

April 2015

Development of the Skilled Nursing Facility Readmission Measure (SNFRM): August 2012 Technical Expert Panel Report

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RTI Project Numbers 0214077.001.000.002.001 & 0211942.100.300



DEVELOPMENT OF THE SKILLED NURSING FACILITY READMISSION MEASURE
(SNFRM): AUGUST 2015 TECHNICAL EXPERT PANEL REPORT

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Order HHSM-500-T0001)

RTI International

April 2015

This project was funded by the Centers for Medicare & Medicaid Services under contract nos. HHSM-500- 2013-13015I Task Order HHSM-500-T0001 & HHSM-500-2008-000211. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. RTI assumes responsibility for the accuracy and completeness of the information contained in this report.

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SECTION 1 INTRODUCTION

In August 2012, RTI convened a Technical Expert Panel (TEP) via webinar to seek guidance on the development of a Skilled Nursing Facility Readmission Measure (SNFRM). The TEP provided advice on a variety of design issues including exclusion criteria, covariates for risk adjustment, and whether to use cohorts to improve the risk adjustment strategy. This work was conducted for the Centers for Medicare & Medicaid Services under the Nursing Home Quality Measures project (contract number HHSM-500-2008-000211).

This report provides a summary of the TEP proceedings, detailing the key issues discussed and TEP recommendations. In the sections that follow, we provide a summary of the background and purpose for developing the SNFRM, the process for convening the TEP and attendees, a summary of TEP comments, and a summary and next steps for this work.

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SECTION 2 BACKGROUND AND PURPOSE

CMS contracted with RTI to develop the SNFRM, which uses fee-for-service (FFS) Medicare claims and harmonizes with CMS' current Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) measure (NQF #1789) and readmission measures being developed for other post-acute care settings (i.e., inpatient rehabilitation facilities [IRF], long-term care hospitals [LTCH], home health agencies [HHA], and end-stage renal [ESRD] facilities). The harmonization is intended to promote shared accountability and to improve care transitions across all settings.

The SNFRM measure reflects CMS' focus on care coordination and improved assessment of quality outcomes of care. The SNFRM also reflects the ideal that quality care extends beyond the acute care setting. In conjunction with the CMS' HWR (NQF #1789), the SNFRM will encourage SNF providers to compete on their ability to reduce hospital readmissions thus reducing costs and improving the quality of care Medicare beneficiaries receive during their SNF stay. SNF providers may use the SNFRM to track their readmissions to the hospital to enhance internal quality improvement efforts. For consumers, they can work with their hospital discharge planning team to select a SNF with lower hospital readmission rates.

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**SECTION 3
PROCESS**

In June 2012, CMS sought nominations for TEP participants, requesting that individuals provide their statement of interest; relevant experience; or current or past activities, relationships, or financial interests that may have posed a conflict of interest with regard to advising on SNFRM development. The names and affiliations of the final TEP participants are provided in *Table 1*.

**Table 1
Name and affiliation of SNFRM TEP participants**

Technical Experts	
Gregory Arling, PhD	Indiana University, Center for Aging Research and Indiana University School of Medicine
Debra Bakerjian, PhD, FNP, RN	University of California, Davis Betty Irene Moore School of Nursing
Susannah Bernheim, MD	Yale University and Yale New Haven Hospital, Center for Outcomes Research and Evaluation
Toby Edelman, JD	Center for Medicare Advocacy
David Gifford, MD, MPH	American Health Care Association
Lawrence Martinelli, MD	Infectious Diseases Society of America
Vincent Mor, PhD	Brown University
Dana Mukamel, PhD	University of California, Irvine
Joseph Ouslander, MD	Florida Atlantic University, Charles E. Schmidt College of Medicine
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Centers for Medicare & Medicaid Services	
Cheryl Wiseman, MPH, MS, CCSQ, Government Task Leader	
Joel Andress, PhD, MS, CCSQ	
Tara McMullen, MPH, PhD	

Prior to TEP meeting, RTI sent the TEP an email with various materials, including an agenda, background document describing the current status of SNFRM development, the key issues to be addressed by the TEP, and a slide deck with discussion points and supporting analyses. The background document provided an overview of how RTI conceptualized the SNFRM, its design specifications including plans for risk adjustment, and analyses to support early measure development. The document also provided analyses to inform issues for which we sought TEP input (see section 3.1).

