Health Data, Health Data, and More Health Data: From Quantity to Quality Through Cooperation

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Health Data, Health Data, and More Health Data: From Quantity to Quality Through Cooperation

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Katarzyna Kolasa, PhD
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Jose Valverde
DG Connect
European Commission
Commission Communication COM (2018) 233

Digital transformation of health and care in the Digital Single Market empowering citizens and building a healthier society

Putting people at the centre of health and care

- Enabling secure access to health data across the EU
- Data sharing for better research and personalised healthcare
- Empowering patients with digital tools

#DigitalSingleMarket
#DigitalHealth
(I) Giving citizens better access to their health data

The eHealth Digital Service Infrastructure (eHDSI) enables exchange of patient data across borders

- **Patient Summary** provides access to health professionals to verified key health data of a patient during an unplanned care encounter while abroad

- **ePrescription** enables patients to receive equivalent medication while abroad to what they would receive in their home country
(I) Giving citizens better access to their health data

EC encourages and support MS to adopt interoperable electronic health records systems

Recommendation

European Electronic Health Record exchange format

DAVIDE IS A 59-YEAR OLD ITALIAN NATIONAL WHO HAS LIVED AND WORKED IN FRANCE FOR THE LAST 30 YEARS.

DAVIDE SUFFERS FROM A PARTICULAR HEART CONDITION, AND WOULD LIKE HIS DOCTORS IN ITALY TO HAVE ACCESS TO HIS FULL MEDICAL RECORDS BUILT-UP IN FRANCE OVER THE LAST 30 YEARS. BUT CURRENTLY THIS IS NOT POSSIBLE.
(II) Pooling health data for research and personalised medicine

- Policy coordination, linking resources
- Support common data infrastructure, standards

In 2015 Anne-Kelly was born in Dublin, Ireland. Doctors recorded an abnormally small head and face, as well as a slow development rate. It was impossible to pinpoint the cause of Anne-Kelly's slow development based on national data alone.

Advanced data analytics through a EU-federated platform made it possible to find a second case with similar symptoms and the same mutation in Spain, and therefore reach an accurate diagnosis for Anne-Kelly's condition.
Declaration for delivering cross-border access to genomic database

- 1 million **genomes accessible** in the EU by 2022
- **Linking access** to existing and future genomic database across the EU
- Providing a sufficient scale for **new clinically impactful** associations in research
(III) Digital tools to foster citizen empowerment and person-centred care

By allowing feedback communication and interaction between users and health care providers, mhealth can improve quality of services and better planning/management by healthcare systems.
(III) Digital tools to foster citizen empowerment and person-centred care

- Deployment of digital services, capacity building
- Common principles for validation and certification
- Mobilise investments supporting large scale pilots
THANK YOU!

Subscribe to our newsletter 'eHealth, Wellbeing & Ageing' via bit.ly/eHealthinFocus
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Wim Goettsch, PhD
Utrecht University
Utrecht, Netherlands
Reasons for changing concepts of HTA

• Internationalization
  • Clinical assessments on an European level
  • Alignment with stakeholders (patients, regulators, payers, clinicians)

• Real world data

• Personalized treatments
  • Smaller populations
  • Combinations of treatments, different sequences
  • Companion diagnostics (genetic testing)
Development of more personalized treatment concepts
This is the reality for patients

Example 1: Bortezomib treatment in practice (NL)

Example 2: CAR-T treatment in practice (USA)


HTx: Vision for a new generation of HTA

• Imagine an individual patient who visits the doctor for a medical problem. The doctor knows this patient’s clinical history (including her use of different health technologies, such as medical devices, e-health technologies and drugs), her preferences and health outcomes.

• Adequate clinical studies and real-world data analysis have resulted in a real-time decision support system that the doctor and the patient can use to obtain person-centered information (in a user-friendly format) about risks, benefits, outcomes and costs associated with a range of possible strategies to manage the patient’s ailment.

