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Evaluation of the uses of medical records within a health assistance network.

Sociological analysis versus analysis of "log files" applied to the ADDICA network in the Champagne-Ardennes region of France.

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ABSTRACT.

This article proposes a method to evaluate the uses of medical records by healthcare professionals within a health assistance network. We have used a mixed methodology with two main axes: a qualitative sociological analysis, based on face-to-face interviews, and a statistical study of computer log files. 19 interviews of healthcare professionals and 16,417 logs files, concerning 111 doctors and 823 patients, over a period of 43 months have been analyzed. The main results are that there is a real use of Shared Patient Records, even if the intensity of use is very heterogeneous, with a small group deeply involved in use of the system. Moreover, the use of Shared Patient Records has increased steadily since the system was launched, both in the number of healthcare professionals consulting them and the number of patients treated. The sharing of data is motivated by a specific goal: to coordinate the care of addictive behaviors and the kind of data shared is determined by this goal. Not all information is shared, but only data that can help other professionals treat addicted patients.

KEYWORDS: SHARED PATIENT RECORD, HEALTHCARE NETWORKS, LOG FILES, SOCIOLOGY OF TECHNOLOGY.

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1. INTRODUCTION.

In France, the ordinances of 24th April 1996, also referred to as the *Ordonnances Juppé*, included the health service networks within the national healthcare system (Sécurité Sociale). The aim was to promote cooperation between players within the different healthcare systems and improve access to care for the populations concerned. The networks set up have remained experimental until now and need to evolve in order to achieve sustainable development. It is therefore useful to understand today the level of adoption by the players involved of the network and put forward indicators of usage that would justify the implementation and organization of new networks.

Information systems play a role in cooperation between health networks. Their development is a response to the need to communicate, coordinate treatments, share information in a secure manner and improve the quality of care. Recent laws, (French laws of 4th March 2002, and 13th August 2005 concerning Health Insurance) are examples of the appropriateness of an information system in dealing with the issue of coordinating care and formalize the obligation of setting up an information system to ensure the development of care within a network of healthcare systems.

Computerized information systems enable the transfer of medical records, even distance treatment of patients, and have developed significantly within formal healthcare networks organized around either a specific pathology, territory or a group of professionals. Organized networks have witnessed the recent emergence of quality processes within the medical field and medical information systems through the sharing of medical records between all the parties involved. Highlighting indicators that allow us to better understand the socio-technical workings of these networks could contribute to optimize them and reveal the conditions of adoption of a network by users. At the heart of the system, Shared Patient Records[1] are an important informational tool for ensuring the continuity of care. Will this new practice of sharing information lead to new roles for healthcare professionals? It is necessary to identify the possible modifications of interpersonal relationships and in particular the roles of the different professionals in the health and social sectors within this new system.

Until now, the evaluation of healthcare networks has been limited to a summary evaluation of the relevance of the network to care processes. This did not include an evaluation of the information system as a driving force behind organizational changes, changes in professional practices, coordination and the treatment of patients. Yet, the 2002 law concerning financing of the national healthcare system has ensured the continued financing of healthcare networks within the framework of a national budget for the development of networks which includes a regional allotment. And, according to the French Court of Financial Auditors (in its report on the national healthcare system in 2003) no national standard of evaluation has been established, not even a software program to transfer information to the CNAMTS (national council made up of representatives of insured people, employers, private insurance companies and institutions whose role is steering, monitoring and assessing health insurance policy) or exchange information with other regions. This is why establishing indicators of usage based on the testimony of the professionals involved and data from computerized health service platforms would enable, in addition to simple performance issues, to gain a better understanding of the adoption of information systems by users within networks.

The objective of this article is to propose (and implement) an original evaluation method for the use of Shared Patient Records within a healthcare network, ADDICA (ADDIctions, précarité, Champagne-Ardennes[2]). The originality of this method resides in the confrontation of observations concerning the frequency of use of records (recorded in

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[1] For this study the term Shared Patient Record was preferred to the notion of shared medical record because this is the term used in the network.

[2] For a historical analysis of the ADDICA network, see Depinoy, 2005.

computer logs) and the uses described by the players (interviews and comments about practices).

ADDICA was created in 1994 within the association GT-51[3]. The clinical aspects of addiction imply cooperation and coordination between healthcare professionals and social services. After functioning for one year, sharing data by traditional means i.e. by telephone or paper files, it became necessary, for organizational purposes, to use a common IT tool. The project was launched in January 2001. After training to use this new collaborative tool, doctors were able to edit the first Shared Patient Records in 2002. The system selected was a platform developed by Uni-médecine. It consists in a set of applications and software accessible via the Internet. It enables healthcare and social service professionals to communicate and exchange information securely. The services offered are: access to shared medical records, tele-expertise and medical training.

After an initial 5-year experimental phase, the network is now entering the consolidation phase with the permanent development of three tools required for smooth and efficient collaborative work: regular pluri-professional training sessions, a professional coordination team and an IT system with Shared Patient Records accessible via a secure extranet.

Financed by a joint decision of the *Union Régionale des Caisses d Assurance Maladie* (Regional Health Insurance) and the ARH (Regional Hospital Agency) within the framework of the DRDR (regional budget for the development of healthcare networks), the network must undergo evaluation by an external body . The AUTOMATE research project (*Analyse des Usages en Télésanté : Organisation d un Réseau, Mesure de son Appropriation, Techniques d Evaluation*), sponsored by the Ministry of Research and New Technologies, took part in this external

evaluation[4] by proposing an analysis of the use of Shared Patient Records within this network.

In the first section we will present the methodology we propose to implement in order to evaluate use. This methodology includes a sociological analysis described in the second part and a statistical analysis the results of which will be presented in the third part. In a final section we will present the overall results.

2. EVALUATION METHOD: "FROM THE FREQUENCY OF USE OF SPR TOWARDS A REPRESENTATION OF PRACTICES".

The originality of our method lies in the confrontation of representations by different practitioners of their use of Shared Patient Records (analyzed during sociological interviews) and measurement of frequency of use of the interfaces set up between these practitioners (counted using statistical analysis of computer logs). To preserve the anonymity of the subjects, the goal is not to compare profiles within a specific category of healthcare professionals but to indentify common trends expressed according to categories in the network (general practitioners, specialists, social workers, administrative staff&) or eventually certain particularities specific to one or another of these different professions.

Today, the description of uses of new technologies has essentially been limited to a qualitative approach based on user accounts concerning their practices. To complete this approach we have decided to confront these statements with usage recorded by the IT system itself and stored in log files.

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[3] Association of general practitioners confronted with problems of addiction of all types in the Marne region of France.

[4] The external evaluation procedure was assigned to the ORS Champagne-Ardennes (Regional Health Observatory) with the support of work carried out by Société ENDEL and the team of the AUTOMATE project.

