

Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. Examples of Perfect Care Indexes

<u>Coronary Artery Bypass Grafting (CABG)</u>	<u>Hip Fracture</u>	<u>Colectomy</u>
Antibiotics administered within one hour prior to surgery (N)	Evidence-based institutional Hip Fracture Admission Order Set was used (L)	Antibiotics administered within one hour prior to surgery (N)
Use of internal mammary artery when appropriate (N)	Case went to operating room within 24 hours of emergency department presentation (L)	Proper antibiotics were administered prior to surgery (N)
Cumulative post-operative mechanical ventilation \leq 24 hours (N)	Family was given institutional 'Family To-Do List' to facilitate delirium reduction strategies and discharge planning (L)	Patient ambulated by noon day after surgery (L)
No re-intubation during the post-operative recovery period (N)	Post-operatively, acute Confusion Assessment Method (CAM) was performed to assess for delirium (L)	Patient was off intravenous medications within 48 hours post-operatively (defined as by 5:00 PM of post-operative day 2) (L)
Antibiotics discontinued after 24 hours but before 48 hours post-operatively (N)	Physical therapy was performed on day of surgery (L)	
Guideline adherent antiplatelet therapy prescribed at discharge (N)	Guideline adherent therapies for venous thromboembolism prevention were prescribed (N)	
Guideline adherent beta-blockers prescribed at discharge (N)	Guideline adherent therapies for osteoporosis treatment were prescribed at discharge (L)	
Anti-lipid treatment prescribed at discharge (N)		

(L) Locally Developed Measure

(N) Nationally Endorsed Measure

eTable 2. Population Characteristics for Value Improvement Projects

Value Improvement Project	Characteristic	Baseline Period	Evaluation Period	Baseline Mean (SD), or N (%)	Baseline Median (25 th – 75 th percentile)	Evaluation Period Mean (SD), or N (%)	Evaluation Period Median (25 th – 75 th percentile)
Total Joint Replacement	Sex (% female)	4/2012 - 3/2013	4/2013 - 3/2014	376 (59)	-	383 (60)	-
	Age (yrs)	4/2012 - 3/2013	4/2013 - 3/2014	62 (13)	62 (54 – 70)	62 (13)	63 (56 – 71)
	Case Mix Index	4/2012 - 3/2013	4/2013 - 3/2014	2.45 (0.60)	2.10 (2.09 – 2.61)	2.38 (0.55)	2.15 (2.10 – 2.61)
	Sex (% female)	4/2013 - 3/2014	4/2014 - 3/2015	376 (59)	-	379 (58)	-
	Age (yrs)	4/2013 - 3/2014	4/2014 - 3/2015	62 (13)	62 (54 – 70)	62 (12)	63 (56 – 70)
	Case Mix Index	4/2013 - 3/2014	4/2014 - 3/2015	2.45 (0.60)	2.10 (2.09 – 2.61)	2.37 (0.47)	2.15 (2.11 – 2.15)
Hospitalist Laboratory Utilization	Sex (% female)	7/2012 - 1/2013	2/2013 - 4/2014	1,039 (51)	-	2,203 (52)	-
	Age (yrs)	7/2012 - 1/2013	2/2013 - 4/2014	56 (19)	57 (41 – 71)	56 (19)	57 (41 – 71)
	Case Mix Index	7/2012 - 1/2013	2/2013 - 4/2014	1.51 (1.02)	1.17 (0.86 – 1.88)	1.55 (1.20)	1.22 (0.96 – 1.85)
Sepsis Value Improvement	Sex (% female) – Comparison 1*	7/2014 - 12/2014	11/2015 - 2/2016	11 (38)	-	36 (47)	-
	Age (yrs) – Comparison 1*	7/2014 - 12/2014	11/2015 - 2/2016	52 (19)	48 (38 – 66)	55 (18)	55 (44 – 65)
	Case Mix Index – Comparison 1*	7/2014 - 12/2014	11/2015 - 2/2016	2.11 (1.35)	1.81 (1.46 – 1.85)	2.01 (2.04)	1.79 (1.04 – 1.79)
	Sex (% female) – Comparison 2**	7/2014 - 12/2014	11/2015 - 2/2016	77 (49)	-	36 (47)	-
	Age (yrs) – Comparison 2**	7/2014 - 12/2014	11/2015 - 2/2016	55 (18)	56 (39 – 68)	55 (18)	55 (44 – 65)
	Case Mix Index – Comparison 2**	7/2014 - 12/2014	11/2015 - 2/2016	2.5 (2.79)	1.81 (1.45 – 2.13)	2.01 (2.04)	1.79 (1.04 – 1.79)

* Comparison 1 is restricted to patients within the pilot acute internal medicine service for both the baseline and evaluation periods.

** Comparison 2 is restricted to patients within the acute internal medicine service for the evaluation period but includes the full hospital at baseline.

