1st BRAZILIAN NATIONAL DIGITAL HEALTH STRATEGY 2020-2028 MONITORING AND EVALUATION REPORT
2021 Ministry of Health of Brazil.

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Abramed – Brazilian Association of Diagnostic Medicine
AMAI – Alagoas Cities Association
APCSC – Admission for Primary Care Sensitive Condition
BFF – Backend For Frontend
BNAFAR – Brazilian National Pharmaceutical Assistance Base
BPAi – Individualized Outpatient Production Bulletin
CGATES – General Coordination for Technical Actions in Health Education
CGESD – Digital Health Strategy Steering Committee
CGIS – Health Information Governance Committee
CGISD – General Digital Health Innovation Coordination
CIINFO – Data Governance Sub-committee of the Information and Informatics Committee
CIT – Triparty Intergovernment Commission
CNES – National Healthcare Facility Registry
CNS – National Health Council
CONASEMS – National Council of Municipal Health Secretariats
CONASS – National Council of Health Secretariats
CONJUR-MS – General Coordination of Health Affairs and Normative Acts
COSEMS – Municipal Health Secretariats Council
DATASUS – Department of Informatics of the Brazilian National Health System (SUS)
DDS – Drug Dispensing System
DEGES – Department of Health Education Management
DESF – Department of Family Health
DINTEG – Integrity Board
DMI-H – Digital Maturity Index for Healthcare
DS – Discharge Summary
eAP – Primary Care Team
EAP – Primary Care Facility
EAS – Healthcare Facility
EBSERH – Empresa Brasileira de Serviços Hospitalares
ESD – Digital Health Strategy
eSF – Family Health Team
HC-FMUSP – Hospital das Clínicas da Faculdade de Medicina da USP
HCPA – Hospital das Clínicas de Porto Alegre
HIS – Hospital Information System
IAA – Inpatient Admission Authorization
ICT – Information and Communications Technology
INFORMATIZA APS – Primary HealthCare Data Qualification and Informatization Support Program
IPBS – Integrated Planning & Budgeting System
LACEN – Central Public Health Laboratory
LEMS – Laboratory Environmental Management System
LGPD – General Data Protection Law
LTR – Laboratory Test Result
MCTI – Ministry of Science, Technology, and Innovations
MS – Ministry of Health
NEAPV – Post-Vaccine Adverse Event Notification
OIS – Outpatient Information System
OPA – Outpatient Procedure Authorization
PEC – Electronic Citizen Health Record
PHC – Primary Health Care
PM&A – Monitoring and Evaluation Plan
PNIIS – National Health Information and Informatics Policy
PNS – National Health Plan
PPA – Pluriannual Plan
PWA – Progressive Web App
RAC – Clinical Care Record
RAS – Health Care Network
RIA – Immunobiological Administration Record
RNDS – National Health Data Network
RNP – National Research and Education Network
RTS – Health Terminology Repository
SAES – Specialized Healthcare Secretariat
SAPS – Primary Healthcare Secretariat
SBIS – Brazilian Health Informatics Association
SCTIE – Secretariat of Science, Technology, Innovation, and Strategic Health Inputs
SDC – Simple Data Collection
SE – Executive Secretariat
SEFTI-TCU – Information Technology Inspection Secretariat of the Brazilian Federal Court of Auditors
SESAU – State Department of Health
SGTES – Labor Management and Health Education Secretariat
SI-PNI – National Immunization Program Information System
SISAB – Primary Healthcare Information System
SUS – Brazilian National Health System
SVS – Department of Health Surveillance
TISS – ANS Supplementary Health Information
UF – Federative Unit
UFG – Universidade Federal de Goiás
UNA-SUS – Universidade Aberta do Sistema Único de Saúde
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Introduction
This document, appraised and approved in the 38th Ordinary Meeting of CGESD, on November 6th, 2020, introduces the first Brazilian National Digital Health Strategy 2020-2028 monitoring and evaluation report (ESD28) (BRASIL, 2020a). The report aims to and propose the organizational and operational resources so this key Digital Health monitoring and evaluation instrument has biannual periodicity and meets the purposes defined in the ESD28.

Brazil’s 2019-2023 National Health Strategy Action, Monitoring, and Evaluation Plan (PAM&A 19/23) (BRASIL, 2020a), approved in December, 2019, at the 34th Ordinary Meeting of the Digital Health Strategy Steering Committee (CGESD), and agreed on Ad Referendum in the Triparty Intergovernment Commission (CIT), on March 30, 2020, established the need for both systematic and periodic monitoring and evaluation processes for the actions concerning the Digital Health Strategy and the revision of the PAM&A 19/23 in order to consolidate the existing initiatives and expand the vision and actions of the Digital Health Strategy, both at the operational level and with temporal reach. The Digital Health expectations for the future revision and expansion of the PAM&A 19/23 resulted in the 2028 Brazilian Digital Health Strategy (ESD28), a document agreed on at the 6th Ordinary Meeting of the CIT, on August 27, 2020, and approved by CGESD at the 37th Ordinary Meeting, on August 28, 2020, introducing the Digital Health Vision, Action Plan, and priorities to reach it, as well as the necessary Monitoring and Evaluation Plan to keep actions aligned with the needs of ESD28.

For consistency with the ESD28, this evaluation report is organized according to the priorities comprising the strategy, and covers all actions which have already been initiated. At the end of this document, an evaluation of the advancements of the ESD as a whole is also conducted, including lessons learned and recommendations for continuity.

The ESD28 monitoring and evaluation process will be systematic and continuous, being developed based on the understanding of the proposed objectives, the definition of criteria to determine success, and the identification of metrics and indicators to measure it. The definition and periodic collection and analysis of indicators, followed by the review of obtained results and decision making regarding the subsequent action cycle will also be necessary, in order to cover the strategy’s intrinsic needs, such as changes to the national and international Digital Health scene and, above all, to the Health scene, whose impact was evidenced by the recent pandemic.

The ESD28 acknowledges the need to use established, robust, and thorough methods for the monitoring and evaluation of the Digital Health Action Plan. However, since the initiatives described and assessed in this report are very recent, and were developed under the direct impact of the new coronavirus pandemic, the desired method rigor still has room for improvement in its full extent.

The actions started in 2019 were expanded and amplified and, as such, they are incorporated to the ESD28. For this reason, this first report covers the evaluation of all Digital Health Strategy actions started since the formulation of the PAM&A 19/23.

This document also proposes the governance mechanisms and organizational resources to be formalized and consolidated to ensure that the Digital Health monitoring and evaluation processes occur in a predictable, systematic, and ongoing manner.

“The actions started in 2019 were expanded and amplified and, as such, they are incorporated to the ESD28.”
2.1 Purpose of the Monitoring and Evaluation Plan

The Brazilian Digital Health 2020-2028 Monitoring and Evaluation Plan describes the organization and governance of the monitoring and evaluation actions, as well as the set of actions executed for the period. The actions proposed in the ESD28 M&A Plan have as primary purpose to ensure that the Action Plan remains consistent and compliant with the Digital Health vision, allowing for systematic and periodic reviews in order to correct inadequacies, meet new needs, and seize value capturing opportunities which may arise over the course of its execution.

Thus, this work front aims to consolidate the governance and the monitoring and evaluation processes for the Digital Health Strategy. These processes have been enforced, as shown by the elaboration of this document.

Figure 1 – M&A Plan

Source: Own elaboration.
2.2 Digital Health Strategy Monitoring and Evaluation Governance Model

The ESD monitoring and evaluation governance framework is divided in three levels, to wit:

**Strategic:** focused on the Digital Health vision as a means to achieve health system goals and provides strategic recommendations. The role of this jurisdiction is to ensure institutional support for the Digital Health Strategy, driving the strategic vision at all levels of the Brazilian NHS (SUS) management, in and outside the Ministry of Health, disclosing the results obtained by the ESD and facilitating the obtainment of political, institutional, and financial support for the strategic actions.

Within the Brazilian health system’s governance mechanism, the National Health Council (CNS) is the one in charge of approving the National Health Plan (PNS), where the objectives, guidelines, indicators, and goals for the country’s health system are described for the four year-period to which it refers.

The Triparty Intergovernment Commission (CIT), in turn, is the jurisdiction for negotiation and agreement between the federal, state, and municipal spheres, represented by the Ministry of Health (MS), the National Council of Health Secretariats (CONASS), and the National Council of Municipal Health Secretariats (CONASEMS), respectively. The CNS and the CIT exercise, at different levels, but in a complementary manner, the governance of the Brazilian National Health System (SUS).

In order to strengthen this level, the Digital Health Strategy Steering Committee (CGESD), instituted through CIT resolution no. 46/2019, plays the governance role of the Digital Health Strategy at the strategic level, in line with the guidelines, objectives, and goals established in the National Health Plan (BRASIL, 2016) and the National Public Health Policies. Among the competencies of the CGESD are the following:

I – to prepare and keep the Brazilian National Digital Health Strategy up to date;

II – to follow the development of computer applications within the Ministry of Health, aiming to collect information on healthcare processes, support administrative activities at healthcare facilities and the health care network flow, with the purpose of complying with the Digital Health Strategy;

III – to propose:

a) the adoption of the interoperability standards across electronic patient health record applications, aiming at integration with the Electronic Health Record, as well as to define the implementation strategies;

b) the strategy for informatization of all public healthcare facilities in the country;

c) the information models to be adopted for the exchange of Health information;

d) the terminologies to be adopted in the Electronic Health Record and its respective revisions;

IV – to decide on revisions of the information models mentioned on the item above, when they do not imply changes to the information system framework;

V – to monitor and evaluate the necessary projects for the execution of the items above. (BRASIL, 2019d, art. 2).
From a Digital Health Strategy Monitoring and Evaluation standpoint, the CGESD is formed as the body in charge of:

- validating and approving the Monitoring and Evaluation Plan prepared by the tactical level;
- proposing the necessary agreements for the execution of the Monitoring and Evaluation Plan impacting sub-national bodies to the CIT;
- reviewing, critiquing, and validating the Monitoring and Evaluation reports received from the tactical level, approving or proposing improvements;
- reporting the general progress status of the Action Plan to the CIT;
- proposing eventual renegotiations of deadlines and goals as a result of the monitoring and evaluation process to the CIT.

Still regarding the strategic level, it is noteworthy to stress the important role in Strategic M&A Oversight and Management. This activity, performed by the panel formed by Executive Secretariat, CGESD, and CIT, provides oversight and guidance for the monitoring and evaluation process, including:

- to provide guidance and input for the definition of indicators, goals, monitoring processes, and evaluation timelines;
- to review and approve indicators, goals, and monitoring and evaluation processes;
- to provide support in the resolution of risks, issues, and conflicts relating to monitoring and evaluation;
- to review and approve recommendations on corrective or improvement actions;
- to ensure that goals are reached and corrective or improvement actions are taken.

**Tactical:** this level is in charge of the execution of the M&A Plan in agreement with the ESD. It is responsible for ensuring the definition and collection of data as planned and promoting its compilation, analysis, interpretation, understanding and extraction of insights and knowledge, providing the strategic level with the necessary input for an objective – qualitative and quantitative – evaluation of the development of the Action Plan.

The team assigned to coordinate the development of the ESD at the tactical level of governance is the Department of Informatics of the Brazilian NHS (SUS) of the Executive Secretariat of the Ministry of Health (DATASUS/SE/MS). Its responsibilities include primarily the following:

- proposing the Monitoring and Evaluation Plan to the CGESD;
- coordinating the execution of the Monitoring and Evaluation Plan;
- integrating the multiple sectors and actors involved in the M&A Plan;
- presenting the monitoring and evaluation results systematically to the CGESD;
- communicating the result of the M&A actions to the high management of the MS.
Still at the tactical level, it is noteworthy to stress the important Management role of the ESD Monitoring and Evaluation Plan. This activity is the responsibility of DATASUS, which reports to the superior bodies (Executive Secretariat, CGESD, CIT, and CNS) and receives their support to promote actions and decisions outside its governability.

The management role has as purpose to ensure that the M&A Plan is executed properly, adequately guiding the execution of the Action Plan and keeping compliance with the Digital Health Strategy objectives. This activity also includes the coordination of:

- the development and review of ESD monitoring and evaluation indicators, with cooperation from other areas in the Ministry, CONASS, CONASEMS, and expert groups;
- the definition of baselines, goals, and timelines to be achieved, in a way as to enable the measurement of progress in an objective manner;
- with the support of the superior bodies, and in line with the institutional Communication Plan, the disclosure of the results obtained from the development of the ESD, promoting integration with other governmental agencies, professional councils, academia, technical-scientific societies, and relevant civil society organizations;
- the superior bodies and all relevant actors, the national efforts for the training and qualification of human resources, as well as the increase in the technical and operational Digital Health capacity.

**Operational:** this level acts directly in the execution of the activities comprising the Monitoring and Evaluation Plan.

At the operational level, the calculation of indicators involves activities of definition, collection, qualification, and analysis of data, as well as the computation and interpretation of each indicator and indicator axes/groups. The generation of each indicator axe/group must have a collegiate management structure, capable of coordinating and monitoring its execution and communicating with the Monitoring and Evaluation Plan coordination framework.

Also noteworthy is the important role of this level in the Operationalization of the Monitoring and Evaluation Plan. The team assigned by the ESD’s Tactical level for the operationalization, monitoring, and evaluation of the strategy’s advancements is the General Digital Health Innovation Coordination of the DATASUS (CGISD/DATASUS/SE/MS). Its responsibilities include primarily the following:

- recommending, together with agencies, secretariats, and departments involved in the ESD, the list of indicators, goals, phases, and deadlines which must comprise the M&A Plan;
- coordinating and monitoring the definition, collection, qualification, and processing of the data for calculation of the selected indicators;
- communicating the superior bodies about difficulties found or opportunities for improvement;
- consolidating the indicators, as well as interpreting and presenting the deliverables, in agreement with the MS’ indicator usage, management, and systematization instruments.

Figure 2 shows the conceptual model of the M&A Plan’s Governance Framework.
The definition, inclusion, and modification of indicators can be proposed by any level and any actor who understands their need. There must be, however, an approval process by tactical, aiming to ensure the consistency, non-redundancy, and relevance or value of the indicator, thus securing a consistent pool of indicators. The monitoring and evaluation processes and governance can and should evolve on an ongoing basis in order to follow the advancement, institutionalization, and maturity of the Digital Health Strategy. So far, the model presented is proving to be an important instrument for the consolidation of the strategy, particularly the operationalization, transparency, and publicity of the Conecte SUS Program’s monitoring and evaluation.

Evaluation of the Actions according to Priority
3.1 Priority 1

Governance and Leadership for the ESD

This priority is focused on ensuring the development of the ESD28 under the institutional funding of the strategic bodies of the Brazilian NHS. The execution of the initial Digital Health Actions for Brazil is the responsibility of the Ministry of Health, as it is the body with the necessary jurisdiction to develop a Digital Health Strategy which represents the interests of all, in accordance with the principles of the Brazilian NHS and in line with CNS and CIT guidelines. It is, however, the Ministry’s responsibility to disseminate the intersectoral approach for Digital Health initiatives, attracting other government and federal agencies, as well as relevant public and private institutions, seeking to develop Digital Health at the national level, as proposed in the ESD28.

The ongoing initiatives in connection with the Governance and Leadership priority include primarily the following:

- Institutionalization of the Digital Health Strategy Steering Committee’s competencies
- Review of the National Health Information and Informatics Policy (PNIIS)
- Formal consolidation of the Digital Health Strategy
- Definition of a legal framework for the advancement of the Digital Health Strategy.

3.1.1 Institutionalization of the Digital Health Strategy Steering Committee’s capacities

The Digital Health Strategy Steering Committee (CGESD), the highest Digital Health management authority in Brazil, was instituted by CIT Resolution no. nº 5/2016, as amended by CIT Resolution no. 46/2019, establishing its composition, capacities, and operational units within the Ministry of Health’s framework.

Its primary role is to exercise, at the strategic level, the attribution of governance of the Digital Health Strategy in agreement with the guidelines, objectives, and goals defined in the PNS and the National Health Policies. The capacities of the Digital Health Strategy Steering Committee include, but are not limited to:

I. preparing and keeping the Brazilian Digital Health Strategy up to date;

II. following the development of computer applications within the Ministry of Health which aim to collect information on healthcare processes, supporting administrative activities at healthcare facilities and the health care network flow in order to comply with the Digital Health Strategy;

III. [...] monitoring and evaluating the necessary projects for the execution of the items above. (BRASIL, 2019d, art. 2).
Currently, the monthly ordinary meeting schedule is defined, and the following work flows pertaining to CGSD activities are being mapped, validated, and institutionalized:

- preparation and validation of the executive summaries;
- definition, prioritization, and validation of agendas;
- follow-up of the execution of the proceedings established (actions, persons in charge, and timelines) in ordinary and extraordinary meetings and covered in the executive summaries;
- organization of ordinary and extraordinary meeting agendas;
- preparation and submission of the necessary materials for the items in the meetings’ agendas.

It is noteworthy that, following the Governance model proposed for the Digital Health Strategy, all topics discussed within the CGESD must be validated by the CIT.

