Using A Quality Improvement Program to Reduce Length of Stay and Readmissions: Real World Evidence from One Health Care System

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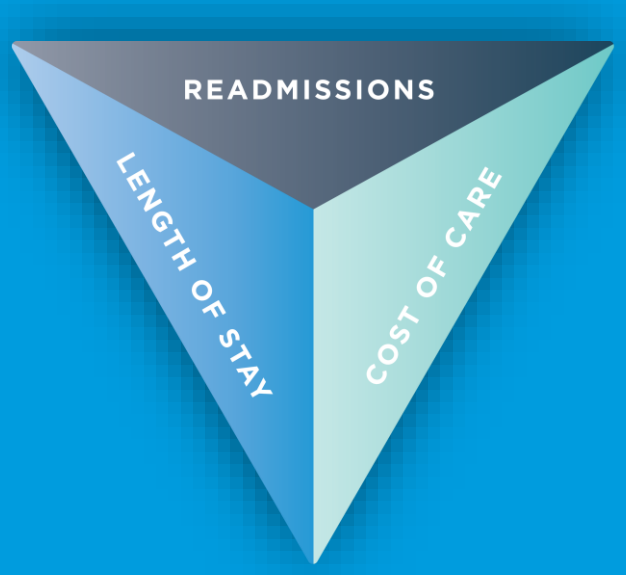
Becker's Hospital Review Conference



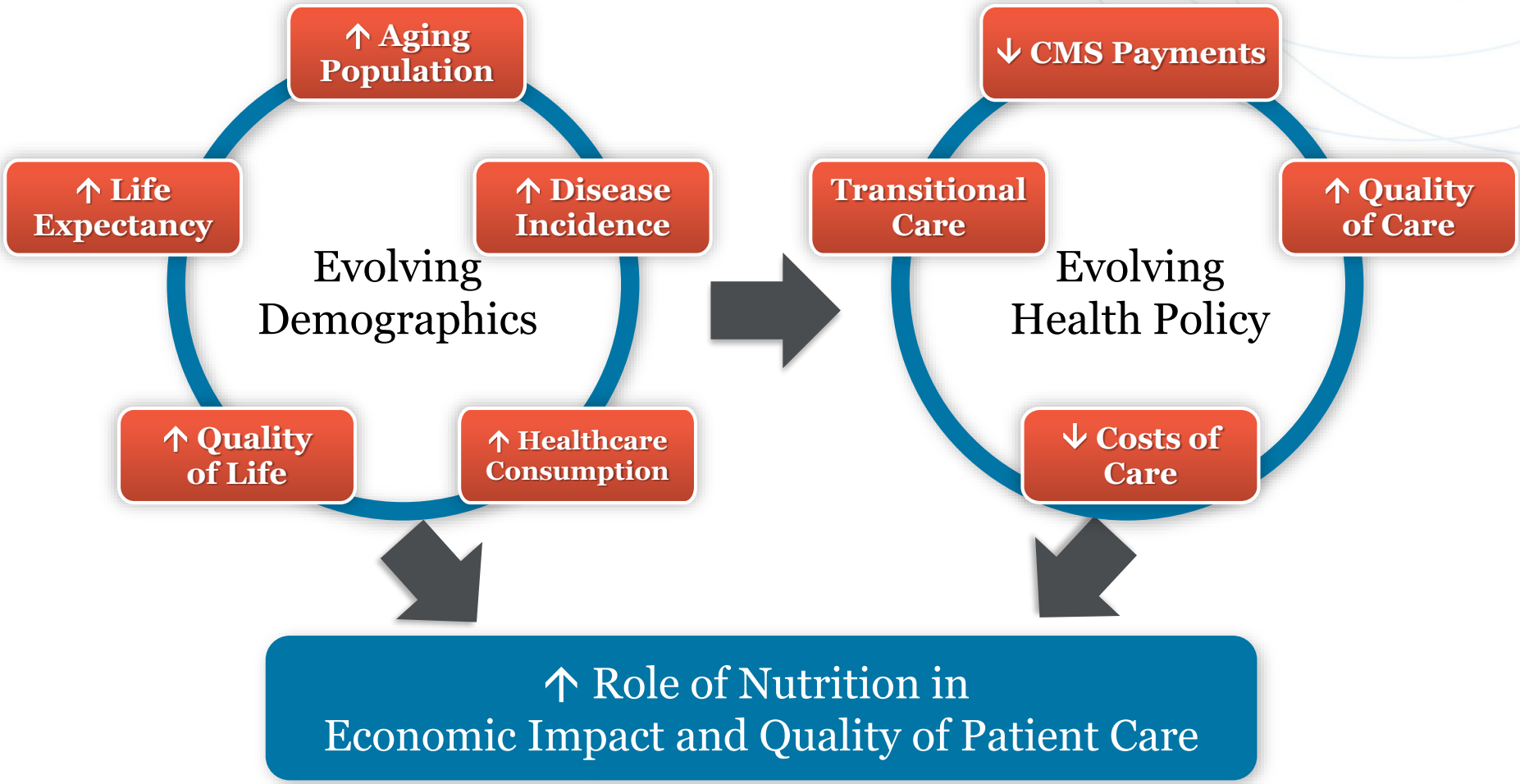
DISCLOSURES

- Support for this program is provided by Abbott Nutrition
- This program is not intended for continuing education credits for any healthcare professional

