
The citizen centric eHealth approach and implementation measures in Slovakia

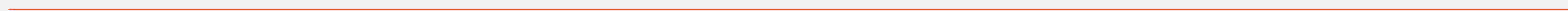


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eHealth is big beast ...



eHealth work domains

- K1. National legislation
- K2. EU legislation
- K3. National standards
- K4. International standards
- K5. Architectural framework
- K6. Certification / Accreditation
- K7. Network layer HIN
- K8. Support for HIN
- K9. Data store in HIN
- K10. PKI infrastructure in HIN framew.
- K11. Master Data repository
- K12. Infrastructure for EHR
- K13. Infrastructure for EDS
- K14. National Health Portal
- K15. epSOS – National Contact Point
- K16. Health Professional Card
- K17. Health Insurance Card
- K18. Infrastructure for ePrescription
- K19. Infrastructure for eReferrals
- K20. Middleware for integration
- K21. IS for ambulances
- K22. IS for pharmacies
- K23. IS for laboratories
- K24. Radiologic IS / PACS
- K25. Clinical IS
- K26. IS for Blood Transfusion Service
- K27. IS for Integrated Rescue System
- K28. IS for rescue services
- K29. eReferrals
- K30. ePrescription
- K31. IS of Public Health
- K32. Monitoring the providers of HC
- K33. Integration into Nat.Health Portal
- K34. Call center for eHealth
- K35. Telemedicine applications
- K36. Evidence based medicine supp.
- K37. IT support for DRG
- K38. EU mobility of insured citizens
- K39. eLearning in eHealth area
- K40. IT in new areas of medicine
- K41. R&D in eHealth area
- K42. Using token for more purposes
- K43. Integration into eGovernment
- K44. PR / acceptance by stakeholders
- K45.** IS for subjects of regional government in health care

