

Disrupting the Oncology Care Continuum Through AI and Advanced Analytics



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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



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.



The Cognitive AI Pathway

What is AI?

the science of making computers do things that require intelligence when done by humans

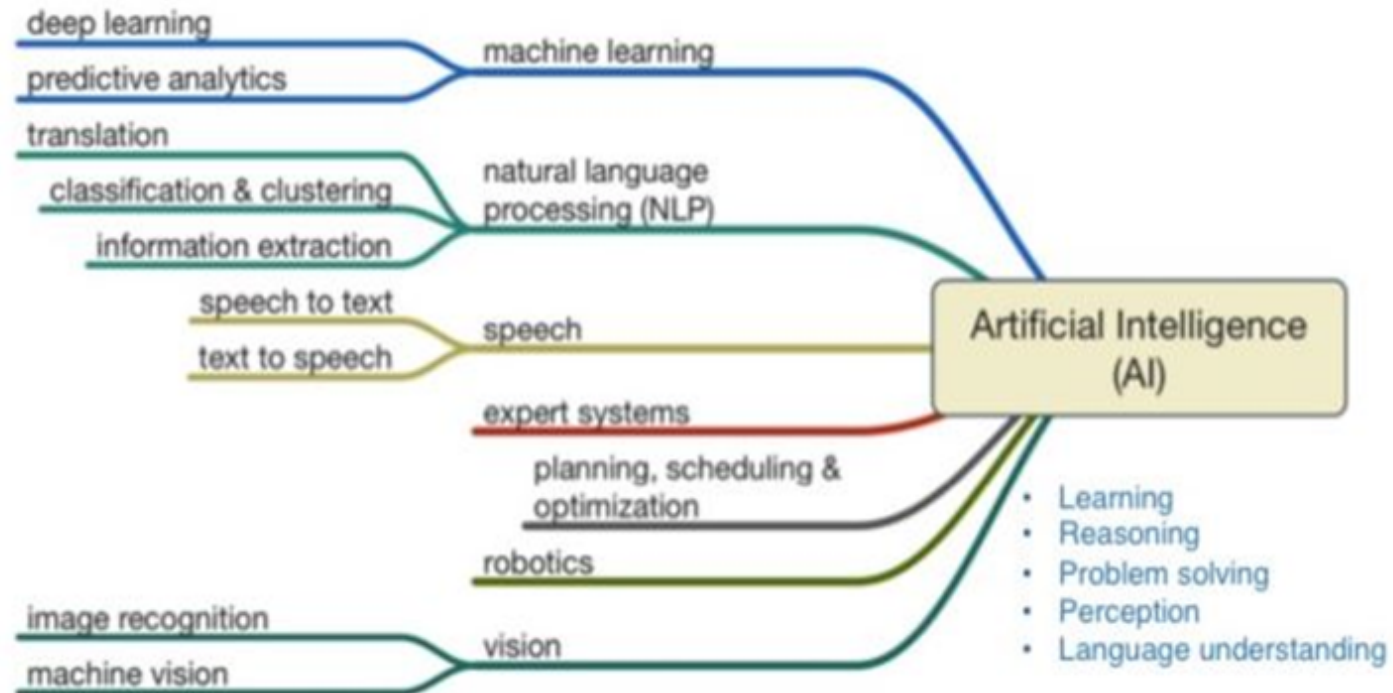


Diagram courtesy of Insurance-Canada.ca



Utilization of AI

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

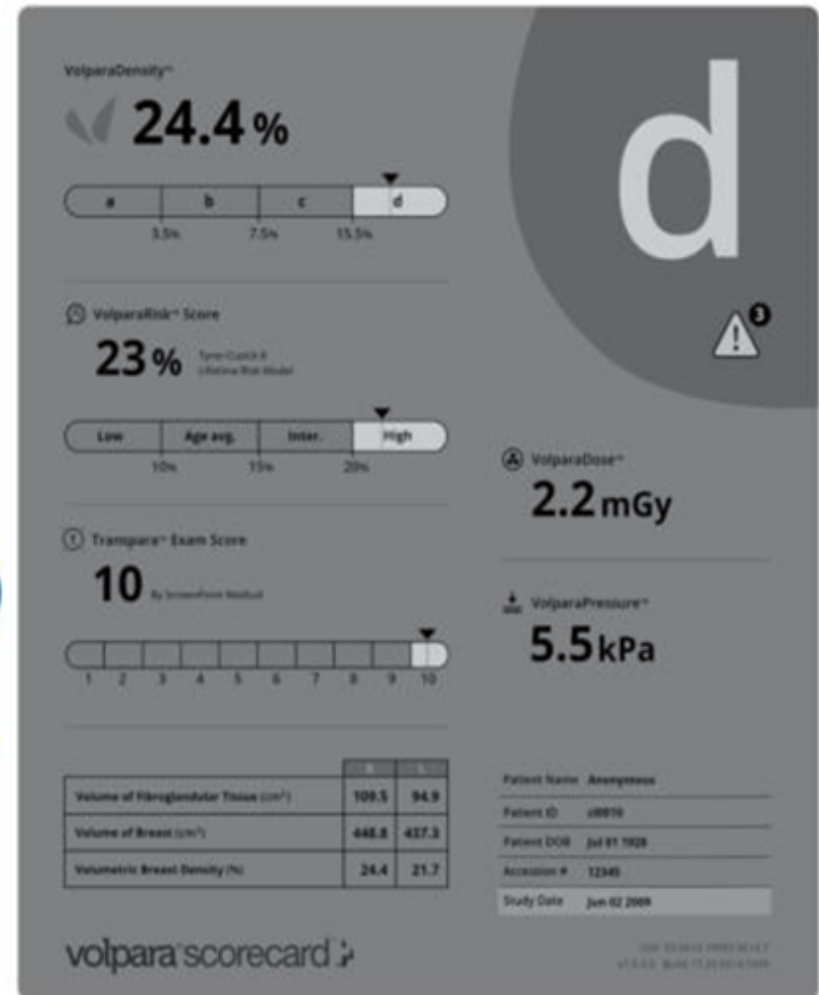


Photo Courtesy of Volpara Solutions™



Clinical Decision Support

PLAN Katherine Grech DEC (03) 2019

EMR HPI | EMR | OHS | EAM | SCORE | De&S | Genomics | TMs | Plan(s) | Interventions

PLAN LIBRARY [PRINT PLAN COMPARISON](#)

CONSIDERATIONS

PATIENT PLANS

Name	Phase	Stage	Actualized Date	Estimated Date
SOC - Breast - Stage II - Adjuvant - HER2 neg - Epirubicin + cyclophosphamide Q 21 Days				
SOC - Breast - Stage II - HER2 - Dose Dense AC -> weekly T + Surgery + EBRT				
