Economic Security at the Individual Level

INTERCONNECTION OF PUBLIC HEALTH INFORMATION SYSTEMS FOR THE OPERATIVE MONITORING OF THE PANDEMIC SITUATION IN THE REPUBLIC OF MOLDOVA

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Abstract
The paper examines the current situation in the field of operational monitoring and reporting of cases of SARS-Cov-2 infection in the Republic of Moldova. The existing problems of this process, mostly performed in manual mode, are highlighted. It mentions the unnecessary waste of time by the doctors involved in the fight with COVID-19 for the manual completion of the daily reports sent for centralization to the hierarchically superior medical organizations. The main information systems used in the field of public health in the Republic of Moldova are reviewed and their basic functionality is mentioned. The lack of a centralized information system for collecting and processing primary medical data, necessary for operational and strategic decisions by the central administration, is accentuated. It is proposed the concept of interconnection of medical information systems and profile databases through the automated information system of primary health care and the creation within this system of a subsystem for monitoring and reporting the epidemiological situation in the Republic of Moldova.

Keywords: *health information systems, operative monitoring, pandemic situation.*

JEL Classification: *L86, I13*

INTRODUCTION

In the field of public health in the Republic of Moldova, a series of medical information systems are implemented to record the services provided to the population of the republic.

The National Health Insurance Company (NHIC) registers the citizens included in the Compulsory Health Insurance System (CHIS) in the database "**Register of persons insured in the system of compulsory health insurance**". This database is organized in accordance with legal requirements and is a component part of the automated information system "Compulsory Health Insurance". An insurance number is assigned to the person registered in the "Register of persons insured in the compulsory health insurance system". The records in the "Register of persons insured in the compulsory health insurance system" are made on the basis of the state identification number (IDNP) or the series and number of the valid identity card in the national passport system, for persons who do not have IDNP, and of the number of compulsory health insurance. The status of insured person is verified by querying the automated information system "**Compulsory health care insurance**" by accessing the official website of the NHIC (**http://vsa.cnam.gov.md/app/verify/**)

The NHIC information system has a reduced functionality for citizens: the status of insured person in the field of compulsory health insurance is checked or the registration of the family medicine is checked. In the latter case, the citizen obtains information about the public health medical institution to which he is affiliated, registration data and the name of the family doctor.

The automated information system "**Reporting and evidence of medical services**" (AISREMS) ensures the real-time monitoring of the provision of medical services and the reporting of data to the National Health Insurance Company. Within AISREMS, doctors can identify the person in the NHIC database, check their insured or uninsured status, and in the case of the insured patient - fill in the referral ticket online for medical services. Through the system it is possible to make online appointments at medical services, accessing the link **https://sirsm.cnam.gov.md**. The database is continuously updated with information on medical services prescribed to patients by doctors, appointments made by doctors and patients, the number and volume of services contracted and the real-time execution of services in accordance with the contract with the medical institution. The stored information is used to prepare synthesis and analysis reports.

Territorial Medical Associations (TMA) use both the NHIC information system and the automated information system "Primary Health Care" (AISPHC) (**https://sia.amp.md/**). AISPHC allows the computerization of the activities of the medical, administrative and management staff within the health units, the evidence, the control and the automated coordination of the activity of the basic subdivisions of the public medical institution of the Primary Health Care, as well as the accumulation of information necessary for decision making and data processing, including those related to the health status of the beneficiaries of medical services. In the automated system are stored and processed personal data of citizens, such as: IDNP, name, surname, patronymic, date of birth, sex, citizenship, blood type, health insurance number, education, job, position, profession, type and number of identity document, patient's mobile phone, email, number of children, marital status, medical file number.

For this reason, the authentication of doctors in the AISPHC is possible by using the government service **MPass** (**https://sia.amp.md/siaamp**/) by electronic signature, mobile signature or electronic identity card. The functionality of the automated information system "Primary Health Care" is described in the AISPHC User Manual [1].

RESULTS AND DISCUSSIONS

Along with the medical-organizational activities for monitoring the situation with the spread of COVID-19 on the territory of the Republic of Moldova, the Ministry of Health, Labor and Social Protection developed a series of prevention and control measures, stipulated in a series of orders issued.

Thus, in order no. 213 of March 2, 2020 [2] was approved the Bulletin accompanying the biological sample for the detection of SARS-Cov-2 virus (COVID-19) (hereinafter Accompanying Bulletin) and the WHO Provisional Form for reporting probable and confirmed cases of Covid-19 infection (hereinafter WHO Provisional Form).

