisdictions and measure elements to determine reliability of the measure based on consistency of understanding and applying definitions.
            - The inter-rater agreement, for numerator data, was 88% in Jurisdiction A (kappa: 0.82), 94% in Jurisdiction B (kappa: 0.89), and 80% in Jurisdiction C (kappa: 0.66).
            - The inter-rater agreement, for denominator data, was 97% in Jurisdiction A (kappa: 0.95), 99% in Jurisdiction B (kappa: 0.96), and 68% in Jurisdiction C (kappa: 0.55).
            - The developer notes that agreement was generally lower among facilities from Jurisdiction C for both the numerator and denominator, because Jurisdiction C was unable to conduct on-site validation visits, and therefore was not always able to review complete documentation for numerator or denominator data.
    - During the last review, the Standing Committee noted the following:
        - There is a lack of geographic variation in the testing sample population. Absent from the sample was representation from the Midwest and South.
        - At least two of the four states recruited for measure testing (New York and California) require HCP be vaccinated or wear a mask; these existing mandates may skew performance results.

Questions for the Committee regarding reliability:

- *Do you have any concerns that the measure cannot be consistently implemented (i.e., are measure specifications adequate)?*
- *The developer attests the specifications have not changed and that additional reliability testing was not conducted. Does the Committee agree that the measure is still reliable and there is no need for repeat discussion and vote on Reliability?*

Preliminary rating for reliability: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

2b. Validity: Validity testing; Exclusions; Risk-Adjustment; Meaningful Differences; Comparability; Missing Data

For maintenance measures – less emphasis if no new testing data provided.

2b2. Validity testing should demonstrate the measure data elements are correct and/or the measure score correctly reflects the quality of care provided, adequately identifying differences in quality.

2b2-2b6. Potential threats to validity should be assessed/addressed.

Validity Testing

- Validity testing has not been updated since the last review.
- Validity testing conducted at the Accountable Entity Level:
    - Convergent validity was assessed using a one-way ANOVA, where the developer examined the association between the number of evidence-based strategies used by a healthcare institution to promote influenza vaccination and the institution's reported vaccination rate among each denominator group of HCP.
        - The developer hypothesized that the vaccination rates would be positively correlated with an increasing number of strategies that have been found previously to be associated with higher influenza vaccination coverage among healthcare personnel.
        - A systematic assessment of face validity of performance measure score was performed in 2011.
        - Significance testing using a one-way ANOVA revealed:
            - The association between employee vaccination rates and number of strategies used was borderline significant at p=0.05.
            - The association between credentialed non-employee vaccination rates and number of strategies used was significant at p=0.02.
            - The association between other non-employee vaccination rates and number of strategies used was significant at p=0.01.
    - Face validity was assessed in 2011 using a modified Delphi technique via a panel of nine experts. The panel reached consensus on the definition of the various HCP type groups.

Exclusions

- The measure does not use exclusions.

Risk-Adjustment

- The measure is not risk adjusted or stratified.

Meaningful Differences

- There are no concerns with the ability to identify meaningful differences in performance.
- Performance differences were identified by a) above average performance: vaccination rate in the top quartile b) average performance: vaccination rate in the 2nd and 3rd quartile c) below average performance: vaccination rate in the bottom quartile.
- Vaccination coverage rates were calculated using reported data elements and then classified into quartiles for analysis.
- Among employees, the median influenza vaccination coverage rate was 63% (quartile 1: 44%, quartile 3: 79%). Among credentialed non-employees, the median influenza vaccination coverage rate was 46% (quartile 1: 8%, quartile 3: 90%). Among other non-employees, the median influenza vaccination coverage rate was 51% (quartile 1: 29%, quartile 3: 92%).
- The wide range between the first and third quartiles indicates substantially meaningful differences in performance that are easily detected by examining the data visually. In addition, there is clear variability by personnel group as identified by the 10-15 percentage point difference between the three different denominator groups.

Missing Data

- The developer has reviewed three years of data which shows that the proportion of healthcare personal for whom vaccination status cannot be assessed (missing data) is low and decreased over time for two of the three facility types, representing over 5,000 reporting facilities. It is believed that the risk of bias due to missing data is low.

Comparability

- The measure only uses one set of specifications for this measure.

Questions for the Committee regarding validity:

- *Do you have any concerns regarding the validity of the measure (e.g., exclusions, risk-adjustment approach, etc.)?*
- *The developer attests that additional validity testing was not conducted. Does the Standing Committee agree that the measure meets NQF's validity requirements and there is no need for repeat discussion and vote on Validity?*

Preliminary rating for validity: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:

2a1. Reliability – Specifications

- As noted, variation in mandates between states make measure difficult to evaluate need/effectiveness for
- There are not any changes in reliability since the last endorsement. No concerns.
- Data elements are clearly defined.
- Rating: moderate, missing 2 regions of the country (Midwest & South)
- None
- Reliability testing conducted at the patient/encounter level, with good results.
- All clear

- The reliability testing has remained the same as previously conducted by the developer. The developer conducted reliability testing at the patient or encounter level at 93 randomly selected facilities (i.e., 78 acute care hospitals, 59 long-term care facilities, 16 ambulatory surgical centers, 43 dialysis clinics, and 38 physician practices). Inter-rater reliability very high at Jurisdictions A (97%) and B (99%), not conducted at Jurisdiction C for on-site validation.

2a2. Reliability – Testing

- No concerns
- No concerns.
- No new reliability testing, not sure what the NQF standard is for that...
- None
- Testing at the patient/encounter level cannot support a high rating.
- Seems fine
- Lack of geographic variation and 2 of 4 states (NY and CA) require HCP be vaccinated or masked -could skew results

2b1. Validity – Testing

- No
- No
- As commented above
- None
- No concerns
- No concerns
- No concerns

2b2-2b3. Threats to validity (Exclusions, Risk Adjustment)

- No updates have been made. The measure is not risk-adjusted.
- The measure excludes non-employee clinicians who are not physicians, NPs or PAs. The LTC/SNF industry makes heavy use of nurses and rehab therapists from staffing agencies. Many hospitals also use nursing staffing agencies. This means that frontline clinicians who have daily contact with patients are excluded from this measure and, thus, misrepresents the degree to which healthcare personnel are vaccinated.
- Rating: moderate
- No concerns
- No concerns
- There are no exclusions or adjustments used or proposed
- There is no risk adjustment measure

2b4-2b7. Threats to validity (Statistically Significant Differences, Multiple Data Sources, Missing Data)

- Racial/gender data absent
- No
- See response re: threats to validity.
- No
- None

- No concerns
- No concerns with missing data, differences seem clear and meaningful
- There are no concerns with the ability to identify meaningful differences in performance. The risk of bias due to missing data is low.

Criterion 3. Feasibility

Maintenance measures – no change in emphasis – implementation issues may be more prominent

3. Feasibility is the extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

- Data elements are coded by someone other than person obtaining original information
- Some data elements are in defined fields in electronic sources
    - The measure captures data on healthcare personnel, not patients, as such it may be difficult to capture all data from electronic sources.
    - There are also aspects of the measure, such as verbal declination, that would be difficult to capture electronically

Questions for the Committee:

- *Are the required data elements routinely generated and used during care delivery?*
- *Are the required data elements available in electronic form, e.g., EHR or other electronic sources?*
- *Is the data collection strategy ready to be put into operational use?*

Preliminary rating for feasibility: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:

3. Feasibility

- Feasible dependent on HR software being utilized
- The required elements are routinely generated.
- No concerns.
- Rating: moderate
- No concern
- Measure currently in wide use.
- No concerns
- Some data are defined in electronic sources. Others, such as verbal decline are difficult to capture electronically

Criterion 4: Use and Usability

Maintenance measures – increased emphasis – much greater focus on measure use and usefulness, including both impact/improvement and unintended consequences

4a. Use (4a1. Accountability and Transparency; 4a2. Feedback on measure)

4a. Use evaluates the extent to which audiences (e.g., consumers, purchasers, providers, policymakers) use or could use performance results for both accountability and performance improvement activities.

4a.1. Accountability and Transparency. Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

Current uses of the measure

Publicly reported?	☒	Yes	☐	No		
Current use in an accountability program?	☒	Yes	☐	No	☐	UNCLEAR
Planned use in an accountability program?	☐	Yes	☐	No	☒	NA

Accountability program details

- Measure data is reported through the National Healthcare Safety Network (NHSN) by free-standing acute care facilities, inpatient rehabilitation facilities (IRFs), critical access hospitals, long-term acute care facilities, and prospective payment system (PPS)-exempt cancer hospitals, along with IRF units located within acute care facilities, long-term acute care facilities, critical access hospitals, and inpatient psychiatric facilities.
    - Publicly reported information is available via: CMS Hospital Inpatient Quality Reporting Program, CMS Inpatient Rehabilitation Facility Quality Reporting Program, and CMS Long Term Care Hospital Quality Reporting Program
- The measure is recommended by The Joint Commission to fulfill element of performance number six of accreditation standard IC.02.04.01, which requires facilities to have a written methodology of how staff influenza vaccination is tracked.

4a.2. Feedback on the measure by those being measured or others. Three criteria demonstrate feedback: 1) those being measured have been given performance results or data, as well as assistance with interpreting the measure results and data; 2) those being measured and other users have been given an opportunity to provide feedback on the measure performance or implementation; 3) this feedback has been considered when changes are incorporated into the measure

Feedback on the measure by those being measured or others

- Facilities may use the NHSN analysis tools to check data entry accuracy, examine data for certain time periods during the influenza season and compare data to previous seasons. Assistance is also available to reporting facilities through the NHSN website support helpdesk.
- Summary measure results are published annually.
- Feedback has been received through qualitative and quantitative evaluations
    - One thousand hospitals were surveyed on implementation and use of this measure for the 2012-2013 influenza season.
      Semi-structured telephone interviews were also conducted with staff of 46 hospitals.
- Facilities appeared to recognize the importance of the measure, but reported the following challenges
    - Tracking and collecting vaccination data from non-employee contracted personnel, which is not a required reporting category for the measure.
      Larger facilities reported more challenges than smaller facilities.

***Questions for the Committee**:*

- *How have (or can) the performance results be used to further the goal of high-quality, efficient healthcare?*
- *Has measure feedback been recently obtained from those being measured?*

Preliminary rating for Use: ☒ **Pass** ☐ **No Pass**

4b. Usability (4a1. Improvement; 4a2. Benefits of measure)

4b. Usability evaluates the extent to which audiences (e.g., consumers, purchasers, providers, policymakers) use or could use performance results for both accountability and performance improvement activities.

4b.1 Improvement. Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated.

Improvement results

- Improvement in HCP influenza vaccination coverage has occurred over time.
    - The exception to improvement was the 2020-2021 season, which the developer states is likely due to the COVID-19 pandemic.
      Pre-pandemic HCP influenza vaccination coverage rates should be used as goals for facilities to re-achieve or exceed as the COVID-19 pandemic is addressed.
      In acute care hospitals, overall HCP vaccination coverage improved from the 2015-2016 season through the 2019-2020 season:
        - 2015-2016 season: 86.4% (interquartile range, 62.5%-97.3%) among 4,640 facilities
          2019-2020 season: 89.5% (interquartile range, 86.0%-97.5%) among 2,908 facilities
          2020-2021 season: 84.4% (interquartile range, 77.4%-96.1%) among 4,464 facilities
    - In ambulatory surgery centers (ASCs), overall HCP vaccination coverage has continued to improve since the 2015-2016 season:
        - 2015-2016 season: 76.3% (interquartile range, 71.4%-89.1%) among 4,278 facilities
          2019-2020 season: 82.7% (interquartile range, 74.1%-97.6%) among 532 facilities
          2020-2021 season: 83.2% (interquartile range, 75.0%-97.2%) among 461 facilities
    - In long-term care facilities (LTCs), HCP vaccination coverage was collected in few facilities until the 2019-2020 season, and HCP vaccination coverage declined in the 2020-2021 season, likely due to disruptions from the COVID-19 pandemic:
        - 2019-2020 season: 85.8% (interquartile range, 80.9%-97.8%) among 37 facilities
          2020-2021 season: 79.6% (interquartile range, 66.7%-95.3%) among 47 facilities

4b2. Benefits vs. harms. Benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such evidence exists).

Unexpected findings (positive or negative) during implementation

- No unexpected findings were discovered in 2019-2020 or 2020-21 influenza seasons.

Potential harms

- The developer is not aware of any unintended consequences, positive or negative, that have resulted from use of this measure.

Additional Feedback:

- This measure was reviewed by the Measure Applications Partnership (MAP) for the Skilled Nursing Facility Quality Reporting Program SNF QRP program in 2021. MAP supported the measure for inclusion in the Skilled Nursing Facility Quality Reporting Program. MAP's rationale was that this measure added value to the Skilled Nursing Facility Quality Reporting Program because it addresses something not currently addressed in this program and it aligns with other Post-Acute Care / Long Term Care programs utilizing the same measure. MAP also noted that vaccination coverage among healthcare professionals within SNF facilities can decrease influenza transmission and decrease morbidity and mortality among patients.
- Large-scale feedback regarding the burden of the measure or any indication that the measure is not performing well has not been received from those being measured.

***Questions for the Committee**:*

- *How can the performance results be used to further the goal of high-quality, efficient healthcare?*
- *Do the benefits of the measure outweigh any potential unintended consequences?*

Preliminary rating for Usability and use: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee Pre-evaluation Comments:

4a. Use

- Yes- feedback collected
- This is an easily understood measure. Those being measured have been given performance results.
- Because the measure "excludes" non-medical personnel contracted through staffing agencies, it misrepresents the extent to which healthcare personnel, especially patient-facing personnel, are vaccinated.
- No explicit feedback from those measured was shared, this may hamper transparency & continuous improvement
- No concern
- No comments
- No concerns
- Results used for public reporting and accountability programs. Facilities use qualitative and quantitative feedback to improve flu vaccinations. Data is reported to facilities through NHSN reports. Public reporting through CMS hospital IQRP.

4b. Usability

- No identified unintended consequences.
- The measure would be more usable if the licensed independent practitioner was revised to include all licensed or regulated healthcare personnel whose services are provided under contract.
- Rating: moderate
- Workforce shifts to population with greater compliance could equate to those who can absorb the education
- No comments
- No concerns
- Yes

Criterion 5: Related and Competing Measures

Related measures

- NQF # 0041 Preventative Care and Screening: Influenza Immunization
- NQF #0226 Influenza Immunization in the ESRD Population (Facility Level)
- NQF #0680 Percent of Residents Who Were Assessed and Appropriately Given the Seasonal Influenza Vaccine (Short-Stay)
- NQF #1659 Influenza Immunizations
- NQF #3684 Percent of Residents or Patients Who Were Assessed and Appropriately Given the Seasonal Influenza Vaccine (short stay)

Harmonization

- The developer advises that the measure specifications are harmonized to the extent possible.

Committee Pre-evaluation Comments:

5: Related and Competing Measures

- Distinct from other influenza vaccine measures
- There are related measures regarding vaccination for the general public. They are being harmonized.
- No.
- Appears to be harmonized appropriately
- None
- All flu vaccine measures should have the same inclusion and exclusion criteria, consistent with NQF report of a few years ago.
- No concerns
- There are several related measures. The developer advises that the measure specifications are harmonized to the extent possible.

Public and NQF Member Comments (Submitted as of June 15, 2022)

Member Expression of Support

- No member submitted an expression of support.