3.1 Key Issues for TEP Consideration

The SNFRM is designed to identify unplanned readmissions to an acute care hospital for patients who have been admitted to a SNF within 30 days of a prior discharge from inpatient prospective payment system (IPPS) hospital, critical access hospital (CAH), a PPS-exempt cancer or psychiatric hospital. The readmission risk window for the SNFRM begins at discharge from an acute care hospital and continues for 30 days following the initial acute care hospital discharge. One of the primary issues for which RTI sought guidance was how to handle multiple post-acute care stays within the 30-day risk window—see issues 1-3 below. The full set of issues and questions covered during the TEP proceedings are below.

3.1.1 Issue 1: Defining Gap

- Should the 30-day hospital readmission risk window be modified to exclude readmissions occurring immediately after transfer to a SNF from another setting (e.g., readmission 24-48 hours after acute care hospital discharge)?
- Should the 30-day hospital readmission risk window be modified to exclude or risk adjust for gaps between index hospital discharge and SNF admission?

3.1.2 Issue 2: Intervening Stays

- Should individuals with intervening IRF or LTCH stays be excluded?

3.1.3 Issue 3: Other Attribution Issues

- Regarding SNF to SNF transfers, should both SNF stays be counted in the measure?

3.1.4 Issue 4: Exclusion Criteria

- Are the current exclusion criteria appropriate?

3.1.5 Issue 5: Planned Hospital Readmission & Observation Stays

- Is the current set of planned hospital readmissions as specified for CMS' HWR appropriate for use in a SNF measure?
- Should observation stays be included in the measure?

3.1.6 Issue 6: Risk Adjustment

The HWR (NQF #1789) uses stratification to improve the efficiency of the risk adjustment process by classifying patients into 5 cohorts based on hospital care teams: medical, cardiovascular, cardio-respiratory, neurology, surgery gynecology. Predictive models are run separately for each cohort and then combined to produce on final model. The expectation is that the comorbidities for patients within a cohort based on their primary diagnosis will have similar effects on their risk for readmission, whereas the effects may differ between cohorts. In other words, the cohorts take into account potential interactions between a patient's primary diagnosis and comorbidities. For example, the contribution (i.e., beta coefficient) of a comorbid diagnosis of diabetes on risk for readmission for a patient with a cardiovascular primary diagnosis may be quite different compared to a patient with an orthopedic primary diagnosis. By stratifying the sample into cohorts, the coefficients on the comorbidities are allowed to vary by cohort.

During a conference call in October 2011, RTI discussed with subject matter experts (SMEs) whether developing cohorts along a “care team” approach similar to the HWR would be appropriate for the SNF population. RTI noted that because SNFs have a different medical care delivery structure than acute care hospitals that the SNFRM cohorts would have to be developed based on different parameters than those used in the HWR measure.

RTI took two approaches to defining cohorts for the SNFRM measure an **HWR – analogous approach**, which groups patients by medical condition allowing for a separate surgical cohort or a **hybrid approach** which groups patients with certain surgical procedures into cohorts along with patients with their medical conditions. We recognized that SNF patients' hospital stays may be complex and the options for coding their hospital experience would be a mix of medical diagnoses and surgeries when they occurred. For example, a patient who had a hip replacement during the inpatient stay will likely have the procedure coded as well as the precipitating diagnosis, osteoarthritis. If we posit that the primary reason for the index acute care admission drives the model, which in this example is the hip fracture, and the effects of the comorbid conditions are similar for medical and surgical patients, then they can be combined into one cohort—thus the impetus for the hybrid cohort approach. RTI developed 7 hybrid cohorts: (1) Cardiovascular/Pulmonary (CVP); (2) Infections/Skin (IS); (3) Medical/Cancer/Other Systemic (MCOS); (4) Medical/Metabolic, including drug related (MM); (5) Miscellaneous (MISC); (6) Neuropsychiatric (NP); and (7) Orthopedic/Trauma/Musculoskeletal (OTMS).

- Is the cohort methodology used in the HWR measure, which stratified the measure population into cohorts, appropriate for the SNF measure?
- Preference for the HWR-analogous or hybrid cohorts?
- Can any of RTI's 7 hybrid cohorts be combined?
- Which risk adjustment variables should be selected?
- What is the appropriate time window for including comorbidities in the acute care hospital stay?

