EU4Digital

EU4Digital: supporting digital economy and society in the Eastern Partnership

Analysis of the current state of eHealth in the Eastern partner countries

23 May 2020

Key Terms and Definitions

Term	Definition
ACHI	The Australian Classification of Health Interventions is a classification system which consists of a tabular list of interventions and accompanying alphabetic index that has seven digits codes
AR-DRG	The Australian Refined Diagnosis Related Groups is a classification system, which relates the number and type of patients treated in a hospital to the resources required by the hospital
ASN.1	Abstract Syntax Notation One is a formal notation used for describing data transmitted by telecommunications protocols, regardless of language implementation and physical representation of these data
The Eastern Partnership	A joint initiative of the European External Action Service of the European Union together with EU, its Member States, and six Eastern European Partners governing its relationship with the post-Soviet states of Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine
Eastern partner countries	the six Eastern Neighbourhood countries: Armenia, Azerbaijan, Belarus, Georgia, Moldova, and Ukraine
eDispensation	The act of electronically retrieving a prescription and giving the medicine to the patient. Once the medicine has been dispensed, a report on the items dispensed is sent to the prescribing Member State in a structured format
eHealth / digital health	The use of information and communication technologies (ICT) for health
Electronic Health Record (EHR)	A collection of longitudinal medical records or similar documentation of an individual in digital form. This set of health information based on the principle one EHR per patient in a country
Electronic Medical Record (EMR)	An electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorised clinicians and staff within one health care organisation
ePrescription (eP)	A medicinal prescription issued and transmitted electronically
HCP	Health Care Provider
Health Level 7 (HL7)	A framework (and related standards) for the exchange, integration, sharing, and retrieval of electronic health information. These standards define how information is packaged and communicated from one party to another, setting the language, structure and data types required for seamless integration between systems
ICD-10	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision
Information Society	Describes a society where a significant degree of activity focuses on the creation, distribution, use and reuse of information. This activity takes place by means of what is known as information and communication technologies (ICTs)
IHE	Integrating the Healthcare Enterprise is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information
LOINC	Logical Observation Identifiers Names and Codes a terminology for laboratory and clinical observations to send clinical data electronically
NeHS	National eHealth Strategy

Patient Summary (PS)	A dataset of essential and understandable health information that is made available at the point of care to deliver safe patient care during unscheduled care (and planned care) with its maximal impact in the unscheduled care
Public Key Infrastructure (PKI)	A set of roles, policies, hardware, software and procedures needed to create, manage, distribute, use, store and revoke digital certificates and manage public-key encryption
The Systematized Nomenclature of Medicine (SNOMED)	Multiaxial hierarchical and computer processable classification of medical terminology covering most areas of clinical information such as diseases, procedures, pharmaceuticals etc.

Table of Contents

Executive Summary

This cross-country report on eHealth in the Eastern Partnership is a part of the activities to develop common harmonisation and interoperability guidelines and standards for the Eastern partner countries in the project "EU4Digital: supporting digital economy and society in the Eastern Partnership", carried out by an EY led international consortium.

The present analysis of eHealth in the Eastern partner countries provides information regarding eHealth legislation and governance, infrastructure and services, funding mechanisms and involvement in the international communities as well as the key findings and insights for each country. The main findings for the Eastern partner countries are as follows:

Challenges and Priorities

The main **common challenges** the Eastern partner countries is facing are these:

- lack of interoperability caused by the absence of common standards for digital health sector data and systems in the region;
- different maturity and readiness level of the digital health (as can be seen in 2.2 section) is the main obstacle for cross-border interoperability;
- project-oriented eHealth governance is prevailing rather than all-encompassing digital health governance for sustainable eHealth operation and development.

The main **common priorities** in the Eastern partner countries are these:

- adoption of actionable and comprehensive eHealth Strategy;
- introduction of unified standards for Digital Health and further development of national eHealth services;
- eHealth interoperability services on a country level as a prerequisite to have a cross-border eHealth information exchange (e.g. for the medical tourism use case as expressed during the eHealth Network event workshop).

Legislation and Governance

Currently, none of the Eastern partner countries has adopted national eHealth strategy (NeHS), however, Armenia and Azerbaijan have approved roadmaps, Belarus, Georgia and Ukraine have approved concepts while Moldova is currently in a drafting phase of its strategy. All the countries are seeking to comply with international standards of eHealth. Most of the Eastern partner countries have passed regulations for the ePrescription service with Azerbaijan and Moldova being an exception, while only Georgia has adopted regulations enabling Patient Summary services (as a part of EHR regulation).

Infrastructure and Services

Majority of the Eastern partner countries have re-used or planned of re-using some elements of the national or regional IT infrastructure for eHealth services and eHealth IT solutions, including eGovernment services. Patient Summary services are operating nationwide in Armenia and Georgia meanwhile ePrescription service is fully implemented in Belarus and Ukraine and rolled out countrywide. In Georgia, ePrescription is available in Tbilisi area (but planned to be implemented nationwide in 2020) while it's in a pilot phase in Armenia.

Funding

Funding in eHealth development and operation in the Eastern partner countries is rather scarce as none of the Eastern partner countries has yet dedicated institutions which would strategically ensure the adequate funding for operations and development of the eHealth domain. The operation, maintenance and continuous development of eHealth services, as well as the expansion of IT solutions, are typically funded with international organisations' funds (i.e. USAID, World Bank etc.), sometimes by the state budget or private funds.

For further advancing and developing the eHealth ecosystem on a national level the Eastern partner country are recommended as follows:

- development of comprehensive and actionable digital health strategy;
- establishing a robust financing and operational model;
- establishing and operationalizing digital health governance;

- developing digital health architecture and establishing digital health governance.

These actions will further enable common harmonisation and interoperability for cross border eHealth services.

1 Introduction

This document has been developed by the EU4Digital project eHealth stream as a part of activity 5.1.3. "Analysis of current eHealth state in the Eastern partner countries, identification of needs and definition of the scope and priorities for common harmonisation and interoperability standards and guidelines".