Building blocks of National eHealth Program

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41								
	National legislation	EU legislation	National standards	International standards	Architecture framework	Cert. / accreditation / HTA	Network level of HIN	HIN management	HIN management	PKI infrastructure	Data registers	EHR infrastructure	EDS infrastructure	National Health Portal	Switch Point	HPC	HIC	ePrescription infrastructure	eReferrals infrastructure	Middleware	IS for GPs	IS for Pharmacies	Laboratory IS	PACS	Hospital's IS	IS for blood donors	Integrated 112	IS for urgent medicine	eReferrals	ePrescription	Public health IS	Monitoring health care	Portal integration of appl.	Call centre for eHealth	Telemedicine	IT support for EBM	IT support for DRG	EU patient mobility	eLearning	IT support for adv. medicine	eHealth R&D								
National legislation	sD	R	mD	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R					
EU legislation	R		R																																														
National standards	sD	D		sD	R		R		R	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
International standards	R	sD																																															
Architecture framework	D	mD	sD	D			R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
Certification / accreditation / HTA	sD	mD	D	mD	D				R	R								R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
Network level of HIN	mD	mD	D	mD	sD			R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
HIN management	mD	mD	mD	D	sD		sD		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
HIN - data storage	mD	mD	D	mD	sD	R	sD	mD		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
PKI infrastructure	sD	mD	sD	D	D	R	mD	mD	R																																								
Data registers (GP, patients, drugs)	sD	mD	sD	mD	mD				sD																																								
EHR infrastructure	mD	mD	D	D	sD		sD	D	D	sD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D		
EDS infrastructure	mD	mD	D	D	sD		D	D	sD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
National Health Portal	mD	mD	mD	mD	D		D	D	D	D	mD	mD	mD	R	R	R	R	D	D	D	D	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
Switch Point (EU - Slovakia)	mD	sD	mD	mD	mD		D	mD																																									
HPC	D	mD	D	mD	sD					sD	D																																						
HIC	D	D	D	D						sD	D																																						
ePrescription infrastructure	mD	mD	mD	D	sD		D	D	sD	D	sD	D	D	sD				sD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
eReferrals infrastructure	mD	mD	mD	sD			D	D	mD	D	D	D	D	sD				sD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Middleware	D		mD	mD	D		mD		mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
IS for GPs	D	mD	mD	mD	R	D	mD		mD	mD	mD	mD	mD	mD	D	D	D	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
IS for Pharmacies / Drugstores	D	mD	mD	mD	R	D	mD		mD	mD	mD	mD	mD	mD	D	D	D	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Laboratory IS	D	mD	mD	mD	R	D	mD		mD	mD	mD	mD	mD	mD	D	D	D	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
PACS	D	mD	mD	D	R	D	D		sD	mD	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Hospital's IS	D	mD	mD	mD	R	D	D		D	mD	mD	D	D	D	D	D	D	sD	D	D	D	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
IS for blood donors	D	mD	mD	mD	D	mD		D		sD	mD	mD	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Integrated 112	D	D	mD	D	mD		mD		mD																																								
IS for urgent medicine	D	mD	mD	mD	mD		mD		D																																								
eReferrals	D		mD	mD	D	D	sD	D	D		mD			sD	mD	mD	D																																
ePrescription	sD	mD	D	D	D	D	sD	mD	D	D	D	mD		sD	mD	sD	mD	sD																															
Public health IS	mD	mD		mD	mD		D		mD					D	mD																																		
Monitoring health care	D	mD	mD	mD	mD		sD	D		mD				mD	mD	D	D	mD	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Portal integration of applications	mD		mD	sD			mD	D	D	D				sD	mD	D	D	mD	mD	D	R	R	R	R	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Call centre for eHealth	mD		mD	mD	D		D	mD	D					mD	R																																		
Telemedicine	D	mD	mD	D	D		sD	mD	D	mD	D	D		D	mD	D	mD																																
IT support for EBM	mD		mD	D	mD					mD				D																																			
IT support for DRG	mD		mD	mD	mD					mD				D																																			
EU patient mobility	mD	sD	D	sD	mD		mD		D		sD			mD	mD	D	mD	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
eLearning							mD							D																																			
IT support for advanced medicine	D	mD	mD	D	D	D		sD	D	D		mD																																					
eHealth R&D	D	D	D	D	D	mD								mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	
Token's re-usability	sD	mD	D	mD	sD		mD		sD					sD	sD		D	sD	mD	D																													
eGovernment / eHealth integration	sD	D		mD	D		D	mD	R	D	D	mD	mD	mD				D	D	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	mD	
Professionals & Public acceptance	sD	D		sD			mD		D	mD	D	D	D	D				mD	sD	D																													
IS of State Health related Depart.	mD		D	mD	mD																																												

sD - strongly depends on
D - depends on
mD - small dependance
R - receives requirements from

Example 1: National legislation strongly depends on EU legislation
Example 2: National legislation receives requirements from PKI infrastructure (example: how to long-time archive revocations of certificates)

Top 10 issues in Slovak approach

- 1) **Challenges (EU level, national level, health sector level) and needs (all stakeholders)**
 - 2) **Possible benefits (health, economical, social)**
 - 3) **Vision & Strategy (approved by government)**
 - 4) **Stakeholders support (support, stoppers)**
 - 5) **Priorities (health based)**
 - 6) **Money (CBA, ROI, new view on health sector)**
 - 7) **Skilled teams (Programme level, Projects level)**
 - 8) **Architecture (CHF2, TOGAFF)**
 - 9) **Implementation plan (RUP approach)**
 - 10) **Implementation (early prototypes, pilots)**
-

Participants *or* who was involved?

- ü **Ministry of Healthcare**
 - ü eHealth committee (20 important stakeholders)
 - ü Dept. of Informatics
 - ü National eHealth operator
 - ü **Government**
 - ü Ministry of finance - responsible for eGovernment
 - ü Government Secretary office
 - ü **Chambers (doctors, pharma, nurses ...)**
 - ü **IT companies chamber (ITAS)**
 - ü **Media (TV, Internet, tabloids, medical journals, ...)**
 - ü **Citizens, patients groups (Catalogue of needs)**
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Levels of questions dealing with eHealth

- ✓ **Why eHealth?** (answer: Ministry of healthcare)
- ✓ **What to do?** (answer: Dept. of informatics, MoH)
- ✓ **How to do it?** (National eHealth Operator)
- ✓ **Who will do it?** (Ministry of Finance, MoH)
- ✓ **When do some action?** (Programme office)
- ✓ **How much it will cost?** (Feasibility studies)
- ✓ **What are the benefits ?** (Citizens, doctors, insurance companies, state)