### 3.1.2 Revision of the National Health Information and Informatics Policy (PNIIS)

This action consists of the identification and mobilization of several actors for the revision of the National Health Information and Informatics Policy (PNIIS) and the collection of contributions from experts and organizations outside the MS, submitting the result to the multiple superior bodies in the MS and the Brazilian NHS (SUS), until the revised PNIIS is approved and published. As presented in the PNIIS text, its relation with the ESD28 is clearly defined, and both documents must remain harmonically complementary.

The PNIIS currently in place was published in 2015 and incorporated to Consolidation Ordinance no. 2/2017, with the purpose of: defining the principles and guidelines for public health practices in the Brazilian National Health System (SUS) scenario to be performed by healthcare institutions and those related to the Ministry of Health, in order to improve governance without the use of computerized information and resources, promoting an innovative, creative and transformational use of information technology in healthcare work processes (BRASIL, 2015).

Between 2017 and 2020, the perception over the need for a Digital Health Strategy and its integration to the PNIIS grew, which led the Ministry of Health to propose the revision and update of this policy while the ESD28 was being developed.

The revision of the PNIIS had the participation of several experts in the Health Information and Informatics fields. The proposed revision is in the public consultation phase, so society can give its opinion regarding the Information and Communications Technology (ICT) guidelines and Digital Health in Brazil.

At the end of the public consultation period, the inputs received will be analyzed and the final text will be submitted for evaluation by the Brazilian NHS’ collegiate governance bodies for approval and publication.
3.1.3 Formal consolidation of the Digital Health Strategy

The Brazilian e-Health strategy, governed by Resolution no. 19/2017, of the Triparty Intergovernment Commission (CIT), established the e-Health Vision for Brazil and described the contributory mechanisms for its incorporation to the Brazilian NHS (SUS) until 2020. With the purpose of incorporating updates with an eight-year vision, the Brazilian National Digital Health Strategy (ESD28) aims to systematize and consolidate the work carried out over the last decade. It is in this setting, therefore, that actions are developed to make sure the Digital Health Strategy is formally supported by the proper normative instruments.

This institutionalization process is being conducted by DATASUS, with support from the Information Technology Inspection Secretariat of the Federal Court of Auditors (SEFTI/TCU), the Integrity Board of the Ministry of Health (DINTEG/MS), and the General Coordination of Health Affairs and Normative Acts (CONJUR/MS).

The main challenge found was the lack of clarity and fragmentation in the regulations supporting the Digital Health Strategy. In this setting, an attempt was made to consolidate the formal instruments of the ESD28 with the publication of a Ministerial Ordinance instituting the Digital Health Strategy – 2028 Vision. The drafting of this ordinance is undergoing the proceedings for publication this year still.

It is worth noting that the revision of the Brazilian Digital Health Strategy: 2020 – 2028 Vision document is under review by the National NHS’ Collegiate Governance Bodies for approval and publication.

3.1.4 Legal framework for the advancement of the Digital Health Strategy

In order to advance, Digital Health requires legal assurance and proper regulation for all actors, ensuring fundamental rights, such as confidentiality and data privacy.

To that end, the ESD defined as one of its sub-priorities the Digital Health Regulation and Law, which comprise a regulatory benchmark to guide the users and actors in general regarding what is expected from them as users or suppliers of Digital Health products or services.

This front has made advances in the drafting and publication, as well as the alignment of a set of ordinances aiming at strengthening the Digital Health Strategy, namely:

• Ordinance no. 1.434, dated May 28, 2020, for the institutionalization of the National Health Data Network and the adoption of interoperability standards (BRASIL, 2020g).

• Ordinance no. 1.792, dated July 17, 2020, making the submission of the SARS-CoV-2 diagnostic tests conducted by public and private labs mandatory (BRASIL, 2020h).

• Ordinance establishing the obligation of submission of the CPF [individual taxpayer registration] to the information systems (ongoing).

• Deadline extension for Ordinance no. 1.792/GM/MS/2020 and publication of SVS Ordinance regulating the submission of testes to the RNDS (ongoing).
• Ordinance for the Institutionalization of the ESD (ongoing).

• Ordinance for the Institutionalization of the Digital Health Steering Committee (ongoing).

• Ordinance Subsidizing the implementation of electronic health records in UBS [Basic Health Units] (ongoing).

Additionally, ESD28 establishes the definition and development of initiatives relating to the General Data Protection Law (LGPD) as one of its priorities. With that in mind, a Workgroup was created in the Ministry of Health in order to advance discussions on the subject, invite experts, and build pathways, such as, for instance, the drafting of a normative act addressing to critical topics:

• definition of LGPD profiles;

• definition regarding consent in the National Health Data Network (RNDS).

These normative acts are expected to mitigate sensitive gaps for health interoperability and data exchange, such as the cases for exemption of explicit consent, particularly those associated to health custody in procedures performed by healthcare professionals or health agencies. The definition of procedures, healthcare professionals, and health services are some of the challenges to be overcome in order to ensure the legal basis supporting the advancement of the Digital Health Strategy.

In order to advance these and other initiatives associated with the LGPD, a set of activities is ongoing, among which are primarily the following:

• drafting of a RNDS Evaluation and Compliance report;

• partnership with the Prosperity Fund/Better Health Program Brazil for the execution of the “RNDS Expansion – LGPD initiatives” project.
3.2 Priority 2

Informatization of the Three Healthcare Levels

This priority consists of driving the implementation of health system informatization policies, expediting the adoption of electronic record systems and hospital management as an integral part of health services and processes.

For the implementation of the actions to meet this priority, the Ministry of Health instituted the Conecte SUS Program, with the mission of materializing the Brazilian National Digital Health Strategy, promoting Support for the Informatization and Qualification of Primary Care (Informatiza APS) and the exchange of information among healthcare facilities across the several points of the Health Care Network through the dissemination of a minimum data set. This will be possible with the implementation of a complex cloud platform called National Health Data Network (RNDS). This program is executed by the Department of Informatics of the Brazilian NHS (DATASUS) of the Executive Secretariat (SE) in partnership with the Department of Family Health of the Primary Health Care Secretariat (DESF/SAPS).

The projects structuring Conecte SUS in connection with the Informatization of the three levels of healthcare comprise three major actions:

- expansion of Primary Care Informatization (Informatiza APS);
- expansion of internet coverage for Family Health Teams (eSF);
- expansion of the other levels of care.

3.2.1 Expansion of Primary Care Informatization (Informatiza APS)

This work front aims to address the challenge of providing primary care services with health record systems capable of sharing and consuming clinical information collected from different healthcare facilities.

In order to reach that goal, the Federal Government instituted the Primary Healthcare Data Qualification and Informatization Support Program (Informatiza APS) through Ordinance no. 2.983, dated November 11, 2019. This program has the objective of supporting the informatization process of Primary Healthcare Units (APS), as well as to promote data qualification, subsidizing the management of health services and the improvement of multi-professional healthcare. As defined by the program, a healthcare facility regularly submitting information (minimum submission parameters defined and published in technical note) to the Primary Healthcare Information System (SISAB) through electronic record systems is considered informatized. The data submitted to SISAB will later be shared in the National Health Data Network (RNDS). Informatized units secure the receipt of a monthly maintenance funding resource ranging from BRL 1,700.00 to BRL 2,000.00 for the data submitted.
Aiming to ensure the effectiveness of this effort, the Ministry of Health, through the Department of Family Health, is constantly providing updated versions of the Electronic Citizen Health Record system (PEC/e-SUS APS). However, support mechanisms for the process of implementation and support of the system’s adoption in Brazilian cities must still be established.

Another known challenge is the difficulty some cities have to ensure the availability of equipment (computers, printers, UPS, etc.) in healthcare facilities. In this context, a Pilot Project was established in Alagoas to test an additional informatization incentive model.

This approach had additional funding to support the implementation of informatization as provided for on Ordinance no. 2.984/2019, which created the Pilot Project Supporting the Implementation of Primary Care Informatization in the state of Alagoas. The ordinance outlines what adhering cities would receive, fund by fund, in a single installment, for each Primary Healthcare facility with a non-informatized family health team (eSF), an amount ranging from BRL 8,500 and BRL 10,000. The main goal was to implement the informatization of eSFs and Primary Care Teams (eAPs) in the cities in order to expedite the availability of necessary equipment, allowing for the submission of information to the Ministry of Health. This proposal complemented the actions formulated by the federal and state governments in partnership with CONASEMS in order to establish a joint effort qualification model for the persons implementing the e-SUS APS system as a way to address this difficulty.

Additionally, the implementation of the pilot project aimed at understanding the key obstacles and pathways to be considered for the planning of the informatization expansion project in the country.

The results obtained with the Pilot Project in Alagoas will be discussed on Part 3 – Evaluation of the Conecte SUS Actions; however, it is known that the appearance of the Covid-19 disease and the impact caused by the pandemic triggered a temporary suspension of this mobilization, which is scheduled to be resumed in the second half of 2020, together with the provision of an informative Technical Note defining the minimum criteria for submission of electronic records, as provided for on Ordinance no. 2.984/2019. It is noteworthy that, in view of the pandemic setting, the publication of Ordinance no. 1.247, dated May 18, 2020, delaying the limit date for submission of data to the Ministry of Health for another four reference periods, was necessary. Currently, a new Ordinance is under appraisal to delay this date again, for another six reference periods.

### 3.2.2 Expansion of the internet coverage for Family Health Teams (eSF)

One of the difficulties identified for the acceleration of the health facility informatization process is the lacking minimum infrastructure for the installation of electronic record systems, e.g. the unavailability of an internet connection.

In order to overcome this obstacle, and as a result of the need to respond to Covid-19, a partnership was formed between the Ministry of Health and the ministry of Science, Technology, and Innovation (MCTI), with support from the National Research and Education Network (RNP), a social organization linked to the MCTI, to enable internet access in 100% of Family Health Facilities. We would like to stress that, in view of the heterogeneity of the national territory, this action must consider different technologies for the connectivity stages of each region, including the use of fiber optics, satellite, or radio to meet the specificities found in the country.
The RNP resources promoting this initiative are agreed upon in an addendum to the TED MS/MCTI/RNP, instituting the Connectivity Project, and which is in the final stage of formalization. A few major advances merit special attention:

- Two specific calls were opened to verify target units for the execution of the project. These calls resulted in the selection of 4,905 healthcare facilities and the homologation of 6,805 proposals from companies interested in providing the connection.

- Currently, the project is launching its third call, which will take place in stages, across Brazilian regions, with an anticipated finalization date on December 10, 2020.

- As of October, 2020, the project provided 1,150 healthcare facilities with a connection.

This initial process has also been vital to generate and perfect learnings, in order to advance even further. The key challenges faced were:

- limitations in the selection of facilities (facilities selected by the project already had connectivity, while other facilities without connectivity were not qualified in the first two calls);

- difficulties with registration details of the selected facilities (e.g. wrong addresses);

- failure to communicate properly (some UBS do not authorize the installation because they are not familiar with the project: the initial communication strategy was based on a circular letter of the project submitted only to the municipal authorities, and not the selected UBS);

- difficulty of the supplying companies to ensure the connection speed established in the service agreement;

- lack of interest by the suppliers regarding the issues found.

The advancement of this work front also takes into account the importance of intensifying communications with municipal health secretariats in order to update addresses and contact information of the facilities, as well as align their installation schedules.

### 3.2.3 Expansion of the other Healthcare levels

The Digital Health Strategy is a long-term project aiming to combine different actions in order to transform healthcare until 2028. Thus, it is acknowledged that this is the first step at the beginning of a journey, and other actions and projects are yet to be developed. Among these projects, future initiatives to expand the informatization of the other levels of healthcare deserve special attention. In this setting, discussions with the Ministry of Education and Empresa Brasileira de Serviços Hospitalares (EBSERH) were started to allow for the use of the Hospital Management System (AGHUse) developed by EBSERH at Hospital de Clínicas de Porto Alegre (HCPA), in order to meet the needs of University Hospitals, and at Hospital de Clínicas da Faculdade de Medicina da USP (HC-FMUSP), so both can be integrated to the RNDS and have new functionalities to address the needs of Hospital Care, and maybe even of Specialized Outpatient Clinics.
3.3 Priority 3
Support for the improvement of Health Care

There are multiple ongoing Digital Health initiatives in the Brazilian NHS (SUS), as well as in Supplementary and Private Healthcare; however, this action has not been started yet. It is anticipated to start in 2021, aiming at identifying, attracting, and proposing mechanisms of collaboration across the existing initiatives, seeking creative, innovative solutions capable of contributing to the improvement of Health Care.

3.4 Priority 4
The user as a protagonist

It is known that a number of research groups, public and private healthcare organizations, and companies value the participation of healthcare service users, and have been developing initiatives for their inclusion. However, the development of this priority action has not been started. It is anticipated to start in 2021, and the proposed activities include the identification, attraction, and organization of the existing efforts, proposing mechanisms of collaboration which result in innovation and value for the population.

3.5 Priority 5
Human Resource Qualification

This priority has the objective of ensuring that the country has the adequate numbers and professional profiles to achieve the proposed Digital Health vision. In order to achieve this goal, the Ministry of Health is developing a human resource qualification model, focusing on the three main target audiences involved in the Conecte SUS Program: healthcare professionals, public managers, and IT professionals. The joint effort of the CGISD, in charge of managing the Conecte SUS Program, the General Coordination for Technical Actions in Health Education (CGATES), linked to the Department of Health Education of the Labor Management and Health Education Secretariat (DEGES/SGTES), and the DESF of the Primary Healthcare Secretariat (SAPS) is proving to be a key element for the success of this journey.

In this setting, the Ministry of Health formed a partnership with the Health Information Governance Commission of Universidade Federal de Goiás (CGIS/UFG) through a Term of Reference – Educational Module for the Virtual Environment of the Brazilian NHS (AVASUS) – for the provision of the different qualification modules required for the Conecte SUS Program in the virtual platform of Universidade Aberta do SUS (UNA-SUS).
From this initiative came the Educational Digital Health Program of UFG, intended for:

- Healthcare and information technology professionals who are interested in the field;
- Professionals from healthcare facilities who are interested in the subject, such as: managers, administrators, and system users;
- Public managers seeking new knowledge and solutions in health information technology;
- Other interested/indicated professionals of health information technology.

The program was started with a triad of micro-courses focusing on the concepts of Digital Health, RNDS, and the safety and ethics in the sharing of personal health information. The micro-courses are ministered remotely, free of charge, through UNA-SUS. Furthermore, these courses are self-instructional, as the activities are developed without the support of a teacher and with short contents.

The schedule of all micro-courses is available at the UNAS-SUS website (https://arouca.unasus.gov.br/plataformaarouca/auth/ConsultaOferta.app) and registrations will be open until December 1st, 2020. The three micro-courses, offering 30 thousand spots each, are:

- Micro-course 1: Trajectory of Digital Health in Brazil (10 class hours).
- Micro-course 2: National Health Data Network: what do we need to know? (15 class hours).
- Micro-course 3: Safety and ethics in the sharing of personal health information (15 class hours).

These programs, started in May, 2020, already show important results, as demonstrated by the data reproduced below, derived from UFG management reports generated in the Arouca Platform maintained by UNASUS (BRASIL, 2020g):

- Micro-course 1: Trajectory of Digital Health in Brazil (made available at the platform on 05/11, with classes ending on 11/11/2020)
  - 5,003 enrolled
  - 1,455 certificates already issued.

- Micro-course 2: National Health Data Network: what do we need to know? (Made available at the platform on 06/08, with classes ending on 12/08/2020)
  - 2,452 enrolled
  - 645 certificates already issued.

- Micro-course 3: Safety and ethics in the sharing of personal health information (Made available at the platform on 07/01, with classes ending on 12/31/2020)
  - 2,438 enrolled
  - 774 certificates already issued.
Three other ongoing initiatives and one finalized initiative of the qualification process are also worth mentioning:

- Alagoas e-SUS APS Deployers Qualification Course (AL Joint Effort), which qualified over 20 e-SUS APS deployers, allowing for the dissemination of informatization in the state.

- e-SUS/APS 4.0 distance learning course.

- Distance learning course on Data Quality in Primary Healthcare Records.

- Qualification Course in Maceió, ministered by Hospital Sírio-Libanês as part of the Digital Health education by the PROADI/SUS program.

In addition to these initiatives, the Digital Health Specialization Course is in the formalization stage, and has the objective of providing targeted, more detailed knowledge on the subject.

This educational program helps healthcare professionals and administrators to recognize the importance of the Brazilian Digital Health Strategy actions and understand their roles in engaging citizens, so this effort results in integral, continued, effective, quality healthcare.

The qualification of healthcare and ICT professionals must continue to advance in order to ensure the number and availability of the necessary human resources for the implementation and consolidation of Digital Health to its full extent, supporting the clinical practice, management, collaboration, and knowledge generation. To that end, it is vital that we evolve with partnerships – such as professional health councils, the Brazilian Health Informatics Association (SBIS), universities, among others – for the development of new micro-courses and, above all, in order to obtain funding and support in the publicity and attraction of new interested parties. It is noteworthy that the medium-term goal is to build a robust, united community to lead the implementation and use of Digital Health services.

