Supplemental Information

METHODS 1. DETAILED METHODS REGARDING DEVELOPMENT AND PRIORITIZATION OF TRANSITION QUALITY MEASURES

This Supplemental Information describes the methods the COE4CCN used to develop quality measures focused on transitions between sites of care (Supplemental Table 6). This work was led by members of the COE4CCN Care Transitions Working Group, a multistakeholder group of researchers, providers, parents, payers, and state agency representatives with expertise or experience with care transitions.

Conceptual Framework

The Care Transitions Working Group began quality measure development by first creating a conceptual framework for pediatric transitions between sites of care through a collaborative and iterative process (Supplemental Fig 1, Supplemental Fig 2, Supplemental Fig 3 and Supplemental Fig 4). The conceptual framework was adapted from the National Transitions of Care Coalition Proposed Framework for Measuring Transitions of Care.[1] This framework uses the Donebedian model for examining health services and evaluating quality of care by identifying important structures, processes, and outcomes of care during transitions.[2] The working group also identified 3 central components of pediatric transitions between sites of care: the child and family, the PCP or medical home, and the payment systems that support health care. In addition, the conceptual framework highlights several health care and community-based sites of care between which pediatric transitions commonly occur.

Targeted Literature Reviews

Based on this conceptual framework, the Care Transitions Working Group conducted 2 targeted literature reviews to inform quality measure development. The first literature review targeted studies examining processes of care related to information transfer and communication between providers during transitions. The second literature review targeted studies examining processes of care involving family education and engagement in transitions.[3] Both literature reviews examined the impact of these transition processes of care on family experience, patient safety, and health care utilization outcomes. Processes of care were defined as interactions between patients and providers through the delivery of health care, whereas outcomes referred to the effects of health care on the health status of patients and populations. Quality measure development related to shared care plans, medication reconciliation, pediatric to adult transitions, and transitions related to mental health conditions were excluded from our literature reviews.

We searched 6 electronic databases including PubMed, Cumulative Index to Nursing and Allied Health Literature, Cochrane, PsycINFO, Embase, and Web of Sciences for studies relating to transitions between sites of care. Studies that met the following criteria were included in the reviews: use of experimental design (cohort, case–control, and randomized clinical trials); conducted in pediatric, adult, or older adult populations; and evaluated outcomes in the areas of patient or caregiver experience, patient safety, and health care utilization as listed in the conceptual framework. The literature reviews included studies in adult and older adult populations because of our assumption that high-quality pediatric studies relating to transitions between sites of care would be scarce. Additionally, we included only studies published in the United States after 2001 because the goal of these reviews was to inform development of quality measures that would be applicable to current pediatric practice in the United States health system. The contents of the 2 reviews were divided based on whether the study examined transition processes directly involving patients or families (eg, discharge education) or did not (eg, information transfer between providers). Study eligibility criteria, search strategy, study selection, and data extraction are described in detail in the review by Desai et al.[3]

Based on the results of the literature reviews, the COE4CCN then drafted a set of quality measures for transitions between sites of care. Findings from these 2 literature reviews indicated a paucity of evidence in the pediatric literature; therefore, development of quality measures was based primarily on studies in adult and older adult populations. Only studies with a level of evidence $\geq$4, based on the Oxford Centre for Evidence-Based Medicine' levels of evidence,[4] were used to inform measure development.[4] The draft quality measures subsequently

underwent iterative refinement based on input from the COE4CCN quality measure development experts.

RAND/UCLA Modified Delphi Method

The RAND/UCLA modified Delphi method was then used to rate the validity and feasibility of each quality measure to arrive at a final set of quality measures for transitions between sites of care. This method is a well-established, structured approach to measure evaluation that involves 2 rounds of independent Delphi panel member scoring, with a group discussion in between.[5] Independent scores are used to determine whether a measure is selected for the final measure set rather than using a group consensus approach. The RAND/UCLA modified Delphi method has demonstrated reliability, as well as content, construct, and predictive validity in previous studies.[6,7]

