

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
ESCOLA DE ENGENHARIA
PROGRAMA DE PÓS-GRADUAÇÃO EM ENGENHARIA DE PRODUÇÃO

**The Economic Enterprise Risk Management Innovation
Program for healthcare organizations: E²RM_{healthcare}**

ANA PAULA BECK DA SILVA ETGES

Porto Alegre, 2018

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Defesa de Tese de Doutorado submetida ao Programa de Pós-Graduação em Engenharia de
Produção da Universidade Federal do Rio Grande do Sul
Orientador: Prof. Francisco José Kliemann Neto, Dr.

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Program for healthcare organizations: E²RM_{healthcare}

Esta tese foi julgada para a defesa de doutoramento pelo Orientador e pela Banca Examinadora designada pelo Programa de Pós-Graduação em Engenharia de Produção da Universidade Federal do Rio Grande do Sul.

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Resumo

A Gestão de Riscos Corporativos (ERM), a partir das publicações da ISO 31000 em 2009 e do guia do COSO em 2007, vem sendo aplicada e adaptada às especificidades de múltiplos mercados. O contexto hospitalar, caracterizado pela necessidade de avanços em sistemas e métodos gerenciais que permitam maior acurácia de informações e sustento na orientação à tomada de decisão, passou a, também, interessar-se pelo valor da ERM. Influenciado pelos programas de qualidade e segurança do paciente e de gestão de riscos assistencial, presentes na cultura hospitalar mundial, gestores estratégicos à frente de organizações de saúde começaram a procurar por metodologias que possam ser adaptadas à complexidade de um hospital e apoiem a implementação da ERM. A literatura prévia ao desenvolvimento desta tese não apresenta um modelo que consolida e orienta a operacionalização da ERM em organizações de saúde, mas destaca em múltiplas publicações a necessidade que os hospitais têm de atentar a metodologias que permitam gerir de forma proativa e estratégica seus negócios, que estão expostos a riscos internos e externos. Motivada pela lacuna descrita, esta tese explorou o mercado brasileiro e norte americano através de entrevistas, estudos de caso e survey, e propôs um modelo global de ERM para organizações de saúde: o E²RMhealthcare. Este sugere requisitos para a operacionalização global da ERM e é fragmentado em 4 níveis: *risk baseline*, *education*, *quantitative* e *governance* que orientam uma implementação gradual, considerando a maturidade de gestão da organização. Formas de como explorar as características do hospital e capital humano para exercer a ERM também foram estudadas, sendo proposto uma relação entre as equipes de avaliação de tecnologias de saúde hospitalar e de ERM no processo de criação de valor da organização através de um mapa de causa e efeito. Como destaque do negócio saúde, essa tese inova propondo o primeiro inventário de riscos corporativos orientado a organizações de saúde que foi validado por gestores de múltiplos países, identificando o risco de ataques cibernéticos como o principal. Por fim, o uso de métodos de análise multicriterial e de custeio por atividade são aplicados como soluções inovadoras para a priorização e avaliação econômica de riscos ao longo dos níveis Baseline e Quantitative do E²RMhealthcare. O avanço do E²RMhealthcare com estas metodologias incorporadas para um software com capacidade de inteligência artificial é deixado como sugestão de trabalhos futuros além da sua real aplicação em múltiplos casos.

Palavras chave: Gestão de Riscos Corporativos, ERM, Gestão da saúde, Economia da saúde, Análise de riscos em saúde.

Abstract

Since the ISO 31000 publication in 2009 and the COSO guide in 2007 Enterprise Risk Management (ERM) has been applied and adapted to the specificities of different business markets. The hospital context characterized by the demand for advances in management systems and methods that allow to improve information accuracy and to support the decision-making process, also became interested in the value of ERM. Influenced by quality and patient safety and healthcare risk management programs presents in the global hospital culture, managers at the top of healthcare organizations started to look for methodologies that can be adapted to the hospital management complexity to support the ERM implementation. The literature, prior to the development of this thesis, does not present a model that consolidates a guide to operationalize ERM in healthcare organizations. Although emphasizes, in multiple publications, the urgency for methodologies that enable proactive and strategic management of healthcare businesses, which are exposed to internal and external risks. Motivated by the described gap, this thesis explored the Brazilian and American healthcare market through interviews, case studies and survey, and proposed a global ERM model for healthcare organizations: E²RMhealthcare. It suggests requirements for global operationalization of the ERM and is organized in 4 levels: risk baseline, education, quantitative and governance that guide a gradual implementation, considering the maturity of the organization management. Different manners to explore the features of the hospital and human capital to operate the ERM were also studied, and it was proposed a relation between the hospital healthcare technology assessment teams and the ERM in the value creation process of the organization through a cause and effect map. Focusing on the healthcare business, this thesis innovates by proposing the first enterprise risk inventory aimed at healthcare organizations that was confirmed by risk managers from different countries. Cyber-attack was identified as the main enterprise risk in healthcare. Finally, the use of multicriterial analysis methods and activity-based costing are applied as innovative solutions for prioritization and economic assessment of risks throughout the Baseline and Quantitative levels of E²RMhealthcare. The progress of E²RMhealthcare with these incorporated methodologies for a software with artificial intelligence capacity is left as a suggestion for future studies, in addition to its actual application in multiple cases.

Keywords: Enterprise Risk Management, ERM, Healthcare Management, Healthcare economics, Risk analysis in healthcare.

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1 INTRODUCTION

Hospital management has been discussed in literature and pursued by hospitals that look for excellence in delivering their services to the society. The complexity inherent to multiple client environment and the diversity of services increases the demand for using practices that enable wide and effective management of healthcare organizations (BLAIR et al., 2001).

Since the publication of the book entitled “*Err is Human :: building a safer Health System*” by the Institute of Medicine of the United States (2000), the spread of the safety and quality culture encouraged the adoption of risk management practices in hospitals. Amongst the reasons leading to this seminal publication, it is worth mentioning the existence of high risks in healthcare environments due to the volume of employees, high degree of interdependence between areas (LEAPE & BERWICK, 2005, CELONA, JOHN; DRIVER, JEFFREY; HALL, 2010), technological complexity and significant volume of standards and laws they are subject (GREEN, 2005, CARE, 2014). Aiming at regulating hospitals regarding safety and management, institutions such as the Joint Commission International (JCI), the American Society for Healthcare Risk Management (ASHRM), the World Health Organization (WHO) and the National Agency of Health Regulation (*Agência Nacional de Vigilância Sanitária* - ANVISA) started to employ efforts to improve patient's safety and hospital management.

The risk management standard, ISO 31000, defines risk as the effect of uncertainty in objects (PURDY, 2010, AVEN, 2011). Risk is defined, in other studies, as the possibilities of different outcomes for a certain situation and refers to the presence of the estimated variability, through distributions of probability or not, on an expected result (AVEN, 2012).

From the identification of the presence of risks in complex management environments, literature has proposed models that aim the management of enterprise risks. Among them there is the one described in the chapter eleven of PMBoK (PMI, 2015), which focus in managing project risks, proposing the use of qualitative and quantitative analysis. The model developed by the Committee of Sponsoring Organization of the Treadway Commission, which defines the key components for using Enterprise Risk Management (ERM), discusses fundamental principles and concepts and suggests a common language for risk classification (COSO; PWC, 2007). Despite widely spread, COSO does not suggest tools conduct its deployment (SOUZA, 2011) being deemed as a theoretical model, of

difficult real application in practice (CARON et al., 2013). There is still the Model for Identification and Management of the Risk Level of Companies (MIGGRI - *Modelo para Identificação e Gerenciamento do Grau de Risco de Empresas*), which, from the previous models, enables measurement for reaching this result (SOUZA, 2011).

The three models mentioned have methodologies that were developed and have been implemented in service companies and large manufactures. For the specific hospital environment, it is noticeable the existence of methods that use mainly COSO (CARE, 2014) to propose methodologies that pursue the expected performance aimed at the specifics of the context of institutions linked to human health (BAKER, 2010).

1.1 Theme and objectives

The development of risk management methods and ERM for hospital environments represents the focus theme of this thesis. The World Health Organization, through the International Classification for Patient Safety, translated the key concepts related to risk management in a hospital environment, suggesting a ranking hierarchy for types of risk involved in a hospital environment. JCI started to consider in its accreditation the execution of practices aimed at risk management in hospitals accredited by it. Carrol (2010), in Risk Management Handbook for Healthcare Organizations, consolidated practices and knowledge about the topic, encouraging the dissemination of existing guides. Hospital regulating institutions around the world have issued guides aiming at guiding hospitals in the adoption of practices to turn risk management a habit in hospital management. Among them are worth mentioning: the *Healthcare Insurance Reciprocal of Canada* (HIROC); the *American Society of Healthcare Risk Managers* (ASHRM); and the *National Health Service* (NHS).

The HIROC in 2014 proposed the risk resource guide, Integrated Risk Management for Healthcare Organizations. It analyses previous models in order to conceptualize integrated risk management tools and methods. Thus, the result is a proprietary methodology, which has a risk management software for hospitals that show interest.

Amongst the contributions that differentiate the HIROC model from the others, it suggests a risk taxonomy, showing key types of risk which a hospital is subject to. In addition, agreeing with the use of the classification proposed in COSO, the taxonomy suggested by HIROC indicates consideration of 11 categories: Care; Working Environment; Financial; Leadership; External Relations; Technology; Facilities; Regulatory; Education;

Research; and Community Medicine. These categories allocate 118 types of risk present in a hospital environment. However, if there is no information on the severity, impact or frequency of the risks evidenced in the taxonomy and, regardless of the theoretical foundation on the awareness about the use of risk management practices being detailed in the document, the source of the classification suggested in the taxonomy is not clear.

ASHRM proposes an ERM encouraged by the concept that risk managers may be able to generate proactive changes in a hospital. This position is based on reviews of concepts on the topic and indicates that systemic use of ERM practices has as principle the education of employees aiming at aligning everybody to the strategy of the organization (ASHRM, 2006). Its first action is educating all employees regarding risk management concepts and the opportunities it rises in a hospital environment (ASHRM, 2006).

From the dissemination of the concepts involving management, the ASHRM (2006) model, mainly based on COSO (2007), suggests that risk plan strategic planning is unfolded, so that risks are linked to the strategic objectives. It uses a ranking of six risk categories: operational; financial; human; strategic; legal; and technological. Then, the organization must define the level of appetite and risk it is willing to accept for each of the categories.

Along the ASHRM (2006) suggestions are pointed that the identification of risks in the strategic unfolding must be continuous. Risks must be assessed regarding their impacts on the organization as a whole and, according to severity, plans must be established to manage them. There must be a person responsible for management who, according to existing possibilities, must avoid, accept, reduce or share critical risk. Intending at coordinating the progress of risk management actions, there must be a *Chef Risk Officer*, who should be an experienced professional, with a wide view of all categories and, mainly, of the correlations between hospital services and areas.

The NHS (2008) developed a guide aiming at providing guidance to use risk management practices in hospital environments (NATIONAL PATIENT SAFETY AGENCY (NPSA), 2008a). The guide is intended to answer four questions: what may present danger; how it may happen; with what frequency; and if any action is required. The guide suggests, with the cyclical use of these four questions, that hospitals implement their risk management models with a corporate approach, valuing the existing opportunities to work with the correlation between services and sectors. Risk assessment is focused, in this

guide, in qualitative analysis of severity from the crossover between occurrence impact and probability, not emphasizing the relation with strategic unfolding.

In addition to the guides and models suggested by the aforementioned institutions, some authors have developed studies on this topic. Among them Haney, Church, & Cockerill (2013) proposed an ERM model presenting as main differentiator the adaption of widespread models to the specifications of Canadian healthcare environment. The authors explored the current barriers by trying to implement, in hospitals, models that were already in practice in other market niches, and their model was structured in five phases: (i) organizational risk network; (ii) corporate risk management framework; (iii) strategic planning and decision process; (iv) implementation; and (v) assessment.

The first phase focuses on the connection between operating managers of the hospital and the remaining *stakeholders*, so that by exchanging information it is possible to establish the operational risks and their impact on several stakeholders. The ERM framework is aimed at spreading the practices in the environment and answering questions about how risks are managed; how they are related to the decisions; and how they relate to the vision, the mission and the values. In the third phase the authors are aware that ERM is essential for the strategic decision making of the company, therefore the assessed risks must be associated to the strategic goals of the hospital. The implementation phase must be characterized by effective communication between the parties, documenting what is being done, the sense of urgency among the managers and everyone's engaged involvement. Finally, the assessment must have performance indicators that enable assessing risk mitigation in all levels, with effective cost reduction or improvement of the quality of operational services (HANEY et al., 2013). Regarding the importance of communication, Kaplan et al. (2016) suggest that its presence among multiple healthcare professionals and with the patient is essential for the clinical or management decision making, exposed to risks, to contribute to the capacity of adding value of a healthcare organization. It is noticeable the value of incorporating communication practices and adopting an information system when building the ERM.

