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Digital Transformation of the Healthcare Sector in Greece

Ioannis Kotsiopoulos,, BSc, MSc, MPhil, PhD, PgDip, PMP

Secretary General of Health Services, Ministry of Health, Greece



A few things about myself



1999 - 2000 Masters in Decision Support Systems (University of Manchester)

2003 - 2007 **PhD in Semantic Interoperability between Electronic Health Records Systems in the context of the NHS UK**
(University of Manchester)

- Distributed System Architecture vs Data Warehousing

- Develop truly extensible system architectures that reflect business reality in the healthcare domain

- Provide clinicians with the full dataset from a patient journey

- Secondary use of information for research, education, policy making etc

2008-2011 Consultant in Greek startup companies (EHR system vendors)

2011-2015 Deputy Chief Executive Officer, General Hospital of Nea Ionia, Greece

2015-2019 Chief Information Officer, Head of Business Intelligence, Dorset County Hospital, UK

2019-2022 **Secretary General for Health Services, Ministry of Health, Greece**



1. Funding
2. Aging population and chronic disease management
3. Shortage of Healthcare Professionals in NHS
4. The Pandemic crisis

Total Funding

Συνολική χρηματοδότηση



Public Funding

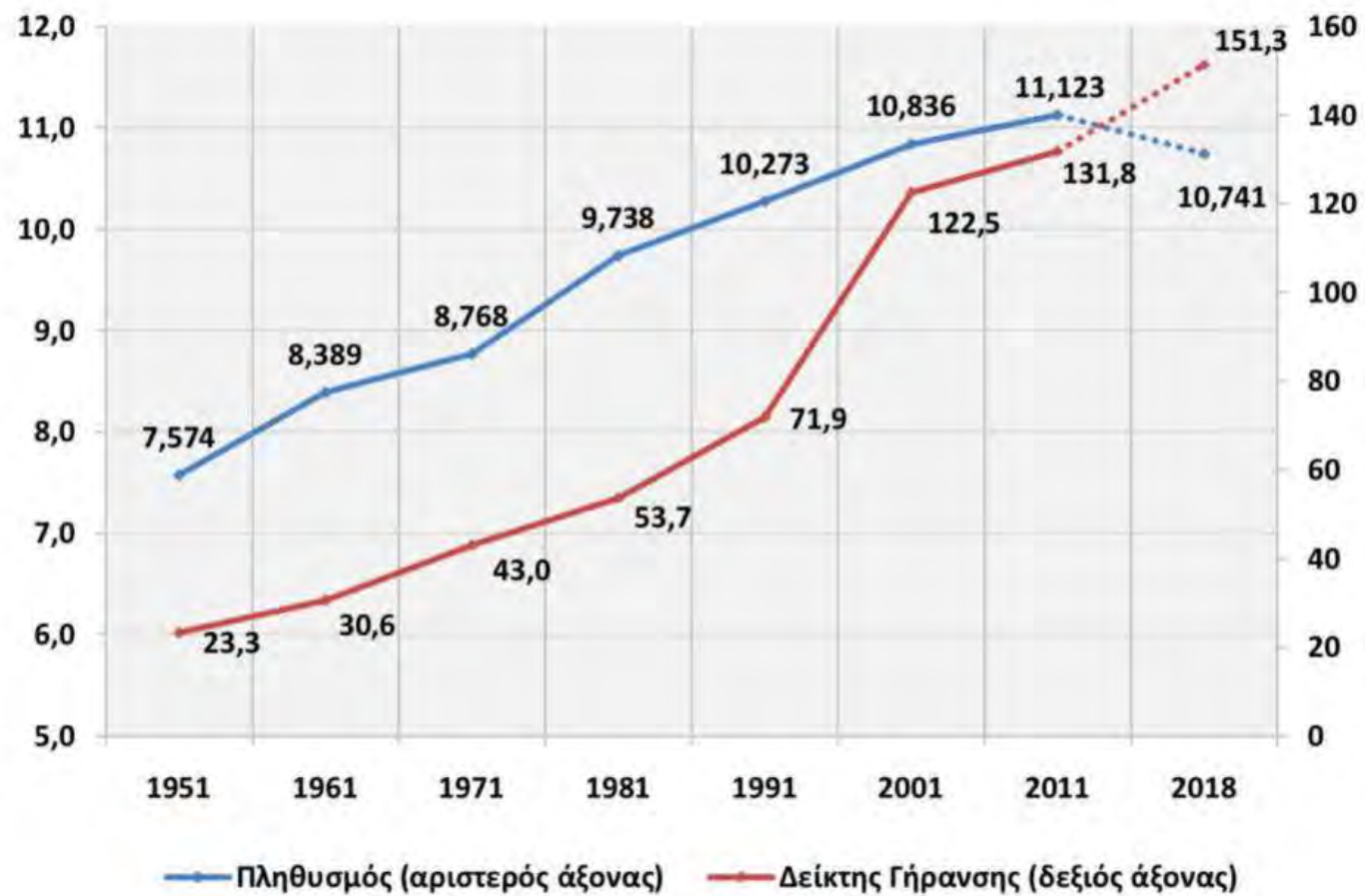
Δημόσια χρηματοδότηση



Πηγή: ΣΛΥ 2018, ΕΛΣΤΑΤ., 2019, Eurostat, OECD Health Statistics, 2019, επεξεργασία στοιχείων ΙΟΒΕ. Νότιες Χώρες (Ιταλία, Ισπανία, Πορτογαλία), EE23: (μη διαθέσιμα στοιχεία για Βουλγαρία, Κροατία, Κύπρος, Ρουμανία και Μάλτα)