Comments

- No NQF member and public comments were received in advance of the Standing Committee evaluation

Scientific Acceptability Evaluation

RELIABILITY: SPECIFICATIONS

1. **Have measure specifications changed since the last review? ☐ Yes ☒ No**
2. **Are submitted specifications precise, unambiguous, and complete so that they can be consistently implemented? ☒ Yes ☐ No**
3. **Briefly summarize any changes to the measure specifications and/or concerns about the measure specifications.**
   - No changes have been made to the measure specifications since the last endorsement date.

RELIABILITY: TESTING

4. **Did the developer conduct new reliability testing? ☐ Yes ☒ No**

   4a. If no, summarize the Standing Committee's previous feedback:

   - Committee members noted lack of geographic variation in the testing sample population. Absent from the sample was representation from the Midwest and South.
   - One Committee member noted that at least two of the four states recruited for measure testing (New York and California) require HCP be vaccinated or wear a mask; these existing mandates may skew performance results.

   4b. If yes, describe any differences between the new and old testing and summarize any relevant Standing Committee's feedback from the previous review:

   - NA

5. **Reliability testing level: ☐ Accountable-Entity Level ☒ Patient/Encounter Level ☐ Neither**
6. **Reliability testing was conducted with the data source and level of analysis indicated for this measure:**

   ☒ Yes ☐ No

7. If accountable-entity level and/or patient/encounter level reliability testing was NOT conducted or if the methods used were NOT appropriate, was **empirical VALIDITY testing** of patient-level data conducted?

   ☐ Yes ☒ No

8. **Assess the method(s) used for reliability testing:**

   - The developer conducted reliability testing at the patient or encounter level at 93 randomly selected facilities (i.e., 78 acute care hospitals, 59 long-term care facilities, 16 ambulatory surgical centers, 43 dialysis clinics, and 38 physician practices).
   - Inter-rater reliability was assessed via a review of 60 records using systematic sampling or simple random sampling. Smaller institutions may have assessed fewer than 60 records.
   - Site visits were conducted by project staff in Jurisdictions A and B, whereas facilities were asked to mail or fax records to the project staff in Jurisdiction C. Project staff compared the categorization of numerator and denominator status between facility staff and project staff and calculated a kappa statistic, as well as percent agreement, to evaluate consistency of using measure definitions.
   - Each institution also received a series of case studies to assess their comprehension of the measure definitions. The developer assessed the percentage of correct responses from facility staff across jurisdictions and measure elements to determine reliability of the measure based on consistency of understanding and applying definitions.

9. **Assess the results of reliability testing**

   - The inter-rater agreement, for numerator data, was 88% in Jurisdiction A (kappa: 0.82), 94% in Jurisdiction B (kappa: 0.89), and 80% in Jurisdiction C (kappa: 0.66).
   - The inter-rater agreement, for denominator data, was 97% in Jurisdiction A (kappa: 0.95), 99% in Jurisdiction B (kappa: 0.96), and 68% in Jurisdiction C (kappa: 0.55).
   - For both numerator and denominator, agreement was generally lower among facilities from Jurisdiction C, because Jurisdiction C was unable to conduct on-site validation visits, and therefore was not always able to review complete documentation for numerator or denominator data.
   - For case studies, 21 of 23 vignettes were correctly answered by the majority of facilities
   - Based on the case study results the developers made measure specification updates to address areas of the measure definitions that were poorly understood.

10. Was the method described and appropriate for assessing the proportion of variability due to real differences among measured entities? **NOTE:** If multiple methods used, at least one must be appropriate.

☒ **Yes** ☐ **No** ☐ **Not applicable**

11. Was the method described and appropriate for assessing the reliability of ALL critical data elements?

    ☒ **Yes** ☐ **No** ☐ **Not applicable** (patient/encounter level testing was not performed)

12. **OVERALL RATING OF RELIABILITY** (taking into account precision of specifications and all testing results):

    ☐ **High** (NOTE: Can be HIGH only if accountable-entity level testing has been conducted)

    ☒ **Moderate** (NOTE: Moderate is the highest eligible rating if accountable-entity level testing has not been conducted)

    ☐ **Low** (NOTE: Should rate LOW if you believe specifications are NOT precise, unambiguous, and complete or if testing methods/results are not adequate)

    ☐ **Insufficient** (NOTE: Should rate INSUFFICIENT if you believe you do not have the information you need to make a rating decision)

13. **Briefly explain rationale for the rating of OVERALL RATING OF RELIABILITY and any concerns you may have with the approach to demonstrating reliability.**

    - The inter-rater agreement Kappa scores show high or moderate certainty or confidence that the critical patient/encounter level data elements used in the measure are reliable.

VALIDITY: TESTING

14. **Did the developer conduct new validity testing? ☐ Yes ☒ No**

    14a. If no, summarize the Standing Committee's previous feedback:

    - Convergent validity was assessed using a one-way ANOVA, where the developer examined the association between the number of evidence-based strategies used by a healthcare institution to promote influenza vaccination and the institution's reported vaccination rate among each denominator group of HCP. The developer expected that vaccination rates would be positively correlated with an increasing number of strategies that have been found previously to be associated with higher influenza vaccination coverage among HCP.
    - The association between employee vaccination rates and number of strategies used was borderline significant at p=0.05; between credentialed non-employee vaccination rates and number of strategies it was significant at p=0.02; and between other non-employee vaccination rates and number of strategies used was significant at p=0.01.
    - Face validity was assessed in 2011 using a modified Delphi technique via a panel of nine experts. The panel reached consensus on the definition of the various HCP type groups.

    14b. If yes, describe any differences between the new and old testing and summarize any relevant Standing Committee's feedback from the previous review:

    - NA

15. **Validity testing level (check all that apply):**

    ☒ **Accountable-Entity Level** ☐ **Patient or Encounter-Level** ☐ **Both**

    NOTE: Empirical validity testing is expected at time of maintenance review; if not possible, justification is required.

16. **If patient/encounter level validity testing was provided, was the method described and appropriate for assessing the accuracy of ALL critical data elements? NOTE:** Data element validation from the literature is acceptable.

    ☐ **Yes**

    ☐ **No**

    ☒ **Not applicable** (patient/encounter level testing was not performed)

17. **Method of establishing validity at the accountable-entity level:**

☒ **Face validity**

☒ **Empirical validity testing at the accountable-entity level**

☐ **N/A (accountable-entity level testing not conducted)**

18. **Was the method described and appropriate for assessing conceptually and theoretically sound hypothesized relationships?**

☒ **Yes**

☐ **No**

☐ **Not applicable** (accountable-entity level testing was not performed)

19. **Assess the method(s) for establishing validity**

- The developer performed empirical validity testing using convergent validity, by using survey questions asked of all pilot participants (n=234).
- Convergent validity was assessed by examine the association between the number of evidence-based strategies used by healthcare institutions to promote influenza vaccination and the institution's reported vaccination rate among each denominator group of healthcare personal.
- The developer hypothesized that the vaccination rates would be positively correlated with an increasing number of strategies that have been found previously to be associated with higher influenza vaccination coverage among healthcare personnel.
- A systematic assessment of face validity of performance measure score was performed in 2011.

20. **Assess the results(s) for establishing validity**

- Significance testing using a one-way ANOVA revealed:
  - The association between employee vaccination rates and number of strategies used was borderline significant at p=0.05.
  - The association between credentialed non-employee vaccination rates and number of strategies used was significant at p=0.02.
  - The association between other non-employee vaccination rates and number of strategies used was significant at p=0.01.
- Validity testing demonstrated statistically significant associations between strategies known to increase healthcare personnel vaccination uptake and higher vaccination rates reported by facilities for the three subgroups of healthcare personal examined in this testing.
- The developer performed additional convergent validity analysis using inpatient (hospital) and outpatient (ambulatory surgery center) data from over 2,000 facilities who were reporting the measure during the 2015-2016 influenza season and the results obtained were similar.

VALIDITY: ASSESSMENT OF THREATS TO VALIDITY

21. **Please describe any concerns you have with measure exclusions.**

- There are no measure exclusions for the measure.

22. **Risk Adjustment**

22a. **Risk-adjustment method**

☒ None (only answer Question 22b and 22e) ☐ Statistical model ☐ Stratification

☐ Other method assessing risk factors (please specify)

22b. **If not risk-adjusted, is this supported by either a conceptual rationale or empirical analyses?**

☐ Yes ☐ No ☒ Not applicable

22c. **Social risk adjustment:**

22c.1 Are social risk factors included in risk model? ☐ Yes ☐ No ☒ Not applicable

22c.2 Conceptual rationale for social risk factors included? ☐ Yes ☐ No

22c.3 Is there a conceptual relationship between potential social risk factor variables and the measure focus? ☐ Yes ☐ No

22d.**Risk adjustment summary:**

22d.1 All of the risk-adjustment variables present at the start of care? ☐ Yes ☐ No

22d.2 If factors not present at the start of care, do you agree with the rationale provided for inclusion? ☐ Yes ☐ No

22d.3 Is the risk adjustment approach appropriately developed and assessed? ☐ Yes ☐ No

22d.4 Do analyses indicate acceptable results (e.g., acceptable discrimination and calibration) ☐ Yes ☐ No

22d.5.Appropriate risk-adjustment strategy included in the measure? ☐ Yes ☐ No

22e**. Assess the risk-adjustment approach**

- NA

23. **Please describe any concerns you have regarding the ability to identify meaningful differences in performance.**

For cost/resource use measures, does this measure identify meaningful differences about cost and resource use between the measured entities?

- There are no concerns with the ability to identify meaningful differences in performance.
  - Performance differences were identified by a) above average performance: vaccination rate in the top quartile b) average performance: vaccination rate in the 2nd and 3rd quartile c) below average performance: vaccination rate in the bottom quartile.
  - Vaccination coverage rates were calculated using reported data elements and then classified into quartiles for analysis.
  - Among employees, the median influenza vaccination coverage rate was 63% (quartile 1: 44%, quartile 3: 79%). Among credentialed non-employees, the median influenza vaccination coverage rate was 46% (quartile 1: 8%, quartile 3: 90%). Among other non-employees, the median influenza vaccination coverage rate was 51% (quartile 1: 29%, quartile 3: 92%).
  - The wide range between the first and third quartiles indicates substantially meaningful differences in performance that are easily detected by examining the data visually. In addition, there is clear variability by personnel group as identified by the 10-15 percentage point difference between the three different denominator groups.

24. **Please describe any concerns you have regarding comparability of results if multiple data sources or methods are specified.**

- The measure is not risk adjusted and there is not more than one set of specifications for this measure.

25. **Please describe any concerns you have regarding missing data.**

- The developer has reviewed three years of data which shows that the proportion of healthcare personal for whom vaccination status cannot be assessed (missing data) is low and decreased over time for two of the three facility types, representing over 5,000 reporting facilities. It is believed that the risk of bias due to missing data is low.

For cost/resource use measures ONLY:

If not cost/resource use measure, please skip to question 25.

26. **Are the specifications in alignment with the stated measure intent?**

☐ **Yes** ☐ **Somewhat** ☐ **No (If "Somewhat" or "No", please explain)**

27. **Describe any concerns of threats to validity related to attribution, the costing approach, carve outs, or truncation (approach to outliers):**
28. **OVERALL RATING OF VALIDITY taking into account the results and scope of all testing and analysis of potential threats.**

    ☐ **High** (NOTE: Can be HIGH only if accountable-entity level testing has been conducted)

    ☒ **Moderate** (NOTE: Moderate is the highest eligible rating if accountable-entity level testing has NOT been conducted)

    ☐ **Low** (NOTE: Should rate LOW if you believe that there are threats to validity and/or relevant threats to validity were not assessed OR if testing methods/results are not adequate)

    ☐ **Insufficient** (NOTE: For instrument-based measures and some composite measures, testing at both the accountable-entity level and the patient/encounter level is required; if not conducted, should rate as INSUFFICIENT.)

29. **Briefly explain rationale for rating of OVERALL RATING OF VALIDITY and any concerns you may have with the developers' approach to demonstrating validity.**

    • Empirical validity testing was performed (Box 2) at the accountable entity level (Box 5), construct validity was performed at the convergent level which revealed differences in accountable entity levels between groups (Box 6), there is moderate certainty or confidence that the accountable entity levels are a valid indicator of quality.

FOR COMPOSITE MEASURES ONLY: Empirical analyses to support composite construction

30. **What is the level of certainty or confidence that the empirical analysis demonstrates that the component measures add value to the composite and that the aggregation and weighting rules are consistent with the quality construct?**

    ☐ **High**

    ☐ **Moderate**

    ☐ **Low**

    ☐ **Insufficient**

31. **Briefly explain rationale for rating of EMPIRICAL ANALYSES TO SUPPORT COMPOSITE CONSTRUCTION**

    • [Summary]

ADDITIONAL RECOMMENDATIONS

32. **If you have listed any concerns in this form, do you believe these concerns warrant further discussion by the multi-stakeholder Standing Committee? If so, please list those concerns below.**

    • [Summary]

Criteria 1: Importance to Measure and Report

1a. Evidence

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria

---

1ma.01. Indicate whether there is new evidence about the measure since the most recent maintenance evaluation. If yes, please briefly summarize the new evidence, and ensure you have updated entries in the Evidence section as needed.

[Response Begins]

Yes

[Yes Please Explain]

2022 Submission

Recent systematic reviews conclude that influenza vaccination of healthcare personnel (HCP) could effectively reduce the incidence of laboratory-confirmed influenza, absenteeism rates, and workdays lost among HCPs.

[Response Ends]

Please separate added or updated information from the most recent measure evaluation within each question response in the Importance to Measure and Report: Evidence section. For example:

2021 Submission:

Updated evidence information here.

2018 Submission:

Evidence from the previous submission here.

1a.01. Provide a logic model.

Briefly describe the steps between the healthcare structures and processes (e.g., interventions, or services) and the patient's health outcome(s). The relationships in the diagram should be easily understood by general, non-technical audiences. Indicate the structure, process or outcome being measured.

[Response Begins]

Use of this measure to monitor influenza vaccination among healthcare personnel (HCP) is envisioned to result in increased influenza vaccination uptake among HCP, because improvements in tracking and reporting HCP influenza vaccination status will allow healthcare institutions to better identify and target unvaccinated HCP. Increased influenza vaccination coverage among HCP is expected to result in reduced morbidity and mortality related to influenza virus infection among patients, and HCP.

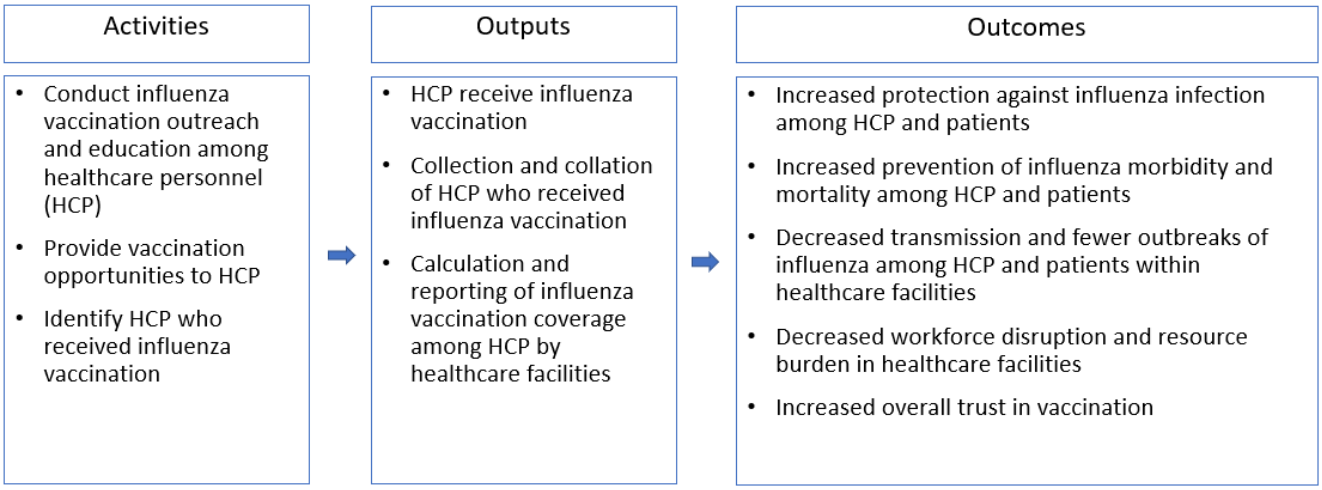

Figure. Logic model describing steps between monitoring influenza vaccination among healthcare personnel (HCP) and positive HCP and patient outcomes.

