

# AI & Robotics Implementation and Pitfalls

THE JOURNAL 2023

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# Integrative Diagnostics: a Vision for Better Care

Integrative Diagnostics is a pathway to more patient centered care with better outcomes but this disruptive innovation must clear significant hurdles in the current delivery and education system to achieve its potential for patients.

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## key points

- The digitisation of pathology, advances in computing power and the ability of artificial intelligence to extract and knit together relevant data elements means that “Integrative Diagnostics” are within our grasp.
- While we push the boundaries to personalise treatment of cancer through immunotherapy, we are still sending faxes. Initiatives to transcend our diagnostic silos exist but they are few and far between.
- For our patients navigating the complexities of a system that often seems designed for every stakeholder but them we must strive to do better. Integrative Diagnostics is what better looks like.

## Introduction

As a breast imager I form part of a team that makes the diagnosis of breast cancer. That team typically comprises radiologists and pathologists and increasingly includes geneticists. A patient’s journey from screening mammogram to definitive surgical management can take weeks or even months as she and her care team piece together the puzzle that will identify her path to survivorship. Ask a breast cancer survivor about the moment she heard she had cancer and you’ll hear her relive that moment with crystal clarity. For most patients receiving this dreaded news the overwhelming desire is to move expeditiously from diagnosis to treatment and any delay can seem agonising. The disconnected nature of our health system can compound this wait, requiring patients to request and deliver outdated CDs in order to seek second opinions. Inequities multiply the stress as women from minoritised communities wait longer to complete the diagnostic process, travelling further to secure advanced imaging when necessary. We need to do better.

The landmark Institute of Medicine report, “To Err is Human” identified a 10-15% diagnostic error rate that is responsible for thousands of deaths and some of the costliest malpractice suits. A follow up report: “Improving Diagnosis in Healthcare”, pointed to “information

integration and interpretation” as a key opportunity to do better.

But what does “better” look like? Imagine a diagnostic pathway that seamlessly directed patients to the correct imaging modality according to their presenting symptoms. A process that sequenced testing across multiple departments with the patient’s convenience and wellbeing top of mind. Picture a holistic view of the pertinent patient data that used compelling graphics to support physicians in decision making and created materials that would allow the patient to understand and fully participate in their care. Dare to dream of a feedback loop that identified patients at risk and afforded an earlier diagnosis.

A fantastical utopia? Not at all. The digitisation of pathology, advances in computing power and the ability of artificial intelligence to extract and knit together relevant data elements means that “Integrative Diagnostics” are within our grasp.

With radiologist and pathologist colleagues we explored this topic in a publication titled “Integrative Diagnostics: The Time is Now”<sup>1</sup> for the Journal of the American College of Radiology. In this paper we reviewed the limitations of the current fragmented diagnostic process and its impact on not only the quality but also the cost of care. We also highlighted the

significant barriers that stand in the way.

No sector both promotes and frustrates innovation simultaneously like healthcare. While on the one hand we push the boundaries to personalise treatment of cancer through immunotherapy, on the other hand we are still sending faxes. Initiatives to transcend our diagnostic silos exist but they are few and far between.

could inform patients in an intelligent but automated way.

Maybe we ourselves are the biggest barrier? We settle into specialty “swim lanes” very early. How often do we ask a medical student: “what specialty are you applying to” rather than “what problems in healthcare do you want to solve”? Do we need to create cross functional diagnostic teams whose training experience bridges

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Is it our United States fee for service payment system that keeps us locked in our segmented process? There is in fact no meaningful incentive for a collaborative process. Tumor Boards, an essential component of high value cancer care, are largely unreimbursed. With imaging volumes at an all-time high and physician burnout exacerbating workforce shortages, the energy to advocate for disruptive payment models that better support an integrated approach to diagnostic medicine is understandably lacking.

The unfulfilled promise of AI must take some blame. Surely there’s an algorithm that can effectively extract administrative costs from the system freeing personnel to focus on patient related tasks? In a ChatGPT enabled world why is breast imaging the rare imaging specialty issuing patient friendly lay letters? Why can’t we issue patient facing communications that reference data from both imaging and pathology as well as the Electronic Health Record in a format that meets the patient where they are? The requirements of the 21st Century Cures Act to make test results immediately available have piled additional burdens of communication onto already overworked clinicians rather than driving innovation that

radiology, pathology and genomics? Should there be a diagnostic medicine residency? Leaders in the field like Dr Nick Bryan who established the founding Department of Diagnostic Medicine at the University of Texas Dell School of Medicine have cracked open the door to a novel training pathway but questions abound about how to scale this approach.

I’m encouraged by the several cross-specialty conversations on Integrative Diagnostics in which I’m participating but I’m sanguine about the inertia that will need to be overcome. As healthcare spending in the U.S. continues to climb with outcomes that fail to match those peer economies we must continue to strive for the oft cited goal of “value-based healthcare”. For our patients navigating the complexities of a system that often seems designed for every stakeholder but them we must strive to do better. Integrative Diagnostics is what better looks like.

### Conflict of Interest

Board member and stockholder NextGen Healthcare  
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