Member Selection for the Delphi Panel

The first step in the RAND/UCLA modified Delphi method is to select appropriate stakeholders as panel members to review, score, and discuss the draft quality measures. The Delphi panel consisted of 9 individuals nominated by relevant stakeholder groups including the American Academy of Pediatrics (AAP) Committee on Pediatric Emergency Medicine, the AAP Home Care Committee, the AAP Section on Hospitalist Medicine, the Academic Pediatric Association, the Case Management Society of America, the Children's Hospital Association, Family Voices, the Medicaid Medical Directors Learning Network, and the National Association of Pediatric Nurse Practitioners. Delphi panels generally consist of 9 members, because larger panels have been found to be less productive.[5] The final panel consisted of a pediatric emergency medicine physician, a rehabilitation medicine physician, a pediatric hospitalist, a general pediatrician, a case manager, the medical director of a complex care program, a parent representative, the chief medical officer of a state Medicaid program, and a nurse practitioner. All panelists had relevant experience related to pediatric transitions between sites of care.

Panel Member Scoring: First Round

After members of the Delphi panel were selected, a conference call was conducted to orient them to the RAND/UCLA modified Delphi method. Six weeks before the in-person group discussion, all panel members were sent the draft quality measures and the literature reviews on which the quality measures were based. After reading the reviews, each panelist scored the draft quality measures on validity and feasibility on a scale from 1 (low) to 9 (high).

Panel members were instructed to apply the following criteria for a measure to be considered valid: Adequate evidence or expert consensus supports the measure, identifiable health benefits are associated with receiving the measure-specified care, providers and provider groups who adhere more consistently to the measure would be regarded as providing higher-quality care, and adherence to the measure is in the control of providers or the health care system. A rating of 1 to 3 indicates that the proposed quality measure is not valid, a rating of 4 to 6 indicates that the validity of the proposed quality measure is equivocal, and a rating of 7 to 9 indicates that the proposed quality measure is deemed to be valid.

Panel members were instructed to apply the following criteria for a measure to be considered feasible: Medical record data to assess measure eligibility and adherence should be readily available in the average record (paper or electronic), and quality assessments based on the measure would be reliable and unbiased. A rating of 1 to 3 indicates that the measure is not considered feasible to implement, a rating of 4 to 6 indicates that feasibility of implementation is questionable, and a rating of 7 to 9 indicates that the measure as specified is feasible to implement.

After independently scoring each quality measure, panel members submitted their scores and comments to the measure development team. Research staff at Seattle Children's Research Institute compiled the initial results and shared them with panelists, who received the score distribution and a caret to indicate their own score for each measure. The results that were shared were otherwise anonymous.

