

## SHORT REPORT

# SAFE NURSE STAFFING LEVELS IN ACUTE HOSPITALS





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KOEN VAN DEN HEEDE, LUK BRUYNEEL, DORIEN BEECKMANS, NIELS BOON, NICOLAS BOUCKAERT, JUSTIEN CORNELIS, DORIEN DOSSCHE, CARINE VAN DE VOORDE, WALTER SERMEUS





## ■ FOREWORD

On May 12th of 2020 we celebrate that, 200 years ago, Florence Nightingale, the pioneer of modern nursing, was born. She contributed extensively to the professionalization of the nursing profession, e.g. by investing in nursing education programmes. Less known is that she was also an expert in statistics. She used these skills in a very didactic way to improve public health. She demonstrated that science can perfectly go hand in hand with human skills, such as empathy. A combination that is essential for nursing.

The efforts of Florence Nightingale transformed nurses from purely devoted persons into versatile and competent healthcare professionals. The societal image of nursing is up till now still often limited to a caring profession. Yet, nurses combine the art of caring with mastering advanced technical skills, complex treatments, surveillance, clinical reasoning and an ability to quickly react in emergency situations.

The ever increasing workload and care complexity put pressure on the combination of these skills. The current study shows in a rigorous and scientifically sound way that the number of patients assigned per nurse is much too high to enable nurses to do their job properly. On the one hand resources for nurses are not sufficient due to outdated (licensing and payment) standards. On the other hand they are expected to provide high-quality technical care in a human way. Balancing these skills in the current context is far from optimal. As such protest emerges in Belgium and abroad.

Clear policy measures that will require additional financial resources are urgently needed. Yet, let's not fool ourselves, not everything can be solved with millions of Euros. Before additional nurses can be recruited they will have to be educated. To attract more nursing students to the university and colleges, efforts to make the profession more attractive are needed. While important, several studies demonstrate that it is not sufficient to provide students the outlook of a competitive salary. They need to be ensured that the working conditions are such that they can deliver high-quality patient care in a safe and scientifically based manner as patients have the right to expect. What is more, they need to have guarantees that they can focus on activities for which they are competent and that supporting staff is available to perform non-nursing tasks.

Marijke EYSEN  
Deputy general director a.i.

Christian LÉONARD  
General director a.i.



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## 1. BACKGROUND

This study aims to evaluate if the current nurse staffing standards for acute hospitals in Belgium are still appropriate in light of the changing hospital practice (e.g. reductions in length of stay, ageing population). We first give a contextual description of the Belgian (hospital) nursing workforce and the relevance of this topic before detailing the scope and research questions in section 1.4.

### 1.1. The Belgian nursing workforce: a context description

We describe below the context of the Belgian nursing workforce in order to understand 'nurse staffing levels' in Belgian hospitals. We refer the reader to Chapter 1 of the scientific report for more information on the history of nursing practice, career pathways (including advanced educational pathways), attraction and retention policies (including salary schemes) and legal context (e.g. scope of practice).

#### 1.1.1. Two main educational pathways to enter the nursing profession

In Belgium there are two main educational pathways to enter into the nursing profession: Bachelor-level nurses ('Bachelor-verpleegkundigen'/'Bachelier d'infirmier[ère] – historically known as A1) and Diploma-level nurses<sup>1</sup> ('HBO-5 verpleegkundigen' in the Flemish Community and 'brevet d'infirmier[ère] hospitalier [ère]' in the French-speaking community – historically known as A2). In order to harmonise nursing education programmes across the EU and to facilitate labour mobility, EU-directives were adopted including minimum criteria for nursing educational programmes (see Chapter 1 of the scientific report for more details).

- Diploma-level: In all communities, the diploma-degree programmes were until recently organised through a three-year vocational training programme following secondary level education. Yet, in the French-speaking community it was decided to extend the education (with an additional 6 months) to comply with the EU-directives. In the Flemish community there has been no such reform (yet). As such, it is unclear if the HBO-5 level complies with the EU-directives.<sup>1</sup>
- Bachelor-level: The Bachelor education is organised by Higher Education Institutions linked to universities (called university colleges). To comply with the EU-directives the programme was reformed by increasing the amount of hours of practical training and by adding competencies to the curriculum. Starting from the academic year 2016-2017 it became a four-year programme.

Contrary to most countries with several entry gates in the nursing profession, in Belgium, there is no difference in scope of practice in patient care, and no legal framework that enforces a differentiated practice.<sup>2</sup>

#### 1.1.2. The nursing workforce: facts and figures

##### **Nurse density in Belgium is higher and the working percentage lower than the EU-average**

In 2016, there were 202 402 nurses licensed to practice (including nurses with Bachelor-level; Diploma-level; with a foreign degree in nursing and hospital assistants<sup>2</sup>) in Belgium.<sup>3</sup> Of these nurses, 143 470 were active (55%) on the Belgian labour market (all possible sectors) and 124 196 nurses ('practising nurses') were working in the healthcare sector.<sup>3</sup> In the most recent 'Health at a Glance' publication, 11 nurses per 1 000 inhabitants are reported which is higher than the OECD-36 average of 8.8. Belgium is ranked 11<sup>th</sup> (5<sup>th</sup> place of EU-28 countries).<sup>4</sup>

<sup>1</sup> Organised at the level of the 'secondary school': 'Hoger secundair beroepsonderwijs'/'Formation de niveau secondaire complémentaire'.

<sup>2</sup> Old category of nurses that was abolished in 1996.<sup>2</sup>

<sup>3</sup> This includes hospitals, nursing homes, home nursing, etc. It should be noted that (while not indicated in the OECD-reports) this includes not only nurses involved in bedside care but also managers, nurses in administrative roles, etc.



### **Nurses providing direct patient care on general hospital wards work around 80% FTE**

Like in most EU-countries, also in Belgium the majority of nurses (around 75 000 nurses) work in hospitals and the number of nurses (head count and full-time equivalents or FTE) working in hospitals has increased over the past decade.<sup>5</sup> Yet, while in many countries the ratio of FTE nurses to the absolute number (head count) remained stable at around 0.80 to 0.95, this ratio is, according to the OECD, lower (0.70-0.75) in Belgium.<sup>5</sup> Our analysis indicates that the working ratio in 2016 for nurses providing direct patient care on general hospital wards was around 0.80, while lower rates were reported for e.g. day-care wards (see Chapter 2 of the scientific report).

### **An ageing workforce**

In addition, it is important to note that the nursing workforce is ageing (more than 1 in 3 nurses is aged  $\geq 50$  years), the share of foreign-trained nurses is low but gradually increasing (from 0.5% in 2000 to 3.5% in 2017) and the number of nursing graduates has been decreasing in recent years after a short period (2013-2017) of increased inflow (see Chapter 2 of the scientific report for more details).

#### ***1.1.3. Nurse staffing levels in acute hospitals: licensing standards and hospital payment system***

The two main drivers of current staffing levels in Belgian hospitals are the hospital payment system and licensing standards.

### **Nurse-to-bed ratios are an important driver of hospital budgets**

Hospitals receive a basic budget (via the B2-part of the hospital budget) for nurse staffing (see Chapter 4 of the scientific report for more details) that is based on the number of justified beds (see Box 1), and the minimal nurse-to-bed ratios for various types of nursing wards (e.g. 12 FTE per 30 justified beds). In addition to this basic budget, hospitals receive a budget based on the intensity of nursing care (i.e. calculated via the Belgian Nursing Minimum Data Set, B-NMDS; also part of B2 of the hospital budget), type of hospital (i.e. compensation for university hospitals), collective labour agreements (CLA) and other policy measures (e.g. payment for 'floating staff': a pool of

nurses that can be allocated in a flexible way to different nursing wards within the same hospital), project funding (part B4 of the hospital budget), etc. Roughly estimated a budget of 13 to 15.25 FTE per 30 justified beds (assumption of minimum payment based on 'justified beds' and 1 additional FTE from CLA) corresponds with a bedside patient-to-nurse ratio ranging between 11.3 patients per nurse and 14.0 patients per nurse (see Chapter 4 of the scientific report for details).

This estimate does not take into account that the budget for nurse staffing foreseen in the hospital budget per FTE is since many years lower than the actual salary costs for 1 FTE.<sup>6</sup> Therefore, hospitals might have to downsize their staffing levels, substitute nurses by lower qualified and cheaper staff or use other resources to finance nursing care (e.g. increased patient supplements and/or deductions on physician fees).<sup>6</sup> The latter also holds when hospitals decide to implement higher staffing levels than those based on 'financial standards'.

### **Licensing standards**

The minimal nurse staffing levels for general hospital wards are regulated by the Royal Decree of 23 October 1964.<sup>7</sup> It is stipulated that on each day the nursing ward should have, at all times, one nurse staffed (diploma or bachelor in nursing or midwifery) per 30 patients to ensure quality of patient care. The nursing ward manager cannot be counted as 'nursing staff' to meet this requirement. Furthermore, it is stated that the proportion of full-time versus part-time nurses is such that continuity of care is ensured and that nursing wards are organised in a way that it is possible to identify which nurse is responsible for the care of a particular patient. Next to these general licensing standards, there are additional or specific standards for specific ward types (e.g. 14.13 FTE nurses, allied health professionals or care assistants per 24 geriatric beds), functions (e.g. intensive care holds a specific team with 24/7 availability of at least two nurses for each six beds) and care programmes (e.g. stroke: 24/7 availability of 1 bachelor nurse with competence in neurovascular care, 1 additional nurse with equivalent competencies for each 6 supplementary patients). There are also specific licensing standards for university hospitals via the Royal Decree of December 1978:<sup>8</sup> e.g. surgical and internal medicine wards need to be staffed at least with 0.6 FTE per occupied bed (nursing and supporting staff) of which 75% are at least qualified nurses.



As part of the 6<sup>th</sup> State reform, it was specified that from 1 July 2014 onwards, the Federal authority remains responsible for the hospital budget, while the Federated authorities gain responsibility for defining, granting and controlling the licensing standards. Yet, these standards have to respect the organic legislation, the federal programming criteria and the federal power to regulate the practice of medicine. If necessary, the federal government has a veto right against standards that have a negative impact on the budget of the federal government or the social security budget.<sup>9</sup>

## 1.2. The importance of adequate staffing levels and a good nursing work environment

### 1.2.1. Nurse staffing and outcomes are clearly associated but the relationship is complex

#### Nurse staffing levels and patient and nurse outcomes: number and educational level

A large body of evidence supports associations between nurse staffing levels with both patient outcomes and nurse outcomes.<sup>10-19</sup> It is sufficiently demonstrated that there is a relationship between the number of registered nurses (RNs) and patient and nurse outcomes and between educational level (proportion of RNs with a Bachelor's degree) and patient outcomes. This association has been mainly studied *via cross-sectional study designs*.<sup>20, 21</sup> Although these studies illustrate fairly consistently that lower staffing levels (e.g. a higher patient load per nurse) are associated with a higher risk of worse patient outcomes (e.g. mortality, failure-to-rescue, hospital-acquired infections) and worse nurse outcomes (e.g. burnout, job dissatisfaction, intention-to-leave), the cross-sectional nature of the study designs hampers causal inferences.<sup>22</sup> Yet, studies with *longitudinal study designs*, and studies that link the 'nursing dose (i.e. amount of nursing care that is given to a patient)' at the individual patient level, to patient outcomes

start to emerge. These recent longitudinal studies confirm these relationships.<sup>23-26</sup>

#### The importance of missed nursing care

There is emerging evidence that 'missed nursing care' is a mediating factor explaining the association between nurse staffing levels and patient outcomes. Indeed, nurses ration<sup>4</sup> care implicitly in function of their workload. As such the 'missed nursing care' increases when staffing levels are lower.<sup>27-31</sup> (see Box 1 for a detailed explanation of the 'missed nursing care' concept).

#### The role of supporting staff

The role of healthcare assistants (HCAs) is less clear. While some studies demonstrate that working with HCAs (irrespective of the level of the RN staffing levels) increases the risk of worse outcomes,<sup>32</sup> there is a recent longitudinal study<sup>29</sup> that indicates that an optimal level of HCAs might exist. The authors found that HCA levels were significantly associated with a lower risk of mortality up to a certain level. Above that threshold level the risk of mortality increased (i.e. adding more HCAs increased the risk of mortality). The results suggest increased harms when there are either too few or too many HCAs.<sup>29, 33</sup> It seems that too many HCAs result in a diffusion of efforts but that a sufficient supporting staff is required to avoid a shift of the work of supporting staff (e.g. transporting patients, delivering food trays) to RNs. Such a shift might lower the time of RNs to spend on nursing tasks such as patient assessment, surveillance, etc. The assumption for such a mechanism seems to be confirmed by another recent longitudinal study in which it is shown that the effect of low RN staffing levels on patient outcomes might be intensified when supporting staff levels (licensed practice nurses (LPNs: see Box 1 for more information about this role) and HCAs) are low.<sup>34</sup>

Although the evidence about HCAs is not as well established as that about nurse staffing levels, it shows that HCAs work as complements (to a certain extent) rather than substitutes for RNs.<sup>33</sup>

<sup>4</sup> The withholding or failure to carry out necessary nursing tasks due to inadequate time, staffing level, etc.



### Nursing work environment

The complexity of the staffing – outcome relationship is also illustrated by the body of evidence that links factors of the nursing work environment (e.g. physician-nurse relationships, leadership style, staffing adequacy, participation in hospital affairs) with patient and nurse outcomes. It is possible that the relationship between nurse staffing levels and patient/nurse outcomes is influenced by the quality of the work environment. Indeed, evidence suggests that the positive effect of more staff per patient disappears in poor nursing work environments.<sup>17, 35-40</sup>

One way to implement improvements in nurse work environments is through the Magnet recognition program, led by the 'American Nurses Credentialing Center (ANCC)'. A strong nurse practice environment is a core element of this programme. Magnet hospitals follow a blueprint to demonstrate nursing excellence through empirical outcomes. Achievement in five components is required to attain Magnet recognition, including (1) transformational leadership, (2) structural empowerment, (3) exemplary professional practice, (4) new knowledge, innovations and improvements, and (5) empirical outcomes.<sup>41, 42</sup> In Belgium there is one hospital (University Hospital of Antwerp) that was formally accredited as a 'Magnet Hospital'.<sup>43</sup>

### Many practical questions remain unanswered

Despite the sound consistent and cumulative evidence about relationships between nurse staffing levels and patient and nurse outcomes, several fundamental questions remain largely unanswered: 'How many nurses are exactly needed?', 'What kind of skill mix is recommended?', 'Are patient-to-nurse ratios the best solution to ensure adequate nurse staffing levels?'.<sup>44</sup> These issues are pertinent for the real-world application of a policy on nurse staffing levels. This explains why regions and countries that are setting up safe staffing policies use different approaches while they all start from the same body of evidence (see section 4; see Chapters 6-11 in the scientific report).

### 1.2.2. *Bedside nurse staffing levels in Belgian hospitals are known to be low in a European context*

A large European study (i.e. 'RN4CAST' – see Box 1) conducted in 2009 in 12 European countries allows to compare bedside nurse staffing levels in Belgium in an international perspective. A nurse working on a Belgian general surgical or internal medicine ward, was in 2009 on average responsible for 10.7 patients. Only Germany and Spain had a higher caseload per nurse. What's more, the Belgian nurse staffing ratio was far above the European mean of 8.3 patients per nurse. Furthermore, in Belgium 55% (range 26%-86%) of bedside hospital nurses were educated at the Bachelor-level which is slightly higher compared to the European average of 52%.<sup>20</sup>

### 1.3. *A hospital landscape in evolution and potential impact on nursing care*

#### **A dense hospital landscape with high utilization rates and fragmentation**

The Belgian healthcare system is characterized by a dense hospital landscape with a high number of acute beds per population and high utilization of hospital services (i.e. a high number of nursing days per inhabitant per year).<sup>9, 45</sup> Belgian hospitals are mainly operating as stand-alone organizations providing the full range of services, including very specialized and complex services. This results in duplication and fragmentation of services.<sup>6, 9, 45, 46</sup> It is important to assess Belgian nurse staffing levels within this context.

#### **Clear trends: more hospital admissions – decreasing length of stay – substitution towards day care – ageing hospital population**

During the last two decades several clear trends in hospital utilization were identified. It was observed that an increasing number of hospital admissions was offset by a decreasing length of stay and a substitution from inpatient towards day care. As a result, the number of inpatient days decreased.



It is expected that these trends will continue in the forthcoming years. Between 2014 and 2025 the number of hospital admissions (inpatient stays) is expected to increase by 11.8% while the length of stay will further decrease for most pathology groups. As a result, it is estimated that the number of inpatient stays will further decrease with 5%. As a consequence of these changing hospital utilization rates and changing demographics, the required hospital capacity will change. The current observed overcapacity of acute hospital beds is expected to intensify. Therefore, it seems indicated to reduce the number of inpatient beds, and to invest in alternatives (e.g. day-care facilities, hospital alternatives). The real challenges, however, are situated beyond 2025, when ageing starts to peak. This will revert the reduction in inpatient stays and will result in an increasing proportion of elderly amongst the hospitalized patients requiring a boost in geriatric expertise in the hospital workforce and/or substantial investments in hospital alternatives tailored to this population.<sup>9, 47</sup>

### **A major reform of the Belgian hospital sector is in the starting blocks**

The Belgian hospital landscape is undergoing a reform which aims to enhance task distribution between hospitals (e.g. concentration of complex care or high-cost technologies in a more limited number of hospitals) and rationalize the supply of general hospital services. An important policy lever to achieve these goals is the introduction of geographically defined hospital collaborations, the so called 'loco-regional clinical networks'. Indeed, early 2019 a law was voted that will make it compulsory for hospitals to be part of a loco-regional hospital network from 2020 onwards. These loco-regional networks (max. 25 for the Belgian territory) will have to make arrangements about general hospital services such as geriatric wards, paediatric services, emergency departments, etc. In addition, the law stipulates that for certain services (e.g. complex cancer surgery) loco-regional hospital networks have to make arrangements with hospitals outside the network. These are called 'supra-regional' collaborations.<sup>48</sup>

### **Implications for nursing care**

It is clear that these evolutions and reforms will have several important implications on the (nursing) workforce such as required expertise, increased intensity of care of the remaining nursing days, mobility of staff (e.g. across care settings, within a hospital network), etc. In this study we will mainly focus on the impact of the (potential) increased intensity of nursing care on nurse staffing levels.

## **1.4. Study objectives – scope and approach**

### **Study aim**

The main aim of this study is to evaluate if the current nurse staffing standards (i.e. staffing levels as included in legislation and payment system) for Belgian acute hospitals are appropriate, especially in light of a changing hospital context (e.g. reductions in length of stay, ageing population, etc.). The three main topics addressed in this study are:

- Are nurse staffing levels adapted to changes in intensity of nursing care?
- Have key variables (e.g. patient-to-nurse ratios, proportion of Bachelor-prepared nurses, missed nursing care, job satisfaction, burnout, intention-to-leave, etc.) as measured by the RN4CAST-study (2009) changed over the last 10 years?
- What lessons can be learned from safe staffing policies abroad?

### **Scope – inpatient hospital wards in acute hospitals**

We focus throughout the report on 'nurse staffing levels' that are required for safe patient care, as well as to ensure that hospitals are attractive work places with a positive impact on nurses' wellbeing. It is beyond the scope of the report to address issues such as 'advanced practice nursing roles' and other specialized nursing roles, staffing levels for other healthcare professionals (e.g. physician staffing), etc.





We are focussing on inpatient hospital wards and general surgical and internal medicine wards in particular. Despite the focus on these ward types (mainly because of the available evidence and the comparability with RN4CAST) we expand this scope where possible (i.e. evolution of intensity of nursing care and staffing levels: Chapter 3 of the scientific report; international comparison: Chapters 6-11 of the scientific report) to other hospital wards (i.e. geriatrics, rehabilitation, paediatrics). Also for intensive care wards the evolution in 'care intensity' and nurse staffing levels is shown. Maternity care wards are out-of-scope given the important role of midwives and the different scope of practice. Wards or services such as day care, emergency departments, operation theatre, neonatal intensive care, medical-technical wards, etc. were not studied (e.g. because of lack of available data). This does, however, not imply that staffing ratios are adequate or not relevant on these wards and services, they are just not studied in the current study.

