Review Article
Volume 11:3, 2021

Journal of Health & Medical Informatics

ISSN: 2157-7420 Open Access

Brazilian Patient Summary Exchange Health Data Using IPS and FHIR

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Abstract

This paper summarizes a successful experience in a Brazilian small city that improve its health infrastructure that became to exchange information reducing many duplicate records and unnecessary costs and also build engagement of health agents and citizens using a set of free tools provided by the Brazilian Unified Health System (BUHS) and health data acquisition through Quality Tools as PDCA and DMAIC and Communities of Practice (CoP) to engage stakeholders, without extra costs for the municipality. The experience inspired in best practices of International Patient Summary (IPS) by exchanging messages that use Fast Healthcare Interoperability Resource (FHIR). The main contribution of this paper is to present general lines of steps to collect data aiming to fulfill a task of HL7 Workgroup that systematized IPS parameters with National Network Health Data (NNHD) using FHIR generating an Implementation Guide.

Keywords: International patient summary • Fast healthcare interoperability • National network health data • Exchange health data • Interoperability • Quality tools

Introduction

Interoperability is non-negotiable requirement since the world of healthcare operates around exchanging clinical data and the healthcare industry evolves reaching new levels of complexity (HL7, 2020; ROBKIN et al, 2015).

Health Information Systems (HIS) are a set of technology-based instruments designed for prevention, diagnosis, treatment, monitoring, and management often fragmented that do not communicate and depend on Interoperability that can be seen as a series of protocols and standards to establish communication processes for data exchange more than formal and technological systems providing healthcare or administrative and management [1].

The National Health Data Network (NHDN) is being gradually implemented in Brazil through the provision of virtual "containers". The medical history will be registered at the National Health Network (NHN) linked in a unique registration identification key (CPF).

Fast Healthcare Interoperability Resource (FHIR) is used as a messager to integrate and also exchange data. It is important to work in actions that will populate data in the National Health Data Network (NHDN) to control transactions that generate patient information that will be available to health's professional access with the consent of them [2].

This paper summarizes a result of an action research that generated a pilot aiming to exchange health data covering aspects as 1) Efficiency of collect data-plan and tools used to implement a solution engaging health agents, workforce team and citizens; 2) Interoperability-using a model of international patient summary, all citizens in city and health workforce could access their clinical history through a single ID in a National Health Bus Interoperability (NHBI)[3].

Material and Methods

The city of Bananal is a little town with almost 11, 000 inhabitants that offer to its citizens a health infrastructure with one Health Unit and four offices to attend the family health strategy, and one basic care unit, totalizing 6 facilities that never exchanged health data causing many duplicates records, and unnecessary costs. An Action Research allowed evaluating the city´s resources and building a logistic to transform into a digital town able to exchange and interoperable health data, engaging citizens and the health workforce in the process. Before initiating the capture of health data were evaluated available resources, best practices, and scenarios to capture and manipulate citizens health data since the numbers of citizens until the quality of registration that is data sensitive and managed by public health agents, physicians, nurses, and will be

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Received: 02 August, 2021; **Accepted:** 16 August, 2021; **Published:** 23 August, 2021

necessary to establish an instrument of simple steps for helping governance structure been built [4].

According to the best practices, the chosen model was International Patient Summary (IPS) as a document that is resulted from clinical encounters oriented by a common data set library as shown in Figure 1. The elements as 1) Patient administrative, 2) Clinical data, 3) and Medical problems constitute the "implementable" principle attempting to be sufficiently generic in the design of the templates providing generic solutions for global application aiming to facilitate the re- use of data [5].

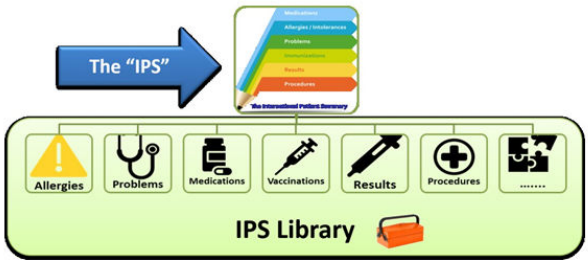

Figure 1. IPS library.

