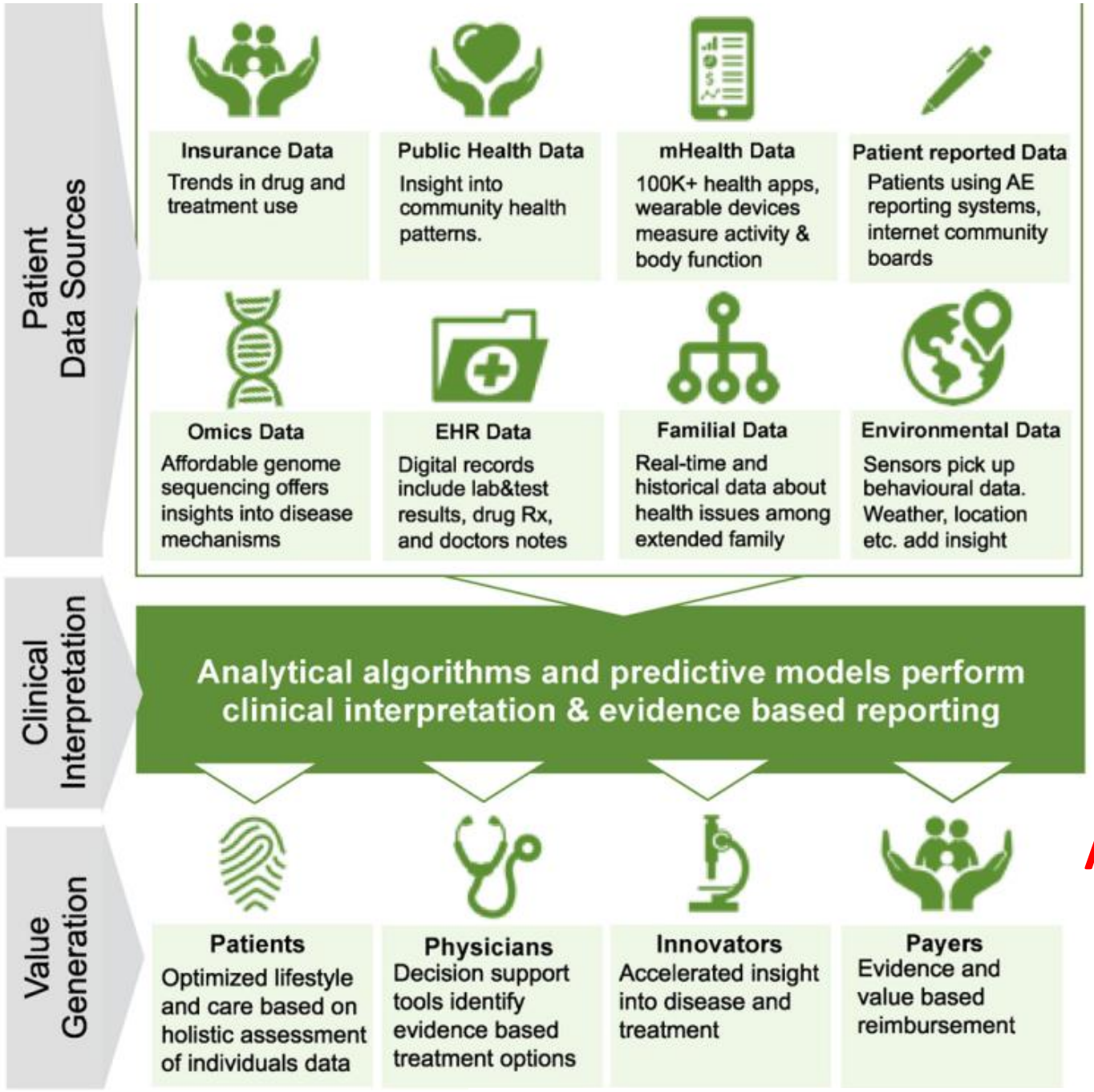


G. Taglang, D.B. Jackson / Gynecologic Oncology 141 (2016) 17–23

Digitalized Real World Data