It was beyond the scope to study the evaluate nurse staffing levels in other sectors such as home care, nursing homes or mental healthcare. For each of these sectors a specific study is required.

In this study we did not link nurse staffing variables with patient outcomes. This was, from the outset of the study, considered out of scope for two reasons:

- This relationship is already sufficiently demonstrated in (inter-) national research. The added value of yet another study would have been limited.
- Working with patient outcome data (mostly via administrative databases) is complex and time consuming. It would have extended the study duration substantially. We work, for instance, with nurse survey data from 2019. Linking these data with patient outcomes data from 2019 will only be possible from 2021 onwards (time lag in data availability).

### Box 1 – Key concepts

#### Nurses and healthcare assistants (ILO ISCO-08<sup>49</sup>)

- A registered nurse (RN) is a nurse who has met the criteria for a nursing license defined by their country's (or state's) statute. They are independently accountable for their decisions and actions.
- An associate level nurse provides basic nursing and personal care for people in need of such care due to effects of ageing, illness, injury, or other physical or mental impairment. They generally work under the supervision of, and in support of, implementation of health care, treatment and referral plans established by medical, nursing and other health professionals. This level corresponds with titles such as enrolled nurses (EN), licensed practice nurse (LPN), licensed vocational nurse (LVN), etc.
- A healthcare assistant (HCA) works under the guidance of a qualified healthcare professional (usually a RN). Sometimes they are known as nursing aides, nursing auxiliaries, or nursing assistants. This level can be defined as 'providing direct personal care and assistance with activities of daily living to patients and residents in a variety of health care settings such as hospitals, clinics and residential nursing care facilities'. They generally work in implementation of established care plans and practices, and under the direct supervision of medical, nursing or other health professionals or associate professionals.

#### Nurse staffing levels

Two measures that are often used to quantify the number of nurses are:

- Nursing Hours per Patient Day (NHPPD): the sum of the staffed hours of RNs involved in direct patient care divided by the number of inpatient days per nursing ward.
- Patient-to-nurse ratio: the number of patients cared for by one nurse.

A measure often used to calculate the qualification level of nurses is:



- The 'proportion of RNs with a Bachelor's degree': This is the proportion of staffed nursing hours for nurses with at least a Bachelor's degree on the totally staffed registered nursing hours.

#### **Intensity of nursing care and workload**

- Intensity of nursing care is the amount of direct and indirect patient care activity required to carry out the nursing function and the factors that have an impact on the level of work required to perform that activity.<sup>50</sup> The intensity of nursing care has several attributes such as patient dependency; the complexity of care (e.g. sudden changes in care needs; activities that need to be combined at a particular moment; activities requiring high levels of technical or theoretical expertise; the physical-mental-emotional exertion, etc.).<sup>51</sup> Patient acuity is a very similar concept as 'intensity of nursing care'. In the current study we use 'Care Intensity per Patient Day (CIPPD)' as a measure of intensity of nursing care. Based on the items of the Belgian Nursing Minimum Data Set (B-NMDS II) a care intensity weight was calculated per patient day. A previously developed and validated weight system<sup>52, 53</sup> was used.
- Nursing workload encompasses both nursing intensity and non-patient care-related nursing activities. It is the amount of time and care that a nurse can devote (directly and indirectly) towards patients, workplace, and professional development at a given time period linked to the available resources (number and competencies).
- Care episode: each time a patient changes from wards during a day, a new care episode starts and amounts to the time the patient actually stays in that ward. Hence, during a single day, a patient can have multiple care episodes, even multiple care episodes on the same nursing ward (e.g. on day of surgery a patient can have a pre- and post-surgery care episode on the same surgical ward). If a patient remains on the same nursing ward from midnight to midnight, there is only one care episode that coincides with the patient day.

#### **Missed nursing care and care left undone**

- When the nursing workload is too high there are indications that nurses start to set priorities in care and do not deliver all the care that

is required.<sup>54</sup> There are three concepts identified in the literature for unfinished care: care left undone, the implicit rationing approach, and the missed care approach. In the current study we asked nurses which necessary tasks (yes/no) they could not perform during their last shift due to time constraints. We make a distinction between clinical tasks left undone (e.g. repositioning patients to prevent pressure ulcers; adequate patient surveillance) and planning and communication activities left undone (e.g. comforting and talking with patients; educating patients and family; prepare patients and families for discharge).

#### **Hospital payment system**

Justified activities and beds: justified activities are based on the national average length of stay (LOS) per pathology group (All Patient Diagnosis Related Groups per severity of illness; APR-DRG-SOI), which is then applied to the case-mix of each hospital. Multiplying the national average LOS per pathology group with the case-mix of a hospital, gives the number of justified patient-days for the hospital. Per department, the number of justified patient-days is multiplied by the 'normative occupancy rate' of the department (e.g. 80% for surgical and internal medicine wards) to calculate a number of justified beds (see KCE Report 229<sup>6</sup> for more information).

#### **RN4CAST-study**

A large European study (i.e. 'RN4CAST') that was conducted in 2009 in 486 hospitals in 12 European countries. In each participating hospital nurse survey data (e.g. patient-to-nurse ratio last shift; nursing work environment characteristics; job satisfaction; risk for burnout; perceived quality of care, etc.) were collected. All nurses of randomly selected nursing wards (only general internal medicine and surgery) received a questionnaire. In addition, data about patient experiences (patient survey) and patient outcomes (risk-adjusted mortality and failure-to-rescue based on administrative databases) were collected in a selection of hospitals. This large-scale study confirmed the associations between nurse staffing levels, nursing work environment with patient outcomes, patient experiences and nurse outcomes.<sup>20, 55, 56</sup>



## Methods

The study applies a mixed-method approach. The main steps of the research and data sources are summarized in Table 1.

**Table 1 – Mixed-method approach**

What?	How?
<b>A factual description of the Belgian nursing workforce (e.g. education, scope of practice, licensing standards)</b>	<ul style="list-style-type: none"> <li>Review of Belgian studies on this topic: grey literature, peer-reviewed literature, legal documents, policy papers.</li> <li>Analysis of routinely collected data by the Federal Public Service (FOD – SPF) Public Health.</li> </ul>
<b>Evolution in the intensity of nursing care and nurse staffing levels</b>	<ul style="list-style-type: none"> <li>An analysis of administrative databases. The Belgian Nursing Minimum Data Set (B-NMDS II or VG-MZG/ DI-RHM) for the years 2009-2014 and 2016 was analysed together with nurse staffing data ('EMPLODAY'). This analysis was done at the level of the nursing wards per observation day (Maximum of 60 days per nursing ward, per year) for general surgical, internal medicine, mixed surgical/internal medicine, geriatric, rehabilitation, paediatric and intensive care wards. Several concepts were analysed with the following being the most important ones: <ul style="list-style-type: none"> <li>Care Intensity per Patient Day (CIPPD): based on the B-NMDS II items a care intensity weight was calculated per patient day. A previously developed weight system was used;</li> <li>Nursing Hours per Patient Day (NHPPD): the available RN hours for patient care per patient day;</li> <li>Care intensity relative to the staffed nursing hours (CINURS): the 'care intensity' relative to the available RN hours per patient day;</li> <li>Patient-to-nurse ratio (P2N): 24 hours/NHPPD.</li> </ul> </li> <li>We focused on general hospital wards (surgical and internal medicine; geriatric, paediatric, rehabilitation) and described the evolution of NHPPD, CINURS and CIPPD also for intensive care wards. We excluded wards that were out-of-scope (e.g. day-care wards) or because the data were not available (e.g. operation theatre, emergency departments). A full description of in- and exclusion rules can be found in Chapter 3 of the scientific report. We illustrate the data flow for semester 2 of the last year (2016) in appendix 1 to this short report.</li> </ul>
<b>Nurse survey to collect information on key concepts as measured by the RN4CAST study</b>	<ul style="list-style-type: none"> <li>Replication of the RN4CAST nurse survey in 2019: all Belgian acute hospitals were invited, participating hospitals provided a master list with all general surgical and internal medicine wards. Four to six nursing wards per hospital were randomly chosen. All nurses of these wards were asked to fill out an electronic nurse survey.</li> <li>Two main types of analysis were done: <ul style="list-style-type: none"> <li>Description of the current situation anno 2019;</li> <li>Comparison with 2009 (panel-data for hospitals that participated in 2009 and 2019).</li> </ul> </li> </ul>
<b>Lessons learned from international practices</b>	<ul style="list-style-type: none"> <li>An international comparison of safe staffing policies in four countries (Australia: Victoria, Queensland; United States: California, Massachusetts; United Kingdom: England; Ireland) via a literature review. The selection of countries was based on the following criteria: variation of policy approaches; implementation realized or in a stage where evaluation of several policy elements is already possible; availability of published documents (legal and policy documents, grey- and peer-reviewed literature).</li> <li>Experts in the safe staffing policies in each of the regions were consulted for additional information. In addition, these experts were asked to review a first draft of the relevant region.</li> </ul>





## 2. EVOLUTION IN THE INTENSITY OF NURSING CARE AND NURSE STAFFING LEVELS IN BELGIAN HOSPITALS

In this section we describe the results of the analysis of the administrative databases. The analysis has two main components: 1) intensity of nursing care; 2) nurse staffing levels. The analysis of intensity of nursing care is based on 'performed nursing activities on a particular ward during a particular care episode'. A summation of the care intensity of all 'care episodes' is made per observation day, per nursing ward. The measure of intensity might differ from required nursing care (both under- and overuse are possible). It was decided to work with the B-NMDS II since this instrument is systematically used in a standardized way by all Belgian hospitals. The downside is that it is known that measurement noise (e.g. upcoding because the data are also used for hospital payment purposes) cannot be avoided. To deal with this issue, we removed the items that were identified (based on several audits) as being prone to coding problems. Measuring the required care based on a validated patient classification system would have required a primary data collection which would never be possible on the same scale (all hospitals and nursing wards) as with the B-NMDS II. Moreover, no gold standard patient classification system exists.<sup>57</sup>

The evolution of nurse staffing levels is based on 'staffed nursing hours on a particular ward per observation day'.

### General surgery and internal medicine wards

We report the results in first instance only for 'general internal medicine and surgery wards' to enable the comparison with the survey results. The selection of wards differs between both samples. The following differences need to be taken into account when interpreting results:

- For the administrative data we have data about all Belgian acute hospitals (n=102) while for the nurse survey we have data from hospitals that volunteered to participate (n=84);

- For the administrative data all wards labelled as having 'C', 'D' or 'CD' beds were selected (more than 900 wards per year) whereas for the 'nurse survey' only 4-6 nursing wards per hospital were selected from a master list of wards that was provided by the hospital management as being 'general internal medicine and/or surgery wards'. The latter method is more precise since 'the bed types label' contains also more specialized wards (e.g. haematology wards label as 'D' internal medicine wards);
- The years available: administrative data (2009-2014; 2016); nurse survey (2009 and 2019);
- Method: administrative data (registration for 60 observation days per year per nursing ward); survey of nurses (one survey per nurse with a possibility to make a distinction between shifts (day/afternoon-evening/night)).

The correlation at the hospital level between staffing measures based on the nurse survey versus the administrative data is for the 'patient-to-nurse ratio' and the 'proportion of bachelor-prepared nurses' 0.47 and 0.76, respectively.

### General hospital wards (surgery – internal medicine – mixed – geriatric – rehabilitation – paediatric) and intensive care wards

In second instance we report the administrative data per ward type (based on administrative labels) for a total of about 1 400 general hospital wards per year: internal medicine (D) – 32%; surgery (C) – 29%; mixed medical/surgical (CD) – 5%; geriatric (G) – 17%; rehabilitation (S1-S6, Sp) – 8%; paediatric (E) – 9%. In addition, also 207 intensive care (I) wards were included in the sample.

For all of the measured concepts substantial variation across wards and hospitals was observed. Also some regional differences were noticed (see Chapter 3 of the scientific report for more details).



## 2.1. Evolution in intensity of nursing care and nurse staffing levels

We first describe the evolution in nurse staffing levels and intensity of nursing care on surgical and internal medicine wards (cf. targeted nursing ward types by nurse survey) and then also describe the results for other ward types.

### 2.1.1. Intensity of nursing care

#### **The intensity of nursing care increased steadily over time on surgical and internal medicine wards**

The intensity of nursing care steadily increased over time from an average of 47.6 CIPPD (=KCE-points<sup>5</sup> per patient day) in 2009 to 52 CIPPD in 2016 (see Figure 1). The CIPPD is higher on weekdays compared to weekend days (e.g. in 2016 an average of 53 versus 49.3 CIPPD) and in university compared to non-university hospitals (in 2016 an average of 56.6 CIPPD versus 51 CIPPD). These differences remained stable over time.

Patient turnover adds information about care intensity not measured by the B-NMDS (e.g. administrative and logistic burden of admission-discharges-transfers or ADT). The average ADT rate on general surgical and internal medicine wards increased from 0.86 patient movements per patient day (median:0.59) in 2009 to 0.98 patient movements per patient day (median:0.71) in 2016.

#### **Also on most other ward types the intensity of nursing care increased**

From Figure 2 it can be observed that for all (except for mixed general-surgical wards<sup>6</sup>) general hospital wards the intensity of nursing care increased over time. The intensity of nursing care was the highest on paediatric care wards (from 62.98 CIPPD in 2009 to 65.77 CIPPD in 2016), followed by geriatric care wards (from 54.90 CIPPD in 2009 to 57.89 CIPPD in 2016). Yet, the increase in intensity over time seems to be the steepest in medical wards (from 46.67 CIPPD in 2009 to 51.94 in 2016).

The ADT per patient day increased over time on all ward types (except on paediatric wards). The average ADT per patient day is still the highest on paediatric wards but decreased over time (from 1.67 patient movements in 2009 to 1.57 in 2016) followed by surgical wards which increased (from 1.08 in 2009 to 1.26 in 2016). On rehabilitation wards (from 0.12 in 2009 to 0.15 in 2016) and geriatric wards (from 0.16 in 2006 to 0.20 in 2016) the ADT per patient day is the lowest.

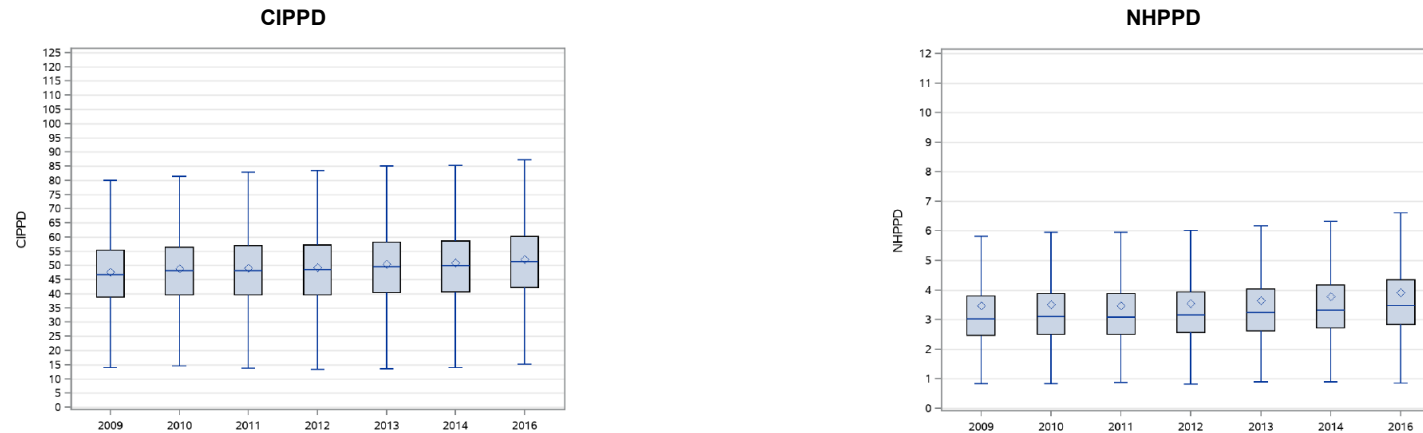
The change in intensity of nursing care on intensive care wards was minor: from an average of 144.13 CIPPD in 2009 to 146.55 in 2016.

<sup>5</sup> 1 point corresponds, more or less, with 5 minutes of care

<sup>6</sup> A category with little observations. The intensity of nursing care remained almost unchanged over years.



**Figure 1 – Care Intensity per Patient Day (CIPPD) and Nursing Hours per Patient Day (NHPPD) for surgical and internal medicine wards**



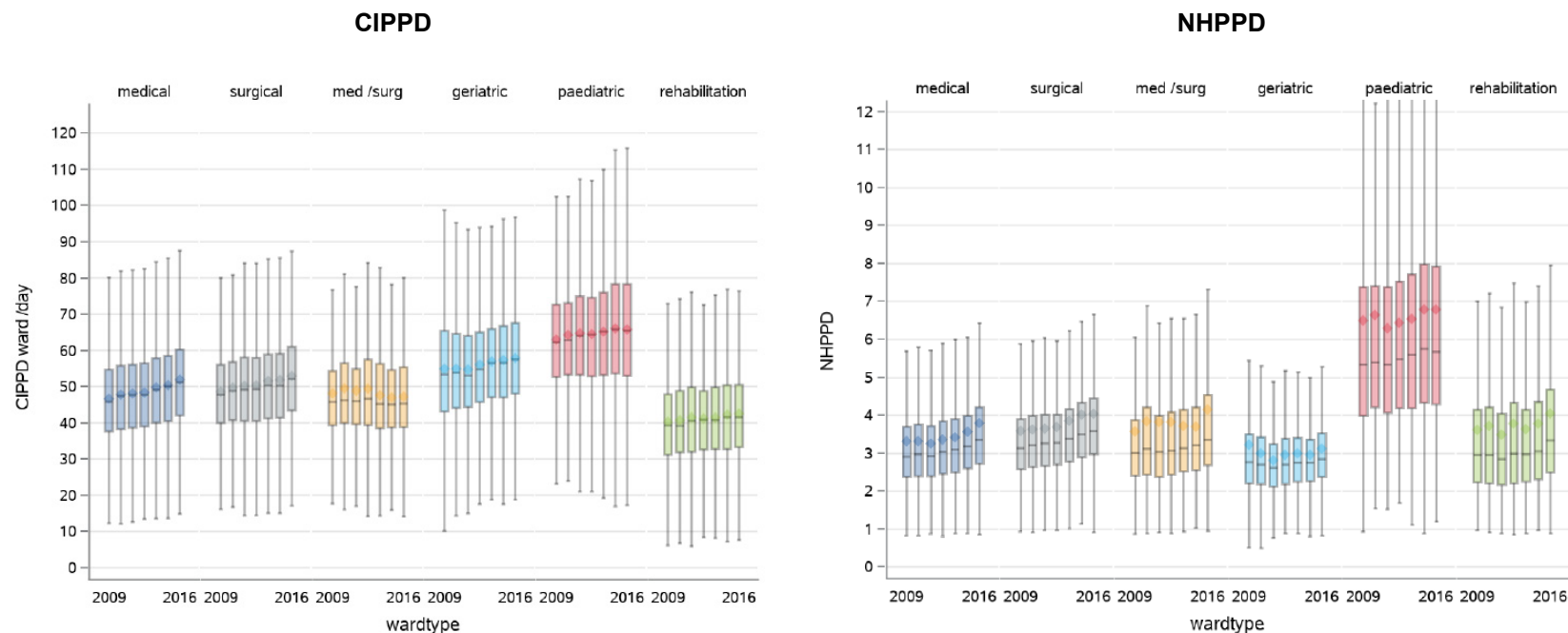
year	N Obs	10th Pctl	25th Pctl	50th Pctl	75th Pctl	90th Pctl	Std Dev	Mean
2009	52 293	32.06	38.75	46.72	55.26	63.71	13.74	47.64
2010	55 039	32.29	39.54	47.97	56.25	65.08	15.12	48.79
2011	54 666	32.11	39.62	48.15	56.87	65.78	15.40	49.09
2012	54 264	32.35	39.65	48.40	57.18	66.02	15.70	49.34
2013	53 128	32.79	40.30	49.39	58.17	67.30	18.00	50.40
2014	52 552	32.47	40.66	49.79	58.50	67.04	21.93	50.80
2016	51 785	34.26	42.23	51.22	60.26	69.59	15.43	52.02

year	N Obs	10th Pctl	25th Pctl	50th Pctl	75th Pctl	90th Pctl	Std Dev	Mean
2009	52 293	2.04	2.46	3.03	3.81	4.87	2.87	3.46
2010	55 039	2.06	2.50	3.09	3.88	4.98	2.64	3.50
2011	54 666	2.07	2.50	3.09	3.88	4.95	2.67	3.48
2012	54 264	2.12	2.56	3.16	3.94	5.00	2.48	3.54
2013	53 128	2.17	2.62	3.23	4.04	5.14	2.46	3.64
2014	52 552	2.26	2.72	3.32	4.16	5.32	2.87	3.77
2016	51 785	2.34	2.82	3.47	4.34	5.60	2.43	3.92

*Note: CIPPD and NHPPD are calculated per nursing ward per observation day; general and internal medicine wards include the following nursing wards: surgical wards are wards with predominantly C-beds; internal medicine wards are wards with predominantly D-beds; mixed wards are wards with predominantly CD-beds. The year 2015 is not included in the figure since these data were not available for analysis. Outlying values are not shown in the figure. The number of observations are the number of registration days (i.e. maximum 60 days per year) per nursing ward.*



**Figure 2 – Care Intensity per Patient Day (CIPPD) and Nursing Hours per Patient Day (NHPPD) per ward type**



*Note: CIPPD and NHPPD are calculated per nursing ward per observation day. The data are shown per ward type: medical wards (D); surgical wards (C); med/surg (CD); geriatric wards (G); rehabilitation wards (S1-S6; Sp); paediatric wards (E). The year 2015 is not included in the figure since these data were not available for analysis. Outlying values are not shown in the figure. Circles within box represent the mean. Lower box border = 25<sup>th</sup> percentile. Middle straight line within box = median = 50<sup>th</sup> percentile. Upper box border = 75<sup>th</sup> percentile. Upper whisker = max observation below upper fence (red: upper fence equals 1.5\*IQR above 75<sup>th</sup> percentile). Lower whisker = min observation lower fence (red: lower fence equals 1.5\*IQR under 25<sup>th</sup> percentile). Intensive care wards are not shown on this graph.*



### 2.1.2. Nurse staffing levels

#### Nursing Hours per Patient Day (NHPPD) increased over time

The nurse staffing levels on surgical and internal medicine wards steadily increased over time from an average of 3.46 NHPPD in 2009 to 3.92 NHPPD in 2016 (see Figure 1). The staffing levels are higher on weekdays compared to weekend days (e.g. in 2016 an average of 4.02 NHPPD versus 3.62 NHPPD). Yet, when NHPPD are corrected for ward managers' presence on weekdays the staffing levels are similar: 3.58 NHPPD on weekdays and 3.62 NHPPD on weekend days. In 2016, the average NHPPD in university hospitals was 4.46 compared to 3.80 for non-university hospitals. These differences remained stable over time.