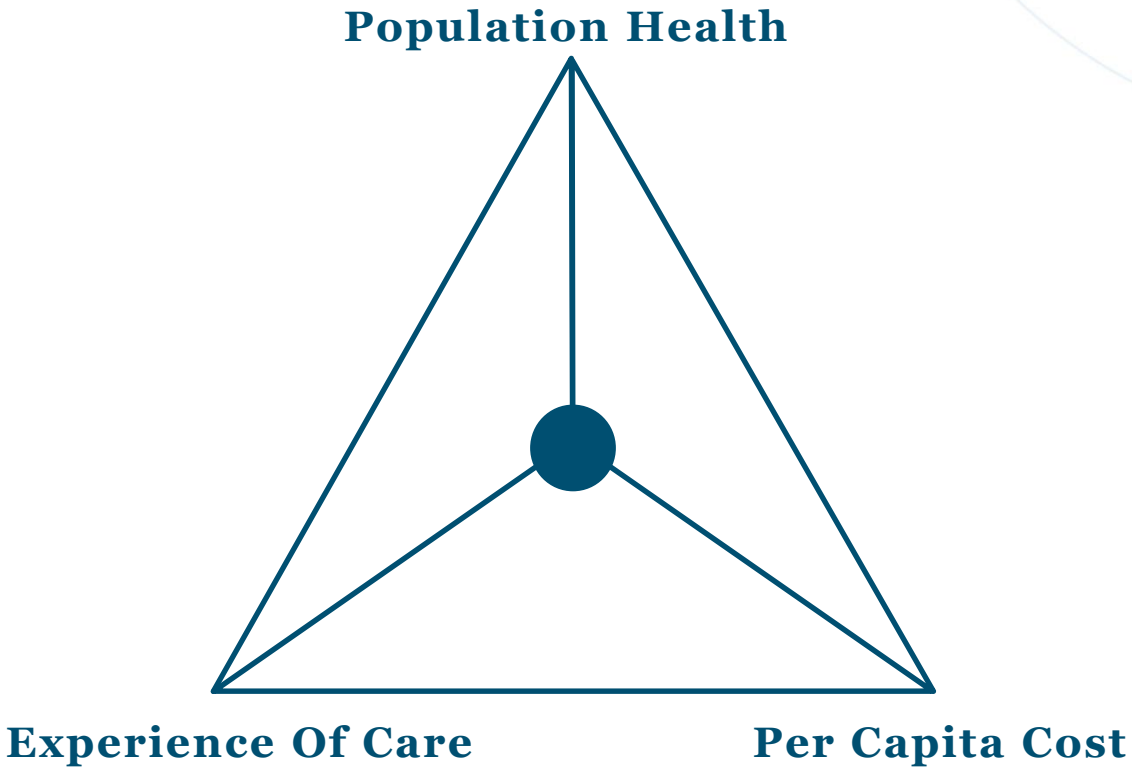
OBJECTIVES

- Provide an overview of literature on the impact of oral nutritional supplements (ONS)
- Review real-world experience with nutrition-focused Quality Improvement Programs (QIPs)
- Demonstrate how an improved nutrition care process that includes the use of ONS, has been shown to reduce readmissions, length of stay (LOS), and cost of care

EVOLVING DEMOGRAPHICS AND HEALTH POLICY ENABLE NUTRITION TO HAVE A POSITIVE ECONOMIC IMPACT



NUTRITION INTERVENTION ALIGNS WITH THE INSTITUTE FOR HEALTHCARE IMPROVEMENT (IHI) TRIPLE AIM[1]



1. Stiefel M, Nolan K. A guide to measuring the Triple Aim: population health, experience of care, and per capita cost. IHI Innovation Series white paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2012. (Available on www.IHI.org)

NUTRITIONAL STATUS IS PROGRESSIVELY COMPROMISED OVER THE CONTINUUM OF CARE

Upon Admission to the Hospital

30% to 50% of patients are malnourished upon admission[1]

During Hospital Stay

Many patients with normal nutrition status experience a decline during hospitalization[1]

Post-discharge

Weight loss and loss of muscle increase risk of readmissions[2,3]

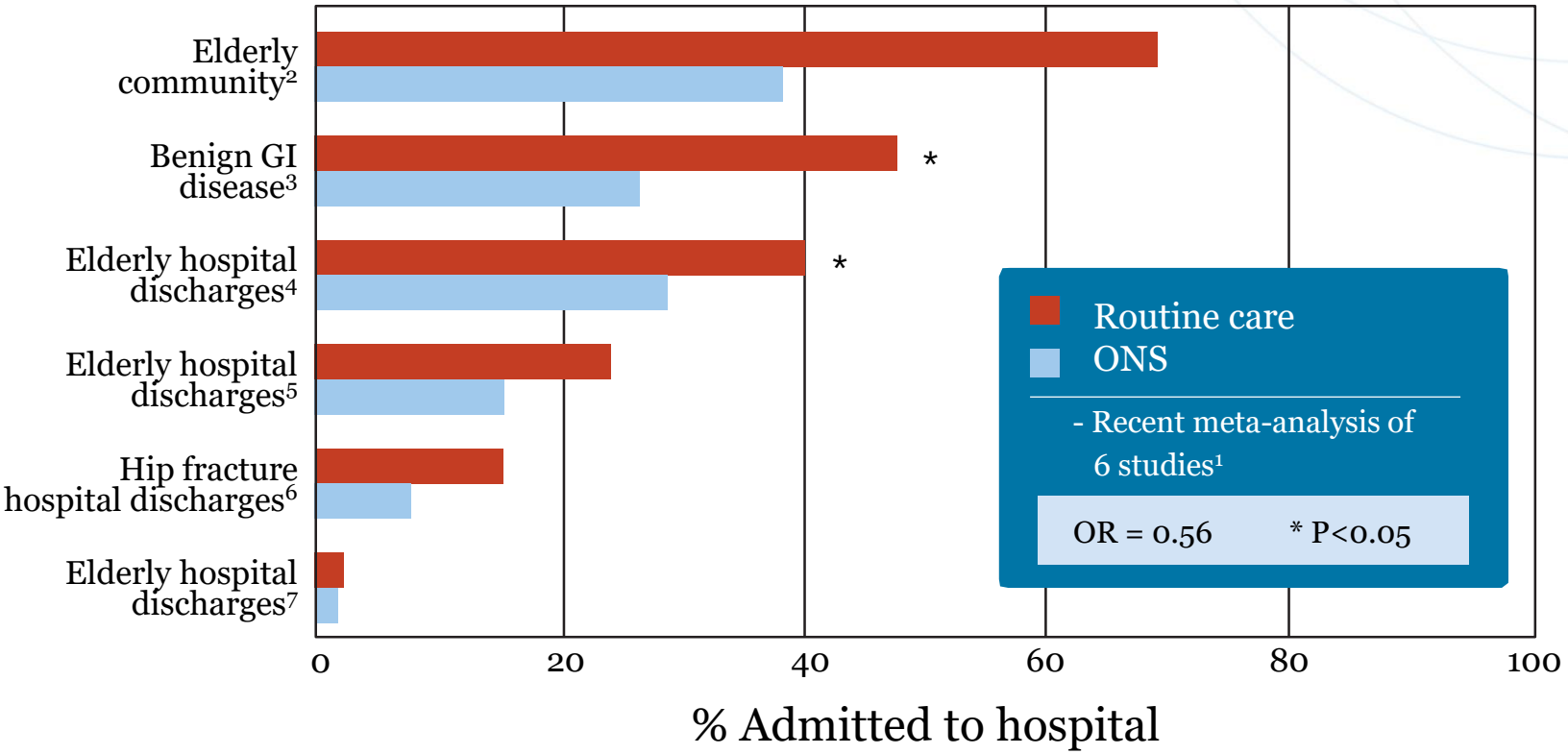
1. Sriram K, Sulo S, VanDerBosch G, et al. *J Parenter Enteral Nutr. 2016;1-8*. http://journals.sagepub.com/doi/abs/10.1177/0148607116681468.
2. Gariballa S, Elessa A. *Clinical Nutrition*. 2013; http://dx.doi.org/10.1016/j.clnu.2013.01.010.
3. Allaudeen N, Vidyarthi A, Maselli J, Auerbach A. *J Hosp Med*. 2011;6:54–60.

UNRECOGNIZED MALNUTRITION CAN LEAD TO COSTLY CONSEQUENCES

- Increased LOS[1]
- Higher complication rates[1]
- Increased readmission rates[1]
- Increased morbidity/mortality[1]
- Increased cost of care[1]
- Increased risk of pressure ulcers[2]

1. Philipson TS, Thorton Snider J, Lakdawalla DN, et al. *Am J Manag Care*. 2013;19(2):121-128.
2. Shahin ES et al. *Nutrition*. 2010;26(9):886-889.

STUDIES OF ONS INTERVENTION DEMONSTRATE REDUCED HOSPITAL ADMISSIONS



GI= gastrointestinal.