Figure 1 shows the approach adopted within the AUTOMATE project and highlights the originality of the method i.e. the interaction between statistical and sociological analyses.
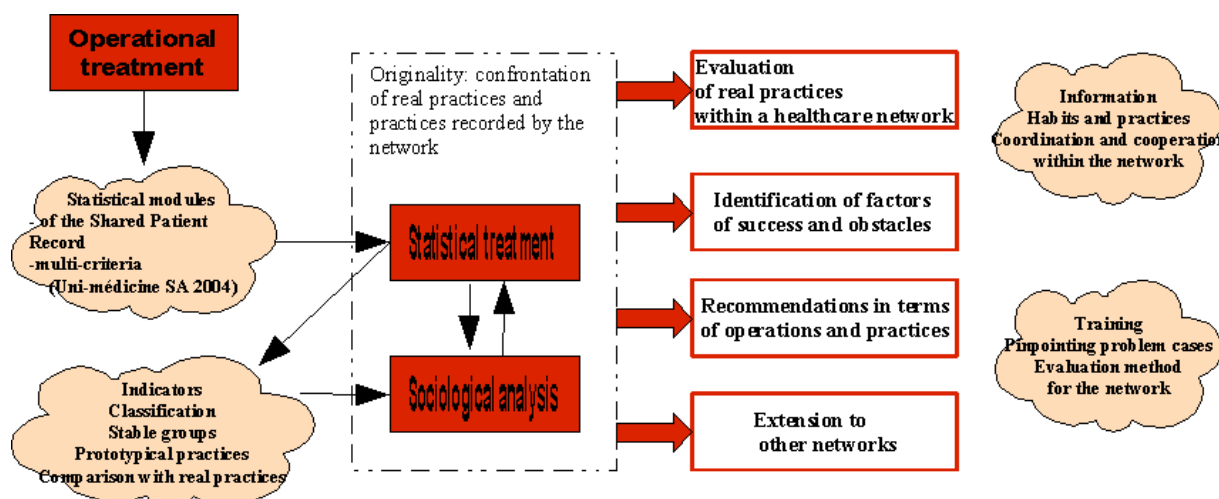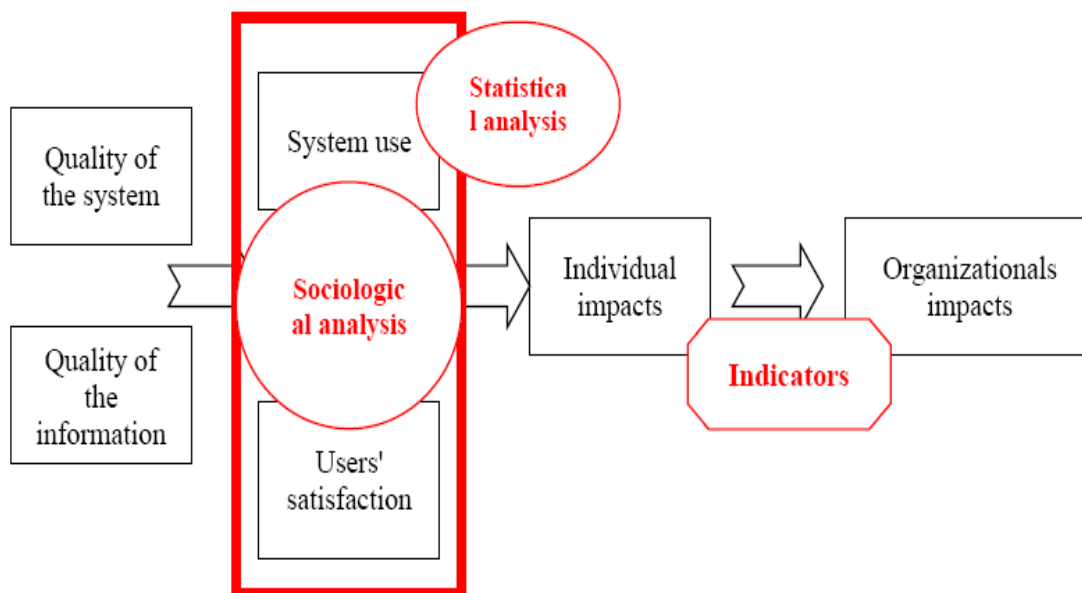

figure 1. Research methodology.

figure 2. Positioning of our methodological contribution within Delone and McLean model.

The evaluation model we propose is inspired by work on evaluation of information systems[5]. We can justify our approach using the pioneer model of Delone and McClean[6]. The aim of this model is to measure the variable of Information System Success . They determined six dimensions for evaluating information systems: quality of the system, quality of the information, use of the system, user satisfaction, individual impact on each user and organizational impact. We can observe that most work concerning the evaluation of information systems focuses on one or two categories only (in general quality or user satisfaction). The basis of our approach is pluri-disciplinary (sociology and statistics) and is user-oriented (cf. Figure 2) with the aim of highlighting indicators of individual and organizational effects, the system studied being the Shared Patient Record.

[5] Kefi H., Kalika M., 2004.
[6] Delone W.H., Mc Lean E.R., 1992.

Our approach is both a global study of information systems and yet sufficiently detailed concerning practices so as to provide an explicative value as to the workings of the system. The evaluation of uses of Shared Patient Records is intended for use by regulatory bodies of health networks.

3. SOCIOLOGICAL ANALYSIS: THE LOGIC BEHIND PRACTICES.

Our hypothesis is that technological tools affect professional practices within the framework of a network, in this case, an information system like Shared Patient Records. These effects reveal existing professional rationales and outline the professional changes at work and possible tensions. The characteristics of our study enabled us to identify different dimensions: the organization of the system over a long period of time, the conditions of adoption and uses of the SPR by professionals, the different professional rationales concerning the sharing of data and the advantages and drawbacks associated with the SPR by users.

3.1. Interviews and research in the field.

Networks and innovations.

We wanted to analyze the real uses of the network by different professionals according to their membership in a particular institution, their professional methods, and the type of relationship between care and patients. In Sociology of Innovation, the notion of a network is an indispensible tool for understanding and analyzing the complex mechanism of interactions to describe the implementation of appropriate forms of coordination and to account for the dynamics of relationships[7] . Then it is necessary to reveal the social network established through the use of different communications media, including the Shared Patient Record.

This notion of the network is based on two main ideas. The first describes the relationship between institutions, professionals and patients and is the minimal structure for a whole set of phenomena (professional actions, monitoring of patients). The second is more complex and involves a particular means of coordination of agents that is not that of the market, nor that of the hierarchy, but where variety and heterogeneity is combined with an increase in interactions and leads to the multiplication of negotiations of all sorts and the need for compromise[8] . On this basis, our analysis considers certain number of phenomena concerning the distance and proximity of two entities, for example, the chain of middle men and actions that comes into play between a patient and a doctor or between two professionals, one defining himself as a healthcare professional, the other belonging to social services. It takes into account the importance of connexity and convexity i.e. the multitude of choices in the collaborations and coordinations implemented. Finally, this approach sheds light on the morphological evolution of different players within the network: the effects of attraction, the strengthening of links between partners, such as the development of means of sharing between different organizations, and also the interactions between the patient and his family with different professionals.

