INFORMATION PAPER
on
Main eHealth activities outside of the EU

Annex 3
Main Brazil eHealth policies and activities

LIST OF ABBREVIATIONS

ACRONYM	DEFINITION
ANVISA	Agência Nacional de Vigilância Sanitária - National Health Surveillance System
BIREME	Biblioteca Regional de Medicina - Regional Medicine Librayn
CETIC	Centro Regional para o Desenvolvimento da Sociedade da Informação - Studies Centre for ICT now for Information Society Development
CFM	Conselho Federal de Medicina - Federal Council of Medicine
CIA	Central Intelligence Agency
CIINFO	Comitê de Informação e Informática em Saúde - Committee for Information and Informatics in Health
CONASEMS	Conselho Nacional de SMS - National Council of SMS
CONASS	Conselho Nacional de SES - National Council of SES
CRM	Conselho Regional de Medicina - Regional Council of Medicine
CT	Computer Tomography
DATASUS	SUS Department of Informatics
EHR	Electronic Health Record
H2020	Horizon 2020
HcP	Healthcare Provider
HP	Health Professional
ICT	Information and communication technologies
IT	Information Technology/ies
MRI	Magnetic Resonance Imaging
MS	Ministério da Saude - Ministry of Health
NCF	New Cities Foundation (urban development and innovation)
NGO	Non Governmental Organization
PAHO	Pan American Health Organization
PHR	Personal Health Record
PNIIS	Política Nacional de Informação e Informática em Saúde - National Policy for Information and IT in Health
RS	Rio Grande do Sul
RUTE	Rede Universitária de Telemedicina - Telemedicine University Network
SES	Secretaria de Estado da Saúde - State health department
SMS	Secretaria Municipal de Saúde - Municipal health department
SNIS	National Health Information System

SUS	Sistema Unico de Saude - Unified Health System
UNA-SUS	Universidade Aberta do SOS - SUS Open-health University
VHL	Virtual Health Library
WHO	World Health Organization

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Preamble

Object

The present document is an Annex to Joint Action to support of the eHealth Network (JAseHN) Deliverable 8.1.4 in WP8 "Report on main eHealth activities outside of the EU". It has been prepared by Norbert Paquel (external, director of Canope cabinet – France) under the control of Michèle Thonnet (Work Package leader-FRNA), then corrected and approved by the sPSC.

The present document is an Annex to JAseHN D8.1.4 "Report on main eHealth activities outside of the EU". The objective of D8.1.4 is to observe the situation in various countries in order to better understand the development factors and main trends in the worldwide movement towards a tighter integration of ICT tools in healthcare but also to be able to initiate cooperation when advisable and possible. To that end, concrete projects have been identified as potentially interesting for eHN Member States (MS) exchanges or cooperation. These opportunities would need deeper analysis, through direct contact with experts, notably local representatives of the concerned MS or participants in EU projects.

Methodology

As explained in the main D8.1.4 document, the research was based on a desk study carried out between 2017/02 and 2017/08. It is important to note that time runs often very fast in the eHealth and mHealth domains. Accordingly, contrary to healthcare organizations and fundamental policies trends, concrete programmes and projects can change rapidly. However, if they correspond to clear needs and sustainable methods, they should not disappear. Moreover, when possible, some of the main important developments that have occurred since August 2018 have been taken into account.

Brazil: basic information on the country

Brazil is the 5th country in the UN population estimations for 2017, with 207,691,000 people. The country is 5th also in size.

Brazil is a federal republic with 26 States and one Federal District of the capital, Brasilia. There are more than five thousand cities and municipalities. Each state and city has political and administrative autonomy in the management of public policies.

States are very different, from São Paulo, with the greatest population (44,035,304), to Roraima with the smallest (496,936) (est. 2014). Differences in population density are huge: the highest are Rio de Janeiro (376 ha/km^2) and Sao Paulo (177,4), the lowest being Amazonas (2,5) and Roraima (2,2) – (the highest is in fact the Federal District of Brasilia, with 493,5 – a situation which had not be envisioned by the founders). There are clearly profound differences between the relatively small highly populated coastal states and the vast forest states.

Two characteristics of Brazil have to be reminded as they explain much of the Health System organization and Health information system development. The most important is the highly unequal distribution of wealth and income, one of the most extreme in the world. In 2014, there are still 4,87% of Brazilians (10,1 millions) who survive on less than 1,90$ a day (World Bank poverty level). The other characteristic is the return from military dictatorship (1964-1985) to democracy, albeit with harsh tensions and from a centralized country to a federal one – this will be visible in the successive reforms of the health system from 1988.