Also on other general hospital ward types (except for geriatric wards) the NHPPD increased. The NHPPD are the highest for paediatric wards (from 6.50 NHPPD in 2009 to 6.79 NHPPD in 2016) followed by mixed general internal medicine/surgical wards (from 3.56 NHPPD in 2009 to 4.14 NHPPD in 2016) and surgical wards (from 3.59 NHPPD in 2009 to 4.04 NHPPD in 2016). The lowest NHPPD are observed on geriatric wards (from 3.22 NHPPD in 2009 to 3.11 NHPPD in 2016) followed by medical wards (from 3.33 NHPPD in 2009 to 3.79 NHPPD in 2016).

Also the NHPPD on intensive care wards increased: from an average of 17.68 NHPPD in 2009 to 18.27 NHPPD in 2016.

#### Percentage of Bachelor-prepared nurses increased over time

Besides the NHPPD also the educational level of the nursing staff increased between 2009 and 2016. On surgical and internal medicine wards the percentage of Bachelor-prepared nurses increased from 58% in 2009 towards 62% in 2016. This percentage is higher for university hospitals (from 73% in 2009 to 79% in 2016) compared to non-university hospitals (from 53% in 2009 to 59% in 2016). The same evolution can be observed for the other general hospital wards with the highest percentage of Bachelor-

prepared nurses on paediatric wards (from 86% in 2009 to 92% in 2016), followed by mixed medical/surgical (from 60% in 2009 to 63% in 2016) and medical wards (from 57% in 2009 to 63% in 2016). The lowest percentage was observed on geriatric wards (from 49% in 2009 to 54% in 2016) and rehabilitation wards (from 51% in 2009 to 51% in 2016).

### 2.1.3. Are nurse staffing levels adequate?

#### Nurse staffing levels followed the increase in intensity of nursing care

An evaluation of the 'care intensity relative to staffed nursing hours' (CINURS) does not allow to evaluate if nurse staffing levels are optimal or adequate<sup>7</sup>. It is merely an indication of the extent to which the nurse staffing levels are adjusted for intensity of nursing care (e.g. over time, across ward types, etc.). From our analysis we learn that the CINURS for surgical and internal medicine wards remained stable over the years (0.26 in 2009 versus 0.25 in 2016). What's more, also between week- and weekend days (in 2016: 0.25 versus 0.26) and between university and non-university hospitals (in 2016: 0.24 versus 0.25) the differences are small. This implies that the evolution in nurse staffing levels and intensity of nursing care are interconnected, with a similar evolution over time, between hospital types and type of days. The latter statement should be qualified in the sense that ward managers' time is taken into account in the staffed nursing hours. When this measure is corrected for ward managers' time the relative intensity on weekdays is higher than on weekend days.

Also for other ward types the differences over time were rather small. Yet, it can be observed that the relative intensity per staffed hours was the highest on geriatric wards (from 0.34 in 2009 to 0.35 in 2016) and the lowest on paediatric wards (from 0.21 in 2009 to 0.20 in 2016).

On intensive care wards a 24/7 availability of nursing staff is an essential ward characteristic. This is reflected in a low CINURS (0.17 in 2009 and 0.16 in 2016).

<sup>7</sup> The nursing care that is provided and registered is not necessarily optimal or adequate as time restrictions of the nurse might cause a rationing in the provided care (see also section 3.3.1).



### But staffing levels that can be considered as unsafe were highly prevalent

The literature about optimal staffing levels is more based on expert consensus than on evidence. Moreover, optimal staffing levels seem to differ between regions and countries (cf. section 4). Yet, evidence indicates that unsafe (or harmful) staffing levels should be avoided. More than 8 patients per nurse is generally accepted as an unsafe staffing level, especially during day/evening shifts.<sup>58</sup> In Belgium, in 2016, a patient-to-nurse ratio above this level was observed in 43% of the measured days in the surgical and internal medicine wards. This corresponds with 484 402 of the 980 721 (or 49%) patient days in our sample. Despite the positive evolution (improved patient-to-nurse ratios and less days with unsafe staffing levels) this is still a bad and alarming result. A more conservative estimate of 'harmful patient-to-nurse ratios' is the average of an 8:1 ratio during daytime and the best 25% staffed hospitals during night time (i.e. 15:1 ratio based on survey results – see Chapter 5 of the scientific report). This equals a 10.6 patient-to-nurse ratio. Such a ratio was observed in 14% of the measured days concerning 17% of all patient days on general surgery and internal medicine wards in our sample.

When looking at all general hospital wards unsafe staffing levels of 8 patients per nurse on a 24/7 basis (or 10.6 patients per nurse) were observed on 39.40% of the observation days involving 53.34% of all patient days (for the 10.6 ratio this involved 17.54% of the observation days and 21.80% of all patient days).

Per ward type, it is clear that the prevalence of unsafe ratios on geriatric wards (8:1 ratio on 68% of the observed days involving 74.02% of patient days; 10.6 ratio on 32.09% of observation days involving 36.23% of the patient days) is the highest and the lowest for paediatric wards (8:1 ratio on 8.25% of the observed days involving 13.22% of patient days; 10.6 ratio on 1.96% of observation days involving 3.37% of the patient days). The lower rates on paediatric wards is not a surprise as international standards for paediatric wards are in general stricter with lower recommended patient-to-nurse ratios. The ratios seem to be more favourable on surgical wards (8:1 ratio on 38.08% of the observed days involving 44.04% of patient days; 10.6 ratio on 10.75% of observation days involving 12.90% of the patient days)

compared to medical wards (8:1 ratio on 43.39% of the observed days involving 52.56% of patient days; 10.6 ratio on 16.94% of observation days involving 20.30% of the patient days).

**Table 2 – Registration days and patient days exposed to alarming patient-to-nurse ratios**

	Above 10.6:1 ratio (average on 24 h., 8-1 ratio daytime and 15-1 ratio night time)		Above 8:1 ratio (average on 24 h.)	
Nursing wards	Registration days	Patient days	Registration days	Patient days
Internal medicine and surgery	7 452/ 51 785 (14.39%)	171 538/ 980 722 (17.49%)	22 214/ 51 785 (42.90%)	484 403/ 980 722 (49.39%)
Geriatrics	4 421/ 13 776 (32.09%)	104 689/ 288 995 (36.23%)	9 416/ 13 776 (68.35%)	213 901/ 288 995 (74.02%)
Paediatrics	125/ 6 391 (1.96%)	1 643/ 78 422 (3.37%)	527/ 6 391 (8.25%)	10 364/ 78 422 (13.22%)
Rehabilitation	1 839/ 6 917 (17.54%)	39 025/ 109 760 (35.55%)	3 541/ 6 917 (51.19%)	69 007/ 109 760 (62.87%)
Total	13 837/ 78 869 (17.54%)	317 895/ 1 457 899 (21.80%)	35 698/ 78 869 (45.26%)	777 674/ 1 457 899 (53.34%)

*Internal medicine and surgery include internal medicine wards (D); surgical wards (C) and mixed wards. The figures for surgical wards (C): 8:1 ratio on 38.08% of the registration days and 44.04% patient days; 10.6:1 on 10.75% of the registration days and 12.90% of the patient days; Internal medicine wards (D): 8:1 ratio on 43.39% of the registration days and 52.56% of the patient days; 10.6:1 ratio on 16.94% of the registration days and 20.30% of the patient days; Mixed wards (CD): 8:1 ratio on 47.85% of the registration days and 57.74% of the patient days; 10.6:1 ratio on 18.73% of the registration days and 23.92% of the patient days.*





#### 2.1.4. Supporting staff

Although supporting staff cannot be used as a substitute for nursing staff, they can alleviate the workload from nurses by shifting non-nursing tasks to supporting staff. In this study we evaluated the presence of HCAs and non-caring staff as 'Supporting Staff Hours per Patient Day' (SHPPD). For surgical and internal medicine wards there is no clear trend over time. The average SHPPD was 0.77 from 2009-2011, increased slightly in 2012 (0.79 SHPPD) and then started to drop to 0.68 SHPPD in 2016. The number of supporting staff is higher in university hospitals (0.91 SHPPD in 2016) compared to non-university hospitals (0.63 SHPPD in 2016). The level of supporting staff is also higher on weekdays (0.76 SHPPD in 2016) compared to weekend days (0.45 SHPPD in 2016).

When the results are studied for the general hospital wards it is clear that the level of supporting staff is the highest on geriatric wards (steadily decreased from 1.14 SHPPD in 2009 to 0.91 SHPPD in 2016), rehabilitation wards (steadily decreased from 1.27 SHPPD in 2009 to 1.07 SHPPD in 2016) and paediatric wards (steadily decreased from 1.06 SHPPD in 2009 to 0.92 SHPPD in 2016). The number of supporting staff is lower on surgical wards (0.74 SHPPD in 2009 and 0.67 SHPPD in 2016) and medical wards (0.78 SHPPD in 2009 and 0.67 SHPPD in 2016).

On intensive care wards the average SHPPD remained stable (0.97 SHPPD in 2009 and 2016).

When looking at the HCAs and non-caring staff separately the same conclusions can be made.

#### 2.2. Relationship between nurse staffing levels and the hospital budget

The hospital budget consists of many parts and subparts, and different rules and criteria apply to them. Although subparts of the hospital budget are meant for specific purposes (for example, part of the B2-budget serves to finance nursing staff in surgical units), they are not earmarked. There is no close link between the budget and its destination which makes it very difficult to figure out which parts of the budget are spent on nursing staff.

The basic budget hospitals receive for nurse staffing is based on their justified activities and on minimal nurse-to-bed ratios which differ across nursing wards. The rules to calculate the basic budget that is allocated to each hospital are the same for all hospitals. On top of the basic budget, a supplementary budget is granted to adjust nursing staff to the intensity of care. Both the basic and supplementary budget are included in the B2-part of the hospital budget. University hospitals (in B7) and non-university hospitals with university beds (in B7 or B4) receive an additional basic budget, which dates back to a change in financing rules in 2002. In addition, several other decisions resulted in additional budget lines in the BFM (e.g. additional staff via collective labour agreements – CLA; additional staff for floating pools; to compensate hospitals for additional costs resulting from attraction measures; etc.).

##### **A maze of rules makes it impossible to know the budget for nurse staffing**

The lack of an earmarked budget for nursing staff and the maze of rules that accumulated over time make it impossible to answer the simple question, namely: 'What is the budget hospitals receive for nurse staffing in a specific ward type?' As a consequence, it is also not possible to answer the question: 'Do hospitals use the budget that they receive for nurse staffing for nurse staffing?' The following points explain why it was not possible to disentangle the budget for nursing staff on surgical and internal medicine wards from the budget for other professional groups and/or nursing wards.



- The basic and supplementary budget in the B2-part can be assigned to specific ward types (for example surgical and internal medicine wards), but the budget not only finances labour costs of nursing staff but also of healthcare assistants.
- University hospitals (in B7A) and non-university hospitals with university beds (in B7B or B4) receive an additional basic budget, which dates back to a change in financing rules in 2002. The additional budget for non-university hospitals with university beds is for nursing staff and healthcare assistants on surgical, internal medicine, paediatric and maternity wards. Part B7B for the university hospitals, however, also covers research, new medical technologies, etc.
- Over the years, minimum nurse-to-bed ratios were improved by the introduction of floating teams or through collective labour agreements (CLAs). Also for these additional budgets it is not possible to link them unambiguously to nurse staffing levels. First, some parts of the CLAs relate to logistics and administrative staff and second, the budgets have a broader scope than surgical and internal medicine wards.
- In addition to budgets for extra staff, a number of measures were taken for better working conditions or higher income of existing staff, with a broader scope than nursing staff.

### 3. NURSE STAFFING LEVELS AND NURSING WORK ENVIRONMENT IN BELGIAN HOSPITALS

In this section we describe the results based on the nurse survey. When we describe results anno 2019, the data from all participating hospitals (84 hospitals; 5 203 nurses) are being reported. When changes between 2009 and 2019 are reported only the data for hospitals which participated in 2009 and 2019 are used (49 hospitals; 3 035 nurses in 2009 and 3 457 nurses in 2019). While small for most concepts, there are differences in the values reported for the 2019 data (entire sample of 84 hospitals versus panel data of 49 hospitals).

#### 3.1. Nursing work environment

##### **The nursing work environment scores vary for the different factors: staffing and resource adequacy is a clear obstacle**

The nursing work environment is measured via the PES-NWI (Practice Environment Scale – Nursing Work Index) including 32 items and five factors. In 2019, overall favourable results (>60% of nurses that agree or totally agree) are found for 'foundations for quality of care' (74% of nurses that agree or totally agree). Also the scores on 'nurse-physician relationships' (65%) and 'managers ability, leadership and support' (63%) are fairly good. Poor results were found for 'staffing and resource adequacy' (29%) and 'participation of nurses in hospital affairs' (40%). In Figure 3 the results are shown per hospital and for each of the 32 items separately. A substantial variation across hospitals can be observed suggesting that some hospitals have implemented successful strategies to optimize specific aspects of nurses' work environment while others did not.



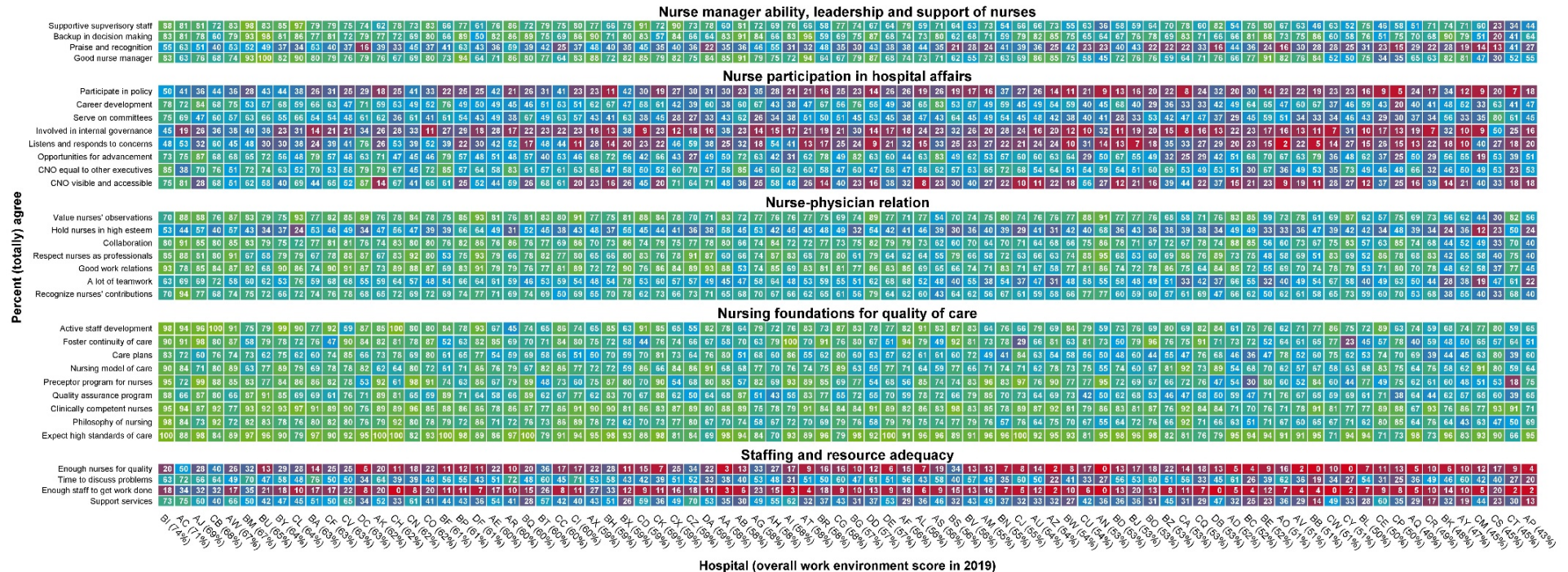
**Positive evolution in leadership, nurse-physician relationships and foundations for quality of care**

Compared to 2009, the nursing work environment changed positively on three factors (i.e. leadership, nurse-physician relationships, and foundations for quality of care) and remained unchanged on 'staffing and resource adequacy' and 'participation of nurses in hospital affairs'. The improvements in 'foundations for quality of care' can potentially be explained by the several 'quality improvement initiatives' that were set up during the last decade (e.g. quality and safety contracts, accreditation programmes, quality indicators, etc.). The improved nurse-physician relationships might be due to improved attention for multidisciplinary collaboration already starting during the education. Leadership might have been improved via several efforts such as education, leadership programmes, etc.

When studying the changes in 'work environment' at the hospital level it appears that hospitals that performed well compared to the other hospitals in 2009 experienced a drop in 2019 and hospitals that performed poor in 2009 compared to the other hospitals experienced an improvement. This 'convergence towards the mean' does not imply that the ranking of hospitals drastically changed. In general, hospitals that performed better in 2009, still do so in 2019.