**Interconnectivity environment**

This priority aims to strengthen the collaborative work in the National Health Data Network (RNDS), allowing for the interoperability of all healthcare sectors from the definition of concepts, standards, service models, policies, and regulations that to be practiced.

Among the ongoing initiatives associated with the interconnectivity environment, the following sub-priorities are highlighted:

- Interoperability with external systems;

- Development of standards and terminologies for the RNDS.
3.6.1 Interoperability with external systems

The National Health Data Network (RNDS) has as its initial purpose to promote the exchange of information across healthcare facilities in the several points of the healthcare network through the dissemination of a minimum data set, providing healthcare professionals with access to the patients’ medical history, and allowing for the continuity and transition of care in health services.

Driven by Covid-19, the interoperability with public and private labs was established as the first major achievement of the RNDS. Currently, secure and controlled sharing of individual laboratory test results relating to the coronavirus conducted at different labs is already possible. In order to enable the RNDS connection process, DATASUS has made accrediting systems and technical documentation available to the laboratories at the Service Portal, based on interoperability standards and best practices. In a joint effort with the Brazilian Association of Diagnostic Medicine (Abramed), DATASUS also conducted a series of technical meetings with the main laboratories in the country, in order to provide clarifications, offer additional information on the connection with the RNDS, and open support channels for the integration process. The connection of public and private laboratories with the RNDS is a relevant milestone in the fight against Covid-19, and will bring long-term benefits as a core reference for the Brazilian Digital Health.

Another work front in a rather advanced stage is the interoperability in Primary Care. Among the ongoing activities to allow for the integration of healthcare facilities to the interconnectivity environment are primarily the following:

- **PEC/e-SUS APS Integration:**

  The e-SUS Primary Care (e-SUS APS) strategy is an approach of the Department of Family Health to restructure Primary Care information at the national level. This action is in line with the more general Health Information System restructuring proposal of the MS. e-SUS APS is comprised by two data collection software tools:

  - The Simple Data Collection (SDC) system is a transition/contingency system to support the data collection process through forms and typing systems.
  
  - Electronic Citizen Health Record (PEC) System, which is the most complete primary care electronic health record system, and will enable integration with the RNDS, i.e., allows for a healthcare professional who is a system user to access the medical history of an individual from an integrated PEC/e-SUS APS version. This feature redirects the user to the Conecte SUS web Portal interface - Healthcare Professional Profile (the Conecte SUS Portal will be introduced in more detail on Part 3 of this document). This integrated version is already in the pilot phase in ten SAPS partner cities for homologation of the e-SUS APS system evolution. The feature is expected to be available for the entire country in December, 2020.

- **Integration of other Primary Care electronic health record systems:**

  Using the period of September/2020 as reference, approximately 45% of Family Health Teams use an electronic health record system other than the e-SUS APS/PEC. With that in mind, the Primary Care interoperability strategy has been making accrediting systems and technical documentation available since the second half of 2020, so the administrators of these third-party/private systems can follow the same approach adopted by the e-SUS APS and be integrated to the RNDS.
3.6.2 Development of standards and terminologies for the RNDS

The development of the RNDS has also been driving major changes to the healthcare information governance framework. The need to establish rules and permissions for sharing, limits and conditions for data treatment, and other key security aspects, associated with the need for the definition of appropriate terminologies and datasets will establish a solid foundation for the promotion and adoption of interoperability in the country. It was from this commitment that the Data Governance Sub-committee of the Health Information and Informatics Committee (CIINFO/MS), coordinated by DINTEG, as well as a Terminology Sub-committee (CIINFO/MS) led by DATASUS were created. The central goal is to strengthen the Health Terminology Repository (RTS). A repository of terminologies, including clinical terminology and the associated terminology services, is a vital component of the framework to meet the Strategic Digital Health Vision, as its implementation facilitates the interoperability among systems and promotes information quality for the benefit of citizens, professionals, and administrators.

GM/MS Ordinance no. 1.434, dated May 28, 2020, positively impacts Digital Health in providing on the adoption of interoperability standards and recognizing the need for syntactic and semantic interoperability in the exchange of medical information. Moreover, the rule establishes that the country-wide adoption of the following healthcare interoperability standards will have preference:

- Standards which are open, free, or exempt from usage costs;
- Standards with lower adoption cost and complexity, including for other federal entities;
- Standards with broader adoption by the Brazilian health sector in a non-experimental or academic setting;
- Standards with broader adoption by governments of other countries, particularly those of which Brazil is a partner or with which Brazil cooperates;
- Standards with stable versions.

The definition and adoption of rules and standards for the representation, storage, exchange, and use of health information helps the RNDS to fulfill its purpose as a digital health information and service platform. Accordingly, the evolution from medical information models in the Fast Healthcare Interoperability Resources (FHIR) (HL7FHIR, 2019) format to the minimum dataset for the exchange of information regarding coronavirus test results is a critical advancement for the evolution of interoperability in the country, contributing to the Digital Health Strategy.
In the second half of 2020, the following computer models reflecting the technical specifications of clinical documents were or are being delivered:

- Laboratory Test Result (LTR)/Covid-19 – Nov./2020;
- Discharge Summary (DS) – Dec./2020;
- Clinical Care Record (RAC) – Dec./2020;
- Immunobiological Administration Record (RIA) – Dec./2020.

Regarding the information models, which are an early phase of the creation of computer models, where functional specifications are established for the clinical documents, the expected delivery dates are listed below:

- LTR/Covid-19 – Nov./2020;
- RIA – Dec./2020;
- Drug Dispensing (SDM) – 2021;
- Post-Vaccine Adverse Event Notification (NEAPV) – 2021.

### 3.7 Priority 7

**Innovation Ecosystem**

This priority is focused on the promotion of an innovation ecosystem which leverages the health interconnectivity environment as much as possible, as allowed by the RNDS.

Among the ongoing initiatives associated with this priority are primarily the following:

- Expansion of the RNDS integrated services;
- Implementation of the health information Data Lake.

#### 3.7.1 Expansion of the RNDS integrated services

The expansion of the RNDS integrated services is the essence of the desired transformations with the advancement of the Digital Health Strategy in the country, as it addresses the capacity for interoperability of the information collected in healthcare facilities and the incorporation of innovative technologies, methods, models, and processes. Upon establishing the RNDS as a national platform intended for the integration and interoperability of health information across public and private healthcare facilities and healthcare management bodies of the federal entities, the ESD28 aims to ensure the necessary access to health information for the continuity and transition of the citizen's healthcare.
The definition, detailing, development, and stabilization of the RNDS’ technological framework and its sub-systems and components were some of the major milestones of the Brazilian Digital Health Strategy. During this step of the project, the functional and non-functional requirements, such as security, availability, performance, and capacity requirements, were defined. Additionally, studies were designed for the definition of messaging, persistence, and information dissemination strategies, as well as the definition of the necessary infrastructure requirements to support the RNDS. Among the components, the following are highlighted:

1- **Informational Services** – such as documents, nation-wide registries, audit trail, among others;

2- **Technological Services** – Backend For Frontend (BFF);

3- **Electronic Health Services** – comprised by EHR Service, RTS integration, security components, among others, as well as the Conecte SUS Portal, a unified health information platform initially intended for citizens and healthcare professionals.

The Conecte SUS Portal – Administrator Profile is expected to be available in December, 2020, where the data stored in the RNDS is presented in an anonymized fashion (without identifying the information holders) in order to aid the management of health services.

It is noteworthy that the implementation of the RNDS took place through the provision of virtual cloud “containers” for each federative unit and the Federal District. The installation schedule for these “containers” was expedited, and they are already operational across all states, i.e., they are already being fed with coronavirus test result records submitted by public and private laboratories across the 27 states.

Additionally, in order to ensure value for RNDS users from the first access, the network is being fed and is expected to receive the record history load for the last 2 years from the following DATASUS databases:

- Laboratory Environmental Management System (LEMS);
- Primary Healthcare Information System (SISAB);
- Supplementary Health Information Exchange Standard (TISS);
- Hospital Information System (HIS) with Inpatient Admission Authorization (IAA) ;
- Outpatient Information System (OIS), through information from the Individualized Outpatient Production Bulletin (BPAi) and the Outpatient Procedure Authorization (OPA);
- National Immunization program Information System (SI-PNI);
- Brazilian National Pharmaceutical Assistance Base (BNAFAR).
The initial load of the records from the LEMS system was completed in the beginning of the second half of 2020 and is currently being designed with a continuous load process to ensure permanent feeding of the RNDS with the records of Covid-19 test results performed in the Central Public Health Laboratories (LACEN).

The IAA and OPA base load is at an advanced stage, and is expected to be completed in December, 2020.

As mentioned previously, all RNDS data are shared with citizens and healthcare professionals in an ethical and secure manner, through the Conecte SUS Portal.

The Conecte SUS Citizen Portal, a Progressive Web App (PWA) from the application available at Google Play e App Store, allows the individual to access their health information, according to Brazilian NHS and private facility healthcare records, such as tests, visits, vaccines, and medications obtained through an authentication conducted upon accessing the gov.br portal (through digital access, by the user, to the digital public services).

The Conecte SUS Healthcare Professional Portal allows healthcare professionals to access the patients’ medical history at the time of the visit, enabling their follow-up. This access takes place through the authentication of the ICP-Brasil Digital Certificate in combination with other data from previously enabled electronic patient health records of healthcare facilities.

The modernization of the Conecte SUS Citizen application, launched in August, 2020, was a paramount benchmark in the advancement of Digital Health in the country, since, among the several already existing functionalities (visit, vaccines, donations, online scheduling, etc.), it also provided citizens with access to results of Covid-19 tests taken in public and private labs.

We would like to stress that the Digital Health Strategy, as well as many other innovation actions and projects, are yet to be structured. Among these are primarily future initiatives to functionally expand digital health, more specifically the RNDS.

### 3.7.2 Implementation of the health information Data Lake

The data lake is a type of repository which stores large and diverse raw data sets in native format, i.e., data which have not been processed for any specific purpose. The main reason to implement a data lake in the RNDS is to allow for the existence of a future innovation ecosystem where data scientists can access raw information through predictive modeling or more advanced analytical tools for the production of knowledge from the RNDS data.

The detailed definition of the architecture of this data lake, with its sub-systems and components, is in the final formulation stages, and aims to make the environment adherent to all legacy bases to be loaded into the framework. After this definition, the implementation, stabilization, loading, and availability stages in the production environment will be initiated.
Digital Health
Strategy
Indicators
The 2019-2023 PAM&A defined the implementation of the Conecte SUS program as a core purpose, which encompasses both the Informatiza APS project, conducted by the DESF/SAPS, and the National Health Data Network (RNDS) initiative. The RNDS is a nation-wide health data integration platform designed and managed by DATASUS/SE, with the purpose of promoting the exchange of information across the points of the Health Care Network (RAS), allowing for the transition and continuity of care across the public and private sectors.

Thus, the core monitoring and evaluation task defined in the 2019-2023 PAM&A is to follow and guide the execution of Conecte SUS. This activity was structured through a clear data collection, analysis, and interpretation process with adequate quality, comprehensiveness, and depth. This process built understanding, knowledge, and insights which permanently subsidize decision-making for the continued execution of the Action Plan. The results of the Monitoring and Evaluation process, the accumulated knowledge, and the proposed actions have been broadly disseminated to all relevant actors involved in the Digital Health Strategy, through Conecte SUS Program bulletins, and are consolidated in this first monitoring and evaluation report.

In order to meet these needs, a monitoring and evaluation model comprising four representative dimensions of the Action Plan was developed. The M&E model based on these four dimensions addresses the needs of the 2019-2023 PAM&A and is in line with the priorities established in the ESD28. This model will be revised periodically, in a way as to advance the Brazilian Digital Health Strategy.

4.1 Conecte SUS Goals

The Conecte SUS Program was instituted through GM/MS Ordinance no. 1.434, dated May 28, 2020, which states, in its article two, that:

The Conecte SUS Program is hereby instituted within the Ministry of Health, aimed at the informatization of healthcare and integration of public and private healthcare facilities, as well as healthcare management agencies of the federal entities in order to ensure the necessary access to health information for the continuity of the citizen’s care (BRASIL, 2020g, art. 2).

Still on article two, the sole paragraph establishes that:

The Conecte SUS Program has the following objectives:

I - to implement the National Health Data Network – RNDS covered on arts. 254-A to 254-C of Consolidation Ordinance no. 1/GM/MS, dated September 28, 2017;

II - to support the informatization of the healthcare facilities comprising the healthcare points, starting with Primary Healthcare, through actions such as the Informatiza APS Program, covered on art. 504-A of Consolidation Ordinance no. 5/GM/MS, dated September 28, 2017, and the Pilot Project Supporting the Informatization of Primary Healthcare, covered on Ordinance no. 2.984, dated November 11, 2019; and

III - to provide citizens, healthcare facilities, healthcare professionals, and healthcare administrators access to the health information through a mobile and digital service platform of the Ministry of Health; and
Therefore, Conecte SUS encompasses two structuring projects, the RNDS and Informatiza APS. Each of these projects is associated with goals and objectives which allow for their monitoring and follow-up.

As a way to follow the achievement of these goals in a predictive and systematic manner, a set of informatization, usage, access, and information exchange indicators was defined, and is the essence of Conecte SUS.

### 4.1.1 Informatiza APS Goals

The Informatiza APS Program, under the coordination of the DESF/SAPS, established goals at the national level, which are provided for in the 2020-2023 Pluriannual Plan (BRASIL, 2019a), and goals for the Alagoas Pilot Project, which are provided for in the pilot project work proposal.

The national goal of Informatiza APS, described on Attachment I, “Finalist Programs”, of the 2020-2023 PPA (BRASIL, 2019a), concerns the broadening of the percentage of Informatized Family Health teams:

- **Program 5021 – Management and Organization of the Brazilian NHS (SUS).**
  - Guideline 6 – Broadening of the coverage and effectiveness of primary healthcare, and strengthening of the integration between health services.
    - Objective 1217 – To improve the management of the Brazilian NHS, aiming to ensure access to quality, equitable health products and services;
    - Goal 517 – To increase the level of informatization of Family Health teams to 92% until 2023.

The nation-wide goal of Informatiza APS is to reach 92% of informatized eSFs until the end of 2023. To that end, the DESF/SAPS organized annual goals to be monitored, which are detailed in the document providing on the PPA goals in the Integrated Planning and Budgeting System (IPBS) of the Ministry of Finance, as shown on Table 1.
Table 1 – Summary of the Informatiza APS goals for Brazil

<table>
<thead>
<tr>
<th>Goal name</th>
<th>Goal</th>
<th>Expected start date</th>
<th>Expected end date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>To increase the informatization of Primary Healthcare Teams (75% of the teams)</td>
<td>75% of all active eSFs in the CNES I December, 2020</td>
<td>11/11/2019</td>
<td>12/31/2020</td>
<td>34,381 eSFs informatized in 09/2020 – (65%)</td>
</tr>
<tr>
<td>To increase the informatization of Primary Healthcare Teams (85% of the teams)</td>
<td>85% of all active eSFs in the CNES I December, 2021</td>
<td>01/01/2021</td>
<td>12/31/2021</td>
<td>Monitoring not initiated</td>
</tr>
<tr>
<td>To increase the informatization of Primary Healthcare Teams (90% of the teams)</td>
<td>90% of all active eSFs in the CNES I December, 2022</td>
<td>01/01/2022</td>
<td>12/31/2022</td>
<td>Monitoring not initiated</td>
</tr>
<tr>
<td>To increase the informatization of Primary Healthcare Teams (92% of the teams)</td>
<td>92% of all active eSFs in the CNES I December, 2023</td>
<td>01/01/2023</td>
<td>12/31/2023</td>
<td>Monitoring not initiated</td>
</tr>
</tbody>
</table>

Source: Adapted from Espelho SIOP – Metas PPA 2020-2023 (BRASIL, 2020d).

Table 2 details the informatization status of Brazilian eSFs at the baseline and on the cutoff date for this report.

Table 2 – Summary of the Informatiza APS goal for Brazil

<table>
<thead>
<tr>
<th>Brazil</th>
<th>Baseline Oct./2019</th>
<th>Cutoff date Sept./2020</th>
<th>Goal Dec./2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>%</td>
<td>Quantity</td>
</tr>
<tr>
<td>Informatized eSFs</td>
<td>24,594</td>
<td>55%</td>
<td>34,381</td>
</tr>
<tr>
<td>Non-informatized eSFs</td>
<td>20,192</td>
<td>45%</td>
<td>18,142</td>
</tr>
<tr>
<td>Total</td>
<td>44,786</td>
<td></td>
<td>52,523</td>
</tr>
</tbody>
</table>

Source: Adapted from data from SISAB, period from Oct./2019 to Sep./2020 (BRASIL, 2020i).

* Value based on the number of active eSFs in the CNES in September/2020. Awaiting the end of the year for the exact number comprising 75% of eSFs in the country.
As can be seen, Brazil had a considerable increase both in the number of informatized eSFs and the amount of eSFs added in the period. Figure 3 details the advances seen in the 12 months covered by this report.

**Figure 3 – Overview of the eSF informatization scene in Brazil**


For the country to reach the target of 75% informatized eSFs until the end of 2020, at least 6,671 eSFs must be informatized. Figure 4 depicts the progress seen regarding the 2020 informatization target and makes forecasts based on the numbers seen.