- I -
Health and Healthcare background

1. Elements on health situation

WHO Bulletin [3] 2008 article concludes: *"Despite its many problems, Brazil's revamped public health system has brought quality health care to millions of poorer inhabitants who were previously denied even basic care."*

However, after two decades in operation, the lack of political wills to help people in rural areas still hampers universal access objective. Brazil is also confronted to the general problem of ageing populations, with growth of infectious diseases and non-communicable chronic diseases. Moreover, ancient oppositions between hospital network and primary healthcare subsist, albeit the last is recognized as the most effective way to provide greater access to health services in the country.

Some health indicators *[CIA WorldFacts]* show that the SUS has allowed this very populated country to attain world's middle range:

- Life expectancy at birth m/f (years, 2015) 71/79

- Infant mortality rate: 18/1000 (EU: 4, non industrial countries many are around 90-100)

- Maternal mortality rate: 56 middle range between more than 1000 in not ind to one digit number in developed countries (CIA 2016 est.)

A new stage should be now to allow for equitable access to specialized health care and diagnostic tests, especially in remote municipalities, where health professionals often feel isolated and staff turnover is high. This is where telehealth has started to bring important progresses.

2. Healthcare system

The Healthcare system went through a radical change since the inscription of right to universal access in the 1988 constitution. Before existed only a private sector, comprising several prepayment mechanisms (e.g. health insurance) and out-of-pocket financing. It is now included in a national system, the Sistema Unico de Saude (SUS).

[Extracts from Brazil eHealth – Overview, Trends & Opportunities [1] and WHO Bulletin] *"The vision of a system providing "health for all" emerged towards the end of the military dictatorship that started in 1964 and during the years of political opposition that was to a large extent framed in terms of access to healthcare. This struggle culminated in the 1988 constitution, which enshrined health as a citizens' right and which requires the state to provide universal and equal access to health services.*

Under a subsequent health reform in 1996, Brazil established a health system based on decentralized universal access, with municipalities providing comprehensive and free health care to each individual in need financed by the states and federal government. Key to this strategy was primary health care. Today, primary health care remains one of the main pillars of the public health system.

About 75% of Brazil's population receives care from this system; the remainder, are enrolled in private health plans, being able to afford them (however they can access SUS services). All three levels of government – federal, state and municipal – have worked hard to encourage the poor to use and benefit from the health system through initiatives such as the Family Health Programme and through the deployment of auxiliary health agents (agentes de saúde) working with the poor.

Created in 1994, the Family Health Programme (or now Family Health Strategy) – Brazil's main primary health care strategy – seeks to provide a full range of quality health care to families in

their homes, at clinics and in hospitals. The pace of Family Health Strategy scale-up has been remarkable: from about 2000 teams including 60,000 community health agents providing services to 7 million people (4% of the Brazilian population) in 1998 to 39,000 teams incorporating more than 265,000 community health agents, plus 30,000 oral health teams, together serving 120 million people (62% of the population) in 2014 in nearly all Brazil's 5560 municipalities, each serving up to about 2000 families or 10 000 people. Family Health teams include doctors, nurses, dentists and other health workers. Health clinics were created. This was a decisive movement against public health critical problems. In particular, pregnant women can attend prenatal appointment in clinics, which has contributed to the fall in infant mortality rate. The SUS is also responsible for the provision of services such as health surveillance, disease control and health industry regulation. Community participation is crucial to the programme's success; meetings are organized with representatives of Church, NGOs, schools; input is passed to municipal health council.

There are about 2 200 000 healthcare workers, most of them employed by the public sector, with many at the municipal level. Annual resources for primary health care have increased in the past 13 years to about US$ 3.5 billion, with US$ 2 billion of that money devoted to the Family Health programme out of an overall government health budget of about US$ 23 billion. The Brazilian public health system faces serious financial and organizational challenges, due to economic slow-down in recent years.

Furthermore, it is important to note that, apart from the spectacular and really impressive move towards universal access through building of SUS, Brazil has also a very large private sector (health plans, supplementary insurance, private hospitals and doctors). In fact *[1]*, *"the current state of health care service in Brazil's public sector is driving the use of private care by wealthier citizens. In 2014, private health insurance programmes covered 50.8 million people — a quarter of the population — making Brazil the world's second-largest insurance market by population, after the U.S".* The differences are very important but synergies exist, depending on government and stakeholders policies.

