IBM Healthcare

Healthcare system transformation: Predicting the future?

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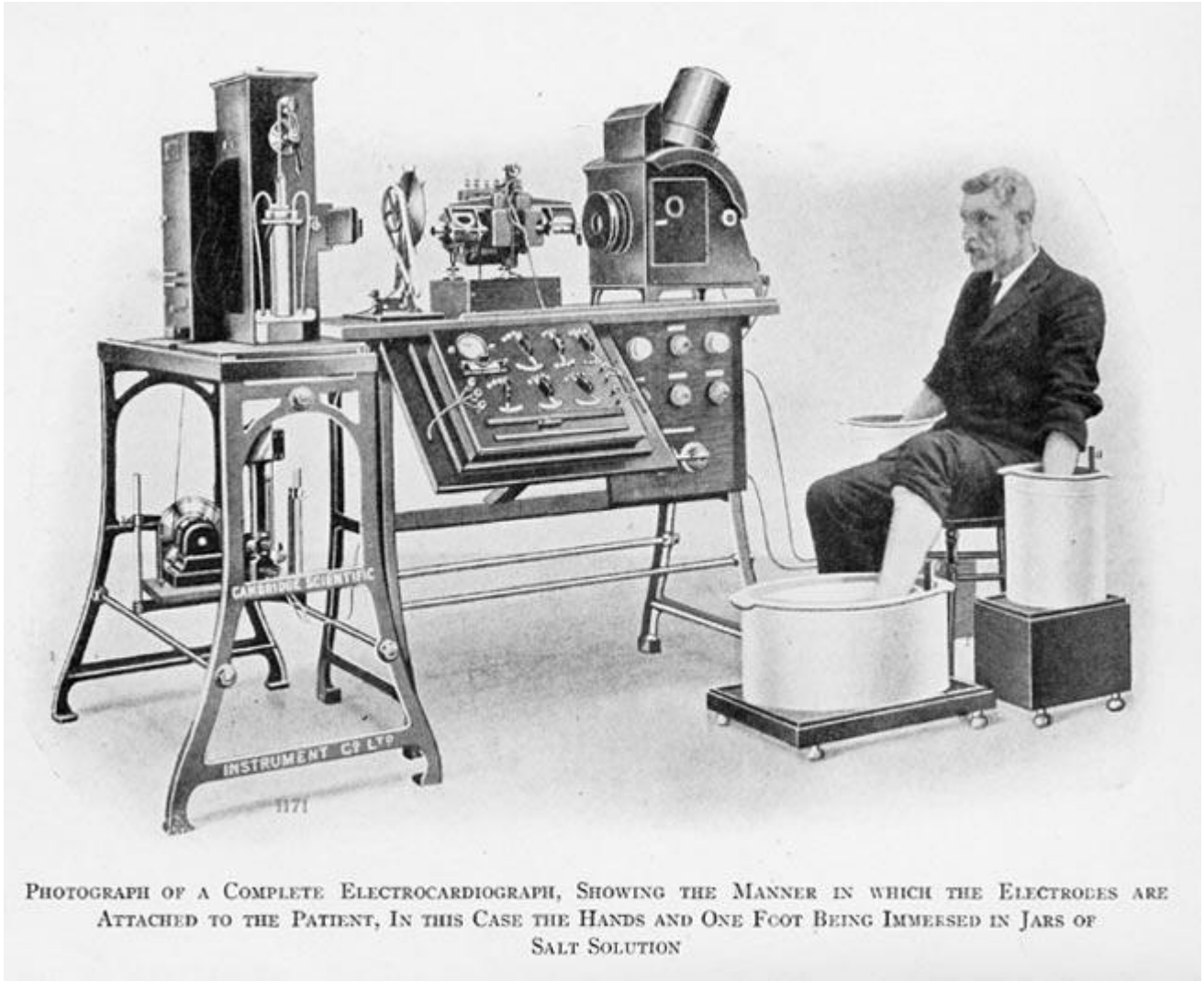
First tele-cardiogram: Willem Einthoven, 22 March 1905, Leiden



