Health Information Systems : not a foundation

Grégoire Lurton[1]

Abstract

Abstract here

1. Introduction

The need for to produce and publish high quality information is now recognized as inevitable for most modern organizations. Authors have recognized the early role of statistics in the invention and installation of democratic governance [12], and their importance for the management and strategic governance of most organizations. The faith in the capacity of the use of numerical data to empower individuals and organization to reach their full potential in the developing work has even led some to declare the advent of a *Data Revolution*[8] [5].

In the Global Health field, the importance of Health Information Systems (HIS) has been claimed, and these systems have been deemed essential to proper decision making and administration of health programs [1]. Meanwhile, the weakness of health information systems, and the inadequacy of current systems in a lot of developing countries is widely recognized, and has fueled the development of a dedicated academic literature genre [2] [10]. Meanwhile, the health sector shouldn't be too embarrassed on the state of its information generation capabilities, as other fascinating bodies of works describe the weakness of information provided in other sectors of public life as well [9].

Meanwhile, this literature, if it questions the performance of HIS, does not question the notion of their possibility. The existence anywhere in a the world of a coherent, purposive and purposively designed systems producing all information relevant for the strategic planning and daily management of health systems is nonetheless far from evident. It is often unclear even for practitioners, what HIS are or are not. As systems, health information systems are indeed recognized as a complex ensemble of tools, methods and processes aimed at answering a diversity of information needs for actors in charge of a multitude of decisions in health systems. Meanwhile, defining what should be happening in HIS and how it should happen is not as straightforward as it may appear.

In the effort to provide guidance and advice on how to produce much needed information for health systems, Health Information Systems are presented as unified systems, with inner logics and methods. Frameworks are provided, that present guidance and advice on how to design and administer HIS [7]. These documents are very helpful for practitioners and field workers, but there is an inherent risk in these normative approaches, which is to provide an illusion of unity, coherence and inevitability in some systems. The definition of requirements both in terms of purposes and tools of HIS results lowers the incentives to problematise this information and to limit the role of HIS strengthening to answering these requirement more than using local and specific assets and problems to find local solutions. In other words, once a standard is defined, all questions asked only appear to be technical questions on how to achieve and enforce this standard, to the detriment of problematization and customization of these standards.

knowledge and expertise are "a network that connect all sorts of actors, systems, tools, concepts and institutionnal and spatial arrangements." [4]

There is a false unity in the description of Health Information Systems [HMN , Vital Wave , AEDES]. The production and use of information a population, its health and the health systems it has access to indeed has a long and varied history, with different traditions and intellectual origins. The concentration on short term interventions or projects, aimed at strengthening specific aspects of these systems fosters a loss of perspective when it comes to understanding the globality of a system. This is especially true in countries with limited national governemental resource and capabilities, where it is even harder to enforce a unified approach to producing this information. In many settings, the repeated design of strategic information plans and other M&E plans is happens in the meantime as the implementation of atomised and unstructured subsystems, and the piecemeal collection of evidence and data by a multitude of actors.

Understanding the differences in premices and historical precedence of different approaches appears es-

sential in empowering actors to understand and objectify choices, shortcuts and traditions, and to imagine innovative approach.

There are indeed multiple mindsets and traditions when it comes to the quantification and quantification of public health. These are generated from the history and traditions of statistics both as a scientific and an administrative field. The field of public health has also generated different traditions and approach. In former colonies, these traditions and mindsets have been compounded by the colonial experience, which created its own set of values and practices when it came to population statistics and the use of evidence for administration. Finally, the emergence of new technologies and the generalisation of powerful computing methods have deeply modified the way statistics are thought and made, and this in turn put a final layer of complication in the way health information is considered in the developing world.

This paper will offer a quick perspective into long term trends that ended up producing contemporaneous HIS questions. We will do so building on a litterature close to the Science Studies movement and Colonial Studies. We feel this body of research is especially important in the field of Global Health, in which the time frame is often the time frame of the project or the planification round, and where questions are rediscovered and solutions reinvented with often an historic shortsightedness, with little perspective or critical insigth in previous practices.

From this review, we will offer an approach to questioning HIS related intervention, and to understand how they can contribute to fostering evidence generation and use in developing countries.

[14]. Collection of methods and traditions from different fields to create multi-morphous knowledge.

2. Trends in information systems

We will quickly discuss three main dimensions of the evolution of health information systems in developing countries. The first dimension is the mechanisms that lead to the development of a public statistics as a field, and more specifically how has the field of health information emerged. The second dimension is an approach to how public statistics were understood and produced in the colonial world. Finally, the question of how technics and methods innovation affect HIS will be approached.

