



Health information system in Romania

Assessment of HIS in Romania, March 6-7th, 2019

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Executive summary

This report is produced by experts from Moldova and Latvia with the support of experts from Belgium, Malta and Romania and reports on a peer assessment of the health information system (HIS) of Romania. The assessment took place in Bucharest, Romania on the 6-7th of March of 2019. Before the country visit, a desk review is carried out with analysis of the existing policy and background information, based on the documents provided by the Romanian coordinators of the peer assessment. This was used to steer the assessment when conducting interviews with stakeholders and policy makers. The aim of this assessment is to identify the challenges and gaps in the HIS as well as to learn from good practices by identifying strengths, weaknesses, threats and opportunities of the HIS in Romania, formulate recommendation and exchange between experts.

A comprehensive HIS assessment was conducted based on interviews that were organised by the National Public Health Institute of Romania with stakeholders and policy makers such as: National Institute of Statistics, College of Physicians of Romania, Ministry of Health, National Health Insurance House, National Institute of Public Health (National Centre of Health Statistics and Informatics, National Centre for Monitoring Environmental Risks, National Centre for Surveillance and Control of Communicable Diseases, National Centre for Health Status Evaluation and Health Promotion), National School of Public Health and Management Bucharest, and National Coordinator of Regional Cancer Registries. The results of the conducted interviews are reflected in a strengths, weaknesses, opportunities, and threats (SWOT) analysis.

Romania is improving its comprehensive data collection and dissemination system. E-Health is planned to be integrated in the HIS. This would be an excellent opportunity to improve the communication within data providers, collectors and users as well as an opportunity to avoid duplication of data collection which is currently the case. It would also contribute to accessibility of data as currently it is provided is obtained through a specific request as a paid service.

The recommendations focused on potential improvements in linkage and data flows, cooperation between the different stakeholders; recommendations regarding the performance of registries and the e-health system.

InfAct: Assessment of health information system in Romania

I. Introduction

The health information system remains highly centralized, with administrative regulation and financial control concentrated at the national level.

The Romanian health system is organized at two main levels: the national level responsible for the implementation of government health policy; and the district level responsible for ensuring service provision according to the rules set centrally. The social health insurance system is managed by the National Health Insurance House (NHIFH). The NHIH is also represented at district level by district health insurance houses (DHIHs). In primary health care around 11000 family doctors in contract with NHIH (2000 inhabitants list). According to the data collected through the National Institute of Statistics (NIS) annual survey, in 2017 there were: 367 public and 209 private hospitals at tertiary care level in Romania.

Romania's Social Health Insurance (SHI) based system has remained highly centralised despite recent efforts to decentralise some regulatory functions. At the national level the Ministry of Health provides overall stewardship, policy direction and regulatory oversight while at local level, District Public Health Directorates (DPHD) are responsible for delivering public health services. Similarly, the National Health Insurance House administers and regulates the SHI system through district-level branches that contract services.

There is no national health information strategy, however there is a priority specific component in the National Health Strategy 2014-2020 setting the agenda for the national health information system. The first such strategy was developed in 2004. The 2004 Strategy remained a mere programming document. Its implementation was neither monitored nor assessed. The current Strategy came into force in December 2014 and covers the period 2014-2020 (Ministry of Health, 2014). The specific topic of the current Strategy is "Efficiency of the healthcare system by speeding up the use of modern information and communications technology (E-health)".

Legal basis for official statistics is set according to the provisions of Law no 226/2009 regarding organization and functioning of official statistics. There are different pieces of legislation for the collection of different data sets. Routine system and analysis of the performance of the HIS indicators are in place.

The National Institute of Public Health (NIPH) is the main coordinator for data collection, analysis and reporting in the public health field. All four existing National Centres, National Centre of Health Statistics and Informatics, National Centre for Monitoring Environmental Risks, National Centre for Surveillance and Control of Communicable Diseases, National Centre for Health Status Evaluation and Health Promotion are involved in data management in their specific field of responsibility.

