NATIONAL QUALITY FORUM

NQF Measure Incubator™ Innovation Challenge

January 11, 2017

NQF Measure Incubator™ Innovation Challenge

- NQF is hosting a series of webinars to explore innovative solutions to improve measure development and address areas that have too few or no meaningful measures, as part of initial steps to the launch of the NQF Measure Incubator Learning Collaborative.
- The featured speakers on today's webinar are winning recipients of the recently announced the NQF Innovation Challenge.
- Visit our website to see a recording of our past Innovation Challenge presentations
  http://www.qualityforum.org/Measure_Incubator_Webinar_Series.aspx

Today's Speakers

Charlotta Lindvall, MD, Dana-Farber Cancer Institute
Proposes using natural language processing to develop quality measures in palliative surgery using electronic health record (EHR) data

Tracy Spinks, MD Anderson Cancer Center
Outlines a new, streamlined, standardized approach to implementing PRO measure sets in EHRs

Moderated by Ed Septimus, MD, medical director, Infection Prevention and Epidemiology, Hospital Corporation of America

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Using natural language processing to develop quality measures in palliative surgery through the use of electronic health record data

Charlotta Lindvall, MD, PhD

Our Team

DFCI – Palliative Care	BWH - Surgery	MIT – Computer Science
Charlotta Lindvall, MD, PhD	Elizabeth Lilley, MD, MPH	Alex Forsyth
James Tulsky, MD	Zara Cooper, MD	Regina Barzilay, PhD

- We aim to develop scalable quality measures that can be implemented in serious illness including palliative surgery

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Why is it important to measure quality in palliative surgery?

- Invasive procedures are increasingly relevant near the end of life
- Up to 20% of surgical procedures for patients with cancer have a palliative indication
- Current metrics do not reflect high-quality care processes or treatment outcomes

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Quality measures are used to achieve better outcomes

	Tonsil cancer receiving neck radiation therapy	Pancreatic cancer with malignant bowel obstruction
Symptom	Pain with swallowing	Refractory vomiting
Surgery	G-tube	G-tube
Indication	Feeding	Venting
Desired outcome	Nutritional support during treatment	Symptom control at the end of life
Current outcome measure	30-day mortality	30-day mortality

- Completion of advance care planning may be a more relevant quality measure in patients receiving venting G-tube

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Novel approaches are needed to efficiently and effectively assess patient-centered outcomes

- Clinical notes contain troves of relevant data
  - quality of communication
  - symptom management
  - illness severity
- Manual chart review is not scalable
- Natural language processing (NLP) holds the promise of extracting meaningful non-categorical data from Electronic Health Records

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NLP addresses three major barriers to implementing quality measures in serious illness

1. Identify specific patient populations within the EHR
   - cancer patients receiving palliative surgery
2. Identify processes of care embedded in the medical note
   - documentation of advance care planning
3. Identify relevant treatment outcomes embedded in the medical note
   - documentation of targeted symptoms

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We used NLP to assess outcomes associated with venting G-tube

Study objective	1. Identify patients who had G-tube placed for palliative indication (venting) 2. Characterize the quality of end-of-life care processes (advance care planning) 3. Characterize outcomes of treatment (symptom management)
Sample	• 305 cancer patients who had a G-tube procedure were identified using ICD9-CM billing codes • 75,626 electronic text documents
Methods	• Manual coding was performed by two clinicians • NLP algorithms were written in Python

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NLP code label notes containing the key word “venting”

```
Charlottas-MacBook-Air-3:regex_extraction-master root# python extract_values.py
"/private/var/root/Downloads/Gastrostomy_Lno.txt" --phrases "venting"
```

