

THE DESIGN OF PERFORMANCE MEASUREMENT SYSTEMS FOR PUBLIC HEALTH SERVICES: THE CASE OF TUSCANY REGION IN ITALY

Abstract

In recent years in Italy as well as in the other European countries, non-hospital services has been giving an increasing emphasis. While hospital services are usually monitored, and often financed, by DRGs, other services still lack of similar measurement systems. The peculiarities of public health make the measurement of these services almost difficult. For this reason it appears particularly interesting the case of the Tuscan Health System that decided to design and implement a system that classifies public health activities linking them to health needs, standardized procedures and homogeneous resources. This system, named “final products”, sounds like a sort of DRG for Public Health, even if it has not financing purposes. The paper describes its design and implementation through the lenses of an interventionist research approach. The results of the system application support health authorities and regional government to efficiency evaluation and to rethink about procedures and health needs. However, in the comparison between the costs afforded in designing the system and the benefits from its use severe doubts arise on its cost effectiveness.

Key words

Measurement System, Public Health, Process analysis

1. Introduction

The aim of this paper is to describe the development of a performance measurement system for Public Health in one Italian Region (Tuscany Region). Public Health is the branch of medicine that aims to prevent diseases and guarantee safety of people. Public Health activities consist mainly in controls, inspections and education. In 1998 the Institute of Medicine of U.S. defined Public Health as “fulfilling society’s interests in assuring conditions in which people can be healthy”.

In the Italian National Health System (NHS), Public Health deals with four areas of services (Donadini et al., 2001)

- hygiene and public health, including infectious and parasitic disease prophylaxis, health promotion and education and prevention of environmental hazards;

- food control (production, processing, preservation, commerce and transport), prevention of food-related disease and nutritional surveillance (preventing obesity and malnutrition, etc.);
- prevention of occupational diseases and accidents;
- veterinary medicine (surveillance of animal stock health, hygiene of food production and animal).

The position of Public Health within the governance structure of HC system is inscribed in the history of the Italian NHS, that was defined by law 833/1978. Its structure is based on three levels with decentralization of responsibility: national, regional and local. The national and the regional levels play a role of coordination and planning, while the local level deals both with operational and managerial tasks. The local level is represented by Local Health Authorities (LHAs). Each LHA runs three kind of services - Acute Care (Hospital), Primary Care (*Cure primarie*) and Public Health (*Prevenzione*) – as a unique trust. Each Local Health Authority (LHA) has one Public Health Department which is in charge of providing services and managing resources.

Since reforms of '90, commonly knew as New Public Management Reforms (NPM), LHAs are organized as autonomous organizations. This concept is linked to two main aspects: delegation for the organization and the provision of health services and responsibility for results. LHAs are legal entities and have autonomy in all the administrative aspects such as organization of work, investments and legal aspects (Bachelet, 2008). The combination between autonomy and responsibility is the fundamental aspects characterizing the entrepreneurial nature of LHAs, introduced by NPM Reforms, and aims at sustaining a more efficient use of resources (Kurunmaki, 1999; Lapsely, 1994).

If we look to the history of healthcare services, until recent years the largest amount of healthcare services has been provided by hospitals and the amount of funding provided to hospital activities has been always much more larger than those provided to Public Health and Primary Care. Correspondently the collection of information regarding hospital activities has been always systematic. In fact, since the '90s, the DRGs system has been introduced for financing and performance evaluation purposes in hospitals.

In recent years more emphasis has been given to the non-hospital services: funds for hospitals fall from the 50% of 2000 to the 43% of 2007. The earmarks funds for Public Health have grown from the 3.6% of 2000 to the 5% of 2007. This is also linked with the progressive shifting of health activities from Acute Care towards Primary Care and Public Health services, that are considered more effective and less expensive alternatives to hospital care. Even if the percentage for Public Health is lower than the percentage for Primary Care (52%) and Acute Care (43%), Public Health in Tuscany Region costs about 377 million, hence it should not be precluded to the design and implementation of a measurement system.

