



Beyond the ostensible: an exploration of barriers to lean implementation and sustainability in healthcare

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Abstract

The barriers to implement lean have been well researched and have generated consistent results; this study identifies these as ostensible barriers. There is a dearth of research that focus on understanding the causes of these ostensible barriers. Thus, this study aims to empirically investigate the deeper causes that produce ostensible barriers to implement lean in emergency areas of the healthcare. To achieve this aim, the paper draws on rich, qualitative data from four different sources of data, using exploratory case studies as the main approach. Undertaking thematic analysis, six main underlying barriers emerge as the root cause of ostensible barriers. The results suggest that addressing each of the underlying barriers in healthcare is likely to support lean implementation and sustainability, by reducing the impact of restraining forces that come from stakeholders and the public healthcare system.

Keywords: Lean Production, Lean Implementation, Barriers, Public Healthcare

Word count: 12671

1. Introduction

The literature outlines several barriers to implementing lean, including but not limited to; people, lack of positive attitude and commitment to change the process (Radnor *et al.*, 2006), insufficient understanding of the potential benefits (Marodin and Saurin, 2015), resistance to change to something new or scepticism (Bhasin, 2012a), lack of resources (Bateman and Rich, 2003) and poor communication (Sim and Rogers, 2009). Whilst several studies offer descriptions of the barriers and their impact to implementing lean,

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3 there is a dearth of research that focuses on understanding the causes of these barriers
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5 which we term ‘ostensible’. This study focuses on healthcare systems in developing
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7 countries, such as Brazil and draws on qualitative data to understand the deeper causes that
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9 influence the creation of these ostensible barriers in the Brazilian public healthcare, which
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11 we have termed ‘underlying’ barriers. The contribution of this research is to introduce and
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13 discuss underlying barriers, a contextual contribution in a developing country, and field
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15 forces analysis in order to identify barriers in healthcare.
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19 The healthcare systems, both private and public, of any country seem to be
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21 constantly under pressure of cost reduction and increasing demand (Sisko *et al.*, 2018).
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23 Commonly, a public healthcare system that adopts the universal model of coverage based
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25 on use free of cost, faces pressures to provide timely healthcare assistance to taxpayers that
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27 claim to be paying their taxes in exchange of a reasonable level of service (Berwick, Nolan,
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29 and Whittington 2008; Paim *et al.*, 2011).
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33 In the case of the Brazilian public healthcare (UHS) used as subject of this work, the
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35 system is facing difficulties to provide the wide coverage as planned in the Brazilian
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37 Constitution and expected by taxpayers (Bravo, 2001). The main challenges are related to:
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39 long waiting times; to receive treatment; to be transferred to a hospital bed and to perform
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41 basic and specialized tests (Almeida, Giovanella and Mendonça, 2010; Azevedo and Costa,
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43 2010; Menucci, 2009; Paim *et al.*, 2011). These problems have concentrated in the
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45 emergency areas of UHS and have a direct impact in the treatment of the patients, waiting
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47 times and satisfaction (Derlet, and Richards, 2000) and, overcrowding (Ludwig and
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49 Bonilha, 2003).
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53 Finding an approach that can ease these problems is a challenge in Brazil (Brandao
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55 de Souza, 2009) but the lean philosophy has emerged as one method (Mazzocato *et al.*,
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3 2012; Naik *et al.*, 2011; Ryan *et al.*, 2013). Originally an approach to be used by
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5 manufacturing companies (Womack, Jones and Ross, 1990; Womack and Jones, 1996;
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7 Yadav, Seth and Desai, 2018), lean has rapidly spread to the services areas (Allway and
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9 Corbett, 2002), with great focus and positive results in healthcare (Brandao de Souza, 2009;
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11 Burgess and Radnor, 2013; Mazzocato *et al.*, 2010).

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14 Regardless of the popularity of lean, Jadhav, Mantha and Rane (2014) argue that
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16 even though lean is one of the most powerful quality improvement methodologies, nearly
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18 two-thirds of the implementations end in failure and less than one-fifth of those
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20 implemented have sustained results. These low rates of success are related to difficulties in
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22 dealing with barriers to the lean journey (Bhasin, 2012a). Thus, this paper seeks to
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24 understand the deeper causes that create the barriers that constrain the lean implementation
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26 and sustainability in the Brazilian public healthcare. Therefore, the following research
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28 question is proposed:
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33 What are the underlying barriers that influence the creation of ostensible barriers to
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35 lean implementation in healthcare?
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38 To answer this question, the paper first provides a review of the lean philosophy and
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40 its impact on healthcare, outlining the main hurdles to the lean journey depicted in the
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42 literature. Subsequently, the research methodology is introduced, showing that the paper
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44 draws on rich, qualitative data from four different sources of data within a case study in the
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46 emergency areas of UHS. Next, triangulating this data and using thematic analysis, the
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48 paper then identifies ostensible and underlying barriers to implementing lean in healthcare.
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50 Finally, using these findings together with Lewin's (1951) force field analysis model, the
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52 discussion and conclusion sections identify and discuss the main elements that act as
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54 restraining forces during the lean journey in healthcare and influence the creation of the
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3 ostensible barriers. This section considers the theoretical and practical contribution of this
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5 paper and provides insights for further research.
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7 **2. The Brazilian public healthcare issues**

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10 The healthcare system in Brazil is divided into private and public. The public healthcare
11
12 system, also widely known as the Unified Health System (UHS) (*Sistema Unico de Saude –*
13
14 *SUS*) is responsible for providing healthcare assistance free of charge for over 150 million
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16 people (ANS, 2013). The system is based on use free of cost and solely funded by the
17
18 government resources, which together with federal government, states and municipalities
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20 support the administration of these resources in three different levels of the system:
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22 preventive, emergency and high specialization.
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26 The preventive level is designed to provide assistance using general practitioners
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28 (GP) assistance for non-urgent care. The emergency level relies on emergency care units
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30 (ECU) and emergency departments (ED) also known as accident and emergency (A&E)
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32 within hospitals, treating situations that involve risk of death; it is considered an ‘open
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34 door’ model. The specialized level uses hospitals to perform a variety of highly specialized
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36 care, for example, chemotherapy, renal dialysis, heart surgery, transplant and complex tests
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38 (Ministry of Health, 2014).
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42 A system such as UHS that has to provide wide coverage of healthcare services,
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44 presents a series of operational problems that affect patients (Dickson *et al.*, 2009) such as
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46 waiting times and queues to receive treatment, which includes seeing a physician and
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48 performing tests (Piola *et al.*, 2009; Solla and Chioro, 2008). These problems have a high
49
50 concentration in the emergency level, as it operates as an ‘open door’ policy which can lead
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52 to high numbers of patients (Ipea, 2011; Ludwig and Bonilha, 2003).
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3 The literature shows that these issues in emergency areas have been addressed using
4 process improvements approaches, such as lean philosophy which was first applied in the
5 manufacturing field (Womack, Jones and Roos, 1990) but later adapted to healthcare which
6 has revealed positive results (Burgess and Radnor, 2013; Mazzocato *et al.*, 2010; Radnor *et*
7 *al.*, 2006).

14 3. Lean philosophy: from manufacturing to healthcare

15 Originally an approach developed by the Japanese company Toyota in the mid-50s and
16 known as Toyota Production System (TPS) it was later termed as 'lean thinking' by
17 Womack, Jones and Roos *et al.* (1990) and Womack and Jones (1996) in manufacturing
18 companies in the West. The lean thinking focuses on waste elimination and creation of
19 value for the customer. From the advent of the lean concept to the present day, the
20 popularity of lean thinking has spread rapidly to other public and commercial sectors
21 (Bateman, Hines, and Davidson, 2014; Leite and Vieira, 2015; Yadav, Seth and Desai,
22 2018). It became evident that reducing waste and creating value is not only for
23 manufacturing applications (Allway and Corbett, 2002), indeed, after a long period of lean
24 applications exclusively in manufacturing companies, the techniques were adapted to the
25 services area with the same focus, to reduce waste and create value for 'end-users' (Radnor
26 and Osborne, 2012, 10).