In the pursuit of guidance for implementation, the model proposed by Haney et al. (2013) does not present a real case, neither it suggests tools that enable its effective implementation. Amongst the indications, the authors stress the importance of considering cultural and regional differences in the construction of an effective model.

Figure 1 consolidates the models proposed by the Canadian (HIROC), English (NHS) and North-American (ASHRM) in order to understand what is already carried out in enterprise and assistance risk management practices by these institutions.

| Name | HIROC | NHS - NPSA | AHSRM | Haney et al. (2013) |
|--|--|--|---|--|
| Origin/Country | Canada | England | United States | Canada |
| Monetary quantification | In Parts | No | In Parts | In Parts |
| Definition of tolerance degree to risk | Yes | No | Yes | Yes |
| Use of CRO | Yes | Yes | Yes | Yes |
| Cultural/management/innovation change | Yes, the hospital culture will enable sustaining the ERM and integration of everyone. | Yes | Yes - the hospital culture will enable sustaining the ERM | Yes - the hospital culture will enable sustaining the ERM |
| Stratifications between areas | No - it identifies risks from strategic goals of the hospital without directing them to specific areas | It uses the word domain to indicate the types of risks: human resources, quality, marketing, strategy, finance. It does not make clear how it carries out the identification process, not making possible to conclude whether stratification is made per area in the search for domains or the search for domains is carried out in general. | Yes (Strategic Planning, Internal Audit, Risk Management, Budgeting, Acquisition Management and R&D) are areas that must get involved in the ERM process. It identifies risks per category (risk grouping - operational, clinical, strategic, financial, human capital, legal/regulatory, technology and hazard) and relates them to the areas. | Yes. The author proposes that, in order to be able to identify corporate risks in a hospital, it is key to identify with the working networks. |
| Process view | No, but it evidences the importance of having a relationship between assistance risk management and ERM. Therefore, an integration of strategic management with operational areas is required. | No | Only when dealing with the risk. | Yes |

Figure 1 - Previous methods of risk management in hospitals

From the initial contextualization and mentioning of some studies already carried out, the main objective of this doctorate thesis is to proposal, considering the literature and international practical cases, an Enterprise Risk Management model for healthcare organizations.

The specific objectives are:

- (i) Identifying state-of-the-art literature on the topic and propose innovations aiming at ERM operationalization in healthcare organizations;

- (ii) Understanding and assessing the existence of ERM practices in hospitals in, at least, two countries with distinct economic and political characteristics;
- (iii) Identifying and ordering requirements, activities and methodologies that guide the gradual implementation of ERM in healthcare organizations;
- (iv) Proposing an enterprise risk inventory based on the literature and expertise of Brazilian and North American healthcare risk managers;
- (v) Identifying opportunities to share personal background of the healthcare organization for the feasibility of ERM activities, making the process more sustainable;
- (vi) Defining the map of value creation of ERM for the healthcare organization; and
- (vii) Proposing solutions to rank risks and to conduct economic analysis oriented to estimate the economic impact of enterprise risks;

1.2 Methodological Procedures

This research has an applied nature, given it aims at solving the problem of implementing ERM in healthcare organizations (BOAVENTURA, 2009). Regarding the approach, there is a qualitative discussion, where data arising from case study procedures, participant observation, interviews and literature reviews are treated, generating essential information for the construction of the results. Regarding the goals, there is an exploratory research, which provides deepening in the topic that is close to uniqueness due to the level of novelty existing in literature basis and implementation cases in the world (YIN, 2005).

The methodological procedures of the thesis are fragmented in the structure of articles. The first article focuses in a qualitative study, mixed procedure exploratory, systematic review and case studies with seven Brazilian hospitals. The second article includes 8 semi-structured interviews with 8 hospitals in the United States and 7 Brazilian hospitals, followed by a qualitative analysis of data, with the Nvivo software for Mac and proposal of an ERM model for hospitals. The third article involved the data absorbed throughout the first and the second and was added with a review of the literature on Hospital-Based Health Technology Assessment (HB-HTA) and analysis of literature content and previous studies of this thesis. Its purpose is identifying how HB-HTA and ERM may share human capital and activities and, therefore, contribute to value creation in the hospital. Finally, the fourth article, through the analysis of content of the interviews conducted in

articles 1 and 2 and previous ERM guides followed by a survey applied to risk managers of hospitals, proposes an inventory of enterprise risks of healthcare organizations.

Figure 2 details the procedures to build the thesis and, in the sequence, there is the detail of the objectives of each article, respecting the objectives of the thesis previously mentioned.

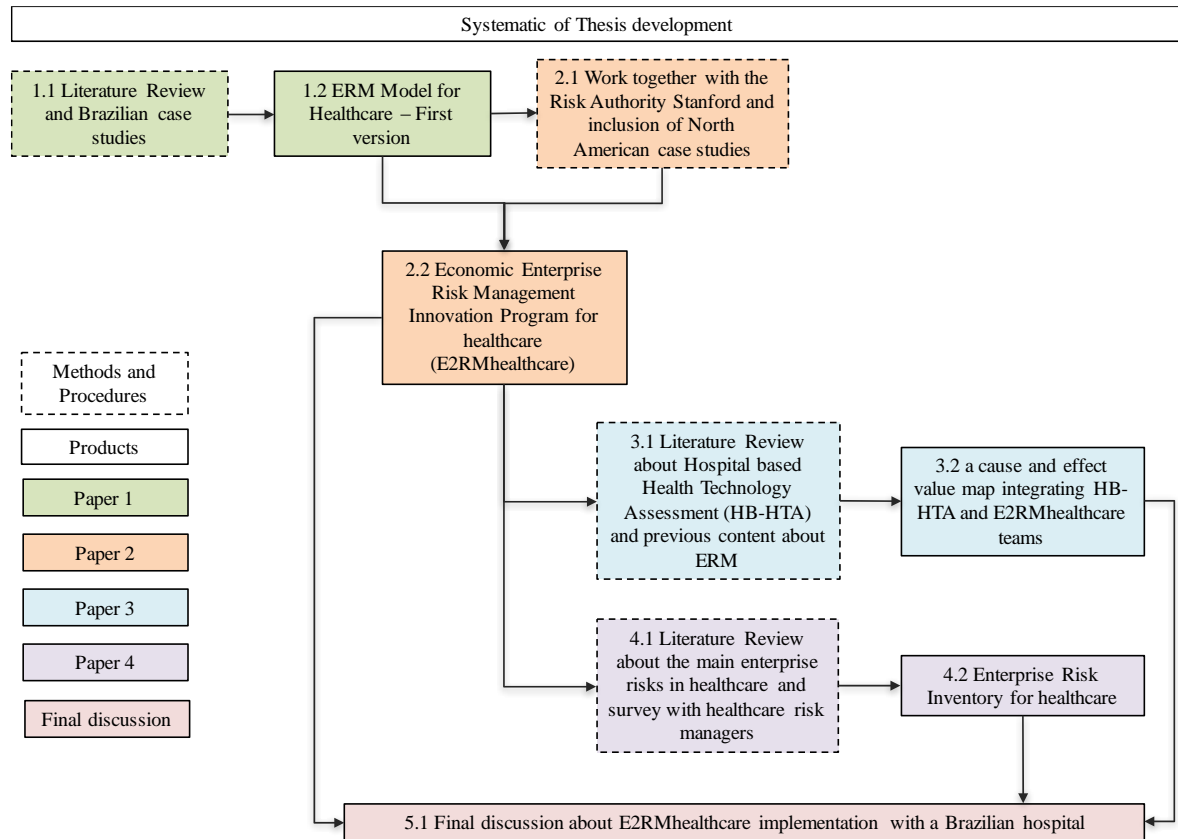


Figure 2 - Research method

The first article is comprised of procedures of systematic review of literature and semi-structured interviews followed by participant observation in seven Brazilian hospitals. Its purpose is developing a preliminary ERM model for hospital environments based on the literature and in the expertise of managers of Brazilian hospitals. The questionnaire used is described in the Appendix A.

Article two involved approaching a hospital risk management consulting company (The Risk Authority Stanford), identified in the systematic review of literature. With their support, eight hospitals in the United States were added to the study. Semi-structured interviews were conducted by the researcher and the consultant of the company using the questionnaire in Appendix B. The hospitals in Brazil were contacted again in order to refine and update some information. Qualitative data analysis was conducted with the Nvivo

software for Mac with the fifteen transcribed interviews. The purpose was responding to the objective established for this article, which is analyzing how hospitals in the United States and Brazil are structuring and implementing ERM processes in their management structures and then propose a review of the ERM model for healthcare organizations. As a result, the Economic Enterprise Risk Management for Healthcare (E²RMhealthcare) was proposed, followed by a guide of implementation activities, suggestion of managers that should be involved and complexity levels of each activity.

At this point, the thesis reaches its main purpose of proposing an ERM model aiming at meeting the complexity of healthcare organizations. However, it was identified throughout its development the need to go deeper into some specifics of the sector: opportunities to enable the implementation considering the human capital that the hospital may explore in other activities; showing how systemic use of ERM contributes to the creation of a safer environment, more likely to create value; and identification of the main corporate risks healthcare organizations are exposed to. Exploration of these specifics stresses of how E²RMhealthcare is developed in a manner that is oriented to healthcare organizations. It is believed that its adaptation to other markets may be feasible, however it demands greater detailing of how its operationalization should be conducted and what specific characteristics of each market need to be further explored. Articles three and four explored the highlighted specificities.

In the article three, the data sources of the interviews with the fifteen hospitals and the review on ERM were added with a review of the literature on HB-HTA. Then the multiple data sources were subject to a content analysis with Nvivo and also of multiple matrices identifying common characteristics and opportunities to share human capital. As main result, a matrix that correlates the implementation principles of E²RMhealthcare with those previously published of HB-HTA and details how the human capital of the hospital may be shared for the feasibility of these two processes (ERM and HB-HTA); and a cause and effect value map that identifies how the ERM and HB-HTA processes contribute to the value creation of the organization.

The article four explored the creation of an enterprise risk inventory. In order to do so, the data sources of the interviews were added with guidance on the types of risk of COSO, ASHRM, HIROC, NHS and AON to build an enterprise risk inventory of healthcare organizations with twenty-eight risks. In the inventory, each risk is defined, exemplified and

related to an impact form: financial, social, reputational or in the patient. The inventory may be seen in the Appendix C.

After the inventory was developed, a survey was created on Qualtrics system, and respondents were invited to indicate whether they strongly agree, agree, do not have an opinion, disagree or strongly disagree that such risk is an important corporate risk of healthcare organizations. A question was created for each of the twenty-eight risks (Appendix D). The survey was applied throughout the annual congress of ASHRM in Seattle, in October 2017 and, also, sent through direct mailing from the researchers to executives and risk managers of hospitals. Data analysis were conducted in SPSS and enable identifying the prioritization hierarchy of corporate risks of healthcare organizations, in addition to validating that the twenty-eight risks are recognized by the interviewees as important corporate risks of healthcare organizations. This information is an important input to conduct E²RMhealthcare and represents an innovative characteristic and applied specifically to the healthcare context.

Finally, using a case study in a Brazilian hospital in São Paulo and the consulting company (The Risk Authority Stanford) practices a discussion on conducting the implementation of E²RMhealthcare was presented. A risk ranking methodology using Multicriteria decision analysis and a suggestion to assess enterprise risks with real financial data through the application of Time driven activity-based costing methodology are presented.

It is worth mentioning that regarding this thesis, relating to the research project with the Brazilian hospital, the project was approved in the ethics and research committee of the hospital and submitted to *Plataforma Brasil*. The consulting company The Risk Authority Stanford agreed to collaborate with the research (Appendix E contains the agreement letter). The other companies involved in Brazil and the United States agreed to participate in the research and did not demand approval from ethics committees.

1.3 Limitations of the Study

Amongst the limitations it is worth mentioning the lack of deepening in the identification and review of clinical risks regarding the specificities of the study of medicine. This study encompasses solely the positioning and relation that clinical risk management has with ERM.

The thesis does not present application of the proposed model. Part of it was conducted in case studies and enabled some progresses and discussions presented throughout the study. However, its presentation in full is not explored in this document as well, due to the fact that it presents strategic and confidential information of the companies. This reason also contributed to, despite being a guidance of the proposed model, not performing the assessment of the economic impact of the presence of ERM in the healthcare organization; it was solely discussed.