This General Principles and Specifications, as a holistic conception, guidance and considerations, aiming to help implement a deployment model, roles, process, information, technology, resources, and capabilities to operate the solution suggesting that the success of the deployment requires a combination of institutional factors, technologies, human capital, that meets the needs of citizens and government applied to the experience in Bananal.

Results

Quality tools as PDCA and DMAIC were used in project to identify, measure, analyze, improve, and control the processes of collect and register data in System. This ensured a reduction of duplicates databases and exchange information aiming to deal with legacies of data.

This also contributed to the work of system administrators allowing health workforce to track and exchange health data through health units and establish a channel between the government and the population reaching interoperability.

To acquire, collect, and register data of Bananal citizens was necessary to apply tools of Quality and Management as PDCA and DMAIC for helping build a plan. The objective was to transform paper storage into digital.

Table 01 presents a summary of the goals of the pilot project that brought results that are transforming collecting health data citizens into a digital way using only systems and apps provided by Unified Health System (UHS) without extra costs (Table 1).

Muncipality main goal	Problem	Solution	Used tool	% of status reached
Informatization of units and connect health network	Diagnoses evaluate scenarios and resources establishing a plan	Evaluate the necessity of investments and available resources and specification of hardware and software	PDCA/ 5W2H	85%
Collect, correct and provide population health data	Articulates available resources and teams to collected and correct data into systems.	Use tools already offered by SUS aiming to minimize costs. Implement Logistics. Implementation Guide	PDCA DMAIC	83%
Interoperability for citizen patients data	Actions to minimize or eliminate and duplicate of records	National Health Data Network (RNDS) . Implementation Guide	IPS/FHIR MODEL/ RNDS	94%

Table 1. Chart of results achieved in pilot.

Following IPS instructions, an implementation guide is a document that undergoes constant changes through community collaborations used in this work, available in a public repository for access, comments, and collaboration. The multidisciplinary team worked in the pilot project using combined tools in a methodology of Knowledge-Based Engineering (KBE) as a model to produce a knowledge-intensive activity aiming to develop an FHIR artifact and normalize IPS data with RNDS to exchange data. The Workgroup team was split into (a) Specification, (b) Conceptualization, (c) Formalization, (d) Implementation and its objective was to produce the best results. The model implemented in the city of Bananal can be applied to other neighboring municipalities. This research provided network integration between health professionals and users of the Unified Health System (UHS), allowing accurate data collection, creating a deeper understanding of how networks support the efforts, and this can benefit all society and healthcare ecosystem through citizens, patients, and their families to achieve better health results, including the health workforce.

Conclusion

The paper describes the process used to collect and insert health data in the available platform provided by the Unified Health System (UHS), using a unique patient data key aiming to popularize the use of the National Health Data Network (NHDN). This allowed us to track and exchange health data through health units and also establish a channel between the government and the population. A summary of the Implementation Guide using FHIR from the IPS as a pilot developed from the municipality of Bananal that can be scaled to other cities in the country contextualize how RNDS in the Unified Health System (UHS) is capable of integrating health professionals and users of the system. The pilot project developed in the city of Bananal used integrated methods and tools allowing greater precision in data collection, creating understanding and impact of collaborative networks to achieve better health results and popular health data at the National Health Data Network (NHDN). He model implemented in Bananal City can be scaled for other municipalities in Brazil. The combined use of instruments like Knowledge-Based Engineering (KBE) as a model to produce a knowledge-intensive activity. PDCA to plan and collect health data and Communities of Practice to engage stakeholders. This research provided a network

integration among health professionals and users Unified Health System (UHS) allowing accuracy in collecting data, creating a deeper understanding of collaboration networks that supporting the efforts to reach better health outcomes.

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How to cite this article: Andrade, Neusa, and Torres Jair G M. "Brazilian Patient Summary Exchange Health Data Using IPS and FHIR." *J Health Med Informat* 11 (2021) : 344.