FACULTEIT ECONOMIE EN BEDRIJFSKUNDE

WORKFORCE FLEXIBILITY AND DEMAND FLUCTUATIONS IN HEALTHCARE: SEASONAL FLUCTUATIONS. HOW CAN WORKFORCE FLEXIBILITY MITIGATE THE NURSING STAFF SHORTAGE IN THE WINTER PERIOD?

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ABSTRACT

Purpose – All hospitals, and especially their paediatric departments, are confronted with a nursing staff shortage in the winter period due to seasonal demand fluctuations. The current economizations, the declining inflow of nurses and the intensified work environment have made workforce flexibility an inherent and indispensable part of the employment strategies. The purpose of this dissertation is to provide insight into how workforce flexibility strategies could mitigate the summer-winter staffing problem.

Design/methodology/approach – Based on the attributes of location-based, time-based and function-based workforce flexibility strategies, derived from an extensive literature research, a case study was set up. Three Flemish hospitals of different orders of magnitude were examined through semi-structured interviews conducted with head nurses of the paediatrics department, the responsible care managers and employees from the human resources department. More specifically, the current procedures and the three most promising strategies, i.e. implementing an annualized hours system, making use of temporary workers and investing in cross-training, were evaluated.

Findings – The interviews reveal the importance of having a stable and flexible base team and the power of adequately training nurses in a mobile and compensation team. An annualized hours system and hospital networks also come out as promising solutions, despite the legal limitations. External temporary workers on the other hand are very negatively perceived.

Originality/value – This study provides descriptive and valuable prescriptive information on the problem and use of workforce flexibility strategies to deal with the seasonal demand fluctuations and the resulting nursing shortage in healthcare organisations. Hospitals can use this dissertation's findings to ensure optimal application and development of their procedures and improve their operational performance. Additionally, researchers can solicit this study's results as basis for further research.

PREFACE

With this master's dissertation I conclude my Master's degree in Business Engineering at Ghent University. Five years of enriching experiences, interesting courses, fascinating professors and hard work allowed me to become not only the business engineer but also the person that I am today. I was lucky enough to spend half of my Master's degree in Tampere University of Technology. Not only did it teach me valuable professional insights in business and technology, it allowed me to broaden my cultural and personal horizons.

In this dissertation I was able to combine my interest for the healthcare industry and operational performance. I would therefore like to thank my supervisor prof. dr. Paul Gemmel for granting me the opportunity to write this dissertation under his supervision. His feedback and wise council provided valuable guidance. I also wish to express my gratitude towards the interviewees, without whom this research would not be possible.

Additionally, I would like to thank my family and friends for their enduring support during the process of writing this dissertation. I am especially grateful for my parents' undying confidence in my abilities as well as their insightful and constant advice, and my sisters for their encouragement and friendship.

Eleonore Théry, June 2019

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

WF	Workforce flexibility
AH	Annualized hours
TW	Temporary workers
FF	Functional flexibility
CT	Cross-training
MS	Multi-skilling
AZN	AZ Nikolaas
AZA	AZ Alma
AZSTV	AZ Sint-Vincentius
HN	Head nurse
CM	Care manager
HR	Human resources
FTE	Full-time equivalents
OR	Operating room
ER	Emergency room
IPT	Internal patient transport
PD	Paediatrics department
MD	Maternity department

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Hospitals are continuously confronted with fluctuations in demand. Even though demand for healthcare can be estimated relatively correctly, it is still subject to a lot of unpredictability and variability both in the short term and in the long term. This dissertation focuses on the long-term fluctuations in demand, more specifically seasonal fluctuations, which is a type of naturally occurring demand variability. This means that the fluctuations are initiated by a natural event. They can, however, be predicted to a certain extent due to their cyclical behaviour (Winasti, Peters, & Berrevoets, 2016). All hospitals have to deal with challenges regarding an increase in demand in the winter period. This is due to – among other things – weaker immune systems, preferences for scheduling surgeries in winter, a higher amount of car accidents during the holiday period, etc. Seasonal fluctuations are impossible to eliminate or influence, so creativity is required to adapt the workforce to the changes in demand. These adjustments result in undesirable pressure on the medical personnel. When there is more demand for a product or service, more supply is needed. This is the same for care provision. More nurses are needed to deal with an increase in demand for care. However, it seems to be difficult for hospitals to adapt the workforce capacity to these fluctuations, while still ensuring maximum quality care.

A research project conducted by the MINOZ research centre of the Vlerick Business School in 2017, analysing flexible working practices in hospitals, constitutes the groundwork for this dissertation (Schoonaert, Gemmel, & Cardoen, 2018). Multiple members of the research network signalled having issues with the demand peak in the winter period. The project revealed that a potential and promising solution for the workforce problem lies with the concept of flexibility, more specifically flexibility of the care providing workforce. This dissertation focuses on nurses. They are the ones who spend the most time with the patients and who experience the fluctuations in demand first-hand. The ability of the hospital to respond to seasonal demand fluctuations is largely determined by the supply of nursing staff. Flexibility allows hospitals to adjust the workforce more easily to the changing environment, which contributes to more efficient and effective operational performance. This dissertation focuses on the potential of workforce flexibility (WF) and how it can mitigate the winter-problem that all hospitals deal with. Strategies are explored that can be applied to make the nursing workforce more flexible.

Unfortunately, adapting the workforce capacity to demand fluctuations is one of the biggest challenges hospitals have to deal with (e.g. Sasser, 1976; Jack & Powers, 2009; Rudy & Sions, 2003). The first obstacle in healthcare provision is the shortage of nursing staff (VRT NWS, 2018; Dubois & Singh, 2009). The inflow of nurses does not evolve at the same pace as demand for healthcare. There is a general shortage of nurses and especially in the winter period nurses are struggling to keep up with the increasing workload. Not only do the nurses suffer from being overworked, but the quality of care also diminishes as well as the safety of the patient (e.g. Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Nancarrow, 2015; The Joint Commission, 2002). Secondly, the medical personnel have to meet increasingly specific requirements regarding training and education in order to carry out the jobs correctly and qualitatively. Jack and Powers (2004) point out that higher patient expectations and technological developments contribute to the changes in healthcare competencies. This is confirmed by the recent extension of the nurse education program from three to four years to comply with the European legislation and directives (Vlaams Ministerie van Onderwijs en Vorming, 2015). Next to the intensified educational requirements, legislation and employment contracts have become more and more complex in recent years. In order to protect care providers from being overworked, strict legislation is imposed. This limits the possibilities of adapting the workforce, especially in the short run. Lastly, the healthcare industry has been subject to multiple economizations in the healthcare industry. In 2017 the Belgian government announced that the reform of the financing of hospitals would be accelerated and that additional cuts of 40 million euros would be realized (van Cutsem, 2017). This hampers the investments in the workforce, especially since staffing costs represent the majority of the hospital budget (e.g. Henao, Munoz, & Ferrer, 2015; van Schingen, Dariel, Lefebvre, Challier, & Rothan-Tondeur, 2017). These obstacles highlight the importance and difficulty of facilitating flexibility of the workforce.

This dissertation is structured as follows. Before strategies are explored that can be used to make nurses more flexible and adaptable to summer-winter fluctuations without violating the strict regulations regarding the employment of nurses and without fully exhausting the scarce financial resources, the concept of flexibility needs to be understood. In the literature review of this dissertation, the different perspectives and types of flexibility are analysed in order to create an overview of the potential practices applicable in a healthcare setting. Thereafter, the most suitable strategies for dealing with the seasonal demand fluctuations are compared and analysed. In the empirical study these WF strategies are assessed through case study research. Semi-structured interviews with key hospital employees provide insight into the issues and potential solutions. First, the study design and framework for qualitative research are described. Subsequently, the results on the current measures as well as the attitude

towards to the theoretically most suitable strategies are reported. The empirical study concludes with an evaluation of the management and policy implications for the participating hospitals. This dissertation closes by discussing the limitations, further research opportunities, and a final conclusion.

LITERATURE REVIEW

1. Methodology

This first chapter describes the research methodology of the systematic literature review. A comprehensive search was undertaken of the social science, nursing, health and operational literature using Web of Science (WoS), PubMed, ResearchGate, ScienceDirect and Google Scholar. Additionally, reference chaining enabled to consult relevant literature not included in the results of the database searches. All search results were reviewed by title and by abstract to determine their potential relevance to this dissertation. References that related directly to the subject, either in title or in abstract, were also included. It is important to note that the reviewed literature is written in English, Dutch and French, which results in a bias in terms of countries and consequentially health systems that are examined.

The first step of the literature study was to gather information on the concept of workforce flexibility (WF) in healthcare. Initially, the research subject was delineated through the following key search words: *workforce flexibility in healthcare, labour/labor flexibility in healthcare, resource flexibility in healthcare, agile workforce*; as well as without the 'healthcare' search string. Literature on WF was mainly focused on the manufacturing industry. Proportionally less research has been conducted on flexibility in a healthcare setting. Consequentially, the most relevant articles and research papers from other industries were also included in the literature research in order to get a full view on the concept of flexibility and more specifically WF. Based on a few core articles a framework was constructed to distinguish and categorise the different types of WF. To understand the concept of WF a context needed to be provided so literature was also screened on a high level for general flexibility in healthcare settings, using the following keywords: *flexibility in healthcare, strategic flexibility in healthcare* and *process flexibility in healthcare*. Once the different types of WF applicable in the healthcare industry were determined and analysed, further research was conducted into those strategies that are promising for mitigating the summer-winter challenge. In this phase only research discussing these particular methods in the healthcare industry were included, i.e. implementing an annualized hours system, making use of temporary workers and investing in cross-training. This time the search strings *annualized hours in healthcare, temporary nurses/workers in healthcare* and *cross-training in healthcare*, were used.

Research articles discussing outsourcing were not included, despite it being a widely used method to increase workforce flexibility, as discussed by e.g. Young and Macinati (2012). According to the two researchers, outsourced healthcare services are non-core and non-clinical, which renders this practice insignificant for dealing with the summer-winter problem. Research on flexibility that considers professional healthcare providers but not nurses was also excluded since this dissertation explicitly focuses on the nursing workforce. Furthermore, articles concerning solutions for short-term or acute staffing problems were only included when the concept was valuable to long-term seasonal problems as well. Lastly, research was sometimes excluded because it was out-dated or based on out-dated research.

2. Positioning

Flexibility is a complex and multidimensional concept with administrative, organizational and operational implications. It is an umbrella term for practices that allow an organization to reduce costs and improve organizational performance. Atkinson's model of a flexible firm, postulated in the 1980s, was the starting point of flexibility as a management tool. It stimulated changes in working practices to improve an organization's productivity, increase its competitiveness and ameliorate its resource efficiency (Atkinson, 1984; Atkinson & Meager, 1986). Flexibility allows organizations to respond better to changes in the environment, such as changing demographics, government-imposed economisations and, most importantly, fluctuations in demand. Jack and Powers (2008) compare the use of flexibility in a service business to the keeping inventory in a manufacturing organization.

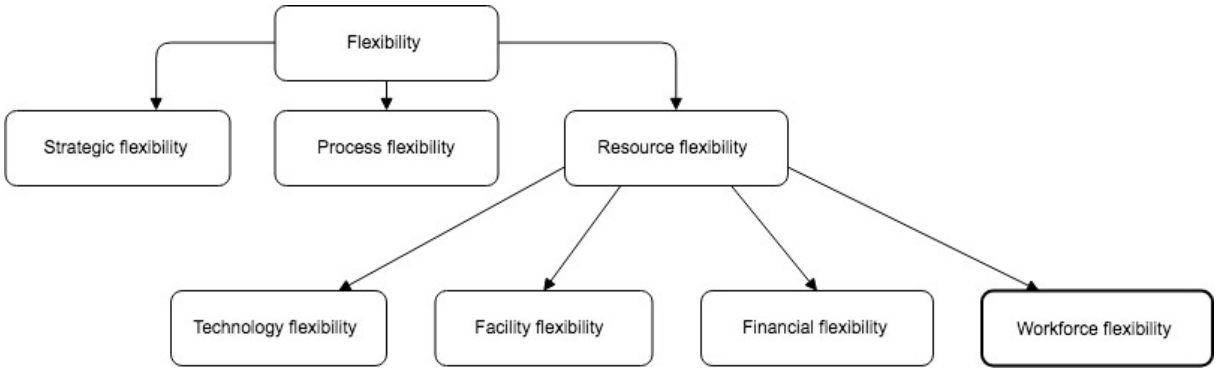

Figure 2.1 *Positioning of workforce flexibility in the broad flexibility concept (Karuppan et al., 2016).*

The concept of flexibility on its own does not imply much for an organization. Depending on the industry and the perspective, different types of flexibility can be distinguished, all of which have different characteristics and thus different implications for an organization. Therefore, a more in-depth analysis and categorization of the concept are needed in order to understand its potential. The focus here lies on flexibility in healthcare settings, and more specifically on the WF of nurses. The flexibility strategies applied in hospitals have their roots in successful practices applied in the manufacturing sector, documented in e.g. Sethi and Sethi's (1990) review on *Flexibility in Manufacturing*. Before elaborating on the different types of WF a context is provided discussing all types of flexibility available in the healthcare industry. This allows situating WF in the overall context of flexibility. This dissertation follows the high-level classification of flexibility as used by Karrupan et al. (2016) in their book on *Operations Management in Healthcare,* illustrated in Figure 2.1 Positioning of workforce flexibility in the broad flexibility concept (Karuppan et al., 2016).

2.1. Strategic flexibility

Flexibility can be categorised based on how fast a change needs to be implemented (de Neufville, Lee, & Scholtes, 2008; Karrupan et al., 2016). Strategic flexibility is the most general and long-term type of flexibility. It deals with uncertainties that can be responded to well in advance, if correctly assessed and anticipated in the business strategy of the healthcare organization. For example, the size and distribution of the population that needs care can be anticipated to a certain extent. Vissers, Van Der Bij, and Kusters (2001) talk about different reasons for the long-term volatility of demand. A known issue is the aging population, which means that more and more care is needed for older people and thus, different specialisations are required than when twenty-something people would be the dominating generation. Another reason is the economic circumstances that influence what patients can afford and what can be provided by a hospital. Additionally, the technological and healthcare innovations offer more potential every day, meaning that more and different patients can be treated more efficiently. Determining the amount of capacity needed to be able to respond to changes (expected or not) in demand is a challenge for every service business but especially healthcare organizations (Henao et al., 2015; Jack & Powers, 2009). Having excess capacity means higher costs because of unused resources, and too little capacity means disruption of the timeliness and reduction of the quality of care. Especially the last aspect, the loss of quality, is not acceptable in the healthcare industry. Therefore, it is argued by e.g. Karuppan, Dunlap and Waldrum (2016), that it is preferred to have excess capacity.

2.2. Process flexibility

Process flexibility, or tactical flexibility, focuses on medium-term uncertainty. It deals with relatively ‘simple’ issues, given the already existing equipment and resources in the hospital (de Neufville et al., 2008). According to Karrupan et al. (2016), process flexibility refers to the “ease with which a process can be modified” (p. 523). Since a business strategy is not static, because it changes as the internal and external environment changes, the business processes need to adapt. The same holds for healthcare processes. Like other service-oriented organizations, healthcare processes are subject to wanted and unwanted variations (De Regge, Gemmel, Claerhout, & Duyck, 2014). They are flexible and dynamic in nature because they depend on the internal characteristics of the nursing personnel, i.e. their knowledge and skills, as well as on external circumstances, such as the number of patients.

One way in which healthcare processes can be adjusted is by introducing delivery flexibility, which refers to the ability to alter the time and place of the service provision. This is only limitedly applicable to the healthcare industry because of continuity of care (Schoonaert et al.,

2018). Continuity of care defined as “the offering of healthcare that is experienced as coherent and connected, and consistent with the patient’s medical needs and personal context” (Haggerty, 2003, p. 1221). Roche, Duffield, O’Brien-Pallas, and Catling-Paull (2009) make a distinction between personal continuity, which refers to the care provision of the same nurses for one patient, and care continuity, which refers to a consistency of care provision by different healthcare workers. Irrespective of the different definitions, continuity of care is important because it improves patient satisfaction and quality of care and reduces costs (Roche et al., 2009). Sudhakar-Krishnan and Rudolf (2007) observed that continuity is a valuable and indispensable for both patients and healthcare practitioners. Grinspun (2003) found that care suffers from interrupted or shortened interaction between patient and nurse, which would be the case for most process flexibility practices. Moving a diabetes patient’s daily insulin injection throughout the day goes against the policy of continuity of care, for example. Nevertheless, there are circumstances in which delivery flexibility is applicable and even desirable (Schoonaert et al., 2018). For example, a Magnetic Resonance Imaging scan (MRIs) or a Computerised Tomography scan (CTs) could be moved throughout the day or even the week to adjust to the schedules of the patient as well as to distribute the workload more evenly. In this way the hospital can respond to fluctuations in demand more efficiently.

2.3. Resource flexibility

A hospital’s resources consist of its technology, its facilities, its treasury and most importantly its personnel.

2.3.1. Technology flexibility

Technology flexibility, also called product or service flexibility, is defined as “the ability to introduce new products or services in terms of the needs and opportunities of the healthcare industry” (Schoonaert et al., 2018, p.17-18). A hospital needs to keep up with the rapid technological and clinical advancements in order to maintain and improve the quality of the care services. The rapid developments of information technologies enable the hospital to better respond to demand fluctuations (Jack & Powers, 2004). Even though it requires a lot of effort from the hospital and the nursing workforce to adapt to the rapidly changing technological environment (e.g. Karuppan et al., 2016), the benefits outweigh the challenges. Hersh (2002) states that medical technologies can reduce costs, enhance care and provide access to valuable information. Take for example RFID-based (Radio-Frequency Identification) tracing systems that can keep track of the location of a patient inside a hospital or even inside a hospital network; or mobile applications that can help patients to become more independent, which also creates time for the nurses to focus on other tasks. Moreover, the use of high-

quality information technology is important to employ highly skilled nurses (Hassmiller & Cozine, 2006).

2.3.2. Facility flexibility

It is important for the hospital's facilities to be adaptable to changes in the environment. As mentioned before, the customers' needs and thus the demand are constantly, and most of the time unpredictably, changing. It is up to the designer to make sure that the hospital infrastructure is flexible enough to deal with this (Karuppan et al., 2016). Moreover, Hassmiller and Cozine (2006) argue that in order to attract and maintain highly skilled and qualified nursing staff the design and allocation of the hospital workspace needs to be optimized. The American accreditation organization, The Joint Commission (2008), talks about standardized flexibility, which is often used in designing hospital buildings. It allows for a relatively fixed method of facilitating the hospital processes and lowering the costs, while at the same time providing the potential to be flexible and adaptable. Examples include modular design, which subdivides a building into different departments that can be built and modified separately before being connected, expansion flexibility of shelves, adaptable flexibility, which enables spaces to be constructed for multiple uses and convertible flexibility, which refers to the ability of rapidly changing rooms for other uses (The Joint Commission, 2008).

2.3.3. Financial flexibility

This type of flexibility is not as widely discussed, partially because it is a less useful strategy compared to the others (Kalleberg, 2001). Atkinson (1984) distinguishes two reasons for applying financial flexibility or pay flexibility: adjustment to supply and demand in the labour market, and adaptability to shifts in the remuneration system. The second reason is considered the most important for this dissertation, since it allows accommodating the different types of WF. The WF strategies discussed in the next section all have differing costs based on the contracts and training. Making use of overtime, for example, results in higher compensation for the extra hours worked that are not part of a nurse's contract. Atkinson (1984) also characterizes financial flexibility as the possibility to change from a rate-for-the-job pay system to a performance-based system. Which means that salaries are not paid according to the job but according to what is delivered. Nancarrow (2015) advocates the regulation of tasks and not professions. This implies that rewards need to be matched to the levels of skill and risk required to perform a particular task and not to the professional title. However, Atkinson and Meager (1986) found that pay flexibility is less common in service organizations. When used, it serves mostly as incentive to encourage individual performance.

3. Workforce flexibility

Workforce flexibility, also called labour flexibility, is a supply management mechanism that has been proven to improve organizational performance (e.g. Aij, Simons, van der Eng, & ten Have, 2016; Atkinson & Meager, 1986; Jack & Powers, 2004; Roger & Ventolini, 2005; van Rossum). WF is essential for nursing to survive in the current healthcare environment (Rudy & Sions, 2003). There are different practices to making the workforce more flexible or facilitating an environment that allows flexibility, which are discussed in the subsequent sections. It is important to note that WF and an agile workforce are not the same concepts. Workforce agility lies outside the scope of this dissertation, since it focuses on rapid action and one-time changes, whereas flexibility is concerned with continuous adjustments of the entire hospital or departments (e.g. Wendler, 2013).

Table 3.1 on p. 12 illustrates the categorization of WF used in this dissertation, which was constructed based on extensive literature research (Atkinson, 1984; Atkinson & Meager, 1986; Dubois & Singh, 2009; Everaere, 2012; Jack & Powers, 2004; Nancarrow, 2015; Roger & Ventolini, 2005; Schoonaert et al., 2018; Sibbald, Shen, & Mcbride, 2004; Wright & Bretthauer, 2010; Qin, Nembhard, & Barnes II, 2015) and which focuses on those flexibility methods applicable to healthcare. The literature considered for the construction of the framework is represented in Table 3.2 on p.13.

The starting point for the categorization is the distinction between qualitative and quantitative practices for the improvement of WF (Everaere, 2012). WF is a multidimensional concept that ranges from quantitative to qualitative practices. Quantitative practices are volume or numerical flexibilities that either entail changing the number of workers or distributing the worked time over the existing workers (Atkinson, 1984; Atkinson & Meager, 1986). The more qualitative the type of flexibility, the bigger the influence will be on the strategy of the organization, meaning these are long-term solutions with a bigger and structural impact on the workforce (Everaere, 2012). Qualitative strategies are typically more expensive and disruptive. In Table 3.1 all practices are organised along the continuum of quantitative to qualitative methods.