A healthcare network is a favorable context for identifying the minimal rules that enable networks to function and exploring the different relationships that bind its members. Innovation is by definition an emerging phenomenon during which interactions are progressively set up that link agents, knowledge and goods, which were not connected before and which little by little become caught up in a web of interdependencies [&] it works its way across institutions weaving complicated and surprising relationships between different spheres of activities, playing both on personal relationships, the market, law, science and technology[9] .

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[7] Callon et alii, 1999, p.1.

[8] Op.cit p. 7.
[9] Callon M., 1999.

The Shared Patient Record (SPR) seems, *a priori*, to correspond to this definition of innovation, both because of the way it works and the impact it is supposed to have on relations between different players that interact in the treatment of pathologies, especially the relation between doctor and patient. This is why the innovation of the SPR provides an opportunity to better understand the workings (or breakdown) of a network. Beyond a description, we are providing an account of the system of relations that develops between individual players, between institutions or heterogeneous spheres of activity that act in an isolated manner. The SPR is therefore an intermediate object through which are materialized the means of cooperation, communication and linking of different players for the benefit of patients. This object can then serve to explain the roles, interests and, to a certain extent, the identity of the network[10].

Working hypothesis.

Our main hypothesis is the following: we presume that depending on the interpersonal network and social links established between professionals, use of the information system will be more or less frequent. Previous studies[11] lead us to believe that there is a correlation between a network of relationships and use of technological tools. These uses then lead to changes in professional practices and even a reorganization of the medical and social service professions.

The indicators used refer to certain key concepts: confidence, doctor-patient confidentiality, professional secrecy, shared secrets, patient healthcare records, professional background, cooperation, interdependency and independence.

Several sub-hypotheses concerning the technical tool seemed interesting for us to explore:

– the technical tool would modify professional practices in terms of patient admissions and organization of work;

– uses of the technical tool within a network would depend on the relationships established with other professionals;

– the technical tool would be a factor of inclusion or exclusion from the network depending on the equipment available to professionals;

– the technical tool would be a challenge for the network in terms of sharing knowledge and competencies;

– through the technical tool, the boundaries and links between professionals could be redefined.

Study of the ADDICA network.

We preferred to use a method based on interviews. The interviews conducted with several members of the ADDICA network had a dual objective:

1. to retrace the origins and foundations of its creation by questioning, in particular, the professionals coordinating the network. Interviews were carried out with the coordinating doctor who started the network, the project manager and the secretaries;

2. to study the practices of healthcare and social services professionals within the network. The questions concerned joining the network, their motivations, forms of participation in terms of meetings, use of the information system, exchanges& Nineteen semi-directed interviews of professionals[12] enabled us to achieve this goal.

3.2. An organization built over the time.

The creation of networks results from the need for coordinating treatment by professionals with

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[10] Callon et alii, 1999 p. 5. See also Vinck D., 1999.
[11] Projet T@PA, Projet Psaume. http://www.psaume.infini-i.fr, see Cardon, Trellu, 2004.

[12] Three general practitioners (including the founder of the Addica network), two hospital MDs, one hepatologist, one tabacologist, one hospital nurse, one special educator, two social assistants, one social worker, two psychologists, one medical secretary.

diversified competencies in several healthcare situations. These coordinated actions are not obvious and are one of the key challenges for the network. Before using an information system, professionals must make an initial first step: taking part in a network.

Different rationales for taking part in a network.

The interest of global treatment of a patient by a pluri-disciplinary team is put forward. While listening to the professionals of the ADDICA network, we observed that the stakes behind their participation are situated on several levels. They no longer want to work alone and are trying to establish links with other professionals. For some, salaried professionals belonging to an organization, taking part means getting out of their institution. For independent professionals, the network makes up for the lack of relations with colleagues. A. Grenier[13] points out that the isolation of independents is even more acute in the context of treating certain patients or pathologies and more precisely when treatment requires the intervention of other healthcare and social service professionals. Faced with a feeling of helplessness in treating certain patients and pathologies, the network is seen as an opportunity to share difficulties with other professionals and to gain specific knowledge in the expectations of patients and the characteristics of a pathology.

Learning to work collectively with and around a single patient calls into question a culture of previously isolated professions and sectors (in-home care, hospital, urban medicine, social workers&). For a pluri-disciplinary treatment of the patient, boundaries and hierarchies among professionals need to be reviewed. This new way of working requires new means of interacting and negotiating between two very different worlds.

Preliminary steps before the use of SPR.

Even if professionals belong to several informal groups where relationships based on confidence and routine procedures are developed, the challenge of networks (in the formal sense of the word) today seems to be to achieve a new

structure of links between different professionals, a reorganization of roles, positions and identities leading to new means of collaboration and organization[14]. Interdependency of practices established between professionals requires translation processes in the sense that each must make visible and explain part of his practices to other professionals in the healthcare and social fields. Delimiting and understanding the work of each party is essential for cooperation. Internal network meetings offer an opportunity for everyone to translate his practices and ways of working and identify those of others. This is particularly the purpose of training and coordination meetings held on different themes 4 or 5 times a year. Their organization is explained by the project manager:

That is to say that the people arrive and 10 to 15 minutes are devoted to introductions during the plenary session. Case studies are handed out and we form 3 or 4 groups. Of course we divide people up. It has to be representative with an institution, a hospital, an association, an independent, a nurse, a psychologist. There has to be a good mix. They meet and then work in subcommittees. They talk and exchange ideas on reality, their own reality, the reality of that professional. So, this reveals the type of organization, the competencies of the departments, who does what, the limitations, problems that exist in reality. It s their real life, not a theory&

Through these meetings, the network not only ensures the transmission of knowledge and information, but also enables, through shared experience, the dissemination and creation of new knowledge and competencies.[15] Individual apprenticeship and collective competencies can be set up and a relationship based on confidence can be created. The latter is established according to the constraints of the different members and different deontologies (for example, professional secrecy). In this way, professional contacts promote access to information and/or competencies and the cooperative approach calls into question former

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[13] Grenier A., 2004.

[14] Levasseur G., 2001.

[15] Domin J.-P., 2004.

habits by transforming interfaces between different professionals.

The use of Shared Patient Records takes place in a second phase in the history of networks. This second phase comes after the integration and socialization of each professional who has joined the network. The creation of different relations based on confidence is a prerequisite for any collective project and any use of the SPR. The latter is a tool used for the coordination between the different parties, but does not create this interface. The SPR can facilitate the exchange of information, organize certain professional practices, and offer a means of working collectively and mutualization of certain knowledge. If taking part in a network is already a first culture shock for professionals, the use of IT tools, and moreover a data sharing tool, represents another step in the restructuring of professional activities.

3.3. Adoption and uses of SPR by professionals.

Training.

The adoption of the tool was possible for some during a half-day training session organized by Uni-médecine, a session often deemed too short by the participants. This is particularly the case for those who did not use SPR right away, either because they had no time or equipment available at their place of work. The project manager also trained several members. This seemed more successful since the members were less hesitant to contact him afterwards when they encountered problems, thus limiting discouragement due to technical difficulties.