PHOTOGRAPH OF A COMPLETE ELECTROCARDIOGRAPH, SHOWING THE MANNER IN WHICH THE ELECTRODES ARE ATTACHED TO THE PATIENT, IN THIS CASE THE HANDS AND ONE FOOT BEING IMMERSED IN JARS OF SALT SOLUTION

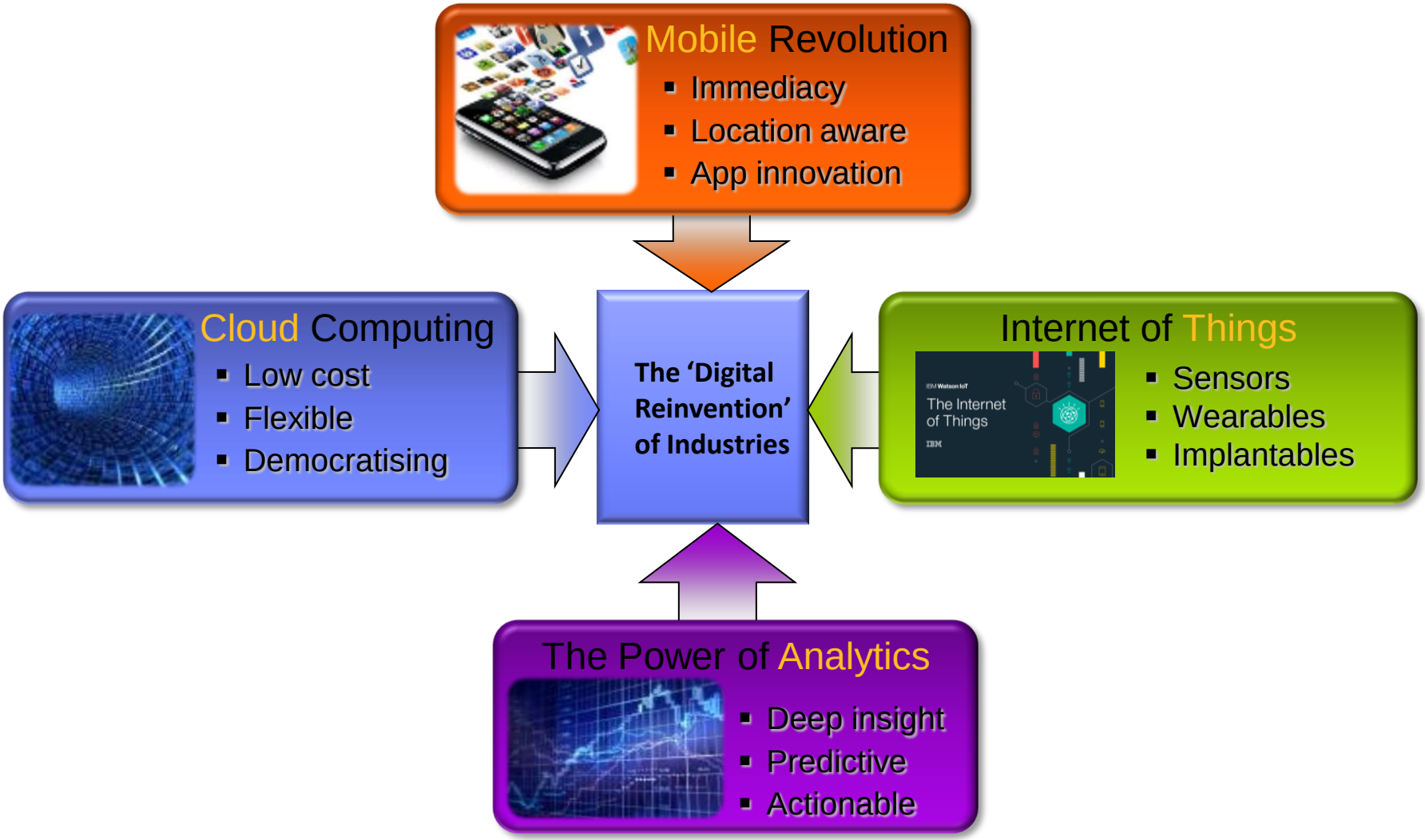
Cardiology Journal, 2007, Vol. 14, No. 3, pp. 316.317 Copyright © 2007 Via Medica

Anticipating remote medical consultations using radio in 1924

Mercy Virtual: The world's first facility dedicated to telehealth?