Activities include: conducting influenza vaccination outreach and education among healthcare personnel (HCP); providing vaccination opportunities to HCP; and identifying HCP who received influenza vaccination.

Outputs include: HCP receiving influenza vaccination; collection and collation of HCP who received influenza vaccination; and calculation and reporting of influenza vaccination coverage among HCP by healthcare facilities.

Outcomes include: increased protection against influenza infection among HCP and patients; increased prevention of influenza morbidity and mortality among HCP and patients; decreased transmission and fewer outbreaks of influenza among HCP and patients within healthcare facilities; decreased workforce disruption and resource burden in healthcare facilities; and increased overall trust in vaccination.

[Response Ends]

1a.02. Select the type of source for the systematic review of the body of evidence that supports the performance measure.

A systematic review is a scientific investigation that focuses on a specific question and uses explicit, prespecified scientific methods to identify, select, assess, and summarize the findings of similar but separate studies. It may include a quantitative synthesis (meta-analysis), depending on the available data.

[Response Begins]

Clinical Practice Guideline recommendation (with evidence review)

Other systematic review and grading of the body of evidence (e.g., Cochrane Collaboration, AHRQ Evidence Practice Center)

Other (specify)

[Other (specify) Please Explain]

2017, 2013 Submission

Four cluster-randomized controlled trials of the effect of influenza vaccination of healthcare personnel on outcomes in long-term care residents.

[Response Ends]

If the evidence is not based on a systematic review, skip to the end of the section and do not complete the repeatable question group below. If you wish to include more than one systematic review, add additional tables by clicking "Add" after the final question in the group.

Evidence - Systematic Reviews Table (Repeatable)

Group 1 - Evidence - Systematic Reviews Table

1a.03. Provide the title, author, date, citation (including page number) and URL for the systematic review.

[Response Begins]

2017 Submission:

- Effect of Influenza Vaccination of Healthcare Personnel on Morbidity and Mortality Among Patients: Systematic Review and Grading of Evidence. Faruque Ahmed, Megan C Lindley, Norma Allred, et al. Clin Infect Dis 2014 Jan;58(1):50-7. doi: 10.1093/cid/cit580. Epub 2013 Sep 17. https://pubmed.ncbi.nlm.nih.gov/24046301/

[Response Ends]

1a.04. Quote the guideline or recommendation verbatim about the process, structure or intermediate outcome being measured. If not a guideline, summarize the conclusions from the systematic review.

[Response Begins]

2017 Submission: There is moderate quality of evidence that HCP influenza vaccination reduces mortality and influenza cases in patients of healthcare facilities. HCP influenza vaccination can enhance patient safety.

[Response Ends]

1a.05. Provide the grade assigned to the evidence associated with the recommendation, and include the definition of the grade.

[Response Begins]

2017 Submission: Ahmed et al. assigned a moderate grade for HCP influenza vaccination reducing mortality and influenza cases in patients of healthcare facilities. The study used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology for grading the quality of evidence. "Grading quality of evidence begins with the study design. The initial evidence grade is classified as high for randomized controlled trials (RCTs) and low for observational studies. There are 5 GRADE criteria for downgrading the evidence grade: risk of bias, inconsistency, indirectness, imprecision, and publication bias. There are 3 GRADE criteria for upgrading the evidence grade: large magnitude of effect, dose-response, and opposing residual confounding or bias. These criteria determine the final classification into 4 evidence grades (high, moderate, low, or very low). The evidence grades reflect confidence in effect estimates."

[Response Ends]

1a.06. Provide all other grades and definitions from the evidence grading system.

[Response Begins]

2017 Submission: Ahmed et al. found the evidence of quality for the effect of HCP vaccination on patient hospitalization was low, as was the quality of evidence for the effect of HCP vaccination on influenza cases. The overall quality of evidence was moderate. Definitions of grades already provided in 1a.05).

[Response Ends]

1a.07. Provide the grade assigned to the recommendation, with definition of the grade.

[Response Begins]

Not applicable (systematic review). See 1a.05) for grade assigned to evidence for systematic reviews.

[Response Ends]

1a.08. Provide all other grades and definitions from the recommendation grading system.

[Response Begins]

Not applicable (systematic review). See 1a.06) for grade assigned to evidence for systematic reviews.

[Response Ends]

1a.09. Detail the quantity (how many studies) and quality (the type of studies) of the evidence.

[Response Begins]

2017 Submission: Ahmed et al. included 8 studies, 4 cluster randomized controlled trials and 4 cohort or case-control studies.

[Response Ends]

1a.10. Provide the estimates of benefit, and consistency across studies.

[Response Begins]

2017 Submission: In Ahmed et al., the risk difference for all-cause mortality was 44 fewer deaths per 1000 patients when the control group risk was 151 deaths per 1000 patients (Table 1); the risk difference was 17 fewer deaths per 1000 when the assumed control group risk was 60 per 1000. The pooled risk ratio and the relative risk reduction were 0.60 (95% CI, .44–.82) and 40% (95% CI, 18%–56%), respectively. For the subgroup with follow-up periods confined to the period of influenza activity, the pooled risk ratio was 0.78 (95% CI, .62–.99) and the relative risk reduction was 22% (95% CI, 1%–38%). There was low statistical heterogeneity for all outcomes.

[Response Ends]

1a.11. Indicate what, if any, harms were identified in the study.

[Response Begins]

Studies did not evaluate harms of vaccination.

[Response Ends]

1a.12. Identify any new studies conducted since the systematic review, and indicate whether the new studies change the conclusions from the systematic review.

[Response Begins]

(see below)

[Response Ends]

Group 2 - Evidence - Systematic Reviews Table

1a.03. Provide the title, author, date, citation (including page number) and URL for the systematic review.

[Response Begins]

2022 Submission:

- A systematic review and meta-analysis of the direct epidemiological and economic effects of seasonal influenza vaccination on healthcare workers. Chisato Imai, Michiko Toizumi, Lisa Hall, et al. *PLoS One* 2018 Jun 7;13(6):e0198685. doi: 10.1371/journal.pone.0198685. eCollection 2018. https://pubmed.ncbi.nlm.nih.gov/29879206/

[Response Ends]

1a.04. Quote the guideline or recommendation verbatim about the process, structure or intermediate outcome being measured. If not a guideline, summarize the conclusions from the systematic review.

[Response Begins]

2022 Submission:

- Imai et al: Pooled results showed a significant effect on HCW laboratory-confirmed influenza incidence but not influenza-like illness (ILI), although ILI absenteeism among HCW was significantly reduced (and length of absenteeism was also reduced). These findings reinforce the influenza vaccine effects in reducing infection incidence and length of absenteeism among HCW.

[Response Ends]

1a.05. Provide the grade assigned to the evidence associated with the recommendation, and include the definition of the grade.

[Response Begins]

2022 Submission:

- Imai et al: The authors found a moderate quality of evidence for observational studies in their analysis, using the number of stars assigned on the Newcastle-Ottawa Scale (NOS) which is a bias risk tool. They categorized the quality of observational studies as follows: seven to nine stars on the NOS was labeled high quality, five to six stars moderate quality, and four or fewer stars low quality.

[Response Ends]

1a.06. Provide all other grades and definitions from the evidence grading system.

[Response Begins]

2022 Submission:

- Imai et al. used the Cochrane Collaboration tool for bias evaluation of randomized controlled trials (RCTs), requires evaluations of six domains: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other sources of bias. Using Cochrane's tool, each RCT study was classified into unclear, low, or high risk for each domain. The authors used the Newcastle-Ottawa Scale (NOS) to evaluate risk of bias in observational studies; the NOS uses a star system, with a maximum nine stars and evaluates three domains with a total eight items: the selection of the study groups, the comparability of the groups, and the ascertainment of outcome of interest. Each item of NOS was

rated by unclear (no star), low risk (one or more stars), or high risk (no star). For observational studies as assessed by the authors using the ROS, the risks of bias in ascertainment of exposure and assessment of outcome were assessed as potentially high. For the RCTs, risk of selection bias by using Cochrane's tool was found to be "the most uncertain of all biases as there was a lack of information regarding randomization procedures in two of the three studies."

[Response Ends]

1a.07. Provide the grade assigned to the recommendation, with definition of the grade.

[Response Begins]

Not applicable (systematic review). See 1a.05) for grade assigned to evidence for systematic reviews.

[Response Ends]

1a.08. Provide all other grades and definitions from the recommendation grading system.

[Response Begins]

Not applicable (systematic review). See 1a.06) for grade assigned to evidence for systematic reviews.

[Response Ends]

1a.09. Detail the quantity (how many studies) and quality (the type of studies) of the evidence.

[Response Begins]

2022 Submission:

- Imai et al. included 13 studies: 3 RCTs, 2 prospective cohort studies, and 8 retrospective cohort studies.

[Response Ends]

1a.10. Provide the estimates of benefit, and consistency across studies.

[Response Begins]

2022 Submission:

- Imai et al. found the overall pooled RR across all four studies of laboratory-confirmed influenza cases was 0.40 (95% CI; 0.23–0.69). The authors assessed heterogeneity among the studies using Q statistic-based $\chi 2$ test and I2 statistic, with P-values less than 0.1 for the $\chi 2$ test considered significantly heterogeneous. They found there was high heterogeneity in the measured effects between the RCT and a group of the observational studies ($I2 = 79\%$, $p = 0.03$), while there was no significant heterogeneity among the observational studies ($I2 = 0\%$, $p = 0.45$). For absenteeism, "the pooled analyses showed that the difference between unvaccinated and vaccinated group in absenteeism due to ILI and laboratory-confirmed infections were -0.50 days (95% CI = -0.91–-0.10) and -0.60 (95% CI = -2.32–1.12) respectively. There was no heterogeneity between the two groups with the different sick leave causes ($I2 = 0\%$, $p = 0.91$). The overall pooled analysis estimated that a vaccinated group had a significantly shorter sick leave– 0.46 days shorter–than an unvaccinated group (95% CI; -0.71–-0.21, $p < 0.01$)."

[Response Ends]

1a.11. Indicate what, if any, harms were identified in the study.

[Response Begins]

Studies did not evaluate harms of vaccination.

[Response Ends]

1a.12. Identify any new studies conducted since the systematic review, and indicate whether the new studies change the conclusions from the systematic review.

[Response Begins]

(see below)

[Response Ends]

Group 3 - Evidence - Systematic Reviews Table

1a.03. Provide the title, author, date, citation (including page number) and URL for the systematic review.

[Response Begins]

2022 Submission:

- A Systematic Review and Meta-Analysis of Seasonal Influenza Vaccination of Health Workers. Tingting Li, Xiaoling Qi, Qin Li, et al. A Systematic Review and Meta-Analysis of Seasonal Influenza Vaccination of Health Workers. *Vaccines (Basel)* 2021 Sep 29;9(10):1104. doi: 10.3390/vaccines9101104. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8537688/

[Response Ends]

1a.04. Quote the guideline or recommendation verbatim about the process, structure or intermediate outcome being measured. If not a guideline, summarize the conclusions from the systematic review.

[Response Begins]

2022 Submission:

- Li et al: Vaccination significantly decreases the incidence of laboratory-confirmed influenza in different countries, study populations, and average-age vaccinated groups. Influenza vaccinations could effectively reduce the incidence of laboratory-confirmed influenza, absenteeism rates, and workdays lost among HCWs. It is advisable, therefore, to improve the coverage and increase the influenza vaccination count among HCWs, which may benefit both workers and medical institutions.

[Response Ends]

1a.05. Provide the grade assigned to the evidence associated with the recommendation, and include the definition of the grade.

[Response Begins]

2022 Submission:

- Li et al: For observational studies, the authors used Newcastle-Ottawa Scale (NOS) to evaluate the risk of bias for cohort and case-control studies. "The NOS uses the 'star system,' with a maximum of nine stars, and evaluates three domains with a total of eight items: selection; comparability; the outcome of exposure of interest. Studies with scores of seven or more stars were considered to be of high

quality, five to six stars of moderate quality, and four or fewer stars of low quality…Of the six RCTs, four had moderate risks of bias and two had low risks of bias. Of the ten cohort studies, three displayed high quality and seven exhibited moderate quality."

[Response Ends]

1a.06. Provide all other grades and definitions from the evidence grading system.

[Response Begins]

2022 Submission:

- Li et al. also used Cochrane tool for assessing bias for RCTs and the NOS for observational studies (detailed above). Of the six RCTs, four had moderate risks of bias and two had low risks of bias. Of the ten cohort studies, three displayed high quality and seven exhibited moderate quality.

[Response Ends]

1a.07. Provide the grade assigned to the recommendation, with definition of the grade.

[Response Begins]

Not applicable (systematic review). See 1a.05) for grade assigned to evidence for systematic reviews.

[Response Ends]

1a.08. Provide all other grades and definitions from the recommendation grading system.

[Response Begins]

Not applicable (systematic review). See 1a.06) for other grades assigned to evidence for systematic reviews.

[Response Ends]

1a.09. Detail the quantity (how many studies) and quality (the type of studies) of the evidence.

[Response Begins]

2022 Submission:

- Li et al. included 16 studies (19 arms), including 6 RCTs and 10 cohort studies.

[Response Ends]

1a.10. Provide the estimates of benefit, and consistency across studies.

[Response Begins]

2022 Submission:

- Li et al. found pooled effects using the fixed-effect model showed that vaccinated HCWs were less likely to get an influenza infection than comparisons (pooled RR: 0.36, 95% CI: 0.25 to 0.54, I2 = 9.7%; $p < 0.001$), and that vaccine effectiveness (VE) was 64%. Subgroup analyses regarding the study population suggested vaccination could decrease influenza infection among doctors and nurses (RR: 0.13, 95% CI: 0.05 to 0.37, with 87% VE) and doctors alone (RR: 0.48, 95% CI: 0.25 to 0.92, with 52% VE); in addition, vaccination was found "effective in reducing the influenza incidence among HCWs in studies with different study designs and published years." For influenza-like illness (ILI), the authors found an overall insignificant reduction of ILI incidence among vaccination groups compared with

comparisons (combined RR: 0.69, 95% CI: 0.45 to 1.06, p = 0.087), but with substantial heterogeneity among the studies (I2 = 87.2%). Subgroup analyses were performed to explore heterogeneity, which are detailed in the article. And "as for study design, the results demonstrated that a decreased incidence of ILI was reported in RCT studies (RR: 0.52, 95% CI: 0.36 to 0.76, I2 = 56.8%; p = 0.001). The results also showed that influenza vaccination could effectively reduce the incidence of ILI within half a year of vaccination (RR: 0.45, 95% CI: 0.35 to 0.57, I2 = 0.0%; p < 0.001)." Evaluation of absenteeism rate found a significant decrease among HCWs exposed to influenza vaccination (overall RR: 0.63, 95% CI: 0.46 to 0.86; p = 0.004), but with moderate heterogeneity among these studies (I2 = 54.3%). The pooled effect for HCW workdays lost found a significant decrease in lost workdays for vaccinated HCWs in contrast to comparison groups (summarized SMD: −0.18, 95% CI: −0.28 to −0.07, I2 = 28.0%; p = 0.001).