**Figure 3 – Percentage of nurses agreeing or totally agreeing with presence of positive work environment aspects, at hospital and regional level in 2019**





## 3.2. Nurse staffing levels

### 3.2.1. Patient-to-nurse ratios

#### Large variation between hospitals and across shift types

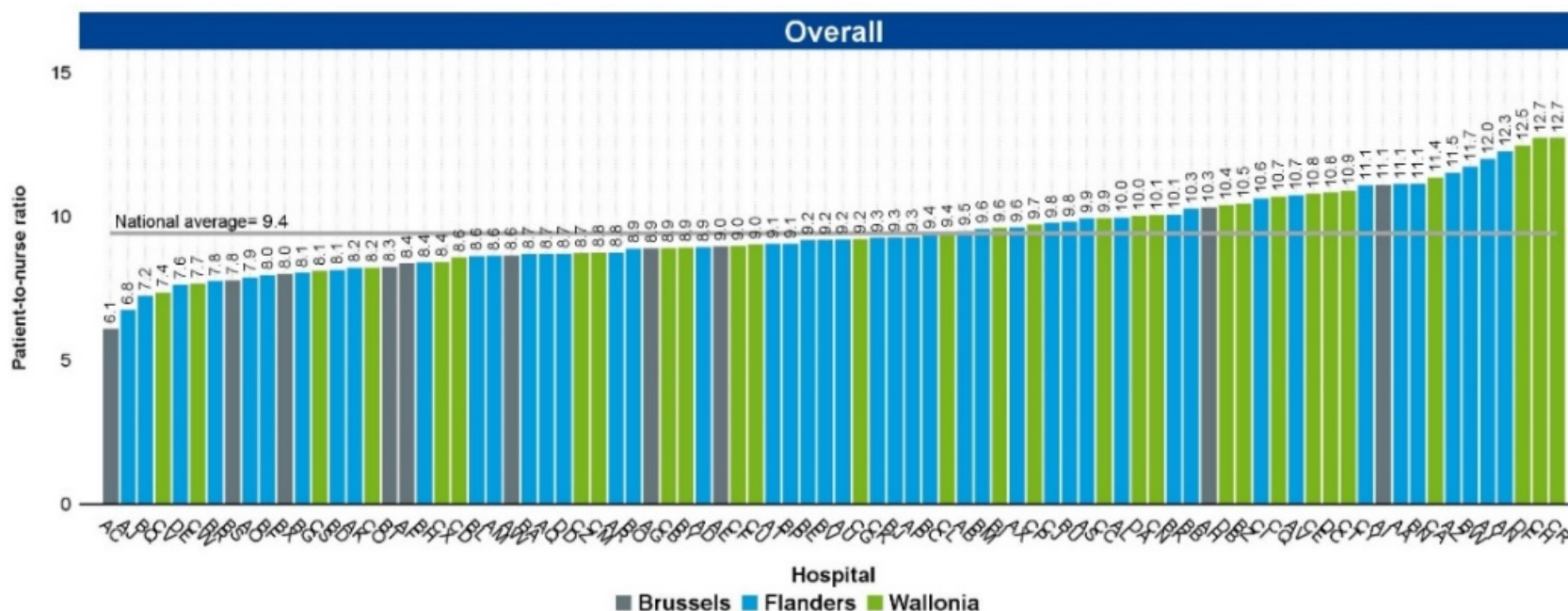
The overall patient-to-nurse ratio in Belgian hospitals, in 2019, is 9.4 patients per nurse (Figure 4). This ratio varies across hospitals from 6.1 to 12.7. Large differences in ratios can be observed according to shift type:

- Morning/day shift: 7.1 patients per nurse (variation across hospitals from 5.4 – 9.9);

- Afternoon/evening shift: 8.9 patients per nurse (variation across hospitals from 4.6 – 13.3);
- Night shift: 18.1 patients per nurse (variation across hospitals from 8.0 – 27.6).

The patient-to-nurse ratios do not differ much between week- and weekend days. The average ratio for university hospitals was 7.8 while it was 9.5 in non-university hospitals.

Figure 4 – Overall patient-to-nurse ratio, at hospital and regional level in 2019





### Patient-to-nurse ratios improved compared to 2009

Overall as well as for each shift-type the patient-to-nurse ratios significantly decreased in 2019 compared to the situation of 2009. This decrease was observed across most hospitals and has to do with both a slight increase in nursing staff and a slight decrease in patient activity.

### 3.2.2. Proportion of Bachelor-prepared nurses

#### A clear increase in the proportion of Bachelor-prepared nurses

The average percentage of Bachelor-prepared nurses is 63% (61% in non-university hospitals; 83% in university hospitals). Yet, hospitals seem to have different policies regarding the recruitment of nurses. This results in a variation ranging from 34% to 96% of Bachelor-prepared nurses. Compared to 2009, there has been a significant and substantial improvement of almost 10 percentage points.

## 3.3. Nursing activities

The nurse survey did not measure the nursing activities performed by nurses (see section 2.1). Yet questions were posed to measure the level of rationing in nursing care ('care left undone during the last shift') and the amount of non-nursing tasks (i.e. tasks that could be performed by supporting staff) performed by nurses.

### 3.3.1. Care left undone as reported by nurses

#### Clinical activities as well as planning or communication activities are rationed due to a high workload

There are two main categories in care left undone:

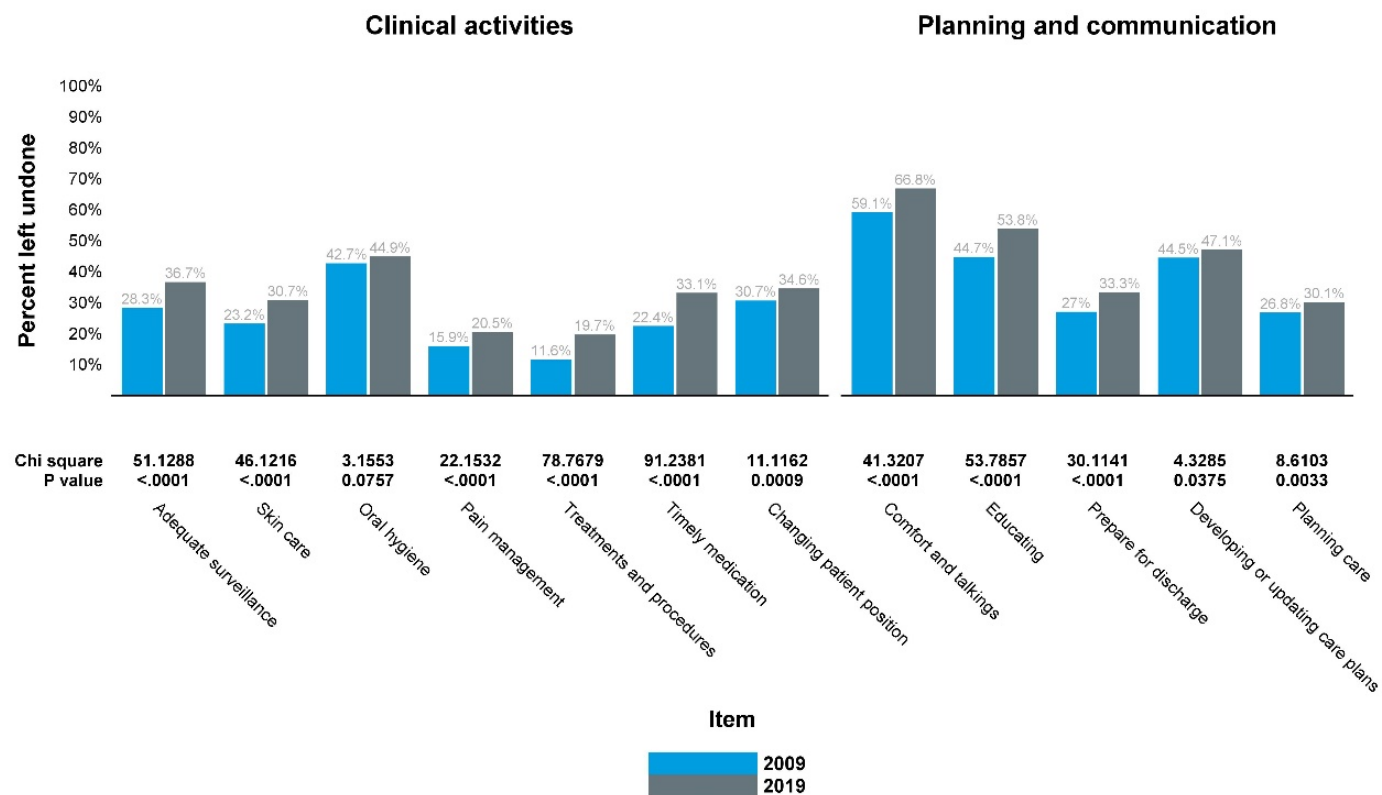
- Clinical activities, measured via 7 items: adequate patient surveillance, skin care, oral hygiene, pain management, treatments and procedures, administer medications on time, and frequent changing of patient position. On average, nurses reported leaving 2.2 (hospital variation ranges from an average of 1.3 to 3.2 activities) of seven clinical tasks left undone during their last shift. The highest percentages are reported for oral hygiene (48%), surveillance and changing patient position (both 37%).
- Planning and communication, measured via 5 items: comforting and talking with patients, educating patients and family, prepare patients and families for discharge, develop or update nursing care plans or care pathways, and planning care. On average, nurses reported leaving 2.3 (hospital variation ranges from an average of 1.4 to 3.2 activities) of five planning and communication tasks left undone during their last shift. The highest percentages are reported for 'comforting patients' (67%) and 'patient education' (55%).

#### The reported care left undone increased substantially

Both the clinical and the planning and communication activities that were left undone increased significantly. From Figure 5 it can be observed that this increase was present for all activities (except for oral hygiene where the increase was not significant). Also at the hospital level the amount of 'care left undone' increased. This effect is the highest among hospitals that performed well in 2009. Some very poor performers improved compared to 2009.



Figure 5 – Care left undone, evolution between 2009 and 2019







### 3.3.2. *Non-nursing tasks*

#### **Nurses often performed tasks below their skill level**

There are eight items measuring tasks below nurses' skill level. The percentage of nurses that reported to often/sometimes perform these tasks is high: distributing food trays (82%, ranging from 58%-97%), performing non-nursing care<sup>h</sup> (96%, ranging from 89%-100%), arranging discharge (73%, ranging from 32%-97%), transporting patients (61%, ranging from 17%-97%), cleaning (77%, ranging from 30%-100%), performing non-nursing services (44%, ranging from 23%-66%), obtaining supplies (57%, ranging from 2%-88%), and performing clerical duties (98%, ranging from 87%-100%).

#### **The direction of the changes over time is task-dependent**

In 2019, for some tasks significant less nurses (compared to 2009) reported that they sometimes/often performed them: collect and distribute food trays, arrange patient discharge, transport patients, perform non-nursing services, and obtain supplies. For 'perform non-nursing care' a significant higher percentage of nurses reported they sometimes/often performed it. The observed differences for 'cleaning' and 'clerical duties' were not significant.

### 3.4. *Nurse outcomes*

There are several nurse outcome measures. We report in this section the risk of burnout, job dissatisfaction, and intention-to-leave the hospital. Important regional differences exist with consistent significant worse results in Walloon compared to Flemish hospitals.

#### 3.4.1. *Risk of burnout*

#### **A substantial risk for burnout: 36% of nurses are at risk for emotional exhaustion**

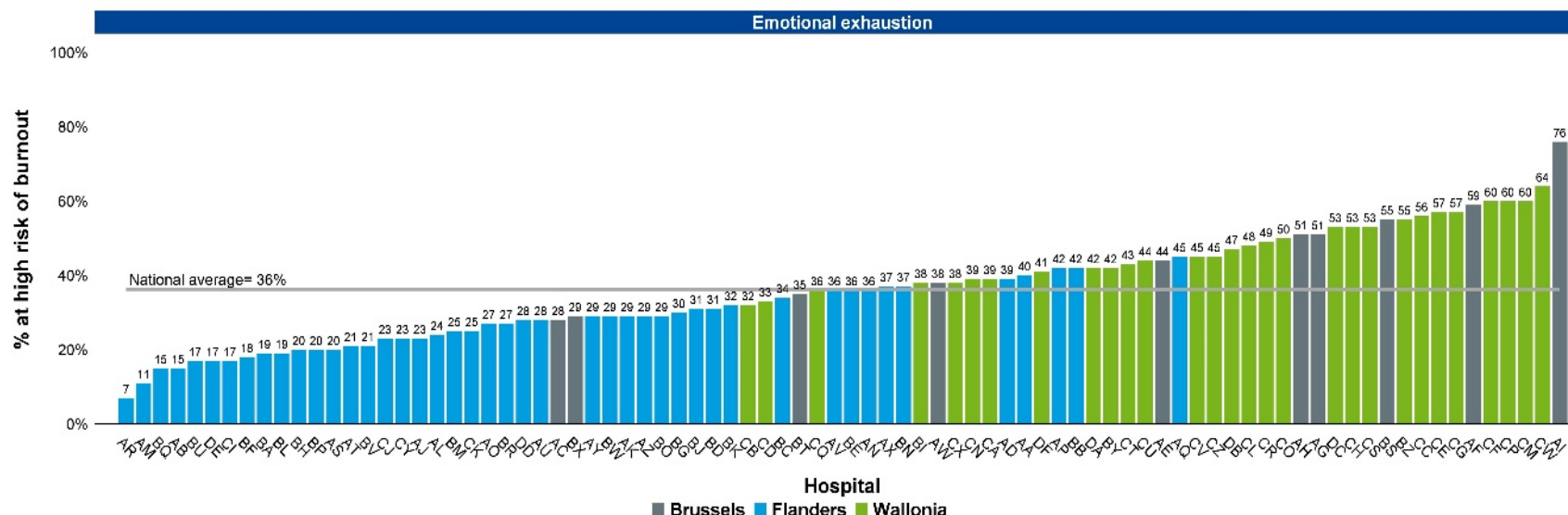
The risk of burnout is measured via the 'Maslach Burnout Inventory'. This scale includes 22 items and three subscales: 'emotional exhaustion'; 'depersonalisation'; and 'reduced personal accomplishment'. The risk of burnout is substantial. The average percentage of nurses at high risk of emotional exhaustion is 36% (hospital rates vary between 7% and 76%) (see Figure 6).

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<sup>h</sup> This is a single (general) question as one of the eight items. Questions about the 7 other tasks are more specific.



**Figure 6 – Percentage of nurses at high risk of emotional exhaustion, at hospital and regional level in 2019**



The results for the two other dimensions are similar. A substantial percentage of nurses (32%) is at high risk of depersonalization (hospital rates vary between 9% and 66%) and reduced personal accomplishment (31%; hospital rates vary between 12% and 65%).

### The risk of emotional exhaustion and depersonalization increased between 2009 and 2019

Compared to 2009, 2019 marked an increase in the percentage of nurses at high risk of depersonalization and emotional exhaustion and a decrease in reduced personal accomplishment. At the hospital level it could be observed that the best hospitals deteriorated and the worst hospitals improved (yet, in general still with a higher risk of burnout compared to the best performers in 2009).



### 3.4.2. *Job dissatisfaction and intention to leave*

Also, the results for the two other nurse outcomes are not good.

#### **High rates of job dissatisfaction**

The average percentage of nurses dissatisfied with their job is 27% (hospital rates vary between 0% and 77%). A significant deterioration with the 2009 situation was observed on this general job dissatisfaction measure. When looking at specific items, it was observed that, compared to 2009, a significant increase in dissatisfaction with annual leave and sick leave was reported while the satisfaction with 'independence at work', 'wages', and 'professional status' improved.

#### **Intention-to-leave the hospital remains high**

The intention-to-leave the hospital did not change between 2009 and 2019. It remains high with 32% of the nurses reporting that they have the intention to leave the hospital in the next year (hospital rates vary between 9% and 70%). The absolute percentage of nurses considering to leave their current hospital for a job in another hospital is 14% (hospital rates vary between 2% and 39%); for a nursing job outside a hospital is 8% (hospital rates vary between 0% and 40%); and for a non-nursing job is 10% (hospital rates vary between 1% and 25%).

### 3.5. Nurse-perceived quality of care

In this section we describe the nurse-perceived quality of care and focus on three general measures (we refer the reader to the scientific report for more detailed information). First, the average percentage of nurses reporting a poor, acceptable and failing nursing ward safety grade was 54% in 2019 (hospital rates vary between 20% and 83%). This variable significantly deteriorated (compared to 2009). Second, in 2019, 83% of the nurses reported not to be confident at all or somewhat confident that management acts to resolve problems in patient care (hospital variation: 58%-99%). Also this result is significantly worse compared to 2009. Third, nurses report problems with discharge policies at a similar level compared to 2009. The average percentage of nurses, in 2019, reporting to be not at all confident

or somewhat confident that patients are able to manage own care after discharge is 66% (hospital rates vary between 46%-91%)

### 3.6. The impact of factors of the nursing work environment and staffing on (nurse) outcomes

In this study we evaluated the impact of the nursing work environment and staffing on nurse outcomes. The evaluation of the impact on patient outcomes was out of scope (no availability of data). A regression model was developed including characteristics of the nurse (gender, age, educational level); region (Flanders, Wallonia and Brussels) and the hospital. The hospital level characteristics included the 'patient-to-nurse ratio', and 'work environment factors': 'nurse-physician relations'; 'foundations for quality of care' and 'manager ability, leadership and support'. The staffing and resource adequacy factors were omitted from the model given the overlap with 'patient-to-nurse ratio'. Also, 'Care Intensity per Patient Day' was included in the model as a hospital level characteristic to correct for differences in nursing care. Although this variable was not significant, it was decided to keep it in the model as a 'risk-adjuster'. A second model was developed to evaluate predictors of 'missed nursing care'. Next to the above mentioned variables also the degree of performed non-nursing tasks was added as a 'hospital characteristic' and type-of-shift (day/evening/night) and type of day (week versus weekend) as 'nursing respondent characteristics'.

#### **Patient-to-nurse ratio and leadership are important predictors for nurse outcomes**

A higher patient-to-nurse ratio is consistently associated with worse nurse outcomes. The higher the patient-to-nurse ratio in the hospital, the higher the risk of 'emotional exhaustion', 'depersonalization', 'job dissatisfaction' and 'intention-to-leave the hospital'. The association between patient-to-nurse ratio and 'reduced personal accomplishment' was not significant. The association between the different factors of the 'nursing work environment' and 'nurse outcomes' is less clear. For leadership a consistent relationship with nurse outcomes was observed. The higher the score on 'leadership', the lower the chance on 'emotional exhaustion', 'depersonalization', 'job dissatisfaction', and 'intention to leave'. It was also found that a better score





on 'participation in hospital affairs' was significantly associated with a lower risk of 'emotional exhaustion' and 'job dissatisfaction'. The other hospital-level factors were not significant. It should be noted that 'intention-to-leave' and 'depersonalization' are significantly associated with the age of the nurses. The youngest age groups seem to be at higher risk which might require further study and potentially targeted action.

#### **Missed nursing care significantly associated with 'patient-to-nurse ratio' and the 'performance of non-nursing tasks'**

An important increase in missed nursing care was observed compared to 2009. Based on the regression model it can be concluded that 'patient-to-nurse ratio' and 'non-nursing tasks' are important predictors for missed nursing care (clinical activities as well as 'planning and communication activities'). In hospitals with a higher patient-to-nurse ratio and in hospitals where nurses perform more non-nursing tasks, the risk of both types of 'missed nursing care' is higher. This implies that not only improving the caseload is required to avoid missed nursing care. It is also necessary that nurses are not burdened with 'non-nursing tasks'. In addition to these hospital-level characteristics the regression model shows that 'missed nursing care' on morning shifts during weekdays deserves special attention. Moreover, males and the youngest age category of nurses (aged 20-29) seem to have a higher risk of 'missed nursing care'.

## **4. INTERNATIONAL SAFE STAFFING POLICIES**

### **4.1. Background**

Although safe staffing policy measures all start from the same premise, their implementation varies across countries and regions. This is not surprising since the available evidence lacks precision on important practical issues such as 'the optimal number of nursing staff', 'the best way to measure patient acuity', and 'the ideal way to tailor staffing levels to type of hospitals and nursing wards'.

To draw lessons for the Belgian context, we studied safe staffing policies in the following countries and/or regions: the UK (with a focus on England), Ireland, Australia (with a focus on the states of Victoria and Queensland) and the USA (with a focus on California and Massachusetts). Germany recently adopted a safe staffing policy which is briefly described but not in-depth given the early stage of implementation. Each of these regions deal in another way with the same policy question: *'How to ensure safe nurse staffing levels at the bedside and at the same time create or maintain a working environment for nurses that is attractive and satisfactory.'*

From this international overview, it is clear that there is not one 'best way' to deal with these issues. As a consequence the policies taken often rely, partly, on expert consensus (e.g. determination of the patient-to-nurse ratio) which demands a collaboration of all relevant actors (e.g. nursing associations, policy makers, hospital associations) and strong central leadership. Despite the absence of a gold standard method, certain policy features are common or highly similar across the different countries. This allows us to make a number of policy observations. In the sections below, we discuss the main similarities and differences.