Finally, the countries with greater involvement and exploration in this research were Brazil and the United States. Thus, generalizations for Europe, Asia, Oceania and Africa must be preserved. Updates of this study started with other continents may contribute to a state-of-the-art global ERM model for healthcare.

1.4 Structure of Thesis

This thesis is unfolded in seven chapters. The first chapter presented the topic, grounds, objectives, methodological procedures and limitations of the study. Then, chapters two, three, four and five present the articles comprised in this thesis. The chapter six presents the final discussion on the implementation of the proposed model. Finally, chapter seven contain the conclusions. All references used are presented at the end of the final conclusions. The Appendix F presents the actual publications from this research.

2 A PROPOSED ENTERPRISE RISK MANAGEMENT MODEL FOR HEALTH ORGANIZATIONS

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Abstract: Healthcare organizations are environments with high management complexity and subject to a constant exposure to risks. Enterprise risk management (ERM) has been studied and applied in different economic environments with the aim of improving organizational performance. However, the health sector still suffers from a lack of attention in this context, in particular with regard to the need for a high degree of financial transparency and for the establishment of process-orientated management, and this provides the motivation for the study described in this paper. An ERM model for health organizations is proposed, based on a systematic literature review and on seven case studies in Brazilian hospitals. An approach to economic risk assessment using indicators such as the cash flow at risk and the variability of costs and receipts from the proposed model is suggested. The health organizations involved in the case studies all interpret ERM as a source of information contributing to corporate governance, and the indicators listed provide constructive data for improvement-driven decision-making. Given the interest expressed by the organizations involved, further application and validation of the proposed model in subsequent studies is suggested.

Keywords: Enterprise risk management; Risk management and health; Corporate governance; Economic risk analysis.

3 ERM FOR HEALTH CARE ORGANIZATIONS: AN ECONOMIC ENTERPRISE RISK MANAGEMENT INNOVATION PROGRAM (E²RM_{HEALTH CARE})

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Abstract: In recent years, healthcare organizations have looked to Enterprise Risk Management (ERM) for novel systems to obtain more accurate data on which to base risk strategies. This study proposes a conceptual ERM framework specifically designed for healthcare organizations. We explore how hospitals from the United States and Brazil are structuring and implementing ERM processes within their management structure. This study incorporates interviews with 15 chief risk officers (eight from the United States, seven from Brazil) with qualitative data analysis using Nvivo. The interviews confirm that adopting ERM for healthcare organizations has gained momentum and become a priority, and that the demand for risk economic assessment orientation is common among healthcare risk managers. We propose an ERM Model for healthcare (E²RM_{healthcare} – Economic Enterprise Risk Management in Healthcare) divided into four maturity levels and complemented by an implementation timeline. The model is accompanied of a guideline to orient the ERM gradual implementation, including orientation to perform risk economic assessment.

Keywords: Enterprise Risk Management; Healthcare management; Risk analysis; Risk Education; Corporate Governance.

4 PROPOSITION OF A SHARED AND VALUE-ORIENTED WORK STRUCTURE FOR HOSPITAL-BASED HEALTH TECHNOLOGY ASSESSMENT AND ENTERPRISE RISK MANAGEMENT PROCESSES

A similar version is being submitted to the International Journal of Technology Assessment in Health Care

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Abstract: Healthcare organizations have invested efforts on Hospital-based Health Technology Assessment (HB-HTA) and Enterprise Risk Management (ERM) processes for novel systems to obtain more accurate data on which to base strategic decision. This study proposes to analyze how HB-HTA and ERM processes can share personal resources and skills to achieve its principles with results oriented to value. Previous literature about ERM and data from interviews with healthcare managers were joined with a new HB-HTA literature review to compose the research data sources, which were submitted to a qualitative data analysis using Nvivo. The analysis was oriented to identify the association between ERM and HB-HTA application; to propose a cause and effect value map sharing ERM and HB-HTA resources; to identify common principles of HB-HTA and ERM; and to propose, in a matrix, the capability to share personal resources between HB-HTA and ERM teams. The HB-HTA literature review resulted in seven papers. The common principles and personal background suggested for HB-HTA and ERM teams allowed to build a matrix to identify how both teams can work in an integrated manner. The value creation capability behind this integrated work structure is expressed in a cause and effect value map. Educational programs shared by all employees, financial data and the ability to routinely report risks and technology information to stakeholders are identified as common objectives for ERM and HB-HTA processes. The identification of common principles, objectives and capabilities between ERM and HB-HTA suggested on this study advances with the literature from both research areas. The opportunity to share personal resources between HB-HTA and ERM also contributes to the implementation of those processes in hospitals with less financial resources, approaching its own management to be more efficient with the care chain.

Keywords: Enterprise Risk Management; Healthcare management; Risk analysis; Risk Education; Corporate Governance.

5 DEVELOPMENT OF AN ENTERPRISE RISK INVENTORY FOR HEALTHCARE

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Abstract: The first phase of an enterprise risk management (ERM) program is the identification of risks. Accurate identification is essential to a proactive and effective ERM function. The authors identified a lack of such risk identification in the literature and in practical cases when interviewing the chief risk officers from healthcare organizations. A risk inventory specific to healthcare organizations that includes detailed risk scenarios and risk impacts currently does not exist. Thus, the objective of this research is to develop an enterprise risk inventory for healthcare organizations to create a common understanding of how each type of risk impacts a healthcare organization. ERM guidelines and data from 15 interviews with chief risk officers were analyzed to create the risk inventory. The identified risks were confirmed through a survey of risk managers from a range of global healthcare organizations during the ASHRM conference in 2017. Descriptive statistics were developed and cluster analysis was performed using the survey results. The risk inventory includes 28 risks and their specific risk scenarios. Cyberattack was ranked as the principal risk by the respondents, followed by sentinel events and risks associated with human capital management (organizational culture, use of electronic medical records and physician wellness). The data analysis showed that the specific characteristics of the survey participants do not impact an individual's opinion of the importance of the risks identified. A personal background in risk management (clinical or enterprise) was a characteristic that showed a small difference in the perceived importance of the risks from the proposed risk inventory. In addition to defining specific risk scenarios, the enterprise risk inventory presented in this research can contribute to guiding the risk identification phase of an ERM program and thereby support the development of a risk culture.

Keywords: Enterprise risk management; Healthcare management; Risk inventory; Healthcare; Risk identification; Risk analysis.

6 E²RMhealthcare SUGGESTIONS FOR APPLICATION

This section has the objective to discuss how two important steps of the E²RMhealthcare application happens. A project conducted with a Brazilian hospital and the interaction with the Risk Authority Stanford, which was involved in other papers, were fundamental to develop this final discussion.

Considering the four levels suggested by the E²RMhealthcare, it is possible to highlight that two new methodologies are being proposed: a risk ranking considering the use of Multi-Criteria Decision Analysis (MCDA) to analyze enterprise risks at the Baseline level; and the use of Time-driven Activity based Costing (TDABC) to assess risks at the Quantitative level, suggesting and TDABC adaptation: Time-driven Risk Activity based Costing (TDRABC). This section is fragmented in these two areas to explain and exemplify how they can be conducted in a health organization.

However, all the information about risks, finances and hierarchies presented on this section are only supposed to illustrate the methodologies. The real information is not being expressed because of its strategic and confidential data nature for the companies.

6.1 Risk Ranking considering MCDA – Baseline level

For the risk ranking starting it is suggested the use of the risk inventory (chapter 5 – Appendix C). In addition, the first challenge is discussing with hospital managers if it is necessary to include more specific risks in the inventory or not.

At the hospital studied, meetings with the clinical risk manager and the chief risk officer were held with the objective of agreeing whether the inventory was completed for the current moment of the hospital. It is important to highlight that this hospital has worked with an ERM process, then, during the entire E²RMhealthcare project the current process was used and discussed, which is recommended in future similar cases. After the meetings, the researcher and the managers agreed that the hospital should work with the inventory in Portuguese, not only literally translating the words, but also using a vocabulary localized to Brazil. In addition, three new risks were added: *Qualificação e competências adequadas, fusões e aquisições* and *flexibilidade para mudanças e capacidade de expansão*.

The previous ERM matrix used by the hospital has 72 risks, identifying the possibility to work with 31 risks is considered a positive achievement. Another issue that was a theme of discussion is concentrated in better integrating the clinical risk manager and

the chief risk officer. At this point, the fact that the inventory highlights if the risk impacts the patient was valued and useful for the discussion between the managers.

With the list of risks defined, it was necessary to prepare the use of MCDA. The method selected was the Analytical Hierarchy Process (AHP). It is suggested to have one AHP matrix for each risk group: clinical, compliance, financial, operational, political, human resources and information technology (presented at the chapter 5). For each of them, a group of people must be selected to be interviewed about the risks. People selection may consider its familiarity with the group of risks, for example: for information technology, the technology chief should be involved, as well as other professionals that works with Hospital-based Health Technology Assessment (HB-HTA).

People are invited to answer paired comparisons about the risks from the group thinking about likelihood and severity in two different moments. The Figure 30 shows an example of how to build the questions that invite the interviewers to answer about likelihood for the group information technology. This example uses the Qualtrics platform, which works online and enables managers to be engaged in the ERM process, with AHP, using a friendly platform, ending the impression that it is not easy to apply quantitative methodologies to people that have different backgrounds and functions.

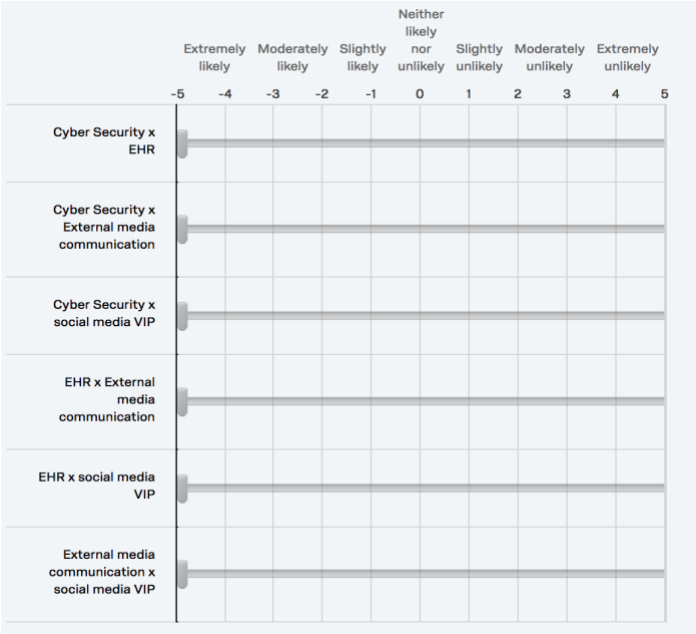


Figure 3 - Example of AHP for a group of risks

After the paired comparisons, the researcher or risk analyst can develop the AHP risk matrices. Two final matrices will be developed for each risk group, one with likelihood and

another with severity. If the risk analyst identifies a huge difference in the paired answers from two or more people, the risk manager should contact respondents again to achieve a consensus about the paired comparisons. To build the AHP matrixes the Saaty Scale (SAATY, 2008) must be used. The Figure 31 exemplifies how the final matrix with the likelihood and severity vectors may be presented.

| | Severity | AHP - Likelihood |
|--|----------|------------------|
| Cyber Security – ransomware | 16% | 18% |
| Electronic Health Record (EHR) – loss of power | 50% | 9% |
| External media communication | 13% | 24% |
| Use of social communication networks – VIP patient | 20% | 49% |

Figure 4 - Information Technology risk group - final AHP matrix

With this matrix and considering the strategic objectives of the hospital, it is a duty of the chief risk officer to analyze which risk is more critical at the current moment. For example, if the hospital is implementing an EHR system, even though it has a low likelihood (9%), at this moment it should be considered critical. Maybe in one year it will not be anymore. It is the moment when the chief risk manager can add value to the ERM process by integrating it more with the actual organizational culture.

After his definition, a validation with C-suite for all the risk groups can be conducted and the actions plans, connecting risks and strategic goals, developed. It is important to appoint: a risk owner that has to report the action status to the chief risk officer; a deadline to finish the action and an indicator with a visual capability to control. The Figure 32 shows an example.

| Strategic goals | Risk Group | Main Risk | Risk Owner | Actions | Indicator | Deadline |
|---|------------------------|-----------------------------------|------------|---------|-----------|----------|
| Financial Strength | Financial | Dependence of insurance companies | - | - | | - |
| Technology Innovation | Information Technology | Cyber Security | - | - | | - |
| Employee Experience | Human Resources | Provider Wellness | - | - | | - |
| Strategic Planning and Financial Strength | Compliance | Loss of accreditation | - | - | | - |

Figure 5 - Enterprise risk action plan

In addition to the action plan, the quantitative analysis can be conducted using TDABC for critical risks of each risk group. The next section details how it can be applied.