Global figures in 2015: [2]

	Public	Private
Hospitals	4012	2138
Beds – Clinical / Surgical	152953	57651
Beds – Intensive care	28029	25525

Governance structure reflects Brazil' federal organization; main public actors are:

- Ministério da Saude (Ministry of Health)

- CONASS Conselho Nacional de Secretários de Saúde (National Council of SES - Secretaria de Estado da Saúde (State health department)

- CONASEMS - Conselho Nacional de Secretarias Municipais de Saúde (National Council of SMS - Secretaria Municipal de Saúde (Municipal health department)

3. Motivations for selecting Brazil for eHealth study

- 5th country and 5e in size on the planet

- Federal with wide States autonomy and great differences

- Strong partnership with the EU (Innovation, Education, Science and Technology, H2020)

- Strong population and cultural links with EU (notably Portugal, Netherlands) (id)

- Brazil develops south to south cooperation, with notably Latin America and Africa countries

- II -
Telemedicine and eHealth development

Telemedicine and eHealth are primarily viewed as tools to fulfill the strategic objectives of the Brazilian health system: universal access, priority to primary care to ensure it, always consider health needs, then information needs and then technical digital applications. In terms of organization, albeit with difficulties, efforts have been deployed to ensure decentralization and ensure social control, associating population representatives and stakeholders participation in decisions at every level.

4. From isolated information systems to National Policy: building the foundations

4.1 Principles
[4]

- **eHealth role**

Telemedicine and eHealth are primarily viewed as tools to fulfill the strategic objectives of the Brazilian health system: universal access, priority to primary care, always considering health needs first. Decentralization and social control must be developed, associating population representatives and stakeholders participation in decisions at every level. eHealth is not approached as a technical perspective but a strategic function of SUS and, in fact, a component of e-government.

- **Trust and security**

The regulation of telemedicine has to follow the general rules set up since 1999 and conform to requirements of the Brazilian Federal Board of Medicine (CFM), representing the doctors, and the National Health Surveillance System,. The CFM has to ensure that the storage, sharing, handling and transference of Electronic Health Records (EHR) are secure, and their authenticity, confidentiality and integrity assured. Systems must also conform to requirements set forth by ANVISA (National Health Surveillance System).

- **Coherent data sources.**

From 1991, reforms on collation and treatment of data have concurred to transfer data from diverse organizations (including Ministry of Social Security) to the SUS Department of Informatics (DATASUS). Content and production of data was reviewed towards more coherence and simultaneously more decentralized production.

- Information on citizens (identity, birth, death) has been reorganized. Giving municipalities control on most personal information greatly improved data quality.

- Programme started in 2005 to review and standardize the tables of hospital and outpatient procedures. Decentralization process implies that states and municipalities must have access.

- Collaboration with the private sector – project TISS (2005) created structures for the exchange of information between various health sectors in Brazil. [4]

- **Education, training, access to information and knowledge**

Fundamental resources: Telemedicine University Network RUTE (created 2006)
[1]The most important national project is Telemedicine University Network (Rute), coordinated by the National Education and Research Network (RNP), integrated into the Brazilian Telehealth Programme (Programa

Telessaúde Brasil Redes). With the results achieved, the initiative is considered one of the biggest in the world: currently, the network comprises 150 university and teaching hospitals and includes 88 telemedicine and TeleHealth centres, inaugurated and in operation, located in all the 27 Brazilian states.

Access to medical knowledge

This appears important for the Brazilian democratic development of the healthcare system and then eHealth. Great efforts have been made for the general public and healthcare professionals in order to give access to national and international electronic journals, and national open archive for scientific research:, with **Virtual Health Library** project, which promotes the inter-institutional partnerships, **Scielo**, an electronic journals portal, **Capes portal**, which makes international journals available free of charge to all teaching institutions and, being built in 2017, the **Health portal** of the Ministry.

Capacity – human resources knowledge and skills

[WHO observatory [4]]

- Open-health University (UNA-SUS) training on the job.

- An effective reform has included ICT for health components in curricula of HPs

- Experiments with distance learning in the health sphere have also led to the successful expansion of ICT.