II. Aim

The aim of this assessment is to identify the challenges and gaps in the HIS as well as to learn from good practices by identifying strengths, weaknesses, threats and opportunities of the HIS in Romania, formulate recommendation and exchange between experts.

III. Approach

The assessment of the Health Information System (HIS) in Romania took place on the basis of a condensed version of the Support Tool developed by WHO Europe via the Joint Action on Health Information's (InfAct) project Work Package 5 (WP). The approach strengthens capacities within and between countries through the exchange of experiences to address challenges in HIS.

The assessment exercise started with a training in Moldova and Latvia. InfAct's coordination and task leaders provided assessors with guidelines and a training on how to use the WHO tool and carry out the HIS assessment. In this training, potential stakeholders in each country were identified.

In preparation for the HIS assessment, the country representatives provide the assessors with relevant documentation for a desk review report to be prepared by the assessors. The desk review report is then used by the assessors to get an overview of the health (information) system of the country and potentially already identify gaps and challenges before interviewing stakeholders

The assessment period in Romania was two days. Semi-structured interviews of key informants at senior level, both decision-makers and professionals working in the field of health information, were performed by experts from Moldova, Latvia and Malta (See annex 2). During these two days there were 14 semi-structured interviews using the HIS assessment item list for guidance. Three assessors were accompanied by the main national contact persons from the receiving institution, a facilitator, and an observer.

Assessors:

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National contact:

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Facilitator:

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During the interviews, assessors made notes, which they summarized afterwards in the HIS assessment item list (see Annex 1), in the form of a SWOT analysis (see section IV, A) and through a set of recommendations for short and long term actions (see section IV, B). The results from the HIS assessment are then summarised in this report and reviewed by the contact persons in the assessed country to check whether the findings and suggestions for improvement are clear and recognizable for the receiving country.

The final report will then be presented to the stakeholders in the country during a stakeholder follow-up meeting. The results can then be discussed and possible actions may be taken.

IV. Results

The following sections includes the identified strengths, weaknesses, threats and opportunities regarding the Romania HIS and suggestions for improvement.

A. SWOT Analysis of the Romanian Health Information System

Table 1: Analysis of strengths, weaknesses, opportunities and threats (SWOT)

Key issues identified in the mission terms of reference	
To assess the health information system (HIS) in Romania	
Process and methodology followed for the HIS assessment	
The health information system was assessed on the basis of a condensed version of the Support Tool developed by WHO Europe. See section Annex 1.	
Key mission findings	
<p><u>Strengths</u></p> <ul style="list-style-type: none"> - Good reputation of the National Institute of Public Health, trust from other stakeholders; - Strong public health capacity at the National Institute of Public Health; - Ministry of Health has a high level of trust in the National Institute of Public Health; - Strong reporting capacity of the National Institute of Public Health; - Strong National Institute of Statistics (NIS) WEB portal; - Existence of the well developed general statistics strategy at NIS; - Good communication between national and district level; - Existing national ID number. - The legal framework is mainly harmonized with the European Union' legal framework 	<p><u>Weaknesses</u></p> <ul style="list-style-type: none"> - There is no national health information strategy - Limited communication between health information system players; - Duplication of data - No interoperability of existing data bases - Week access of patient at information - High burden on health care providers; - Fragmentation in HIS; - Poor enforcement of health data obligations in private sector, lacking a mechanism to report health data. - Legal and regulatory framework is not yet completely adjusted to the new realities of the digital environment - Spending on public health is rather low, with impact on HIS development; - Missing of periodic trainings modules for colecting/reporting / analysis Public Heath data - Weak data collection capacity of national registries