The aim of this document is to provide key findings and insights into the current state of eHealth in the Eastern partner countries. The analysis is based on the country inputs collected from the filled 'Questionnaire for the update on the current state, developments and needs in the Eastern partner countries', which was distributed during the Eastern partner eHealth Network event on June 25/26th in Tbilisi, Georgia, and based on inputs during individual country workshops locally and remotely that followed the Eastern partner eHealth Network event.

2 Key Findings and Insights for eHealth Harmonisation and Interoperability

2.1 eHealth Legislation and Governance

Currently, none of the Eastern partner countries has formally adopted the **national eHealth strategy (NeHS)**. However, from the earlier time, Armenia (2017) and Azerbaijan (2016) have approved roadmaps, Belarus (2018), Georgia (2014) have approved concepts in different kinds of legal acts, all of the countries recognise the need for dedicated eHealth strategy. Moldova and Ukraine are currently in the drafting phase of the eHealth strategies.

Countries that have partially approved the NeHS (having roadmaps and concepts) comply with **international standards of eHealth** to a different extent (e.g. HL7 and SNOMED are defined in most of the Eastern partner countries).

While Ukraine is the only Eastern partner country that has a **legal definition of eHealth** within the health care legislative framework, the rest of the Eastern partner countries have initiated eHealth legislation – it is either in the approval phase (Armenia, Belarus) or drafting phase (Moldova), however, Georgia has a separate EHR regulation and is planning to have an eHealth definition in the future and Azerbaijan has a digital roadmap where eHealth is mentioned.

Only Georgia and Ukraine have defined **eHealth architectural model** in place. Nevertheless, it is planned to be included in Moldavian NeHS.

Personal medical information in Eastern partner countries is regulated under the Personal Data Protection Laws without a separate health data regulation. Regarding the data protection regulation compliance to the EU GDPR, only Georgia is mostly in compliance with the EU standards and Armenia and Moldova are in the process of synchronization. However, none of them currently have regulation as strict as GDPR.

Georgia stands out in the Eastern partner countries as the only country that has adopted **regulations enabling Patient Summary services** (as a part of EHR regulations). Also, such document has been drafted by the Ministry of Health in Ukraine too, however, the rest of the Eastern partner countries highlight the priority to create the policy, but currently don't have these regulations.

Most of the Eastern partner countries have adopted **regulations for the ePrescription service** with Azerbaijan and Moldova being an exception.

The governance model with key participants in the eHealth sector is partially defined in the region (Armenia, Belarus, Georgia, Ukraine) as a part of the concept and roadmap documents. Moldova is planning to adopt the definition of the eHealth governance model (main roles and participants) in the NeHS in the future.

Ministries of Health in the Eastern partner countries are typically the **responsible bodies** for eHealth governing and issuing policies and regulations. Institutions under the ministries are typically the responsible bodies for the execution of eHealth development programs and projects, with exception of MD and GE, where the execution and operation have appeared to be within departments of the Ministry of Health.

2.2 eHealth Infrastructure and Services

Most of the Eastern partner countries have been **re-using** (Armenia, Georgia, Ukraine) or are planning to re-use (Azerbaijan and Moldova) some elements of their public sector (incl. national or regional levels) of IT

infrastructure for eHealth services and eHealth IT solutions, including eGovernment services that of eGovernment portals, eID and eSignature for eHealth digital enablement.

eHealth services are implemented to a different level in the Eastern partner countries. **Patient Summary services** are operating nationwide in Armenia and Georgia whereas in the other Eastern partner countries there is no such service implementation yet.

Meanwhile, **ePrescription service** is implemented in Belarus and Ukraine. In Georgia, ePrescription is used only in Tbilisi area (but planned to be implemented nationwide in 2020) while it is running in the pilot phase in Armenia. The number of ePrescriptions issued in 2018 and the first half of 2019 in Belarus was approx. 10,5 million, in Georgia approx. 700 000 and in Ukraine approx. 4 million (from April of 2019 to August 2019).

National patient and health care professionals' portals (with access to EHR) operate in Armenia and Georgia. In Moldova, a health care professionals' portal is operational whereas a patient portal is not implemented. Azerbaijan is currently in the development of the national patient portal.

The integration of national or private pharmacy information systems with eHealth information systems exists in Belarus, Georgia and Ukraine as they have implemented an ePrescription service, which fulfils prescription and dispensation functionality as well as helps for pharmaceutical reimbursement purposes, in Ukraine, it is available for the reimbursed medicine, but planned support for other medicines by 2020.

During our analysis, the importance of common vocabulary and semantics became apparent, for example, the name e-Referral in Georgia refers to a service, which is primarily operated by the Social Service (in this case in a role of a health insurance provider) under MoH and used to verify whether a patient case is eligible for financial coverage by the social insurance/ financing scheme rather than the use of one HCP to refer a patient to another HCP for consultation, lab test or for further health care service provision, which would carry by its main purpose medical information (as usual would be typical practice in the EU or HL7 terms) rather than administrative HCP-to-Payor interaction.

2.3 Funding and Incentives Mechanisms for eHealth

Funding in eHealth development and operation in the Eastern partner countries is rather scarce. None of the Eastern partner countries has dedicated institutions which would strategically ensure adequate funding to develop and operate the eHealth domain. The operation, maintenance and continuous development of eHealth services, as well as the expansion of IT solutions, are typically funded by with international organisations' funds (i.e. USAID, World Bank etc.), sometimes by the state budget or private funds.

Notably, Belarus has two out of three ongoing projects funded by the state budget and one project funded by the World Bank that relates to the development of the eHealth domain and further development of IT solutions in eHealth till 2022. Ukraine distinguishes by having strong support from international donor organisations (i.e. USAID Health Reform Support till 2023) and together with the strongly developed ecosystem of private-sector vendors of eHealth services (HIS/ EMR) for HCPs thus taking over the direct burden from the state in development of HCP-level eHealth solutions and enabling market competition (with the condition if the HCP procurement processes are observed and vendor ICT anti-lock-in measures applied).