1. Stratton RC and Elia M. *Proc Nutr Soc*. Annual Meeting of the Nutrition Society and BAPEN 2010;1-11.
2. Eddington J et al. *Clin Nutr*. 2004;23:195-204. 3. Normal K et al. *Clin Nutr*. 2008;27:48-56. 4. Gariballa S et al. *Am J Med*. 2006;119:693-699. 5. Chapman IM et al. *Am J Clin Nutr*. 2009;89:880-889. 6. Miller MD et al. *Clin Rehabil*. 2006;20:311-323. 7. Price R et al. *Gerontology*. 2005;51:179-185.

A LARGE HEALTH ECONOMIC STUDY OF ONS DURING HOSPITALIZATION DOCUMENTED ECONOMIC BENEFITS[1]

Study Design

- 11-year retrospective analysis

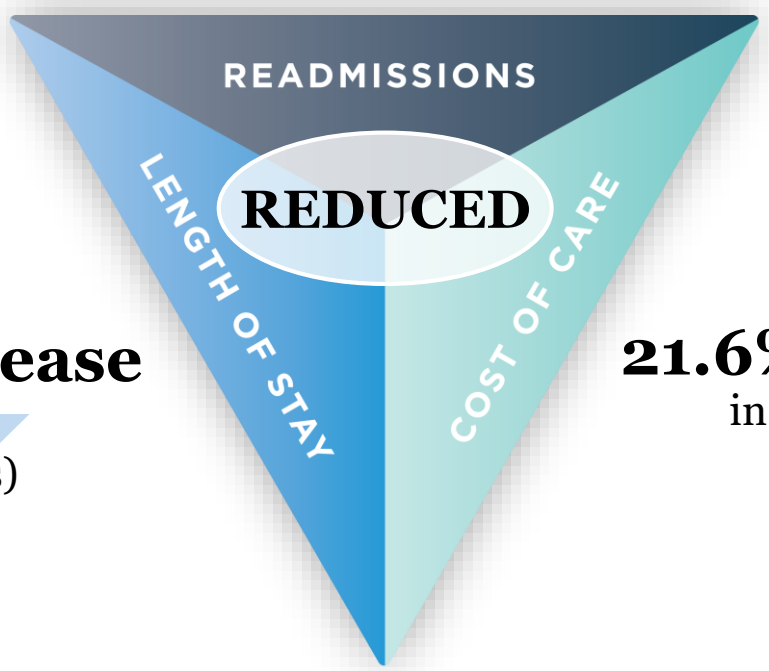
Premier Research Database

- Includes detailed information on adult (18+) U.S. hospital episodes from 2000 to 2010
  - 460 hospitals in the United States
  - 44 million adult inpatient episodes
  - ONS use identified in 724,027 of 43,968,567 adult inpatient episodes
  - Rate of ONS use=1.6%

1. Philipson et al. *Am J Manag Care*. 2013; 19(2):121-128.

LARGE HEALTH ECONOMICS STUDY SHOWED ONS DURING HOSPITALIZATION IMPROVED OUTCOMES[1]

6.7% decrease*
in probability of
30-day readmissions



21% decrease
in LOS
(2.3 days)

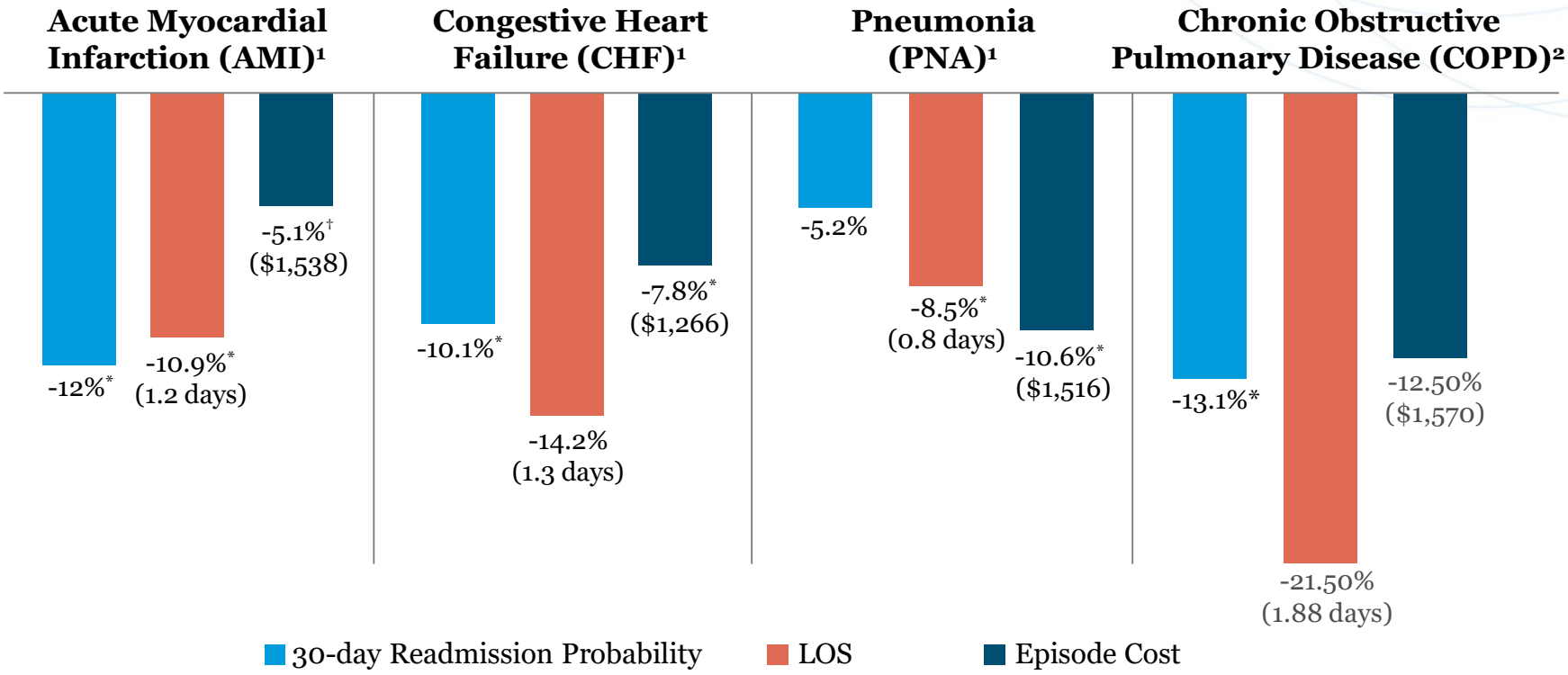
21.6% decrease†
in episode costs
($4734)

*Readmission defined as return to study hospital for any diagnosis.
Data measured delayed readmission and do not include patients not readmitted due to recovery or death.
†Monetary figures are based on 2010 US dollars and inflation-adjusted.

1. Philipson TJ et al. *Am J Manag Care*. 2013;19(2):121-128.

ONS IMPROVED OUTCOMES AND REDUCED HOSPITAL COSTS IN FOUR TARGETED MEDICARE POPULATIONS[1,2]

Data from 2 retrospective health economic studies[1,2]



*Indicates significance at the 1% level.
†Indicates significance at the 5% level.
‡ One to one matched sample was created from a 10,322 ONS episodes and 368,097 non-ONS episodes data population (N=14,326).

