IMPACT OF DIGITALIZATION IN HEALTH WORKFORCE: A Challenge for Europe

Luís Velez Lapão, PhD, MSc

14th June 2016
DIGITAL TECHNOLOGY IS PUSHING HEALTHCARE...
EUROPEAN COMMISSION STRATEGY IS BASED ON AN INTEGRATED NETWORK
OF SENSORS AND INFORMATION SYSTEMS

INTEGRATED HEALTHCARE RECORDS
NEW EQUIPMENTS ARE ARRIVING… AND THEY ARE LEVERAGING THE CAPACITIES OF HEALTH PROFESSIONALS
Professionals are also changing behaviour.
AND PHYSICIANS SHORTAGE IS PRESSURING FOR NEW IDEAS AND INNOVATION!

THE CHALLENGE OF INTERNET OF THINGS IN HEALTH Services, Technology Management, Security

THE INTERNET OF THINGS
AN EXPLOSION OF CONNECTED POSSIBILITY

BILLIONS OF DEVICES

YEAR

2002
1,000,000
About the equivalent of the population of Pakistan.

2012
14.4 BILLION
Today, there are ten times more connected to the Internet as there are humans on the planet.

2013
11.2 BILLION
According to Fortune magazine, 50 billion connected devices will exist by 2020. The rise of "Machine to Machine" technologies will allow billions of devices to communicate with one another.

2014
22.9 BILLION
More than a quarter of all mobile traffic is expected to be generated by machines in 2014.

2016
18.2 BILLION
1 out of 6 Internet of Things (IoT) devices will be mobile connected.

2017
28.4 BILLION
According to the Internet of Things Market Intelligence and Forecast Report, 2017-2023, the IoT market is expected to grow to $3.2 trillion by 2023.

2018
34.8 BILLION
The first 5G network is expected to be commercially available in 2018.

2019
42.1 BILLION
The first 5G network in the United States was launched in 2019.

2020
50.1 BILLION
By 2020, there will be more connected "Things" than "Humans" on the planet.

The growth of the Internet of Things is predicted to continue, with an estimated 75 billion connected devices by 2020.
WHAT WILL BE THE EFFECT OF DIGITALIZATION IN HEALTHCARE?

• Among researchers two ideas are dominating, opposing each other.
• One is **skeptical about the payoff of new healthcare technologies**, and the need to deal with healthcare-reorganization due to economic crisis and increasing demand for services.
  – There is a threat on unemployment from change in healthcare services.
• Others are more convinced of the **promise of innovation in healthcare**, believing that the economic **gains from the eHealth revolution are still to come.**
SOCIETY CHANGE

HEALTHCARE SERVICES DIGITAL TRANSFORMATION

Digital Technologies

Management/Patient Knowledge

Health Professionals’ Skills
A Universal Truth: No Health Without A Workforce
WHAT CHANGES IT WILL IMPLY FOR THE HEALTHCARE SERVICES MODEL?
What New Policies Will Be Required?

NEEDS

CHANNELS

PRODUCTS/SERVICES

RESOURCES
Our Healthcare Services Transformation Projects...

Creating artefacts that solve problems on the intersection between Engineering and organizations...

...creating better conditions for health innovation
WHY HEALTH PROFESSIONALS “DO NOT HAVE TIME”? Nurses and Physicians observed use of time (per activity)

**Profissionais observados**

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<thead>
<tr>
<th>Serviço X</th>
<th>Valid</th>
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<tbody>
<tr>
<td>Enfermeiro</td>
<td>79</td>
</tr>
<tr>
<td>Médico</td>
<td>53</td>
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<tr>
<td>Total</td>
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**Frequência**

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<th>Profissionais observados</th>
<th>Frequn</th>
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<tr>
<td>Enfermeiro</td>
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<td></td>
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<tr>
<td>Médico</td>
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<td></td>
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<td>Total</td>
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**MULTITASKING**

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<td>Serviço X</td>
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<td>116</td>
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<td>16</td>
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<td>132</td>
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THE OPPORTUNITY OF LEAN IN PROMOTING INNOVATION
Lean na Gestão da Saúde: Uma Oportunidade para Fomentar a Centralidade do Doente, o Respeito pelos Profissionais e a Qualidade nos Serviços de Saúde

Lean in the Health Management: An Opportunity to Improve Focus on the Patient, Respect for Professionals and Quality in the Health Services

Luís Velez LAPÃO
Acta Med Port 2016 Mar;29(3):xxx-xxx • http://dx.doi.org/10.20344/amp.6615

Palavras-chave: Assistência Centrada no Doente; Eficiência Organizacional; Gestão da Qualidade Total.
Keywords: Efficiency, Organizational; Patient-Centered Care; Total Quality Management.