The Eastern partner countries neither have **research funds** to support eHealth research programmes nor provide **incentives or funding to the private sector** for the development of eHealth applications and services and research in eHealth. Similarly, none of the Eastern partner countries provides funding mechanisms or initiatives to support the use of eHealth services among citizens.

2.4 Challenges and Priorities

The **main challenges** among the Eastern partner countries are:
- low maturity of eHealth interoperability caused by the absence of common standards and governance structures for the digital health sector in the Eastern partner countries;
- different understanding/application of international standards and readiness level of the digital health (as can also be seen in 2.2 section) is the main obstacle for cross-border interoperability;
- project-oriented eHealth governance is prevailing rather than all-encompassing digital health governance for sustainable eHealth operation and development.

The **main priorities** for the Eastern partner countries are the following:
- adoption of actionable and comprehensive eHealth Funding Strategy;
- introduction of unified standards for digital health and further development of national eHealth services;

- cross-border eHealth information exchange for medical tourism.

The **actionable directions** to achieve priorities and overcome listed challenges are recommended as follows:

- development of comprehensive and actionable digital health strategy;
- establishing a robust financing and operational model;
- establishing and operationalizing digital health governance;
- developing digital health architecture and establishing digital health governance.

2.5 Involvement in International Communities

The involvement of the Eastern partner countries in international eHealth interoperability communities is rather low. All the countries are engaged with WHO, however, there is low involvement with the HL7 community (Belarus, Georgia[1] and Ukraine planned) and Central European Initiative (CEI) (Belarus, Ukraine, Moldova). Ukraine is also involved in the EIP on AHA activities.

However, the countries are interested in getting different eHealth practice examples and are engaged in the analysis of existing models in the EU (e.g. Estonia).

3 Priorities and Challenges by Countries

In this section we provide our findings on main challenges, obstacles and priorities gathered during country high-level self-assessment and subsequent interviews with the Eastern partner eHealth Network stakeholders.

3.1 Armenia

Table 1. Challenges, obstacles and priorities regarding eHealth in Armenia.

Main challenges for eHealth initiatives	Priorities to strengthen eHealth readiness and capability
- Need for improving interoperability with key databases and information systems - Lack of integration of fragmented health information systems - Need for alignment of the functions of the eHealth operator to the strategic development of eHealth in Armenia - Lack of systematic funding	- Training for health care professionals - Improving user experience - Updating the legislative eHealth framework - Making the inventory of eHealth infrastructure developed and implemented by the national operator, aligning it to further strategies of eHealth development in Armenia - Integration of health information systems - Improving the access to eHealth services for remote regions (telemedicine)

3.2 Azerbaijan

Table 2. Challenges, obstacles and priorities regarding eHealth in Azerbaijan.

Main challenges for eHealth initiatives	Priorities to strengthen eHealth readiness and capability
- Absence of IT solutions and standards - Lack of skills and personnel capacity - Lack of funding	The current priority is development and operationalization of national health insurance information system

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1 HL7 International https://www.hl7.org/about/yellowpages/index.cfm?membership_type_code_gomembers=GPU&co_fullname=georgia&Submit=Search

3.3 Belarus

Table 3. Challenges, obstacles and priorities regarding eHealth in Belarus.

Main challenges for eHealth initiatives	Priorities to strengthen eHealth readiness and capability
• Integration of existing IT solutions • Creation of the national eHealth platform - integrated health management information system and clinical decision support system for services quality improvement.[2] • Lack of state financing • Current lack of usage of common international standards, yet in the process of adopting HL7	• Development of sustainable financial mechanisms • IT resources consolidation and management centralization (creation of centralised eHealth platform)

3.4 Georgia

Table 4. Challenges, obstacles and priorities regarding eHealth in Georgia.

Main challenges for eHealth initiatives	Priorities to strengthen eHealth readiness and capability
• Lack of quality, confidentiality and accessibility of health data • Lack of skills and personnel capacity • Lack of funding • Absence of qualitatively operating hardware and software of eHealth services rather than existing data of statistical nature • Absence of nationwide repository for collecting health care data (incl. medical health record data) • Absence of web application firewalls for Trust and Security Standards compliance in eHealth services • Limited usage of mobile application due to lack of promotion • Implementation of eSignature in health care – lack of legislation to recognize it equal to hand-written signature in EMR (e.g. for financial audits)	• IT infrastructure for the network infrastructure expansion is required for connecting regional hospitals • Equipping HCPs with a sufficient number of computerized workplaces • Delivering training programs to build necessary skills for health care professionals and patients • The well-defined funding model for assured continuity • Implementation of common international standards for data exchange (HL7, ICD10)

3.5 Moldova

Table 5. Challenges, obstacles and priorities regarding eHealth in Moldova.

Main challenges for eHealth initiatives	Priorities to strengthen the eHealth infrastructure
• Lack of integration of health information systems • Fragmented regulations on eHealth • Lack of eHealth-specific provisions in the countries legal base	• Approval and updates of the NeHS • Development and implementation of a unified health information system (eHDSI of Moldova) • Integration of existing health information systems • Implementation of EHR and EMR operations infrastructure, services and underlying IT solutions

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2 Belarus health System Modernization Project https://projects.worldbank.org/en/projects-operations/project-detail/P156778

• Lack of legal framework allowing data exchange for integrated services between health and other regional authorities • Ensuring medical data accuracy and integrity • Lack of skills and personnel capacity • Lack of funding • Lack of interest of authorities regarding eHealth • Absence of qualitatively operating software of eHealth services	• Continuous enhancement of computer literacy for health care professionals • Ensuring the use of trusted authentication and eSignature methods among the health care professionals

3.6 Ukraine

Table 6. Challenges, obstacles and priorities regarding eHealth in Ukraine.

