

# PUBLIC HEALTH AND TECHNOLOGY

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## ABSTRACT

Healthcare changes dramatically because of technological developments, from anesthetics and antibiotics to magnetic resonance imaging scanners and radiotherapy. Future technological innovation is going to keep transforming healthcare, yet while technologies will drive innovation, human factors will remain one of the stable limitations of breakthroughs. No predictions can satisfy everybody; instead, this article explores fragments of the future to see how to think more clearly about how to get where we want to go. Significance for public health Technology drives healthcare more than any other force, and in the future it will continue to develop in dramatic ways. While we can glimpse and debate the details of future trends in healthcare, we need to be clear about the drivers so we can align with them and actively work to ensure the best outcomes for society as a whole.

**Keywords:-**Technology, Future, Healthcare.

## Introduction

Pluck a nurse and surgeon out of the nineteenth century and transport them into a modern 21st century hospital and it would be a thoroughly recognizable place, with the same hierarchies and strict cultures. Patients treated as helpless, stripped of their clothes and possessions, lying in beds and almost completely ignorant of their illness. They might be disappointed in our treatment particularly of old people, but I don't think it would surprise them.

If our two time-travellers were able to attend a post-mortem and listen in on a discussion of human error, very little would seem novel. Clinicians would still be in denial, lawyers would still be hovering, and the delay and deny culture would be no surprise. However, the changes that would surprise the nurse and surgeon are all changes to technology. Infusion pumps, dialysis machines, antibiotics, heart valves, MRI scanners, even hand washing stations would be new ideas. All the hidden technology used in the laboratories behind the scenes, from path labs to decontamination, would be startlingly new if it was noticed.

Though the medical culture is similar, there have been dramatic technological changes, and actually these changes would be hard to explain. Does anybody even know how an infusion pump works? They used to

be clockwork (and before that, gravity fed) and now almost everything contains a computer and has a colourful screen and lots of buttons. Implanted defibrillators that use telephone networks and web sites to keep cardiologists up to date with their patients are just magic; new pharmaceuticals that change moods, change blood pressure, or kill bacteria: all are modern magic. On reflection, given the centuries of stability, it is amazing how much healthcare has changed in the last 150 years – and one wonders how this accelerating pace of change will proceed in the future

## Technology

Will advance and there will always be new and exciting solutions. Today we have robotic keyhole surgery, and things can only get better. We have intelligent decision aids to improve diagnosis, and they will only get better. Some people would point to the underlying drivers: technology is getting faster, better and smaller. Moore's Law says the speed of innovation is accelerating. The simple story is we will just enjoy the ride. However, the more complex story exposes trade-offs. For example, new computers are indeed much faster, but to take advantage of them we first have had to throw away the slower computers so they can be replaced, and then we may well discover the patient information on the old computers won't work on the new ones. In fact, we are in a continual struggle to keep up – it costs us a lot, and a lot of solutions that excited us yesterday are already in landfill. The faster we go, then, the more we can expect incompatibilities, and indeed greater spread between those at the sharp end of developments and those without the resources to benefit. When we honestly think about the future, we have to broaden our spotlight from the few exciting ideas that attract our attention to the wider issues, the broader context of change and complexity, in which those innovations could be used effectively. As good science fiction does so well, turning an exciting idea into a fully-worked out story helps us explore the issues does not have an agenda of helping healthcare, however much we might like to focus on benefits. It develops because of miniaturization, lowering costs of production, and so on, not because it makes people well, but rather because it can find ways of making money and reinvesting it. Koppel and Gordon's edited book First Do Less Harm is recommended as an overview of issues.

Technology automates and extends things that previously had to be done by people. Before infusion pumps, nurses had to give injections every so often; the infusion pump technology automated that. Now the nurse's time is freed up for other activities, and if the manufacturer has used technology in the production of the infusion pump – as they surely will have – they can reduce the cost of production for exactly the same reasons. Some plastic moulding process will make millions of infusion pumps as easily as it makes one; once one infusion pump has been programmed in software, it costs essentially nothing to program them all. This virtuous circle of using technology to make technology ensures prices drop, market share increases, and profit margins increase, which in turn allows the manufacturer to invest in more cunning production and distribution. These are some of some powerful technological drivers, and it is hard to draw a line under the discussion. We have not discussed many technologies that are both critical and exciting such as nanohealth, personalized healthcare, mobile health, telehealth and so on – the beginnings of all of these are already available and in use in first adopter places. What the brief discussion illustrates is the diversity, the rapid pervasiveness, and the complex trade-offs of future technologies.