**Figure 4 – Monthly advancement of informatized eSF - Brazil**

Analyzing Figure 4, it becomes clear that, following the current average informatization (approximately 816 eSFs per month), the country will see December 2020 with 36,828 informatized eSFs (68%) – 4,015 fewer than expected in the 75% target. In order to achieve the planned result by the end of 2020, the informatization needs to speed up to a pace of at least 2,154 informatized eSFs per month.

As for the Conecte SUS Pilot Project in Alagoas, the eSF informatization targets were established by the DESF/SAPS in the document Pilot Project Work Proposal\(^1\). This document presented a diagnosis of the situation in Alagoas in September/2019, subsequently establishing the alignment of expectations between DESF/SAPS and the Alagoas State Department of Health (SESAU-AL), the Municipal Health Secretariats Council of the State of Alagoas (COSEMS-AL), the Alagoas Cities Association (AMAI), DATASUS, CONASS, and CONASEMS.

After the Pilot Work Plan maturation process, Conecte SUS’ management defined that the baseline for extraction of the data would be October, 2019 and the cutoff date for collection of the indicators would be nine months later, in June, 2020, the date when the Conecte SUS Pilot Project would be finalized in Alagoas. Over the course of the Alagoas pilot project, CGISD conducted, together with the DESF/SAPS, the preparation of the document “Final Report of the Conecte SUS Pilot Project”, where the advances of informatization in the state and the lessons learned are detailed, as well as the recommendations of next steps for the actors involved.

Table 3 details the goals followed throughout the Conecte SUS Pilot Project in Alagoas.

### Table 3 – Summary of InformatizA PS targets for the Alagoas Pilot Project

<table>
<thead>
<tr>
<th>Goal name</th>
<th>Goal</th>
<th>Expected start date</th>
<th>Expected end date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>To increase the informatization of the Primary Healthcare teams of the state of Alagoas</td>
<td>450 eSFs of Alagoas (50%) informatized until the end of the Pilot Project</td>
<td>11/11/2019</td>
<td>06/30/2020</td>
<td>307 informatized eSFs in 06/2020 – 33.4%</td>
</tr>
<tr>
<td>To increase the informatization of the Primary Healthcare teams of urban cities in Alagoas</td>
<td>270 eSFs of urban cities (56%) informatized until the end of the Pilot Project</td>
<td>11/11/2019</td>
<td>06/30/2020</td>
<td>218 informatized eSFs in 06/2020 – the achieved result was 46%</td>
</tr>
<tr>
<td>To increase the informatization of the Primary Healthcare teams in surrounding intermediate cities in Alagoas</td>
<td>30 eSFs of intermediate cities (53%) informatized until the end of the Pilot Project</td>
<td>11/11/2019</td>
<td>06/30/2020</td>
<td>16 informatized eSFs in 06/2020 – the achieved result was 28%</td>
</tr>
<tr>
<td>To increase the informatization of the Primary Healthcare teams in surrounding rural cities in Alagoas</td>
<td>150 eSFs of rural cities (39%) informatized until the end of the Pilot Project</td>
<td>11/11/2019</td>
<td>06/30/2020</td>
<td>73 informatized eSFs in 06/2020 – the achieved result was 19%</td>
</tr>
</tbody>
</table>


---

The goal set for informatization in the Pilot Project conducted in the state of Alagoas was to reach 450 informatized eSFs until June, 2020. Table 4 shows the data gathered in the baseline and the cutoff point, together with the established target, allowing for a comparative view:

Table 4 – Monthly progress of eSF informatization in Alagoas

<table>
<thead>
<tr>
<th>Alagoas</th>
<th>Baseline Oct./19</th>
<th></th>
<th>Cutoff point Jun./20</th>
<th></th>
<th>Target – Jun./2020</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quantity</td>
<td>%</td>
<td>Quantity</td>
<td>%</td>
<td>Quantity</td>
<td>%</td>
</tr>
<tr>
<td>Informatized eSFs</td>
<td>209</td>
<td>23.5%</td>
<td>307</td>
<td>33.4%</td>
<td>450</td>
<td>50%</td>
</tr>
<tr>
<td>Non-informatized eSFs</td>
<td>677</td>
<td>76.5%</td>
<td>611</td>
<td>66.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>886</strong></td>
<td></td>
<td><strong>918</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Once the selected baseline and cutoff date for the Pilot Project have been presented, it is necessary to detail the monthly progress of eSF informatization in Alagoas as compared to the established target, as shown on Figure 5:

Figure 5 – Monthly progress of eSF Informatization in Alagoas

Considering the analyzed period, the number of informatized eSFs jumped from 209 in October, 2019 to 307 in June, 2020, an increase of 98 informatized eSFs. This represents a 10% growth in the total percentage of informatization in the state of Alagoas, from 23.5% to 33.4%.

When making a forecast based on the average advancement seen in the number of eSFs by reference period, it can be seen that, from October, 2019 to March, 2020, there was an average growth of 19 eSFs/reference period. Thus, when projecting this average eSF growth until December, 2020, it is found that the target of 450 informatized eSFs would be reached mid-October, 2020.

Because the new coronavirus pandemic impacted the Conecte SUS planning from March onwards, a number that draws attention is the stagnation of informatized eSFs seen from March to June, 2020. The decreased pace seen can be attributed to a few factors: cities which adhered to the pilot project only received funding for implementation in January and February, 2020, which, together with the public calamity circumstances brought by the pandemic mid-March, made the implementation of the necessary structure by the cities difficult in the analyzed period.

For the Pilot Project, the target established by the DESF/SAPS was to reach 450 informatized eSFs until the end of June, 2020. Given that the total Informatized eSFs in the period was 98, it can be inferred that Conecte SUS reached 40% of the goal target of increase in the number of informatized eSFs.

**Figure 6 – Analysis of achievement of the established goal**

![Figure 6](image-url)

In the Informatiza APS Project Plan, the DESF/SAPS establishes informatization goals for each of the city types in the state of Alagoas. In order to assess whether there is a correlation between the city type where the eSF is and the degree of progress in informatization, one must observe the informatization obtained for each of the types, as shown on Table 5.
From the analysis on Table 5, it becomes clear that eSFs belonging to rural cities were the farthest from the goal established by the DESF/SAPS, with 73 informatized eSFs versus the target of 150, which corresponds to 49% achievement regarding the expected result. With regard to teams located in intermediate cities, the target was of 30 informatized eSFs, while the result seen was 16, that is, 53% of the target was achieved. As for the positive result seen in urban cities, which totaled 218 informatized eSFs versus a goal of 270, the goal achievement was at 81%, confirming that urban cities have the advantage concerning the informatization process as compared to other cities, which face challenges such as the scarcity of infrastructure and qualified teams for the implementation of the health record and the assurance of data submission.

Figure 7 shows the informatization goal by city type until June, 2020 and compares the obtained results with the established goal. It is possible to see that none of the city types reached the expected goal.

### Table 5 – Informatization by city type

<table>
<thead>
<tr>
<th>City type</th>
<th>Total eSFs</th>
<th>Oct./19</th>
<th>Informatized eSFs</th>
<th>% informatization</th>
<th>Jun./20</th>
<th>Informatized eSFs</th>
<th>% informatization</th>
<th>Goal achievement - June/20</th>
<th>Informatized eSF target</th>
<th>% goal achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>461</td>
<td>154</td>
<td>33%</td>
<td>479</td>
<td>218</td>
<td>46%</td>
<td></td>
<td>270</td>
<td>81%</td>
<td></td>
</tr>
<tr>
<td>Intermediate surrounding</td>
<td>57</td>
<td>9</td>
<td>16%</td>
<td>57</td>
<td>16</td>
<td>28%</td>
<td></td>
<td>30</td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>Rural surrounding</td>
<td>368</td>
<td>46</td>
<td>13%</td>
<td>382</td>
<td>73</td>
<td>19%</td>
<td></td>
<td>150</td>
<td>49%</td>
<td></td>
</tr>
<tr>
<td>Grand Totals</td>
<td>886</td>
<td>209</td>
<td>23.6%</td>
<td>918</td>
<td>307</td>
<td>33.4%</td>
<td></td>
<td>450</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


From the analysis on Table 5, it becomes clear that eSFs belonging to rural cities were the farthest from the goal established by the DESF/SAPS, with 73 informatized eSFs versus the target of 150, which corresponds to 49% achievement regarding the expected result. With regard to teams located in intermediate cities, the target was of 30 informatized eSFs, while the result seen was 16, that is, 53% of the target was achieved. As for the positive result seen in urban cities, which totaled 218 informatized eSFs versus a goal of 270, the goal achievement was at 81%, confirming that urban cities have the advantage concerning the informatization process as compared to other cities, which face challenges such as the scarcity of infrastructure and qualified teams for the implementation of the health record and the assurance of data submission.

Figure 7 shows the informatization goal by city type until June, 2020 and compares the obtained results with the established goal. It is possible to see that none of the city types reached the expected goal.
The suboptimal results are due to the Covid-19 pandemic, but are also a consequence of the fact that Alagoas cities received the implementation funds in January and February, 2020, shortly before the consolidation of results for this report (cutoff date: June/2020).

The greatest impacts were felt in the expected informatization schedule for the Pilot Project, which strongly affected the results and initial strategy. In May, the DESF/SAPS was forced to change the timelines foreseen in the ordinances and the technical note of Informatiza APS with respect to the informatization deadline after the receipt of the implementation funds. This extension was established through Ordinance no. 1.247, dated May 18, 2020, which delayed in four months the deadline for initiation of regular data submission by Primary Healthcare Facilities through an electronic health record system. Thus, the cities now have until the end of 2020 to prove that they used the funds and that their eAPs have been informatized; otherwise, they will have to return the received funds.

It is important to highlight that, in light of the public calamity state triggered by the new coronavirus in March, the Conecte SUS pilot project was driven to aid the control of the public health emergency, redirecting its efforts and focusing on a contingency plan, as well as actions in response to the pandemic.

As outlined in the Final Conecte SUS Pilot Project Report, the goal established by the DESF/SAPS was to informatize 450 eSFs (50%) until the end of June, 2020; however, due to the public calamity circumstances brought by the Covid-19 disease, this goal was re-planned to be achieved until December/2020. In order to follow the overall eSF Informatization goal of the Conecte SUS Pilot Project in Alagoas, this monitoring and evaluation report – whose cutoff date is October 30, 2020 – gathered the available data from SISAB for the reference period of Sep./2020, where it is possible to observe the following advance in informatization in the state of Alagoas.

Figure 8 – Monthly progress of eSF informatization in Alagoas

Figure 8 shows that, after three months as of the Alagoas Pilot Project end date (June/2020), the total informatized eSFs was 135, which led the state to jump from 209 informatized teams in October, 2019 (23.5%) to 344 in September, 2020 (37%). The value achieved in the period was of 344 informatized eSFs out of the total 934 eSFs in the state, that is, there was 37% of informatization. At the current informatization rate seen in Alagoas, after the coronavirus crisis (average of 6 eSFs informatized per month, from March to September), the target of 450 informatized eSFs will not be reached until the end of 2020, and must be followed over the course of 2021.

Regarding the specific targets of Informatiza APS for each of the three city types of Alagoas, it was found that, in spite of the advancement of 135 eSFs in the period from October, 2019 to September, 2020, none of the targets were reached, as detailed on Table 6.

Table 6 – Informatization by city type

<table>
<thead>
<tr>
<th>City type</th>
<th>Oct./19</th>
<th>Sep./20</th>
<th>Goal achievement - June/2020</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total eSFs</td>
<td>Informatized eSFs</td>
<td>% informatization</td>
</tr>
<tr>
<td>Urban</td>
<td>461</td>
<td>154</td>
<td>33%</td>
</tr>
<tr>
<td>Intermediate surrounding</td>
<td>57</td>
<td>9</td>
<td>16%</td>
</tr>
<tr>
<td>Rural surrounding</td>
<td>368</td>
<td>46</td>
<td>13%</td>
</tr>
<tr>
<td>Totals</td>
<td>886</td>
<td>209</td>
<td>23.6%</td>
</tr>
</tbody>
</table>


After the end of the pilot project in Alagoas, an advancement of 21 informatized eSFs was seen in rural cities, with 16 informatized eSFs in urban cities and zero informatized eSFs in intermediate cities. The chart shown on Figure 9 allows for the visualization of the goal achievement for each city type of Alagoas in the analyzed period.

Figure 9 – Informatization goal by city type

4.1.2 RNDS Goals

The need to establish the RNDS is based on the principles and guidelines of the National Informatics and Information Policy (PNIIS), and is in line with both the Information and Communications Technology Master Plan – PDTIC 2019/2021 (DATASUS, 2019) and the 2020-2023 PPA for the Brazilian National e-Health Strategy, which reinforce, in their vision, that:

Until 2020, e-Health will be incorporated to the Brazilian NHS (SUS) as a fundamental dimension, being recognized as a consistent healthcare improvement strategy through the supply and use of comprehensive, accurate, and secure information which expedites and improves the quality of health services and processes at the three government levels and the private sector, benefiting patients, citizens, professionals, administrators, and healthcare organizations (BRASIL, 2017, p. 9).

Another normative device where the RNDS is covered as a strategic project for the country is PDTIC 2019/2021, which highlights the following in its strategic goals, numbers four and five:

- OE.04 – To provide digital solutions to enable actions based on the guidelines, policies, and programs of the Ministry of Health.
- OE.5 – To implement the National Health Data Network – RNDS as the foundation for the Brazilian National e-Health (Digital Health) Strategy. (BRASIL, 2020b, p. 38).

Like Informatiza APS, the RNDS was linked to a goal which comprises a monitoring normative device, the 2020-2023 National Health Plan. In its chapter five, entitled "Objectives, Goals, and Projects", the PNS details its seven objectives and the four-year goals whose follow-up takes place on an annual basis, through the Annual Health Schedules. The RNDS is described under objective seven, to "Improve the management of the Brazilian NHS (SUS), aiming to ensure access to equitable, quality health products and services" (BRASIL, 2020c), as a goal of:

- Connecting the 27 Federative Units (UF) to the National Health Data Network (RNDS)

In order to be considered as connected to the RNDS, the Healthcare Facilities of the State must submit health information of the treated citizens to the RNDS. The CGISD/DATASUS/SE, in charge of managing the RNDS, established the network’s goals, which were submitted to the Office of the Chief of Staff for progress monitoring through the “Agenda + Brasil” platform. Table 7 details the indicators submitted to the Office of the Chief of Staff.

Table 7 – RNDS Goals

<table>
<thead>
<tr>
<th>Goal name</th>
<th>Goal</th>
<th>Expected end date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>To connect Primary Care Facilities (EAPs) to the RNDS in the 27 UF&lt;es&gt;</td>
<td>At least 1 EAP connected in each UF</td>
<td>12/31/2020</td>
<td>Monitoring ongoing; 1 UF connected so far.</td>
</tr>
<tr>
<td>To connect Primary Care Facilities (EAPs) to the RNDS in the 27 UF&lt;es&gt;</td>
<td>50% of the EAPs of each UF connected</td>
<td>12/31/2023</td>
<td>Monitoring not initiated</td>
</tr>
</tbody>
</table>

Source: RNDS goal sheet submitted to the Office of the Chief of Staff.
This report, whose cutoff date is October, 30, has been monitoring the RNDS connection status of the EAPs in the 27 States. Connectivity will be established through access to the integrated e-SUS APS/RNDS version, which will be available in the PEC, and through which the connection of the EAP to the RNDS will be effected. In order to allow the facility to make the integration, it must have an A1 digital ICP-Brasil certificate to ensure security and compliance with data protection laws during information exchanges.

The Conecte SUS work fronts in charge of making the e-SUS APS PEC available for access to the RNDS are DATASUS/SE and DESF/SAPS. The RNDS connectivity planning was executed by both fronts together, which defined a plan divided in two phases:

- **Pilot**
  - Availability of the RNDS-integrated e-SUS APS PEC version to ten selected cities in the following states: Distrito Federal, São Paulo, Rio Grande do Sul, Rio de Janeiro, Tocantins, Minas Gerais, Mato Grosso, Mato Grosso do Sul, and Piauí.
  - Date: October, 2020.

- **National expansion**
  - Availability of the RNDS-integrated e-SUS APS PEC version to all UFs of the country.
  - Expected date: December, 2020.

Currently, only the city of Arujá/SP already has EAPs integrated to the RNDS through the new e-SUS APS PEC version. Across the other cities selected for the pilot, the following statuses are seen:

- Cuiabá/MT – certificate issued and PEC integrated to the RNDS; in the final phase of RNDS integration;
- Palmas/TO – certificate issued, integration expected to start in November/2020;
- Santa Luzia/MG – certificate issued, integration expected to start in November/2020;
- Brasília/DF – awaiting certificate issuance;
- Marília/SP – awaiting certificate issuance;
- Pelotas/RS – awaiting certificate issuance;
- Pirai/RJ – awaiting certificate issuance;
- Dourados/MS – awaiting certificate issuance;
- Teresina/PI – awaiting certificate issuance.
4.2 RNDS Operational Data

4.2.1 Definition and purpose

Operational data are those reflecting the operations conducted by a certain business or institution, being stored in platforms which allow for their consultation and use by other intelligence areas or systems of the organization.