Big data analytics

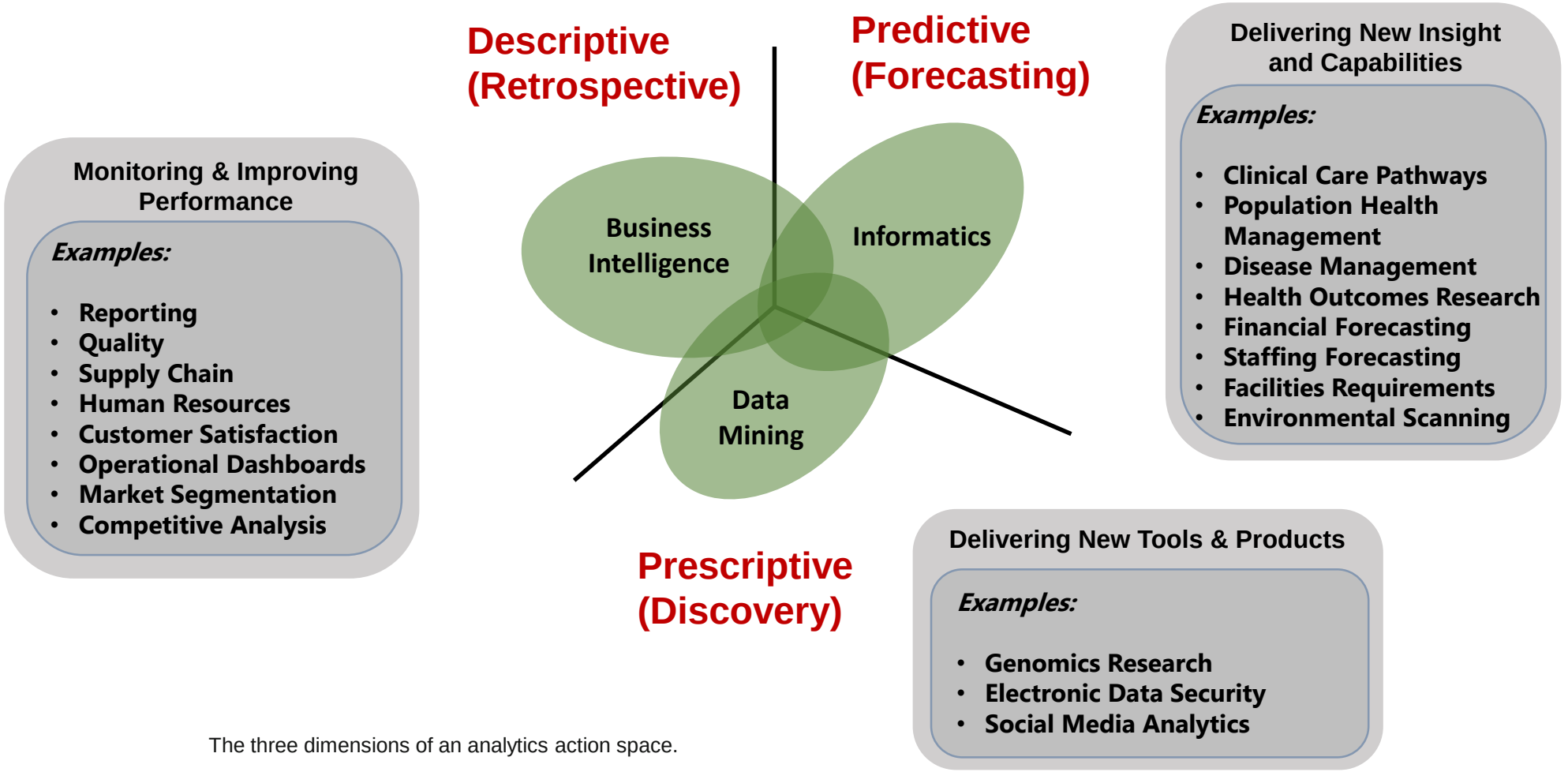
- Bio-Medical informatics
- Biostatistics
- Computational science
- Systems level analysis

