AI vs COPD: The Fight for Patient Health

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Conflict of Interest

Paul F. Simonelli, MD, Ph.D
Has no real or apparent conflicts of interest to report.
Conflict of Interest

John Showalter, MD, MSIS
Salary: Jvion, Inc.
Royalty: Mastering Physician Engagement: A Practical Guide to Achieving Share Outcomes (Author)
Agenda

• Understanding the Challenges of Chronic Obstructive Pulmonary Disease (COPD)
• Defining an Artificial Intelligence (AI) Approach to COPD
• Overcoming Challenges to AI Adoption
• Applying AI to Drive Chronic Condition Management
• Q&A
Learning Objectives

• Differentiate between cognitive machine-driven AI and machine learning/predictive analytic models

• Identify the shortcomings of predictive analytic methods in reducing risk for COPD patients

• List the critical activities required to drive physician adoption of AI solutions

• Explain how AI can be applied to support chronic condition management—specifically for COPD patients and more broadly
Understanding the Challenges of COPD

AI vs COPD: The Fight for Patient Health
A Quick Overview of COPD

COPD impacts **30,000,000** people in the US

It is the **3rd** leading cause of death

COPD patients account for the highest rate of **avoidable inpatient stays** and the second highest rate of preventable ED visits

Understanding AECOPD

Acute exacerbations of COPD (AECOPD) are a leading cause of COPD patient deterioration

1. AECOPD-related costs are estimated to be around $4069/year per patient
2. Approximately 50% of AECOPD episodes are not reported by patients
3. AECOPD drives 2.4% of acute hospitalizations
4. Acute exacerbations have an overall mortality rate of 11.6%, which increases up to 37% in patients with repeat admissions
Defining an AI Approach to COPD

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The Persistent Problem with Predictive Analytics

Predictive solutions miss the patients who are at risk but fall outside of the narrow high-risk band.

Identifying and helping these patients drives business and quality impact.

Effective AI goes beyond the “known” at-risk individuals to more precisely and correctly identify at-risk patients across the population. This is especially important for an underreported diagnosis like AECOPD.
The Persistent Problem with Predictive Analytics

Predictive Analytics
- Static risk projections that stratify the easy to identify, known at-risk population
- Limited to a discrete set of use cases
- Most accurate at high-risk bands
- Assess risk in one dimension

Cognitive Machines
- Find the “hidden patients” missed by predictive analytics
- Deliver a complete view of the patient and population
- Focus on driving clinical impact
- Provide a longitudinal, multi-dimensional view of the patient that accounts for exogenous determinants of health

Known At-risk Population
73 year old male former smoker with a BMI of 19, multiple hospital admissions, history of intubation.

Impactable, At-risk Population
54 year old female current smoker with a BMI of 29, multiple acute clinic visits, confusion about when/how to use her inhalers, and financial concerns.
A Unique Approach to AI

Geisinger’s solution uses a complex mapping technique. Each individual is mapped into the cognitive machine. The machine can determine an individual’s proximity and trajectory toward or away from a clinically relevant cluster.

A patient’s trajectory is called a vector. With this information, Geisinger can determine:
- Who is at risk of an AECOPD episode within the next 30 days
- The clinical and non-clinical factors driving that risk
- And the most effective interventions to prevent an avoidable ER or inpatient stay
Overcoming Challenges to AI Adoption

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A Challenging Environment

Nearly half of primary care physicians (44%) say the primary value of their EHR is digital storage.

Almost ¾ of physicians report that EHR technologies contribute to burnout.

How Doctors Feel About Electronic Health Records
National Physician Poll by The Harris Poll: [http://med.stanford.edu/content/dam/sm/ehr/documents/EHR-Poll-Presentation.pdf](http://med.stanford.edu/content/dam/sm/ehr/documents/EHR-Poll-Presentation.pdf)
A Challenging Environment

Increased demands are driving an estimated **20%** of unmet clinical need.