	EMPI	HOSPITAL	MRN	NOTE TYPE	ID	DATE	NLP
27872							
27873	####	MGH, BWH,	###	Notice of Death	####	#####	
27874	####	MGH, BWH,	###	Addendum: IR Brief Operative Note	####	#####	
27875	####	MGH, BWH,	###	IR Brief Operative Note	####	#####	1
27876	####	MGH, BWH,	###	Patient Note	####	#####	1
27877	####	MGH, BWH,	###	SW Clinical Assessment- Inpt	####	#####	
27878	####	MGH, BWH,	###	Addendum: Palliative Care Consult	####	#####	
27879	####	MGH, BWH,	###	Palliative Care Consult	####	#####	1
27880	####	MGH, BWH,	###	H&P	####	#####	
27881	####	MGH, BWH,	###	Team 1 Admission Note	####	#####	1
27882	####	MGH, BWH,	###	MGH ED Note	####	#####	
27883	####	MGH, BWH,	###	Baker Surgery Team 3 Consult Note	####	#####	1
27884	####	MGH, BWH,	###	Baker Surgery Team 3 Consult Note	####	#####	1
27885	####	MGH, BWH,	###	Phone Call	####	#####	
27886	####	MGH, BWH,	###	Phone Call	####	#####	
27887	####	MGH, BWH,	###	Phone Call	####	#####	
27888	####	MGH, BWH,	###	Phone Call	####	#####	
27889	####	MGH, BWH,	###	Phone Call/No Hospice for now	####	#####	
27890	####	MGH, BWH,	###	Progress Note	####	#####	

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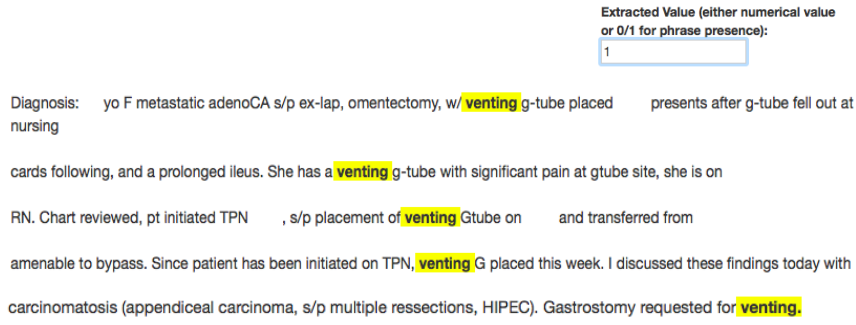
Rapid chart review of NLP output



Extracted Value (either numerical value or 0/1 for phrase presence):
1

Diagnosis: yo F metastatic adenoCA s/p ex-lap, omentectomy, w/ venting g-tube placed presents after g-tube fell out at nursing

cards following, and a prolonged ileus. She has a venting g-tube with significant pain at gtube site, she is on

RN. Chart reviewed, pt initiated TPN , s/p placement of venting Gtube on and transferred from

amenable to bypass. Since patient has been initiated on TPN, venting G placed this week. I discussed these findings today with

carcinomatosis (appendiceal carcinoma, s/p multiple ressections, HIPEC). Gastrostomy requested for venting.

- Our NLP program allows for review at the note or patient level

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NLP correctly identified patients who received venting G-tube

	Manual coding n=305	NLP n=305
Palliative indication	75 (24.6%)	72 (23.6%)
Time	28 hours	2 hours
Sensitivity		95.8%
Specificity		97.4%
PPV		92.0%
NPV		98.7%

- Key words that are used in manual chart review are not necessarily “NLP ready”

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We have validated key words that identify documentation of advance care planning

Extracted Value (either numerical value or 0/1 for phrase presence):
1

1) **Goals of care.** Patient clearly expressing preference for comfort-oriented **goals of care** at this time, given her clinical situation and prolonged hospitalization. Patient wants to go home and wants assistance in communicating this to her husband. We will assist with

-We would like to ensure that the patient's code status is consistent with the **goals of care.** Per the resident, Dr. , the patient has elected full code status when asked in the past. Given her preference for comfort and acknowledgment of the seriousness of her illness, I am concerned that full code status in the event of cardiopulmonary arrest would not be helpful toward achieving her goal to return home. We will address this issue tomorrow during the family meeting.