1. Lakdawalla D et al., *Forum for Health Economics and Policy*. 2014 DOI 10.1515/fhep-2014-0011.
2. Thornton Snider J et al. *Chest*. 2014 Oct 30. doi: 10.1378/chest.14-1368.

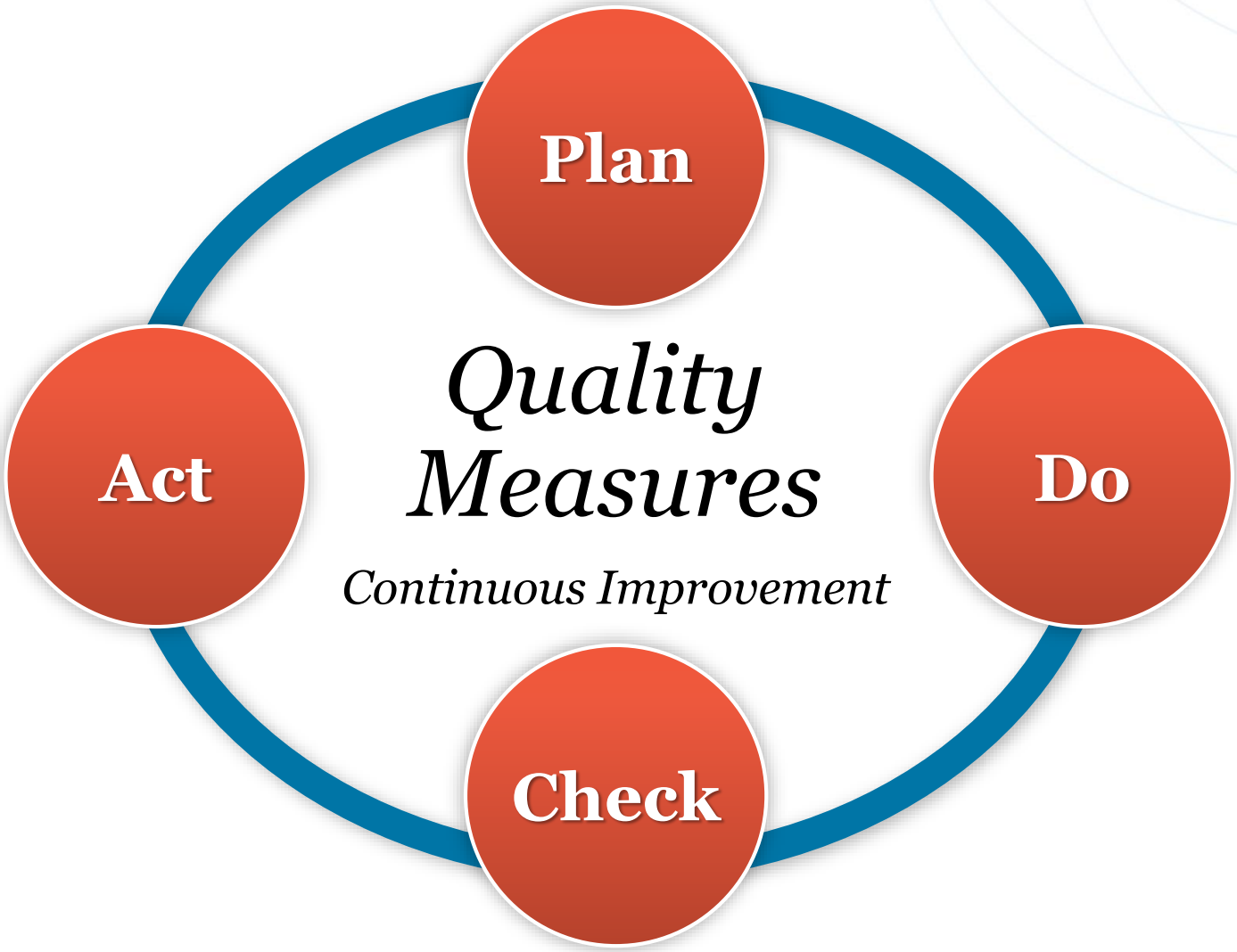
WHAT ARE THE REAL-WORLD IMPLICATIONS OF THESE RESEARCH FINDINGS?

And just what is a QIP?[1]

- The Affordable Care Act and pay-for-performance are driving healthcare organizations across the nation to institute QIPs
- A QIP involves systematic activities that are organized and implemented by an organization to monitor, assess, and improve the quality of healthcare
- The activities are cyclical, ie, organization continues to seek higher levels of performance to optimize care for the patients it serves, while striving for continuous improvement

1. HRSA. Health Resources and Services Administration. Quality Improvement. https://www.hrsa.gov/quality/toolbox/methodology/qualityimprovement/index.html. Access January 9, 2017.

QIP PLANNING AND EVALUATION STEPS



ADVOCATE HEALTH CARE QUALITY IMPROVEMENT STUDY OVERVIEW[1]

Study Design

Multi-site, 2-group, pre-post QIP study
Conducted from October 13, 2014 to April 2, 2015

Patient Population

(N=1269*; 45.2% at risk for malnutrition)

- Older adults; mean age of 66.6 ± 17.2 years
- Most were white/caucasian (70.4%)
- Admitted for a primary medical diagnosis (77.3%)

Study Scheme

Two hospitals implemented a QIP-basic program—QIP-b	Two hospitals implemented a QIP-enhanced program—QIP-e

*2808 patients were screened with 1269 patients enrolled.

1. Sriram K, Sulo S, VanDerBosch G, et al. *J Parenter Enteral Nutr. 2016;1-8*. http://journals.sagepub.com/doi/abs/10.1177/0148607116681468

THE RESEARCH QUESTION AND ENDPOINTS

- **Study Hypothesis:** Nutrition-focused QIP **will decrease 30-day readmission rate by 20%** compared with existing ONS protocol in patients at risk/malnourished
- **Sample Size:**
  - Baseline comparator patients (**n=4611**)—January 1, 2013-December 31, 2013
  - Enrolled in QIP (**N=1269**; QIP-b n=769; QIP-e n=500)—October 13, 2014-April 2, 2015
  - Validation comparator patients (**n=1319**)—October 13, 2013-April 2, 2014
- **Primary Endpoint:** Non-elective readmission 30-days post-discharge
- **Secondary Endpoint:** Length of hospital stay
- **Patient Population:** Aged 18+ years, any primary diagnosis, risk for malnutrition (Malnutrition Screening Tool [MST] score ≥2)

THE QIP USED THE 6 PRINCIPLES OF NUTRITION CARE TO DESIGN THE PROCESS CHANGE[1]

Principles to Transform the Hospital Environment	Principles to Guide Clinical Action
Create Institutional Culture	Recognize and Diagnose ALL Patients at Risk
Redefine Clinicians' Roles to Include Nutrition	Rapidly Implement Interventions and Continue Monitoring
Communicate Nutrition Care Plans	Develop Discharge Nutrition Care and Education Plan