[Response Ends]

1a.11. Indicate what, if any, harms were identified in the study.

[Response Begins]

Studies did not evaluate harms of vaccination.

[Response Ends]

1a.12. Identify any new studies conducted since the systematic review, and indicate whether the new studies change the conclusions from the systematic review.

[Response Begins]

2022 Submission:

Wei WE, Fook-Chong S, Chen WK, et al. The impact of healthcare worker influenza vaccination on nosocomial influenza in a tertiary hospital: an ecological study. *BMC Health Serv Res* 2020 Jul 10;20(1):636. doi: 10.1186/s12913-020-05490-1. http://pubmed.ncbi.nlm.nih.gov/32650745/

- This single-center study from Singapore found no statistically significant association between vaccination coverage and nosocomial influenza incidence rate - although a protective effect was suggested (IRR 0.89, 95%CI:0.69-1.15, p = 0.37). The study does not change the conclusions of the systematic review, because of the clinically significant difference and reasons provided in the study why the protective effect was not statistically significant.

Grohskopf LA, Alyanak E, Ferdinands JM, et al. Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices, United States, 2021–22 Influenza Season. *MMWR Recomm Rep* 2021 Aug 27;70(5):1-28. doi: 10.15585/mmwr.rr7005a1. http://pubmed.ncbi.nlm.nih.gov/34448800/

- This updated Advisory Committee on Immunization Practices (ACIP) recommendation does not change the conclusions from the systematic reviews. ACIP continues to recommend influenza vaccination in HCW: "When vaccine supply is limited, vaccination efforts should focus on administering vaccination to persons at higher risk for influenza-related complications, as well as persons who live with or care for such persons, including the following: Health care personnel, including all paid and unpaid persons working in health care settings who have the potential for exposure to patients or to infectious materials. These personnel might include (but are not limited to) physicians, nurses, nursing assistants, nurse practitioners, physician assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff, and other persons not directly involved in patient care but who might be exposed to infectious agents (e.g., clerical, dietary, housekeeping, laundry, security, maintenance, administrative, and billing staff and volunteers). ACIP guidance for vaccination of health care personnel has been

published previously" (and this refers to the 2011 ACIP guideline Immunization of health-care personnel: recommendations of the Advisory Committee on Immunization Practices. *MMWR Recomm Rep* 2011 Nov 25;60(RR-7):1-45 where ACIP recommends vaccination of all HCP who have no contraindications, and also recommended healthcare administrators should include influenza vaccination coverage among HCW as a measure of quality of care).

[Response Ends]

1a.13. If source of evidence is NOT from a clinical practice guideline, USPSTF, or systematic review, describe the evidence on which you are basing the performance measure.

[Response Begins]

2017, 2013 Submission

Four cluster-randomized trials comparing healthcare personnel vaccination arms to control arms have been published over the last 15 years.

[Response Ends]

1a.14. Briefly synthesize the evidence that supports the measure.

[Response Begins]

2017, 2013 Submission

The primary outcome in these studies is mortality rate in long-term care residents, which is an objective and direct outcome. The studies report substantial reductions in mortality in long-term care residents. The evidence that influenza vaccination of healthcare personnel benefits residents in long-term care settings should be generalizable to acute care settings because the biological rationale for vaccination of healthcare personnel for reducing influenza transmission does not vary by setting. One limitation of the evidence pertains to unclear follow-up rates in the studies. The quality of evidence may be considered to be moderate because of this limitation and because of the possible indirectness for acute care settings.

The four cluster-randomized studies report lower mortality in long-term care residents in vaccination vs. control facilities:

Lemaitre et al, 2009: Adjusted odds ratio = 0.80.

Hayward et al, 2006: Rate difference = 5 fewer deaths per 100 residents.

Carman et al, 2000: Odds ratio = 0.58.

Potter et al, 1996: Odds ratio = 0.56.

[Response Ends]

1a.15. Detail the process used to identify the evidence.

[Response Begins]

2017, 2013

Hand review of peer reviewed literature.

[Response Ends]

1a.16. Provide the citation(s) for the evidence.

[Response Begins]

2017, 2013 Submission

1. Hayward AC, Harling R, Wetten S, et al. Effectiveness of an influenza vaccine programme for care home staff to prevent death, morbidity, and health service use among residents: cluster randomised controlled trial. BMJ 2006; 333: 1241-1246.

2. Potter J, Stott DJ, Roberts MA, et al. Influenza vaccination of healthcare workers in long-term-care hospitals reduces the mortality of elderly patients. J Infect Dis. 1997; 175:1-6.

3. Lemaitre M, Meret T, Rothan-Tondeur M, et al. Effect of influenza vaccination of nursing home staff on mortality of residents: a cluster-randomized trial. J Am Geriatr Soc. 2009; 57:1580-1586.

4. Carman WF, Elder AG, Wallace LA, et al. Effects of influenza vaccination of health-care workers on mortality of elderly people in long-term care: a randomised controlled trial. Lancet 2000; 355:93–97.

[Response Ends]

1b. Gap in Care/Opportunity for Improvement and Disparities

1b.01. Briefly explain the rationale for this measure.

Explain how the measure will improve the quality of care, and list the benefits or improvements in quality envisioned by use of this measure.

[Response Begins]

Use of this measure to monitor influenza vaccination among HCP is envisioned to result in increased influenza vaccination uptake among HCP, because improvements in tracking and reporting HCP influenza vaccination status will allow healthcare institutions to better identify and target unvaccinated HCP. Increased influenza vaccination coverage among HCP is expected to result in reduced morbidity and mortality related to influenza virus infection among patients, as described above in Section 1a.

[Response Ends]

1b.02. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis.

Include mean, std dev, min, max, interquartile range, and scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include. This information also will be used to address the sub-criterion on improvement (4b) under Usability and Use.

[Response Begins]

Performance scores on the measure are provided for the 3 settings for which the measure is specified: Inpatient/Hospital setting (acute care hospitals); Outpatient Services (ambulatory surgery centers); and Post-Acute Care (longterm care facilities).

Table 1a. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in acute care hospitals† (4,464 hospitals, 8,217,159 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

§	Employee Vaccination %	Licensed Independent Practitioner Vaccination %	Adult Student/ Trainee & Volunteer Vaccination %	All Healthcare Personnel‡ Vaccination %
No. Facilities	**4,464**	**4,070**	**3,409**	**4,464**
Mean (SD)	86.5 (14.1)	76.3 (28)	88.5 (24.5)	84.4 (15.3)
Minimum, Maximum	0, 100	0, 100	0, 100	1.8, 100
Interquartile Range (25^{th}, 75^{th})	80.1, 97.1	59.2, 98.6	92.1, 100	77.4, 96.1
Decile	§	§	§	§
0-9.9%	67.1	28.6	54.7	63.3
10-19.9%	76.8	51.5	86.5	73.8
20-29.9%	82.8	68.5	95.5	80.3
30-39.9%	87.6	80.8	98.8	85.0
40-49.9%	91.3	89.1	100	89.2
50-59.9%	94.2	94.1	100	92.3
60-69.9%	96.3	97.4	100	95.0
70-79.9%	97.7	99.6	100	97.1
80-89.9%	98.7	100	100	98.5
90-100%	100	100	100	100

Table 1a. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in acute care hospitals† (4,464 hospitals, 8,217,159 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Acute care hospitals include general, acute care; oncology; orthopedic; pediatric; surgical; women's; women's and children's; military; and Veterans Affairs.

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 1b. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in acute care hospitals† (2,908 hospitals, 5,167,211 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2019-2020 (past) influenza season.

§	Employee Vaccination %	Licensed Independent Practitioner Vaccination %	Adult Student/ Trainee & Volunteer Vaccination %	All Healthcare Personnel‡ Vaccination %
No. Facilities	**2,908**	**2,671**	**2,544**	**2,908**
Mean (SD)	91.4 (10.6)	81.2 (24.4)	90.2 (18.2)	89.5 (11.6)
Minimum, Maximum	0, 100	0, 100	0, 100	0, 100
Interquartile Range (25^{th}, 75^{th})	89.3, 98.1	71.1, 99.1	89.3, 100	86, 97.5
Decile	§	§	§	§
0-9.9%	78.9	42.9	68.8	74.3
10-19.9%	86.5	63.2	85.0	83.6
20-29.9%	90.8	76.8	92.3	87.9
30-39.9%	93.3	87.2	96.0	91.0
40-49.9%	95.1	92.4	98.2	93.3
50-59.9%	96.6	95.9	99.6	95.2
60-69.9%	97.6	98.2	100	96.8
70-79.9%	98.5	100	100	98.1
80-89.9%	99.2	100	100	99.0
90-100%	100	100	100	100

Table 1b. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in acute care hospitals† (2,908 hospitals, 5,167,211 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2019-2020 (past) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Acute care hospitals include general, acute care; oncology; orthopedic; pediatric; surgical; women's; women's and children's; military; and Veterans Affairs.

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 2a. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in ambulatory surgery centers (ASCs)† (461 ASCs, 29,413 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

§	Employee Vaccination %	Licensed Independent Practitioner Vaccination %	Adult Student/ Trainee & Volunteer Vaccination %	All Healthcare Personnel‡ Vaccination %
No. Facilities	**461**	**416**	**74**	**461**
Mean (SD)	82.5 (19.9)	86.7 (23.6)	84.6 (33.2)	83.2 (19.7)
Minimum, Maximum	0, 100	0, 100	0, 100	0, 100
Interquartile Range (25^{th}, 75^{th})	73.7, 98.6	83.3, 100	95.4, 100	75, 97.2
Decile	§	§	§	§
0-9.9%	55.6	55.9	0	56.7
10-19.9%	69.2	80.0	83.3	69.7
20-29.9%	77.8	88.6	100	80.0
30-39.9%	84.6	94.1	100	86.7
40-49.9%	88.9	98.1	100	90.9
50-59.9%	92.9	100	100	93.2
60-69.9%	96.1	100	100	96.4
70-79.9%	100	100	100	98.6
80-89.9%	100	100	100	100
90-100%	100	100	100	100

Table 2a. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in ambulatory surgery centers (ASCs)† (461 ASCs, 29,413 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Ambulatory Surgery Centers (ASCs) include all ACSs except hospital outpatient procedure departments (HOPD).

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 2b. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in ambulatory surgery centers ASCs† (532 ACSs, 32,247 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2019-2020 (past) influenza season.

§	Employee Vaccination %	Licensed Independent Practitioner Vaccination %	Adult Student/ Trainee & Volunteer Vaccination %	All Healthcare Personnel‡ Vaccination %
No. Facilities	**530**	**486**	**101**	**532**
Mean (SD)	82.7 (20.2)	84.6 (25.1)	86.3 (31.6)	82.7 (20)
Minimum, Maximum	0, 100	0, 100	0, 100	0, 100
Interquartile Range (25^{th}, 75^{th})	71.4, 100	81.8, 100	100, 100	74.1, 97.6
Decile	§	§	§	§
0-9.9%	55.6	48.2	0	53.1
10-19.9%	67.9	75.0	90.9	68.4
20-29.9%	78.0	85.7	100	78.6
30-39.9%	84.0	90.9	100	86.1
40-49.9%	90.0	97.0	100	90.0
50-59.9%	94.3	100	100	93.6
60-69.9%	96.9	100	100	96.5
70-79.9%	100	100	100	99.0
80-89.9%	100	100	100	100
90-100%	100	100	100	100

Table 2b. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in ambulatory surgery centers ASCs† (532 ACSs, 32,247 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2019-2020 (past) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Ambulatory Surgery Centers (ASCs) include all ACSs except Hospital outpatient procedure departments (HOPD).

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 3a. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in long-term care facilities (LTCs)† (47 LTCs, 10,339 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

§	Employee Vaccination %	Licensed Independent Practitioner Vaccination %	Adult Student/ Trainee & Volunteer Vaccination %	All Healthcare Personnel‡ Vaccination %
No. Facilities	**47**	**34**	**13**	**47**
Mean (SD)	81.6 (18.7)	85.2 (28.5)	64.2 (45.8)	79.6 (20.1)
Minimum, Maximum	28.2, 100	0, 100	0, 100	28.2, 100
Interquartile Range (25^{th}, 75^{th})	66, 95.8	85.7, 100	3.3, 100	66.7, 95.3
Decile	§	§	§	§
0-9.9%	56.0	45.5	0	45.6
10-19.9%	65.1	55.6	0	62.6
20-29.9%	76.7	100	3.3	73.1
30-39.9%	85.2	100	71.4	80.5
40-49.9%	90.2	100	100	88.5
50-59.9%	91.9	100	100	91.7
60-69.9%	95.0	100	100	93.3
70-79.9%	96.3	100	100	96.5
80-89.9%	99.3	100	100	99.1
90-100%	100	100	100	100

Table 3a. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in long-term care facilities (LTCs)† (47 LTCs, 10,339 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Long-term care facilities (LTCs) include nursing homes/skilled nursing, long-term care for the developmentally disabled, and assisted living facilities.

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 3b. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in long-term care facilities (LTCs)† (37 LTCs, 9,561 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2019-2020 (past) influenza season.

§	Employee Vaccination %	Licensed Independent Practitioner Vaccination %	Adult Student/ Trainee & Volunteer Vaccination %	All Healthcare Personnel‡ Vaccination %
No. Facilities	**37**	**27**	**22**	**37**
Mean (SD)	86.1 (18.9)	83.3 (26.3)	91.3 (22)	85.8 (17.7)
Minimum, Maximum	26.6, 100	20.0, 100	0, 100	28.8, 100
Interquartile Range (25^{th}, 75^{th})	87.3, 98.4	66.7, 100	94.4, 100	80.9, 97.8
Decile	§	§	§	§
0-9.9%	55.0	33.3	75.0	60.9
10-19.9%	76.5	53.8	91.8	74.8
20-29.9%	88.8	82.1	94.4	87.3
30-39.9%	90.6	98.1	97.0	90.1
40-49.9%	92.3	100	100	91.1
50-59.9%	96.2	100	100	94.7
60-69.9%	97.3	100	100	96.7
70-79.9%	99.0	100	100	98.6
80-89.9%	100	100	100	100
90-100%	100	100	100	100

Table 3b. Pooled influenza vaccination coverage* of healthcare personnel (HCP) reported as vaccinated in long-term care facilities (LTCs)† (37 LTCs, 9,561 HCPs) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2019-2020 (past) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Long-term care facilities (LTCs) include nursing homes/skilled nursing, long-term care for the developmentally disabled, and assisted living facilities.

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

[Response Ends]

1b.03. If no or limited performance data on the measure as specified is reported above, then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement. Include citations.

[Response Begins]

Not applicable.

[Response Ends]

1b.04. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability.

Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included. Include mean, std dev, min, max, interquartile range, and scores by decile. For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b) under Usability and Use.