Patient Information

Name	Jane Doe
Age at Admit	49
Gender	Female
MRN	xxx-xxx-xxx
Visit Number	xxx-xxx-xxx

Surgery Information

Surgeon	Dr. Xxxx Xxxxx
Scheduled Procedure	Arthroplasty Total Knee
Laterality	Right
Surgery Type	Elective
Admit Date	10/23/14
Discharge Date	10/26/14
Discharge Location	Skilled Nursing Facility

Perfect Care Tracker

Admit to OTSS	Yes
Early Mobility	No
Hospital Acquired Condition	Yes
Patient Safety Indicator	Yes
SCIP	Yes
30 Day Readmission	Yes
ED Visit within 90 Days	Yes
Perfect Care	No

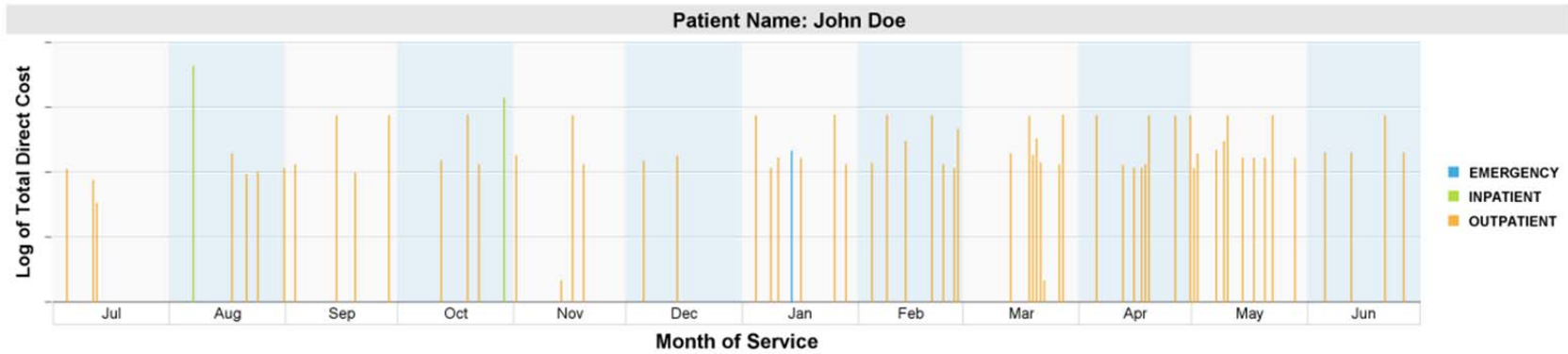
Visit Costs

Pharmacy Cost	\$\$\$
Therapy Services Cost	\$\$
Lab Cost	\$\$
Implant Cost	\$\$\$
Imaging Cost	\$\$
Facility Cost	\$\$\$
Non-Implant Supply Cost	\$\$\$
Total Cost	\$\$\$\$

Unit History

Patient Unit Description	Unit In Date/Time	Unit Out Date/Time	Unit LOS
UH MAIN OR	10/23/2014 10:57:00 AM	10/23/2014 5:15:00 PM	0.26
UH (OTSS) ORTHO TRAUMA SURG SPECIALTIES	10/23/2014 5:15:00 PM	10/26/2014 1:39:00 PM	2.85

eFigure 1. Sample Encounter-Level Report for Perfect Care Index and Costs



Visit No	Admit Date	Discharge Date	LOS	Pre-Surg LOS	Post-Surg LOS	Patient Class	Direct Cost	Primary Diagnosis	Primary ICD-9 Procedure	Provider Division	Discharge Location	ED
xxx-xxx-xxx	7/3/13	7/4/13				Out	\$\$	428.22 - Chronic Systolic Heart Failure		Cardiology	Home or Self Care	No
xxx-xxx-xxx	7/10/13	7/11/13				Out	\$\$			Respiratory Critical Care	Home or Self Care	No
xxx-xxx-xxx	7/4/13	8/7/13	34.2	14	20	Inp	\$\$\$\$		37.86 - Insertion Of Implantable Heart Assist System	Cardiothoracic Surgery	Home or Self Care	No
xxx-xxx-xxx	8/16/13	8/17/13				Out	\$\$	425.4 - Other Primary Cardiomyopathies		Cardiology	Home or Self Care	No
xxx-xxx-xxx	8/16/13	8/17/13				Out	\$\$			Cardiothoracic Surgery	Home or Self Care	No
xxx-xxx-xxx	8/21/13	8/21/13				Out	\$\$	367.1 - Myopia		Ophthalmology	Home or Self Care	No
xxx-xxx-xxx	8/23/13	8/24/13				Out	\$\$	425.4 - Other Primary Cardiomyopathies		Cardiology	Home or Self Care	No
xxx-xxx-xxx	8/30/13	9/3/13				Out	\$\$	428.0 - Congestive Heart Failure Unspecified		Cardiothoracic Surgery	Home or Self Care	No