27 Several service areas, such as banks, offices and public services are applying lean
28 (Bowen and Youngdahl, 1998), however, healthcare operations have received particular
29 attention from academics and practitioners of lean in this area (Mazzocato *et al.*, 2012;
30 Naik *et al.*, 2011; Ryan *et al.*, 2013). Different literature reviews about lean healthcare have
31 been carried out the results show the growing of lean healthcare studies, positive results
32 after implementation in hospitals' operations and, the development of new tools and

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3 approaches (Brandao de Souza, 2009; Mazzocato *et al.*, 2010; Radnor, 2010). **These results**
4 **about the growing relevance of lean in healthcare operations are not only theoretical but**
5 **have a considerable number of practical results with several researchers publishing positive**
6 **results (Kim *et al.*, 2007; Womack *et al.*, 2005).**
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12 The benefits are reported in different ways including cost reduction, process
13 improvements, time savings, queue reduction, investment savings, reduction in wasted
14 medication, improvements in time of patient admission and reduction in the average time to
15 first appointment. There are also benefits more focused on patients, such as reduction of
16 patient walking, increase in patient satisfaction, improved patient safety, reduced mortality,
17 including others (Cima *et al.*, 2011; Mazzocato *et al.*, 2010; Radnor *et al.*, 2006).
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26 Regardless of all the benefits that the lean implementation brings to the context in
27 which it is implemented, the literature also shows that the lean journey (implementation and
28 sustainability) faces substantial barriers that inhibit the success of the approach (Bhasin,
29 2012a; DeSanctis *et al.*, 2018; De Souza and Pidd, 2011; Lean Enterprise Institute, 2007;
30 Kundu and Manohar, 2012; Radnor *et al.*, 2006; Yadav and Desai, 2017).
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38 **4. Barriers to implementing lean**

39 Scholars within the literature have reported relative low rates of lean project success.
40 Jadhav, Mantha and Rane (2014) argue that even though lean is one of the most powerful
41 quality improvement methodologies, nearly two-thirds of the implementations culminate in
42 failure and less than one-fifth of those implemented have sustained results. There are cases
43 where the success rates are even lower, for instance, Bhasin and Burcher (2006) report that
44 less than ten per cent of companies succeed at implementing or keeping the lean philosophy
45 well instituted. Implementing lean has become a challenge for several organisations with
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3 one of the main reasons being the lack of ability to cope with barriers faced across the
4 implementation and sustainability process (Bhasin, 2012a; DeSanctis et al. 2018).

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7 The barriers to implement and sustain lean have been identified across different
8 sectors, such as public services (Radnor *et al.*, 2006), healthcare systems (De Souza and
9 Pidd, 2011), manufacturing (Bhasin, 2012a; Yadav and Desai, 2017) and the IT service
10 sector (Kundu and Manohar, 2012). To provide a comprehensive understanding of the
11 barriers that constrain lean implementation Table 1 lists the barriers identified in the
12 literature. Table 1 was developed undertaking a systematic review of the literature based on
13 similar studies carried in this field (Brandao de Souza, 2009, Mazzocato et al. 2010, and
14 Yadav and Desai, 2016) with a structured protocol to extract and review relevant papers.
15 The literature review protocol also included guidance from scholars that conduct in-depth
16 systematic literature review, such as Tranfield, Denyer and Smart (2003) and Westby *et al.*,
17 (2008).

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20 The main elements presented in the protocol for this study are based on a selection
21 of the key words, peer-reviewed journals, definition of criteria of inclusion and exclusion as
22 well as, saturation of the search. According to Tranfield, Denyer and Smart (2003) these
23 painstaking procedures and detailing of the searching protocol ensure that the search can be
24 replicated in the future.

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27 To access relevant secondary data within the literature the researchers explored
28 academic articles published in several databases including, Science Direct, Emerald
29 Fulltext, Springer Link, Taylor and Francis Online, Ebsco, Medline, PubMed and
30 Inderscience. The only non-academic source considered was the Lean Institute which was
31 justified by the relevance of the institution in the field of study so was considered as a
32 technical source. The publication's period considered for the search followed the

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3 availability of the papers up to 2017. The criteria defined to carry out the searches followed
4 suggestions from Brandao de Souza (2009) and were based on the saturation of the
5 following key words: lean barriers, enablers, challenges, obstacles, constraints and
6 healthcare. The predetermination of keywords to carry out search in databases during
7 literature review is also encouraged by Robson (2011).
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14 In order to select the papers an inclusion and exclusion criteria were used from
15 Saunders (2011) who advocates that the use of predetermined explicit criteria can help to
16 select relevant research studies during the literature review. Therefore, during the searching
17 process the inclusion and exclusion criteria undertaken was based on academic peer-
18 reviewed papers that matched the predetermined key words.
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26 Finally, aiming to identify and select suitable papers a screening process was carried
27 out in two phases. Firstly, selecting papers based on title, abstract and key words which led
28 to an extensive review that selected 180 papers. The second phase involved a rigorous
29 screening process based on abstract assessment, where the researchers reviewed article by
30 article and tried to find contributions related to the key words used to find the papers. This
31 reduced the final number to 115 papers selected.
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44 The barriers identified in table 1 also have some degree of similarity with the
45 challenges faced in the healthcare sector. This is confirmed by Drotz and Poksinska (2014)
46 who advocate that similarly to what happens in the manufacturing settings lean practices
47 implemented in healthcare also face significant barriers.
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53 During the literature review it was found that some academics highlighted common
54 barriers found in manufacturing context also emerged in healthcare settings which include;
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3 fear of job losses (Andersen and Røvik, 2015; Fine *et al.* 2009; Kim *et al.*, 2007); personal
4 and organisational cultural issues (De Souza and Pidd, 2011; D'Andre Matteo *et al.*, 2015;
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6 Kim *et al.*, 2007; Kinder and Burgoyne, 2013); poor communication (Albliwi *et al.*, 2014;
7
8 Andersen, Røvik and Ingebrigtsen, 2014); people's lack of attitude and commitment
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10 (Kinder and Burgoyne, 2013, McDermott and Venditti, 2015; Poksinska, 2010); lack of
11
12 resources (Aij *et al.*, 2013; Albliwi *et al.*, 2014; Andersen *et al.*, 2014); resistance to change
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14 (Aij *et al.*, 2013; Brandao de Souza and Pidd, 2011; Poksinska 2010); training and
15
16 education (Aij *et al.*, 2013; Andersen, Røvik and Ingebrigtsen, 2014; Grove *et al.*, 2010);
17
18 leadership failure/misunderstanding and lack of commitment and support (Al-Balushi,
19
20 2014; Drotz and Poksinska, 2014; Grove *et al.*, 2010); lack of long-term strategy
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22 (Andersen, Røvik and Ingebrigtsen, 2014; De Souza and Pidd, 2011; D'Andre Matteo *et*
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24 *al.*, 2015).

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31 It is not unusual to find these barriers either in healthcare or manufacturing settings.
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33 However, there are other barriers that are specifically found in and related to the healthcare
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35 context. For instance, the literature shows professional boundaries, healthcare fidelity and
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37 need for evidence-based as specific barriers found when transferring lean into the
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39 healthcare settings (Dixon-Woods *et al.*, 2013; De Sousa and Pidd, 2011; Radnor *et al.*,
40
41 2006)

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44 Professional boundaries also known as professionalism is a common phenomenon
45
46 found during lean implementation (De Sousa and Pidd, 2011; Stanton *et al.*, 2014). It
47
48 involves the power and influence of staff members (physicians and nurses) that work in a
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50 fragmented structure in a hospital (Fillingham, 2008; Waring and Bishop, 2010). Power and
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52 culture are two strong elements in the healthcare structure that usually emerge as a barrier
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3 in lean implementation in terms of professional and functional silos developed within the
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5 fragmented structure of the healthcare (Radnor et al., 2006; De Sousa and Pidd, 2011).
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8 When working in silos healthcare practitioners are separated in professional groups
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10 which has a great impact on communication, interaction and protectionism of areas in
11
12 healthcare (De Sousa and Pidd, 2011), and works against lean practices such as teamwork
13
14 and decentralization of power (Drotz and Poksinska, 2014). Some of these problems related
15
16 to professionalism were identified during lean implementation in healthcare institutions
17
18 such as ThedaCare, Royal Bolton and Flinders Medical Centre (Ben-Tovim et al., 2008;
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20 Radnor, 2010b; Toussaint, 2009; Womack et al., 2005).
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24 The healthcare fidelity in replicating lean in helathcare is another barrier found
25
26 during implementation. For example, implementing techniques adapted from
27
28 manufacturing plants to improve quality and safety in healthcare settings has been a
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30 challenge so as a consequence the results sometimes are considered superficial, with no
31
32 meaningful changes, low rates of success and difficult to replicate (Davidoff *et al.*, 2014;
33
34 Dixon-Woods *et al.*, 2013). According to Glouberman and Zimmerman (2002) some of the
35
36 difficulties to sustain change in healthcare emerge from the complexity of this setting
37
38 which includes its challenging technical, social, institutional and political context.
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42 Nevertheless, the challenge is not only related to transferring from manufacturing to
43
44 healthcare, constraints also exist during attempts to replicate lean initiatives across
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46 healthcare areas. Dixon-Woods et al. (2013) argue that this often brings some disconcerting
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48 effects such as failure to outperform the secular trend and the decline effect when the
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50 intervention does not deliver successful results during replication in the new context
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52 thereby, jeopardising the sustainability and leading to failure (Dixon-Woods *et al.*, 2011).
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3 This discussion about lean replication contributes to another contemporary
4 healthcare challenge that has been discussed within the literature which is the need for
5 evidence of the benefits of the lean approach (Andersen *et al.*, 2013). Most of the studies in
6 lean healthcare present positive results. However, sometimes they have limitations such as
7 poor case studies, weak design and methodology which affects the validity and
8 generalizations of results (Alexander and Hearld, 2009; Mazzocato *et al.*, 2010; Young and
9 McClean, 2008). The main barrier according to Andersen, Røvik and Ingebrigtsen (2014) is
10 the replication of study designs which have limited adaptations and do not account for
11 contingency factors that are needed to translate the findings from one setting to another.
12 This barrier found within the literature states that lean is unique and to be adopted
13 successfully it must consider that it is context dependent and so pure replication will not be
14 sustained (Bateman, Hines and Davidson 2014; Bhasin, 2012; Kaplan *et al.*, 2010; Leite
15 and Vieira, 2015; Radnor and Osborne, 2012).