Artificial Intelligence

Real World Evidence

Applications of Medical Big Data

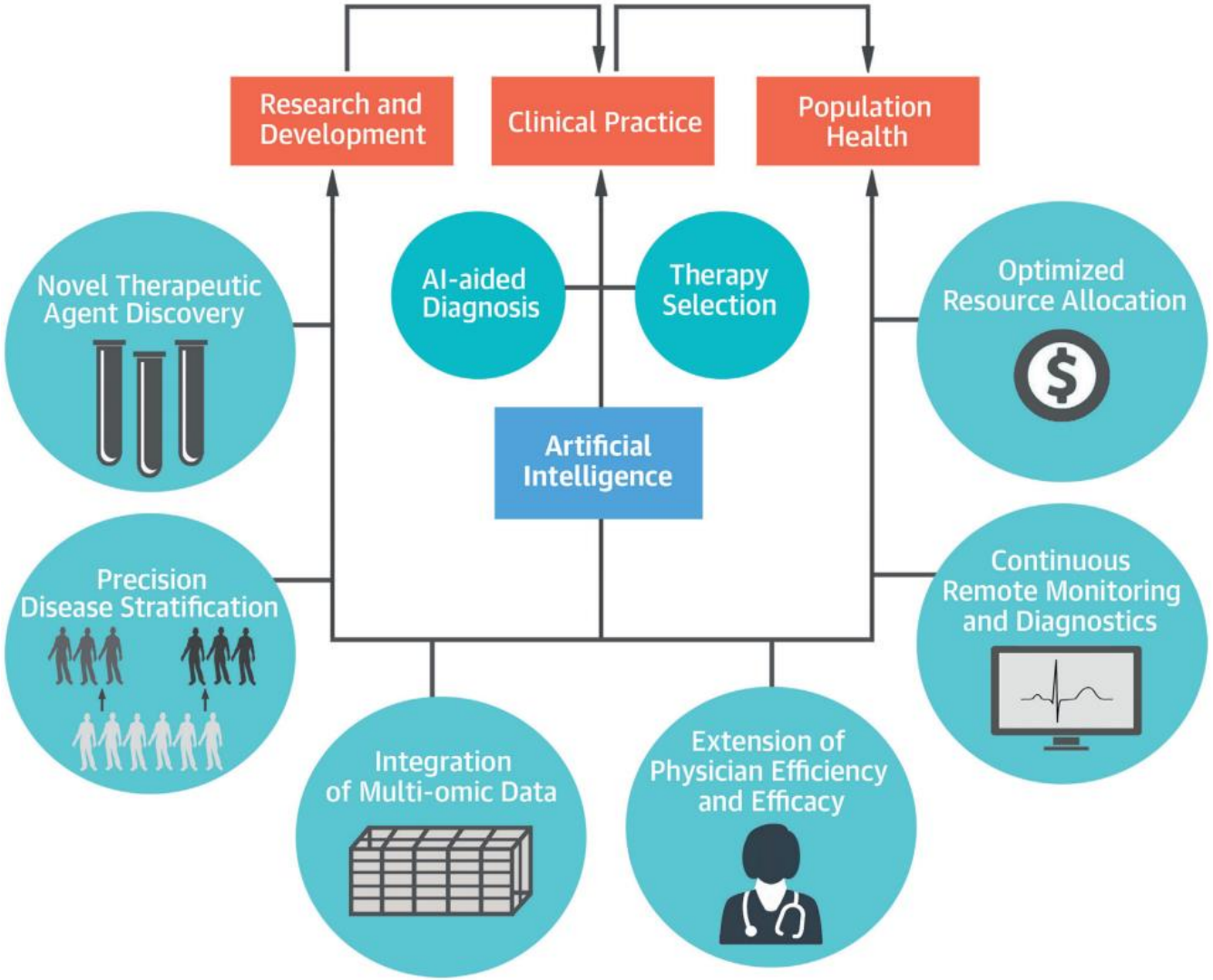
- The ability to collect, analyze, and report information in real-time allows data owners to adapt to changing business environments, identify inefficiencies, and disseminate time sensitive information to key stakeholders



The three dimensions of an analytics action space.