3.2 Overview of TEP Proceedings

RTI provided a brief overview of the history, timeline, and goals for SNFRM development and emphasized that the TEP would be instrumental in ensuring that measure was well-designed and that the development process was transparent with sufficient stakeholder engagement.

To solicit TEP input on the SNFRM design, we presented three diagrams to illustrate examples of the care trajectories patients discharged from a prior hospitalization to a SNF could receive within the 30-day risk window. These diagrams facilitated our discussion of issues related to gaps between claims and post-acute care stays intervening between the prior proximal hospital discharge and the index SNF admission, and also prior to the end of the risk period.

Next, we provided a description of our initial definitions for the numerator and denominator of the measure and how the SNFRM aligns with CMS's HWR (NQF #1789) with regard to exclusions and the risk adjustment strategy.

We also sought the TEP's guidance on whether to classify patients into cohorts based on medical diagnoses to increase the efficiency of the risk adjustment models. RTI provided numerous cohort analyses to help guide TEP recommendations.

SECTION 4 SUMMARY OF TEP COMMENTS

4.1 Gaps

The measure risk window begins at the time at which the patient is discharged from the hospital, continuing for 30 days past discharge from an IPPS, CAH, PPS-exempt cancer or psychiatric hospital (heretofore referred to as a prior proximal hospitalization). It is possible that a patient can go directly to the SNF from the prior proximal hospitalization, or they can have a gap between their prior proximal hospitalization and their SNF stay. If a readmission occurs after discharge from a SNF, but within the 30-day risk window, it is counted in the measure. If a readmission occurs after the 30-day risk window, even if the resident is readmitted directly from the SNF, it is not counted in the measure.

The TEP was asked to advise RTI on whether the 30-day readmission risk window should be modified to exclude readmissions occurring immediately after transfer to a SNF from another setting (e.g., 24-48 hours after acute care hospital discharge) and whether it should be modified to exclude or risk adjust for gaps between index hospital discharge and SNF admission. The consensus was that readmissions occurring in the first 24-48 hour window should not be excluded from the numerator of the measure.

To inform the gap issue, RTI will conduct analyses to compare the characteristics of residents in three groups: 1) those with no gap and no intervening PAC stay between the proximal hospitalization and SNF admission; 2) those with any gap and an intervening PAC stay; and 3) those with any gap but no intervening PAC stay. Besides evaluating readmission rates taking resident characteristics into account, we also conducted analyses of the gap by looking at SNF characteristics, the 10 most prevalent diagnosis condition categories from the proximal hospitalization, and how the gap affects SNF facility readmission distributions.

4.2 Intervening Stays

As described above, there could be a gap between the prior proximal hospitalization and admission to the SNF. Within the gap, a patient could be admitted to an IRF, LTCH, receive HHA services, or be sent home without services. For the SNFRM measure, we consider an “intervening stay” to be a stay at an IRF, LTCH, HHA, or any type of post-acute care stay that comes prior to the SNF admission.

Preliminary analyses indicate that approximately 94 percent of patients go directly from the prior proximal hospitalization to the SNF on the same day. Six percent have an intervening PAC stay (IRF, LTCH, or another SNF) or go home from their prior proximal hospitalization and are later admitted to a SNF within the 30-day risk window.

TEP remarks indicated that episodes with IRF or LTCH intervening stays should be excluded. It was discussed that people going into SNFs from an intervening stay may differ in acuity than those who do not. TEP members suggested that there would need to be very strong evidence that those going directly to a SNF and those with intervening post-acute care stays are similar to justify keeping patients with intervening stays in the measure. However, there was some concern about excluding these cases with intervening stays. It was pointed out that it would

be important to determine whether patients with intervening PAC stays tend to concentrate in certain SNFs and if by excluding these individuals, the measure would also exclude large numbers of patients within those SNFs. It is appropriate to exclude entire SNFs but not large proportions of patients within one SNF. The concern was that bias might be introduced into the measure due to differences in case mix and potential selection bias given the uneven geographic availability of LTCHs and IRFs, which could influence the mix of patients entering SNFs directly.

Lastly, it was pointed out that SNFs would not want to be held accountable for care provided in other institutions so excluding patients with intervening stays would lend face validity to the measure from the SNF perspective.