## Health

The field of public health is multidisciplinary. For instance, the social sciences, biostatistics, epidemiology, and health service management are all pertinent. Occupational safety, disability, oral health, gender issues in health, community health, behavioural health, health economics, public policy, mental health, health education, and health politics are additional significant subfields.[5] A nation's entire healthcare system includes primary, secondary, and tertiary care in addition to public health. The implementation of public health involves the tracking of cases and health indicators as well as the encouragement of healthy lifestyle choices. Promoting breastfeeding and hand washing, administering immunisations, encouraging ventilation and better air quality both indoors and outdoors, preventing suicide, quitting smoking, educating people about obesity, expanding access to healthcare, and Students studying Health Information Management (HIM) gain a broad yet targeted skill set that includes clinical, IT, leadership, and management abilities. Health care professionals serve as a bridge between clinicians, administrators, technology designers, and information technology professionals by utilising their expertise in records administration and information technology. Information technology, law, management, medical, and finance are all included in the curriculum of HIM programmes. Graduates can select from a range of career situations across a multitude of healthcare areas because of this unique combination. To browse accredited health information management master's, associate's, baccalaureate's, and certificate of degree programmes in health information management, visit the CAHIIM Programme the assumptions of mass production are changing. For example, today's 3D printers are capable of making objects of any shape; they are slightly less efficient than standard mass production, but the costs of custom objects of certain sorts has been lowered significantly. It is now possible to custom make titanium implants the right shape and size to fit. Going further, it is widely envisaged that custom drugs will be manufactured, customized to the patient's disease and genetic makeup. While this seems to be enormously beneficial to patients, there are dangers. For example, a customized drug may be very effective, but its side effects will be unique to the patient too, and therefore harder to diagnose has an interesting technological imperative. If we can personalize healthcare, we get population-sized markets: instead of selling to clinicians, manufacturers can sell to individuals – a market 1000s of times larger.

## Future

The authority structures in healthcare, the division of labour, the pretence that clinicians know everything, and other human factors are slow to change. Despite our knowledge of germ theory and antiseptics, we are still resistant to washing our hands. As soon as we get to our future, there will be another – and we will increasingly be seeing partially-completed solutions superseded by even better ideas. Today we might be thinking we just need to computerize all patient records, but before we've finished doing that some fancy new technology will change what we want to do or how we should do it. For the foreseeable future, we will have to live with fragmented and partially working technologies. Healthcare is just a market for technology where consumers such as hospitals are happy to pay enormous amounts of money, particularly for prestige equipment, such as PET and MRI scanners and linear accelerators.

## **Key points about futures for healthcare**

Patients are the reason for healthcare and they should be at the centre of it. This article, however, is about possible technological trends and drivers in healthcare; it should therefore be read in conjunction with patient-centered perspectives like the Royal College of Physician's Future Hospital: Caring For Medical Patients report.

## **Conclusions**

If we don't know where we are going, we won't know when we don't get there says the quotable Yogi Berra. The market will surely figure out a way to make money, and technology will advance in miraculous ways. Instead, we need to figure out a way to have healthier and happier patients (and not just treating them as individuals), and to do that we've got to focus on integrating technology with culture rather than focusing on technology alone. my view the key thing is to think clearly. Initiatives like the UK Royal College of Physicians Future Hospital Commission, patients and healthcare professionals – have sat down and worked out what sort of future hospital they need are to be commended; more importantly, they have articulated principles, not just specific solutions. Such principles are or should be timeless; we should not plan the future by being technology-driven (e.g., implementing cloud, nanohealth, etc) but by improving along criteria behind principles (such as improving patient care or staff support). Articulating the principles of the futures we want should be a continual process, not a one-off activity; every day there is a new future to plan, and new discoveries that will change our minds about what is possible and likely. Future planning should be as much a routine part of healthcare as responsive care is. If we don't know what we need, we will get what is easy and profitable to make; as we emphasized above, what we need and what we want are often confused.