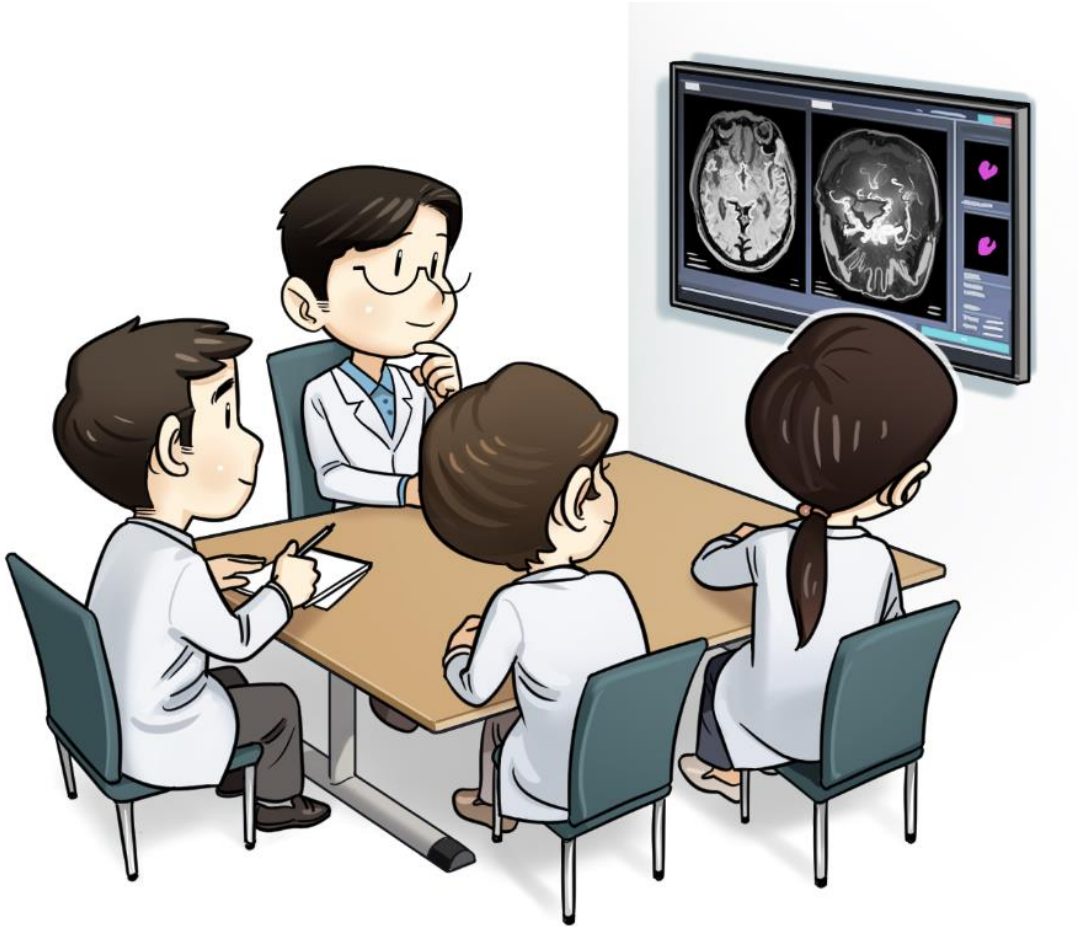
Austin C, et al. J Interv Card Electrophysiol. 2016;47;51

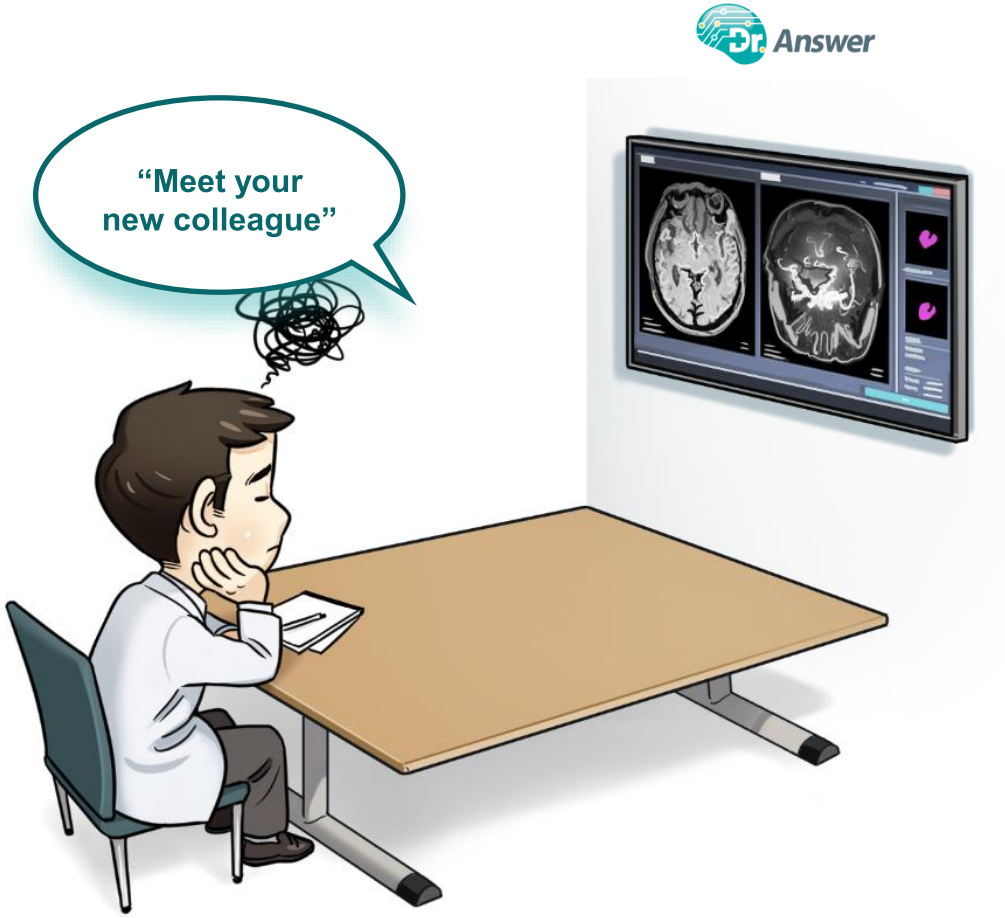
Role of Artificial Intelligence in Medicine