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33 During the identification of these barriers (Table 1), a high level of commonality
34 was noted (Mostafa, Dumrak, and Soltan 2013). However, what is missing from these
35 barriers is an analysis of their deeper causes that influence their creation. It can be
36 suggested that these barriers themselves already shed understanding about the challenges to
37 implement lean (Bhasin, 2012a). Others would argue that there are underlying causes that
38 should be investigated, as Hines, Holweg, and Rich (2004) first advocated in their study
39 about 'enablers' using the 'lean iceberg model' to illustrate underlying enablers that are
40 behind ordinary ones. Therefore, the research presented in this paper aims to understand the
41 underlying factors by investigating the introduction of lean into emergency areas of the
42 Brazilian healthcare system.

5. Methodology

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3 To achieve the aims of this research it is important to define and follow a clear
4 methodology. Therefore, this section aims to explain the methodological procedures carried
5 out to access and analyse the data. Undertaking a qualitative methodology the researchers
6 adopted exploratory case studies as the primary strategy. Semi-structured interviews and
7 observations across four different sources of data collection were used to access data; lean
8 management consultants, staff members in private hospitals, and staff members and
9 patients from ECU and ED. From this data it was possible to carry out thematic analysis
10 and triangulate to access in-depth results. This section provides further explanation and
11 details of the methodological approach.
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24 This is an exploratory study that aims to understand a new perspective on the
25 barriers that influence lean implementation and sustainability by looking into the
26 underlying causes of those barriers. A case study research based on four sources of data
27 was taken. In the operations management field, the use of case study research is
28 encouraged by different scholars (Karlsson and Åhlström, 1995). Voss (2010) advocates
29 that despite all challenges in conducting a case study, such as time-consuming, resources
30 constraints and others, this is still a powerful research method in operations management
31 field that provides an opportunity for in-depth observation.
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42 Case study is a common strategy used amongst academics that investigate lean
43 (Mazzocato et al., 2012; Yadav, Seth and Desai, 2018; Wikner et al., 2017). Seth, Seth and
44 Dhariwal (2017) used case studies when analysing lean application in complex production
45 environments advocating that they allowed the phenomenon to be studied in relation to its
46 real-life context facilitating rich dialogue. According to Garza-Reyes et al. (2018) who
47 studied lean implementation in the logistics sector an exploratory case study approach can
48 provide critical and empirical information about the phenomenon under analysis. Finally,
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3 the case study has been suggested as a valid research strategy particularly encouraged when
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5 the focus of the study cannot be separated from the context where it occurs (Cameron and
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7 Price 2009; Collis and Hussey, 2013; Eisenhardt, 1989).
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10 Figure 1 outlines the research framework, where case study research was
11
12 undertaken using four sources of data collection. These sources were separated in lean
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14 experiences by private healthcare and emergency area of the public healthcare system. Lean
15
16 experiences in private healthcare can be divided into two main sources: lean management
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18 consultants and staff members in a lean private hospital. On the other hand, experiences
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20 from emergency areas of the public healthcare system was provided from two main
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22 sources: staff members, physicians from ECU and ED.
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27 ...Insert Figure 1 About Here...
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30 Lean management consultants are considered people with a high-level of knowledge of the
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32 lean philosophy, principally with experience in the healthcare sector. Some examples of
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34 these practitioners are management consultants in the lean domain e.g. local Lean
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36 Enterprise Academy or Institute, or, consultancy offices.
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39 Staff in a lean private hospital contributed with their own experience in this field
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41 and highlighted the main barriers to lean implementation within the context of the public
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43 healthcare system. Both lean management consultants and staff in the private hospital were
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45 interviewed to access information about their previous experience working with lean
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47 projects in healthcare. This approach is encouraged by Saunders (2011) who argues that
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49 interviews with practitioners and experts in the subject are a great method to access the data
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51 needed.
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3 The ED in public hospitals and ECU detached units are places to access data about
4 the current and real situation in the public healthcare system. Observation and interviews in
5 these venues considered people involved in the process of co-production, such as staff
6 members, physicians and patients. Their point of view associated with patients' pathway
7 observation and analysis reflected barriers for the lean implementation (culture, regulations,
8 resources, process).
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10
11 Table 2 outlines the case study sources, showing whom and how many were
12 interviewed or observed. In total 43 semi-structured interviews (Robson, 2011; Yin, 2014)
13 were conducted with physicians, nurses, social care practitioners and patients across UHS
14 sites, whilst in the private system, interviews with nurses and project managers were carried
15 out, and finally, the lean management consultants as specialists were interviewed. The
16 interview in the emergency areas with healthcare staff members aimed to understand the
17 barriers to implement lean in this environment, whilst interview with patients tried to
18 identify the main problems faced when they seek healthcare assistance.
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35 The lean management consultants' selection for the interviews considered the most
36 influential experts in lean healthcare in Brazil. Amongst these people were book writers,
37 keynote speakers, pioneers in lean healthcare in Brazil and management consultants with
38 considerable experience in the area.
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50 Additionally, data from patients' pathway observation was collected. The data from
51 observation was collected using participant as observer method (Collis and Hussey, 2014;
52 Saunders, 2011). Ten patients had their entire journey observed from admission process
53 until discharging. The observation aimed to understand the patients and staff members'
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3 interactions across the patient's journey within the emergency areas of UHS highlighting
4 the main issues observed during its journey.
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8 The use of different sources in this case study provided an opportunity to triangulate
9 the data allowing access to different levels of reality (Bryman and Bell, 2005). Collecting
10 data across multiples sources within case study research and undertaking different methods
11 such as interviews and observations enables cross-checking of data and ensures that the
12 evidence reflects the consistency of findings and the research trustworthiness (Denzin,
13 1978; Patton, 1999).
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21 The interview questions considered during the data collection across the four
22 sources of this case study are described in Table 3. The interview questions were framed to
23 provide a response to the research question which is anchored on the understanding of the
24 barriers to implementing lean in the healthcare. Aiming to understand each source's point
25 of view the same questions were either asked to multiple sources or specific questions were
26 asked to only one source. For instance, as patients could not answer questions about lean
27 they were only asked questions about problems faced during their journey in the emergency
28 areas of UHS. Whereas, questions about the barriers found in UHS could be answered by
29 lean management consultants, a lean team in private hospital and, staff in UHS.
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46 Semi-structured interviews were used to collect data, and the questions were based
47 around themes to start the interview process, followed by some key-words called 'pick-ups'
48 based on literature (Table 1) to engage the discussion. This approach is encouraged by
49 Robson (2011). Additionally, where necessary, the questions were followed by new issues
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3 that emerged. All 43 interviews were transcribed and additional 'reflective notes' were
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5 developed during the case study (Radnor, 2002).
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8 Due to the nature of the qualitative data it tends to generate a large non-standardized
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10 and cumbersome database. Therefore, the data analysis becomes an important and
11
12 challenging phase of the research (Bryman and Bell, 2011; Collis and Hussey, 2014). The
13
14 method chosen to analyse the data will vary according to different elements such as
15
16 research philosophy, qualitative or quantitative data collected, whether the data is primary
17
18 or secondary as well as methods to access these data (Collis and Hussey, 2014; Saunders,
19
20 2011). Undertaking thematic analysis which is one of the most common methods within the
21
22 qualitative field allows the researcher to code and keep tracking of the data (Braun and
23
24 Clark, 2016). Moreover, Radnor and O'Mahoney (2013) advocate that this method of
25
26 analysis can enable a level of sensitivity of details and context, likewise accurate access to
27
28 information. Therefore, to analyse the data collected in this case study, an adapted model
29
30 based on Braun and Clark (2006) and Radnor's (2002) suggestions were used, performing
31
32 six main steps from initial coding to main themes, and finally interpreting the data (Figure
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...Insert Figure 2 About Here...

44 The model from the experiences of Braun and Clarke (2006) and Radnor (2002)
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46 provides a step-by-step data analysis, illustrating the methods with several practical
47
48 examples about the technique, which provides support and a 'friendly' technique for
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50 researchers to analyse their own data collection. This standardized model has been
51
52 previously used in the operations management field as reported by Radnor and Johnston
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(2013) during the investigation of lean in the UK government. In order to provide validation of the findings, reports of the four case study sources were produced.

6. Findings

The research findings will be presented based on those related to ostensible and underlying barriers with specific focus on the underlying barriers which are considered the root cause of other barriers.

6.1 Ostensible Barriers

From the data analysis twenty barriers emerged as main constraints to the lean implementation in UHS (Table 4). The barriers come from the four different sources of data collection. Analysis of table 4 shows that most of the barriers are common in at least two sources, except the financial barrier, the structure of the system that affects physicians and, public servant tenured career. Regardless of the fact that those barriers only appeared in the ECU source, they are still relevant for this study, particularly when compared to literature or context of the research (Bateman and Rich, 2003; Fillingham, 2008; Marodin and Saurin, 2015).