However, unlike the hospital where activities are codified and collected by means of the DRGs system, non hospital activities are still being studied and analyzed to identify and codify services. This has a double impact: LHAs are not supported by adequate tools for performance improvements and cost control, while the government does not have

adequate information with respect to the evaluation of LHAs' results in the field of Public Health.

The remainder of the paper is structured as follows: after a paragraph of analysis of the issues of measuring in Public Health, we will describe the research methodology: an *action research approach*, together with a survey involving 180 professionals, have been adopted and professionals highly involved in the development of the system. Then we will describe the adopted FPs system in its structure and use and at the end we will discuss the current use of the system and its unexploited potentialities.

2. Measuring Public Health

Measuring efficiency and effectiveness of Public Health is particularly difficult because of the features of its services (Contini et al., 2001; Maglione, 2001; Hunter, 1990): the approach to the provision of services, the absence of an explicit demand, the peculiarities of the users of services, the multiplicity of actors involved and the professional nature of Public Health services.

The first significant dimension of Public Health relates to the approach to the provision of services: Public Health acts *ex ante* in order to reduce risks of diseases and costs arising from subsequent treatments needed, while other services (such as hospitals) follow the traditional approach "diagnosis - treatment". So if "traditional" health services intervene when health problems occur, Public Health services aim to prevent diseases and to promote the health of population. Consequently the measurement and evaluation of results of Public Health (increase in the health of population) may be appreciated in the long term (Contini et al., 2001, Maglione, 2001; Hunter, 1990).

The second feature relates to the absence of an explicit demand for Public Health services. In fact, the provision of these services answers to essential health needs related to all the population (i.e. the security of food, the security of workers etc) and not to an explicit demand. Moreover: even if services are usually addressed to a specific target, they offer a benefit to all population: for instance, campaigns against smoke are addressed to smokers but they give also a benefit to non-smokers because they reduce the passive smoke. Consequently individuating a specific customer and measuring its satisfaction is not easy.

The third features relates to the presence of different kind of "users". In fact we can identify two types of users in such services: a "final user" who benefits from a service that he does not receive directly and an "intermediate user" who receives the service directly. "Intermediate users" of Public Health services are for example: food industries, building sites, farms etc.. With respect to these users, Public Health services mainly verify, through inspections, the compliance with rules, procedures and laws. It is understandable therefore the difficult to read the results in terms of "satisfaction" that these users have from an inspection. "End users" are not single individuals but a category of individuals (i.e. employees, consumers of food, etc.) or a community of individuals. Controls and inspections for "intermediate users" provide to the "end users" the guarantee of quality and safety of products and services. However, "end users" did

not receive directly these services. Consequently it is difficult to detect the degree of satisfaction about services not received directly.

The fourth feature stands in the multiplicity of actors involved in Public Health. In fact, in Italy some activities, typical of the departments of Public Health, can also be provided by other entities such as Arpat (*Agenzia regionale per la protezione dell'ambiente Toscana* – Regional Agency for the protection of the environment in Tuscany) for the environmental performance; Iizzss (*Istituto Zooprofilattico sperimentale* – Experimental zoo - prophylactic institute) with regard to food security and animal health or ISPESL (*Istituto superiore per la prevenzione e sicurezza nei luoghi di lavoro* – Central institute for prevention and safety on workplace) with regard to supervision and inspection in the workplace.