1. Tappenden et al *JPEN J Parenter Enteral Nutr*. 2013;37:482-497

DIFFERENCES BETWEEN QIP-E AND QIP-B

Differences between QIP-e and QIP-b Programs	QIP-e	QIP-b
MST is a part of EMR	√	√
RN completes MST	√	√
ONS selection via automatic drop-down menu by RN	√	-
ONS ordered by MD, RN, or RD	√	√
RD consultation	√	√
Time to RD consultation: <24 hours	√	-
Time to ONS delivery (in hours)	**1 – 24 h**	24 – 48 h
Discharge planning instructions	√	√
Discharge materials including coupons and literature	√	-
Standard post-discharge phone calls (24-72 hours)	√*	√
Nutrition-focused **post-discharge phone calls** (N = 4)	√*	-

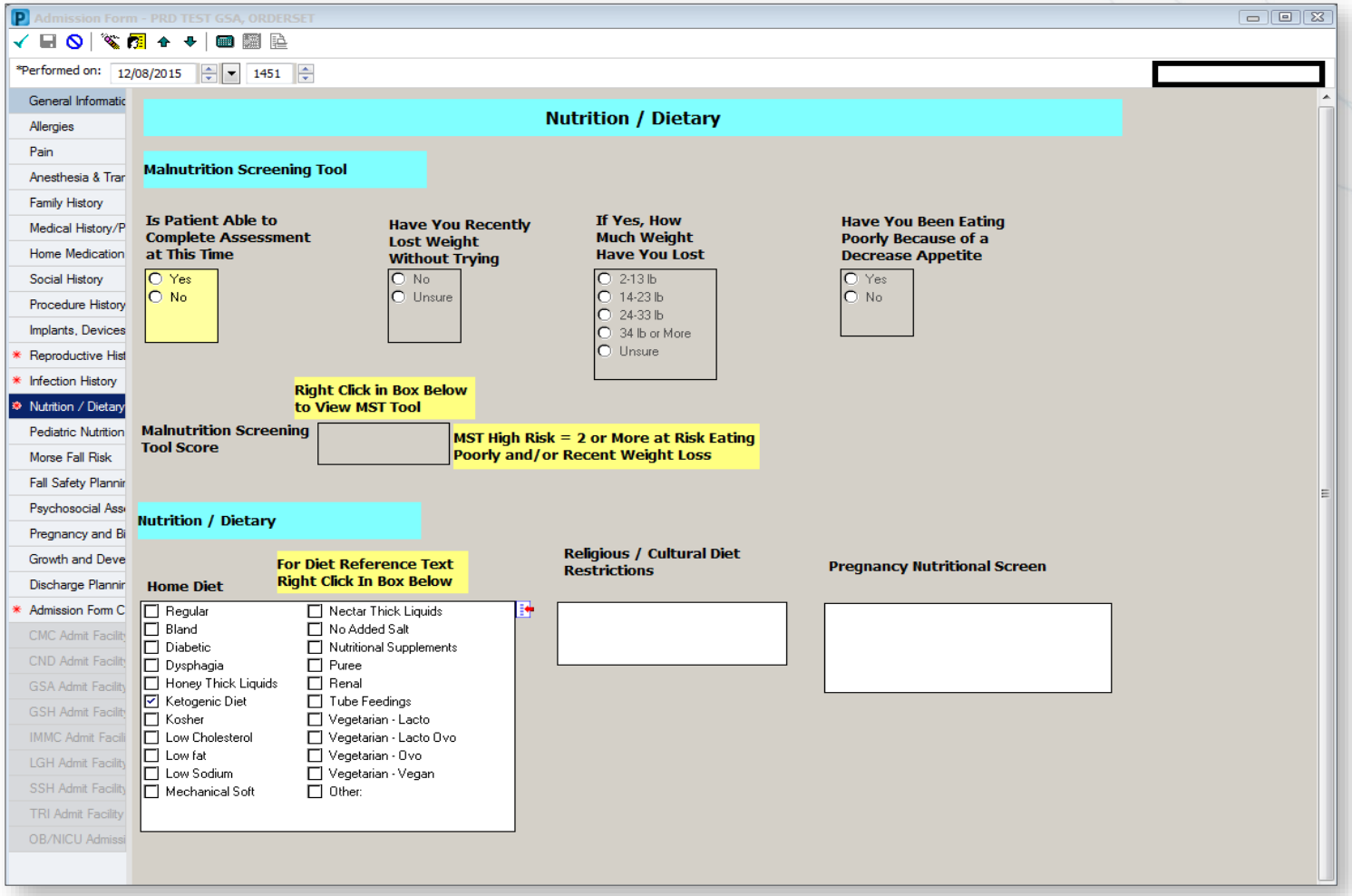
MST=Malnutrition Screening Tool
EMR=Electronic Medical Record
*Nutrition-focused questions were incorporated in the standard post-discharge phone calls.

RESEARCHERS USED A 22% READMISSION RATE FOR MALNOURISHED PATIENTS AS A BENCHMARK

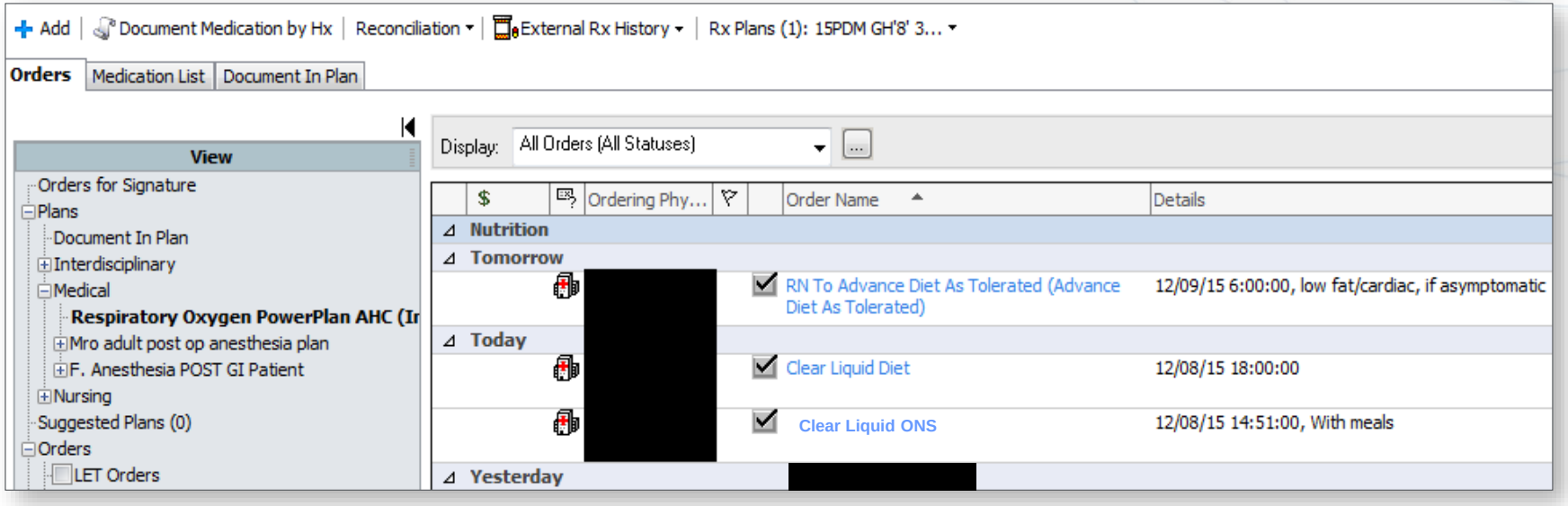
This was based on validation comparison patients:

