Fleming Symposium: Update on Quality and Patient Safety

September 12th, 2019

Matthew M. McCambridge, MD, MS, FACP, FCCP
Sr VP, Chief Quality and Patient Safety Officer
Agenda

- Two Parts
  - Part one
    - Trends in Quality and Patient Safety
      - Expensive, unsafe, highly variable
      - Prices, administrative burden, over utilization
      - Pathways, Dashboards, Feedback
  - Part two
    - Wellness
Lehigh Valley Health Network

- 2,005 Physicians
- 834 Advanced Practice Clinicians
- 4,208 Registered Nurses

- 17,000+ Employees
- 1,200+ volunteers
- Four Time Magnet
70 year old man with CAD and a known cardiomyopathy. His wife was being seen in the LVPG Muhlenberg Cardiology office on 8/2/19 and he was in the waiting room. The MA noticed he had aphasia, dysarthria, gaze deviation, left hemianopsia, left hemiplegia, left-sided sensory loss, and gait difficulty. He was emergently transferred to the LVH M ED. CTA showed right MCA M1 occlusion. TPA was given at 29 minutes. Cardio embolus was suspected and he was transferred to the LVH CC IR lab. Clot removed. CT Head the following day showed no stroke. Echo demonstrated intracardiac thrombus. NIHSS was 23 on arrival and 0 on discharge to home four days later.
81 year old man with HTN, CKD 3, CAD, OSA and hyperlipidemia. On 5/23/17 he underwent a cystoscopy which showed bladder cancer. On 11/13/17 he received a robotic-assisted laparoscopic cystectomy with ileal conduit formation. In January of 2019, he was found to have left hydronephrosis due to a mid urethra stricture. Nephrostomy tube needed to be placed by IR. On 4/19/19, renal scan showed high-grade obstruction of the left renal collecting system most likely due to obstruction at the level of the mid ureter – 79% function on the right and only 21% function on the left. After much discussion with Dr. Bacala, the patient underwent a single-port robotic nephrectomy on 8/2/19. He was discharged on 8/3/19. First single-port robotic nephrectomy in the region.
93 providers
30 Nurses
12 Tech Partners
20 RRT
17 Physicians
14 Therapist (PT, OT, Speech)

118 Blood products
48 PRBCs
6 FFP
29 Platelets
36 Cryoprecipitate
Overarching themes of the US Healthcare System

- Expensive
- Unsafe
- Highly Variable
Healthcare Spending as a Percentage of GDP, 2000–2016

Data Source: OECD
Analysis: Bay Area Council Economic Institute

Data Source: OECD, National Health Expenditure as Percentage of GDP, 2016
Medicare/Medicaid Trends

Chart 1.15: Medicare Enrollees, (1) 1995 – 2016


(1) Hospital insurance (Part A) enrollees and/or Supplementary Medical Insurance (Part B) enrollees, including enrollees with Medicare Advantage; includes all persons (aged and disabled).


- Other Title XIX
- Adults
- Children
- Blind/Disabled
- Aged
Health Spending Growth for 2017
-- Increased by 3.9% to $3.5 trillion
  -- a decline from 5.1% in 2014
  -- 5.8% in 2015
  -- 4.3% in 2016
-- Taken together, healthcare spending was 17.9% of GDP
  -- Hospital spending, 33% of total, $1.1 trillion
  -- Physician and Clinical Services, 20% of total, $694 billion
  -- Retail Prescription Drug spending, 10%, $333 billion, 0.4% growth
  -- Private Health Insurance spending, $1.2 trillion
  -- Medicare spending was $705 billion
  -- Federal Medicaid spending was $582 billion
Drivers of US Health Spending

- Prices
- Administrative Burden
- Utilization

Uwe E Reinhardt. Priced Out: The Economic and Ethical Cost of American Health Care
International Federation of Health Plans

2015 Comparative Price Report
Variation in Medical and Hospital Prices by Country

-- 80 members, 25 countries

-- Prices for US
   -- 370 million medical claims
   -- 170 million pharmacy claims
Source: International Federation of Health Plans, 2015 Comparative Price Report, Variation in Prices by Country
Hospital Prices Grew Substantially Faster Than Physician Prices For Hospital-Based Care In 2007–14

**Exhibit 2**
Inpatient and outpatient physician and facility prices, 2007–14

**Exhibit 4**
Changes in physician and facility prices for four hospital-based procedures and for total inpatient and outpatient care, 2007–14