6.2 TDRABC applied to assess enterprise risks in healthcare

To measure the economic impact of the risk, after the presentation of the model it is being suggested the use of Activity-based costing methodologies, in special TDABC during the chapter 3 and 4. Before starting to detail how it can be used, some characteristics about the method are summarized.

TDABC identifies opportunities for making processes more efficient by reducing the resources used in each activity (KAPLAN et al., 2014). TDABC was proposed as an improvement on activity-based costing because it renders ABC faster and easier to update by transforming all cost drivers into a single cost driver – time. Since it was first proposed, TDABC has become a frequent accounting method in clinical settings (KEEL et al., 2017b). In a literature consulting conducted during the development of this thesis by Pubmed and Scinece Direct, it is possible to suggest that after the TDABC publication in 2007 (KAPLAN; ANDERSON, 2007b), it started to be more frequent in healthcare studies. Figure 33 shows the frequency of papers exploring the theme of Activity based Costing (ABC), Simplified Activity based Costing (SABC) and TDABC in healthcare before and after 2007. However, cost analyses for risks in healthcare were not identified.

| | TDABC | ABC | SABC | TOTAL |
|-------------|-------|-----|------|-------|
| After 2007 | 12 | 7 | 3 | 22 |
| Before 2007 | 0 | 6 | 2 | 8 |
| TOTAL | 12 | 13 | 5 | 30 |

Figure 6 - The use of TDABC in healthcare studies

Considering that all enterprise risks are connected to different processes and activities that will happen if the risk affects the hospital, this study proposes to advance the environment where TDABC has been applied in healthcare to enterprise risks. This advance enables to measure the economic impact of enterprise risks in healthcare.

In order to apply TDABC to measure the economic impact of enterprise risks, a sequence of seven activities, that represents the adaptation of TDABC to TDRACB, is suggested: (i) risk event process map fragmented in macro process: clinical treatment, legal and regulatory, human capital and reputation; (ii) time equation estimation for each risk event process; (iii) identifying departments involved in risk process and estimating the cost of resources for each department; (iv) estimating the capacity in hours of each department involved; (v) calculating the Capacity Cost Rate (CCR) in \$/h; (vi) designing the time and cost equations; and (vii) calculating the total cost of each risk event process (Figure 34).

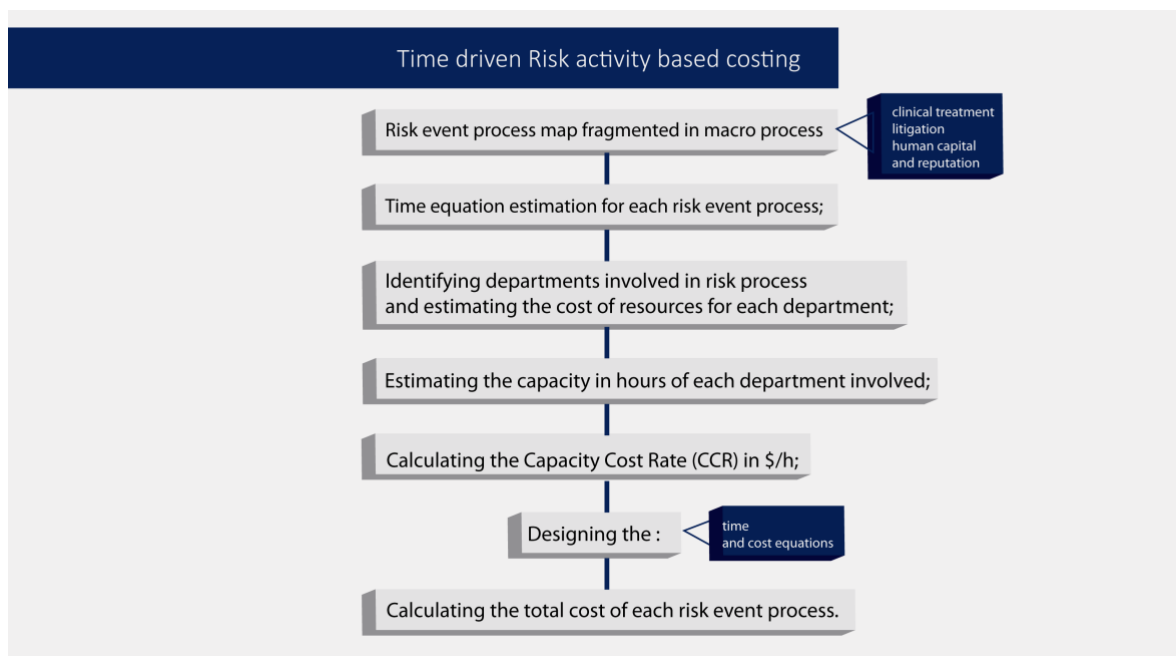


Figure 7 - TDRABC

Using the example of how the treatment at The Risk Authority Stanford is conducted when a Cyber-attack risk happens, the process map considering the four macro-processes is

expressed bellow (Figure 35). Each color represents a different macro-process: clinical treatment (blue), legal and regulatory (green), human capital (purple) and reputation (orange) helping to manage the activities.

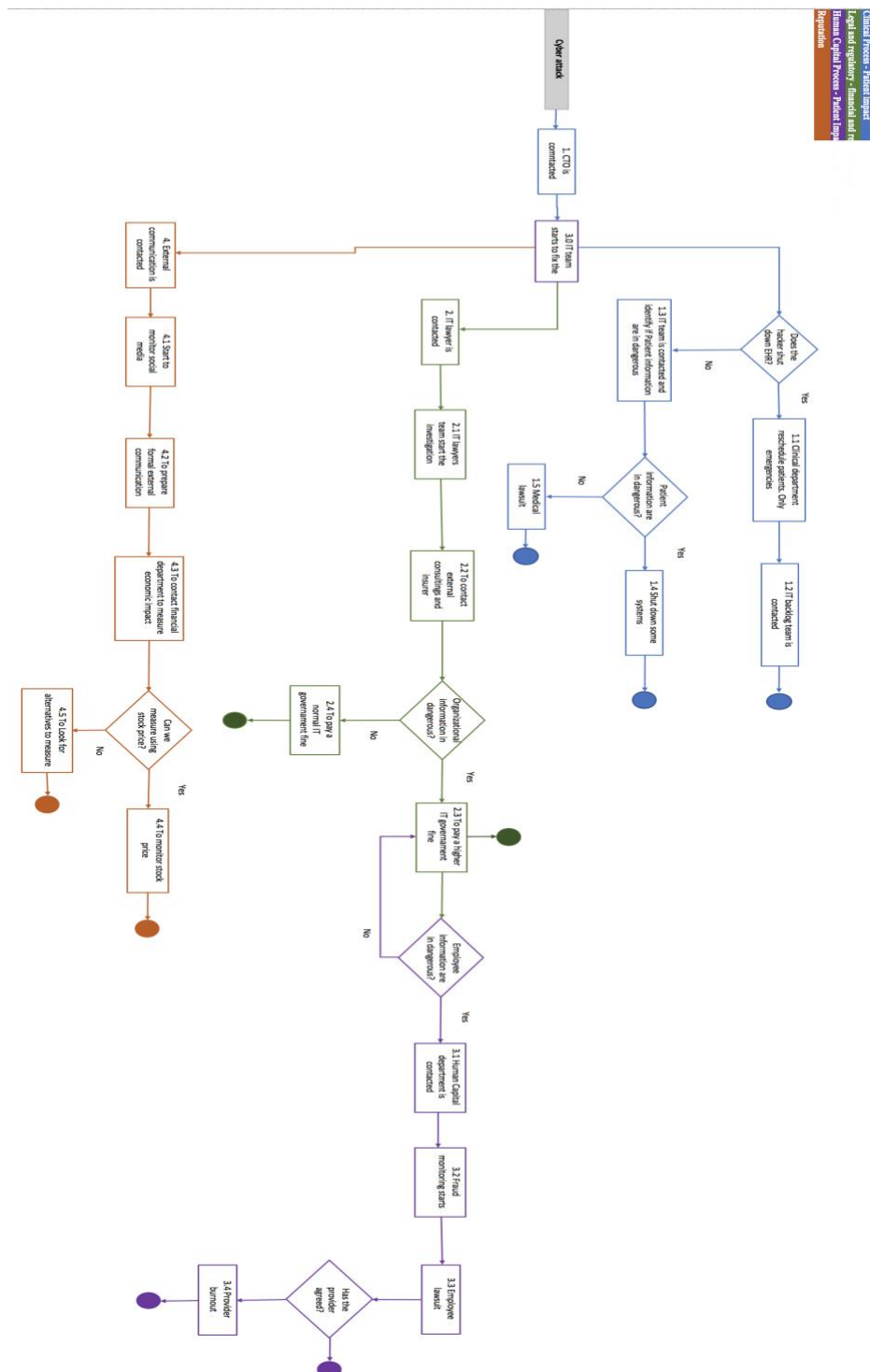


Figure 8 - risk event process map based on The Risk Authority Stanford procedures

At the next step, the departments involved, and the time spent in each activity of the process can be estimated. It is also necessary to identify all financial resources allocated to

each department and to estimate the department capacities. Then this flow of activities is displayed with fictitious values.

The capacity estimation can be calculated in different manners according to department characteristics. For example: hospitalization departments may have the capacity associated to the number of beds that are available twenty-four hours per day; a surgery department has the capacity associated to the combination of the number of surgery rooms, open hours for working, and clinical team available. In addition, an expected idleness can be considered. The Figure 36 shows some examples for capacity calculation.

| Department | Total capacity (I) (hours) | Production capacity (P) (hours) |
|---|--------------------------------|---------------------------------|
| Hospitalization A | 24h x 20beds x 30days = 14.400 | 14.400 x 0,9 = 12.960 |
| Surgery | 18h x 7rooms x 30days=3.780 | 3780 x 0,78=2.948,4 |
| Exams | 12h x 6physicians x 22 = 1584 | 1584 x 0,85=1.346,4 |
| I = 100% efficient and P = considering an expected idleness | | |

Figure 9 - Capacity estimation example

With the capacity calculated and financial resources allocated to each department, it is possible to measure the CCR for each department, Figure 37.

| Department | Resources costs | I | P | CCR 100% EFFICIENT | CCR WITH IDLENESS |
|--------------------------|-----------------|------------|------------|--------------------|-------------------|
| Hospitalization A | \$300.000,00 | 14.400 (h) | 12.960 (h) | 20,83 (\$/h) | 23,14 (\$/h) |
| Surgery | \$500.000,00 | 3.780 (h) | 2.948 (h) | 132,27 (\$/h) | 169,60 (\$/h) |
| Exams | \$240.000,00 | 1.584 (h) | 1.346 (h) | 151,51 (\$/h) | 178,30 (\$/h) |

Figure 10 - Example of CCR calculation

The CCR is fundamental to design the cost and time equations. The time equation uses the TDABC equation, expresses on equation 2.

$$C = \sum \beta_i \times CCR_i = \beta_1 \times CCR_1 + \beta_2 \times CCR_2 + \dots + \beta_n \times CCR_n + y \quad (2)$$

Where:

- a) C: Unitary cost of risk process;
- b) β_i : time used in each department involved on the process;

- c) CCR_i: CCR from each department;
- d) i: number of departments involved;
- e) y = Other direct costs associated to the process.