[Response Begins]

Because this performance measure examines summary vaccination data at the facility level, it is not possible to assess individual differences in vaccination by racial/ethnic group, gender, age, or other sociodemographic variables. However, we note significant variation in performance for this measure based on geographic location (state). For example, reported vaccination rates for the 2013-2014 influenza season for personnel working in hospitals ranged from 69.0%–97.6% for employees, 33.8%–93.6% for licensed independent practitioners, and 50.3%–96.3% for adult students/trainees and volunteers. In the 2014-2015 season, reported rates ranged from 75.2%-98.3% for employees, 33.5%-95.9% for licensed independent practitioners, and 53.2%-97.2% for adult students/trainees and volunteers. Similar patterns of wide variability by state were observed across all years and in all facility types. These findings indicate notable disparities in quality of care based on geographic location of the reporting facilities.

[Response Ends]

1b.05. If no or limited data on disparities from the measure as specified is reported above, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations. Not necessary if performance data provided in above.

[Response Begins]

Not applicable.

[Response Ends]

Criteria 2: Scientific Acceptability of Measure Properties

spma.01. Indicate whether there are changes to the specifications since the last updates/submission. If yes, update the specifications in the Measure Specifications section of the Measure Submission Form, and explain your reasoning for the changes below.

[Response Begins]

No

[Response Ends]

spma.02. Briefly describe any important changes to the measure specifications since the last measure update and provide a rationale.

For annual updates, please explain how the change in specifications affects the measure results. If a material change in specification is identified, data from re-testing of the measure with the new specifications is required for early maintenance review.

For example, specifications may have been updated based on suggestions from a previous NQF CDP review.

[Response Begins]

No changes have been made to the measure specifications since the last endorsement date.

[Response Ends]

sp.01. Provide the measure title.

Measure titles should be concise yet convey who and what is being measured (see What Good Looks Like).

[Response Begins]

INFLUENZA VACCINATION COVERAGE AMONG HEALTHCARE PERSONNEL

[Response Ends]

sp.02. Provide a brief description of the measure.

Including type of score, measure focus, target population, timeframe, (e.g., Percentage of adult patients aged 18-75 years receiving one or more HbA1c tests per year).

[Response Begins]

Percentage of healthcare personnel (HCP) who receive the influenza vaccination.

[Response Ends]

sp.04. Check all the clinical condition/topic areas that apply to your measure, below.

Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.

Please do not select:

- *Surgery: General*

[Response Begins]

Infectious Diseases (ID)

Infectious Diseases (ID): Pneumonia and respiratory infections

[Response Ends]

sp.05. Check all the non-condition specific measure domain areas that apply to your measure, below.

[Response Begins]

Primary Prevention

[Response Ends]

sp.06. Select one or more target population categories.

Select only those target populations which can be stratified in the reporting of the measure's result.
Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.
Please do not select:

- *Populations at Risk: Populations at Risk*

[Response Begins]
Adults (Age >= 18)
[Response Ends]

sp.07. Select the levels of analysis that apply to your measure.

Check ONLY the levels of analysis for which the measure is SPECIFIED and TESTED.
Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.
Please do not select:

- *Clinician: Clinician*
- *Population: Population*

[Response Begins]
Facility
[Response Ends]

sp.08. Indicate the care settings that apply to your measure.

Check ONLY the settings for which the measure is SPECIFIED and TESTED.
[Response Begins]
Inpatient/Hospital
Outpatient Services
Post-Acute Care
[Response Ends]

sp.09. Provide a URL link to a web page specific for this measure that contains current detailed specifications including code lists, risk model details, and supplemental materials.

Do not enter a URL linking to a home page or to general information. If no URL is available, indicate "none available".

[Response Begins]
http://www.cdc.gov/nhsn/acute-care-hospital/hcp-vaccination/index.html

[Response Ends]

sp.11. Attach the data dictionary, code table, or value sets (and risk model codes and coefficients when applicable). Excel formats (.xlsx or .csv) are preferred.

Attach an excel or csv file; if this poses an issue, contact staff. Provide descriptors for any codes. Use one file with multiple worksheets, if needed.

[Response Begins]

No data dictionary/code table – all information provided in the submission form

[Response Ends]

sp.12. State the numerator.

Brief, narrative description of the measure focus or what is being measured about the target population, i.e., cases from the target population with the target process, condition, event, or outcome).

DO NOT include the rationale for the measure.

[Response Begins]

HCP in the denominator population who during the time from October 1 (or when the vaccine became available) through March 31 of the following year:
(a) received an influenza vaccination administered at the healthcare facility, or reported in writing (paper or electronic) or provided documentation that influenza vaccination was received elsewhere; or
(b) were determined to have a medical contraindication/condition of severe allergic reaction to eggs or to other component(s) of the vaccine, or history of Guillain-Barré Syndrome within 6 weeks after a previous influenza vaccination; or
(c) declined influenza vaccination

Each of the three submeasure numerators described above will be calculated and reported separately, alongside the overall numerator calculated as the aggregate of the three submeasure numerators.

[Response Ends]

sp.13. Provide details needed to calculate the numerator.

All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, time period for data collection, specific data collection items/responses, code/value sets.

Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at sp.11.

[Response Begins]

1. Persons who declined vaccination because of conditions other than those specified in the 2nd numerator category above should be categorized as declined vaccination.
2. Persons who declined vaccination and did not provide any other information should be categorized as declined vaccination.
3. Persons who did not receive vaccination because of religious or philosophical exemptions should be

categorized as declined vaccination.
4. Persons who deferred vaccination all season should be categorized as declined vaccination.

[Response Ends]

sp.14. State the denominator.

Brief, narrative description of the target population being measured.

[Response Begins]

Number of HCP in groups(a)-(c) below who are working in the healthcare facility for at least 1 working day between October 1 and March 31 of the following year, regardless of clinical responsibility or patient contact.

Denominator is reported in the aggregate; rates for each HCP group may be calculated separately for facility-level quality improvement purposes:
(a) Employees: all persons who receive a direct paycheck from the reporting facility (i.e., on the facility's payroll).
(b) Licensed independent practitioners: include physicians (MD, DO), advanced practice nurses, and physician assistants only who are affiliated with the reporting facility who do not receive a direct paycheck from the reporting facility.
(c) Adult students/trainees and volunteers: include all students/trainees and volunteers aged 18 or over who do not receive a direct paycheck from the reporting facility.

[Response Ends]

sp.15. Provide details needed to calculate the denominator.

All information required to identify and calculate the target population/denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets.

Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at sp.11.

[Response Begins]

1. Include all HCP in each of the denominator categories who have worked at the facility between October 1 and March 31 for at least 1 working day. This includes persons who joined after October 1 or who left before March 31, or who were on extended leave during part of the reporting period. Working for any number of hours in a day should be counted as a working day.
2. Include both full-time and part-time personnel. If a person works in two or more facilities, each facility should include the person in their denominator.
3. Count persons as individuals rather than full-time equivalents.
4. Licensed practitioners who receive a direct paycheck from the reporting facility, or who are owners of the reporting facility, should be counted as employees.

[Response Ends]

sp.16. Describe the denominator exclusions.

Brief narrative description of exclusions from the target population.

[Response Begins]

None.

[Response Ends]

sp.17. Provide details needed to calculate the denominator exclusions.

All information required to identify and calculate exclusions from the denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at sp.11.

[Response Begins]

Not applicable.

[Response Ends]

sp.18. Provide all information required to stratify the measure results, if necessary.

Include the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate. Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format in the Data Dictionary field.

[Response Begins]

The measure should be calculated separately for each denominator group of healthcare personnel: employees; licensed independent practitioners; and adult students/trainees and volunteers. Definitions for these groups are as follows:

(a) Employees: all persons who receive a direct paycheck from the reporting facility (i.e., on the facility's payroll).
(b) Licensed independent practitioners: physicians (MD, DO), advanced practice nurses, and physician assistants who are affiliated with the reporting facility, but are not directly employed by it (i.e., they do not receive a paycheck from the facility), regardless of clinical responsibility or patient contact. Post-residency fellows are also included in this category if they are not on the facility's payroll.
(c) Adult students/trainees and volunteers: medical, nursing, or other health professional students, interns, medical residents, or volunteers aged 18 or older who are affiliated with the healthcare facility, but are not directly employed by it (i.e., they do not receive a paycheck from the facility), regardless of clinical responsibility or patient contact.

[Response Ends]

sp.19. Select the risk adjustment type.

Select type. Provide specifications for risk stratification and/or risk models in the Scientific Acceptability section.

[Response Begins]

No risk adjustment or risk stratification

[Response Ends]

sp.20. Select the most relevant type of score.

Attachment: If available, please provide a sample report.

[Response Begins]

Rate/proportion

[Response Ends]

sp.21. Select the appropriate interpretation of the measure score.

Classifies interpretation of score according to whether better quality or resource use is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score

[Response Begins]

Better quality = Higher score

[Response Ends]

sp.22. Diagram or describe the calculation of the measure score as an ordered sequence of steps.

Identify the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period of data, aggregating data; risk adjustment; etc.

[Response Begins]

Among each of the denominator groups, the measure may be calculated by dividing the number of HCP in the first numerator category (i.e., received an influenza vaccination) by the number of HCP in that denominator group, and multiplying by 100 to produce a vaccination rate expressed as a percentage of all HCP in the denominator group. Rates of medical contraindications, declinations, and unknown vaccination status can be calculated similarly using the second, third, and fourth numerator categories, respectively.

As noted above, numerator categories should not be summed; each numerator status should be calculated and reported separately.

[Response Ends]

sp.25. If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.

[Response Begins]

Not applicable.

[Response Ends]

sp.28. Select only the data sources for which the measure is specified.

[Response Begins]

Electronic Health Records

Instrument-Based Data

Management Data

Paper Medical Records

[Response Ends]

sp.29. Identify the specific data source or data collection instrument.

For example, provide the name of the database, clinical registry, collection instrument, etc., and describe how data are collected.

[Response Begins]

Data sources for required data elements include management/personnel data, medical or occupational health records, vaccination record documents, HCP self-reporting in writing (paper or electronic) that vaccination was received elsewhere, HCP providing documentation of receipt of vaccine elsewhere, verbal or written declination by HCP, and verbal or written documentation of medical contraindications.

[Response Ends]

sp.30. Provide the data collection instrument.

[Response Begins]

Available at measure-specific web page URL identified in sp.09

[Response Ends]

2ma.01. Indicate whether additional empirical reliability testing at the accountable entity level has been conducted. If yes, please provide results in the following section, Scientific Acceptability: Reliability - Testing. Include information on all testing conducted (prior testing as well as any new testing).

Please separate added or updated information from the most recent measure evaluation within each question response in the Scientific Acceptability sections. For example:

Current Submission:

Updated testing information here.

Previous Submission:

Testing from the previous submission here.

[Response Begins]

No

[Response Ends]

2ma.02. Indicate whether additional empirical reliability testing at the accountable entity level has been conducted. If yes, please provide results in the following section, Scientific Acceptability: Validity - Testing. Include information on all testing conducted (prior testing as well as any new testing).

Please separate added or updated information from the most recent measure evaluation within each question response in the Scientific Acceptability sections. For example:

Current Submission:

Updated testing information here.

Previous Submission:

Testing from the previous submission here.

[Response Begins]

No

[Response Ends]

2ma.03. For outcome, patient-reported outcome, resource use, cost, and some process measures, risk adjustment/stratification may be conducted. Did you perform a risk adjustment or stratification analysis?

[Response Begins]

No

[Response Ends]

2ma.04. For maintenance measures in which risk adjustment/stratification has been performed, indicate whether additional risk adjustment testing has been conducted since the most recent maintenance evaluation. This may include updates to the risk adjustment analysis with additional clinical, demographic, and social risk factors.

Please update the Scientific Acceptability: Validity - Other Threats to Validity section.

Note: This section must be updated even if social risk factors are not included in the risk adjustment strategy.

[Response Begins]

No additional risk adjustment analysis included

[Response Ends]

2a. Reliability

2a.01. Select only the data sources for which the measure is tested.

[Response Begins]

Electronic Health Data

Electronic Health Records

Management Data

Paper Medical Records

[Response Ends]

2a.02. If an existing dataset was used, identify the specific dataset.

The dataset used for testing must be consistent with the measure specifications for target population and healthcare entities being measured; e.g., Medicare Part A claims, Medicaid claims, other commercial insurance, nursing home MDS, home health OASIS, clinical registry).

[Response Begins]

N/A

[Response Ends]

2a.03. Provide the dates of the data used in testing.

Use the following format: "MM-DD-YYYY - MM-DD-YYYY"

[Response Begins]

11/01/2010 - 04/30/2011

[Response Ends]

2a.04. Select the levels of analysis for which the measure is tested.

Testing must be provided for all the levels specified and intended for measure implementation, e.g., individual clinician, hospital, health plan.

Please refrain from selecting the following answer option(s). We are in the process of phasing out these answer options and request that you instead select one of the other answer options as they apply to your measure.

Please do not select:

- *Clinician: Clinician*
- *Population: Population*

[Response Begins]

Facility

[Response Ends]

2a.05. List the measured entities included in the testing and analysis (by level of analysis and data source).

Identify the number and descriptive characteristics of measured entities included in the analysis (e.g., size, location, type); if a sample was used, describe how entities were selected for inclusion in the sample.

[Response Begins]

318 healthcare institutions were recruited for measure testing in California, New Mexico, New York City, and Pennsylvania; 234 (74%) responded to the three quantitative surveys fielded in November 2010, January 2011, and April 2011: 78 acute care hospitals, 59 long-term care facilities, 16 ambulatory surgical centers, 43 dialysis clinics, and 38 physician practices. Participants represented a diversity of types of healthcare institutions, with different policies and levels of experience related to providing vaccination and measuring influenza vaccination among HCP. Overall, approximately 20% of facilities were public facilities, with remainder evenly divided between private for-profit and not-for-profit ownership. Slightly over half were located in urban areas, with the remainder evenly divided between suburban and rural locations. Nearly 90% of participating facilities had offered influenza vaccine to HCP for at least 5 years. About 30% of facilities had no experience measuring HCP influenza vaccination, but another 40% had been measuring HCP vaccination for at least 5 years.

From the 234 respondents participating in the pilot project, 93 institutions were randomly selected in California, New Mexico, and New York City to undergo reliability testing as described below (the reliability testing and case study instruments were piloted in Pennsylvania). Of these 93 institutions, 82 also completed

case studies to assess comprehension of the measure specifications for both numerator and denominator elements. The 93 institutions participating in the reliability testing included 26 acute care hospitals, 19 long-term care facilities, 16 dialysis clinics, 13 ambulatory surgery centers, and 19 physician practices. The 82 institutions completing case studies included 24 acute care hospitals, 18 long-term care facilities, 14 dialysis clinics, 12 ambulatory surgery centers, and 14 physician practices.

[Response Ends]

2a.06. Identify the number and descriptive characteristics of patients included in the analysis (e.g., age, sex, race, diagnosis), separated by level of analysis and data source; if a sample was used, describe how patients were selected for inclusion in the sample.

If there is a minimum case count used for testing, that minimum must be reflected in the specifications.

[Response Begins]

This measure is specified for and was tested at the facility level only; therefore no patient (or healthcare worker) data were collected.

[Response Ends]

2a.07. If there are differences in the data or sample used for different aspects of testing (e.g., reliability, validity, exclusions, risk adjustment), identify how the data or sample are different for each aspect of testing.

[Response Begins]

Convergent validity was assessed among all 234 participating institutions. Reliability testing was conducted among a randomly-selected subsample of 93 institutions due to the more intensive resource requirements for this assessment. The distribution of validity and reliability samples across facility types was similar.

[Response Ends]

2a.08. List the social risk factors that were available and analyzed.