Finally cultural resistances could arise against managerial control in a sector, which traditionally has the largest autonomy in organizing activities, if compared to hospitals. Laughlin *et al* provide a deep analysis of this issue (Laughlin *et al.*, 1992; 1994) with reference to General Practice (GP) in UK. In UK this branch of medicine has particularly resisted to NPM reforms, if compared with other branches (surgeons and physicians), because of the particular historical and professional context of GPs. In fact, since the end of '800, the Government encouraged a wide autonomy of this branch: their contracts were quite generalist, without thig definition of tasks expected, remuneration was based on capitation payments and a limited number of cost information was required. NPM reforms introduced for GPs several changes. We can recall: new GP contracts with tight definition of tasks required, remuneration linked both to services provided and to the number of patients, introduction of an indicative drugs amount, tight control on costs through Family Health Services Authorities (FHSA) and introduction of medical audits. GPs opposed these reforms considered by them an unfair intrusion into their autonomy, previously widely encouraged, and a breakdown in trust that characterized their relationship with the Government. The situation of professionals working in Public Health is similar to a large extent and in this sense exposed to resistance to change.

The experience of Tuscany Region appears particularly innovative in Italy. Tuscany Region decided to developed a system, called Final Products (FPs) system, where, following the idea of the DRG system for hospital services, each Final Product (FP) represents a public health service. In other words, an effort has been made to classify the services provided according with their nature and the resources involved and consumed. As well as for DRGs, the idea of FPs system was to classify homogeneous services, but differently from DRGs and at least for now, the FPs aim of the system is to measure the quantity and the efficiency of public health services and not to define a pricing system for financing. This paper describes the process of development of the FPs system, its characteristics, the opportunities and the untapped potentialities of the system.

3. Methodology

The development of the system included two main tasks: the identification of the structure of the FPs system and the identification of standard resource consumption for each FP.

In subsequent sub-sections we will describe the methodology adopted for each task.

3.1 Action research approach: identification of the structure of the FPs system

The first FP system idea started in 1998, as a pilot project in two LHAs. During the following 7 years others five LHAs decided to implement the system in order to fill the gap of information in public health services (Contini et al., 2001). In this phase the system was originated and carried out by professionals on their own, without any specific Regional commitment and investment. Consequently there were limited possibilities for an effective implementation. The output of this phase was a prototype of the present version of the FPs system. The prototype contained a list of FPs of Public Health. In this prototype each FP was represented by a flow chart describing the procedure to perform in order to answer to an health need of Public Health.

In 2006, the Regional Health Authority decided to formally adopt this system for all the 12 LHAs (as reported in the regional law 7229/2005). With the aim to apply the system to all 12 LHAs and to introduce the updating required by changes occurred in laws and procedures, the flowchart included in the prototype were refined and associated with a glossary and with the resource consumption. This paper is particularly focused in the phase of extension of the system to all LHAs.

The identification of the structure of the FPs system included the revision of the flowchart included in the original prototype, the identification of a glossary for each FP and each activity. This phase required 18 months and was supported by an *action research approach* (Jonsson, Lukka, 2007; Cinquini et al., 2007).

The *action research approach* evolved by mean of a group composed by twelve professionals from all the Department of Public Health, two researchers and one professor of Management Accounting. Professionals represented all twelve Departments of Public Health. Both heads of departments and professionals without managerial responsibility were involved, depending on the specific task to face.

Totally the group met in twenty semi-structured meetings conducted by a group leader chosen among professionals and by researchers. Meetings evolved through an agenda containing the list of issues to face. Every time, within a few days after the meeting, the group leader sent to all participants a summary of the decisions taken during the meeting. Participants had some days to send their comments until the final summary of decisions was completed. Researchers took also notes, used to support the group leader in writing the summary of the meeting and pointing out issues to face in following meetings.

Periodically, the group reported to the Regional Health Authority in order to collect other comments for the development of the system.

The adopted *action research* particularly suited the aim of the research for three main reasons.

Firstly, as reported by empirical studies, professionals oppose to managerial tools designed without their involvement (DHSS , 1986; Jones, Dewing, 1997; Arnaboldi, Lapsley, 2004). Involvement of professionals creates a better organizational environment and supports the individuation of managerial tools more aligned with the actual organization of work.