## 4.2. Nursing education and skill mix

### Nursing education programmes for RNs are upgraded

The original nursing education programmes in all studied regions were hospital-based 'apprenticeship programmes', where nursing students were often counted as being part of the 'workforce'. During the last couple of decades all regions reformed their nursing programmes to increase the educational level of 'new nursing graduates'. There is a clear policy intention to bring the pre-registration educational pathway for RNs to the level of a 'Bachelor's degree'. Yet, the studied regions are at different stages of implementing these reforms. In England, Ireland and Australia RNs are educated at the 'Bachelor-degree' level, which are organized at the 'university level' (university colleges or nursing schools associated with universities). In the United States, there are still lower-level entry-programmes (i.e. diploma- and associate degree-level). Yet, there are guidelines from the 'Institute of Medicine' as well as from the professional nursing association to upgrade these to a 'Bachelor-degree' programme. While the 'diploma level' is by now more or less abolished, a large number of nursing students are still enrolled in the 'associate degree' programme. The latter is often an intermediary step towards the Bachelors' degree.

In all countries nurses can follow advanced education programmes (Master and/or PhD level) and career opportunities at the 'advanced nursing practice' level start to emerge.

### If different levels in nursing exist, they are different in terms of education, title, salary, and scope of practice

Some regions opt for one 'basic or general' educational level in nursing while others have two (distinct) levels. In Ireland and England, for instance, only one nursing level exists(ed): RNs educated at the Bachelor's degree level. In other countries/regions a second level of nursing education/practice exists. In the USA this is called 'Licensed Vocational/Practical Nurse (LVN/LPN)' while in Australia the terminology 'Enrolled Nurse (EN)' is used. While the EN-level was abolished more than three decades ago in England because of several problems (e.g. overlap between roles, low professional

status, etc.), a new second level of nursing ('nursing associates') was recently introduced (new graduates from 2019 onwards).

RNs make up by far the largest proportion of the nursing workforce in all countries. It is important to note that countries with two nursing levels make a clear distinction in educational level (Bachelor's degree versus vocational level training), title (RN versus EN/LPN), salary, responsibility (e.g. EN/LPN have a limited scope of practice and work under supervision of an RN), etc. In these countries, bridging programmes are organized to obtain a RN degree.

Independent of the number of nursing levels, healthcare assistants or equivalent roles (HCAs) exist in all countries. While initially they were mainly employed in nursing homes they are, nowadays, more and more working in the hospital sector too. In most regions policy discussions or reforms are ongoing regarding the required educational pathway, their role and scope of practice, etc. In general, their role seems to be flexible involving a mixture of direct patient care and other activities to support nurses. Yet, they act within clear boundaries and always under supervision of RNs (see also skill mix thresholds in section 4.5).

## 4.3. Why were 'safe staffing policies' developed?

### 'Never waste a good crisis'

In many of the studied regions a crisis seems to have triggered the development of a 'safe staffing policy'. In England, a series of public inquiries (e.g. Mid-Staffordshire report) linked severe patient safety problems to inadequate nurse staffing levels. In Victoria and Ireland the safe staffing policy came, under pressure of the nursing unions, to remediate the negative consequences (e.g. low staff morale, lowered status and attractiveness of the nursing profession, reports of decreases in quality of nursing care, etc.) of a period of serious dis-investment in nursing. In Ireland, for instance, the number of nurses employed by public health services decreased with 4 000 FTE<sup>59</sup> (or a reduction of 13%) between 2008 and 2013, because of austerity measures. As a consequence, together with other policy actions (salary cuts of 7%, loss of experienced staff due to early retirement schemes), the



nursing profession was plunged in a severe crisis. Also in England, austerity measures (e.g. salary caps) were taken after the economic recession in 2008. No reduction nor an increase in the nursing workforce was observed, while the demand for nursing care grew substantially. Moreover, it was assessed that the nursing workforce was in crisis (e.g. low job morale, unfilled vacancies, high staff turnover, etc.).

### **Pro-active policy making**

In other regions (California, Queensland) the legislators did not wait for a 'systemic crisis' to develop a 'safe staffing policy'. Based on problems voiced by the nursing profession (e.g. industrial action in California) and starting from a solid evidence basis about the nurse staffing and patient outcomes relationship (as done in Queensland) policy makers developed a 'safe staffing policy'.

### **Attractiveness of the nursing profession and better outcomes**

In all of the selected regions the objective seems to be twofold: improve patient outcomes and increase the attractiveness of the nursing profession (including better outcomes for nurses such as improved job satisfaction and lower risk of burnout).

## **4.4. Policy options vary from flexible to rigid and from limited in scope to very comprehensive**

In Victoria, California and Queensland patient-to-nurse ratios are regulated by law. Yet, not in all countries that developed safe staffing policies, the policy is enforced by law. In Ireland, for instance, the 'safe staffing framework' is supported by the public authorities but not implemented via a law. Also in England no major 'legal levers' were used to implement the nationwide guidance on safe staffing. In this section we further describe the differences in scope and allowed flexibility of the different approaches.

### **Scope: from medical-surgical wards towards a range of services outside hospital care**

The number and type of services that are captured within the scope of the safe staffing policy vary. In Queensland and Ireland the scope is limited to general medical/surgical nursing wards while in other regions the scope is larger including a wide range of services within and outside hospitals. The latter approach, and thus the larger scope seems more appropriate since otherwise the risk exists that areas with nurse-staffing ratios might be realized at the expense of areas without ratios.

### **Fixed patient-to-nurse ratios at all times**

Large differences between regions exist in the degree of flexibility of the staffing allocation process. The Californian patient-to-nurse ratio system is the most rigid of the countries discussed. The ratios are applied at the patient level, at all times (e.g. also during lunch breaks) with the same ratios for all shift types. On general surgical nursing wards, for instance, the maximum number of patients assigned to one nurse may not be higher than five. Although many feared that the rigid character of the patient-to-nurse ratios would have a negative impact on nurse satisfaction, the overall job satisfaction of nurses in California increased after the ratios were implemented. Similar ratios as in California were implemented in Massachusetts, however only for the intensive care wards and emergency departments.

**Table 3 – Patient-to-nurse ratio and skill-mix thresholds for general surgical and internal medicine wards**

	California	Victoria	Queensland	Ireland	England
<b>Patient-nurse ratio</b>	5:1	4:1 (day) 8:1 (night)	4:1 (day) 7:1 (night)	N/A*	N/A**
<b>Skill-mix</b>	Ratio obtained with a max. of 50% LPNs	Ratio obtained with at least 80% RNs (remaining by ENs)	Only RNs and ENs	80% RNs and max. 20% healthcare assistants	N/A

*Legend: \*Adjust nursing teams based on (a.o. factors) the measurement of patient acuity; \*\*More than 8 patients per nurse is an unsafe ratio.*

### **Fixed patient-to-nurse ratios at the ward level and adapted to type of shift**

The patient-to-nurse ratio systems in Victoria and Queensland are more flexible as the ratios are applied at the level of the nursing ward and differ per shift type (i.e. in Queensland on general nursing wards there is a maximum of 4 patients per nurse on morning and afternoon shifts and a maximum of 7 patients per nurse during night shifts). The calculation of ratios at the ward level includes rules about rounding down (e.g. in Victoria: a patient-to-nurse ratio of 4:1 on a ward with 22 patients can be achieved with 5 nurses). Because the ratios are applied at the nursing ward level it is possible to take into account patient characteristics (e.g. acuity) as well as nursing characteristics (e.g. expertise) in the nurse staffing allocation process. In Victoria, a further differentiation in patient-to-nurse ratio takes place based on hospital type with higher ratios for hospitals characterised with a less severe case-mix (e.g. 5:1 ratio on day-shifts in hospitals called 'type 3', the lowest level of case-mix, etc.).

### **Determining required staff based on patient acuity measurement**

In Ireland no fixed ratios are imposed but a safe staffing framework is created including a system to determine staffing levels (i.e. Nursing Hours per Patient Day – NHPPD) by means of the use of a standardized patient acuity system. If staffing requirements (determined on patient acuity) are higher than the actual staffing levels an upscaling is required. Yet, the Irish system does not impose a strategy on how the upscaling needs to be executed since the required staffing levels can be overruled based on professional, clinical judgement. Nevertheless, the pilot tests showed that the option to overrule the outcome of the patient acuity measurement is rarely applied.


**Table 4 – Example of calculation of the number of FTE for a nursing team in Ireland**

Steps	Measure	Example
<b>1. Patient acuity measurement</b>	Based on acuity measurement patients are categorized in 4 groups of care intensity.	Acuity levels patients: 44% low; 56% medium; 0% high; 0% very high
<b>2. Ward type</b>	Based on this patient acuity measurement the ward is categorized in 5 categories ranging from low to very high complexity. Each ward type has a guidance about required NHPPD (can be overruled based on clinical judgement).	Moderate complexity general ward with a 4.9 NHPPD required
<b>3. Calculate the required average nursing hours per day and per year</b>	This calculation takes into account the average amount of 'indirect hours per ward' and 'the activity level: number of beds and occupancy rate'.	$(4.9 \text{ NHPPD} \times 30.3 \text{ patients [98\% bed occupancy on a 31 bed ward]}) + 5.6 \text{ indirect hours} = 154.07 \text{ hours (or 56 235.5 hours per year)}$
<b>4. Calculate the total FTE</b>	1 FTE (39 hours working week during 52 weeks: 2 028 days), adjusted for absence rate (22% on average).	<ul style="list-style-type: none"> <li>• <math>56\,235 / 2\,028 = 27.7 \text{ FTE}</math></li> <li>• Absence rate: <math>27.7 \text{ FTE} \times 22\% = 6.1 \text{ FTE}</math></li> <li>• Required FTE = 33.8 FTE</li> </ul>
<b>5. Compare current with required FTE and adjust when necessary</b>	The actual FTE are compared with the required FTE and the skill-mix threshold (max. 20% healthcare assistants is applied).	<ul style="list-style-type: none"> <li>• Current team: 30 FTE: 16 RN, 14 HCA</li> <li>• Required team: 27.04 RNs and 6.76 HCA</li> <li>• Adjustment: 7.24 HCA are replaced by a RN, and an additional of 3.8 RN FTE are provided</li> <li>• 1 FTE ward manager (supernumerary to the team)</li> </ul>

### A Board-to-ward approach combined with data and transparency

The most flexible system is the English system. The core element of the English safe staffing policy was the development of a nationwide guidance on safe staffing. This nationwide guidance includes: a Board-to-ward approach; the use of evidence-informed tools together with professional judgement and quality of care indicators; transparency and benchmarks of staffing levels, etc. There are no patient-to-nurse ratios included in the guidance although it is stated that there is an increased risk for harm when one nurse is responsible for more than 8 patients. The guidance and its elements are not imposed.

The implementation is left to the initiative of the individual hospitals. Nevertheless, some policy measures (e.g. public reporting of nurse staffing levels, transparency of yearly staffing plans) ensure that it is not entirely permissive.



#### 4.5. Common elements and objectives observed in safe staffing policies

Despite the large observed differences we identified also important commonalities.

##### **Increase the number of nursing staff at the bedside**

The introduction of 'minimal safe patient-to-nurse ratios' aims to increase the number of nurses available at the bedside to ensure safe patient care. *Yet, why does the height of the patient-to-nurse ratios differ between regions (see Table 3)?* The reason is that ratios are merely based on expert consensus and adaptation to the local context (e.g. shorter length of stay; higher substitution towards day care; historical starting point) than on evidence. Therefore, the minimal staffing ratios for medical-surgical wards in California were set at 5 patients while in Victoria and Queensland (during day-shifts) the ratio was set at a minimum of 4 patients per nurse. While in England no minimal safe patient-to-nurse ratios were defined, the NICE-guideline<sup>58</sup> stated that more than 8 patients per nurse (during the day) is unsafe. Also the Irish framework has a clear policy intention to increase the number of nurses at the bedside (guided on patient acuity measurement).

##### **Account for differences in patient acuity and patient mix**

In all systems the importance of patient acuity differences is acknowledged. This is done by patient acuity measurement or by differentiating the minimal patient-to-nurse ratios (e.g. according to shift type or ward type).

The measurement of patient acuity is most pronounced in the Irish system where it is used to determine the required nurse staffing levels. An Australian patient classification system showed to be applicable within Ireland. During the pilot test the 'required NHPPD' that resulted from patient acuity measurement were rarely contested. Also the English nationwide guidance advises the use of patient acuity measurement in the staffing allocation process. There is no single patient classification system that is recommended (partly because an evidence review showed that no superior patient classification system could be identified). Instead they recommend

to use measurement methods that are endorsed by NICE (e.g. 'Safer Nursing Care Tool').

In the regions with mandated patient-to-nurse ratios (e.g. California, Victoria, Queensland, etc.), it is specified that the minimum staffing levels need to be up-scaled based on patient acuity measurement ('floor level'). In reality, however, this is rarely the case and the ratios are used as a maximum staffing level ('ceiling level'). The rationale to vary patient-to-nurse ratios according to type of shift has to do with differences in 'required nursing care' per shift type. In Victoria the ratios also partly capture differences in patient acuity by specifying different ratios according to the hospital type.

##### **Important to note is that ratios vary between disciplines**

In Table 3, the ratios for general-surgical wards are shown. Yet, in California and Victoria patient-to-nurse ratios were developed also for other ward types. While haematology is a medical discipline, the required staffing levels differ from general medical wards. Therefore, Victoria defined lower patient-to-nurse ratios for this ward type (i.e. 3:1 instead of 4:1 on morning shifts). In California, lower ratios were defined for oncology wards (4:1 instead of 5:1) while this was not the case in Victoria (4:1 on morning shifts, which is the same as on general medical wards). Other examples are the lower ratios for paediatric wards (4:1 instead of 5:1 in California); acute stroke wards (3:1 on all shift types in Victoria); intensive care wards (2:1 in California); and palliative care wards (e.g. 6:1 instead of 8:1 during night shifts in Victoria).

##### **Skill-mix thresholds**

The safe staffing policies take into account the evidence about the association between the educational level of nurses and patient outcomes. This is most explicitly done in Victoria and Ireland. In Victoria, hospitals can comply with the ratios by using both RNs and ENs but at least 75% of the nursing staff needs to be an RN. In Ireland, where there is only one level of nurses (i.e. RNs with a Bachelor degree), the safe staffing framework includes an 80%/20% skill mix recommendation. As such the nursing and caring team of a nursing ward in Ireland includes maximal 20% HCAs. In California it was feared that hospitals would employ more LPNs (a maximum of 50% was defined) to comply with the mandated ratios and that as a





consequence the skill mix would drop. Yet, this fear seemed idle as no drop in the skill mix was observed after implementation of the mandated ratios.

### **The role of ward managers: leadership and supervision**

Also the importance of the evidence about nursing leadership is incorporated in the safe staffing policies. The mandated ratios (California, Victoria, Queensland) exclude nursing ward managers from the ratios. Also the Irish and English systems advise to count the nursing ward managers as supernumerary.

### **Create awareness from board to bedside**

The safe staffing policies aim to introduce an awareness about the importance from hospital board to bedside. This requires that staffing decisions and discussions take place at the hospital level (e.g. yearly budget for staff per nursing ward) and the nursing ward level (e.g. allocation of nurses per shift, use of float pools, etc.). In the regions with systems with mandated patient to nurse ratios the nursing ward managers need to ensure that staffing levels comply every shift with the ratios. These decisions will also require discussions at the hospital level to provide sufficient budget and provide staffing mechanisms (and mechanisms such as float pools, agency staff, admission and discharge policy) to comply with the ratios.

The Irish and English staffing policies give explicit advice (e.g. frequency of staffing discussions at the hospital board level, use of a dashboard system) to ensure safe staffing is discussed from board to bedside. Guidance is given to standardise staffing decisions, apply them systematically and make them more evidence informed (e.g. red flag monitoring system indicating the number of shifts per ward with potentially unsafe staffing). Moreover, in England hospitals have to be transparent about staffing decisions both at the board level (e.g. making reports of discussions about staffing budgets public) as well as on the ward level (e.g. each shift the nurses responsible for patient care are shown on a board per ward).

### **Approaches are data-driven**

From the international examples it is clear that the systematic collection of data about staffing and related factors in a standardised way is an important part of a safe staffing policy. It allows to benchmark within and across hospitals and helps to create transparency. In Queensland the compliance with the ratios is, for instance, publicly reported. In England the 'caring hours per patient day' are publicly reported. The complex nature of nurse staffing decisions is also reflected in the data that are advised to collect in a regular fashion. Besides data about the staffing levels (and patient acuity) it is also advised (e.g. in England and Ireland) to collect data about missed nursing care, nursing work environment, patient outcomes and nurse outcomes. Despite the importance of data to make objective decisions about staffing, the safe staffing policies in England and Ireland stress the importance of the clinical judgement of nursing managers. It is possible to overrule 'data-driven solutions' when there are good reasons for doing so and when these reasons are made transparent.

## **4.6. Impact of safe staffing policies**

### **Evaluation research about the impact of safe staffing policies is rather limited**

Before discussing the impact of the safe staffing policies it should be noted that evaluation research within this policy area is limited and often of poor quality. It mostly concerns retrospective comparisons on the pre- and post-implementation period. There are two exceptions. In Ireland an evaluation programme is linked to the implementation of the safe staffing programme. The first evaluation results on the first six pilot units that implemented safe staffing policies are available but the evaluation of the extended project (16-19 nursing wards) is still ongoing. Also in Queensland a pre-post evaluation was budgeted and commissioned prior to implementing the patient-to-nurse ratios in 27 pilot hospitals. First (temporary) results are being released. Despite these limitations some general conclusions can be drawn based on the available material.

**Safe staffing policies have a clear impact on nurse outcomes and nurse staffing levels**

'Safe staffing policies' result in more RNs at the bedside. In all regions (Victoria, California, Queensland) that implemented safe patient-to-nurse ratios, the ratios improved after the legislation came into action. Also the staffing levels in Ireland improved. And even in England (the system with the least obligations) there are some indications that the nationwide guidance resulted in increased staffing levels but only up to the level of the pre-recession situation. In addition, these increases in the number of nurse staffing levels at the bedside coincide with an improved nursing work environment (e.g. improved nurse-physician relationships), improved nurse outcomes (e.g. less burnout, higher job satisfaction, less intention to leave) and an increased attractiveness of the nursing profession (e.g. more applications for nursing schools, nurses increasing their job time).

**Budgetary impact is unclear**

The budgetary impact of the different staffing policies is unclear. In California, for instance, several other reforms in the hospital payment system which were introduced around the same time, hamper an evaluation of the budget impact of safe staffing ratios. Nevertheless, it seems that hospitals succeeded to implement the ratios without receiving additional funding. In Victoria additional funding was provided to implement the ratios. In Ireland the upscaling of NHPPD is only partly funded. Yet, large cost-savings are reported because the use of agency staff drastically reduced after implementation of the safe staffing framework.

**Awareness increased**

The awareness about the importance of safe staffing (general public, policy makers, hospital boards and administrators, nursing managers) increased in all of the evaluated regions.

**There are (modest) indications for improved patient outcomes**

There are indications that mandated patient-to-nurse ratios (as implemented in California) have a beneficial impact on patient outcomes (mortality in particular) but this evidence is not yet sound enough to make firm statements. While a large study illustrated an impact on mortality and failure-to-rescue this finding could not be confirmed by other studies (often using less robust designs or other patient outcome measures). The first results of the (intermediate) evaluations in Ireland and Queensland seem to confirm the positive impact on patient outcomes.





## 5. TOWARDS A SAFE STAFFING POLICY IN BELGIAN ACUTE HOSPITALS

In this section we present the steps that need to be taken by different actors (e.g. public authorities, hospital sector) towards a safe staffing policy. Despite some limitations (both related to scope, data availability and applied methods: see Box 3) this study demonstrated, based on empirical evidence, that there is a sound case to invest in a safe staffing policy for the Belgian hospital sector.

### 5.1. Improve patient-to-nurse ratios in acute hospitals

A substantial increase of nurse staffing levels is required to establish a robust safe staffing policy. An immediate policy intervention is required as a first step to end manifest unsafe staffing levels.

