

Supplemental Digital Appendixes

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Supplemental Digital Appendix 1

List of the 31 Articles Included in the Literature Review of Publications Related to High-Value Care Topics or Concepts, Published 1970–2015

1. Artenstein AW, Higgins TL, Seiler A, et al. Promoting high value inpatient care via a coaching model of structured, interdisciplinary team rounds. *Br J Hosp Med (Lond)*. 2015;76(1):41-45. 10.12968/hmed.2015.76.1.41
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Supplemental Digital Appendix 2

High-Value Care Rounding Tool Final Codebook

Quality

1. Offer anticipatory guidance to prevent a complication of a medical issue or unplanned readmission

A team member should discuss opportunities to prevent likely complications of a medical issue or discuss ways to prevent future “unplanned hospitalizations” or “unplanned readmissions.”

Examples:

“Let’s talk about ways we can prevent this child with a history of constipation from being re-admitted next month for another bowel cleanup”

“This is the 3rd admission for sacral ulcers, let’s make sure the mother has all of the supplies she needs, and that they have close follow up with the wound clinic so we can hopefully prevent a 4th re-admission.

2. Narrow down the chronic/home medication list or discharge medication list

When a chronic or home medicine is discontinued due to lack of clinical benefit.

Examples: If an acid suppressions medication is discontinued in a neonate who has shown no clinical improvement

Do NOT give credit if a medicine is stopped at the end of a predicted course as this would be an example of just appropriate medical management

Examples: Stopping prednisone on day 5 for status asthmaticus

3. Praise a team member for NOT doing an unnecessary test/treatment

4. How a test may or may not “change” or “impact” or “affect” management

A team member must use the one of the following words in regards to a test, procedure, or medication: “impact”, “change”, or “affect” in regards to outcomes, management, or specific decisions for patient care.

Examples:

“Let’s go ahead and hold off on ordering the MRI at this time until we have the spinal fluid results, the MRI results would not impact our management of this kid”

“Let’s order a MRI on this patient because with his high blood pressure, if we saw Posterior reversible encephalopathy syndrome (PRES) it would change our management discussion for outcomes and recovery for this child.

Examples of discussions that would NOT qualify as high value care:

“Let’s hold on ordering the MRI on this patient until we have the spinal fluid results.”

“We are already treating this patient for PRES based off clinical diagnosis, but let’s go ahead and order the MRI just to make sure.”

5. Balance between the clinical benefits of care with its harms (discussion must include BOTH sides of a therapy: “benefits,” “pros” versus “risks” “harms,” “cons”)

This item is looking to contrast both the potential positive aspects of a therapy/plan of care vs the negative sides of an intervention. The discussion must incorporate both sides of the therapy and may include phrases such as risk vs benefit, risk vs harm, benefits vs harm, pros vs cons, desired effect vs side effects.

Do NOT give credit if only one side of the therapy is discussed

Cost

1. Care alternatives, including less expensive test/treatment (cost) and/or observation

Give credit if the discussion includes the “cost” (including the actual dollar amount) of a drug, test, or treatment. Also give credit if the discussion includes the exploration of care alternatives due to any short term or downstream harms of the previously established plan. Additionally, give credit if observation or watchful waiting is suggested as a potential therapeutic option (instead of ordering tests/studies in order to identify a precise etiologic diagnosis).

2. Avoid or cancel a low-value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter) or consult

3. Discussion about whether the patient requires ongoing hospitalization (i.e., has patient already met d/c criteria?)

Give credit if the discussion revolves around recognition that a patient has already met discharge criteria or if there is exploration/questioning re: the need for ongoing hospitalization

Examples:

“I know the eating disorder protocol states that the resting overnight HR must be over 45 beats per minute, does anyone know the evidence behind that recommendation?”

Do NOT give credit if a team member simply reviews “generic” discharge criteria.

Examples:

“Discharge criteria for this patient include making she he can tolerate fluids and waiting for the blood and urine cultures to be negative at 36 hours”

Patient Values

1. Customize care plan to incorporate patient/family values/goals

Plan must actually change. Team should actually act on the patient and family's values/goals. Do NOT give credit if a team member merely references a value or goal of care.