• The same information is made available to HTA agencies whose decisions are informed by means of this information, analysed at the level of individuals and summarised at the subgroup and population level for the benefit of payers’ decision-making. This framework is what we envision as HTx.
About the HTx project

- HTx is a Horizon 2020 project supported by the European Union, kicking-off in January 2019 and lasting for 5 years.
- HTx will facilitate the development of methodologies to deliver more customized information on the effectiveness and cost-effectiveness of complex and personalised combinations of health technologies.
- HTx will also provide methods to support personalised treatment advice that will be shared with patients and their physicians.
- Finally, HTx will in close collaboration with the European Network for HTA (EUnetHTA) and its stakeholders pilot the implementation of these methods in Europe.
Consortium partners

- Utrecht University (project coordinator) (UU) Netherlands
- University of Copenhagen (UoC), Denmark
- University of Oulu (UoO) Finland
- University of York (UoY) UK
- Medical University of Sofia (MUS) Bulgaria
- University of Bern (UBERN) Switzerland
- Universidad Politecnia de Madrid (UPM) Spain
- European Organisation for Research and Treatment of Cancer (EORTC) Belgium
- Dental and Pharmaceutical Benefits Agency (TLV) Sweden
- National Health Care Institute (ZIN) Netherlands
- National Institute of Health and Care Excellence (NICE) UK
- Syreon Research Institute (SRI) Hungary
- Synapse research management (SYNAPSE) Spain
- EURORDIS Rare Diseases Europe (EURORDIS) France
- University of Maastricht (UM) Netherlands
Advisory boards

HTx Forum:
• to discuss the broader implications of methods and tools developed in project for society and healthcare systems.
• senior representatives of the most important stakeholder groups, which are patients and consumers, payers, healthcare providers, technology producers and also regulators and HTA bodies.

Expert Forum:
• scientific advisory board to also assure alignment with other international scientific activities
• representatives of relevant H2020 (i.e. Impact HTA) and IMI projects (i.e. Prefer, GetReal, EHDEN)
• representatives from other organisations that play an important role in setting tools and methods for guideline development (e.g. ISPOR, Cochrane/GRADE, HTAi, ISPE)
Work Packages

• WP1 Treatment pathways in specific therapeutic areas
  • General framework for the methods
  • Case studies on proton therapy head & neck cancer, diabetes, multiple sclerosis and myelodysplastic syndrome (MDS)

• WP2 Using real world data (RWD) for Evidence synthesis

• WP3 Using artificial intelligence (AI) to forecast individualised treatments

• WP4 Implementation into systems and processes

• WP5 Transferability and dissemination

• WP6 Scientific coordination and project management
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Wim Goettsch, PhD
Utrecht University
Utrecht, Netherlands
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Guenka Petrova, PhD, DSc
Medical University
Sofia, Bulgaria
What information the big data analysis could provide – example with diabetes registry

Prof. Guenka Petrova
Diabetes register in Bulgaria

- Developed with a financing support of EU program;
- Publicly accessible;
- Hosted by National University Endocrinology Hospital;
- Contains structured information about millions of examinations, patients records, discharge data etc.;
- Structured XML field provide data about:
  - Date and time of the visit
  - Pseudonymised personal data, age, gender
  - Pseudonymised visit-related information
  - Diagnoses in ICD-10
  - NHIF drug codes for medications that are reimbursed
  - A code if the patient needs special monitoring
  - A code concerning the need for hospitalization
  - Several codes for planned consultations, lab tests and medical imaging.
Development of Bulgarian diabetes register
3 years follow up of patients treated with DDP-4i, GLP and SGLT-2i

- observational study based on the officially reported results for diabetic population therapy with incretin’s and SGLT-2i base therapy
- achieved decrease in HbA1c level for one year period.
- includes all patients treated during the period 2012-2016 after the introduction of the therapeutic groups in the practice;
- out of 705,515 records of type 2 diabetic patients, 10,457 received the analyzed therapy and 6,122 perform a decrease in HbA1c level.
3 years follow up of patients treated with DDP-4i, GLP and SGLT-2i

Changes in number patients per HbA1c level before and after the therapy with incretin’s and SGLT-2i.

<table>
<thead>
<tr>
<th>HbA1c decrease in %</th>
<th>DPP-4 i</th>
<th>DPP-4 i + MET</th>
<th>GLP-1 RA</th>
<th>SGLT-2 i</th>
<th>SGLT-2 i + MET</th>
<th>Total average reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average decrease for 6122 patients with positive clinical result</td>
<td>-1,43</td>
<td>-1,71</td>
<td>-1,76</td>
<td>-1,71</td>
<td>-1,46</td>
<td>-1,67</td>
</tr>
</tbody>
</table>

Reduction in HbA1c according to therapeutic group
3 years follow up of patients treated with DDP-4i, GLP and SGLT-2i