4.2   A pillar: Telehealth Programme for Primary Health Care [5]

The Family Health Teams *(see 2)* are the point of action of the National Telehealth Programme (2009), which includes teleconsultation, tele-expertise, documents exchange as well as access to information, documentation and training courses and material.

- **Three main objectives**

1. Education, information, training through virtual library, videoconferencing, on-site and virtual skills, public television channels, video streaming and chats. A network of institutions develops materials for interactive tele-education.

2. Logistical strategy: Optimize public health system costs through greater resolution levels at basic care, decrease the number of patients transferred to the secondary and tertiary levels, and/ or emergency units, and organization of requests for complementary tests.

3. Integration of actors: between the professionals of the Family Health teams and health system managers at the municipal, state and federal levels; between the academic sector and the primary health care level: in a second phase, create new telehealth centres at institutions and university hospitals in every state participating in the project.

- **Coordination partners**

- The Brazilian Ministry of Health through the Secretariat for Management of Labor and Education in Health and the Health Care Secretariat

- Universities, responsible for the Telehealth Centres

- BIREME (PAHO Latin American and Caribbean Centre on Health Sciences Information)

- Ministries (Education, Science and Tech, Communication, Defense, Civil Affairs)

5. The National Policy: PNIIS

[8]

5.1 Principles

In 2011, the Ministry of Health's decided to build a National Policy.

In 2013, the Ministry, with the Brazilian Development Bank and the Financing Agency for Studies and Projects created the Health Innovation Programme, scheduled to end in 2017, including telemedicine R&D projects. In 2014, Ordinances encouraged the establishment of new state and intermunicipal Telehealth Core Centres, by compensating states and cities for their creation and effective use, measured by indicators that were created for this purpose.

PNISS needs to respect all levels of democracy, social control, equal access to information and to resources, supporting regionalization and conforming to hierarchic processes, while strengthening an horizontal network of health services.

Primary care teams and in particular the Family Health teams are at the center and improvement of their qualification is a key objective. User empowerment is favored, and development of a culture about patient control of his personal data and privacy. Users and HPs must have full access to information on public health situation. Financing and deployment depend on municipalities, states and stakeholders.

The challenge for PNIIS is information integration and knowledge of the effective services and their impact.

5.2 Key central programmes

One must know that, in Brazil, telemedicine covers exchanges of documents or videoconferencing between medical doctors (teleassistance or teleexpertise). No direct consultation between a patient and a doctor is allowed (but it is a growing demand in 2017).

Applications and services include:

- An electronic register of all health events, individual as collective, automatically fed, (all other method for collecting information should be eliminated). This leads notably to a Patient Health Record (PHR) describing all encounters with HPs and healthcare institutions. Anonymized data will be used for Public Health and Healthcare management.

- The three levels of government must install mechanisms to maintain a permanent system of IT professionals and to allow system integration.

- Identification system for users, professionals. The National Health Card (for users and HPs – *see 5.3*) and the National Cadastre of Health Establishments (since 2008, including all HPs and HcPs of different professions and activities) are basis of the paradigm.

- Adoption - through open and participative process, of standards for information representation – vocabulary, content and format of messages.

- Investment in telecommunication infrastructure.

- Legal, organizational, standardized rules, to ensure confidentiality, privacy, integrity, data availability, using digital certificate.

- Open access to anonymized health databases, under conditions for ethic use and no threat on privacy.

- Stimulation of local initiatives, considering their potential and taking into account regional characteristics.

- Strengthening State competence in software domain, through software production, local initiatives, open standards, a national open software repository, capabilities of software market and its financing, certification and quality, methodology

- Support of professional practice, information through different media and languages, access to virtual libraries, education and training (cooperation between Ministries of Health, Science and Technology and Education)

PNIIS defines mechanisms to guarantee users and professional participation in development of information system for SUS, together with a "National Plan for Development of Information Systems in Healthcare"; a network of collaborative centres in the area of Information and IT in Health is in charge of education and training of human resources, studies, R&D, information, evaluation and quality control. A general publishing encouragement policy is developed.

5.3   Difficulties, constraints and corresponding national projects

- **Difficulties**

Main obstacles have been identified:

- Lack of standards to obtain and process health data

- Heterogeneous periodicity

- Difficulties to connect health services to wide band Internet

- Insufficient financing strategy in IT and health information

- Insufficient professional qualification

As eHealth appeared important in interregional and states-municipalities relations, Health Ministry created in 2011 a Committee for Information and Informatics in Health (CIINFO) to review, promote and reinforce PNIIS.

aInformation systems interoperability has been at the center of efforts, notably through building Health Records Register, National Health Card, Health Portal.