Secondly, *action research approach* particularly suits the aim of this research, because the identification of a system able to provide a correct “diagnosis” of the situation (Malmi, 1997) and to represent the work (Pallotti, 2007) requires the involvement of people who deeply know the operational context and the working environment, otherwise the model can't be able to represent the reality of organization. Moreover, according to Laughlin (Laughlin,1987), actors involved should be only those who have the potential power to affect change in the phenomena under investigation. To this aim, researchers and practitioners composed the team. Within this collaboration, professionals brought they knowledge about Public Health activities and pointed out difficulties and potentialities to face in the development of the system. On the other side, researchers gave a methodological support for the development of tools suitable for their requirements. They supported also the interaction and the communication between members of the group and facilitated the process of identification of problems and possible solutions (Ryan et al., 2002). However in the *action research approach*, preserving researchers and “researched” integrity is an important topic (Baard, 2010). For this reason, precise roles and tasks were defined. The researchers' role was to support the group through the progressive understanding of the problems related to the development of the system and to propose a methodological approach and alternative courses of action. Researchers also elaborated information and reports by using a database management software. The role of practitioners was to bring their experience, discuss proposed options, and choose among them.

Preserving the free choice of the researched is another important issue. Free choice is important for participants to feel willing and motivated to work on a problem and to facilitate successful change (Agrys, 1970). Therefore, the researcher must resist any temptation to control or coerce participants towards any particular course of action. With the aim to preserve the researched free choice we avoid expressing our opinions or preferences.

Thirdly, *action research approach* particularly suits the aim of this research because, it is oriented to solve a practical problem of the organization (in this case the measurement of prevention activities of the departments) and one of the basic assumptions of *action research* is the practical functioning of the adopted solution.

3.2 Survey: identification of the standard resource consumption

The identification of the standard resource consumption for each FP required eight months. Data was collected through a survey on a sample of 180 professionals (Cinquini et al., 2009) which representing the 10% of the total amount of professionals working in Tuscany Region. Professionals involved were business unit managers from

all sectors of the departments of Public Health in Tuscany. Professionals were required to estimate the resources spent for each FP. The 90% of total cost for Public Health is represented by the costs of personnel, for this reason the estimated resource consumption included only personnel and not other indirect and fixed costs.

Professionals compiled and sent, via e-mail, pre-set templates that listed all activities composing FPs. In particular, professionals evaluated for each FP: the kind and the number of involved professionals distinguishing among six typologies of professionals (Physician, Veterinary, Administrative, Engineer, Technical Operator, Other Manager, Nurse), the time spent in carrying out activities by each of them and eventually some notes. In filling the sheet professionals were supported by a list of instructions and by the list of flow charts and the glossary elaborated during the first phase of *action research* (see section 3.1). The glossary was very important, as it allowed to clarify any doubts regarding the interpretation of the meaning of FPs. In fact, learning and improvement that comes from the availability of information implies not only their acquisition and distribution but also their interpretation (Huber, 1991).

Before this phase professionals participated to a two days training whose aim was to explain professionals' work and the role and aim of the project.

Findings were shared in a subsequent plenary meeting. In that meeting, professionals discussed and interpreted results. For example, they discussed about the high variability in responses and tried to understand if this variability depended on a wrong compilation of tables or by different organizational arrangements among LHAs.

Subsequently, a restricted group composed by 20 professionals and researchers analyzed the result of the survey and determined a standard resource consumption for each FP.

4. Description of the system and how it is used

Nowadays the system includes a group of 72 FPs and 144 activities.

These 72 FPs measure a wide number of Public Health services provided in general by the Italian NHS and deal with all sectors of Public Health.

Each FP represents one of the services provided to answer to essential Public Health needs defined by the national law DPCM 29th November 2001. This law lists the essential needs in charge of the regional health systems, including Public Health.