In order to make the equations structure easier, it is suggested to build a matrix with the resources, the total cost of each resource, the capacity and CCR in the columns and one activity in each row. The time spent in each activity with the different resources should be added in the center. In addition, a fragmentation to identify the class of the resource, for example, structure, technology or human resources, can be created to enable analysis about the origin of the cost in each risk event. The Figure 38 shows a map example considering the risk process for a cyber-attack.

| Activity | Description | People | | | | | | | | | | Technology | Total Cost |
|----------|---|-----------|-----------|---------------|---------------------|------------------|-------------------------------|----------------------|-----------------|------------|------------|------------|------------|
| | | Physician | Manager | IT department | Clinical Department | Legal department | External relations department | Financial department | Human Resources | Board | Software | | |
| | Financial Resources (month) | \$ 18,000 | \$ 25,000 | \$ 340,000 | \$ 400,000 | \$ 200,000 | \$ 340,000 | \$ 500,000 | \$ 300,000 | \$ 500,000 | \$ 250,000 | | |
| | Capacity (month) | 120 | 120 | 2500 | 3000 | 700 | 1500 | 1800 | 2500 | 1000 | 8000 | | |
| S/h | \$ 150,00 | \$ 208,33 | \$ 136,00 | \$ 133,33 | \$ 285,71 | \$ 226,67 | \$ 277,78 | \$ 120,00 | \$ 500,00 | \$ 31,25 | | | |
| 1.0 | CTO is contacted | | 5 | 10 | | | | | | 1 | 10 | \$ 3.214 | |
| | Clinical department reschedule patients. Only emergencies | 3 | 2 | 10 | 10 | | | | | | 10 | \$ 3.873 | |
| 1.1 | IT backlog team is contacted | | 10 | 20 | | | | | | | 20 | \$ 5.428 | |
| | IT team is contacted and identify if Patient information are in dangerous | | 10 | 40 | | | | | | | 10 | \$ 7.836 | |
| 1.3 | Shut down some systems | | | 50 | | | | | | | 40 | \$ 8.050 | |
| 1.4 | Medical lawsuit | 1 | | | 5 | 5 | | | | 5 | | \$ 4.745 | |
| | IT lawyer is contacted | | 10 | 10 | | 10 | | | | | | \$ 6.300 | |
| 2.0 | IT lawyers team start the investigation | | | | | 50 | | | | | 20 | \$ 14.911 | |
| | To contact external consultings and insurer | | 10 | | | 30 | | | | | 20 | \$ 11.280 | |
| 2.2 | To pay a higher IT government fine | | | | | 50 | | | | 10 | | \$ 19.286 | |
| 2.3 | To pay a normal IT government fine | | | 50 | 30 | | | | | 10 | | \$ 20.371 | |
| 2.4 | IT team starts to fix the problem | | | 70 | 30 | | | | | | | \$ 18.091 | |
| 3.0 | Human Capital department is contacted | | | 10 | | | | | | | | \$ 1.840 | |
| 3.1 | Fraud monitoring starts | | | 30 | | 40 | | | | 4 | 20 | \$ 16.614 | |
| 3.2 | Employee lawsuit | | | | | 40 | | | | 4 | | \$ 11.909 | |
| 3.3 | Provider burnout | 1 | 15 | | | 15 | | | | 4 | | \$ 8.041 | |
| | External communication is contacted | | | | | | | | | | | \$ 5.677 | |
| 4.0 | Start to monitor social media | | | | | 15 | 2 | | | | 30 | \$ 1.391 | |
| 4.1 | To prepare formal external communication | | | | | | 2 | | | | | \$ 453 | |
| | To contact financial department to measure economic impact | | | | | | 2 | 4 | | | | \$ 1.564 | |
| 4.3 | To monitor stock price | | | | | | | 4 | | 3 | 30 | \$ 3.549 | |
| 4.4 | To Look for alternatives to measure | | | | | | 2 | | | | 30 | \$ 4.002 | |
| 4.5 | Total Cost | \$ 750 | \$ 12.917 | \$ 40.800 | \$ 2.000 | \$ 90.000 | \$ 2.267 | \$ 3.333 | \$ 1.920 | \$ 16.000 | \$ 8.438 | \$ 178.424 | |

Figure 11 - Example of map to design time and cost equations for a cyber-attack risk

By using the map, it is possible to multiply the time spent with each resource per each CCR in each activity and, finally, to calculate the total cost involved in each risk process. One value connected to apply TDRABC is focused on the rich information that can be identified. For example, to explore the activities that are more expensive and why are

more expensive, can suggest to a manager, that these activities and main resources need to be studied to be conducted with efficiency. Chart 8 illustrate how is possible to identify that, which the x-axis contains the activities.

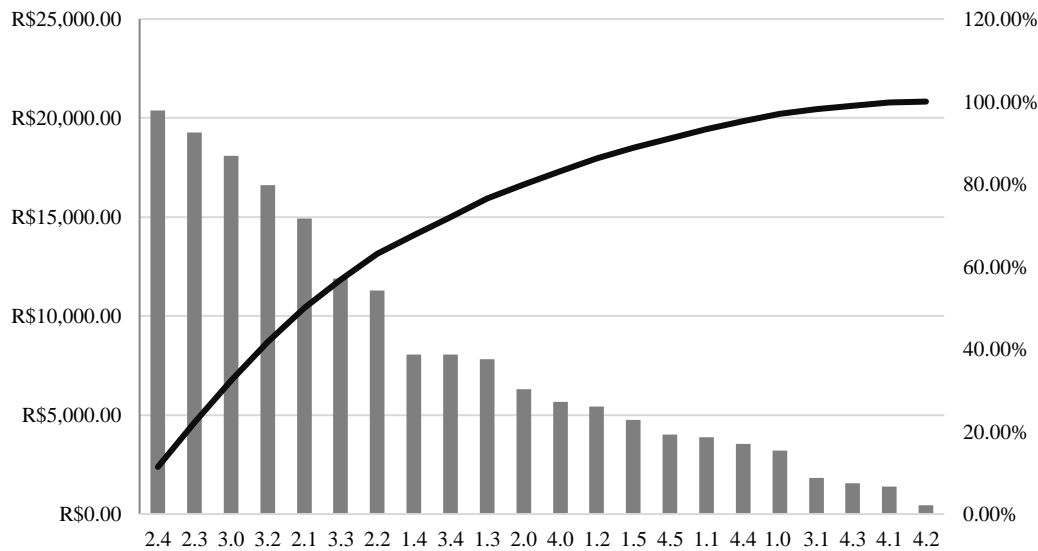


Chart 1 - Cost per activity

Using the chart 9 it is possible to identify that the activities connected with fine payments (2.4 and 2.3), to fix the problem and to monitor fraud (3.0 and 3.2), cost more than \$15.000,00. If we analyze the resources more used on these activities, it is possible to highlight that IT department and legal are responsible for the higher cost (Chart 9).

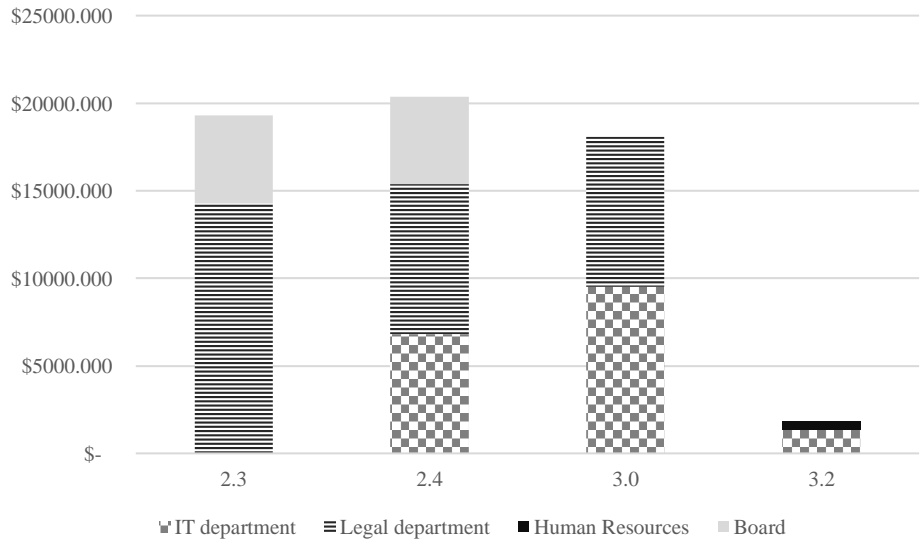


Chart 2 - The cost origin of each risk

With this information, the next question is: could we do it with more efficiency and control and, consequently, cheaper? If risk events happens, the company can be better prepared to manage the risk, spending less money and as a result, the financial impact can be smaller. The ERM department is responsible for guiding and controlling the correct processes to treat the main enterprise risks. In addition, the possibility to design all the activities enable to include the regional regulations and compliance aspects to the process, creating an information transparency, that can be useful to protect the company in future lawsuits.

Analysis between risks and origin of cost can be conducted. The Charts 10 and 11 illustrates examples of charts that can help the analysis process.

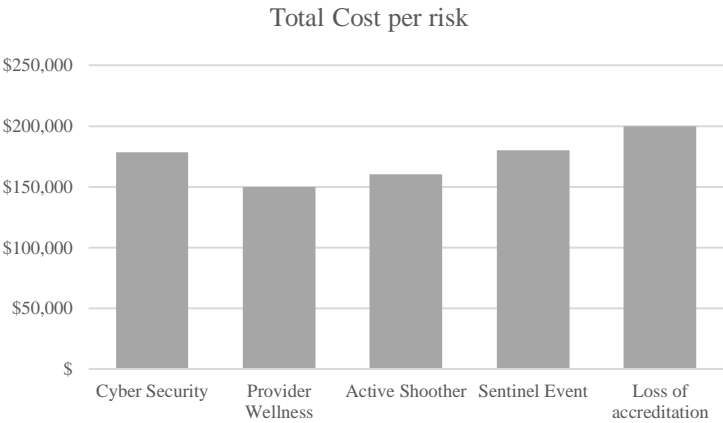


Chart 3 - Total cost per risk

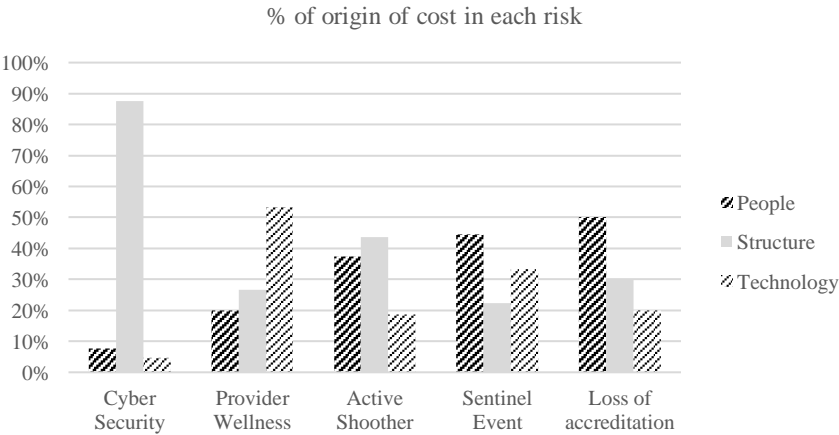


Chart 4 - Examples to orient risk cost analysis

Finally, with the information of how much cost to treat one enterprise risk in healthcare is, it is possible to compare the investment in ERM with the cost metric. Chart 12

shows the relation between investment in ERM in the hospital and the cost of treating each one of the risks estimated through TDRABC.

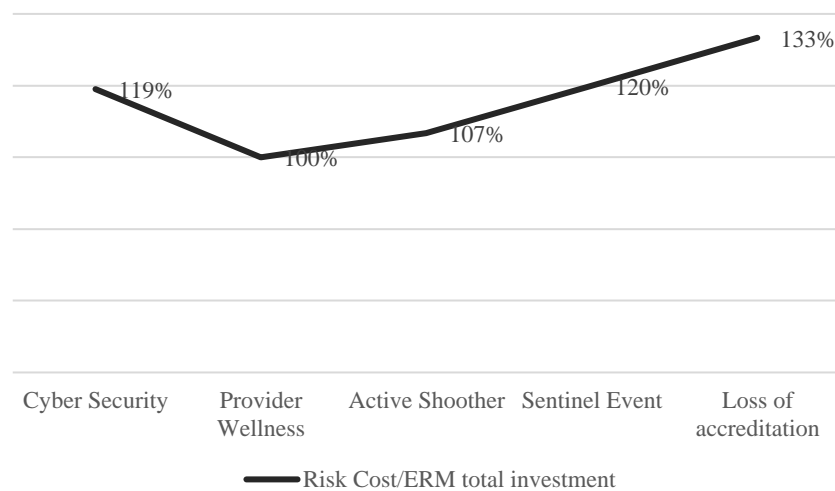


Chart 5 - Percentage of risk cost relation to ERM investment

By using analysis as this one above, it is possible to identify that the investment in ERM can be returned if only one of the risks happens. This information is useful to justify the implementation of the ERM process in special because the possibility that in one year the hospital can be exposed to more risk is real.

6.3 Conclusions about the discussion

This section expressed examples of how MCDA and TDRABC can be used to rank and assess risks in healthcare, innovating from previous literature and cases. Their application in ERM in healthcare projects is being conducted in different hospitals, and it is expected by the author of the thesis that after the development of multiple cases, it will be possible to publish effective guidance about their use in ERM analysis in healthcare. Finally, developing a software tool to guide MCDA and TDRABC for risk analysis in healthcare is a future project that may innovate the current solution to measure risks in healthcare.

In special for TDRABC software application with multiples companies and researchers can create a learning routine about the better processes to treat risks and, using machine learning, in future projects, it can teach future companies about the most effective manner to treat the risks. The solution also can integrate regional compliance aspects, adding value to the company that look for enterprise risk protection and information transparency with regulations. It represents an important innovation to insurance market around the world that are continuously looking for new solutions to measure the real economic impact of important and recurrent risks as, for example in 2018, cyber-attacks.