**In order to improve patient safety in hospitals and to ensure that hospitals are attractive work places for nurses, the patient-to-nurse ratios have to be decreased.**

#### *Within the next 5 years:*

**To ensure sustainable safe patient-to-nurse ratios, a national agreement on safe patient-to-nurse ratios is made taking into account differences in patient acuity (e.g. patient-to-nurse ratios that are differentiated between ward types such as general surgical and internal medicine versus specialised surgical and internal medicine wards; between shift types: morning and evening versus night; or based on patient acuity measurement). This will require an increase in staffing 5 527 FTE corresponding with € 403 456 000. The required number of staff and budget for safe staffing ratios throughout all hospital wards and services not studied in the current study need to be evaluated.**

#### *Immediate policy action:*

**To put an end to patient-to-nurse ratios that expose patients to a manifest unsafe care environment (>8 patients per nurse during daytime on general hospital wards) extra budget and staff is required. This will require an increase in staffing (220 FTE for 8:1 ratio during daytime; or 1 629 FTE when applied on a 24/7 basis) amounting to a budget of € 16 089 200 (or € 118 946 200 for 24/7). This can be considered as a first step and is not sufficient to ensure safe staffing ratios.**

#### *Joint effort from public authorities and hospital sector:*

**After an initial investment of the public authorities, a joint effort from the hospital sector and the public authorities is required: the hospital sector by a reorganization of their activities (closing inefficient wards and avoiding unnecessary hospital admissions and patient days) and the public authorities by increasing the hospital budget (BFM). The potential efficiency gains need to be considered care assignment per care assignment. To start up this reform an initial investment from the public authorities will be required.**

### **Patient-to-nurse ratios have improved over time ... but are still below international standards**

The patient-to-nurse ratios on Belgian internal medicine and surgical wards, for instance, are with a hospital average of 8.12 (estimate based on the MZG – RHM; 6.88 in university hospitals and 8.21 in non-university hospitals) and 9.4 (estimate based on the nurse survey; 7.8 in university hospitals and 9.5 in non-university hospitals), still far higher compared to international standards. In regions where safe minimal patient-to-nurse ratios were set this varies between 4:1 and 5:1 during the day and amounting to a maximum of 8:1 (Victoria) during the night. Especially during night time, the Belgian average patient-to-nurse (18:1) is far above international standards. But also during day (7:1) and evening shifts (9:1), Belgian



patient-to-nurse ratios deviate from what is regarded at the international level as a minimum to ensure safe patient care.

An improvement of patient-to-nurse ratios is required to ensure a safe environment for patients and a satisfying work environment for nurses. The evidence to back up this statement is sound as a large number of studies repeatedly showed an association between patient-to-nurse ratios with both patient outcomes and nurse outcomes. Moreover, the relationships between patient-to-nurse ratios and nurse outcomes (i.e. risk for burnout<sup>i</sup>, job dissatisfaction, intention-to-leave the hospital) were confirmed in the current study. The observed slight decrease in patient-to-nurse ratios in Belgian acute hospitals over time seems to be largely insufficient. After all, due to a reduction in length of stay and substitution from inpatient towards day care the intensity of nursing care increased. The increased nurse staffing levels seem to follow this increase in intensity only in part. After all, missed nursing care increased and seems to be related to patient-to-nurse ratios. This indicates that nurses start to ration care when workload is too high. As such nursing activities are left undone and put the patients potentially at risk. Since these activities are not captured by the B-NMDS (only performed activities are measured) the increase in required nursing care is probably steeper than the observed increase in 'intensity of nursing care'. The upper limit to the level of workload nurses can bare seems to be reached.

### **The standards for nurse staffing in the hospital payment system and licensing standards seem to be outdated**

The two main policy levers to influence nurse staffing levels in Belgian hospitals are the hospital payment system and the licensing standards and seem to be outdated. Both are at the origin of the high patient-to-nurse ratios. After all, despite some exceptions (e.g. care programmes for stroke, geriatric care, etc.) the main licensing standard regarding 'nurse staffing levels' is with 1 nurse for every 30 patients very low. Also the payment standards seem to be outdated. When the 'basic payment standards (e.g.

13-15.5 FTE per 30 beds)' are transformed, estimates of between 11.3 and 14.0 patient-to-nurse ratios are obtained. These estimates are higher than the average observed ratios (more patients per nurse) and indicate that, on average, hospitals determine staffing levels above the 'standards included in the payment system'. Yet, this is not true for all hospitals (association staffing – budget). The large variation in staffing levels indicates that some hospitals staff above and others below these standards. The former group finances staffing levels via other revenues (e.g. deduction on physician fees, profit margins elsewhere). This needs to be taken into account when the BFM is raised.

### **Development and implementation of minimal safe ratios in a systematic way**

In absence of evidence about optimal safe staffing levels a method to determine 'patient-to-nurse ratios' has to be developed. In most countries a safe staffing policy is developed by a taskforce including all relevant stakeholders (e.g. nursing associations and unions, hospital sector, public authorities). Besides a strong leadership by e.g. chief nursing officer of the Ministry of Public Health, making use as much as possible from the available data and evidence (international examples) are prerequisites to succeed in the design of a 'safe staffing policy'. This would imply that in Belgium the administrative data ('the Belgian Hospital Discharge Data Set' including nurse staffing, nursing activities, medical data, and licensing of specific care programmes) are used to classify nursing wards. This classification needs to go beyond the administrative labelling of wards according to 'bed type (e.g. C, D, I, G)'. Based on medical data (e.g. medical activity profiles: diagnoses and procedures) and nursing data (e.g. intensity of nursing care) nursing wards are categorized (e.g. general medical and surgical nursing wards; medium-care wards; specialised medical wards such as stroke wards, haematology wards, etc.). Based on a consensus-approach (e.g. Delphi-approach) the 'level' of the patient-to-nurse ratios can be identified.

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<sup>i</sup> Emotional exhaustion and depersonalization (not significant results for reduced personal accomplishment).



Within this consensus process it can be considered to set thresholds as done internationally regarding educational levels of the nurses (e.g. a minimum proportion of Bachelor-prepared nurses). After all, evidence shows that a higher proportion of Bachelor-prepared nurses is associated with better patient outcomes.

This process needs to be repeated at regular time intervals (e.g. once every 5-10 years) to adjust to a changing context (e.g. hospital landscape reform, medical innovations, changing demographics, etc.) and informed by a systematic data-driven approach (i.e. collecting, analysing and reporting data). It can be considered to correct the patient-to-nurse ratios for the available national budget (e.g. correction of the 'level' of the ratios in relation to national available budget). Yet, such a correction has only budgetary grounds and will (if deviations of defined ratios are too large) prevent that a safe care environment is guaranteed.

### **Minimal safe patient-to-nurse ratios will require a substantial additional investment**

The step towards 'minimal safe patient-to-nurse ratios' per ward type (and shift type) is essential. To ensure a safe care environment, minimal safe patient-to-nurse ratios will have to be obtained. Such a measure will require additional investments. We can estimate the budgetary impact using a conservative estimate by applying the upper limits of international examples: 5:1 for day and evening shifts (California), and 8:1 for night shifts (Victoria). This results in an average of 6.1 patients per nurse for general wards. We calculated the required FTE and budget based on two methods (see Box 2). It should be noted that the safe staffing ratios abroad are always minimal ratios. This means that staffing levels have to be increased when the workload is higher than usual (e.g. based on patient acuity measurement).

### **Box 2 – Calculation method budget impact**

- **Method 1:** we calculate the **average patient-to-nurse ratio for each ward over the registration days in a semester**. This implies that on a ward-level, registration days with a patient-to-nurse ratio above and below the target value can compensate each other. If the average patient-to-nurse ratio is above the pursued target value, we calculate the additional number of nursing hours needed to achieve the target, i.e. the difference between the current nursing hours and the nursing hours needed to fulfil the target patient-to-nurse ratio. Of course, for wards with staffing levels that are better than the pursued target, no additional staff is required.
- **Method 2:** we calculate the **patient-to-nurse ratio for each ward and each registration day**. If the patient-to-nurse ratio on a registration day is above the pursued target value, we calculate the additional number of nursing hours needed to achieve the target, i.e. the difference between the current nursing hours and the nursing hours needed to fulfil the target patient-to-nurse ratio. If the patient-to-nurse ratio is below the target, no additional staffing hours are required.

The estimated additional nursing hours are extrapolated to annual values and aggregated for each hospital by ward type. These nursing hours were converted to FTE. Taking account of holidays, sick days, education and training time, etc. we estimated actual work time to be 200 days, which corresponds to 1 520 work hours for a day of 7h36. The required budget for these additional FTE is estimated, based on the national average labour cost as applied in the calculation of the B2-part of the hospital budget (RD of 25/4/2002, art.46). The average labour cost is based on labour costs of nursing staff, healthcare assistants, paramedical staff, but nurses are the largest group (all educational levels). Each of these staff categories is subdivided according to seniority. In 2019, average labour costs amounted to € 73 206.07. The budget impact of the target patient-to-nurse ratios is based on an average labour cost of € 73 000.



When applying other salary costs (for example future IFIC-salaries; other mix of Bachelor- and diploma-level nurses; ageing of the nursing profession; salary increase to make the nursing profession more attractive; more nurses doing night time will demand extra budget to compensate for irregular hours) the calculated budget needs to be adjusted. To adjust for the extra costs of IFIC the calculated budget needs to be increased with 1%.

*IFIC=The Institute for classification of Functions; 'Het Instituut voor Functieclassificatie' / 'L'Institut de Classification de Functions'*

When we apply such a ratio to all general hospital wards (knowing that international patient-to-nurse ratios for paediatric wards and specialised medical and surgical wards are lower) we estimate for method 1 an additional 5 527 FTE or 29% of total FTE on these wards (€ 403 456 000). When we apply method 2, this amounts to 5 888 FTE or € 437 095 000. One should keep in mind that this is an underestimation since several ward types (e.g. day care; emergency departments; intensive care; operation theatres) were not included in our analysis or were out of scope (e.g. psychiatric hospitals). In addition, it is important that the existing 'under-payment' is not worsened: when additional FTE are envisaged they should be correctly financed (i.e. the budget foreseen in the hospital payment system should cover the salary costs).

**Table 5 – Budget impact to establish safe ratios on general hospital wards within the scope of the current study**

Ward type	Ratio of 6.1:1	
	FTE (200 days)	Budget (in 000 €)
<b>Surgical and internal medicine</b>	3 424.6 (+26.5%) – 3 727.6 (+28.8%)	249 996 – 272 115
<b>Geriatric</b>	1 558.4 (+49.7%) – 1 601.2 (+51%)	113 763 – 116 888
<b>Paediatric</b>	48 (+2.9%) – 106 (+6.5%)	3 504 – 7 738
<b>Rehabilitation</b>	495.8 (+36.5%) – 552.8 (+40.7%)	36 193 – 40 354
<b>Total</b>	5 526.8 (29.0%) – 5 987.6 (+31.4%)	403 456 – 437 095

*In the calculation the assumption was taken that 1 FTE can be allocated for 200 days in direct patient care (365 days – weekends and holidays, sickness and educational leave, etc.). The salary cost (total cost for employer) per FTE amounts to € 73 000. This corresponds with the average cost for nurses, healthcare assistants and allied health professionals (cf. BFM 2019). The lower bound corresponds with calculation method 1, the upper bound with calculation method 2 (see Box 2).*

**Manifest unsafe ratios need to be remediated immediately**

The exposure to manifest unsafe staffing levels (>8 patients per nurse during daytime) is clearly demonstrated in the current study. In 2016, for instance, 49% of patient days on general internal medicine and surgical wards were exposed to a patient-to-nurse ratio of more than 8:1 when applied on a 24/7 basis (or 17% of patient days when a 10.6 ratio<sup>j</sup> is applied). Such high patient-to nurse ratios need to be eradicated as soon as possible. After all, this 8:1 ratio seems to be a critical threshold in our data (nurse survey) as well. Fifty percent of Belgian hospitals have an average patient-to-nurse ratio (day and evening shifts) above 8:1 and the observed significant relationships with both nurse outcomes and missed nursing care are consistently present from this level onwards. This is an important indication that patient-to-nurse ratios in a vast amount of Belgian hospitals are unsafe since missed nursing care is a mediator in the relationship between nurse staffing and mortality.<sup>27</sup> Furthermore, the 38% observed missed care in Belgium (2019), is far higher than the European average of 25% reported in 2009. It should be noted that eight patients per nurse is not an optimal nor a safe situation. After all, for missed nursing care (clinical activities) and risk on emotional exhaustion this significant association is already observed at lower patient-to-nurse ratios (7.28 patients per nurse during daytime).

While much of the results focus on surgical and internal medicine wards the observations based on the B-NMDS also apply, a fortiori, for geriatric wards and to a lesser extent for paediatric which are (historically) better staffed. On geriatric wards, for instance, 74% of the patient days were realised on wards with patient-to-nurse ratios higher than 8:1 (or 10.6:1 ratio: 36% of patient days). Rehabilitation wards are a specific category given the strong multidisciplinary nature of care on these wards and the limited capacity of the B-NMDS to capture the multidisciplinary workload. Wards such as day care, emergency care, recovery, maternity care, etc. were out-of-scope of the current study but might also require attention from policy makers. Also intensive care, will require specific attention.

To avoid manifest unsafe patient-to-nurse ratios a substantial increase in bedside nurse staffing levels is required. Indeed, we calculated that a 24/7 patient-to-nurse ratio of 10.6:1 (scenario 1) and 8:1 (scenario 2) correspond with 220 FTE or 1.2%<sup>↑</sup> of total FTE on these wards (method 2: 533 FTE) and 1 629 additional FTE or 8.5%<sup>↑</sup> of total FTE on these wards (method 2: 2 186 FTE), respectively (see Table 6). This corresponds with a budget of € 16 089 200 for scenario 1 (method 2: € 38 924 000) and € 118 946 200 for scenario 2 (method 2: € 159 578 000). This includes 104 FTE or 0.8%<sup>v</sup> (882 FTE or 6.8%<sup>↑</sup> in scenario 2) for internal medicine and surgical wards; 82 FTE or 2.6%<sup>↑</sup> (or 565 FTE or 18%<sup>↑</sup> in scenario 2) for geriatric wards; 33 FTE or 2.4%<sup>↑</sup> (175 FTE or 12.9%<sup>↑</sup>) for rehabilitation wards; and almost none for paediatric wards. Given that the Belgian hospital landscape is dispersed and known for high utilization rates, it is worthwhile to explore a pact between the public authorities and the hospital sector. Such a pact could include both savings (e.g. agreed targets about decreases in hospital activity) and investments (e.g. initial investment to launch the reform; additional budget for nurse staffing). After an initial investment of the public authorities to get the reform started, a reduction in bed capacity with preservation of (part of) the staffing budget can take place. Such a mechanism can be inspired on the principles of historical examples (e.g. the 'recycling measure') but should be implemented with a fair time horizon. Yet, the actual implementation and potential efficiency gains will need to be considered care assignment per care assignment.

In any case, a fair allocation mechanism will be required to ensure that those hospitals that have better patient-to-nurse ratios are not penalized for their past efforts to ensure safe nurse staffing levels. To be transparent about nurse staffing levels, systematic data collection and reporting of nursing staff involved in direct patient care is required.

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<sup>j</sup> This is a combination of a 8:1 ratio during daytime and 15:1 ratio (=P<sub>25</sub> based on nurse survey) during night time



**Table 6 – Budget impact to remediate manifest unsafe ratios on general hospital wards (within the scope of the current study)**

Ward type	Ratio of 10.6:1 Scenario 1		Ratio of 8:1 Scenario 2	
	FTE (200 days)	Budget (in 000 €)	FTE (200 days)	Budget (in 000 €)
<b>Surgical and internal medicine</b>	104 (+0.8%) – 266 (+1.2%)	7 592 – 19 418	882 (+6.8%) – 1 238.6 (+9.6%)	64 401 – 90 418
<b>Geriatric</b>	82 (+2.6%) – 1766 (+5.6%)	5 986 – 12 892	565 (+18%) – 668.6 (+21.3%)	41 245 – 48 808
<b>Paediatric</b>	1.4 (+0.1%) – 8.2 (+0.5%)	102 – 599	7.6 (+0.5%) – 30.6 (+1.9%)	555 – 2 234
<b>Rehabilitation</b>	33 (+2.4%) – 82.4 (+6.1%)	2 409 – 6 015	175 (+12.9%) – 248.2 (+18.3%)	12 746 – 18 119
<b>Total</b>	220 (+1.2%) – 533.2 (+2.8%)	16 089 – 38 924	1 629 (+8.5%) – 2 186 (+11.5%)	118 946 – 159 578

*In the calculation the assumption was taken that 1 FTE can be allocated for 200 days in direct patient care (365 days – weekends and holidays, sickness and educational leave, etc.). The salary cost (total cost for employer) per FTE amounts to € 73 000. This corresponds with the average cost for nurses, healthcare assistants and allied health professionals (cf. BFM 2019). The lower bound corresponds with calculation method 1, the upper bound with calculation method 2 (see Box 2).*

### Social and economic case for investment in nurse staffing

Also in other countries the bill to improve patient-to-nurse ratios is entirely (in California), partly (Victoria, Ireland) or for the largest part (Queensland) paid by the hospital sector. Investing in nurse staffing needs to be assessed as any other investment. From a macro-perspective there is a clear social case as improved patient-to-nurse ratios have beneficial effects on patient outcomes and nurse well-being. Yet, research also indicates that there is an economic case because additional costs are compensated by a reduced length of stay and (to a smaller degree) also by improved patient outcomes (e.g. less complications).<sup>60</sup> Given the substantial savings associated with reduced length of stay this research points out that there is also a potential business case for hospitals (e.g. in Belgium, this would result in improved performance on 'justified days'). In addition, given the clear association between patient-to-nurse ratios and nurse outcomes (e.g. risk of burnout and intention to leave) there is also on that side a potential return on investment.

### Patient-to-nurse ratios are one of several policy options to improve bedside nurse staffing levels

The international comparison showed that there are several policy actions possible to increase bedside nurse staffing levels. The introduction of minimal safe patient-to-nurse ratios seems to be the most obvious solution. It can be integrated as 'minimal standards' for hospitals to obtain/maintain a license next to other criteria (e.g. infrastructure requirements, physicians, specialized roles in nursing and medicine). Rather than defining minimal levels of nursing staff related to the number of beds, these licensing standards have to be defined, monitored and upheld related to 'the number of patients'. Yet, more flexible, less imperative ways to implement these ratios can be considered (e.g. public reporting of patient-to-nurse ratios).

Moreover, policy-makers can opt for less stringent measures than patient-to-nurse ratios to increase the bedside nurse staffing levels. Such less compulsory measures are the adjustment of actual staffing levels based on patient acuity measurement (e.g. Ireland) or increased transparency about the decision-making process (England). All policies seemed to succeed in their objective, namely increasing bedside nurse staffing levels. Yet, the patient-to-nurse ratio policies had the largest impact (e.g. substantial





improvements in patient-to-nurse ratios and nurse outcomes, attractiveness of the nursing profession, indications for an improvement in patient outcomes, etc.). The introduction of legally binding minimal patient-to-nurse ratios is therefore a valid policy option for Belgian hospitals. From the international comparison we learn that the Australian examples (Victoria and Queensland) have the advantage of being more flexible than the Californian system. While the Californian system works, the Victorian and Queensland's examples seem to be preferred as they are more pragmatic and thus realistic. The differentiation between shift types allows to better align staffing levels with differences in activity patterns (i.e. less required nursing care during night shifts thus higher patient-to-nurse ratios allowed). In addition, the calculation of the ratios at the ward instead of the nurse level allows more degrees of freedom to the nurse manager. In fact, they include the level of nurses' expertise and patient acuity within their decision of assigning patient loads to nurses.

#### **Sustainment and reinforcement of measures that improve the attractiveness of the nursing profession**

Improving ratios will require more nurses (working in direct patient care). As the number of nurses per inhabitant in Belgium is already above the OECD-average it seems worthwhile to improve the proportion of nurses active in clinical care roles. However, this will not be sufficient, also an increase of nursing graduates will be needed. The international examples demonstrate that better working conditions (i.e. improved patient-to-nurse ratios) will attract more people to the nursing profession (e.g. new nursing graduates, increase of working percentages, re-entry into the profession, etc.). Yet, a more general approach to enhance the attractiveness of the nursing profession is required including measures such as positive image campaign, life-long learning support, competitive salaries, etc. Therefore, the current actions (see Chapter 2 of the scientific report) need to be sustained and intensified. Nevertheless, it will remain challenging to attract and retain nurses. The implementation of patient-to-nurse ratios will challenge hospitals to be competitive both in terms of patient care quality as on the domain of the nursing work environment.

