Quality and Value in COPD Management

Michael Ezzie, MD

January 28th, 2015
Outline

• To explain the value equation in healthcare
• To understand opportunities for value in COPD
• To review quality metrics in COPD and apply them to COPD management
Patient Perspective on Value

• A 63 year old self-employed plumber goes to urgent care for a “chest infection”. He has a productive cough, green sputum and increased breathlessness.
• He was diagnosed with COPD 6 years ago and uses an inhaler as needed.
• He has 2-3 episodes a year of increased symptoms and misses 10 days of work each time.
• He was advised to stop smoking but relapsed after two weeks.
• He checks in with his PCP yearly for his flu vaccine.
Key questions?

• Will review the historic perspective on quality in medicine
• Will introduce the value equation
• Relate the value equation to the COPD patient
• Examine opportunities to reduce waste, enhance the patient experience, provide the right care and improve overall quality in COPD.
• Review current quality metrics and future state
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Table 1. Percentage Change in U.S. Age-Adjusted Death Rates for Major Chronic Diseases, 1963–2005

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>Percent Change 1963–2005</th>
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<tbody>
<tr>
<td>Coronary heart disease</td>
<td>-70%</td>
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<tr>
<td>Stroke</td>
<td>-73%</td>
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<tr>
<td>Other cardiovascular diseases</td>
<td>-43%</td>
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<tr>
<td>COPD and allied conditions</td>
<td>+162%</td>
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Quality Improvement

• QI consists of systematic, continuous actions leading to measurable improvement in healthcare services & health status of targeted patient groups.

• QI processes address reliability gaps & improve quality/safety of the healthcare system using effective tools supported by rigorous science.
QI Improves Outcomes and Reduces Errors

• If can’t measure, don’t know much about it.

• If don’t know much about it, can’t control it.

• If can’t control it, we are at mercy of chance.

Start by decreasing variability & increasing reliability.
History of Quality in Medicine

• Origins of quality improvement in medicine noted in mid 1800’s by Ignaz Semmelweis
  – 1/6 women in one OB ward in Vienna died following childbirth
  – 1/14 in another ward
  – Developed an intervention to decrease rate to less than 1/33
44,000-98,000 Americans die annually due to preventable medical errors c.1999
Are medical errors the third leading cause of death?

Sunday, September 29, 2013 - Steps to Authentic Happiness via Positive Psychology by Paul Mountjoy

WASHINGTON, September 29, 2013 — Estimates of the number of Americans who die due to medical errors are between 400,000 and 425,000 annually, according to the Journal of Patient Safety.

Statistically, this suggests that medical errors are the third largest cause of death in the United States, behind cancer and heart disease.
Expectations for Quality and Value

• Joint Commission
• Expectations for data-driven hospital management
• Operations analysis
• Hospital Compare
Cost of COPD

- 12.7 million US adults estimated to have COPD in 2011
- 24 million US adults have evidence of abnormal lung function
- 2009, COPD caused 8 million office visits, 1.5 million ED visits, 715,000 hospitalizations and 133,965 deaths in the US
- 2010, costs estimates around 50 billion dollars
## Hospital Readmission Reduction Program

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<td>July 1, 2009 to June 30, 2012</td>
<td>July 1, 2010 to June 30, 2013</td>
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Transition to Value

• Rising healthcare costs
• Few data suggest ROI for US health expenditures
• Variation in value within US
• Perception that healthcare is not doing this themselves
• You will have ongoing involvement in improving healthcare quality and safety, regardless of your practice.
VALUE = Q/C

Q = Quality
C = Cost
VALUE = Q/C

VALUE = [A * (Q + S)] / W

Q = Quality
C = Cost
A = Appropriateness
S = Satisfaction
W = Waste
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Patient Perspective on Value

• A 63 year old self-employed plumber goes to urgent care for a “chest infection”. He has a productive cough, green sputum and increased breathlessness.
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• He was advised to stop smoking but relapsed after two weeks.
• He checks in with his PCP yearly for his flu vaccine.
VALUE = Q/C

\[
VALUE = \frac{A \times (Q + S)}{W}
\]

Q = Quality  \quad A = \text{Appropriatenessness}
C = \text{Cost}  \quad S = \text{Satisfaction}
W = \text{Waste}
Appropriate Care - COPD

• Access to care
• The right diagnosis
• GOLD guidelines
• Lung Transplant
• LVRS
• Pulmonary rehabilitation
Making the diagnosis

**COPD Population Screener™ (COPD-PS)**

This survey asks questions about you, your breathing, and what you are able to do. To complete the survey, mark an X in the box that best describes your answer for each question below.