7 CONCLUSIONS

Considering the importance that ERM has received during the last years in different markets reported by authors mentioned along the development of this document, this thesis advances on ERM solutions for healthcare business. Attending the principal objective, the E²RM_{healthcare} was suggested exploring different levels of ERM that can be applied by the organizations. The levels are not punitive and look for turning the ERM a gradual implementation process, according to organizational maturity. The consideration of literature reviews and international cases to develop this model attends some specific objectives and was fundamental to contribute with the literature about the theme and to propose practical solutions to the market.

Others specific objectives of this thesis were achieved through a sequence of research procedures. Literature reviews, case studies, interviews and a survey were used to study the state of the art about ERM in healthcare content and to develop the background necessary for advancing.

The identification of how ERM teams can share resources and human capital with HB-HTA teams represents an important contribution for health organizations. The literature agrees with the importance of including these structures in the hospital routine, but to turn it sustainable is a challenge yet. The research pointed that the high level of background in specific areas demanded by both could be better explored, when shared. The opportunity to share personal resources between HB-HTA and ERM also contributes to the implementation of those processes in hospitals with less financial resources, approaching its own management to be more efficient with the care chain. The research by the answer of how ERM and HB-HTA contributes to organizational value creation oriented the proposition of the value map, expressing how ERM contributes to create a safer and more effective environment.

In regard to the specific characteristics of healthcare environment, the enterprise risk inventory for healthcare can be mentioned as a meaningful contribution that helps health risk managers to start an ERM process. The inventory highlights important questions from the actual market that looks for solutions, as cyber security. It also represents an opportunity to orient future researchers, which for each main risk identified could be developed specific solutions to improve healthcare organizations capability to be safer and more effective. In addition, to identify that only personal background in risk management (clinical or

enterprise) was a characteristic that showed a small difference in the perceived importance of the risks from the proposed risk inventory endorses how the personal education of the risk manager is important and deserve attention.

The consideration of cases in different countries also added value to this research. Despite the fact that two countries studied have different economic situations and health systems, the necessity and search for ERM solutions is common in both. Identifying an alternative to orient the risk analysis and to assess enterprise risks with real financial data is a gap reported by the majority of interviewers. Like an answer for that, the E²RM_{healthcare} innovates in how to analyze and to assess risks. The risk ranking methodology based on MCDA methods represents an opportunity to turn the risk analysis more effective and based on comparisons substantiated, without turning the process difficult to engage managers. And the proposition of TDRABC is an innovative TDABC adaptation for risk economic analysis. Exploring the use of both methodologies (MCDA and TDRABC) will be relevant to assume that they can contribute with general literature and practices about ERM around the world and in different markets.

The use of the model in real cases is essential to advance and turn the orientations about ERM more adjusted to the actual market. When TDRABC works together with a risk inventory previously identified to the market, as is suggested here for healthcare, is expected that with multiple applications will be possible to estimate common activities and resources conducted by different organizations in the same market. This fact turns easier to measure the costs associated to each risk. If, it is possible to orient the process to treat the risk, using high technology, to change the data base for resources and to measure the costs related to risks treatment in each organization is facilitated. The methodology learns with each real application, and with the previous learning can educate the next customer; it is machine learning codes applied to improve the organizations capability to assess enterprise risks. This future technology advance can allow opportunities to develop a strong and replicable product based on E²RM_{healthcare} to conduct ERM implementation based on high quality of real financial data to assess enterprise risks.

The development of artificial intelligence algorithms to assess risks and technologies in healthcare is identified as a future research area, which deserves attention by researchers and, in special, by global insurance market. The development of guidelines to orient the application of TDRABC and similar costs modeling for new technologies in healthcare have been the focus of current studies. As soon as information technology advances to allow

systems to support the application of activity base costing methods in health technology assessment studies it will be possible to develop big data on actual cost. This will allow cost comparisons by countries, health systems or disease; performance of economic evaluations with a higher quality of data; and the capability to develop artificial intelligence to identify standard processes of treatment and cost benchmarking in a global perspective.

At the beginning of this research the healthcare gap of models suggesting tools and methods to implement ERM was identified. This fact makes the $E^2RM_{\text{healthcare}}$ to represent an innovation to healthcare management. Different companies from healthcare market have demonstrated interest about parts of the model to improve and/or implement their own risk manager processes. It is expected by the author of this thesis, that with the background that can be developed by different projects using the concepts developed here, it will be possible to join, in a future publication, all this expertise, adding an important value to this current proposition: practical questions from hospitals, insurers, clinicians or other agents in healthcare market that deserve special practices not identified yet. Although, this demand years of different applications and projects, being the main reason to don't be an objective during this thesis and only a final important suggestion.

Finally, it is understood that other business that are also based on process conducted and with high level of human capital, could use the $E^2RM_{\text{healthcare}}$ as an ERM orientation. For that, it is suggested to explore the specific risks (risk inventories) and operational characteristics of different markets to turn the E^2RM able to be applied in different markets. This point add value to the proposition developed during this thesis, because highlights that the new $E^2RM_{\text{healthcare}}$ also contributes with general ERM research and represents a research opportunity to be continued by future academics.

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APPENDIX A
QUESTIONÁRIO PARA PESQUISA DE DOUTORADO DO PROGRAMA DE
PÓS GRADUAÇÃO EM ENGENHARIA DE PRODUÇÃO DA UNIVERSIDADE
FEDERAL DO RIO GRANDE DO SUL

TEMA DE PESQUISA: GESTÃO DE RISCOS CORPORATIVOS EM
AMBIENTES DE SAÚDE

1. Identificação da Instituição de Saúde:

- 1.1 Nome do Hospital: _____
- 1.2 País e Estado: _____
- 1.3 É um hospital escola? (Com faculdade de Medicina) _____
- 1.4 Quanto leitos possui o hospital? _____
- 1.5 Qual o faturamento do hospital? _____
- 1.6 Quantos funcionários possui o hospital? _____
- 1.7 O Hospital possui alguma acreditação de órgão regulamentador?

2. A Gestão de Riscos

- 2.1 Existe um departamento de gestão de riscos no hospital?
- 2.1.1 Quantas pessoas trabalham nesse departamento?
- 2.1.2 Qual a formação dos profissionais que trabalham nesse departamento?
- 2.1.3 Este departamento envolve outras áreas do hospital para gerir riscos? Quais?
- 2.1.3.1 Como é feita a interação entre as áreas e a equipe da gestão de riscos?
- 2.1.3.2 Existem acordos de nível de serviço entre as áreas e a equipe de gestão de riscos?
- 2.1.3.3 Existem processos mapeados do fluxo de informação da Gestão de Riscos no hospital?
- 2.2 Existem mapas de risco?
- 2.3 Há interação com profissionais de outras áreas (como engenharia e administração)?

3. A Gestão de Riscos Assistenciais

- 3.1 A gestão de riscos efetuada é focada somente no aspecto assistencial?
- 3.2 No que diz respeito à gestão assistencial, é usada alguma tipologia ou guia internacional como orientação?

3.3 A gestão de riscos assistencial está vinculada ao planejamento estratégico do hospital?

3.4 A gestão de riscos assistencial dissemina informações e indicadores e distribui relatórios por todo o hospital?

3.4.1 Quem utiliza esses indicadores e informações?

3.4.2 Há uma periodicidade nas revisões de indicadores e metas?

3.4.3 Os indicadores proporcionam um monitoramento de riscos e desenvolvimento de Planos de ação?

3.5 A notificação de riscos pode ser feita por quem no hospital?

3.5.1 É utilizado um *software* para notificações?

3.5.2 Qual a periodicidade de análise e divulgação de análises das notificações no hospital?

3.5.3 As análises efetuadas são qualitativas e quantitativas?

3.5.4 Entre as técnicas abaixo, alguma é utilizada para análise e gestão de riscos?

Brainstorming ()

FMEA ()

FTA ()

Relação probabilidade e impacto ()

Matriz Ranking ()

AHP ()

MAUT ()

Matriz SWOT ()

Matriz GUT ()

Planos de ação ()

Outras: _____

—

4. A Gestão de Riscos Corporativos

4.1 A gestão de riscos efetuada também abrange aspectos corporativos?

4.2 No que diz respeito à gestão de riscos corporativos, é usado algum modelo de referência? (COSO, PMI, ISO 30000)

4.3 A gestão de riscos corporativos está vinculada ao planejamento estratégico do hospital?

4.4 Existe um *Chief Risk Manager*?

4.4.1 Qual a formação do *Chief Risk Manager*?

4.5 A gestão de riscos corporativos visualiza o hospital por processos para identificar riscos?

4.5.1 Quais os principais processos (grandes áreas) que o hospital é dividido para implementar a gestão de riscos corporativos?

4.5.2 Como são identificados riscos corporativos? Utiliza-se alguma referência ou tipologia?

4.6 A gestão de riscos corporativos dissemina informações e distribui relatórios por todo o hospital?

4.6.1 Quem utiliza esses indicadores?

4.6.2 Há uma periodicidade nas revisões de indicadores e metas?

4.6.3 Os indicadores proporcionam um monitoramento de riscos e desenvolvimento de Planos de ação?

4.7 A notificação de riscos pode ser feita por quem no hospital?

- 4.7.1 É utilizado algum *software* de notificações?
- 4.7.2 Qual a periodicidade de análise e divulgação de análises das notificações no hospital?
- 4.7.3 As análises efetuadas são qualitativas ou quantitativas?
- 4.7.4 Entre as técnicas abaixo, alguma é utilizada para análise e gestão de riscos corporativos?

Brainstorming ()

FMEA ()

FTA ()

Relação probabilidade e impacto ()

Matriz Ranking ()

AHP ()

MAUT ()

Matriz SWOT ()

Matriz GUT ()

Planos de ação ()

Outras: _____

- 4.8 Como se estabelece a relação da gestão de riscos assistencial com a gestão de riscos corporativos?

5. A mensuração econômica a partir da gestão de riscos

- 5.1 A definição de criticidade de riscos está relacionada com a métrica monetária? (risco crítico = risco com elevado impacto econômico)

- 5.2 É feita alguma mensuração econômica de impacto de riscos?

- 5.2.1 Como é feita a mensuração econômica?

- 5.2.2 A mensuração econômica utiliza a distribuição de custos, para isso, qual o sistema de custeio existente no hospital? Como são utilizadas as informações do sistema de custeio para fins de análise de risco?
-

- 5.2.3 Há alguma análise de cruzamento entre investimento em gestão de riscos e redução de custos do hospital?

5.2.4 Entre a gestão de riscos assistenciais e a gestão de riscos corporativos, alguma apresenta maior facilidade de mensuração econômica?

5.2.5 Quem faz a mensuração econômica?

5.2.6 Quem utiliza a informação gerada pela mensuração econômica?

5.2.7 Entre as técnicas abaixo, alguma é utilizada para a mensuração econômica de riscos?

Simulação de Monte Carlo ()

Análise de Cenários ()

Análise de Sensibilidade ()

Valor em Risco ()

Opções reais ()

AHP ()

NCIC ()

Árvore de Decisão ()

Variação de custos ()

Variação de VPL ()

Outras:_____

5.3 Existe um parâmetro de aceitação de Risco ou variação de custo aceitável? (Apetite ao risco, grau de exposição risco)

6. Opinião

6.1 Há uma disseminação de aprendizado gerado a partir de notificações de riscos?

6.2 Há envolvimento de todos os funcionários?

6.3 A gestão de riscos é valorizada pela instituição?

6.4 A gestão de riscos tem gerado resultados?

6.4.1 Estes resultados são mensurados economicamente?

6.5 Qual a principal vantagem da existência da gestão de riscos para o hospital?

- 6.6 Existe uma relação entre proteção e criação de valor ao adotar-se práticas de gestão de riscos corporativos?
- 6.7 Resultados gerados pela gestão de riscos são documentados e apresentam fácil acesso aos funcionários?
- 6.8 Há interesse por parte da instituição em participar da continuidade da pesquisa permitindo o uso do hospital para a aplicação e validação de um modelo preliminar de gestão de riscos corporativos?

APPENDIX B

QUESTIONNAIRE FOR A PhD RESEARCH (PPGEP/UFRGS and TRA)

RESEARCH THEME: ENTERPRISE RISK MANAGEMENT IN HEALTH
ORGANIZATIONS

Researchers: Ana Paula Beck da Silva Etges and Veronique Grenon

Professors Advisors: Francisco José Kliemann Neto, PhD and Joana Siqueira de
Souza, PhD

7. Identification:

7.1 Hospital Name: _____

7.2 Country and State: _____

7.3 Does the hospital have Medicine School? _____

7.4 How many beds does the hospital have? _____

7.5 What is the hospital revenue? _____

7.6 How many employees does the hospital have? _____

7.7 How many hospitalizations does the hospital have? _____

7.8 Does the hospital have an accreditation? (for example: JCI) _____

7.9 Does the hospital work with multiple centers or specific centers? (Cancer hospital,
children's hospital, or all specialties integrated).