<table>
<thead>
<tr>
<th>Diabetes incident</th>
<th>Hospital cost</th>
<th>Yearly ambulatory cost</th>
<th>Difference in the number of incidents</th>
<th>Cost for 10 years therapy</th>
<th>Cost for 10 years therapy of incidents according to level of HbA1c</th>
<th>Cost for 10 years therapy of incidents on average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any end point related to diabetes</td>
<td>600</td>
<td>427.92</td>
<td>58.9</td>
<td>141</td>
<td>287384.88</td>
<td>687967</td>
</tr>
<tr>
<td>Death related to diabetes</td>
<td>600</td>
<td>0</td>
<td>46.6</td>
<td>53</td>
<td>27960</td>
<td>31800</td>
</tr>
<tr>
<td>All cause mortality</td>
<td>2134</td>
<td>0</td>
<td>40.2</td>
<td>48</td>
<td>85786.8</td>
<td>102432</td>
</tr>
<tr>
<td>Fatal and non-fatal myocardial infarction</td>
<td>200</td>
<td>51.22</td>
<td>43.6</td>
<td>47</td>
<td>31051.92</td>
<td>33473</td>
</tr>
<tr>
<td>Fatal and non-fatal stroke</td>
<td>650.56</td>
<td>43.13</td>
<td>8.4</td>
<td>10</td>
<td>9087.62</td>
<td>10818.6</td>
</tr>
<tr>
<td>Microvascular end points</td>
<td>744</td>
<td>36.38</td>
<td>87.6</td>
<td>113</td>
<td>97043.28</td>
<td>125181.4</td>
</tr>
<tr>
<td>Cataract extraction</td>
<td>360</td>
<td>10.08</td>
<td>14.4</td>
<td>15</td>
<td>6635.52</td>
<td>6912</td>
</tr>
<tr>
<td>Amputation or death from peripheral vascular disease</td>
<td>2050</td>
<td>20.68</td>
<td>21.0</td>
<td>28</td>
<td>47392.8</td>
<td>63190.4</td>
</tr>
<tr>
<td>Heart failure</td>
<td>420</td>
<td>112.72</td>
<td>12.0</td>
<td>10</td>
<td>18566.4</td>
<td>15472</td>
</tr>
<tr>
<td>Total cost for 10 years ambulatory therapy and only 1 hospital incident</td>
<td>332.7</td>
<td>465</td>
<td>610 909.22</td>
<td>1 077 247</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cost of avoided diabetic incidents
Quality of diabetes control and its economic implications in Bulgaria

<table>
<thead>
<tr>
<th>Description</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of DM cases</td>
<td>431197</td>
<td>446881</td>
<td>461645</td>
<td>473192</td>
<td>483836</td>
</tr>
<tr>
<td>Patients with type-1 DM</td>
<td>28108</td>
<td>27886</td>
<td>27193</td>
<td>26259</td>
<td>25426</td>
</tr>
<tr>
<td>Patients with type-2 DM</td>
<td>397154</td>
<td>413331</td>
<td>428972</td>
<td>441199</td>
<td>452490</td>
</tr>
<tr>
<td>New cases of type-1 DM</td>
<td>1474</td>
<td>1982</td>
<td>1722</td>
<td>1613</td>
<td>1538</td>
</tr>
<tr>
<td>New Cases of type-2 DM</td>
<td>72973</td>
<td>75120</td>
<td>75447</td>
<td>71948</td>
<td>71331</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMI (as per available data)</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 30</td>
<td>23,79</td>
<td>24,01</td>
<td>24,06</td>
<td>23,76</td>
<td>24,05</td>
</tr>
<tr>
<td>&gt; 35</td>
<td>11,22</td>
<td>11,32</td>
<td>11,58</td>
<td>11,85</td>
<td>12,39</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with HgA1c below 7% with type-1 DM (%)</td>
<td>24,6</td>
<td>23,89</td>
<td>27,69</td>
<td>33,88</td>
<td>32,44</td>
</tr>
<tr>
<td>Patients with HgA1c below 7% with type-2 DM (%)</td>
<td>41,68</td>
<td>40,05</td>
<td>42,52</td>
<td>44,13</td>
<td>43,91</td>
</tr>
</tbody>
</table>
Quality of diabetes control and its economic implications in Bulgaria