Main challenges for eHealth initiatives	Priorities to strengthen the eHealth infrastructure
• A large number of outdated laws • Political instability • Lack of personnel with digital health skills due to the lack of training programs for doctors • Lack of funding planned for continuous eHealth operation after donor-funded projects end • Ignorance of cybersecurity and cyber hygiene skills	• Implementation of the digital agenda • Intensification of the cooperation with European institutions • Transnational cooperation • Development of sustainable financial mechanisms

4 State of Play of eHealth Harmonisation and Interoperability by Countries

4.1 eHealth Legislation and Governance

4.1.1 National eHealth Strategies

Table 7 provides an insight into the current state of adoption of the National eHealth strategy (NeHS) in the Eastern partner countries. International standards defined in the corresponding NeHS are outlined, if applicable.

Table 7. Extent of the National eHealth Strategy (NeHS) adoption in the Eastern partner countries.

Country	Status of NeHS implementation	International standards defined in the document
AM	Not approved. The roadmap approved in 2017 (Decision No. 1556-A). The new roadmap is in the process of implementation in parallel with the strategy for 2020-2025.	HL7 (in the process of adoption and implementation), ICD10 (translated; in the process of adoption) LOINC, SNOMED, ICNP (translated; in the process of adoption and implementation)
AZ	Not approved. 'Strategic Roadmap of Azerbaijan Republic on the Prospects on the National Economy 2025' approved in 2016 (Decree No 1138) includes a section on the integrated eHealth infrastructure	HL7, SNOMED
BY	Not approved. 'Concept of eHealth Development of the Republic of Belarus for the period up to 2022' is approved in 2018 (Order of the Ministry of Health of the	HL7 CDA, HL7 FHIR, IHE, СТБ ISO/IEC 27001-2011, LOINC, SNOMED

	Republic of Belarus No. 244) and now under implementation	
GE	Not approved. The state concept of Georgian Healthcare System 2014-2020 "Universal Health Care and Quality Control for the Protection of Patients' Rights" was approved by the Government of Georgia in 2014 (Decree N724)	HL7, ASN.1, DICOM, ICD10
MD	Not approved. The drafting phase of 'The National eHealth Strategy 2020' is ongoing; agreed to prepare and adopt as a part of the negotiation with the World Bank for financing the Strategic Planning Reform of Health Information Management in Moldova (2012-2015)	n/a
UA	Not approved. The Concept of Informatization of eHealth Development in Ukraine by 2023 is currently in process of agreeing with ministries	HL7 FHIR, LOINC, ICPC-2-E, ICD10, ACHI, AR-DRG, SNOMED, ISO 27001

4.1.2   Definition of eHealth

The existence of the definition of eHealth term in the context of the national health care legislation in each Eastern partner country is shown in Table 8.

Table 8. Existence of the definition of eHealth in the legal national health care context in the Eastern partner countries.

Country	Status of eHealth definition
AM	Not defined – in the process of approval by National Assembly of Armenia
AZ	Not defined
BY	Not defined – included in the article on eHealth as a part of the Law on Health Care which is in the process of approval
GE	Not defined
MD	Not defined – the term aligned with the WHO definition and included in 'The National eHealth Strategy 2020' which is under development by the MoH
UA	Defined (Cabinet of Ministers of Ukraine Decree No. 411 (2018))

4.1.3   eHealth Governance

Table 9 provides summarised information regarding the main parties responsible for eHealth governing in the Eastern partner countries. This includes eHealth governance model, key policy-forming/policy-implementing and IT developing institutions as well as their roles, other eHealth related bodies and their roles and, finally, the main private sector enterprises providing eHealth services/eHealth IT solutions. If applicable, entities involved in the development of information society/Digital agenda in the country are included as well.

Table 9. eHealth governance model, key governing bodies, their responsibilities, other related bodies, their responsibilities and the main private sector providers of eHealth services in the Eastern partner countries.

Country	eHealth governance model	Key eHealth governing bodies and their responsibilities	Key eHealth and other sectors related digital infrastructure bodies (in cooperation with eHealth operators or bodies)/ entities and their roles	Main state enterprises and private sector players in eHealth related domain private
AM	Defined. In the process of being updated	Ministry of Health of the Republic of Armenia – responsible for eHealth development and financing priorities, integration into health care processes, initiatives	National Electronic Healthcare Operator* – responsible for integration into health care processes, technical management and improvement of the system,	AArmed – eHealth system provider

		management, defining development and performance goals, monitoring Ministry of High-Tech Industry of the Republic of Armenia is a state body designated to develop and implement the digitization policy of the Republic of Armenia	software maintenance, subscriber and user services, training for users Digitization Council-an advisory body, headed by the Deputy Prime Minister of the Republic of Armenia EKENG CJSC is a unit, created by the administration of the government of the Republic of Armenia as an e-government projects implementation unit	
AZ	Not defined	Ministry of Healthcare of Azerbaijan The State Agency on Mandatory Health Insurance – *de facto* responsible for initiating, developing and implementing eHealth policy as well as financing and implementing IT infrastructure for EMRs of hospitals	Ministry of Transport, Communications and High Technologies – responsible for the eGovernance regulation	–
BY	Defined	Ministry of Health – determines the policy for digitalisation The Republican Scientific and Practical Centre of Medical Technologies, Informatisation, Management and Economics of Public Health – responsible for eHealth development and provides organisational and methodological support for digitalization as well as planning, monitoring, operating and financing	The Ministry of Communications and Informatisation of the Republic of Belarus – responsible for government regulation and management of the activities in the domain of communications and informatisation, coordinates the activities of legal persons and individual entrepreneurs in this field The Operational and Analytical Centre under the President of the Republic of Belarus – regulates the provision of information security, personal data security and protection of other information	The National Centre for Electronic Services United Institute of Informatics Problems of the National Academy of Sciences of Belarus[3] Closed joint-stock company МАПСОФТ B Soft Laboratory Republican Unitary Telecommunication Enterprise Beltelecom
GE	Defined	Ministry of IDPs, Labour, Health and Social Affairs of Georgia – responsible for passing laws, decrees in eHealth and other with eHealth-related issues (i.e. Deputy Minister of the Ministry develops coordination between three departments: Health care department (responsible for eHealth planning and policy-making), IT department (for planning, operations, development and infrastructure) and SSA-LEPL (for operations, development,	Ministry of Justice Inspector of Personal Data Protection National Centre for Disease Control and Public Health Regulation Agency for Medical Activities State Development Agency Data Exchange Agency Social Service Agency	Private companies that develop Hospital Management Systems Insurance companies Pharmaceutical companies