Group Discussion

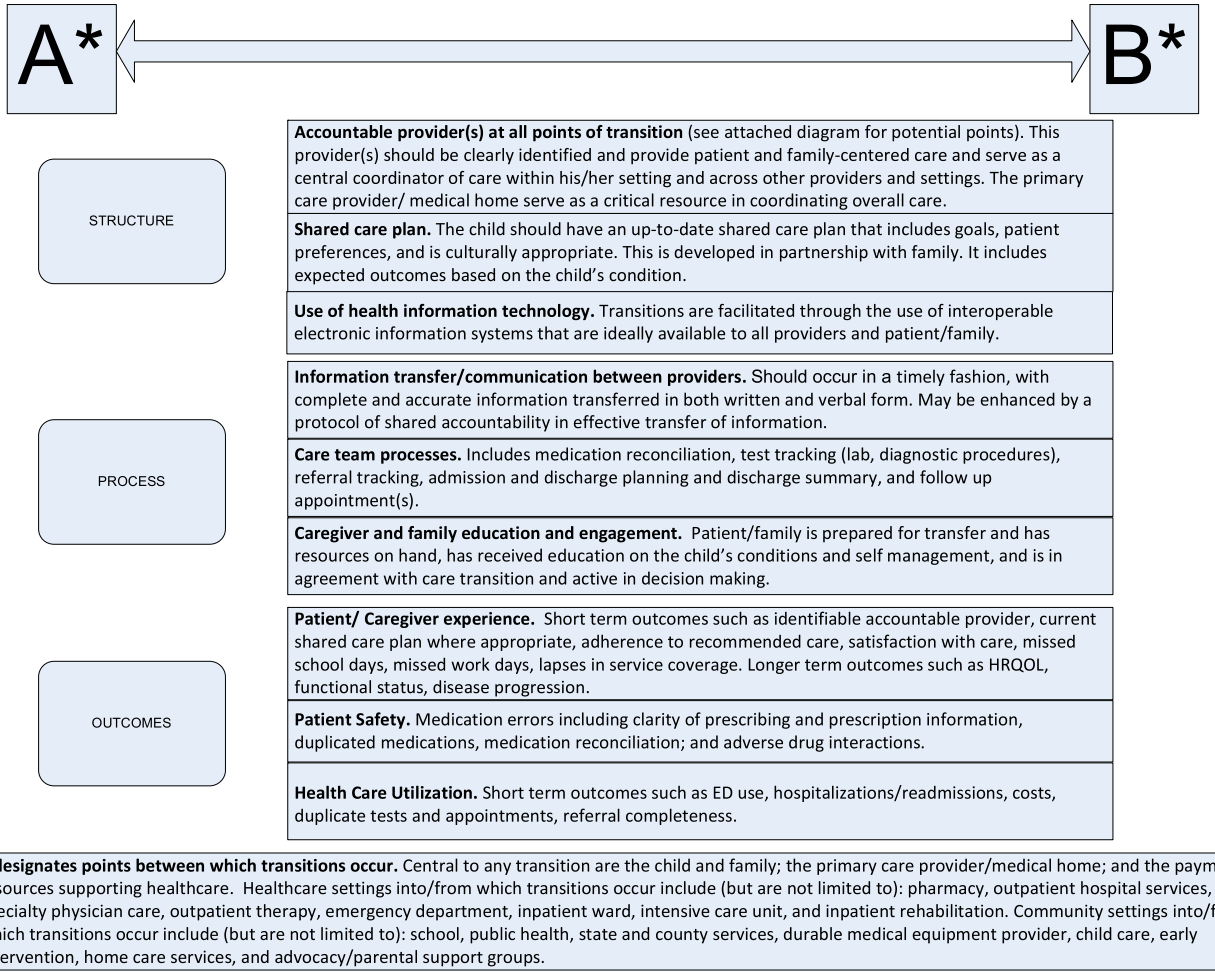
Panel members then participated in a 2-day in-person meeting in Seattle, Washington to discuss controversial quality measures. A measure was considered to be controversial if the median validity score was 4 to 6, if the median feasibility score was <4, or if the panel scores indicated an indeterminate level of agreement or indicated disagreement between panelists.

To determine level of agreement or disagreement between Delphi panelists on the validity and feasibility of a given measure, we used a statistical method that frames agreement and disagreement as hypotheses in comparison with expected score distributions from a hypothetical population of similar panelists. To determine agreement, we tested the hypothesis that 80% of the hypothetical scores would be within the same score domain (1–3, 4–6, or 7–9) as the observed median score. The measure was determined to be scored "with agreement" if we could not reject the hypothesis on a

binomial test at the 0.33 level. Based on a group of 9 scores, agreement requires that ≤2 scores be outside the 3-point domain that contains the observed median. To determine disagreement, we tested the hypothesis that 90% of hypothetical scores were within 1 of 2 larger, overlapping score domains (1–6 or 4–9). We determined scores to be "with disagreement" if we rejected that hypothesis on a binomial test at the 0.10 level. Based on a group of 9 scores, the definition of disagreement was met when ≥3 ratings are in both the 1 to 3 range and the 7 to 9 range. If the scores could not be classified as either with agreement or with disagreement based on these definitions, they were considered to be indeterminate.

Panel Member Scoring: Second Round

After discussion of all controversial measures, panelists independently rescored all measures. All measures with a median validity score of ≥7, with a median feasibility score of ≥4, and scored without disagreement were considered to have been endorsed by the panel to move forward in the measure development process. The Delphi criterion is more liberal for feasibility than for validity because all measures go through field testing after the Delphi panel. The field-testing step in the measure development process confirms whether the measures scored in the 4 to 6 range are truly feasible to implement as specified.



SUPPLEMENTAL FIGURE 1
A conceptual framework for transitions between sites of care on processes of care within these key areas.

