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## **Hospital do Subúrbio**

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A case study of the first Public-Private Partnership  
in healthcare provision in Brazil

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## ABSTRACT

The Brazilian healthcare sector is peculiar. The quality gap of the medical services between the public and private providers is significant. The national health system is based on the decentralization of medical services. States and municipalities needed to secure the necessary resources to provide appropriate medical care for the population. Thus, in September 2010, the state of Bahia inaugurated the first Public-Private Partnership hospital in Brazil, Hospital do Subúrbio. This thesis presented the case of the hospital and evaluated its success. The hospital's purpose was to combine the quality of the private healthcare with the affordability of the public healthcare. The maintenance, management and operation of the hospital were outsourced to a private consortium. A review of several models of PPP was conducted for Portugal, Spain, Canada and the United Kingdom. Similarities emerged in the length of the contract and responsibilities allocated to the private partners. Differences in the provision of clinical services and the project finance reflected the differences in the legal framework of each country. In the end, an analysis of the performance of the hospital was presented. This performance was evaluated using available quantitative and qualitative data provided by the private consortium. The analysis revealed defects in the performance forecasts, which had a positive impact on the payment to the consortium. The mortality rate of the hospital was revealed as a matter for concern. However, the overall positive performance of the hospital confirms that it is a case of success.

## RESUMO

O setor da saúde no Brasil é peculiar. Por um lado, existe uma diferença significativa de qualidade entre os serviços médicos públicos e privados. Por outro lado, o sistema nacional de saúde baseia-se na descentralização dos serviços médicos. Estados e município necessitam de assegurar os recursos necessários para fornecer à população cuidados médicos apropriados. Assim, em setembro de 2010, o estado da Bahia inaugurou o primeiro hospital em Parceria Público-Privada no Brasil, o Hospital do Subúrbio. Esta tese apresentou o caso do hospital e avaliou o seu sucesso. O objetivo do hospital era juntar a qualidade dos serviços médicos privados com a acessibilidade dos serviços médicos públicos. Por essa razão, a manutenção, gestão e operação do hospital foram atribuídas a um consórcio privado. Posteriormente, foi elaborada uma revisão de vários modelos de PPP para Portugal, Espanha, Canadá e o Reino Unido. A duração dos contratos e as responsabilidades dos parceiros apresentaram algumas semelhanças. O fornecimento de serviços clínicos e o financiamento dos projetos refletiram as diferenças na estrutura legal de cada país. Por fim, foi realizada uma análise do desempenho do hospital. Este último foi avaliado com recurso a dados quantitativos e qualitativos disponibilizados pelo consórcio privado. A análise revelou defeitos nas previsões de desempenho, que tiveram um impacto positivo no pagamento ao consórcio. A taxa de mortalidade institucional revelou-se como um motivo de preocupação. No entanto, o desempenho positivo geral do hospital confirmou que se trata de um caso de sucesso.

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## INTRODUCTION

Public private partnerships (PPPs) originated in the United Kingdom in the 1980's (Jefferies et al., 2013). The earliest form of partnership between private and public entities was the Private Finance Initiative (PFI), which was developed under the conservative administration of John Major (Brito & Silveira, 2005). The partnership was a mean for a public entity, at the state level or municipality level, to fund a specific project with private capital. The terms of such partnerships were then extended in the late 1990's under the government of Tony Blair, and the PFI was transformed into the modern day PPP (Brito & Silveira, 2005).

Why were PPPs important for public entities? European countries were experiencing a period of fiscal contraction with tight budgets and limited debt to respect the limits imposed by the Maastricht Treaty. PPPs appeared as a response to the increase in the demand for public services while respecting their fiscal constrains and overcoming the struggles of public financing (Brito & Silveira, 2005; Jefferies et al, 2013). The private sector was perceived as a role model for efficiency. Governments seized the opportunity of bringing efficient services to a larger scale without the constraints that could emerge from private sector, such as a high price.

This has resulted in impressive numbers for PPP investment, specifically long-term infrastructure contract (LTIC) types of PPPs<sup>1</sup>. From the early-90s to the beginning of this century, thousands of contracts were established worldwide with amounts totalling almost \$200 billion (Hodge & Greve, 2009). At first, PPP projects were focused on transportation. Road projects entitled the private operator to remuneration directly from the users, i.e. tolls, or remuneration from the government calculated using the number of vehicles, i.e. shadow tolls (Jefferies et al., 2013). Portuguese SCUT highways built between 1999 and 2001 were an example of shadow tolls remuneration (Sarmiento & Reis, 2013) before the model was dropped and physical electronic tolls were installed.

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<sup>1</sup> Hodge & Greve (2009) define LTIC-type of PPPs as projects that “emphasize tight specification of outputs in long-term legal contacts”.

Over the years, PPPs have evolved to other fields. Allard & Trabant (2008) listed PPP projects in Spain. Infrastructures have been developed in solid waste management (Centro de Residuos in Cantabria) or railway transportation (Metro Sevilla in Andalucía). Naturally, PPPs have been developed in the healthcare provision sector, with examples in the United Kingdom (Norfolk and Norwich University Hospital), France (Hôpital Henri Laborit), Romania (University Hospital Bucuresti), Portugal (Hospital Beatriz Ângelo), Spain (Hospital Universitario de la Ribera), among many others (EC, 2014).

In the healthcare provision sector, PPPs are commonly associated with hospitals. However, PPPs in this sector are not limited to hospitals. Partnerships were established between governments and pharmaceuticals to improve the development of proper medicine to tackle specific diseases and granting larger access to medical advancements (Liang, 2011). But with fully public financed health sectors, high efficiency level targets and restrictive budgets, governments were forced to implement reforms to increase the hospitals' performance (Simões, 2004).

PPPs were institutionalized in the Brazilian legislature in 2004. The government was looking to replicate the positive aspects from the international experience of PPPs and adapt them to the local needs (Brito & Silveira, 2005). Contracts are characterized by the provision of public services in the medium-long run under the supervision of the Public Administration (Brito & Silveira, 2005). At the federal level, examples of existing PPP projects are: a datacenter, an administrative center or a railway line (Ministério do Planejamento, 2015; PPP Brasil, 2015). At the state level, examples of PPPs are: football stadiums, hospitals or underground transportation.

PPPs have only recently started to reach the Brazilian healthcare sector with the construction of the Hospital do Subúrbio in the state of Bahia. The project was accomplished on September 14, 2010 (SEFAZ Bahia, 2015). Most recently the state has signed a PPP contract in the field of image diagnostics in medical units of the state health system (PPP Brasil, 2015). Furthermore, the example of this hospital has pushed for replication initiatives in other Brazilian states, namely São Paulo and Minas Gerais (PPP Brasil, 2015). This work focuses on the PPP project of Hospital do Subúrbio.

To assist this research, three questions will need to be answered:

**1) How was the Hospital do Subúrbio PPP project designed?**

This research is centred on Hospital do Subúrbio, the first experience of PPP in healthcare in Brazil. The central piece of this case is the public-private partnership itself, which has various features that are important to analyse. The project starts with a tender, then the partner is selected, a contract between partners is established and then both partners must achieve their mutual obligations. The aim is to describe this process.

**2) How do the different models of PPP in Healthcare compare in different countries?**

In the interest of evaluating the Hospital do Subúrbio as a PPP it becomes relevant to compare the Brazilian model with other PPP models in healthcare provision in other countries. In order to perform the comparison, several countries with PPP hospitals were selected. The hospital will serve as an example for the country's PPP model. The selected countries and hospitals are: Hospital Beatriz Ângelo in Portugal, Norfolk and Norwich University Hospital in the United Kingdom, Hospital Universitario de la Ribera in Spain and Centre Hospitalier de l'Université de Montréal in Canada.

**3) Why is Hospital do Subúrbio a successful case study?**

It is important to assess the extent to which this case study can be considered a success or not. Studying the performance of the hospital will provide an answer to this question. The performance is measured by a set of indicators. The analysis of the later should give a perspective of the quality of the hospital, i.e. its success.

In the topic of PPPs it is interesting to have a recent case to study that is a premiere in its business area. Particularly when the use of PPPs has been a conventional model for numerous countries around the world. Developing countries face a various set of issues that are not a concern for developed countries anymore. A successful case in a developing country can serve as an example for other countries to replicate.

This work will be organized as follows. The first chapter will present a literature review concerning PPPs, PPPs in healthcare and PPPs in Brazil. The methodology will be presented in the second chapter. The third chapter will present the case to be studied, thus answering the

first research question. Then, the fourth chapter will present a comparison of PPP models in selected countries. This chapter will provide an answer to the second research question. Then we will proceed onto the analysis of the performance of the Hospital do Subúrbio. And finally, the conclusions of this study will be presented in the sixth and last chapter of this research.

## **1. LITERATURE REVIEW**

### **1.1 What is a Public-Private Partnership?**

Nikolic & Maikisch (2006) distinguished several types of PPPs, or Public-Private Collaboration (PPC), depending on the degree of risk and responsibility of each party to the contract. On the one hand, there are contracting out types of PPPs. They take various forms such as service contract, management contract, construction, maintenance and equipment contract, hybrid contracts, or leases. On the other hand, there are concession contracts, including the PFI. Table 5 of the appendix provides further explanations for each type of contract hereby mentioned.

Among several definitions of the PPP, Grimsey & Lewis (2005) simply define PPPs as “a refinement of the private financing initiatives for infrastructure that ... describe the provision of public assets and services through the participation of the government, the private sector and the consumers”. PPPs aim at optimizing the risk management of a large-scale project and maximize its Value for Money (Jefferies et al., 2013), thus justifying the evolution of the rationale from a traditional provision of assets or services to the acquisition of services from a private company (Pollock et al., 1997; Brito & Silveira, 2005, McQuaid & Scherrer, 2009; Siemiatycki & Farooqi, 2012). Although PPPs are not limited to the provision of infrastructures/services, they can exist as private ownership of shares in state-owned businesses or by exploiting the commercial value of Government assets (McQuaid & Scherrer, 2009).

PPP projects need to be clearly defined. They require provisions to share the risk among the public authority and the private entity, a contractually limited time frame and a separation between the public partner and its private homologous (EC, 2014; Nikolic & Maikisch, 2006).

This risk transfer is expressed as the division of the different responsibilities among the partners (Sarmiento & Renneboog, 2014). Although risk sharing is an obligation in the PPP contract, it also serves as an instrument for the public entity to ensure the creation of the appropriate set of incentives for the private partner (EC, 2014; Nikolic & Maikisch, 2006).

The extent to which the risk is transferred to the private part of the contract will depend on the incentives needed to successfully achieve the contract and the extent of the risks that the public partner has to incur. This risk transfer may imply a cost for the public partner in the form of a fixed remuneration. Public authorities need to make sure that by transferring risk, they do not transfer unbearable risks (Nikolic & Maikisch, 2006).

PPPs suppose a long-term arrangement between the partners, typically 20-35 years for healthcare facilities, as in existing cases in the United Kingdom, Portugal, or Spain (EC Annexes, 2014). Such long-term relationships exist under the form of concessions or franchises (McQuaid & Scherrer, 2009). Among numerous reasons to develop PPPs, efficiency of public spending (McQuaid & Scherrer, 2009) and comparative advantage in the provision of a service (Nikolic & Maikisch, 2006) are distinguished as most important. They are stimulated by the integrated vision of the project's life cycle developed by the private partner (Brito & Silveira, 2005) since it is responsible for the whole project, i.e. construction, financing and mobilization of the assets needed to provide the required service.

The structure of a PPP project funding follows a rationale of Project Finance (Brito & Silveira, 2005). To develop the project, the investors/sponsors create a distinct entity whose assets and obligations are distinct from theirs and whose responsibility is solely limited to the capital raised for the project (Brito & Silveira, 2005; Gatti, 2005). The distinct entity is known as a Special Purpose Vehicle (SPV). The debt and/or equity raised, as an initial investment for the project, will be paid using the cash flow resulting from the project operation, discounted at a rate that compensates for the risk taken by the shareholders (Gatti, 2005). Equity will originate from the sponsors, whereas debt can be raised via banks or bond markets (Sarmiento & Renneboog, 2014). Gatti (2005) also emphasises the fair share of risk among sponsors and the collateral given by the sponsors to the lenders as distinctive features of the Project Finance.

## 1.2 Advantages and Disadvantages of Public-Private Partnerships

Advantages and disadvantages of PPPs have been widely discussed and criticized by the general public, the media, political parties and several authors. On the positive side, PPPs allow for greater efficiency stemming from the private partner experience. They alleviate the financial pressure on public entities involved in the partnership. And, they provide a better healthcare management. On the negative side, such advantages seem to be rather theoretical than actual benefits. PPPs present a set of risks that would otherwise not be faced by the public partner. Plus, other types of disadvantages, such as obsolescence of the infrastructure, are important to highlight. However it is crucial to emphasize that a main quality of a PPP is that it allows for the construction of an infrastructure at all (Sarmiento & Renneboog, 2014).

### *1.2.1 Advantages*

The core benefit and purpose of PPPs is the increase of efficiency in service provision (Brito & Silveira, 2005), facilities operation (Nikolic & Maikisch, 2006) or maintenance (Grilo & Alves, 2012). The public entity seeks a private partner that is able to execute a task with greater efficiency than it could do (Brito & Silveira, 2005). Partnering with a private company seeks to develop greater asset utilisation, economies of scale and better performance with the use of key performance indicators (McQuaid & Scherrer, 2009). Furthermore, this efficiency is verified in the structure of the project, specifically in the SPV. All activities related to the project are concentrated in one entity that creates the incentive for cost-optimization and improvement of service quality (Brito & Silveira, 2005; Grilo & Alves, 2012).

Public entities seek PPPs as a way to fund their projects and the result for the treasury is an “off-balance sheet” operation (McQuaid & Scherrer, 2009; Sarmiento & Renneboog, 2014). PPPs reduce the amount of up-front investment carried by public funds (Nikolic & Maikisch, 2006; Brito & Silveira, 2005), as the private partner has to uncover the financial resources to initiate the project. This is an example that PPPs allow for a better risk allocation and risk reduction (Nikolic & Maikisch, 2006) in this particular case. PPP contracts induce a careful risk analysis to procure reliable cost estimates to provide a solid ground for decision makers (Grilo & Alves, 2012). In addition, risks are carefully evaluated by the shareholders, thus

providing an incentive for proper risk mitigation, namely during the construction phase of a project (Grilo & Alves, 2012).

With a specific emphasis on the healthcare sector, PPPs provide a better healthcare management, both in the services provided as well as the infrastructure management (Nikolic & Maikisch, 2006; Grilo & Alves, 2012). PPPs are a method of leveraging technical or managerial expertise as well as enhancing technology transfers through the incentive scheme set by the public partner and the performance monitoring of the private operator (Nikolic & Maikisch, 2006; McQuaid & Scherrer, 2009). As the contracts contain thresholds of performance, this results in adequate infrastructure maintenance (Grilo & Alves, 2012).

### *1.2.2 Disadvantages*

On the downside, there appear to be no scientific evidence that PPPs in healthcare provision are cost-effective compared to any other form of publicly financed entity. Various reports suggest that a long-term analysis proves that PPPs are more expensive (EC, 2014). The structure of the PPP itself, combined with the bidding process and further monitoring, represents elevated costs for the public entity, which will have to account for them in the project evaluation (Brito & Silveira, 2005). These high costs, combined with a slow process of implementation, increase the difficulty to set up such a framework for small projects (Grilo & Alves, 2012). Also, any renegotiation process will also amount to a further increase in costs for the public entity (Grilo & Alves, 2012).

Furthermore, PPPs are highly relevant in national economic terms. It was argued that large PPP programmes lead to fiscal risk, which is concerning in countries such as the United Kingdom where PPPs represent 40% of the total health sector investment (EC, 2014). The evaluation of risks, as discussed earlier, can uncover risks resulting from low institutional capacity or regulatory framework, or even risks from the creation of excess capacity or new capacity in the wrong place (Nikolic & Maikisch, 2006).

Moreover, the evolution of the demand may render the service obsolete or the PPP contract inadequate for the changes needed in the project (Grilo & Alves, 2012). New technologies may have a negative effect on the projects when innovative techniques in the construction techniques are yet to be tested (Grilo & Alves, 2012). Compensation payments for the risk

taken by the private partner might cover risks that do not materialize, or risks that the private partner cannot deal with (Grilo & Alves, 2012). Also, municipal PPPs may involve higher risks due to the knowledge gap existing between the municipality and the private company or the state, which should have more knowledge in PPPs through past experiences (McQuaid & Scherrer, 2009).

### 1.3 Value for Money of Public-Private Partnerships

Value for Money (VfM) in PPPs is defined as a “measure of the extent to which cost savings are achieved when delivering a public infrastructure project through a PPP relative to a traditional government-led procurement approach” (Siemiatycki & Farooqi, 2012). Transferring healthcare service provision from public hands to private hands was seen as the logical step to improve the VfM of healthcare facilities, given the advantages discussed earlier. However, VfM is difficult to measure due to the subtleties existing in the transfer of risk from the public to the private partner (Sarmiento & Renneboog, 2014). Hodge & Greve (2009) reviewed international literature about the Value for Money of PPPs and found diverging conclusions. Several authors found empirical evidence of profitability in PPPs. On the other hand, other authors found conclusive evidence of the exact opposite. However, Hodge & Greve (2009) argue that the reliability of these findings is to be questioned.

The European Commission (2014) has major insights in this topic. The VfM of healthcare service provision can only be calculated for a specific patient population in relation to a defined alternative. Costs savings and value of completing the project on schedule and without cost overruns are large enough to compensate for the risks taken by the private contractor. The approach to the project VfM study varies for each country and lacks depth, accuracy and objectivity, because sometimes the PPP promoter performs the study. All of which does not compare to the fact that some PPPs are implemented without a proper assessment of their profitability.

## 1.4 Public-Private Partnerships in Healthcare Provision

Private participations in hospitals may take various forms depending on the PPP objectives and the population needs, as well as the government's resources and constraints (Nikolic & Maikisch, 2006). The European Commission (2014) distinguished two main types of PPPs with regard to healthcare provision services: full-service PPPs (infrastructure and clinical service) and accommodation-only PPPs (PFI). Full-service PPPs need to be subjected to the same rules of patient access and tariffs to ensure that the patients' experience does not differ considerably from hospitals controlled by other public, private, or social sponsors (EC, 2014). Accommodation-only projects are discussed when the public sector lacks the up-front investment needed for the construction of facilities resulting from budget restrictions (EC, 2014).