SOC - Breast - Stage II - adjuvant - HER2 neg - Capecitabine 14 on Q 21 Days				

SEARCH PLANS

DIAGNOSTIC PLANS

TREATMENT PLANS

SOC - BREAST - STAGE II - ADJUVANT - HER2 NEG - CAPECITABINE 14 ON Q 21 DAYS

SELECT PLAN **PRINT PLAN**

WARNINGS

REFERENCE

PHASE 1: CAPECITABINE 6 CYCLES / 21 DAYS

VISITS	DAY
LAB VISIT	1, 8, 15
EXAM VISIT	1

DRUGS	DOSE	DAY
capecitabine Oral tablet	1250 MG/M2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

TEST/LABS

TEST/LAB	DAY
CBC W AUTO DIFFERENTIAL PANEL	1, 8, 15
COMPREHENSIVE METABOLIC 2000 PANEL	1, 8
CANCER AG 27-29 (UNITS-VOLUME) IN SERUM OR PLASMA	1

TOXICITIES

TOXICITY	DAY
ANEMIA	1
ANOREXIA	1
FATIGUE	1
MYALGIA	1
NAUSEA	1

SOC - BREAST - STAGE II - HER2 - DOSE DENSE AC -> WEEKLY T + SURGERY + EBRT

SELECT PLAN **PRINT PLAN**

WARNINGS

REFERENCE

PHASE 1A: DOXORUBICIN + CYCLOPHOSPHAMIDE 4 CYCLES / 14 DAYS

VISITS	DAY
INFUSION VISIT	1
LAB VISIT	1
MEDICAL ONCOLOGY EXAM VISIT	1

DRUGS	DOSE	DAY
Epirubicin	150 MG	1
cyclophosphamide	400 MG/M2	1
DOXORUBICIN	60 MG/M2	1
dexamethasone	12 MG	1
Neulasta	6 MG	2
Alizer	0.25 MG	1