4.3 Other Attribution Issues

Regarding the SNF to SNF transfers RTI proposed the following options:

- **Option 1.** All residents with intervening stays, regardless of provider type, will be excluded. (RTI recommended approach.)
- **Option 2.** Measure specification should attribute the hospital readmission only to the proximal SNF discharging to hospital.
- **Option 3.** Measure specification should attribute responsibility of the hospital readmission to all SNF stays within the risk window.

The TEP did not reach consensus on this issue. TEP comments suggested analytic complexities with accurately allocating attribution when residents are admitted and discharged from multiple SNFs. In comparison with the number of SNF admissions in a given calendar year, the number with SNF to SNF transfers is relatively low. The TEP leaned toward assigning attribution to the SNF discharging to hospital if SNF to SNF transfers were retained in the measure, especially if the number/proportion of stays affected is small. It keeps the attribution issue straightforward. SNFs are likely to push back on Options 2 and 3, claiming that the “other guy” caused the problem. Option 3 is potentially very complicated to calculate. Although there is little likelihood that SNFs will transfer high risk patients to other SNFs to improve performance (and thus be excluded from the measure), a recipient SNF may be reluctant to accept high risk transfers if they are held accountable for the readmission.

Of the 7 TEP members who provided additional input on the SNFRM issues, only one TEP member supported option 3.

4.4 Exclusion Criteria

As the SNFRM is designed to align very closely with the HWR (NQF #1789), the exclusion criteria are very similar. Following are summaries for the initial exclusion criteria and related TEP input.

Death: The majority of TEP members agreed to exclude those who die during their SNF stay, especially because this is a typical exclusion for SNF quality measures. Also, place of death is not necessarily an accurate record of where people died and may be coded as such for administrative purposes. Some individuals who go to a SNF are not technically on hospice but they still go the SNF for their remaining days. Including these patients may have the unintended consequences of driving up hospice cost or driving patients back to the hospital for their remaining days.

The TEP concluded that RTI should exclude deaths in the facility and not readmissions who die in the readmitting hospital. We do not want to exclude persons who may have experienced the most egregious care problems in the SNF and subsequently died in the hospital. Excluding SNF deaths should recognize patients receiving palliative care for whom hospitalization might be inappropriate.

Discharge against medical advice: The TEP were in unanimous agreement to exclude these patients.

Allowable prior proximal hospitalizations: The TEP agreed to exclude discharges from PPS-exempt cancer or Psychiatric Hospitals (without an acute Hospital Stay), Non-Continuous FFS Medicare, Medical Treatment of Cancer so as to harmonize with NQF #1789. However, to align with the RTI's IRF/LTCH measures, and also based on TEP comments that the SNFRM need not align on all issues with NQF #1789 given clinical differences in the patient populations, RTI will not exclude discharges from PPS-exempt cancer or psychiatric hospitals if the patients had an acute condition.

Continuous FFS Medicare for 12 months: Only one TEP member questioned this exclusion, suggesting that requiring FFS Medicare for a full 12 months prior to the proximal hospitalization may not be necessary. Having some data from claims prior to the hospitalization would be valuable. However, the resident must be FFS Medicare when discharged from the proximal hospitalization prior to the SNF stay.

Medical Treatment of Cancer: The TEP agreed to this exclusion, and the SNFRM will exclude patients who have a principal diagnosis from their proximal hospitalization indicating the medical treatment of cancer. One TEP member remarked that the medical treatment of cancer is really about trying to identify "scheduled" admissions. Since this is a really difficult and complicated issue and probably not all that common among those discharged from hospital to SNF, aligning with NQF #1789 by excluding these patients is probably the best option.

4.5 Planned Hospital Readmissions and Observation Stays

4.5.1 Planned Hospital Readmissions

RTI pointed out that the exclusion of planned readmissions from the numerator of the SNFRM parallels the NQF #1789 measure. Overall the TEP agreed with RTI's conceptualization of planned readmissions. One participant expressed agreement with the diagnoses on the lists and another deferred to the clinicians. A third TEP member asked whether gaming could occur by [the hospital] picking a diagnosis that will fit the definition of 'planned'.

The same member also asked about the prevalence of planned readmissions and commented that CMS probably should monitor the rate of planned readmissions to see if this changes as hospitals, and now SNFs, are under increasing pressure to reduce unplanned readmissions.