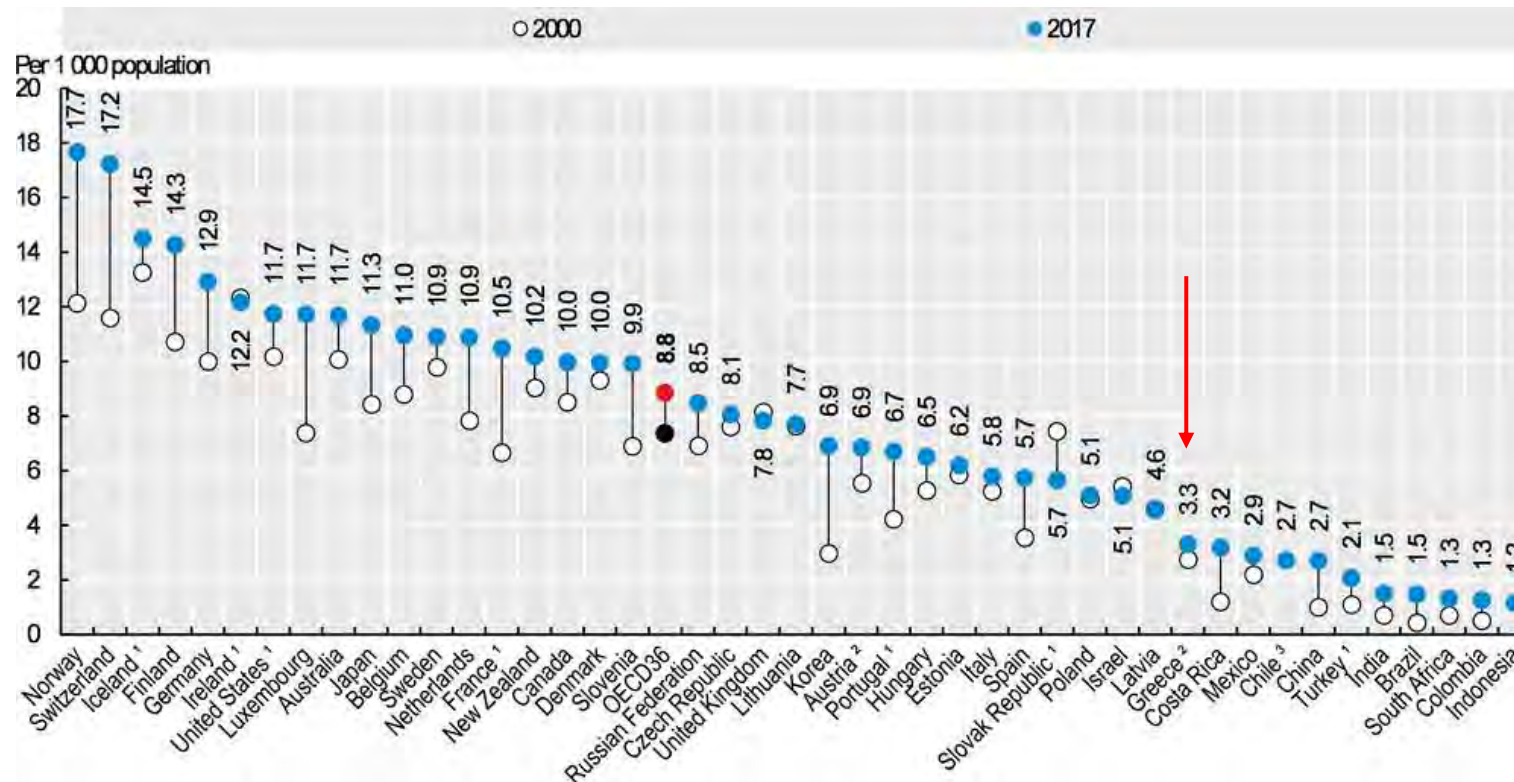


Aging Population



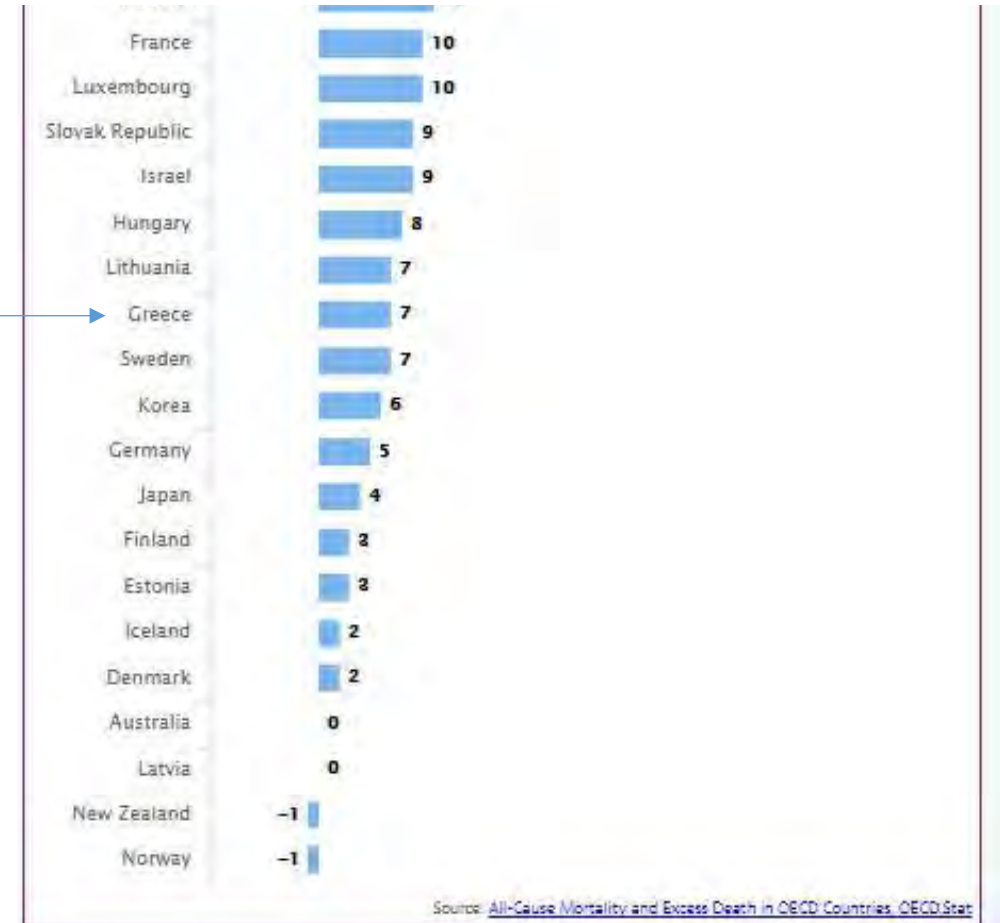
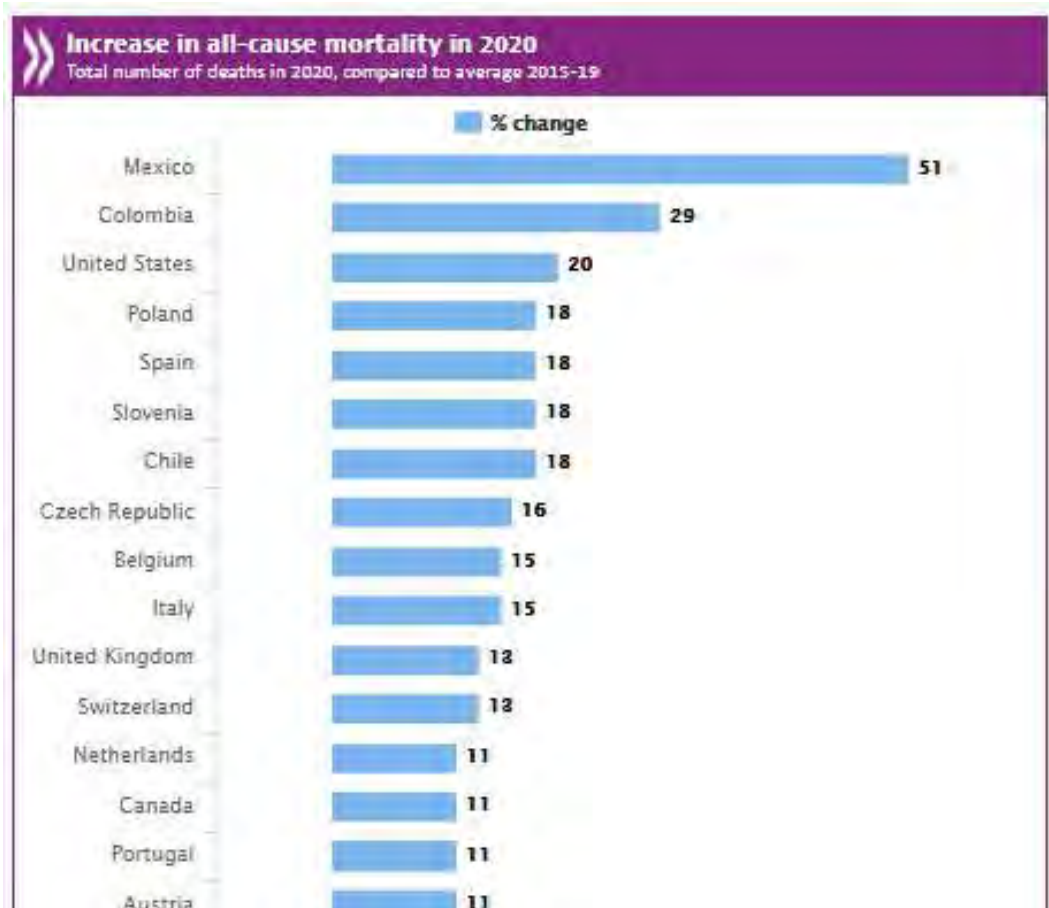