- Quality of documentation can be scored using a Likert scale

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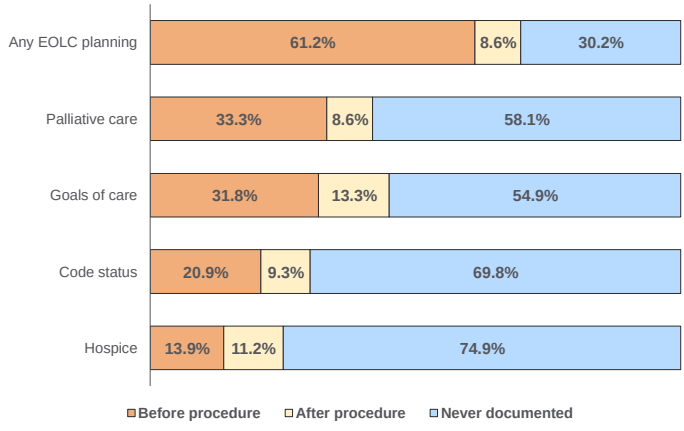
NLP results can be used for internal quality improvement and external oversight



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We are validating key words that identify symptoms

Extracted Value (either numerical value or 0/1 for phrase presence):
1

resection with evacuation of pseudomyxoma. Now with persistent nausea and **vomiting,** anorexia and dysphagia, no further surgical options, transitioning to

fatigue consistent with deconditioning and ?dehydration d/t prolonged nausea and **vomiting** precipitating admission. Continue to recommend transition to inpatient rehab

Medical Center on with persistent nausea and **vomiting.** Her hospital course was notable for UTI, obstructive

on further management of her persistent nausea and **vomiting** and for consideration of possible surgical interventions. Last evening,

- Machine learning may facilitate this process

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In summary

- NLP provides novel opportunities to develop patient centered quality measures in palliative surgery and beyond
- We are looking for collaborations and partnership to scale these efforts
- Thank you for the opportunity to present our work

We look forward to speaking to you!
Charlotta_Lindvall@DFCI.harvard.edu

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NQF Measure Incubator Challenge™

Implementing Patient-Reported Outcome Measures Sets in EHRs

January 11, 2017

Tracy Spinks, Program Director, Cancer Care Delivery
The University of Texas MD Anderson Cancer Center

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- MD Anderson Cancer Center: Clinical Operations, Institute for Cancer Care Innovation, Division of Surgery, Division of Radiation Oncology, Division of Cancer Medicine, Information Services, Thoracic Center
- International Consortium for Health Outcomes Measurement
- Institute for Strategy and Competitiveness

BACKGROUND

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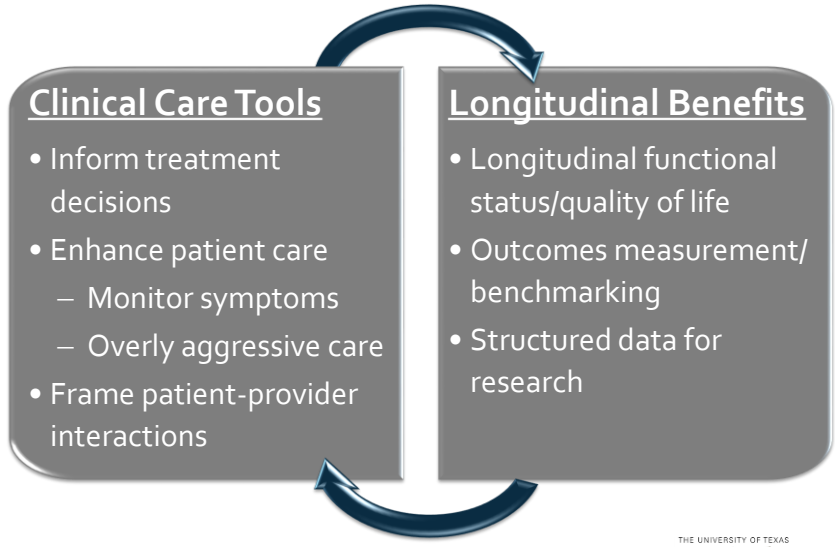
Rationale for PROs as Standard of Care