2. Discussion about what "worries" or "concerns" the patient/family in the context of a specific medical decision (also could include "goals," "values")

Discussion should revolve around trying to get a better understanding of the patient/family values/goals of care related to a specific medical decision. Other key words include "worries" or "concerns" or "values" or "goals" in an effort to learn what is important to the family/patient.

Examples:

"What questions do you have this new drug (or discharge plan or surgery)?"

Examples of discussions that would NOT qualify as HVC:

"What questions do you have?"

"What questions or concerns do you have?"

Supplemental Digital Appendix 3

Development and Refinement of the High-Value Care (HVC) Rounding Tool From the Preliminary Item List Through Two Rounds of the Modified Delphi Process and Three Iterations of Instrument Piloting to Determine the Final 10 Observable Items: Color-Coded Charts 3A and 3B

Chart 3A: Modifications on the HVC Rounding Tool From the Preliminary HVC Item List From Delphi Round 1

Preliminary HVC item list: 16 items	Result of Delphi Round 1 voting: 19 HVC items ^a
Topic discussed during rounds	Potential topics discussed during rounds
1. Potential benefits of a test/treatment	1. Potential benefits of a test/treatment to the patient
2. Potential harms of a test/treatment	2. Potential harms of a test/treatment to the patient
3. Estimate costs of a test/treatment	3. Estimate cost/charge of a test/treatment
4. Balance clinical benefits of care with harms and costs	4. Balance between the clinical benefits of care with its harms and its costs
5. Alternatives of care or less expensive test/treatment	5. Care alternatives, including less expensive test/treatment and/or observations
6. Impact of setting of care (inpatient vs outpatient) on outcomes/costs	6. Selecting a setting of care to optimize value (inpatient, outpatient, subacute facility)
7. Ways to prevent future hospitalizations	7. Offer anticipatory guidance to prevent a complication of a medical issue or unplanned admission
8. How a test may or may not “change management”	8. How a test may or may not “change management”
Actions that occurred on rounds	9. Discussion about whether the patient requires ongoing hospitalization
9. Avoid or cancel an unnecessary or harmful test (daily CBC; ESR and CRP)	10. Avoid or cancel a low value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter)
10. Discontinue an unnecessary therapy	11. Apply principles of sensitivity, specificity, predictive value, likelihood ratios, NNT/NNH when selecting and analyzing a test
11. Ask patient/family about values/goals	12. Reference specific patient/family values/goals of care
12. Customize care plan to incorporate patient/family values/goals	13. Customize care plan to incorporate patient/family values/goals
13. Praise a team member for NOT doing an unnecessary test/treatment	14. Praise a team member for NOT doing an unnecessary test/treatment
14. Recommend discharging patient in a timely manner	15. Ask team member if a proposed test was previously performed

15. Offer anticipatory guidance to prevent likely complications of a medical issue	16. Narrow down the medication list or discharge medication list
16. Apply principles of sensitivity, specificity, predictive value, likelihood ratios when selecting and analyzing a test	17. Uses the terms over-use, over-treatment and over-diagnosis
	18. Ask patient/family what worries or concerns them
	19. Potential risks/costs of consultations

Abbreviations: CBC indicates complete blood count; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; NNT, number needed to treat; NNH, number needed to harm; d/c, discontinue.

^aAs a result of the Round 1 voting (described in the text), 10 items were modified, 5 items were added (in green), and 4 items were consolidated (light blue in column 1 to dark blue in column 2, and yellow in column 1 to orange in column 2).

Chart 3B: Modifications to the HVC Rounding Tool from Round 2 of the Delphi Panel and Instrument Piloting