I. Medical Records Abstraction Questions

1. Date of Birth
Enter the patient's date of birth: [DATE]

2. Admission and Discharge Dates and Times
Enter the date and time (using a 24-hour clock) the patient was admitted and discharged from the inpatient hospital admission.

a) Date of admission: [DATE]
b) Time of admission: [TIME]
c) Date of discharge: [DATE]
d) Time of discharge: [TIME]

If patient age is ≥ 19 years old at time of admission, STOP (replace)
Otherwise, continue to Q3 (ICU)

3. ICU Admission
During this admission, was this patient ever treated in ICU?

o	Yes	*Continue to Q4 (ICU discharge)*
o	No/No data	*Skip to Q7 (discharge)*

4. ICU Discharge
To where was the patient discharged from the ICU stay? If more than one ICU stay during the admission, focus on the first.

o	Transferred from ICU back to the floor	*Continue to Q5 (transfer note)*
o	Discharged alive from the marker hospital (directly from ICU)	*Skip to Q7 (destination)*
o	Patient deceased in ICU	*STOP (replace)*

5. ICU-Floor Transfer: Transition Note
At the time of the patient's transfer from the ICU to the floor, did the record include a transition note written by an ICU provider?

Transition note = Note labeled "transition note," "transfer note," or "interim note" OR a progress note that is written at the time (NOT in advance or in anticipation) of the patient's actual transfer.

o	Yes	*Continue to Q6 (problems)*
o	No, but the ICU provider was also the floor provider	*Skip to Q7 (destination)*
o	No/No data	*Skip to Q7 (destination)*

6. ICU-Floor Transfer: Problem List and Treatment Plan
Did the transition note include a list of the patient's problems at the time of transfer?

o	Yes	*Continue to Q6a (plans)*
o	No/No data	*Skip to Q7 (destination)*

SUPPLEMENTAL FIGURE 2
Part 1. Medical records abstraction tool and specifications for determining measure legibility and scoring.

6a) Enter the problems (up to 10) listed in the transition note and for each problem listed, indicate if there is a treatment plan specified for each problem.

i) Problem	ii) Treatment plan specified for this problem? (check if YES)
a) _____	☐
b) _____	☐
c) _____	☐
d) _____	☐
e) _____	☐
f) _____	☐
g) _____	☐
h) _____	☐
i) _____	☐
j) _____	☐

Continue to Q7 (destination)

7. Discharge Destination

At the time of discharge from the hospital, what was the patient's discharge destination?

o	Home	*Continue to Q8*
o	Transferred to another facility	*IF PICU admit, data complete. If not, STOP (replace)*
o	Left AMA	*IF PICU admit, data complete. If not, STOP (replace)*
o	Deceased	*IF PICU admit, data complete. If not, STOP (replace)*

8. Follow-up PCP

Did the medical record identify the patient's primary care provider (PCP)?

o	Yes, known at the time of or during admission	*Continue to Q9 (communication)*
o	No PCP, but assigned/referred to a PCP by the time of discharge	*Continue to Q9 (communication)*
o	No PCP and NOT assigned/referred to a PCP by the time of discharge/No data	*Skip to Q10*

9. Communication with PCP

Was there documentation of communication (telephone, e-mail, or fax) between the hospital provider and the patient's PCP during the time interval from *[date and time of discharge – 24 hours OR Date and time of admission if hospitalized <24 hours]* to *[date and time of discharge + 48 hours]?*

o Yes
o No, PCP was the hospital provider
o Neither of the above/No data

SUPPLEMENTAL FIGURE 3
Part 2. Medical records abstraction tool and specifications for determining measure legibility and scoring.

10. Patient Transition Report

Does the hospital record include a copy of a transition report/summary that was given to the patient/caregiver at the time of discharge? This may be called "Discharge Instructions" and may include more than one document (e.g., a separate discharge medication list).

o	Yes	*Continue to Q11 (content)*
o	No/No data	*STOP (data collection complete)*

11. Patient Transition Report Content

(i) Which of the following elements were included in the transition report given to the patient/caregiver?