This monitoring and evaluation front aims to measure the progress and effectiveness of the RNDS as a national platform for innovation, information, and digital health services. Right now, we can already gather relevant information in the RNDS, whose volume and geographic reach allow for its evaluation, as well as the measurement of the citizens’ interest in consuming it.

The set of operational data integrated, collected, and made available in the RNDS to generate this analysis are:

- Number of laboratories connected to the RNDS;
- Number of Covid-19 test results submitted by these labs;
- Number of downloads of the Conecte SUS Cidadão app.

4.2.2 Methodology and obtained results

The Monitoring and Evaluation Plan prioritizes the dataset that can be directly extracted from the RNDS production. The first data submission to the RNDS was a result of an initiative by the Ministry of Health, through DATASUS, which – in light of the publication of GM/MS ordinance no. 1.792, dated July 21, 2020, requiring laboratories from the public or private network, as well as university labs, to submit Covid-19 test results to the MS – promoted several meetings with clinical analysis laboratories to clarify questions about the accreditation process and technical documentation for data submission via API to the RNDS. DATASUS has provided the accreditation system (technical documentation) for the RNDS in the Service Portal; the material was prepared based on the best practice and the interoperability standards. The Ministry of Health, through DATASUS, provides laboratories with support for eventual questions around the use of the RNDS at the electronic address https://rnds.saude.gov.br.

Once the alignment process was started with the clinical analysis labs for data submission to the RNDS, a pilot project was started, for which eleven laboratories were selected. The selection process was conducted by DATASUS together with Abramed, which listed the reference labs for participation in the project. Please find below the list of laboratories selected for the pilot project and their integration status mid-July, 2020:

- Diagnósticos da América S. A. – integration completed and submitting data to the RNDS;
- Fleury – integration completed and submitting data to the RNDS;
- Hermes Pardini – integration completed and submitting data to the RNDS;
- Sabin Medicina Diagnóstica – integration completed and submitting data to the RNDS;
• Laboratório Butantã – developing API for integration;

• Laboratório Israelita Albert Einstein – participated in the alignments at the MS, but did not start the integration process;

• Alliar – did not participate in the alignments at the MS and did not manifest regarding the integration process;

• Diagnósticos do Brasil – did not participate in the alignments at the MS and did not manifest regarding the integration process;

• DMS Burnier – did not participate in the alignments at the MS and did not manifest regarding the integration process;

• Lab Rede – did not participate in the alignments at the MS and did not manifest regarding the integration process;

• Central Sorológica de Vitória – did not participate in the alignments at the MS and did not manifest regarding the integration process.

After the publication of Ordinance no. 1.792/2020, the laboratories TOMMASSI and SES-BA have also reached out to the MS and started the API development process for integration.

Between July and October, 2020, the integration of the laboratories to the RNDs developed at a fast pace. Aiming to increase the adherence of clinical analysis laboratories to the RNDS integration process, DATASUS has structured live sessions and technical meetings in the social media for interested laboratories to clarify any questions about the accreditation process. If in July there were 11 laboratories integrated to the RNDS and submitting Covid-19 test results, at the end of October, after the many efforts of DATASUS, this number increased to 67. Additionally, the total Covid-19 test results submitted to the RNDS in July amounted to a little over 1 million units, having reached 3,859,376 tests until October 30 (cutoff date for this report).

For the generation of this monitoring and evaluation report, data was extracted from the RNDS cloud by DATASUS and summarized on tables 8 and 9. Table 8 shows the eight private laboratories and the Ministry of Health data integrated to the RNDS, which, taken together, account for 95% of the Covid-19 test results submitted to the RNDS.
Table 8 – COVID-19 test results submitted to the RNDS by laboratory

<table>
<thead>
<tr>
<th>Laboratory</th>
<th>Covid-19 test results submitted</th>
<th>% of the total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fleury S. A.</td>
<td>1,090,238</td>
<td>28%</td>
</tr>
<tr>
<td>Ministry Of Health</td>
<td>788,418</td>
<td>20%</td>
</tr>
<tr>
<td>Laboratório Sabin de Análises Clínicas S. A.</td>
<td>666,813</td>
<td>17%</td>
</tr>
<tr>
<td>Diagnósticos da América S. A.</td>
<td>522,208</td>
<td>14%</td>
</tr>
<tr>
<td>Instituto Hermes Pardini LTDA</td>
<td>258,009</td>
<td>7%</td>
</tr>
<tr>
<td>Labi Exames S. A.</td>
<td>140,333</td>
<td>4%</td>
</tr>
<tr>
<td>HI Technologies S. A.</td>
<td>100,223</td>
<td>3%</td>
</tr>
<tr>
<td>Genolab Genética Avançada Laboratório LTDA</td>
<td>48,783</td>
<td>1%</td>
</tr>
<tr>
<td>Simile Instituto de Imunologia Aplicada LTDA</td>
<td>42,510</td>
<td>1%</td>
</tr>
<tr>
<td>Other labs</td>
<td>201,841</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,859,376</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: Prepared from data of the National Health Data Network; extraction on 10/30/2020 (BRASIL, 2020a).

The chart depicted on Figure 10 shows that, until the cutoff date, the concentration of submissions was comprised of eight private Laboratories added to the Ministry of Health data.

Figure 10 – COVID-19 test results submitted to the RNDS by laboratory

1,090,238 788,418 666,813 522,208 258,009 140,333 100,223 48,783 42,510 201,841

Source: Prepared from data of the National Health Data Network; extraction on 10/30/2020 (BRASIL, 2020a).
Table 9 summarizes Covid-19 test result submissions by state.

Table 9 – Test results submitted to the RNDS by UF

<table>
<thead>
<tr>
<th>State</th>
<th>Covid-19 test results submitted</th>
<th>% of the total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>1,725,170</td>
<td>45%</td>
</tr>
<tr>
<td>DF</td>
<td>666,813</td>
<td>17%</td>
</tr>
<tr>
<td>MG</td>
<td>337,220</td>
<td>9%</td>
</tr>
<tr>
<td>RJ</td>
<td>309,462</td>
<td>8%</td>
</tr>
<tr>
<td>PR</td>
<td>170,867</td>
<td>4%</td>
</tr>
<tr>
<td>Other states</td>
<td>649,844</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>3,859,376</td>
<td>45%</td>
</tr>
</tbody>
</table>

Source: Prepared from data of the National Health Data Network; extraction on 10/30/2020 (BRASIL, 2020a).

Another way to measure the advancements of Digital health in Brazil is the analysis of how many times the Conecte SUS Cidadão app was downloaded until the cutoff date of this report. Table 10 summarizes the number of downloads of the Conecte SUS Cidadão app in the operational systems Android and IOS.

Table 10 – Downloads of the Conecte SUS Cidadão app

<table>
<thead>
<tr>
<th>Platform</th>
<th>Number of Downloads until the cutoff date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android</td>
<td>2.75 million</td>
</tr>
<tr>
<td>IOS</td>
<td>2.2 million</td>
</tr>
</tbody>
</table>

Source: Prepared from data of the National Health Data Network; extraction on 10/30/2020 (BRASIL, 2020a).

The new app, modernized from Meu DigiSUS, allows citizens to view visits, vaccination, and medication taken from the Brazilian NHS’ Healthcare Network points. By facilitating the citizens’ access to their healthcare utilization history and Covid-19 test results, the MS takes an important step towards the strengthening of the continuity and transition of care in the public and private sectors.
4.2.3 *Next steps*

In addition to the indicators detailed above, a larger, broader set of indicators is being developed so that, by the end of 2020, the measurement of the RNDS’ results can cover all necessary variables.

4.3 *Digital Maturity of Healthcare Facilities*

It is known that more digitally mature healthcare facilities improve the experience of patients and the healthcare professionals, being able to offer better continuity and transition of care to individuals. But what is the current stage of healthcare facilities in this digital transformation journey? How to measure the digital maturity level?

With that in mind, the concept of Digital Maturity Index for Healthcare (DMI-H) was developed, based on international digital healthcare maturity assessment methods, such as the maturity models of HIMSS Analytics, the NHS Digital Assessment Tool of the English Department of Health and Social Care, and the Global Digital Health Index, of the WHO.

The DMI-H is a tool for the monitoring and evaluation of the maturity of healthcare facilities regarding digital health. This tool consists of a set of questions classified in a dimension and a domain. Each question is comprised of five possible answers indicating the degree of maturity of the different aspects of digital health, such as governance, interoperability, information security, use of the Electronic Patient Record, etc., and gives back a percentage identifying the digital level of a healthcare facility, considering technology adoption and the digital readiness.

Among the benefits of the DMI-H are primarily the following:

- assessing, in a simple and expedited fashion, the digital maturity level of a healthcare facility, through a standardized method, allowing for benchmarking and comparisons;
- allowing for the follow-up of the digital health transformation of a community of institutions (city, state, federal, among others);
- supporting the development of public policies to expedite the digital transformation in healthcare and adherence to the RNDS.

Thus, the DMI-H enables an assessment that is both agile and comprehensive, once it consists of a questionnaire that can be answered directly by the administrator of the Healthcare Facility (EAS).
4.3.1 Methodology

The index is derived from the completion of an online self-assessment questionnaire comprised by questions organized in two dimensions and four domains:

• Dimensions:
  
  • **Technology adoption** – assesses the level of incorporation of digital technologies (systems, applications, etc.) to the institution’s operational, healthcare, and managerial processes. Includes the domains Systems and Services, Standards and Interoperability, and Infrastructure and Security.
  
  • **Digital readiness** – assesses whether the institution is preparing for the incorporation of digital technologies, considering a team that is trained in digital health, with institutional support and governance. Additionally, the institution must have a well-planned strategy with follow-up of the impact of the changes to their indicators.

• Domains:
  
  • **Infrastructure and Security**: assesses the IT infrastructure required to allow for adequate adoption and operationalization of the technologies, as well as information security aspects.
  
  • **Human Resources in Digital Health**: assesses the qualification of the organization’s staff leading the digital health projects.
  
  • **Organizational Resources and IT Governance**: assesses the aspects relating to digital health governance in the organization, including strategic, organizational culture, and innovation aspects.
  
  • **Systems, Services, Standards, and Interoperability**: assesses the services and systems implementing digital health in the healthcare facilities, as well as standards and interoperability.

The questions are classified in domains and dimensions, and assigned a score ranging from 0% to 100%, which allows for a measurement of the maturity stage in a graded scale, as depicted on Figure 11.
The institution does not have a digital strategy. The leaderships and the staff are not prepared for the transformation. As a result, most services and applications are not digital.

The institution has already begun its digital journey, and has a few digital solutions for the most basic services. The leaderships already understand that digital transformation is essential.

The institution is already benefiting from digital transformation, with a clear strategy and the engagement of its employees. A substantial part of services and applications is already digital.

The institution has reached advanced levels in digital services, with a strategy for the creation of new technology-based services, and assessing the impact in continued improvement cycles.

The maturity stages outlined above aid the identification of healthcare facility profiles from a digital evolution standpoint, allowing local administrators or national researchers to follow the progress of digital health in the country.

It is noteworthy that the index acknowledges the peculiarities of and discriminates questionnaires for application in different types of healthcare facilities, such as:

- Public institutions, applied to EAS;
- Laboratories, applied to clinical analysis laboratories;
- Sponsoring institutions, applied to administrators of charitable networks.

As mentioned before, the questionnaire is self-assessed, i.e., the administrator of the institution (or its sponsoring institution) must access the applicable questionnaire for the institution's profile and answer it. The questionnaires are available at https://redcap.saude.gov.br/surveys/?s=X83M79KRC8.
4.3.2 Current situation

The DMI-H has finalized, in July, 2020, its application pilot. During this step, 18 facilities were assessed, of which 15 were healthcare institutions (2 UBS, 1 UPA, 1 clinic, and 11 hospitals) and 3 were clinical analysis laboratories. Although it was also impacted by the pandemic (the initial sample was of 33 facilities distributed across 11 cities), this DMI-H pilot step was vital to assess and refine the applied questionnaire and the weighing of the answers. The data gathered in the pilot step for application of the DMI-H questionnaires are summarized on Figure 12.

**Figure 12 – Summary of results for the application of DMI-H questionnaires**

<table>
<thead>
<tr>
<th>Healthcare Institutions</th>
<th>Maturity (IDS)</th>
<th>Dimensions</th>
<th>Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Technology Adoption</td>
<td>Digital Readiness</td>
</tr>
<tr>
<td>EAS 1</td>
<td></td>
<td>57.1</td>
<td>46.2</td>
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<tr>
<td>EAS 2</td>
<td></td>
<td>62</td>
<td>39.6</td>
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<td>EAS 3</td>
<td></td>
<td>51</td>
<td>26.9</td>
</tr>
<tr>
<td>EAS 4</td>
<td></td>
<td>54.8</td>
<td>50</td>
</tr>
<tr>
<td>EAS 5</td>
<td></td>
<td>54</td>
<td>40.4</td>
</tr>
<tr>
<td>EAS 6</td>
<td></td>
<td>74</td>
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<tr>
<td>EAS 7</td>
<td></td>
<td>76.9</td>
<td>46.2</td>
</tr>
<tr>
<td>EAS 8</td>
<td></td>
<td>33.7</td>
<td>22.9</td>
</tr>
<tr>
<td>EAS 9</td>
<td></td>
<td>26.9</td>
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<tr>
<td>EAS 10</td>
<td></td>
<td>66.7</td>
<td>57.7</td>
</tr>
<tr>
<td>EAS 11</td>
<td></td>
<td>14.1</td>
<td>22.9</td>
</tr>
<tr>
<td>EAS 12</td>
<td></td>
<td>60.6</td>
<td>72.9</td>
</tr>
<tr>
<td>EAS 13</td>
<td></td>
<td>0</td>
<td>7.1</td>
</tr>
<tr>
<td>EAS 14</td>
<td></td>
<td>64.1</td>
<td>80.6</td>
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<td>EAS 15</td>
<td></td>
<td>11.5</td>
<td>34.6</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Laboratories</th>
<th>Maturity (IDS)</th>
<th>Dimensions</th>
<th>Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Technology Adoption</td>
<td>Digital Readiness</td>
</tr>
<tr>
<td>LAB 1</td>
<td></td>
<td>60.4</td>
<td>52.3</td>
</tr>
<tr>
<td>LAB 2</td>
<td></td>
<td>52.3</td>
<td>47.9</td>
</tr>
<tr>
<td>LAB 3</td>
<td></td>
<td>38.5</td>
<td>29.2</td>
</tr>
</tbody>
</table>

Source: Prepared from data gathered in the questionnaires applied in the DMI-H Pilot Step.
It must be acknowledged and reinforced that the number of evaluated facilities is small, but the initial purpose is to assess the potential for conduction of analyses when the indicator is applied in large scale. In line with that, the table above allows for the assessment of the results obtained for each facility and indicates the potential for evolution and digital transformation in the dimensions and domains explored in the Digital Health Strategy.

Figure 13 shows a chart extracted from the assessment of the results obtained in the dimensions of the DMI-H, allowing for a quadrant concentration analysis, that is, an overall maturity analysis of the health system in terms of the relation between technology adoption and digital readiness.

**Figure 13 – Graphic depiction of the readiness of Healthcare Facilities**

Once the assessment of results for the DMI-H pilot application was finalized, the next step consisted of gathering of feedback from the participating facilities and the submission of results to the CGESD, which added inputs and remarks for improvements, primarily concerning the alignment of the index to the ESD28. Based on the feedback from the participants and the input from CGESD, the DMI-H has been going through an improvement process over the final months of 2020, which involves:

- The adjustment of the questionnaire according to participating facility type, e.g. UBSs, UPAs, clinics or practices, laboratories, among others.
The development of questions to account for factors such as the use of telemedicine, RNDS connection, use of digital certificate, support to Brazilian NHS APS programs, interoperability with pharmacies, use of clinical terminology, interoperability with internet of things, among others.

4.3.3 Next steps

By the end of 2020, DATASUS intends to complete the following steps:

- defining a strategy for expansion, dissemination, and submission of the DMI-H;
- preparing the database for expansion of the DMI-H;
- preparing the technical documentation of the DMI-H, as well as educational and training materials about the index;
- applying the DMI-H in waves in the healthcare facilities defined in the expansion strategy.

4.4 Conecte SUS Gestor Indicators

Conecte SUS Gestor is a digital solution that will allow the sharing of information obtained in the RNDS with health administrators through an analytical panel derived from a population base of health visit records and medical documents submitted to the RNDS. Through a visualization dashboard, administrators will be able to access information about the health service utilization and the clinical-epidemiological profile of the population shortly after it is made available. This will enable informed decision making and pro-active strategic planning, based on an analysis of real needs. Furthermore, managers will be able to have a more accurate view of the population's health, with legitimate information about the needs and resource utilization of citizens under their jurisdiction and, thus, they will be able to schedule and plan actions and services thought for these real demands.

The indicators to be made available at Conecte SUS gestor are divided in two groups:

- Specialized health indicators, under the governance of DATASUS, and defined by the General Specialized Healthcare Service Indicator Monitoring Coordination/SAES.
- Primary Care Indicators, under the leadership of DATASUS, and defined by the General Primary Healthcare Monitoring and Evaluation Coordination and the General Primary Care Information Coordination/SAPS.