The barriers found during this research can be also separated into three main categories. It does not mean a strict categorization, where one barrier cannot be part of another category, but it is just a way to illustrate that they are common within some areas. The categories from where the barriers emerged are: 1) literature, which represents barriers that are common within the literature (Table 1); 2) UHS context, which represents the barriers that come from the context of the emergency level of UHS, such as the UHS bureaucratic style, slow pace of change in UHS, public servant tenured career; 3) practitioners' knowledge, which represents barriers that emerged from specific and

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3 advanced lean knowledge that comes from lean management consultants and staff from a
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5 lean private hospital, for instance lack of long-term strategy and performance management.
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9 ...Insert Table 4 About Here...
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11
12 These 20 barriers found in UHS can be named ‘ostensible barriers’ as they appeared
13
14 to be the real cause. However, the data analysis found there to be other causes influencing
15
16 the creation of these barriers. These can be defined as underlying causes of the barriers in
17
18 UHS and are presented in the following section.
19
20

21 **6.2 Underlying Barriers**

22

23 The categorization of the underlying barriers was based on Braun and Clarke’s (2006)
24
25 suggestion of thematic analysis. The analysis was carried out based on an inductive process
26
27 of clustering the codes and sub-themes, around one main theme and checking the theme
28
29 repetition (Robson, 2011) which is illustrated in figure 2. During the data analysis the
30
31 underlying barriers emerged as main themes, the ostensible barriers as sub-themes and,
32
33 additional and general information related to the barriers emerged as codes.
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36

37 Table 5 displays the results from the thematic analysis, indicating the frequency that
38
39 respondents provided information related to a specific underlying barrier. These barriers
40
41 together with evidence from data will be discussed in the following sections.
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45 ...Insert Table 5 About Here...
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48 Physicians’ influence within the process: As physicians deliver substantial ‘value
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50 add’ to patients during the service delivery process in healthcare they can be considered an
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52 important element in the co-production process. The physician will perform one of the most
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54 skilled activities and will determine whether the patient should receive treatment or be
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3 discharged. Thus, a main theme called ‘physicians’ influence within the process’ emerged
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5 from data analysis with 9.6% of the frequency of the codes related to this subject (Table 5).
6
7 This underlying barrier was identified as the cause of four ostensible barriers: ‘physicians
8
9 lack of commitment’, ‘physicians’ resistance to change’, ‘public servant tenured career’
10
11 and ‘fear that lean will cause job losses’.
12
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14
15 Additionally to these ostensible barriers, there were some further codes that
16
17 emerged during the data analysis that also supported the findings related to this underlying
18
19 barrier. These codes were merged into different sub-themes as follows: physicians’
20
21 involvement, affecting system, affecting patient and, affecting clinical staff.
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23

24
25 According to the data analysed the physicians’ involvement brings contribution to
26
27 this underlying barrier as it addresses the positive view of having a key healthcare
28
29 professional involved in a lean project. Moreover, it could be argued that physicians are
30
31 interested in seeing the process working well. Nevertheless, there is also a negative
32
33 influence when their behaviour affects the system, patients and clinical staff. Physicians
34
35 can be resistant to changes that they do not understand, therefore, affecting the system.
36
37 There are cases shown during the analysis that have presented a lack of commitment from
38
39 physicians which increased the waiting time and affected the patient. These situations
40
41 illustrate the influence and impact of the physicians within the process which was also
42
43 advocated by a clinical staff member from a hospital that have implemented lean:
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45

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47 So when you can involve the doctor it’s even better, because the doctor is
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49 always difficult to convince about something new, they are always open to
50
51 studies and learn new techniques, however is a little bit difficult to talk with
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53 them. When you have a doctor in the project it helps a lot. (Clinical Staff from
54
55 Private Hospital)
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3 The information discussed above raises awareness about the involvement of the
4 physicians in the lean journey. It shows that their influence within the process is an
5 underlying barrier that should be considered during lean implementation and sustainability
6 so this can ease or avoid ostensible barriers.
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11
12 Patients' behaviour in emergency areas: The patient as the main user, creates
13 demand and receives the service delivered. According to Womack and Jones (1996)
14 providing value at the right time to customers is one of the key principles of the lean
15 philosophy. Thus, it is important to bring this concept of value delivering into the
16 healthcare setting especially because the patient is probably the most important element in
17 the consumption process in healthcare.
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26 The patient's behaviour in emergency areas emerged as an underlying barrier with
27 16.2% of the frequency of the codes during the data analysis (Table 5). It shows that
28 patient's behaviour influences the creation of the ostensible barriers 'non-urgent patients'
29 presence in emergency areas' and 'emotional stress between patients, staff members and
30 physicians' (Table 4). Additionally the sub-theme that addresses the patient's impact on
31 physicians emerged and will be discussed.
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40 The data analysis has shown that non-urgent patients in emergency departments
41 influence demand, creating an unstable operation. This also motivates the generation of
42 emotional stress and tensions between patients and clinical staff members (Table 4). There
43 were cases observed by the researchers during the data collection where patients become
44 aggressive and started arguing with clinical staff. The presence of non-urgent patients
45 within the process also affects the physician. This situation is related to some of the codes
46 found during the data analysis, for instance, stress between patients and physicians because
47 of the physician not issuing a sick note if the patient was not urgent. Patients that did not
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3 have urgent situations became aggressive when they were referred to GPs. According to
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5 physicians and clinical staff this situation could be avoided if the non-urgent patients
6
7 sought assistance at the GPs, however, they either did not find the GP available, or just
8
9 went directly to the emergency areas:
10

11
12 The delay here (emergency area) is because the demand is too big, and
13
14 sometimes they (patients) come from another place, because they've been
15
16 instructed to come here. If I was this patient I'd be very upset, because they go
17
18 to the GP and they can't be seen there, so they come here and have to wait for 4
19
20 or 5 hours for a simple thing. (Nurse from an emergency care unit)
21

22 When it comes to lean implementation and sustainability it is important to consider
23
24 the impact of the patients' behaviour within the emergency areas as it generates a variety of
25
26 demands that are not necessarily linked to the service as planned or provided i.e. routine
27
28 rather than emergency care.
29

30
31 Constraints related to resource management affecting staff: When resources are not
32
33 available it starts to impact on staff performance. Based on interviews with staff members
34
35 and observations of the process this main theme regarding resource constraints emerged as
36
37 an underlying barrier. The analysis shows 14.4% frequency of the codes (Table 5) that this
38
39 underlying barrier motivates the creation of the ostensible barriers; 'financial barrier to
40
41 implement lean', 'nurses performing different activities that are not core' and, 'poor
42
43 management of resources' (Table 4).
44
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47 The financial barrier to implement lean is related to lack of resources. It emerged as
48
49 a sub-theme in the data analysis bringing several related codes such as; shortage of staff,
50
51 lack of material, medication and conditions to perform the work, amongst others. The next
52
53 sub-theme 'poor management of resources' addresses issues such as; lack of control of
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3 resources, lack of control about waiting time, shifts are not levelled according to demand,
4
5 lack of material control and, poor quality of material/equipment that generates waste. When
6
7 a new project, such as lean, is suggested there is a fear that it can increase the cost or even
8
9 demand creating a barrier not just to implement but, to sustain the lean journey, as
10
11 explained by a nurse:
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14
15 When you have to make a change that you have to buy something that will
16
17 involve money, it also becomes difficult in the public service. You know that
18
19 everything takes time and need a public bid. (Nurse from an emergency care
20
21 unit)

22
23 Overall, if lean is attempted to be implemented in the scenario where there is lack
24
25 and poor management of resources, resistance might arise from staff members which could
26
27 lead to discouragement to support and sustain changes.
28

29
30 The UHS model impacts on physicians work: As physicians deliver substantial
31
32 value add to patients in the co-production process, when their environment starts to affect
33
34 their job and performance it could directly impact on the service delivered to patients. This
35
36 underlying barrier emerged with 10.3% frequency of the codes during the data analysis
37
38 (Table 5) and causes the ostensible barriers; ‘the structure of the system affects the
39
40 physicians’ and ‘physicians spend time performing activities that are not core’.
41
42

43
44 On several occasions during the interview process the UHS structure was
45
46 highlighted as a barrier for physicians’ work. The model or style that the system operates
47
48 shows that the physicians are affected when they have to perform activities that are
49
50 bureaucratic and not specifically related to delivering value to the patient. This is also
51
52 linked to another ostensible barrier that emerged during the analysis, which is ‘the
53
54 physicians spending time with non-core activities’ (Table 4). For instance, performing
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3 activities that are not core is something that most of the physicians admit to being a waste
4
5 of their time and creates frustration.
6

7
8 Sometimes I have to go after people, I don't know how to measure exactly but
9
10 I can say I spend about two hours making prescriptions, doing these
11
12 bureaucratic things, in my opinion this is where we waste more time, in this
13
14 bureaucratic question. I think most of the time, about 90% is solving problems,
15
16 calling people, updating the system. The other part of my time is seeing
17
18 patients. (Physician from and Emergency Care Unit)