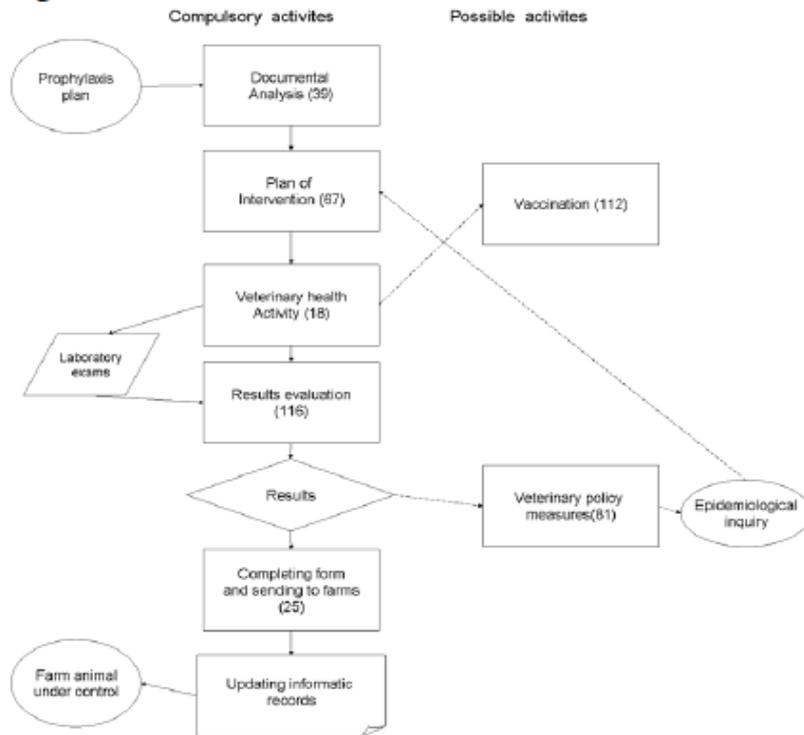
For instance, as reported in Table 1 three FPs answer to the essential need of care "epidemiologic surveillance and prophylaxis in order to weed out infectious diseases in the animals": the FP number 1 "Requested opinion also related to authorization", the FP number 43 "*Farming under control for surveillance or prophylaxis plans*" and the FP number 51 "Epidemiological inquiry". The FP 43 includes visits and exams aiming at monitoring the health of animals in farming.

Table 1 - Essential health needs for the *Veterinary Medicine and Final Products*

Code	Description of the essential health need (DPCM 29 th November 2001)	<i>Final Products</i> involved (code no.)
1.4.1a	Epidemiologic surveillance and prophylaxis in order to weed out infectious diseases in the animals	1-43-51
1.4.1b	Prevention and control of zoonosis	42-51-68-75-67
1.4.1c	Veterinary intervention	42-44-48
1.4.1d	Surveillance on animals movements and concentration, on animals export and import and facilities used	1-2-45-50-65
1.4.1e	Veterinary urban hygiene	10-68
1.4.1f	Stray fight and control of dog population	41-46-47
1.4.1g	Control of synanthropic and wild species in order to protect human health and equilibrium among human being, animals and environment	44-46-48-68-67-66

The current use of the FPs system confirms the usefulness of process analysis also in non-hospital settings (Cinquini, Vainieri, 2008). FPs and their activities are represented by flow charts. As an example, Figure 1 shows the flow chart of the FP number 43 “*Farming under control for surveillance or prophylaxis plans*”. As Figure 1 shows flow chart clarifies the list of activities, their logic sequences and decision making hubs. Flow charts underline also the event that starts the *Final Product* (i.e a prophylaxis plan or an epidemic) and possible outputs (i.e. documents, reports or further procedures required).

Figure 1 - The flow chart of the FP 43



Flow charts attempt to standardize procedures and provide guidelines for professionals. On average, each FP is composed by 10 activities. The same typology of activity could characterize more than one product, but it can differ, across products, in terms of standard resource consumption. Activities could be *compulsory* or *possible*. *Compulsory* activities are the minimum set of activities required to answer to the health need. *Possible* activities are those activities whose occurrence depends on certain circumstances.