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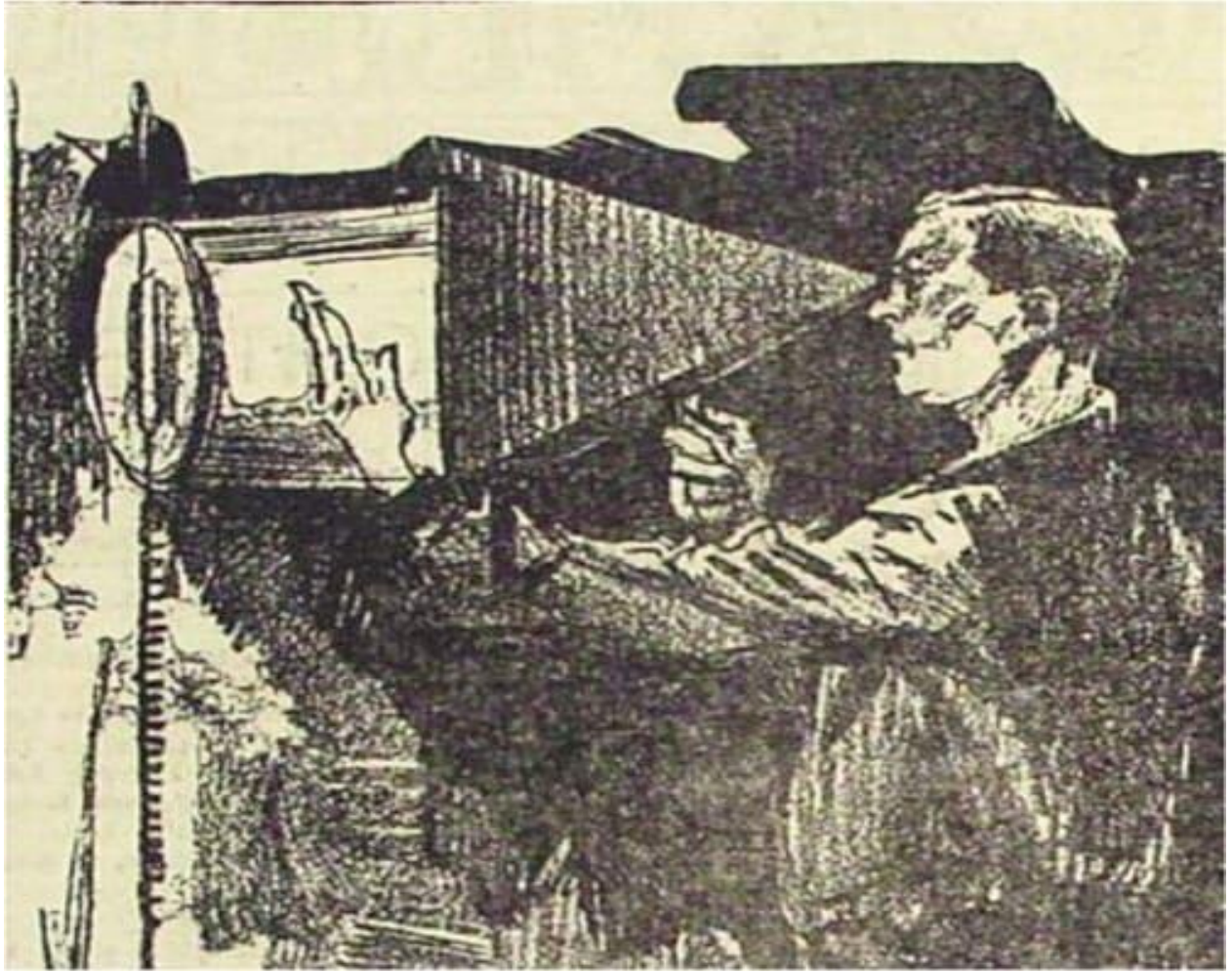
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