54 million dollar investment in Missouri, 330 specialised healthcare professionals providing ICU and home monitoring, nurse on call, and telestroke services

Converging technological innovations are driving the digital revolution across many industries – including healthcare

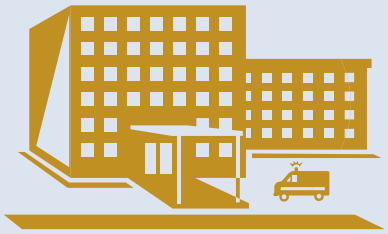


eHealth has mostly consisted of enabling and connecting providers of *medical care*

National eHealth Infrastructure (Unique ID, Summary Care Record, Disease Registries, Image Archives, Portals etc)

Acute/Secondary Care

EPR



•Patient Administration

•Clinical Departments (Radiology, Pathology, Theatre etc)

EPR

Tertiary Care

Community Care

EPR

•Public Health

•Case Management

Primary Care

•GP Systems

•Order Entry

•Prescriptions etc

eHealth

mHealth

Home

Office

Mobile

Connected Health

How can we speed adoption of ***Digital Health*** services for all***?***

National eHealth Infrastructure (Unique ID, Summary Care Record, Disease Registries, Image Archives, Portals etc)

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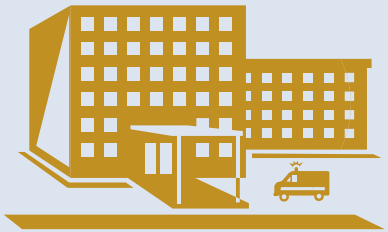

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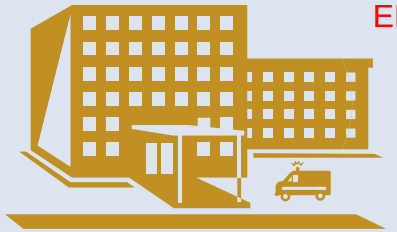

Tertiary Care

Community Care

EPR

•Public Health

•Case Management

Primary Care

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eHealth

mHealth

Home

Office

Mobile

PHR

Apps

•Information

•Communities

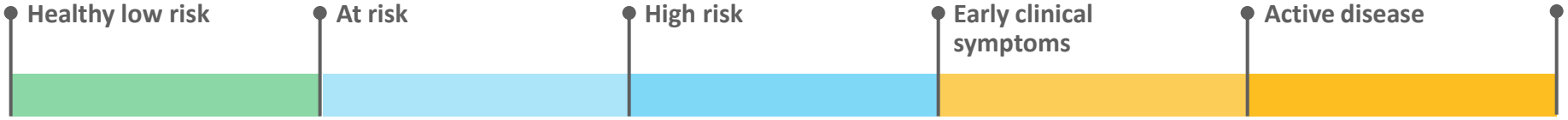
•Health Monitoring

•Disease Management

•Connected Devices

Connected Health

1. Care systems will use data to proactively manage population and individual health risks (Population Health)



Prevention

Educate and engage to modify behaviours to reduce health risks

Examples

- Run effective public health programmes
- Increase health literacy and self-awareness
- Encourage individuals to manage health risks

Early intervention

Promote routine screening and healthy lifestyles to defer disease onset and manage risk

- Predict disease onset to intervene earlier
- Support for smoking cessation, reducing alcohol and drug dependency, promoting increased activity, dietary advice

Care Management

Deliver the right care services in a coordinated way to maintain quality of life and optimise resources

- Prevent admissions and readmissions through alternative care pathways
- Provide proactive support for rehabilitation
- Ensure dignified and compassionate end of life care for elderly with frailty and dementia

2. For patients with complex needs, we need multi-disciplinary teams with shared plans

Superb access to care

Patient engagement in care

Clinical information systems, registry

Care coordination

Team care

Communication/ Patient Feedback

Mobile – easy to use and available information

Examples:

Region of South Denmark - Shared Care Platform

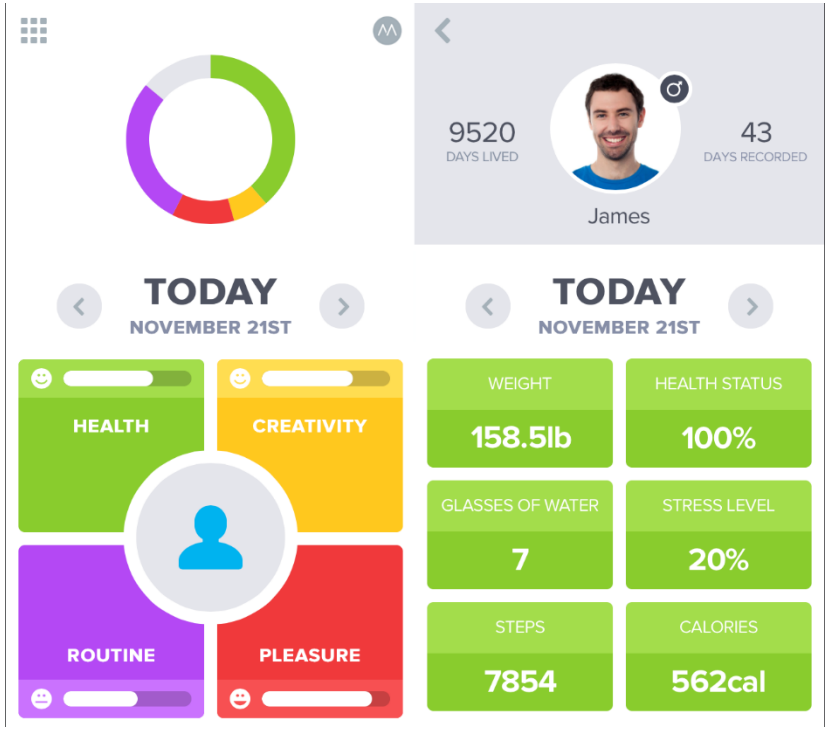
Catalonia – Shared Individual Intervention Plan (PIIC)

Scotland – Anticipatory Care Planning and Key Information Summary (KIS)

3. Each of us will be engaged as managers of our own health

Quantified Self
self knowledge through numbers

muse™
the brain sensing headband



4. New services will be created to meet the demands of an older population

Call and Check - postal workers to provide support and care for the community

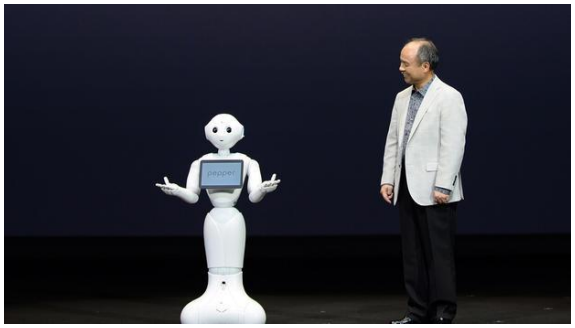
Jersey Post

Jersey Post now offers a range of health related services to the local community. From regular visits for vulnerable residents to repeat prescription services, our new services will help make your life a little easier.