Before the advent of PPPs, dynamics already existed between the public and private sector. Countries that provide healthcare mainly through public entities have to rely on private entities to provide some inputs, such as pharmaceuticals and support services (McKee et al., 2006). By opposition, in some countries, the state is able to influence predominant privately owned healthcare provision facilities through regulations and incentives (McKee et al., 2006).

The success in achieving the project objectives relies on the payment structure and incentives. The complexity of activities developed in a hospital can also have a major effect on the success of the project as, for example, a university hospital presents a higher degree of complexity than a local hospital (EC, 2014). To increase the potentiality for success, any PPP in healthcare should include clinical staff in the discussion of the project, among other stakeholders (EC, 2014), i.e. universities and research funders (McKee et al., 2006). Additionally, a serious analysis of costs incurred in the bidding procedure needs to be conducted. This step implies large costs for the healthcare provider to develop their tender. A cost analysis would avoid such results as fears of insolvency that already occurred in PFI contracts in the UK because of an inadequate analysis (McKee et al., 2006).

## 1.5 Public-Private Partnerships in Brazil

The term PPP is employed for three types of concessions existing in the Brazilian legislature: regular concessions, administrative concessions and sponsored concessions (PPP Brasil, 2015). The definitions of each type of concessions can be found in table 6 of the appendix. Two laws regulate the PPPs in Brazil: the Federal act nº 8.987/1995 and nº 11.079/2004 (PPP Brasil, 2015; Banco do Brasil, 2015). The first applies to regular concession, whereas the later applies to administrative and sponsored concessions (PPP Brasil, 2015; BB, 2015). These three forms of concession all share a common characteristic that is proper to PPPs. They allow the state to attract private investment to fund infrastructures (PPP Brasil, 2015).

The PPP contract cannot involve monetary values inferior to R\$ 20 million, with a duration comprised between 5 to 35 years (Portal Brasil, 2015; Brito & Silveira, 2005). The partnership can be established between a private partner and the Federal government, the state or the municipality (Portal Brasil, 2015). The law also establishes the rules for risk sharing in several contexts (Brito & Silveira, 2005). It provides a fundamental mechanism to improve the incentive for the private partner to improve the project efficiency. The law defines the obligation of payment from the public partner for the service included in the PPP contract, with the possibility of having a variable amount to be paid according to performance objectives (Brito & Silveira, 2005).

The Brazilian PPP Observatory accounted for seventeen PPPs in 2011 in eight different categories: stadiums, sanitation, roads, incarceration facilities, administrative centre, subway system, hospital and habitation (Ramos & Marques, 2011). They are located in six of the twenty-six Brazilian states, namely Minas Gerais, Bahia, Pernambuco, São Paulo, Rio Grande do Norte, Ceará. The projects are elaborated with the Federal Government or the State Government. The most represented form of PPP was the construction of stadiums for the 2014 FIFA World Cup, with 5 stadiums built under a public-private partnership contract (Ramos & Marques, 2011).

To this date, the Ministry of Planning, Budget and Management accounts for fifteen PPP at the Federal level, this includes a Data center, a public digital television network and national parks, among others (Ministério do Planejamento, 2015). In the state of Bahia, PPPs were

introduced with the state law nº9.290 on the December 27, 2004 (SEFAZ Bahia, 2015). The state has currently six PPPs in execution, including the Hospital do Subúrbio, and it has two projects under study (SEFAZ Bahia, 2015).

The Brazilian legislature relies on the positive aspects of the international experience in PPPs, such as having a central public entity that is responsible for the coordination and implementation of the projects (Brito & Silveira, 2005). The law 11.079/2004 defines the competencies of the public entity that will be in charge of managing the PPP projects. Such entity is composed of representatives of the Ministério do Planejamento, Orçamento e Gestão (Ministry of Planning, Budget and Management, MP), Ministério da Fazenda (Ministry of Finance, MF) and from the Casa Civil da Presidência da República (Civil House of the President), under the supervision of the MP (Brito & Silveira, 2005). This central entity has the role of defining the services to be contracted using a PPP, as well as the procedures for such contracts, and obtain authorizations for the bidding procedure, among others (Brito & Silveira, 2005).

## 1.6 Healthcare Provision in Brazil

Brazil implemented a national healthcare system, the Sistema Único de Saúde (SUS, Unique Healthcare System), through the federal constitution in 1988 and the 1990 Lei Orgânica da Saúde (Organic Health Law) (Travassos et al., 2000; Pinto, Wall, Yu et al., 2012). The SUS emerged in a time where the dictatorship was fading away (Jurberg, 2008). It was driven by the Reforma Sanitária (Sanitary Reform), which was based on a set of crisis affecting the country (Teixeira, 2009). The Brazilian population had poor sanitary conditions, a weak healthcare system and a crisis of the medical practice all together (Teixeira, 2009). The health reform of 1996 cleared the notion of decentralized universal access to healthcare (Jurberg, 2008). The federal and state governments are responsible for financing the system, whereas the actual service is provided directly by municipalities. In numbers, the SUS serves approximately 70% of the Brazilian population (Jurberg, 2008). The remaining population seeks private healthcare, because they are able to afford it.

The most important aspect of the SUS is primary care, i.e. promotion of health, prevention, treatment and focus on serious diseases (Jurberg, 2008). The government thus created the

Estratégia Saúde da Família (Family Health Programme) to achieve its goals of primary healthcare provision (Jurberg, 2008). This programme is based on a transdisciplinary vision to face health and environmental issues affecting communities (Pinto, Wall, Yu et al., 2012). Healthcare is provided directly to people's homes, in addition to hospitals and clinics (Jurberg, 2008). Health care providers strive to analyse issues on evidence-based practices, which would combine research with patient input (Pinto, Wall, Yu et al., 2012). In 2008, the Programme accounted for 27.000 teams, serving 5.560 municipalities and each team serving approximately 2.000 families or 10.000 people (Jurberg, 2008). The teams have nurses, doctors, dentists, and other practitioners according to the local needs.

The Brazilian healthcare providers sector was valued in 2013 at \$208 billion and is expected to grow past \$300 billion in next few years (Marketline, 2014)<sup>2</sup>. The sector is divided into the following categories: outpatient care, inpatient care, medical goods, collective services and capital formation, long-term care (MarketLine, 2014). Outpatient care<sup>3</sup> represents the biggest share of the healthcare providers sector with almost 35% of the sector's value<sup>4</sup>, followed by inpatient care and medical goods.

## **2. METHODOLOGY**

In this work we will use the case study methodology to provide a framework for “examining contemporary events, but when the relevant behaviors cannot be manipulated” (Yin, 2003). It is important to differentiate between a case study that presents an institution or describes a phenomenon, which is the model used for this research, and a case study used for teaching purposes, to which the concept of case study differs (Yin, 2003).

The case study presents the ability to test theories in a specific case, as well as drawing theories from various cases. The output of the case can help generalizing a theory for similar cases (Eisenhardt, 1989; Yin, 2003), which serves the scientific purpose of the research. Plus, this framework allows the use of different types of information sources, from documents, to interviews, archival records, or even physical presence (Yin, 2003), which can complement

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<sup>2</sup> Information about the growth of the Brazilian healthcare providers sector can be found in Table 9 of the appendix

<sup>3</sup> Outpatient care is defined as the medical care that does not require a patient to be admitted into the hospital.

<sup>4</sup> Table 10 and figure 3 of the appendix provide further insights on each segment's share of the sector.

all together to build a solid case. This author suggests that compiling evidence from multiple cases also helps the case become more robust, this is the reason for the introduction of evidence from other cases in this research.

Case studies should help answering questions that contain substance and form (Yin, 2003) in order to report or explain. The case study should answer questions such as “how”, “what”, “why”, “who” (Yin, 2003). Thus, the research questions of this work follow this structure. How was the Hospital do Subúrbio PPP project designed? How do the different models of PPP in Healthcare compare in different countries? Why is Hospital do Subúrbio a successful case study?

Unfortunately the case study presents drawbacks. This type of research study faces a set of limitations that can impair the quality of the study. It has been argued by authors that the scientific validity of a case study is low because of the nature of the study (Yin, 2003). Documentation may contain information that is biased according to the author’s standpoint, and it is difficult to verify the veracity of such information.

For this research, various PPP hospital models will be studied. Each hospital was selected for their added value to this research. The United Kingdom was the precursor of PPPs. Their PFI model is a reference of comparison for all PPP ventures. The country has the widest experience in PPPs in healthcare, with more than 130 projects in 2012<sup>5</sup>. In the late 1990’s, Portugal began its journey of PPP hospitals with the hospital Amadora-Sintra. It has since built four other hospitals using a PPP model that is specific to the country. Spain’s experience with PPPs began in the beginning of the last century (Allard & Trabant, 2008; Allard & Cheng, 2009) and it evolved onto the provision of healthcare in the late 1990’s. This case reinforces this research as the model was used in several healthcare projects in Spain (EC, 2014) and it is the one model to present an integrated healthcare provision model. Finally, the Canadian experience will complement this study, with the controversial case of the Montreal University Hospital. The project’s VfM has been criticised ever since by the public mass and groups of interest (Carbonneau, 2011). This model includes the merging of three hospitals into one location. It is the only model in this research to present a case of centralization of services.

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<sup>5</sup> Healthcare UK (2013). Retrieved May 21th, 2015 from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/266818/07\\_PPP\\_28.11.13.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266818/07_PPP_28.11.13.pdf)

### 3. THE CASE OF HOSPITAL DO SUBURBIO

The Hospital do Subúrbio<sup>6</sup> is located in Salvador, capital city of the state of Bahia, in the east coast of Brazil. More precisely, it is located in the Subúrbio Ferróviário (Ferróviário Suburb) of the Periperi district<sup>7</sup>. It is the first public hospital to be inaugurated in the metropolitan area of Salvador, in the last 20 years. The state accounted for 14 million habitants in 2009, with 4 million located in the metropolitan area<sup>8</sup>. The hospital was expected to serve one million people in this area (Fernandez et al.). Subúrbio Ferróviário is one of the poorest parts of Salvador. Plus, the city faces a high level of income disparity among the population and a low level of Human Development Index (HDI) relative to that of the state and the country (IFC, 2013). Access to healthcare services and quality of healthcare services are two notions that did not complement each other in this region.

The state of Bahia was not successful in the decentralization of the SUS, as Mara Clécia Dantas Souza, special advisor to the Office of the Health Secretary of the state of Bahia, explains in a panel discussion<sup>9</sup>. In 2007, Salvador was one of the few capitals to have medical assistance and emergencies in hospitals that were provided by the state and not the municipality. This contradicted the decentralization model on which was based the SUS. This was the scenario faced by the Partido dos Trabalhadores (Workers Party) when they were elected to govern the state of Bahia. The healthcare system was fragile, investment in healthcare was scarce and direct assistance had several issues. However, in 4 years, the party was able to build 5 hospitals, which supports their bet on healthcare.

The objectives set by the government of Bahia for this PPP were divided into two segments (IFC, 2013). First, there was the desire of allowing the population of Salvador to gain access to high quality emergency health services. Then, the hospital would serve as a benchmark within the public health system, and then serve as a base for replication in following projects. The result was a 298-bed hospital, occupying an area of 19.825m<sup>2</sup> that was officially

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<sup>6</sup> Figure 9 of the appendix provides a visual representation of the hospital.

<sup>7</sup> Figures 4 to 8 of the appendix provide a visual aid to locate the state, its capital city and the district where the hospital is located.

<sup>8</sup> Presentation of Hospital do Subúrbio PPP project. “Apresentação sobre o Projeto de PPP do Hospital do Subúrbio”. Retrieved May 26th, 2015 from <http://www1.saude.ba.gov.br/hospitaldosuburbio/docs.html>

<sup>9</sup> Junior, Á. E., Abrucio, F. L., Souza, M. C. D., & Monteiro, V. C. C. Mesa redonda. A experiência nacional. *Revista Debates GVsaúde*, 22-38. Retrieved May 31<sup>st</sup> from <http://bibliotecadigital.fgv.br/ojs/index.php/debatesgvsauade/article/view/23590/22351>

inaugurated on September 13, 2010. The number of beds was later increased to 373 in 2012. The hospital offers specialized treatment for trauma, orthopaedic and cardiac emergencies, and other complex injuries as a complement for traditional emergency services (IFC, 2013). Services are divided among the different units of the hospital: hospitalization, pediatrics, intensive care unit, semi intensive care and home care.

The state government enlisted the help of the International Financial Corporation (IFC) to provide consulting services on PPPs in healthcare provision (IFC, 2013). In 2009, the IFC and the government realised several studies including technical studies and a feasibility analysis. Together, they managed the bidding procedure, promoted the PPP, drafted the legal documents required for the transaction, and structured the later. The bidding procedure took place at the Bovespa Stock Exchange in the form of an auction. The winning consortium is composed of two companies that operate the hospital under the SPV *Prodal Saúde S.A.*

The first company is Promedica, a Brazilian expert on healthcare services. It represents 70% of the contract and provides all medical procedures (Fernandez et al.). The second company is Dalkia, a French company that is in charge of non-medical services and facilities management. Its share of the contract is 30% with responsibilities towards the infrastructure, hygiene, safety, food, cleaning, among others (Fernandez et al.). The transaction was secured on May 28, 2010 for a total investment from the consortium of \$32 million for the lifetime of the contract (IFC, 2013). In the first year of the project \$23 million were already invested, leaving \$9 million to be invested.

As described by the IFC (2013), the partnership is structured as follows. The concession contract is valid for 10 years, with a renewal option for 10 additional years. The public sector transferred the following responsibilities to the private sector: clinical and non-clinical service operation and management, and facilities equipment and maintenance to meet the highest technology standards of private hospitals. At the end of the contract, the ownership of the equipment is transferred to the state. Outside the PPP scope laid the construction of the building, which resulted in mandatory adjustments of the building (Fernandez et al.).

The payment by the public sector for the services provided by their partners is conditioned to Key Performance Indicators (KPIs), both quantitative and qualitative. Quantitative KPIs account for 70% of the payment requirement and qualitative KPIs account for the remaining

30% (Junior et al.). Payments are done in a monthly basis, and adjusted to the performance review of the indicators. All performance indicators are subject to regular auditing, in addition to the financial statements audit.

Since it started operating, the hospital has performed 1,8 million medical procedures (IFC, 2013). Its emergency demand has exceeded forecasts in 50%, in the first year alone. The hospital created near 1.500 positions for health professionals (Junior et al.). In 2013, the hospital received a prize from the World Bank for being among the 10 best PPPs of Latin America and the Caribbean. This year, the hospital is the second place winner of the 2015 United Nations Public Service Award in the category “Improving the Delivery of Public Services” for Latin America and the Caribbean<sup>10</sup>.

#### **4. MODELS OF PUBLIC-PRIVATE PARTNERSHIPS**

The existing literature identifies several different types of PPPs<sup>11</sup>. For hospitals, partners have to decide which part will build the facilities and maintain them, who will provide the medical services and the non-medical services, or even the entity in charge of managing the hospital. Several models will be reviewed based on European cases studied by the European Commission (2014) and also the research conducted by McKee et al. (2006), to help understanding the different possibilities existing in hospital care provision. This will help setting a base for the study of the model used for Hospital do Subúrbio and other hospitals.

McKee et al. (2006) distinguish different PPP models in hospital provision according to the division of responsibilities and ownership towards the infrastructure and/or the services. The first distinction made is whether or not the hospital already exists. If it does, the PPP contract takes the form of a franchise, where the public entity outsources the management of the hospital to a private company. If the infrastructure has to be built, then the construction, operation and ownership of the facilities will be divided between partners. Most often the private partner will finance the project, design the hospital, build the infrastructure, and then

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<sup>10</sup> United Nations Public Service Award (2015). Retrieved May 26<sup>th</sup>, 2015 from: <http://www.unpan.org/DPADM/UNPSDayAwards/UNPublicServiceAwards/tabid/1522/language/en-US/Default.aspx>

<sup>11</sup> Zarco-Jasso (2005) identified eight types of PPP contracts basing their analyses on ownership, control and funding. Different delivery PPP models are analysed in Duffield, Colin F., 2010, Different delivery models, in Carsten Greve and Anthony E. Boardman Graeme A. Hodge, ed.: International handbook on public private partnerships (Edward Elgar)

operate the hospital. Otherwise, the private partner may build and operate the hospital, thus remaining the owner of the infrastructure, and the public authorities will purchase services for a fixed duration. At the end of the contract, ownership may remain private, or be transferred to the public domain. A special derivation from this type of contract, known as the Alzira model<sup>12</sup>, where the private contractor builds and operates the hospital and has a contract for the provision of healthcare for a pre-defined population. And finally, the private contractor might lease the infrastructure to the public authority after building it, and a public entity will be in charge of managing the hospital. Table 5 of the appendix summarizes the different models under the nomenclature used by McKee et al. (2006) in their paper.

To complement this analysis of healthcare PPP models, the European Commission (2014) has summarized the different models used in the member states, which are presented in the Table 8 of the appendix. The models follow the rationale described in the last paragraph and the most important difference is the presence or absence of clinical services provision.

After understanding the possible existing PPP models it is important to develop further the models used for PPP hospitals in Portugal, United Kingdom, Spain, and Canada, to compare them to Hospital do Subúrbio. Also, to provide a direct point of reference for Brazil, a model of public consortium will be presented. The information will derive from the EC report (2014) and each PPP contract that is available, as well as the tender information and other sources of information related to each hospital. The chapter will be concluded with a comparison of the different models.

#### 4.1 Hospital Beatriz Ângelo (HBA), Portugal

The hospital chosen to represent the Portuguese PPP case is the Beatriz Ângelo Hospital in Loures. The hospital opened in 2012 with 424 beds to serve a population of 286.000. This hospital was part of the second-wave PPP hospitals in Portugal. Other projects included in this wave of PPP hospitals were the Cascais Hospital (contract signed in 2008), the Braga University Hospital (contract signed in 2009) and the Vila Franca de Xira Hospital (contract

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<sup>12</sup> McKee et al. (2006) and the EC (2014) evaluated the PPP model used in the Alzira (city of Valencia) projects. The project has two distinct phases, Alzira 1 and 2, following an anticipated renegotiation (Acerete et al. 2011) of the partnership that resulted in the addition of primary care to the contract, among other changes.

signed in 2010). They are currently all operational and, with the exception of the Beatriz Ângelo Hospital, all are replacement hospitals.