Several TEP members commented that cases of planned readmissions, such as multi-stage operations with recovery times in between stages, should be identified and removed from the numerator.

4.5.2 Observation Stays

The TEP was definitive that the SNFRM should include observation stays but acknowledged that the number of observation stays is small at the current time. However, an observation stay is not a readmission unless the patient is actually admitted to the hospital subsequent to the observation stay. A member of the NQF #1789 development team agreed that observation stays are limited currently and as a result, they did not include them in their measure. Two TEP members explained that if patients have very long observation stays and thus never qualify for the Medicare SNF benefit, resulting in them paying out of pocket, they will never have a Medicare [inpatient] claim and will therefore not be included in the measure. Reports indicate that the occurrence of observation stays has been increasing. Two TEP members stated that observation stays are important from both a quality of care and cost standpoint, especially because some patients are under observation for several days at a time.

RTI conducted analyses on the frequency of observation stays to inform the measure specifications. As the TEP indicated that this appears to be a growing problem, RTI will continue to monitor this issue and if necessary, will define a method for handling observation stays in the future.

4.6 Risk Adjustment

4.6.1 Cohort Methodology

The TEP discussed at length the issue of whether the cohort methodology is necessary to improve the efficiency of the risk adjustment methodology. RTI planned to use cohorts to better align with NQF #1789 but RTI's cohorts were "hybrids" because they combine medical diagnoses and surgical procedures. In contrast, the HWR (NQF #1789) cohorts were based on hospital care teams and thus, had a surgical cohort. In general the TEP had no strong recommendations for whether to use cohorts. Two TEP members suggested that the hybrid approach of grouping SNF patients by underlying medical condition is preferred to mixing orthopedic and cardiac surgery patients in a surgical cohort as was done by NQF #1789. This point is particularly important if the cohort methodology is difficult for clinicians to understand and implement. As one TEP member argued, clinicians' acceptance of a simple model may be strategically a better choice than developing an elegant statistical model.

Another TEP member summarized: cohort assignment is complex and for many patients difficult given the high complexity of multiple medical conditions often complicating the surgery which is the reason the person could not go home. Because the TEP had no strong preferences, RTI based the final decision on analysis results, which showed that the cohort methodology did not provide any additional efficiency.

4.6.2 Risk Adjustment Variable Selection

In general the TEP viewed favorably the set of covariates proposed by RTI (see *Table 2*), the panel agreed that sex should be included as a covariate. TEP suggested an analysis adjusting for prior service use. Another panel member recommended not adjusting for administrative characteristics such as facility size, location and hospital affiliation, and quality of care-related outcomes like prior hospitalization or other service use.

Table 2
Reference for Issue 6 Risk Adjustment: RTI proposed covariates

Variable	Rationale
Age	Demographic characteristic that is often important for readmission
Sex	Demographic characteristic that may be important for readmission. Note, the HWR does not control for this variable in their risk adjustment models
Length of stay during prior proximal acute care hospitalization	Patients who are hospitalized for longer periods of time may require more complex care because they are often sicker
Disabled as a reason for Medicare coverage	May correlate with age however.
End-stage renal disease	Prior research has indicated this is a risk factor for adverse outcomes
Dually eligible (Medicare and Medicaid)	Prior research has indicated this is a risk factor for adverse outcomes (not retained in final model)
Number of IPPS stays in the 365 days prior to the index IPPS stay	More hospitalizations in the previous year may be associated with declining health and complexity of care
Comorbidities as categorized by the Hierarchical Condition Categories (HCC)	Comorbidities provide indicators of case-mix and severity of the patient's health

Some panel members suggested including other variables like severity of cognitive impairment, ADL dependency or other functional variables from the Minimum Data Set (MDS).

Most TEP members also indicated that using comorbidities from hospitalizations in the previous 12 months would be appropriate although there was some concern that some of the comorbidities may have resolved during this time period. These risk factors, plus additional factors suggested in subsequent comments from stakeholders and subject-matter experts were tested to create the final model.

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SECTION 5 SUMMARY AND CONCLUSIONS

5.1 Issue 1: Defining Gap

- Should the 30-day hospital readmission risk window be modified to exclude readmissions occurring immediately after transfer to a SNF from another setting (e.g., readmission 24-48 hours after acute care hospital discharge)?

