

Open sources information systems used in risk management for healthcare

Daniela Drugus, Doina Azoicai and Angela Repanovici

Abstract— The paper presents the importance and benefits of open sources especially those regarding healthcare. The risk management process includes different methods of decision making considering the predictable and unpredictable risk situations. The basic principles of risk management are analyzed. Authors start from the assessment of risk management implementation need in the Romanian healthcare system. A quality marketing research based upon a previous documentation from specialized literature is performed. We used a SurveyMonkey online questionnaire and present the research results.

Keywords— computerized systems, open sources, risk management, sanitary system, Romania.

I. INTRODUCTION

THE management of information within the healthcare system has developed in various directions. Medical information and documentation centers put at the disposal of the interested medical parties various possibilities for storing, archiving and accessing information. Referring to risk management, the situation is still at an individual level, there are no information instruments or procedures distributed or shared between different institutions of the healthcare system. Risk management in health care is defined “by clinical and administrative activities undertaken to identify, evaluate, and reduce the risk of injury to patients, staff, and visitors and the risk of loss to the organization itself” [1]. The 7 steps in the Risk Management process are establishing the context, “identifying, analyzing, evaluating, and treating the risks, continuous monitoring and review, and communication and consultation” [2]. The policy development and executive program in risk management system “consisted of designating a leader and coordinator core and defining its role” [3], and defining communications with hospital boards and committees, describing processes and preparing the infrastructure for patient safety education and culture-building [4].

Risk management has had reactive and proactive approaches including adverse event reporting and learning, root cause investigation and failure mode and effect analysis [5].

Daniela Drugus is with the Medicine and Pharmacy University, Iasi, (e-mail: drugus_daniela@yahoo.com).

Doina Azoicai is with the Medicine and Pharmacy University, Iasi, Romania (e-mail: doina.azoicai@gmail.com).

Angela Repanovici is with Transilvania University of Brasov, Romania, Faculty of Product Design and Environment (corresponding author , 40745820361, e-mail: arepanovici@unitbv.ro).

II. THE VALIDATED MODEL FOR RISK MANAGEMENT SYSTEM

Health and clinical service delivery organizations are obliged to provide a safe environment for patients as well as staff [6].

Several different studies revealed that risk management is the basis for minimization of medical errors and enhancement of patient safety in hospitals which needs to be implemented as strategies and practical plans; and, simultaneously, clinical staff should be trained and well oriented of different risk management guidelines and scheme [7].

Results of different research studies have demonstrated that educating staff regarding safety measures can lead to patient safety improvement [8]. The policy development and executive program in risk management system consisted of designating a leader and coordinator core and defining its role, and defining communications with hospital boards and committees, describing processes and preparing the infrastructure for patient safety education and culture-building [5].

Risk management has had reactive and proactive approaches including adverse event reporting and learning, root cause investigation and failure mode and effect analysis. (Fig. 1).

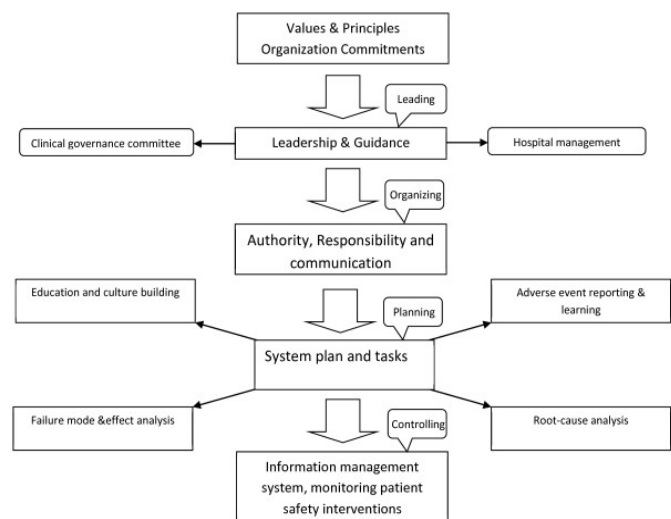


Fig. 1 The validated model for risk management system [5]