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of diabetics with at least 2 measurements of HbA1c</td>
<td>92748</td>
<td>103592</td>
<td>107477</td>
<td>127916</td>
<td>155288</td>
</tr>
<tr>
<td>Men</td>
<td>41882</td>
<td>46913</td>
<td>48490</td>
<td>58219</td>
<td>10430</td>
</tr>
<tr>
<td>Women</td>
<td>50866</td>
<td>56679</td>
<td>58987</td>
<td>69697</td>
<td>144858</td>
</tr>
<tr>
<td>Average age (SD)</td>
<td>63(13.06)</td>
<td>63 (13.08)</td>
<td>63.02(13.02)</td>
<td>63 (9.6)</td>
<td>64 (9.5)</td>
</tr>
<tr>
<td>Type of diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1 Diabetes (ICD code Е10)</td>
<td>10784</td>
<td>11133</td>
<td>10390</td>
<td>10056</td>
<td>10430</td>
</tr>
<tr>
<td>Type 2 diabetes (ICD code Е11)</td>
<td>81669</td>
<td>92110</td>
<td>96703</td>
<td>117417</td>
<td>144048</td>
</tr>
<tr>
<td>Malnutrition diabetes (ICD code Е12)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other identified diabetes (ICD code Е13)</td>
<td>6</td>
<td>15</td>
<td>9</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Other unidentified diabetes (ICD code Е14)</td>
<td>286</td>
<td>331</td>
<td>373</td>
<td>432</td>
<td>790</td>
</tr>
<tr>
<td>HbA1c-1 (SD)</td>
<td>7,63 (1,88)</td>
<td>7.6 (1.82)</td>
<td>7.501(1.81)</td>
<td>7,5 (1,34)</td>
<td>7,4 (1,35)</td>
</tr>
<tr>
<td>HbA1c-2 (SD)</td>
<td>7,59 (1,85)</td>
<td>7.5 (1.77)</td>
<td>7.45(1.75)</td>
<td>7,4 (1,32)</td>
<td>7,3 (1,32)</td>
</tr>
<tr>
<td>HBA1c平均变化 (SD)</td>
<td>0,05 (1,11)</td>
<td>0.08 (1.23)</td>
<td>0.048 (1.2)</td>
<td>0,06 (0,59)</td>
<td>0,07 (0,46)</td>
</tr>
<tr>
<td>Number of patients with increases in HbA1c</td>
<td>15509</td>
<td>26863</td>
<td>25135</td>
<td>33154</td>
<td>32135</td>
</tr>
<tr>
<td>Number of patients with decreases in HbA1c</td>
<td>17869</td>
<td>22364</td>
<td>26812</td>
<td>29071</td>
<td>26360</td>
</tr>
<tr>
<td>Number with no change</td>
<td>59370</td>
<td>54365</td>
<td>55530</td>
<td>65691</td>
<td>96793</td>
</tr>
<tr>
<td>Average increase (SD)</td>
<td>1,24 (0,35)</td>
<td>1.3 (1.33)</td>
<td>1.26 (0.81)</td>
<td>1,2 (0,87)</td>
<td>1,19 (0,89)</td>
</tr>
<tr>
<td>Average decrease (SD)</td>
<td>1,33(0,88)</td>
<td>0.08 (1.23)</td>
<td>1.14 (0.93)</td>
<td>1,1 (0,8)</td>
<td>1,04 (0,77)</td>
</tr>
</tbody>
</table>
Survival analysis

Tendency in the mortality in the general population for the observed period 2012-2015г. (NSI)

Tendency in the mortality in the diabetes population for the observed period 2012-2015г. (National Diabetes Register)
### Survival analysis

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>P-value</th>
<th>2013</th>
<th>P-value</th>
<th>2014</th>
<th>P-value</th>
<th>2015</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LE in type 1 diabetes</td>
<td>70,05</td>
<td>&lt;0,0001</td>
<td>69,78</td>
<td>&lt;0,0001</td>
<td>70,43</td>
<td>&lt;0,0001</td>
<td>70,96</td>
<td>&lt;0,0001</td>
</tr>
<tr>
<td>LE in type 2 diabetes</td>
<td>74,2</td>
<td>0,067</td>
<td>74,34</td>
<td>0,001</td>
<td>74,59</td>
<td>0,0002</td>
<td>75,19</td>
<td>&lt;0,0001</td>
</tr>
<tr>
<td>LE in the general</td>
<td>73,96</td>
<td></td>
<td>73,97</td>
<td></td>
<td>74,18</td>
<td></td>
<td>74,55</td>
<td></td>
</tr>
</tbody>
</table>

Life expectancy in the general population and diabetic population

Survival in diabetic patients group and in general population (without endocrine diseases)
Conclusions

• Registers should be regularly analyzed;
• They provide valuable information for clinicians:
  – About the level of control achieved;
  – About the effectiveness of therapy;
  – Many possibilities for subgroup analysis;
  – Life expectancy and survival as long term results.
• They also provide valuable information for health care authorities about the economic impact of new therapies.
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Alexander Berler Msc, PhD
Gnomon Informatics SA
Athens, Greece
Challenges of data standardization and governance across borders

Dr. Alexander Berler
Director Consulting Services,
Gnomon Informatics SA

27-28 March 2019 | Warsaw, Poland
The Challenge

What if you had a cell phone plan that only allowed you to call other customers of your carrier?