Others adopted the tool by trying to fill out a file on their own, pointing out the relative simplicity of the form. *See, it s logical. It s simple and, in fact, if I could make only one wish it would be that it stays this simple* declared one general practitioner. The record is made up of questions with items to tick. There is no need to type long lines of text or fill in a blank page. For many, this enabled them to take the plunge since it is only necessary to fill in a few sections. It is also possible to write comments and this function is used more by doctors than paramedical or social workers.

Some had the opportunity of being present when the creation of the tool was being discussed and worked on files that make up the SPR, both its form and content. This enabled them to take part in the architecture of the SPR and have a tool that corresponds more or less to their expectations. The network s SPR is made up of several files concerning particular fields: tobacco, alcohol and psychosociology. In general, adoption depends on interest in the tool.

Use of the Shared Patient Record.

Several results stand out from our interviews with professionals concerning uses of the SPR. The first is that certain professionals create SPR and others do not. Some only consult SPR, while others will also feed information into the file.

The second result underlines that consultation can constitute a first step towards using the tool. It can be a way for the professional to familiarize himself with the tool without making a personal commitment. Such practices avoid the questions linked to entering data: what do I accept to share with others? When should I enter data? Several hypotheses can be put forward to explain consultation practices. The person:

– is not totally convinced by the tool,

– is not sufficiently computer literate or does not master the SPR, thus limiting use,

– is afraid of sharing data,

– or has difficulty taking part in collective professional practices.

The third result reveals differentiated uses that need to be linked to different indicators. Indeed, using a tool also means changing one s professional practices. Questioning one s professional culture is not automatic. When the use of the SPR includes data entry it can be more or less important and systematic. This depends on several factors:

– organizational factors: available equipment, mastery of the tool,

protocolization or not of use within the professional s own practices and/or those of the organization, optimization of time spent entering data and use of double-entry techniques ;

– professional factors : job, population encountered (heterogeneous population including some patients with addictive behavior or a majority of patients suffering from addictive behavior), type of care (health, social), professional deontology, use of SPR by colleagues ;

– factors linked to the tool itself and the network: interest, participation in the creation of SPR files, means used for learning, time in the network.

3.4. Sharing data: different professional rationales.

Reference to a collective approach for treatment.

We can note that data is shared to achieve a specific goal: treatment of addictive behavior. This is also what determines the nature of the information shared. This does not mean sharing all data, but only information that can help other professionals treat the patient s addiction. According to the professionals encountered, by remaining within this perimeter doctor-patient confidentiality is preserved. Furthermore, SPR files serve as a guideline and limit what can be shared. And yet, depending on the profession, the question is not considered in the same terms. The use of SPR reveals different ways of apprehending the information shared verbally and in writing according to different professions. Indeed, the deontology of different professionals can interfere with sharing computerized data. By confronting the viewpoints of various professionals (general practitioners, specialists, psychologists, social workers&) different professional rationales are revealed as well as the relationship of confidence between healthcare providers and patients.

Selecting what can be consulted and what remains in the sphere of private conversation.

In addition there are also each person s professional habits and strong reservations about sharing are perceptible, even among professionals who have opted to work in a network. Certain psychologists and psychiatrists, for example, remain opposed to this record, explaining that it contains intimate information, emotions and affects which they are trying to treat. Furthermore, not sharing is also a way of preserving a certain independence for the professional by avoiding monitoring by his peers[16]. Another source of dissonance concerning sharing of data was observed: sharing data is perceived by some as promoting better treatment for some patients, but for others it is too intrusive because, from their point of view, every professional does not need to know everything in the patent s records. For them, the interest of the SPR is questionable.

Generally speaking, sharing data is easier when one knows the other professionals working with the SPR. Each person knows how the other works and the relationship of confidence that has been established alleviates any doubts about sharing.

3.5. Advantages and drawbacks of the SPR.

If professionals highlight several advantages of SPR, they also point out some limitations. These advantages and limitations can be classified according to two levels that concern the relation with the patient and, secondly, organization of work and communication between professionals.

The interest of the SPR&

The primary interest for the patient is adaptation of the treatment proposed by the practitioner according to other treatments and care performed by other professionals. The patient s history can be traced via the SPR: *Well, it s interesting because it enables an evaluation of the evolution, because, in fact, from the point of*

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[16] Ferrand A., 2003.

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view of evolution over time, the patient s complete history is in there. It s a question of temporality. We have our own vision of the evolution of things and maybe what we would like to see evolve and the patient has his own role in that and his own temporality and what he wants is not necessarily what we want or what I want, to answer your question on the record explains one general practitioner.

The SPR can easily be used to introduce temporalities and events in the monitoring of patients. There is a dual interest: for a professional treating a patient over a long period of time, the SPR is a record that enables him to observe evolutions in the patient; for a new professional, the SPR enables him to consult the patient s history and see what has already been done, if, of course, this has been recorded. The pluri-disciplinary approach to healthcare offered by the SPR enables closer monitoring of the patient s evolution and his pathology, to identify his participation in the treatment process and to take into account different patient rationales. Thus, a dual-reading of the patient s history is possible for each professional: a reconstruction of events over time as well as a global representation of care, showing both medical and social aspects.

Secondly, the SPR facilitates the organization of work by sharing information more quickly, providing access to updated information, available at any time, according to the availability of each professional:

So, it has changed my practices in that it is simpler because I worked … because I have always shared a lot, in fact. It was time consuming. That is, I had to go see people; I had to phone. And now, with the record, even if I don t have the time to go and see people, I know they have the information explains a psychologist.

Communication problems between healthcare professionals are caused by the separation of disciplines but also the availability of the different parties. They cannot always reach each other by phone and do not always write. The SPR makes it possible for everyone to access information even if everyone is not available at

the same time. As in the work of Florence Bailly[17], the technical tool has also become a regulatory tool between professionals, enabling the coordination of absences, presences and availabilities. The SPR also serves for some as a pedagogical tool. Specific files concerning tobacco or alcohol offer a way of interviewing the patient concerning his habits through a list of items. The file is not really of interest for specialists in addiction, but rather for other professionals. The files serve as a guide for professionals confronted with addictions and help organize their consultations. Also within this pedagogical approach, the SPR, through its presentation on the screen, arranges and organizes the data. A computerized tool imposes a certain precision in the data recorded. Furthermore, the files and alerts represented on the screen as alarm clocks, for example, serve as visual aids for the professional. The SPR is sometimes easier to read than a paper file.