Challenges as driver for Slovak eHealth

- ü **Growing gap between healthcare costs and financial resources available for healthcare**
 - ü Ageing population / demographics crises
 - ü Civilization diseases (+ growing part of child population with these diseases – diabetes, etc.)
 - ü More possibilities (new drugs, examinations, therapy)
 - ü More expensive medicine (genomics, proteonomics, ...)
- ü **Inefficient use of costly healthcare resources**
- ü **Reduced capacity of doctors, nurses and other skilled healthcare professionals**
- ü **Drug expenses**

Needs as other driver for Slovak eHealth

- ü Catalogue of Health related needs (more than 600 identified)
- ü Driven by eHealth Committee – Ministry of Healthcare, approved by stakeholders
- ü All stakeholders needs are mapped
- ü Possible eHealth services were are mapped on identified needs
- ü Only than were defined priorities
- ü Special issues: dysfunctions and disparities

eHealth benefits for stakeholders – the key issue

Health:

- n Decrease mortality, morbidity, burden of disease and injuries (DALYs) – it can be also monetarized

Economical:

- n Cut down expenses for healthcare related activities
- n Increase the efficiency of providing the health care
- n Lower duplicities, the rate of errors and mistakes
- n „Only healthy citizens can pay taxes“

Social:

- n Reducing inequities, disparities
 - n Increase citizens „well being“, social cohesion
-

Vision: based on new paradigm of Health sector

Move from

patient's healthcare

to the

citizen's health

Discussed and approved by stakeholders and Ministry

New paradigm of Health sector (citizen's health centric)

Management of all health determinants

- ü Physical environment
- ü Social and economic environment
- ü Healthcare (**only 15 - 20 % influence on health**)
- ü Life-style
- ü Genetics

Support all forms of healthcare

- ü Individual level of healthcare (self-medication)
 - ü Community level of healthcare
 - ü Professional healthcare
 - ü Public health
-

Strategic approach to eHealth in Slovakia I.

Top down approach was preferred

Why? - we lost 10 years, bad coordination on bottom

Levels:

- n eHealth Strategy – approved by government
- n eHealth Programme – approved by Ministry of healthcare
- n Main projects (financed from EU funds) - approved by Ministry of Finance
- n Architecture – approved by National eHealth Operator
- n Prototypes, Alpha, Beta – approved by Operator

Strategic approach to eHealth in Slovakia II.

Strategic decisions

- ü Long-term National eHealth Programme - mixed with private activities and smaller projects
- ü One, state owned National eHealth operator
- ü Strong Programme management
- ü National eHealth portal
- ü Integrated eHealth applications on National level
- ü PHR / EHR structure

Slovak eHealth priorities

eHealth v. 1.0 (core of system)

- c National eHealth portal as service bus for applications (CHF 2 based)
- c National PHR
- c eMedication / ePrescription
- c eBookings
- c epSOS / EU interoperability + Security

eHealth v. 2.0 (connect to Health ecosystem) +

- c Continue in v. 1.0 priorities
- c From PHR to EHR
- c SNOMED
- c Telemedicine
- c PACS
- c e Public Health
- c Genomics + Security

eHealth v. 3.0 – smart eHealth services

National eHealth operator

Roles of National eHealth operator in Slovakia:

- ü Programme office for eHealth Programme
- ü Operator for National eHealth applications (Health portal, national PHR, ePrescription, eBookings, ...)
- ü Awareness dealing with eHealth for citizens and doctors
- ü National standards for health IT
- ü Health statistics, source of KPI of Health sector
- ü Health library
- ü Master data repository for demographic data of patients
- ü Archive for some PHR data
- ü National contact point for epSOS
- ü National health terminology + SNOMED

Timeline

ID	Activity	2008	2009	2010	2011	2012	2013
1	eHealth Programme mandate	█					
2	Catalogue of stakeholders needs	█					
3	National eHealth operator		█	█	█	█	█
2	Feasibility studies		█	█			
4	Tenders for eHealth v. 1.0		█	█			
5	eHealth v. 1.0			█	█	█	
6	Legislation changes				█	█	
8	First benefits for citizens				█	█	
7	eHealth v. 2.0					█	█
8	Next benefits for citizens					█	█
9	eHealth v. 3.0						█