<u>Opportunities</u>	<u>Threats</u>
<ul style="list-style-type: none"> - There is a priority specific component in the National Health Strategy 2014-2020 setting the agenda for the national health information system - e-Health system strategy development; - Optimise data flow and actors; - Single electronic health records system across health system; - International support for transformation processes; - Availability of external EU funding; 	<ul style="list-style-type: none"> - Ageing human resources in National Institute of Public Health; - Weak intersectoral collaboration at central level; - Existing different levels of technology in data collection and evaluation (differences between regional and national level) could lead to data gaps; - Limited existing resources for future development of e-Health (human, financial, IT); - Lack of motivation to work for e-Health by misunderstanding the processes of the system and lack of support from the government (for ex. financially); - Lack of comprehensive knowledge in the field of data protection legislation and application, leading to misunderstanding and misinterpretation of Data protection system. This leads to limited data usage and data networking between different governmental institutions and stakeholders; - Bureaucratic resistance to change; - Frequent political changes at decision level making and shifting priorities.. - Lack of sustainable national funding - Shortage of well trained and motivated people

B. Suggestions for improvement

The following section summarises recommendations and suggestions for improvement of the Romania HIS. The suggestions are developed in accordance to the SMART principles: Specific, Measurable, Assignable/Achievable, Realistic, Time related: short term, medium term, and long term).

Suggestions for steps to be taken in the short term

- Complete the development in the field of E-Health in the Single Integrated Information System of the National Health Insurance House, the electronic health insurance card and the electronic health file, which are essential projects at different stages of development.
- Suggest to accelerate the adoption of e-Health solutions, including m-Health, to increase the efficiency of the system as a whole and, ultimately, to increase access to quality services and reduce health inequalities.
- Suggest to increasing the capacity of the data collection, processing, analysis and reporting system in existing information or information systems, as well as the use of

data and information available in public policies. Unitary classifications and coding (e.g. for healthcare units with beds, outpatient types of providers, medical laboratories etc.) should be used at national level in order to link different data.

- Encourage the governmental institutions involved in HIS (National Health Insurance House collaboration with other stakeholders, having also a feedback) to improve communication for better data linkage, transparency and implementing good practices.
- Ministry of Health should wisely plan human and financial resources in the government controlled institutions, anticipating space for unplanned expenses as well as committing to administratively less complicated resource planning in the institutions (for example, office supplies). This may also apply to expenses regarding business trips and possibility for professional growth.
- Suggest setting up an inter-stakeholder group, presenting the stakeholders involved in the health information system (governmental organisations, other stakeholders), defining effective collaboration in order to establish effective and comprehensive e-Health system.
- Suggest that the responsible authorities should provide training opportunities in the health information statistics for the staff involved in HIS.
- Use the InfAct opportunities, as well as other international projects for improving the existing HIS

Suggestions for steps to be taken in the short to medium term

- Encourage responsible authorities (Ministry of Health care and Services) to review HIS data flow that could be less fragmented.
- Encourage the Ministry of Health to support the development and maintenance of disease registers in responsible authorities (i.e. National Institute of Public Health) and their interoperability
- Encourage responsible authorities (i.e. Ministry of Health, National Institute of Statistics, National Institute of Public Health, College of Physicians of Romania, The National School of Public Health Management and Professional Development, Bucharest) to collaborate in order to set up national level human resource database in health care field and link with NHIH database.
- Encourage responsible structures to develop efficient and effective IT solutions in monitoring the outcomes of national health programs.
- Encourage responsible governmental authorities and other stakeholders as they are not defined in the e-Health planning to develop inclusive information access plan in system planning.
- Develop at NIPH level a specialized team for health system performance assessment, including health care.

Suggestions for steps to be taken in medium to long term

- Suggest the Ministry of Health to invest in health care field (i.e. HIS) experts and capacity building (harmonise salary between different education background, increase staff motivation and attract young persons in HIS field). These activities may improve data surveillance systems (routine data and national registries of health data) as well as possibility of the institutions to use the innovative minds when having youth as well as staff with improved professional knowledge.

- Suggest to work on possibilities for data linkage process.
- Suggest to implement of an integrated public health information system with a comprehensive and integrative architecture that allows effective and optimal use of data and information.
- Establishing a broader vertical and horizontal communication format for all actors and beneficiaries of the health system.
- A complex system management with better government coordination of the field by applying the multisectoral approach.
- To continuously develop the communication component to / access to relevant information for the patient and the population.
- Encourage participation of the NIPH in international projects, programmes and initiatives on health information system development and networking.
- Develop a training course for public health statistics and health informatics by the NIPH.