That’s the situation for most healthcare providers today, when they join a data sharing network.
European context

The building blocks represent a massive investment since their creation by the Large Scale Pilots. As their user base grows, the Commission is already working on their sustainability beyond CEF.

Piloting  | Consolidation  | Roll-Out  | Ecosystem

2014  | 2020

DSI  
Digital Service Infrastructure

Source: Gerald Cultot, European Commission, Keynote speech at IHE World Summit 2016
EUROPEAN INTEROPERABILITY TIMELINE

1980
- 1992 CADDIA Programme, INGIS Programme

1985 - 1992
- OLS Paper
- Bangemann Report

1990
- 1995 - 1999 Interchange of Data between Administrations (IDIA) Programme

1999 - 2004
- The Follow-on Programme IDIA II

2000
- 2005 - 2009 IDMII Programme
- Lisbon Strategy for growth and employment
- eGovernment Ministerial Conference in Brussels
- Commission Communication on Interoperability for the European eGovernment Services
- Decision 2004/387/EC Adopting the IDMII Programme
- Lisbon Ministerial Declaration (2010) Initiative

2001
- Public Sector Information Directive (2003/98/EC)

2003
- Public Procurement Directive (2004/18/EC)

2004
- Service Directive (2006/123/EC)

2005

2006

2010
- 2010 - 2015 ISA Programme
- Decision 2009/922/EC Adopting the ISA Programme
- eEurope 2005 Action Plan
- eEurope 2005 Initiative
- Commission Communication (COM(2011) 1982) final on Open Data, an engine for innovation, growth and transparent governance
- Digital Agenda
- Europe 2020 Strategy

2011
- 2016 General Data Protection Regulation (2016/679)
- eIDAS Regulation (910/2014)
- DSM Strategy
- Decision 2015/2464 establishing the ISA' Programme

2012
- Regulation (1025/2012) on European Standardisation
- Regulation (316/2013) establishing the Connecting Europe Facility

2020
- New EIF (2012)

Related EU Initiatives
The many dimensions of Interoperability

- **Legal & Regulatory**: Legal and regulatory constraints
- **Policy**: Information Exchange, Collaboration agreements
- **Care Process**: Collaborative care and workflow processes
- **Information**: Defining structure and coding of information
- **Applications & Services**: Transport and Exchange services, Integration in healthcare systems
- **IT Infrastructure**: Generic Communication protocols

From Refined eHealth European Interoperability Framework EU eHealth Network, 23/10/2015
Components of a National/Regional eHealth Strategy

What components contribute to interoperability?

From National eHealth Strategy Toolkit – WHO – ITU - 2012
**Use case driven approach**

### Key Challenges and User Needs

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Describe User needs for today and tomorrow</td>
</tr>
<tr>
<td>2</td>
<td>Deduce Interoperability Use cases</td>
</tr>
<tr>
<td>3</td>
<td>Analyze your current infrastructure</td>
</tr>
</tbody>
</table>

### Select Use Cases

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Define your criteria selection</td>
</tr>
<tr>
<td>2</td>
<td>Define your eHealth roadmap</td>
</tr>
<tr>
<td>3</td>
<td>Select your use cases</td>
</tr>
</tbody>
</table>

### Develop your tender

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Prepare your budget</td>
</tr>
<tr>
<td>2</td>
<td>Write your tender based on your interoperability specifications</td>
</tr>
<tr>
<td>3</td>
<td>Validate your tender following EU/National rules</td>
</tr>
</tbody>
</table>

### Define your testing strategy

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>Define your testing strategy</td>
</tr>
<tr>
<td>2</td>
<td>Define your testing environment</td>
</tr>
<tr>
<td>3</td>
<td>Select your test tools</td>
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</table>

### Define your implementation

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<tbody>
<tr>
<td>1</td>
<td>Define your governance (distribution of responsibilities between technical and organisational level)</td>
</tr>
<tr>
<td>2</td>
<td>Describe your interoperability realisation scenarios</td>
</tr>
<tr>
<td>3</td>
<td>Select profiles and standards (IOP Framework)</td>
</tr>
<tr>
<td>4</td>
<td>Develop corresponding detailed Interoperability Specifications</td>
</tr>
</tbody>
</table>

