Disrupting the Oncology Care Continuum Through AI and Advanced Analytics

Immunotherapy

BIG DATA

Artificial Intelligence

Proteomics

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Agenda

- Defining Artificial Intelligence and Advanced Analytics;
- Barriers and Limitations
- Data Driven Shift in Oncology
- Social, Ethical, Regulatory Resistance
- The Dollar behind the Data

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Artificial Intelligence

Artificial Intelligence (AI) in Oncology

Artificial intelligence (AI) in healthcare is the use of complex algorithms and software to emulate human cognition in the analysis of complicated **medical** data. Specifically, **AI** is the ability for computer algorithms to *approximate* conclusions without direct human input.

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The Cognitive AI Pathway
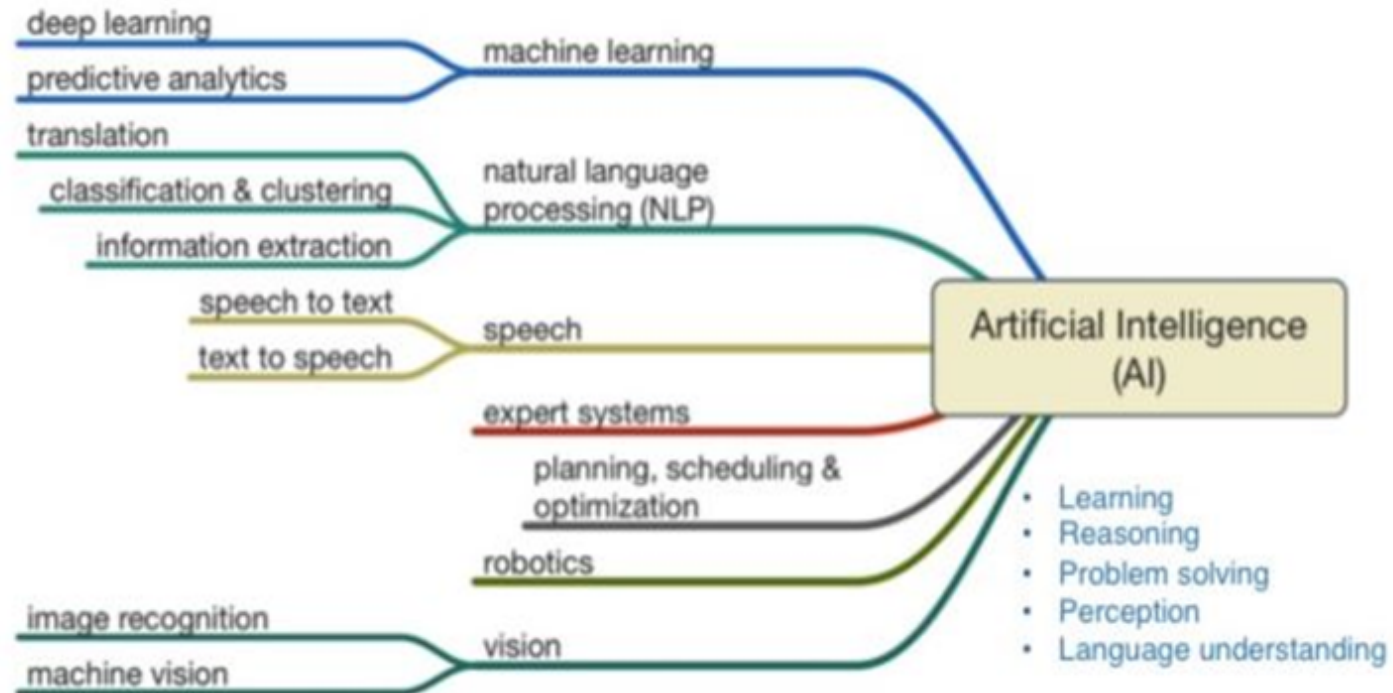
Diagram courtesy of Insurance-Canada.ca