19
20 These situations that affect the physicians' work can lead to demotivation and
21
22 discouragement which start to affect the quality of the service delivered by the physicians.
23
24 Summarizing, this underlying barrier represents a decrease of focus on value added
25
26 activities and an increase in waste bringing disruptions across the process.
27

28
29 The model that UHS operates creates constraints: This underlying barrier emerged
30
31 from data analysis with 15.8% frequency of the codes (Table 5). It was identified as the
32
33 cause of three ostensible barriers; 'UHS bureaucratic style as a barrier to lean', 'public
34
35 system lack of interest/motivation in changing' and 'differences between service delivered
36
37 in public and private/performance management' (Table 4).
38

39
40 This underlying barrier also tackles issues related to UHS influence on the patient's
41
42 journey as well as the misinterpretation about the emergency level purpose. There is a
43
44 misunderstanding about the purpose of each level (preventive, emergency and specialized)
45
46 of UHS. It was found that even other areas in UHS did not understand properly the aim of
47
48 the emergency area, consequently demand is moved from other areas, this can create
49
50 bottlenecks in the emergency areas as explained by a physician:
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53 So they have a limited capacity there (at the GP), a limited number of patients
54
55 to be seen, like 'the GP will close, you aren't an emergency, you can come
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3 tomorrow. That's why they come here, because we work 24hours, like they
4 think: I can wait 3, 5 or even 6 hours, but I'll be seen (laughs). (Physician from
5 and Emergency Care Unit)
6
7

8 The testimony above shows that the emergency area will be the place chosen by a
9 patient to find the solution to their issue. Thus, from the emergency area point of view, this
10 situation creates problems with patient flow, such as long waiting times, dissatisfaction,
11 stress and poor quality of service. This is one example of how UHS affects the patients
12 creating difficulties for them to access timely care.
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20 Overall UHS is seen as a bureaucratic system that restrains initiatives of
21 improvement and, only substantial changes would bring improvements to the system.
22 However, this seems to be a matter of long-term commitment:
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26 It'll take a long time, it's necessary to change this Government, change this
27 culture that the Brazilians have of outsourcing the responsibility, I think they
28 should be more responsible and have more commitment. I think it will take a
29 few years, unless they make a very big movement of improvement of
30 processes in hospitals. (Lean Management Consultant)
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39 The UHS cultural style influences directly on the patients as the main users of this
40 co-production process and so, could influence attempts to implement lean.
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44 Influence of the clinical staff behaviour as a barrier to lean: Similar to physicians,
45 clinical staff are also relevant to the service delivery process and consequently to lean
46 implementation. During the data analysis this underlying barrier emerged with 33.7%
47 frequency of the codes related to this subject (Table 5).
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53 Clinical staff members work in front line operations, receiving patients and
54 supporting the physicians' requests. The influence of the clinical staff behaviour on lean is
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3 an underlying barrier that was identified as the cause of five ostensible barriers; ‘clinical
4 staff resistance to change’, ‘fear that lean will cause job losses’, ‘lack of lean knowledge
5 and experience’, ‘communication disruptions amongst staff and between shifts’ and ‘the
6 administration or leadership can be a barrier to lean’ (Table 4).
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11
12 There are other relevant codes that also emerged during the data analysis and
13 strengthen the view about the clinical staff behaviour as an underlying barrier to lean. For
14 instance, the staff behaviour towards the patients raises the discussion about the lack of
15 focus on patient flow within the emergency areas of UHS. Furthermore, findings have also
16 showed a positive view that if the staff members understand and participate in the lean
17 project they will feel part of it. This was explained by a staff member from a lean private
18 hospital:
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29 Let’s make a project here in the emergency room, so let’s see who will be
30 involved here, then you question what are the problems, and they know what
31 the problems are, then you take these people, all of them who participate in the
32 process, explain the purpose, train and leave them doing the process, then I
33 think you can get a large insertion, with everyone involved. (Clinical Staff from
34 Private Hospital)
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44 The lean project needs the involvement of people to succeed. Therefore, if the staff
45 members do not engage with the lean implementation it could affect the patients, as
46 improvements will not reach the most important person in the consumption process.
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50 This section presented the findings from the data analysis which can be separated
51 into two main findings; identification of ostensible barriers and underlying barriers. The
52 ostensible barriers, many of which were recognized from the literature, have some
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3 interesting characteristics. Firstly, they are easy to identify and so, can be tackled
4 particularly with a tools-based lean approach, for instance, communication might be found
5 as an issue within the organisation, therefore tools such as, standardization or visual
6 communication might be a tool to tackle this problem. Secondly, ostensible barriers appear
7 to be the real cause, however, as this research has identified, the real causes might lie
8 deeper.
9

10
11 It could be argued that there are fewer underlying barriers although they are strong
12 inhibitors in lean implementation. Underlying barriers are linked with people's behaviour
13 and organisation's style which makes them more difficult to identify as they are not overtly
14 tangible. In contrast with the ostensible barriers, underlying barriers do not come from the
15 literature but emerge from the field investigation after consideration of the causes of
16 ostensible barriers.
17

18
19 Overall, when analysing these barriers it is possible to notice the influence of four
20 elements; patients, physicians, clinical staff members and UHS. Which themselves can be
21 separated into stakeholders and UHS. The next section will provide a discussion about the
22 importance of these barriers in the context of lean implementation in UHS. Furthermore,
23 new literature to support some findings related to the influence of stakeholders and the
24 healthcare public system will be presented.
25
26

27 **7. Discussion**

28
29 This paper has presented two types of barriers to implement lean. First, the ostensible
30 barriers, which could be considered as common visible constraints often based on tools
31 (Burgess and Radnor, 2013; Costa and Godinho, 2016; Spear, 2004). The ostensible
32 barriers appear to be the real cause, but in reality there are other deeper causes which lead
33 to the second type of barriers - underlying barriers, which are less-visible which emerged
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3 from the rich, qualitative data in the case study about the emergency areas of UHS. These
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5 barriers are fewer but could be argued as the root cause that influences the creation of the
6
7 ostensible barriers. The findings have shown that the behaviour of stakeholders and the
8
9 UHS management style are the main influencers of the underlying barriers.
10

11 ***7.1 Underlying Barriers, Stakeholders and UHS Relationship***

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14 The data analysis has shown that most of the time stakeholders and UHS constrain the
15
16 service delivered which influences the underlying barriers. For example, a non-urgent
17
18 patient can create unexpected demand and bottlenecks across the process which affects the
19
20 capacity of the healthcare system or, UHS can constrain the process when resources are not
21
22 available to provide the right care which directly affects staff performance and ability to
23
24 keep the process stable.
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28 To understand and provide support for discussion about this relationship between
29
30 stakeholders, UHS and, underlying barriers it is important to understand the concept of
31
32 services in this context. The healthcare system is a service with high co-production and
33
34 simultaneous consumption processes (Osborne, Radnor, and Nasi 2013). In services, as
35
36 opposed to manufacturing, production and consumption usually occurs simultaneously
37
38 (Normann, 1991). This means that the patient is actively participating during the service
39
40 delivery process.
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45 Nevertheless, in the healthcare setting the service delivery process and co-
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47 production goes beyond patient participation, by also being influenced by other
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49 professional such as physicians, who deliver the 'value add' and clinical staff members who
50
51 provide support across the patients' pathway. Osborne and Strokosch (2013) argue that a
52
53 given surgical procedure is influenced as much by the individual pathology of a patient as
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55 by the skills of the physician. At a fundamental level co-production is not an 'add-on' to
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3 services but a core feature of them. The same concept also applies to nurses and other
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5 healthcare staff delivering procedures during the co-production and consumption process.
6
7 Likewise, as the main provider of the services, UHS has a strong influence in the co-
8
9 production process as it controls the resources and rules in this setting.
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11

12 This strong influence of stakeholders and the public healthcare system (which will
13
14 be addressed only as 'system') in the co-production process is illustrated by underlying
15
16 barriers to implement lean. Each of the barriers represents an influence from either a
17
18 stakeholder or the system. Figure 3 shows that when moving in opposite directions from the
19
20 value add, stakeholders and UHS a negative influence or force is created in the expected
21
22 value add and generated ostensible barriers. Value added is one of the key principles of the
23
24 lean philosophy (Womack and Jones, 2003) therefore when stakeholders and UHS move
25
26 against the value added, they inhibit attempts to improve the process across the patients'
27
28 pathway.
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33 To understand the 'forces' acting in the service delivery process in the emergency
34
35 area of UHS it was found to be useful to recall Lewin's study from 1951 which presents a
36
37 Force Field Analysis and its impact on encouragement and discouragement of behaviour of
38
39 individuals and organisations (Lewin, 1951). This behavioural model shows that there is a
40
41 field which represents the environment (field) and, an objective or a reward (central field)
42
43 that a given person or organisation wants to achieve. In this field there are variable forces
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45 acting independently in a positive (driving forces) or negative (restraining forces) way
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47 towards or against the central field.
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51 This explanation of force field analysis from Lewin (1951) can be related to the
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53 research outcomes found in emergency areas of UHS. Figure 3 presents an adapted
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55 analysis as 'Field of Forces in Healthcare' to illustrate the findings Figure 3 illustrates that
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3 stakeholders and the system often had a negative influence (restraining forces, represented
4 by the dotted arrows) in the process of lean implementation in the emergency areas of UHS,
5 repulsing the central field which is the service delivered or value added in healthcare.
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11 ...Insert Figure 3 About Here...
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14 As discussed in the healthcare process stakeholders and the system are
15 interdependent during the co-production process. So we argue that when they work as
16 independent and restraining forces driving the service delivered towards their own interests
17 they create disruptions across the processes. This research found that when they act
18 independently, in a negative way, there is little recognition about the possible effects in
19 delivering the service. This situation was found to create ostensible and underlying barriers
20 and inhibit lean implementation.
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30 **7.2 Lean Implications**