The third element of interest is the quality and systematic nature of communication that the SPR can provide professionals. The information exchanged corresponds to a specific objective and the data is predefined. The SPR confines the inter-professional exchanges within a framework of specific information (files, items, boxes to tick&) This framework reassures professionals as to what they are exchanging, particularly for certain professionals such as nurses who fear the judgment of other professionals, notably doctors. They are only asked to enter what they have observed during consultations. They can add a few sentences in a text zone, but this is not mandatory. By limiting themselves to the items, they can avoid making a subjective judgment on a situation. Thus, the SPR alleviates certain doubts concerning the hierarchy of professions and expertise since each person enters the data related to his or her field of competency. In addition to this advantage, the structure provided by the SPR guarantees the quality of information exchanged and that it is relevant for a collective approach to treatment.

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[17] Bailly F. 2001.

& and the limitations raised by professionals.

A first limitation concerns the reduced involvement of the patient. The question of access to the SPR by the patient remains undecided. Certain professionals see this as an essential condition for them to devote time to filling in the record. From a technical standpoint, the patient has the possibility of managing the professionals authorized to access his record (but not the content). The network has not integrated this functionality yet. In fact, certain professionals are not ready to share data with patients. This possibility is a subject of debate at the heart of the network. Moreover, some have expressed doubts about the patient s authorization to create a SPR. Even if they do not question the need for each professional to carefully explain the function of the SPR to the patient, they cannot help but wonder to what extent the patient should feel obliged to take part, given that he has come to the professional for help. The network has planned to provide the patient with access to his record within the framework of the future *dossier médical personnel* (personal medical record).

Another limitation mentioned by professionals is the difficulty of adoption and mastery of the tool. It is indeed necessary to be computer literate in order to use the SPR and this takes time. Use of the SPR leads to double data entries in that professionals also keep their own paper or computer files. Even if a few, in very rare cases, have abandoned their own files in favor of ADDICA records, this is inconceivable for others:

If I enter something in the Addica record I have no trace of it in the patient s file and the patient s file is still a priority. We have that, with the letters in it, and it remains an essential tool for us according to one specialist.

The third limit concerns reservations for some professionals on sharing data. If they feel capable of exchanging information verbally, it is not always obvious for them to transmit written data if they are not already accustomed to doing so (for example, letters exchanged between doctors or doctors and paramedical professionals). The question of doctor-patient confidentiality is raised again:

For me, at the end of each consultation I have to take a few notes, minimum. And, as a psychologist, as I already question the patient in-depth, I have a personal file afterwards which I refer to as my personal notes. Because there are things that you can t put in medical records. And then there are things that can be interpreted differently, a bit subjective, which could come across as judgmental. So, like in the medical records, you just can t enter this kind of thing because today someone can consult it and in a Shared Patient Record it is not obvious because its& well, I think that would not be the right place asserts a psychologist.

In fact, if the SPR is not shared with others, or if other authorized professionals only consult it, professionals really involved in these records will have a tendency to reduce, or stop altogether, the systematic introduction of shared data.

These results were confronted with computer records (log files) recovered from the SPR hosting platform.

4. STATISTICAL ANALYSES OF COMPUTER LOGS: FREQUENCY OF USE.

The data analyzed concerns consultations by 111 doctors, hospital staff or social workers within the ADDICA network of records of 823 patients from January 2nd 2002 to 31st October 2005. The data is made up of a chronological series of pages visited, messages sent or other possible actions within the network. This is possible because the network is secure and all user actions are recorded and nominative. Since this data is confidential, use was rendered anonymous by using identification numbers instead of the real names of the people browsing the network.

The use of Shared Patient Records by professionals implies a path within the IT platform. There is a logic behind access to data.

This is described in Figure 3. Log files enable us to identify, in chronological order, the actions that take place on the platform.
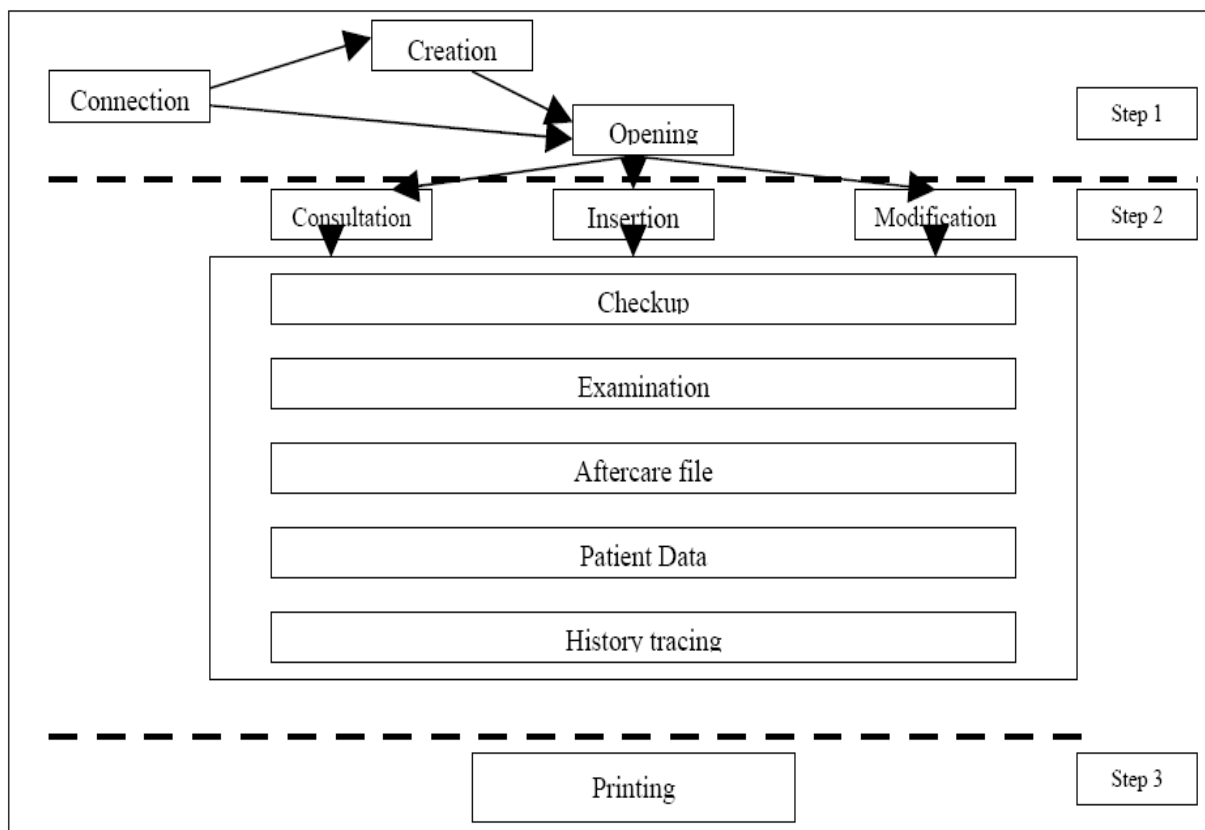

figure 3. Procedure for use of the Shared Patient Record.

Monitoring these steps in the computer database provides a first measurement of use of the SPR by professionals.

A descriptive study shows that the predominant medical profession represented in the network is the general practitioner, making up 80% of the sample, followed by nurses and psychologists.