- Comparison of the same time period
  - Enrolled in QIP (N=1269; QIP-b n=769; QIP-e n=500)—October 13, 2014-April 2, 2015
  - Validation comparator patients (n=1319)—October 13, 2013-April 2, 2014
- Patients having an ICD9 code for malnutrition and ONS order
- Comparison of the same Advocate hospitals (4 QIP hospitals)

THE VALIDATED MST AS IT APPEARED IN THE EMR



PATIENTS WITH AN MST SCORE OF ≥2 RECEIVED ONS ON THEIR NEXT MEAL TRAY

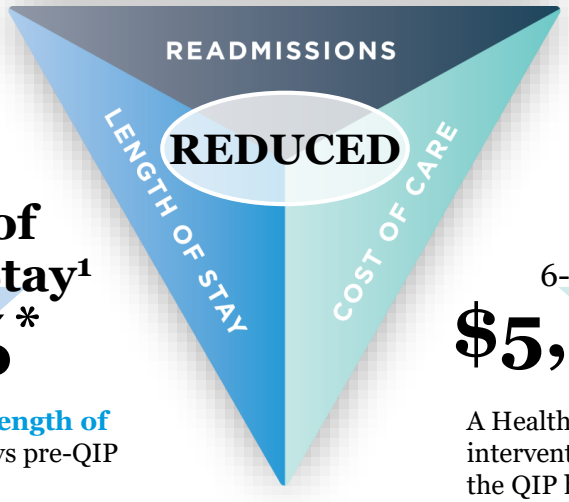


QIP-E PROGRAMS REDUCED READMISSIONS, LOS, AND COSTS[2]

All-cause 30-day Readmissions[1]

-29%*

QIP-e, including ONS therapy, reduced **all cause 30-day readmission rates** by 29% vs pre-QIP



Length of Hospital Stay[1]

-26%*

QIP-e, including ONS therapy, reduced **length of hospital stay** by 26% (1.9 [±3.6] days) vs pre-QIP

Costs[2]

6-Month Savings:

$5,452,309

A Healthcare Quality Outcomes Study that included interventions with Abbott Nutrition formulary for the QIP hospitals during a 6-month period **reduced healthcare costs from avoided readmissions and reduced LOS**[†‡]

*Data from QIP-e intervention, percentage expressed as relative risk reduction (RRR) compared to pre-QIP.
†Data from baseline comparison cohort: 6-month hospital savings for the 4 QIP hospitals was $5,452,309 (when QIP program cost is subtracted).
‡Products available in each hospital's formulary were used.

1. Sriram K, Sulo S, VanDerBosch G, et al. *J Parenter Enteral Nutr. 2016;1-8*. http://journals.sagepub.com/doi/abs/10.1177/0148607116681468
2. ClinicalTrials.gov. https://clinicaltrials.gov/ct2/show/NCT02262429. Accessed November 22, 2016
www.linktocomedecember6.com. Accessed November 22, 2016.

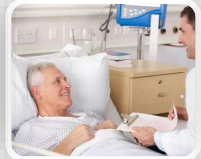
SUBPOPULATION ANALYSES EXAMINED BROAD-BASED PATIENT TYPES

- All of the QIP patients were pooled (QIPe + QIPb)
- For the MST analysis, data from 1269 patients enrolled in the QIP between October 2014 and April 2015 were analyzed and were grouped into:
    - MST = 2
    - MST > 2
- Data from 2588 patients (1269 electively admitted, non-critically ill, QIP patients enrolled between October 2014 and April 2015, and 1319 validation controls admitted in the same hospitals between October 2013 and April 2014) were categorized by:
    - Age
    - Admission type (medical or surgical)
    - Diagnosis Related Group (DRG)
- All subpopulations benefited from nutrition-based QIP

1. Sulo S, et al. Poster presented at: ESPEN Congress; Copenhagen, Denmark; September 19, 2016. 2. Sriram K, et al. Poster presented at: ASPEN Meeting; Austin, TX, January 17, 2016. 3. Sulo S, et al. Abstract submitted to: SHM Meeting. May 1-4, 2017, Las Vegas, NV. Awaiting Acceptance Confirmation. 4. Sulo S, et al. Poster presented at: SMDM Meeting; Vancouver, Canada; October 26, 2016.