"Clear policies" for:
- Privacy and security
- Governance rules for implementation (e.g. testing and conformity assessment)
- Govern evolution of the framework

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Interoperability: From a problem to a solution

Base Standards
- OASIS
- IETF
- ISO
- W3C
- DICOM
- IEEE
- HITRANSITION
- CDISC
- LOINC
- IHTSDO

Profile Development
- IHE
- Continua

Project Specific Extensions

Profiling Organizations Are Well Established

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27 IHE Profiles recognized under EU regulation 1025/2012

- Regional, National, Cross-border:
  - Share
  - Patient Id
  - Imaging
  - Summaries
  - Lab
  - Privacy
  - XDS.b
  - XDR
  - XDS-I.b
  - XPHR
  - XD LAB

- Regional, National, Hospital Patient Id & Security
  - PIX
  - ATNA

- Hospital-HIS
  - PAM
  - SVS

- Hospital-Rad
  - SWF.b
  - SWF

- Hospital-Lab
  - LCSD
  - LAW

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eHDSI Architecture is based on IHE profiles
Next Stop in a future not that far: interconnected healthcare services networks for the benefit of the patient

mHealth, eHealth and Health/Medical Devices as components of the connected health system
IPS compliance, made for the EHRxF

Cross border, Across devices, Across clouds, Frictionless data flow for healthcare and wellness, Direct to Cloud Medical IoT

https://www.ehealthpass.gr/
Our Values…

Privacy
Manage privacy and consent, Collect and aggregate data from information sources and the IoT world under patient’s control of data usage

Self Management
From IoT to personalised questionnaires and chatbots
Empower the Patient to get in charge of his own data

Interoperability
Support of international standards and EU eHealth interoperability framework
Unlock the value of data for the gain of end users and innovators!

Collaboration
Provide modern patient doctor collaboration tools (Alerts, Reminders, Appointments, Shared care Plans, teleconferences

…Our Future

Medical tourism across borders
Emergency and unplanned care
Chronic Disease Management
Cross border Data for the Citizen
eHealthPass for Diabetes

Diabetes self-management
- Shared care plan
- Patient empowerment
- Community building
- Continuous education and training
- IoT Devices
- Diabetes virtual assistant

Patient View

Diabetes monitoring
- Increase efficiency
- Predictive and proactive analytics
- Information exchange
- Clinical decision support
- Remote communication and monitoring
- Improve collaboration

Professionals View

Collaboration
- Shared Care Plan
- Doctor’s Dashboard
- Virtual Coach (Chatbot) data acquisition
- Video Conferencing
- Questionnaires

Training
- Virtual Patient
- Timely information presentation

Internet of Things
- Sleep
- Physical Activity
- Stress

Engagement Support Social Network
- User Stories
- Community Portal
- Buddies
Cross Border Healthcare: Healthcare Roaming
Welcome to a new market being born

- **Medical Tourism**
  - Patient summary transfer and translation
  - Access to accredited point of care only
  - Access information anywhere anytime after patient consent

- **Disease Management**
  - Monitor wellness and new society diseases (diabetes, Obesity)
  - Use m-Health and web applications
  - Update medical data repositories (EHR, PHR, etc)

- **Clinical Second Opinion**
  - Cancer Patient can get second opinion before expensive treatment
  - Get access to accredited networks of medical competence centers
  - Get prior authorization online
  - Translate Med Rec. from country of origin to country of treatment

- **Telemedicine & Mobile Health**
  - Machine to Machine Connectivity – Mobile health
  - Medical device connectivity and data monitoring
  - Get Access specialized competence centers

- **Chronic Care**
  - Create specific Disease Management Protocols and exchange coded data
  - Use of Consolidated CDA
  - Get Prior Authorization

- **Clinical Trial Management**
  - Connect disparate data repositories
  - Conduct complex clinical trials with patient in many countries with one unique data structure

- **Tour Operators**
- **Tourism Providers**
- **Insurance Institutions**
- **Patient Communities**
- **Governments**
- **Healthcare Provider Organizations**
- **Workflow Organizations**
- **Telecare Providers**
- **Pharma Industry**
Thank you!

For More Information
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“The best way to predict the future is to invent it.”  
Alan Kay
Health Data, Health Data, and More Health Data: From Quantity to Quality Through Cooperation

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