Os casos de Flinders Medical Center (Austrália), Royal Bolton (UK), ThedaCare e Virginia Mason (USA) são exemplos de hospitais que conseguiram melhorar o seu desempenho através da utilização de metodologias Lean. Todavia, nem sempre o processo é tão fácil como aparenta. Não é que a aplicação do Lean seja difícil mas exige condições de melhoria continua. Isto diz respeito aos gestores, mas também aos profissionais de saúde e aos doentes.

Há um aspecto central na teoria da gestão que é o acesso à informação, sem a qual não é possível compreender como a organização está a funcionar e corrigir se neces-
Hospital organisation, management, and structure for prevention of health-care-associated infection: a systematic review and expert consensus. The Lancet Infectious Diseases, Nov 2014

Introduction
Health-care-associated infections (HAIs) affect millions of patients worldwide every year. In the European Union (EU) alone, the estimated number of HAIs is 4,544,100 annually, leading directly to around 37,000 deaths and 16 million extra days of hospital stay. Several evidence-based strategies for prevention of HAIs have been shown to be effective. However, implementation of these strategies is often hindered by organisational and managerial issues. This systematic review aimed to identify key elements for the organisation of effective infection-prevention programmes in hospitals and key components for implementation of monitoring. 92 studies published from 1996 to 2012 were assessed and ten key components identified: organisation of infection control at the hospital level; bed occupancy, staffing, workload, and employment of pool or agency nurses; availability of and ease of access to materials and equipment; and optimum ergonomics; appropriate use of guidelines; education and training; auditing; surveillance and feedback; multimodal and multidisciplinary prevention programmes that include behavioural change; engagement of champions; and positive organisational culture. These components comprise manageable and widely applicable ways to reduce health-care-associated infections and improve patients’ safety.

Despite control efforts, the burden of health-care-associated infections in Europe is high and leads to around 37,000 deaths each year. We did a systematic review to identify crucial elements for the organisation of effective infection-prevention programmes in hospitals and key components for implementation of monitoring. 92 studies published from 1996 to 2012 were assessed and ten key components identified: organisation of infection control at the hospital level; bed occupancy, staffing, workload, and employment of pool or agency nurses; availability of and ease of access to materials and equipment and optimum ergonomics; appropriate use of guidelines; education and training; auditing; surveillance and feedback; multimodal and multidisciplinary prevention programmes that include behavioural change; engagement of champions; and positive organisational culture. These components comprise manageable and widely applicable ways to reduce health-care-associated infections and improve patients’ safety.

...TO ADDRESS HOSPITAL INFECTIONS THERE ARE MANY BARRIERS...MOSTLY MANAGERIAL AND BEHAVIOURAL
BUT THEY SAY THEY DO NOT HAVE TIME TO HAND HYGIENE!

Nicolas Mary @ Flickr CC BY NC ND
Design a HIS Artefact for managing hospital infections

Source: WHO five Moments to reduce Hospital Infections
And Helping Prescribing Antibiotics…

HAITool

A Toolkit to Prevent, Manage and Control Healthcare Associated Infections in Portugal
IMPROVING THE CLINICAL VALUE BY LINKING PHARMACEUTICAL SERVICES AND PATIENTS IN THE WEB 2.0

- Service Monitoring and related parameters recording
- Support for communication with patients and other stakeholders
eHEALTH MEDICINE MANAGEMENT SYSTEM ARTIFACT
Linking together physicians, pharmacists and patients

Physiologic Data

Biochemical Data

Graphics
Mix-method approach combining literature review with the results from a focus group on this issue. Several experts participated:

- eHealth services will be a significant component of the services (new services and patient experience frameworks)

- Brynjolfsson and McAfee perspective on digitalization: digital revolution will be comparable to industrial revolution in its effects on the long-run, and eventually creating significant unemployment in the short-mean time.