ALL SUBPOPULATIONS BENEFITED FROM THE NUTRITION-BASED QIP

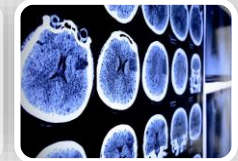

Age <65


Age 65+


Medical Patients


Surgical Patients


CV


Oncology


GI

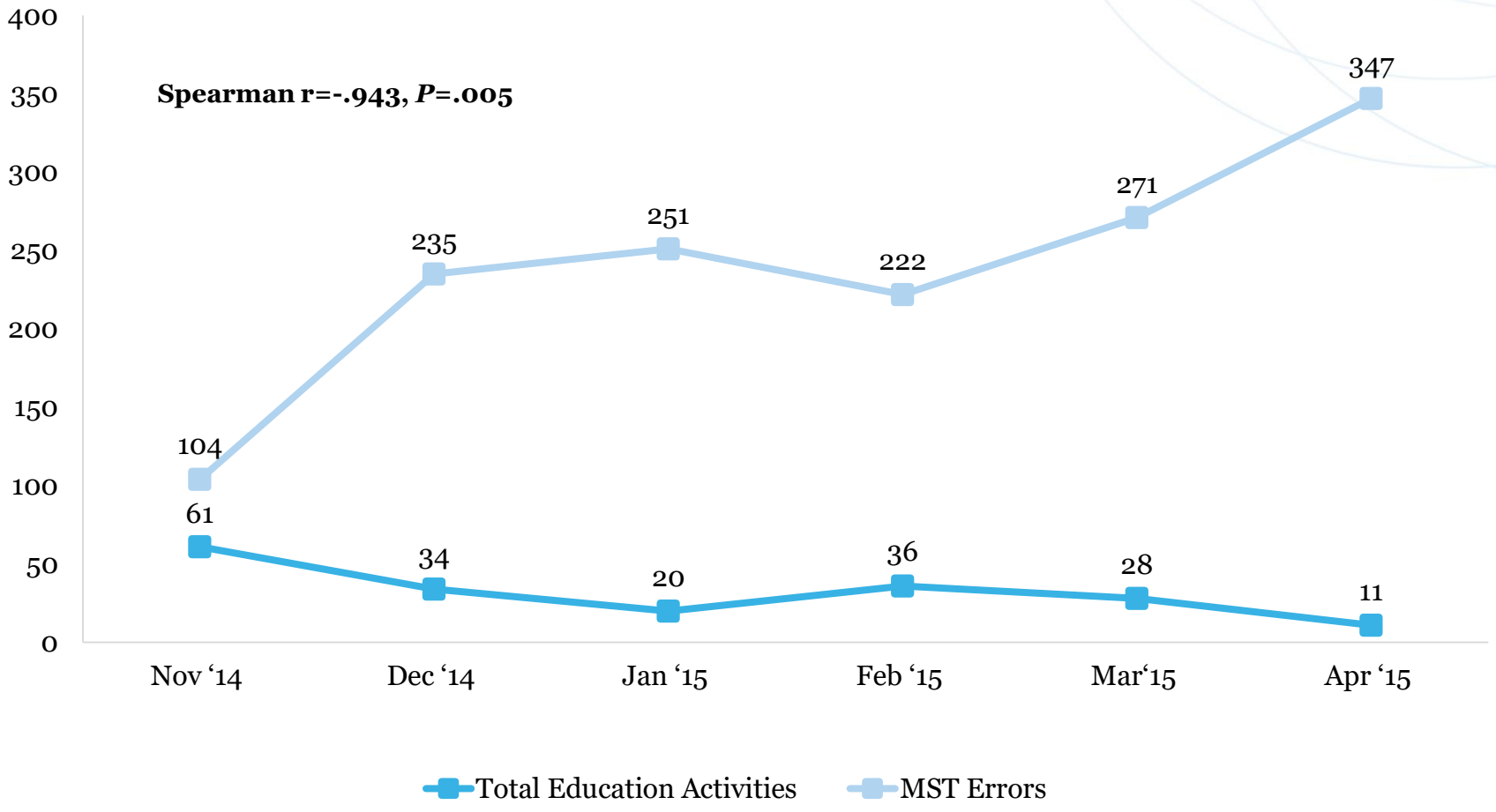
Across all MST Scores

MST = 2

MST > 2

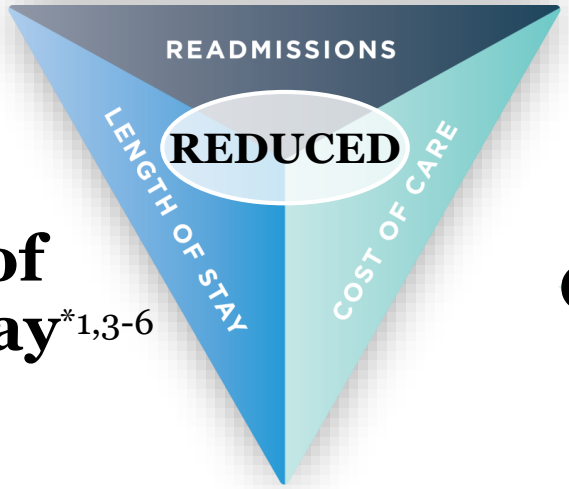
1. Sriram K, Sulo S, VanDerBosch G, et al. *J Parenter Enteral Nutr. 2016;1-8*. http://journals.sagepub.com/doi/abs/10.1177/0148607116681468.
2. Gariballa S, Elessa A. *Clinical Nutrition*. 2013; http://dx.doi.org/10.1016/j.clnu.2013.01.010. 3. Allaudeen N, Vidyarthi A, Maselli J, Auerbach A. *J Hosp Med*. 2011; 6:54–60.

CONTINUAL MST EDUCATION CORRELATES WITH FEWER MST ERRORS



NUTRITION INTERVENTION IMPROVES OUTCOMES FOR ALL MALNOURISHED PATIENTS[1-6]

All-cause 30-day Readmissions[*1,3-6]



Length of Hospital Stay[*1,3-6]

Costs[2†‡]

*Data from QIP-e intervention, percentage expressed as RRR compared to pre-QIP. Products available in each hospital's formulary were used.
† Data from baseline comparison cohort: 6-Month Hospital Savings for the 4 QIP hospitals was $5,452,309 (when QIP program cost is subtracted).
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1. Sriram K, et al. *J Parenter Enteral Nutr*. 2016 Dec 6 [Epub ahead of print]. 2. ClinicalTrials.gov. https://clinicaltrials.gov/ct2/show/NCT02262429. Accessed November 22, 2016. 3. Sulo S, et al. Poster presented at: ESPEN Congress; Copenhagen, Denmark; September 19, 2016. 4. Sulo S, et al. Poster presented at: SMDM Meeting; Vancouver, Canada; October 26, 2016. 5. Sriram K, et al. Poster presented at: ASPEN Meeting; Austin, TX, January 17, 2016. 6. Sulo S, et al. Abstract submitted to: SHM Society of Hospital Medicine. May 1-4, 2017, Las Vegas, NV. Awaiting Acceptance Confirmation.

NUTRITIONAL QIP INITIATIVES—WHERE DO WE GO FROM HERE?

- Malnourished hospitals patients often do not have their nutrition needs addressed while in the hospital[1]
- Studies show that nutrition-based QIPs can improve readmission, length of stay, and cost outcomes for all patients at risk/malnourished[1-6]
- An appropriate QIP includes:
  - Malnutrition risk screening at admission
  - Prompt initiation of ONS
  - Nutrition support during hospital stay and at discharge
- Keys to success:
  - Foster a culture of nutrition science
  - Multidisciplinary team work
  - Provide continuing staff education
  - Monitor and adjust the process to ensure continuous quality improvement