Furthermore, these WF methods can be subdivided into three categories depending on flexibility of time, place or functional competences (Dubois & Singh, 2009; Everaere, 2012; Sibbald et al., 2004; Qin et al., 2015). It is important to note that different WF strategies can be categorized under multiple subsections, depending on the point of view. This is discussed when elaborating on the different strategies in the subsequent sections.

Moreover, in terms of flexibility a distinction needs to be made between external and internal human resources (Jack & Powers, 2004; Nancarrow, 2015; Roger & Ventolini, 2005; Wright & Bretthauer, 2010). External resources come from outside the hospital and have different managerial and operational implications than internal flexibility resources, which are situated within the organization. The healthcare industry is characterised by a high degree of internal flexibility (Verbiest, Goudswaard, & Wijk, 2014).
A last distinction that is made for each method individually is the implication of different levels of application, namely individual, group or organizational (Qin et al., 2015). This is not applicable to all practices but the results and encountered obstacles are different when approached from these levels.

All the concepts and perspectives of WF are discussed in the next part of the literature study, which is structured as follows. Starting with time-based flexibility, first the internal WF strategies are discussed and then the external ones. Secondly the different types of location-based WF methods are reviewed. And lastly, the functional strategies are evaluated. It is important to note that the discussed practices are not mutually exclusive. The boundaries between the different WF methods are not well defined and most concepts and perspectives partially overlap.

Table 3.1 *Categorization of workforce flexibility strategies applicable to healthcare*

	TIME		LOCATION		FUNCTIONAL	
	INTERNAL	**EXTERNAL**	**INTERNAL**	**EXTERNAL**	**INTERNAL**	**EXTERNAL**
QUANTITATIVE	- Overtime - Flexible workdays - Personnel planning - Self rostering - Annualized hours	- Agency workers			- Redeployment - Redistribution of tasks - Flex pools - Mobile team	
QUALITATIVE		- Subcontracting	- Floating workers - Generalists - Intra-organizational mobility	- Inter-organizational mobility	- Role enlargement - Role redesign	

Table 3.2. *Literature considered for construction of the framework for the categorization of WF strategies*

Title	Author	Year	Industry	Types of flexibility
Manpower Strategies for Flexible Organizations	Atkinson	1984	General	Numerical, Functional, Pay
Changing Working Patterns: How Companies Achieve Flexibility to Meet New Needs	Atkinson et al.	1986	General	Numerical, Functional, Pay, Distancing
Sources of volume flexibility and their impact on performance	Jack et al.	2004	Healthcare	Volume flexibility
Changing the skill-mix of the health care workforce	Sibbald et al.	2004	Healthcare	Functional: enhancement, substitution, delegation, innovation Location: transfer, relocation, liaison
La mobilité professionnelle au-delà des mesures classiques	Roger et al.	2005	General	Mobility
From staff-mix to skill-mix and beyond: towards a systemic approach to health workforce management	Dubois et al.	2009	Healthcare	Skill development: role enhancement, role enlargement; Skill flexibility: role substitution, role delegation
Strategies for addressing the nursing shortage: coordinated decision making and workforce flexibility	Wright et al.	2010	Healthcare	External: agency nurses, travel nurses; Internal: overtime, on-call staff, float pool, cross-training
Flexibilité appliquée aux ressources humaines: compatibilités et contradictions	Everaere	2012	General	Time-based, Function-based, Location-based
Workforce flexibility in operations management	Qin et al.	2015	General	Time-based: overtime, flexible workdays, annualized hours, working time accounts; Floating workers; Cross-training
Six principles to enhance workforce flexibility	Nancarrow	2015	Healthcare	Numerical, Functional, Locational, Wage
Flexibel werken in ziekenhuizen: OM en HRM perspectief	Schoonaert et al.	2018	Healthcare	Operational: volume, mix, delivery, product/service; HRM: skill, pay, functional, work arrangement

3.1. Time-based flexibility

Time-based flexibility, or employment flexibility (e.g. Nancarrow, 2003), covers staffing strategies aimed at increasing the flexibility of workers' schedules through changes in the terms and conditions of employment.

INTERNAL

3.1.1. Overtime

Overtime requires nurses to work beyond the regular working time. It is a type of inherent flexibility, which means that it is a solution that does not require the hospital to take action (Schoonaert et al., 2018). It is important to note the difference between overtime and doing extra hours. Extra hours are the number of hours worked more than the contractual amount of working time, but less than the regular full-time working hours ('Meeruren of overuren ... is er een verschil? - ondernemingsdatabank.nl', n.d.). Generally, these extra hours are not compensated, whereas overtime is reimbursed at a higher financial rate.

Allowing varying labour hours, within the legal and contractual boundaries, creates flexibility (Qin et al., 2015). These strategies allow answering to temporary and acute surges, but it does not provide a sustainable solution, neither for the hospital's wallet, nor for the mental and physical health of the nurses. Doing overtime and extra hours has a negative effect on nurse satisfaction and on quality of care, which also results in low patient satisfaction and in extreme cases even in low patient safety (Grinspun, 2003; Olds & Clarke, 2010; Rogers, Hwang, Scott, Aiken,& Dinges, 2004; Wright & Bretthauer, 2010). Grinspun (2003), for example, advocates the reduction of overtime because "it would result in diminished levels of sick time, increased continuity of care and cost-reductions" (p. 74).

3.1.2. Flexible workdays

Winasti et al. (2016) subdivide the main tasks of a nurse into 5 categories (in decreasing order of importance): patient care, overhead (which refers to administrative work), focus areas (which refers to, for example, the development of policy plans or being part of committees), supernumerary training (which refers to the education of new nurses) and education (which refers to additional training to maintain a nurse's skills). It is generally predetermined how much time should be devoted to certain tasks and in which proportion. One way to generate more flexibility is by allowing modifications of this arrangement to adjust to changes in the workload. For example, when there is more need for patient care on a certain day, nurses should spend more time on their main task (patient care), regardless of it being scheduled for them to work on a focus area, such as participating in protocol meetings. This type of flexibility is relatively easy to implement, and most hospitals and/or nurses already do this instinctively. Patient care

is their main responsibility, so other duties sometimes need to be set aside. The necessity of flexible workdays is made clear by for example Skinner, Elton, Auer and Pocock (2014) in their study on work-life interaction.

Qin et al. (2015), on the other hand, define flexibility of the workday as the adjustment of the length of the workday. Nurses are generally required to work a certain number of hours per week, based on their contract. Allowing altering shift durations throughout the week or transfers of working hours to another week when more capacity is needed, increases flexibility of the workforce. This interpretation of the concept of flexible workdays is closely linked to the strategy of annualized hours (see 3.1.5 Annualized hours).

3.1.3. Personnel planning

A personnel planning is another type of quantitative flexibility. A good personnel planning is the result of a balance between meeting the requirements of the patients, the needs of the workforce and the desires of the organization (Winasti et al., 2016). This is confirmed by, for example, the findings of Rambur, Palumbo, McIntosh and Mongeon (2003) in their study on nurses' intention to leave. They found that, depending on the point of view, whether from the position of the employee or from the ambitions of the hospital, the outcome will be different. An employer wants to ensure flexibility of care provision to better match demand, whereas an employee prefers a well-balanced work-life schedule (Rambur et al., 2003). Also, Silvestro and Silvestro (2000) mention that a scheduling system that fails to incorporate the needs of the workforce has a potential negative impact on the care delivery.

However, the strict legislation regarding employment contracts limits the possibilities of adapting the work schedules (Arbeidswet van 16 March 1971). Flexibility in personnel planning from the employer point of view entails a variety of work schedules, depending on the amount and type of shifts. Looking at short-term personnel planning and scheduling, shifts can differ based on the time of day and based on the number of hours. In general, there are 4 types of shifts: early, late, night and day shifts. The duration of these shifts depends on the hospital policy and the strong legislation surrounding minimum and maximum working hours (Schoonaert et al., 2018). Normally, the shifts should be more than 3 and less than 11 hours long and the total amount of hours worked in one week should be at most 50. There are also limitations regarding the sequence of the shifts and working days. For example, a nurse working the night shifts cannot work 7 days in a row in the same week.

Furthermore, changing nurse schedules is not a straightforward task and the nurse satisfaction always needs to be taken into account since it can have a big influence on quality of care and

thus also on patient satisfaction (Aiken et al., 2002). Maenhout and Vanhoucke (2013) demonstrate an important trade-off of flexibility. The higher the flexibility in the scheduling and planning of shifts for nurses, the higher the job satisfaction and the efficiency, but the lower the effectiveness of providing high-quality care because of the decrease in continuity of care.

Noteworthy is one hospital in Belgium, the University Hospital Brussels (UH Brussels), which works with a 12-hour shift system (Schoonaert et al., 2018), which is exceptional in the Belgian healthcare sector. This type of scheduling system is only possible through agreement of all involved actors, i.e. the hospital management, the labour unions and the nurses (De Raedt & Clays, 2011). To compensate for the long working hours the UH Brussels' regulations were changed so that at most 3 to 4 days can be worked in one week with a maximum of 3 consecutive days, still adhering to the legislation of a maximum of 50 working hours a week. This new way of personnel planning and scheduling improves continuity of care thanks to the reduction in the frequency of handovers. A discussion point is the concern about the long working hours and the quality of care. However, it has been proven that the 12-hour shift does not have an impact on the attention and concentration of nurses (Schoonaert et al., 2018). Moreover, a study conducted by Stone et al. (2006) showed no difference in patient outcomes, as well as demonstrated that nurses working in a 12-hour shift system were more satisfied due to flexible work environment. These nurses even seem to experience less stress and have a healthier Body Mass Index (De Raedt & Clays, 2011).

3.1.4. Self-rostering

With this type of more participative scheduling nurses are allowed to construct their own working schedule based on a set of rules and limitations. Researchers have demonstrated that a self-rostering system contributes to a better morale, teamwork and nurse retention (Silvestro & Silvestro, 2000). The downside, however, is the lack of a cyclic and more stable schedule, which negatively influences continuity of care. Additionally, this system is difficult to implement in a large hospital department that makes use of a complex scheduling system (Silvestro & Silvestro, 2000). It also has an effect on efficient team working, because different nurses need to work together at different moments (Schoonaert et al., 2018). This impact on continuity of care and teamwork can also be extended to other WF strategies, such as flexible workdays.

3.1.5. Annualized hours

Another way to better respond to the changing demand is by making use of annualized hours (AH) or a plus-minus conto-system, in which the working time is expressed as a total amount of working hours per year instead of working hours per week, still keeping in mind the legal limitations (e.g. Qin et al., 2015; "Veelgestelde vragen over de jaarurensystematiek of plus-

minus conto", 2016; Winasti et al., 2016). Currently an AH system is not possible in Belgian hospitals, but it has been successfully implemented in other countries, such as the Netherlands (NVZ, 2017).

An AH schedule should meet the conditions regarding minimum and maximum working time per time slot as well as for the complete yearly planning horizon (van der Veen, Hans, Veltman, Berrevoets, & Berden, 2012; Winasti et al., 2016). Essential is that the plus-hours in one period are compensated with minus-hours in the other, ensuring a well-balanced yearly work schedule. A pre-defined percentage determines the amount of allowed minus- and plus-hours. Plus-hours are hours worked more during a certain period than the average that is determined in the nurse's contract. Whenever an employee works less than what was determined, hours are subtracted, called minus-hours ("Veelgestelde vragen over de jaarurensystematiek of plus-minus conto", 2016). Making use of an AH scheduling system automatically triggers the strategy of flexible workdays (see section 3.1.2 Flexible workdays). Nurses are not restricted to working a certain number of shifts per week, but the working hours can be spread throughout the year, coordinated with the longer-term, foreseeable fluctuations in demand. Furthermore, Stredwick and Ellis (1998) argue that in an AH system nurses should be still paid on a fixed monthly basis, regardless of the number of shifts worked in a month.

A system of AH allows the employer, in this case the hospital, to deploy more nurses during busier periods without having to rely too much on over-hours or external workers, which are the costlier WF methods. This also results in more holidays or days off for the nurses during less crowded periods. For a more thorough description of an AH system's positive consequences and barriers refer to section 4.3.1 Annualized hours.

3.1.6. Part-time

A part-time nurse is permanently employed but works less than the standard full weekly or monthly hours. Part-time nurses have always been a considerable segment of the hospital workforce. This type of nurse could be employed for a fixed or flexible amount of hours (Grinspun, 2003). They are more cost friendly than employing temporary nurses (Bloom, Alexander, & Nuchols, 1997). Not a lot of research exists into the influence of part-time nurses as a flexibility strategy on the hospital performance. They are regarded as a type of employee rather than as a tool that creates flexibility.

EXTERNAL

First, the concept of temporary workers (TW) in healthcare needs to be explained before elaborating on the external time-based WF methods. TW are defined as "the systematic

replacement (or supplement) of permanent full-time and part-time staff with staff employed on an ad-hoc basis (Richardson & Allen, 2001, p. 104)". They are tasked with ensuring that the normal way-of-working and processes can be continued without disruption (Winasti et al., 2016). Employing extra nurses can reduce the workload (e.g. Bae, Mark, & Fried, 2010; May, Bazzoli, & Gerland, 2006; Richardson & Allen, 2001; Seo & Spetz, 2013). TW, sometimes referred to as casual workers (e.g. Creegan, Duffield, & Forrester, 2003; Lumley Stanton, & Bartram 2004; Richardson & Allen, 2001), are a prime example of numerical WF. In this dissertation it is argued that employing TW can also be categorised as a qualitative WF strategy, on top of a quantitative strategy. When nurses are employed for a longer duration, the dynamics in that particular unit change. The solution is no longer short-term, which means that there are structural changes and thus the WF strategy becomes more qualitative.

Depending on the reasoning behind the categorisation TW can be viewed as internal or external personnel (van der Veen et al., 2012; Winasti et al., 2016). The distinction is based on the fact whether the nurse is employed inside the hospital or through an external organization.

For a thorough description of the consequences and the barriers of a WF strategy that makes use of TW, refer to subsection 4.3.2 Temporary workers.

3.1.7. Agency nurses

Making use of external nursing agencies, also defined as temporary employment agencies, can be a solution to manage staff absenteeism and shortages (e.g. Castle & Engberg, 2008; Manias, Aitken, Peerson, Parker, & Wong, 2003). These TW are employed to, for example, replace a sick worker or to stand in for a nurse who is on pregnancy leave. According to e.g. Grinspun (2003) agency nurses are "care providers who have employment arrangements for a company which supplies nurses to healthcare organizations" (p. 58). Hurst and Smith (2011) state that agency nurses are care providers who are as flexible as internal TW but who are less acquainted with the hospital's procedures. Essential is that these nurses need to be highly skilled; otherwise they will not be able to provide the necessary support.

A distinction needs to be made between project and interim agency nurses. Interim nurses mostly work on a day-to-day basis, whereas project nurses are deployed on a longer-term basis. The latter are employed to provide aid in projects where specific knowledge and skills are required ('Wat is een projectverpleegkundige?', 2019). Because of this agency nurses can also be categorized as an external function-based type of flexibility.

3.1.8. Subcontracting

Subcontracting, called distancing by Atkinson and Meager (1986), was added to Atkinson's model of the flexible firm in the second report. It is defined as "the displacement of employment contracts by commercial contracts" (p. 9). The researchers consider this as an alternative to flexibility, rather than a flexibility method. In non-service industries subcontracting is used to increase competitiveness, because they do not have the resources or expertise. It allows shifting the risk and uncertainty to other organizations, whilst also decreasing costs (Tomicki, 2016).

Subcontracting in healthcare is mostly used for secondary or tertiary services (e.g. Bach, 2000), such as laundry or culinary responsibilities. This has an indirect impact on the flexibility of nurses since they are able to focus more on what is really important. Therefore, it is valuable to employ high-quality subcontractors. Additionally, the hospital could invest more in care provision because these tasks are carried out by external service providers.

3.2. Location-based flexibility

Flexibility in the location has to do with mobility within different departments, campuses, hospitals and within integrated hospital networks. Nurses are then able to perform the same tasks in different settings. These nurses are categorized as internal and external TW.

INTERNAL

3.2.1. Floating workers and generalists

Float nurses are part of the standard workforce and can be categorized as internal TW (Bae et al., 2010). They are part of a float team or flex pool (see section 3.3.3 Flex pools). Ruby and Sions (2003) define floating as "the reassignment to a unit other than the unit for which the nurse was hired, for a minimum of 4 hours" (p. 196). Generalists (Winasti et al., 2016; Qin et al., 2015) are a specific type of floating nurses who have been trained to have general knowledge on and extensive experience in multiple disciplines, which means they can be flexibly re-assigned where needed. Mostly these nurses make up the mobile team in a hospital (see section 3.3.4 Mobile team). Both types of nurses are assigned to a unit at the beginning of a shift (Wright & Bretthauer, 2010). It is debatable whether these types of nurses provide quantitative or qualitative flexibility.

The potential downside to using generalist nurses is that their skills are not optimized at a more task-specific level (Qin et al., 2015). They are able to perform general tasks and can help in departments where the need for more capacity is high, but they cannot provide specialized or

complex care. Moreover, both types of nurses are not only unfamiliar with the specialities of the department, but also with the unit culture, staff and relationships (Dziuba-Ellis, 2006). The cost-benefit ratio of these workers is delicate because even though there is an added value to dynamically employable nurses, the costs can be very high.
Floating nurses and generalists can also be categorized as professional intra-organizational mobility over different departments.

3.2.2. Intra-organizational mobility

This section talks about intra-organizational mobility (Roger & Ventolini, 2005), which means that nurses are required to change location whilst remaining under the same employer. According to Roger and Ventolini (2005) professional mobility can be subdivided in terms of the employer, which leads to a classification of internal and external mobility; and in terms of the origin, which results in mandatory and voluntary mobility (van Schingen et al., 2017). Voluntary mobility refers to nurse turnover, which lies outside the scope of this dissertation. Healthcare organizations rely on mandatory mobility arrangements and practices to enhance the locational flexibility of their workforce. van Schingen et al. (2017) further found that there are two types of mandatory mobility based on the timing: short-term occasional changes and planned regular changes. There are different degrees to mobility depending on the scale of mobility and the size of the hospital. In this section internal mandatory mobility is discussed from the perspective of mobility throughout different campuses.

There is an international trend towards hospital consolidation and collaboration (e.g. Cardoen, Peeters, Van Dyck, & Schoonaert, 2017; De Regge et al., 2019). The three most common types of collaboration, in Belgium, are hospital associations (in which multiple hospitals together provide a service or departmental care), hospital grouping (in which hospitals cooperate in their care provision) and mergers (in which one hospital completely absorbs another hospital) (De Regge et al., 2019; Eeckloo, De Regge, De Pourcq, Gemmel, & Callens, 2018). Mergers allow intra-organizational mobility, whereas hospital associations and hospital grouping should be categorized as inter-organisational mobility.

Firstly, temporary relocations could take place on campus level (Schoonaert et al., 2018). Campuses exist because of the mergers of hospitals. In most hospitals, nurses are assigned to a specific department and campus. However, it could be possible to travel between different campuses when necessary. This is already the case for specialized nurses, who exist next to the permanent nursing staff and who are highly skilled in a certain discipline, such as wound care or diabetics for example (Schoonaert et al., 2018). Sibbald et al. (2004) have defined this

very specific type of workforce flexibility as liaison, “using specialists in one health care sector to educate and support staff working in another sector” (p. 29).

EXTERNAL

3.2.3. Inter-organizational mobility

Inter-organizational mobility, also defined as external mandatory mobility, refers to shifts with a change of employer (Roger & Ventolini, 2005). It is important to point out that the line between external and internal mobility is very fluid and depends on the applied perspective.

Integrated hospital networks go a step further than hospital networks because next to hospitals they are also comprised of home care, residential care and general practitioners. Jack and Powers (2009) talk about multi-hospital systems, which are a type of external flexibility that allows hospitals to meet the fluctuating demand. These collaborations allow hospitals to share capacity and focus on their specific area of expertise (Cardoen et al., 2017; De Regge et al., 2019; Sasser, 1976). Cooperating provides opportunities to share and save on equipment and workforce resources. Bravi et al. (2013) state that introducing network models allows specialization and a more focused use of investments. It could be considered unnecessary for every hospital in a certain area to invest in expensive medical equipment for every type of treatment, which is not used at full capacity. So, hospital collaborations allow a better usage of resources, and due to the increased focus hospitals deliver more qualitative medical care. However, this will have implications on specific departmental nurses, such as from the paediatrics department, who will no longer be able to perform their jobs in certain hospitals, as well as on the patients who will have to travel farther and out of their comfort zone to find the necessary care services.

This type of networks enables another type of mobility to take form. The population is getting older and so is the nursing workforce (‘The 2018 Ageing Report’, 2018). This means that more and more nurses are at a stage in their life where they cannot always keep up with the stressful circumstances, both physically and emotionally. Schoonaert et al. (2018) cite the following advantage of networks for these nurses. When nurses work in a hospital that is part of an integrated hospital network, they can be offered the opportunity to work part-time as a hospital nurse and part-time as a home care provider. The requirements of home care are increasingly complex and high standard, due to the trend of moving care from the hospitals to people’s home. Patients need to more independent more quickly. That is why highly skilled and experienced nurses are needed for their supervision and care (Schoonaert et al., 2018).

Although it could be beneficial for both the hospitals and the nurses to exchange resources within those networks, there are still a lot of obstacles that need to be overcome before the full potential of the networks can be reached (Cardoen et al., 2017; De Regge et al., 2019; De Pourcq et al., 2018; Eeckloo, De Regge, De Pourcq, Gemmel, & Callens, 2018). Examples are the allocation of hospital budgets, the complex structure of the Belgian legislative system, the switch from a competitive to a collaborative environment and the absence of adequate governance structures. The researchers also argue that further regulations and policy measures are needed to facilitate the new format of collaboration (De Regge et al., 2019; Eeckloo et al., 2018; De Pourcq et al., 2018). In this respect it is also interesting to note the statement of Jack and Raturi (2002) who found that large organisations have a better competitive position to gain the most from longer-term flexibility solutions, such as networks.