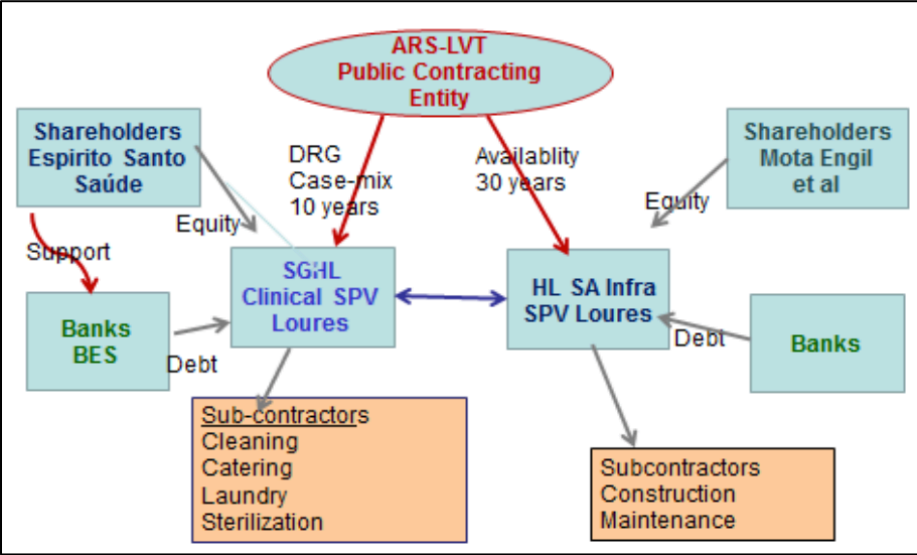
The distinctive characteristic of Portuguese PPP hospital projects is the division into two separate contracts. This model is depicted in Table 1 as the Twin SPV model. The state establishes one contract, the infrastructure contract, with a private entity for the construction and maintenance of the hospital's infrastructure. Another contract, the clinical contract, is valid for the management and operation of clinical and non-clinical services.

For these two contracts, a single national tender was held in 2007. The infrastructure contract was awarded to the contractor Mota Engil, which operates through the SPV *HL-Sociedade Gestora do Edifício, SA*. The clinical contract was awarded to the healthcare specialist group Espírito Santo Saúde, now Luz Saúde, which operates through the SPV *SGHL-Sociedade Gestora do Hospital de Loures, SA*. The duration of the contract also differs for each contract. The infrastructure contract is valid for 30 years, whereas the clinical contract is valid for 10 years, with a renewal option for 30 years. The total investment for the project was estimated to be €135 million.

Risk allocation goes beyond the fact that this project incorporates two PPPs. This process is summarized in the following Figure 1. Both SPV rely onto subcontracts to perform several activities, and their financing structure is somewhat different despite major similarities.

**Figure 1 – Risk allocation in the Hospital Beatriz Ângelo PPP project.**

The project is financed using standard project finance. Equity emerges from the shareholders of the parent company, and debt emerges from several banks. For the infrastructure contract, the debt is spread over several banks, national and international, to account for availability risk. However, for the clinical contract, the majority of the debt emerges from one bank, Banco Espírito Santo, which was part of the same conglomerate as Espírito Santo Saúde.



(Source: EC, 2014)

The payment for clinical services provided by SGHL is structured as a “fee-for-service”. Payments are made for each medical procedure, together with annual quotas, on a monthly basis according to a pre-determined value that is indexed to inflation and complemented at the end of the year with a top-up payment. For the infrastructure contract, the payment is made according to the availability of infrastructure and equipment and the respective performance. A negative performance will induce a deduction in the payment.

4.2 Norfolk & Norwich University Hospital (NNUH), United Kingdom

PPPs dominate the British health sector. Roughly 90% of hospital infrastructure investment arises from PFIs (EC, 2014). PFIs were developed as “ways to increase the scope for private financing of capital projects” (EC, 2014). With this ideology, the Government signed a project agreement in 1998 for the construction and management of the Norfolk & Norwich University Hospital (NNUH), located in Norwich, East Anglia. This was UK’s first academic teaching hospital to be built under a PFI. It was designed to replace two hospitals with a combined capacity of 1.200 beds. The hospital has a capacity of 987 beds and treats approximately 700.000 patients each year.

The contract tender was held in 1995. *Octagon Healthcare* was chosen among the three candidates for being able to meet output requirements with the lowest cost. The basic cost for the construction of the hospital was £159 million (1998 prices) (EC, 2014). The project was predominantly funded through bank finance. Funds are structured by priority, from senior debt, to junior (mezzanine) debt and equity at last. The later is only a minimal portion of the funds, representing £1 million (EC, 2014).

The lifespan of the contract is commonly said to be 35 years, which is the most common duration for such projects. However, the public entity, NHS Foundation Trust, has in fact a break option starting at the 35-year mark. The length of the contract for the occupation of the hospital is 60 years. Facilities management services have a different type of contract that is re-evaluated every 5 years with the company in charge.

The contract structure follows a standard PFI model, as announced formerly. The private partner is responsible for the design, finance and construction of the hospital. The contract suggests a part-operation for facilities management services. The Trust plays a crucial role in monitoring the management and operations of the hospital and services that are provided by *Serco*, a subcontractor of *Octagon Healthcare* and a major player in the consortium. Facilities services include such services as cleaning, catering, portering, security, car parking, and grounds maintenance. *Serco* is also responsible for the maintenance of the building, according to the standards agreed upon in the contract. Clinical services are provided entirely by the public sector.

A rent is paid by the Trust for the occupation and use of the building. Payments to *Octagon Healthcare* are based on a monthly unitary charge, which relates the availability of the services to their usage, and covers for the capital and lifecycle costs. A small element of the payment scheme is linked to the number of patients admitted into the hospital. In its turn, the Trust receives a certain sum from the Department of Health to cover for the changes in the PFI costs.

### 4.3 Hospital Universitario de la Ribera (HUR), Spain

Spain has a historical experience in PPPs, starting in the beginning of the 20<sup>th</sup> century (Allard & Trabant, 2008; Allard & Cheng, 2009). The Hospital Universitario de la Ribera, located in Alzira, Valencia, was the first Spanish hospital built under a PPP project. The model used for this first wave of healthcare PPP projects became known as the Alzira model. The hospital was expected to serve a population of 250.000 with a capacity of 300 beds. The contract was renegotiated two years after the beginning of activities in the hospital. It was deemed unviable and forced a bailout from the public entity responsible for the project. The two phases of this PPP are referred to as Alzira 1 and Alzira 2. The information provided reflects the current situation, and differences between the phases will be duly mentioned.

Only one bidder presented an offer for the project and was automatically awarded the project. Several companies formed a consortium called the *Ribera UTE*. Only national companies participated in this union: medical insurer Adeslas SA, healthcare provider Ribera Salud SA, and construction companies Dragados and Lubasa. The project was funded using bank loans from savings banks that were stakeholders of the main sponsors. The total investment for this project was evaluated in €140 million.

The contract was similar to an administrative concession, as it involved outsourcing the responsibilities of building, financing and managing the hospital. The private partner becomes responsible for full health service provision and primary care. The initial contract duration was 10 years. After the renegotiation, the contract is now binding for 15 years with an extension option to 20 years.

An innovative system was developed for the private partner payment. An annual capitation fee was set in the contract. However, the fee used in the first phase of the project was relatively low and indexed to consumer inflation. After the renegotiation, the fee was revised upwards of three times its original value. The current capitation fee is indexed to the population's health expenditure, which provides a more accurate metric for the fee calculation. Rents are paid for the infrastructure and support services, i.e. non-clinical services.

#### 4.4 Centre Hospitalier de l'Université de Montréal (CHUM), Canada

Following the desire from the Minister of Health and Social Services to have a French university hospital centre<sup>13</sup>, in 1996, the Montreal University Hospital Center was born. The CHUM derives from the fusion of three hospitals: Hôpital Saint-Luc, Hôtel-Dieu and Hôpital Notre-Dame<sup>14</sup>. The project for the renovation of the hospital and the centralization of its services started in 2011 and is expected to end in 2020. It has been qualified as the largest PPP project in all the Canadian history.

The new 772-bed hospital will be located in downtown Montreal, in the exact same location as the current Hôpital Saint-Luc. This project will imply the demolition of the later hospital, when the first phase of the new CHUM is complete in 2016<sup>15</sup>. The first phase includes the construction of a thermal power station and the hospital, with both clinical and non-clinical facilities (85 % of ambulatory care facilities, logistic services, etc.). The second phase will include the remaining 15% of ambulatory care facility, a library, the administrative services facility and an auditorium.

The contract was awarded to a consortium of companies after the 2009 tender. The *Collectif Santé Montréal* consortium is composed of local and foreign companies. The four partners are Innisfree Santé Montréal Inc., OHL Santé Montréal Inc., Explore Santé Montréal Inc. and Dalkia Santé Montréal Inc. They have invested approximately 2 million CAD for this project.

The project was financed through standard project finance. The sale of covered bonds totalled 1,37 billion. This innovative financing technique was awarded with two prizes, in Canada and the USA<sup>16</sup>. Another 180 million were obtained from bank loans and equity from the partner

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<sup>13</sup> Canadian PPP Project Database. Retrieved May 20th, 2015 from [http://projects.pppcouncil.ca/ccppp/src/public/project?project\\_id=34&scope=view&timeStamp=17e62166fc8586dfa4d1bc0e1742c08b&pageid=3d067bedfe2f4677470dd6ccf64d05ed](http://projects.pppcouncil.ca/ccppp/src/public/project?project_id=34&scope=view&timeStamp=17e62166fc8586dfa4d1bc0e1742c08b&pageid=3d067bedfe2f4677470dd6ccf64d05ed)

<sup>14</sup> Construction Santé Montréal – Aperçu. Retrieved May 20th, 2015 from <http://www.constructionsantemontreal.ca/apercu/>

<sup>15</sup> Construction Santé Montréal – Phasage et Livrables. Retrieved May 20th, 2015 from <http://www.constructionsantemontreal.ca/phasage-et-livrables/>

<sup>16</sup> Conseil Canadien pour les partenariats public-privé: le prix Or 2012 pour le financement du nouveau CHUM. Retrieved May 20<sup>th</sup>, 2015 from <http://www.chumontreal.qc.ca/salle-de-presse/medias/communiqués/conseil-canadien-pour-les-partenariats-public-privé-le-prix-or>

companies. The hospital financed part of the project with 300 million CAD that will be generated through the hospital foundation and parking revenue<sup>17</sup>.

The partnership includes the design, construction, financing, and maintenance of the hospital. Maintenance is awarded to Dalkia for a period of 30 years and involves both the infrastructure and the equipment. The payment structure to the private partners includes a monthly payment for all services and the energy usage from the thermal power station. Also, an annual payment accounts for balance differences and lifecycle costs. The value of payments differs for the two phases of the project.

#### 4.5 Consórcios de Saúde (CS), Brazil

This subpart will present a type of public procurement of healthcare services in the state of Bahia known as the Healthcare Consortium<sup>18</sup>. This will complement the analysis by adding a public healthcare procurement model that is different from the standard public procurement model. Similar to a PPP model, this procurement model seeks to solve issues with the standard model<sup>19</sup>, such as lowering operational costs or facilitating the access to healthcare services to the population. The decree-law n° 6.017/2007 instituted this consortium model. 10 consortiums are expected to be in place by 2016<sup>20</sup>.

The consortium works as a non-profit association between two, or more, public entities. The partnership can be horizontal, thus an association of municipalities or states. Or it can be vertical, an association between a municipality and the state or a union. In the state of Bahia, the partnerships are exclusively between municipalities with a mandatory participation of the state as well. This is done to alleviate the financial burden of maintenance and respond to the difficulty of the municipalities to allocate the needed financial resources<sup>21</sup>.

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<sup>17</sup> Construction du nouveau CHUM, signature de l'entente de partenariat entre le CHUM et le Collectif Santé Montréal. Retrieved May 20th, 2015 from <http://www.chumontreal.qc.ca/salle-de-presse/medias/communiqués/construction-du-nouveau-chum-signature-de-l-entente-de>

<sup>18</sup> Consórcios de Saúde. Retrieved May 21th, 2015 from [http://www.saude.ba.gov.br/novoportal/index.php?option=com\\_content&view=article&id=9133%3Aconsorcios-de-saude&catid=31%3Aestrutura-de-atendimento&Itemid=31](http://www.saude.ba.gov.br/novoportal/index.php?option=com_content&view=article&id=9133%3Aconsorcios-de-saude&catid=31%3Aestrutura-de-atendimento&Itemid=31)

<sup>19</sup> Consórcios de Saúde. Retrieved May 21th, 2015 from <http://www.saude.ba.gov.br/consorcios/>

<sup>20</sup> Consórcios de Saúde – Apresentação. Retrieved May 21th, 2015 from [http://www.saude.ba.gov.br/novoportal/images/stories/PDF/Apresentacao\\_consorcios\\_saude.pdf](http://www.saude.ba.gov.br/novoportal/images/stories/PDF/Apresentacao_consorcios_saude.pdf)

<sup>21</sup> Consórcio de Saúde – Manual de Orientação Retrieved May 21th, 2015 from [http://www.saude.ba.gov.br/novoportal/images/stories/PDF/Manual\\_consorcios\\_saude.pdf](http://www.saude.ba.gov.br/novoportal/images/stories/PDF/Manual_consorcios_saude.pdf)

The state builds a fully furnished polyclinic, which costs \$R12 million. This facility is expected to serve a population of 500.000 spread over the two partnering municipalities. The maintenance costs are supported by the municipalities and equally divided among them. These costs are estimated to be approximately R\$ 700.000. In general, the state is responsible for financing 40% of the project, while municipalities are responsible for financing the remaining 60%. This last percentage has to be divided according to the proportion of the population from each municipality that the polyclinic is serving. The financial risk is then spread among several parties, instead of being concentrated in one municipality who does not have the appropriate capacity to deal with it.

This method is a response to the decentralization forced by the Brazilian national health system, SUS, which allows for the adaptation of the project to the local reality that is often similar in adjacent municipalities. The consortium enforces the cooperation between entities and the joint management of the project.

#### 4.6 Comparison of the different Models

The information gathered in this chapter can be summarized in one table to provide assistance for the direct comparison of the different models used in the hospitals studied. The following Table 1 will include the five PPP hospitals and the public consortium that were developed in chapter 3 and 4 of this research.

**Table 1 – Comparison of the different models of hospitals in different countries**

This table provides 10 different points of comparison of the hospitals. The private partners can either be national or international companies/consortiums. The project may be financed through bonds, equity, bank loans, or a combination of different resources. The construction, maintenance, operation and management of the hospital can be divided among the partners, or not included in the contract. Clinical and non-clinical services can be separated and provided by different entities. The length of the contract varies from a project to another, but similarities may occur. The payment to the private partner might be done as a result of the number of patients treated, of performance indicators, or pre-determined at the time of the elaboration of the contract.

	<b>Portugal</b> <i>HBA</i>	<b>UK</b> <i>NNUH</i>	<b>Spain</b> <i>HUR</i>	<b>Canada</b> <i>CHUM</i>	<b>Brazil</b> <i>HS</i>	<b>Brazil</b> <i>CS</i>
<b>1) Private Partner</b>	National	National	National	International	International	N/A
<b>2) Financing</b>	Project Finance	Project Finance (Bank Finance)	Bank Loans	Project Finance	Bank Loans	Public (State)
<b>3) Construction</b>	Private	Private	Private	Private	Public (State)	Public (State)
<b>4) Maintenance</b>	Private	Private	Private	Private	Private	Public (Partners)
<b>5) Operation</b>	Private	Public & Private	Private	Public	Private	Public (Partners)
<b>6) Management</b>	Private	Public & Private	Private	Public	Private	Public (Mixed)
<b>7) Clinical Services</b>	Private	Public	Private	Public	Private	Public (Partners)
<b>8) Non Clinical Services</b>	Private	Private	Private	Public	Private	Public (Partners)
<b>9) Contract Length</b>	Partner 1 30 years Partner 2 10 years	Facilities 35 years Management 5 years	15 years	30 years	10 years	N/A
<b>10) Payment Structure</b>	Payment for each medical procedure + Annual Quotas	Payment based on availability and usage	Annual Capitation Fee	Payment for service and energy usage	Based on KPIs	N/A

First, the table shows that countries with a longer experience in healthcare PPPs resort to national companies for their projects. The Project Finance takes different forms in the different models, with a different combination of financial resources. Bank loans represent the largest part of the financing, as opposed to equity. However, the Canadian experience demonstrates an emphasis on bonds as the main financing tool.

The construction of the infrastructure is often included as part of the project. In Brazil, the state is in charge of the construction of the hospital, whether or not a PPP project is used. When operations and management are included in the contract as responsibilities for the private partner, the latter will thus provide all the services in the hospital, whether they are clinical or non-clinical. The exception lies within the British case, where clinical services are entirely allocated to the public entity. Thus, both partners accomplish operations and management.

The contract for infrastructure is usually around 30 years, with the exception of the Spanish case. Management/operations/maintenance contracts are usually shorter, around 10 years, depending on the requirements from public authorities. Finally, the payment structure always starts with a pre-determined annual fee, but the actual amount may vary. This variation is reported differently in each case. In Brazil, payment is linked to key performance indicators. The UK will rely on the usage and availability of services. Portugal, Spain and Canada have a similar structure. Portugal and Canada use payments related to the services provided with an adjustment at the end of the year, whereas as Spain relies on a payment per patient.

In the specific case of Brazil, a PPP hospital seems to be the best solution for large hospitals that operate in very populated cities. Healthcare consortiums present a suitable model for small municipalities, which need specific services and have small populations.

## **5. PERFORMANCE OF THE HOSPITAL**

Performance is measured in order to calculate the appropriate amount to be paid to the private consortium each quarter. This requires the use of several indicators divided into two main categories: qualitative indicators and quantitative indicators. These indicators result from a technical report conducted by the Professor Doctor Gilson Caleman (2009).