- Our focus was on the impact of digitalization on healthcare services and on changes in employment.
| eHealth Service                                      | Health Professionals participating | Special skills Required | Healthcare Workforce Impact
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<tr>
<td><strong>Store-and-forward</strong></td>
<td></td>
<td></td>
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<tr>
<td>Tele-radiology</td>
<td>Two Physicians* radiologists, one administrative</td>
<td>No</td>
<td>-</td>
</tr>
<tr>
<td>Tele-diagnosis (ECG, EEG, MAPA, etc.)</td>
<td>Technician, Nurse, Physician</td>
<td>No</td>
<td>-</td>
</tr>
<tr>
<td>Healthcare eLearning</td>
<td>Technician, Nurse, Physician</td>
<td>Yes (Pedagogy)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Remote monitoring</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expert (&amp; 2nd opinion) offline consulting</td>
<td>2 physicians, 2 nurses or 2 technicians</td>
<td>Yes (communication)</td>
<td>+</td>
</tr>
<tr>
<td><strong>Technological eHealth</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5G - Ambient Assisted Living (e.g. sensors)</td>
<td>Technician or nurse</td>
<td>Yes ( Several)</td>
<td>+ +</td>
</tr>
<tr>
<td>Telenursing (monitoring)</td>
<td>Nurse</td>
<td>Yes, (communication)</td>
<td>+</td>
</tr>
<tr>
<td>Telepharmacy (monitoring drug intake and interactions)</td>
<td>Pharmacist</td>
<td>Pharmacist (Communication &amp; pharmaceutical care)</td>
<td>+</td>
</tr>
<tr>
<td>IoT</td>
<td>Administratives, Nurses, Physicians</td>
<td>No</td>
<td>+</td>
</tr>
<tr>
<td><strong>Interactive eHealth</strong></td>
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<tr>
<td>TeleTriage</td>
<td>Nurse and physician</td>
<td>Yes (communication)</td>
<td>-</td>
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<tr>
<td>Real-time Consultation between health professionals</td>
<td>2 physicians, 2 nurses or 2 technicians</td>
<td>No</td>
<td>-</td>
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<tr>
<td>Specialist Consultations</td>
<td>1 or 2 physicians</td>
<td>Yes (communication)</td>
<td>-</td>
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<tr>
<td>Tele-cardiology, Tele-dermatology, Tele-ophthalmology</td>
<td>1 or 2 physicians</td>
<td></td>
<td></td>
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<tr>
<td>Tele-Trauma</td>
<td>1 or 2 physicians</td>
<td>Yes (equipment)</td>
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<tr>
<td>Remote therapy</td>
<td>Technician</td>
<td>Yes (equipment)</td>
<td>+</td>
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<tr>
<td>Robotic Surgery</td>
<td>2 physicians</td>
<td>Yes (equipment)</td>
<td>+</td>
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<tr>
<td>Emergency telemedicine</td>
<td>Nurse, physician</td>
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<td>+</td>
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<tr>
<td>Tele-hemodialysis</td>
<td>Physician</td>
<td>No</td>
<td>- -</td>
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DISCUSSION

- Proper eHealth services implementation would require adjustments in the organization and on the workforce.

- Overall, it is not clear what would be the impact on health workforce.

- There are areas that the eHealth services will enable to optimize HR whereas other areas that will demand more health professionals, probably even promoting the emergence of other professions.

- Technological changes might eliminate routine labor, whether physical or cognitive, and it increases demand for non-routine work typically requiring more education.
THE IMPACTS OF DIGITIZATION ARE MUCH PROFOUND AND RAISE MANY QUESTIONS OPEN TO RESEARCH.

- What new professions and what changes on the other health professions will digitization force?

- What new organizations/business models are necessary to address new healthcare demands?

- Will physicians will be using more sophisticated electronic decision-support-systems?

- Would this use reduce/increase the number of health professionals required to respond to the population demands?
"WhatsApp a Doctor 24/7"

"No the doctor doesn’t do house calls, but Twitter him your symptoms and he’ll get back to you."

"We have all the latest high-tech equipment here. Would you like to send him some E-mail?"
Thank you!

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