A mobile nursing workforce enables the hospital to respond more accurately to changes in demand (Roger & Ventolini, 2005). However, it requires significant changes in the work arrangements of nurses. Nurses fall under the regulations and employment agreements of one hospital (Eecklo et al., 2018; Schoonaert et al., 2018). This implies that in order for nurses to be able to travel between different hospitals there needs to be an agreement on an overarching labour contract so that every nurse follows the regulations applied in the hospital where he or she is employed at each moment in time, which is forbidden (Wet van 24 juli 1987 betreffende de tijdelijke arbeid, de uitzendarbeid en het ter beschikking stellen van werknemers ten behoeve van gebruikers, *B.S.* 20 augustus 1987). The only way this is currently possible is for these nurses to be pooled within one employer's group (Eecklo et al., 2018; Schoonaert et al., 2018). Moreover, nurse mobility depends heavily on the willingness and commitment of nurses. van Schingen et al. (2017) found that younger nurses are more open to change location, but they are nevertheless the ones who are least re-located because of the hospital's belief that these workers are in high need of familiarisation. Furthermore, in their study of French hospitals, van Schingen et al. (2017) also found that nurses are more satisfied with mobility that is periodic and organised in advance. It should be agreed upon with the nurses if they are willing to be mobile, in order to ensure optimal nurse satisfaction. On the other hand, Roger and Ventolini (2005) found that mobility has the ability to increase motivation because it implies variation in the limited career possibilities of nurses.

3.3. Function-based flexibility

Functional flexibility (FF), also defined as personal flexibility (Winasti et al., 2016) or task flexibility (Li & King, 1999), is a type of WF in which employees can undertake multiple and varied forms of work, sometimes outside of their initial job description. It provides an alternative

to cope with demand variations that does not require changing the number of workers, since FF is always categorized as qualitative. Molleman and Slomp (1999) define FF as "how a labour system can arm itself to cope with variation in the supply and demand of human resources without making an appeal to outer-system capacity (p. 1838)". FF is thus applicable to the core group of workers, who are the permanent nursing staff in the hospital (Atkinson, 1984). Nancarrow (2003) specifies FF as role flexibility and defines it as the blurring of workforce boundaries between different types of healthcare workers. Another term, used by King, Nancarrow, Borthwick, and Grace (2015) to refer to FF is inter-professional practice. Some researchers also talk about skill-mix as comprehensive term to refer to flexibility methods concerning the functional aspect of the workforce (e.g. Bach, 2000; Sibbald et al., 2004). Function-based flexibility can manifest itself in various different forms, which are discussed in the subsequent sections.

First, the concept of cross-training (CT), or multi-skilling (MS)[1], as a widely discussed flexibility tool should be discussed. Even though some researchers categorize CT as a specific type of WF (e.g. Qin et al, 2015; Wright & Bretthauer, 2010), in this dissertation CT is viewed as a means to generate flexibility of the workforce, which in turn enables FF. Increasing the skill set, increases the flexibility capacity. Corominas, Lusa, and Pastor (2007) define CT as a flexibility strategy in which there are "different sets of worker categories that can perform different types of tasks, with different efficiencies for each type of task and each category" (p. 3). Nurses are able to perform a wider set of tasks and can thus be deployed in multiple departments and situations (Qin et al., 2015). Through CT nurses get familiar with other units, other equipment, other patient types etc., which facilitates the redeployment, role enlargement or floating that make up the FF strategies (Richardson & Allen, 2001). Aileone and Viehland (2012) talk about how flexibility is limited in a healthcare setting due to health workforce skill shortages, demonstrating the importance of MS. The strict regulations concerning the required skills of the nursing workforce limit hospitals in the use of traditional strategies to respond to changes in demand, such as hiring seasonal under-skilled job students. CT increases the nurses' flexibility capacity and thus reduces the skill shortages. MS is useful to increase and maintain multi-functionality and redundancy in a nurse team (Chang, 2004; Molleman & Slomp, 1999; Qin et al., 2015). Multi-functionality refers to the number of different tasks a nurse can perform. Redundancy is the number of nurses who are able to perform a certain task. The more multi-functionality and the more redundancy, the more flexible a team is with regard to demand fluctuations.

[1] Cross-training (CT) and multi-skilling (MS) are used interchangeably throughout this dissertation, as is done in literature.

For a thorough description of the positive consequences, the barriers and guidelines for the implementation of FF workers refer to subsection 4.3.3 Functional flexibility.

3.3.1. Redeployment

Firstly, the core nursing personnel can be redeployed to those departments that deal with too high workloads. Winasti et al. (2016) refer to unit flexibility, meaning that nurses who are employed at a certain unit have the competencies to work in another unit. In order for these nurses to be redeployed, they need to be multi-skilled (MS) or cross-trained (CT). Every nursing department has a permanent team that can be supplemented by flexible employees who can undertake the excess workload coming from unexpected absences or structural shortages (e.g. Schoonaert et al., 2018). Unexpected absences are categorised as sickness, family circumstances and force majeure, such as extreme weather conditions for example. Structural shortages are more problematic because they have long-term consequences and cannot always be fixed by making use of a flexible team. This refers to long-term sickness or pregnancy for example. It is possible to use nurses from other departments who do not have a big workload that day. Essential is that the department of the nurse stepping in does not suffer from his or her absence.

Redeployment is a very short-term solution and is certainly not sustainable, but it can help in unexpected situations such as sickness of another nurse and when neither the flex pools (section 3.3.3 Flex pools) nor the mobile team (section 3.3.4 Mobile team) are available. Wright and Bretthauer (2010) found that “there is almost no benefit to transferring unit nurses when float nurses are trained for more than one unit” (p. 395). It is less effective to CT unit nurses when there is a float unit or mobile team.

3.3.2. Redistribution of tasks

A second type of volume flexibility is the redistribution of the range of tasks throughout the day so that more time becomes available for the most pressing matters. Most hospitals have a system through which they can categorize the different types of tasks a nurse can perform. This ranges from patient care and administration to trainings and projects (Winasti et al., 2016). The degree to which the different tasks can be redistributed throughout the day depends on the number of working hours and shifts. Smaller shifts result in less flexibility for task redistribution. The redistribution of tasks is closely linked to the time-based flexibility method discussed in section 3.1.2 Flexible workdays.

The same can be applied to redistributing tasks, more specifically trainings and on-boarding, throughout the year (Schoonaert et al., 2018). Additional educational training and the

employment of new nurses should be done in the summer time when there is less demand for care. This depends on the department considered, but most hospital divisions struggle with the same fluctuations and trends in demand. In doing so the hospital will have more staff that are highly trained and are able to work more efficiently and correctly during the busier winter period.

Role delegation is a type of task redistribution that is defined by Sibbald et al. (2004) as the shift of tasks up or down the traditional hierarchical role boundaries. Dubois and Singh (2009) talk about role delegation as a type of longer-term task redistribution. It is defined as "transferring certain responsibilities or tasks from one nurse to another by breaking down traditional job boundaries" (Dubois & Singh, 2009).

3.3.3. Flex pools

Internal flex teams, also known as flex pools or float pools, are comprised of floating nurses from different departments and specialities. These nurses help out when there is a temporary need for extra nursing personnel and when the mobile team (see next section) is not available. A flex pool can be made up of mandatory floating nurses or voluntary floating nurses, who are employed as a strategy to deal with unpredictable staffing (Dziuba-Ellis, 2006; Ruby & Sions, 2003). Their main advantage is the cost-efficiency, especially in comparison to external agency nurses (section 3.1.7 Agency nurses), such as interims (Dziuba-Ellis, 2006).

3.3.4. Mobile team

A last type of volume flexibility is a mobile team, which is defined as a group of nurses that are deployed in the short-term to compensate understaffing or a too high workload (Schoonaert et al., 2018). In Belgium mobile teams are supported by the government, so all hospitals rely upon one or more mobile teams (KB van 15 februari 1999 tot wijziging van het KB van 23 oktober 1964 tot bepaling van de normen die door de ziekenhuizen en hun diensten moeten worden nageleefd, *B.S* 28 april 1999). According to Winasti et al. (2016) a mobile team consists of nurses with generic skills who can be deployed in different departments when needed. Devos, Decoster, and Vanneste (2011) make a distinction between general mobile teams, which can be deployed in the entire hospital, and specialist mobile teams, which are responsible for a select set of departments with similar patients and care provision. McHugh (1997) refers to un-clustered and clustered floating nurses.

In some hospitals the mobile team consists of mainly new nursing personnel. The underlying idea is that these new nurses can get to know the different departments and that there will always be people in the mobile team. Other hospitals want their mobile teams to be a mix of

inexperienced and experienced/specialized nurses in order to better match a specific need in a department (Schoonaert et al., 2018). This is a decision each hospital makes on their own, depending on what is desired or necessary in their working environment. Although this solution offers relief in times of need there are some challenges and issues concerning the expertise of the nurses in the team. For a thorough description of the advantages of and barriers to the implementation of a mobile team in the context of TW, refer to section 4.3.2 Temporary workers.

3.3.5. Role enlargement

Role enlargement, or role enhancement, can take place on a horizontal level or on a vertical level, also called downward enlargement (Nancarrow & Borthwick, 2005). Role enlargement and CT are very closely linked. Dubois and Singh (2009), as well as Sibbald et al. (2004), define role enlargement as an expansion of the worker's skill set. Riley and Lockwood (1997) talk about the loosening of boundaries so that a task can be performed by a wider set of nurses. Role enlargement entails an intra-disciplinary change, or an expansion or tasks within a certain discipline (Nancarrow & Borthwick, 2005). These authors categorize role enlargement as a type of diversification of the range of tasks. It is a strategy that contributes to more integrated patient-centred care, whilst also generating a more flexible and widely employable workforce.

CT also allows role substitution, which goes a step further than role enlargement. It is a type of inter-disciplinary change (Nancarrow & Borthwick, 2005). The concept is defined by Dubois and Singh (2009) as "extending practice scopes by encouraging the workforce to work across and beyond traditional professional boundaries". Sibbald et al. (2004) also categorize role substitution as a way of changing the skill mix by working across professional boundaries or exchanging types of nurses. According to Riley and Lockwood (1997) whole functional role substitution includes nurses taking over other jobs when needed. The downside to role enlargement and substitution is the potential quality degradation.

3.3.6. Role redesign

Desombre, Kelliher and Macfarlane (2006) define role redesign as "developing new jobs to combine tasks in new ways, expanding the scope of existing jobs while possibly crossing traditional professional boundaries" (p. 143). Sibbald et al. (2004) talk about role innovation.

4. Comparison and analysis of suitable strategies

This last section of the literature research discusses the WF strategies that are most suitable for the problem at hand, namely the nursing staff shortage in the winter period. The results constitute the basis for the empirical research, in which strategies are explored to make nurses more flexible and adaptable to the summer-winter fluctuations, without violating the strict regulations regarding the employment of nurses and without fully depleting the increasingly scarce financial resources.

4.1. Workforce flexibility in general

Making the workforce more flexible or facilitating an environment that allows flexibility can ensure increased organizational efficiency, help with the nursing shortage and consequentially offer higher quality care (e.g. Dubois & Singh, 2009; Easton, 2011; Jack & Powers, 2004; Nancarrow, 2015; Pinker & Shumsky, 2000). It is beneficial for both the nurses and the hospital (Batch, Barnard, & Windsor, 2009). Moreover, Jack and Powers (2006, 2009) found that there is a positive relationship between the use of flexibility strategies and patient satisfaction, which is the main objective of every healthcare organization. WF is perceived as both positive and negative in terms of consequences for the workforce. Looked at from the point of view of the hospital, the benefits (mostly) outweigh the costs. It is commonly agreed upon that the discussed WF strategies can help respond better to fluctuations in demand, which increase in the winter period (e.g. Corominas et al., 2007; Bach, 2000; Desombre et al., 2006; Li & King, 1999; Lockwoord et al., 1989; Nancarrow, 2015; Qin et al., 2015; Rudy & Sions, 2003; Winasti et al., 2016; Wright & Bretthauer, 2010). However, from the point of view of the nurses the results are dual (e.g. Corominas et al., 2007; Desombre et al., 2006; Everaere, 2012; Nancarrow, 2015). On the one hand, the work is considered more varied and less monotone and flexibility allows having a better work-life balance. On the other hand, however, flexibility is perceived as a limitation that hinders the work conditions.

A small nurse-to-patient ratio means an increased workload, which has negative consequences on care delivery (e.g. Subois & Singh, 2009). Rogers et al. (2004), for example, found that increased work intensity and a heavier workload increase the risk of making errors. Needleman, Buerhaus, Mattke, Stewart, and Zelevinsky (2002) demonstrate that staffing more nurses results in lower adverse consequences. Aiken et al. (2002) learned that nurses experiencing a higher patient-to-nurse ratio are more likely to experience a burnout and lower job satisfaction, which in turn affects the care delivery. These are a few examples of the

extensive literature on nurse staffing and the effect on patient safety outcome and nurse performance.

Seasonal demand fluctuations are not entirely unpredictable or unusual, but the hospital resources are operated at full capacity, so flexibility is required to cushion the surges in demand. WF allows answering to seasonal fluctuations without having to result to the costly strategy of keeping slack capacity to reduce high work pressures. Slack capacity, or structural over-capacity, is the method of scheduling personnel and other resources according to maximum capacity (Winasti et al., 2016). It is based on the important trade-off between costs because of unused services and costs resulting from a shortage of resources. From an economic point of view both costs should be avoided, still, the scale of the trade-off tips towards having excess capacity rather than shortage of capacity (e.g. Karuppan et al., 2016; Rodriguez-Alvarez, Roibás, & Wall, 2012). However, it is not efficient to keep a maximum of nurses to always be able to respond to the highest possible demand. Moreover, Easton (2011) points out that hospitals also make use of absence anticipation strategies, due to uncertain workforce capacity, on top of the maximum demand forecast. These measures may increase service levels but as workforce is the biggest cost in healthcare, they do not provide a sustainable solution.

Apart from the focus on demand patterns, there are multiple objectives a healthcare organization can pursue in adopting flexible working, such as workforce development, recruitment and risk avoidance or reduction (Lockwood & Guerrier, 1989). Furthermore, employing flexible workers also enables to lower the labour cost (e.g. Pinker & Shumsky, 2000; Stredwick & Ellis, 1998). Batch et al. (2009), as well as Skinner et al. (2014), further state that flexible work arrangements ensure a better work-life interaction, which leads to a reduction of worker absenteeism. Moreover, WF allows retaining high-skilled nurses who are no longer able to work full-time (Schoonaert et al., 2018; Stredwick & Ellis, 1998).

It is important to note that even though WF is a promising concept, there are limits with respect to performance and cost (Karrupan et al., 2016). Too low flexibility under-stimulates employees and causes lack of alertness and boredom, which undermines performance. Too high flexibility over-stimulates employees because they do not have the capacity to process that much information and still deliver qualitative care. Additionally, complete flexibility should not and cannot be an objective of a healthcare organization, since this would mean that any person could do any job or task, and the costs of education would become too high (e.g. Henao, Munoz, Ferrer, & Vera, 2016; Hopp & Van Oyen, 2004; Inman, Blumenfeld, & Ko, 2005; Qin et al., 2015). Next to being time consuming and costly, the benefits of total flexibility are limited

due to forgetting effects (e.g. Gnanlet & Gilland, 2014; Hopp & Van Oyen, 2004; Nembhard, 2000). Repetition and experience increase the nurses' ability to deliver certain types of care. For example, changing bandages after surgery will happen more quickly and efficiently when a nurse has done this multiple times compared to the first few times. Moreover, Henao et al. (2016) found that even if the cost of training is minimal, a fully flexible workforce is not necessary to reach maximum benefit.

4.2. Choosing the most suitable strategy

The question arises which flexibility strategy is most appropriate for the discussed issue of seasonal demand fluctuations. Multiple methods can be applied simultaneously, which complicates the situation. The main objective is to find or create capacity to be able to respond to the need for care. Winasti et al. (2016) have identified three aspects that play an important role in the decision process. The size of demand fluctuations and the capacity of the existing workforce, the timing of the demand variations and the quality requirements regarding healthcare determine to a great extent which strategies are most applicable. The aspect of timing, however, is often overlooked (Winasti et al., 2016). Hospitals use the yearly staff capacity as a measure for day-to-day availability of nurses, which often results in a mismatch in reality.

An enumeration is provided in Table 4.1 of those flexibility methods that are considered most suitable by researchers to mitigate the summer/winter-problem of demand fluctuations. It is clear that the three most promising WF strategies are making use of annualized hours, employing (external) temporary workers and investing in functional flexibility of the existing workforce.

Table 4.1 *Most suitable flexibility methods to deal with the seasonal demand fluctuations*

Title	Author	Year	Preferred flexibility method
Flexible Working in the Hospitality Industry: Current Strategies and Future Potential	Lockwood et al.	1989	Cross-training, downward vertical job enlargement, part-time workers, temporary labour, job sharing, annualized hours contracts, committed hours schemes, shift work systems, short-term contracts, agency staff and trainees
Flexible Working Practices: Techniques and Innovations	Stredwick et al.	1998	Annualized hours contracts combined with cross-training and team working
Sources of volume flexibility and their impact on performance	Jack et al.	2002	Cross-training
Managing the nursing workforce	Morgan et al.	2004	Seasonal core contracts, seasonal pay plans, internal pool seasonal contracts, overtime pay, per diem and travel nurses
Float Pools and Resource Teams: A Review of the Literature	Dziuba-Ellis	2006	Temporary workers: float pools
Obligation to float	Kane-Urrabazo	2006	Float pools
Planning annualized hours with a finite set of weekly working hours and cross-trained workers	Corominas et al.	2007	Annualized hours contracts
Who are temporary nurses?	Goodman-Bacon et al.	2007	Temporary labour
Workforce flexibility in operations management	Qin et al.	2015	Flexible working time: annualized hours contracts and temporary labour
The impact of multi-skilling on personnel scheduling in the service sector: a retail industry case	Henao et al.	2015	Cross-training and part-time contracts as complementary flexibility practices
Capaciteitsplanning in de zorg	Winasti et al.	2016	Annualized hours contracts and cross-training

4.3. Evaluation of the advantages and disadvantages of the most suitable WF strategies

In this chapter the most promising strategies are evaluated to determine the potential benefits as well as the barriers and side-effects for the hospital performance. Table 4.2 and Table 4.3 illustrate how each WF strategy performs in terms of the advantages and disadvantages for the hospital, the nurses and the care provision.

Table 4.2 *Evaluation of the advantages of the WF strategies, based on literature*

Advantages	Temporary workers	Annualized hours	Functional flexibility
Better response to demand fluctuations	✓	✓	✓
Better distribution of workload	✓	✓	
Fewer days of shortage		✓	
Less/no need for extra nurses		✓	✓
Increased quality		✓	✓
Reduction of errors		✓	
Cost reductions	✓	✓	✓
Higher service level		✓	✓
Better work atmosphere		✓	
Improved teamwork		✓	
Increased nurse satisfaction		✓	✓
Reduction of overtime	✓		
Innovative and renewing input	✓		✓
Enhanced productivity and efficiency	✓		
Improved teamwork			✓
Familiarity			✓
More patient-centred care			✓
Less disruptions of continuity			✓
More gender equality			✓

Table 4.3 *Evaluation of the disadvantages of the WF strategies, based on literature*

Disadvantages	Temporary workers	Annualized hours	Functional flexibility
High costs due to set-up and on-boarding	X		X
High costs due to incentives	X		
High costs due to administration	X		
High costs due to training			X
Decreased nurse satisfaction	X		
Lower productivity and efficiency of core nurses	X		
Unfamiliarity	X		X
Disrupted continuity of care	X	X	X
Skill erosion due to undermining of education	X		
Forgetting effects			X
Limited benefits		X	X
Confusion of responsibility			X
Less efficient and productive team working		X	X
Temporary absences due to training			X
Therapeutic partitioning			X
Traditional role boundaries			X
Absence of consistent and regular system		X	
Irregular work-life balance		X	
Risk of hospital taking advantage		X	
Complexity of composing the schedule		X	
Limited by laws and collective labour agreements		X	
Intuitive behaviour	X		X
Insecurity and discomfort			X

4.3.1. Annualized hours

In this section the system of AH is evaluated to determine the potential benefits as well as the drawbacks for the hospital performance, despite it being impossible for Belgian hospitals at the moment of writing.

BENEFITS

This type of long-term flexibility allows the employer to better distribute the workload and manpower. The gap between demand and supply can be reduced because the capacity of nurses evolves at the same rate as the demand for care. In this way, less nurses need to be hired and thus costs are reduced (Corominas et al., 2007; Winasti et al., 2016). Organizations have to rely less upon overtime, which is a costly WF alternative (Stredwick & Ellis, 1998). Furthermore, the quality of care increases and a higher service level can be maintained because demand can be covered in time (Corominas et al., 2007). For the nursing workforce this system results in a better work atmosphere because there are no extremes in the workload. Nurses have more freedom thanks to the flexible workweeks, which stimulates more commitment and a better alignment of their intentions with those of the hospital (Stredwick & Ellis, 1998). Additionally, the researchers found that the AH system reduces nurses' absenteeism and error making and improves teamwork.

SIDE-EFFECTS, BARRIERS AND COSTS

The downside to the AH system is the absence of a regular system, which negatively influences continuity of care as well as efficient team working because different nurses need to work together at different moments (Schoonaert et al., 2018). This can have a negative effect on the working conditions and job satisfaction of nurses, since they have to work irregular shifts (Corominas et al., 2007; Qin et al., 2015). Especially for nurses with children it can be difficult to adjust to this type of arrangement (Stredwick & Ellis, 1998). Often the AH system is accompanied by some sort of compensation, e.g. more holidays, to convince nurses of this work-style. There is also a risk for the employee that the hospital will take advantage of the system, so thorough and proper arrangements need to be made in order to avoid these situations. Besides, constructing an optimal nurse schedule is in itself a complex task, which is further complicated when annualized hours are included. Corominas et al. (2007), as well as Stredwick and Ellis (1998), discuss the complexity of determining the weekly number of working hours for an annual horizon. In practice the AH strategy is limited because of the laws and collective labour agreements to protect the nurse's working conditions (Corominas et al., 2007).