Quantitative indicators are subdivided into three categories: Hospitalization, Emergency/Clinic and Diagnostics. Qualitative indicators used for this performance study describe the quality and performance of health services given to patients. The following Tables 2 and 3 summarise all quantitative and qualitative performance indicators that are available for public consultation. Other qualitative indicators refer to: operational auditing,

clinic management, insertion in the SUS, human resources management, social control performance, humanization performance and accreditation. Numerical information about the indicators was collected each quarter starting from September 14, 2010<sup>22</sup>.

**Table 2 – Quantitative Indicators**

<b>Hospitalization</b>			
Medical Clinic	Surgery Clinic	Pediatrics	Intensive Care Unit (ICU) Adult
ICU Pediatrics	Semi Intensive Care Adult	Semi Intensive Care Pediatrics	Medical Clinic / Surgery Clinic II
Home Care			
<b>Emergency/Clinic</b>			
Emergency Services	Appointment Triage Reception	Outpatient Clinical Appointments	Outpatient Surgical and orthopaedics procedures
<b>Diagnostics</b>			
Clinical Laboratory	Radiology	Anatomical Pathology	Magnetic Resonance Imaging (MRI)
Diagnostic Sonography	Computerized Tomography Scan (CT Scan)	Endoscopy	Electrocardiography (ECG) & Electroencephalography (EEG)
Hemodynamic			

(Source: author, based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Table 3 – Qualitative Indicators**

<b>Medical Care Performance</b>			
Substitution Interval	Renewal Index	Solvability Index	Treatment Rate (Non-urgent patients)
Time Interval to realize an Emergency Surgery	ICU Return Rate		
<b>Medical Care Quality</b>			
Global Density of Hospital Infection	Mortality Rate	Surgery Mortality Rate	Post Surgery Mortality Rate
Density of Hospital Infection associated to the Central Venous Catheter	Acute Myocardial Infarction Mortality Rate	Stroke Mortality Rate	Ischemic Stroke Mortality Rate
Mortality Rate of Patients with Sepsis			

(Source: author, based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

<sup>22</sup> Table 12 of the appendix provides the dates of beginning and end of each quarter.

To interpret the performance indicators, it is necessary to understand the figures provided. Table 11 of the appendix presents all information provided about the KPIs for the last quarter that ended on March 13<sup>th</sup>, 2015. Forecasts are defined as a threshold for the different services and then compared to the actual numbers. This gives us a percentage of the real numbers over the forecast. The performance is considered to be positive if results are above 100% and negative if results are below 100%. Forecasts were set in the first year and many were revised each quarter until the seventh quarter. All the forecasts have remained constant since.

## 5.1 Payment Structure

The payment terms between partners need to be clearly understood in order to relate the performance to the payment. The payment is done on a monthly basis. The maximum value of one month payment for the beginning of the project is R\$ 8.625.000, which at the end of the year totals R\$ 103.500.000. The value of the payment was adjusted after the first quarter of activity. As said before, 70% of the payment is bounded to quantitative indicators and the remaining 30% to the qualitative indicators.

For quantitative indicators, the payment is based on the three categories: Hospitalization, Emergency/Clinic, and Diagnostics. Each category is assigned with a specific weight in the formula, which results in a total of 100%. The weight of each activity is a function of the cost of the activity relative to the total cost of the hospital. The formula used to calculate the monthly payment based on the quantitative indicators is

$$Payment = K_1 \times w_1 \times 70\% \times 8.625.000$$

$K_1$  represents the percentage of requirement fulfilment of each category of indicators,  $w_1$  represents the weight of each category and 70% is the weight of quantitative indicators in the payment. The percentage of the indicators is determined by an interval system<sup>23</sup>. For example, if the percentage of the indicator is comprised between 95% and 99,99%, the percentage used in the formula will be 99%.

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<sup>23</sup> Table 14 of the appendix.

For qualitative indicators, this formula system is very similar. Each indicator is awarded with a specific percentage weight in relation with its importance<sup>24</sup>. The indicators used for this performance study currently account for 38% of the qualitative performance indicators, with the most part being attributed to the quality of medical care. In the first year, quality of medical care, operational auditing and performance of medical care were the most important indicators, in that order. From the third year onwards, the quality of medical care is still the most important indicator. However, accreditation of the hospital now represents 20% of the qualitative indicators and human resource management is now the third most important indicator.

Satisfying the requirements for an indicator will be awarded with the percentage of this indicator, which will be represented in the formula by  $K_2$ . The sum of all the indicator percentages will be used to define the percentage to include in the formula, with the use of a similar interval system<sup>25</sup>. The formula used for qualitative indicators is

$$Payment = K_2 \times 30\% \times 8.635.000$$

Taking into account that, currently, the indicators for the performance and quality of medical care account for 38% of the total qualitative indicators, the maximum amount based on the indicators evaluated in this study becomes

$$Payment = 38\% \times 30\% \times 8.635.000 = 984.390$$

## 5.2 Quantitative Performance Indicators

Before making an in-depth analysis of each quantitative performance indicator, the three categories will be evaluated. The following Figure 2 provides a visual help for this analysis. The analysis of the real percentage of the indicators can provide a ground for critics to the forecast calculation. Low forecasts will automatically force real percentages to be above 100% and thus enforcing the full payment to the private partner. They could also mislead the supervisor of the project and hide potential errors in the hospital operation.

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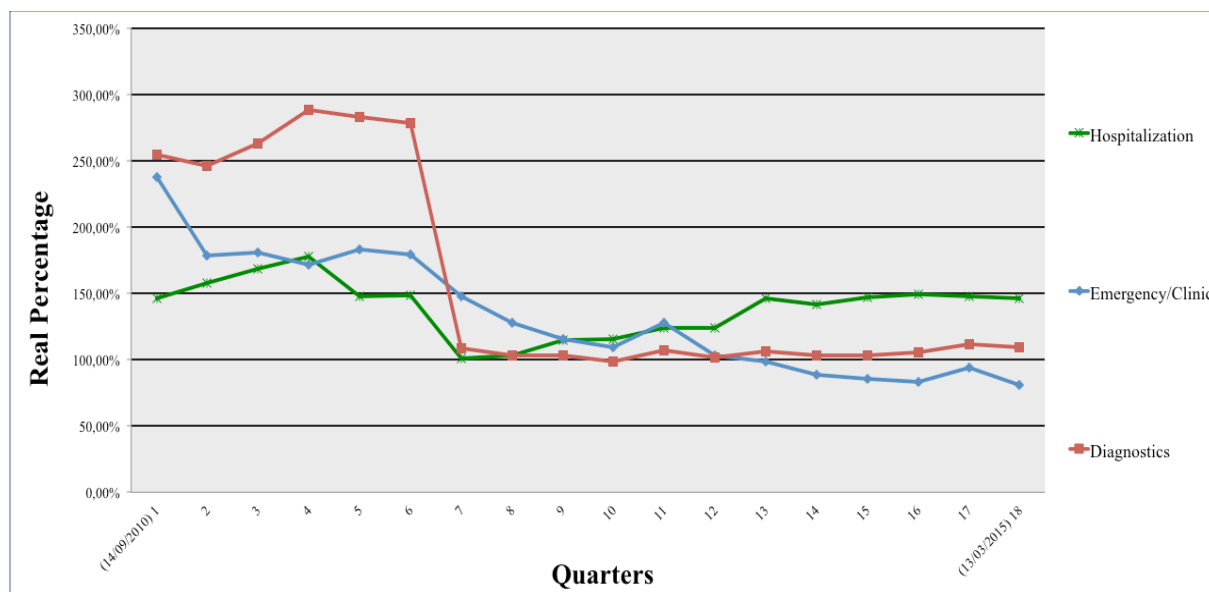
<sup>24</sup> Details of the weight of each qualitative indicator can be found in Tables 16, 17 and 18 of the appendix, for the first, second and following years of activity of the hospital.

<sup>25</sup> Table 15 of the appendix.

## 5.2.1 Analysis of the Three Categories of Quantitative Indicators

**Figure 2 – Quantitative Performance Indicators**

This figure presents the evolution of the three categories of quantitative indicators. The figure clearly shows two patterns that result from the revision of forecasts used for the calculation of indicators. This forecast revision was done gradually throughout the first six quarters and was finalized by the seventh quarter. Before the seventh quarter, the performance was highly positive, which resulted in a full payment from the public authorities to the private partner. These results may have forced a revision of the forecasts, because they did not reflect the reality of the performance and allowed the private operator to easily surpass those forecasts. Currently, the overall performance is still positive, but not all indicators are above 100%.



(Source: author, based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

Until the seventh quarter, all quantitative performance indicators display positive results. Diagnostics indicators were close to 300% from the fourth quarter to the sixth quarter. After the seventh quarter, the indicator remains mostly above 100% with smaller variations. Emergency and Clinic indicators were comprised between 100% and 200% for the first three years of the hospital, and decreasing below 100% until today. Hospitalization indicators are consistently above 100% and close to 150% for most part of the life of the hospital. These observations mean that the payment to the private partner was impacted by the forecast revision and this has become an incentive to increase the performance. As forecasts were inadequate, with an underestimation of the number of patients, this would translate as a simple way for the private consortium to be entitled to full payments for at least 70% of the total payment value. After the revision, there was conversion of indicators to 100%, meaning that forecasts come close to the reality experienced. Nevertheless, the hospital performs better in hospitalization, which accounts for 2/3 of the payment related to quantitative indicators.

### 5.2.2 Analysis of each Quantitative Indicator

To deepen the analysis, Figures 10 and 11 of the appendix provide a visual representation of the evolution of the *Hospitalization* indicators. Indicators such as the real percentage of patients in the medical clinic and the surgery clinic are well above 100%, with the former being systematically comprised between 200% and 350%. The indicator for adult intensive care unit (ICU) was above 100% for the first year and has been negative since. The indicator for ICU pediatrics goes back and forth on positive and negative performances. Other indicators have been for the major part under 100%, such as home care, pediatrics, and the second indicator for medical clinic and surgery clinic. The later indicator replaced both indicators for semi intensive care, which had had bad performances.

*Emergency/Clinic* indicators follow opposite paths as shown in Figure 12 of the appendix. Until the seventh quarter, indicators for emergency services and appointments, triage and reception show extremely positive results. Indicators were close to 450% in the first quarter, which exposes a default in the patient forecast. Indicators for outpatient services were on the contrary well below expectations, which is reasonable as the services gathered in the indicator require a certain adaptation from the patients. After the seventh semester, there was a change in the trend, as the outpatient services indicators increase beyond 100% and the other indicators decrease to negative performance levels after the twelfth quarter.

*Diagnostics* indicators display both positive and negative performances, as shown in Figures 13 and 14 of the appendix. Until the seventh quarter, indicators for clinical laboratories, radiology and CT scans were registering positive performances. Clinical laboratories results were almost five times as high as the forecasts before their adjustment. The MRI indicator did not register any result for the first three quarters, but has since increased and has showed positive results for the last three years, always around 150%. To contrast with these results, indicators for hemodynamic and anatomical pathology had some of the lowest results, with the majority of the quarters presenting a result of 0. This means that these diagnostic methods were not used for any patient during that time frame. The three last diagnostic indicators present overall negative performances. The indicators in question are ECG (electrocardiography) & EEG (electroencephalography), diagnostic sonography and endoscopy. With the forecasts revision, the indicator for the number of ECG & EEG has registered positive performances, just above 100%.

### 5.3 Qualitative Performance Indicators

Qualitative indicators provide an insight on the quality and performance of the medical care that is offered to patients. Indicators are compared to thresholds, either maximum values or minimum values, in order to provide an overview of the performance. Indicators are computed with different formulas, which are detailed in Table 13 of the appendix. We will start by reviewing the performance of medical care.

The first indicator to be analysed is the *substitution interval*<sup>26</sup>, which measures the idleness of the hospital beds. This indicator is continuously below its expected threshold of 1 day, and has reached negative levels below -1 day. This indicates a high occupancy rate and that patients seek the hospital for small procedures rather than procedures that require a longer period of stay.

The *renewal index*<sup>27</sup> describes the amount of discharges in comparison to the total number of hospital beds. This translates the number of patients that use the same bed during a defined period. The results for this indicator are extremely positive. The minimum threshold for this indicator is set at 4,9, and the indicator is mostly four times as high and increasing for the last year. The hospital is able to accommodate patients and have a high patient turnover, which is consistent with the substitution interval indicator.

The *solvability index*<sup>28</sup> measures the percentage of discharges for patients that were admitted in the emergency services for observations. Between the sixth and twelfth quarters, the indicator was below the minimum value. However, it has mostly been just above the threshold for the major part, especially for the last year. This should not be considered as a bad performance, but rather an alert to remind that efforts need to be made in order to ensure the necessary turnover to maintain this indicator at desired levels.

The *treatment rate*<sup>29</sup> describes the percentage of patients that do not require immediate medical care. The indicator is expected to be lower than 10%. It decreased from the second quarter to the seventh quarter, and has remained below the threshold since the third quarter.

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<sup>26</sup> Figure 15 of the appendix.

<sup>27</sup> Figure 16 of the appendix.

<sup>28</sup> Figure 17 of the appendix.

<sup>29</sup> Figure 18 of the appendix

Results are exceeding expectations for this indicator, even with some fluctuation in the indicator lately.

The *interval of time between emergency surgeries* is an important indicator. It measures the agility of the surgery teams. Negative results directly influence the overall output of the hospital and have great impact in the perceived quality of the hospital. The analysis of this indicator is divided into two parts that are provided in Figures 19 and 20 of the appendix. The indicator is expected to be below 60 minutes in 90% of the cases. Until the seventh quarter, the indicator was measured in minutes. After the seventh quarter, the indicator was measured as a percentage of the cases where the indicator was lower than 60 minutes.

Until the sixth quarter, the time interval between emergency surgeries was below 60 minutes. However, on the seventh quarter the indicator was almost 10 times greater than it should have been. Since then, the indicator shows that the time interval is lower than 60 minutes for a lower than recommended percentage of the cases. Disregarding the result for the seventh quarter, which could be due to abnormal delays or the lack of appropriate resources to conduct the surgeries on time, the time interval between surgeries has not been small enough in the majority of cases. Including the fact that the indicator for the surgery clinic has been increasing during the same period, as seen in the previous discussion about quantitative indicators, the time interval between surgeries should have decreased instead of the opposite. This can be related with a poor management of the surgery clinic.

The *ICU return rate*<sup>30</sup> measures the percentage of adult patients who return to the ICU during their hospital stay after already being admitted in the intensive care unit once. The indicator displays a positive performance by remaining under its maximum acceptable level of 2,3%. It is fair to infer that the quality of care given in the hospital's intensive care unit is efficient so as to prevent the return of patients.

The density of infections is measured using two indicators; the first measures the *global density of hospital-acquired infections*<sup>31</sup> and the second measures the *density of infections associated with the central venous catheter*<sup>32</sup> (CVC). The former displays a positive

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<sup>30</sup> Figure 21 of the appendix

<sup>31</sup> Figure 22 of the appendix

<sup>32</sup> Figure 23 of the appendix

performance, by remaining under half of the maximum threshold, and the later presents mixed results. The density of infections in the bloodstream associated with the CVC has exceeded the maximum value, with a staggering negative performance in the fifth quarter. The majority of quarters present a positive performance; consequently the overall result for this indicator is not concerning. A special attention needs to be set for this indicator that can indicate either a default in the staff's training, or an inappropriate environment for the patient.

The last set of indicators all relate to the mortality rate of the hospital. The overall *mortality rate* of the hospital is depicted in Figure 24 of the appendix. This indicator illustrates a major flaw in the performance of this hospital. The mortality rate has been increasing beyond its maximum threshold and is now three times as high. This is the biggest issue that the hospital has to deal with. Similarly to the other indicators, the threshold for this indicator was set according to the technical report by Professor Doctor Caleman (2009). For the mortality rate, the threshold of 3% was based on studies that showed an average mortality rate of 2,21% for 88 hospitals in 2008, as well as a World Bank study of 2003 of 12 hospitals in São Paulo that displayed an average rate of mortality of 3,8%. This hospital is thus expected to present a lower mortality rate for the future.

The surgery mortality rate was computed for the first five quarters as one indicator and was divided into two indicators after the seventh quarter: mortality rate during surgery and post surgery mortality rate. The *mortality rate during surgery*<sup>33</sup> presents many variations, but remains mostly under its threshold. The *post surgery mortality rate*<sup>34</sup> displays very good results as it presents results around 0,5%, which is smaller than the maximum threshold.

Several indicators describe diseases-related mortality rates. The *mortality rate associated with acute myocardial infarction*<sup>35</sup> is under the threshold, which translates into a positive performance. The *stroke mortality rate*<sup>36</sup> had a positive performance until the thirteenth quarter, but has since kept on increasing and it is now above its threshold. This explains in part the results for the overall mortality rate. The *sepsis mortality rate*<sup>37</sup> presents also negative results with an increasing trend of the indicator since the fifth quarter. The indicator is

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<sup>33</sup> Figure 25 of the appendix

<sup>34</sup> Figure 26 of the appendix

<sup>35</sup> Figure 27 of the appendix

<sup>36</sup> Figure 28 of the appendix

<sup>37</sup> Figure 29 of the appendix

currently well beyond the maximum acceptable value, with a mortality rate close to 45%. This result has a great impact in the mortality rate of the hospital. The hospital needs to implement changes to counter this trend, which may be the principal cause for a poor performance in regard to the mortality rate.

The hospital presents an overall good quality of its services, given the threshold defined for each. However, the mortality rate

Due to the missing information concerning the remaining qualitative indicators, it is not possible to perform any analysis on the impact of the indicators onto the amount paid to the hospital operator. However, it is important to remember some of recommendations and alerts that this analysis of indicators had brought. The performance of the majority of the indicators is positive, and in certain case it is beyond expectations. Yet a special attention needs to be set for the density of infection, specifically for infections related to the CVC, as well as the time interval between surgeries. Most importantly, may become an issue for the hospital. As opposed to many other indicators, everyone easily understands this indicator and this can have an effect on the reputation of the hospital. Efforts made to improve this indicator can bring the performance of the hospital to such good levels that could make this PPP model even more attractive for replication.

## **6. CONCLUSION**

As a response to an increasing demand for appropriate healthcare services, the state of Bahia in Brazil decided to rely on the international experience and invest in a hybrid procurement model. Forming a partnership with private companies would alleviate the financial pressure on the public treasury, give access to better healthcare services to the majority of the population and increase the efficiency of healthcare provision. A transition country such as Brazil needs to invest in different public infrastructures and services to improve the living conditions of its population. It becomes important that such projects have positive outcomes, because states will not always be able to support directly every public project.