III. RISK MANAGEMENT IN THE ROMANIAN HEALTHCARE SYSTEM

The implementation of risk management systems in the healthcare sector is facilitated by the legal framework in force resulted from the transposition of European directives in the Romanian legislation and the harmonization of the national legislation with the international one. The spade work refers to training the employer as well as the employee for elaborating the risk management system. At this phase, the following actions must be taken into consideration:

- the staff attending specialized training courses,
- proper documentation on the requirements for implementing the management system,
- providing specialized consultancy for elaborating and implementing the system, consultancy for which must be contracted only widely recognized experienced institutions [9].

IV. METHODOLOGY

The authors have developed a qualitative marketing research study regarding the implementation level of the risk management system in the healthcare system. The research relied on an online questionnaire, survey monkey, <https://www.surveymonkey.com/s/ML2GS72>

The questionnaire was sent to the health care institutions in Iasi, Romania, a university centre with an old university tradition where there is also one of the oldest universities of medicine. The survey was conducted from January – March 2013. The survey focused on the development degree within the healthcare organizations – university, hospitals, support institutions – of the structures specialized in risk management.

V. RESULTS

We used Survey Monkey™ to anonymously survey in health institutions.

We received answers from all the institutions which implemented risk management. The survey is validated by the gender relation, men-women, and the staff structure within the institutions taking part at this research study.

We continue with presenting the answers to the 11 questions asked.

Question no. 1 “Within your organization is there a structure supporting the process of risk management?” 97.87% of which answered “yes”, 0% answered “no”, and 2.13% answered “there are attempts” (Table I).

Table I Institutions supporting risk management

YES	NO	THERE ARE ATTEMPTS
97,87%	0%	2,13%

At question no. 2 “Do you have system and/or operational system procedures that regulate the activity of identification,

measuring, hierarchization, treating, monitoring and documenting the risks that can affect the organization?” 95.74% answered “yes”, 2.13% answered “no” and 2.13% answered “there are initiatives” (Table II).

Table II Institutions having operational system procedures

YES	NO	THERE ARE INITIATIVES
95,74%	2,13%	2,13%

At question no. 3 “Do you asses and document the risk when you take important decisions (initiating projects, drawing up strategic plans etc.)?” 95.74% answered “yes”, 4.26% answered “no” (Table III).

Table III Assessment of risk initiatives

YES	NO
95,74%	4,26%

At question no. 4 “Is any type of professional training method used to facilitate and develop the amount of information referring to risks?” 95.74% answered “yes”, 4.26% answered “no” (Table IV).

Table IV Professional training existence

YES	NO
95,74%	4,26%

At question no. 5 “Are there plans for emergency situations that correspond to unlikely situations, but with major consequences, which can block the organization’s activity?” 80.85% answered “yes”, 0% answered “no” and 19.15% answered “there are intentions of drawing them up” (Table V).

Table V Emergency plans existence

YES	NO	THERE ARE INTENTIONS OF DRAWING THEM UP
80,85%	0%	19,15%

At question no.6 “Does the organization use risk transfer or sharing instruments with other organizations (eg. Insurance companies)?” 48.89% answered “yes”, 31.11% answered “no” and 20% answered “there are intentions” (Table VI)

Table VI Use of risk transfer instruments

YES	NO	THERE ARE INTENTIONS
48,89%	31,11%	20%

At question no. 7 “Is there a risk reassessment process after the implementation of the measures meant to

diminish/counteract the risk identified?” 70.21% answered “yes”, 6.38% answered “no” and 23.40% answered “there are intentions” (Table VII).

Table VII Existence of risk reassessment process

YES	NO	THERE ARE INTENTIONS
70,21%	6,38%	23,40%

At question no. 8 “What are the limitations preventing you to implement the plans on diminishing risks?” lack of funds 2,12%, legislative limitations 17,02, the respondent’s lack of decisional power 2,12%, absence of trained staff in this field 2,12%, the risk management information is unclear and undifferentiated on fields of activity, 2,12%, don’t know 2,12%, there are no limitations 4,25% (Table VIII).