A glossary provides the definition and the description of FPs and activities to avoid misunderstanding.

FPs is currently used by the Regional Health Authority and by LHAs to evaluate the efficiency of their Public Health activities.

In this respect, the FPs system attempts to serve both the interest of the Regional Health Authority and the interest of LHAs.

On one hand, the FPs provides a set of standardized and uniform information to the Regional Health Authority, because the glossary and flow charts make services comparable. The Regional Health Authority currently uses the PFs system to evaluate the efficiency of LHAs, by comparing output (number of performed PFs) and available input (personnel employed). As an example, as table 2 shows, the productivity of the food safety services is measured as the number of Final Products of food and safety over the personnel working on food safety (this last information was gathered by the

regional flow of the European requests of the country profile). Information gathered from this system supported also a discussion between Regional Health Authority and LHAs about the reasons of the variability on efficiency and typology of services/products across LHAs.

Table 2 - Productivity of the of food safety services

Health Organization	Number of products performed	Number of qualified personnel	Value
Tuscany Region	20.154	458	44,03
LHA 1	1.094	24	45,58
LHA 2	1.239	28	43,94
LHA 3	1.218	33	36,69
LHA 4	1.03	20	51,76
LHA 5	1.774	37	47,75
LHA 6	2.545	43	59,53
LHA 7	934	38	24,69
LHA 8	1.487	42	35,66
LHA 9	1.901	31	62,02
LHA 10	4.633	97	47,89
LHA 11	1.443	37	39,11
LHA 12	856	29	29,84

On the other hand, LHAs can use the FPs system with two aims: improvement of efficiency and guidance for professionals.

In addition the FP system provides to LHAs inspiration for a process of organizational revision, i.e. who has to do what: the survey highlighted that sometimes for the same activity in the same FP, LHAs uses different figures (with different costs).

Nowadays the FP system is not operating at full capacity because the reliability of data collection is limited by the adaptation of informative systems in all LHAs. For this reason LHAs systematically collect data on a selected group of FPs (about 25 FPs) defined by the Regional Health Authority that currently use only these PFs for evaluating LHAs. Moreover they are only used to measure efficiency, while the FPs system has also potentialities in supporting the identification of financing criteria.

5. Discussion: the potentialities of the system

The success in the design and implementation of the FPs system in Tuscan Public Health stems from its birth as a voluntary initiative designed entirely by professionals. In fact, according to previous research in HC, if the authority for professional activity

control comes from the expertise of the same professionals, it may not be perceived as a bureaucratic control and more easily it can be accepted (Donatini et al., 2001).

Beside that, the experience of the FPs system can be discussed considering four aspects: the structure of the system, the adopted methodology, the costs and the difficulties occurred in developing and implementing the system and the current use of the system.

The structure of the FPs system is based on 72 FPs which represent procedures provided to answer to a specific health need. The unit of analysis is represented by activities performed to obtain a result. This approach can support a coherence between needs and activities and between activities and resources.

If we look to the first aspect, coherence between needs and activities, standardization of procedures today provides to professionals the necessary guidelines to help them in understanding how to answer to a specific need of Public health, supporting also quality. Moreover standardization allows the comparison between different contexts and can also support a process of improvement.

If we look to the second aspect, coherence between activities and resources, the linkage between activities and resources can support a distribution of resources more coherent with the financing needs rising from activities and health needs. Even if it is not used yet in this way, the system could lead, just like the DRG for hospital, to financing purposes across LHAs and resource allocation within prevention departments that can otherwise use the system as a tool to support funding requirements (King et al., 1994).