#### **Safe staffing is also relevant for other sectors**

It should be prevented that nurses from other sectors (e.g. nursing homes, home nursing, psychiatric hospitals etc.) are drawn into hospitals, creating problematic situations in other sectors. Therefore, parallel actions in those sectors are required.

#### **Box 3 – Study limitations and research agenda**

- Despite the large scale of the current study (e.g. about 1 500 nursing wards studied via the B-NMDS and about 5 000 nurses surveyed in 84 hospitals), the scope of the study can also be described as limited. After all, we focused on general hospital wards and for reasons of comparability with the RN4CAST-study on internal medicine and surgical wards in particular. While we were also able to show the evolution in nurse staffing and intensity of nursing care on other general hospital wards (geriatric wards, rehabilitation wards, paediatric wards) we did not measure the nursing work environment and nurse outcomes on these wards. Moreover, for several ward types or hospital services (e.g. operation theatres, emergency departments, day care, maternity care) the data were too specific or not available. The domain of intensive care wards needs further exploration. While we studied the evolution in the intensity of nursing care and nurse staffing levels, we did not compare the staffing levels with international standards. Therefore, future research is required to cover some of these domains (e.g. ward and service types patient to-nurse ratios might also be relevant for other sectors such as nursing homes, home care or psychiatric hospitals).



- One of the added values of this research is that we could show the evolution in intensity of nursing care based on the B-NMDS. Yet, these data are also vulnerable for coding problems (e.g. upcoding which is a common problem for administrative databases that are used for hospital payment purposes). Therefore, we limited the calculation of the 'intensity measure' to the B-NMDS items (i.e. 55 out of 78 items) for which no large coding problems were identified based on the audits by the public authorities. Nevertheless, some of the observed variation (especially the outliers) might be due to variation in coding practices. Another limitation of the use of administrative data is the lack of specificity of the ward type (e.g. a general and a specialised internal medicine ward are both labelled as D-wards). It is worthwhile to use pathology information (e.g. diagnoses and procedures) to better understand the observed variation in intensity of nursing care.
- The current study is of observational nature. It allowed us to describe changes in nursing work environment and nurse outcomes between 2009 and 2019 based on the nurse survey and an evolution in nurse staffing levels and intensity of nursing care between 2009 and 2016. In addition variation across hospitals, regions and nursing wards was demonstrated for several concepts. Yet, some of the reasons of the observed variation and differences are unclear. This will require field research (e.g. qualitative study) where best- and worst-performers on some of the key indicators are studied in depth (e.g. why and how do some hospitals succeed in implementing safe patient-to-nurse ratios while others don't?). Also to better understand what the barriers and facilitators are to use the B-NMDS for staffing allocation further research is required (e.g. hospitals that use it and hospitals that do not use it).
- We used available databases and replicated a large study. It was beyond the scope of the current study to include concepts measured via other instruments. Therefore, we might miss relevant variables (e.g. the use of agency staff) that need to be included in future research.

- The relationship between nurse staffing levels and patient outcomes has been sufficiently illustrated. Therefore, and also since a time lag in data availability exists (e.g. linking results of the nurse survey of 2019 with patient outcomes is only possible from 2021 onwards) it could be of value to undertake such research in the future.
- We focused on the nursing profession. To complement this study some of the elements need to be expanded to other healthcare professionals. To optimize the nursing expertise and better adapt it to future evolutions in hospital care a broad policy reflexion on the role and task of all healthcare professionals is required. Such a reflection can be supported by research using other methods such as scenario building.

#### *5.1.1. Use the nursing expertise for nursing care*

**The expertise of nurses should be used for nursing care, not to perform non-nursing tasks. This will require the allocation of 'supporting roles', complementary (and not as a substitution) to nursing staff. A broad reflection of the role of healthcare assistants and non-nursing staff is required.**

The nurse survey demonstrates that nurses perform a high number of non-nursing tasks. For example, 96% of the nurses report that they often/sometimes perform non-nursing tasks. Specific examples of tasks reported by nurses that are often/sometimes performed are 'the delivery of food trays (82%)', 'transporting patients (61%)', and 'obtaining supplies (57%)'. These tasks do not require nursing expertise and can be performed by non-caring staff. The de-investment in supporting roles (observed in 2016 by a drop in supporting hours per patient day) did probably not help this trend. What's more, we found that hospitals with high levels of 'non-nursing tasks' are associated with high levels of 'missed nursing care'.



A large evaluation of the role of healthcare assistants is required as they also take up 'caring tasks'. The recent legal changes allow healthcare assistants in Belgium to expand their role. In the future, a larger reflection and consultation are required to evaluate to what extent healthcare assistants can be employed in hospitals in order to support nursing staff. Also in other countries (e.g. Ireland and England) a national consultation process was undertaken to define the role and function of healthcare assistants. It is clear that healthcare assistants cannot be used as substitutes of nurses. Yet, also the complementary role of healthcare assistants seem to have a delicate equilibrium: too few is harmful for patient care but too many (regardless of the level of nursing staff) as well. Furthermore, organisational methods to further increase the efficiency of nursing care (e.g. avoiding inefficient care by applying the principles of lean thinking methodology) should be explored.<sup>61, 62</sup>

Next to the role of healthcare assistants and administrative and logistic support, a broader reflection should start about the role of nurses and other healthcare professionals (e.g. allied health professionals, physicians) in a changing hospital landscape (e.g. further reduction of length of stay and shift of hospital care towards ambulatory care and alternative care settings).

#### *5.1.2. Simplify the hospital payment system and ensure a fair allocation system of (additional) resources for nurse staffing*

##### **Concerning the hospital payment system:**

- **The different components included in the BFM to pay for nurse staffing should be simplified in order to increase transparency about the match between the 'budget received' and the 'budget allocated' to nurse staffing. The different components could include a basic budget to obtain the minimal defined safe staffing ratios, a supplementary budget based on variation in 'intensity of nursing care', a budget for additional nursing staff (not providing general bedside nursing care) and a budget to compensate for additional staffing costs.**

- **When the BFM is increased in order to eradicate the manifest unsafe patient-to-nurse ratios (>8 patients per nurse), a 'fair' allocation model needs to be applied rewarding those that improve their ratios to safe standards (those who currently staff above 8 patients per nurse) but also the hospitals that already achieved these staffing levels (i.e. those who already staff below 8 patients per nurse). As such, the calculated budget (see proposal 1) will not be sufficient for the lower staffed hospitals to become an achiever. A financial effort from their own resources will be necessary. This allocation mechanism could be integrated in the P4P-payment system.**

Deriving the budget that hospitals receive for staffing via the BFM is not a straightforward exercise. Over the years a number of rules, exceptions, and corrections resulted in a quite complex and not entirely transparent payment system. These include measures to increase staffing (e.g. additional FTE, sometimes only meant for nurses, sometimes also including other professionals); to correct for increasing salary costs; to finance new roles (e.g. geriatric liaison), etc. The complexity of the BFM not only concerns the 'nurse staffing budget' but the entire BFM. Nevertheless, to increase the transparency of staffing decisions, it seems indicated to simplify the payment system meant for bedside nurse staffing in a basic component (based on justified beds) and a supplementary component (based on intensity of nursing care). The basic component could integrate several components (e.g. B2 based on justified activities integrating CLAs for additional nursing staff) of the current BFM in less and more straightforward categories. In addition, two additional categories can integrate the separate budgets for additional staffing (e.g. geriatric liaison, pain nurse) and additional costs (e.g. premiums for professional titles).

When additional budget is invested in the BFM to increase current staffing levels it is important that this is allocated in a fair way. After all, some hospitals already invested in more nursing staff via other resources (e.g. deductions on physician fees) while others did not. As such a mechanism should be installed that rewards both those who already performed well as those that improve towards safe ratios. This mechanism could be included in the pay-for-performance system.



In the medium term, when safe ratios are defined per ward type, the payment system for the basic staffing levels should be aligned. When for instance safe staffing ratios differ for general medical and specialised medical wards (e.g. stroke; haematology; medium care) this should be reflected in the payment system.

### 5.1.3. *Nurse staffing levels on geriatric wards require specific attention*

**Specific initiatives are required to enhance the attractiveness for nurses to work in 'geriatric care'. This requires initiatives by the public authorities (e.g. specific module in positive image campaigns), nursing schools (e.g. reinforce the geriatric care training both via courses and clinical placements in the general nursing curricula), the social partners (e.g. competitive salary schemes compared to other disciplines), and the hospital sector (e.g. creating a culture where 'geriatric care' and expertise is highly valued).**

Our study demonstrates that geriatric wards deserve particular attention and action in the context of safe staffing policies. After all, the 'intensity of nursing care' is higher in geriatric wards compared to other general hospital wards (such as internal medicine and surgery), while nurse staffing levels are lower. Although the admission-discharge-transfer rate on geriatric wards is much lower than on internal medicine and surgical wards, and despite the slightly higher (but decreasing) use of supporting staff, there is a clear indication that workload on geriatric nursing wards is a particular concern. To clarify, the intensity of nursing care relative to staffed nursing hours is far higher compared to all other ward types. Furthermore, the educational level of nurses (in 2016 the average proportion of Bachelor-prepared nurses was 0.54) is lower compared to surgical and internal medicine wards (0.62). Moreover, the geriatric domain is known to be a difficult area to recruit nurses (as well as other healthcare professionals)<sup>63</sup> while the needs continue to grow. Indeed, based on trend analysis, it is expected that the only area where inpatient hospitalisation capacity will continue to grow in the future are the geriatric wards (and rehabilitation wards). In order to staff these wards with competent people it is important to train nurses within this domain and to make nurses familiar with geriatric care (e.g. theory and

clinical placements in the general nursing curricula). In addition, it will be required to ensure that the working conditions are at least as attractive as in other areas (e.g. salary schemes competitive with other areas). The hospital sector but also the public authorities should create a positive image that makes it appealing for nurses to work within this domain. The cognitive and physical skills that are demanded from nurses working within this complex care are challenging and should be valued and rewarded as such.

## 5.2. A safe staffing policy at the macro-level

### **Joining forces within the context of the 'inter-ministerial conference' to develop a nationwide safe staffing policy**

In all studied international regions, the safe staffing policies are initiated or supported by an overarching macro-level policy plan. Also in Belgium, such a policy plan at the macro-level will be required to guide the hospital sector through this process. Given that the competencies about a safe staffing policy are divided at both the federal (e.g. hospital payment) and the federated (e.g. licensing standards) level a joint action plan seems to be indicated. Moreover, the observed regional differences in Belgium (e.g. staffing patterns, performance of non-nursing tasks, well-being of nurses, etc.) indicate that regions could benefit from exchanging practices. This will require central action from the 'inter-ministerial conference' with arrangements about the objectives, processes and responsibilities. It is for instance possible that a regular check-up of the 'nursing work environment' is conducted by the federated entities while at the federal level an agreement is made about which instruments are used. The inter-ministerial conference could charge a small but high-profile 'taskforce' with the task to develop such a national plan (cf. Ireland). This taskforce could include representatives of academia, public authorities, the hospital sector and the nursing profession. It is required that public means are made available to support this taskforce. After all several actions will have to be undertaken such as: analysing administrative data to identify ward types that require separate ratios, conducting a Delphi-approach to obtain minimal ratios per ward type, collect data in areas with missing information (e.g. nurse wellbeing in geriatric care), make a link between the ratios and the hospital budget, decide about which



data need to be systematically monitored, develop data dashboards, etc. It is beyond the scope of the current report to recommend in detail the actions required per competency level. Instead we focus on two main working packages that will have to be integrated in a national safe staffing policy: data systems – evaluation study.

### *5.2.1. Data-information system to inform and monitor a safe staffing policy*

**A nationwide data-information system should be constructed including the following elements: nurse staffing, intensity of nursing care, nursing practice environment, nurse well-being and patient outcomes. This can be achieved by:**

- **Re-activation of the nurse staffing registration in the Belgian Hospital Discharge Data Set as a complement to the registration of nursing activities;**
- **Using the instruments developed in the current study at regular time intervals to monitor the condition of the ‘nursing practice environment’ and ‘nurse well-being’;**
- **Including data about patient outcomes and patient satisfaction from other data sources.**

#### **A comprehensive data-information system regarding safe staffing**

This study showed ample variation (between hospitals and often also across regions) on several key concepts: ‘nursing work environment’, ‘nurse staffing levels’, ‘intensity of nursing care’ and ‘nurse outcomes’. In addition also variation between patient outcomes (potentially sensitive to nursing care) and patient satisfaction exists in Belgian hospitals. Given that these concepts are related (e.g. higher patient-to-nurse ratios are associated with a higher risk of worse patient outcomes and nurse outcomes) a data-information system needs to be installed to obtain, analyse, publish and use these key indicators. This will allow actions at both the level of the public authorities (e.g. adjust hospital payment budget, undertake specific actions to improve nurse well-being, etc.) as at the level of the hospitals (e.g. leadership development, increasing nurse staffing levels on particular

wards, etc.). The development of such data-information system is an integral part of safe staffing policies abroad (e.g. in England NHPPD are monitored and publicly reported, in Ireland the nursing work environment is measured together with missed care, nurse staffing levels and patient acuity). In Belgium we are, as this study demonstrates, in a privileged position regarding data availability. We have data about ‘intensity of nursing care’ and we had data about ‘day-to-day nurse staffing levels’. It is important to keep, further develop, and use this valuable information.

#### **Re-activate the nurse staffing data-system**

The decision to cancel the obligation to register the nurse staffing data (EMPLODAY: registration per nursing ward on 60 observation days) is regretted in light of the international evolutions. While most countries start such a registration, Belgium did the opposite. It is a key element to increase transparency about staffing policies within and across institutions (e.g. to discuss staffing plans at the board of directors; to benchmark with other hospitals). In addition, it is necessary to hold hospitals accountable. After all, when installing safe patient ratios a substantial investment with public money will be made. Hospitals will have to be able to demonstrate that they implement these safe patient-to-nurse ratios. This cannot be done with the currently available data (e.g. FINHOSTA which is a registration of accounting data including the FTE per category of health professionals per cost accounting centre). We need dynamic data per day (or shift) where we can link for each nursing ward, data about nurse staffing levels with patient activity (e.g. care episodes, patient days). Therefore we recommend to re-activate this registration at the soonest possible time. It offers valuable insights in staffing patterns at the regional, hospital and ward level. The availability of the nursing activity data allows to evaluate to what extent the nurse staffing levels are adjusted to differences in patient acuity. This, for example, made it possible to highlight a ‘relative mismatch’ on geriatric wards compared to other general hospital wards. It can, however, be considered to make a few changes to the current registration system to adjust this to current and future practice changes. The daily registration should be constructed such that ward managers’ time (or nurse in charge’s time) is registered as a separate category. The same holds for new roles that are not to be counted as ‘general bedside nursing staff’ (e.g. advanced





practice nurses). After all, ward managers (or nurses in charge in absence of a ward manager) are supernumerary and should not have a patient caseload (consistent finding in all safe staffing policies). Registering their time in a separate category would not require adjustments anymore (as was done in the current study) when 'patient-to-nurse ratios' are calculated. An additional adjustment that has to be made in the medium term is the alignment of 'determined safe staffing ratios' with ward types. For now, bed indices are used to identify ward types. Yet, this approach is not specific enough since staffing levels (current practice but also required levels based on patient acuity) differ substantially. Therefore, it seems recommended to register/classify 'ward types' in a way that better match the reality on the field. The same classification should be used throughout the database allowing the match between nursing activities and nurse staffing levels.

#### **A dashboard that allows feedback and benchmarking at different levels**

In addition, together with the sector (e.g. representatives of the hospital sector, nursing profession, patient organisations, research institutions), a dashboard needs to be developed enabling dynamic and actionable feedback and also benchmarking. This dashboard should include at least the following concepts: 'patient-to-nurse ratios and/or NHPPD'; 'days with patient-to-nurse ratios higher than 8'; 'intensity of nursing care'; 'intensity of nursing care relative to nurse staffing'; 'proportion of Bachelor-prepared nurses'; 'supporting staff levels'; 'ADT-rate'. The dashboard should enable to illustrate variation between regions, hospitals and nursing wards. The dashboard can use data visualisation techniques to present data in a cross-sectional way (e.g. per year) as well as changes over time (e.g. improvement or deterioration in specific concepts). The data visualisation techniques (e.g. heatmaps) used in the current report can serve as input. In addition to this systematic registration it can be considered to set up studies at certain time intervals to measure concepts for which data are missing in a representative sample (e.g. administrative burden). Also the inclusion of concepts and indicators that were not measured can be considered. For instance, to deal with some of the limitations of the B-NMDS II complementary measures to measure patient acuity can be considered. Yet, given the absence of a gold standard a system comparable to that in England (where NICE endorses particular measurement methods after an evaluation)<sup>58</sup> can be applied.

#### **Linkages with other data sources: patient outcomes and patient experiences**

The relationship between nurse staffing levels and patient outcomes, i.e. 'patient satisfaction', prompts data-information-system developers to integrate information about patient experiences and 'nurse sensitive' patient outcomes in the dashboard. Rather than registering additional data, the existing registration systems (e.g. PREMs measured in the context of pay-for-performance; nosocomial infections registration Sciensano, risk-adjusted mortality based on the Belgian Hospital Discharge Data Set) should be integrated in the dashboard. This is also done in other countries with safe staffing policies.

#### **Measure nursing work environment, missed care, non-nursing tasks and nurse outcomes at regular time intervals**

The administrative databases have to be complemented with a check-up of the nursing work environment, missed care and nurse outcomes at a regular basis (e.g. once every 4-5 year). Instruments (e.g. NWI, MBI, job dissatisfaction, intention-to-leave, non-nursing tasks, missed nursing care, etc.) used in the current study can serve for this purpose. Once every four to five years an online survey could be conducted in all Belgian acute hospitals. It will be important to have a coordinator in each hospital (e.g. person responsible for B-NMDS registration) to actively involve nurses (e.g. stimulate them to register, feeding back the results). The scope of the survey will have to be larger than the current study including other hospital wards (e.g. geriatric wards, intensive care wards, paediatric wards). This enlargement of scope will require a pilot-test to assess the psychometric properties of the instrument on these ward types.<sup>64</sup>





### 5.2.2. Evaluate the impact in a proactive and systematic way

**A study should be set up to evaluate the impact of the policy measures. This study will require a dedicated research team with the assignment to design a study protocol (e.g. defining the scope, research objectives, measurement methods, primary and secondary outcomes, etc.), execute the study (e.g. access to relevant data, budget to collect and analyse additional data, etc.) and report about the results in an independent manner. The following options can be considered:**

- **Test the psychometric properties of the instruments used in the current study in other ward types (e.g. geriatric wards) to enable a larger scope;**
- **Use the current study (and additional data collection when the scope is enlarged) as a baseline measurement;**
- **Implement the policy measures (e.g. increased staffing levels) in a selection of pilot sites (e.g. hospitals that volunteer to contribute part of the required budget with own resources) and use other hospital sites as controls;**
- **Collect data after implementation of the policy measure (e.g. after 6 months, 1 year, 2 years).**

One of the shortcomings identified during the international comparison was the lack of resources dedicated to the evaluation of the safe staffing policies. In fact, in most regions these evaluations were either absent or of a retrospective nature. Yet, in Ireland and Queensland the approach was different. In both regions a research team was dedicated to the evaluation of the safe staffing policy in a prospective way. This implies that the research team was able to develop a research protocol prior to the start of the policy measure. This allowed them to set up a baseline measurement including decisions about scope, primary and secondary outcomes, analysis plan, intervention and control arms, etc. In both regions the policy actions were restricted to pilot sites. Such a prospective evaluation study should also be undertaken in Belgium when it is decided to undertake policy action. Otherwise, it is impossible to evaluate if the actions have the desired impact.