Moreover, in a research project conducted in a Dutch hospital, van der Veen et al. (2012) have proven that it is not cost-efficient to solely apply the AH strategy. Just as Winasti et al. (2016),

they argue that the AH flexibility method only becomes valuable if the cost of external nurses is high enough. When there are sudden peaks in demand it could be more beneficial to hire external workforce rather than contracting more part-time or full-time nurses.

Based on a case study conducted in a UK hospital, Stredwick and Ellis (1998) conclude that an AH system performs better in smaller hospitals because of the reduced unit-sizes. Nurses are familiar with all their colleagues and are more open to help each other, which enhances the benefits of the system.

4.3.2. Temporary workers

In this section TW are evaluated to determine the potential benefits as well as the barriers and side-effects for the hospital performance. In the discussion on TW it is important to make a distinction between functionally flexible internal and external nurses, because their employment has different consequences for the hospital.

BENEFITS

First of all, hiring TW is a way of avoiding demand variations (Goodman-Bacon & Ono, 2007). TW enable a hospital to answer to fluctuations in demand, so that all demand is met, and the core nursing personnel is not overworked (e.g. May et al., 2006; Richardson & Allen, 2001; Seo & Spetz, 2013). TW are called in when the permanent nurses cannot cope with the workload, which could be due to sickness and absences but also to seasonal demand peaks. Researchers argue TW can enhance efficiency of the workforce through more flexibility (e.g. Bae et al, 2010; Seo and Spetz, 2013). For example, Bae et al. (2010) found that using TW reduces the risk of making mistakes thanks to a more balanced and comfortable workload. However, they also found that the relationship is non-linear, meaning that only moderate levels of TW ensure the increase in patient safety (Bae et al., 2010). Moreover, Wright and Bretthauer (2010) observed that overtime is also reduced. Because of this, more desirable schedules can be created, which plays a big role in the nurses' satisfaction.

Grinspun (2003) and Lumley et al. (2014) argue that flexible nurses can bring in new ideas and knowledge. They allow for innovation and improvement of the care practices. Additionally, TW can compensate for staffing deficiencies and shortcomings on a qualitative level (Aiken, Xue, Clarke, & Sloane, 2007). Additionally, Kane-Urrabazo (2006) argues that float pools, an internal type of TW, are an essential practice to deal with the nursing shortage.

Next to increased productivity and efficiency, using TW can also lead to cost-reductions (e.g. Creegan et al., 2003; Grinspun, 2003; Seo & Spetz, 2013). Seo and Spetz's (2013) findings

support that through TW the high fixed costs pressures of permanent staff can be avoided. For internal float pools and mobile teams in particular, multiple authors have found a significant lowering of the labour costs (e.g. Dziuba-Ellis, 2006; Wright & Bretthauer, 2010). Creegan et al. (2003) argue that savings could be considerable when attention is paid to cost-effective management of these nurses. McHugh (1997) conducted more thorough research into the cost-effectiveness of general versus specialized mobile teams and found that un-clustered teams ensured reduced understaffing, but clustered teams delivered more qualitative care.

Lastly, from the nurses' point of view, they get the opportunity to develop additional competencies by working in different hospitals and departments, or units. These flexible work arrangements can be challenging for the nurses. TW and more specifically floating workers and nurses from the mobile team are compensated with incentives such as a higher pay rate or a car from the hospital or from the external organization they are employed by, to make the work arrangements more attractive (Dziuba-Ellis, 2006; Grinspun, 2003; Schoonaert et al., 2018).

SIDE-EFFECTS, BARRIERS AND COSTS

However, there are substantial downsides to the employment of temporary nurses. Firstly, due to their high costs most hospitals are cautious about working with external agency nurses. This is partially due to the value added tax that is applicable to this type of workforce, which is not required for permanent care providers (Berden et al., 2016). Bae et al. (2010) and Wright and Bretthauer (2010) point out that external staffing strategies typically come at a higher cost when looked at from the administrative point of view. They require additional processing and the legal implications are often unclear, which makes administration more complicated (Creegan et al., 2003). Bloom et al. (1997) found that the costs go up due to these overhead and administrative costs. Qin et al. (2015) also state that TW require set-up and on boarding time to get acquainted with the practices of a department and team, which brings along additional costs. Additionally, these types of nurses mostly receive a higher pay, which increases the expenses even more. The permanent nursing personnel often feels unfairly treated compared to external agency nurses because they are compensated unevenly for carrying out the same tasks. According to Goodman-Bacon and Ono (2007) as well as Seo and Spetz (2013), hiring TW costs more but the cost reduction potential lies in the flexibility gains, without having to augment the pay of the permanent nursing staff, or more importantly without having to deal with the costly process of hiring and firing core nurses.

External TW (more so than internal nurses) have significantly less knowledge about the care policies and procedures of the hospital, which reduces their productivity. Multiple authors express concerns regarding the lack of knowledge on a department or unit and its way-of-working as well

as its healthcare workers, because it can hamper quality of care and thus patient safety (e.g. Castle, 2009; Richardson & Allen, 2001; Roche et al., 2009; Seo & Spetz, 2013). Moreover, TW are not under the same supervision as the standard nurses, so there is less control over the quality outcomes (Bloom et al., 1997; Creegan et al., 2003). McGillis, Doran and Pink (2004) found that the lower the ratio of professional and experienced nurses, the higher the number of mistakes and the lower the quality of care. Additionally, they discovered that more nursing hours are needed, which makes them less efficient. Additionally, the unfamiliarity with the practices and policies may interfere with continuity of care (Bae et al., 2010; Roche et al., 2009). Batch et al. (2009) add that the disruptions of continuity negatively influence the quality of care.

Roche et al. (2009) found that using TW can reduce the core nursing staff's productivity as well. Castle (2009) found that the permanent nursing staff is often responsible for the guidance and supervision of TW, which partly undoes the effect of a more balanced workload. Moreover, Bach (2000) found that healthcare managers and providers often feel that the permanent, highly-skilled nursing staff is being replaced or supplemented by less qualified personnel. Grinspun (2003) found that the use of TW leads the permanent nursing staff to experience stress. Batch and Windsor (2015) confirm this and add that there is a lack of trust when having to work with TW, because these nurses often rely on their intuitiveness to provide care. In this research in particular, the focus was on flex pool nurses.

For flex pools in particular it is possible that the nurses cannot answer to the needs of the hospital because they are unavailable due to other obligations since these nurses are internal workers (Dziuba-Ellis, 2006). Moreover, when the floating is mandatory, nurses often disliked their job because of increased stress levels, which could lead to refusal of work and a decrease of quality (Dziuba-Ellis, 2006; Kane-Urrabazo, 2006). Wright and Bretthauer (2010) learned that increasing flexibility by enlarging the float pool is limited. If the level of flexibility is low in the float pool, then adding nurses has no effect. Stacchini (2004) further calls attention to the complicated and expensive recruitment process of hiring nurses and the cost of maintaining the internal flex pool.

The negative attitude towards TW limits their access to learning and personal advancements and growth (Batch et al., 2009). Richardson and Allen (2001) for example found, based on literature research, that TW are often assigned to less critical patients. Lumley et al. (2004) found that personal development is an important issue for flexible workers and that, unless self-initiated, these nurses receive very little additional training and education. It is believed that the discontinuous nature of these nurses' work limits their skill development, which makes them less qualified. Batch and Windsor (2015) similarly learned that skill development of these types of nurses was limited, as well as that their education was neglected, because it was assumed that

TW lack knowledge and competences. Creegan et al. (2003) also argue that TW do not get the same opportunities as the permanent, core nursing staff. Undermining nurses' education is dangerous because of skill erosion, meaning that a lack of training results in reduced capabilities, which endangers patients.

However, Aiken et al. (2007) found that the perceived negative consequences of using TW are not always justified, since a big proportion can be attributed to other problems the hospital is facing, more specifically insufficient and inadequate resources and low staffing rates. Hurst and Smith (2011) similarly found that TW are employed when there is a risky patient-to-nurse ratio. This implies that TW are employed to be able to answer demand, indicating that researchers often make the wrong conclusion concerning the origin of lower quality care. The latter is often due to too heavy workloads or problematic nurse absences. Furthermore, Aiken et al. (2007) state that the main reasons for the care outcomes of TW to be worse than those of the permanent staff are that they are perceived as less qualified and unfamiliar with the hospital guidelines and patients. That is why Aiken et al. (2007) rightfully point out that these issues also affect the permanent nurses. They experience communication problems and continuity of care is not guaranteed due to casualization (Batch et al., 2009). Hurst and Smith (2011) state that concerns are often expressed regarding quality of care but with little empirical evidence. They found that the quality is not significantly different in departments that employ TW in comparison to departments that only work with the permanent staff.

4.3.3. Functional flexibility

FF relies on appropriate training and CT of staff. Once nurses have the skills to perform different tasks, they are able to expand or redesign their role. In this section FF and CT are evaluated to determine the potential benefits as well as the drawbacks for the hospital performance.

BENEFITS

A truly functionally flexible workforce does not only improve productivity, it also contributes to the enhancement of quality (e.g. Campbell, 1999; Cridland, 1997; Desombre et al., 2006; Easton, 2011; Inman et al., 2005; Walker, Clendon & Nelson, 2015). CT nurses can improve quality and the overall service level because the hospital can respond better to the changes in patient demand by deploying nurses where the need is the highest (Easton, 2011; Inman et al., 2005). Johns, Brusco and Reed (1998) refer to an increase in staffing or scheduling flexibility, which allows responding better to changing demand. In addition, Inman et al. (2005) say that the quality of care provided by CT nurses is higher than that of external TW. The latter are not familiar with the hospital policies, procedures and guidelines and thus have a bigger negative impact on continuity

and quality of care. found, based FF can enhance and reinforce team working (Fraser & Hvolby, 2010; Molleman & Slomp, 1999) on how FF can reinforce team performance.

Furthermore, CT allows reducing labour costs. Depending on the ratio of CT nurses and regular nurses, costs can be reduced (e.g. Gnanlet & Gilland, 2014; Inman et al., 2005; Johns et al., 1998). Here lies the biggest asset of FF; it eliminates the need to hire extra nurses (Campbell, 1999). A thorough comparison is necessary to balance the cost of training against the cost of hiring (Inman et al., 2005). Henao et al. (2015) found that if the training costs are low, then there will always be economic benefits to CT. On the other hand, when costs increase it becomes more attractive for the hospital to hire extra nurses. Another way labour costs are reduced is due to hospitals having to rely less on absence anticipation policies (Easton, 2011). However, Easton (2011) also notes that this is only valid if CT nurses are as efficient as the dedicated nurses, and when demand is not at peak capacity, meaning that during the winter period the latter cost reduction statement becomes redundant.

CT allows care to be provided in a more patient-centred way (Nancarrow, 2015). The argumentation behind this is two-fold (Desombre et al., 2006). Firstly, a more functionally flexible labour force allows for a service user to have fewer different contact points, which ensures continuity of care. Secondly, the quality of a service is defined when the interaction is taking place. Because of this, flexibility is highly valued, since care providers can adapt and be adapted according to the situation. Based on Wright & Snell's *Strategic framework for exploring fit and flexibility in strategic Human Resource Management* (as cited in Bhattacharya, Gibson, & Doty, 2005), Bhattacharya et al. (2005) distinguish this as a separate type of flexibility, called behavioural flexibility. Even if nurses possess the necessary skills, without the ability to display the appropriate behaviour, FF is limited.

Moreover, according to Bach (2000), "a richer skill mix will enhance job satisfaction and improve patient care" (p. 936). From the nurses' point of view a more varied job package may counteract boredom and provides development opportunities (e.g. Adams, Lugsden, Chase, Arber, & Bond, 2000; Desombre et al., 2006; Johns et al., 1998; Sibbald et al., 2004). Nurses are more motivated and develop a more responsible and effective service attitude. MS offers opportunities for personal achievements and recognition (Dubois and Singh, 2009). Additional education increases competence and confidence, as well as allows nurses to exercise more autonomy (Campbell, 1999; Walker et al., 2015). Nurses feel empowered and are able to perform more patient-centred care. CT allows them to work to the full extent of their scope. Consequentially, they are more satisfied with their job (Walker et al., 2015) and the desire to leave is mitigated, which reduces the turnover rate (Inman et al., 2005). Kahn (1999) points out that FF can have a positive effect

on gender equality because women have the chance to broaden their knowledge and extend their education.

Compared to external TW, May et al. (2006) found that internal TW are cheaper and thus preferred by many hospitals. Despite the higher salaries of these internal TW workers (such as floaters) compared to the permanent nursing staff, the internal nurses are less expensive than external TW such as agency nurses. Furthermore, healthcare organizations feel more confident about the quality of care and the commitment to the patients when staffing internal flexible nurses (May et al., 2006).

SIDE-EFFECTS, BARRIERS AND COSTS

Inman et al. (2005) and Qin et al. (2015) have determined several costs and side-effects of CT workers, based on extensive literature research. Qin et al.'s review of *WF in operations management* (2015) focuses on strategies applied across multiple industries. The results, however, can be generalised and applied to the healthcare industry. Inman et al.'s (2005) analysis focuses specifically on the CT of hospital nurses.

Firstly, there are the training costs for educating nurses on different tasks. The MS of staff requires extensive and expensive training programs, which creates a barrier to the implementation of FF (e.g. Desombre et al., 2006; Henao et al., 2015; Henao et al., 2016; Sibbald et al., 2014; Walker et al., 2015). Li and King (1999) make further comments about the dependency of CT on the willingness and enthusiasm of nurses to follow extra training and to perform tasks outside of their initial role boundaries. Sibbald et al. (2004) found that the speed and extent to which MS can be implemented depends on the spectrum of existing skills and thus on the amount of required training. The bigger the gap between what is present and what is desirable, the more extensive and expensive the additional education becomes.

There is also the cost of switching between different teams and departments. Just like external TW, nurses need to adjust to the new atmosphere and working processes, which could temporarily result in a decrease of the efficiency and thus quality of care in that department or unit. Transfer between teams can lead to a lower social identity and morale because a nurse feels like he or she does not belong to a group (Qin et al., 2015). Moreover, due to the switching nurses find it difficult to keep up with the changes in procedures in the different units and departments and continuity of care is restricted (Inman et al, 2005).

Furthermore, Qin et al. (2015) argue that cross-trained workers are rarely fully efficient in every task they are trained for. They are less effective and productive than specialized workers due to

forgetting effects and unfamiliarity (e.g. Easton, 2011; Gnanlet & Gilland, 2014; Hopp & Van Oyen, 2004; Nembhard, 2000). This is reinforced by Pinker and Shumsky's (2000) examination of the efficiency-quality trade-off of flexible workers. Because they perform these secondary tasks less frequently, they do not gain experience and thus, productivity and quality losses can occur. Wright and Bretthauer (2010) found that CT nurses could be very beneficial but only to a certain extent. Past a certain threshold, which is determined by the level of demand, additional MS has little value. Significant benefits, and most importantly costs savings, can already be generated through low levels of CT (Campbell, 1999; Gnanlet and Gilland, 2014; Johns et al., 1998). Multiple researches, conducted in other industries, demonstrate that the workforce is most effective when having two skills, also referred to as 2-flexibility (e.g. Brusco & Johns, 1998; Campbell, 1999; Henao et al., 2016; Johns et al., 1998). Additionally, Henao et al. (2016) found that flexibility is maximized when CT nurses from the same department are not trained for the same additional skillset. Furthermore, Dziuba-Ellis (2006) argue for example that floating should only take place when absolutely necessary and nurses should be constrained to float to a limited number of different units. Inman et al. (2005) also found that it is counterproductive and very expensive to only invest in CT. Henao et al. (2015) state that it is more beneficial to combine CT and specialized personnel. It is better to focus on the distribution of skills throughout the team that is providing care rather than the excessive MS of individual nurses (Molleman & Slomp, 1999). This is in line with the statements of for example Karuppan et al. (2016) and Qin et al. (2015) that a fully flexible workforce is impossible and inefficient.

Adams et al. (2000) found that nurses feel insecure because they are expected to execute tasks and provide treatment with which they have less experience. They feel uncomfortable and pressured because they sense they do not possess the right set of skills. This underlines the importance of adequate training programs and nurse motivation, in order for flexibility methods to succeed. However, education does not only require a financial investment. Nurses will have to follow a training for which they are expected to be away from the hospital, which means lost productivity for the hospital. The hospital needs to be able to temporarily miss some of its nurses (Desombre et al., 2006).

An additional side effect is the confusion of responsibility (e.g. Desombre et al., 2006; Dubois & Singh, 2009; Qin et al., 2015). When allowing multiple types of nurses to take over or aid in certain tasks, it becomes difficult to determine who is responsible, since the sub-tasks do not belong to a specific profession anymore. That confusion can lead to disagreements, which can cause adverse attitudes and conflicting working relationships (Dubois and Singh, 2009; King et al., 2015). Tied to the confusion of responsibility are the consequences on the working relationships. More boundaries to flexibility arise from the complexity of the inter-relationships and interactions that nurses have (Nancarrow, 2015). Changes in the nurses' roles have an impact on their

occupancy level, which influences their ability to connect with their colleagues. Nurses feel more isolated, which has a negative impact on team working (Adams et al., 2000).

Increasing functional flexibility will reduce idle time, also called non-productive time, which leads to an intensification of the workload (Desombre et al., 2006; Dubois & Singh, 2009; Sibbald et al., 2004). The consequences of overwork are a higher error rate and negative worker satisfaction causing lower quality of service delivery and thus lower patient satisfaction, and an increased turnover rate (e.g. Adams et al., 2000; Aiken et al., 2002; Roche et al., 2009; Rogers et al., 2004; Unruh, Joseph, & Strickland, 2007). To illustrate, Unruh et al. (2007) found that when the occupancy rate is high, there is an increase in incident reports. Moreover, in combination with high nurse absenteeism the number of deaths rose as well. In a healthcare environment this area has received a lot of attention because the possible consequences could reach severe conditions.

Another barrier to FF comes from a concept called therapeutic partition, which means that healthcare providers are not able to treat a patient fully because of the lack of access to medication, diagnostic equipment, … or even rights to perform a task (Nancarrow, 2015). Because of this, patient care is delayed, and the service becomes costlier and thus more expensive. Additionaly, hospitals' resources are becoming scarcer (e.g. van Cutsem, 2017), which means that – especially in the winter period when there is more demand for healthcare – nurses have to manage higher workloads with tighter budgets. This results in higher risks and thus a fear that quality will suffer (Adams et al., 2000).

Finally, the traditional role boundaries and occupational regulations pose a limitation to functional flexibility (Aileone & Viehland, 2012). The nursing workforce, and the complete healthcare workforce in general, are relatively inelastic because the knowledge and skills required for a profession create boundaries (Nancarrow, 2015). Desombre et al. (2006), and Nancarrow and Borthwick (2005) – amongst others – point out that healthcare providers tend to build a certain identity, complete with predefined skills and competences, stimulating the idea that they are the only ones with the ability to do the job. This concept is called social closure, also referred to as occupational closure by King et al. (2015). It limits the potential of WF since tasks and roles are considered too specific to be transferred.

4.4. Guidelines for implementation

4.4.1. A good working environment

As mentioned before, the workforce is the most important resource of healthcare organizations. Hospitals are judged based on the quality of the care they provide, which is directly linked to the performance of the employees (Hassmiller & Cozine, 2006). The nurses' efforts and actions determine the reputation of the hospital (Li and King, 1999). This means that it is important to pay attention to their health and well-being. WF and the environment in which they are implemented can influence nurse satisfaction (e.g. Aiken et al., 2011; Batch et al., 2009; Hassmiller & Cozine, 2006; Jack & Powers, 2006, 2009; Morgan & Tobin, 2004; Rambur et al., 2003; Silvestro & Silvestro, 2000; Skinner et al., 2014; The Joint Commission, 2002). For example, The Joint Commission (2002) point this out in their report on strategies for addressing the evolving nursing crisis. Aiken et al. (2011) demonstrated that better work environments improve outcomes. Additionally, Gnanlet and Gilland (2014) found that a negative working environment or a changing environment if not well managed could result in dissatisfaction, stress and a negative attitude towards WF methods.

This does not only apply to the core nurses; it also holds true for TW. Hurst and Smith (2011) argue that great attention needs to be paid to temporary nurses' satisfaction because TW are valuable workers for many hospitals. When the workload is too high or the workplace atmosphere is uncomfortable, TW will not want to come back to the hospital or a department, which poses a risk for healthcare organizations. Winasti et al. (2016) recognize the importance of nurse comfort and present a set of practices, based on the employee motivation theory of Herzberg (as cited in Winasti et al., 2016), to cultivate the satisfaction and motivation of external nurses. Firstly, there need to be clear and correct rules regarding the fundamental requirements of the employment contract. Secondly, there needs to be room for development and growth. The longer the contract is, the higher the need for personal advancement. This implies that hospitals should provide guidance, coaching and training opportunities not only for nurses with a permanent contract, but for TW as well. Lastly, TW like being involved in the organization atop the standard activities, which requires invitations to events or participation in meetings, for example. Pink (2011) also states this and adds that financial remunerations only work to a certain extent.

4.4.2. Systematic and skilful management

Institutional forces such as traditional role boundaries, shared values, predefined structures etc. can create boundaries to the implementation of WF, so adequate management is important to facilitate the changes. "Flexibility should be a permanent pro-active attitude of both managers and professionals and should take all organizational levels into account" (van Gool, Theunissen,

Bierbooms, & Bongers, 2017, p. 184). Most flexibility practices fail because hospitals are unable to discontinue the previous manner of working. The researchers recommend taking a holistic approach to planning and management of flexibility procedures, which means that it should encompass the entire hospital system (Sibbald et al., 2004). Other examples of researchers emphasizing the importance of management in the context of implementing WF strategies are Adams et al. (2000) who state that attention needs to be paid to systematic management of the changes with an emphasis on nurse involvement, nurse satisfaction and quality of care.