3 United Institute of Informatics Problems, Belarus http://uiip.bas-net.by/eng/

		implementation and monitoring). Department for State Budget plans and controls the budget.)		
MD	Not defined – included in the draft NeHS	Ministry of Health, Labour and Social Protection – main national authority for health care policies (incl. eHealth) and is directly responsible for the implementation of the NeHS National Health Insurance Company (NHIC)** Establishment of eHealth Agency is included in the draft NeHS	e-Governance Agency – responsible for the modernisation of governmental services, government e-Transformation, implementation of the NIF, cybersecurity audit Information Technology and Cybersecurity Service – responsible for the administration, development and maintenance of the government IT infrastructure, and implementation of national cybersecurity policy Ministry of Education – responsible for academic curriculum updates and training of health care professionals National Centre for Data Protection – responsible for personal data protection Ministry of Justice – manages medical assistance for the detained persons	Bass System SRL (MD company) and Genius IT Solutions (RO company) - which have developed the cloud SIA AMS – Hospital healthcare system as well as SIA Primary Health Care system. There is also a SIA Social Assistance system which modules are still in development. Currently, BASS System SRL is providing support services
UA	*Defined*[4]	Ministry of Health of Ukraine – responsible for eHealth policymaking, strategic planning, passes regulatory legal acts for the functioning of the eHealth system National Health Service of Ukraine – responsible for eHealth policy-implementation (e.g. defines functional requirements for eHealth systems and the implementation of eHealth policy, maintains health sector registers, contracting and performs reimbursement payments for provided medical services by HCPs for the assistance provided according to the data from the EHR system) as well as coordination	State Agency for e-Government of Ukraine – responsible for the coordination of all digital initiatives in Ukraine and central access for patients is planned though the eGovernment portal	Medical Information Systems / cloud-service providers – front-end development for hospitals (e.g. Emcimed[7], Ciet Holding[8], Doctor Eleks[9], MedStar[10], Medikit[11]) State-owned enterprise (SoE) Electronic Health – responsible for infrastructure, operations and technical administration of eHealth systems (incl. design and implementation of

4 The Concept of Informatization of eHealth Development in Ukraine by 2023 - eHealth Management and Delegation

7 EMCI med https://www.mcmed.ua/ua

8 Ciet holding https://ciet-holding.com/ua/about-us/

9 Eleks https://eleks.com/about-eleks/

10 Medstar Ukraine http://www.medstar.in.ua/

11 Medikit https://medikit.ua/

| | | of state-owned enterprise Electronic Health[5]

The Public Health Centre of the Ministry of Health of Ukraine – defining functional requirements for data exchange with an electronic integrated system of epidemiological surveillance for infectious diseases and central eHealth component, and requirements for Early Warning and Response System[6] | | the systems, verification of compliance to the legal requirement of the systems, attracting funds for the support and development of the information platform and develops requirements, testing and connection to the central component)[12] |

* The "National Electronic Healthcare Operator" (closed joint-stock company that operates on a concession basis) has been operating since September 2017. The founder of the company is the joint venture consisting of the "Sylex SARL" LLC (Switzerland) and "Masys Apahov" (Armenia) LLC, which has been recognized as the winner of the tender announced by the Government of Armenia for transferring the eHealth system for concession management.[13]

** A single independent pooling and purchasing agent (the National Health Insurance Company, NHIC) was created to collect mandatory health insurance contributions from payroll taxes, with comparable contributions from the national budget to cover non-employed groups.[14]

4.1.4 Data Privacy

The names of regulations that ensure secure and trustworthy data exchange as well as data privacy, and the level of their compliance to the EU GDPR are indicated in Table 10.

Table 10. Extent of common security and data privacy policy for eHealth in the Eastern partner countries.

Country	Name of regulation	Level of compliance with GDPR
AM	• Law on Personal Data Protection (2015)	In the process of synchronisation
AZ	• Law of the Republic of Azerbaijan on approval of "Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data"	n/a
BY	• None, just the Personal Data Protection Act is currently under consideration for adoption • Some privacy provisions in: • Law No. 455-3 of the Republic of Belarus of 10 November 2008 "On Information, Informatization and Protection of Information"; • Law No. 113-3 of the Republic of Belarus of 28 December 2009 "On Electronic Document and Digital Signature"; • Decree No. 450 of the President of the Republic of Belarus of 1 September 2010 "On Licensing of Certain Types of Activities"; • Decree No. 196 of the President of the Republic of Belarus of 16 April 2013 "On Some Measures to Improve the Protection of Information";	n/a

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5 Ibid.

6 Ibid.

12 The Concept of Informatization of eHealth Development in Ukraine by 2023 - eHealth Management and Delegation

13 National Electronic Healthcare Operator https://corporate.armed.am/en/about-us

14 Ministry of finance http://mf.gov.md/en/content/mandatory-health-insurance-fund and http://cnam.md/

	• Decree No. 46 of the President of the Republic of Belarus of 23 January 2015 "On the Use of Telecommunications Technologies by State Bodies and Other State Organizations"; • Resolution No. 673 of the Council of Ministers of the Republic of Belarus of 26 May 2009 "On Some Measures to Implement the Law of the Republic of Belarus "On Information, Informatization and Protection of Information" and on Revocation of Some Resolutions of the Council of Ministers of the Republic of Belarus"	
GE	• Law on Personal Data Protection (2012) • Information Security Standard ISO 27000 • Law on Information Security (2012)	Mostly in compliance, however, there is no data breach notification, DPO, or special security obligations for cross-border data transfer[15]
MD	• Law on Personal Data Protection (2011)	In the process of synchronisation
UA	• National regulation (" Law of Ukraine on Protection of Personal Data") where protection of personal data is established, the national Data Protection Authority is established as well	GDPR implemented in system architecture *Harmonisation of national laws to the GDPR is planned in The Concept of Informatization of eHealth Development in Ukraine by 2023*

4.1.5 eHealth Architecture model

Table 11 summarises the status of the adoption of eHealth architectural model and to what extent the eHealth architecture governance model in the Eastern partner countries is aligned with Enterprise Architecture Principles, if applicable.