8. The ERM – contextualization

By establishing the context, the organization articulates its objectives, defines the external and internal parameters to be taken into account when managing risk, and sets the scope and risk criteria for the remaining process (ISO 31000, 2009).

8.1 Is there an enterprise risk management department in the hospital?

8.1.1 How many employees does this department have?

8.1.2 What is the professional training of these employees?

8.2 Is there a Chief Risk Manager/Officer? What is his professional training?

Reports directly to CFO

8.2.1 Do the CRO and the ERM process have relation with compliance, controllership and corporate governance? If yes, please indicate the intensity of relation: (0= none, 1 = weak, 3 = moderate, 5 = Strong, 7 = very Strong)

ERM and Controllershship: _____

ERM and Compliance: _____

ERM and Corporate Governance: _____

ERM and Audit: _____

8.2.2 Does this department involve other hospital departments to manage risks? If yes, which department is involved? Are there employees that assume ERM functions within their department? For example IT

8.2.2.1 How does the interaction happen between the risk management team and others department's teams? Do you use time or activities agreements between the teams?

8.3 With regard to ERM, does it use a reference model? (COSO, PMI, ISO 30000)

8.4 How does the hospital value the ERM process?

8.5 How is the ERM related to the hospital strategic planning? How does this relation happen on a daily basis?

8.6 How does the relationship work between ERM team and Quality / Care risk team (providers)? Is there a periodicity of information shared and discussion?

8.7 How many sentinel events do you have roughly in (1 year)?

8.7.1 About Care risk teams, is there any risk typology (terminology) applied? (WHO, JCI, HIROC, other, ...)

8.7.2 Does the Care risk team generate KPIs that feed the ERM analysis? If yes, please, if possible, share with us an example.

8.7.2.1 Does the Care risk KPI generate action plans that ERM team control? If yes, who manage these actions plans: Care risk team manager or CRO?

8.8 Check if those tools are used for risk contextualization. Please, let us know if there is any other.

Brainstorming: ____

Strategic planning analysis: _____

Matrix Strengths, weaknesses, opportunities and threats: _____

Matrix Severity, Urgency and Trend: _____

Other: _____

9. Risk Identification and analysis

Risk identification represents the phase which the Organization should identify sources of risk, areas of impacts, events and their causes and their potential consequences. The aim of this step is to generate a comprehensive list of risks based on those events that might create, enhance, prevent, degrade, accelerate or delay the achievement of objectives (ISO 31000, 2009).

Risk analysis involves developing an understanding of the risk. It provides an input to risk evaluation and to decisions on whether risks need to be treated, and, the most appropriate risk treatment strategies' methods (ISO 31000, 2009).

- 9.1 How does the identification phase happen? Do you use a terminology and classification?
- 9.2 How is the risk identification proactive?
- 9.3 Is the risk identification encouraged by an external institution? Are you expecting to receive a certification?
- 9.4 Does the ERM team view the hospital by process / department to identify risks? What are the key processes (big areas) that the hospital is divided in to operationalize ERM?
- 9.5 What methodologies do you apply during the risk identification phase? Who is involved in this process?
- 9.6 How do you treat communication issues (between areas) as one of the major risks for ERM process?
- 9.7 Is the risk identification spread in the hospital culture? How long?
- 9.8 Does the ERM team make qualitative risk analysis? If possible, please, share with us an example.
- 9.9 Check if these tools are used for risk identification or analysis. Please, let us know if there is any other.

Brainstorming: _____

Ishikawa: _____

London Protocol: _____

5-why: _____

Failure Mode and Effect Analysis (FMEA):_____

Matrix ranking (Impact x likelihood):_____

Severity Levels Definition: _____

Root cause analysis: _____

What if: _____

Layer of Protection Analysis (LOPA):_____

Process Mapping *AS IS* - *TO BE*: _____

Others: _____

10. Risk assessment

The purpose of risk assessment is to assist in making decisions, based on the outcomes of risk analysis, about which risks need to be treated and the priority for treatment implementation. Decision should take into account the wider context of the risk and include consideration of the risk borne by parties other than the organization that benefits from the risk (ISO 31000, 2009).

- 10.1 Is the definition of critical risk related to economic aspect? (Critical risk = risk with high economic impact).
- 10.2 Is there any measure of economic impact of risks? How is this economic measure done?
- 10.3 Who is responsible for the risk economic measure?
 - 10.3.1 If the economic measurement uses cost distribution, how those costs are identified? (Hospital costing system, ABC, TDABC, Cost centers).
 - 10.3.2 Does the economic measure use revenue information or costs only?
- 10.4 Is there any analysis about investment in ERM and/or cost reduction from hospital? It is done periodically? Who is responsible?
- 10.5 Who uses the economic information generated by ERM? What is their aim using it?
- 10.6 Does the risk assessment raise financial transparency for the stakeholders?
- 10.7 Does the risk assessment encourage the process rationalization? How does it happen?
- 10.8 Is the risk assessment linked with the strategic deployment and goals? How does the control of this relation work?

10.9 Is the risk assessment in ERM process essential for the value creation of the health organization? Why?

10.10 Is there an appetite for risk defined?

10.11 Check if those tools are used for risk assessment. Please, let us know if there is any other

Monte Carlo Simulation: _____

Scenarios analysis: _____

Sensibility analysis: _____

Value at Risk or Cash Flow at Risk: _____

Real Options Analysis: _____

Analytical Hierarchy Process: _____

Non-traditional Capital Investment Criteria: _____

Decision Tree Analysis: _____

Cost analysis in occasional events: _____

Revenue Analysis: _____

Appetite for risk – acceptable variability: _____

NPV variability: _____

Others:

Risk treatment and monitoring:

The purpose of risk treatment involves selecting one or more options for modifying risks, and implementing those options. Risk monitoring should be planned part of the risk management process and involve regular checking or surveillance. It can be periodic or ad hoc (ISO 31000, 2009).

10.12 Does the risk analysis or assessment generate short, medium and long term actions plans? Who is responsible for the management and operations of it?

10.13 Does the hospital approve a budget for the improvements identified by ERM?

10.14 Does the CRO assign goals to committees and owners of risks? Is it related to performance or payout structure?

- 10.15 How does the dissemination and education about ERM happen?
- 10.16 Has ERM generated positive results? In your opinion, what is the principal advantage provided by ERM process?
- 10.17 In your opinion, what do you like to add or make different to improve ERM process?
- 10.18 The hospitals are interested in being a case study for an applied research about ERM Model for Health Organizations? Who must be contacted?
- 10.19 Check if those tools are used for risk monitoring a treatment. Please, let us know if there is any other

Action Plans Definition: _____

Preparation of budget for the actions plans: _____

Definition of Risk Owners in each process: _____

Risk Maps: _____

Metrics links to strategic goals and objectives: _____

Dissemination of results and education: _____

Other: _____

APPENDIX C
ENTERPRISE RISK INVENTORY
E²RMhealthcare

1. Active shooter

Assault and active shooter threats to patients, families and hospital employees.

Impact:

Reputation

Patient

Social

Example: An active shooter, a doctor, enters a hospital and shoots several patients and employees. The doctor opened fire inside a hospital where he used to work, killing a woman and wounding six people before turning the gun on himself. Streets are closed and terrorist activity is considered but it is discovered that the shooter has no relation with a terrorist group. Patients inside are part of the crime scene, and need treatment for post-traumatic shock disorder.

2. Board governance – poor communication or lack of direction

Relationship with shareholders and the Board of Directors of the organization; lack of transparency in the information and results, and capacity to prosecute governance. Can be related to a merger or an acquisition or a conflict of interest.

Impact:

Reputation

Financial

Example: A hospital receives an investment from a group of companies to build a new unit in their hospital. One investor is under investigation by law and therefore cannot make new investments. The hospital will be investigated, because it is among the investor patrimony.

The hospital finances are affected, the new building project is delayed, and the hospital needs to wait for a judgement before proceeding with the project.

3. Business Interruption Due to Natural Catastrophe

Occurrence of external events, which makes it impossible for the organization to maintain its critical activities. This includes natural disasters: earthquake, hurricane, tornadoes, flood.

Impact:

Financial

Social

Example: A natural disaster occurs and destroys part or all of a hospital. Patients are consequently obligated to seek treatment in other hospitals. The financial impact is large due to business interruption. The insurance policy is triggered but the limit of the insurance policy is not high enough to cover the losses. In addition, equipment and technological resources are lost, further degrading future revenue streams.

4. Clinical Batch Claim

With the growing use of technologies and multiple alternatives to treat patients, batch claims have increased in size and frequency. Batch claims are frequently related to misfeasance in delivery of clinical service. For regions where the expression “batch claim” is not applied, this risk suggests failures that happen during clinical treatment and cause a large volume of patient claims related to each other. Claims are filed against the hospital as well.

Impact:

Reputation

Patient

Social

Financial

Example: A nationwide fungal meningitis outbreak is linked to contaminated steroids produced by a pharmacy. Thousands of people were injected with the drug and were affected. Of those injected, several hundred people were diagnosed with meningitis, fungal

infections, and/or abscesses, and other injuries. Sixty-four of those people died as a result of their infections. The pharmacy is bankrupted, hospitals that administered the steroids are suffer reputational and financial losses, and patients are harmed.

5. Conflicts Due to Organizational Hierarchy

Responsibilities, leadership, and respect among the employees and functions. The relation between the decision-making process and hierarchy. The medical hierarchy needs to be balanced in favor of teaching, learning, and patient safety rather than the exercise of power (WALTON, 2006).

Impact:

Patient

Example:

In a woman enters a hospital for a plastic surgery procedure. After the local anesthetic, she suffers cardiac arrest, but the anesthesiologist is no longer in the OR. The surgeon attempts to save the woman. The woman dies before the anesthesiologist can be found.

OR

The physician and professor responsible for a surgery team leave the hospital after a long surgery. They fail to inform the team of their absence. During this period, the patient starts to experience complications. The team looks for fast solutions, but without guidance from the professor, it hesitates to take more aggressive action to save the patient. By the time they realize it's necessary to act on their own, it is too late. The patient has died.

6. Cyber Security

Internal or external hacker penetrates a hospital's IT system and causes damages to the information security of the organization, its operational capacity, and its finances.

Impact:

Reputation

Patient

Social

Financial

Example: Over the course of a year and a half tenure, an employee uses her position in the hospital to gain access to patient's names, addresses and Medicare numbers to sell their information in the open market. When the hacking came to light, the hospital suffered reputational loss as well as financial loss due to decrease in customer confidence. Additionally there were significant expenses to resolve claims and upgrade IT security.

OR

Hackers accessed hospital databases around the world, interrupting operations and stealing data from millions of patients and thousands of companies. Information and Technology consultants are involved to solve fast the problem and try to minimize losses.

7. Deficiency in Developing New Technology and Innovating

Lack of technological innovation or development of innovations that do not meet the organization's needs. It is related to the organization's ability to possess, master, and use technological resources that improve its operations. This impacts the quality of clinical procedures and patient experience.

Impact:

Reputation

Patient

Financial

Example: A new technology is available to treat a specific disease, but acquiring the technology requires funds and time for training the providers. The hospital cannot fund this investment for at least 12 months. As a result, the hospital will not have the new technology available as a treatment option, and patients may seek care in a competing hospital.

8. Dependence on health insurance companies

Negotiations with one health insurance company that accounts for 30% of the billing. The insurance company wants to reduce reimbursements for many medical tests and procedures.

Impact:

Financial

Patient

Example: A hospital has 80% of its billings with two insurance companies (A and B), split 35% for company A and 45% for company B. Negotiations on reimbursements between the hospital and insurance company B are taking a long time. For an entire month, the hospital does not receive income from the patients that have coverage with insurance company B. In addition, new patients insured with insurance company B chose a different hospital, thus the hospital loses the income associated with new patients.

9. Dispute with insurance companies on reimbursement

An insurance company disputes the drugs, devices, or procedures used by the providers and hospital. The insurance company denies coverage.

Impact:

Financial

Patient

Provider

Example: A patient insured by a health insurance company (company B) was admitted for surgery. The patient spent 10 days in the hospital. At the time of billing, the insurance company denies coverage for some drugs and diagnostic procedures that the patient received during his stay. The insurance company argues that the drugs and procedures were never covered by the patient's plan. The hospital enters into the discussion with the insurance company, the patient, and the provider team regarding who will ultimately assume the expenses. The patient is impacted financially and worried about future medical care. The hospital is also impacted financially. Finally, the provider may also suffer financial loss if the provider is not allowed to administer the drugs or perform the procedures in the future.