The same holds for employing TW and CT the core personnel. To realize the advantages of MS, the implementation requires intensive consideration (Campbell, 1999). Molleman and Slomp (1999) found that not only the training but also the maintenance of skills should be prioritized. Employees need to have clear guidelines, not only to perform their job correctly but also for the others in the organizations to know what can be expected (Desombre et al., 2006). For example, Rudy and Sions (2003) postulated guidelines for the implementation of floating, which have proven to be beneficial for the nurse satisfaction and turnover rate. Skilful management is the key to successful CT because the negative consequences result from poor management rather than from CT itself (Inman et al., 2005). Adams et al. (2000) state that to facilitate the process of changing the skill mix the hospital needs to continuously invest in training and education to improve the nurses' skills and capabilities. Sibbald et al. (2004) add that it is only in the long run that the advantages of FF are visible, when the new roles and tasks are fully embedded into the processes, so clarifying and holistic management is important. Dubois and Singh (2009) state: "Good skill management enables organizations to optimise patient outcomes while ensuring the most effective, flexible and cost-efficient use of human resources." In this respect it is interesting to note the difference, discussed by Desombre et al. (2006), between multi-skilled and being multi-tasked. The latter does not automatically assure that all tasks are carried out according to the standards and requirements. One can have responsibility over different tasks but be skilled in only one of them due to their education.

Similarly, employing TW requires hospitals to pay attention to the nurse satisfaction of both the core nursing personnel as well as the internal and external TW. Manias et al. (2003) researched the point of view concerning employment of the hospital and from the point of view of the agency nurse providers. The results indicate that there are issues whereof the perceptions differ. For example, hospitals attach most importance to adequate staffing levels whereas agencies care about an appropriate allocation of nurses based on their qualifications (Manias et al., 2003). This indicates that in order for the collaboration to be successful and also to mitigate the concerns and risks regarding decreased quality of care, policies need to be developed. The integration of TW needs to happen as seamlessly as possible. The differentiation or division between the core

nurses and the external workers should ideally only exist in contractual documents (Winasti et al., 2016). Situations in which TW feel isolated from the actual decision-making and care planning, as demonstrated by (Manias et al., 2003) should be avoided.

4.4.3. Competent teamwork

The following considerations regarding teamwork are valid for CT nurses as well as for TW. Optimal integration results from forming teams consisting of both core and external workers (Nancarrow, 2003). According to Nancarrow (2003) the ideal structure is a hybrid team, which can be situated in the middle of the continuum that represents all team structures. The extremes being on the one hand a dedicated team of core workers who share a common patient-centred goal, and on the other hand a virtual team that integrates mostly temporary, non-core workers. It combines the benefits of both extremes. A patient is cared for by a group of nurses and doctors who complement each other in the different steps of the care process. Good teamwork contributes to the nurses' wellbeing and augments the quality of care (Borrill, West, Shapiro, & Rees, 2000). Slomp (1999) found, based on extensive literature research, that FF can enhance team working. This is confirmed in the research of Fraser and Hvolby (2010) on how FF can reinforce team performance. Nancarrow (2003) remarks that teams need to comply with two important and conflicting requirements; a paradox also mentioned by van Gool et al. (2017) as a barrier to the implementation of flexibility. On the one hand, there is need for stability to ensure optimal quality of care, which means that there are clear and well-organised procedures. On the other hand, the workforce needs to be flexible to respond to changes in demand and to adapt to variable patient needs. However, a team is only as strong as its weakest member. Employing TW may destabilize well-functioning teams (Hurst & Smith, 2011). They may decrease the quality outcomes of the team because these nurses require more supervision, which limits productivity (Bae et al., 2010). It is important to find the appropriate balance.

4.4.4. Transparent communication

Lastly, there is the importance of communication to facilitate the transformation process and counteract the fear that flexibility is a way of increasing the workload (Desombre et al., 2006; Schoonaert et al., 2018; Wright & Bretthauer, 2010). Communication can mitigate some of the problems and disadvantages concerning WF (Batch et al., 2009). It enables information sharing, which is important for efficient organizational performance. Stredwick and Ellis (1998) for example state that it is most important to incorporate feedback of the nurses in the evaluation and review process of the AH system. Batch et al. (2009) further demonstrate that there is a positive relationship between good communication, job satisfaction and quality of care. Furthermore, it allows reducing territorial behaviour of the permanent nursing staff (Batch & Windsor, 2015).

5. Conclusion

This extensive literature study demonstrates the considerable multitude of WF strategies applicable in a healthcare setting. The first step was to add structure to be able to group different methods for further analysis. Depending on the point of view different categorisations can be made. In this dissertation the distinction was made based on location-based, time-based and function-based flexibility. Analysing every type of strategy, in order to evaluate its power to mitigate the nursing shortage in the winter period, lay outside of the scope of this study. Therefore, the three most promising WF methods were selected, based on literature, and researched more thoroughly.

Despite the system of AH not being applicable in Belgian hospitals, the potential of this WF strategy in terms of dealing with seasonal demand fluctuations proves interesting to research. It allows employing the core workforce more flexible without having to rely upon expensive overtime or external TW. A second promising strategy is employing both internal and external TW. This has the advantage of dealing with more balanced and comfortable workloads, as well as the potential of new input and knowledge. The last strategy that will be researched in the empirical study is the cross-training of nurses, which allows using solely familiar, internal nurses. Importantly, all of the discussed WF strategies have their downsides, mostly impacting the continuity of care, cost structures and nurse satisfaction, which also need to be taken into consideration in the evaluation process.

Researchers tend to give recommendations and impart guidelines for implementation of their examined flexibility methods. There are four key recurring topics, i.e. the importance of a good work environment, systematic and skilful management, competent teamwork and transparent communication. A good work environment has the potential of positively influencing nurse satisfaction, which in turn can have a positive impact on the delivery of care and on patient safety and satisfaction. This holds true for both the core nursing personnel and TW. Systematic and skilful management is necessary to cultivate the nurses' capabilities and development and counteract the negative consequences of employing supplementary WF strategies. For optimal integration hybrid teams need to be formed, consisting of core and TW. Good teamwork can contribute to the nurse's well-being and the quality of care. And lastly, the success of employing WF strategies depends greatly on communication. The key to facilitate the collaborations and cooperation is transparent communication, since it can make or break the hospital's game plan.
The second part of this dissertation focuses on the empirical study, which was developed based on the literature research.

EMPIRICAL STUDY

In this chapter the study design and data collection method will be discussed, followed by a thorough description and analysis of the results.

1. Methodology

For this dissertation a qualitative study was conducted. In order to examine the main research question: *How can workforce flexibility mitigate the nursing staff shortage in the winter period?* a descriptive case study design was developed. It is important to find out why and how hospitals apply the current procedures, what are the stumbling blocks, what are the positive elements, and how are the seasonal fluctuations perceived. Through case study research strategies can be explored to make nurses more flexible and adaptable to the summer-winter fluctuations, without violating the strict regulations regarding the employment of nurses and without fully depleting the increasingly scarce financial resources. As demonstrated by Yin (2014) in his work on *Case Study Research*, a case study is the preferred strategy when How? and Why? questions are being researched. Furthermore, this dissertation aims to describe a real-life and contemporary phenomenon, which enforces the choice of case study research instead of a quantitative analysis (Yin, 2014).

The data was collected through semi-structured interviews conducted in three Belgian hospitals: AZ Nikolaas (AZN) in Sint-Niklaas, AZ Alma (AZA) in Eeklo and the Sint-Vincentiusziekenhuis (AZSTV) in Deinze. The hospitals were deliberately chosen based on their order of magnitude because this has an influence on their human, financial and material resources and thus, hypothetically, has an impact on the applied strategies. The goal is to conduct a meticulous and diversified comparison between the different approaches to the problem. Since every hospital department experiences the seasonal fluctuations differently and with fluctuating levels of severity, one department was singled out for this research. Initially, the pneumology department would be analysed, but the participating hospitals unanimously indicated that the seasonal fluctuations are most prominent in the paediatrics department (PD).

The head nurse (HN) as well as the responsible care manager (CM) and a staff member from the human resources department (HR) were selected for the interviews. As a result, three people were interviewed in each, which results in a total of nine interviews that have been conducted. This amount was the most feasible given the time period of the study. The choice of respondents

was based on careful consideration on which perspectives on the seasonal fluctuations and its consequences could provide the most interesting and complete results. Moreover, it provides a first step towards triangulation to reinforce the credibility of the research (Yin, 2014).

Multiple meetings were set up to explain the research and obtain approval from the Ethics Committees. The official approval can be found in Appendix B Approval Ethics Committee (Ghent University). Subsequently the interviewees were contacted via e-mail and a date was set. By opting for semi-structured interviews, the interviewees were able to freely answer the questions according to their own reference framework. The predefined structured questions, which can be consulted in Appendix A Interview topic list per type of interviewee (in Dutch), provided a skeleton for categorization of the responses. Moreover, all the interviewees were sent the questions one week in advance in preparation of the interview. The interviews were conducted in the month of March 2019 in order for the Ethics Committees to process the applications and to be able to analyse the data afterwards. The duration of the interviews ranged between 30 minutes and 1 hour. Each interview was recorded and transcribed for further analysis.

The interviews consisted of four parts, each focusing on a different aspect of the phenomenon. Firstly, the interviewees were asked about the severity of the seasonal fluctuations. The questions were centred around the consequences of the increase in demand in the winter period, such as a potential increase in mistakes, the influence on nurse satisfaction, the impact on the quality of care, etc. The aim was to ascertain how the nurses in the PD experience the phenomenon and what the influence is on the department and on them.
In the second part the concept of flexibility was assessed. The respondents were asked about the flexibility methods currently applied in the hospital, not only in the PD. The questions were aimed at how flexibility is perceived in the hospital and which types are most commonly used.
The third part follows directly from this by cross-examining which of these flexibility practices are applied to deal with the seasonal demand fluctuations. The interviewees were asked about the current procedures and processes, their advantages and disadvantages, the reasoning behind their selection and finally, the possibilities for improvement. In this respect it was also interesting to probe the potential of hospital networks, which is a rising flexibility method.
In the last section of the interview the three most promising WF strategies, discussed in the last part of the literature research (chapter 4. Comparison and analysis of the most suitable strategies) were evaluated. The goal was to get a full view on the perception of these methods, i.e. making use of an annualized hours scheduling strategy, employing (external) temporary workers and investing in functional flexibility or cross-training. These strategies could provide the hospitals with a solution or first steps towards a solution. To this end, it was valuable to ask about how these strategies are perceived. These questions were placed at the end of the interview because at that

moment the interviewee had a clear vision of the flexibility reference framework applied in the hospital. Deep-dive questions could be asked based on the previous answers in order to get the full scope on the potential of the strategies.
It is important to note that the sequence of the questions was not always followed to obtain the desired answers. This is due to the fact that the interviewees were able to prepare the questions and thus, the answers often overlapped.

The interviews were processed through the Computer Assisted Qualitative Data Analysis software NVivo12. An inductive coding method was employed to make the transcribed interviews more manageable. No a priori scheme was used as the concepts and information emerge from the data during the inductive coding process (Mortelmans, 2011). However, the structure of the interviews was kept in mind when deciding on the nodes in order to maintain a similar structure in the analysis of the results. The nodes were re-evaluated to create a coding tree in which associations were processed. This process is called axial coding and allows analysing the data and subsequently, deriving valuable results (Mortelmans, 2011). All qualitative data analyses were conducted using NVivo 12.

In addition to the interviews, organizational and administrative documents were reviewed to support and corroborate the findings and obtain further triangulation to reinforce the validity and reliability of the qualitative research (Yin, 2014). These files include the hospitals' employment policy plans, which provide information on the hospitals' labour agreements and thus limitations of certain WF strategies, as well as reports on the annual distribution of the occupancy rate and workload, which illustrate the seasonal demand fluctuations and the nurse-staffing arrangements.

Similar to a quantitative study, the quality of an empirical case study depends on the following four concepts: construct validity, internal validity, external validity and reliability (e.g. Malagon-Maldonado, 2014; Yin, 2014). Firstly, construct validity refers to whether the research evaluates the intended research question. The use of multiple data sources, structured based on systematic literature research, helped in establishing this concept validity. Secondly, in order for correct conclusions to be drawn, which is evaluated by the internal validity, recordings were made to capture the interviews. Thirdly, external validity involves the extent to which a study's finding can be generalized. Since 9 semi-structured interviews were conducted in 3 hospitals with a different order of magnitude, the generalizability is of a mediocre to great level. Finally, to guarantee the reliability the case study should be repeatable with similar findings and results. Yin (2014) states that an important prerequisite for repetition is to document the followed procedures, which has been done in this research and thus, improves reliability.

2. Results

In this chapter the findings from the case study research are discussed. This part is structured according to the interview protocol. Firstly, the severity of the seasonal fluctuations is reviewed by focusing on the consequences for the hospital, the patients and the nurses themselves. Secondly, the procedures currently in place to deal with the summer-winter problem are described, along with their advantages and areas for improvement. Lastly, the most promising strategies are evaluated.

2.1. The difficulty and impact of seasonal demand fluctuations

When talking about the problem of seasonal demand fluctuations all respondents pointed out that the seasonal fluctuations are not as predictable as they seem in theory. Often the PD is confronted with surges and drops in demand throughout the entire year.

> *"It is not as defined as in theory. Moreover, in the past those periods were more delineated in comparison to today. Now you encounter these surges throughout the entire year, which makes it even more difficult."* (AZA – CM)

> *"The idea that they have to shift up a gear in the winter period but that it does not last that long and that they can recharge in the summer period… and that they have to do some extra hours in the winter period, which they can compensate in the summer… that is gone."* (AZN – HN)

Moreover, it is difficult to predict when the winter peak will start and when it will end. All hospitals state that they have had years where the winter peak lasted until June and later. AZN even claims that in the whole of 2018 they had only 2 calm weeks. The interviewees do confirm that the winter months are the busiest. However, they add that although these are recurring fluctuations, there is still a lot of unpredictability on a day-to-day basis.

The issue of the nursing staff shortage is very topical in the hospitals. As the hospital size increases, the concerns and the severity seem to become more intense, which will become clear in the next paragraphs.

> *"The problem is very present. If you mean concerning the planning and organization of work, that's one of the biggest problems, I think. I have been part of this trade for a while,*

as a nurse and as a head nurse. So, I have experienced it from both sides, and I feel that it is a big problem." (AZA – HN)

"I think that we, the hospital, are looking for something that could provide an answer. It is very topical. We have established this for quite some time now, but at the moment we keep fiddling with our numbers by making them go up and down…" (AZSTV – HR)

"The nursing workforce really struggles with the seasonal fluctuations. They experience it as very stressful and straining because in these peak moments there really is a shortage of hands." (AZN – CM)

Remarkably, there are differences in the answers to the questions about the severity of the problem depending on the professional background of the interviewee. They experience the fluctuations differently. It seems that the HRs and CMs are worried about the seasonal demand fluctuations, but they feel that the existing workforce is able to cushion the problem. They mostly worry about the impact on the scheduling system. The HR of AZ Alma for example finds that the nurse shortage in the winter period is not an immediate problem since the standard nursing workforce is able to answer demand when needed. Their statements are partially based on the fact that the struggles are not quickly communicated to the human resources department. The HNs expressed more concern, especially regarding work pressure and nurse satisfaction. For example, in AZN the HN emphasized that her workforce is struggling intensely to keep up.

"I constantly feel like my personnel are struggling with 'drinking or sinking'." (AZN – HN)

The most severe consequences present itself in the area of the scheduling of nurses and the increased workload. The next paragraphs describe the five categories that are impacted the most by the seasonal fluctuations and thus, should be selected as objective for the flexibility methods that will be discussed later.

2.1.1. Scheduling

The biggest issue lies with the planning and scheduling of nurses. All hospitals are struggling with their numbers. They have to ensure that enough nurses are present to answer to demand as well as make sure that the nurses' working hours are balanced out on a 13-week basis. The hospitals are limited by the regulations concerning the maximum and minimum deployment of nurses, which forces them to be creative in the scheduling process. Even though there is an increase in demand in the winter period, the hospitals do not have enough full-time equivalents (FTE) of nurses to constantly deploy a higher staffing level. Additionally, staffing extra nurses during the

winter period means that these extra shifts have to be compensated in the calmer periods, which is hampered by the smoothened surges and drops.

The PDs are also limited by the hospitals' budget plans. One could state that they simply need to employ more nurses, but this is not possible given the current budget and regulations. Moreover, employing more nurses could solve the nurse shortage in the winter period but during summer there is not enough work to schedule all these nurses and allow them to work their minimum required number of hours or shifts. The HN of AZN criticises the budget restrictions because whenever a new nurse is hired, he or she is almost immediately expected to lead an entire area. Since they are part of the budget there is no possibility to ensure they are double staffed. This was a recurring remark in the other hospitals as well, that there is not enough budget to ensure qualitative habituation and education, which limits the efficiency of the department.

Linked to this is another challenge that was often mentioned, the struggle of having to employ a minimum number of nurses in calmer periods. The PD has distinct requirements regarding the nursing personnel, so they are limited in options to give back the accumulated hours.

> *"Rather, it is a limitation that you also have to keep to the minimum staffing levels. Even if there are only three children in the department, there always has to be an early, day and late shift, and sometimes there are only a few rooms occupied during the night. I think this makes it more difficult, because other departments are able to team up with each other by merging the corridors. This is not possible in the PD because you really need someone who is a paediatric nurse and who has a valid education for treating children."* (AZA – HR)

The bigger hospitals both point out that the base level staffing is not always determined fairly. A PD is an outlier inside a hospital because most of the rules are adapted to fit their specific characteristics. However, when calculating the required base level staffing, they are treated in the same way as other departments. An example is the internal patient transport (IPT), which is the service of transporting patients from, for example, the operating room (OR) or the emergency room (ER) to the correct hospital ward.

> *"We always carry out the transport service ourselves, which is characteristic to a paediatrics department. Currently, the emergency admissions of other departments are picked up by the IPT until 7 o'clock in the evening, expect for paediatrics. For everything there is always the exception of paediatrics."* (AZA – HN)

Another illustration of an important exception is an arrangement regarding extra hours. AZA for example will implement a new scheme for extra hours in which the extra hours have to be compensated by the month of April. However, the head nurse of the PD has asked to make an exception for them and extend the compensation period until September. Otherwise it would be impossible to compensate the extra hours because April is still a very busy month. These exceptions have developed over the years as a mutual decision between the hospital and the PD. They feel that these young patients need the extra, specialised care. However, both hospitals find that these aspects need to be taken into consideration, because it is often forgotten how much this increases the workload. This should have an influence on the base staffing levels, which could serve as a first step towards a solution. For a more thorough discussion on the importance of the base staffing level, refer to 3. Discussion.

2.1.2. Workload

The winter period is characterised by a higher occupancy rate due to the increase in demand. One example of an underlying cause is the Human Respiratory Syncytial Virus (HRSV), which a lot of children suffer from in the winter months. The majority of the hospitalisations are due to this virus. The occupancy rate is enhanced by the high turnover in the hospitals. The CM and HN of AZN mentioned that the hospital and its doctors invest in providing quick and efficient care in order to treat as many patients as possible, especially when demand is as high as in the winter months. They want to minimize the duration of stay and keep bed capacity as high as possible. This increases the workload because these patients need to be treated as efficiently as possible, they have to be discharged and new patients have to be admitted. Next to the intensified work environment this also contributes to the unpredictability of the demand fluctuations.

The requirements regarding administration have become stricter and more amplified in the last years. Take for example the electronic patient files, the electronic medication prescription, everything regarding NIAZ (Nederlands Instituut voor Accreditatie in de Zorg), etc. These are tasks that need to be completed and cannot be put aside until calmer periods, regardless of the number of patients.

Moreover, the hospitals in this research all have day admissions, ambulatory patients, as well as patients coming from the OR. This means that the patients can be very diversified, which increases the pressure even more. There could be patients coming from the OR who need intense care and supervision, whilst there are others that require less attention. Not only does this complicate the nurses' tasks but it also requires the hospital to adjust the staffing levels to ensure safety. On top of that, fewer patients are being transferred to tertiary institutions, but they are

treated inside the hospitals. The CMs collectively agree that the PDs are being intensified. The CM of AZA mentioned the following example of a child that requires Optiflow oxygen therapy:

> *"Optiflows were also added. An Optiflow refers to a child that needs breathing support, but that should not be transferred to a tertiary centre, the University Hospital of Ghent for example. This child is actually too 'bad' for this hospital, but too 'good' to be sent to an intensive, tertiary centre. That is Optiflow, a lot of paediatrics departments have to deploy that now."* (AZA – CM)

Furthermore, the interviewees pointed out that the workload remains the same throughout the year. As mentioned before, all hospitals in this research make use of a nurse schedule in which more nurses are deployed in the winter months and less nurses in summer. Because of this, nurses have to perform at a constant level. Take the following example cited by the HN of the AZN:

> *"It could be that at a certain moment in August there are 20 children in the ward for 2 nurses, which means that the workload constantly remains the same, be it summer or winter. Because when there are 3 nurses at work in the winter period and there are 30 children, the workload remains the same."* (AZN – HN)

Some hospitals make use of an admission stop, which protects the nurses and the patients. The past two years AZA had to invoke this limit. The HN argued that it is important to know the nurses' limits. There are boundaries to their flexibility. In order to ensure high quality care and respect the comfort of the nurses, a stop like this is needed. This does however mean that patients are denied care inside that specific hospital.