Table VIII Limitation situation in implementing preventing risks

Lack of funds	2,12%
Legislative limitations	17,02%
The respondent’s lack of decisional power	2,12%
Absence of trained staff in this field	2,12%
The risk management information is unclear and undifferentiated on fields of activity	2,12%
Don’t know	2,12%
The are no limitations	4,25%

At question no.9 “What do you think is the main risk for your organization?” the following major risks have been stated: insufficient financing 21,27%, reduced activity due to the decreased number of students and employees 2,12%, measures which lead to the unfulfillment of the objective 4,25%, measures taken against the organization’s interests 2,12%, routine 2,12%, lack of interest in becoming familiar with the legislative field 2,12%, unknown external factors 2,12%, don’t know 2,12%, there are no risks 2,12% (Table IX).

Table IX The main risk for organizations

Insufficient financing	21,27%
Reduced activity due to the decreased number of students and employees	2,12%
Measures which lead to the unfulfillment of the objective	4,25%
Measures taken against the organization’s interest	2,12%
Routine	2,12%
Lack of interest with the legislative field	2,12%
Unknown external factors	2,12%
Don’t know	2,12%
There are no risks	2,12%

At question no. 10 “Your gender” 80.43% have been females and 19.57% males (Table X).

Table X Gender situation

FEMALES	MALES
80,43%	19,57%

At question no.11 “Your institution” the following institutions being represented: public or state institutions, “Gr.T. Popa” University of Medicine and Pharmacy Iasi , hospital, Department of public health, Forensic Medicine Institute of Iasi (Table XI).

Table XI Institutions segmentation

Public or state institutions	44,6%
“Gr. T. Popa” University of Medicine and Pharmacy Iasi	25,53%
University	14,89%
Hospital	6,38%
Department of public health	4,25%
Forensic Medicine Institute of Iasi	2,12%

VI. DISCUSSIONS

Most institutions have implemented structures for risk management consisting in a set of procedures and rules according to the legal provisions in force. Any initiative or project starts with the assessment of risks. There is a training plan in this field and an emergency situation plan, but not in all institutions. In some institutions there is only the intention of taking these measures.

Unfortunately, 31% of the respondents are not aware of any collaboration and cooperation initiatives with other institutions for reducing risks.

The majority considers risk reassessment should be conducted after the implementation of the measures, but there are institutions in which this presents itself just as an intention. The legal limitations and the insufficient founding prevent the system from developing better.

We consider that better dissemination and collaboration on the measures and good practices in diminishing risks are effective solutions and not very expensive. Using an Open source platform for dissemination, information, documentation and collaboration in the field of risk management might be the best solution, with low costs and maximum efficacy in any informational society.[10],[11],[12].

VII. OPEN SOURCE RISK MANAGEMENT PLATFORM

“Mirth Connect is one of healthcare integration engines, specifically designed for HL7 message integration. It provides the necessary tools for developing, testing, deploying, and monitoring interfaces. And because it’s open source, there are all of the advantages of a large community of users with quality support” [13]. RMI (Risk Management Data) data were

published to Mirth Connect. Mirth Connect is an open source product created by Mirth Corporation to transform messages among formats and/or route them from one location to another. Mirth Connect creates Nationwide Health Information Network (NwHIN) in others countries, Document Submission (XDR) messages from HL7 2.x and ICD-9-CM data files [14].

The platform was developed to receive the sources of RMI in different formats, generate RMI narrative texts in structured data, normalize these data using clinical models and Consolidated Health Informatics standard terminologies [15].

VIII. CONCLUSIONS

The findings of the research study indicated that the institutions have system procedures and the culture of risk assessment exists when important decisions have to be taken. The universities include in their curriculum courses of risk management but there are no training courses, towards which people showed great interest. There are also plans for emergency situations at most institutions.