PHR / EHR structure

Granularity is the key in the Slovak PHR – citizens electronic Health book, PHR as set of pages

- n Page: minimum logical and consent management unit**
- n Every page – special archetype**

Examples of pages

- n Patient summary (epSOS maximum set compliant)**
 - n Health assurance account, Medication history**
 - n Genealogy linkages, Genetic risks**
 - n Vaccinations page**
 - n Pregnancy page, Childhood page**
 - n Tele – data,**
 - n Wellness / Fitness data**
 - n EHR links**
 - n Specialized**
-

eHealth – security issues

- ü Standards: ISO 27xxx
 - ü Plus advanced security concepts from DoD
 - ü **Security in on all SDLC**
 - ü Start: set of security requirements and principles
 - ü Security enclaves (HIN, DC, ...) - 4 levels of security classification
 - ü All levels (from OS to app.) security monitoring
 - ü Consent based access management
 - ü Anonymization / pseudonymization
 - ü Set of authentication methods
 - ü Business Continuity Planning and Disaster Recovery
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More information dealing with Slovak eHealth Programme (english)

www.ezdravotnictvo.sk/?new-dimension

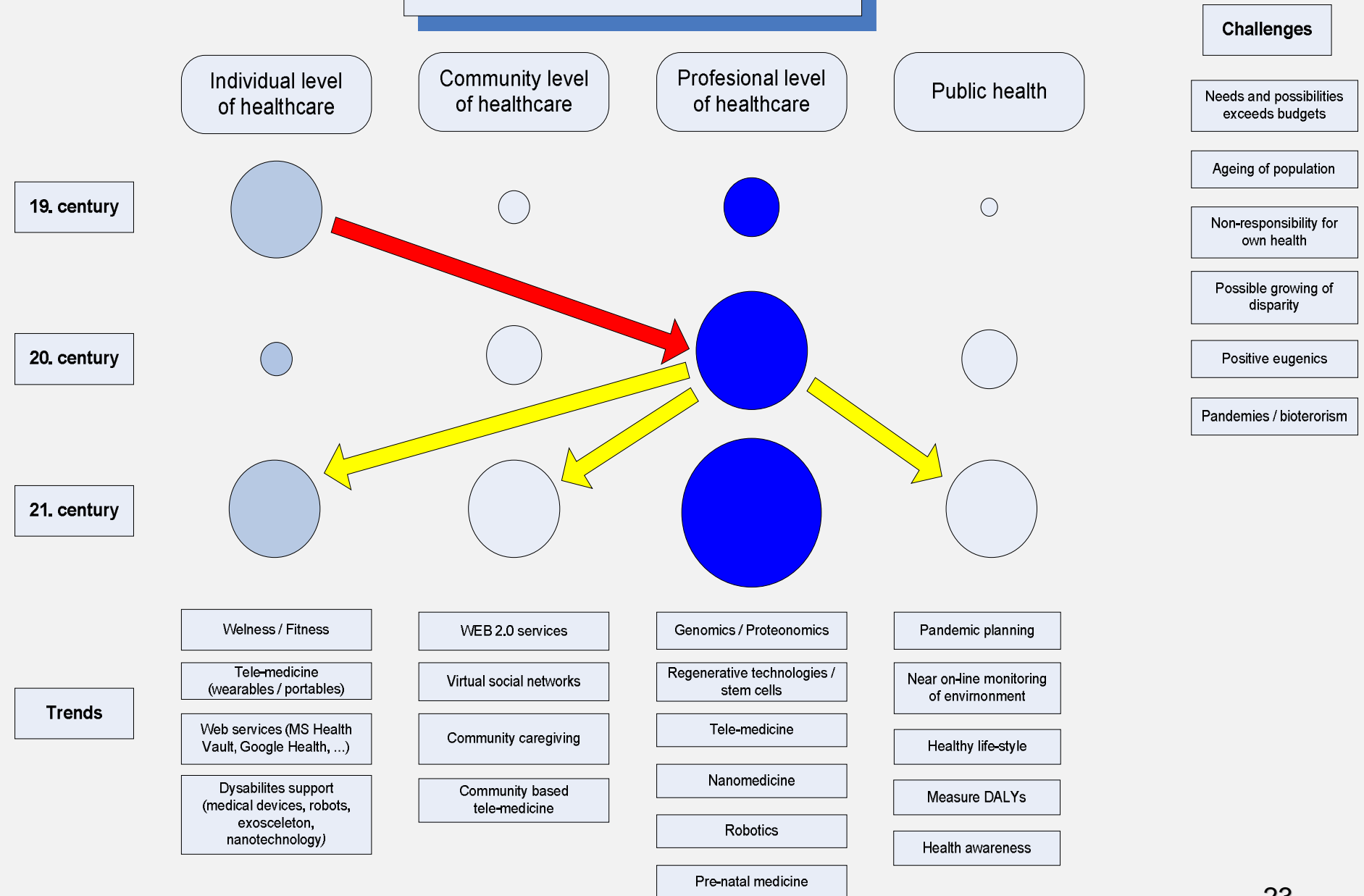
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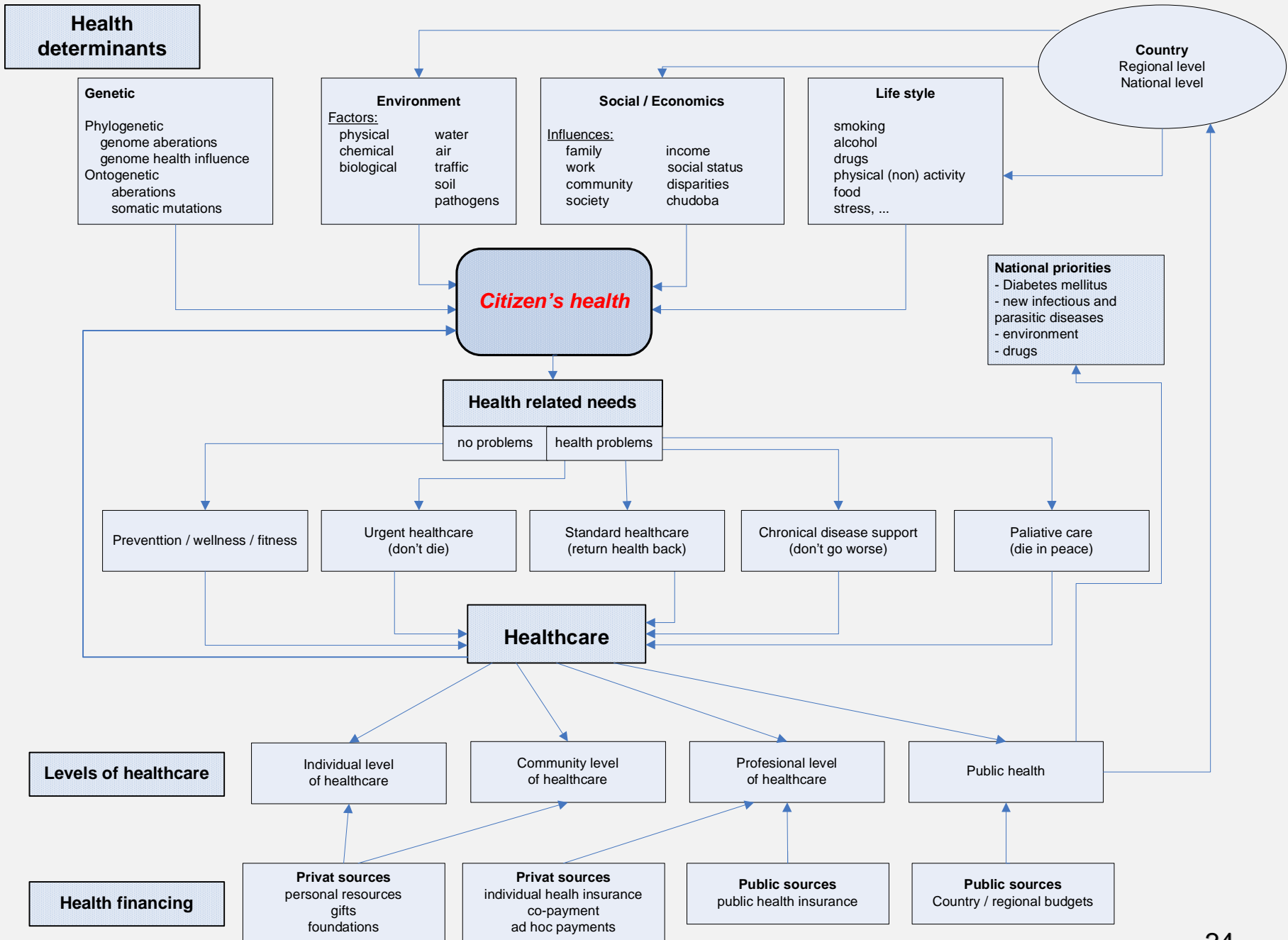