The new PNIIS must concentrate on National Electronic Register and National Health Information System (SNIS), precursor for care continuity.

The Health Ministry announced in 2016 a huge investment in order to integrate all the current computer systems used by the government, sharing resources and unifying electronic medical records into a single system.

- **DATASUS**

A Department of Information and Information Technology for Health (DATASUS) was created in the Ministry. It became progressively a critical nexus for all data. Moreover, tools allow to link health characteristics of a given population to cartographic base and to create statistics. States and municipal Health Secretariats can implement them with support of DATASUS.

- **National projects**

SUS Card and central database: towards National Health Identification Card to be generalized 2018

From creation of SUS, an inscription card had been delivered to every citizen who needed to access SUS or requested it. It is now replaced with an electronic National Health identification card system, with a personal identification number. This number allows a patient's health record to be accessed via a central database from any public or private hospital within the Unified Health System network.

The aim of the card is to create a better system of coordination between public and private sector healthcare institutions regulated by the Health Agency (Agência de Saúde Suplementar). Despite the new name, the National Health Identification Card is still commonly referred to as an SUS card.

Health Portal: still in construction, to be opened 2018

Once issued a SUS card, citizens can access, with a password, their medical records via the Citizens Health Portal. The user can add personal health information as allergies. [9]

6. Provinces and municipalities own developments

States and Municipalities are the real implementers of eHealth national strategy. How and when depends from their characteristics and political will. *[Examples from eHealth Reporter – [6]]*

- **Example: Telehealth in Minas Gerais –**

In 2005, the state launched Telehealth network in order to improve patients' access to specialized health care in university hospitals from remote municipalities health departments. Objective was to support professionals in providing tele-assistance and perform tele-electrocardiography and teleconsultations, due to the significance of cardio-vascular diseases in the epidemiological profile of that state. The network uses low-cost equipment.

608 municipalities were connected, many of them in remote areas, which represent a population of around 9 265 820 inhabitants (47.2% of the population of the state).

From June 2006 to December 2011, 825 349 electrocardiograms and 33 042 teleconsultations were performed; 6000 HPs were trained in this use. Most of them (97%) were satisfied with the system, which was cost-effective, economically viable and averted 81% of potential case referrals to distant centres. Here "teleconsultations" include a majority of off line exchanges.

Lessons learnt: to succeed, a telehealth service must be part of a collaborative network, meet the real needs of local health professionals, use simple technology and have at least some face-to-face components. If applied to health problems for which care is in high demand, this type of service can be economically viable and can help to improve patient access to specialized health care.

- **Example: Telehealth in Rio Grande do Sul (RS)**

TelessaúdeRS was established in 2010 to develop a platform and a support system for primary care teams with a special focus on optimizing the flow between primary and specialized levels of care. To define priorities, TelessaúdeRS analyzes the health needs of the population and the most common inquiries it receives from primary care health professionals.

This led to the first telediagnostic service for chronic respiratory diseases, highly prevalent in that state, and obstetric sonography. In a mobile unit at the local primary care facility pregnant women undergo obstetric sonography remotely monitored in real time by specialist physicians.

From 2010 to 2015, over 50,000 clinical consultations have been provided. More than 15 ,000 healthcare professionals have benefited from teleconsultations, telediagnosis and tele-education activities. The Telessaúde team developed the system and mobile apps, using a Web-based National Telehealth Platform.

- **Example: Santa Catarina**

Since 2005, the state of Santa Catarina has developed a broad remote testing transmission network that includes, among others, ECG, CT-scan, ultrasound, and Magnetic Resonance Imaging. Tests performed in countryside hospitals have their reports made by medical experts of collaborating centres. A study was conducted to describe the form of systematic analysis and user profile.

- **Example: São Paulo tele-education**

The state has focused on tele-education, with initiatives such as the Virtual Man Project, the Young Doctor Project, the Cybertutor Project, the Interactive Classroom of the Future Project, among others.

- **Example: Municipality of Rio de Janeiro - Experiment with international partners**

The Swiss New Cities Foundation (NCF) works on urban development and innovation – with support of industries, associations, universities. In 2012, the NCF has set up a Task Force on eHealth, working in close collaboration with the Municipality of Rio de Janeiro, General Electric (GE) Healthcare and the State University[1]. The objective: to test a replicable, cost-effective healthcare model that leverages technology to provide improved access to primary healthcare in an underprivileged urban community.