Table 11. Legislation of eHealth architectural model in the Eastern partner countries.

Country	Status of eHealth architectural model adoption	Status of alignment with Enterprise Architecture Principles
AM	Not adopted	Not aligned
AZ	Not adopted	Not aligned
BY	Not adopted	Not aligned
GE	Adopted in 2014 but not updated (see the Annex)	A part of the eGovernment architecture model and based on service-oriented architecture principles
MD	Not adopted - included in 'The National eHealth Strategy 2020' which is under development	Not adopted – the model aligned with Enterprise Architecture Principles is included in the draft of NeHS
UA	Adopted (see the Annex)	High-level alignment as a part of the eHealth informatization concept.

4.1.6 Patient Summary and ePrescription Regulation

The regulations enabling Patient Summary and ePrescription services in the Eastern partner countries are summarised in Table 12.

Table 122. Regulations enabling Patient Summary and ePrescription services in the Eastern partner countries.

Country	Regulation for Patient Summary	Regulation for ePrescription
AM	None	• Regulated by Government Decision No. 1556-A 'On the approval of the roadmap provision of the

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[15] Bloomberg BNA https://media2.mofo.com/documents/160531privacylawsineuropeandeurasia.pdf, p. 8

		united economic information system in the health sector in the Republic of Armenia' (2017)
AZ	None	• None
BY	None	• Regulated by Orders of the Ministry of Health of the Republic of Belarus:
		• No. 863 'On the organisation of trial operation of the Electronic Prescription information system at the pilot zone in Minsk"' (31.08.2015);
		• No. 22 'On the organisation of the extended trial operation of the Electronic Prescription information system at the pilot zone in Minsk' (16.01.2016);
		• No. 453 'About amendment to the order of the Ministry of Health of the Republic of Belarus of 16 January 2016 No. 22' (13.05.2016);
		• No. 570 'On the expansion of the pilot area of the automated information system for the circulation of electronic prescriptions' (10.05.2017);
		• No. 1213 'On expanding the area of operation of the automated information system for the circulation of electronic prescriptions' (19.10.2017);
		• No. 464 'On the further expansion of the pilot area of the automated information system for the circulation of electronic prescription' (11.05.2018);
		• No. 562 'On the further promotion of electronic prescription technology in the Republic of Belarus' (13.05.2019)
GE	Regulated by the Order No. 01-1 / N. 'On the definition of the function of the Electronic Record System of Health (EHR) and the Production Rules' (2018)	• Regulated by Order No. 01-29 / N. on the approval of electronic prescription (2016)
MD	None	• None
UA	None The document has been drafted by the Ministry of Health of Ukraine	• Regulated by the Order of the Ministry of Health of the Ukraine No. 735 'Amendments to writing prescriptions for medicines and medical products' (2018)

4.2 eHealth Infrastructure and Services

The extent of re-use of existing national or regional IT infrastructures for eHealth services and eHealth IT solutions in the Eastern partner countries is summarised in Table 13.

Table 13. Extent of re-use of existing national or regional IT infrastructures for eHealth services and eHealth IT solutions in the Eastern partner countries.

Country	The extent of IT infrastructure re-use
AM	eID, eSignature, interoperability system*
AZ	eSignature and eGovernment portal (planned).
BY	eSignature is re-used for ePrescription. In the future, a national IT infrastructure will be reused when designing and implementing a national eHealth information system
GE	eGovernment services, Citizen Personal Information service, State Exchange Data gateway

MD	None currently, planned the potential re-use of eGovernment/ Digital Trust services (incl. MPass, MSign, MPay, MConnect, MCloud)
UA	eID, eSignature, national electronic system for data exchange between public registers named "Trembita"[16] , eGovernment portal is planned to be re-used for Patient portal development.

* Armenia has x-road interoperability protocol implemented from Estonia, but not all the governmental systems (including eHealth domain) have it adopted and used.

The status of integration of national or private pharmacy information systems with eHealth information systems is defined in Table 14.

Table 14. Level of integration of national or private pharmacy information systems with eHealth information systems in the Eastern partner countries.

Country	Status of integration	Purpose
AM	Integrated to hospital pharmacies only – plan to start integrating other major pharmacies in following years	ePrescription, pharmaceutical reimbursement
AZ	Not integrated	n/a
BY	Integrated	ePrescription, pharmaceutical reimbursement
GE	Integrated	ePrescription, National Registry of Medical Products, pharmaceutical reimbursement
MD	Not integrated	n/a
UA	Integrated	Medicine prescription, discharge and pharmaceutical reimbursement by ePrescription – currently only for reimbursed medicines, planned for all by 2020

The extent of Patient Summary and ePrescription service operation is summarised in Table 15.

Table 135. Extent of Patient Summary and ePrescription service operation in the Eastern partner countries.

Country	Patient Summary service operation	ePrescription service operation	Number of ePrescriptions issued in 2018	Number of ePrescriptions issued in 2019 H1
AM	Accessed nationwide (with HL7 CDA integration)	Running in a pilot mode since December 2018	*No information*	*No information*
AZ	Not implemented	Not yet implemented – planned in the Roadmap 2025	n/a	n/a
BY	Not implemented	Centralised and accessed by all state health organisations and most private sector organisations	6 464 630	4 002 330
GE	Included in the EHR system and accessed nationwide	Implemented in Tbilisi and planned to be implemented nationwide in 2020	Approx. 700 000 in 2018 and 2019 H1	
MD	Not implemented	Not implemented	n/a	n/a

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16 Trembita https://nszu.gov.ua/en/novini/v-ukrayini-rozpochato-vprovadzhennya-trembiti-nalagodzheno-a-40

UA	Not implemented – planned*	Implemented recently (since 2019/04/01)	–	Approx. 4 000 000 since 2019/04/01 by August 2019

* Other medical events planned in the scope of the project: Managing medical data for №025/o; managing medical data for №112/o; managing medical data for ICPC2; referral; authorization to medical data using declaration; authorization to medical data by emergency; risk assessment; device; medication statement.