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Physician price</th>
<th>Facility price</th>
<th>Total price</th>
<th>Facility component of total change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesarean section</td>
<td>5.9% 0.8%</td>
<td>41.9% 5.1%</td>
<td>27.8% 3.6%</td>
<td>91.7%</td>
</tr>
<tr>
<td>Vaginal delivery</td>
<td>7.1 1.0</td>
<td>46.8 5.6</td>
<td>29.4 3.8</td>
<td>89.4</td>
</tr>
<tr>
<td>Colonoscopy</td>
<td>34.1 4.3</td>
<td>41.7 5.1</td>
<td>39.6 4.9</td>
<td>76.9</td>
</tr>
<tr>
<td>Knee replacement</td>
<td>4.1 0.6</td>
<td>27.4 3.5</td>
<td>23.2 3.0</td>
<td>96.8</td>
</tr>
<tr>
<td>Inpatient</td>
<td>17.7 2.4</td>
<td>42.3 5.2</td>
<td>36.5 4.5</td>
<td>88.5</td>
</tr>
<tr>
<td>Outpatient</td>
<td>6.1 0.9</td>
<td>25.1 3.2</td>
<td>20.9 2.7</td>
<td>93.5</td>
</tr>
</tbody>
</table>
High Administrative Cost
- Private Insurers (marketing, appeals, M/L ratio, etc)
- Public Insurers (less but lots of regulatory creation)
- Hospitals (Duke – 1600 billing clerks)
- Physicians ($80.000/per physician/year interacting with insurers

Source: Bureau of Labor Statistics, NCHS
$765 billion of the $2.5 trillion spent on healthcare in 2009 was wasteful.
Mammography Machines/million people - 2018

USA 59.7/million

OECD Data
Figure 1. Annual Change in Imaging Rates per 1000 Person-Years by Imaging Modality, Age, and Country, Based on Joinpoint Analysis

**A.** All examinations

**B.** CT

**C.** MRI

**D.** Ultrasound

**E.** Nuclear medicine

JAMA | Original Investigation

Trends in Use of Medical Imaging in US Health Care Systems and in Ontario, Canada, 2000-2016
Medical error—the third leading cause of death in the US

Medical error is not included on death certificates or in rankings of cause of death. Martin Makary and Michael Daniel assess its contribution to mortality and call for better reporting.

Martin A Makary professor, Michael Daniel research fellow
Department of Surgery, Johns Hopkins University School of Medicine, Baltimore, MD 21287, USA


- Cancer: 585k
- Heart disease: 611k
- COPD: 142k
- Suicide: 41k
- Motor vehicles: 34k
- Firearms: 34k
- Other: 2,597k

Major cause of death: All causes

Based on our estimate, medical error is the third most common cause of death in the US.

However, we’re not even counting this, medical error is not recorded on US death certificates.

Data source: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf
Admissions/1,000 people/State

Graph 1. Inpatient Admissions per 1,000 Population by State

LVPG MHL IM
Antibiotic Stewardship Report
(antibiotic prescriptions written when indications were not appropriate)
Jul 2017 - May 2018

Small N

% of scripts written for providers who had ≥ 20 scripts

Prepared by Kerri Vincent
Analytics Portal – Care Pathways

CARE PATHWAYS TOPICS

SURGERY
- Bariatric
- CABG
- Hip Replacements
- Knee Replacements
- Hip Fractures
- Ileostomy
- ERAS
- Pressure Ulcer
- Sepsis
- Pediatric Trauma Imaging
- Transplant Donor
- Perioperative Anticoagulant
- ICHOUGH
- Small Bowel Obstruction

WOMEN'S HEALTH
- OB: Active Pregnancy Episodes
- OB: Inpatient - Deliveries & Births
- OB: Pre-Term Labor
- Pregnancy of Unknown Origin
- Perinatal Substance Abuse

ADULT INPATIENT MEDICINE
- PCI
- Pneumonia
- CHF
- ACS
- COPD
- Opioid Inpatient
- Stroke
- Clostridium Difficile
- Ventilator
- Enhanced Respiratory Monitoring
- GI Hemorrhage
- Cellulitis
- Blood Utilization Management