## 5.3. Staffing matters from board to bedside

### 5.3.1. Building a good environment for nurses with attention for staffing levels from board to bedside

**The hospital sector should implement in each hospital a culture and practice where staffing matters from board to bedside. This will include:**

- **The systematic evaluation of the nursing team composition (e.g. FTE, skill-mix) twice a year making use of standardized data collection (evidence-informed staffing tools: e.g. nurse staffing data and intensity of care complemented with outcome data) in combination with professional judgment (e.g. senior nurse managers assessment of team functioning). This process led by the chief nursing officer will result in a staffing plan per (group of) nursing ward(s) where the decision and argumentation of the hospital management and board of directors is documented.**
- **The nurse staffing levels and related factors (e.g. sick leave, leavers, etc.) are continuously monitored by the nursing management providing feedback to the hospital management on a monthly basis. A comparison between planned (required) and the actual staffing levels is made.**
- **A system is set up to evaluate staffing on a shift-to-shift basis (e.g. use red flags to signal potential problems) and undertake action when required.**



### **A board to ward approach combined with data and transparency**

Despite of its high potential, the B-NMDS is hardly used in staffing decisions. There are few Belgian hospitals where the B-NMDS is used in combination with nurse staffing levels to evaluate if the staffing budget of a particular ward or department needs to be adjusted. Adjustments are mainly based on 'professional judgement', historical grounds, or cost-containment efforts. It is worthwhile to evaluate (e.g. via a qualitative research) why hospitals do not use this tool for staffing decisions.

We plea to increase the use of a systematic, standardized and transparent process in making staffing decisions. Much inspiration for such an approach can be found in the English system. The nationwide guidance recommends to work with staffing plans that are based on an evaluation of the required staffing levels (based on evidence-informed patient acuity tools: in Belgium the B-NMDS can, for instance, be used), the actual staffing levels, patient and nurse outcomes and professional judgement. The staffing plans document the (argumentation for the) decision which increases transparency. Although the CNO is the responsible person to lead this process, it is a decision from the entire hospital management endorsed by the board. In addition, a system has to be set in place to monitor staffing levels more frequently. The English national guidance also included the advice to work with dashboards to give boards each month an update about staffing and skill-mix levels together with efficiency and outcome parameters. It is the idea to compare the actual staffing levels with the expected staffing alongside quality of care, patient safety, patient and staff experience data. In addition, it is recommended that senior nursing managers and ward managers at least every 24h assess if staffing is adequate to meet the demands. If this is not the case a procedure should be in place to react. An assessment of staffing problems may require a decision to increase staffing numbers to meet patient demand; partially or fully close a ward or service for a determined period until the issues are resolved; temporarily reduce service delivery or take another demand management approach to redeploy the available workforce to areas of critical needs to sustain safe and adequate patient care; or close the service or facility in the long-term. Red flags such as delay of >30 minutes in providing pain relief, patient vital signs not assessed or recorded as outlined

in the care plan, and missed lunch breaks can be used for shift-to-shift monitoring. When a red flag event occurs a prompt action by the nurse in charge is required and might include the allocation of additional nursing staff. These day-to-day assessments will have to be documented and can be used to inform future planning of ward level nurse staffing. Another, complementary approach is to work with 'tipping points' for patient safety. A safety tipping point is a minimum level of staffing that needs to be present on each ward. If these levels are breached a face-to-face discussion with the nurse in charge has to take place to ensure safe staffing is provided (e.g. not less than 1 RN for eight patients; at least 2 RNs on every shift; at least 50% Bachelor-prepared RNs).

**The hospital sector should create a nursing work environment that is attractive, safe and pleasant to work in. This will include, besides providing adequate staffing resources, investments in leadership, participation of nurses in hospital affairs, good nurse-physician relationships, and quality of patient care.**

### **Building good work environments to improve patient outcomes and nurses' well being**

The current study illustrated that staffing and resource adequacy, together with 'participation of nurses in hospital affairs' are two factors in the work environment with the lowest scores. Yet, also on the other factors variation between hospitals was identified. This variation is important since the literature shows that variation in these components is associated with variation in both patient and nurse outcomes. In this study, leadership and 'participation in hospital affairs' were consistently associated with nurse outcomes. It has also been illustrated by prior research that increasing nurse staffing levels in wards with a poor nursing work environment might not be an effective intervention. For all these reasons, it is necessary that hospitals invest in good work environments. Various interventions can be undertaken varying from very simple to complex interventions. A simple, straightforward and low-cost intervention to increase nurses' participation in hospital affairs is to support and facilitate the participation of bedside nurses in working groups, hospital committees and organizational innovation projects. In addition, working on a highly visible nursing leadership seems to be



rewarding. This can be done by a 'managing by walking around' approach (i.e. regularly visiting the nursing wards). It is important that the leadership is highly accessible during these visits and that they act when staff members report problems to them. Yet also more costly and comprehensive interventions can be undertaken. An example of such an intervention known to have a positive effect on nurse retention and nurse outcomes is the 'Magnet accreditation programme'. As such, the programme of magnet hospital accreditation can be considered as an effective strategy to retain nurses and improve nurse outcomes.<sup>39, 42</sup> It is of course insufficient to create a positive work environment for nurses only. The hospital sector needs to create a positive work environment for all people that work in the hospital. Yet, the evaluation of the current work environment, staff outcomes or interventions were out of scope of the current study.

## 6. CONCLUSION

This study aimed to evaluate if nurse staffing standards in Belgian acute hospitals are still accurate given the changing hospital context. In 2009 a European study (RN4CAST) already pointed out that Belgian staffing levels were low compared with other European countries. This is a concern since the evidence about the association between nurse staffing levels with both patient and nurse outcomes is clear. As a result many countries developed 'safe staffing policies' to ensure that staffing levels at the bedside are safe and hospitals are attractive places to work in with a positive influence on nurse well-being.

In Belgium this evidence (RN4CAST-study and other related studies) did not result in such a formal policy. Yet, this does not imply that nothing has changed. We observed several positive evolutions both in staffing levels (patient-to-nurse ratios slightly decreased; proportion of Bachelor-prepared nurses increased) and nursing work environment (improvement in leadership, nurse-physician relationships, and foundations for quality of care). Despite these observed improvements the nurse outcomes deteriorated (higher levels of burnout and job dissatisfaction). It seems that the patient-to-nurse ratios are still too high. Indeed, the observed patient-to-nurse ratios are still far above patient-to-nurse ratios that are internationally considered as safe and the exposure to 'harmful' patient-to-nurse ratios is considerable. Furthermore, while nurse staffing levels increased also the 'intensity of nursing care' increased at a similar pace. Yet, the increase in 'missed nursing care' is considerable. This is a potential indicator that the maximal capacity of what a nurse can perform in the time available is crossed, resulting in rationing of nursing care.

The empirical evidence presented in the current study demonstrates that there is a strong case to develop a safe staffing policy for Belgian hospitals. A cornerstone of such a policy is the improvement of patient-to-nurse ratios. This will require a joint effort from the public authorities and the hospital sector. The public authorities need to invest in additional budget for nurse staffing (and align the hospital payment system with the staffing-related licensing standards) while the hospital sector has to engage in the reform of the hospital landscape (i.e. rationalisation of services, decreasing hospital



capacity) and adopt a culture in which staffing decisions are important from board to bedside. Furthermore, such a safe staffing policy will have to foresee a data-information infrastructure used at the meso- and macro-level (e.g. re-activation of the daily staffing data collection) and an evaluation of the policy measures. When no such formal safe staffing policy is installed it is expected that patient outcomes will deteriorate and that the nursing workforce will be confronted with serious problems (e.g. attraction and retention). Given the known challenges (e.g. ageing population and workforce) it is time to act now. Besides mandatory patient-to-nurse ratios, alternative policy measures exist to increase the number of nurses at the bedside: e.g. public reporting of patient-to-nurse ratios, nationwide guidance on how to develop staffing plans (use of patient acuity measures). These are considered as 'light touch' policy measures. To make a real difference on the field it seems indicated to install mandatory patient-to-nurse ratios.



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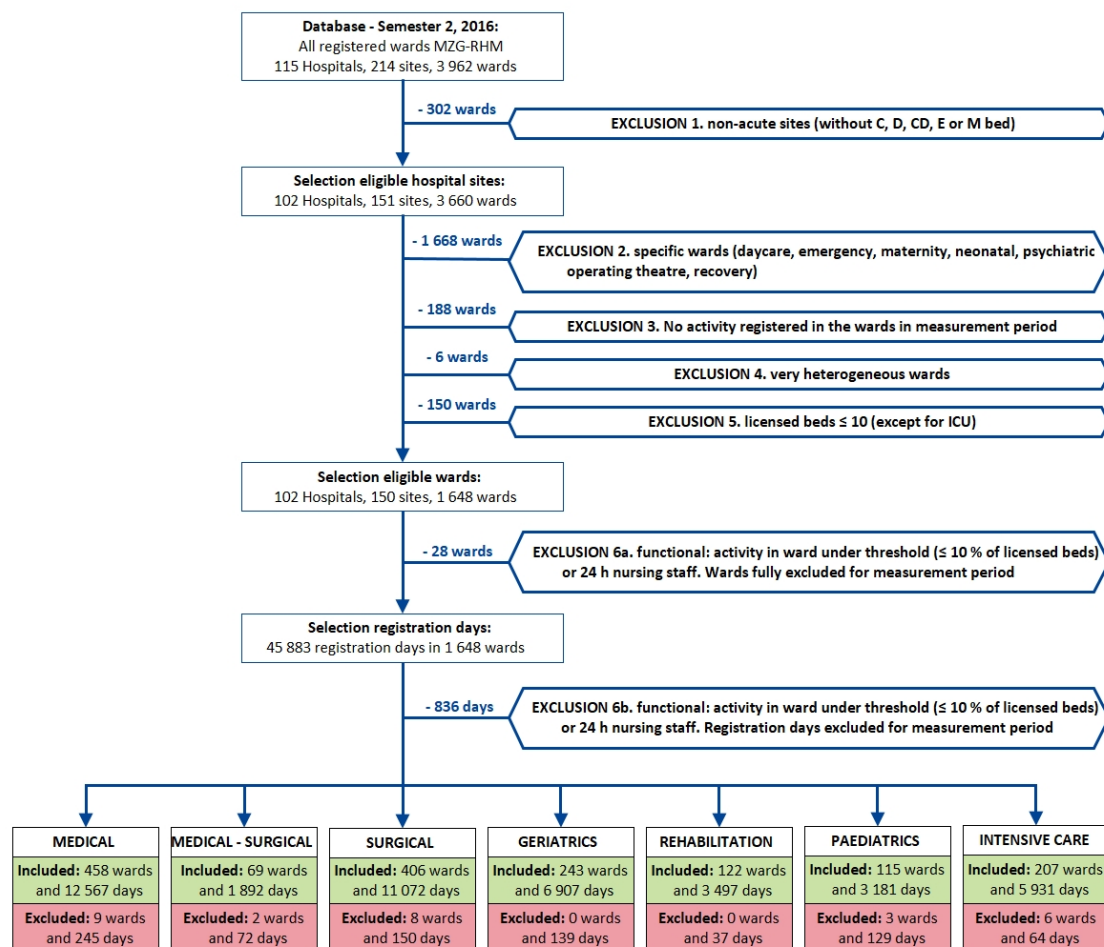
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## ■ APPENDIX 1 – FLOW-CHART DATA SELECTION PROCESS OF THE BELGIAN NURSING MINIMUM DATA SET (SEMESTER 2, YEAR 2016)





## ■ RECOMMENDATIONS<sup>k</sup>

In order to improve patient safety in hospitals and to ensure that hospitals are attractive work places for nurses, the patient-to-nurse ratios have to be decreased.

*Within the next 5 years:*

- To ensure sustainable safe patient-to-nurse ratios, a national agreement on safe patient-to-nurse ratios is made taking into account differences in patient acuity (e.g. patient-to-nurse ratios that are differentiated between ward types such as general surgical and internal medicine versus specialised surgical and internal medicine wards, shift types: and evening versus night, or based on patient acuity measurement). This will require an increase in staffing 5 527 FTE corresponding with 403 456 00000 EURO. The required number of staff and budget for safe staffing ratio's throughout all hospital wards and services not studied in the current study need to be evaluated.

*Immediate policy action:*

- To put an end to patient-to-nurse ratios that expose patients to a manifest unsafe care environment (>8 patients per nurse during daytime on general hospitalization wards) immediate policy action is required. This will require an increase in staffing (220 FTE for 8:1 ratio during daytime; or 1 629 FTE when applied on a 24/7 basis) amounting a budget of € 16 089 200 (or € 118 946 200 for 24/7). This can be considered as a first step but is not sufficient to ensure safe staffing ratio's.

The budget can be borne both by the hospital sector and the public authorities: the hospital sector by a reorganization of their activities (closing inefficient wards and avoiding unnecessary hospital admissions and patient days) and the public authorities by increasing the hospital budget (BFM). To start up this reform an initial investment from the public authorities will be required.

The expertise of nurses should be used for nursing care, not to perform non-nursing tasks. This will require the allocation of 'supporting roles', complementary (and not as a substitution) to nursing staff. A broad reflection of the role of healthcare assistants and non-nursing staff is required.

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<sup>k</sup> The KCE has sole responsibility for the recommendations.

***Concerning the hospital payment system:***

- The different components included in the BFM to pay for nurse staffing should be simplified in order to increase transparency about the match between the 'budget received' and the 'budget allocated' to nurse staffing. The different components could include a 'basic budget to obtain the minimal defined safe staffing ratios', a supplementary budget based on variation in 'intensity of nursing care', a budget for additional nursing staff (not providing general bedside nursing care) and a budget to compensate for additional staffing costs.
- When the BFM is increased in order to eradicate the manifest unsafe patient-to-nurse ratios (>8 patients per nurse), a 'fair' allocation model needs to be applied rewarding those that improve their ratios to safe standards (those who currently staff above 8 patients per nurse) but also the hospitals that already achieved these staffing levels (i.e. those who already staff below 8 patients per nurse). As such, the calculated budget (see proposal 1) will not be sufficient for the lower staffed hospitals to become an achiever. A financial effort from their own resources will be necessary. This allocation mechanism could be integrated in the P4P-payment system.

A nationwide data-information system should be constructed including the following elements: nurse staffing, intensity of nursing care, nursing practice environment, nurse well-being and patient outcomes. This can be achieved by:

- Re-activation of the nurse staffing registration in the Belgian Hospital Discharge Data set as a complement to the registration of nursing activities;
- Using the instruments developed in the current study at regular time intervals to monitor the condition of the 'nursing practice environment' and 'nurse well-being';
- Including data about patient outcomes and patient satisfaction from other data sources.

A study should be set up to evaluate the impact of the policy measures. This study will require a dedicated research team with the assignment to design a study protocol (e.g. defining the scope, research objectives, measurement methods, primary and secondary outcomes, etc.), execute the study (e.g. access to relevant data, budget to collect and analyse additional data, etc.) and report about the results in an independent manner. The following options can be considered:





- Test the psychometric properties of the instruments used in the current study in other ward types (e.g. geriatric wards) to enable a larger scope;
- Use the current study (and additional data collection when the scope is enlarged) as a baseline measurement;
- Implement the policy measures (e.g. increased staffing levels) in a selection of pilot sites (e.g. hospitals that volunteer to contribute part of the required budget with own resources) and use other hospital sites as controls;
- Collect data after implementation of the policy measure (e.g. after 6 months, 1 year, 2 years).

The hospital sector should implement in each hospital a culture and practice where staffing matters from board to bedside. This will include:

- The systematic evaluation of the nursing team composition (e.g. FTE, skill-mix) twice a year making use of standardized data collection (evidence-informed staffing tools: e.g. nurse staffing data and intensity of care complemented with outcome data) in combination with professional judgment (e.g. senior nurse managers assessment of team functioning). This process led by the chief nursing officer will result in a staffing plan per (group of) nursing ward(s) where the decision and argumentation of the hospital management and board of directors is documented.
- The nurse staffing levels and related factors (e.g. sick leave, leavers, etc.) are continuously monitored by the nursing management providing feedback to the hospital management on a monthly basis. A comparison between planned (required) and the actual staffing levels is made.
- A system is set up to evaluate staffing on a shift-to-shift basis (e.g. use red-flags to signal potential problems) and undertake action when required.

The hospital sector should create a nursing work environment that is attractive, safe and pleasant to work in. This will include, besides providing adequate staffing resources, investments in leadership, participation of nurses in hospital affairs, good nurse-physician relationships, and quality of patient care.



## COLOPHON

Title:	Safe nurse staffing levels in acute hospitals – Short report
Authors:	Koen Van den Heede (KCE), Luk Bruyneel (KU Leuven), Dorien Beeckmans (KU Leuven), Niels Boon (UZ Leuven), Nicolas Bouckaert (KCE), Justien Cornelis (KCE), Dorien Dossche (KCE), Carine Van de Voorde (KCE), Walter Sermeus (KU Leuven)
Project facilitator:	Nathalie Swartenbroekx (KCE)
External experts:	Koen Balcaen (Nationaal Verbond van Katholieke Vlaamse Verpleegkundigen en Vroedvrouwen (NVKVV)), Ingrid De Bisschop (UZ Leuven), Peter Fontaine (Europa Ziekenhuizen), Sylvie Godart (Europa Ziekenhuizen), Eleonora Holtzer (Vlaams Agentschap Zorg en Gezondheid), Barbara Janssens (UGent en UZ Gent), Magali Pirson (Université libre de Bruxelles (ULB)), Gauthier Saelens (Grand Hôpital de Charleroi), Guy Vanden Boer (UZ Leuven)
International experts:	Jonathan Drennan (University College Cork, Ireland), Peter Griffiths (University of Southampton, England), Julia Koppen (Technische Universität Berlin, Germany), Claudia Maier (Technische Universität Berlin, Germany), Matthew McHugh (University of Pennsylvania School of Nursing, United States)
Stakeholders:	Geoffroy Berckmans (Union Générale des Infirmiers de Belgique (UGIB)), Bernard Ceriez (Association Belge des Directeurs d'Hôpitaux (ABDH)), Margot Cloet (Zorgnet-Icuro), Alexander Deschuymere (Gezondheidsinstellingen Brussel Bruxelles Institutions de Santé (GIBBIS)), Ellen De Wandeler (Algemene Unie van Verpleegkundigen van België (AUVB)), Arabella D'Havé (FOD Volksgezondheid – SPF Santé Publique), Paul D'Otreppe (Association Belge des Directeurs d'Hôpitaux (ABDH)), Eric Dubois (Centrale générale des syndicats libéraux de Belgique (CGSLB)), Pedro Facon (FOD Volksgezondheid – SPF Santé Publique), Aline Hotterbeex (Union en Soins de Santé (UNESSA)), Colette Jacob (Santhea), Miguel Lardennois (SPF Santé Publique – FOD Volksgezondheid), Joris Mestdagh (FOD Volksgezondheid – SPF Santé Publique), Jan Mortier (Algemeen Christelijk Vakbond (ACV)), Françoise Noël (Agence pour une Vie de Qualité (AVIQ)), Karel Op de Beeck (Algemene Unie van Verpleegkundigen van België (AUVB)), Samira Ouraghi (SPF Santé Publique – FOD Volksgezondheid), Laurien Renders (Vlaams Agentschap Zorg en Gezondheid), Jo Tanghe (Algemene Unie van Verpleegkundigen van België (AUVB)), Carmen Thieren (FOD Volksgezondheid – SPF Santé Publique), Philippe Valepyn (Vlaams Agentschap Zorg en Gezondheid), Gert Van Hees (Algemene Centrale der Liberale Vakbonden van België (ACLVB)), Francine Van Reeth (Algemene Unie van Verpleegkundigen van België (AUVB)), Justine Verboomen (Agence pour une Vie de Qualité (AVIQ)), Annabell Verhaegen (Domus Medica), Katrien Verschoren (Zorgnet-Icuro)
External validators:	Reinhard Busse (Technische Universität Berlin, Germany), Michael Simon (Universität Basel, Switzerland), Peter Van Bogaert (Universiteit Antwerpen, Belgium)
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- **The external experts were consulted about a (preliminary) version of the scientific report. Their comments were discussed during meetings. They did not co-author the scientific report and did not necessarily agree with its content.**
- **Subsequently, a (final) version was submitted to the validators. The validation of the report results from a consensus or a voting process between the validators. The validators did not co-author the scientific report and did not necessarily all three agree with its content.**
- **Finally, this report has been approved by common assent by the Executive Board.**
- **Only the KCE is responsible for errors or omissions that could persist. The policy recommendations are also under the full responsibility of the KCE.**

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