The literature helped understanding the origins of PPPs. The concept was defined; the advantages and disadvantages were discussed alongside the critical notion of Value for

Money of such projects. The PPP experience in Brazil was detailed, alongside the evolution of healthcare in the country. The case of the Hospital do Subúrbio was presented, and the model of the PPP was developed. The private consortium operates the hospital through an administrative concession contract. Its responsibilities were, first, equipping the hospital, and then operate and manage the clinical and non-clinical services of the hospital, as well as maintaining the facility. This private consortium is remunerated for its service provision according to key performance indicators analysed by the public authorities. These findings have provided an answer for the first research question: How was the Hospital do Subúrbio PPP designed?

Then, an extensive analysis of several other cases of hospital PPPs was made. Examples emerged from Portugal, Spain, Canada and the United Kingdom. More experienced countries outsourced the hospital's construction and maintenance to the private partner. Bank finance appears as the main type of financing, equity as the less representative, and innovative forms of debt finance using covered bonds arise. Contracts are longer when the infrastructure construction is included. And in the Brazilian case, healthcare consortiums represent an alternative to the standard public procurement model and the PPP model, for smaller municipalities. These findings answered the second research question: How do the different models of PPP in healthcare compare in different countries?

Finally, the hospital's performance was evaluated. This last chapter answered the last research question: Why is Hospital do Subúrbio a successful case study? At the beginning, the number of patients was greatly exceeding expectations. And most of the qualitative performance indicators displayed positive results. However, the initial forecasts were inadequate and resulted in payments to the private partner of the full amount agreed upon in the contract. If forecasts were appropriate, this might not have been the case and the state could have saved money. Furthermore, the management team of the hospital needs to be aware of certain negative aspects that exist in the time interval between surgery and in the density of hospital infection. Aggravating results in these indicators could be extremely negative for the hospital and impact other performance indicators. Also, mortality rate indicators are too high compared with expectations. This project is expected to perform better in this area than other hospitals. Any improvement will greatly benefit this project and the future prospects of replication in other Brazilian states, because the overview on the performance of the hospital

is greatly positive. The hospital has been exceeding expectations, and delivering outstanding services to the population.

Putting aside the performance review, the hospital does provide an access to proper healthcare services with technologically advanced equipment to a population that could not afford these services because they were mostly available through private healthcare. This research does not contrary the general opinion about the success of this PPP, whether it is through the awards received or the media exposure. The PPP does appear to be a success and any effort of replication should be encouraged and appreciated by companies as an investment opportunity. Any improvement for the performance that was suggested by this research will definitely confirm the success of this project.

Limitations in this research arise in the analysis of performance indicators, as information for 7 categories of qualitative indicators is not available. Patient reviews of the hospital are included in these indicators, and they would be useful to prove or disprove the conclusion of this research. Additionally, a more extensive comparison of PPP models could help design a model for PPP hospitals with great odds of success based on the feedback from 20 years of experience in PPP hospitals worldwide.

When all qualitative performance indicators are available for public consultation, future research could be done to evaluate the performance of the hospital and the performance of the hospital's management structure. Research can be done to evaluate the extent to which the PPP fulfils its financial purpose by comparing this hospital directly to similar public and private hospitals. This would determine the true Value for Money of the Hospital do Subúrbio. And strictly in a healthcare standpoint, an analysis of the impact of the hospital on the population's health can be conducted to discover if in fact the hospital provides the decent medical care that the Brazilian population needs.

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## APPENDIX

### 1. Definitions

**Table 5** – Definition of several types of PPP/PPC contracts

<i>Service Contracts</i>	Public authorities reach a private entity for the provision of a given service of which the private partner demonstrates a comparative advantage
<i>Management Contracts</i>	This contract includes the transfer of authority from the public partner to the private partner to manage a public facility and provide a service
<i>Construction, Maintenance and Equipment Contracts</i>	These contracts typically involve the development, refurbishment or maintenance of a facility
<i>Hybrid Contracts</i>	Such contracts may involve a variety of elements present in the above defined contracts to serve a specific need or situation
<i>Leases</i>	The private entity pays a fee to its public homologous to manage and operate a public facility in exchange for the revenues originated from the facility's exploitation
<i>Concessions</i>	This arrangement states that the facility remains a public ownership, with the private partner being responsible for needed investment and activities of operation and maintenance
<i>Private Finance Initiatives</i>	Typically involves a concession contract. In the UK, private consortia enter in a long-term contract with the government to finance, build, and manage new projects.

(Source: author based on information available in Nikolic & Maikisch, 2006)

**Table 6** – Definition of the three types concessions according to the Brazilian legislature

<b><i>Regular concession</i></b>	The user fees reward directly the private partner for the investment done in providing a service.
<b><i>Administrative concession</i></b>	In the case where it is not convenient, nor possible to charge user fees for a certain type of service, the private partner receives regular inflows of budgetary funds from the public sector, which would have been agreed upon in the contract.
<b><i>Sponsored concession</i></b>	In addition to user fees, the government complements the private partner with awards through systematic budget funds. This is done because the fees are not sufficient to offset the investment made by the private partner.

(Source: author based on information available at PPP Brazil, 2015)

**Table 7** – Models of Public-Private Partnership in Hospital provision (McKee et al., 2006).

<b>Model</b>	<b>Description</b>
<i>Franchising</i>	Public authority contracts a private company to manage existing hospital
<i>DBFO (Design, Build, Finance, Operate)</i>	Private consortium designs facilities based on public authority's specified requirements, builds the facility, finances the capital cost and operates their facilities
<i>BOO (Build, Own, Operate)</i>	Public authority purchases services for fixed period (say 30 years) after which ownership remains with private provider
<i>BOOT (Build, Own, Operate, Transfer)</i>	Public authority purchases services for fixed period after which ownership reverts to public authority
<i>BOLB (Build, Own, Lease back)</i>	Private contractor builds hospital; facility is leased back and managed by public authority
<i>Alzira Model</i>	Private contractor builds and operates hospital, with contract to provide care for a defined population

(Source: author based on information available in McKee et al., 2006)

**Table 8 – Models of PPP in the Health Sector in EU Member States**

<b>Type</b>	<b>Description</b>
<i>1) Accommodation Model</i>	Hospital infrastructure and hard facility management (Many PFI)
<i>2) Accommodation model</i>	As Type 1), but with the SPV owned entirely from the start by the public sector (e.g. Hospital Universitario Central de Asturias)
<i>3) Extended Accommodation Model</i>	As Type 2), but including IT, soft facilities management, and supply, installation and maintenance of some or all medical equipment (Several PFI)
<i>4) Twin-SPV Model</i>	Joint venture with separate infrastructure (~PFI) and clinical service companies (e.g. Portuguese “Wave 1” hospitals like Loures)
<i>5) Accommodation and Service Model</i>	Specialist “monoproduct” hospital infrastructure with facilities management and medical services (e.g. Coxa, Dialysis Centres and ISTC)
<i>6) Full service provision secondary health care model</i>	General (district hospital) infrastructure with facilities management and medical services (Most of the sites in the German hospital chains)
<i>7) Full service franchise provision tertiary health care model with teaching and R&amp;D</i>	University (teaching/research, “tertiary”) hospital infrastructure with facilities management and medical services (e.g. Berlin Buch/Helios or Giessen & Marburg/Rhön)
<i>8) Full service provision at all levels of care</i>	Integrated hospital and community/primary care (e.g. the Ribera Salud/Alzira companies)

(Source: EC, 2014)

## 2. Brazilian Healthcare Providers Sector

**Table 9** – Brazil healthcare providers sector value from 2009 to 2013 (\$ billion)

Year	\$ billion	BRL billion	€ billion	% Growth
2009	131,4	283,6	98,9	
2010	157,4	339,6	118,4	19,8%
2011	170,9	368	128,5	8,5%
2012	190,0	409,9	142,9	11,2%
2013	208,0	448,7	156,4	9,5%
<b>CAGR: 2009-13</b>				12,2%

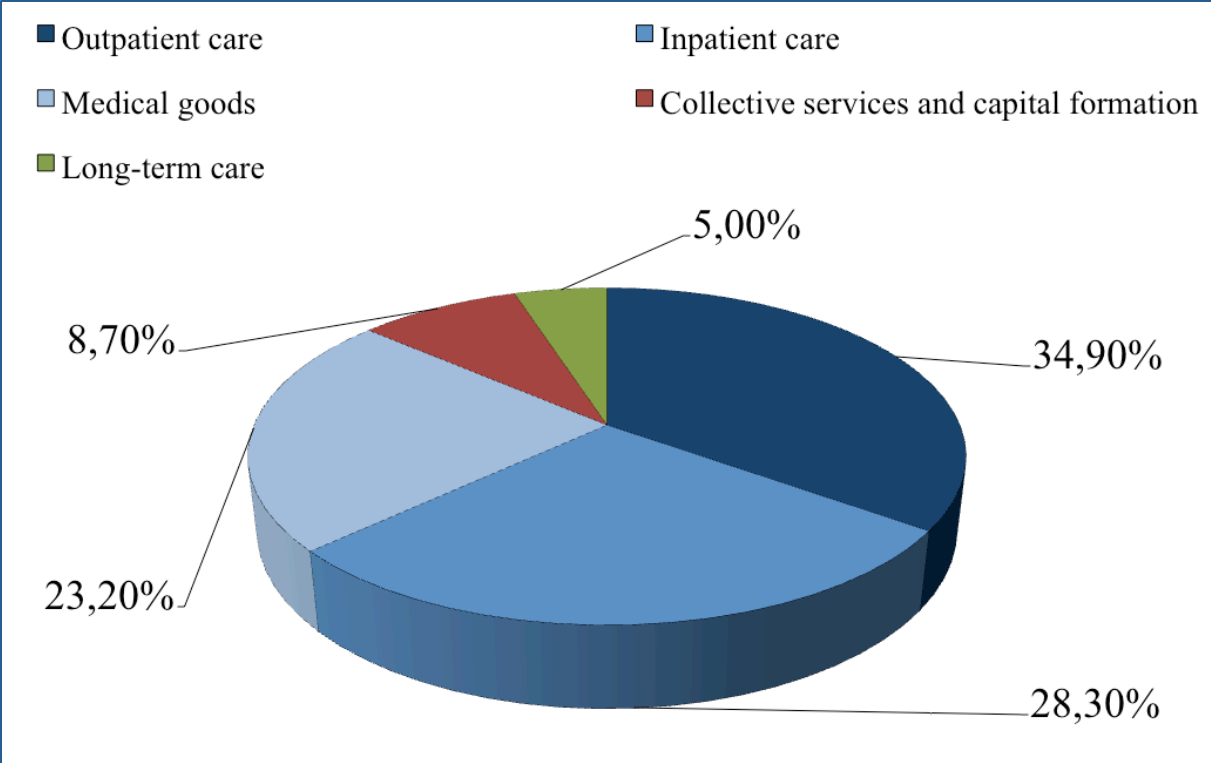
(Source: author based information available in Marketline, 2014)

**Table 10** – Brazil healthcare providers sector category segmentation in 2013 (\$ billion)

Category	2013	%
Outpatient care	72,5	34,9%
Inpatient care	58,9	28,3%
Medical goods	48,2	23,2%
Collective services and capital formation	18,0	8,7%
Long-term care	10,3	5,0%
<b>Total</b>	<b>207,9</b>	<b>100%</b>

(Source: author based information available in Marketline, 2014)

**Figure 3** – Brazil healthcare providers sector category segmentation in 2013 (%share)



(Source: author based information available in Marketline, 2014)

### 3. Geographical Maps

**Figure 4 – Map of Brazil**



(Source: <https://maps.google.com>)

**Figure 5 – Map of the state of Bahia**



(Source: <https://maps.google.com>)

**Figure 6** – Map of Salvador, capital city of the state



(Source: <https://maps.google.com>)

**Figure 7** – Map of the Salvador with a highlight on the Periperi District



(Source: <https://maps.google.com>)



## 4. Key Performance Indicators

**Table 11** – Key Performance Indicators from December 14<sup>th</sup>, 2014 to March 13<sup>th</sup>, 2015

<b>KPIs</b>		<b>Year 5</b>		
		<i>18th Quarter</i>		
<b>Qualitative</b>		14/12/2014 - 13/03/2015		
	Substitution Interval (in days)			-1,1
	Renewal Index			29,2
	Solvability Index			92,60%
	Treatment Rate (non-urgent)			0,80%
	Time interval to realize an emergency surgery (in minutes)			77,4
	Intensive Care Unit (ICU) return rate			0,20%
	Global density of hospital infection (/1000)			5,9
	Density of hospital infection associated with the central venous catheter (/1000)			3,6
	Mortality Rate			8,75%
	Surgery Mortality Rate			0,00%
	Post Surgery Mortality Rate			0,30%
	Acute Myocardial Infarction Mortality Rate			11%
	Stroke Mortality Rate			10,90%
	Ischemic Stroke Mortality Rate			5,50%
	Mortality Rate of patients with Sepsis			42,90%
<b>Quantitative</b>		<i>Forecast</i>	<i>Real</i>	<i>Real Percentage</i>
<i>Hospitalization</i>		<b>5.009,00</b>	<b>7.323,00</b>	<b>146,20%</b>
	Medical Clinic	1.419,00	2.607,00	<b>183,72%</b>
	Surgery Clinic	946,00	3.181,00	<b>336,26%</b>
	Pediatrics	1.051,00	617,00	<b>58,71%</b>
	ICU Adult	578,00	499,00	<b>86,33%</b>
	ICU Pediatrics	116,00	112,00	<b>96,55%</b>
	Home Care	162,00	108,00	<b>66,67%</b>
	Medical Clinic / Surgery Clinic II	737,00	199,00	<b>27,00%</b>
<i>Emergency/Clinic</i>		<b>53.254,00</b>	<b>43.004,00</b>	<b>80,75%</b>
	Emergency Service	15.500,00	11.447,00	<b>73,85%</b>
	Appointment / Triage / Reception	33.000,00	24.328,00	<b>73,72%</b>
	Outpatient clinical appointments: urology, orthopedics, neurosurgery	2.717,00	3.590,00	<b>132,13%</b>
	Outpatient surgical and orthopedics procedures	2.037,00	3.639,00	<b>178,65%</b>
<i>Diagnostics</i>		<b>63.366,00</b>	<b>69.324,00</b>	<b>109,40%</b>
	Clinical lab	45.000,00	48.421,00	<b>107,60%</b>
	Radiology	10.100,00	12.850,00	<b>127,23%</b>
	Anatomical Pathology	0,00	23,00	
	Diagnostic sonography	2.100,00	1.368,00	<b>65,14%</b>
	MRI (Magnetic Resonance Imaging)	360,00	570,00	<b>158,33%</b>
	CT Scan (Computerized Tomography Scan)	3.450,00	4.229,00	<b>122,58%</b>
	Endoscopy	230,00	73,00	<b>31,74%</b>
	ECG (Electrocardiography) & EEG (Electroencephalography)	1.730,00	1.715,00	<b>99,13%</b>
	Hemodynamics	396,00	75,00	<b>18,94%</b>

(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Table 12** – List of the Quarters for the Key Performance Indicators

<i>Quarter</i>	<i>Period</i>	<i>Quarter</i>	<i>Period</i>
1	14/09/2010 - 12/12/2010	10	14/12/2012 - 13/03/2013
2	14/12/2010 - 13/03/2011	11	14/03/2013 - 12/06/2013
3	14/03/2011 - 13/06/2011	12	14/06/2013 - 13/09/2013
4	14/06/2011 - 13/09/2011	13	14/09/2013 - 13/12/2013
5	14/09/2011 - 13/12/2011	14	14/12/2013 - 13/03/2014
6	14/12/2011 - 13/03/2012	15	14/03/2014 - 13/06/2014
7	14/03/2012 - 13/06/2012	16	14/06/2014 - 13/09/2014
8	14/06/2012 - 13/09/2012	17	14/09/2014 - 13/12/2014
9	14/09/2012 - 13/12/2012	18	14/12/2014 - 13/03/2015

(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Table 13** – Formulas used to compute qualitative performance indicators

<b>Indicator</b>	<b>Formula</b>
<b><i>Substitution Interval</i></b> (Intervalo de Substituição)	$\frac{(1 - \text{Hospital Occupancy Rate}) \times \text{Average Stay Time}}{\text{Hospital Occupancy Rate}}$
<b><i>Renewal Index</i></b> (Índice de Renovação)	$\frac{\text{Total Number of Discharges}}{\text{Number of Beds}}$
<b><i>Solvability Index</i></b> (Índice de Resolubilidade)	$\frac{\text{Number of Discharges up to 5 days of Stay}}{\text{Total Number of Discharges}} \times 100$
<b><i>Treatment Rate</i></b> (Taxa de Atendimento de Usuários em Regime de Não Urgência e Emergência)	$\frac{\text{Number of Treated Patients (non urgent)}}{\text{Total number of Treated Patients}} \times 100$
<b><i>Time Interval for an Emergency Surgery</i></b> (Intervalo de tempo para Realização de Cirurgia)	<i>Time interval between the notification of the need for surgery and the anesthetic procedure for patients that require an Emergency Surgery</i>

<i>de Emergência)</i>	
<b>ICU - Adult Return Rate</b> ( <i>Taxa de Reingresso na UTI-Adulto Durante a Mesma Internação</i> )	$\frac{\text{Number of ICU Adult returns in the same hospital stay}}{\text{Number of ICU Adult Discharges}} \times 100$
<b>Global Density of Hospital-Acquired Infection</b> ( <i>Densidade Global de Infecção Hospitalar</i> )	$\frac{\text{Number of Hospital Acquired Infection Cases}}{\text{Number of Daily Patients}} \times 1000$
<b>Density of Hospital-Acquired Infection associated with the Central Venous Catheter in the ICU-Adult</b> ( <i>Densidade de Infecção Hospitalar Associada a Cateter Venoso Central na UTI Adulto</i> )	$\frac{\text{Number of Primary Infections of th Bloodstream}}{\text{Number of Daily Central Venous Catheter}} \times 1000$
<b>Institutional Mortality Rate</b> ( <i>Taxa de Mortalidade Institucional</i> )	$\frac{\text{Number of Deaths after a 24h stay}}{\text{Total Number of Discharges}} \times 100$
<b>Surgery Mortality Rate</b> ( <i>Mortalidade Operatória</i> )	$\frac{\text{Number of Deaths during Surgery}}{\text{Number of Surgeries}} \times 100$
<b>Post Surgery Mortality Rate</b> ( <i>Taxa de Mortalidade no Pós-operatório</i> )	$\frac{\text{Number of Deaths up to 24h after Surgery}}{\text{Number of Surgeries}} \times 100$