V. Implications and limitations

Given that the presence of the relevant stakeholders involved in the interviews was important, due to other competing meetings and limited time and resources, there was no possibility to interview all of the identified stakeholders, as well as for all of the representatives to attend. Yet there was a telephone interview with National Coordinator of Regional Cancer Registries. National Health Insurance House representative could not be present, but information on their work and implications to HIS were presented mostly by NIPH and other stakeholders.

Acronyms and abbreviations

ANSP - Annual National Statistical Programme

CNEPSS - National Center for Evaluation and Promotion of Health Status

CNMRMC - National Centre for Environmental Monitoring of Risks in the Community

CNSCBT - National Centre for Surveillance and Control of Communicable Diseases

CNSISP - National Center for Public Health Statistics Monitoring

CoP - Fundamental Principles of Official Statistics and the European statistics Code of Practice

DHIHs - district health insurance houses

DPHDs - District Public Health Directorate

EU - European Union

GDP - Gross domestic product

HIS - Health Information System

InfAct - Joint Action on Health Information's (InfAct) project

NHIH - National Health Insurance House

NIPH - National Institute of Public Health

NIS - National Institute of Statistics

NSS - National Statistical System

SWOT - strengths, weaknesses, opportunities, and threats analysis

SHI - Social Health Insurance

UN - United Nations

WHO-The World Health Organisation

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Annex 1: HIS assessment for Romania

Category & nr	Item	Explanation/Elaboration situation in the country
I Resources		
Policy & planning_1	The country has up-to-date legislation providing the legal framework for all relevant components of the national HIS: ideally, this legal framework also covers an evidence-informed policy cycle	Up-to-date legislation with all health institutions in country involved in the decision making process. Yet, some obstacles remain as there is duplication of data collection and dissemination as well as a room for improvement in multi-sectoral cooperation, as well as stronger cooperation via health related institutions. It is also mentioned by partners, that legislation should be more detailed foreseeing the rights and responsibilities of health-related institutions by creating unitary strategy for HIS.
Policy & planning_2	There is a comprehensive, written HIS strategic plan in active use and it is implemented at the national level	There is no national health information strategy, however, there is a priority specific component in the National Health Strategy 2014-2020 setting the agenda for the national health information system. Yet, there is an integrated electronic platform at the National Health Insurance House comprising e-card, e-health record, e-prescriptions.
Policy & planning_3	The ministry of Health has established a multisectoral HIS coordination mechanism with the other main HIS stakeholders in the country (e.g., a task force on health statistics); this coordination mechanism has a clear role and mandate	Legal basis for data collections, reporting activities is set according to the provisions of Law 226/2009 regarding the organisation and functioning of official statistics in Romania with the successive amendments, and the secondary and tertiary legislation with Orders by ministries to responsible institutions. However, a coordination multisectoral mechanism for the HIS was not formally set up.
Policy & planning_4	There is a routine system in place for monitoring the performance of the HIS and its various subsystems	Routine system and analysis of the performance of the HIS indicators are in place, yet