### 1. During the past 4 weeks, how much of the time did you feel short of breath?
- None of the time: 0
- A little of the time: 1
- Some of the time: 2
- Most of the time: 3
- All of the time: 4

### 2. Do you ever cough up any “stuff,” such as mucus or phlegm?
- No, never: 0
- Only with occasional colds or chest infections: 1
- Yes, a few days a month: 2
- Yes, most days a week: 3
- Yes, every day: 4

### 3. Please select the answer that best describes you in the past 12 months. I do less than I used to because of my breathing problems.
- Strongly disagree: 0
- Disagree: 1
- Unsure: 2
- Agree: 3
- Strongly agree: 4

### 4. Have you smoked at least 100 cigarettes in your ENTIRE LIFE?
- No: 0
- Yes: 1
- Don’t know: 2

### 5. How old are you?
- Age 35 to 49: 0
- Age 50 to 59: 1
- Age 60 to 69: 2
- Age 70+: 3

**How to score the survey:** In the spaces below, write the number that is next to your answer for each of the questions. Add the numbers to get the total score. The total score can range from 0 to 10.

#1 + #2 + #3 + #4 + #5 = TOTAL SCORE

If your total score is 5 or more, your breathing problems may be caused by chronic obstructive pulmonary disease (COPD). COPD is often referred to as chronic bronchitis and/or emphysema and is a serious lung disease that slowly gets worse over time. While COPD cannot be cured, it is treatable.
Updated GOLD Guidelines

• GOLD launched in 1997 in collaboration with the NHLBI, NIH and the World Health Organization.

• Updated December 2015 at www.goldcopd.org

• Assessment of COPD based on:
  – Symptoms
  – Severity of spirometric abnormality
  – Future risk of exacerbations
  – Identification of co-morbidities
GOLD Classification

- **GOLD Grade**
  - 1
  - 2
  - 3
  - 4

- **Airflow Limitation**

- **Exacerbations Per year**
  - 0
  - 1
  - ≥2

- **Symptoms**
  - mMRC<2
  - mMRC≥2

- **Risk Levels**
  - **A**: Low Risk, Less Symptoms
  - **B**: Low Risk, More Symptoms
  - **C**: High Risk, Less Symptoms
  - **D**: High Risk, More Symptoms
Why new classification strategy?

• Previous system does not reflect totality of disease burden
  – FEV$_1$ predicts mortality but does not correlate with overall health status
  – Patients with more symptoms have higher mortality
    – (Group B higher mortality than Group C*)

EXACERBATIONS

- Impact on quality of life
- Impact on symptoms
- Increased economic costs
- Accelerated lung function decline
- Increased Mortality
Patient Classification

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GOLD Classification

- **GOLD Grade**
  - 1: Low Risk, Less Symptoms
  - 2: Low Risk, More Symptoms
  - 3: High Risk, Less Symptoms
  - 4: High Risk, More Symptoms

- **Airflow Limitation**
  - mMRC < 2: Less Symptoms
  - mMRC ≥ 2: More Symptoms

- **Exacerbations Per year**
  - 0: Low Risk
  - 1: Low Risk
  - ≥2: High Risk
Quality Care - COPD

• Diagnosis with spirometry
  – Severity contributes to readmissions

• Prescribe the right inhaler
  – Poor adherence to guidelines

• Teaching about inhaler use
  – Social issues

• Vaccinations
General approach to all patients with COPD

**ALL PATIENTS**
- Smoking cessation advice
- Patient education / self management
- Assess co-morbidity
- BMI: Dietary advice if >25, specialist dietary referral if <20
- Exercise promotion
- Pneumococcal vaccination
- Annual influenza vaccination

**SYMPTOMS?**
- Breathlessness
  - Short-acting bronchodilators (β-agonist/anticholinergic) for relief of symptoms
- Persistent symptoms
  - See pharmacotherapy algorithm (page 13)
- Productive cough
  - Consider mucolytics

**FUNCTIONAL LIMITATION?**
- MRC score ≥3
  - Optimise pharmacotherapy
    - See pharmacotherapy algorithm (page 13)
  - Offer pulmonary rehabilitation

**EXACERBATIONS**
- (Oral steroids/ antibiotics/ hospital admissions)
  - Optimise pharmacotherapy
  - Discuss action plans including use of standby oral steroids and antibiotics