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32 The six underlying barriers found in this study raise important implications for the lean
33 implementation and sustainability. Table 6 outlines these implications as well as how the
34 restraining forces impact lean discussed in the previous section (Figure 3).
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41 ...Insert Table 6 About Here...
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44 From this study we can develop some propositions. The first one addresses the
45 ostensible barrier physicians' influence within the process during the lean journey (Table
46 6). Some ostensible barriers emerged raising awareness of the physicians' influence within
47 the process showing how as an underlying barrier it can influence the creation of different
48 hurdles across the lean journey. For instance, lack of commitment, resistance to change
49 and, fear of job losses (De Souza and Pidd, 2011; Malmbrandt and Ahlstrom, 2013; Sim
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3 and Rogers, 2009; Yadav and Desai, 2017). It shows that physicians are key stakeholders in
4 the healthcare service delivery process and having them involved in the process of change
5 is an enabler that can support the lean implementation and sustainability. This raises the
6 following proposition:
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12 Proposition 1: Physicians play a critical role in lean implementation and
13 sustainability. They are the ones who deliver substantial value add to patients so it is
14 important to have them engaged in the lean project.
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19 It is important to understand that there is still a dearth of research addressing the
20 influence of physicians across the lean journey in healthcare. Thus, this proposition
21 emerged from empirical data and discussions available within the literature. For instance,
22 Caldwell, Brexler and Gillem (2005) discuss the relevance of physicians and their
23 engagement to implement and sustain lean in healthcare. Moreover, Fine et al. (2009)
24 address the important role developed by physicians during the lean journey and suggest that
25 to increase their engagement, it is necessary to demonstrate the lean benefits in their daily
26 routine, for instance reducing time wasted and increasing performance.
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38 The second proposition considers the underlying barrier related to patients'
39 behaviour (table 6) together with the ostensible barrier public servant tenured career (table
40 4) relating to the contextual and cultural aspects that impact on lean implementation. For
41 instance, non-urgent patients (Azevedo and Costa, 2010; Bulletin of the World Health
42 Organisation, 2010) can cause different constraints such as; increasing demand, usage of
43 the incorrect level of care, unnecessary requests and, requesting sick notes to justify work
44 absence. According to interviewees this is becoming part of the culture where patients have
45 already developed a pattern to seek care in emergency areas no matter how meagre their
46 health condition. In terms of a public servant tenured career, the study found that due to the
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3 security of a job for life, tenured staff do not engage easily in new processes for change.

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5 This leads to the following proposition:

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7 Proposition 2: The contextual and cultural aspects create underlying barriers which
8
9 influence the creation of inhibitors for lean implementation.
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11
12 This proposition echoes discussions about the context where lean is implemented,
13
14 for instance, the literature shows that lean is context dependent and adapting it to the
15
16 implementation context is fundamental to increasing its chances of success (Bateman,
17
18 Hines and Davison, 2014; Radnor and Osborne, 2012). Examples of the cultural and
19
20 context impact are reported within the literature including, De Souza and Pidd (2011) who
21
22 argue about the cultural issues based on healthcare staff. Other academics suggest
23
24 practitioners not to underestimate the cultural differences and identify those barriers that
25
26 impact on lean implementation and sustainability (Boyer and Sovilla, 2003; Erthal and
27
28 Marques, 2018; Jadhav, Mantha and Rane, 2014; Kim et al. 2006).
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31

32
33 The propositions presented in this section summarize the discussion of this paper
34
35 about the impact of the underlying barriers during the lean journey. The research findings
36
37 shows that underlying barriers generate ostensible barriers which is influenced by
38
39 stakeholders and the public healthcare system which act as restraining forces affecting the
40
41 service delivered and value add. As one of the main lean principles, value add to customers
42
43 (Womack and Jones, 2003), these relationships constrain the lean implementation and
44
45 sustainability.
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48 49 **8. Conclusion**

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51 This paper aimed to understand the deeper causes that influence the creation of ostensible
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53 barriers in healthcare - these were identified as underlying barriers. The aim of this research
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55 echoes previous studies that advocate the need to investigate deeper causes that can enable
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3 the lean journey rather than just focus on visible elements commonly related to tools-based
4 approach (Burgess and Radnor, 2013; Costa and Godinho Filho, 2016; Hines, Holweg, and
5 Rich 2004; Spear, 2004). In contrast to previous studies that tackle lean enablers this
6 research focused on deeper causes that could constrain the lean journey in healthcare. To
7 better understand these deeper causes in healthcare this research asked the question: ‘what
8 are the underlying barriers that influence the creation of ostensible barriers during the lean
9 journey in healthcare?’
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19 The results have shown that there are two types of barriers, ostensible and
20 underlying. The ostensible barriers fall in the category of barriers that are usually common
21 during the lean journey but have deeper causes that influence their creation. These barriers
22 come from literature, UHS context and practitioners knowledge. On the contrary,
23 underlying barriers are drawn on rich qualitative data emerging as the root cause of the
24 ostensible. Six of these barriers were identified and, based on an adapted version of
25 Lewin’s force field analysis (Lewin, 1951) has shown that the underlying barriers have
26 strong influence of the stakeholders and system thus impacting greatly on the lean journey.
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37 This study contributes to the discipline of operations management by providing
38 invaluable theoretical, practical and policymakers’ contributions. This can be separated into
39 two main implications; to knowledge and academicians and, to managers and
40 policymakers.
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47 ***Implications to knowledge and academicians:*** The new body of knowledge that
48 this study brings can be separated into three main theoretical contributions: underlying
49 barriers, contextual contribution, and field of forces in healthcare.
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54 ***Underlying barriers:*** the main contribution of this research lies in a new
55 understanding about the relationship between the six underlying barriers, restraining forces
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3 and ostensible barriers during the lean journey in the healthcare setting (Table 6).
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5 Qualitative evidence shows that underlying barriers generate ostensible barriers, and this
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7 process is influenced by the behaviour of stakeholders and the Brazilian public healthcare
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9 system that act as restraining forces affecting the service delivered and value-added in the
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11 emergency level of UHS. Therefore, addressing each of the underlying barriers in
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13 healthcare might support the lean implementation and sustainability reducing the impact of
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15 restraining forces that come from stakeholders and UHS. This contribution might help
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17 healthcare practitioners and lean management consultants to avoid the creation of inhibitors
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19 during the lean journey in the healthcare setting.
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23 Contextual contribution: to be adopted successfully lean must be adapted to its context. It is
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25 vital to understand that lean is context dependent (Bateman, Hines, and Davidson, 2014;
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27 Leite and Vieira, 2015; Radnor and Osborne, 2012). Introducing discussion about the
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29 context in which lean is implemented the research establishes a triangulation between
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31 literature, research findings and contribution related to the context. Sometimes the context
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33 of the research also matters in terms of contribution for example, this research was carried
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35 out in an uncharted field for lean. The findings have shown that patients as well as
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37 physicians might negatively influence the lean implementation and staff members (tenured
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39 career) which might happen only in this type of context. Thus, this study represents a new
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41 understanding and contribution to the knowledge for future research in terms of transferring
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43 lean philosophy into the public healthcare system in a developing country.
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49 Field of forces in healthcare: a field of forces in healthcare (Figure 3) was
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51 developed using Lewin's force field analysis (Lewin, 1951) as background to
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53 understanding the interplay between underlying barriers, restraining forces from
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55 stakeholders and UHS, and the creation of the ostensible barriers. Thus, this research
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3 contributes by bringing a theoretical framework that might be used to find underlying
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5 barriers in other contexts or other areas of the hospitals.
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8 ***Implications to managers and policymakers:*** the contributions to the knowledge
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10 also start to bring the practitioners closer to the practical contributions of this research
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12 which are underpinned as managers and policymakers' contributions. Concerning this two
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14 contributions were identified; first the impact of the public administration model in lean
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16 implementation and, second is related to the impact of the underlying barriers.
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19 Impact of the Brazilian public administration model in the lean journey: the research
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21 has shown that Brazilian public administration as the provider of the healthcare system has
22
23 a significant influence on the process. During the data analysis, three out of six underlying
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25 barriers related to UHS that might constrain lean implementation emerged. Therefore,
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27 attempts to implement lean by managers or practitioners, should consider the previous
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29 analysis of the public administration influence in the physicians' work, resource
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31 management affecting clinical staff and the model that UHS operates in creating
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33 constraints.
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38 The public healthcare system has meaningful participation in defining how lean
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40 principles or other process improvements initiatives will be implemented. Therefore,
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42 policymakers need to be aware of the challenges to improve the healthcare processes and
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44 the characteristics of its modus operandi providing new direction to policies that will
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46 prompt future process improvement initiatives in this context. New policies should consider
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48 the impact of the stakeholders and the public healthcare system influence in the changing
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50 process which could contribute to ease the implementation process and reduce the
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52 challenges commonly faced in the healthcare setting.
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3 The impact of underlying barriers brings important implications to managers. This
4 contribution might help healthcare practitioners and managers to avoid the creation of
5 inhibitors during the lean journey in the healthcare setting. The underlying barriers have
6 been underscored as leading causes of common barriers that emerge during lean
7 implementation thus, addressing each of the underlying barriers in healthcare might support
8 the lean implementation and sustainability reducing the impact of restraining forces that
9 come from stakeholders and the UHS.
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19 One of the questions that can be raised about these contributions is why this is
20 happening in healthcare and why it was never discussed in traditional lean settings such as
21 manufacturing. To understand this discussion it is important to recognise the settings in
22 manufacturing are different to services where there is more focus on the value stream map
23 and absence of the co-production process (Henrique *et al.* 2016; Normann, 1991) which
24 brings limited influence of stakeholders on the process. Furthermore, manufacturing
25 companies are not part of a large public organisation that is highly politicized (Glouberman
26 and Zimmerman, 2002). Finally, the majority of implementations carried out in healthcare
27 have been done in a piecemeal way and not as an overarching model (Brandao de Souza,
28 2009; Radnor; 2010; Radnor and O'Mahoney, 2013) which creates a different scenario for
29 lean implementation.
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44 The findings of this paper contribute to the knowledge and practice bringing a new
45 perspective to lean barriers especially in a new context of a developing country. The paper
46 not only focused on common barriers from the literature (ostensible), but provided
47 understanding of the deeper causes that emerged as underlying barriers. This might be a
48 first insight to rethink the way that the value add is addressed in public healthcare
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3 management and, to start a process to identify underlying barriers that will influence the
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5 creation of ostensible barriers.
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8 It is expected that outcomes from this research will motivate future applications
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10 within and outside the healthcare context. Therefore, research contributions and
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12 propositions draw together three main directions for academicians to carry out future
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14 research.
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17 The analysis around the underlying barriers has emerged as a robust method to
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19 summarise ostensible barriers but the healthcare area is not the only context in which this
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21 can be applied. Future research in other areas using the same approach identifying
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23 underlying barriers, restraining forces and ostensible barriers is encouraged.
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26 This research has focused on barriers to implement lean so as a consequence only
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28 the restraining forces were identified. Therefore, future research should focus on the
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30 identification of driving forces (positive forces) in healthcare that supports lean
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32 implementation.
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35 Professional boundaries or professionalism issues during lean implementation in
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37 healthcare is still a limited area in terms of research. Therefore, an in-depth analysis of the
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39 professionalism issues involving physicians and nurses during lean implementation and
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41 sustainability is suggested as future research.
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Figure 1 – Research framework