The data for the generation of the indicators composing Conecte SUS Gestor is extracted from the records of clinical events submitted by Primary Care Facilities to SISAB or the Inpatient Admission Authorization system (IAA-SUS). Once the RNDS update process is consolidated, these indicators are submitted at the Conecte SUS Gestor Portal.
During the planning phase, DATASUS reached an agreement with the technical areas of the SAES regarding what the eight indicators made available in the tool should be. Among the Specialized Health Indicators that may be used to aid the monitoring of the advancements of Digital Health in Brazil, whose qualification sheets are contained in the attachment to this document, are primarily the following:

- Estimated bed occupancy rate by surgical specialty;
- Estimated bed occupancy rate by clinical specialty;
- Estimated overall bed occupancy rate;
- Estimated ICU bed occupancy rate;
- Estimated institutional mortality rate;
- Readmission within up to seven days after the last stay in the same hospital.
- Mean overall length of stay;
- Average length of stay (days) in the ICU.

After discussions between DATASUS and SAES, it was defined that ICU-related indicators would not be prioritized, and must only be implemented after the other indicators are configured. Specialized Health indicators will be made available at the Conecte SUS Gestor Portal as the technical area in charge at SAES aligns the collection and availability flow with DATASUS.

In addition to Specialized Care indicators, the Conecte SUS Gestor Portal will monitor Primary Care indicators, which are being developed by the technical areas at SAPS together with DATASUS. As of the cutoff date for this report, six Primary Care indicators were chosen to generate input for the Conecte SUS Gestor Portal:

- ratio between the number of persons not linked and linked to the APS served in a given city;
- percentage of persons considered as APS hyperusers;
- percentage of persons admitted for Primary Care-sensitive conditions (PCSC);
- percentage of persons admitted for hypertension and its complications;
- percentage of persons from 30 to 59 years old admitted for Diabetes Mellitus and its complications;
- percentage of persons with Diabetes Mellitus who underwent lower limb amputation/disarticulation.

The indicators defined with the SAPS are in the qualification process and, therefore, do not have a finalized qualification sheet for inclusion in the attachment hereto. The proposed set of indicators will be matured in an incremental, iterative fashion, as the technological solution behind the integration of health information to the RNDS matures. Once the indicators have been defined and implemented, it will be possible to measure epidemiological aspects associated with the exchange of health information through the RNDS.
Expansion of the ESD28 Monitoring and Evaluation Plan
5.1 Evolution of the ESD28 Monitoring and Evaluation Plan

To reinforce the concepts defined on Part 1 hereof, the actions proposed in the M&A Plan have the purpose of ensuring that the Action Plan is kept consistent with and adherent to the Digital Health vision over the years. The M&A Plan is intended to provide clear guidelines and offer the necessary flexibility so the activities developed in each cycle of the Action Plan remain compliant with healthcare needs, leveraging value capturing opportunities which may present over the course of its execution.

The ESD28 proposes that the M&A Plan be focused in two major priorities which, when met, will lead to an actionable M&A Plan, which becomes more robust and more consistent with each revision.

It is critical to emphasize that the purpose of the ESD28 incorporates and expands the purposes of the Conecte SUS Program, as this is a government program and, therefore, is limited to four years, while the Digital Health Strategy is focused on actions and deliverables for 2028. Moreover, the ESD28 covers the vision of a RNDS that is a platform for innovation, information, and digital health services for all of Brazil. As described in the ESD28, this vision will be achieved through the creation of a collaborative space structured by adequate governance instruments, legislations, and financial, material, human and organizational resources. Among this set of resources, the collaborative space and the strategy should comprise innovative, holistic, best-practice monitoring and evaluation mechanisms.

The Monitoring and Evaluation Plan adopted thus far by the Conecte SUS Program offers a base which has been tested and validated in the real world, and which will be used to drive the necessary quality leap for a PM&A that is consistent with the needs of the ESD28.

The proposed approach for expansion of the PM&A for the ESD28 is the development of actions under two priorities, namely:

- to consolidate the Conecte SUS monitoring and evaluation model;
- to establish the monitoring and evaluation model for the collaboration, vital for the RNDS to achieve the proposed strategic vision.

These priorities and the ways to meet them are introduced in the section below.

“The Monitoring and Evaluation Plan adopted thus far by the Conecte SUS Program offers a base which has been tested and validated in the real world.”
5.2 To Consolidate the Conecte SUS Monitoring and Evaluation Model

This priority has as purpose to consolidate the governance and the monitoring and evaluation processes of Conecte SUS. As exposed in the previous sections, these processes are being practiced and need to be consolidated and continuously expanded in order to keep up with the evolution of Conecte SUS, as proposed in the Action Plan.

The consolidation of the Conecte SUS monitoring and evaluation model can be expressed by the following sub-priorities.

5.2.1 To formalize the Conecte SUS M&A governance model

This sub-priority is aimed at strengthening and expanding the Conecte SUS governance model through the strengthening and consolidation of the arenas already being used in the formulation of monitoring actions and submission of the periodic evaluation reports.

5.2.2 To formalize and consolidate the Conecte SUS M&A governance arenas

This action has as primary goal to formalize and consolidate the arenas used in the monitoring and evaluation processes of the Conecte SUS Program at the strategic, tactic, and operational levels, in accordance with the guidelines established in the 2019-2023 PAM&A and which have been practiced for the preparation of this report. For clarity, these arenas are referenced below:

- Sponsorship of the Conecte SUS Monitoring and Evaluation Plan – ensures that the M&A Plan is valued as a crucial tool to secure the program's success;

- Strategic Conecte SUS M&A Management and Oversight – provides guidance and input for the definition of indicators, targets, and monitoring processes. Reviews and approves corrective or improvement recommendations;

- Management of the Conecte SUS M&A process execution – ensures that the M&A Plan is executed to satisfaction, adequately guiding the execution of the Action Plan, and keeping it compliant with the ESD's objectives.

Among the activities to be developed are the following:

- identification of the actors in each arena;

- preparation of the attributions and responsibilities documents;

- publication of the associated ordinances.
5.2.3 To formalize the Conecte SUS M&A operation model

The purpose of the monitoring and evaluation role is to systematically follow and review the implementation of the Digital Strategy Action Plan in order to ensure that the analysis of results is efficacious and effective for the generation of insights, the recommendation of course corrections, as necessary, and the proposition of initiatives to better leverage new value capturing opportunities for the Digital Health Strategy to the benefit of all.

This section proposes the processes and responsibilities to be formalized so the Conecte SUS M&A activities are stable, robust, and able to lead to the consistent, systematic review of the actions developed within the program, as described below.

5.2.3.1 Selection and Maintenance of Indicators

The selection and maintenance of an adequate array of indicators is key for the monitoring and evaluation process. The choice of indicators follows predefined criteria. Ideally, the indicators must:

• result in relevant information that is correlated to the expected results;
• be objective and quantitative so its measurement is reproducible and observer-independent;
• be extracted from the operation routine;
• be easily obtainable, from accurate, verifiable, actionable quality data;
• unequivocally, clearly, and accurately define what is being measured;
• be timely, generated in time for the decision making;
• enable comparisons between services, regions, or countries at any moment and over time;
• contribute to the risk management, in a way as to control the potential impact of undesirable effects.

The indicator adoption process may be comprised by two sub-processes:

A) Conception of the Indicator

This step defines the conception and adoption of an indicator for a given purpose, with rationales, and all aspects of the indicator’s qualification. It also includes the systematic review of the set of indicators in use.

B) Definition of Baseline, Goals, Phases, and Timelines

In this step, the baseline, the goals, the phases, and the timelines associated with the indicator are defined.
5.2.3.2 Approval

The inclusion or modification of indicators must be approved by the relevant arena so it can be part of the monitoring and evaluation activity.

5.2.3.3 Data Extraction and Calculation of the Indicator

This activity consists of the extraction, analysis, and qualification of the necessary data for the calculation of the indicator, according to qualification. The data extracted must be analyzed for a quality check, in line with well-established criteria and processes for its use in the calculation of the indicator.

5.2.3.4 Interpretation of the indicator’s meaning

Once calculated, the indicator must be analyzed for consistency, unexpected results, impact from external phenomena, or any other factors which may change its meaning.

5.2.3.5 Compilation and Analysis

Once the indicators set for each period or phase has been calculated, the reporting team must analyze its quality and completeness and interpret the cross-correlation between indicators. The indicator set, as well as the information, knowledge, and insights derived from its analysis, are prepared and forwarded to DATASUS.

5.2.3.6 Reporting

The initial report prepared in the Compilation and Analysis phase is assessed, critiqued, and validated by DATASUS, which forwards it to the superior bodies, which are responsible for proposing tactical and strategic actions as a result of the monitoring and evaluation process.
5.3 To establish the M&A Model for the Collaboration

Axis 3 of the ESD28 aims at implementing the conceptual, normative, educational, and technological environment favoring effective collaboration. As leadership of the Action Plan, it is the responsibility of the Brazilian NHS' governance spaces, notably the Triparty Intergovernment Commission (CIT), to offer guidelines, attract partners, and promote the institutionalization of this collaborative space. It is the responsibility of the Ministry of Health to carry out the necessary actions for the implementation of this space, attracting participants which must be acknowledged as partners of the initiatives and have the freedom to create and act, as well as participation in the decision making, abiding by the rules and guidelines formulated on Axis 2.

The success of the ESD28 is deeply tied to the success of this Digital Health collaboration space. Thus, the ESD M&A process must be focused on the systematic understanding, monitoring, evaluation, and decision-making to ensure that the collaboration remains effective, efficient, and oriented towards the Digital Health vision.

This priority has the purpose of establishing the governance and the monitoring and evaluation processes of the ESD collaboration space. Defining the governance of these processes is an action to be led by DATASUS/MS, which must be inclusive in order to drive an effective, responsible, ethical, and legally safe cooperation.

The collaboration's M&A governance model is similar, but not identical to that of Conecte SUS, primarily due to the need for a balance between governmental authority and the need to build a consensus.

Considering that the establishment of the M&A model for the collaborative actions of the ESD28 is part of the establishment of the Governance and Leadership of the ESD, as defined on Priority 1 of the Action Plan, and that this activity requires the participation of a wide range of actors, it is proposed that the detailing of the activities covered in this section follows the steps defined in the ESD28. Still, it is worth proposing that the M&A model for the collaboration uses the knowledge and expertise obtained in the preparation of this Evaluation Report.
Conclusion
This section summarizes the first evaluation of the 2020-2028 Brazilian National Digital Health Strategy. It also aims at providing recommendations for the evolution of the ESD28, particularly the Digital Health Strategy monitoring and evaluation process.

6.1 Progress and Limitations

The ESD28 has a very recent history. Approved by CGESD on July 31, 2020 and by CIT in August, 2020, it was defined as a revision of the 2019-2023 PAM&A, resulting in the unification of the initiatives and the expansion and further development of the concepts, practices, and cultures allowing for the achievement of the strategic vision of the RNDS as a national platform for innovation, information and Digital Health services.

This report is the first evaluation of the strategy’s development, and is intended to become systematic and periodic, as to generate insights, perceptions, and knowledge which enable the continued improvement of all aspects of the ESD28, having as guidelines the strategy in itself, the governing principles of the Brazilian NHS (SUS), and the Health needs, the well-being, and the social development of the Brazilian population.

The period covered by this report, from October, 2019 to July, 2020, is short in view of an eight-year strategic focus. The current M&A processes were largely built and adopted over the course of this period. Nevertheless, there was the creation of a relevant seed of strategic culture and practices at all levels, particularly DATASUS, which must be acknowledged and valued. Over the course of these ten months, transforming achievements were obtained, which must be consolidated so they are incorporated to the practices of the Ministry of Health, above all at DATASUS, and, thus, become sustainable and resilient. Each of these relevant achievements referenced below has an inherent value, but the analysis of the set of achievements shows that the strategic, integrating, transformative actions had significant progress over the course of 2019 and 2020:

- **Development of the Risk Management Culture** – the risk management culture has gained momentum with the series of workshops conducted within the Conecte SUS Program, including those specific for the RNDS and Informatiza APS. The acquired knowledge and established processes are documented and published in the respective reports of the workshops, in the Electronic Information System of the Ministry of Health. More importantly still, risk management has entered the routine of the activities of DATASUS and other departments, particularly in actions related to the ESD.

- **LGPD appreciation culture** – the taskforce for investigation and adequacy of the DATASUS activities to the LGPD deserves special attention due to the internalization of the LGPD’s concepts by the DATASUS and the MS team, particularly the professionals involved in the implementation of the RNDS. Therefore, it is important to be alert regarding the need for privacy, secrecy, transparency, consent, and security associated with this initiative.

- **Institutionalization of the Digital Health Strategy Steering Committee (CGESD)** – the formalization of the Digital Health Strategy Steering Committee (CGESD) through a CIT resolution dated August 29, 2019 enabled the governance of the Digital Health Strategy in agreement with the guidelines, objectives, and goals defined in the PNS and the National Health Policies, such as the PNIIS.

- **Institutionalization of the Conecte SUS Program, including Informatiza APS and the RNDS** – the institutionalization of the National Health Data Network (RNDS) and several aspects related to the adoption of interoperability standards through an ordinance published on May 28, 2020 has given the RDNS the proper dimension and relevance to prompt it as a national Digital Health platform. It also resulted in the institutionalization of the primary care qualification and informatization project as a strategic project for Conecte SUS.
• **Publication of the 2019-2023 PAM&A** – once approved by the Digital Health Strategy Steering Committee and agreed ad referendum at the CIT, the Brazilian National Digital Health Action, Monitoring, and Evaluation Plan for the period of 2019-2023 was published. The 2019-2023 PAM&A has as primary goal to identify, prioritize, and integrate, in a coordinated fashion, healthcare programs, projects, and actions, information and communications systems and services, funding, infrastructure, and governance mechanisms, human resources, and technology in order to achieve the Digital Health Strategy vision, of which it is an integral part. The PAM&A is also aimed at establishing monitoring and evaluation processes to enable the follow-up of its execution, providing data, input, and insights allowing both the leveraging of quick growth opportunities that may arise and the proposition of course corrections, when necessary. The approval and publication of the 2019-2023 PAM&A drove the formulation of the ESD28.

• **Approval of the 2020-2028 Digital Health Strategy** – the approval of the ESD28 by CGESD on July 31, 2020 is an extremely relevant milestone for Digital Health in Brazil. It legitimizes the initiatives evaluated in this report and gives room for the institutionalization of the ESD28 at all levels, making it possible for the priorities identified in the ESD28 to be met in a systematic, integrated, and coordinated manner.

• **Revision of the National Health Information and Informatics Policy (PNIIS)** – the revision, update, validation, and publication of the PNIIS almost simultaneously to the ESD28 values the Brazilian Digital Health development process and contributes to its institutionalization, legitimacy, and sustainability.

Obviously, there were actions which did not achieve the expected and desired results. Part of the lessons learned was exposed and discussed in the previous sections of this report. Many of the difficulties and flaws are certainly explained by the focusing of the efforts of DATASUS to meet the demands arising from the coronavirus pandemic, as was extensively reported in this document. Nevertheless, and in order to strengthen the ESD, it is important to evaluate the aspects which could have been better addressed, regardless of the pandemic. Among these, the following should be mentioned:

• **Strengthening of the relationship with CONASS, CONASEMS, and triparty actors** – the participation of triparty actors in the formulation of the ESD28 document was one of the factors which made its approval possible. In the new cycle of the ESD28, now executing the Action Plan and starting with the publication of this report, the organized, systematic participation of the triparty actors becomes vital to extend the reach of the actions and contribute to the inclusion of other relevant actors of the public and private sectors.

• **Expansion of participative processes and decision bodies** – as emphasized in the previous section, there was enormous advancement in the institutionalization and formal decision processes regarding the Digital Health Strategy. We recommend that this concern is maintained and that formal, innovative methods, tools, and mechanisms are used to expand the participation of all relevant actors in the development and decision-making processes, as appropriate.

• **Establishment of new tools for communication with all actors** – in view of the imminent start of a new cycle of ESD28 actions, formal and informal processes must be established for communication with all actors, whether they are those directly involved in the activities of the ESD28, users, partners, or the general public. The ESD28 brings an expectation of participation of relevant actors by action, which must be used for the development of the ESD28 communication plan.

• **Broadening of intersectoral and social participation** – in order to execute the ESD28 Action Plan and the collaborative space to reach their goals, it is vital to include in the ESD28 actions the actors leading the collaboration and innovation that will support, until 2028, the materialization of the RNDS as a national platform for innovation, information, and Digital Health Services. The active, conscientious, responsible participation of the actors foreseen in the ESD28 is a critical factor for the success of the ESD28.
It is crucial that it be understood that this evaluation report marks the beginning of a new phase for the Digital Health Strategy. With the approval of the ESD28 by CGESD, there is now a commitment to formally delineate the activities of the Action, Monitoring, and Evaluation Plan, which include the continued monitoring and systematic and periodic evaluation of the ESD’s results. Therefore, the publication of this report marks the beginning of the new cycle of the ESD28, where the next ESD evaluation report must be submitted to the superior bodies of the Brazilian NHS (SUS), also being broadly disseminated among the intersectoral and civil society actors. This fact is very positive, as it creates the expectation of results and prompts DATASUS and the MS to advance the actions of the ESD28.

