

# How digital medicine is changing absolutely everything

## Abstract

The world's industries are in the midst of a digital transformation, and the field of medicine is finally catching up. Now that technologies in wearable devices, machine learning, predictive analytics, and others are being proven as useful tools for these industries and contexts, eyes are now on medicine as the next "new frontier" for such capabilities. This new frontier is also known as Digital Medicine - a broad term that describes the intersection of technological and medical expertise, the result of which will someday result in a dramatic shift in the way medicine is practiced and delivered. The hope is that now that the technologies are somewhat ready for medicine, medicine will be at least somewhat prepared for these technologies.

Academic hospital centers, key decision makers in this transition, are now faced with the overwhelming responsibility sifting through these innovations in order to find the best solutions to their digital needs. And, there is an extra pressure to commercialize work and ideas generated internally. Such centers are vying to be the most innovative so that they can enhance their brand, extend their reach, and reduce their costs.

The digital trend has implications beyond the delivery of healthcare. Trends towards population health and shifts towards value-based reimbursements are changing the way hospitals approach business. If applied wisely and innovatively, these new technologies can prove to be enormous assets for institutions in helping them stay competitive and effective. As such, strategic discussions concerning financial investments, innovation processes, and operational restructuring are at the top of mind.

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## Where to invest

Buzz words like "big data", "wearables", and "telehealth" have institutions up in arms trying to figure out where the dollars should go, and where competitors are putting theirs. Realistically, the correct answer is probably everywhere, and the correct amount is probably tens of millions of dollars. But, this requires a huge shift in mentality and a very progressive institution; many of the more risk-averse institutions are still looking for a single blockbuster technology that can magically place them in front at the cutting edge. In other words, just having a strong telehealth program will not be enough to place an institution at the forefront of the digital landscape. Hospitals need to solve the issues of interoperability, they need to ramp up their data analytics power, and they need to finally redesign their entire system to be more consumer facing and engaging - all of which costs lots of money. The picture is actually quite simple, those willing to shell out the tens of millions of dollars in technological investments will thrive; those that do not have this forward thinking vision will face massive challenges in the near future and risk losing out to the more progressive thinking players within the space.

## Innovation, Innovation, Innovation

These new outside technologies are creating an innovation bug within the world of academic medicine. "Innovation" is becoming more than just a buzz word, as institutions are now trying to operationalize the way ideas are generated and transformed into a final, marketable product. Fortunately, the antiquated biases against commercializing science are beginning to fade. Historically, commercializing ideas was frowned upon; the thought being that if an idea has merit it should be disseminated for free to everyone. The reality is, however, that a good idea is not enough. Full value is far more likely to be realized if it is packaged into an implementable, sustainable product.

But this takes well-oiled processes. Right now, few centers have effective systems that harness the innovation potential of the talented workforce of physicians, nurses, researchers, and students. They lack a well-defined pipeline for ideas coming from both within the institution, as well as from those coming from external start-ups and organizations. Institutions may be keenly aware of the importance of commercializing R&D, but those on the ground are not equipped with the know-how to do so, nor do they have the appropriate time and resources they need.

For these reasons, hospital centers are feeling the pressure to restructure how they deal with innovation. They must begin teaching clinicians and researchers about the commercialization process, and they must provide outlets, resources, and protected time for ideas to progress to final products. This requires a cultural transformation that would bring the spirit of entrepreneurship to the classically very rigid practice of medicine.

Transforming the way medical centers function is no simple task, and thus far, no institution has it completely figured out. Some are getting closer than others, but for the most part no one is able to efficiently tap into the wealth of internal and external idea potential. The player that is ultimately able to design an effective innovation pipeline stands to win big in terms of cost savings, talent attraction, and brand expansion. Otherwise, they can expect to shell out even more cash in the long run as they learn through the costly process of trial-and-error.

## Operational restructuring

To think that technology investments and innovation improvements are where the game ends would be short sighted and hospital systems should be keenly aware of this. For innovation and implementation to become streamlined, we can expect overhauls in governance

models that can ensure that this happens. Currently, this process at most institutions is decentralized and lacks structure. Rarely do individuals know who to turn to for immediate guidance, nor do they understand what is required of them. To remedy this, hospitals may look to create “centers for innovation” where there can be a workforce that is dedicated to feeling out the next big technology, solving the problems of incentive misalignment, and optimizing operational implementation of new ventures. In other words, historically rigid structures need to become flexible, proactive, and adaptive - otherwise they can expect these large investments to fail while their competitors encroach upon their market share.

## Competition

Digital medicine is shifting the competitive landscape. Large academic medical centers will continue to compete with one another as they traditionally have, but they also share a new, common threat - start-up health care organizations and disruptive technologies. For reasons mentioned above, institutions are on the brink of large expenditures and uncertain workforce shifts. Consequently, the pressure is on more than ever to cut costs. The question is, how will they accomplish this alone, or is this even possible? Perhaps hospitals

will find innovative ways to share costs through cooperation. Or, maybe there will be a push to acquire “disruptive start-ups” so that they can build up a safety net of resources. If centers choose to play competitively in the digital space now, they certainly need to find creative ways to control the short term costs until their return on investment can come to fruition.

It is exciting to see that medicine is on the verge of this huge transformation. Now that the conversations are beginning to gain momentum, we can hope to see tremendous progress in technologies and processes. Medicine has been sheltered from the digital transformation that has driven other industries to a newfound level of technological sophistication, and it is time that it catches up to its potential. And so here we are, at the cusp of a digital arms race - and the outcome is still far from being determined.

## Acknowledgments

None

## Conflicts of interest

None.