It was noticed that the obstacles preventing the implementation of risk management plans can be overcome by creating a joint source for documentation, information centers regarding the legislation in force, implementation methods and practices, the existent procedures.

Following this analysis of needs, documents and procedures included in risk management, we implemented Mirth Connect, an open source software for information management, used to integrate procedures and risk analysis. This portal will represent a collaboration instrument and it will be useful in sharing experiences.

REFERENCES

- [1] Joint Commission Improving America's Hospitals. (2007). *The Joint Commission's Annual Report on Quality and Safety*. Available: http://www.jointcommission.org/improving_american_hospitals_joint_commission_annual_report_quality_safety_2012/, [accessed June 20, 2013].
- [2] Tasmanian CT review team Risk management process. (2003). *Draft guidance manual for infrastructure operators*. Available: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3598162/>, [accessed June, 1, 2013].
- [3] J. Miller The definition of Risk Management in Health Care. *E-How Health* [online] Available online: http://www.ehow.com/about_6619711_definition-risk-management-health-care.html, [accessed June 20, 2013].
- [4] J R Coll Physicians Lond, in *PubMed Abstract*, 32(2), pp.125-129, 1998..
- [5] H. Adibi, N. Khalesi, H. Ravaghi, M. Jafari and A.R. Jeddian, Development of an effective risk management system in a teaching hospital, in *Journal of Diabetes & Metabolic Disorders*, vol. 11-15 Available: <http://www.jdmonline.com/content/11/1/15>.
- [6] C. Hare, C. Davies, M. Shepherd, Safer medicine administration through the use of e-learning, in *Nursing Times*, 102(16), pp. 25-27, 2006.
- [7] G. Neale, *Risk management in the care of medical emergencies after referral to hospital*, [online] Available <http://www.ncbi.nlm.nih.gov/pubmed/9597627>, [accessed June, 1, 2013].
- [8] D.A. Handel, K.J. McConnell, Emergency department length of stay and predictive demographic characteristics, in *Ann Emerg Med*, 50(3), :p.70, 2007.
- [9] *Stadiul actual al managementului securitatii si muncii in Romania*, cadrul legislativ, The present stage of labour and safety management in Romania, legal framework [http:// www.management/managementul-muncii/Stadiul-actual-al-managementul65785.php](http://www.management/managementul-muncii/Stadiul-actual-al-managementul65785.php), [accessed June 20, 2013]
- [10] A. Comsa,I. Maniu,, N. Modler, W. Hufenbach, W., EC Lovasz,, V. Ciupe, An Overview of Library Automation in *Mechanisms, mechanical transmissions and robotics Book Series: Applied Mechanics and Materials*, (162) 583-588, 2012
- [11] E.C.Lovasz, D. Perju, KH Modler, A.E. Lovasz, I. Maniu, C. Gruescu, D.Margineanu,V. Ciupe, ,A. Comsa, Demonstrative Digital Mechanisms Library in Mechanisms, *Mechanical transmissions and robotics Book Series: Applied Mechanics and Materials* (162), 37-46, 2012
- [12] V. Ciupe, EC Lovasz, CM Gruescu, High Quality Document Digitization Equipment, in *Mechanisms, mechanical transmissions and robotics Book Series: Applied Mechanics and Materials* (162), 589-596, 2012
- [13] Mirth Connect, Mirth Corporation (2011), <http://www.mirthcorp.com/community/mirth-connect>, [accessed June, 1, 2013].
- [14] S. Rea, J. Pathak, G. Savova, T.A. Oniki, L. Westberg, C.E. Beebe, C. Tao, C.g. Parker, P.J. Haug, S.M. Huff and C.G. Chute, Building a robust, scalable and standards-driven infrastructure for secondary use of EHR data. The SHARPN project, in *Journal of Biomedical Informatics*, 45, pp.763-771, 2012..
- [15] Meta health Care, Mirth solutions (2013), <http://www.metahealthcare.com/solutions/mirth/>, [accessed June, 1, 2013]