eFigure 2. Sample Patient-Level Report for System Utilization Costs Over Time

	Pre-Service	Pre-op Day 0	Surgery	Post-op Day 0	Post-op Day 1	Post-op Day 2-3
Physician/ Physician Assistant	<ul style="list-style-type: none"> Medical clearance Anesthesia clearance VTE plan finalized Pre-op orders Joint Academy 	<ul style="list-style-type: none"> Consent History and physical Surgical site initials 		<ul style="list-style-type: none"> Post-op order entry Operative report Multimodal pain protocol Postoperative rounds 	<ul style="list-style-type: none"> Selective labs Assess: pain, physical therapy progress, dressing Discuss VTE prophylaxis, discharge plan (home health vs. skilled nursing facility), at home physical therapy, ice and elevation, therapy expectations 	<ul style="list-style-type: none"> Labs if needed Assess: pain, physical therapy progress, dressing Discharge instructions Discharge summary Answer patient questions Review follow-up appointments
Clinical Nursing	<ul style="list-style-type: none"> Pre-op optimization Pre-op clearances Pre-op MRSA screening Review pre-op labs Joint Academy education <ul style="list-style-type: none"> pain management, anxiety, dressing care, elevation, ice. Encourage regional anesthesia 1 week pre-op call <ul style="list-style-type: none"> Meds to stop Clarity of instructions Questions Discharge plan 	<ul style="list-style-type: none"> Nurse admission Pre-op medications Site shave Chlorhexidine cloths Urinate prior to surgery 		<ul style="list-style-type: none"> Initiate multimodal pain protocol Assess pain, vitals, oxygen saturation, cryotherapy Education: <ul style="list-style-type: none"> Elevation Incentive spirometry Plexi-pulse boots Bladder scan if unable to void Welcome packet/folder 	<ul style="list-style-type: none"> Multimodal pain protocol Assess pain, vitals, oxygen saturation, cryotherapy Elevation Incentive spirometry Plexi-pulse boots Bowel regimen Wean oxygen Wean intravenous fluids Encourage oral fluids Final intravenous antibiotic dose Patient education: Joint Academy videos, pain management, anxiety, relaxation exercise videos 	<ul style="list-style-type: none"> Multimodal pain protocol Assess pain, vitals, oxygen saturation, cryotherapy Elevation Incentive spirometry Plexi-pulse boots Bowel regimen Wean oxygen Hep-lock intravenous access Oral fluids Patient education: discharge instructions, discharge medications
Case Manage- ment	<ul style="list-style-type: none"> Assessment and education for post-acute care discharge plan: <ul style="list-style-type: none"> Home health (preferred) Skilled nursing facility (rarely) DME Joint Academy Initiate referral to post acute care and outpatient therapy 	<ul style="list-style-type: none"> Share plan of discharge with entire team via email summary 		<ul style="list-style-type: none"> Follow-up preservice assessment and plan Follow up DME Utilization review 	<ul style="list-style-type: none"> Follow-up preservice plan Follow-up/obtain DME Utilization review Finalize discharge plan Change if needed 	<ul style="list-style-type: none"> Discharge plan confirmed Obtain DME Fax final orders to home health or skilled nursing facility if needed
Surgery Scheduler	<ul style="list-style-type: none"> Schedule: <ul style="list-style-type: none"> Surgery date Joint Academy Follow-up appointments Ensure surgery authorized Adjust surgery date if needed Case management or nursing to advise 					
Physical Therapy	<ul style="list-style-type: none"> Participate in Joint Academy Exercises Crutches Cane Walker Stairs 			<ul style="list-style-type: none"> *Physical therapy session *Early mobilization *Out of bed when spinal is worn off Deliver paper packet of home exercises <i>*Change in care pathway to offer ambulation to all patients on post-op day 0</i> 	<ul style="list-style-type: none"> Physical therapy per pathway protocol Two sessions If early discharge: <ul style="list-style-type: none"> Stair education Car simulator Home exercises 	<ul style="list-style-type: none"> Physical therapy per pathway protocol Stair education Car simulator Home exercises
Pharmacy				<ul style="list-style-type: none"> Review home medications and restart as appropriate Check VTE prophylaxis 	<ul style="list-style-type: none"> Review home medications and restart as appropriate 	<ul style="list-style-type: none"> Discharge medication instructions Thrombosis education (if on warfarin)
Social Work				<ul style="list-style-type: none"> Consider in hip trauma resulting in hemi or total hip arthroplasty 	<ul style="list-style-type: none"> If needed, psychosocial consult 	

- Care Navigator Outreach phone call to review medications, pain control, elevation, problems, additional care, and questions
 - 24-48 hours after discharge
 - 7-10 days after discharge
 - Weekly in skilled nursing facility to facilitate discharge to home as soon as safe
 - 30, 60, 90 days after discharge

eFigure 3. Total Joint Replacement Care Pathway

DME = durable medical equipment. VTE = venous thromboembolism.