The Task Force equipped a primary care health clinic in the community of Santa Marta favela with an eHealth kit consisting of a backpack containing tools to measure health indicators. During the pilot, the clinic staff made home visits to a sample of 100 elderly patients suffering from chronic diseases and mobility issues

Key Findings were on cost reduction, better monitoring and early diagnosis decreasing hospitalization, faster access to biological results. Above all: "An eHealth model of healthcare accelerates the public health system's ability to overcome barriers to healthcare access in underprivileged communities" and "the e-health pilot essentially leapfrogged the process of gradual, incremental improvements in Rio de Janeiro's healthcare services"

- **Example: private initiative with potential of extension to public system**

Telemedicine has also been tested with success outside traditional hospital environments. In a partnership between the highway administrator CCR Group and the hospital Israelita Albert Einstein, vital signs data are sent from an accident location until arrival at the hospital, allowing doctors to monitor and intervene. A pilot started in 2016, and the system is expected to be rolled out to public hospitals.

7. Success of e-health: a global view

7.1   Basis

The development of e-health in states and municipalities is certainly impressive – a great number of projects will have to be analyzed more closely for development and impact. The problem is that they are not interoperable, even if the march towards common definition of data has been engaged through national incentives.

At the national level, the SUS is being migrated from paper to electronic records, but even though the deadline for the migration to the new system was due early December 2016, only about 35% of the SUS units adhered to the electronic system by that time.

Telemedicine is considered one of the eHealth systems with the broadest adoption both in private and public sectors. The great majority of private hospitals have telemedicine facilities and they are also commonly found in university hospitals and some of SUS network of hospitals.

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[1] New Cities Foundation (2013), An Urban E-Health Project in Rio, http://www.newcitiesfoundation.org/wp-content/uploads/PDF/Research/New-Cities-Foundation-E-Health- Full-Report.pdf

However, there are still difficulties – notably legal ones and cultural ones, many professionals being still cautious about advantages of telemedicine.

The Family approach has proved very effective to help poor and isolated populations for a first level of public health most critical situations – from perinatology to oral health – but it encounters difficulties to exploit eHealth, the main one being insufficient level of capacities and training of the numerous "Family agents".

A strong information basis has been established to support eHealth and Telemedicine development, with two important networks for education, training and research:, the Telemedicine University network and the Open-health University.

7.2   ICT penetration approach

[Extracts from French National Agency of Digital Health (ASIP) – 2014 – esante.gouv.fr] The Brazilian Studies Centre for Information and Communication Technology (CETIC) was established in 2005. It publishes studies and reports on the use of ICT, all sectors combined. Health sector statistics and indicators were published for the first time in December 2013, built on interviews in public and private health institutions. It showed that available paperless data on patients was primarily collected for administrative purposes: identity, admission, transfer and release. As for actual care, data was still not paperless. Thus, 83% of establishments (having used the Internet in the last 12 months) reported having administrative data on their patients, while only 21% had digital information on vaccines administered to patients and 25% images of radiological examinations in their archives.

As far as telehealth is concerned, the results of the study highlight the role of governmental agencies in the development of health education and research activities. Thus, in settings where this technology is already available, education and training were the main uses of teleconference tools between health professionals. 30% of public institutions that had Internet offered distance-learning services in the health domain and 24% conducted research remotely in the same field. Finally, 24% of the public facilities with Internet participated in a telehealth network, while only 8% of the private ones were incorporated in such a network. Totally electronic records were present at 22% of the facilities, with a 33% proportion for private facilities. On the other hand, 30% of the facilities keep their records totally on paper and, in this case, the proportion of public facilities is 51%.

The main obstacles to a widespread use of ICT in health facilities were, according to the respondents, the lack of support from public policies (83% of doctors and 72% of nurses) and inadequate training (75% of doctors and 71% of nurses). The internal policy procedures of all establishments are also called into question by 70% of doctors and 66% of nurses.