		comprehensive monitoring of HIS and its subsystems isn't developed yet.
HIS institutions, human resources and financing_1	The institutions with official roles in the health information system (e.g. the ministry of health, national statistical office, national public health institute, subnational health authorities) have adequate and sustainable capacity in core health information sciences (epidemiology, demography, statistics, ICT, knowledge integration (including forecasting), health reporting, knowledge translation)	As mentioned from the stakeholders, partners and other representatives in the assessment- there is shortage in the human resources. Usually with a grade in medicine or public health, individuals combine their competences in various fields to fulfil the needs of administrative as well as innovative tasks. New staff or staff taking over responsibilities are building capacity via colleagues, therefore capacity building is very limited if not existing as it very much depends on the resources (both, human and material).
HIS institutions, human resources and financing_2	The institutions with official roles in the health information system (e.g. the ministry of health, national statistical office, national public health institute, subnational health authorities) have adequate and sustainable resources for their health information activities	As mentioned from various stakeholders, the resources for HIS, as well as salary and resources for the capacity building and other experiences are very limited. Professionals are paid adequately only when having medical degree, other being underpaid and poorly motivated. Majority of the staff with the will of having adequate salary and possibilities of capacity building and experience gaining, do get involved in the EU projects, but are not supported enough from the perspective of the institutions.
HIS Infrastructure	Adequate ICT infrastructure (e.g. computers, data management software, internet access) and adequate ICT support is in place at the national level, at relevant sub-national levels and at hospital/provider level.	ICT infrastructure is satisfactory, but not covered perfectly as there may be differences within the regions or urban/rural areas. The ICT infrastructure may not be up-to-date, yet used effectively enough to collect the data from all of the regions in the country. In cases of system failure, paper reporting is used to get data coverage.

		As ICT infrastructure may not be the focus for finance investments in HIS, the improvements remain minimal.
II Indicators		
Indicators_1	Core indicators have been selected in a transparent way and implemented for national and relevant subnational levels, covering all categories of health indicators (e.g. determinants of health; health system inputs, outputs and outcomes (health systems performance assessment); health status; health inequalities)	Core indicators are selected and described in the National Health Strategy 2014-2020, as well as historically used, analysed and collected indicators and public health burdens that are relatable for the health determining indicators. Main demographic and health indicators are based on standardized formats (possible to analyze time trends). Indicators also do cover the needs of information for such organisations as OECD, WHO, Eurostat etc. Moreover data is available in regional level, providing the decision makers with data within community level. As mentioned from stakeholders there are gaps in data from surveys of some health determinants.
Indicators_2	Reporting on the set(s) of core indicators occurs on a regular basis	Core indicators are reported due to the guidelines on a regular basis (weekly, monthly, yearly, etc.).
Indicators_3	The usefulness and completeness of the core indicators is periodically evaluated together with policy-makers and other end users	The usefulness and completeness of the core indicators are evaluated mostly by highest-standing institutions with the consultations of the institution responsible for collecting, analysing and disseminating the data on the indicator.
Indicators_4	There is adequate alignment between the core indicators used at national and at sub-national levels; there is adequate alignment between the core indicators used by the different sub-national health authorities	There is alignment due to use of the core indicators and their implementation in the national and sub-national level, yet some obstacles persist as data collection for core

		indicators may be cumbersome or may duplicate the reporting of the indicators to several data collecting institutions.
III Data Sources		
Census	The country has adequate capacity to: (1) implement data collection; (2) process the data; (3) analyse the data; and (4) disseminate the analyses and the (micro)data	The Population Census conducted by NIS. NIS has adequate capacity and profound knowledge and experience in data collection. NIS regularly analysed coverage and completeness of data.
Civil Registration and Vital Statistics (CRVS)_1	There is high coverage of deaths registered through CRVS	CRVS has very high coverage of data, even including national citizen death cases abroad in the Death register.
Civil Registration and Vital Statistics (CRVS)_2	There is high coverage of cause-of-death information recorded on the death registration form	Yes, information is very comprehensive and gives the best and fullest explanation of the death case when completing e-death certificate or one in paper form in case of failure of the system. The death registration system, including codification of causes of death is decentralized. It is performed at the county level. At the district civil registration office, the statistical death bulletin is completed in accordance with the technical norms elaborated by NIS. At the level of the district civil registration office, all the information about causes of death (both part I and part II) is copied from the medical death certificate to the statistical death bulletin. The trained staff from the district public health directorate is responsible for codifying causes of death according to the ICD-10. In 1999, Romania adopted the detailed 4-digit ICD-10 classification.
Civil Registration and Vital Statistics (CRVS)_3	There is high quality of cause-of-death information recorded on the death registration form: there is a low	There is a significant amount of ill-defined codes as a cause of death that is being prevented by