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Utilization of AI

- **Cancer Imaging**
- **Cancer Prevention**
- **Health Interventions**
- **Clinical Outcomes**
- **Translational Oncology**
- **Clinical Decision Support (CDS)**
- **Tumor Board/MDC**
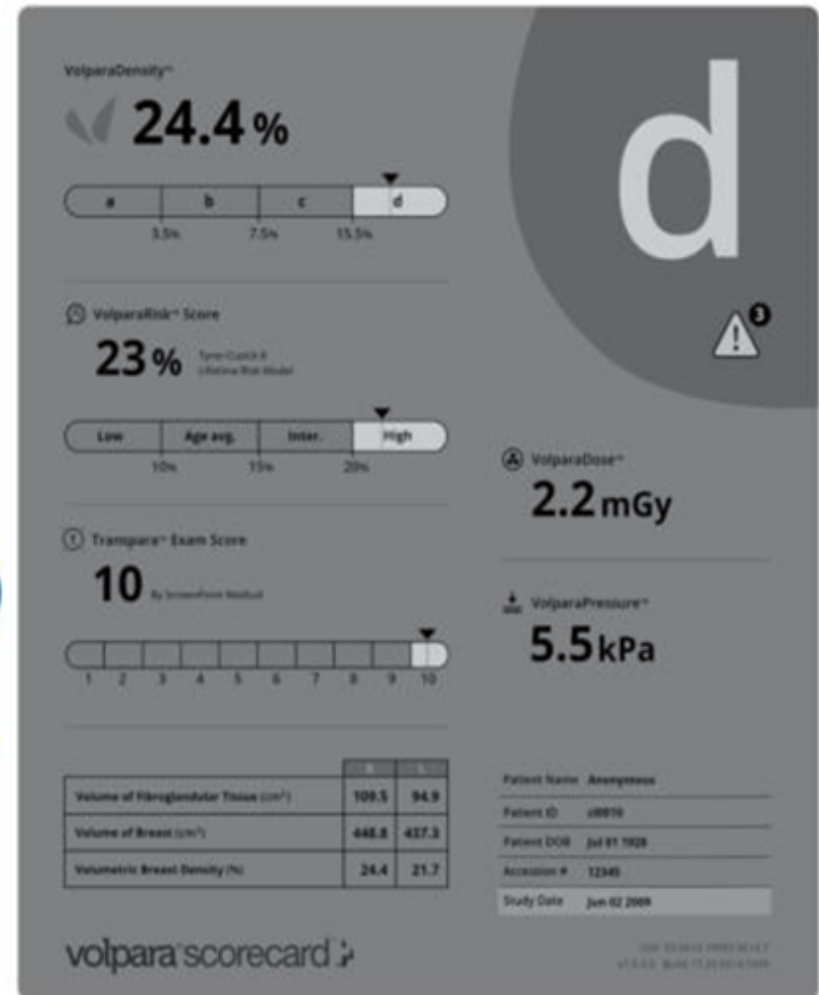- **Artificial Emotional Intelligence**

Photo Courtesy of Volpara Solutions™

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Clinical Decision Support

Photo Courtesy of Viecure™ Precision Platform

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Enhancing the Patient-Provider Care Continuum

Oncologist Time Spent on Admin and Paperwork (Pre AI/CDS)

- > 20hr — 43%
- 10-19hr — 42%
- 5-9hr — 13%
- < 5hr — 2%

(Axis: 0% to 50%)
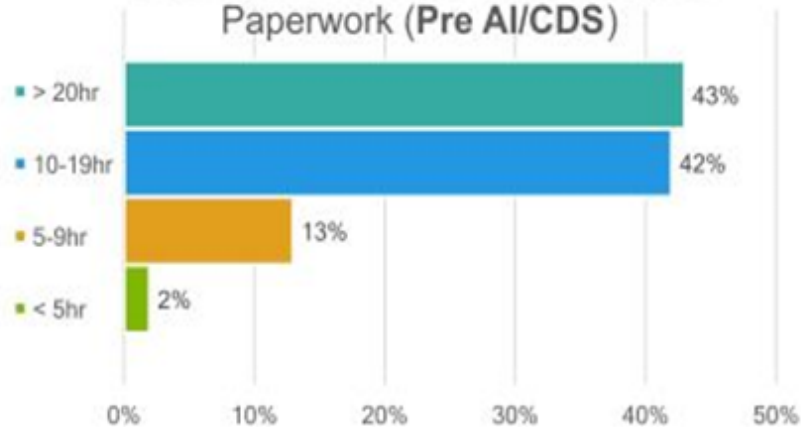
Implementing AI/CDS Potential:

- **Less Physician Burnout**
- **Greater Work-Life Balance**
- **Higher Associated Income**

Implementing AI/CDS Potential:

- **Greater Patient/Physician Satisfaction = Value Based Care**
- **Increased opportunity for Shared Decision Making**
- **Improved Patient Safety/Outcomes**

Oncologist Time Spent Directly with Patient (Pre AI/CDS)

- >25min — 14%
- 17-24min — 39%
- 13-16min — 35%
- 9-12min — 10%
- < 9min — 1%

(Axis: 0% to 50%)

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Driving Clinical Trial Participation

- **AI-based models are helping trial design,**
- **AI-based techniques are being used for patient recruitment,**
- **AI-based monitoring systems aim to boost study adherence and decrease dropout rates.**

11.1% — Improvement in Patient Recruitment*

Increase in Patients Screened* — **14.7%**

34% — Reduced Screening Time*

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Advanced Analytics

Advanced Analytics

The process of deriving insights from patterns and correlations found in healthcare data to make future predictions and improve probability of success.