5. The Internet of Things (IoT) - smart homes, telehealth and robotics will support ‘ageing in place’

Telemedicine, telehealth, telecare: keeping people safe at home

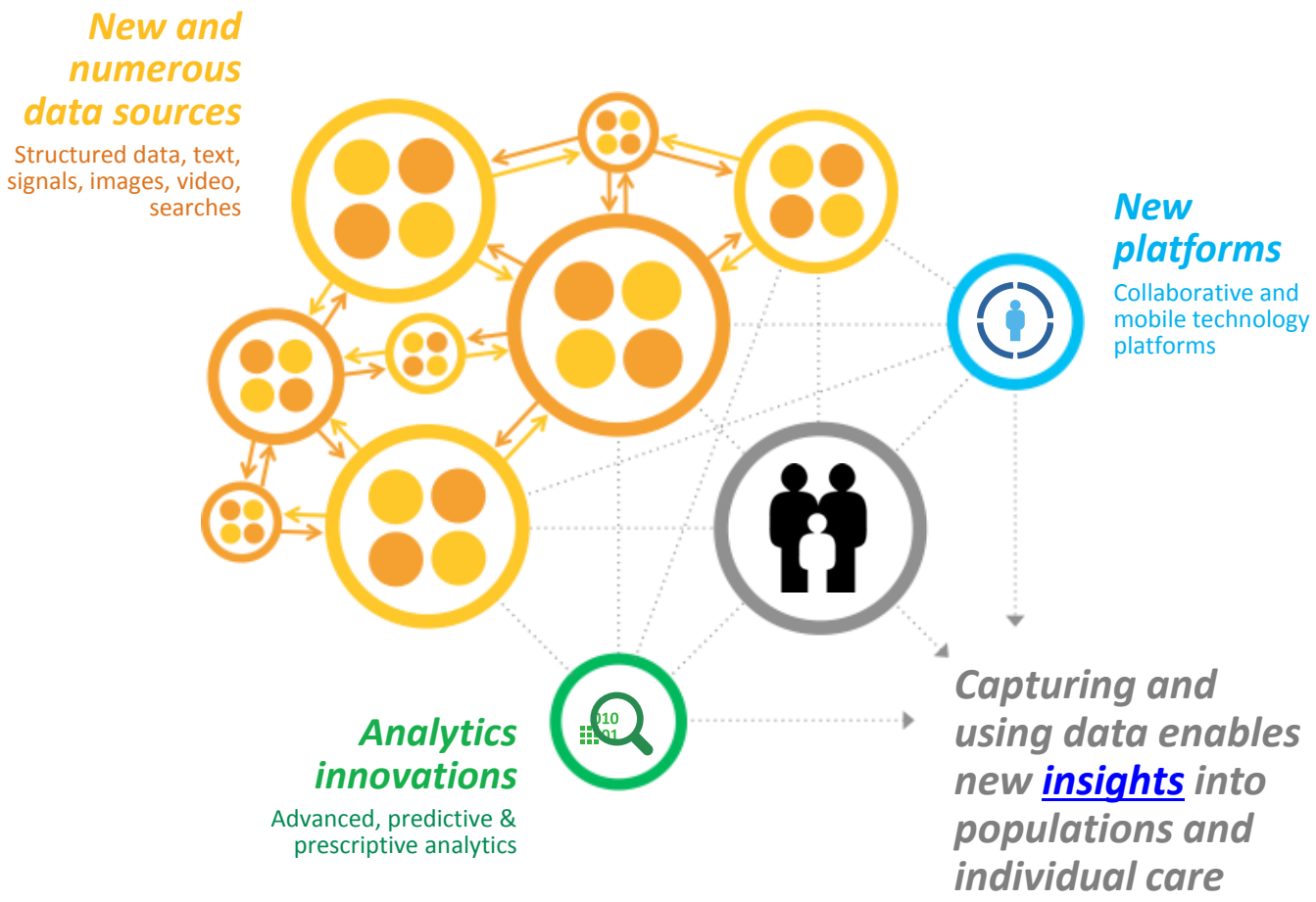
Smart Homes: analysing activities of daily living (ADL) – Bolzano, Italy



Affective Computing: recognising emotions and responding to them – Pepper, USA

Assistive technologies: robots that can lift and carry to compensate for disabilities – RoBear, Japan

6. Health data will be liberated and put to work for our benefit



Data will support medical research, personalised medicine and healthcare service improvement

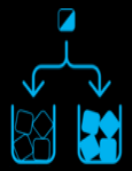
7. Machine learning and artificial intelligence will support the development of personalised healthcare & precision medicine

Ken Jennings vs Watson vs Brad Rutter, Jeopardy, 13-14 February 2011

It begins with the power of Watson

- Understands, reasons, learns and interacts
- Extracts and derives meaning from structured and unstructured content – at scale
- Provides analyses across vast arrays of criteria to transform decision-making
- Dynamically updates hypotheses based on variable chains of evidence
- Harnesses entire bodies of knowledge

Humans excel at:


Common Sense


Dilemmas


Morals


Compassion


Imagination

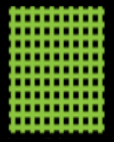

Dreaming


Abstraction

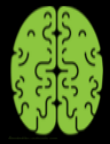

Generalization

Cognitive systems excel at:


Natural Language


Pattern Identification


Locating Knowledge


Machine Learning


Eliminate Bias


Endless Capacity

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