	proportion of all deaths coded to ill-defined causes	educating the doctors as well as doing a quality control and using automatic coding system when setting the main cause of death. In most cases, the total number of deaths from these causes is rather small, especially for those codes that were coded to R99. At the final step of the reconstruction, NIS redistributed ill-defined causes of deaths (items R00-R94, R96, R98, R99 under ICD10) proportionally between all other causes of death.
Civil Registration and Vital Statistics (CRVS)_4	The country has adequate capacity to: (1) implement data collection; (2) process the data; (3) analyse the data; and (4) disseminate the analyses and the (micro) data	The country has satisfactory level of capacity to carry out tasks mentioned, yet some data linkage problems may occur.
Population-based surveys_1	The country has adequate capacity to: (1) conduct regular population based surveys (including sample design and field work); (2) process the data; (3) analyse the data; and (4) disseminate the analyses and the (micro) data.	Regular population-based surveys using EU regulation and methodologies are conducted by institutions under the administration of Ministry of Health as well as National Institute of Statistics.
Population-based surveys_2	The health and statistical constituencies in the country work together closely on survey design, implementation and data analysis and use	Overlap of the data collection and dissemination persists, as well as obstacles in the multisectoral collaboration.
Health and disease records (including disease surveillance systems)_1	The country has adequate capacity to: (1) diagnose and record cases of notifiable infectious diseases; (2) report and transmit timely and complete data on these diseases; and (3) analyse and act upon the data for outbreak response and planning of public health interventions	Indeed, country has a system of reporting and analysing the data with successful decision making in order to prevent or limit the cases. Some implications may be needed, for example, it was mentioned that monitoring of the quality of drinking water is analysed once a year, which is not very timely with water-transported disease outbreaks.
Health and disease records (including disease surveillance systems)_2	There is a high level of implementation of the <i>International Statistical Classification of Diseases and Related Health Problems version 10</i> (ICD-10) for	Use of ICD-10 is up to date when coding hospital discharge, yet capacity building is always in place, knowing the need of comprehensive

	reporting hospital discharge diagnoses	information of the case of the patient, especially when it being a discharge that ended with a death to determine the best information available based on ICD-10 coding manual.
Health and disease records (including disease surveillance systems)_3	Adequate and sustainable resources for operating the national cancer registry according to international standards are available	Regional cancer registries are in the responsibility of various institutions. Four out of the eight are based at the NIPH. For these four, data are provided by the respective DPHDs. The human resources both at local level and NIPH are insufficient. Personnel ageing may also be a threat. Data collection is also complicated on the local level due to difficulties in the communication with specialists and underreporting due to data protection. There is limited capacity at the NIPH for data collecting and maintenance.
Health service records_1	There is a comprehensive electronic health service based information system that brings together data on discharge diagnoses, procedures and other treatments and services provided and their costs from all public and private facilities	An integrated electronic platform at the National Health Insurance House comprising e card, e health record, e prescriptions. Monitoring in real time. For hospital activity are 2 different data basis: the NHIH has a per service data base that has no diagnoses nor procedure and the National School of Public Health Management and Professional Development, Bucharest DRG data basis with diagnoses and procedures but no costs. It could be possible to merge the information from the two data basis. Data protection mechanisms in place with different levels of access but there is a place to improve communication mechanisms between data providers, institutions etc. collaboration