<b>Acute Myocardial Infarction Mortality Rate</b> <i>(Taxa de Mortalidade por Infarto Agudo do Miocárdio)</i>	$\frac{\text{Number of Deaths by Acute Myocardial Infarction}}{\text{Number of Discharges with Diagnosis Code of AMI}} \times 100$
<b>Stroke Mortality Rate</b> <i>(Taxa de Mortalidade do Acidente Vascular Cerebral)</i>	$\frac{\text{Number of Deaths by Stroke}}{\text{Number of Discharges with Diagnosis Code of Stroke}} \times 100$
<b>Ischemic Stroke Mortality Rate</b> <i>(Taxa de Mortalidade por Acidente Vascular Cerebral isquêmico)</i>	$\frac{\text{Number of Deaths by Ischemic Stroke}}{\text{Number of Discharges with Diagnosis Code of I.S.}} \times 100$
<b>Mortality Rate of Patients with Sepsis</b> <i>(Taxa de Mortalidade de Clientes com Sepse)</i>	$\frac{\text{Number of Deaths by Sepsis}}{\text{Number of Discharges with Diagnosis Code of Sepsis}} \times 100$

(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Table 14 – Payment value based on the quantitative performance indicators**

<b>Medical Activity</b>	<b>Indicator Percentage</b>	<b>Payment Value</b>
<i>Hospitalization</i>	≥ 100%	100% x 72,45% x 70% x Monthly Payment
	From 95% to 99,99%	99% x 72,45% x 70% x Monthly Payment
	From 90% to 94,99%	97% x 72,45% x 70% x Monthly Payment
	From 85% to 89,99%	95% x 72,45% x 70% x Monthly Payment
	From 80% to 84,99%	93% x 72,45% x 70% x Monthly Payment
	From 75% to 79,99%	88% x 72,45% x 70% x Monthly Payment
	≤ 74,99%	83% x 72,45% x 70% x Monthly Payment
Emergency / Clinic	≥ 100%	100% x 21,00% x 70% x Monthly Payment
	From 95% to 99,99%	99% x 21,00% x 70% x Monthly Payment
	From 90% to 94,99%	97% x 21,00% x 70% x Monthly Payment
	From 85% to 89,99%	95% x 21,00% x 70% x Monthly Payment
	From 80% to 84,99%	93% x 21,00% x 70% x Monthly Payment
	From 75% to 79,99%	88% x 21,00% x 70% x Monthly Payment
	≤ 74,99%	83% x 21,00% x 70% x Monthly Payment
Diagnostics	≥ 100%	100% x 6,55% x 70% x Monthly Payment
	From 95% to 99,99%	99% x 6,55% x 70% x Monthly Payment
	From 90% to 94,99%	97% x 6,55% x 70% x Monthly Payment
	From 85% to 89,99%	95% x 6,55% x 70% x Monthly Payment
	From 80% to 84,99%	93% x 6,55% x 70% x Monthly Payment
	From 75% to 79,99%	88% x 6,55% x 70% x Monthly Payment
	≤ 74,99%	83% x 6,55% x 70% x Monthly Payment

(Source: author based on information available in the Hospital do Subúrbio PPP contract)

**Table 15** – Payment value based on the qualitative indicators

<b>Indicator Percentage</b>	<b>Payment Value</b>
From 95% to 100%	100% x 30% x Monthly Payment
From 90% to 94,99%	98% x 30% x Monthly Payment
From 85% to 89,99%	95% x 30% x Monthly Payment
From 80% to 84,99%	85% x 30% x Monthly Payment
From 75% to 79,99%	80% x 30% x Monthly Payment
From 70% to 74,99%	75% x 30% x Monthly Payment
≤ 70%	70% x 30% x Monthly Payment

(Source: author based on information available in the Hospital do Subúrbio PPP contract)

**Table 16** – Weight of each qualitative performance indicator for the first year

<b>Indicators</b>	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
Operational Audit	18%	18%	18%	12%
Medical Care Performance	16%	16%	16%	12%
Medical Care Quality	32%	32%	32%	36%
Clinic Management	4%	4%	4%	6%
Insertion in the SUS	6%	6%	6%	10%
Human Resources Management	12%	12%	12%	12%
Social Control	6%	6%	6%	6%
Humanization	6%	6%	6%	6%
Accreditation	0%	0%	0%	0%

(Source: author, based on information available in Caleman, 2009)

**Table 17** – Weight of each qualitative performance indicator for the second year

<b>Indicators</b>	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
Operational Audit	12%	12%	6%	6%
Medical Care Performance	12%	12%	6%	6%
Medical Care Quality	36%	36%	32%	32%
Clinic Management	6%	6%	6%	6%
Insertion in the SUS	10%	10%	8%	8%
Human Resources Management	12%	12%	10%	10%
Social Control	6%	6%	6%	6%
Humanization	6%	6%	6%	6%
Accreditation	0%	0%	20%	20%

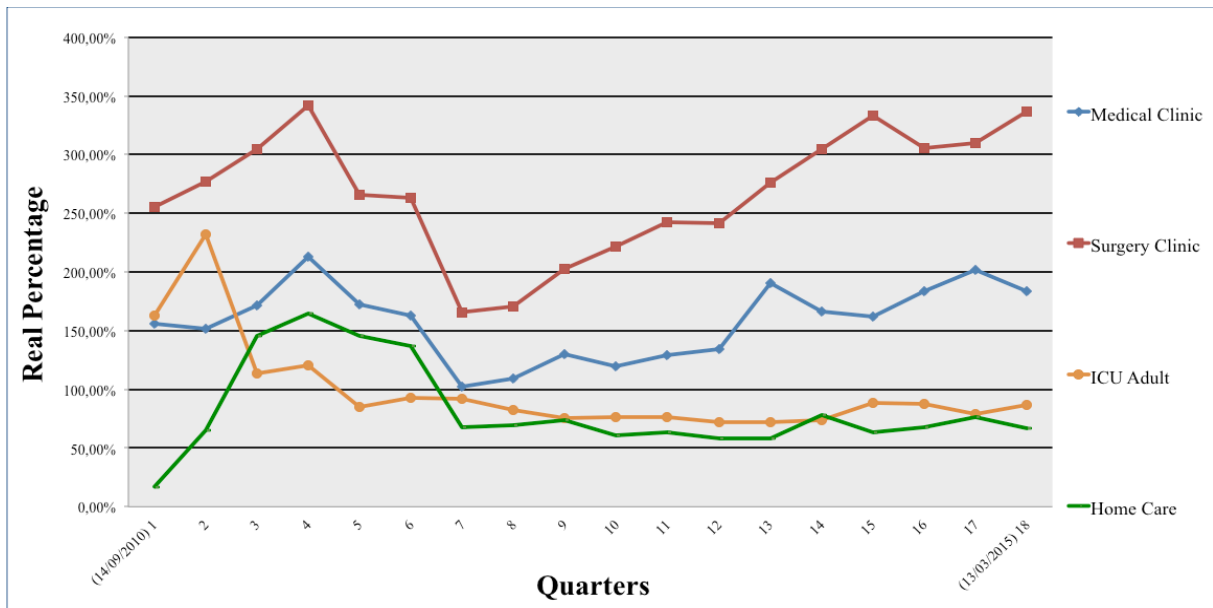
(Source: author, based on information available in Caleman, 2009)

**Table 18** – Weight of each qualitative performance indicator from the third year onwards

<b>Indicators</b>	<b>1<sup>st</sup> Quarter</b>	<b>2<sup>nd</sup> Quarter</b>	<b>3<sup>rd</sup> Quarter</b>	<b>4<sup>th</sup> Quarter</b>
Operational Audit	6%	6%	6%	6%
Medical Care Performance	6%	6%	6%	6%
Medical Care Quality	32%	32%	32%	32%
Clinic Management	6%	6%	6%	6%
Insertion in the SUS	8%	8%	8%	8%
Human Resources Management	10%	10%	10%	10%
Social Control	6%	6%	6%	6%
Humanization	6%	6%	6%	6%
Accreditation	20%	20%	20%	20%

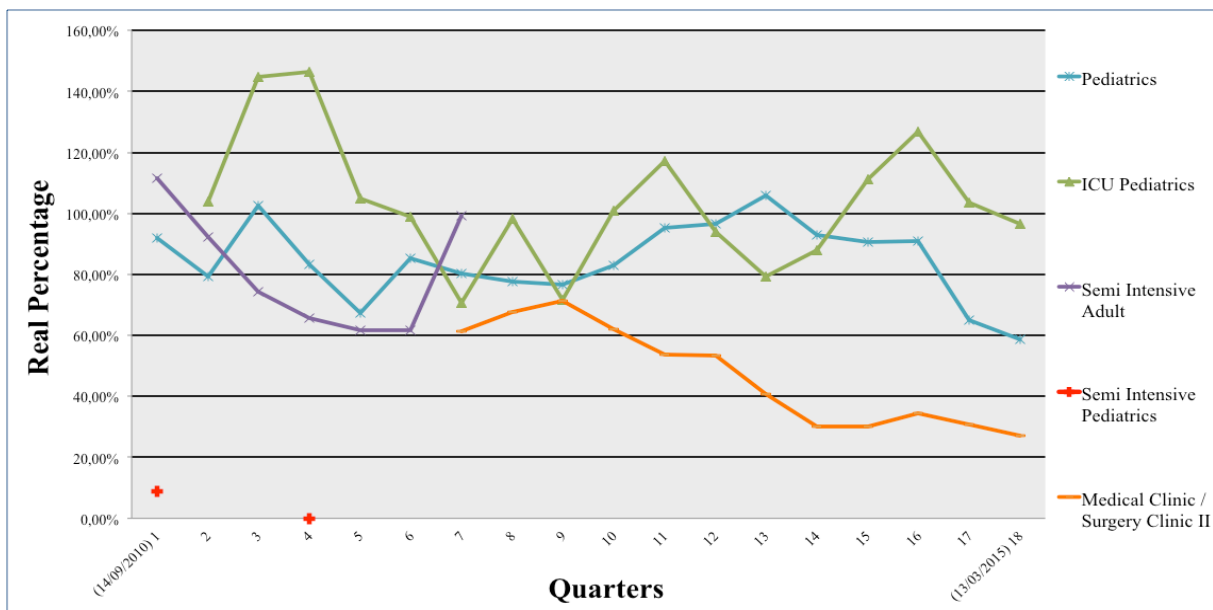
(Source: author, based on information available in Caleman, 2009)

**Figure 10 – Hospitalization Performance Indicators, Part 1 (real percentage)**



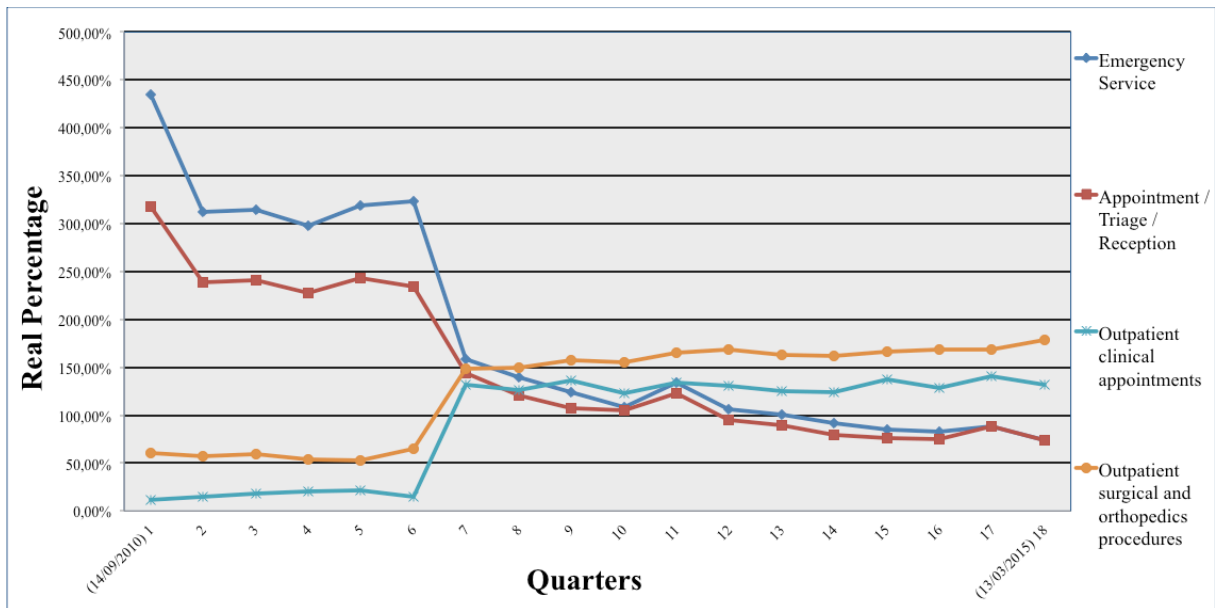
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 11 – Hospitalization Performance Indicators, Part 2 (real percentage)**



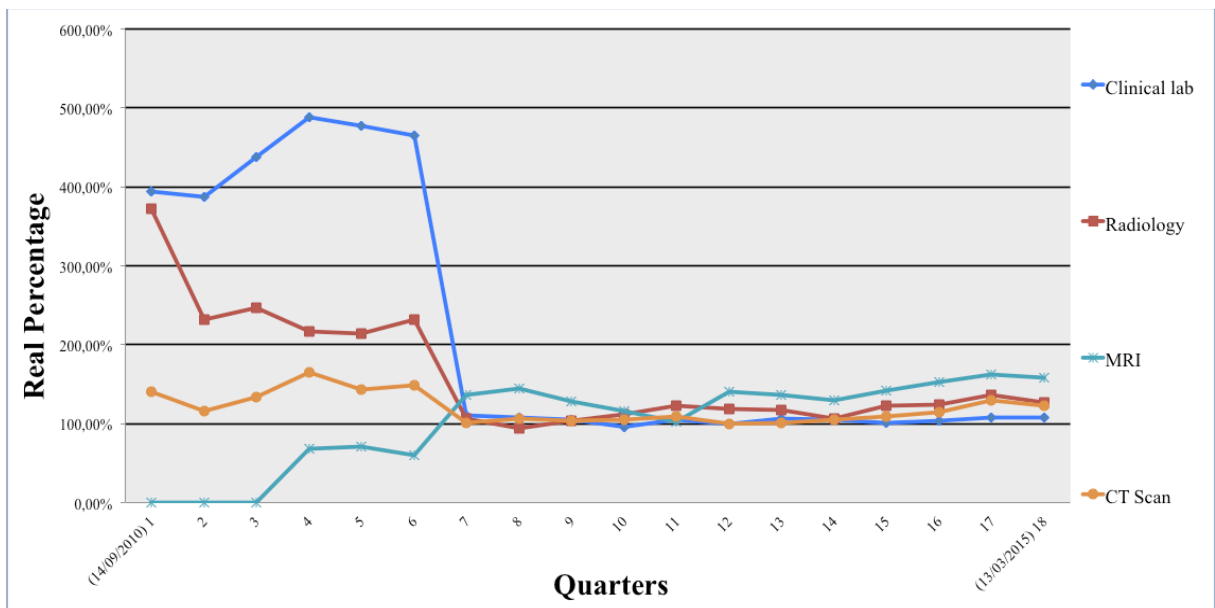
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 12 – Emergency/Clinic Performance Indicators (real percentage)**



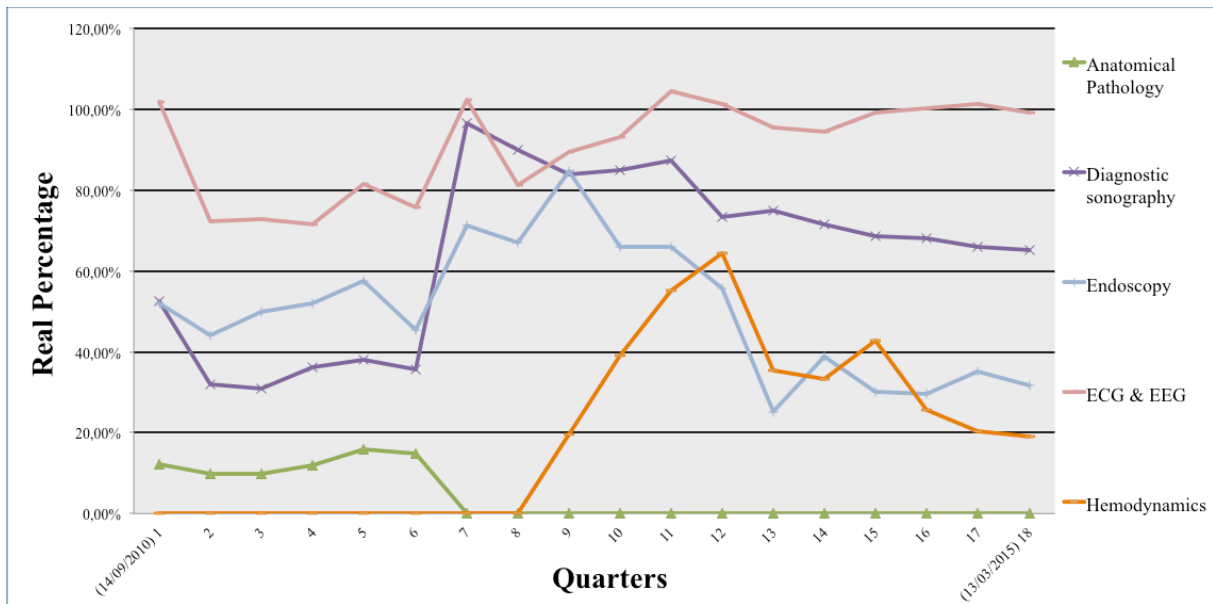
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 13 – Diagnostics Performance Indicators, Part 1 (real percentage)**