Johnson, K.W. et al. J Am Coll Cardiol. 2018;71(23):2668-79.

AI for Global Health





AI for the global health

	Types of AI	Example
Diagnosis	Expert system; machine learning; natural language processing; signal processing	Researchers applied machine learning and signal processing methods to digital chest radiographs to identify tuberculosis cases and drug-resistant tuberculosis cases
Mortality and morbidity risk assessment	Data mining; machine learning; signal processing	To quantify the risk of dengue fever severity, researchers applied machine learning algorithms to administrative datasets from a large tertiary care hospital in Thailand
Disease outbreak prediction and surveillance	Data mining; machine learning; natural language processing; signal processing	Remote sensing data and machine learning algorithms were used to characterise and predict the transmission patterns of Zika virus globally
Health policy and planning	Expert planning; machine learning	Machine learning models were applied to administrative data from South Africa to predict length of stay among health-care workers in underserved communities

Schwalbe N et al. Lancet 2020; 395: 1579

AI for the global health

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- NIH staff guidance on coronavirus (NIH Only) »

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NEWS RELEASES

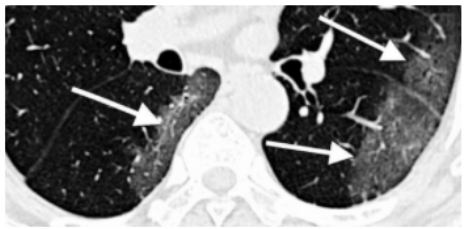
Wednesday, August 5, 2020

NIH harnesses AI for COVID-19 diagnosis, treatment, and monitoring

Collaborative network to enlist medical imaging and clinical data sciences to reveal unique features of COVID-19.

The National Institutes of Health has launched the Medical Imaging and Data Resource Center (MIDRC), an ambitious effort that will harness the power of artificial intelligence and medical imaging to fight COVID-19. The multi-institutional collaboration, led by the National Institute of Biomedical Imaging and Bioengineering (NIBIB), part of NIH, will create new tools that physicians can use for early detection and personalized therapies for COVID-19 patients.

"This program is particularly exciting because it will give us new ways to rapidly turn scientific findings into practical imaging tools that benefit COVID-19 patients," said Bruce J. Tromberg, Ph.D., NIBIB Director. "It unites leaders



CT scan of lungs of COVID-19 patient with areas described by radiologists as resembling grains of ground glass. *RSNA*

Institute/Center

National Institute of Biomedical Imaging and Bioengineering (NIBIB)

Contact

Ray MacDougall
301-496-3500

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Standardization of Data

CURRENT OPINION

Big data requirements for artificial intelligence

Wang SY et al. Curr Opin Ophthalmol 2020;31:318

KEY POINTS

- Big data is often characterized by volume (size), velocity (speed of acquisition), and variety, which, in health care, often implies data which are multimodal: a combination of images, text, and structured fields.
- Increasing use of EHRs and the simultaneous development and widespread adoption of standards for health data exchange, such as Digital Imaging and Communications in Medicine for imaging and Fast Healthcare Interoperability Resources for EHR, have enabled the aggregation of health data from multiple sources, creating a rich new environment for big data and artificial intelligence.
- Conducting reproducible research in big data for artificial intelligence is critically reliant on the labels on which artificial intelligence models are trained, the underlying structure and characteristics of the data, and the details of the artificial intelligence model architecture.
- Consensus is needed on definitions for labeling data, standards for sharing and reusing data, the sharing of code specifying artificial intelligence models, and adoption of open APIs to artificial intelligence models.
- To foster reproducible science, common data labels, data sharing, and openness in artificial intelligence models are also critically important to promote the widest possible benefits from artificial intelligence research.

Interoperability

DICOM

FHIR

Standardized data labeling

Data sharing

Transparency