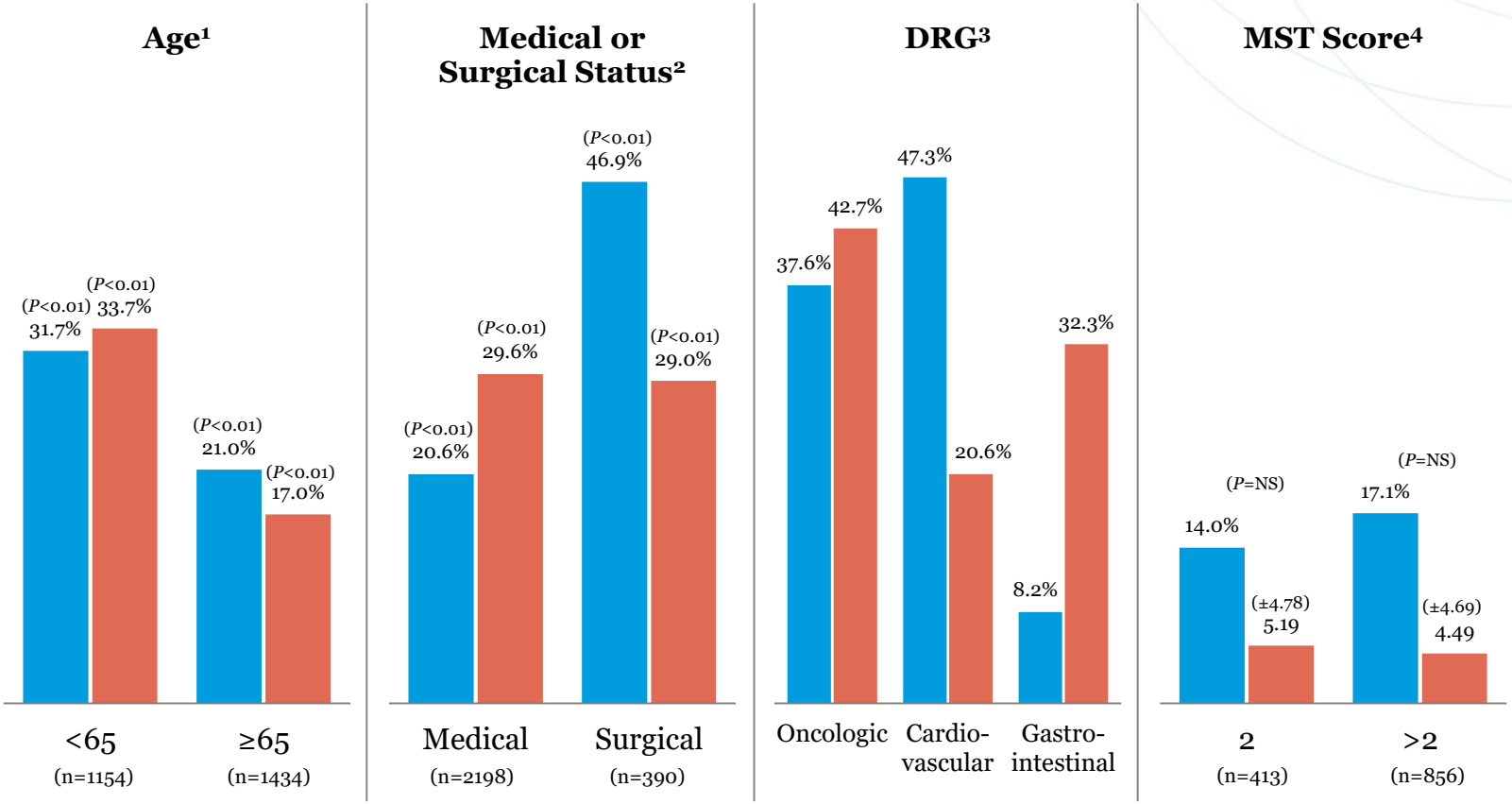
QUESTIONS AND ANSWERS

BACK-UP AND ANCILLARY SLIDES

BASELINE CHARACTERISTICS

Characteristic	Comparison Group N = 1319	QIP Group N = 1269	P Value
Male, No. (%)	622 (47.2)	552 (43.5)	.062
Age, mean (± SD), years	63.1 (17.4)	66.6 (17.2)	<.001
Race, No. (%)			<.001
Non-Hispanic White/Caucasian	865 (65.6)	893 (70.4)	
Non-Hispanic Black	185 (14.0)	277 (21.8)	
Hispanic	120 (9.1)	84 (6.6)	
Other/Unknown	149 (11.3)	15 (1.2)	
Medical	1217 (92.3)	981 (77.3)	
Surgical	102 (7.7)	288 (22.7)	

SUBPOPULATION ANALYSES SHOW *ALL* PATIENTS BENEFIT FROM NUTRITION INTERVENTION[1-4]



1. Reduction Due to ONS QIP Based on Age (RRR vs Pre-QIP).
2. Reduction Due to ONS QIP Based on Medical or Surgical Status (RRR vs Pre-QIP).
3. Reduction Due to ONS QIP Based on DRG (RRR vs Pre-QIP).
4. Differences in Readmission Rate and LOS Based on MST Score Were Non Significant (NS, $P > 0.05$)—All Patients Benefitted from Nutrition Intervention Irrespective of MST Score.

PRE-QIP VALIDATION COHORT READMISSION DATA

- To validate this readmission estimate and identify possible confounding issues, data were extracted **post hoc**
- A second QIP comparator cohort—patients who were admitted to the **4 hospitals a year prior to QIP** (October 13, 2013–April 2, 2014) were analyzed
- **1319 patients** included in the **validation cohort**
- Their 30-day readmission rate was 22.1%, thereby affirming the conservative use of 20% as the baseline readmission rate estimate
- For comparisons, pre-post QIP readmission differences were referenced to the baseline cohort and the validation cohort rates—20% and 22.1%, respectively

Jencks SF et al. *N Engl J Med*. 2009; 360(14):1418-1428.

PRE-QIP BASELINE & VALIDATION COHORT LOS DATA

- Average LOS for the **baseline cohort** was 6.3 (±6) days; investigators conservatively set the pre-QIP LOS at 6 (±6) days
- The average LOS for the **validation cohort** was 7.2 (±8) days
- Pre-post QIP LOS differences are, therefore, calculated by referencing the LOS of 6 and 7.2 days, respectively, for baseline and validation cohorts

SUMMARY OF RESULTS

Table 1. Readmission rates and LOS results by group pre-post QIP

	Readmission Rates		
	QIP Cohorts 16.1%	**QIPb 16.4%**	**QIPe 15.6%**
RRR from Baseline Cohort, 20%	19.5% (∂ = 3.9%)	18% (∂ = 3.6%)	22% (∂ = 4.4%)
P Value	.001	.01	.01
RRR from Validation Cohort, 22.1%	27.1% (∂ = 6.0%)	25.8% (∂ = 5.7%)	29.4% (∂ = 6.5%)
P Value	<.001	.001	.002
	Length of Stay		
	QIP Cohorts 5.4 ± 4.7 d	**QIPb 5.4 ± 4.8 d**	**QIPe 5.3 ± 4.5 d**
RRR from Baseline Cohort, 6.0 ± 6 d	10.0% (∂ = .63 d)	10.0% (∂ = .63 d)	11.7% (∂ = .73 d)
P Value	.001	.008	.011
RRR from Validation Cohort, 7.2 ± 8 d	25% (∂ = 1.8 d)	25% (∂ = 1.8 d)	26.4% (∂ = 1.9 d)
P Value	<.001	<.001	<.001

Abbreviations: d, day; ∂, delta (difference); NA, not applicable; SD, standard deviation.

SUB-ANALYSIS: AGE

- 1434 (55.4%) patients were aged ≥65 and 1154 (44.6%) were <65 years
- Pre-QIP readmission rates were 20% and 24% for the aged ≥65 and <65 years subgroups, respectively, while LOS were 6.5 days and 8.0 days
- Post-QIP 30-day readmission rate in patients aged ≥ 65 years was 15.8%, showing an absolute rate reduction (ARR) of 4.2% as compared to pre-QIP (21% RRR; $P < 0.01$)
- 7.6% ARR (31.7% RRR, $P < 0.01$) was seen in patients aged <65 years
- The post-QIP hospital LOS in patients aged ≥ 65 years was 5.4 days, showing an absolute reduction of 1.1 days (17% RRR, $P< 0.01$)
- Absolute reduction of 2.7 days (33.7% RRR, $P < 0.01$) post-QIP was reported in patients aged <65 years old

SUB-ANALYSIS: MST

Compare the readmission rates and hospital LOS between patients with MST scores = 2 and >2 to determine differences regarding their risk for 30-day readmissions and prolonged hospitalizations.

Characteristic	**MST = 2 N = 413**		**MST > 2 N = 856**		***P* Value**
Readmission Rate, n (%)	58 (14.0)		146 (17.1)		0.171
LOS, mean (± SD)	5.19 (± 4.78)		4.49 (± 4.69)		0.277
Characteristic	<65 years N = 151	≥65 years N = 262	<65 years N = 366	≥65 years N = 490	*P* Value
Readmission Rate, n (%)	18 (11.9)	40 (15.3)	67 (18.3)	79 (16.1)	>0.05*
LOS, mean (± SD)	5.24 (± 5.89)	5.15 (± 4.02)	5.37 (± 4.88)	5.59 (± 4.54)	>0.05*