TEST/LABS

TEST/LAB	DAY
CBC W AUTO DIFFERENTIAL PANEL	1
COMPREHENSIVE METABOLIC 2000 PANEL	1

TOXICITIES

TOXICITY	DAY
ALOPECIA	1
NAUSEA	1

SOC - BREAST - STAGE II - ADJUVANT - HER2 NEG - EPIRUBICIN + CYCLOPHOSPHAMIDE Q 21 DAYS

SELECT PLAN **PRINT PLAN**

WARNINGS

REFERENCE

PHASE 1: SURGERY 1 CYCLES / 42 DAYS

VISITS	DAY
EXAM VISIT	1, 3, 15
LAB VISIT	1
FOLLOW-UP VISIT	3, 15
SURGERY	1

SURGERIES	DAY
LUMPECTOMY	1
LYMPH NODES	1
MASTECTOMY	1

TEST/LABS

TEST/LAB	DAY
CBC W AUTO DIFFERENTIAL PANEL	1
COMPREHENSIVE METABOLIC 2000 PANEL	1

TOXICITIES

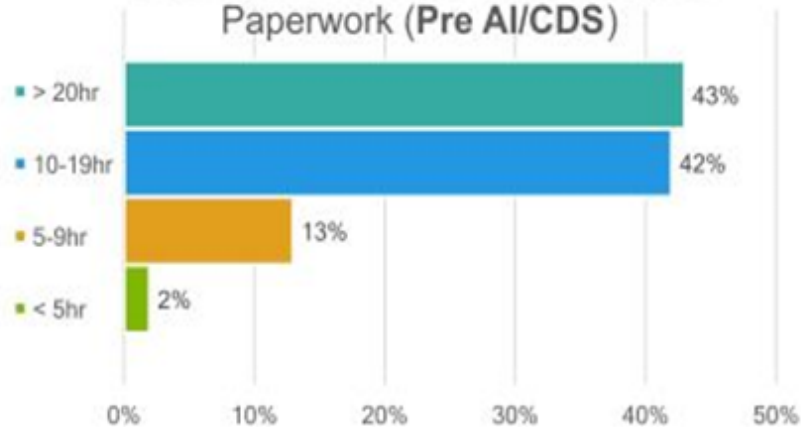
TOXICITY	DAY
PAIN	1, 3, 15
WOUND INFECTION	1, 3, 15
WOUND COMPLICATION	1, 3, 15
WOUND DEHISCENCE	1, 3, 15
LYMPHEDEMA	1, 3, 15

Photo Courtesy of Viecore™ Precision Platform



Enhancing the Patient-Provider Care Continuum

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



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)



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.**



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



Limiting Factors of Implementation

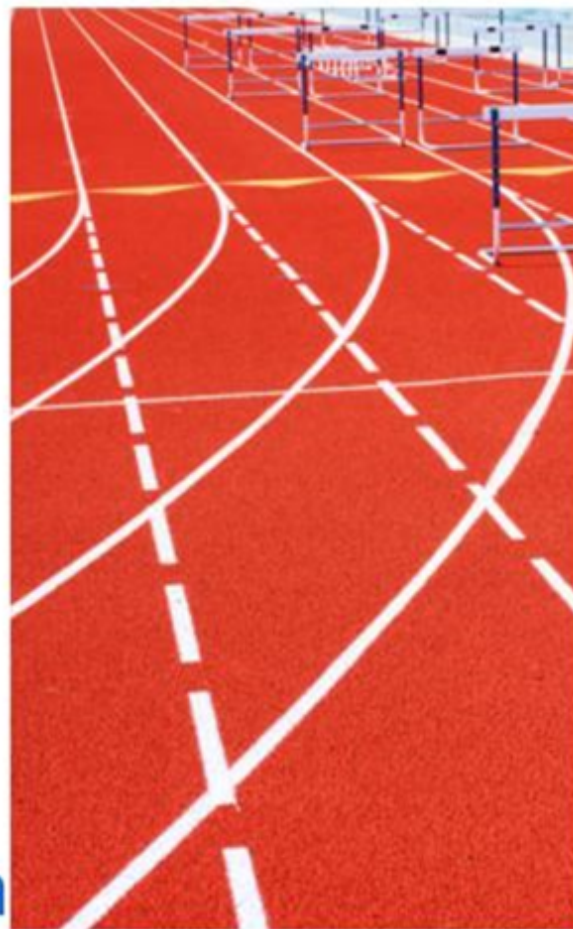


Tip of Data Discovery



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**



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



Potential Healthcare Savings With AI Utilization

Administrative
Workflow
Assistance \$18B*

Clinical Trial
Identifier \$13B*

Preliminary
Diagnosis \$5B*

Virtual Nursing Assistant \$20B*

*Accenture June 2017



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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