Analyzing the structure of the Bulletin accompanying the biological sample for the detection of SARS-Cov-2 virus (COVID-19) we can see the following moments:

1. The accompanying bulletin contains 41 positions, is filled in **manually** by the ascertaining doctor, is signed and initialed in the same way **manually**.
2. Sender information to be filled in **manually** each time
3. The information with the patient's personal data is filled in **manually**
4. The patient's travel data and border transit data shall also be completed **manually**.

As concrete proposals for solving the moments set out above it can be mentioned:

- Elaboration within the AISPHC (sia.amp.md) of **an informational subsystem for monitoring the epidemiological situation** in the territory, **interconnected** with other government information systems and profile databases;

- Design within the information subsystem for monitoring the epidemiological situation in the territory of **Web interfaces** for the **collection of primary medical data** about patients and their storage in the database.
- Development of a **Web interface** for the **automatic generation of statistical forms and reports** necessary for real-time monitoring of the situation in the territories and centralization of statistical data.
- Using the **electronic signature** to identify the doctor and authorizing the document developed in the AISPHC;
- Implementation of the functionality of **automated completion of routine data** from forms (date of completion, time of dispatch, medical institution, etc.)
- **Retrieving personal data** by using the **specialized bulletin scanning technique** and obtaining personal data from **interconnected databases** (NHIC database, Border Police database, etc.)
- **Retrieving patient travel data** from the Border Police database.
- **Automatic transmission of data** to the authorized medical institutions of the National Agency for Public Health (NAPH)
- **Automated evidence** of suspicious and confirmed cases and transmission of related information to the Territorial Medical Associations and family doctors concerned (depending on the patient's place of residence).
- **Automatic generation** of **daily reports** of suspected or confirmed cases of disease in the territories.

For example, the practical implementation of the above recommendations would reduce in only one form of the Accompanying Bulletin the number of positions to be filled from 41 to 17 (all ticked), considerably **reducing the time** taken to complete the document.

Likewise, the completion of the WHO Provisional Form by the responsible worker of the National Agency for Public Health provides for the manual completion of at least 94 positions. Most of the positions to be filled are ticked (confirmation of an election), however, there is a series of positions, which could be filled in automatically:

- Patient information can be filled in automatically from the NHIC or AISPHC databases.
- The clinical information can be filled in automatically from the AISPHC database, using the data entered by the family doctor when taking the case for monitoring or from the computer systems of the hospitals from the patient's electronic file.
- Information regarding the patient's travel can be partially completed with the data taken from the Border Police database and from the AISPHC database, entered by the family doctor when taking the case for monitoring.
- Laboratory information may be completed automatically with the response sent by the specialized laboratory for the detection of SARS-Cov-2 virus (COVID-19).

CONCLUSIONS

In the orders of the Ministry of Health, Labor and Social Protection no. 294 of 20.03.2020 [3] and no. 389 of 10.04.2020 [4], **5 forms** of reporting are specified, which are currently completed manually by the competent bodies and are sent in the form of Excel files for centralization to the higher hierarchical bodies, where they are processed in the same way manually. The waste of the doctor's working time to complete a documentation leads to a drastic decrease in the efficiency of the actual medical act, the doctor being obliged to perform routine activities and not to treat the patient. In this context, the maximum reduction of the time for completing the medical documentation and the

automatic generation of statistical forms and reports becomes a primary priority for the public health system of the Republic of Moldova.

The development within the AISPHC of an information subsystem for monitoring the epidemiological situation in the territory would solve the problem of **reporting and centralizing statistical data** on the current situation in the territories. The numerical fields in these reports contain aggregation values, which can be obtained automatically by querying the AISPHC database, cardinally reducing the number of hours worked unnecessarily to complete momentary documents with volatile operating data. It will also increase the efficiency of crisis reporting and increase the objectivity of operational data, necessary to make a correct operative and strategic decisions.

The idea of interconnection and interoperability of medical information systems **can be extended over time to the national level** by creating an information system for monitoring the epidemiological situation in the Republic of Moldova, connected to medical and government information systems on a common computer platform. The **MCloud** information platform (https://stisc.gov.md/ro/content/mcloud) could serve as a platform for implementing the future information system for monitoring the epidemiological situation. The **MCloud** platform is a common government information infrastructure, which operates on the basis of "cloud computing" technology, hosted in the consolidated infrastructure of data centers. The platform is a model for the provision of IT services, through the telecommunications system of public administration authorities, as well as through public communications networks, exclusively through secure data access and transport channels. The **MCloud** platform is used exclusively by central administrative authorities and organizational structures within their sphere of competence, subordinated to the Government.

The **MConnect** interoperability platform can be used as an integration platform for various information systems within an information subsystem for monitoring the epidemiological situation (https://mconnect.gov.md/#/)

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