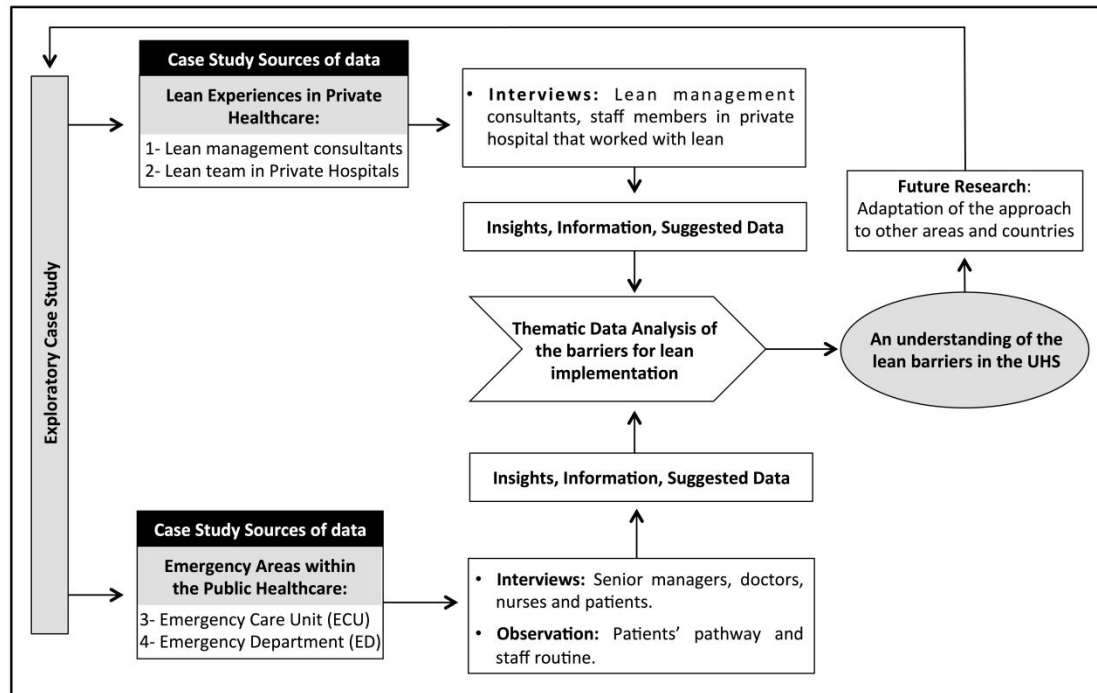
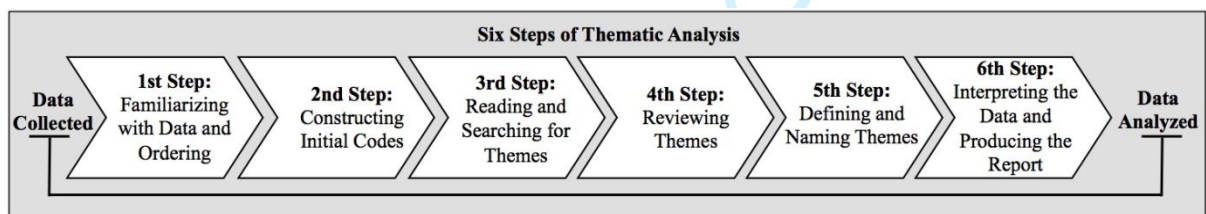
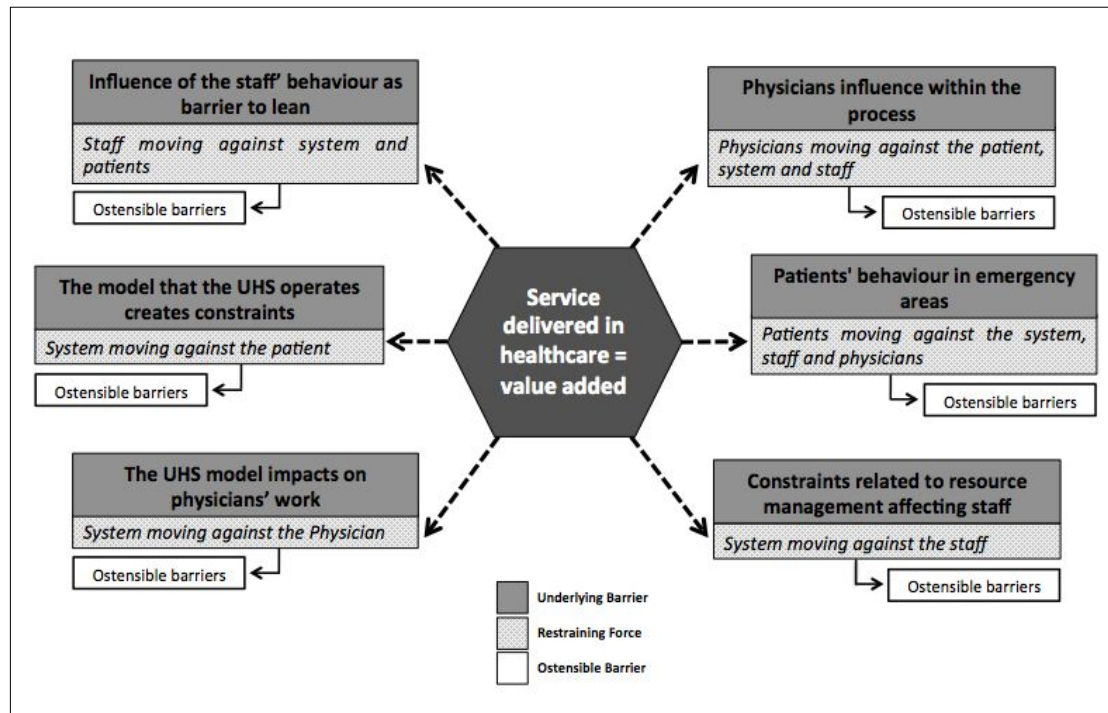


Figure 2 - Data analysis steps



Source: Adapted from Braun and Clarke (2006) and Radnor (2002)