6.2 Recommendations for the execution of the Action Plan

The ESD28 Action Plan is based on the execution of activities associated with the priorities identified as relevant. The proposed activities materialize in projects of varying dimensions, funding needs, execution timelines, and complexities. Each activity requires its own management, but are subject to a governance mechanism that ensures the coordination and integration across actions, projects, and activities.

For the ESD28 cycle that starts with the end of an evaluation period and its approval by CGESD, it is recommended that DATASUS, in charge of coordinating the execution of the Action Plan, prioritizes activities that organize the ESD’s governance and expedite the execution of the Action Plan. Priority 1 actions – Governance and Leadership for the ESD – are vital to make all other actions possible and, because they are still scarcely developed, they require special attention in order to be developed and consolidated as the foundation for the ESD28.

6.3 Evolving implementation of the Conecte SUS Monitoring and Evaluation Plan

The ESD Monitoring and Evaluation Plan was extensively discussed in the previous sections. In summary, this plan was executed and formalized concurrently with the execution of the tactical and strategic actions which ensured the already identified achievements.

In order to make sure that the next ESD Monitoring and Evaluation cycle evolves to the expected systematization and robustness, it is essential that the actions mentioned on Part 4 of this document are executed. The leadership of these actions falls on DATASUS, and includes the expansion of intersectoral participation for a strategy intended to reach the entire country.

Thus, the actions to be prioritized for the evolution of the Monitoring and Evaluation Plan for the next ESD28 cycle can be summarized by the actions below, which are also described in the Monitoring and Evaluation Plan of the Brazilian National Digital Health Strategy document, 2020-2028 cycle:

- **Action 1.1.1** – To formalize and consolidate the Conecte SUS M&A governance bodies;
- **Action 1.2.1** – To formalize and consolidate the Conecte SUS M&A processes;
- **Action 2.1.1** – To establish the M&A Governance Bodies for the Collaboration.

Surely all actions presented in the ESD28 are there because they are priority. The proposition that the actions above be executed in the cycle initiating now is due to the fact that they are the foundation to make all other actions possible and are at a low maturity stage.
References


BRASIL. Departamento de Informática do SUS. Portal de Monitoramento e Avaliação da RNDS. Brasilia, DF: MS, 2020c. [Acesso restrito].


This section covers the detailing of the indicators introduced throughout the 1st 2020-2028 Brazilian Digital Health Strategy Monitoring and Evaluation Report.

**Appendix A — Informatiza APS Indicators**

<table>
<thead>
<tr>
<th>Indicator title</th>
<th>Number of Informatized Family Health teams (eSF)</th>
</tr>
</thead>
</table>
| **Definition**  | Informatized eSFs are those submitting information to the Ministry of Health from electronic health record systems in at least one of the three reference periods preceding the cutoff date for the generation of this report.  
In order for the eSF to be considered informatized, the submission of information through e-SUS APS must be made using the PEC module. Cities with their own health record system must use the Thrift technology to transmit registration and clinical data (CAD+RAS) from their system to a PEC installation or municipal centralizer, which will transmit the data to SISAB. |
| **What it measures** | The number of eSFs and eAPs that are informatized by the end of the analyzed period. |
| **Use** | Measurement of the number of eSFs and eAPs informatized during the execution of the Conecte SUS Program. This indicator allows for the monitoring of how many eSFs and eAPs have been informatized in each of the 27 Brazilian UFs during the analyzed period. |
| **Goal** | The DESF/SAPS established, in the 2020-2023 PPA, a national goal for the Informatiza APS Program of:  
• 75% of eSFs informatized by the end of 2020  
• 85% of eSFs informatized by the end of 2021  
• 90% of eSFs informatized by the end of 2022  
• 92% of Brazilian eSFs informatized by the end of 2023  
The DESF/SAPS also established state goals for Alagoas, the headquarters of the Conecte SUS Pilot Project:  
• 50% of eSFs informatized by the end of the Pilot Project, in June, 2020. |
| **Calculation method** | \( \frac{\text{total no. of Informatized eSFs and eAP}}{\text{total no. of eSFs and eAPs}} \times 100 \) |
| **Data source** | Indicator collected by the DESF/SAPS and extracted through SISAB, made available by closed reference period, in accordance with GM/MS Ordinance no. 135, dated January 21, 2020, published with the submission schedule for the production of the reference period. |
| **Definition** | Corresponds to the variation in the total number of eSFs seen, by UF, from the baseline (October, 2019) to the cutoff date (October, 2020).  
The term added teams refers to those which, over the course of the analyzed period, were activated in the CNES until the cutoff date. |
| **What it measures** | The growth in the number of eSFs in each state throughout the months analyzed in the 1st M&A Report. |
| **Use** | This indicator allows for the assessment of the amount of eSFs added in the period in each state and, consequently, the comparison of this number with the advancement of Informatized eSFs in the same period, allowing the observation of the average teams being added each month and the necessary informatization rate to achieve the goals established by the DESF/SAPS considering this rate. |
| **Goal** | No goals have been defined for this indicator. |
| **Calculation method** | \( \frac{\text{total no. of eSFs and eAPs on the cutoff date (October, 2020)}}{\text{total no. of eSFs and eAPs at the baseline (October, 2019)}} \) |
| **Data source** | Indicator collected by the DESF/SAPS and extracted through SISAB, made available by closed reference period, in accordance with GM/MS Ordinance no. 135, dated January 21, 2020, published with the submission schedule for the production of the reference period. |
Appendix B — Indicators for the Conecte SUS Gestor Portal

<table>
<thead>
<tr>
<th>Indicator title</th>
<th>Estimated bed occupancy rate by Surgical specialty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>To measure the utilization and management profile of Surgical beds as recorded in the Inpatient Admission Authorization (IAA).</td>
</tr>
<tr>
<td>Concept</td>
<td>Represents the estimated bed occupancy rate by Surgical specialty of a given hospital. Evaluates the degree of bed utilization in the hospital as a whole.</td>
</tr>
<tr>
<td>Interpretation / Use</td>
<td><strong>INTERPRETATION:</strong> The performance review of the indicator must take into account the historical series of the specific hospital. Comparisons between hospitals must consider hospital groups with the same profile and in similar locations. It is also influenced by factors related to the regulation of the services. A very high occupancy rate indicates an insufficient number of beds versus the demand, and is associated with an increased likelihood of occurrence of adverse events and decreased safety in the healthcare environment. A very low occupancy rate points to an inadequate number of beds for the region, a flaw in the hospital planning, or low integration of the hospital to the healthcare network, with difficulty of access. <strong>USE:</strong> Considering that efficient bed management increases the availability of beds for the health system, the indicator allows for the measurement of the bed utilization and management profile.</td>
</tr>
<tr>
<td>Limitations</td>
<td>The overall estimated bed occupancy rate takes the total beds registered in the hospital into account in its denominator and does not discriminate beds which have been blocked or deactivated (operational) and does not consider a few eventual extra beds. The CNES Registration records are declaratory. The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.</td>
</tr>
<tr>
<td>Data source/Method of determination</td>
<td><strong>Hospital Information System of the Brazilian NHS (HIS-SUS)</strong> Consider the total length of stay at each month/Year until the Month/Year exit date of each admission (IAA) for each facility. Consider only admissions (IAA) in the SURGICAL specialty. <strong>National Healthcare Facility Registry (CNES)</strong> Consider the total number of SUS beds at each facility in each reference period – Mont/Year. In order to reconcile the beds with the SURGICAL specialty, use: • Bed Type 001 and bed codes: 01-Oral-maxillofacial; 02-Cardiology; 03-General surgery; 04-Endocrinology; 05-Gastroenterology; 06-Gynecology; 08-Nephrology/urology; 09-Neurosurgery; 11-Ophthalmology; 12-Oncology; 13-Orthopedics/traumatology; 14-ENT; 15-Plastic; 16-Chest; 67-Transplant; 88- Adult Burn; 89-Pediatric Burn The length of stay in the ICU (when applicable) must not be considered in the calculation.</td>
</tr>
<tr>
<td>Calculation method: numerator</td>
<td>No. of patient-days in a given month by SURGICAL specialty. Sum of the total length of stay, in days (in the same period), where the patient remained hospitalized based on the discharge date recorded in the Inpatient Admission Authorization (IAA) minus the admission date.</td>
</tr>
<tr>
<td>75 – 85%</td>
<td><strong>Estimated bed occupancy rate by Surgical specialty</strong></td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td><strong>Calculation method:</strong> denominator</td>
<td>No. of bed-days recorded according to the SURGICAL bed type: Sum of the total hospital beds obtained from all SUS beds in the CNES, according to the specialty recorded in the IAA reconciled against the CNES bed type, multiplied by the number of days on the month in question.</td>
</tr>
<tr>
<td><strong>Formula</strong></td>
<td>(No. of patient-days in a given Monty, by SURGICAL specialty / No. of bed-days recorded according to the SURGICAL bed type, multiplied by the number of days in the same evaluation period) × 100.</td>
</tr>
<tr>
<td><strong>Measurement unit</strong></td>
<td>Percentage.</td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td>Each service must have its annual baseline defined by the verified Occupancy Rate of at least 7 months, and preferably the previous 12 months.</td>
</tr>
<tr>
<td><strong>Smallest unit of disaggregation/analysis</strong></td>
<td>( X ) Hospital ( ) City ( ) State ( ) Region</td>
</tr>
<tr>
<td><strong>Associated indicator</strong></td>
<td>Overall Occupancy Rate.</td>
</tr>
<tr>
<td></td>
<td>Average Overall Length of stay.</td>
</tr>
<tr>
<td><strong>Goal number (target)</strong></td>
<td>The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy.</td>
</tr>
<tr>
<td><strong>Goal start</strong></td>
<td>After 3 months as of the formalization of the agreement, in monthly goals.</td>
</tr>
<tr>
<td><strong>Reference index</strong></td>
<td>75 – 85%</td>
</tr>
<tr>
<td><strong>Measurement Periodicity (monitoring)</strong></td>
<td>Monthly</td>
</tr>
<tr>
<td><strong>Measurement Periodicity (determination)</strong></td>
<td>Monthly</td>
</tr>
<tr>
<td><strong>Nature</strong></td>
<td>Efficiency</td>
</tr>
<tr>
<td>Indicator title</td>
<td>Estimated bed occupancy rate by Clinical specialty</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>To measure the utilization and management profile of Clinical beds as recorded in the Inpatient Admission Authorization (IAA).</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Represents the estimated bed occupancy rate by Clinical specialty of a given hospital. Evaluates the degree of bed utilization in the hospital as a whole.</td>
</tr>
<tr>
<td><strong>Interpretation / Use</strong></td>
<td><strong>INTERPRETATION:</strong> The performance review of the indicator must take into account the historical series of the specific hospital. Comparisons between hospitals must consider hospital groups with the same profile and in similar locations. It is also influenced by factors related to the regulation of the services. A very high occupancy rate indicates an insufficient number of beds versus the demand, and is associated with an increased likelihood of occurrence of adverse events and decreased safety in the healthcare environment. A very low occupancy rate points to an inadequate number of beds for the region, a flaw in the hospital planning, or low integration of the hospital to the healthcare network, with difficulty of access. <strong>USE:</strong> Considering that efficient bed management increases the availability of beds for the health system, the indicator allows for the measurement of the bed utilization and management profile.</td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td>The overall estimated bed occupancy rate takes the total beds registered in the hospital into account in its denominator and does not discriminate beds which have been blocked or deactivated (operational) and does not consider a few eventual extra beds. The CNES Registration records are declaratory. The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.</td>
</tr>
<tr>
<td><strong>Data source/Method of determination</strong></td>
<td><strong>Hospital Information System of the Brazilian NHS (HIS-SUS)</strong> Consider the total length of stay at each month/Year until the Month/Year exit date of each admission (IAA) for each facility. Consider only admissions (IAA) in the CLINICAL specialty. <strong>National Healthcare Facility Registry (CNES)</strong> Consider the total number of SUS beds at each facility in each reference period – Mont/Year. In order to reconcile the beds against the CLINICAL specialty, use: • Bed Type 002 and bed codes: 31-AIDS; 32-Cardiology; 33-General practice; 35-Dermatology; 36-Geriatrics; 37-Leperlogy; 38-Hematology; 40-Nephro/urology; 41-Neonatology; 42-Neurology; 44-Oncology; 46-Pneumology; 90-Adult Burn; 91-Pediatric Burn; The length of stay in the ICU (when applicable) must not be considered in the calculation.</td>
</tr>
<tr>
<td><strong>Calculation method: numerator</strong></td>
<td>No. of patient-days in a given month by CLINICAL specialty: Sum of the total length of stay, in days (in the same period), where the patient remained hospitalized based on the discharge date recorded in the Inpatient Admission Authorization (IAA) minus the admission date.</td>
</tr>
<tr>
<td><strong>Calculation method: denominator</strong></td>
<td>No. of bed-days recorded according to the CLINICAL bed type: Sum of the total hospital beds obtained from all SUS beds in the CNES, according to the specialty recorded in the IAA reconciled against the CNES bed type, multiplied by the number of days on the month in question.</td>
</tr>
<tr>
<td><strong>Formula</strong></td>
<td>(No. of patient-days in a given Monty, by CLINICAL specialty / No. of bed-days recorded according to the SURGICAL bed type, multiplied by the number of days in the same evaluation period) × 100</td>
</tr>
<tr>
<td><strong>Measurement unit</strong></td>
<td>Percentage.</td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td>Each service must have its annual baseline defined by the verified Occupancy Rate of at least 7 months, and preferably the previous 12 months.</td>
</tr>
</tbody>
</table>
### Indicator title

**Estimated bed occupancy rate by Clinical specialty**

<table>
<thead>
<tr>
<th>Smallest unit of disaggregation/analysis</th>
<th>(X) Hospital ( ) City ( ) State ( ) Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated indicator</td>
<td>Overall Occupancy Rate.</td>
</tr>
<tr>
<td></td>
<td>Average Overall Length of stay.</td>
</tr>
<tr>
<td>Goal number (target)</td>
<td>The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy.</td>
</tr>
<tr>
<td>Goal start</td>
<td>After 3 months as of the formalization of the agreement, in monthly goals.</td>
</tr>
<tr>
<td>Reference index</td>
<td>75 – 85%</td>
</tr>
<tr>
<td>Measurement Periodicity (monitoring)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Measurement Periodicity (determination)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Nature</td>
<td>Efficiency</td>
</tr>
</tbody>
</table>

### Indicator title

**Estimated overall bed occupancy rate**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>To measure the bed utilization and management profile.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept</td>
<td>Represents the estimated bed occupancy rate of a given hospital. Evaluated the degree of bed utilization in the hospital as a whole.</td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The performance review of the indicator must take the historical series of the specific hospital into account. Comparisons between hospitals must consider hospital groups with the same profile and in similar locations.

A very high occupancy rate indicates an insufficient number of beds versus the demand, and is associated with an increased likelihood of occurrence of adverse events and decreased safety in the healthcare environment.

A very low occupancy rate points to an inadequate number of beds for the region, a flaw in the hospital planning, or low integration of the hospital to the healthcare network, with difficulty of access.

**USE:** Considering that efficient bed management increases the availability of beds for the health system, the indicator allows for the measurement of the bed utilization and management profile.

**Limitations**

The overall estimated bed occupancy rate takes the total beds registered in the hospital into account in its denominator and does not discriminate beds which have been blocked or deactivated (operational) and does not consider a few eventual extra beds. The CNES Registration records are declaratory.