**HYPOXIA?**
- Oxygen saturation <92% at rest in air
  - FEV₁ <30% predicted
  - Refer for oxygen assessment

**HOLISTIC CARE**
- Check social support (e.g. carers and benefits)
  - Treat co-morbidities
  - Consider palliative therapy or secondary care referral for resistant symptoms
  - Refer to specialist palliative care teams for end-of-life care
Figure 12. Beta-blocker treatment after a heart attack, 1996–2005.49

Adapted from Lee, Thomas H.49
Value-Based Design for COPD

- Periodic spirometry to gauge severity of illness
Goals of outpatient COPD care

Overall COPD control

Improving

Current control

- Symptom Improvement
- Improvement in health status

Reducing

Future risk

- Reduction in mortality
- Reduction in exacerbations

Defined by

- Improvement in co-morbidities
- Activity improvement

- Reduction in disease progression
- Reduction in treatment adverse effects

Gruffydd-Jones, K. GOLD guidelines 2011: what are the implications for primary care? Prim Care Respir J 2012; 21
Executive Summary
Prevention of Acute Exacerbation of COPD: American College of Chest Physicians and Canadian Thoracic Society Guideline

CHEST 2015; 147(4):883-893

**PICO 1:** Do Nonpharmacologic Treatments and Vaccinations Prevent/Decrease Acute Exacerbations of COPD?

**PICO 2:** Does Maintenance Inhaled Therapy Prevent/Decrease Acute Exacerbations of COPD?

**PICO 3:** In Patients Aged >40 Years Who Are Previous or Current Smokers With COPD, Does Oral Therapy Prevent/Decrease Acute Exacerbations of COPD?
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Patient with COPD
(greater than 40 years of age, previous or current smoker, post bronchodilator FEV<sub>1</sub>/FVC <0.70)

At risk for acute exacerbation of COPD (AECOPD)
e.g., acute event that requires antibiotic and/or systemic corticosteroids
(moderate: at home, doctor’s office or ER; severe: in hospital)

PICO 1: Non-pharmacological therapies
Recommended
- Annual influenza vaccine
- Pulmonary rehabilitation (AECOPD ≤4 wks)
- SM education and case management with monthly follow-up

Suggested
- Pneumococcal vaccine
- Smoking cessation
- SM education and action plan and case management

Not suggested
- Pulmonary rehabilitation (AECOPD >4 wks)
- Education or case management alone
- SM education with action plan but without case management
- Telemonitoring

PICO 2: Pharmacological inhaled therapies
Recommended
- LABA vs. placebo
- LAMA vs. placebo, LABA or SAMA
- LABA and LAMA vs. placebo
- ICS (with LABA) vs. placebo, LABA or ICS alone

Suggested
- SAMA + SABA vs. SABA
- SAMA + LABA vs. LABA
- SAMA vs. SABA
- LAMA vs. SAMA
- LAMA/ICS/LABA vs. placebo

PICO 3: Pharmacological oral therapies
Suggested
- Long-term macrolides
- N-acetylcysteine
- Carbocysteine
- Systemic corticosteroids to prevent AECOPD in the 30 days after initial event
- PDE4 inhibitors
- Theophyllines

Not recommended
- Systemic corticosteroids in the first 6 months following the initial AECOPD
- Statins
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Why should I send a patient to Pulmonary Rehab?

• NNT for pulmonary rehab for clinically significant improvement = 3

• Focus on outcomes in COPD
  • Smoking cessation
  • Relieve symptoms
  • Prevent progression
  • Improve exercise tolerance
  • Prevent complications including exacerbations
  • Reduce mortality
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CHEST 2015; 147(4):883-893
Value-Based Design for COPD

- Proper management of exacerbations

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<th>Year</th>
<th>Commercial HMO</th>
<th>Commercial PPO</th>
<th>Medicaid HMO</th>
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Short-term vs Conventional Glucocorticoid Therapy in Acute Exacerbations of Chronic Obstructive Pulmonary Disease
The REDUCE Randomized Clinical Trial
Satisfaction- COPD

• Symptom measurement

• Compliance
  – Referral to smoking cessation
  – Referral to rehabilitation
  – Instruction on appropriate use of inhalers
  – A written personalized action plan including at least one maintenance COPD medication
  – A phone call within 48 hours of discharge
  – A VNS home visit
  – A visit with health care provider within 2 weeks of discharge
New concepts in COPD care

