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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

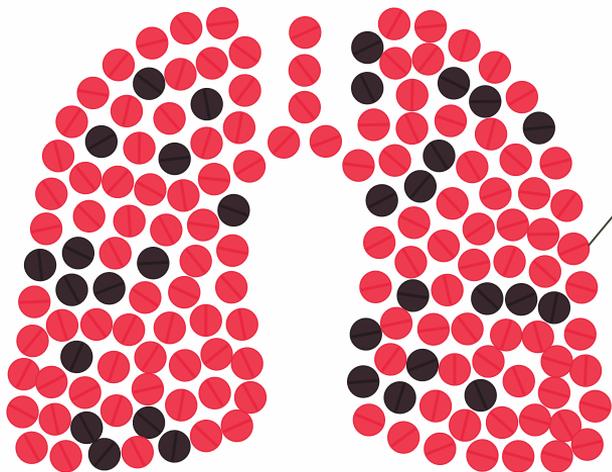


Understanding the Challenges of COPD

AI vs COPD: The Fight for Patient Health

A Quick Overview of COPD

COPD



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

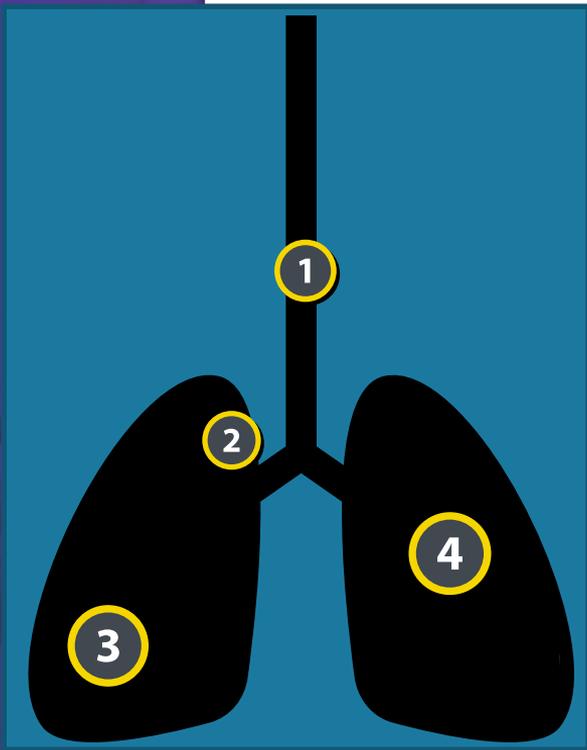
It is the **3rd** leading cause of death

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

- Fingar KR, Barrett ML, Elixhauser A, Stocks C, Steiner CA. Trends in Potentially Preventable Inpatient Hospital Admissions and Emergency Department Visits. HCUP Statistical Brief #195. November 2015. <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb195-Potentially-Preventable-Hospitalizations.jsp>.
- Khakban A, et al "The projected epidemic of COPD hospitalizations over the next 15 years: A population-based perspective" Am J Respir Crit Care Med 2016; Sept. 14: 10.1164/rccm.201606-1162PP.



Understanding AECOPD



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

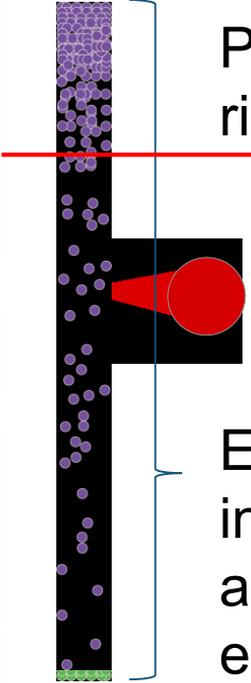
- 1** AECOPD-related costs are estimated to be around **\$4069/year** per patient
- 2** Approximately **50% of AECOPD episodes** are not reported by patients
- 3** AECOPD drives **2.4% of acute hospitalizations**
- 4** Acute exacerbations have an overall mortality rate of **11.6%**, which increases up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



Defining an AI Approach to COPD

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The Persistent Problem with Predictive Analytics