For example, patient-reported data (e.g., income, education, language), proxy variables when social risk data are not collected from each patient (e.g. census tract), or patient community characteristics (e.g. percent vacant housing, crime rate) which do not have to be a proxy for patient-level data.

[Response Begins]

N/A; this measure is used without risk adjustment or stratification and therefore no analysis of this type was conducted.

[Response Ends]

Note: If accuracy/correctness (validity) of data elements was empirically tested, separate reliability testing of data elements is not required – in 2a.07 check patient or encounter-level data; in 2a.08 enter "see validity testing section of data elements"; and enter "N/A" for 2a.09 and 2a.10.

2a.09. Select the level of reliability testing conducted.

Choose one or both levels.

[Response Begins]

Patient or Encounter-Level (e.g., inter-abstractor reliability; data element reliability must address ALL critical data elements)

[Response Ends]

2a.10. For each level of reliability testing checked above, describe the method of reliability testing and what it tests.

Describe the steps—do not just name a method; what type of error does it test; what statistical analysis was used.

[Response Begins]

Inter-rater reliability was assessed via record review; both electronic and paper records were reviewed, depending on what type of data sources were used by the healthcare institution. Project staff from pilot jurisdictions A, B, and C reviewed individual-level records from 93 randomly selected facilities to assess agreement with how the facility staff categorized the numerator and denominator information. For each facility, project staff were instructed to select 60 records using systematic sampling or simple random sampling (20 employees, 20 credentialed non-employees, 20 other non-employees). At smaller institutions or those not having HCP in all three groups, the total number of records assessed may have been fewer than 60. Site visits were conducted by project staff in Jurisdictions A and B, whereas facilities were asked to mail or fax records to the project staff in Jurisdiction C. We compared the categorization of numerator and denominator status between facility staff and project staff and calculated a kappa statistic as well as percent agreement to evaluate consistency of using measure definitions.

We also assessed institutional comprehension of the measure definitions using 'case studies' in order to confirm that our measure specifications were clearly understood by institutions participating in the pilot, and that implementation of the measure specifications would produce comparable results at different types of healthcare institutions. Each institution received a series of 23 brief vignettes, describing a different situation or type of HCP that might be encountered during the vaccination measurement process. Institutions were asked to select the appropriate denominator or numerator group in which to classify the healthcare worker described in the scenario. We assessed the percentage of correct responses from facility staff across jurisdictions and measure elements to determine reliability of the measure based on consistency of understanding and applying definitions.

[Response Ends]

2a.11. For each level of reliability testing checked above, what were the statistical results from reliability testing?

For example, provide the percent agreement and kappa for the critical data elements, or distribution of reliability statistics from a signal-to-noise analysis. For score-level reliability testing, when using a signal-to-noise analysis, more than just one overall statistic should be reported (i.e., to demonstrate variation in reliability across providers). If a particular method yields only one statistic, this should be explained. In addition, reporting of results stratified by sample size is preferred (pg. 18, NQF Measure Evaluation Criteria).

[Response Begins]

For numerator data, inter-rater agreement was 88% in Jurisdiction A (kappa: 0.82), 94% in Jurisdiction B (kappa: 0.89), and 80% in Jurisdiction C (kappa: 0.66). Most of the disagreements for all three jurisdictions

resulted from healthcare institutions reporting verbal declinations in the "declined vaccination" numerator rather than categorizing these declinations as unknown numerator status in accordance with the project protocol, which originally specified that vaccine declinations required written documentation. For denominator data, inter-rater agreement was 97% in Jurisdiction A (kappa: 0.95), 99% in Jurisdiction B (kappa: 0.96), and 68% in Jurisdiction C (kappa: 0.55). For both numerator and denominator, agreement was generally lower among facilities from Jurisdiction C because Jurisdiction C was unable to conduct on-site validation visits and therefore was not always able to review complete documentation for numerator or denominator data.

For case studies, 21 of 23 vignettes were correctly answered by the majority of facilities; changes were made to the measure specifications prior to endorsement to address areas of the measure definitions that were poorly understood.

Full details of the reliability testing including results by individual measure element and jurisdiction are available in the following publication: Libby TE, Lindley MC, Lorick SA, MacCannell T, Lee SJ, Smith C, Geevarughese A, Makvandi M, Nace DA, Ahmed F. Reliability and validity of a standardized measure of influenza vaccination coverage among healthcare personnel. Infect Control Hosp Epidemiol. 2013; 34(4):335-345.

[Response Ends]

2a.12. Interpret the results, in terms of how they demonstrate reliability.

(In other words, what do the results mean and what are the norms for the test conducted?)

[Response Begins]

The results indicate high reliability, with Cohen's kappa statistics of greater than 0.8 (indicative of substantial agreement greater than that expected by chance) in the two jurisdictions that performed in-person reliability testing. See Libby et al publication for further details of kappa statistics by measure element and interpretation.

[Response Ends]

2b. Validity

2b.01. Select the level of validity testing that was conducted.

[Response Begins]

Empirical validity testing

Systematic assessment of face validity of performance measure score as an indicator of quality or resource use (i.e., is an accurate reflection of performance on quality or resource use and can distinguish good from poor performance)

[Response Ends]

2b.02. For each level of testing checked above, describe the method of validity testing and what it tests.

Describe the steps—do not just name a method; what was tested, e.g., accuracy of data elements compared to authoritative source, relationship to another measure as expected; what statistical analysis was used.

[Response Begins]

Convergent validity was assessed using survey questions asked of all pilot participants (n=234). Convergent validity was assessed because it was felt to be the strongest type of measure validity that could be tested given that there is no 'gold standard' for validation of HCP vaccination (unlike patient vaccination, not every HCP will have a medical record or chart to audit). We examined the association between the number of evidence-based strategies used by a healthcare institution to promote influenza vaccination and the institution's reported vaccination rate among each denominator group of HCP. We expected that vaccination rates would be positively correlated with an increasing number of strategies that have been found previously to be associated with higher influenza vaccination coverage among HCP.

Face validity was assessed via a Delphi panel conducted in June 2011. The panel comprised 9 experts in influenza vaccination measurement and quality improvement, recruited from multiple institutions and organizations. Experts were suggested by project staff at CDC and in the pilot jurisdictions as well as nominated by members of the pilot project Steering Committee. Experts rated the elements of the proposed measure on a scale of 1 to 9 prior to a telephone conference call (Round 1 ratings), and their ratings were aggregated and distributed to the group, with areas of disagreement noted. The experts were convened for a one-hour moderated telephone conference, focusing on elements of the Round 1 ratings where consensus on validity was lacking. Finally, experts received a revised set of measure elements and once again rated the validity of these elements individually after the conference call (Round 2 ratings). Experts were considered to have reached consensus on an element when no more than two panelists rated the element outside the three-point grouping containing the median rating. One of the objectives of the face validity exercise was to assess how to improve the measure specifications to address the reporting issues that were identified through quantitative surveys of participating institutions, case studies, and inter-rater reliability assessment. The revised set of measure elements presented to the panel for the second round of ratings included modifications based on the panel´s moderated discussion as well as those based on issues identified in other data collection efforts described in this submission.

[Response Ends]

2b.03. Provide the statistical results from validity testing.

Examples may include correlations or t-test results.

[Response Begins]

For convergent validity, significance testing using a one-way ANOVA produced the following results: the association between employee vaccination rates and number of strategies used was borderline significant at p=0.05. The association between credentialed non-employee vaccination rates and number of strategies used was significant at p=0.02. The association between other non-employee vaccination rates and number of strategies used was significant at p=0.01.

For our analysis of face validity, our Delphi panel of nine experts reached the strongest consensus on the validity of the following definitions for denominator groups: credentialed non-employees defined as non-employee physicians, advanced practice nurses, and physician assistants working at the institution for 30 or more days between October 1 and March 31 of the following year, and other non-employees defined as students and volunteers working at the institution for 30 or more days between October 1 and March 31 of the following year. (There was also consensus on the validity of defining "other non-employees" as all non-employee HCP who were required by the institution to receive a periodic PPD test for tuberculosis. However, we did not recommend use of that definition in the revised measure due to the likelihood of variable testing requirements among institutions in different states, which would reduce comparability of results.) The panel reached consensus on the validity of the following numerator groups: receiving influenza vaccination at the institution, documented receipt of influenza vaccination outside the institution, documented receipt of a

medical contraindication to vaccination, and documented declination of vaccine for non-medical reasons including religious exemptions.

Additional details regarding validity testing and results are included in the paper by Libby et al described in the previous section of this submission.

[Response Ends]

2b.04. Provide your interpretation of the results in terms of demonstrating validity. (i.e., what do the results mean and what are the norms for the test conducted?)

[Response Begins]

Our convergent validity testing demonstrated statistically significant associations between strategies known to increase healthcare personnel vaccination uptake and higher vaccination rates reported by facilities for the three subgroups of HCP examined in this testing; therefore, convergent validity was demonstrated. We have undertaken a second analysis of this type using inpatient (hospital) and outpatient (ambulatory surgery center) data from over 2,000 facilities reporting the measure during the 2015-2016 influenza season and obtained similar results, although they are unpublished.

Face validity of the measure was also demonstrated via consensus among our Delphi panel of experts.

[Response Ends]

2b.05. Describe the method for determining if statistically significant and clinically/practically meaningful differences in performance measure scores among the measured entities can be identified.

Describe the steps—do not just name a method; what statistical analysis was used? Do not just repeat the information provided in Importance to Measure and Report: Gap in Care/Disparities.

[Response Begins]

Meaningful differences in performance across facilities can be assessed by categorizing facilities as above average, average, and below average based on quartiles of achievement, as follows: a) above average performance: vaccination rate in the top quartile b) average performance: vaccination rate in the 2nd and 3rd quartile c) below average performance: vaccination rate in the bottom quartile. Vaccination coverage rates were calculated using reported data elements and then classified into quartiles for analysis.

[Response Ends]

2b.06. Describe the statistical results from testing the ability to identify statistically significant and/or clinically/practically meaningful differences in performance measure scores across measured entities.

Examples may include number and percentage of entities with scores that were statistically significantly different from mean or some benchmark, different from expected; how was meaningful difference defined.

[Response Begins]

In 4,465 acute care hospitals during the 2020-2021 influenza season, overall the median influenza vaccination coverage rate was 89.2 (quartile 1; 77.0%, quartile 3: 96.0%). Among employees, the median influenza vaccination coverage rate was 94.2% (quartile 1: 80.1%, quartile 3: 97.1%). Among licensed independent practitioners, the median influenza vaccination coverage rate was 89.1% (quartile 1: 59.2%, quartile 3: 98.6%). Among student trainees and volunteers, the median influenza vaccination coverage rate was 100% (quartile 1: 92.1%, quartile 3: 100%). (Question 1b.02, Table 1a)

Similar interquartile ranges are found for ambulatory surgery centers and longterm care facilities (Question 1b.02 Tables)

[Response Ends]

2b.07. Provide your interpretation of the results in terms of demonstrating the ability to identify statistically significant and/or clinically/practically meaningful differences in performance across measured entities.

In other words, what do the results mean in terms of statistical and meaningful differences?

[Response Begins]

The large differences in influenza coverage rates at the ends of quartile 1 and quartile 3 (spanning a 17.0% range for HCP overall in acute care hospitals in the 2020-2021 season) indicate there are clinically/practically meaningful differences across measured entities. Similarly wide differences at the ends of quartiles1 and quartile 3 are found for ambulatory surgery centers and longterm care facilities (Question 1b.02 Tables)

In addition, there is even larger rangess in influenza coverage rates at the ends of quartile 1 and quartile 3 by personnel groups (spanning a 39.4% range for licensed independent practitioners in acute care hospitals in the 2020-2021 season).

[Response Ends]

2b.08. Describe the method of testing conducted to identify the extent and distribution of missing data (or non-response) and demonstrate that performance results are not biased due to systematic missing data (or differences between responders and non-responders). Include how the specified handling of missing data minimizes bias.

Describe the steps—do not just name a method; what statistical analysis was used.

[Response Begins]

The measure reporting tool (CDC's National Healthcare Safety Network) includes a numerator category for unknown influenza vaccination status. Therefore, the sum of the numerator categories always equals the denominator for each of the three denominator groups.

The vaccination coverage measure is calculated as the percentage of healthcare personnel (HCP) who received influenza vaccine divided by the total number of HCP, so the number of HCP with unknown influenza vaccination status will never inflate vaccination coverage estimates but can only result in under-reporting of vaccination coverage.

Using the unknown influenza vaccination status category highlights for facilities potential deficits in their vaccination tracking and reporting practices, as well as allowing the potential for under-reporting to be quantified. We assessed the proportion of HCP reported to have unknown vaccination status by facility type and HCP type in order to examine the potential under-reporting risk due to unknown vaccination status.

[Response Ends]

2b.09. Provide the overall frequency of missing data, the distribution of missing data across providers, and the results from testing related to missing data.

For example, provide results of sensitivity analysis of the effect of various rules for missing data/non-response. If no empirical sensitivity analysis was conducted, identify the approaches for handling missing data that were considered and benefits and drawbacks of each).

[Response Begins]

The median overall proportion of all healthcare personnel (HCP) with unknown vaccination status for the 2020-2021 influenza season was 4.7% for acute care hospitals; 0% for ambulatory surgery centers (ASCs); and 5.5% for longterm care facilities (LTCs). The means, minimums, maximums, interquartile ranges, and deciles are reported in the tables below.

Table 4a. Pooled proportions* of healthcare personnel (HCP) reported as unknown vaccination status in acute care hospitals† (4,464 hospitals, 8,217,159 HCPs, 776,589 with unknown vaccination status) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

–	**Employee Unknown Vaccination %**	**Licensed Independent Practitioner Unknown Vaccination %**	**Adult Student/ Trainee & Volunteer Unknown Vaccination %**	**All Healthcare Personnel ‡ Unknown Vaccination %**
No. Facilities	**4,464**	**4,070**	**3,409**	**4,464**
Median	2.4	5.7	0	4.7
Mean (SD)	6.7 (10.7)	20.9 (28.1)	9.6 (23.6)	9.7 (12.9)
Minimum, Maximum	0, 100	0, 100	0, 100	0, 98.2
Interquartile Range (25^{th}, 75^{th})	0, 8.7	0, 35.6	0, 2.2	0.6, 13.9
Decile	§	§	§	§
0-9.9%	0	0	0	0
10-19.9%	0	0	0	0.1
20-29.9%	0.2	0	0	1.2
30-39.9%	1.2	1.2	0	2.7
40-49.9%	2.4	5.7	0	4.7
50-59.9%	4.1	13.9	0	7.3
60-69.9%	6.8	26.5	0.2	11.4
70-79.9%	11	44.6	6.7	17
80-89.9%	19.9	68.7	37.5	27
90-100%	100	100	100	98.2

Table 4a. Pooled proportions* of healthcare personnel (HCP) reported as unknown vaccination status in acute care hospitals† (4,464 hospitals, 8,217,159 HCPs, 776,589 with unknown vaccination status) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

-Indicates cell intentionally left blank

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and

multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Acute care hospitals include general, acute care; oncology; orthopedic; pediatric; surgical; women's; women's and children's; military; and Veterans Affairs.