Practising nurses per 1 000 population, 2000 and 2017 (or nearest year)





COVID-19 pressure to the Greek NHS





DiGITAL Health strategy and priorities

The present

coronavirus.gov.gr

#μένουμε_ασφαλείς



govgr BETA

Digital health strategy and priorities

Response to
the pandemic

Digital health tools to tackle the pandemic

- Paperless e-Prescriptions and Paperless diagnostic e-Referrals
- National Patient Registry for COVID-19
- BI-Health (upgraded to monitor resources availability and impact of the pandemic)
- Teleconsultation service for home-restricted COVID-19 patients (in the process of establishing the legal framework)
- Portal <https://www.gov.gr/> (electronic access to hundreds of services making social distancing more feasible)
- Portal <https://covid19.gov.gr/> (information, guidance and citizens' support in a single location)
- Digital initiatives to tackle the pandemic: #COVIDhackGR
- Portal <https://emvolio.gov.gr/> (vaccination guide, appointment management application and vaccination rates reporting)
- Portal <https://self-testing.gov.gr/> (for self-test dispensation and results' declarations)
- Immunization Information System - IIS
- Digital Green Certificates (Greece aims for acceptance testing by May 15 and go-live by June 1)

Digital First Case study the Vaccination Process in Greece



E-health services in Greece in a nutshell

Introduction of numerous eHealth services, in line with EU strategies, to control costs and improve healthcare delivery:

ePrescription, eDispensation and eReferral for primary care, eConfirmation for insurance status verification, eReimbursement, eRDV for doctors' appointments- primary care, a BI-Health system collecting operational and financial data for the MoH, a few patient registries, Immunisation Information Systems for COVID-19 & Influenza, and the Electronic Health Record for Primary Healthcare.

Also, a [telemedicine network](#) that offers important services but is in need of an expansion.



E-prescription system

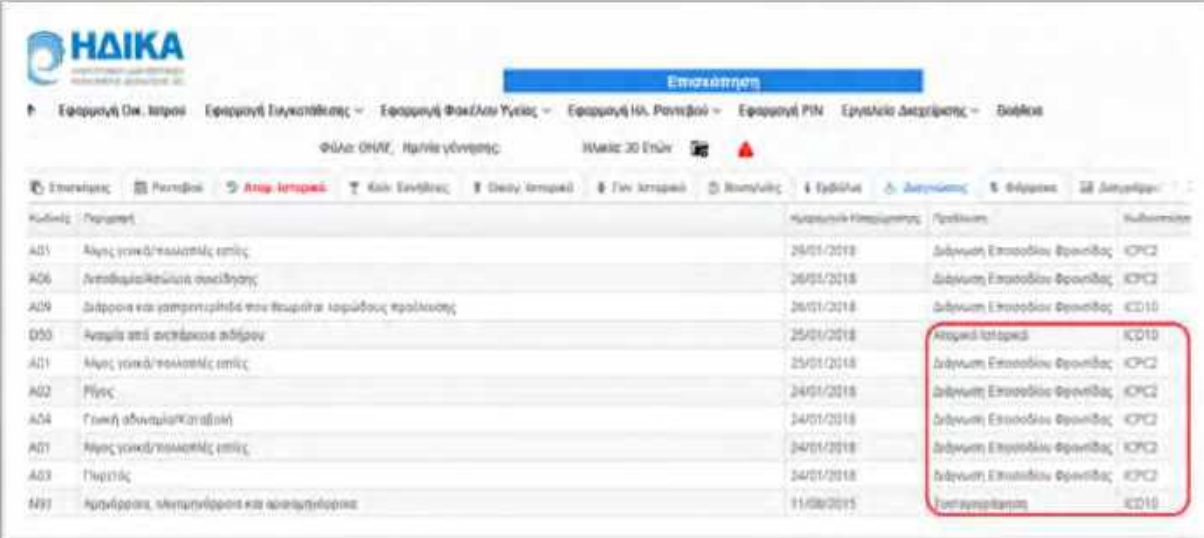
- National coverage >98%
- 850.000 transactions per day
- e-Prescription, e-Dispensation and e-Referrals services
- Standards-based and interoperable.
- Additional components:
 - Business Intelligence Reporting System
 - Anti-fraud sub-system
 - Therapeutic prescription protocols and integrated guidelines for a number of conditions such as dyslipidemias, osteoporosis, rheumatoid diseases, hypertension, etc.



Electronic health record for primary healthcare

Designed to collect patient health information generated by multiple encounters in the primary care delivery system and numerous sources to improve continuity of care and support a patient-centred approach to healthcare services delivery.

- At present: low penetration and information maintained mainly from the **ePrescription System** and from **medical records of visits** to a primary health care provider.
- MoH currently in process of taking all necessary **regulatory actions** to activate the EHR4PH and enable more medical professionals to enter data into the system.



Κωδικός	Περιγραφή	Ημερομηνία Επισκέπτης	Πρόβλημα	Κωδικός
A01	Άσπες γαστρίτιδας/ελπίδας	25/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A06	Αποδομολύση/εξάλειψη συνείδησης	26/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A09	Διάρροια και γαστρεντερικά που θεωρείται λοιμώδους προέλευσης	26/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
D50	Αναιμία από ανεπάρκεια σιδήρου	25/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A01	Άσπες γαστρίτιδας/ελπίδας	25/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A02	Πυρεξία	24/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A04	Γνωστή αδυναμία/Καταβολή	24/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A01	Άσπες γαστρίτιδας/ελπίδας	24/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
A03	Πυρεξία	24/01/2018	Διάγνωση Επισκέπτη Φροντίδας	ICD10
N93	Ασυνέπεια, ανεπάρκεια και ανισορροπία	11/08/2015	Διάγνωση Επισκέπτη Φροντίδας	ICD10

Hospital information systems

- **Hospital Information Systems** are characterized by diversity and extensive **heterogeneity** leading to serious **data fragmentation** among the 130 public hospitals.
- Up to now, all major digital interventions focused on ERP and LIS systems, which are available in every Hospital. However, **fully operational EMR** systems are rare, conformance to standards is low and interoperability is limited.
- Several Hospitals come up with **Medical Image Archiving Systems** and there is a central backup repository which, however, lacks VNA features.
- There is a project in progress, funded by NSRF for the implementation of a **common integrated information system** for 12 Hospitals. 7 Hospitals have already joined but there are delays due to the pandemic.
- Hospital IT departments are seriously **understaffed**, and IT professionals represent just 0.38% of total hospital workforce.