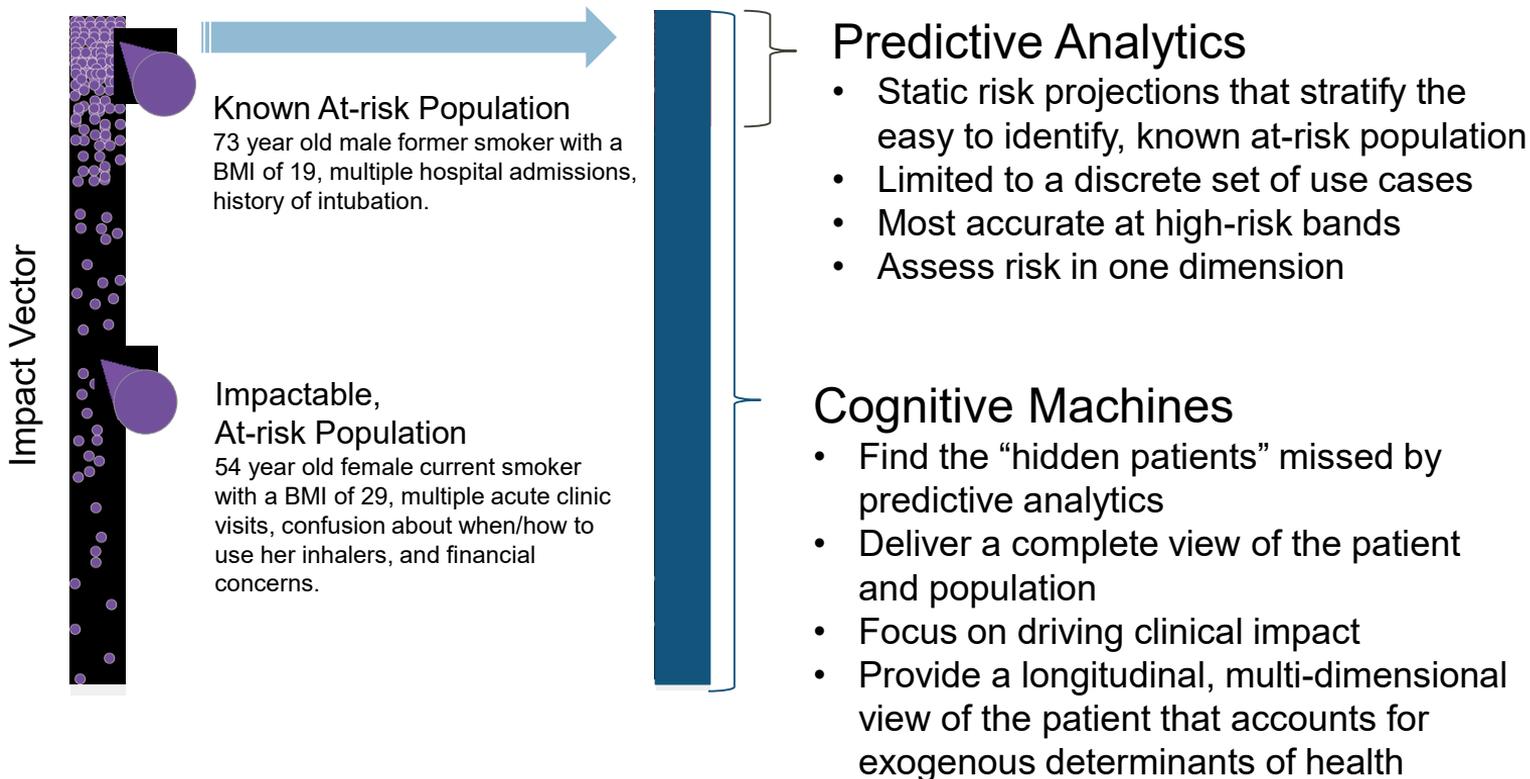
Predictive solutions miss the patients who are at risk but fall outside of the narrow high-risk band.