Result of Delphi Round 1 voting: 19 HVC items	Results of Delphi Round 2 Voting: 11 HVC items (as used in piloting iterations 1 and 2)^a	Final HVC Rounding Tool: 10 HVC items (as used in piloting iteration 3)^b
Potential topics discussed during rounds	Quality topics discussed during rounds	Quality topics discussed during rounds
1. Potential benefits of a test/treatment to the patient	1. Offer anticipatory guidance to prevent a complication of a medical issue or unplanned admission	1. Offer anticipatory guidance to prevent a complication of a medical issue or unplanned readmission
2. Potential harms of a test/treatment to the patient	2. Narrow down the medication list or discharge medication list	2. Narrow down the chronic/home medication list or discharge medication list
3. Estimate cost/charge of a test/treatment	3. Praise a team member for NOT doing an unnecessary test/treatment	3. Praise a team member for NOT doing an unnecessary test/treatment
4. Balance between the clinical benefits of care with its harms and its costs	4. How a test may or may not change management	4. How a test may or may not “change” or “impact” or “affect” management
5. Care alternatives, including less expensive test/treatment and/or observations	5. Balance between the clinical benefits of care with its harms and its costs	5. Balance between the clinical benefits of care with its harms (discussion must include BOTH sides of a therapy: “benefits,” “pros” versus “risks” “harms,” “cons”)
6. Selecting a setting of care to optimize value (inpatient, outpatient, subacute facility)	Cost topics discussed during rounds	Cost topics discussed during rounds
7. Offer anticipatory guidance to prevent a complication of a medical issue or unplanned admission	6 Care alternatives, including less expensive test/treatment and/or observation	6. Care alternatives, including less expensive test/treatment (cost) and/or observation
8. How a test may or may not “change management”	7. Avoid or cancel a low value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter)	7. Avoid or cancel a low-value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter) or consult
9. Discussion about whether the patient requires ongoing hospitalization	8. Discussion about whether the patient requires ongoing hospitalization (i.e., has patient already met d/c criteria?)	8. Discussion about whether the patient requires ongoing hospitalization (i.e., has patient already met d/c criteria?)

10. Avoid or cancel a low value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter)	Patient values topics discussed during rounds	Patient values topics discussed during rounds
11. Apply principles of sensitivity, specificity, predictive value, likelihood ratios, NNT/NNH when selecting and analyzing a test	9. Reference specific patient/family values/goals of care ^c	9. Customize care plan to incorporate patient/family values/goals
12. Reference specific patient/family values/goals of care	10. Customize care plan to incorporate patient/family values/goals	10. Discussion about what "worries" or "concerns" the patient/family in the context of a specific medical decision (also could include "goals," "values")
13. Customize care plan to incorporate patient/family values/goals	11. Ask patient/family what worries or concerns them	
14. Praise a team member for NOT doing an unnecessary test/treatment		
15. Ask team member if a proposed test was previously performed		
16. Narrow down the medication list or discharge medication list		
17. Uses the terms over-use, over-treatment and over-diagnosis		
18. Ask patient/family what worries or concerns them		
19. Potential risks/costs of consultations		

Abbreviations: CBC indicates complete blood count; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; NNT, number needed to treat; NNH, number needed to harm; d/c, discontinue.

^aAs a result of the Round 2 voting (described in the text), 8 items were removed (in purple from column 1).

^bAfter the second round of piloting, 1 item was removed (in aqua from column 2) and examples were added.

^cItem 9 was removed after the second round of piloting (for redundancy).

Supplemental Digital Appendix 4

Kappa Estimates for Individual Items During Early and Late Testing Iterations of High-Value Care (HVC) Rounding Tool Instrument Piloting

HVC domain	Testing Iterations 1 & 2 Observations: 97 patient encounters κ (95% CI)	Testing Iteration 3 Observations: 51 patient encounters κ (95% CI)
Quality		
Offer anticipatory guidance to prevent a complication of a medical issue or unplanned admission	0.29 (-0.07, 0.65)	1.00 (1.00, 1.00)
Narrow down the medication list or discharge medication list	0.67 (0.45, 0.88)	1.00 (1.00, 1.00)
Praise a team member for NOT doing an unnecessary test/treatment	0.66 (0.04, 1.00)	Not observed
How a test may or may not change management	0.14 (-0.18, 0.45)	1.00 (1.00, 1.00)
Balance between the clinical benefits of care with its harms and its costs	0.45 (0.21, 0.69)	1.00 (1.00, 1.00)
Cost		
Care alternatives, including less expensive test/treatment and/or observation	0.23 (-0.09, 0.55)	1.00 (1.00, 1.00)
Avoid or cancel a low value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter)	0.58 (0.36, 0.80)	0.91 (0.74, 1.00)
Discussion about whether the patient requires ongoing hospitalization	0.55 (0.33, 0.76)	1.00 (1.00, 1.00)
Patient values		
Reference specific patient/family values/goals of care (NOTE: dropped before testing period 3)	0.29 (-0.07, 0.65)	N/A
Customize care plan to incorporate patient/family values/goals	0.59 (0.34, 0.83)	1.00 (1.00, 1.00)
Ask patient/family what worries or concerns them	0.16 (-0.17, 0.50)	1.00 (1.00, 1.00)