The extent of national patient and health care professional portals operation is given in Table 16.

Table 146. Extent of national eHealth portal operation in the Eastern partner countries.

Country	State of National patient portal operation and main components	State of National health care professional portal operation
AM	- Operating - Includes e-booking, self-measurement and access to EHR - http://armed.am	Operating
AZ	Not operating	Under development*
BY	Not operating	Not operating
GE	- Operating - Includes information about social and health state services - A separate Patient Portal exists to access EHR - Mobile application available - http://ehealth.moh.gov.ge/	Planned for the rural area HCPs by the Ministry of IDPs from Occupied Territories, Labour, Health and Social Affairs of Georgia
MD	Not operating	- Operating - There are two cloud-based systems SIA AMS (Hospital Healthcare System) and SIA AMP (Primary Healthcare System) - http://www.e-sanatate.md/
UA	- Not operating - The national patient portal is planned to be developed as a part of the centralised eGovernment portal	- Not operating - The ecosystem of private sector providers is present offering and providing solution and services to HCPs

* Azerbaijan is focused on the further development of the Mandatory Social Health Insurance capabilities it is planned to be introduced from 2020 and the unified web portal as a cloud service to HCPs is also under development and the launch is planned by 2025.

4.3 Funding and Incentives Mechanisms

4.3.1 Development Funding

The information regarding funding for the development of eHealth systems and capabilities is summarised in Table 17. This includes responsible institutions or programmes, the type of involvement of universities/academia, institutions/bodies responsible for monitoring the implementation of new eHealth strategies and programs.

Table 157. Funding and incentives for eHealth development in the Eastern partner countries.

Country	Funding sources/ programmes for eHealth development	Type of academic involvement in eHealth development	Institutions/bodies monitoring the implementation of new

	Institutions/programmes funding eHealth development		eHealth strategies and programs
AM	• State budget • World Bank (last project in health topic in 2013)	None	• Ministry of Health of the Republic of Armenia • Ministry of High-Tech Industry of the Republic of Armenia
AZ	• State budget	*No information*	*No information*
BY	• State Program 'Health of the Nation and Demographic Security of the Republic of Belarus' (2016 – 2020) • National Program for the Development of the Digital Economy and the Information Society 2016 - 2020 • Loan funds of the International Bank for Reconstruction and Development allocated for the project Health System Modernization Project for Belarus for the period 2017 - 2022	There is a new IT in healthcare-related study programme opened at the Belarusian State University	• Ministry of Health of the Republic of Belarus • The Republican Scientific and Practical Centre of Medical Technologies, Informatisation, Management and Economics of Public Health
GE	• State Budget • Donor organisations (US AID, World Bank, EU, Global fund)	Involved in Data Content identifying to derive and validate qualitative analytical and statistical information	• Ministry of IDPs from Occupied Territories, Labour, Health and Social Affairs of Georgia
MD	• State Budget • Donor organisations (US AID, World Bank, Global fund)	University curricula address training for health care professionals (applied in State Medicine and Pharmaceutical University and the School of Public Health Management)	• Ministry of Health, Labour and Social Protection is planned to be assigned in the draft NeHS
UA	• Donor organisations (U.S. Agency for International Development, World Bank, Global Funds)	None	• Cabinet of Ministers of Ukraine • State Agency for e-Government of Ukraine

4.3.2 Research Funding

The Eastern partner countries have not indicated any research funds used to support eHealth research programmes, nor there were indicated incentives or funding to the private sector for the development of eHealth applications and services and research in eHealth.

4.3.3 eHealth Operations Funding

The main sources of funding for the Eastern partner country's central eHealth operator or health care providers (HCPs) for the operation, maintenance and continuous development of eHealth services, as well as, development of new services or the expansion of eHealth IT solutions are provided in Table 18.

Table 18. Main sources of funding for the central health operator and HCPs for the operation, maintenance and continuous development of eHealth services, and the expansion of eHealth IT solutions in the Eastern partner countries.

Country	Sources of funding for the operation, maintenance and continuous development of eHealth services	Sources of funding for the expansion of eHealth IT solutions
AM	• State Budget (Armenian National eHealth Operating Company)	• State Budget
AZ	• State Budget	• State Budget
BY	• State Budget • Local funds • Other financing regulated by law	• State Program 'Health of the Nation and Demographic Security of the Republic of Belarus' (2016 – 2020) • National Program for the Development of the Digital Economy and the Information Society 2016 - 2020 • Loan funds of the International Bank for Reconstruction and Development allocated for the project Health System Modernisation Project for Belarus for the period 2017 - 2022
GE	• State Budget (regional health care centres) • Self-funded (private hospitals)	• State Budget (regional health care centres) • Self-funded (private hospitals)
MD	• The Mandatory Health Insurance Fund managed by National Health Insurance Company • State Budget	• The Mandatory Health Insurance Fund managed by the National Health Insurance Company • State Budget
UA	• State and local Budget • Self-funded (healthcare institutions)[17]	• Donor organisations (U.S. Agency for International Development, Global Funds)

4.3.4   Incentives Mechanisms

The Eastern partner countries have not indicated any incentives mechanisms used to support the use of eHealth services among citizens

4.4   Involvement in International Communities

Table 19 provides information regarding the involvement of the Eastern partner countries in the international communities related to eHealth and/or digital innovation in health care that promote the exchange of knowledge and best practices.

Table 19. Involvement of the Eastern partner countries in international eHealth and health care innovation communities, and associated benefits.