The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.
<table>
<thead>
<tr>
<th><strong>Titulo do indicador</strong></th>
<th><strong>Taxa estimada de ocupação de leitos geral</strong></th>
</tr>
</thead>
</table>
| Data source/Method of determination | **Hospital Information System of the Brazilian NHS (HIS-SUS)**<br>Consider the total length of stay at each month/Year until the Month/Year exit date of each admission (IAA) for each facility.  
**National Healthcare Facility Registry (CNES)**<br>Consider the total number of SUS beds at each facility in each reference period – Mont/Year. |
<p>| Calculation method: numerator | No. of patient-days in a given month: Sum of the total length of stay, in days (in the same period), where the patient remained hospitalized based on the discharge date recorded in the Inpatient Admission Authorization (IAA) minus the admission date. |
| Calculation method: denominator | No. of bed-days recorded: Sum of the total hospital beds obtained from all SUS beds in the CNES multiplied by the number of days on the month in question. |
| Formula | (No. of patient-days in a given Monty / No. of bed-days recorded multiplied by the number of days in the same evaluation period) × 100. |
| Measurement unit | Percentage. |
| Baseline | Each service must have its annual baseline defined by the verified Occupancy Rate of at least 7 months, and preferably the previous 12 months. |
| Smallest unit of disaggregation/analysis | (X) Hospital ( ) City ( ) State ( ) Region |
| Associated indicator | Overall Length of stay. |
| Goal number (target) | The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy. |
| Goal start | After 3 months as of the formalization of the agreement, in monthly goals. |
| Reference index | 75 – 85% |
| Measurement Periodicity (monitoring) | Monthly |
| Measurement Periodicity (determination) | Monthly |
| Nature | Efficiency |</p>
<table>
<thead>
<tr>
<th>Indicator title</th>
<th>Estimated ICU bed occupancy rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td>To measure the ICU bed utilization and management profile.</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Represents the estimated ICU bed occupancy rate of a given hospital. Evaluates the degree of bed utilization in the hospital as a whole.</td>
</tr>
<tr>
<td><strong>INTERPRETATION</strong>:</td>
<td>The performance review of the indicator must be made according to ICU bed type profile and patient need. It is also influenced by factors related to the regulation of the services. A very high occupancy rate indicates an insufficient number of beds versus the demand, and is associated with an increased likelihood of occurrence of adverse events and decreased safety in the healthcare environment. A very low occupancy rate points to an inadequate number of beds for the region, a flaw in the hospital planning, or low integration of the hospital to the healthcare network, with difficulty of access. It also implies rejections in the admission of new critical and acute patients and/or delays in the operation room and the post-anesthetic recovery unit and/or difficulty to discharge. USE: Allows for the evaluation of the management efficiency of ICU beds. Good Clinical Practice and ICU Bed turnaround. May evidence bottlenecks in the internal regulation flow or the care service.</td>
</tr>
<tr>
<td><strong>Limitations</strong></td>
<td>The estimated ICU bed occupancy rate takes the total beds registered in the hospital into account in its denominator and does not discriminate beds which have been blocked or deactivated (operational) and does not consider a few eventual uninformed/activated beds. The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.</td>
</tr>
<tr>
<td><strong>Detailed Hospital Information System (SIH-SUS)</strong></td>
<td>ICU daily stays considered: 08.02.01.010-5 – ADULT INTENSIVE CARE UNIT DAILY STAY (ICU I);08.02.01.008-3 - ADULT INTENSIVE CARE UNIT DAILY STAY (ICU II);08.02.01.009-1 - ADULT INTENSIVE CARE UNIT DAILY STAY (ICU III) 08.02.01.016-4 - NEONATAL INTENSIVE CARE UNIT DAILY STAY (ICU I);08.02.01.012-1 - NEONATAL INTENSIVE CARE UNIT DAILY STAY – NICU (TYPE II);08.02.01.013-0 - NEONATAL INTENSIVE CARE UNIT DAILY STAY – NICU (TYPE III) 08.02.01.014-8 – PEDIATRIC INTENSIVE CARE UNIT DAILY STAY (ICU I);08.02.01.015-6 - PEDIATRIC INTENSIVE CARE UNIT DAILY STAY (ICU II);08.02.01.007-5 - PEDIATRIC INTENSIVE CARE UNIT DAILY STAY (ICU III) 08.02.01.021-0 – CORONARY INTENSIVE CARE UNIT DAILY STAY-CCU TYPE II;08.02.01.022-9 - CORONARY INTENSIVE CARE UNIT DAILY STAY-CCU TYPE III; 08.02.01.011-3 – BURNED INTENSIVE CARE UNIT DAILY STAY.</td>
</tr>
<tr>
<td><strong>Data source/Method of determination</strong></td>
<td>National Healthcare Facility Registry (CNES) Beds to be considered: Adult ICU (codes 74, 75, 76); Pediatric ICU (codes: 76, 77, 78); Neonatal ICU (codes 80, 81, 82), Coronary ICU (codes: 85, 86); and Burned ICU (code: 83), observing the number of SUS bed informed in the CNES for the period.</td>
</tr>
<tr>
<td>Calculation method: numerator</td>
<td>No. of patient-days in the ICU in the month: Total sum of days of admission in the ICU in a given month.</td>
</tr>
<tr>
<td>Calculation method: denominator</td>
<td>No. of patient-days in the ICU in the reference period: Total sum of ICU beds in the hospital obtained from all SUS beds in the CNES multiplied by the number of days in the same reference period.</td>
</tr>
<tr>
<td>Formula</td>
<td>(No. of patient-days in the ICU in the month / No. of bed-days in the ICU in the reference period) × 100.</td>
</tr>
</tbody>
</table>
### Estimated ICU bed occupancy rate

**Indicator title** Estimated ICU bed occupancy rate

<table>
<thead>
<tr>
<th>Measurement unit</th>
<th>Percentage.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
</tr>
<tr>
<td>Smallest unit of disaggregation/analysis</td>
<td>(X) Hospital ( ) City ( ) State ( ) Region</td>
</tr>
<tr>
<td>Associated indicator</td>
<td>Average ICU stay.</td>
</tr>
<tr>
<td>Goal number (target)</td>
<td>The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy.</td>
</tr>
<tr>
<td>Goal start</td>
<td>After 3 months as of the formalization of the agreement, in monthly goals.</td>
</tr>
<tr>
<td>Reference index</td>
<td>80-85%</td>
</tr>
<tr>
<td>Measurement Periodicity (monitoring)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Measurement Periodicity (determination)</td>
<td>Monthly</td>
</tr>
<tr>
<td>Nature</td>
<td>Efficiency</td>
</tr>
</tbody>
</table>

### Estimated institutional mortality rate

**Indicator title** Estimated institutional mortality rate

| Purpose | To measure the percent relationship between the number of deaths of patients admitted to the hospital after at least 24 hours as of the admission and the total number of exits from the hospital. |
| Concept | Percent relationship between the number of deaths occurred after at least 24 hours as of hospital admission, in one month, and the number of patients who left the hospital (due to discharge, evasion, treatment waiver, external transfer, or death) in the same period. |

**INTERPRETATION:** Low institutional mortality rates are expected.

The performance review of the indicator must take the historical series of the specific hospital into account.

However, the values determined must consider the hospital's profile regarding set of services offered, level of technological complexity and specialization, and size.

The results are also influenced by the clinical complexity of the patient admitted to the service and the quality of the pre-hospital care and the other units of hospital care.

**USE:** Comparison of hospital performance (endobenchmarking).

Outcome evaluation.

Monitoring of service quality aiming at planning actions to contribute to a higher effectiveness and efficiency of healthcare.
<table>
<thead>
<tr>
<th>Indicator title</th>
<th>Estimated institutional mortality rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limitations</strong></td>
<td>The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation. The overall result does not identify the causes. Case-by-case stratification is necessary for evaluation.</td>
</tr>
<tr>
<td><strong>Data source/Method of determination</strong></td>
<td>Detailed Hospital Information System (HIS-SUS) Considers approved IAAs. Does not include stillbirths and neonatal deaths in the numerator and the denominator when the patient is the mother. Does not include deaths occurred less than 24 hours after admission.</td>
</tr>
<tr>
<td><strong>Calculation method: numerator</strong></td>
<td>Total no. of admissions (IAA) with recorded DEATH in the month by facility: Sum of admissions with recorded PATIENT DEATH after at least 1 day of hospitalization by facility.</td>
</tr>
<tr>
<td><strong>Calculation method: denominator</strong></td>
<td>Total no. of admissions (IAA) by exit date in the same period.</td>
</tr>
<tr>
<td><strong>Formula</strong></td>
<td>( \left( \frac{\text{Total no. of admissions (IAA) with recorded DEATH in the month by facility}}{\text{Total no. of admissions (IAA) by exit date in the same period}} \right) \times 100 )</td>
</tr>
<tr>
<td><strong>Measurement unit</strong></td>
<td>Rate.</td>
</tr>
<tr>
<td><strong>Baseline</strong></td>
<td>Each service must have its annual baseline defined by the verified Occupancy Rate of at least 7 months, and preferably the previous 12 months.</td>
</tr>
<tr>
<td><strong>Smallest unit of disaggregation/analysis</strong></td>
<td>( X ) Hospital ( ) City ( ) State ( ) Region</td>
</tr>
<tr>
<td><strong>Associated indicator</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Goal number (target)</strong></td>
<td>The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy.</td>
</tr>
<tr>
<td><strong>Goal start</strong></td>
<td>After 3 months as of the formalization of the agreement, in monthly goals.</td>
</tr>
<tr>
<td><strong>Reference index</strong></td>
<td>Measurement Periodicity (monitoring) Monthly Periodicidade de Mensuração (apuración) Monthly Nature Efficiency</td>
</tr>
<tr>
<td><strong>Indicator title</strong></td>
<td><strong>Percentage of readmission within up to 7 after the last admission in the same hospital</strong></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>To measure the proportion of readmissions to the hospital occurred within up to 7 days after the last discharge occurred in the same hospital.</td>
</tr>
<tr>
<td><strong>Concept</strong></td>
<td>Proportion of readmissions occurred in the hospital within up to 7 days after the last hospital discharge occurred in the same hospital.</td>
</tr>
</tbody>
</table>
| **Interpretation / Use** | **INTERPRETATION:** The follow-up of this indicator facilitates the identification of potentially avoidable readmissions, as to contribute to the qualification and improvement of clinical setting management processes, discharge planning, provision of household resources to meet the patient’s needs, guidance for self-care and health behaviors.  
Hospital readmissions, when unplanned, may represent deficiencies in the care for the needs associated with a given disease. This, the evaluation must be conducted according to clinical profile.  
**USE:** The indicator measures the percentage of admissions of patients who returned to the same hospital within 7 days as of their discharge.  
Its use allows for the identification of premature discharges or untimely indications for patient discharge. |
| **Limitations**     | The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.  
Not all patient code identification fields are completed within the necessary deadline. |
| **Data source/Method of determination** | Detailed Hospital Information System (HIS-SUS) with VINCULASUS.  
Unique, numeric localization of the patient is necessary (so the patient remains unidentified) for readmission accountability purposes, as well as the registration that the IAA in question is within 7 days after the last admission.  
Delete ADMISSION TYPE LONG-TERM STAY.  
Consider the approved IAA.  
**Calculation method:** numerator  
No. of patients who, within up to 7 days after the last discharge, have been readmitted to the same hospital: Sum of the total number of patients readmitted within up to 7 days after the last discharge.  
**Calculation method:** denominator  
Total no. of patients: Sum of patients admitted in the same period.  
**Formula**  
(No. of patients who, within up to 7 days after the last discharge, have been readmitted to the same hospital / total no. of admitted patients) × 100.  
**Measurement unit** Percentage.  
**Baseline**  
Smallest unit of disaggregation/analysis (X) Hospital ( ) City ( ) State ( ) Region  
**Associated indicator**  
**Goal number (target)** The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy.  
**Goal start** After 3 months as of the formalization of the agreement, in monthly goals.  
**Reference index**  
Measurement Periodicity (monitoring) Monthly |
### Mean overall stay

<table>
<thead>
<tr>
<th>Purpose</th>
<th>To measure the average time, in days, during which patients remain hospitalized.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept</td>
<td>Represents the average time, in days, during which patients remain hospitalized.</td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The average length of stay of hospitalized patients must be assessed according to unit profile and patients’ needs.

- The indicator may vary according to surgical waiting time, therapeutic plan, transfer, or discharge.
- An average length of stay in acute hospitals above seven (07) days is associated with an increased risk of hospital infection.
- It is related to efficient hospital bed management and good clinical practice.
- The performance analysis of the indicator must take the historical series of the specific hospital into account. Comparisons between hospitals must consider hospital groups with the same profile and in similar locations.
- It is also influenced by factors related to the regulation of the services.

**USE:** Evaluates the average time a patient remains hospitalized. It is connected to good clinical practice.

- The indicator can be analyzed with cross information (outcomes/infections/waiting time)
- It is a classic hospital performance indicator connected to efficient bed management. The hospital bed must be managed as an expensive, complex resource, which must be used rationally and with the most appropriate indication, so it is available to individuals who need it to recover their health.

**Limitations**

- The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.
- The monthly period accumulates the days of stay of the months preceding the exit month.

**Data source/Method of determination**

- Hospital Information System of the Brazilian NHS (HIS-SUS)
- Considers the total length of stay at each month/Year until the Month/Year exit date of each admission (IAA) for each facility.
- Considers the month of exit as the month for determination.
- Encompasses all IAAs, including deaths, discharges, and transfers.
- The identification of IAAs represented in the database to be accessed is necessary.

**Calculation method:**

- **Numerator:** No. of patient-days in the Month: Sum of the days of stay of all exited patients, in the same period.
- **Denominator:** No. of patients exited in the same period: Sum of the IAAs by facility by discharge date.
### Mean overall stay

**Indicator title**: Mean overall stay

<table>
<thead>
<tr>
<th>Formula</th>
<th>No. of patients-day, month / No. of patients exited in the same period.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement unit</td>
<td>Days.</td>
</tr>
<tr>
<td>Baseline</td>
<td>Each service must have its annual baseline defined by the mean length of stay of at least 7 months, and preferably by the mean of the previous 12 months.</td>
</tr>
<tr>
<td>Smallest unit of disaggregation/analysis</td>
<td>(X) Hospital ( ), City ( ), State ( ), Region</td>
</tr>
</tbody>
</table>

### Mean overall ICU stay

**Indicator title**: Mean overall ICU stay

<table>
<thead>
<tr>
<th>Purpose</th>
<th>To measure the average time, in days, during which patients remain hospitalized in an ICU bed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept</td>
<td>Relationship between the total number of patient-days admitted in the ICU and the total number of patients who had Admissions with ICU use by hospital.</td>
</tr>
</tbody>
</table>

**INTERPRETATION**: The average length of stay of hospitalized patients must be assessed according to ICU bed type profile and patient need.

An average length of stay above expectations implies rejections in the admission of new critical and acute patients and/or delays in the operation room and the post-anesthetic recovery unit and/or difficulty to discharge.

The performance review of the indicator must take the historical series of the specific hospital into account. Comparisons between hospitals must consider hospital groups with the same profile and in similar locations.

It is also influenced by factors related to the regulation of the services and the availability of beds in the healthcare network.

It may also indicate unavailability of intermediate care beds and nursing wards.

**USE**: Allows for the evaluation of the efficiency of ICU bed management.

Evaluates the average length of stay of a patient in the ICU.

Good clinical practice and ICU Bed Turnaround.

May evidence bottlenecks in the internal regulation flow or the care service.
### Indicator title
**Mean overall ICU stay**

#### Limitations
The current bases are fed by the units and its administrators in an invoice-oriented fashion. These bases do not necessarily reflect the operational reality of each facility. They may be just an approximation.

The overall result does not identify the causes. Cross information is necessary to evaluate the need for admission for a prolonged period.

The monthly period accumulates the days of stay of the months preceding the exit month.

#### Data source/Method of determination
**Detailed Hospital Information System of the Brazilian NHS (HIS-SUS):**

Quantification of all secondary procedures of ICU stays of the IAAs. Currently, at SIGTAP, the procedures are the following:

- ICU daily stays considered: 08.02.01.010-5 – ADULT INTENSIVE CARE UNIT DAILY STAY (ICU I); 08.02.01.008-3 - ADULT INTENSIVE CARE UNIT DAILY STAY (ICU II); 08.02.01.009-1 - ADULT INTENSIVE CARE UNIT DAILY STAY (ICU III)
- 08.02.01.016-4 - NEONATAL INTENSIVE CARE UNIT DAILY STAY (ICU I); 08.02.01.012-1 - NEONATAL INTENSIVE CARE UNIT DAILY STAY – NICU (TYPE II); 08.02.01.013-0 - NEONATAL INTENSIVE CARE UNIT DAILY STAY – NICU (TYPE III)
- 08.02.01.014-8 – PEDIATRIC INTENSIVE CARE UNIT DAILY STAY (ICU I); 08.02.01.015-6 - PEDIATRIC INTENSIVE CARE UNIT DAILY STAY (ICU II); 08.02.01.007-5 - PEDIATRIC INTENSIVE CARE UNIT DAILY STAY (ICU III)
- 08.02.01.021-0 – CORONARY INTENSIVE CARE UNIT DAILY STAY-CCU TYPE II; 08.02.01.022-9 - CORONARY INTENSIVE CARE UNIT DAILY STAY-CCU TYPE III; 08.02.01.011-3 – BURNED INTENSIVE CARE UNIT DAILY STAY.

**Calculation method:**
- **numerator** No. of patients-day in the ICU, monthly: Sum of the days of stay in the ICU in the reference month.
- **denominator** No. of exited patients whose admission had an ICU stay in the same period: Sum of all IAAs with ICU stay, by facility, in the same reference month.

**Formula**

\[
\text{No. of patients-day in the ICU, monthly} / \text{No. of exited patients whose admission had an ICU stay in the same period}
\]

**Measurement unit**
Days

**Baseline**
Each service must have its annual baseline defined by the mean length of stay at least of 7 months, and preferably by the mean of the previous 12 months.

**Smallest unit of disaggregation/analysis**
(X) Hospital ( ) City ( ) State ( ) Region

**Associated indicator**

**Goal number (target)**
The target must be established for each hospital and formalized in the contract with the administrator, as provided for by the National Hospital Care Policy.

**Goal start**
After 3 months as of the formalization of the agreement, in monthly goals.

**Reference index**

- **Measurement Periodicity (monitoring)** Monthly
- **Measurement Periodicity (determination)** Monthly

**Nature**
Efficiency
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