ADULT AMBULATORY MEDICINE
- Diabetes
- CHF Ambulatory
- Chronic Kidney Disease

PEDIATRICS
- Pediatric Septic
- Hyperbilirubinemia
- Pediatric Bronchiolitis
- Pediatric Asthma
- Childhood Obesity
- Pediatric Appendicitis
- Pediatric Diabetes Sick Day

RADILOGY
- Breast Cancer Screening
- Lung Cancer Screening

BEHAVIORAL HEALTH
- Depression Screening

EMERGENCY MEDICINE
- Atrial Fibrillation
- End Stage Renal Dialysis - Missed Dialysis Workflow
Pneumonia Clinical Pathway

Data by Enterprise Analytics
Updated on July 12, 2019

Total Encounters
1,421

Fiscal Year
All

Encounter Count by Month
Month is attributed to the discharge date.

- Jan: 173
- Feb: 160
- Mar: 78
- Apr: 96
- May: 67
- Jun: 46
- Jul: 54
- Aug: 45
- Sep: 45
- Oct: 55
- Nov: 58
- Dec: 76
- Jan: 125
- Feb: 65
- Mar: 66
- Apr: 88
- May: 30
- Jun: 37
- Jul: 7

Encounter Location
- LVH CEDAR CREST: 879
- LVH MUIHLENBERG: 542

DRG Code
- MS194 SIMPLE PNEUMONIA & PLEURISY W CC: 818
- MS193 SIMPLE PNEUMONIA & PLEURISY W MO: 430
- MS195 SIMPLE PNEUMONIA & PLEURISY WCC: 157
- MS177 RESPIRATORY INFECTIONS & INFAMML: 10
- MS178 RESPIRATORY INFECTIONS & INFAMML: 6

Discharge Provider
- MARSH, ADAM D: 46
- JOYCE, KEVIN F: 40
- SILVOTTI, LISA A: 38
- MAKWANA, VINOD D: 36
- STOUT, GREGORY M: 36
- GAHALA, JATINDER S: 24
- BROCKMYER, AIL M: 33

Discharge Department
- M 6T: 154
- CC 6K: 188
- CC 5K: 132
- CC 6AP: 118
- M 7T: 99
- M 5T: 70
- M 4T: 65

Admission Department
- M 6T: 215
- CC 6K: 202
- CC 5K: 155
- M 7T: 86
- M 5T: 91
- CC 787: 61

Admission Source
- ED: 1,358
- Hosp (Acute Care Facility): 25
- Non-Hospital Facility: 10
- Other Type of Health Care Facility: 13
- Physician or Clinic Office: 10
- Skille Nursing, Intermediate Care, etc.: 4

Discharge Disposition
- 01 Home or Self Care: 891
- 06 Home Health Care Svcs: 147
- 03 Skilled Nursing Facility: 255
- 20 Expired: 18
- 59 Hospice/Home: 17
- 51 Hospice/Medical Facility: 16

Payor Mix
- MEDICARE: 690
- CAPITAL BLUE CROSS MED: 114
- UNITED HEALTHCARE MED: 80
- CAPITAL BLUE CROSS: 65
- AETNA MEDICARE ADVANT: 51
- HIGHMARK BLUE SHIELD M: 52
- GATEWAY MEDICARE ASSU: 40

Patient County
- LEHIGH: 715
- NORTHAMPTON: 410
- BERKS: 104
- SCHUYLER: 41
- CARROLL: 27
- MONTGOMERY: 19
- MONROE: 12

Discharge Hour
A count of discharges by hour of the day.
### Pneumonia Population Summary - Value Based Reimbursement Analysis

#### Members with Episodes: 1,188
- Cost & Utilization: $47,104,212
  - Total Claims based Cost: $47,104,212
  - Dollars: $12,979,955
  - Age Band: 18 - 24: $8,609
  - 25 - 40: $634,265
  - 41 - 50: $1,729,795
  - 51 - 60: $6,283,034
  - 65 - 80: $10,427,916
  - 80+: $16,980,601

#### PMPM: 3,478
  - Admissions: 2,729
  - Readmissions: 1,180
  - ER Visits: 3,622

#### Risk
- N/A: $566,729
- Stable: $21,763
- Moderate: $160,144
- High: $2,160,180
- Very High: $44,165,395

#### Admissions (Admit & Dollars)
- Bacterial Pneumonia: 481 ($3,617K)
- Heart Failure: 219 ($2,054K)
- COPD or Asthma in Older Adults: 124 ($1,284K)
- Urinary Tract Infection: 56 ($283K)
- Dehydration: 28 ($187K)
- Diabetes Long-Term Complications: 20 ($212K)
- Hypertension: 18 ($165K)
- Uncontrolled Diabetes: 8 ($75K)
- Diabetes Short-Term Complications: 3 ($52K)