10. Electronic Health Record (EHR) – inappropriate use

Difficulty in obtaining information due to error in communication, loss of processing power, or difficulty in operating the hospital's system.

Impact:

Patient

Example: An EHR system is implemented at a hospital, requiring all physicians, technology professionals, ethicists, administrative personnel, and patients to use the appropriate technology. However, several employees are not engaged with the EHR system and do not log treatments appropriately. This exposes patients to potential failures such as double medicine doses, double exams, and visit control.

11. Environment Protection Agency or Similar

Government agency comes to investigate and the hospital is subject to fines.

Impact

Financial

Patient

Social

Reputation

Example: A group of patients with a disease that has a high level of contamination is in a hospital. The “clean team” has not received special orientation about the possibility of an epidemic and applies the standard disposal methodologies to discard highly infectious bio-hazard waste materials. The neighboring community has to be evacuated to avoid a big contamination after some of the waste is disposed in the normal trash system. The hospital pays a penalty and is committed to treating for free all new cases of the disease. The surrounding region is notified about the failure, causing a bad reputation for the hospital.

12. External media communication

Poor marketing and media communication from the employees of the hospital. Organizational information is leaked before the hospital has released a formal communication and the information is erroneous.

Impact:

Reputation

Patient

Example: The hospital is about to launch a revised treatment protocol based on a new technology. The external communication department has organized a formal event and advertisement to be sent to the television companies and newspapers. An employee at the hospital that knows about the new technology discusses it with a journalist prior to the official launch. The informal interview appears with wrong information in the media. The hospital needs to correct the interview, and won't achieve the expected positive impact. The hospital loses credibility with the public, and this impacts its reputation.

OR

A sentinel event happens in the hospital and a patient expires. Before a formal communication with external media is released, the involved department chair communicates with the media, and the news is shared and reaches many people. The hospital's reputation is impacted and the hospital loses credibility with patients.

13. Financial Batch Claim Emanating from Reimbursement Reform

Financial risk for healthcare organizations associated with bundled services or healthcare outcomes.

Impact:

Reputation

Social

Financial

Example: A group of 100 patients organize a class action against a healthcare organization because they feel that the level of care has been sacrificed to achieve hospital financial goals. They believe that the most advanced medical diagnostic tests were not administered in an effort to contain costs and this affected their quality of care. The hospital's reputation dwindles as patients seek treatment elsewhere. The hospital also loses the income associated with those patients.

14. Fraud committed by a provider

Insurance plan fraud committed by a provider or a group of providers illegally prescribing prescription drugs. Medicines or equipment stolen from the hospital.

Impact:

Reputation

Patient

Social

Financial

Example: Physicians using Medicare in the United States to prescribe unnecessary medical services. The owner of more than 30 Miami-area skilled nursing and assisted living facilities commits fraud that resulting in losses of \$1 billion dollars. The financial impact to the hospital and the government is large. The healthcare organization loses its reputation and barely survives. The fraud directly impacts the patients because the patients undergo unnecessary procedures and are given unnecessary medicines. There is a class action against the organization.

During 3 years a Brazilian group of physicians conducted an illegal sale of weight loss medicines and anabolic. Thousands of people were involved and millions of dollars were devious. At the end of the investigation, 3 physicians were arrested.

15. Government Instability

Reduction in the Country's Healthcare Budget.

Impact

Financial

Patient

Social

Example: The government decides it should no longer provide financial support to states to fund the Medicaid program. The financial burden is assumed in part by the hospital, its insurers, and patients.

16. Loss of Accreditation

Loss of an important certification or accreditation.

Impact

Financial

Patient

Reputation

Example: A hospital receives an accreditation audit and the recommended changes must be put in place within a certain period. During that time, the hospital does not fulfill all the accreditation expectations because of financial hardship. The accreditation authority reduces the accreditation level of the hospital. As a result, some patients that have alternatives to use other hospitals do so.

OR

Medical center accreditation is denied after discovering a noncompliance with 29 standards. The accreditation suggests a possible Hepatitis B exposure at the hospital affecting 650 patients. The hospital reacts quickly and in 15 days receives a contingent accreditation, awarded after the organization successfully abated an immediate threat to life situation through direct observation or other method.

17. Non-compliance with laws and regulations

A clinical trial is taking place without the proper Institutional Review Board (IRB) approval. Patients die while part of the research.

Impact:

Reputation

Patient

Social

Financial

Example: A group of researchers is seeking patients for a clinical trial. The clinical trial consists of administering a new and cheaper drug to patients that suffered from cardiac arrest. The IRB's approval is pending two elements: 1) one provider needs to provide certain documents, and 2) there needs to be a formal training session for all the physicians that will administer the new drug. A patient is admitted to the ER and has just suffered a heart attack. The physician responsible for this patient administers the trial drug. The patient expires. The hospital is sued and found liable. The hospital indemnifies the family of the patient. The media is made aware and reports the event in the news. Patients are losing their trust in the hospital and some decide to seek care elsewhere. This impacts the future revenue of the hospital.

18. Occupational Safety and Healthcare Administration (OSHA/USA) or Similar
Laws that impact how employees are being contracted for employment. Any change in the formal policies will affect hospital management.

Impact:

Financial

Patient

Example: A general work law is modified. At the same time, all companies, including hospitals, change their contractual agreements with employees. Nurse and clinical teams' compensation is affected and this impacts the healthcare organization and patients.

OR

A clinical nurse has a young patient. Though she has already worked a 12 hour shift, she stays longer to ensure the care of the child. Although laws exist mandating the maximum number of hours that the clinical employees must work, it is very difficult to control because of the multiple jobs that the clinical teams can be working at the same time. The nurse

ultimately works for over 36 hours, becomes exhausted, and makes a mistake while administering medicine. The patient dies.

OR

A nursing assistant is trying to lift a patient. He has not been taught the proper form for this, and injures himself. At the same time, he drops the patient, injuring the patient. The patient is directly affected by the employee's lack of training, and financial impacts consequently occur through penalties and workers compensation injuries.

19. Organizational Culture

The healthcare organization needs to share and implement its culture among all the employees. New and old employees need to work by the same values and principles independently of their own background or origin.

Impact:

Patient

Example: A hospital has been investing in safety and quality programs over the last several years. The focus of the investments has been new technologies and acquisition of the best surgical teams, but necessary educational programs for clinicians are not being explored. Basic primary care with patients is not occurring, and although the hospital is working with the best technologies and employees, they are not engaged in a culture of safety and quality, and this results in medical error.

20. Physician Wellness

Physician burnout resulting in turnover, depression, and suicide as well potential harm to patients.

Impact:

Patient

Financial

Example: 5% of physicians have left an organization in one year. This is more than in previous years. A physician wellness survey is administered to measure and address burnout and professional fulfillment and it is discovered that a higher proportion of physicians that left had indicated they were burnt out. The hospital loses talent and consequently the associated income.

OR

A surgeon is over tired and depressed, but she performs surgery as her job requires. During the surgery, a minor mistake becomes a fatality and the patient dies. The surgeon feels blamed for the event and unsupported by the hospital. She quits her job and changes career.

21. Relationship Between the School of Medicine (SOM) or Residency Program and Hospital

Interface between the medical school or residence and the health service that can lead to interference of the university model in the hospital business or, on the other hand, to add value to the health institution due to the quality of teaching.

Interface between the School of Medicine and the health service that may lead to interference with the university business model or, on the other hand, to value the health institution due to the teaching quality.

Impact:

Patient

Social

Reputation

Example: A school of medicine has the responsibility to teach students and they also contribute to the workforce in the hospital. The practical exercises for the students are essential, but if it is not well structured can expose patients to failure. The residents and the medical students are learning. They are integrated with the clinical team but must be

involved in well-guided and supervised programs. Some research proves how teaching hospitals, if well managed, can sustain better outcomes.

A professor of surgery and oncology and chief of thoracic surgery at a well reputed hospital writes a paper that compares the outcomes for lung cancer patients at teaching hospitals versus nonteaching hospitals using the National Inpatient Sample database. The professor concluded that the mortality was better with fewer complications at teaching hospitals. The study evaluated 1.5 million Medicare patients experiencing three commonly treated health problems: heart attacks, heart failure and pneumonia from 2009 to 2010, the study found that there was a 10 percent reduced risk of mortality by being treated in a teaching hospital. The risk is related with how to manage the relationship between the teaching programs and the clinical responsibility to maximize positive patient outcomes and financial results.

22. Sentinel Events

Sentinel events, "never events", or events that are related to medical error and may indicate the beginning of a lawsuit.

Sentinel events, never events, or events that have relation with management process or medical error that can cause a lawsuit.

Impact:

Reputation

Patient

Financial

Example: A newborn is kidnapped from the hospital. The patient (mother) files a lawsuit. The hospital settles the case, pays a penalty and loses its accreditation with the Joint Commission (JCI). The event is reported in the news, and impacts the hospital's reputation. It is estimated that in coming months, women will seek an alternative hospital to deliver their baby.

23. Supply Chain

Materials and equipment control and management. Political problems with countries that supply resources for hospitals.

Impact:

Social

Financial

Example: The government blocks a container with medical material that will provide hospitals from a specific region of the country for 3 months. The hospital material stock is running low. The hospital finds a new distributor at a much higher cost.

24. Terrorism

Terrorist attack at a hospital.

Impact:

Reputation

Patient

Social

Financial

Example: A terrorist puts a bomb in a famous hospital due to their treatment program for political refugees. Patients and employees die and the financial consequences for the hospital are grave.

25. Talent retention

Loss of a team of specialist providers who perform certain procedures. The loss of the team is due to a misalignment with the human resources department.

Impact:

Reputation

Patient

Social

Financial

Example: A hospital with a large center for cardiac transplantation loses its main cardiac transplant surgeon. The surgeon had asked for more personnel and her request was not granted. The surgeon left the hospital and started to work at a nearby hospital. The hospital she left suffered financial consequences as patients chose to follow her to the new hospital. The original hospital may not be able to recruit another transplant surgeon for a year, and is now in direct competition with the surgeon's new hospital.

26. Unethical conduct

Problems related with an employee's unethical conduct involving or not involving patients. Personal information, images or objects are used or shared without the approval of patient.

Impact:

Reputation

Patient

Social

Financial

Example: An OBGYN worked for many years at a major academic hospital in the USA, and used a camera pen strung around his neck to secretly record women during examinations. A female colleague became suspicious of his behavior and eventually brought it to the notice of authorities. The physician was found liable and the hospital had to settle. In addition, the patients' information was leaked to the public, causing outrage and embarrassment on the part of the patients. The lawsuit and damages adversely impacted the hospital's reputation and finances. The hospital paid the settlement and revenue was lower in the next year because patients found care elsewhere.

27. Union Strike

Union strikes among different types of employees that can affect the hospital capacity to operate.

Reputation**Patient****Financial**

Example: Following failed negotiations, members of a nurse union that represent 50% of the nursing workforce have decided on a one-day strike. This threat has led the hospital's management to prepare a contingency plan. The nurses would be locked out for 5 days and replaced by temporary nurses. Temporary nurses are 1.5 x more expensive to hire. This will disrupt patient care, therefore lowering the treatable volume of patients. The situation also increases the potential for adverse outcomes in the hospital.

28. Use of Social Communication Networks

Problems with confidential information being communicated through social media in relation to a public person, an executive, an actor, etc. Information is released on social media platforms with world-wide distribution and reach.

Impact:

Reputation**Social**

Example: The wife of an ex-president dies in a high-quality hospital. A physician posts on social media that the ex-president's wife has died and people share the news on different social media apps before a formal communication can be released by the hospital and the clinical team. The physician that sent the message was dismissed, but the hospital now has a reputation for breaching confidentiality and patients are reluctant to seek care there.

APPENDIX D

Risk Inventory Survey

https://stanforduniversity.qualtrics.com/jfe/form/SV_5cqyep0MOuZ91yd

APPENDIX E



THE RISK AUTHORITY

January 18, 2018

To whom it may concern,

I am writing to certify that I, employed by The Risk Authority Stanford, have contributed to the development of the PhD thesis of the student Ana Paula Beck da Silva Etges.

If you require any further information regarding Mrs. Beck da Silva Etges, feel free to get in touch with me.

Sincère Regards,

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APPENDIX F

Atuais publicações a partir da tese apresentada - <http://lattes.cnpq.br/2142304563601810>

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Referências adicionais : Brasil/Português; Local: Universidade Federal do Rio Grande do Sul; Cidade: Porto Alegre;

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