		<p>mechanism.</p> <p>A lot of challenges persist for the private sector in data reporting because basically the NHIH system is based on health care institution which are contracted with NHIH.</p>
Health service records_2	The electronic health service based information system has a frame of trained health information staff, both at the central level and at the level of facilities, and regular training to keep the staff's knowledge up to date and to guarantee a sufficient pool of trained staff is provided	NIPH and NHIH are responsible for electronic health service based information at system level. The situation should be improved (providing specific courses for data providers and employees on regularly basis) from the perspective of interviewed stakeholders.
Health service records_3	There is a mechanism in place for verifying the completeness and consistency of data from facilities and for feeding this information back to the facilities	There is quality assurance of HIS implementation and usage. In the case of personal health data filing systems, the data provider has a duty to ensure the quality of personal health data.
Resource records_1	There is a national database of public and private-sector health facilities with complete coverage. Each health facility has been assigned a unique identifier code that permits data on facilities to be merged.	<p>Yes</p> <p>There is a register that include all units that have declared themselves as providing health services, as main or secondary activity. This register is held by the Ministry of Finances and the unique identifier is the fiscal code attributed to each of them. The MoF database doesn't contain healthcare data.</p> <p>NIS is using this register to extract the comprehensive nomenclature of sanitary units that provide health care (as main or secondary activity) for the annual survey Activity of Sanitary Units (SAN).</p>
Resource records_2	There is a national human resources (HR) database that tracks the number of health professionals by major professional category working in either the public or the private sector with complete coverage	There is no complete database on national level. Data are differ between institutions. The planning of human resources is mainly based on the number of workplaces within the public

		system, which is relatively constant.
Resource records_3	There is a national database that tracks the annual numbers graduating from all health-training institutions with complete coverage	Health professionals are registered with the relevant professional organization, to which they apply to be accredited or reaccredited. In order to be reaccredited, health professionals must comply with continuing medical education (CME) requirements.
Resource records_4	Financial records are available on general government expenditure on health and its components (e.g., by ministry of health, other ministries, social security, regional and local governments, and extra budgetary entities) and on private expenditure on health and its components (e.g., household out-of-pocket expenditure, private health insurance, NGOs, firms and corporations)	Financial records data are provided for compiling health accounts. For the private sector expenditure the data sources are mainly surveys (Household Budget Survey, annual survey of private insurance companies - collected for the purpose of the health accounts, SAN survey).
Data sources general_1	There are adequate human resources and equipment for maintaining and updating the various health services records and resource databases described above and for producing and disseminating outputs based on these databases	That has been mentioned by the stakeholders that human resource is understaffed, as well as competences of the employees, for example, to use most updated IT tools. The equipment and other technical devices meet the needs of the database users, yet updates on those as well as update on knowledge and skills as a capacity building to staff may improve the effectiveness of the use.
Data sources general_2	The periodicity and timeliness of the routine data collections as described above is adequate and meets the demands of the end user (e.g. health facility managers, health insurance companies)	The periodicity and timing on data collection meets the needs of the data users as it is regulated by the regulations, mandated by governmental authorities.
Data sources general_3	Data from the electronic health service based information system is readily available for public health monitoring (i.e. policy support) and research purposes and are actually being used for such secondary purposes	Some of data is publicly available, yet majority is available only on request. Main indicators collected by NIS through the annual survey Activity of Sanitary Units are available on NIS free online database TEMPO and in the Eurostat online database. Specific

		desegregations are available on demand.
Data sources general_4	Regular assessments of the completeness and quality of the routine data collections as described above take place	Assessment of the completeness and quality of the routine data meets the quality standards and regular improvements may be taken into account.
IV Data management		
Data management_1	There is a written set of procedures for data management including data collection, storage, cleaning, quality control, metadata requirements, analysis and presentation for target audiences, and these are implemented throughout the country	Procedures are described in the methodologies of the institutions responsible for data management.
Data management_2	There is an integrated data warehouse at central level containing data from all population-based and institution-based data sources, both at the national and relevant sub-national levels, and a user-friendly reporting utility accessible to various user audiences	The set of sustainable development indicators for Romania is divided into objectives of the National Sustainable Development Strategy, with an hierarchy on three levels: <ul style="list-style-type: none"> • level 1: main indicators; • level 2: complementary indicators, used to monitor and review sustainable development programs; • level 3: progress indicators of the National Strategy for Sustainable Development of Romania, covering the range of policies it generates, including those not covered by the EU strategy.
Data management_3	A unique patient identifier is in place that allows for the linkage of various data sources at the subject level and such integrated data analyses are regularly performed	Unique patient identifier is in use. Usually linkages can be performed, yet some databases have difficulties with linking the data.
V National HIS data quality/information products		
Information products_1	Policy makers, at the national as well as at the relevant sub-national levels, have access to all the information they need to support their policy decisions, i.e. there are no major information gaps. In particular, all data and information necessary for monitoring the targets of the	Stakeholders and policy makers stated the effective collaboration with various data collectors as great partners, who provide with timely and comprehensive data (note, if it is collected). The question is in data usage by