#### Other Demographics (Members & Dollars)
- PCP Continuity
  - PCP: 1,051 ($5.0M)
  - M: 559 ($2.4M)
  - Not Chronic: 0 ($1.8M)
  - Medium: 75 ($16.5M)
  - High Cost: 0 ($30.3M)

- Gender
  - Male: 629 ($22.7M)
  - Female: 2,160,180

- Chronic
  - Chronic: 1,163 ($45.8M)

- High Cost
  - High Cost: 0 ($30.3M)
Dr. A’s TKA Discharge Disposition and Cost
July 1, 2018-April 30, 2019

13% of patients dc’d home

43% of patients dc’d home
Inpatient Opioid Pathway Dashboard - Addiction Recovery Specialist Data

Owner: Paige Roth
Data comes from patients seen and evaluated by the LVHN Addiction Recovery Specialist

### Hospital Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Encounter Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lehigh Valley Hospital - C..</td>
<td>183</td>
</tr>
<tr>
<td>Lehigh Valley Hospital - M..</td>
<td>57</td>
</tr>
<tr>
<td>Lehigh Valley Hospital - 1..</td>
<td>4</td>
</tr>
<tr>
<td>Lehigh Valley Hospital - Sc..</td>
<td>0</td>
</tr>
</tbody>
</table>

### Hospital Unit

<table>
<thead>
<tr>
<th>Unit</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Floor</td>
<td>159</td>
</tr>
<tr>
<td>ED</td>
<td>61</td>
</tr>
<tr>
<td>ICU/Telemetry Unit</td>
<td>11</td>
</tr>
<tr>
<td>Mother Baby Unit</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
</tr>
</tbody>
</table>

### Primary Drug of Choice

<table>
<thead>
<tr>
<th>Drug</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Heroin/Acetaminophen</td>
<td>40.16%</td>
</tr>
<tr>
<td>Drug Alcohol</td>
<td>7.79%</td>
</tr>
<tr>
<td>Drug Opiates</td>
<td>1.64%</td>
</tr>
<tr>
<td>Drug Methadone</td>
<td>1.22%</td>
</tr>
<tr>
<td>Drug benzodiazepines</td>
<td>0.82%</td>
</tr>
<tr>
<td>Drug Cocaine</td>
<td>0.82%</td>
</tr>
<tr>
<td>Drug Fantasy</td>
<td>0.82%</td>
</tr>
<tr>
<td>Drug Marijuana</td>
<td>0.82%</td>
</tr>
<tr>
<td>Drug Methadone</td>
<td>0.82%</td>
</tr>
<tr>
<td>Drug Suboxone</td>
<td>0.82%</td>
</tr>
<tr>
<td>Other</td>
<td>0.82%</td>
</tr>
<tr>
<td>Drug k2</td>
<td>0.41%</td>
</tr>
<tr>
<td>Drug LSD</td>
<td>0.41%</td>
</tr>
<tr>
<td>Drug PCP</td>
<td>0.41%</td>
</tr>
<tr>
<td>Drug Amphetamin</td>
<td>0.41%</td>
</tr>
</tbody>
</table>

### Referral Source

<table>
<thead>
<tr>
<th>Source</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psych Consultation Unit</td>
<td>35.00%</td>
</tr>
<tr>
<td>Toxology</td>
<td>22.52%</td>
</tr>
<tr>
<td>ED Provider</td>
<td>20.49%</td>
</tr>
<tr>
<td>Hospital Medicine</td>
<td>16.39%</td>
</tr>
<tr>
<td>Case Manager</td>
<td>3.69%</td>
</tr>
<tr>
<td>OB/GYN</td>
<td>3.28%</td>
</tr>
<tr>
<td>Family Medicine Service</td>
<td>2.06%</td>
</tr>
<tr>
<td>COB</td>
<td>1.23%</td>
</tr>
<tr>
<td>Tandem Medical</td>
<td>0.23%</td>
</tr>
<tr>
<td>Cancer of Excellence</td>
<td>0.41%</td>
</tr>
<tr>
<td>Colleague</td>
<td>0.41%</td>
</tr>
<tr>
<td>ED</td>
<td>0.41%</td>
</tr>
<tr>
<td>Family Medicine Resident</td>
<td>0.41%</td>
</tr>
</tbody>
</table>