All of this increases the workload immensely for the nurses during the winter period. They have to deal with a lot of stress and high pressure. This does not only apply to the core nurses but also to the HN. The HN often takes over part of the nurses' work, for example the development of the prescriptions, which reduces her productive time but enables nurses to focus more on their most important tasks.

2.1.3. Nurse satisfaction

This increased workload has a big impact on the nurses' satisfaction, which – as illustrated in the literature research of this dissertation – can have a negative impact on patient satisfaction and even on patient safety.

A recurring aspect in all the hospitals is the result of the satisfaction survey, which reviews different dimensions of the working conditions. In the winter period nurses indicate that they are struggling with the workload and that they ask for more personnel, whereas during the summer period the results are always quite positive.

> *"You can immediately notice which surveys are from the summer and which surveys are from the winter. If there is something negative about the paediatrics department, it is the workload in the winter period."* (AZA – CM)

The interviewees state that the nurses suffer emotionally from the high workload because they feel like they are not able to perform their tasks to their best potential. They are willing to skip their lunch breaks more often than not to ensure the best care and to avoid having to do extra hours.

> *"The busier it gets, the more stress they have, you get sick more quickly, you are grumpier and more irritated, but they would never express that towards the family, the parents or the patients."* (AZSTV – HN)

Another consequence of the high workload that was mentioned by nearly all interviewees is the rise in sick leave. Nurses are more vulnerable and get sick more easily. This consequentially has an impact on the staffing because the base level staffing gets smaller and thus there is even more need for additional workers.

It is interesting to note that the impact of the seasonal demand fluctuations on the scheduling system also incites some reaction in the other departments. In AZA in particular, the interviewees all mentioned that there is quite some jealousy from the other departments. They mainly focus on those calmer periods and feel like the paediatrics nurses should lend a hand in the other departments during the summer months, but they forget that they have experienced a heavy winter.

2.1.4. Quality and safety

Overworked nurses, which are often the case during the winter months, are more likely to make mistakes. This was illustrated throughout the literature research part of this dissertation and has been discussed extensively in other research (e.g. Wright & Bretthauer, 2010; Rogers et al., 2004; Olds & Clarke, 2010; Grinspun, 2003).

The biggest concern is the night shift during the busy winter months. In order to keep the quality and safety at the desired service level, there need to be enough nurses deployed during the night

shifts. There are regulations regarding the amount of night shifts a nurse can take on, so the hospital is limited in their scheduling system. The HNs and CMs expressed a lot of concern about the decision on how many nurses to staff during a busy night shift. It often occurs that patients are admitted during the evening shift or that they have a patient that requires Optiflow (see section 2.1.2 Workload). Then the search for an additional nurse begins, which is very challenging. This is a short-term situation that results from the nursing shortage in the long-term seasonal fluctuations.

The answers on the question whether the seasonal fluctuations and the nursing shortage had an impact on the number of mistakes that are made differ from hospital to hospital. In AZA for example they find that when the occupancy rate is higher and the workload is bigger, there is more alertness. The nurses tend to be more structured in doing their job, whereas when it is calmer there is a more convivial atmosphere in which some tasks may be overlooked.

> *"I even find that when it is busier, that the nurses are more alert. Of course, when it is too busy, then it is too much. But I find that the focus is better when it is busier than when it is calmer. Then you have to pay more attention that things are not forgotten."* (AZA – HN)

AZN on the other hand finds that they have more incident notifications during the busier periods. The HN mentions that she sees a lot of mistakes being made and that she is worried about them. AZSTV, the smallest hospital in this research, states that there is a higher chance of making mistakes when there are more children in the ward, but that it is not necessarily because of the occupancy rate.

Linked to this is the issue of monitoring and supervision, which is restricted when there is too much work. The hospitals all work with the same system in which the department is subdivided into sections for which each nurse is responsible. In those situations, there is no supervision or assistance from other nurses and thus the chances of making mistakes are higher. This concern about the lack of control is a reoccurring issue in multiple WF methods.

The biggest hospital in this research expressed the most concern regarding quality. The HN of AZN states that the different flexibility methods to deal with the fluctuations have as a positive consequence that there are more people who can offer help, but the negative consequence that quality suffers. Despite their current strategies these nurses are struggling severely with the lack of possibilities for adequate training, which will become clear in the section on the current procedures that are in place to deal with the seasonal fluctuations.

2.1.5. Patient satisfaction

Something that makes paediatrics different from other departments is the fact that nurses do not only have to deal with their patients but also with their parents and family, which further intensifies the working environment.

The interviewees all indicated that the nursing workforce would always do their absolute best to make sure that the patient and his or her family get the best care as possible. When there have to be made compromises, the nurses would skip their coffee breaks or do extra hours, for example. It does occur however that the smaller tasks such as cutting the patient's nails are passed over to the parents.

All interviewees find that the patient suffers the least from the nursing shortage in the winter period. The biggest issue lies with the efficient and correct staffing of the nurses and ensuring that their satisfaction is not extremely compromised in order for the care provision to remain qualitative and safe.

2.2. Current procedures to deal with seasonal demand fluctuations

In this section the current procedures deployed by the participating hospitals to deal with the seasonal demand fluctuations and the resulting nursing shortage in the winter period are discussed. Despite these fluctuations to be a long-term combat they also have several short-term implications, so a distinction is made between long-term and short-term strategies.

Next to the WF strategies currently in place there are other types of resource flexibility that are used to deal with the seasonal demand fluctuations. For example, a few years ago AZA moved to a newly constructed building in which they incorporated options to adapt the hospital's facilities to the changing environment. The PD is constructed in such a way that it can easily be expanded from a small department in summer to a large department in winter, whilst still being able to provide high-quality care. In AZSTV there are measures in place to deal with the drop of demand in summer. There is an option to take in adult patients, shielded from the children, so that the paediatrics nurses can remain in the department, but still provide care to other departments when demand is low in the PD. The hospitals also invest in material flexibility because high turnover rates and busy shifts can result in shortages of supplies.

2.2.1. Long-term

All three hospitals make use of similar scheduling and staffing systems to keep the nursing shortage in the winter period to a minimum. Moreover, in two of the hospitals there is a

compensation team specifically meant to serve the PD. Some of the hospitals also call on students and interns as an additional source of flexibility.

2.2.1.1. Personnel planning

The most straightforward strategy is to change the number of working nurses throughout the year. The hospitals prefer making use of their own workforce to deal with the demand fluctuations because then they know that the nurses possess the appropriate education and are familiar with the care processes. There are however limitations to developing an adaptable scheduling system, as mentioned before in 2.1.1 Scheduling and discussed more thoroughly in this section.

All participating hospitals work with a similar system in which the staffing levels are altered based on the time period. In winter there are more nurses scheduled than in summer, and sometimes they make use of a transitional seasonal schedule in between the big seasons. In AZN, for example, they recently made the switch from a constant personnel schedule with a stable budget allocation to a system adapted to the demand fluctuations. Previously they would offer leave to the paediatric nurses at calmer moments while keeping the budget at a constant level, whereas now they increase the headcount in the busier periods and lower it in the summer period. They are still subject to the same budget, but the allocation is different.

The AZSTV has a similar system in which they change their budget allocation on a monthly basis. They make use of an additional transitional season because they noticed that, for example, after the Christmas holidays there is a temporary drop in demand for care, which allows for a lower staffing level.

> *"The base team consists of 11 FTE with a total budget for paediatrics of 13,46 FTE for the entire year, which also includes psychologists. So, if you just look at the nursing staff, we have 11 FTE. We change our budget every month depending on the season. For example: from a minimum in summer of 9,42 FTE to a maximum in winter of 13,71 FTE. Like that we have divided the 11 FTE between the different months so that we would have 11 FTE on a yearly basis."* (AZSTV – CM)

The CM of AZSTV remarks that this system also has some pitfalls because the hospital has to respect the contractual working hours. If a nurse is employed full-time, it is difficult to arrange for them to work more in winter and less in summer. The same holds for part-time nurses who chose to work 80%, for example. They would like to keep their free day a week, without having to compromise relative to the occupation rate. In this respect it is interesting to note the importance of part-time nurses. The HN of AZA mentioned that it is more difficult to flexibly deploy full-time

nurses because they are already working at maximum level. There is less space to move the schedule around to answer to demand and accommodate everybody's wishes.

> *"You cannot schedule full-timers as flexibly because they are already working at their maximum, so you need multiple part-timers. If you have a lot of full-timers in your team, you cannot jump as far. You have to pay attention that you employ enough part-time employees to obtain and maintain a flexible scheduling system."* (AZA – HN)

Part-time nurses are desirable in the core workforce because they allow more flexibility. The HN of AZN, as well as the CM of AZSTV, denotes that this flexibility comes at a price because these nurses are not always up to date.

AZN sometimes makes use of job time alterations based on the period in the year. This depends entirely on the willingness of the employees. If there are problems regarding the occupation levels, part-time nurses are sometimes asked if they are willing to temporarily extend their contractual hours. However, the HR states that there are a lot of part-time nurses who have specific contracts in terms of 'time credit' and parental leave. These are subject to very strict legislation and thus limit these extension possibilities. In AZSTV they have also attempted to assess the willingness for job time alterations, but there has been little to no response.

Additionally, as mentioned before, the hospitals need to make sure that the working hours are balanced out within a 13-week period. Since the hospitals work with a system in which the staffing levels are higher in busier periods and lower in calmer periods, there is less opportunity to offer furlough to the nurses. The possibility of doing extra hours in the winter period and taking them back in the summer period is gone. There are, however, days in the winter period on which extra hours and overtime are necessary despite the additional staffing levels. But due to the scheduling system and the smoothened surges and drops in demand, it has become more difficult to give these hours back on calmer days. This was mentioned specifically by the interviewees of AZN. Their nurses are compensated financially for their extra hours, whilst they prefer receiving extra furlough as reimbursement.

> *"I want to accommodate my employees to give back the extra hours in the next period, but it is a vicious circle. It has a cumulative effect. I cannot allow them to stay home because them I would not have enough personnel to cushion demand."* (AZN – HN)

The HN of AZSTV adds that in their hospital they sometimes struggle in the calmer periods because they allow lower staffing levels to make sure they can give back the extra hours.

Furthermore, the HN of AZN agrees that the system performs very well mathematically but in practice it leads to more stress and less qualitative care. The system increases the pressure on those nurses that are most qualified, because they carry most of the responsibility.

> *"There used to be more room for adjustments with calmer moments to dot the I's and to offer extra training. But now nurses have to lead an area by themselves. According to the schedule there is someone, yes, and the budget is filled out, but qualitatively speaking…"* (AZN – HN)

Ideally, the schedule should always include one or two of the most qualified nurses, but it is not feasible to always deploy them. This is partially due to budget restrictions and partially due to the scheduling system. There is no room for adequate training, which negatively influences the quality.

Nevertheless, the scheduling process is made easier thanks to the flexible timetables. AZA, for example, communicates their schedules 12 weeks in advance, which allows for further adjustments if necessary. The nurses are not employed for a fixed amount of hours per day. Thanks to this additional type of flexibility, the PD can respond more closely to demand fluctuations.

2.2.1.2. Compensation team

Two of the hospitals, AZN and AZSTV, make use of a compensation team meant specifically to supply more nurses to the PD during the busier periods. This is the main strategy to deal with the seasonal demand peaks, next to the adjusted nurse-staffing schedule. A compensation team is very similar to a mobile team, except that it is applied on a longer-term, monthly basis and the team solely consists of paediatric nurses and midwives. It can be categorized as the specialist mobile team or clustered float pool, as defined by, respectively, Devos et al. (2011) and McHugh (1997).

A compensation team is a very powerful system because it allows easy and quick adjusting when needed. The nurses in the team regularly return to the PD, so they are familiar with the department's and hospital's way-of-working. Irrespective of the seasonal fluctuations, the compensation nurses also serve as a safety net for prolonged leave. There is no need to go through the cycle of selecting and hiring external temporary nurses. Additionally, deploying them allows core nurses to take back some extra hours.

In AZN the compensation team also accounts for the maternity department (MD) and the K-department, which is the child and youth psychiatry. The team consists of nurses who ultimately want to work in paediatrics or in the maternity department. It is not possible to get hired for a fixed position in the PD or MD. These vacancies are never made available for externs. The only way to obtain a job as a full-fledged paediatric nurse is through the compensation team. The team was initially created to deal with the over-supply of midwives 8 to 9 years ago. By making use of such a team the midwives could maintain their skills on a regular basis. Gradually the team evolved and got extended with paediatric nurses because they are both very specific departments that require specialized knowledge, which the mobile team could not provide (see section 2.2.2.1 Mobile team). According to the HR of AZN, the compensation team was enlarged to deal with working time reductions for nurses who are 55+. These nurses receive additional free days based on their age and seniority. They are employed as FTE but they work less than what is necessary to be able to respond to demand. Every year the compensation team is assigned based on – among other things – the amount of days that are lost due to this arrangement. It is not feasible to employ external nurses or to expand the core workforce because if these days are concerted to FTE they would sum up to 0,x.

In AZSTV the compensation team accounts for the PD, the MD and the OR. Additionally, they have 2 nurses who are semi-mobile and who are employed half of the time in the PD and the other half in the MD. When one is deployed in one department, the other is scheduled in the other. AZSTV implemented a compensation team after the success story of the team in AZN. The person responsible for the initial development and application of the compensation team in AZN was also in charge of the implementation in AZSTV.

AZA does not make use of a compensation team but did state that they want to work towards implementing one. They feel like it could add real value since they would be able to solely engage nurses that are familiar with the hospital's procedures and processes. However, the interviewees express some concern regarding the fact that these nurses are employed in different departments half of the time. The HN in particular fears that too much would be expected from these nurses with an entrance window that is too small.

Despite the compensation team offering relief in the busy winter months, some negative and worried remarks were communicated. Firstly, this function requires a very flexible mind-set, even more so than of a paediatric nurse, because they never know in advance in which department they will be scheduled and for how long. It is also difficult to assess when a vacancy will become available to pass over to the PD. There is a lot of uncertainty surrounding this job, which puts a tremendous strain on the nurse's satisfaction. The HN of AZN shared the following example:

> *"I had one employee that resigned after a few months and another employee who chose for a stable and fixed job in the 'one day clinic' because the working hours are more controllable. So yes… and I hear from other employees that they find the uncertainty very difficult."* (AZN – HN)

AZN wants to reduce the uncertainty and aims to work proactively by making a provisional yearly schedule that is confirmed per month. In this way both the compensation nurses and the core nurses feel more comfortable.

Secondly, this team is meant to offer relief during the busier periods. Due to budgetary reasons and the decrease in demand these nurses can also be employed in other surgical departments when necessary, such as geriatrics. Consequently, it is possible that a nurse has to spend a few months in a completely different department than they desire. Some find this very stressful because they do not have to right set of skills, others see this as an opportunity to enhance and sharpen their skills. Moreover, since the team consists of midwives and paediatrics nurses there are also some struggles when a midwife is scheduled in the PD. Despite having the feel for children, these nurses do not own the necessary professional education and can never be full-time employed in the PD ('FAQ Wetgeving | Vroedvrouwen.be - VBOV', n.d.).

Thirdly, the compensation team generates the flexibility needed to deal with the nursing staff shortage in the winter period. The downside is that the core nursing team becomes smaller, because the budget remains the same. This is one of the biggest struggles of working with flexible teams, according to the HN of AZN. The core staffing level is smaller, so every time a compensation nurse is added to the team, a whole readjustment process commences. According to the HN there are fewer opportunities to develop the team and due to the frequent switching of shifts the compensation nurses are less efficient than the core nurses. The compensation nurses have to be re-trained and re-educated every time they come back to the PD in the winter months. This requires valuable time and energy that seems wasted during the busier periods. Most of the time this re-training process in unfeasible, so the compensation nurses are expected to perform 100% without any guidance. However, the CM of AZN adds that the compensation nurses are increasingly employed for longer periods of time (6 to 7 months) at the PD. The CM of AZSTV also claims that it is easier to use a compensation team in a smaller hospital because there are fewer changes than in a large hospital. She argues that the knowledge and skills of a part-time nurse and a nurse of the compensation team are not that qualitatively different.

A last remark was that the compensation nurses seem less committed to their job than the core nurses. They feel as if the information, the meetings, additional training, etc. are not meant for

them. It is impossible for them to keep up with all the information of each department without knowing in which department they will be employed. This puts even more pressure on the collaboration between the core nurses and the temporary internal nurses. Remarkably the HN of AZN claims that the lack of commitment of the nurses in the compensation team is due to their own attitude. On the other hand, she also indicates that the core nurses do not consider temporary workers as full-fledged nurses. They experience their work as a burden because they feel responsible, which could cultivate the isolated feeling.

Despite the core nursing personnel finding it very challenging to have an extra set of hands for only a few months, the HN of AZSTV argues that the advantages are still greater than the disadvantages.

> *"The longer they remain in the pool, the more they are able to join the department, the better they will get to know your department and the more you can count on them. So, I truly see the positivity of it."* (AZSTV – HN)

2.2.1.3. Students and interns

AZA and AZN admit they also rely on students and interns to deal with demand peaks. 'Interns' are students who have to do an internship as part of their education, whereas in this dissertation 'students' are viewed as people who are still studying but who are doing a student job during the holidays for example. Even though interns cannot be employed as full-fledged independent nurses, their aid is very appreciated in busy periods. If enough time and effort is put into their guidance, they can make a real difference.

> *"During busier periods you can really see that interns are helping actively, and they mostly enjoy it as well. But I think, definitely in those peak moments, they get a lot of use out of them. They take up smaller tasks such as changing an IV (intravenous infusion) or assisting a child in going to the toilet. Of course, they do not perform heavier tasks such as wound care or attaching an IV, but you do see that in those periods interns are very welcome in the department."* (AZA – HR)

Interns require guidance and supervision, so they cannot replace an experienced nurse, but they can offer some relief. Additionally, it is important to note that internships cannot be planned during the winter months December and January because for most students these make up the exam or holiday period. As mentioned before, the seasonal demand peaks and drops are longer than the theoretical seasons, so interns' assistance is still very much appreciated.

Skilful interns are encouraged to take up a student job in the hospital to lend a hand in the weekends or during busier days. In AZN they really count on those students in their staffing calculations. The HN even shares that without students she would not be able to work out the complex staffing schedule. They almost serve as a genuine additional worker, instead of support. This contributes to the AZN's biggest concern, namely the lack of adequate base staffing levels and a flexible core workforce (see section 3 Discussion). They are aware of the risks, but they argue that it is better to have someone with medium skills and knowledge than no one.

AZSTV makes the least use of this type of WF because they have a smaller team of core workers and demand can be very low in the summer period, which is when they tend to call upon students. The HN says that the hospital should not count on interns and students because in the beginning their work is very unreliable. It is only after a few weeks that their support becomes valuable. The CM of AZSTV states that it is easier to insert a student into the workforce of a larger hospital because they dispose of more employees, whereas in a smaller hospital there are stricter limitations regarding minimum staffing levels.

> *"In a large hospital there will be more employees during the day, and this makes it possible to insert a student. Whereas here, for example, if there are only 2 nurses and one of them is a student… that would be… That is the problem with small hospitals. You have to reach the staffing levels, even if there is only one patient. You have to reach the staffing levels and you have to employ someone who knows everything, and that is the difficult part."* (AZSTV – CM)

2.2.2. Short-term

Due to the nursing shortage in the winter-period there is not enough flexibility to make the necessary changes to the staffing schedule. So, when nurses are deployed at maximum staffing level, given the budget and legislative restrictions, the hospital still needs to be able to respond to short-term peaks in demand. These are highly unpredictable and are the greatest cause of the consequences discussed earlier. There are three main procedures that are in place to deal with the short-term shortages: making use of the mobile team, temporarily employing nurses from other departments and flexibly employing the core nurses.

2.2.2.1. Mobile team

Every hospital participating in this research has a mobile team, which is mainly used to cope with short-term surges and to replace sick nurses. The mobile team is hospital-wide and thus available for every department. The team was introduced so that skilled and sufficiently acquainted nurses could be deployed when needed, without having to hire external nurses or having to ask the core

nursing personnel to step in. According to the interviewees there are two general issues with the mobile team.

Firstly, these nurses are extremely sought after and almost always unavailable. Whenever someone falls ill or cannot come to work, these are the people who balance out the workforce. Whenever it is extra busy, they are the immediate available nurses who could offer assistance and relief. However, these nurses are almost always assigned to a department, so their short-term responsiveness is not as high as theoretically possible. Additionally, it is possible that they are deployed in a department for a prolonged period of time to replace a longer-term absence.

Secondly, and most important for the PD, is the mobile team's lack of knowledge and education on paediatrics. All respondents unanimously state that the mobile team is only a last resort. These nurses cannot replace another nurse because they are only able to offer support and perform secondary tasks. One HN says:

> *"If I would ask for a nurse from the mobile team, I would get one. That is not really the issue, but then that person would come to offer help, not to replace someone or to have an extra worker. They are not able to install a drip or draw some blood from these small children. This is different for other departments because there they can take over a whole section, but here that would be much more difficult because it is so specific."* (AZA – HN)

The HN of AZN adds that employing a nurse from the mobile team incites tension within the core personnel because they find that these nurses are more of a burden than a solace. The core workforce feels responsible for their actions and thus they experience this as an additional task rather than help.

Remarkably, none of the hospitals has a paediatric nurse in their mobile team. AZA has recently published a vacancy for a position in the mobile team, specifically requesting a nurse with the professional title required to work in a PD, but there has been little to no response. According to the HN this is due to the fact that when a nurse chooses to work in the PD, he or she does not want to settle for something less. The CM of AZN on the other hand argues that this is an opportunity to learn and develop new skills.

The CM of AZA states that there are some midwifes in the mobile team who could offer more support because they have some connection with children, but they still lack the knowledge and skills. Both the HN of AZA and AZN indicate that there are currently one or two nurses in the mobile team who have worked in their department for a longer period, and who they trust enough

to employ in their team when demand is high. They are acquainted with the ways of working and the specific care processes. The issue with these few nurses is that they are only employed in the PD for a relatively short period of time, which hinders the continuity. The HNs find that they cannot achieve what they would achieve with only professional and experienced core nurses.