Source: Accenture analysis. Graph is not to scale and is illustrative.
# Physician Engagement Maturity Model

<table>
<thead>
<tr>
<th>Data Driven</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>No data sharing</td>
<td>Data sharing</td>
<td>Information sharing</td>
<td>Knowledge sharing</td>
<td>Sharing actionable knowledge</td>
</tr>
<tr>
<td>Analytics</td>
<td>No analytics</td>
<td>Descriptive analytics – historic</td>
<td>Descriptive analytics – current</td>
<td>Predictive analytics</td>
<td>Prescriptive analytics</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>No communication</td>
<td>Intermittent communication</td>
<td>Routine communication</td>
<td>Active communication</td>
<td>Collaborative communication</td>
</tr>
<tr>
<td>Shared Outcomes</td>
<td>No shared outcomes</td>
<td>Shared vision of the problem</td>
<td>Shared vision of the problem and outcomes</td>
<td>Shared vision of the problem, outcome and indicators of success</td>
<td>Actively evaluating shared indicators of success</td>
</tr>
<tr>
<td>Metrics</td>
<td>No metrics</td>
<td>Reporting on non-shared metrics</td>
<td>Reporting shared metrics</td>
<td>Evaluating shared metrics – historic</td>
<td>Evaluating shared metrics – real time</td>
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## Physician Engagement Maturity Model—AECOPD

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</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td>No data sharing</td>
<td>Data sharing</td>
<td>Information sharing <em>(information about AECOPD)</em></td>
</tr>
<tr>
<td><strong>Analytics</strong></td>
<td>No analytics</td>
<td>Descriptive analytics – historic</td>
<td>Descriptive analytics – current <em>(descriptive analytics about current and historic AECOPD rates)</em></td>
</tr>
</tbody>
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<tr>
<td><strong>Communication</strong></td>
<td>No communication</td>
<td>Intermittent communication</td>
<td>Routine communication <em>(setting the stage for AI adoption)</em></td>
</tr>
<tr>
<td><strong>Shared Outcomes</strong></td>
<td>No shared outcomes</td>
<td>Shared vision of the problem <em>(COPD patients who have a preventable acute exacerbation)</em></td>
<td>Shared vision of the problem and outcomes <em>(driving prevention to avoid the acute exacerbation)</em></td>
</tr>
<tr>
<td><strong>Metrics</strong></td>
<td>No metrics</td>
<td>Reporting on non-shared metrics</td>
<td>Reporting shared metrics <em>(reporting on AECOPD instances)</em></td>
</tr>
</tbody>
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# Physician Engagement Maturity Model—AECOPD

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<tr>
<td>Knowledge</td>
<td>Knowledge sharing (<em>drivers for acute exacerbations</em>)</td>
<td>Sharing actionable knowledge (<em>Sharing most impactful process changes to lower rates of acute exacerbations</em>)</td>
</tr>
<tr>
<td>Analytics</td>
<td>Predictive analytics (<em>AECOPD predictions localized to the population</em>)</td>
<td>Prescriptive analytics (<em>AECOPD risk trajectories and patient-specific interventions</em>)</td>
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<tr>
<td>Communication</td>
<td>Active communication (<em>project and implementation related communications</em>)</td>
<td>Collaborative communication (<em>obi-directional dialogue on AECOPD interventions and outcomes</em>)</td>
</tr>
<tr>
<td>Shared Outcomes</td>
<td>Shared vision of the problem, outcome and indicators of success (<em>success is measured by lowered rates of AECOPD episodes</em>)</td>
<td>Actively evaluating shared indicators of success (<em>ongoing communication of program ROI – clinical and operational</em>)</td>
</tr>
<tr>
<td>Metrics</td>
<td>Evaluating shared metrics – historic (<em>quarterly review of ongoing metrics</em>)</td>
<td>Evaluating shared metrics – real time (<em>availability of real-time metrics</em>)</td>
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Applying AI to Drive Chronic Condition Management

AI vs COPD: The Fight for Patient Health
Geisinger’s Results

Identification of COPD patients who are at a 30x increased risk

50% reduction in avoidable admissions for COPD patients
Key Considerations for AI Success

• How to prove the value and potential impact of the solution on patients
• How to prove the value and potential impact of the solution on the organization
• If there are any clinical workflow adjustments needed to make the most out of an AI solution
• Who are the stakeholders best equipped to enable the realization of quick wins
• How to communicate the AI solution and successes
• How to leverage AI across the organization as a true asset
Other Areas of Potential AI Application

- Heart Failure
- Diabetes
- Asthma
- Bacterial Pneumonia
- UTIs
Questions

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Please remember to complete your session evaluation