The creation of records in the base was carried out by 62 medical staff (out of 111, or 56%). More than one third of the records (291 out of 823) were created by a single person; most medical staff having created none or only one (44% had created none, 22% only one, or more than 60% of the population).

ADDICA medical personnel can perform a wide variety of possible actions in the Shared Patient Record. There are five different ones which are listed in Table 1 along with, for each one, the average number of times they were performed by each staff member. For the action: opening a record we can observe that this action is counted each time a member of medical staff consults the SPR. It is therefore the most frequent action on the level of individual medical staff, since one person has done this 1,691 times, as well as for the entire sample.

Table 1. Descriptive statistics for each possible action concerning the Shared Patient Record.

Type of action performed	Average per medical staff member	Number of medical staff who have performed the action	Minimum	Maximum times performed by one staff member	Number of patients concerned	Average per patient
Report	77.4	80	1	1,494	801	7.5
Creation of a record	13.7	60	1	238	823	1

Initial file	17.5	31	1	276	541	0.7
Modification of patient	3.5	22	1	25	71	0.1
Opening a record	81.2	107	1	1,691	815	10.6

This table confirms the importance of the actions report and opening a record that concern the majority of medical personnel and patients, the other functions being only used by a minority of staff. An interesting case is that of initial file , used by few medical staff (31 out of 111) but which concerns a large number of patients. On average, other than the creation of the record, which is unique for each patient, all other accesses are devoted to reports (7.5 accesses per patient on average) and opening of the record (10.6 accesses on average). The other functions are used less than once per patient.

Within reports, several actions are possible: filling in of thematic files depending on the type of addiction, evaluation form for the addiction and some clinical tests. We can observe that 760 patients were subject to an evaluation of the addiction report and that tobacco use and illegal drug use files are used the most often. 532 patients have a tobacco use file.

More than 25% of the patients have a single doctor who has also created the record. We can observe that the medical staff member who created the patient s record always consults it more than once i.e. at least once after its creation. Logically, the number of actions increases proportionally with the number of medical staff involved. The distribution of actions over time between medical staff treating the same patient seems to indicate that there is a principle healthcare professional (grouping together most of the consultations). This distribution is organized in two ways, either the passage of a patient from one healthcare professional to another (in this case consultations can be split between healthcare professionals over time), or consultations with the same healthcare professional are spread out over time. The first case is frequent (nearly 40% of cases) when two healthcare professionals share the patient s record, but occurs much less often when the number of healthcare professionals per patient is greater than two

(15% in the case of 3 healthcare professionals, 6% for 4, and 10% for 5).

4.1. Use by healthcare professionals.

We can observe for the period studied an increase in used of the information system through consultations (from 0 to 1000 actions), the number of different healthcare professionals using it (from 4 to 45 a month) and the number of patients consulted (from 1 to 327 a month).

One way of obtaining a synthetic vision of the healthcare professionals with common patients is to produce a graph with at its summits the healthcare professionals and to link the professionals together if, and only if, they have accessed at least once the same patient s record.

This graph has 5 related components, i.e. there are 5 distinct groups between the different professionals. Four of these related components are small (cf. Figure 4) and one is large and groups together almost all the healthcare professionals (cf. Figure 6). The lack of connections in Figure 4 can be explained by the small number of patients treated by the professionals represented in this graph.

If we draw a parallel with the specialties concerned, Figure 4 produces the following professional networks (Figure 5):
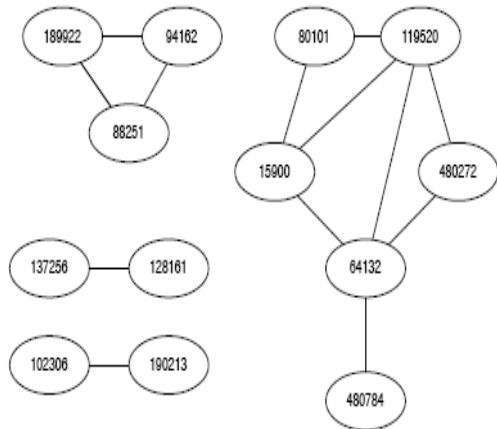

figure 4. Graph showing connections between professionals (part one) : the 4 small components.

NB: the numbers used are the identification numbers of the healthcare professionals.
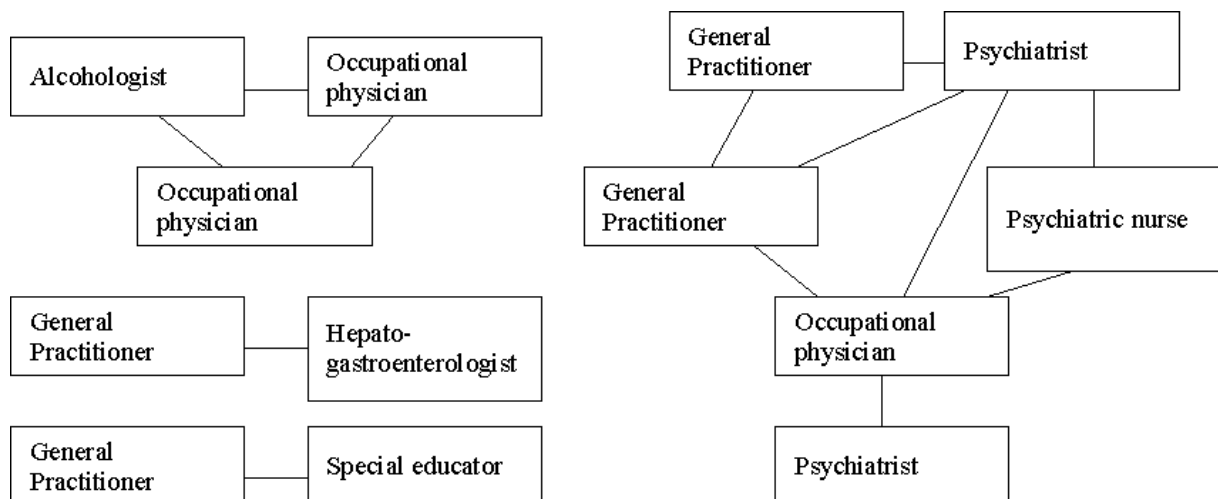