Moreover, the association of resource consumption and activities can support a higher acceptance of managerial tools, especially in professional organizations not used to employ managerial tools. It can realize the “reframing of clinical activities in accounting terms” (Power and Laughlin, 1992) and make the understanding of financial information and the acceptance of the usefulness of this information easier (Arnaboldi, Lapsley, 2004). This condition supports higher possibilities of using financial information in the clinical decision making system

If we look to the methodology, the action research approach (Jonsson, Lukka, 2007) has a double advantage. From the researchers' point of view, the opportunity to become ‘insiders’ may support them in understanding the phenomena under investigation and doing a reflection on the linkage between research context and managerial tools. For example the richness of details of the FPs system - i.e. 72 very articulated flow charts - compared with the DRGs system for hospitals, may suggest the desire of professionals to confirm the peculiarities of their sector and distinguish from other sectors. The desire of professionals to represent the peculiarities of their sector emerged also during their discussion when they often discussed hours on how represent in the FP system small and very particular aspects of their work. For professionals their involvement via the IR approach helped to introduce managerial tools that both met the aims of regional government and the professional culture. In this respect the high involvement of professionals in the evaluation of resource consumption can support higher acceptance and avoid possible rejections. These rejections could occur in professionals settings and especially in sectors where there is a large autonomy in performing activities and could bring to the failure of these initiatives, as reported by previous studies (Laughlin et al.,

1992; 1994). Moreover the high involvement of professionals may support the individuation of a system able to represent reality and manage performances (Malmi, 1997).

In this respect the IR approach contributed to creating a bridge between the Regional Government requirements and professionals.

If we look to costs, the process of development of FPs system has been time (and resource) consuming: it lasted more than 10 years since its first idea and involved totally two-hundred professionals. In fact the large autonomy of Public Health professionals created several differences across LHAs in terms of work organization, typologies of the personnel involved in the activities, software available etc. For this reason the creation of a shared system able to combine all these differences required a lot of time and discussions.

The process of implementation requires high Regional investments in informative systems as well. In fact, there was a quite inhomogeneous situation in terms of informative systems available in each LHA in Tuscany. We found three different kinds of software and different approaches in recording information. Some LHAs had already a detailed reporting for Public Health, even if completely different from the FPs system; some of them registered only a minimum amount of information, some others had a very sophisticated software and others used only simple spreadsheets. As a matter of facts, the collection of homogeneous information requires investments in order to adapt all LHAs informative systems to the requirements of the new FPs system (Kurunmaki, 1999; Arnaboldi, Lapsley, 2004).

Moreover, despite investments in informative system, data collection requires a commitment of professionals in recording and this requires a cultural change, especially in a sector that traditionally was not measured. For long time, professionals working in Public Health have not been used to record their activities because they were requested only a limited amount of information. Consequently they now should deal with the new practice of recording their work on a software every day.

Recording information in a software implies also an adequate training and education. Previous studies demonstrated that limited attention to this topic can be a great limitation in terms of ability of doctors to perceive the importance of new managerial tools (Abernethy, Stoelwinder, 1990), to appreciate the importance of analyzing information (Arnaboldi, Lapsley, 2004) and to use managerial information in decision making (Kurunmaki, 1999) despite internal and governmental initiatives aiming at promoting a managerial culture in professionals (Broadbent et al., 1991). In this respect strong top management's commitment in terms of investments in training and education programs is the first condition for supporting changes in culture, thus favouring the appreciation of the relevance of using managerial tools in decision making (Kurunmaki, 1999; Arnaboldi, Lapsley, 2004).

If we look the current use of the system, today the Regional Health Authority uses the FP system to evaluate efficiency of LHAs through indicators based on final products. Results shows that this practice has led to an improvement in the efficiency of Public Health services in Tuscany Region.

However today the system is not used as a full capacity: only a set of products is systematically recorded because of recording problems and the link between FPs system and financing is still far.

The partial use of the FP system despite its costs arises cost-effectiveness concerns. It opens to a discussion about the success or the failure of this experience.

From one hand, the experience represents a success because FP has in some way covered the need of information in a sector that ten years ago was completely “invisible”: now services can be measured and some efficiency evaluations can be made. From the other hand, the experience has been costly and long and, the most important, still the potentialities of the system are only partially exploited.

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