Health data

- Despite the fact that significant effort has been made to effectively link hospitals, regional health systems, and primary care, still no **uniform access to EHR** is available nationwide and in spite that large amounts of data are generated they continue to reside in data silos and opportunities for **data reuse** are often missed due to the limited interoperability of systems.
- Greece acknowledges the lack of a well-refined interoperability framework and is developing the **NeHIF**.
- Also, places a strategic priority in the National EHR System.
- Greece also recognizes the importance of: **enabling patients to have access to their own data**, and b) the **secondary use of health data**.





DiGITAL Health strategy and priorities

The Strategy

Digital Transformation: hype or game changer?



Our Digital Health Strategy...developed during the pandemic

Our Strategy

1. To extend existing **Digital Infrastructure** as part of a comprehensive Digital Transformation Agency.
2. To align with the **National Digital Strategy** developed by the Ministry of Digital Governance
3. Identify **Quick Wins** that could be delivered within the first few months

Technology

Adopt **Open Architectures** , vendor neutral solutions, innovative technologies like (artificial intelligence, machine learning κ.α.)



People

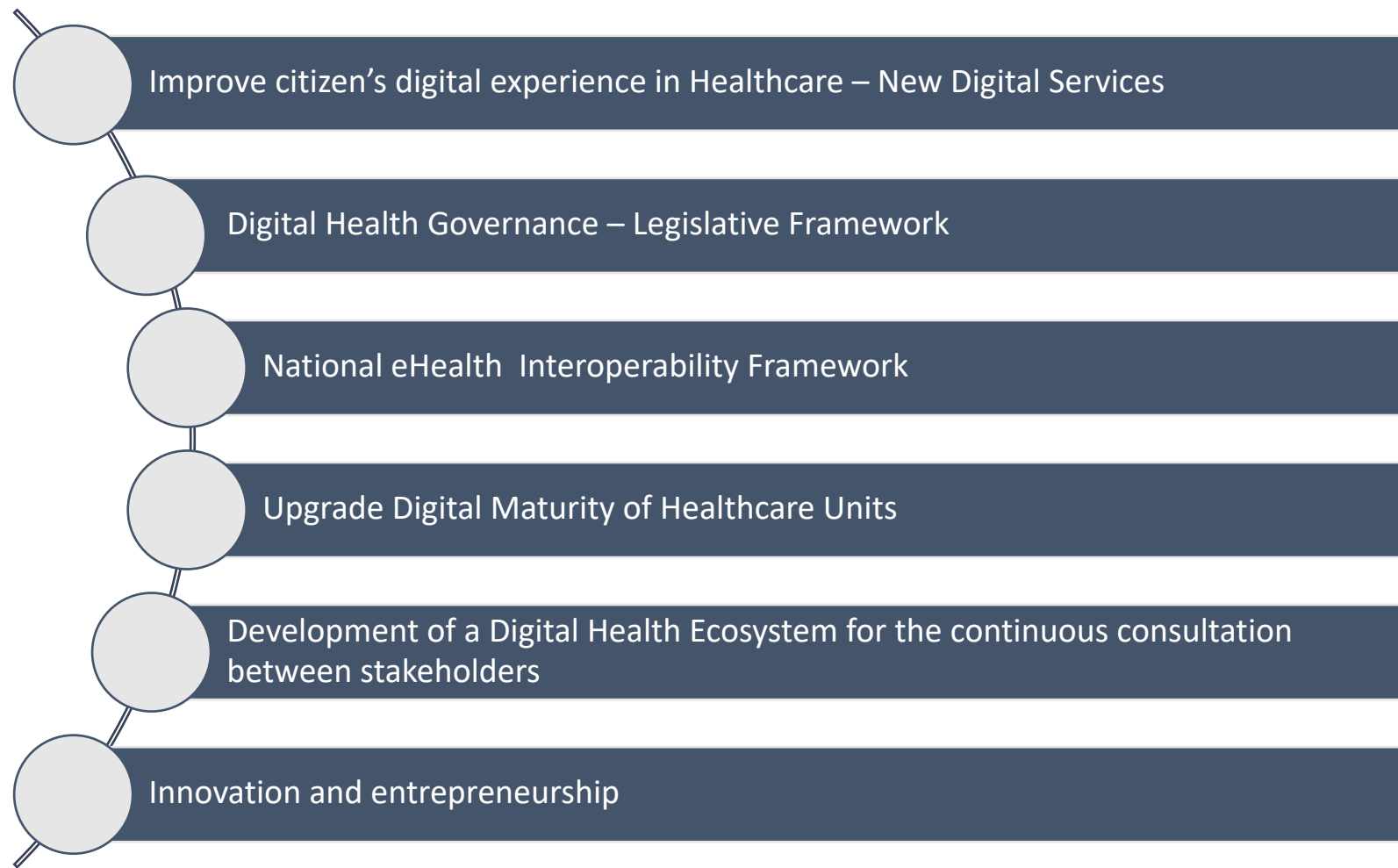
Use technology in ways that help Healthcare Professionals to delivery safer and more compassionate care.