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

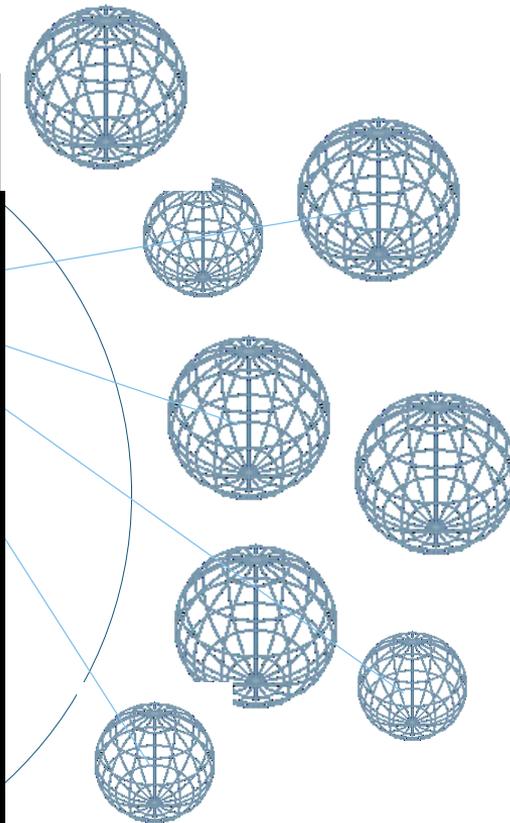
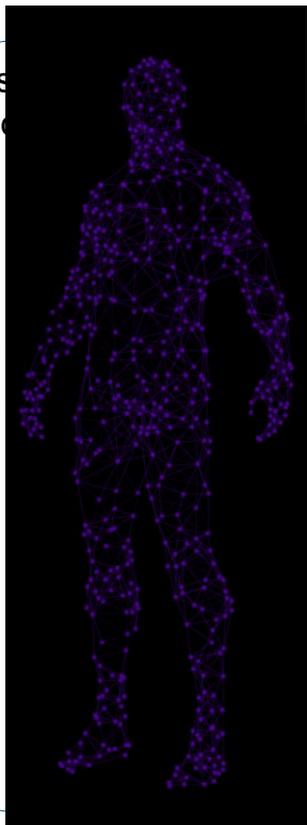


A Unique Approach to AI

Impact Vector

Geisinger's solution uses complex mapping techniques

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

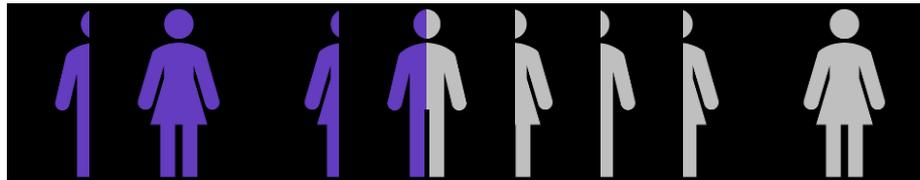


Overcoming Challenges to AI Adoption

AI vs COPD: The Fight for Patient Health

A Challenging Environment

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

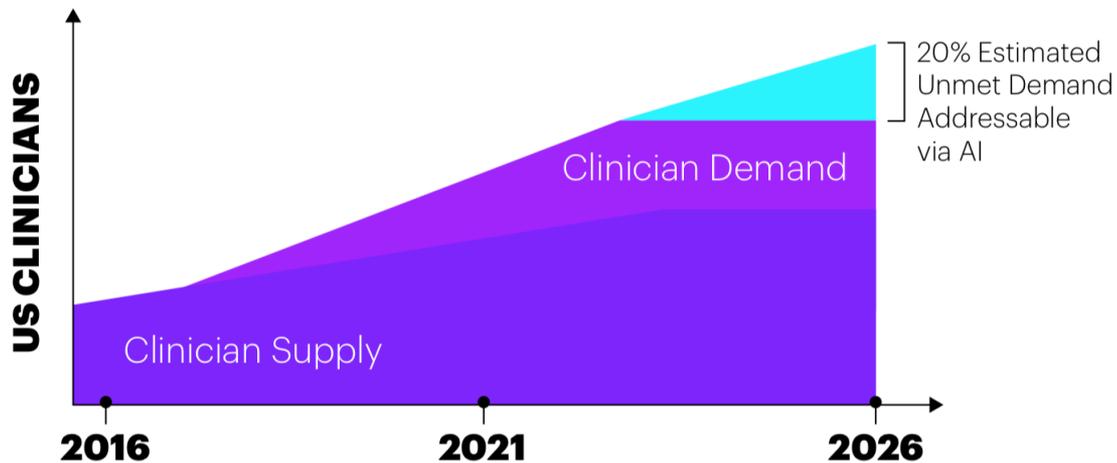


Almost $\frac{3}{4}$ of physicians report that EHR technologies contribute to burnout