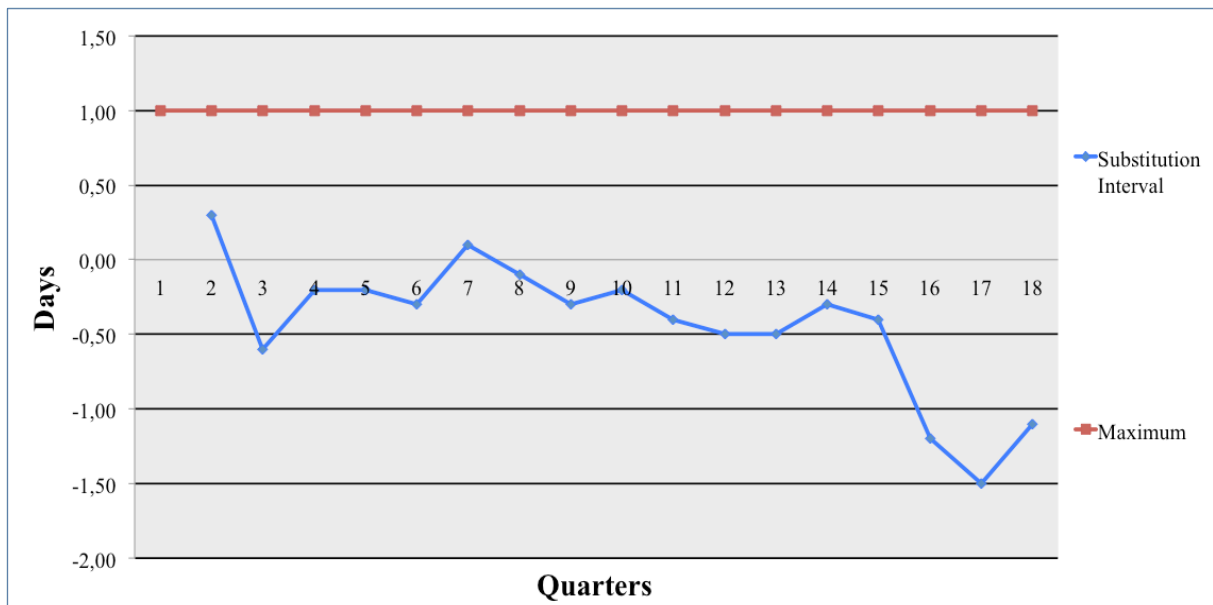
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 14 – Diagnostics Performance Indicators, Part 2 (real percentage)**



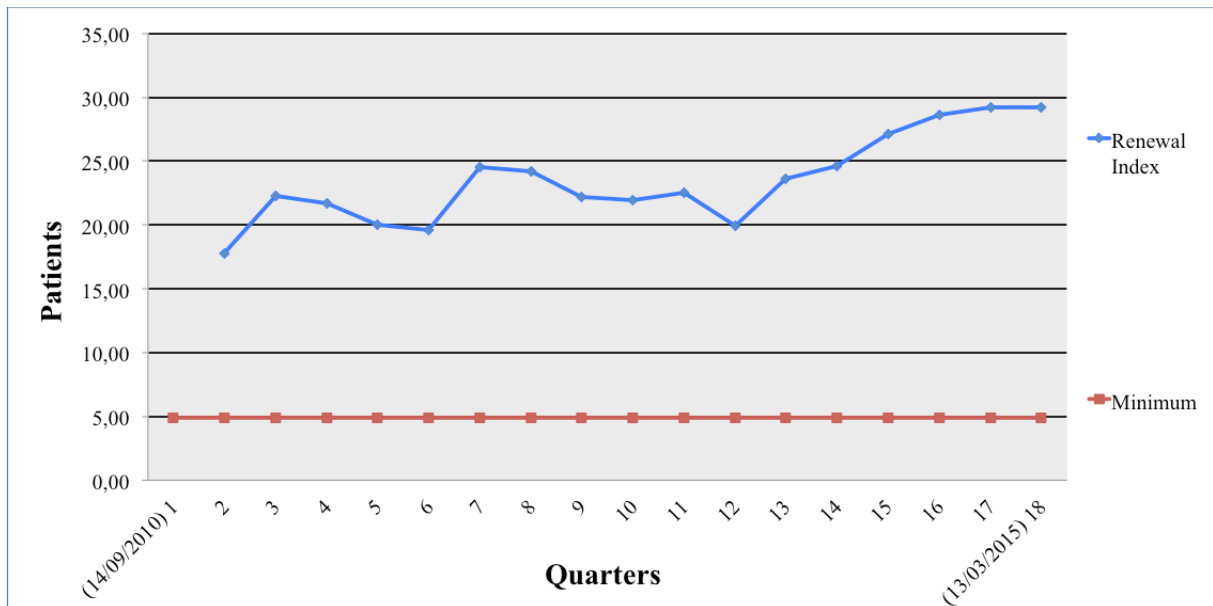
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 15 – Substitution Interval (days)**



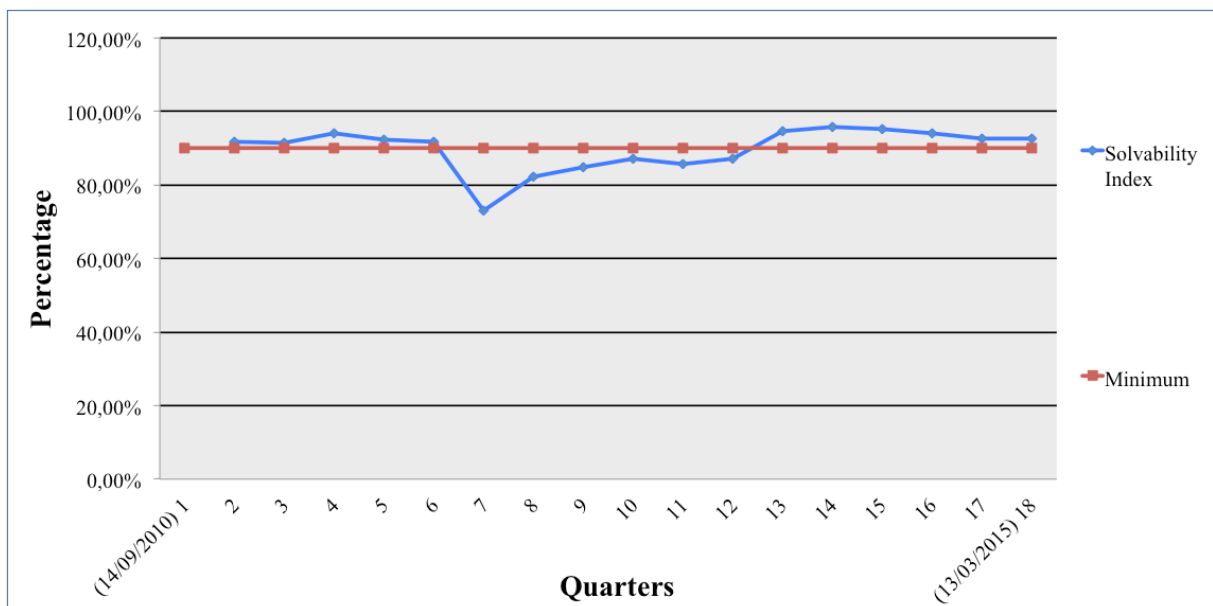
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 16 – Renewal Index (patients)**



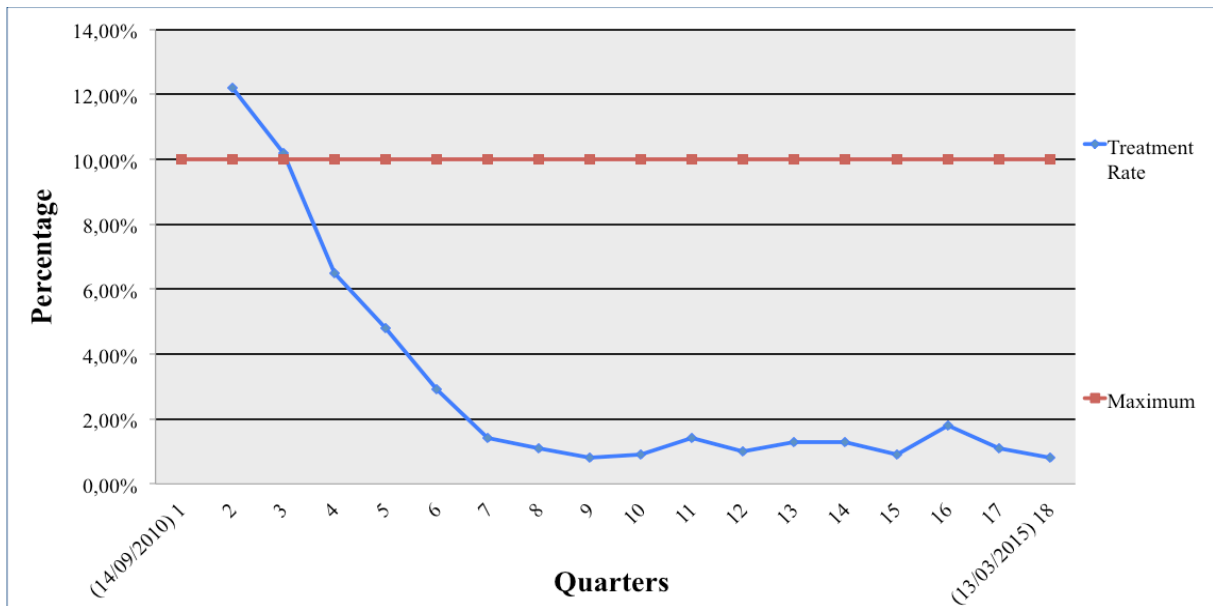
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 17 – Solvability Index (percentage)**



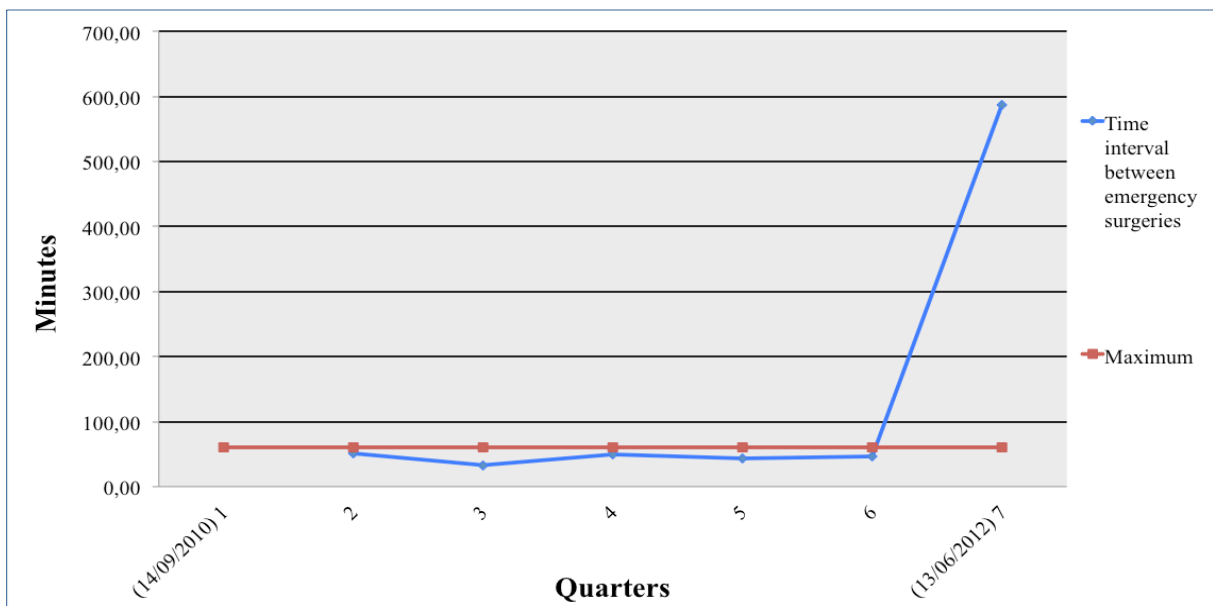
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 18 – Treatment Rate (percentage)**



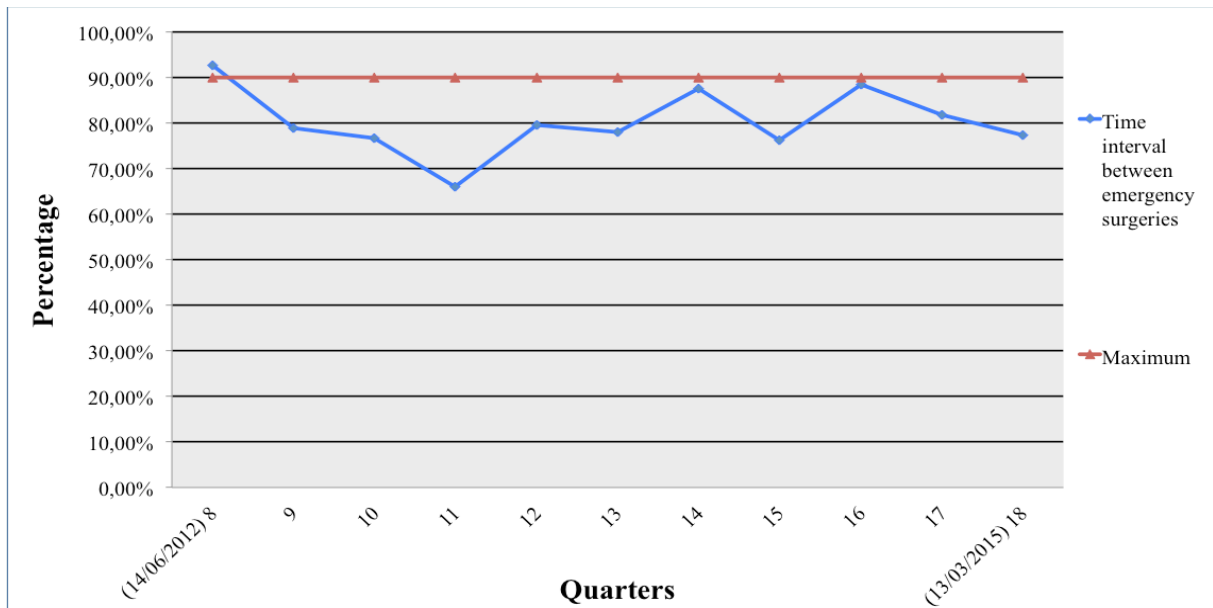
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 19 – Time interval between emergency surgeries, Part 1 (minutes)**



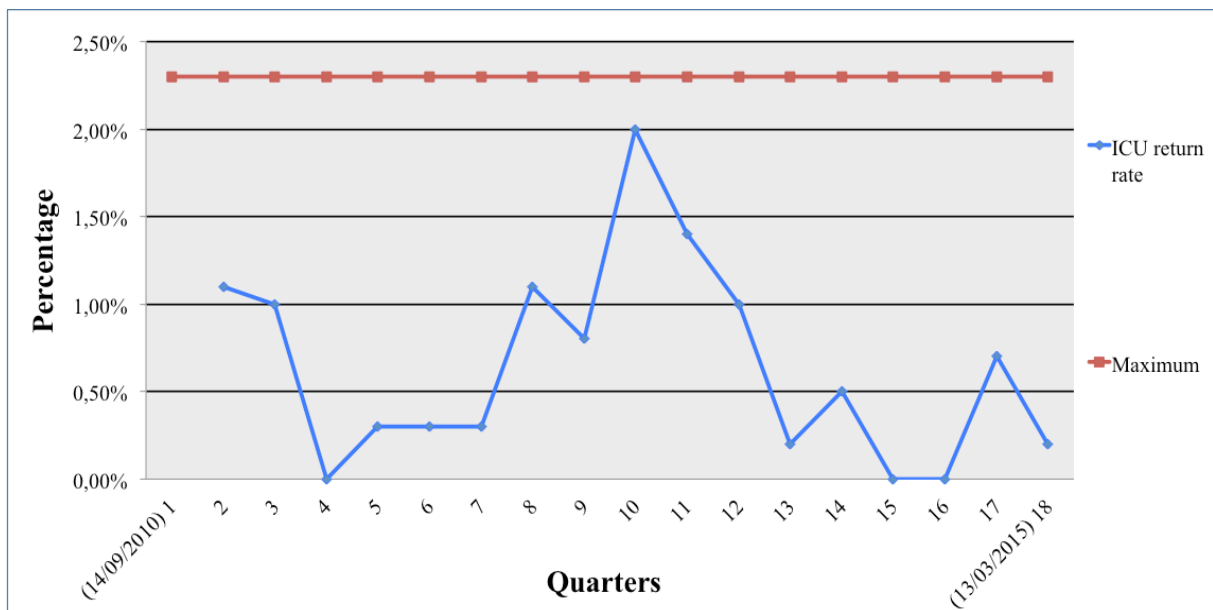
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 20 – Time Interval between Emergency Surgeries, Part 2 (percentage)**



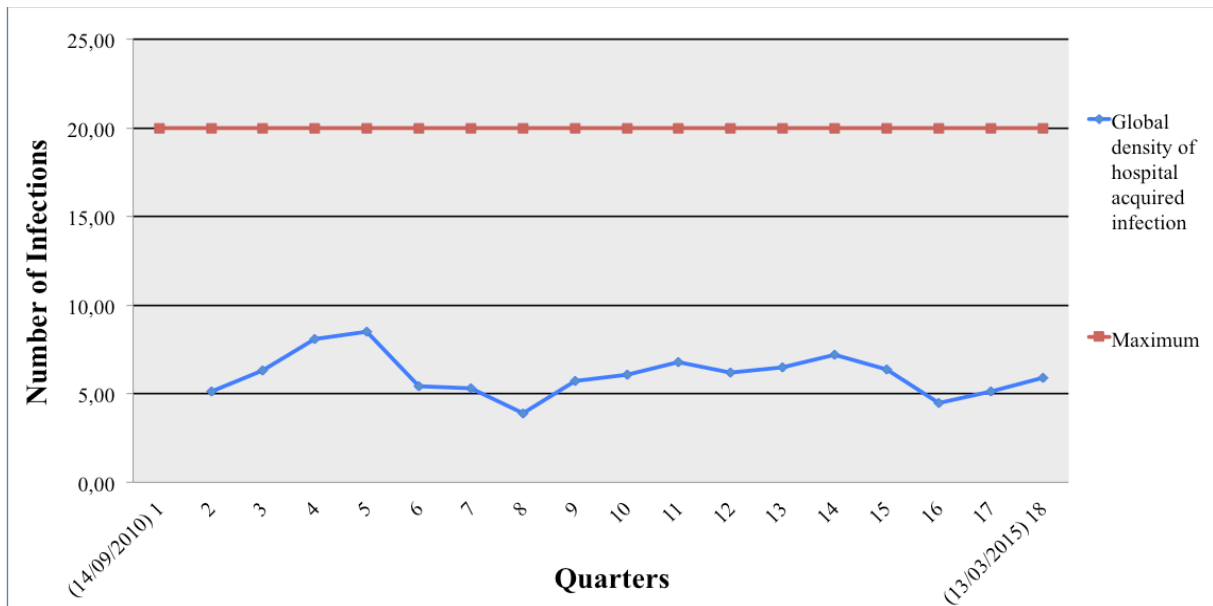
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 21 – ICU Return Rate**