	national health strategy are available	policy makers and interpretation, as it could contain gaps, for example, country has low level of private sector reporting on the indicators.
Information products_2	The data collection method for core indicators is in line with (inter)national standards and recommendations	Yes
Information products_3	The country is able to meet all data delivery requirements from the international organizations of which it is a member/with which it is collaborating	In most cases, the country fulfils the international data reporting requirements.
Information products_4	The timeliness with which the data for official indicators are being collected and the timeliness with which these indicators are being computed and reported is adequate and meets the needs of policy makers	The situation is satisfactory from the perspective of interviewed stakeholders.
Information products_5	The periodicity with which the data for official indicators are being collected and the periodicity with which these indicators are being computed and reported is adequate and meets the needs of policy makers	The situation is satisfactory from the perspective of interviewed stakeholders.
Information products_6	The consistency over time of datasets from major data sources used for computing official indicators is high	Yes
Information products_7	The coverage of major data sources used for computing official indicators is high; representativeness of estimates based on these sources is good	In most cases yes, but coverage of diseases registries data is weak. Need support from government to maintain registries and data transparency. As for the private sector, a lot of challenges persist, as reporting on HIS indicators is low.
Information products_8	Official indicators can be disaggregated by demographic characteristics (e.g. sex, age) socioeconomic status (e.g. income, occupation, education) and locality (e.g. urban/rural, major geographical or administrative region).	Data could be disaggregated, depending on the type of survey, by various characteristics, giving the opportunity to analyse it very broadly.
Information products_9	In-country adjustments use transparent, well-established methods	Methodology is described by the official documents by the institution responsible for the data collection.
VI Dissemination and use		

Dissemination and use_1	Senior managers and policy-makers demand complete, timely, accurate, relevant and validated HIS information and know how to interpret and use it	The interaction and collaboration is present between the data providers and users. Interpretation can be idealized by explaining the indicator and the data coverage which is in place.
Dissemination and use_2	Integrated health reports, including information on the core indicators and their disaggregations, are publicly distributed regularly	Not all of the data is available publicly, as vast majority is a service upon data request.
Dissemination and use_3	Integrated health reports, including information on the core indicators and their disaggregations, are demonstrably used in (national and sub-national) health policy making processes	Core indicators are actively used in decision making processes.
Dissemination and use_4	Adequate mechanisms for knowledge translation* are in place and functioning well * E.g. resources, tools, networks and platforms to structurally support the uptake of health information in policy making, i.e. to structurally support evidence-informed policy-making	A big opportunity could be data linkage which gives higher level of health statistics information and dissemination. Limited capacity (shortage of dedicated resources, both human and IT) at the HIS institutions, weak data collection capacity of diseases registries etc. obstacles makes the evidence-informed policy-making process difficult within the system. There is place to improve dissemination using more interactive information channels.
Dissemination and use_5	Making health information available for research and contribute to publications. Participation in (inter)national projects and networks.	As mentioned previously, not all health information is available publicly, so usage of it is limited for research purposes.

Annex 2: List of stakeholders interviewed

National Institute of Public Health

- National Center for Health Status Evaluation and Health Promotion
- National Center for Statistics and Informatics in Public Health
- National Center for Monitoring Environmental Risks
- National Center for Surveillance and Control of Communicable Diseases
- National Coordinator of Regional Cancer Registries

National Institute of Statistics

- Demography, Health, Culture and Justice Statistics - Department of Studies, Demographic Projections and Population Census

College of Physicians from Romania

- IT expert

Ministry of Health

National School of Public Health and Management Bucharest

- Centre for Management and Health Promotion
- Health Services Research and Evaluation Center

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