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

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

Physician Engagement Maturity Model—AECOPD

| | | Stage 1 | Stage 2 | Stage 3 |
|-------------|------------------------|--------------------|---|--|
| Data Driven | <i>Knowledge</i> | No data sharing | Data sharing | Information sharing (<i>information about AECOPD</i>) |
| | <i>Analytics</i> | No analytics | Descriptive analytics – historic | Descriptive analytics – current (<i>descriptive analytics about current and historic AECOPD rates</i>) |
| Engagement | <i>Communication</i> | No communication | Intermittent communication | Routine communication (<i>setting the stage for AI adoption</i>) |
| | <i>Shared Outcomes</i> | No shared outcomes | Shared vision of the problem (<i>COPD patients who have a preventable acute exacerbation</i>) | Shared vision of the problem and outcomes (<i>driving prevention to avoid the acute exacerbation</i>) |
| | <i>Metrics</i> | No metrics | Reporting on non-shared metrics | Reporting shared metrics (<i>reporting on AECOPD instances</i>) |

Physician Engagement Maturity Model—AECOPD

| | | Stage 4 | Stage 5 |
|-------------|------------------------|--|---|
| Data Driven | Knowledge | Knowledge sharing (<i>drivers for acute exacerbations</i>) | Sharing actionable knowledge (<i>Sharing most impactful process changes to lower rates of acute exacerbations</i>) |
| | Analytics | Predictive analytics (<i>AECOPD predictions localized to the population</i>) | Prescriptive analytics (<i>AECOPD risk trajectories and patient-specific interventions</i>) |
| Engagement | Communi-cation | Active communication (<i>project and implementation related communications</i>) | Collaborative communication (<i>obi-directional dialogue on AECOPD interventions and outcomes</i>) |
| | Shared Outcomes | Shared vision of the problem, outcome and indicators of success (<i>success is measured by lowered rates of AECOPD episodes</i>) | Actively evaluating shared indicators of success (<i>ongoing communication of program ROI – clinical and operational</i>) |
| | Metrics | Evaluating shared metrics – historic (<i>quarterly review of ongoing metrics</i>) | Evaluating shared metrics – real time (<i>availability of real-time metrics</i>) |

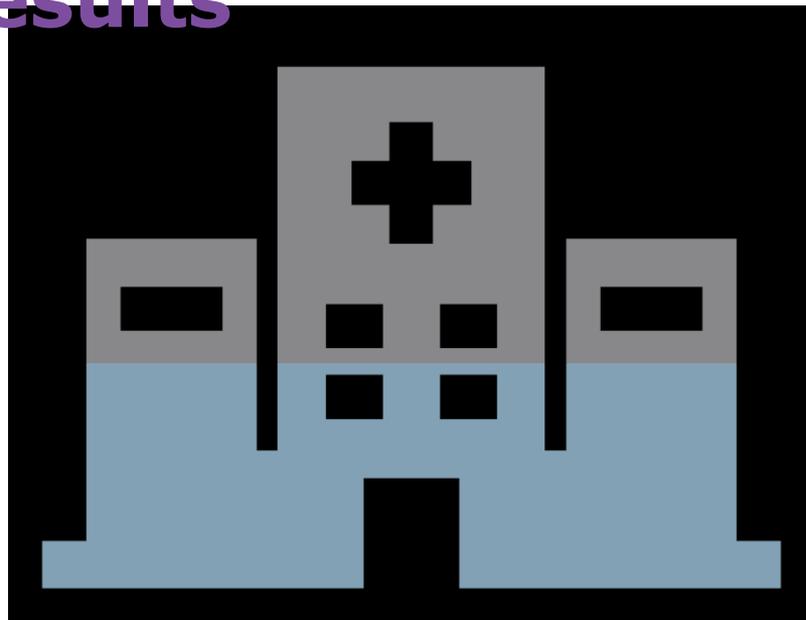
Applying AI to Drive Chronic Condition Management

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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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