The Innovation Centre Danmark – Sao Paulo, a partnership between the Ministry of Higher Education and Science of Brazil and the Ministry of foreign affairs of Denmark has conducted a survey showing which categories of applications are used:

Percentage of total number of establishments
that have used the Internet in 2014 for the different network services:

	Public	Private
Not real-time (e-mail)	72	69
Tele-education	30	17
RT - Teleconference	27	24
Telemonitoring	4	6

- III -
Main conclusions

8. Accepting wide contradictions to foster a coherent approach

- **A double-sided approach**

In all countries, many oppose top-down regulations and organizations to bottom up ones. Both tendencies exist in all complex systems. What is important is to attain a state of negotiation and compromise and even, yet better, co-construction. It seems that, albeit with difficulties, Brazil has reached an efficient organization when building a coherent and fundamentally decentralized public system: strong common principles and standards on one side, decisions at every level on the other, each level being able to take into account local and state specificities and to take initiatives. Also, it is very interesting to see how the country organizes coexistence and sometimes cooperation between public and private systems.

A very important characteristic of the public health system is the firm priority given to primary care in order to improve access of poor, of rural and isolated areas. Moreover, telehealth development is fostered by this approach, as the needs are here much more obvious for all participants.

- **A cross-road**

Attaining a new stage of development and simultaneously harsh political divergences, Brazil will have to find ways of pursuing diffusion of eHealth tools in the public sector in coordination with private one. The government will be under pressure to reduce or rationalize public budgets while a growing middle class and private insurance and establishments are creating one of the biggest health private market in the world.

However, and albeit conflicts, it appears that public and private systems are able to cooperate. Cross fertilization exists inside this complex system.

9. Good practices

They appear in the above analysis.

- Build the healthcare system and now eHealth from the Primary Healthcare level and local medical needs, as expressed by the public, local authorities, HPs.

- Approve and support applications and systems developed by states and municipalities.

- Prepare interoperability, convergence and integration in the whole system through coherent data sources, first outside of the Health domain *(see 4.1)*

- IV -
Potential for cooperation

10. Main domains and axes for exchanges and cooperation

A characteristic of most European countries is that they have organized coexistence and cooperation between public and private actors, albeit with different approaches and solutions according to their culture, traditions and national characteristics.

At the same time, EU member states are confronted as all countries to the new healthcare and wellness paradigm as well as to the growing disparity of the repartition and organization of healthcare professionals and establishments between territories.

Accordingly, it should be very interesting to consider the Brazilian approach combining community control, primary care and eHealth tools. Participation in programmes and experimentations – where EU companies may have been implied – is certainly a concrete way to learn. Brazil is an emerging country, one that will count in the century, and has proven to be innovative technically but also socially, with a specific approach to the new open globalized world.

As noted before, the EU and Brazil have ancient and strong relations. The EU Brazil stragegic partnership indicates domains where opportunities abound: Education, Research (Brazil is a H2020 partner), ICT [7]

11.   Programmes and projects

The following paragraphs use basic elements of the provisional grid described in the D8.1.4 main document (II – 12.3). There are four possible objectives for following a project:

- Learn: the project is a rich source of information for a country confronted to similar problems or working in a similar international action

- Mutual enrichment: development of exchanges between project actors and concerned parties among eHN MS, active in similar projects in their country or abroad.

- Help and support: which can be technical, promotion, financing.

- Participation: co-construction of the project and similar ones.

11.1   National programmes

Exchanges or cooperation on these programmes could be on two levels: general strategy but also common work focused on precise project applying the programme. For instance, in the Family Health Programme, there is a special part for Oral Health – this problem is general in all countries for people that do not follow a regular control process. Moreover, medical doctors and dentists most often do not cooperate. It would be interesting to organize common research with Brazil on the problem – and how and if cooperation has started, as well as education.

- **Primary care**

Telehealth Programme for Primary Health Care – 2009

Organize relations and integration between the he Family Health teams and health system managers at the municipal, state and federal levels (see 4.2).

<div style="text-align:center">Objective for following</div>

Learn: information on the way the programme is coordinated in the Ministry and applied in multiple local conditions
Learn: choose one or more areas and observe human relations with local observers
Mutual enrichment: concentrating on training tools
Mutual enrichment: Oral Health

- **Information systems**

National Plan for Development of Information Systems in Healthcare – 2011

Network of ccntres for ICT education and training of human resources, studies, R&D, information, evaluation and quality control *(5.2).*

<div style="text-align:center">Objective for following</div>

Learn: what activities, organization, roles of the participants
If possible mutual enrichment: on tools for courses, training, evaluation
Participation: co-construction of courses, content, tools

- **DATA**

DATASUS as a nexus for data harmonization

Progressive since 2005

<div style="text-align:center">Objective for following</div>

Mutual enrichment: especially for countries which have engaged in similar strategic programme
Mutual enrichment: on precise points, notably information of citizens – how is it managed with the municipalities