Supplemental Digital Appendix 5

Kappa Estimates for Individual Items During Iterations 1 and 2 of High-Value Care (HVC) Rounding Tool Instrument Piloting

HVC domain	Testing Iteration 1 Observations: 35 patient encounters κ (95% CI)	Testing Iteration 2 Observations: 62 patient encounters κ (95% CI)
Quality		
Offer anticipatory guidance to prevent a complication of a medical issue or unplanned admission	0.65 (0.03, 1.00)	0.17 (-0.20, 0.54)
Narrow down the medication list or discharge medication list	0.92 (0.77, 1.00)	0.30 (-0.08, 0.69)
Praise a team member for NOT doing an unnecessary test/treatment	Not observed	0.66 (0.04 - 1.00)
How a test may or may not change management	0.16 (-0.26, 0.58)	-0.02 (-0.07, 0.02)
Balance between the clinical benefits of care with its harms and its costs	0.64 (0.33, 0.96)	0.29 (-0.03, 0.61)
Cost		
Care alternatives, including less expensive test/treatment and/or observation	0.11 (-0.29, 0.50)	0.38 (-0.18, 0.93)
Avoid or cancel a low value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter)	0.72 (0.48, 0.97)	0.30 (-0.08, 0.69)
Discussion about whether the patient requires ongoing hospitalization	0.72 (0.42, 1.00)	0.45 (0.16, 0.74)
Patient values		
Reference specific patient/family values/goals of care (NOTE: dropped after testing period 2)	-0.04 (-0.12, 0.04)	0.40 (-0.02, 0.83)
Customize care plan to incorporate patient/family values/goals	0.77 (0.46, 1.00)	0.47 (0.14, 0.80)
Ask patient/family what worries or concerns them	-0.04 (-0.13, 0.04)	0.30 (-0.19, 0.80)

Supplemental Digital Appendix 6

Absolute Agreement Measures for Individual Items in Early and Late Iterations of High-Value Care (HVC) Rounding Tool Instrument Piloting

HVC domain	Testing Iterations 1 & 2 Observations: 12 dates, 97 patient encounters			Testing Iterations 3 Observations: 5 dates, 51 patient encounters		
	PPA	CPPA	PNA	PPA	CPPA	PNA
Quality						
Offer anticipatory guidance to prevent a complication of a medical issue or unplanned admission	80.0	66.7	98.9	100	100	100
Narrow down the medication list or discharge medication list	92.3	85.7	98.8	100	100	100
Praise a team member for NOT doing an unnecessary test/treatment	100.0	100.0	100.0	Not observed	Not observed	100
How a test may or may not change management	18.2	10.0	95.1	100	100	100
Balance between the clinical benefits of care with its harms and its costs	74.1	58.8	95.8	100	100	100
Cost						
Care alternatives, including less expensive test/treatment and/or observation	46.2	30.0	96.1	100	100	100
Avoid or cancel a low value test (daily CBC; ESR and CRP) or therapy or monitoring (pulse oximeter)	77.4	63.2	95.7	92.3	85.7	98.9
Discussion about whether the patient requires ongoing hospitalization	90.9	83.3	98.1	100	100	100
Patient values						
Reference specific patient/family values/goals of care (NOTE: dropped after testing period 2)	54.5	37.5	97.3	100	100	100
Customize care plan to incorporate patient/family values/goals	80.0	66.7	97.0	100	100	100
Ask patient/family what worries or concerns them	44.4	28.6	97.3	100	100	100

Abbreviations: PPA indicates percent positive agreement; CPPA, Chamberlain's percent positive agreement; PNA, percent negative agreement.