Furthermore, it is often the case that nurses from the mobile team do not want to work in the PD because they are aware that they lack the skills and they are afraid to treat children. The interviewees understand this aversion. They say that the hospital cannot expect them to feel comfortable to work with small children, if they are not trained to treat them.

Lastly, all interviewees expressed extreme concerns about the teamwork between the core workforce and the temporary internal nurses, while some also indicated that the collaboration between different departments, especially the PD and the MD, has benefited. They claim that there is more understanding and support thanks to the collaborations.

2.2.2.2. Other departments

The same applies to nurses from other departments, which is a second short-term solution that is applied in the hospitals. Sometimes the PD relies on nurses from other departments to help out. AZA, for example, aims to employ those nurses who have a degree as paediatric nurse but who do not want to work in that department. Of course, it has to be calm in their own department for that strategy to succeed. Nurses from other departments without this diploma are seldom called upon because of the same reason why the PD avoids relying on the mobile team, their lack of knowledge and experience. The department that could provide some qualitative care is maternity. These nurses are used to small children, so even though they are also only capable of providing secondary care, it is more useful and efficient.

Remarkably, in AZSTV the paediatric nurses are employed in other departments during summer months. This is not possible in any of the other hospitals because of the constant high workload, as mentioned before. The HN of AZSTV mentions that for a few years in a row they have had to treat adults in the summer. This requires even more flexibility from these nurses because they have to get familiarized with another pathology.

2.2.2.3. Own workforce

Mostly the hospitals try to cushion the fluctuations with their own workforce. In the short-term this means that when the HN calls, somebody has to be available to step in. This requires a lot of flexibility of the nursing personnel. The most problematic moment is the night shift. If there are suddenly a lot of hospitalizations in the evening, it is difficult to find someone who can help during

the nightshift. All interviewees agree that the nurses are extremely flexible to respond to these situations, regardless of their age.

An additional source of WF is the recreation counsellor. Especially in AZA and in AZN, the bigger hospitals, they really count on the recreation counsellor as an extra member of their core workforce. The HN of AZA for example mentions the following, which clearly indicates the importance of an extra worker:

> *"My recreation counsellor is part-time recreation counsellor and part-time care provider. So, I do not have to tell you… Today she is the third person in the night shift because she is a care provider. However, it is suddenly very calm today so I told her she does not have to work as a nurse today because she has had to make the switch very often. Today I have the opportunity to let her make the switch in the other direction. I keep track of it, and I try to monitor it. Normally it should be 50%. So, I employ her extremely flexible. I should not do that actually, but a person has to work with what he's got."* (AZA – HN)

There is also a psychosocial counsellor but he or she does not have the correct qualifications to provide primary care. Nevertheless, some respondents mention that the psychosocial counsellor also lends a hand when it is extremely busy, by for example helping with feeding the children.

An additional type of flexibility that aids in tackling the fluctuations is efficiently deploying nurses who work part-time. In AZA these nurses are scheduled in such a way that their working hours do not exceed their contractual number of hours but that they do shorter shifts, meaning that for the same number of hours they have to work more days.

2.3. Perception and implementation of promising strategies

In this section the responses regarding the attitude and perception of the most promising strategies, as discussed in the literature research of this dissertation (section 4.2 Choosing the most suitable strategy), are reviewed.

2.3.1. Annualized hours

An AH system is currently not possible in Belgian hospitals. The interviewees were asked about the potential of this WF strategy, since it is perceived as one of the most promising solutions to deal with seasonal demand fluctuations. A recurring answer was that their hospital is already using a similar staffing system, to the extent possible, by scheduling more nurses in winter than in summer and by allowing job time alterations and doing extra hours. Remarkably the responses

of the HR, which are responsible for the administrative work behind the scheduling systems etc., are much more positive than those of the CM and HN, who work together more closely with the nurses.

In AZSTV the responses differ based on the point of view, whether from the perspective of the hospital or from the perspective of the nurses. According to the interviewees, the hospital would, theoretically, benefit greatly from an AH system because there would be more time and space to fluctuate the working hours. The HR states that it would eliminate the amount of overtime, which would reduce the costs, and ameliorate the ability to respond to the demand fluctuations. From the point of view of the nurses however, the system would arouse objections. The CM argues that the nurses are currently not willing to work more, so an AH system would not make any difference. It would be the cause of more stress.

The interviewees of AZA, the middle-sized hospital, similarly indicated that there would be nurses willing to adjust their work schedules to an AH system, but the majority of the nursing workforce already indicated that they do not want to make job time alterations, which is a first step towards an AH system. Additionally, the HN expresses some concern regarding the continuity of care when nurses are deployed irregularly.

The HR of AZN was very enthusiastic about the concept of AH. She thinks the concept would not be unfeasible. She makes the comparison with the self-rostering system the hospital has recently implemented as a pilot project to test its potential.

> *"This would have to grow, and trust would have to be built. We would have to try it in small pilot projects. We cannot immediately implement it. There would need to be clear agreements and guidelines. It would have to be monitored closely etc. But I really think it has the potential to make a difference."* (AZN – HR)

So, the overall conclusion regarding an AH system seems two-fold, on the one hand it could facilitate what the hospitals are already implementing and on the other hand the interviewees feel that it would not make that much of a difference, given the current mentality of the workforce.

2.3.2. Temporary workers

As has become clear in the literature part of this study a distinction needs to be made between external and internal TW. External TW are interns and student, interims and project nurses, and employees with a fixed-term contract. Internal temporary workers, which have been discussed in

the previous section 2.2 on the Current procedures to deal with seasonal demand fluctuations, are nurses from other departments, nurses from the mobile team and compensation nurses.

None of the interviewed hospitals employ external temporary workers in the PD, except for interns or students. All interviewees indicated that interims and project nurses are too expensive, and their skills are often too unpredictable and thus unreliable. They are not familiar with the PD's procedures, which limits their potential to offer support. The HN of AZA argues that the advantages do not outweigh the disadvantages. Both she and the HR of AZSTV state that the biggest challenge, next to the cost, is the lack of in-hospital training in comparison to the core workforce.

> *"The advantage is that you have an extra worker, but the drawback is that this person does not know the hospital, and that is very challenging in my opinion. Even if they know the hospital, it is difficult, let alone that they come from outside the hospital. They do not know the hospital at all, for example in terms of telephone numbers. We have to put so much effort into educating and training our nurses and then 1 person would come from outside and is expected to do an entire night shift by him- or herself. I do not understand how that is possible, but there are hospitals that do it."* (AZA – HN)

The CM of AZSTV adds that it is more difficult to deploy external TW in a small-scale hospital. There is a bigger risk to disrupt the hospital's delicate culture, because the external nurse would not support the same values and norms. The cooperation could suffer, which is something that would be impacted less in larger hospitals. Additionally, the HN states that their employment period is often too short and too busy for them to get truly familiarized with the department.

Interims and project nurses are sometimes employed in departments such as geriatrics, but this is kept to a minimum. The HN of AZN stated that they do not deliver the desired stability and quality levels. Moreover, if interims and most importantly project nurses, who are employed on a longer-term basis, are employed it is in the context of replacing a sick nurse or a nurse on pregnancy leave and not to deal with seasonal demand fluctuations.

Hospitals also have the option of employing nurses through a fixed-term contract. This is a cheaper option than making use of interims and project nurses. However, the HR of AZN states that there are not a lot of nurses anymore who want to work temporarily, unless they want to do an additional training program or go on a long-term holiday for example. On top of that, the national nurse shortage reduces the potential nurse pool. This WF strategy is also mostly implemented to deal with sickness and less to deal with the winter surges.

Overall the interviewees indicated that the choice for an extra set of hands is quickly outweighed by the lack of knowledge and the financial consequences. The hospitals prefer mobilising their own workforce.

2.3.3. Functional flexibility

Functional flexibility refers to the cross-training of nurses so that they are able to work flexibly in different departments. Nurses who are employed in the mobile or compensation team are expected to offer qualitative care in those departments with the highest demand or need for support. Most interviewees indicated that these nurses are functionally flexible. However, when asked if these nurses receive specific training the answers were mostly negative.

The HNs all indicated that adequate training is vital for fluent and efficient operational performance. They also stated that the risk of the lack of knowledge is a recurring issue when employing temporary workers, as mentioned before. In AZN additional training is highly encouraged, both for the core nurses as well as for the compensation nurses. They are contractually obligated to follow a predetermined amount of training. It is important to note however that these training sessions are not meant as a CT strategy but as a way to maintain the nurses' skills levels.

> *"We have a Mother-Child academy in which we organize on a yearly basis a few themes are additional training. These are always recurring themes such as reanimation and different modules. Our paediatricians also really support this. The compensation nurses are always invited, and they always have the opportunity to participate. When they are scheduled in the PD they also get invited to the work meetings. They are allowed to follow the training sessions. They are even allowed and encouraged to take up external training."* (AZN – CM)

Remarkably these training sessions are not necessarily organised in the calmer summer periods. The CM of AZN indicated that most nurses want to take up some furlough in the summer period, which limits the efficiency of additional training. She states that it is extremely challenging to find the most suitable moments to plan these sessions. Most nurses are required to take up this training before or after their regular shifts. This contributes to the heavy workload and feelings of stress, according to the CM.

The only specific type of CT that was mentioned by AZSTV is the paediatric nurses switching to adult departments, such as orthopaedics, in the calmer summer period. These nurses receive small-scale training to be able to qualitatively perform the required tasks.

The HR of AZN argues that CT of nurses would have to be compensated with adequate financial rewards. Most nurses would consider the additional training to enrich their skill profile, but they would expect to be reimbursed for their efforts.

2.3.4. Hospital networks

When asked about the potential of collaborations between the hospitals of a network in terms of employees, most interviewees indicated that whenever there is a shortage of nurses due to an increase in demand, all the hospitals in the network are struggling with the same issues. No PD would be able to miss some of its employees. Moreover, the HNs argued that the procedures and processes are too dissimilar for the nurses to maintain qualitative care. If collaboration would be in place the trade unions would want to implement the best aspects of their hospital, which complicates cooperation even more. The interviewees indicate that the networks offer quite some potential, but it is still at an early stage. The HN of AZA states that the hospitals should first develop a robust system inside their own hospital, before attempting to exploit complex collaborations. The HR of AZN mentions that the administrative work required for the implementation of such a system would be immense. The first step would be to find people who are interested because the most important part is the mind-set and willingness of the employees. The CM of AZSTV sees the potential of collaboration on network-level because then they would benefit from having a bigger pool of nurses.

> *"In theory this would be feasible, given that certain conditions are fulfilled. Because then you again have the advantage that a bigger hospital has, that you dispose of a bigger pool of nurses so that you have more flexibility to make the puzzle."* (AZSTV – CM)

The CM of AZN also states that the evolution of the networks will depend on the care program. Previously there were considerations regarding the development of a care program for the paediatrics department in terms of a network, according to the CM. There would be a more diversified system of university centres, tertiary centres, highly specialized centres, specialized centres and base level centres. This would make collaboration and nurse mobility impossible.

One type of collaboration that has taken place when demand was too high is enabling the mobility of patients. The HN of AZSTV shared that they sometimes get calls from other hospitals in their network that ask if there are still beds available. So, patients can be transferred more easily than nurses.

3. Discussion

This final chapter of the qualitative study provides a description of the most relevant findings and relates them to the reviewed literature. Not all hospitals in this study struggle to an equal extent with the seasonal nurse shortage. It seems that the bigger the hospital, the more serious and severe the problem becomes. This evaluation of the research question therefore focuses on the most striking issues rather than attempting to enhance the operational performance of the less disrupted hospitals.

3.1. The power of a compensation team

The most powerful strategy, next to adjusting the nurse-staffing schedule, seems to be the compensation team. When asked about the theoretical as well as the practically feasible ideal solution, there was a clear consensus about the power of a compensation team. The knowledge and skills that are necessary for a PD are very specific, so the general mobile team cannot provide what is needed, unless it would retain nurses with the appropriate education level. This is in line with the findings of multiple researchers stating that the most effective format of a mobile team is when the nurses are dual skilled (e.g. Brusco & Johns, 1998; Campbell, 1999; Henao et al., 2016). It also confirms the research by – among others – Campell (1999), Gnanlet and Gilland (2014), and Pinker and Shumsky (2000), that the advantages of cross-training nurses are limited. The interviewees state that compensation nurses are familiar with the inner workings of the department and the hospital, whereas employing people from the mobile team or employing external TW holds more disadvantages due to their lack of knowledge and skills. This endorses the research conducted by Inman et al. (2005), who add that also teamwork is stimulated. Two out of the three hospitals, AZSTV and AZN, already make use of a compensation team and the third, AZA, has stated that it wants to invest in one.

A recurring complaint however was the unavailability of these nurses. The concept of flexibility often disappears due to the high demand for the compensation team (as well as for the mobile team). These nurses are almost always assigned to a department, so when there is an increase in demand, there is little to no room for flexibility. The interviewees conclude that bigger compensation teams would provide the solution they are looking for. Adjusting the core workforce to ensure that the maximum possible level of demand is always met is not feasible. Nancarrow (2015) states that this would require huge investments in personnel and would leave most of the capacity of the nurses unused in calmer periods. Bigger compensation teams on the other hand provide flexibility because these nurses are engaged primarily to support the PD and the MD, but they can also be employed in other departments when needed. This is in line with the advantage

that larger hospitals have because they dispose of a larger workforce. The CM of AZN rightly points out that it is not possible to expand the compensation teams to infinity. An appropriate solution would be to make an estimate of how much support is required, based on previous years, to designate a fixed number of FTE.

The compensation team could be extended to a larger level, i.e. integrated hospital networks. An umbrella team available to all the hospitals of a network could provide the needed support. Networks are still in the development phase, so the potential of a central mobile team is difficult to evaluate. The interviewees seem to be open to the idea but indicate that it would require a lot of administrative alterations. This was also stated by e.g. Eeckloo et al. (2018), who argue that the complex structure of the Belgian legislative system, the switch from a competitive to a collaborative environment and the absence of adequate governance structures need to be overcome in order for the networks to reach their full potential. Currently hospitals are too dissimilar, which makes it impossible for nurses to deliver qualitative and efficient care. In that case the nurses would not be that different from external TW nurses. The advantages of employing nurses who are familiar with the hospital's procedures would disappear. Cardoen et al. (2017) have conducted a potential scenario analysis through a workshop with healthcare directors. They came up with 4 scenarios that could portray the future of hospital networks. However, it is uncertain how these networks will develop. Analysis of these developments could provide interesting insights into the real practical value of integrated hospital networks (see chapter on Limitations and further research).

Expanding compensation and mobile teams is one part of a trade-off with the other side being the size of the base team. If the nurses are added to the support teams, the base team needs to become smaller. The restrictions regarding the budget still apply. The power of a compensation team lies with the flexibility to employ nurses when necessary, so there is less need for a wide base staffing level.

3.2. Base level staffing

This leads to a second important aspect of WF as a mitigation strategy for the nursing shortage, namely the importance of a strong and robust base level staffing. Regardless of the type of WF employed, be it making use of an AH system, employing internal or external TW or adapting the nurse-staffing schedule based on the time period, without a robust base these strategies cannot succeed. Interestingly, the HN of AZN used the analogy of a triangle to demonstrate the importance, see Figure 3.1. The layers of the triangle do not represent the size of the listed types of employees, but rather the importance in terms of reliance and stability. This perception of a

healthcare institution's optimal workforce structure is very similar to the model of the flexible firm created by Atkinson (1984), which was the starting point of flexibility as a management tool.

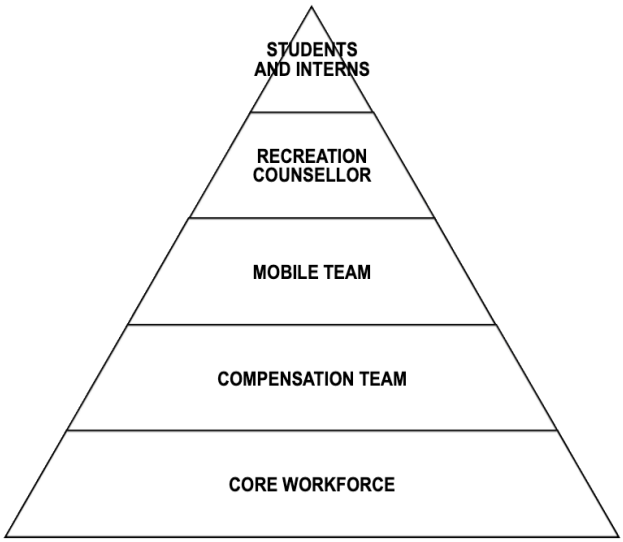

Figure 3.1 *Ideal workforce structure*

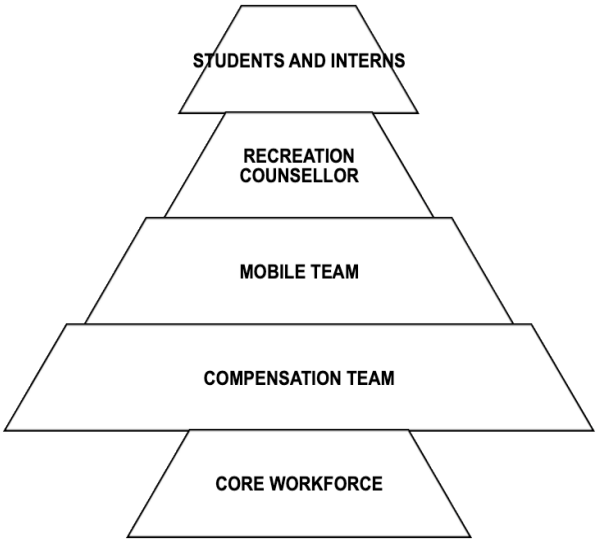

Figure 3.2 *Current, instable workforce structure*

The hospitals are struggling with a workforce structure in line with Figure 3.2, which represents the current, more problematic personnel organisation. The PDs in this study signalled struggling with a core workforce that is often uncomfortable and insecure. AZN relies heavily on TW but with an unsatisfactory core workforce, due to which they lose stability. The nurses in the hospital express a lot of frustration and uneasiness regarding these TW. The hospitals should invest in retention policies and the safeguarding of the nurse's satisfaction, as is proven in multiple research projects (e.g. Batch et al., 2009; Jack & Powers, 2006, 2009; Morgan & Tobin, 2004; Rambur et al., 2003; Rudy & Sions, 2003; Silvestro & Silvestro, 2000; Skinner et al., 2014). The power and advantages of the current system should be emphasized to ensure that the workforce triangle stabilizes. Additionally, there is a discrepancy in the importance of the recreation counsellor and relying on students and interns, in comparison to what should be. The recreation counsellor is an important part of the hospital's base team and is unevenly employed as a nurse, which should be avoided. The hospitals have also indicated that they rely too much on interns and mostly students to keep up with demand. They are dependent on secondary support systems to quasi permanently reinforce the core workforce instead of deploying them as supplementary aid when demand is high in the winter period.

An ideal workforce structure, as demonstrated in Figure 3.1, should first and foremost have a sturdy foundation. The team does not necessarily have to be large, but it should provide the

appropriate stability and guidance for the supplementary workers. The base team should feel confident and comfortable in their work environment to be able to accept the support without seeing it as a burden. Only then they can be supplemented with some kind of compensation team that consists of workers with the suitable professional education and skills. As secondary support system the mobile team has the ability to complement the nurses in times of more acute need, given proper training. The HNs expressed the importance of their recreation counsellors as part of the base team. If these workers own a dual diploma they can be deployed partly as a nurse when there is a shortage of nurses. However, the head nurses should never lose sight of their primary task, which is to entertain children and their families to make the hospitalization more comfortable. Relying on students and interns as full-fledged paediatric nurses is not ethically justified, nor is it the most qualitative solution. They can however offer an extra set of assisting hands when needed, without being deployed as an additional nurse. Not included in the figure but also valuable in times of extreme shortages are nurses from other departments. There are a lot of downsides to the deployment of these nurses since they lack the required knowledge and skills, but they can offer some aid.

3.3. The importance of training

A third aspect that deserves attention is the need for adequate nurse training. The specific care requirements limit the hospitals' possibilities for a more comfortable solution. Moreover, there is a lack of opportunities for adequate education. Whenever a nurse is employed, there is not enough time and budget available for a proper training period. The importance of training is heavily supported by literature. To give a few examples: Nicholls, Duplaga, and Meyer (1996), for example, found that investments in training have a positive impact on patient care. Kane-Urrabazo (2006) argues that the power of a float pool, and thus also of mobile and compensation teams, depends on proper training. Devos et al. (2011) also talk about the value of training in terms of nurse satisfaction and patient care.

In theory TWs are an ideal solution for the nursing staff shortage in the winter period (Dziuba-Ellis, 2006; Goodman-Bacon & Ono, 2007; Lockwood & Guerrier, 1989; Qin et al., 2015). However, there is a lot of negativity surrounding their unfamiliarity with the hospital (for external TW) and with the PD (for internal TW). The core workforce feels they spend a lot of their valuable time on re-training and re-educating TW whenever they come to offer support. Especially the midwives in the compensation team and the nurses from the mobile team should be offered training opportunities to ensure more efficient and qualitative care. As Riley and Lockwood (1997) have imparted, the hospital should determine the need for training, clearly define which functions

should be adjusted and to what extent and which training is needed to successfully implement this strategy.

An interesting suggestion, by the CM of AZA, was to provide e-learning sessions with information on for example how to record a patient's anamnesis, how to analyse a child's medical parameters, how to evaluate a child's pain threshold, how to administer aerosols etc. In this way, internal TW workers get the chance to renew and polish their skills and knowledge without the core workforce being responsible for their (re-)education. In this respect the remark arose that this would hamper the nursing time or would be added to the nursing hours. It is up to the hospital to devise an adequate training program that respects everybody's comfort.