2.1. Health Information Systems as public statistic systems

Ian Hacking pointed that statistics, not like other forms of knowledge, have been developed to specifically serve political actors [HACKING]. Authors usually point that the term statistics is, etymologically, linked to the state. The use of information for public decision and policy making emerged developed concurrently in the health sector and to inform decisions in the economic, education and justice domains [Histoire de la statistique , Desrosi7res, [12]].

In the health sector, the claim is that "reliable and timely health information is the foundation of public health action" [7][1]. The mobilisation and usage of information is indeed part of the genesis of public health, with tutelary figures like John Snow, Florence Nightingale and William Carr in the English world, and the development of population level studies the French hygienists movement [12], and more specifically the figure of Villermé who 'creates the fusion between hygiene, statistics and the study of social world and its evolutions'.

It is nonetheless important to note that, even in countries where public health and statistics emerged in and were developed, no centralized Health Information System to inform all health related decision was in place. In France, From its initial development, the *Annales d'hygiène* contains articles that touch to the diversity of interests of public health : general demography, epidemiological statistics, study of healthcare institutions, and study of different social and environmental problematics [11]. Meanwhile, most of these studies came from studies led by individuals, or from the secondary usage of administrative or other data.

Another important element of the development of national information systems is the development of different national appraoches to public statistics. Alain Desrosières show how a German tradition of complete analytical and comparative

The structuration of statistics as a profession, and how different national statistics cultures were developed according to Different traditions.

Foucaldian perspective

2.2. The heritage of colonial statistics

"In itself, the directive amounted to a document of many hundreds of pages, mandating sixty-five different kinds of tables. The model and framework for the tables were accompanied by demands for very detailed data, along with dates for completing their collection. In addition, the tables had to correspond to numbered

sections of the annual reports describing the activities of individual administrative units. The only think not prescribed in this demented document was how these tables, formulated in Paris, would be completed and by whom" this description of the 1909 directives for the collection of statistics in French colonies is made by Albert Ficatier, who was later involved in the reform of this system and in the development of new statistical systems in the newly independent countries.

Statistics in the colonies was indeed

In sub-Saharan Africa, the way health information systems have evolved is heavily influenced by both medical traditions of colonizing powers, and their statistical traditions. Meanwhile, the development of statistics in these countries was also contrived by the colonial phenomenon as a whole. Comparing the evolution of cartographic knowledge in the French colonies, we can see how the logics that defined mapping [3].

In Europe, influence of social statistics for welfare design. Minor role in colonial states [6]

Colonial statistics was using rudimentary estimates, compiled by less trained administrators and outside observers (Cite Cordell Ittmann Maddox) with unclear incentives (Gervais and Mandé). Only in the 30's are methods converging with the ones used in the metropole.

Space defintiion and toponimy influenced by colonial classification and choices (Gervais & Mande + article histo carto). This set the framework for later denumeration by setting cuonting units. Lasting impact.

And then Global Health. African populations as object of external description, Cite Bonneuil

2.3. Health Information Systems in the age of computerized data collection

Development of EMR

ABSENT = outillage Statistique. = > Le tournant de Global Health Metrics ? [7] promotes global frameworks and norms. Paper vs computer debate

Sampling and then big data. New methods.

3. A typology of HIS interventions

Understanding the long term trends in thinking and producing information on the health of population and health systems is important for organisations and people currently working health information systems strengthening projects, in order for them to understand their positioning and implications. Long term phenomenons are indeed still present in the way we think about how to improve evidence generation in health systems. There are multiple ways in which health infroamtion systems intervnetions in developing countries are being made. We hereby offer a simple typology of these interventions, and trace each intervention type to corresponding frameworks.

Taking in consideration a variety of Health Information Systems intervention in developing countries, we differentiate three main approaches in these programs. In this exercise as in a lot of situation, there is of course no intervention that can be considered pure type, and any project will be using forms and practices from different approaches. Meanwhile, understanding when and why different solutions are geared from different mindset appears essential for understanding the promises and shortcomings of different approaches.

3.1. Process oriented Approach : the puzzle approach

A first type of interventions is putting emphasis on the systemic dimension of HIS, and focuses on strengthening processes and organisation of HIS. This is a mainly goals oriented approach, in the sense that the starting point of these interventions is usually the defeinition of information needs for administrators or end users of this information.