Treatment of comorbidities

May improve COPD control and reduce future risk

Compliance- COPD

Clinical and economic impact of non-adherence in COPD: A systematic review

Job F.M. van Boven a,*, Niels H. Chavannes b, Thys van der Molen c,d, Maureen P.M.H. Rutten-van Mölken e, Maarten J. Postma a, Stefan Vegter a

Respiratory Medicine (2014) 108, 103–113
Patient Perspective on Value

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- He was advised to stop smoking but relapsed after two weeks.
- He checks in with his PCP yearly for his flu vaccine.
Waste - COPD

• Missed opportunities for treatment
• Inhaler use
• Oxygen
• Referrals for care
Figure 9. Health care utilization for patients with COPD vs. controls (40 to 63 years of age).\textsuperscript{47}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure9}
\caption{Health care utilization for patients with COPD vs. controls (40 to 63 years of age).}
\end{figure}

\textit{p} < .0001 for all comparisons.
Value-Based Design for COPD

• Reduce barriers to high-value treatment
• Discourage low-value treatments
Telehealth for chronic disease £52,000/QALY*

Triple therapy £7,000–£187,000/QALY

LABA £8,000/QALY

Tiotropium £7,000/QALY

Pulmonary rehabilitation £2,000–8,000/QALY

Stop smoking support with pharmacotherapy £2,000/QALY

Flu vaccination £1,000/QALY in ‘at risk’ population

*(not specific to COPD)*
Value-Based Design for COPD

- Periodic spirometry to gauge severity of illness
- Smoking cessation
- Proper medication prescription and adherence
- Influenza and pneumococcal vaccination
- Appropriate oxygen therapy
- Appropriate pulmonary rehabilitation
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QI Improves Outcomes and Reduces Errors

• If can’t measure, don’t know much about it.

• If don’t know much about it, can’t control it.

• If can’t control it, we are at mercy of chance.

Start by decreasing variability & increasing reliability.
How do we make quality better?
-- Stages of Personal Accountability

• Stage 1. “The data are wrong”
• Stage 2. “The data are right, but it’s not a problem”
• Stage 3. “The data are right; it is a problem; but it is not my problem.”
• Stage 4. “I accept the burden of improvement”
Quality Measures

- Spirometry to confirm the diagnosis
- Bronchodilator prescription
- Evaluation of exacerbations
- Treatment of exacerbations
- Oxygen assessment
- Referral for pulmonary rehabilitation
- Influenza and pneumococcal vaccination
- Smoking cessation counseling
- Readmissions
**ACT**
Plan the next cycle
Decide whether the change can be implemented

**PLAN**
Define the objective, questions and predictions. Plan to answer the questions (who? what? where? when?)
Plan data collection to answer the questions

**STUDY**
Complete the analysis of the data
Compare data to predictions
Summarise what was learned

**DO**
Carry out the plan
Collect the data
Begin analysis of the data
• Date of last PFT ***
• FEV1/FVC = ***
• FEV1 = ***%
• Smoking = ***
• Dyspnea = *** (mMRC 1-4)
• Exacerbations in last 12 months = ***
• Nutrition = ***
• Mood = ***
• Long-acting inhaler = ***
• Short-acting inhaler = ***
• Influenza vaccine = ***
• Pneumococcal vaccine = ***
• Pulmonary Rehab participation = ***
“At one point, the pulmonologist tried to put a mask over [Steve Jobs] face when he was deeply sedated. Jobs ripped it off and mumbled that he hated the design and refused to wear it. Though barely able to speak, he ordered them to bring five different options for the mask and he would pick a design he liked... He also hated the oxygen monitor they put on his fingers. He told them it was ugly and too complex.”

- New Yorker, Nov 14th
BELIEVE IN WE™ OhioHealth

A FAITH-BASED, NOT-FOR-PROFIT HEALTHCARE SYSTEM + RIVERSIDE METHODIST HOSPITAL + GRANT MEDICAL CENTER
DOCTORS HOSPITAL + GRADY MEMORIAL HOSPITAL + DUBLIN METHODIST HOSPITAL + DOCTORS HOSPITAL – NELSONVILLE
HARDIN MEMORIAL HOSPITAL + MARION GENERAL HOSPITAL + HOMEREACH + OHIOHEALTH NEIGHBORHOOD CARE
WESTERVILLE MEDICAL CAMPUS + 21,000 PHYSICIANS, ASSOCIATES & VOLUNTEERS