TEP comments indicate that readmissions occurring in the first 24-48 hour window should not be excluded from the numerator of the measure. The TEP did not suggest that RTI conduct analyses to explore this issue.

- Should the 30-day hospital readmission risk window be modified to exclude or risk adjust for gaps between index hospital discharge and SNF admission?

Given TEP feedback, RTI will compare the characteristics of residents in these three groups: 1) those with no gap and no intervening PAC stay between the proximal hospitalization and SNF admission; 2) those with any gap and an intervening PAC stay; and 3) those with any gap but no intervening PAC stay. For these groups, RTI will evaluate readmissions, the distribution of readmissions across facilities, and whether the analyses vary by demographic and clinical factors.

5.2 Issue 2: Intervening Stays

- Should individuals with intervening IRF or LTCH stays be excluded?

TEP comments indicate that episodes with IRF and LTCH intervening stays should be excluded. However, the analyses done for Issue 1 will also inform this question.

5.3 Issue 3: Other Attribution Issues

- Regarding SNF to SNF transfers, should both SNF stays be counted in the measure?

TEP comments were inconclusive, but most TEP member were concerned about analytic complexities with accurately assigning attribution when residents are admitted and discharged from multiple SNFs. The proportion of SNF to SNF transfers is relatively low when compared with the total number of SNF stays. Thus, the TEP leaned toward assigning attribution to the SNF discharging to the hospital (a readmission) if SNF to SNF transfers are retained in the measure. Of the 7 TEP members who provided additional input on the SNFRM issues, only one supported option 3. Again, the analyses done for Issue 1 will inform this question.

5.4 Issue 4: Exclusion Criteria

- Is the current exclusion criteria appropriate?
 - Most TEP members agreed to exclude those who die during their SNF stay.
 - The SNFRM will **include** patients from PPS-exempt cancer and psychiatric hospitals with an acute diagnosis as their principal diagnosis. Thus, discharges from PPS-exempt cancer and psychiatric hospitals will be included as prior proximal hospitalizations.
 - For robust risk adjustment, most TEP members agreed that the SNFRM should require patients to have at least 12 months of Part A coverage prior to the prior proximal hospitalization to be included in the measure.
 - The TEP agreed the SNFRM should exclude patients whose prior proximal hospitalization was for a principal diagnosis indicating medical treatment of cancer.
 - All TEP members agreed to exclude patients discharged from the SNF against medical advice from the SNFRM.

5.5 Issue 5: Planned Hospital Readmission & Observation Stays

- How planned hospital readmissions are specified (e.g., procedures) [Note: CMS' HWR measure excludes planned readmissions from numerator only]

The TEP agreed with RTI's conceptualization of planned readmissions.

- Observation stays

The TEP was definitive that the SNFRM should include observations stays, but acknowledged that the numbers may be small at the current time. RTI will monitor this issue over future years as this appears to be a growing problem. If necessary, RTI will define a method for handling observation stays in the future. Note that this is a measure of readmissions and observation stays are not considered the same as admissions.

5.6 Issue 6: Risk Adjustment

- Is the cohort methodology appropriate?

The TEP stated that using cohorts may not be necessary for risk adjustment and this may become especially important if the cohort methodology is difficult for clinicians to understand. RTI will continue to evaluate whether cohorts improve the efficiency of risk adjustment.

- Preference for the hybrid or HWR-Analogous cohorts?

The TEP had no strong preference between the hybrid or HWR-analogous cohorts given their stance on risk modeling in general.

- Can any cohorts be combined?

This issue was not directly addressed during the call but is less relevant given TEP's stance on risk modeling. RTI conducted many analyses subsequent to the TEP and found that cohorts did not improve risk adjustment.

- Which analyses should be done on the underlying SNF population to be included in the measure and which risk adjustment variables should be selected?

Initial covariates met with TEP approval, including sex. The TEP also suggested an analysis adjusting for prior service use. One TEP member offered to send RTI a list of potential covariates based on his research for consideration. (RTI reviewed these covariates and found that several were not available in the available data sources.)

- What is the appropriate time window for including comorbidities in the acute care hospital stay?

This issue was not addressed during the meeting. RTI raised this issue in a subsequent email to the TEP. Most indicated that using comorbidities from hospitalizations in the previous 12 months seemed appropriate although there was concern that some of the comorbidities may have resolved during this time period.

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