figure 5. Existing professional networks for the small related components.
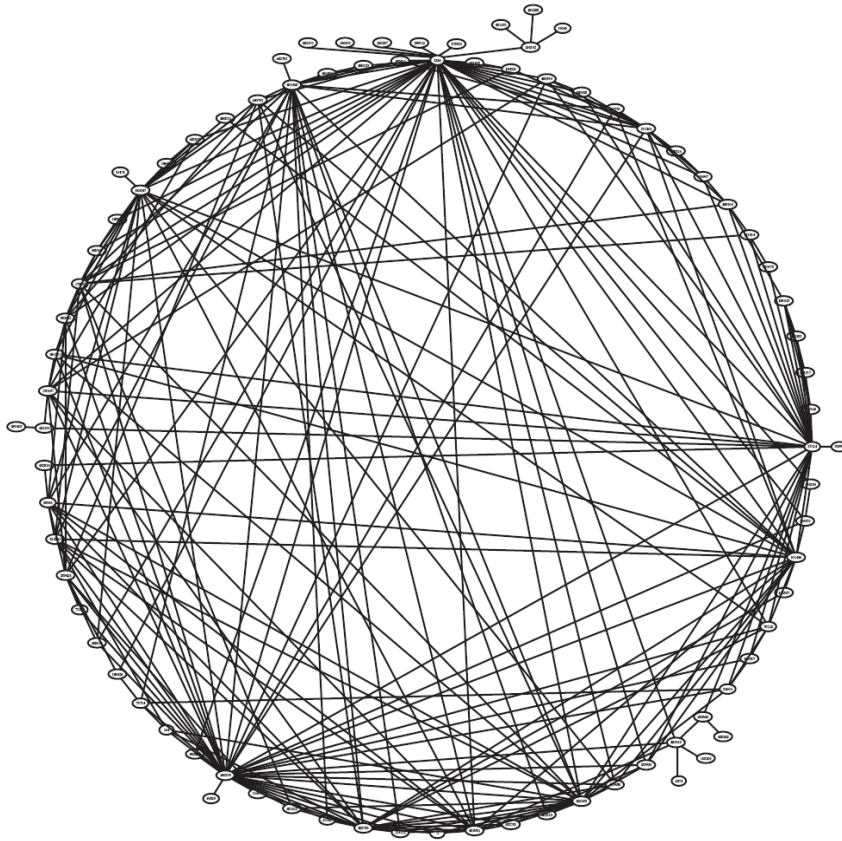
figure 6. Graph showing connections between healthcare professionals (part two).

NB: the numbers used are the identification numbers of the healthcare professionals.

Figure 6 shows that certain professionals only share their patients with one other professional (the leaves[18] of the graph), while others share patients with many other professionals. This type of graph enables us to visualize the number of connections during the 43 months of the study.

The high level of connectivity displayed in Figure 6 is not, however, surprising. The patients initially come from the same network and therefore are likely to be treated by the same team of professionals.

In terms of professional networks, we can observe the presence of some healthcare professionals at the heart of the exchanges. Figure 7 highlights the specialties concerned.
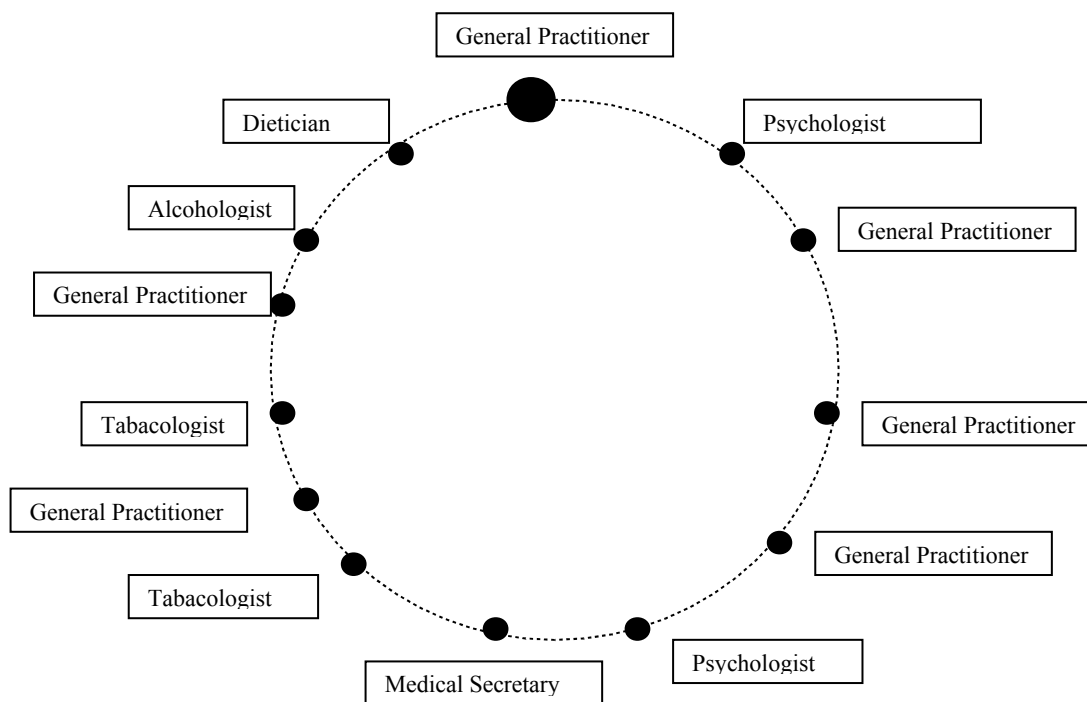
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[18] Extremities of an edge.

figure 7. Existing professional networks for the main component (representation of professionals behind strong relations).

Figures 6 and 7 therefore show numerous exchanges between different medical specialties. We can observe a predominance of general practitioners. They could represent the entry point in the network. In the same way, we can observe a search for links between general practitioners, tabacologists, psychologists, alcohologists and dieticians. Medical secretaries are also at the heart of exchanges.

This study demonstrates that the degree of use of Shared Patient Files is highly heterogeneous and includes a small group of healthcare professionals (5 with more than 1,000 consultations) who are deeply involved in its use.

Moreover, the number of variables present is of little use statistically as they either have a dominant modality or many modalities that do not reflect whether the healthcare professional has used it. Thus, from a methodological standpoint, factorial and classification methods could not be applied because the data was too heterogeneous to establish and classify existing correlations between professionals and identify groups of homogeneous practices.

However, even if the information system is used in a non-homogeneous manner by healthcare professionals, it seems that sharing of records is a reality (even if only two professionals are treating a patient, there is a large turnover in the number of professionals consulting records).

Finally, the number of uses of Shared Patient Records has increased constantly since the concept was launched, both in the number of professionals who consult them and the number of patients treated.

This leads us to believe that medical staff is now convinced of its usefulness and that its use will become more homogenous among the professionals involved.

5. CONTINUITY BETWEEN MEASUREMENT OF FREQUENCY OF USE AND RATIONALES FOR USE.

The first result is the demonstration that between the representations by professionals of their own practices and the type of actions performed within the SPR, the distance is null. Indeed, the professionals encountered did not overestimate or underestimate their use of

Shared Patient Records. This means that the professionals have adopted the tool with full knowledge of the facts and are capable of identifying its role within their practices. The statistical analysis thus becomes essentially a supporting measurement and reveals no distortions with their statements. This measurement tool however remains necessary because it enables us to set a scale of values for usage. The latter is often evaluated in terms of progression and not in real values.

The principle hypothesis concerned the effect of an information system on inter-professional practices. Seven results are outlined below and were produced by the two methodological approaches.

Result 1: The use of SPR has increased since the creation of the network: new healthcare professionals have adopted it, more patients are concerned, actions are more diversified (more creators of new records, more consultations of files&)

Result 2: General practitioners are the dominant group within the network and remain the entry point in the network for patients. They create the most new records.

