Artificial Intelligence and It’s Role in the Future of Healthcare

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Tina Moen, PharmD
Sr. Deputy Chief Health Officer &
Chief Pharmacy Officer
IBM Watson Health

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Merging Health + Healthcare

Source: Adapted from Health Policy Brief, "The Relative Contribution of Multiple Determinants to Health Outcomes," Health Affairs, August 21, 2014.
Artificial Intelligence (AI) is a field of science that is used to describe systems that mimic natural intelligence displayed by humans, such as recognizing voices and understanding language.

Machine Learning (ML) is an application of AI that systems use to learn based on the examples and training humans give them, both explicitly and implicitly.
Barriers to Adoption

- Trust
- Incomplete digital platforms
- Privacy/security
- Interop
- Return on investment
- Digital divide
- Inertia
- Fear for job security

https://practicebusiness.co.uk/ai-in-healthcare-when-will-it-arrive/
Authors set out to apply machine learning to real world data from care management records to personalize care planning strategies to the individual.

“To our knowledge, this is the first study of learning practice based evidence from CM records for care planning, suggesting that increased patient behavioral understanding could potentially benefit augmented intelligence for care management decision support.”

Accuracy of care planning recommendations (n=2416 records)

<table>
<thead>
<tr>
<th></th>
<th>POPULATION-BASED</th>
<th>POPULATION PERSONALIZED</th>
<th>INDIVIDUAL PERSONALIZED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>28.98%</td>
<td>85.7%</td>
<td>87.2%</td>
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Hsueh PY et al. AMIA 2018 Annual Symposium.
Clinical trials are critical to expanding understanding of disease treatment; however, screening for clinical trial enrollment is complex and time-consuming, leading to low rates of enrollment for newly diagnosed cancer patients.

Implementation of Watson for CTM system with a CRC team may enable high volume patient screening for a large number of clinical trials in an efficient manner and promote awareness of clinical trial opportunities within the GI oncology practice.
Prescription fill rates for acute and chronic medications in claims-EMR linked data


N=134,434

African American race negatively associated with overall medication fill rates

<table>
<thead>
<tr>
<th>Prescription Fill Rates</th>
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<tbody>
<tr>
<td>Antibiotic (N = 77,996)</td>
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<tr>
<td>73%</td>
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<tr>
<td>Antihypertensive (N = 78,426)</td>
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<tr>
<td>74%</td>
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<tr>
<td>Antidiabetic (N = 24,013)</td>
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<td>76%</td>
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“Prior treatment history with the same drug was highly predictive of fill rates, with differing directions and magnitudes for different medication.”
Providing current, accurate information on newly approved therapies and open clinical trials requires considerable manual curation performed mainly by human "molecular tumor boards" (MTBs).

Watson for Genomics analyzed

1,018 patient cases previously sequenced and analyzed

- < 3 min: 32%
- 99%

"Molecular tumor boards empowered by cognitive computing can significantly improve patient care by providing a fast, cost-effective, and comprehensive approach for data analysis in the delivery of precision medicine."
Humans + Machine = “AI” or “Augmented Intelligence”

**People excel at:**
- Common sense
- Dilemmas
- Morals
- Compassion
- Imagination
- Dreaming
- Abstraction
- Generalization

**AI systems excel at:**
- Natural Language
- Pattern Identification
- Locating Knowledge
- Machine Learning
- Minimize Bias
- Endless Capacity
Thank you.

“Wherever the art of Medicine is loved, there is also a love of Humanity.”
~Hippocrates

@TinaMoenPharmD @IBMWatsonHealth

Tina Moen – LinkedIn
IBM Watson Health