Country	Names of international communities	Main benefits of participation perceived by countries
AM	• WHO • ADB[18] • EU	• Participation in symposiums • The use of the organisation's standards while filling the documents • Meetings with national and international experts • eHealth system evaluation • Roadmap development • The development program of the quality improvement indicators

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17 The volume of financial, logistical and labour resources

18 Asian development bank https://www.adb.org/

AZ	• WHO • Involvement in HL7 is planned	• Access to materials on best/innovative practices, gain recognition • Exchange of knowledge and good practice via events, workshops and conferences • Exchange of best practices via collaboration (deploying best practice with assistance from the organisation with experience in this practice)
BY	• WHO • The European Health Information Initiative of WHO • HL7 • Central European Initiative[19]	• Access to materials on best/innovative practices • Exchange of knowledge and good practice via events, workshops and conferences • Exchange of best practices via collaboration (deploying best practice with assistance from the organisation with experience in this practice)
GE	• HL7 • WHO	• Chance to build a network • Exchange of best practices via collaboration (deploying best practice with assistance from the organisation with experience in this practice) • Attracting funding for eHealth programs, donor involvement
MD	• WHO • Central European Initiative	• Access to materials on best/innovative practices, gain recognition • Opportunities for eHealth professional and institutional networking • Exchange of knowledge and good practice via events, workshops and conferences • Exchange of best practices via collaboration (deploying best practice with assistance from the organisation with experience in this practice)
UA	• EIP on AHA	• No information provided

In Table 20, the most significant project or initiative regarding a digital innovation in health care/eHealth as identified by each Eastern partner country is outlined.

Table 20. Projects/initiatives regarding digital innovation in health care/eHealth that Eastern partner countries are willing to share with the rest of the international community or the Eastern partner countries

Country	Project/initiative identified
AM	n/a
AZ	n/a
BY	Project Health System Modernisation Project for Belarus within the framework of the Loan Agreement between the Republic of Belarus and the International Bank for Reconstruction and Development of November 25, 2016. Its main purposes include the development of the eHealth system and system implementation to support ICT-based clinical solutions for health care quality improvement
GE	Trust and Security based on eSignature New-born Health Record System
MD	n/a
UA	n/a

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19 Central European Initiative https://www.cei.int/

Annex - Sources

Armenia

http://www.irtek.am/views/act.aspx?aid=93265 Armenia 1556-A

https://www.arlis.am/DocumentView.aspx?docID=98338 Armenia Personal Data Protection

https://corporate.armed.am/en/

Azerbaijan

https://my.gov.az/intro/

http://www.e-qanun.az/framework/41023

http://e-qanun.gov.az/framework/25215

http://e-qanun.gov.az/framework/38481

http://www.e-qanun.az/framework/80

Belarus

https://sites.google.com/view/apteka21vpharmacia/%D0%B7%D0%B0%D1%81%D0%B5%D0%B4%D0%B0%D0%BD%D0%B8%D0%B5-1 Belarus orders on health care summary

http://bii.by/tx.dll?d=345317&a=11 Belarus "On the organization of the trial operation of the information system "Electronic prescription" on the pilot zone in Minsk"

http://bii.by/tx.dll?d=323775 Belarus Order 22

Belarus No 570 "On the expansion of the pilot area of the automated information system for the circulation of electronic prescriptions"

Belarus Order of the Ministry of Health of the Republic of Belarus of October 19, 2017 No. 1213 "On expanding the area of operation of the automated information system for the circulation of electronic prescriptions"

http://uiip.bas-net.by/eng/

https://www.mapsoft.by/programs/medicine-software/

https://bsl.by/en/projects

https://beltelecom.by/en/about

Georgia

https://metronome.ge/story/67980

http://rama.moh.gov.ge/geo/static/411 Georgia ePrescription

https://www.moh.gov.ge/ka/664/eleqtronuli-receptis-sistema Georgia ePrescription updates

http://www.georgia-ccm.ge/wp-content/uploads/ABT_ka-GE.pdf Georgia eHealth architecture

https://matsne.gov.ge/ka/document/view/1561437?publication=20 Georgia Personal Data Protection

https://matsne.gov.ge/ka/document/view/1679424?publication=3 Georgia Information Security

https://matsne.gov.ge/ka/document/view/2657250?publication=0 Georgia concept for health care system and review on information systems

http://www.georgia-ccm.ge/wp-content/uploads/HMIS_Module_Descriptions_ENG.pdf Georgia Health Management Information System (HMIS)

https://matsne.gov.ge/ka/document/view/1561437?publication=20

Moldova

https://www.who.int/goe/policies/countries/mda_support1.pdf?ua=1

http://www.e-sanatate.md/ Moldova health care professional portal

https://mpass.gov.md/?lang=en MPass

https://msign.gov.md/#/ MSign

https://mpay.gov.md/Services?lang=en MPay

 https://mconnect.gov.md/ MConnect

https://stisc.gov.md/ MCloud

http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=312789 Moldova Compulsory health insurance

http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=378598 Moldova Compulsory Insurance Funds, 2019

https://www.who.int/goe/policies/moldova_Strategia-eSanatate-si-Planul-de-implementare2020.pdf?ua=1 Moldova National Health Strategy 2020

http://www.datepersonale.md/en/legi/

http://mf.gov.md/en/content/mandatory-health-insurance-fund and http://cnam.md/

https://monitorul.fisc.md/editorial/lansarea_oficiala_a_sistemului_informaional_automatizat_pentru_medicina_primara.html#cut

Ukraine

https://nszu.gov.ua/en/novini/v-ukrayini-rozpochato-vprovadzhennya-trembiti-nalagodzheno-a-40
https://issuu.com/e.gov.ua/docs/egovernance_in_ukraine_booklet_2018

https://eleks.com/about-eleks/

https://medikit.ua/ (https://en.interfax.com.ua/news/economic/530791.html)

http://www.medstar.in.ua/

https://www.mcmed.ua/ua

https://ciet-holding.com/ua/about-us/