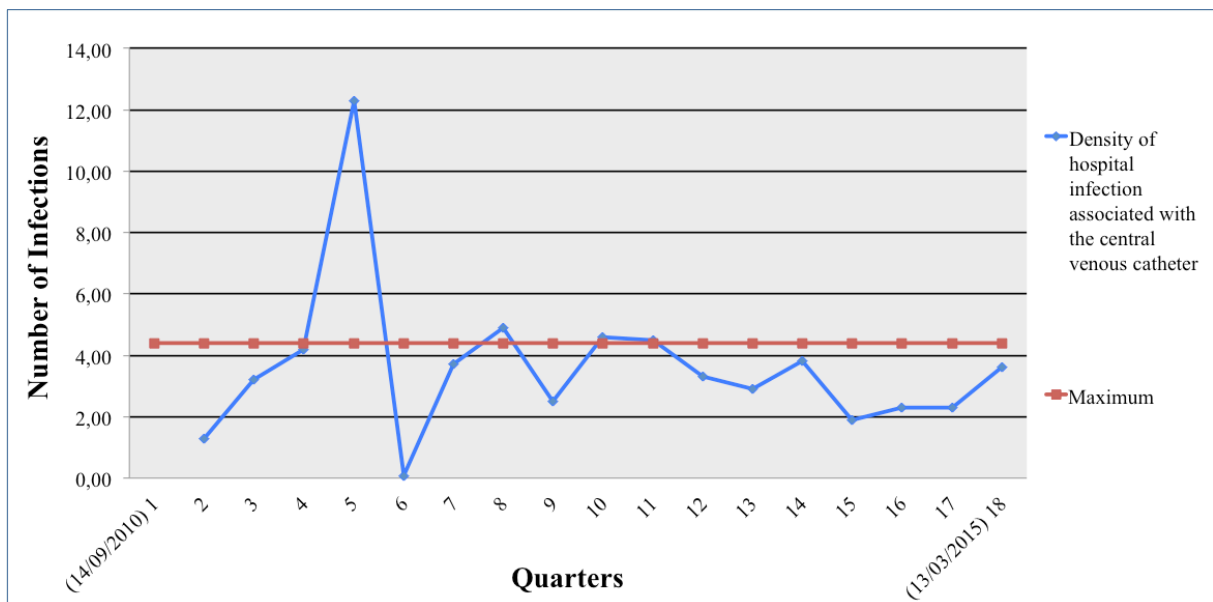
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 22** – Global Density of Hospital Acquired Infection (number of infections)



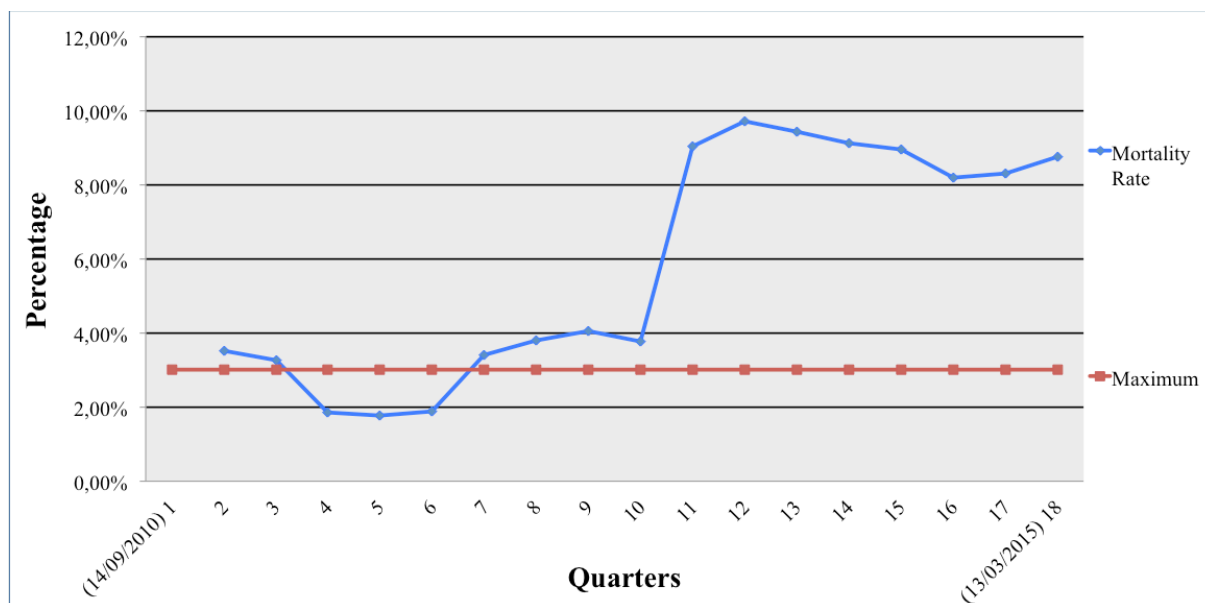
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 23** – Density of Infection associated with Central Venous Catheter (number of infections)



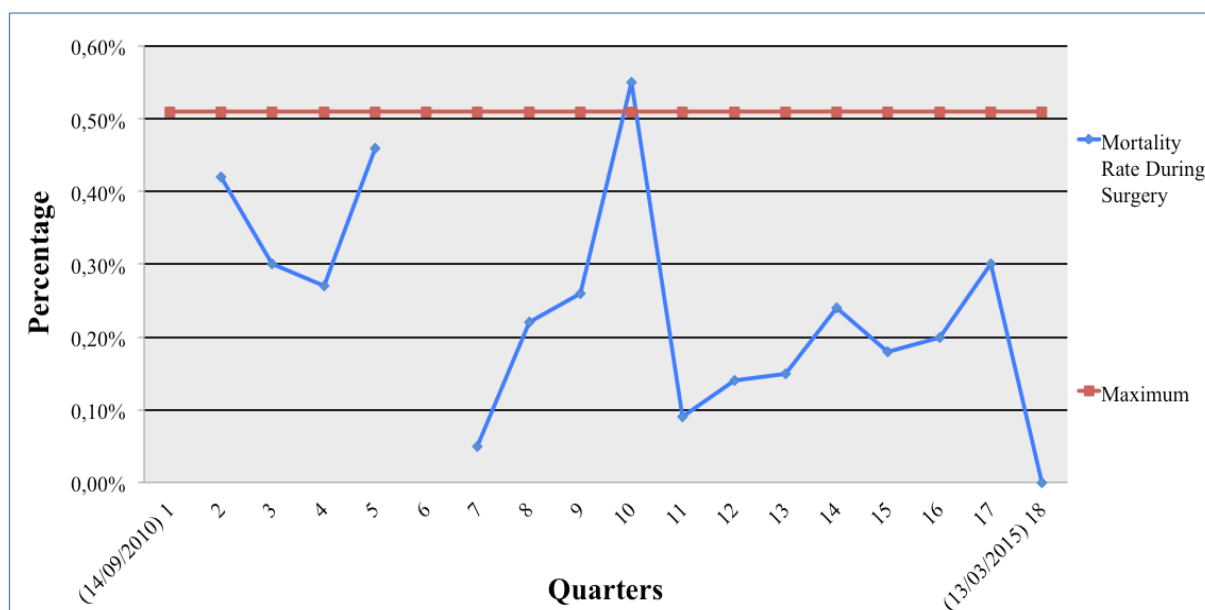
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 24 – Mortality Rate (percentage)**



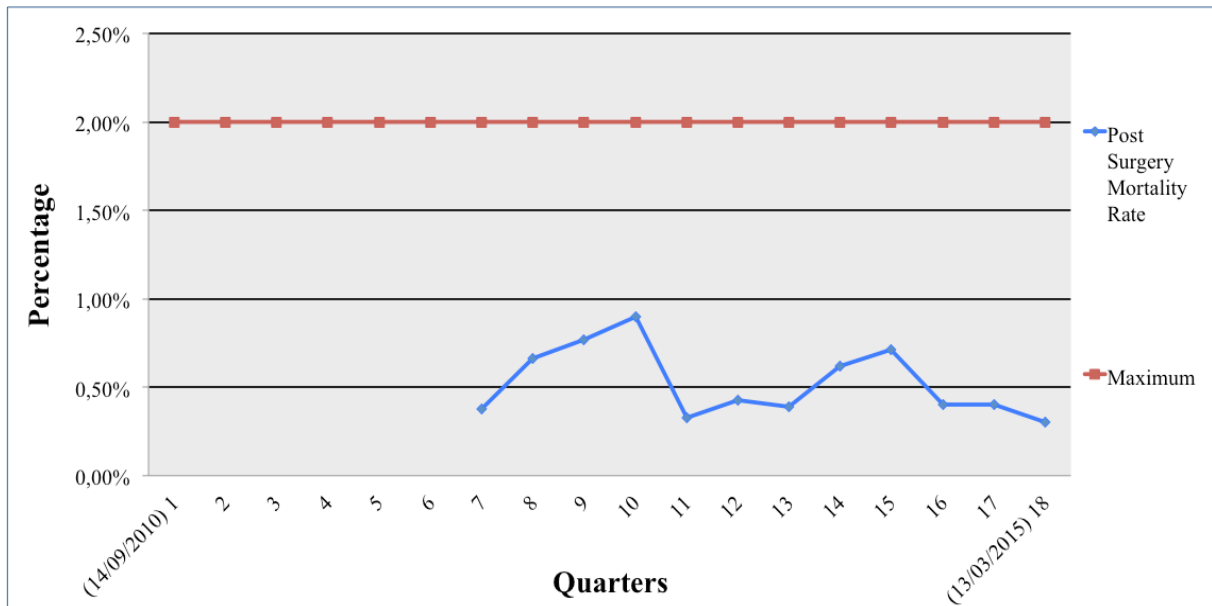
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 25 – Mortality Rate During Surgery (percentage)**



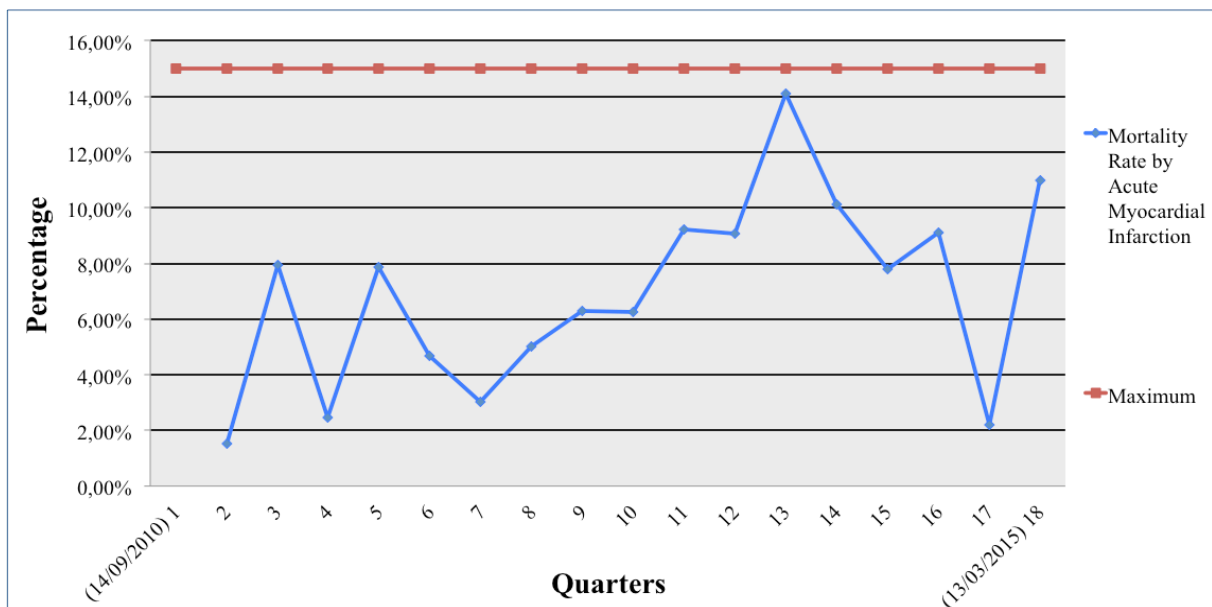
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 26 – Post Surgery Mortality Rate (percentage)**



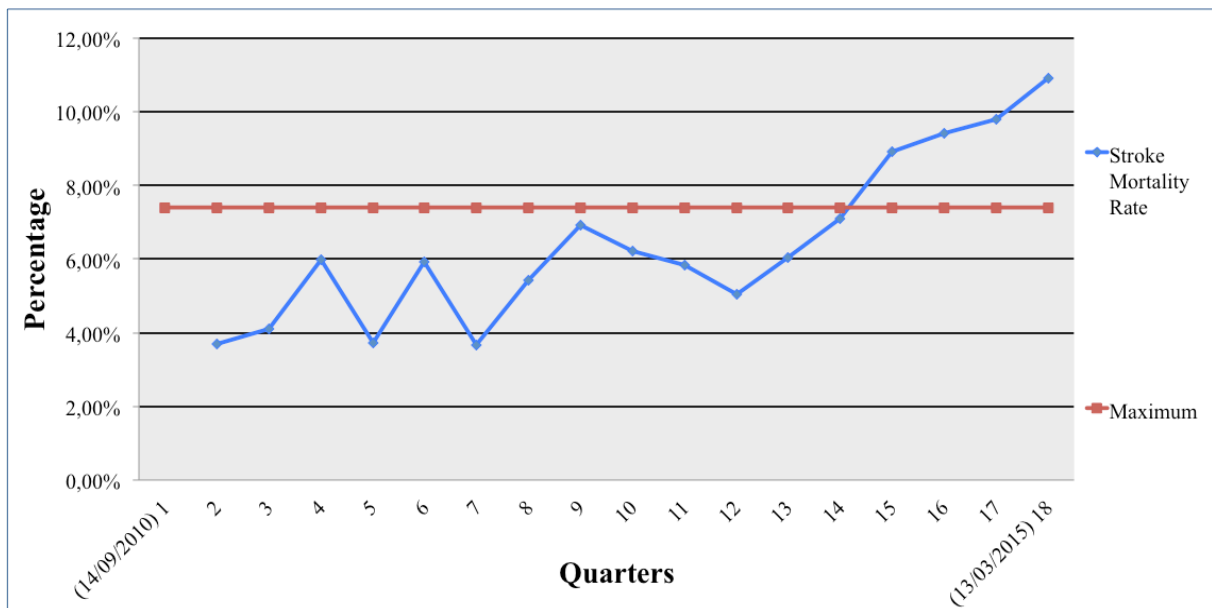
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 27 – Mortality Rate by Acute Myocardial Infarction (percentage)**



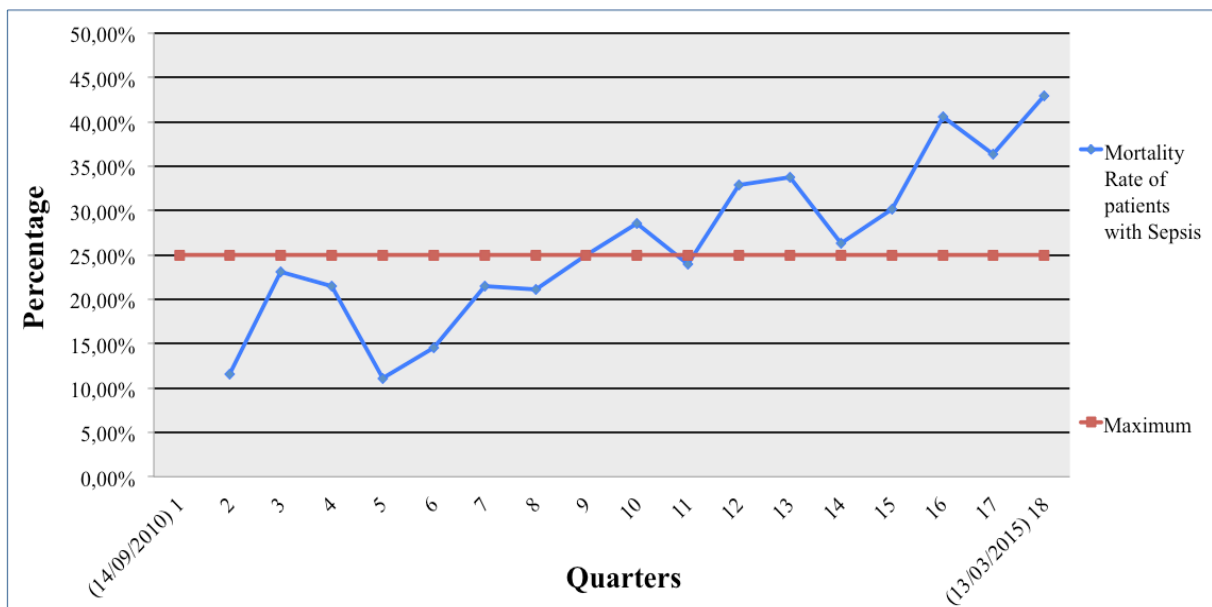
(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 28 – Mortality Rate by Stroke (percentage)**



(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))

**Figure 29 – Mortality Rate of Patients with Sepsis (percentage)**



(Source: author based on information available at [http://www.prodalsaude.com.br/?page\\_id=4568](http://www.prodalsaude.com.br/?page_id=4568))