‡Pooled proportion of unknown vaccination status among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 4b. Pooled proportions* of healthcare personnel (HCP) reported as unknown vaccination status in ambulatory surgery centers (ASCs)† (461 ASCs, 29,413 HCPs, 2282 with unknown status) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

_	**Employee Unknown Vaccination %**	**Licensed Independent Practitioner Unknown Vaccination %**	**Adult Student/ Trainee & Volunteer Unknown Vaccination %**	**All Healthcare Personnel‡ Unknown Vaccination %**
No. Facilities	**461**	**416**	**74**	**461**
Median	0	0	0	0
Mean (SD)	2.7 (9.4)	7 (19.6)	11.3 (29.7)	5.1 (13)
Minimum, Maximum	0, 100	0, 100	0, 100	0, 100
Interquartile Range (25^{th}, 75^{th})	0, 0	0, 0	0, 0	0, 2.7
Decile	§	§	§	§
0-9.9%	0	0	0	0
10-19.9%	0	0	0	0
20-29.9%	0	0	0	0
30-39.9%	0	0	0	0
40-49.9%	0	0	0	0
50-59.9%	0	0	0	0
60-69.9%	0	0	0	0.8
70-79.9%	0	2.3	0	5
80-89.9%	7.7	20	42.9	17
90-100%	100	100	100	100

Table 4b. Pooled proportions* of healthcare personnel (HCP) reported as unknown vaccination status in ambulatory surgery centers (ASCs)† (461 ASCs, 29,413 HCPs, 2282 with unknown status) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (current) influenza season.

- Indicates the table cell left intentionally blank

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP

in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Ambulatory Surgery Centers (ASCs) include all ACSs except Hospital outpatient procedure departments (HOPD).

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

Table 4c. Pooled proportions* of healthcare personnel (HCP) reported as unknown vaccination status in long-term care facilities (LTCs)† (47 LTCs, 10,339 HCPs, 1262 with unknown vaccination status) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (past) influenza season.

-	**Employee Unknown Vaccination %**	**Licensed Independent Practitioner Unknown Vaccination %**	**Adult Student/ Trainee & Volunteer Unknown Vaccination %**	**All Healthcare Personnel‡ Unknown Vaccination %**
No. Facilities	**47**	**34**	**13**	**47**
Median	0	0	0	5.5
Mean (SD)	8 (13.8)	13.1 (28)	28 (42.3)	10.6 (16.5)
Minimum, Maximum	0, 70.4	0, 100	0, 100	0, 70.4
Interquartile Range (25^{th}, 75^{th})	0, 9.8	0, 3.8	0, 38.7	0, 12
Decile	§	§	§	§
0-9.9%	0	0	0	0
10-19.9%	0	0	0	0
20-29.9%	0	0	0	0
30-39.9%	0	0	0	0
40-49.9%	0	0	0	5.5
50-59.9%	5	0	0	8.1
60-69.9%	8.1	0	38.7	9.8
70-79.9%	10.2	15.6	96.4	18.9
80-89.9%	25.2	54.5	100	29.9
90-100%	70.4	100	100	70.4

Table 4c. Pooled proportions
- Indicates the table cell left intentionally blank
* of healthcare personnel (HCP) reported as unknown vaccination status in long-term care facilities (LTCs)† (47 LTCs, 10,339 HCPs, 1262 with unknown vaccination status) reporting to the National Healthcare Safety Network (NHSN), by personnel group, 2020-2021 (past) influenza season.

*Pooled proportions are calculated as the number of healthcare personnel (HCP) vaccinated at their facility plus the number who provided documentation of vaccination elsewhere, divided by the total number of HCP in that group reported as working at the facilities for one day or more from October 1 through March 31, and multiplied by 100. HCP are reported by each facility in which they work; therefore, individuals may be counted more than once.

†Long-term care facilities (LTCs) include nursing homes/skilled nursing, long-term care for the developmentally disabled, and assisted living facilities.

‡Pooled proportion vaccinated among employees, licensed independent practitioners, and adult students/trainees and volunteers combined.

§Cell intentionally left blank.

[Response Ends]

2b.10. Provide your interpretation of the results, in terms of demonstrating that performance results are not biased due to systematic missing data (or differences between responders and non-responders), and how the specified handling of missing data minimizes bias.

In other words, what do the results mean in terms of supporting the selected approach for missing data and what are the norms for the test conducted; if no empirical analysis was conducted, justify the selected approach for missing data.

[Response Begins]

The approach of reporting unknown influenza vaccination status indicates that missing data on vaccination influenza status was infrequent for most facilities with median proportions of unknown vaccination status of 4.7% for acute care hospitals, 0% for ambulatory surgery centers (ASCs), and 5.5% for longterm care facilities (LTCs) during the 2020-2021 influenza season. The calculation of the metric minimizes bias by including only HCP who received vaccination in the numerator but including HCP with unknown vaccination status in the denominator ensures the vaccination coverage rate is not artifactually inflated by missing data. Reporting unknown influenza vaccination status by healthcare personnel category (HCP) highlights for facilities potential deficits in their vaccination tracking and reporting practices and where improvement activity may be directed.

Note: This item is directed to measures that are risk-adjusted (with or without social risk factors) OR to measures with more than one set of specifications/instructions (e.g., one set of specifications for how to identify and compute the measure from medical record abstraction and a different set of specifications for claims or eCQMs). It does not apply to measures that use more than one source of data in one set of specifications/instructions (e.g., claims data to identify the denominator and medical record abstraction for the numerator). Comparability is not required when comparing performance scores with and without social risk factors in the risk adjustment model. However, if comparability is not demonstrated for measures with more than one set of specifications/instructions, the different specifications (e.g., for medical records vs. claims) should be submitted as separate measures.

[Response Ends]

Note: This item is directed to measures that are risk-adjusted (with or without social risk factors) OR to measures with more than one set of specifications/instructions (e.g., one set of specifications for how to identify and compute the measure from medical record abstraction and a different set of specifications for claims or eCQMs). It does not apply to measures that use more than one source of data in one set of specifications/instructions (e.g., claims data to identify the denominator and medical record abstraction for the numerator). Comparability is not required when comparing performance scores with and without social

risk factors in the risk adjustment model. However, if comparability is not demonstrated for measures with more than one set of specifications/instructions, the different specifications (e.g., for medical records vs. claims) should be submitted as separate measures.

2b.11. Indicate whether there is more than one set of specifications for this measure.

[Response Begins]

No, there is only one set of specifications for this measure

[Response Ends]

2b.12. Describe the method of testing conducted to compare performance scores for the same entities across the different data sources/specifications.

Describe the steps—do not just name a method. Indicate what statistical analysis was used.

[Response Begins]

[Response Ends]

2b.13. Provide the statistical results from testing comparability of performance scores for the same entities when using different data sources/specifications.

Examples may include correlation, and/or rank order.

[Response Begins]

[Response Ends]

2b.14. Provide your interpretation of the results in terms of the differences in performance measure scores for the same entities across the different data sources/specifications.

In other words, what do the results mean and what are the norms for the test conducted.

[Response Begins]

[Response Ends]

2b.15. Indicate whether the measure uses exclusions.

[Response Begins]

N/A or no exclusions

[Response Ends]

2b.16. Describe the method of testing exclusions and what was tested.

Describe the steps—do not just name a method; what was tested, e.g., whether exclusions affect overall performance scores; what statistical analysis was used?

[Response Begins]

N/A

[Response Ends]

2b.17. Provide the statistical results from testing exclusions.

Include overall number and percentage of individuals excluded, frequency distribution of exclusions across measured entities, and impact on performance measure scores.

[Response Begins]

N/A

[Response Ends]

2b.18. Provide your interpretation of the results, in terms of demonstrating that exclusions are needed to prevent unfair distortion of performance results.

In other words, the value outweighs the burden of increased data collection and analysis. Note: If patient preference is an exclusion, the measure must be specified so that the effect on the performance score is transparent, e.g., scores with and without exclusion.

[Response Begins]

N/A

[Response Ends]

2b.19. Check all methods used to address risk factors.

[Response Begins]

No risk adjustment or stratification

[Response Ends]

2b.20. If using statistical risk models, provide detailed risk model specifications, including the risk model method, risk factors, risk factor data sources, coefficients, equations, codes with descriptors, and definitions.

[Response Begins]

[Response Ends]

2b.21. If an outcome or resource use measure is not risk-adjusted or stratified, provide rationale and analyses to demonstrate that controlling for differences in patient characteristics (i.e., case mix) is not needed to achieve fair comparisons across measured entities.

[Response Begins]

Risk adjustment is not appropriate for the proposed measure. By virtue of their work environment, all HCP are potentially at risk for contracting influenza and transmitting the influenza virus to patients. The ACIP recommends that all HCP receive annual seasonal influenza vaccination.

[Response Ends]

2b.22. Select all applicable resources and methods used to develop the conceptual model of how social risk impacts this outcome.

[Response Begins]

[Response Ends]

2b.23. Describe the conceptual and statistical methods and criteria used to test and select patient-level risk factors (e.g., clinical factors, social risk factors) used in the statistical risk model or for stratification by risk.

Please be sure to address the following: potential factors identified in the literature and/or expert panel; regression analysis; statistical significance of p<0.10 or other statistical tests; correlation of x or higher. Patient factors should be present at the start of care, if applicable. Also discuss any "ordering" of risk factor inclusion; note whether social risk factors are added after all clinical factors. Discuss any considerations regarding data sources (e.g., availability, specificity).

[Response Begins]

[Response Ends]

2b.24. Detail the statistical results of the analyses used to test and select risk factors for inclusion in or exclusion from the risk model/stratification.

[Response Begins]

[Response Ends]

2b.25. Describe the analyses and interpretation resulting in the decision to select or not select social risk factors.

Examples may include prevalence of the factor across measured entities, availability of the data source, empirical association with the outcome, contribution of unique variation in the outcome, or assessment of between-unit effects and within-unit effects. Also describe the impact of adjusting for risk (or making no adjustment) on providers at high or low extremes of risk.

[Response Begins]

[Response Ends]

2b.26. Describe the method of testing/analysis used to develop and validate the adequacy of the statistical model or stratification approach (describe the steps—do not just name a method; what statistical analysis was used). Provide the statistical results from testing the approach to control for differences in patient characteristics (i.e., case mix) below. If stratified ONLY, enter "N/A" for questions about the statistical risk model discrimination and calibration statistics.

Validation testing should be conducted in a data set that is separate from the one used to develop the model.

[Response Begins]
[Response Ends]

2b.27. Provide risk model discrimination statistics.

For example, provide c-statistics or R-squared values.

[Response Begins]
[Response Ends]

2b.28. Provide the statistical risk model calibration statistics (e.g., Hosmer-Lemeshow statistic).

[Response Begins]
N/A
[Response Ends]

2b.29. Provide the risk decile plots or calibration curves used in calibrating the statistical risk model.

The preferred file format is .png, but most image formats are acceptable.

[Response Begins]
[Response Ends]

2b.30. Provide the results of the risk stratification analysis.

[Response Begins]
[Response Ends]

2b.31. Provide your interpretation of the results, in terms of demonstrating adequacy of controlling for differences in patient characteristics (i.e., case mix).

In other words, what do the results mean and what are the norms for the test conducted?

[Response Begins]
[Response Ends]

2b.32. Describe any additional testing conducted to justify the risk adjustment approach used in specifying the measure.

Not required but would provide additional support of adequacy of the risk model, e.g., testing of risk model in another data set; sensitivity analysis for missing data; other methods that were assessed.

[Response Begins]

[Response Ends]

Criterion 3. Feasibility

Criterion Extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

3.01. Check all methods below that are used to generate the data elements needed to compute the measure score.

[Response Begins]

Coded by someone other than person obtaining original information (e.g., DRG, ICD-10 codes on claims)

[Response Ends]

3.02. Detail to what extent the specified data elements are available electronically in defined fields.

In other words, indicate whether data elements that are needed to compute the performance measure score are in defined, computer-readable fields.

[Response Begins]

Some data elements are in defined fields in electronic sources

[Response Ends]

3.03. If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using data elements not from electronic sources.

[Response Begins]

Because the measure is for healthcare personnel (as opposed to patients), it would be difficult to capture all data from electronic sources. Although some healthcare facilities do maintain electronic health records for their personnel, many continue to use paper forms to document healthcare personnel influenza vaccination among other elements. In addition, there are aspects of the measure that would be difficult to capture electronically, e.g. verbal declination or verbal notification of medical contraindications to vaccination. The decision to permit verbal information for these elements was consciously made to balance the burden of measurement for healthcare facilities with the accuracy of the information collected, and these elements were included in our validity and reliability testing. To capture such verbal statements electronically would require them to be entered manually into electronic databases, which would significantly increase measurement burden and in essence duplicate the collection of information (once verbally, once electronically). Advances in use of electronic health records for healthcare personnel will increase the proportion of elements in this measure that are captured electronically, but the measure cannot currently be specified as a fully electronic measure without imposing changes in data collection processes on thousands of facilities currently using this measure to meet CMS reporting requirements (see section 4a.1, below).

[Response Ends]

3.04. Describe any efforts to develop an eCQM.

[Response Begins]

N/A

[Response Ends]

3.06. Describe difficulties (as a result of testing and/or operational use of the measure) regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.

[Response Begins]

During the first year of implementation of this measure, during the 2012-2013 influenza season, we received feedback from a substantial number of reporting facilities that the ´30-day rule´, i.e. the restriction of denominator populations to personnel working in the facility for at least 30 days during the reporting period, was excessively burdensome. Furthermore, facilities felt strongly that this requirement reduced the accuracy of their measurement as it was difficult for them to gather the necessary data to restrict the denominator in this fashion. Due to the excessive burden imposed by this requirement, we changed the denominator beginning in the 2013-2014 influenza season to include all personnel working in the facility for one day or more. In addition to alleviating burden, this denominator definition conforms with the one used during the pilot-testing and validation of the measure, and produces a more complete picture of the personnel at risk of acquiring and transmitting influenza in a given healthcare facility. NQF approved this change in 2013.

Since making the above-referenced change, we have not received any additional large-scale feedback regarding the burden of the measure or any indication that the measure is not performing well. Indeed, as described above, completeness of data and measured vaccination coverage have improved in each year of use. We are not aware of any unintended consequences, positive or negative, that have resulted from use of this measure.

[Response Ends]

Consider implications for both individuals providing data (patients, service recipients, respondents) and those whose performance is being measured.

3.07. Detail any fees, licensing, or other requirements to use any aspect of the measure as specified (e.g., value/code set, risk model, programming code, algorithm),

Attach the fee schedule here, if applicable.

[Response Begins]

N/A

[Response Ends]

4: Use and Usability

4a. Use

Extent to which potential audiences (e.g., consumers, purchasers, providers, policy makers) are using or could use performance results for both accountability and performance improvement to achieve the goal of high-

quality, efficient healthcare for individuals or populations.

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making.

NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement, in addition to demonstrating performance improvement.

4a.01. Check all current uses. For each current use checked, please provide:

Name of program and sponsor

URL

Purpose

Geographic area and number and percentage of accountable entities and patients included

Level of measurement and setting

[Response Begins]

Public Reporting

[Public Reporting Please Explain]

Free-standing acute care facilities, inpatient rehabilitation facilities (IRFs), critical access hospitals, long-term acute care facilities, and prospective payment system (PPS)-exempt cancer hospitals are still required to report HCP influenza vaccination summary data through NHSN.

IRF units located within acute care facilities, long-term acute care facilities, critical access hospitals, and inpatient psychiatric facilities are also required to report HCP influenza vaccination data through NHSN.