### MAT Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Null</td>
<td>55.56%</td>
</tr>
<tr>
<td>Suboxone/Naltrexone</td>
<td>32.38%</td>
</tr>
<tr>
<td>Naltrexone</td>
<td>18.64%</td>
</tr>
<tr>
<td>Other</td>
<td>1.23%</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>0.41%</td>
</tr>
</tbody>
</table>

### ARS Disposition

<table>
<thead>
<tr>
<th>Disposition</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral to OP assessment</td>
<td>53.64%</td>
</tr>
<tr>
<td>Refused Services/AMA</td>
<td>4.82%</td>
</tr>
<tr>
<td>Direct to inpatient treatment</td>
<td>11.35%</td>
</tr>
<tr>
<td>Discharged Home</td>
<td>5.76%</td>
</tr>
<tr>
<td>Home with referral to inpatient</td>
<td>5.08%</td>
</tr>
<tr>
<td>Transfer to Psych/Dual tr.</td>
<td>4.82%</td>
</tr>
<tr>
<td>Other</td>
<td>2.68%</td>
</tr>
</tbody>
</table>

### Payor Type

- Private Insurance: 82.97%
- Medicaid: 14.76%
- Medicare: 3.26%
- No Insurance: 3.99%

### Patient Zip Code

[Map showing zip code distribution]
Unused Opioids after Joint Replacement

Mean oxycontin prescribed = 52
Mean pills taken = 22

Data collected from 51 patients between 2/19 and 6/19. That data was extrapolated out to FY19 based on FY19 case load and % of pills remaining from the study.
Current State

Oxycodone Metrics

Tramadol Metrics

MEDD

Quantity

Days Supply

Wellness/Burnout
54% of physicians burned out - 2014
"If burnout was reduced by 30% a total of 6,239 fewer infections would be prevented in Pennsylvania hospitals, leading to a estimated cost savings of up to $68 million."
Burnout Rates at LVHN

Percentage of LVHN Attendings Experiencing Burnout

Not "Burned Out" 42%
"Burned Out" (high EE or DP) 58%
Domains of Burnout by Gender

Degree of Emotional Exhaustion by Gender

- Male: High 53%, Moderate 22%, Low 25%
- Female: High 58%, Moderate 23%, Low 19%

Degree of Depersonalization by Gender

- Male: High 27%, Moderate 26%, Low 33%
- Female: High 27%, Moderate 33%, Low 47%

Degree of Loss of Personal Accomplishment by Gender

- Male: High 13%, Moderate 22%, Low 65%
- Female: High 17%, Moderate 24%, Low 59%

*Low loss of PA is equivalent to lower degree of burnout
MBI Question Response – “I Feel Like I am at the End of My Rope”

Percent of Responses to MBI #20
"I Feel Like I’m at the End of My Rope"

- 37% of respondents indicated they felt like they were at the end of their rope, never or rarely (167 responses).
- 19% reported feeling like they were at the end of their rope once a month or less (83 responses).
- 12% indicated they felt this way once a month (52 responses).
- 12% stated they felt this way occasionally (52 responses).
- 7% reported feeling this way once a week (31 responses).
- 9% indicated they felt this way a few times a week (41 responses).
- 5% of respondents felt this way every day (22 responses).
Avedis Donabedian, MD, MPH

Healthcare is a sacred mission...a morale enterprise and a Scientific enterprise but not fundamentally a commercial one. We are not selling a product. We don’t have a Consumer who understands everything and makes rational Choices – and I include myself here. Doctors and nurses are Stewards of something precious...Ultimately the secret Quality is love...If you have love, you can then work Backward to monitor and improve the system.

-- Born in Beirut of Armenian decent  
-- the father of American healthcare quality assurance  
-- He escaped Armenian genocide  
-- Palestine  
-- America  
  -- Harvard  
  -- New York Medical College  
  -- University of Michigan
There is Nothing More Beautiful Than When You Prove to Yourself Just How Strong you Are....
QUALITY  Patient Safety  #1 Infection Prevention  Regulatory Excellence