We call this appraoch the jigsaw-puzzle approach, because of the way it provides information. From an overarching image that one wants to reconcile, pieces have been cut and have on and only way to be assembled to provide the picture we want to see. In this sense, the jigsaw puzzle is very much a social and organized experience (in the words of Georges Perec : "puzzling is not a solitary game: every move the puzzler makes, the puzzle-maker has made before")

This approach will put an emphasis on the use and institutionnal usage of information. A weakness of such interventions is their rigidity, and their heavy determinism. Producing normative docuemtns, frameworkds and guidelines and gearing for standardization.

Multiple projects can use this approach. RHINO, HMN, M&E. Some patients files design.

Does not make

[13]

3.2. Data Collection Approach : the pixel approach

A second type of projects and interventions is putting great emphasis on the collection of data. These approaches are usually relying on more technical perspectives. ODK , OpenMRS,

This approach is built on the belief there is a fundamental value of data collection, and more data is better,

and information systems are first and foremost data collection tools that have to be optimized and should perform. These approach can be fostered by programs that value first and foremost individual patient care,

Usually computer based, but not always. Risk is the undervaluation of politidal determinants.

3.3. Computing Approach : the tangram approach

[15] CITE Higgs (matter questions leading to methods improvement)

Using this framework appears interesting to understand interventions for public health. Expliquer Solthis.

a. How does it contribute to evidence generation b. How does it contribute to the development and emergence of statisticians as a profession c. How does it contribute to the scientific and administrative independence of the country d. How does it contribute to new methods development

1. Entry through EMR. Not sufficient. 2. M&E approach 3. let's do Tangram

HIS are complex political and technical objects. We contend that the creation and implementation of functionning systems should be through combination of these different mindsets. Most importantly, we argue that building health information systems should be the result of complex national evolutions. As much as African philosophy is claiming a space in occidental accademia and curricula, there should not be a tendency to apply one size fits all solutions to complex and varied situations, and there is a space for local innovation, invention. We offer this reflexion as a guide for project manager and field workers to guide their reflections and work in the long term of building healht information systems and not only applying standardized methods.

ACKNOWLEDGMENT

References

[1] Abou-Zahr, C., & Boerma, T. (2005). Health information systems: the foundations of public health. *Bulletin of the World Health Organization*, *83*, 578–583.

[2] Abou-Zahr, C., Gollogly, L., & Stevens, G. (2010). Better data needed: everyone agrees, but no one wants to pay. *The Lancet*, *375*(9715), 619–621.

[3] Appadurai, A. (1996). Number in the Colonial Imagniation. In *Modernity at Large*, (pp. 114–135).

[4] Bergeron, H., & Castel, P. (2014). Savoirs de politique, politique des savoirs. In *Sociologie politique de la santé*. Presses Universitaires de France.

[5] Center for Global Development (2014). *Delivering on the Data Revolution in Sub-Saharan Africa*.

[6] Cordell, D., Ittmann, K., & Maddox, G. (2010). Couting Subjects - Demography and Empire. In K. Ittmann, D. Cordell, & G. Maddox (Eds.) *The demographics of empire: the colonial order and the creation of knowledge*. Ohio University Press.

[7] Health Metrics Network (2008). Framework and standards for country health information system. Tech. rep.

[8] Independent Expert Group on a Data Revolution for Sustainable Development (2014). A World that Counts: Mobilising the Data Revolution for sustainable Development. Tech. rep.

[9] Jerven, M. (2013). *Poor Numbers: how we are misled by African development statistics and what to do about it*. Cornell University Press.

[10] Kiberu, V. M., Matovu, J. K. B., Makumbi, F., Kyozira, C., Mukooyo, E., & Wanyenze, R. K. (2014). Strengthening district-based health reporting through the district health management information software system: the Ugandan experience. *BMC medical informatics and decision making*, *14*(1), 40–40.

[11] Lécuyer, B. (1977). Médecins et observateurs sociaux: les Annales d'Hygiène Publique et de Médecine Légale (1820-1850). In *Pour une Histoire de la Statistique*, (pp. 445–476). INSEE.

[12] Porter, T. (1996). *Trust in numbers: The pursuit of objectivity in science and public life*. Princeton University Press.

[13] RHINO (2003). introducing an analytical framework for understanding performance of routine health information systems.pdf. Tech. rep.

[14] Vital wave consulting (2009). Health Information Systems in Developing Countries. Tech. rep.

[15] Wagenaar, B. H., Sherr, K., Fernandes, Q., & Wagenaar, A. C. (2016). Using routine health information systems for well-designed health evaluations in low- and middle-income countries. *Health policy and planning*, *31*(1), 129–35.