Included in report	Not included	
o	o	a) Admission or discharge *diagnosis*
o	o	b) *Medication list* at discharge or note that there were none
o	o	c) List of follow-up *appointments*
o	o	d) *24/7 telephone contact* for hospitalization-related problems
o	o	e) Number for assistance with *making appointments*
o	o	f) Admission and discharge *dates*

(ii) Which of the following elements were included in the transition report given to the patient/caregiver?

Included in report	Not included	NA	
o	o	o	g) *Pending test* results
o	o	o	h) *Follow-up tests* to be completed after discharge
o	o	o	i) *Immunizations* given during the hospitalization

SUPPLEMENTAL FIGURE 4

Part 3. Medical records abstraction tool and specifications for determining measure legibility and scoring.

SUPPLEMENTAL TABLE 6 Quality Measures, Eligibility, and Scoring

Quality Measure	Eligibility	Scoring	Comments
Measure 1. Hospital-to-home transition record quality	Eligible for measure if Q7 = Discharged from the hospital	Score of 0 if Q10 = no/no data	Absence of transition record results in a score of 0
Children/adolescents admitted to the hospital should have documentation in the medical record of a transition record that contained the following:	If eligible for measure, all are eligible for components 11(a) through (f)	If Q10 = Yes, score based on inclusion of the following applicable components:	Measure score = (total passes/number of applicable items) * 100
a) Admission and discharge diagnoses	Eligible for (g) if Q11(g) not equal to "not applicable" (pending tests)	Q11(a) = 1 pass if Q11(a) included in report (diagnoses)	Composite score is reported for applicable content items (6 items apply to all patients; 3 items may or may not apply)
b) Medication list at discharge	Eligible for (h) if Q11(h) not equal to "not applicable" (follow-up tests)	Q11(b) = 1 pass if Q11(b) included in report (medications)	
c) List of FU appointments	Eligible for (i) if Q11(i) not equal to "not applicable" (immunizations)	Q11(c) = 1 pass if Q11(c) included in report (FU appointments)	
d) 24/7 telephone contact number if problems arise		Q11(d) = 1 pass if Q11(d) included in report (telephone contact)	
e) Number to call for assistance getting needed appointments		Q11(e) = 1 pass if Q11(e) included in report (appointment assistance)	
f) Admit and discharge dates		Q11(f) = 1 pass if Q11(f) included in report (admission/discharge dates)	
g) Pending test results		Q11(g) = 1 pass if Q11(g) included in report	
h) FU tests that need to be completed		Q11(h) = 1 pass if Q11(h) included in report	
i) Immunizations given		Q11(i) = score of 1 if Q11(i) included in report	
		Measure score = (total passes/number of applicable items) * 100	
Measure 2: Timely discharge communication between providers	Eligible if Q7 = discharged from the hospital AND [Q9 not equal to PCP was hospital provider OR Q8 = No PCP assigned]	Score of 100 if Q9 = Yes (phone contact or e-mail or fax)	Use of mutual access EHR is not documented and assumed to be irrelevant to this need for communication.
Children/adolescents discharged from the hospital should have documentation in their medical record that the receiving outpatient FU provider was contacted (phone/e-mail/fax) by a hospital provider within 48 h of the patient's discharge		Score of 0 if Q9 = Neither of the above/ No data	Focus of communication is PCP
Measure 3: ICU-to-floor transition note quality	Q3 = Yes (ICU admit)	Score of 0 if Q5 = no/no data (transition note)	Limited to just ICU–floor transition and limited to the first occurrence
Hospitalized children/adolescents transferred between the ICU and floor should have all of the following elements written in a transition note:	AND	If Q5 = yes, score based on the mean of the following 2 parts:	
a) Current problem list	Q4 = Yes (discharged to floor)	Part 1: If Q6 = Yes (problem list in note), score of 100. If Q6 = No/no data, score of 0	
b) Treatment plan for each problem	AND Q5 not equal to "ICU provider was also the floor provider"	AND Part 2: For each Q6a(i) problem: Q6a(ii) =Yes (treatment plan); component score = problems with plans/total problems Score for measure = [Part 1: problem list score + (part 2: problems with plans/ total problems)]/2 * 100	

EHR, electronic health record; FU, follow-up.

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