Catalogue of needs – all stakeholders (example from Catalogue)

ID	eHealth domains	Health Portal	ePrescription	PHR	eBookings	Telemedicina	Genomics	PACS	eConsulting	eWarnings	eLearning
	Needs (citizen)										
1.1	To find information dealing with health related issues - health risks, examinations, therapy, GPs, hospitals, etc.	X								X	X
1.2	To get support for decision making in care process of own health or family members health (ex. - visit GP?)	X		X	X	X	X		X	X	X
1.3	To get drugs from pharmacy without physical visit of it.	X	X								
1.4	To have possibility monitor own body parameters (blood pressure, temperature, biochemistry).	X		X		X					X
1.5	To get support for decision making based on actual level of body parameters.	X							X		
1.6	To get support from applications, that diminish time spent in hospital and to receive support from healthcare in home.	X				X			X		X
1.7	To have possibility get devices , that diminish time spent in hospital and supporting people with dysfunction in homecare.					X					
1.8	To have somebody, who can be anonymous consultant for citizens health problem.	X		X					X		
1.9	To get support for optimizing dosage of drugs without visiting GP.	X	X	X							
1.10	To get support in case of emergency until emergency will arrive. .	X				X			X		
1.11	To have baseline skills dealing with first aid.	X									X
1.12	To get information dealing with health systems a health risk abroad.	X								X	

Trends in healthcare





DALYs view on Health and eHealth (Disability Adjustment Life Years)

Main notions in DALYs model (WHO):

- ∅ BoD- Burden of disease (0 – 1) 0: healthy, 1: dead
- ∅ YLL - Years of life lost due to premature mortality.
- ∅ YLD - Years of life lost due to disease burden.
- ∅ DALYs = YLL + YLD

DALYs based Health mission:

To reduce mortality, morbidity, persistent and temporal burden of disease and thus improve quality of citizens' life.

DALYs based eHealth mission:

To support Health mission by using ICT.

Life years lost in some countries

(statistics by WHO)

- v Austria: **970.000** lost years
 - v Bulgaria: **1.464.000** lost years
 - v Croatia: **709.000** lost years
 - v Germany: **10.414.000** lost years
 - v Greece: **1.393.000** lost years
 - v Italy: **6.789.000** lost years
 - v Slovakia: **834.000** lost years
 - v Slovenia: **282.000** lost years
-

WHO view on new paradigm

WHO defines health promotion as the process of enabling people to increase control over the determinants of health and thereby improve their health.

The five action points put forward by the Ottawa Charter for Health Promotion for constructing an effective healthcare strategy are:

- ü build healthy public policy**
- ü create supportive environments for health**
- ü strengthen community action for health**
- ü develop personal skills**
- ü reorient health services.**

EU view on new paradigm

White paper:

Together for Health: A Strategic Approach for the EU 2008-2013

Core Values mentioned in White Paper are:

- ü **Citizens' empowerment.**
- ü **Reducing inequities in health.**
- ü **Health policy based on the best scientific evidence.**

Three main challenges concerning EU health systems:

- ü **Demographic changes including population ageing.**
 - ü **Pandemics, major physical and biological incidents, climate change.**
 - ü **New technologies which are revolutionising the way we promote health and predict, prevent and treat illness. These include information and communication technologies, innovation in genomics, biotechnology and nanotechnology.**
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