Key Benefits

- **Predictors:**
  - **Incidence,**
  - **Readmission,**
  - **Recurrence,**
  - **Survival**
- **Population Health**
- **Genomics/Proteomics**
- **Clinical Trial Outcomes**
- **Streamlined Workflow**

Photo Courtesy of LeanTaas iQueue

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Limiting Factors of Implementation

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Hurdles to AI Implementation

- **Lack of Data Sharing**
- **Unstructured EHR**
- **Multiple data sources**
- **Quality of Data Base, Data Warehouse**
- **Unstandardized AI algorithms**
- **Clinical Efficacy**
- **Right Vendor, Right Solution**
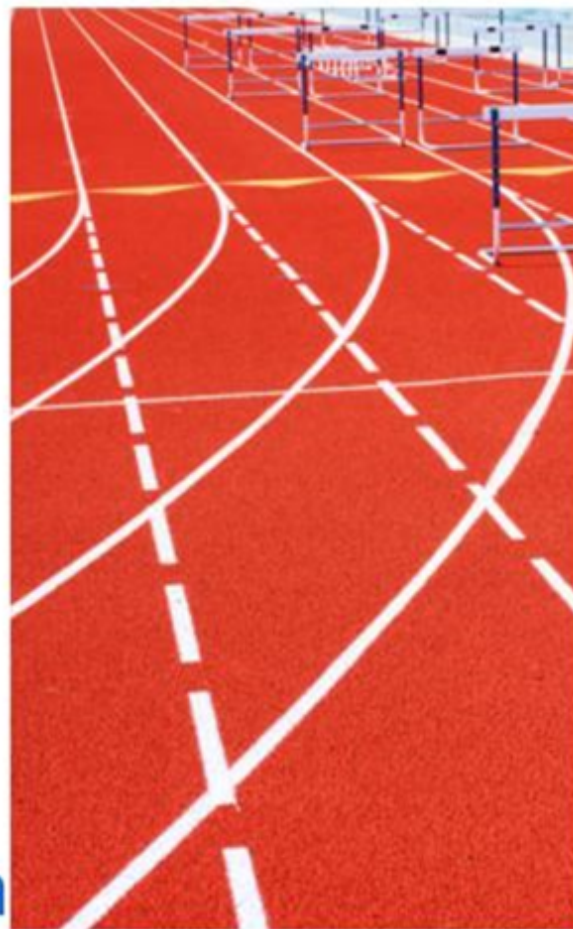
Social, Ethical, Regulatory Challenges

Resistance to Change

- **Privacy**
- **Transparency & Equality**
- **Economic impacts**
- **Governance & accountability**
- **Managing AI risk**
- **AI morality & values**
- **Changing Healthcare Paradigm**

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The Dollar behind the Data

Investment and Return in AI

	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5
# of total patients	4200	5940	7700	9460	11200
Data Sharing Rev.	**$74,993**	**$599,985**	**$1,049,985**	**$2,249,978**	**$3,899,970**
SaaS Costs	$285,000	$511,500	$617,100	$722,700	$828,300
Implementation	$400,00	-	-	-	-
Operating Costs	**$685,000**	**$511,500**	**$617,100**	**$722,700**	**$828,300**
Op Improvements & Tech Redundancy Elimination	**$1,200,000**	**$1,200,000**	**$1,200,000**	**$1,200,000**	**$1,200,000**
Profit/Loss	$589,993	$1,288,485	$1,632,885	$2,727,278	$4,271,670

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Potential Healthcare Savings With AI Utilization

Administrative Workflow Assistance $18B*

Clinical Trial Identifier $13B*

Preliminary Diagnosis $5B*

Virtual Nursing Assistant $20B*

*Accenture June 2017

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Conclusion

- Is AI part of your organizational strategy?
- Do you have stakeholder buy in?
- Does your current vendor(s) technology support this model?
- Are you willing to address Data Security and Privacy issues?

Thank You!

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