Outward Mindset

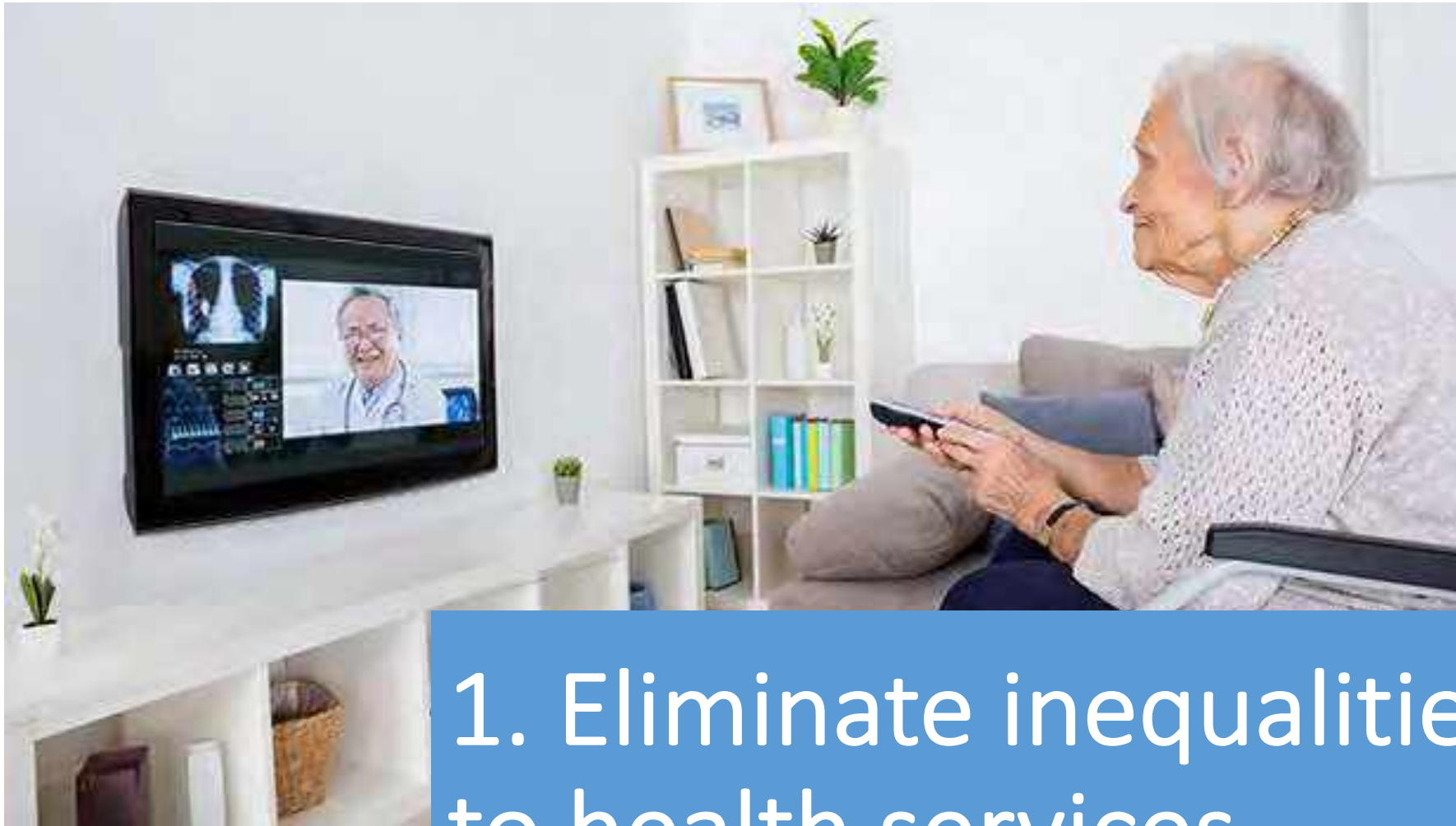
Make use of the experience and the lessons learned from other EU Member States
Collaborate with International Institutions

DIGITAL TRANSFORMATION BIBLE :

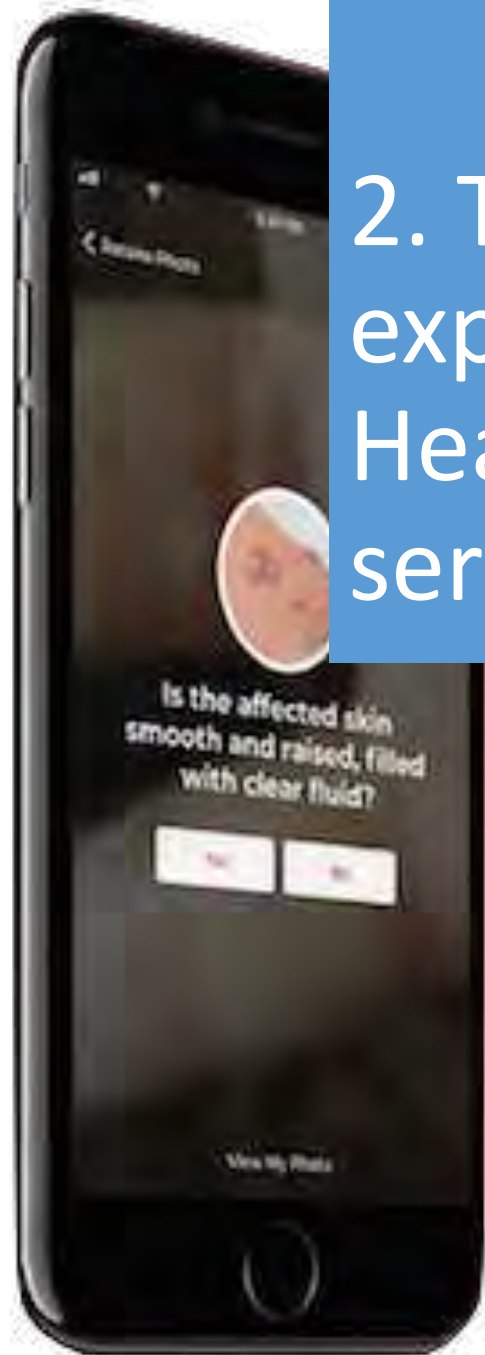
The 7 axis of digital transformation IN HEALTHCARE