Standardization of the tables of hospital and outpatient procedures – 2005

Objective for following

Learn: how evolved the project, how is it integrated in the DATASUS system

TISS – 2005

Exchange of information between public and private sectors

Objective for following

Mutual enrichment: how TISS is integrated in the DATASUS strategy, how the diversity of situations is managed, what is the present state

Standards for information representation

Objective for following

Mutual enrichment: identification and information on Health establishments in a pillar for development of eHealth. The Brazil one includes every actor, which is a difficult challenge

DATASUS cartographic statistics

Objective for following

Mutual enrichment: Gather statisticians to organize exchanges and cooperation

- **Towards PHR, HER**

SUS Card and central database

New electronic ID card to be practically generalized 2018 – *(5.3)*

Objective for following

Mutual enrichment and possible Help and Support: The project encountered difficulties, as it is ambitious

Health Portal

Project being developed since 2016 - the citizen manages his records

Objective for following

Mutual enrichment and possible Participation: this is indeed and ambitious and notoriously complex challenge

Electronic register

Project conceived since 2008, evolved around 2012, records all health events, leading to PHR

Objective for following

Learn or Mutual enrichment: present state, exchanges depending on existence of similar projects in a country

- **Knowledge, education**

Access to information and knowledge

Virtual Health Library, electronic journals portal, international journals free of charge (all projects accelerated around 2000)

Objective for following

Mutual enrichment (probably already existing): Brazil is an important user and actor in this domain. so organize or reinforce cooperation with librarians and specialists is always important – in fact, librarians cooperate always inside specialized networks and fora, notably around Virtual Health Library, relations with scientific journals etc.

RUTE (Inter-Universities network) – 2006 – (7)

Objective for following

Learn and Mutual enrichment for those which manage such networks: this is one of the biggest in the world; what are the main usages, evolution, difficulties, governance…

Open-health University

UNA-SUS training on the job – *(7)*

Objective for following

Mutual enrichment and possible Participation: exchanges on type of courses and information, impact on different groups of personnel, contents (depending on language needs and capabilities…)

11.2   Provinces and municipalities own developments

States and Municipalities are the real implementers of eHealth national strategy. How and when depends from their characteristics and political will. [Examples from eHealth Reporter – [6]]

Due to the very structure of Brazilian governance and eHealth development strategy, a flurry of innovative projects and realizations exist in all States and municipalities, depending on their economic, demographic, geographic situations *(see all examples in 6).*

A specific analysis should determine which of these projects would allow for close observation and partnership. It will be important, in that case, to associate European actors that would be already implied.

Telehealth in Minas Gerais – 2005

Tele-assistance for cardiology

> Objective for following
>
> Learn: The project has a rich experience; it has been evaluated and has brought very interesting conclusions about tele-assistance with low cost equipment, necessity of collaborative network and integration with local professionals.

Telehealth in Rio Grande do Sul - 2010

Liaison with Primary care teams, especially for Chronic Obstructive Pulmonary Disease (COPD) and obstetric sonography

> Objective for following
>
> Learn and possible mutual enrichment: The project has a rich experience; it has been evaluated. Important to learn impact of workforce in the first level of care, methods for training etc. Mutual enrichment for those which participate in programmes in non-industrialized countries.

Santa Catarina – 2005

Remote testing transmission network

> Objective for following
>
> Learn and possible mutual enrichment: The project has a rich experience; it has been studied to precise the form of the analysis and users profile.

São Paulo tele-education

Objective for following

Learn and if possible Mutual enrichment: the most industrialized and powerful state has concentrated efforts on all forms of tele-education. Exchange should be organized with the state government, to understand the global strategy and the different programmes, and perhaps then opening cooperation possibilities.

Municipality of Rio de Janeiro – 2012

Experiment with international partners - improved access to primary healthcare in an underprivileged urban community.

Objective for researching information

Learn: Had this experiment led to novel types of actions in favelas – probably among the biggest underprivileged suburbs in the world

Morumbi District São Paulo – 2016

Sending vital signs from accident in ambulance (an example)

Objective for following such developments

Learn: a typical example of local projects of the private sector, freely developed. A scanning of such projects by correspondents could interest different types of HcPs, eHealth development companies… (not in a general base but on internal news letter)

- V -
Main sources

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