(https://www.cdc.gov/nhsn/faqs/vaccination/faq-influenza-vaccination-summary-reporting.html)

CMS Hospital Inpatient Quality Reporting Program

- https://qualitynet.cms.gov/inpatient/iqr/measures
- Purpose: Track and compare quality
- National: 4,464 acute care hospitals in 2020-2021 season
- Level of measurement: facility

CMS Inpatient Rehabilitation Facility Quality Reporting Program (IRF QRP)

- https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/index.html
- Purpose: Track and compare quality
- National: 1,055 facilities in 2020-2021 season
- Level of measurement: facility

CMS Long Term Care Hospital Quality Reporting (LTCHQR) Program

- https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/ltch-quality-reporting
- Purpose: Track and compare quality
- National: 379 facilities in 2020-2021 season
- Level of measurement: facility

Public Health/Disease Surveillance

[Public Health/Disease Surveillance Please Explain]

Public health surveillance reports by CMS region and by state for mandatory CMS reporting of this measure for past and most recent influenza seasons are published on the National Healthcare Safety Network website - https://www.cdc.gov/nhsn/datastat/flu-datatables.html

There are surveillance reports posted for Ambulatory Surgery Centers, Inpatient Psychiatric Facilities, Inpatient Rehabilitation Facilities, Longterm Acute Care Hospitals, Acute Care Hospitals, and Outpatient Dialysis Facilities.

Payment Program

[Payment Program Please Explain]

Payments to free-standing acute care facilities, inpatient rehabilitation facilities (IRFs), critical access hospitals, long-term acute care facilities, and prospective payment system (PPS)-exempt cancer hospitals are impacted by timely reporting of this HCP influenza vaccination measure through NHSN.

Regulatory and Accreditation Programs

[Regulatory and Accreditation Programs Please Explain]

This influenza vaccination measure is specifically recommended (although not required) by the Joint Commission to fulfill element of performance #6 of accreditation standard IC.02.04.01, which requires facilities to have a written methodology of how staff influenza vaccination is tracked.

[Response Ends]

4a.02. Check all planned uses.

[Response Begins]

Measure Currently in Use

[Response Ends]

4a.03. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing), explain why the measure is not in use.

For example, do policies or actions of the developer/steward or accountable entities restrict access to performance results or block implementation?

[Response Begins]

N/A

[Response Ends]

4a.04. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes: used in any accountability application within 3 years, and publicly reported within 6 years of initial endorsement.

A credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.

[Response Begins]

N/A

[Response Ends]

4a.05. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.

Detail how many and which types of measured entities and/or others were included. If only a sample of measured entities were included, describe the full population and how the sample was selected.

[Response Begins]

Facilities reporting this annual measure through the National Healthcare Safety Network (NHSN) may use the NHSN Analysis tools to check data entry accuracy, examine data for certain time periods during the influenza season and compare data to previous seasons.

Facilities required to report this annual measure to CMS do so through NHSN reporting.

Assistance is available to facilities through the NHSN website (https://www.cdc.gov/nhsn/hps/vaccination/index.html#support) and by contacting the NHSN User Support Helpdesk for specific questions (https://www.cdc.gov/nhsn/about-nhsn/helpdesk.html).

[Response Ends]

4a.06. Describe the process for providing measure results, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.

[Response Begins]

Summary measure results are published annual for each influenza season for those facilities with required CMS reporting. (https://www.cdc.gov/nhsn/datastat/flu-datatables.html)

[Response Ends]

4a.07. Summarize the feedback on measure performance and implementation from the measured entities and others. Describe how feedback was obtained.

[Response Begins]

Qualitative and quantitative evaluation data were collected from hospitals after this measure was implemented on a national level. Qualitative data were analyzed from semi-structured interviews while quantitative data were analyzed from survey responses. Overall, facilities appeared to recognize the importance of the measure; however, they reported challenges in terms of tracking and collecting vaccination data from non-employee contracted personnel.

One thousand hospitals were surveyed on implementation and use of this measure of healthcare personnel influenza vaccination for the 2012-2013 influenza season. Facilities found it easier to collect data on employees than nonemployees; larger facilities reported more challenges than smaller facilities. Barriers may decrease over time as facilities become accustomed to the measure. (Dolan SB, Kalayil EJ, Lindley MC, Ahmed

F. Evaluation of the First Year of National Reporting on a New Healthcare Personnel Influenza Vaccination Performance Measure by US Hospitals. Infect Control Hosp Epidemiol. 2016 Feb;37(2):222-5. doi: 10.1017/ice.2015.275. Epub 2015 Dec 17. PMID: 26673572; PMCID: PMC5771679.)

Semi-structured telephone interviews were conducted of the staff at 46 hospitals who were knowledgeable about data collection to fulfill the Centers for Medicare & Medicaid Services Hospital Inpatient Quality Reporting (IQR) program requirements. Two qualitative data analysts independently coded each interview, and data were synthesized using a thematic analysis. (Kalayil EJ, Dolan SB, Lindley MC, Ahmed F. Influenza vaccination of health care personnel: Experiences with the first year of a national data collection effort. Am J Infect Control. 2015 Nov;43(11):1154-60. doi: 10.1016/j.ajic.2015.06.018. Epub 2015 Jul 30. PMID: 26234522.)

[Response Ends]

4a.08. Summarize the feedback obtained from those being measured.

[Response Begins]

Data collection challenges were noted mainly for non-employee personnel (such as licensed independent practitioners) due to factors such as a lack of established data tracking processes. For example, larger healthcare systems encountered challenges with identifying all healthcare personnel working in facilities throughout the influenza season. Also, obtaining vaccination status information for non-employees was often problematic as they may have received influenza vaccine outside of the healthcare facility, but this category of contracted personnel is not required for this measure.

The measure was generally seen as valuable measure to track vaccination status and identify ways to improve upon facility-level coverage rates. Some facilities also reported using data collected through NHSN to satisfy other reporting requirements in addition to CMS mandates.

[Response Ends]

4a.09. Summarize the feedback obtained from other users.

[Response Begins]

N/A

[Response Ends]

4a.10. Describe how the feedback described has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.

[Response Begins]

This measure has not undergone any recent changes. As noted above, some facilities encountered difficulties with reporting data on non-employees (other contract personnel) and this category is not a required reporting category for the denominator of the measure.

[Response Ends]

4b. Usability

4b.01. You may refer to data provided in Importance to Measure and Report: Gap in Care/Disparities, but do not repeat here. Discuss any progress on improvement (trends in performance results, number and percentage of people receiving high-quality healthcare; Geographic area and number and percentage of

accountable entities and patients included). If no improvement was demonstrated, provide an explanation. If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

[Response Begins]

Improvement in healthcare personnel (HCP) influenza vaccination coverage has occurred over time. The exception has been the influenza season (2020-2021) when, in some settings, HCP influenza vaccination coverage has declined, most likely due to disruptions in HCP staffing due to the COVID-19 pandemic. Pre-pandemic HCP influenza vaccination coverage rates should be used as goals for facilities to re-achieve or exceed as the COVID-19 pandemic is addressed.

In acute care hospitals, overall HCP vaccination coverage improved from the 2015-2016 season through the 2019-2020 season, but HCP vaccination coverage declined in the 2020-2021 season, likely due to disruptions from the COVID-19 pandemic:

- 2015-2016 season: 86.4% (interquartile range, 62.5%-97.3%) among 4,640 facilities
- 2019-2020 season: 89.5% (interquartile range, 86.0%-97.5%) among 2,908 facilities
- 2020-2021 season: 84.4% (interquartile range, 77.4%-96.1%) among 4,464 facilities

In ambulatory surgery centers (ASCs), overall HCP vaccination coverage has continued to improve since the 2015-2016 season:

- 2015-2016 season: 76.3% (interquartile range, 71.4%-89.1%) among 4,278 facilities
- 2019-2020 season: 82.7% (interquartile range, 74.1%-97.6%) among 532 facilities
- 2020-2021 season: 83.2% (interquartile range, 75.0%-97.2%) among 461 facilities

In longterm care facilities (LTCs), HCP vaccination coverage was collected in few facilities until the 2019-2020 season, and HCP vaccination coverage declined in the 2020-2021 season, likely due to disruptions from the COVID-19 pandemic:

- 2019-2020 season: 85.8% (interquartile range, 80.9%-97.8%) among 37 facilities
- 2020-2021 season: 79.6% (interquartile range, 66.7%-95.3%) among 47 facilities

2019-2020 and 2020-2021 season data is available in Question 1b.02.

Data from previous influenza seasons are available at: https://www.cdc.gov/nhsn/datastat/flu-datatables.html

[Response Ends]

4b.02. Explain any unexpected findings (positive or negative) during implementation of this measure, including unintended impacts on patients.

[Response Begins]

During the first year of implementation of this measure, during the 2012-2013 influenza season, we received feedback from a substantial number of reporting facilities that the ´30-day rule´, i.e. the restriction of denominator populations to personnel working in the facility for at least 30 days during the reporting period, was excessively burdensome. Furthermore, facilities felt strongly that this requirement reduced the accuracy of their measurement as it was difficult for them to gather the necessary data to restrict the denominator in this fashion. Due to the excessive burden imposed by this requirement, we changed the denominator beginning in the 2013-2014 influenza season to include all personnel working in the facility for one day or more. In addition to alleviating burden, this denominator definition conforms with the one used during the pilot-testing and validation of the measure, and produces a more complete picture of the personnel at risk of acquiring and transmitting influenza in a given healthcare facility. NQF approved this change in 2013.

Since making the above-referenced change, we have not received any additional large-scale feedback

regarding the burden of the measure or any indication that the measure is not performing well. Indeed, as described above, completeness of data and measured vaccination coverage have improved in each year of use. We are not aware of any unintended consequences, positive or negative, that have resulted from use of this measure.

[Response Ends]

4b.03. Explain any unexpected benefits realized from implementation of this measure.

[Response Begins]

No new unexpected findings in 2019-2020 or 2020-21 influenza seasons.

[Response Ends]

Criterion 5: Related and Competing Measures

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

If you are updating a maintenance measure submission for the first time in MIMS, please note that the previous related and competing data appearing in question 5.03 may need to be entered in to 5.01 and 5.02, if the measures are NQF endorsed. Please review and update questions 5.01, 5.02, and 5.03 accordingly.

5.01. Search and select all NQF-endorsed related measures (conceptually, either same measure focus or target population).

(Can search and select measures.)

[Response Begins]

0226: Influenza Immunization in the ESRD Population (Facility Level)

0039: Flu Vaccinations for Adults Ages 18 and Older

3684: Percent of Residents or Patients Who Were Assessed and Appropriately Given the Seasonal Influenza Vaccine (short stay)

0680: Percent of Residents Who Were Assessed and Appropriately Given the Seasonal Influenza Vaccine (Short-Stay)

1659: Influenza Immunization

0041: Preventive Care and Screening: Influenza Immunization

0040: Flu Shot for Older Adults

0041e: Preventive Care and Screening: Influenza Immunization

[Response Ends]

5.02. Search and select all NQF-endorsed competing measures (conceptually, the measures have both the same measure focus or target population).

(Can search and select measures.)

[Response Begins]

[Response Ends]

5.03. If there are related or competing measures to this measure, but they are not NQF-endorsed, please indicate the measure title and steward.

[Response Begins]

N/A

[Response Ends]

5.04. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s), indicate whether the measure specifications are harmonized to the extent possible.

[Response Begins]

Yes

[Response Ends]

5.05. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.

[Response Begins]

N/A

[Response Ends]

5.06. Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality). Alternatively, justify endorsing an additional measure.

Provide analyses when possible.

[Response Begins]

This measure is superior because there are no competing measures that assess healthcare personnel influenza vaccination coverage. (Other measures assess influenza vaccination in a different population (e.g., patients). Other measures assess different vaccines (e.g., COVID-19 vaccine).

[Response Ends]

Appendix

Supplemental materials may be provided in an appendix: No appendix

Contact Information

Measure Steward (Intellectual Property Owner): Centers for Disease Control and Prevention
Measure Steward Point of Contact: Lindley, Megan, mlindley@cdc.gov, Budnitz, Daniel, dbudnitz@cdc.gov, Poudyal, Natasha, qpp1@cdc.gov, jody.sachs@hhs.gov, Geller, Andrew, wia0@cdc.gov, Sacht, Joseph, squ7@cdc.gov

Measure Developer if different from Measure Steward: Centers for Disease Control and Prevention

Measure Developer Point(s) of Contact: Lindley, Megan, mlindley@cdc.gov, Geller, Andrew, wia0@cdc.gov, jody.sachs@hhs.gov, Poudyal, Natasha, qpp1@cdc.gov, Sacht, Joseph, squ7@cdc.gov

Additional Information

1. Provide any supplemental materials, if needed, as an appendix. All supplemental materials (such as data collection instrument or methodology reports) should be collated one file with a table of contents or bookmarks. If material pertains to a specific criterion, that should be indicated.

[Response Begins]

No appendix

[Response Ends]

2. List the workgroup/panel members' names and organizations.

Describe the members' role in measure development.

[Response Begins]

Development of the final proposed measure described above was guided by the input of staff from the jurisdictions that assisted in implementation of the pilot-testing process: the California Department of Public Health, the New Mexico Department of Health, the New York City Department of Health and Mental Hygiene, and the University of Pittsburgh Medical Center.

Prior to the measure testing process, we also established a Steering Committee to guide our pilot testing and to inform the specifications of the final proposed measure. In addition to staff from the pilot jurisdictions, the Committee consisted of the following members: Ms. Kristie Baus (Centers for Medicare and Medicaid Services); Dr. Barbara Braun (Joint Commission); Ms. Jayne Hart Chambers (Federation of American Hospitals); Dr. John Cooper (Centers for Medicare and Medicaid Services); Dr. Stanley Grogg (American Osteopathic Association); Dr. Charles Helms (University of Iowa Hospitals and Clinics); Ms. Nancy Hughes (American Nurses Association); Dr. Jeffrey Kelman (Centers for Medicare and Medicaid Services); Ms. Nancy Kupka (Joint Commission); Ms. Linda Kusek (Joint Commission); Dr. Mark Montoney (Vanguard Health Services); Ms. Sharon Sprenger (Joint Commission); Dr. Tom Talbot (Vanderbilt University); and Dr. Litjen Tan (American Medical Association).

The Delphi panel of experts who assessed the face validity of the measure consisted of Ms. Kristie Baus (Centers for Medicare and Medicaid Services); Ms. Sharon Sprenger (Joint Commission); Dr. Tom Talbot (Vanderbilt University); Dr. Dale Bratzler (Oklahoma Foundation for Medical Quality); Ms. Kristen Ehresmann (Minnesota Department of Health); Dr. Trish Perl (Johns Hopkins School of Medicine & Bloomberg School of Hygiene); Dr. Mark Russi (Yale-New Haven Hospital); Dr. Ed Septimus (HCA Healthcare System); and Dr. Richard Zimmerman (University of Pittsburgh School of Medicine).

[Response Ends]

3. Indicate the year the measure was first released.

[Response Begins]

2008

[Response Ends]

4. Indicate the month and year of the most recent revision.

[Response Begins]

September 2017

[Response Ends]

5. Indicate the frequency of review, or an update schedule, for this measure.

[Response Begins]

3 years

[Response Ends]

6. Indicate the next scheduled update or review of this measure.

[Response Begins]

Next 3 year maintenance review

[Response Ends]

7. Provide a copyright statement, if applicable. Otherwise, indicate "N/A".

[Response Begins]

Not applicable (government entity)

[Response Ends]

8. State any disclaimers, if applicable. Otherwise, indicate "N/A".

[Response Begins]

The measure specifications and supporting documentation are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

[Response Ends]

9. Provide any additional information or comments, if applicable. Otherwise, indicate "N/A".

[Response Begins]

N/A

[Response Ends]