Two recurring, more small-scale propositions to deal with the nursing shortage were that there should be people in the general night guard as well as in the IPT who are trained to work in the PD. These nurses lack the appropriate training, which further complicates the situation for the PD, since they have fewer nurses they can count on, in comparison to other, less problematic departments.

3.4. The potential of an AH system

All the hospitals, both directly and indirectly, indicated that their ideal solution should include a system in which the working hours can be balanced over a longer time period. This points towards an AH system. As mentioned in the literature part of this dissertation (section 3.1.5 Annualized hours) this system is currently impossible in Belgian hospitals due to the legislative restrictions. In other countries, such as the Netherlands, an AH system has already been successfully implemented (NVZ, 2017). As will be discussed in the next chapter, the positive attitude towards the implementation of such a system in a hospital environment could be the starting point of a pilot project in which its potential is examined.

The biggest objections are focused on the unwillingness of nurses to alter their job time and the loss of continuity of care. Schoonaert et al. (2018) also express concern about the latter since it can have a negative impact on care delivery. To overcome the nurses' aversion the recommendations of Stredwick and Ellis (1998) on how to implement an AH system could provide guidance. Most importantly is the minimum required number of workers during a shift that should be agreed upon with the HN. Only the minimum number of nurses should be specified; no additional factors should be included because this goes against the basic principles of the system. The system should regularly be evaluated in order to communicate the successes to the nurses as well as to improve the operability. In this, it is most important to incorporate the feedback of

the nurses. The authors also state that there should be some kind of compensation for those nurses who could be disadvantaged due to the new system, for example in the form of extra holidays. Furthermore, the nurses and the hospitals should be made aware of the benefits of using an AH system in order for the implementation to succeed. Advantages include – among other things (see section 4.3.1 Annualized hours) – reduced costs (Winaste et al., 2016), less overtime (Stredwick & Ellis, 1998) and a higher service level (Corominas et al., 2007).

Lastly, regarding the finding of Stredwick and Ellis (1998) that an AH system performs better in smaller hospitals, no significant possible advantages were detected or mentioned during the interviews.

Overall, the responses are mostly centred around quality of care, the satisfaction of both core and temporary workers and the impact on the workload. Less is said about the consequences for teamwork or the costs of the different WF strategies, unless when talking about external TW. This shows that security, safety, reliability and satisfaction are the corner stones in the evaluation process of the potential solutions to the nursing staff shortage in the winter period.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

As with every research, this dissertation has some limitations regarding its methods and scope. In this section these limitations will be discussed, and suggestions are provided that are interesting for further exploration in future research.

First of all, since the results of this dissertation are mostly based on semi-structured interviews, subjectivity and response bias are insurmountable (Yin, 2014). This could be due to poorly formulated questions, the interviewee's personal environment and educational background, the interviewer's interpretation of the responses etc. Interviews only provide indirect information, which is filtered through the respondent's view (Malagon-Maldonado, 2014). Moreover, CAQDAS' outcomes are entirely determined by the input of the researcher. In contrast to quantitative research, this software is unable to analyse, understand and explain the transcribed interviews (Mortelmans, 2011). So, the subjectivity of the researcher could pose a threat to the validity of the study results. Additionally, the fact that only 9 female employees of generation X (i.e. born between 1965 and 1979) were interviewed could be seen as a methodological limitation. This was not a deliberate choice, but merely a natural turn of events. The lack of interviews with nurses, who experience the seasonal fluctuations as well as the implications of the applied coping mechanisms first-hand, constitutes another limitation. A more diversified and extensive gender, age and professional distribution could offer interesting insights in seasonal demand fluctuations and the perception and willingness of implementing WF strategies as a mitigation strategy. These aspects could therefore be included as an additional perspective in future studies.

Regarding the generalizability of the research results, some limitations should be mentioned as well. The interviewees were asked about the current procedures and strategies, so the research is only repeatable to the extent in which no big changes are made regarding legislation, policies and administration. Moreover, no university hospitals were included in this research since they make little to no use of external resources, which renders them less suitable for the analysis objective of this dissertation. This study was conducted in Belgian hospitals, which are subject to Belgian legislation. Together with the restriction of examining only one department, this leads to limited transferability and generalizability. However, disregarding the administrative barrier, the concepts and ideas presented in this dissertation are also valuable to hospitals outside of Belgium. Additionally, some bias may be found in the selection process of the participating hospitals since 2 out the 3 participated in the preceding study of the MINOZ research centre.

These limitations may thus affect the generalizability and the possible lack of it may form a threat to the external validity of the study.
This dissertation's findings showed that emphasis is mostly put on quality of care, workload and both nurse and patient satisfaction. In literature on the other hand, the consequences of WF strategies in terms of the implied costs are widely discussed. The interviewees repeatedly mentioned the struggle of budget restrictions but did not mention the impact on the (potential) implementation of WF. Since hospitals are increasingly struck with economizations and costly reformations, it could be interesting to examine the financial aspect of employing these discussed strategies.

Lastly, due to the broad nature of the concept of WF flexibility no strategy was thoroughly analysed in all its aspects. This dissertation merely provides a stepping-stone for further research into the most promising concepts. Most importantly, the outcome of this study indicates two very promising WF strategies to deal with the summer-winter demand fluctuations, the AH system and mobility through integrated hospital networks. No thorough research was conducted into the potential of networks and the AH system, partly because both frameworks are still in its infancy phase and partly because this lay outside the scope of this study. Networks could provide an answer to the increasing demand for bigger teams, through which costs can be reduced thanks to effects of scale. When the legislation has been approved and developed, much more could be analysed. The potential of integrated hospital networks with regards to the nursing staff shortage in the winter period deserves its own research to look more deeply into the possibilities of employee sharing and overarching compensation teams. As for the AH system, it has already been implemented in the healthcare sector in other countries, so a comparative study could provide interesting insights in the possible advantages and drawbacks.

CONCLUSION

Based on the attributes of location-based, time-based and function-based WF strategies, this dissertation explored the problem of seasonal demand fluctuations and how WF could mitigate the nursing staff shortage in the winter period. All aspects of WF have been analysed in a thorough literature research, upon which the case studies that form the empirical part of this dissertation are based. Through semi-structured interviews three hospitals and more specifically their PDs were reviewed. There is no other hospital department in which flexibility is this highly required. The seasonal fluctuations are distinctly present and are the cause of a lot of stress and high workloads. Given the complex nature of workforce organisation and the limitations of this research, it is delicate to draw any general conclusions regarding the usage of WF strategies and the problem of seasonal demand fluctuations. However, the following observations are valuable to conclude this study.

Security, safety, reliability and satisfaction are the corner stones in the hospitals' when evaluating the potential solutions to the nursing staff shortage in the winter period. One perfect solution does not exist. It has become very clear that the different WF strategies are closely interrelated and not mutually exclusive. Most hospitals simultaneously implement different WF methods. Theoretically every solution has the power to deal with the problem, but in practice the hospitals encounter various obstacles. The changing societal and economic environment results in high work pressure and increased levels of stress for the health personnel, who have to deliver more with fewer resources. With both the human as the financial resources becoming increasingly scarce, it is difficult to respond to the changing demand for care.

The research findings indicate that both in the short-term as well as in the long-term there are mechanisms and procedures in place to deal with the summer-winter problem. Overall the interviewees indicated that the choice for an extra set of hands is quickly outweighed by the lack of knowledge and the financial consequences. The hospitals prefer mobilising their own workforce. They rely on adjusted scheduling systems and internal TW such as compensation and mobile teams or even nurses from other departments. In order for these strategies to remain feasible hospitals should re-evaluate the allocation of budget and attach more importance to the comfort and well-being of their nurses. They are the foundation in providing high-quality care. Simply hiring more nurses in the PD would solve the nursing shortage in the winter period, but it would lead to unused capacity in the calmer summer periods. Giving the current environment investing in a well-educated, confident and qualified compensation or mobile team seems to be the ideal solution. Implementing and maintaining a robust base and facilitating cross-training

opportunities do not only augment the performance of these secondary WF strategies. It also induces psychological encouragement, which is the linchpin of a high-quality hospital and thus, the PD. A more confident, comfortable and competent workforce automatically leads to error-reduction and high patient satisfaction, which is the purpose of every hospital.

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APPENDICES

Appendix A. Interview topic list per type of interviewee (in Dutch)

Table A.1 *Topic list interview care manager*

Onderwerp	**Vragen**
Problematiek seizoenschommelingen	1. Hoe ernstig is de problematiek op de afdeling pediatrie? 2. Hoe wordt de problematiek ervaren door verpleegkundigen op de afdeling? Wat is de houding tegenover de problematiek? 3. Welke gevolgen heeft de problematiek op de werking van de afdeling, op de verpleegkundigen en op de patiënten?
Flexibiliteit	1. Wat verstaat u onder flexibiliteit van verpleegkundigen? 2. Wat is de algemene houding tegenover vormen van flexibiliteit zoals bijvoorbeeld part-time werken, mobiele equipes, tijdelijke werknemers etc.? 3. Wordt flexibiliteit reeds toegepast in uw ziekenhuis? 4. Wordt flexibiliteit reeds toegepast op de afdeling pediatrie en in welke vorm?
Huidige procedures en methoden	1. Welke procedures en methodes worden nu toegepast om om te gaan met de seizoenschommelingen op korte termijn en op lange termijn? 2. Wat zijn hiervan de voor - en nadelen? 3. Waarom werd er gekozen voor deze procedure? 4. Welke mogelijkheden tot verbetering ziet u binnen en buiten het wettelijk kader? 5. Welke mogelijkheden ziet u dankzij ziekenhuisnetwerken in verband met mobiliteit van verpleegkundigen?

Table A.1 *Topic list interview care manager (continued)*

Veelbelovende strategieën	A. <u>Jaarurensystematiek</u> 1. Bent u vertrouwd met het jaarurensysteem dat reeds wordt gehanteerd in vele andere landen (bv: Nederland)? 2. Lijkt dit haalbaar in uw ziekenhuis? 3. Wat zouden volgens u de voordelen zijn? 4. Wat zouden volgens u de nadelen zijn? B. <u>Tijdelijke verpleegkundigen (focus op extern)</u> 1. Wordt in uw ziekenhuis beroep gedaan op tijdelijke verpleegkundigen? 2. Hoe worden de verpleegkundigen ontvangen? 3. Hoe wordt hun werk beschouwd? Vormen ze een waardevolle aanvulling? 4. Wat zijn de voordelen? 5. Wat zijn de nadelen? C. <u>Functionele flexibiliteit / cross-training</u> 1. Worden verpleegkundigen ingezet over meerdere afdelingen? 2. Worden de verpleegkundigen opgeleid om een groter takenpakket op te nemen? 3. Wat zijn hierbij de beperkingen op vlak van reglementering? 4. Hoe verloopt de samenwerking wanneer verpleegkundigen worden ingezet op een andere afdeling? 5. Wat zijn de voordelen? 6. Wat zijn de nadelen?

Table A.2 *Topic list interview human resources*

Onderwerp	**Vragen**
Problematiek seizoenschommelingen	1. Hoe ernstig is de problematiek op de afdeling pediatrie vanuit administratief oogpunt? Hiermee wordt verwezen naar bv. overtime en hoe/of verpleegkundigen hiervoor worden vergoed? 2. Welke gevolgen heeft de problematiek? 3. Wat is de houding tegenover de problematiek met betrekking tot tewerkstelling?
Flexibiliteit	1. Wat verstaat u onder workforce flexibility van verpleegkundigen? 2. Wordt flexibiliteit reeds toegepast in uw ziekenhuis? 3. Wordt flexibiliteit reeds toegepast op de afdeling pediatrie en in welke vorm?
Huidige procedures en methoden	1. Welke procedures en methodes worden nu toegepast om om te gaan met de seizoenschommelingen op korte termijn en op lange termijn? 2. Wat zijn hiervan de voor - en nadelen op administratief vlak? 3. Waarom werd er gekozen voor deze strategie? 4. Wordt de selectieprocedure van verpleegkundigen aangepast aan de strategie? 5. Welke mogelijkheden tot verbetering ziet u binnen en buiten het wettelijk kader? 6. Zijn er verschillen met andere afdelingen? Zo ja, waarom? En valt hier iets uit te leren? 7. Welke mogelijkheden ziet u dankzij ziekenhuisnetwerken in verband met mobiliteit van verpleegkundigen?
Veelbelovende strategieën	A. <u>Jaarurensystematiek</u> 1. Bent u vertrouwd met het jaarurensysteem dat reeds wordt gehanteerd in vele andere landen (bv: Nederland)? 2. Lijkt dit haalbaar in uw ziekenhuis? 3. Wat zouden volgens u de voordelen zijn? 4. Wat zouden volgens u de nadelen zijn?

Table A.2 *Topic list interview human resources (continued)*

	B. <u>Tijdelijke verpleegkundigen (focus op extern)</u> 1. Wordt in uw ziekenhuis beroep gedaan op tijdelijke verpleegkundigen? 2. Wat zijn de gevolgen op administratief vlak? 3. Hoe worden deze verpleegkundigen geselecteerd? 4. Hoe worden deze verpleegkundigen ontvangen? C. <u>Functionele flexibiliteit / cross-training</u> 1. Worden verpleegkundigen ingezet over meerdere afdelingen? 2. Wat houden deze opleidingen in? 3. Worden de verpleegkundigen opgeleid om een groter takenpakket op te nemen? 4. Hoe worden deze opleidingen georganiseerd? 5. Wanneer vinden deze opleidingen plaats?

Table A.3 *Topic list interview head nurse paediatrics*

Onderwerp	**Vragen**
Problematiek seizoenschommelingen	1. Hoe ernstig is de problematiek op de afdeling pediatrie? 2. Hoe wordt de problematiek ervaren door verpleegkundigen op de afdeling? Wat is de houding tegenover de problematiek? 3. Welke gevolgen heeft de problematiek op de werking van de afdeling, op de verpleegkundigen en op de patiënten?
Flexibiliteit	1. Wat verstaat u onder workforce flexibility van verpleegkundigen? 2. Wat is de houding tegenover vormen van flexibiliteit zoals bijvoorbeeld part-time werken, mobiele equipes, tijdelijke werknemers etc.? 3. Wordt flexibiliteit reeds toegepast in uw ziekenhuis? 4. Wordt flexibiliteit reeds toegepast op de afdeling pediatrie en in welke vorm?
Huidige procedures en methoden	1. Welke procedures en methodes worden nu toegepast om om te gaan met de seizoenschommelingen op korte termijn en op lange termijn? 2. Wat zijn hiervan de voor - en nadelen? 3. Waarom werd er gekozen voor deze procedure? 4. Welke mogelijkheden tot verbetering ziet u binnen en buiten het wettelijk kader? 5. Zijn er verschillen met andere afdelingen?
Veelbelovende strategieën	A. <u>Jaarurensystematiek</u> 1. Bent u vertrouwd met het jaarurensysteem dat reeds wordt gehanteerd in vele andere landen (bv: Nederland)? 2. Lijkt dit haalbaar in uw ziekenhuis? 3. Wat zouden volgens u de voordelen zijn? 4. Wat zouden volgens u de nadelen zijn?

Table A.3 *Topic list interview head nurse paediatrics (continued)*

	B. <u>Tijdelijke verpleegkundigen (focus op extern)</u> 1. Wordt in uw ziekenhuis beroep gedaan op tijdelijke verpleegkundigen? 2. Hoe worden deze verpleegkundigen ontvangen? 3. Welke taken voeren zijn uit? Hoe kwalitatief wordt hun werk beschouwd? 4. Wanneer en waar worden zij ingeschakeld? 5. Wat zijn de voordelen? 6. Wat zijn de nadelen? C. <u>Functionele flexibiliteit / cross-training</u> 1. Worden verpleegkundigen ingezet over meerdere afdelingen? Welke afdelingen? 2. Worden de verpleegkundigen opgeleid om een groter takenpakket op te nemen? 3. Hoe comfortabel voelen verpleegkundigen zich hierbij? 4. Hoe verloopt de samenwerking wanneer verpleegkundigen worden ingezet op een andere afdeling? 5. Wat zijn de voordelen? 6. Wat zijn de nadelen?

Appendix B. Approval Ethics Committee (Ghent University)

Afz.: Commissie voor Medische Ethiek

Universiteit Gent
Faculty of Economics and Business Administration
Prof. dr. Paul GEMMEL
De pintelaan 185
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contact	telefoon	e-mail
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Ons kenmerk	Uw kenmerk	datum	pagina
2019/0125		8-apr-19	1/2

Betreft :

DEFINITIEF ENIG (centraal) ADVIES voor studie met als titel:
Workforce flexibility and demand fluctuations in healthcare: seasonal fluctuations.
How can workforce flexibility mitigate the nursing staff shortage in the winter period?
- Scriptie: Eleonore Théry

Belgisch Registratienummer: B670201939006

* Begeleidende brief dd. 31/01/2019
* Informatie- en waarschuwingsnota over de verwerking van informatie voor medisch-wetenschappelijk onderzoek dd. 29/01/2019
* CV : Eleonore Théry
* Vragenlijsten dd. 06/12/2018 : Topiclijst vragen interview versie 1
* Advies lokale EC's
  - AZ Alma (advies dd. 18/02/2019 - ontv. dd. 20/02/2019)
  - AZ Sint Nikolaas (advies dd 18/02/19, ontv dd 25/02/19 en advies dd. 07/03/2019 - ontv. dd. 11/03/2019)
  - Sint-Vincentiusziekenhuis Deinze (advies dd. 28/02/2019 - ontv. dd. 04/03/2019 en advies dd. 12/03/2019)
* Antwoord onderzoekers dd 03/04/2019 (Ontvangen dd 04/04/2019) op opmerkingen EC dd 13/03/2019
* Adviesaanvraagformulier, (Herwerkte versie n.a.v. opmerkingen EC dd 13/03/2019)
* (Patiënten)informatie- en toestemmingsformulier dd. 19/03/2019, (Versie 5)

Advies werd gevraagd door:
Prof. dr. P. GEMMEL ; Hoofdonderzoeker

BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD. ER WERD EEN DEFINITIEF ENIG (CENTRAAL) POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 05/04/2019.
INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 04/04/2020, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.
Vooraleer het onderzoek te starten dient contact te worden genomen met Bimetra Clinics (09/332 05 00).

THE ABOVE MENTIONED DOCUMENTS HAVE BEEN REVIEWED BY THE ETHICS COMMITTEE.A DEFINITIVE SINGLE POSITIVE ADVICE WAS GIVEN FOR THIS PROTOCOL ON 05/04/2019.
IN CASE THIS STUDY IS NOT STARTED BY 04/04/2020, THIS ADVICE WILL BE NO LONGER VALID AND THE PROJECT MUST BE RESUBMITTED.
Before initiating the study, please contact Bimetra Clinics (09/332 05 00).

DIT ADVIES WORDT OPGENOMEN IN HET VERSLAG VAN DE VERGADERING VAN HET ETHISCH COMITE VAN 16/04//2019

THIS ADVICE APPEARS IN THE PROCEEDINGS OF THE MEETING OF THE ETHICS COMMITTEE OF 16/04/2019

ALGEMENE DIRECTIE
Commissie voor Medische Ethiek

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- *Het Ethisch Comité werkt volgens 'ICH Good Clinical Practice' - regels*
- *Het Ethisch Comité beklemtoont dat een gunstig advies niet betekent dat het Comité de verantwoordelijkheid voor het onderzoek op zich neemt. Bovendien dient U er over te waken dat Uw mening als betrokken onderzoeker wordt weergegeven in publicaties, rapporten voor de overheid enz., die het resultaat zijn van dit onderzoek.*
- *In het kader van 'Good Clinical Practice' moet de mogelijkheid bestaan dat het farmaceutisch bedrijf en de autoriteiten inzage krijgen van de originele data. In dit verband dienen de onderzoekers erover te waken dat dit gebeurt zonder schending van de privacy van de proefpersonen.*
- *Het Ethisch Comité benadrukt dat het de promotor is die garant dient te staan voor de conformiteit van de anderstalige informatie- en toestemmingsformulieren met de nederlandstalige documenten.*
- *Geen enkele onderzoeker betrokken bij deze studie is lid van het Ethisch Comité.*
- *Alle leden van het Ethisch Comité hebben dit project beoordeeld. (De ledenlijst is bijgevoegd)*
- *The Ethics Committee is organized and operates according to the 'ICH Good Clinical Practice' rules.*
- *The Ethics Committee stresses that approval of a study does not mean that the Committee accepts responsibility for it. Moreover, please keep in mind that your opinion as investigator is presented in the publications, reports to the government, etc., that are a result of this research.*
- *In the framework of 'Good Clinical Practice', the pharmaceutical company and the authorities have the right to inspect the original data. The investigators have to assure that the privacy of the subjects is respected.*
- *The Ethics Committee stresses that it is the responsibility of the promotor to guarantee the conformity of the non-dutch informed consent forms with the dutch documents.*
- *None of the investigators involved in this study is a member of the Ethics Committee.*
- *All members of the Ethics Committee have reviewed this project. (The list of the members is enclosed)*

Het Ethisch Comité UZ Gent heeft rekening gehouden met de adviezen van bovenvermelde lokale ethische commissies.
The Ethics Committee UZGent took into account the advice of the above mentioned non-leading EC's.

Het aangepaste patiënteninformatie- en toestemmingsformulier (versie en datum zoals boven vermeld) werd goed bevonden door het centraal EC UZGent.
Er wordt aangenomen dat dit door de andere lokale EC's aanvaard wordt, tenzij binnen de 5 dagen deelname geweigerd wordt./
The adapted patient informed consent form (version and date as mentioned above) has been accepted by the leading EC UZGent
It is assumed to have been accepted by the non-leading EC's, unless they refuse to participate within 5 days.

Namens het Ethisch Comité / On behalf of the Ethics Committee

Prof. dr. D. MATTHYS
Voorzitter / Chairman

Bijlage: Aangepast(e) patiënteninformatie- en toestemmingsformulier(en)./
Encl.: Adapted informed consent form(s)

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