Figure 3 - Field of forces to influence healthcare value added



Review Only

Table 1 – Main barriers to implementing lean philosophy

Barriers	Sources
People's lack of attitude and commitment to change the process	Kinder and Burgoyne (2013) Poksinska (2010); Radnor et al. (2006)
Lack of understanding of the approach in different organisation levels/lack of lean knowledge	Bhasin (2012a); Deloitte and Touche (2002); Zimmermann and Bollbach (2015);
Lack of understanding of the potential benefits	Andersen, Røvik and Ingebrigtsen (2014); Bhasin (2012a); Marodin and Saurin (2015)
Terminology; something new among the employees	Albliwi et al. (2014); De Souza and Pidd (2011);
Fear of job losses; lean becomes a threat	Jadhav, Mantha, and Rane (2014); Kim et al. (2007); Malmbrandt and Ahlstrom (2013)
Leadership failure/misunderstanding and lack of commitment and support	Bateman and Rich (2003); De Souza and Pidd (2011); Massey and Williams (2005); Sim and Rogers (2009)
Resistance to change to something new/scepticism, including leaders' resistance.	Albliwi et al. (2014); De Souza and Pidd (2011); Jadhav, Mantha, and Rane (2014)
Lack of investment (intern and extern)	Mostafa, Dumrak, and Soltan (2013); Radnor (2010);
Lack of resources and budget constraints	Albliwi et al. (2014); Bateman and Rich (2003); Kundu and Manohar (2012); Radnor et al. (2006)
Financial value not recognized	Lean Enterprise Institute (2007); Marodin and Saurin (2015); Mehta, Mehta and Mehta (2012)
Poor communication	Kundu and Manohar (2012); Marodin and Saurin (2015); Radnor et al. (2006); Sim and Rogers (2009)
Weak link between improvement programmes and the organisational strategic level.	Bhamu and Sangwan (2014); Hines, Holweg and Rich (2004); Radnor et al., (2006)
Lack of long-term strategy	Albliwi et al. (2014); Bhasin (2012a); Marodin and Saurin (2015); Yadav and Desai (2017)
Personal and organisational cultural issues	Bhasin (2012a); Boyer and Sovilla (2003); Kim et al. (2006); Kundu and Manohar (2012); (2017); Yadav and Desai (2017)
Organisational momentum and pace	De Souza and Pidd (2011); Marodin and Saurin (2015); Radnor et al. (2006)
Lack of ownership;	Bhasin (2012a); Marodin and Saurin (2015); Radnor et al. (2006)
Measurement framework; performance management;	Andersen, Røvik and Ingebrigtsen (2014); Kundu and Manohar (2012); Mostafa, Dumrak, and Soltan (2013); Yadav and Desai (2017)
A need to convince shareholders/board	Albliwi et al. (2014); Bhasin (2012a); Lucey et al. (2005);
Viewed as a fad	Crute et al. (2003); Lean Enterprise Institute (2007); Lucey, Bateman and Hines (2005);
Failure of past lean projects	Bhasin and Burcher (2006); Lean Enterprise Institute (2007); Lucey, Bateman and Hines (2005);
Personal/professional skills of healthcare professionals; lack of know-how.	Bhasin (2012a); De Souza and Pidd (2011); Lean Enterprise Institute (2007)
Training and Skill Building	Kundu and Manohar (2012); Malmbrandt and Ahlstrom (2013); Sim and Rogers (2009)

Table 2 – Outline of the case study sources

Case Study Sources	Number of patients seen per day (average)	Number of Interviews	Job Titles	Number Patient's Pathway of Observations
Emergency Care Unit	400 average	8	Nurse	5
		6	Physician	
		1	Social Care	
		5	Patient	
Emergency Department	200 average	11	Nurse	5
		4	Patient	
Lean Management Consultants	N/A	4	Management Consultants	N/A
Lean Private Hospital	250 average	1	Project Manager	N/A
		2	Nurses	
		1	Doctor	

Table 3 – Interview questions by sources

Interview Questions	Lean Management Consultants	Lean Team private hospital	Staff in UHS	Patients in UHS
What kind of barriers do you identify in the UHS in terms of lean implementation?	X	X	X	
Is it possible to overcome these barriers in the UHS? If yes, How? If not, please justify.	X	X		
To what extent do you think that lack of knowledge and experience (know-how) can influence the lean implementation in the UHS?	X	X		
What do you perceive as issues at the UHS emergency level?	X		X	X
In your point of view is it possible to ease these issues with a lean implementation in UHS? If yes or not, please justify.	X	X		
How can the bureaucratic management style of the Brazilian public healthcare influence the lean implementation process in UHS?	X	X	X	
The lean philosophy has a strong base on leadership engagement and staff empowerment, how can this be achieved in this public environment in the UHS?	X			
To what extent do you perceive lean philosophy as relevant for the UHS?	X	X	X	

Table 4 - Barriers to implement lean in UHS by source

Lean Barriers in UHS	Source Found				Category of Barrier		
	UHS Site 1 ECU	UHS Site 2 ED	Lean Management Consultants	Lean Private Hospital - Lean Team	Literature	UHS Context	Practitioners
Physicians lack of commitment	X		X		X	X	X
Lack of lean knowledge and experience	X		X	X	X	X	X
Poor management of resources	X	X	X	X	X	X	X
Fear that lean will cause job losses	X		X	X	X	X	X
Non-urgent patients create unpredictable demand in emergency areas	X	X		X	X	X	X
The administration or leadership can be a barrier to a new project		X	X	X	X	X	X
Staff resistance to change	X	X	X	X	X	X	X
Financial barrier to implement lean (lack of resources)	X				X	X	
Communication disruptions amongst staff and between shifts	X	X			X	X	
Physicians' resistance to change			X	X	X		X
Lack of long-term strategy			X	X	X		X
The structure of the system affects the physicians	X		X			X	X
Physicians spend time performing activities that are not core	X			X		X	X
The UHS bureaucratic style as a barrier to lean	X		X			X	X
Slow pace of changes in UHS	X	X	X			X	X
Performance management in UHS	X		X	X		X	X
Public system lack of interest/motivation in changing	X	X	X			X	X
Nurses performing different activities that are not core	X	X				X	

Emotional stress between patients, staff members and physicians	x	x	x
Public servant tenured career (physicians and staff)	x		x

Table 5 - Frequency of reference from data analysis

Underlying Barriers	Frequency of reference from data analysis
Physicians' influence within the process	9.6%
The UHS model impacts on physicians' work	10.3%
Constraints related to resource management affecting staff	14.4%
The model that UHS operates creates constraints	15.8%
Patients' behaviour in emergency areas	16.2%
Influence of clinical staff behaviour as a barrier to lean	33.7%

Table 6 – Restraining forces and lean implications

Underlying Barriers	Restraining Forces and Lean Implications
01 - Physicians' influence within the process	Physicians have strong influence in the co-production process, as they are the ones who deliver substantial value added to patients. Physicians can act as a restraining force affecting patients, staff and system, every time that they avoid process improvement across the patient's journey. This barrier presents an important implication for lean in UHS as people's commitment and understanding is a strong enabler of the lean journey in manufacturing and service areas (Bhasin, 2012b; Malmbrandt and Ahlstrom, 2013).
02 - Patients' behaviour in emergency areas	This stakeholder actively participates and affects the service delivered in healthcare and it is partially motivated by a dysfunctional healthcare system. Their behaviour across the system acts as a restraining force against the system, staff and physicians mainly increasing unstable demand and creating emotional stress against physicians and staff members. When bringing it to the lean context the patients might create hurdles for the implementation, creating difficulties to focus on value added activities, standardizing the process and sustaining the changes.
03 - Constraints related to resource management affecting clinical staff	When staff members, especially the ones in the front-line of the co-production process do not have access to the right resources it starts to impact on their performance, consequently affecting the patients. Therefore the system that is the provider of the healthcare services acts as a restraining force against the staff. The implications of this on lean emerged in the form of ostensible barriers and were discussed based on the literature which stressed the importance of the resources available for the lean implementation (Jadhav, Mantha, and Rane 2014; Marodin and Saurin, 2015).
04 - The UHS model impacts on physicians' work	The UHS model and system can act as a restraining force by bringing legislations and bureaucratic processes to the physicians' daily activities making them spend time with bureaucratic activities (non-core) rather than seeing the patients. The implications for lean will be less focus on value add activities and generation of waste across the healthcare process.
05 - The model that UHS operates creates constraints	When attempts to implement lean fail because of UHS issues the patient will not benefit from the improvements thus, the system will act as a restraining force against the patient who will have to cope with poor quality of the service. Some hurdles to implement lean in UHS that emerged from this underlying barrier are related to the bureaucratic style of UHS, lack of interest in changing as well as lack of long-term strategy. These situations raise important implications for lean especially as lean is a long-term strategy (Bhasin and Burcher, 2006; Liker, 2004) and requires a level of interest in change.
06 - Influence of the staff behaviour as a barrier to lean	This underlying barrier brings inhibitors related to staff behaviour such as resistance to change, communication disruptions, lack of lean knowledge amongst others. This illustrates that staff can act against the system and patient as a restraining force that inhibits attempts to improve the process. This raises implications for lean implementation as people are key enablers for lean project sustainability (Radnor and Walley, 2008).