Result 3: Use depends on relations with others. The more a professional shares with others the more he uses the different items in the records, essentially in terms of consultations. We also observed, however, privileged relationships with professionals outside the network.

Result 4: Boundaries between professionals are blurred within the network. Each professional benefits from the information entered by all the professionals without making any value judgments since the data is usually succinct. There is a looser hierarchy between healthcare and social services; each professional, by contributing his knowledge, improves the patient s treatment.

Result 5: The Shared Patient Record is an important vector for sharing information. For example, the tobacco use file was consulted by 26 doctors for 532 patients.

Result 6: There is one, more popular, member at the basis of each link and who links with the others. Indeed, one general practitioner performed more than 1,000 operations within the platform.

Result 7: Around this leading member revolves a small group of 4 people. We can observe the strong links between these people and the movement of patients from one to the other.

Then we can formulate four hypotheses. These are propositions that could not be validated as they emerge from previous results or were observed with one of the approaches but not the other.

Hypothesis 1: There are operational rules. We can suppose that doctors read all entries by their colleagues before each consultation as there can be periods between appointments.

Hypothesis 2: New links appear endogenously inside the network. Two professionals start to share information although they did not know each other before.

Hypothesis 3: There are different user profiles depending on time in the network, specializations, and level of involvement.

Hypothesis 4: There are typical patient paths.

We have observed that the period of time in the network and the relationship of confidence established with other members structure different uses of SPR. Indeed, having a computer does not necessarily imply the use of tools offered by the network. The use of a data sharing tool represents a step in the process of restructuring different forms of professional activities.

Dissipating the fears related to the SPR requires setting up discussions and questioning the use of this tool. This question must be asked time and again, even after several years of using the SPR, within the network in order, on the one hand, to integrate new members, and, on the other hand, to maintain the interest of others. The latter demand an evolution in the SPR: modifications according to the uses of different people and the

new organization of work that has developed over time, adaptation of files to the professional members. Furthermore, making the SPR compatible with the tools of each professional seems to be a condition for its longevity.

6. CONCLUSION.

Currently, the evaluation of uses of information systems does not have a definite framework. We proposed in this case a mixed evaluation combining sociological and statistical analysis of actions recorded by a computer tool, the latter enabling essentially the measurement of the value of uses.

To conclude, our method enabled us to reveal a certain number of advantages linked to the use of Shared Patient Records:

- Instant availability of information

- Greater rapidity in acquiring knowledge about the patient

- A spirit of sharing

- An effort to summarize, simplicity of items

- Permanent updating of patient records

- Knowledge on the commitment of the patient to the treatment of his illness through the frequency of consultations in the network

- A legible interface for monitoring the patient that can be presented to him

- Secure data

- An opening up to different organizations and specializations

- Use as a pedagogical tool

The drawbacks linked to its use are:

- Computer equipment and high speed internet access are required

- Lack of interoperability with the information systems of the professional structures of members

- Information is reduced to a list of items

- Learning to use the tool can be long

- The record is not filled in systematically after each patient visit

- The technical aspect can disturb doctor-patient relations

- Sharing is a new phenomenon

- Interpretation of data from other professionals linked to the record

- Existence of a record of verbal information

- Double data entry: between the paper record and the SPR and the personal file and the SPR.

This network owes its success to the motivation of a few members, an organization which is clear and operational, the support of a coordination team and the group culture created by the use of a common tool.

It is not just a computer network, otherwise the analysis of log files would have been sufficient to publish the results obtained. Yet, we observe that the existing inter-professional links and the desire to share information about patients have resulted in the creation of a community of professionals united by a common goal: better treatment of patients. Our interviews have highlighted these elements.

On a final note, let us remember that the Shared Patient Record still remains for most healthcare and paramedical professionals and most social services a complement to paper records. Total substitution has not taken place. Paper records remain the norm, to which storage of computer files has now been added.

BIBLIOGRAPHY

Bailly F. (2001), Les usages des technologies de l information et de la communication dans les milieux tertiaires, approche sociologique , http://www.urishn.asso.fr/bailly.com

Callon M. (1986), Eléments pour une sociologie de la traduction. La domestication des coquilles St Jacques

et des marins pêcheurs dans la baie de St Brieuc ,
L'année sociologique, n° 36.

Callon M. et alii (1999), Réseaux et coordination, Paris,
Economica.

Callon M. (1999), Le réseau comme forme émergente et
comme modalité de coordination : le cas des
interactions stratégiques entre firmes industrielles et
laboratoires académiques , in Callon et alii, (1999),
Réseaux et coordination, Paris, Economica, p. 13.

Cardon P., Trellu H., (2004). Les personnes
vieillissantes et la télé-assistance : privilégier la
dimension relationnelle , Les nouvelles technologies
dans la cité, Rennes, décembre. Cahier de recherche
de M@rsouin n°1-2004.
http://www.marsouin.org/article.php3?id_article=44

Delone W.H., McClean E.R. (1992). Information
Systems Success : the Quest for the Dependent
variable , Information Systems Research, 3(1), p.
60-95.

Depinoy D. (2005), ADDICA, un réseau au cSur de la
complexité de la prise en charge des conduites
addictives , in Technologie et Santé, 55/56,
Septembre/octobre, 121-128.

Domin J.-P. (2004), Les réseaux de santé : une nouvelle
approche de la médecine entre proximité et
communauté, Communication aux 4e journées de la
proximité, GREQAM, Université de Marseille

Dubar C., Tripier P. (1998), Sociologie des professions,
Armand Colin, Paris.

Ferrand A., (2003) Visions profanes des réseaux de
soins : comment les patients perçoivent les relations
entre leurs soignants , in Cresson Geneviève, Drulhe
Marcel, Xavier-Schweyer François, Coopérations,
conflits et concurrences dans le système de santé,
Editions ENSP.

Grenier A., 2004, Exercice groupé et réseaux de santé.
La pratique de la médecine libérale sort de
l isolement , Actualité et Dossier en Santé Publique, n
°49, décembre.

Kefi H., Kalika M. (2004). Évaluation des systèmes
d information : une perspective organisationnelle,
Economica, Paris.

Levasseur G., 2004. Les réseaux : changements de
pratiques ou pratiques de changement,
http://homepages.ulb/ac.be/~bdujardi/psd/foresa/resea
ux.pdf

Strauss A., (1992). La trame de la négociation : sociologie
qualitative et interactionniste, Paris, L Harmattan.

Trellu H., Le Borgne-Uguen F. (coll.), 2007, Création des
réseaux de santé et usages du dossier médical partagé,

in Pennec S. (coord.), Productions de santé, Cahiers de
l ARS , sous presse.

Vinck D. (1999). Les objets intermédiaires dans les
réseaux de coopération scientifique. Contribution à la
prise en compte des objets dans les dynamiques
sociales , Revue française de sociologie, XL(2),
385-414.

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