The Vision of the Digital Transformation in Healthcare



1. Eliminate inequalities in access to health services



2. To create a new digital experience of the citizen in Health with new digital services – self managed care

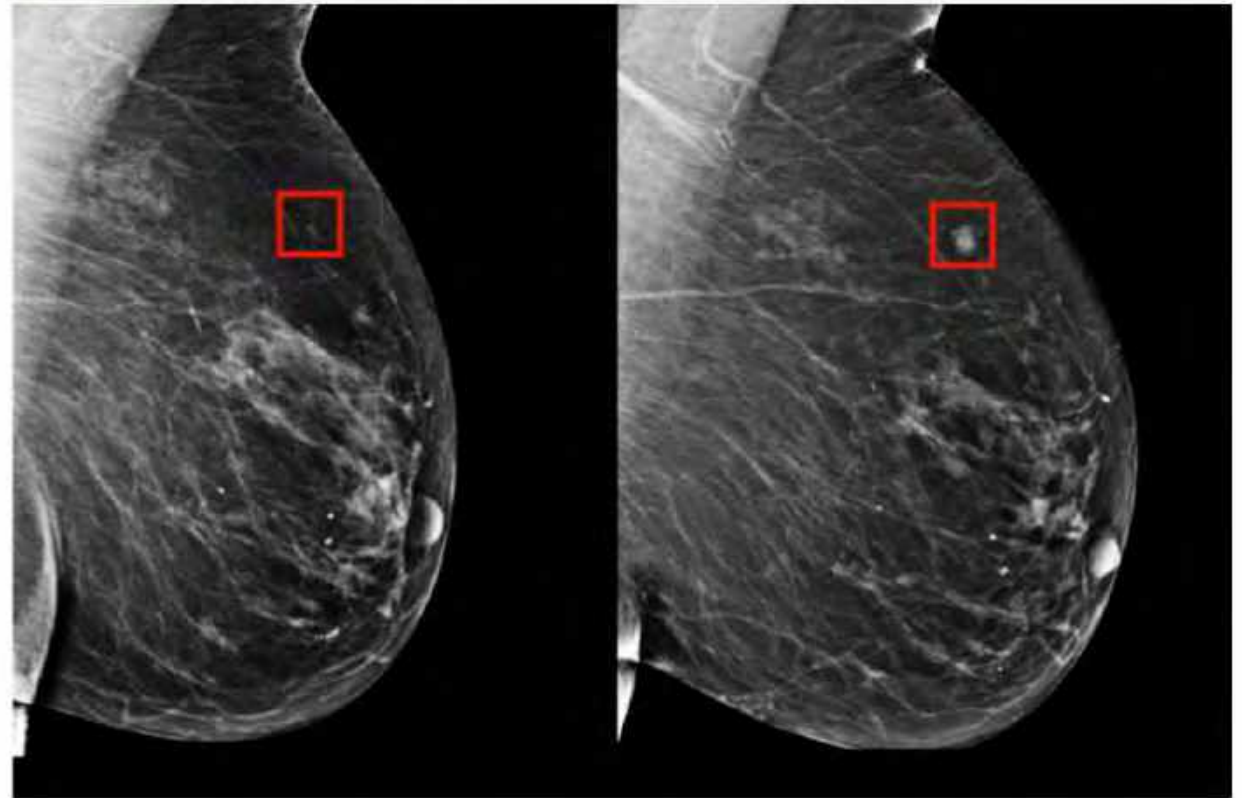


3. To be a reliable partner of the Health Professional

Using AI to predict breast cancer and personalize care

MIT/MGH's image-based deep learning model can predict breast cancer up to five years in advance.

Adam Conner-Simons and Rachel Gordon | CSAIL
May 7, 2019





4. To create fully digitized Hospitals that will be safer for patients

The Greek Digital Health Proposal

4+1 Programs:



HELLENIC REPUBLIC

“Next Generation EU”

Greece 2.0

NATIONAL RECOVERY AND RESILIENCE PLAN

1. National Digital Patient Health Record
2. Cancer treatment digital transformation program
3. Improve Hospital Digital Readiness
4. Telemedicine
5. National Insurance Fund Digital Transformation

Budget**344,2 m. €****Timeline****2021-2025**

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Υπουργείο Υγείας



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Υπουργείο Ψηφιακής Διακυβέρνησης

**ΗΔΙΚΑ**ΗΛΕΚΤΡΟΝΙΚΗ ΔΙΑΚΥΒΕΡΝΗΣΗ
ΚΟΙΝΩΝΙΚΗΣ ΑΣΦΑΛΙΣΗΣ Α.Ε.ΚΟΙΝΩΝΙΑ ΤΗΣ
ΠΛΗΡΟΦΟΡΙΑΣ

Greece 2.0

NATIONAL RECOVERY AND RESILIENCE PLAN

10 Hospitals
all over the
country



Budget
36.445.340,96 €

Digital Cancer Programme

National Cancer Registry

Joining the European Network of Cancer Registries

Common Medical Oncology Information System in 12 Hospitals
with emphasis on systematic antineoplastic treatment

Introduction of MDT Technology in 12 Hospitals

Patient Support Apps for remote monitoring, teleconsultation etc



This Greek Healthcare Digital Transformation Funding Program is based on the following design principles:

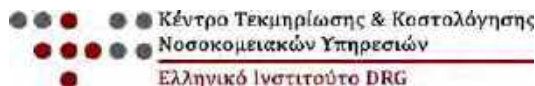
1. The Implementation of robust, well-defined and well-governed eHealth Interoperability Framework (described further in this presentation)
2. The Alignment to EU standards and common vision
3. The Need for additional reforms ahead
4. The concept of not reinventing the wheel



National eHealth
Interoperability
Framework

Εθνικό Πλαίσιο
Διαλειτουργικότητας
στην Ηλεκτρονική Υγεία

1. The National eHealth Interoperability Framework was proposed in 2021 with a first set of specifications for the laboratory results exchange use cases
2. KETEKNY was appointed as the Terminology governance entity and will participate in project XpanDH
3. The Ministry of Health is participating in the X-eHealth project and envision to use the European EHR exchange format specification in Greece



Exchanging Electronic Health Records
in a common framework

Laboratory Results



Medical Imaging



Rare Diseases



Discharge Letters

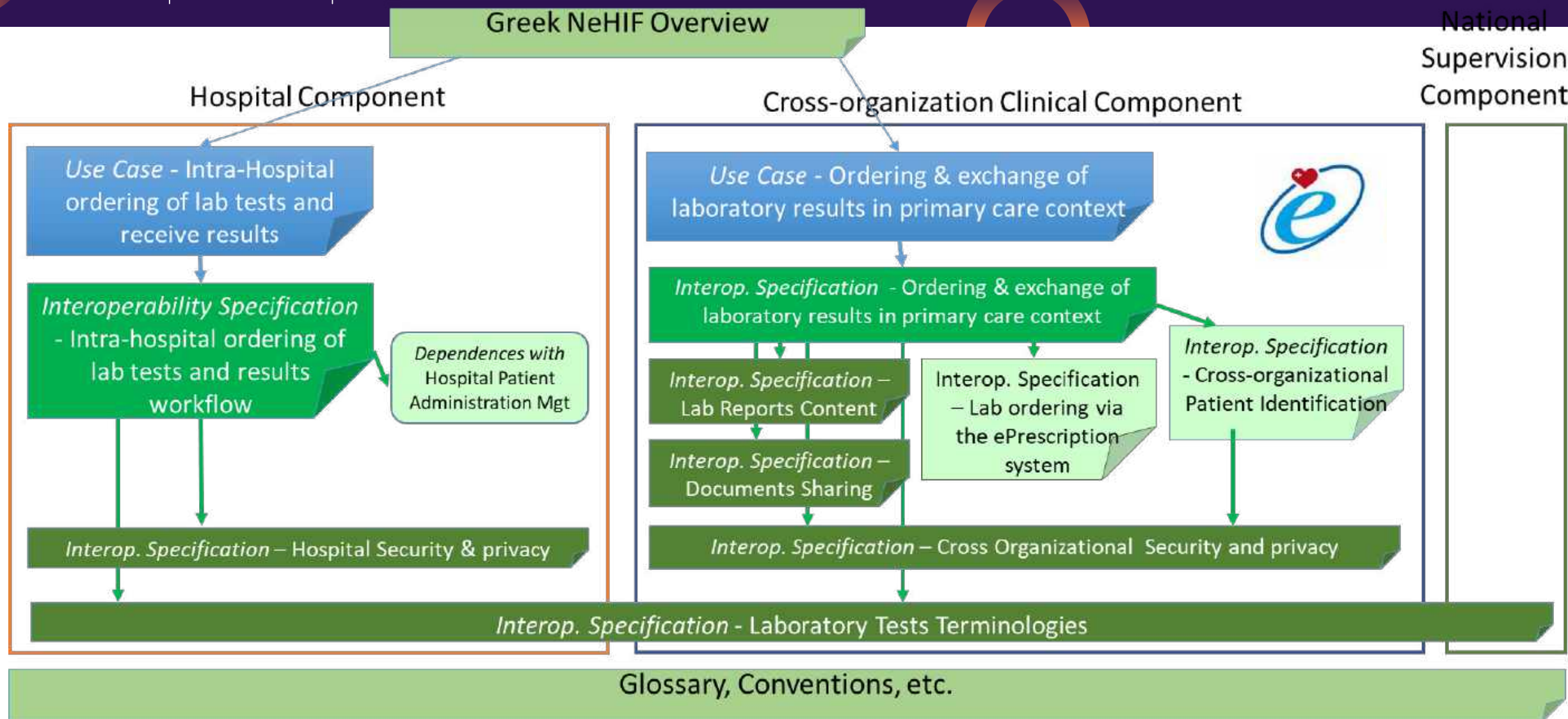


X-eHealth

Exchanging Electronic Health Records
in a common framework



Building the Greek NeHIF – the Lab results Use Case





- 45+ meetings of the Project Team (through Teleconference) took place.
- 4 Technical sub working groups with 70+ meetings through Teleconferences (10 to 35 participants each time) between October and March 2021