Implementing Patient-Reported Outcome Measures Sets in EHRs
Tracy Spinks, The University of Texas MD Anderson Cancer Center, January 11, 2017

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Our Approach

- Adopt condition-specific outcome sets for cancer, including PROs
- Disease-specific PROs as patient care tools in new Epic EHR
- Prepare for next evolution of patient care
  - Functional status/quality of life become longitudinal "vital signs" for all patients

Measurement Challenge

- Large gaps in cancer-specific outcomes, esp. PRO measures
- Unknown impact on clinical workflow
- Automated PROs an emerging application of EHR technology
- Few examples of successful EHR-based PROs w/ automation, structured reporting

TEST CASE: LUNG CANCER

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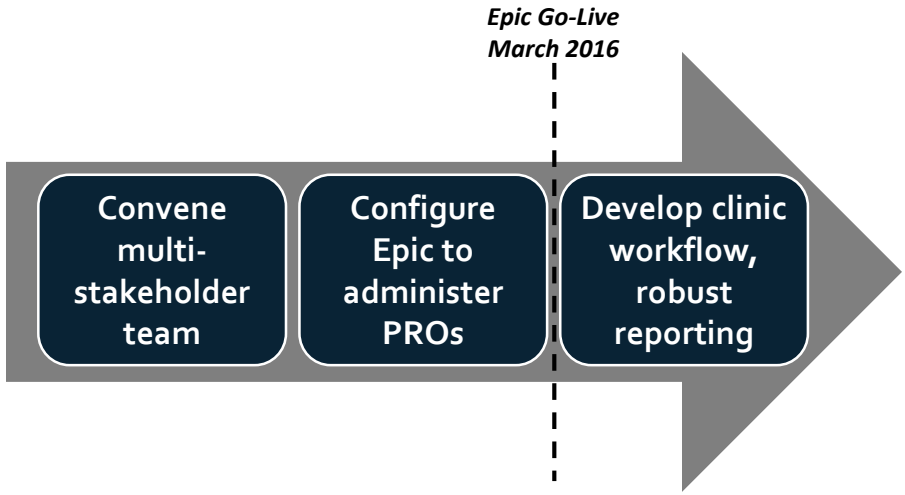
Project Plan



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Step 1: Convene Multi-Stakeholder Team

- Clinical, operational, EHR representatives to guide lung cancer outcomes
- International Consortium for Health Outcomes Measurement (ICHOM)'s lung cancer outcomes as a starting point
  - Patients represented throughout ICHOM's process
- ICHOM-recommended PRO tool: EORTC-QLQ-C30/ EORTC QLQ-LC13

Step 2: Configure Epic to Administer PROs

- Utilize Epic's built-in PRO functionality
  - Patients receive PROs via patient portal
  - Complete at home or in clinic
  - Responses viewable in EHR
  - Stored as structured data
  - Reporting via "Universe"

Step 3: Develop Clinic Workflow, Robust Reporting

- Reconvene multi-stakeholder team
- Leverage ICHOM's experience
- Engage patients
- Key tasks
  - Integration in clinical workflow
  - Meaningful internal reporting
  - Share implementation experience
  - Enterprise reporting with complementary data
  - Patient-focused reporting

Implementation Questions

- How do we. . .
  - Optimize clinical workflow?
  - Minimize burden to patients, staff?
  - Enhance patient/provider interactions?
  - Represent broad patient perspectives?
  - Support longitudinal outcomes measurement?
  - Use PROs for valid comparisons?
  - Aggregate PROs, other data for value measurement, research, patient decision-making?

Broader, Long-Term Questions

- Replicable, scalable model for PROs as standard of care
- Minimized "survey fatigue"
- Overlap w/ existing tools
- Longitudinal view of PROs
- Enhanced EHR, stand-alone technology
- Validated performance measures
- PROs in quality/payment programs

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Thank You

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Questions