- 2 Vendors and stakeholders calls
- 8 Vendors and Stakeholders associations involved
- 5 Steering committee meetings
- 3 training programs completed with 100+ participants
- ~100 experts enrolled in the Working groups communications

- 25+ use case and NeHIF governance workshops with ~20 participants each
- All deliverables approved
- NeHIF governance model approved
- A three-days testing event (Projectathon) was contacted with 22 interested companies, 10 that tested with ~100 tests completed

Projectathon performed between 7 and 9 July 2021

Several participants requested more time for testing
96 test were performed from the 29 test plans already included in the testing platform

Several improvements for the future were proposed.

A 2nd projectathon needs should be planned as soon as possible providing the vendors 6 months to prepare

The projectathon was a successful event

- Participation covered expectation for a first-time event
- The event provided the necessary experience to the vendors
- Vendors adopted and approved this method of co-creating specifications and testing them before implementation



Organisation	Mot clé du système	Nom du système/produit
Computer Solutions SA	FORM_FILLER_CSSA_LIS_ASCLEPIOS	Asclepios LIS
Computer Control Systems ERD SA	OTHER_CCS	Medilab
GREEK INFORMATICS L.T.D	FORM_FILLER_GI	GI
Computer Solutions SA	EHR_CSSA_CARE_ASCLEPIOS	Aclepios CARE
Foundation for Research and Technology - Hellas	EHR_FORTH_ICS	ICS
TechApps Healthier	EHR_TH_Healthier	Healthier
PCC HELLAS	CONTENT_CONSUMER_PCC_CONSUMER	PCC LAB_RES_CON
HYPERMORPH E.E.	EHR_MM_HYPER	HYPER_EHR
Unisystems	CONTENT_CONSUMER_Unisystems_test	Unisystems_test_1
Dravity Health	CONTENT_CONSUMER_DRH_LIS_Order	Medicalinfo_HIS_LIS_Result
Mindmed IKE	EHR_Mindmed	MindMed Platform
Computer Team	OTHER_CTeam_EPR	EPR
Gnomon Informatics S.A.	OTHER_Gnomon_ehealthpass_connect	ehealthpass_connect
Oracle America Inc.	OTHER_ORACLE_2021	Oracle HIE solution 2021
MedSite IKE	EHR_MedSite_pchr	Primary Care Health Records
Intrasoft International	ADT_Intrasoft_EPSMY	HIS - EPSMY
MedSite IKE	OTHER_MedSite_pchr	MyPD
Dravity Health	CONTENT_CREATOR_DRH_HIS_LIS_ORDER	Medicalinfo_HIS_LIS_Order
Infomed C.S	EHR_Infomed	Order creator
Infomed C.S	OTHER_Infomed_Slis	Order consumer

Registered 22 Systems – 17 Vendors

Active during the event: 13 systems – 10 Vendors



Greece is preparing for the Proposed Regulation on the European Health Data Space

Main New Regulation Results

- Strengthen the rights of natural persons to control digitally their health data
- Provide an EU framework for the secondary use of electronic health data
- Cross border sharing and secondary use of electronic health data
- Mandatory certification for EHR systems
- MyHealth@EU would become mandatory and natural persons could exchange their personal electronic health data cross-border



EUROPEAN
COMMISSION



Strasbourg, 3.5.2022
COM(2022) 197 final

2022/0140 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the European Health Data Space

(Text with EEA relevance)

{SEC(2022) 196 final} - {SWD(2022) 130 final} - {SWD(2022) 131 final} -
{SWD(2022) 132 final}



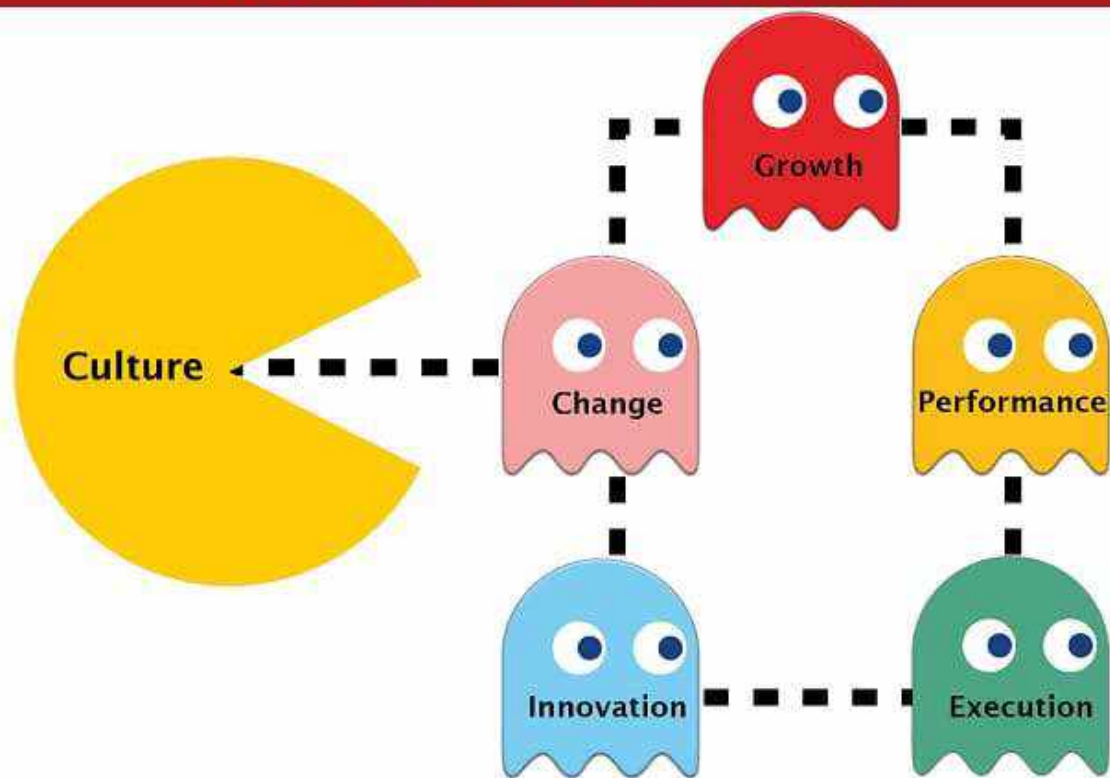
Politics

- Broad consensus and mobilization of the country's digital health potential
- Quick and effective response to required institutional and administrative adjustments.

Legal

- Law 4727/2020 lays the foundations for the Digital Transformation of the country
- More Reforms are required for the healthcare sector with a legal framework for digital health
 - Governance of the National Interoperability Framework
 - National Coding Management
 - Certification of Digital Tools
 - Telemedicine
 - Reform of Organizations of Health Units

Organizational culture eats strategy for breakfast, lunch and dinner



Torben Rick www.torbenrick.eu





Time management



- The Digital Transformation process is a never ending story
- Greece 2.0 program is just the start (next 5 years)
- Quick Wins are important to make the reform visible but we need to focus on the long-term changes

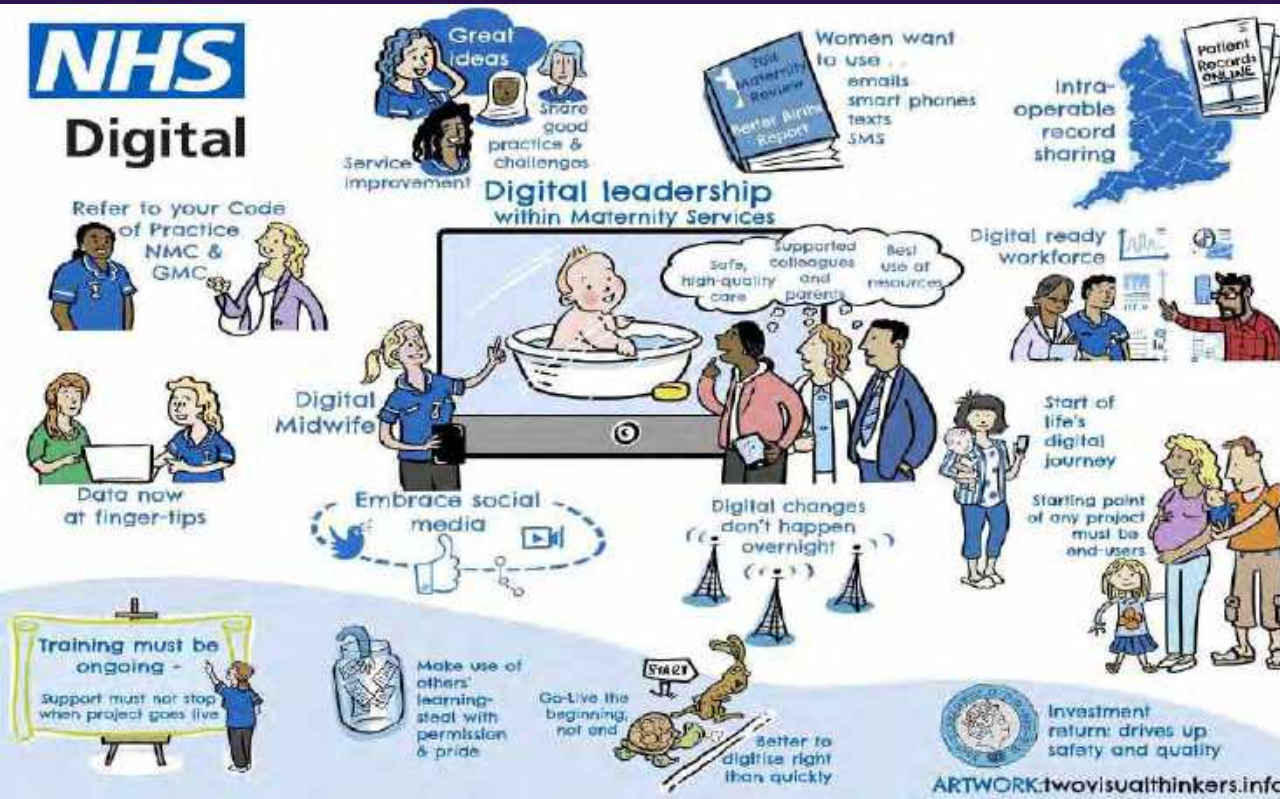
Sustainability

- Securing resources to cover the cost of operation, maintenance and support of Digital Systems after their delivery.
- Forming a continuous governance scheme
- Human resource development - Creation of executives



Leadership

Promote leaders who will adopt modern management models to manage change and support mindset change



The End Users

- pioneers in the design and evaluation of digital solutions
- are actively involved in redesigning the processes required to utilize the new tools
- develop new skills, beyond the simple use of digital systems

The Digital Health Market in Greece is called:

- to invest in innovation
- adapt to the rules (interoperability, certification)
- to respect the State as a customer, providing high quality products and services
- take full advantage of the business opportunities offered, for the first time, to such an extent....

The European Priorities ahead

Digital Health and Care



TRANSFORMATION OF HEALTH AND CARE IN THE DIGITAL SINGLE MARKET - Harnessing the potential of data to empower citizens and build a healthier society

European health challenges

- Ageing population and chronic diseases putting pressure on health budgets
- Unequal quality and access to healthcare services
- Shortage of health professionals

Potential of digital applications and data to improve health

- Efficient and integrated healthcare systems
- Personalized health research, diagnosis and treatment
- Prevention and citizen-centred health services

What EU citizens expect...

- 90% agree** To access their own health data (requiring interoperable and quality health data)
- 80% agree** To share their health data (if privacy and security are ensured)
- 80% agree** To provide feedback on quality of treatments

Support European Commission:

1 Secure access and exchange of health data

Ambition:

Citizens securely access their health data and health providers (doctors, pharmacies...) can exchange them across the EU.

Actions:

- eHealth Digital Service Infrastructure will deliver total cross-border services (patient summaries and prescriptions) and cooperation between participating countries will be strengthened
- Proposals to extend scope of eHealth cross-border services to additional cases, e.g. full electronic health records
- Recommended exchange format for interoperability of existing electronic health records in Europe

2 Health data pooled for research and personalised medicine

Ambition:

Shared health resources (data, infrastructure, expertise...) allowing research, diagnosis and treatment.

Actions:

- Voluntary collaboration mechanisms for health research and clinical practice starting with "real mission" genomes by 2022 targeted
- Specifications for secure access and exchange of health data
- Pilot actions on use cases, infectious diseases and cancer data

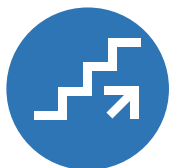
3 Digital tools and data for citizen empowerment and person-centred healthcare

Ambition:

Citizens monitor their health, adapt their lifestyle and interact with their choices and cases (navigating and providing feedback).

Actions:

- Facilitate supply of innovative digital-based solutions for health, also by SMEs, with common principles and certification
- Support demand uptake of innovative digital-based solutions for health notably by healthcare providers and providers, with exchange of practices and technical assistance
- Mobilize more efficiently public funding for innovative digital-based solutions for health, including EU funding



Opportunities

- Funding from the European Recovery Fund and the NSRF
- Utilization of experience from the successful operation of renowned systems (eg E-Prescribing) but also from the less successful efforts (eg Hospital Information Systems).
- Rapid familiarization of people with digital technology thanks to the pandemic



DIGITAL TRANSFORMATION



Threats

- Excessively optimistic targeting
- Pressure for fast results
- Lack of readiness of health institutions to welcome the transformation
- Delays in institutional and administrative interventions
- Failure to ensure continuity - viability