## 1.1 Health workers thinking that staffing levels in hospitals are sufficient to handle the workload and work hours appropriate to provide the best care for patients (% of respondents, HSPSC) (QS-9) Health workers who have positive overall perceptions of patient safety in hospitals (% of respondents, HSPSC) (QS-10)

### 1.1.1 Documentation sheet

| | |
|---|---|
| Description | **Primary indicators** |
| | QS-9 Average percentage of health workers thinking that staffing levels in hospitals (acute, psychiatric, and long-term care) are sufficient to handle the workload and work hours appropriate to provide the best care for patients |
| | QS-10 Average percentage of health workers who have positive overall perceptions of patient safety in hospitals (acute, psychiatric and long-term care hospitals) |
| | **Secondary indicator** |
| | Patient-to-nurse ratio on general nursing units |
| Calculation | **Health workers thinking that staffing levels in hospitals are sufficient to handle the workload and work hours appropriate to provide the best care for patients (% of respondents, HSPSC) (QS-9)** |
| | <u>Numerator:</u> Number of respondents within a hospital who answered positively ("strongly agree" or "agree") for this indicator |
| | <u>Denominator:</u> Total number of survey respondents for this indicator |
| | **Health workers who have positive overall perceptions of patient safety in hospitals (% of respondents, HSPSC) (QS-10)** |
| | <u>Numerator:</u> Number of respondents within a hospital who answered positively ("strongly agree" or "agree") for this indicator |
| | <u>Denominator:</u> Total number of survey respondents for this indicator |
| | **Patient-to-nurse ratio on general nursing units** |
| | <u>Numerator:</u> Number of patients on general surgical and internal medicine nursing units |
| | <u>Denominator:</u> Number of nurses on general surgical and internal medicine nursing units |
| Rationale | The perceptions of health professionals on overall patient safety and on the staffing levels are measures of patient safety culture (PSC), which can be used together with patient-reported experiences on safety to give a comprehensive perspective on the state of safety in health systems. Patient safety is widely recognised as an ethical, economic and public health issue requiring research and improvement[1] and PSC has recently been identified as an essential component in creating and maintaining safe healthcare systems.[2] A growing body of literature reported that positive PSC is associated with positive patient and staffing outcomes, including better health outcomes and patient experiences, as well as improved organisational productivity and staff satisfaction.[2] The COVID-19 pandemic emphasized the importance of PSC in times of emergency. Health systems with more positive PSCs are likely to be more resilient and adaptive to changing circumstances. In Belgium, measuring PSC is a key condition to improve patient safety in hospitals.[3] Starting in 2007, the Belgian government (FPS Public Health) launched |

a 5-year quality and safety program for acute, psychiatric and long-term care hospitals, focusing on three pillars of Donabedian's framework: structure, process and outcome measurement. The first program run from 2007 to 2012 and the second one from 2013 to 2017. A third program on quality and safety was organised for psychiatric hospitals from 2018 to 2022, with attention for safety culture improvement. In addition, in 2018, pay for performance was introduced in acute hospitals with incentives for accreditation processes (including safety culture measurement and improvement).

The health system's need to provide continuous care (i.e. 24 hours a days and seven days a week) and heavy workload are significant challenges for the organisation and the performance of the health system, health workers' well-being, safety and productivity, as well as patients' safety and outcomes.[4] Having adequate staff levels to handle the workload is an important patient safety issue and has been associated with patient outcomes in several studies. One study using data across nine European countries reported that an increase in a nurses' workload by one patient increased the likelihood an inpatient dying within 30 days of admission by 7%.[5] A recent study of 34 267 patients in seven hospitals in Belgium also found that the number of nurses working on a hospital ward affects the mortality rate of the patients in their care.[6] In high burn patient-volume hospitals in the United States, each additional patient per nurse was associated with 30% higher odds of mortality.[7] In the English National Health service, both the level of registered nurses staffing and the seniority mix of registered nurses were associated with patient mortality outcomes, but healthcare support workers and agency nurse staffing were not.[8] Having the right staffing mix and quality ward management are also important to achieve optimal workload, care quality and patient safety.[9]

Furthermore, having appropriate work hours to provide the best care for patients is also an essential patient safety issue. Working overtime, extending shift lengths or reducing the rest time between shifts can increase the likelihood of making medical errors.[9] Two studies have shown that reducing working hours and the length of shifts is associated with a reduction in medical errors.[10, 11] Burnout among nurses in acute care hospitals in the United States was a significant predictor of self-reported medication administration errors.[12]

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| Primary data source | **Primary indicators**<br>Belgian Hospital Survey on Patient Safety Culture (v 1.0), Hasselt University<br>**Secondary indicator**<br>2009 data comes from the European survey called RN4CAST.[13]<br>2019 data comes from the Belgian KCE survey replicating the RN4CAST method.[14] |
| Technical definitions | **Primary indicators**<br>The Hospital Survey on Patient Safety Culture (HSPSC), developed by the American Agency for Healthcare Research and Quality (AHRQ),[15] was chosen to measure PSC within Belgian hospitals, as it covers a large range of patient safety aspects and demonstrates good psychometric properties.[16] All types of hospitals (i.e. acute, psychiatric and rehabilitation) are included in the survey.<br>A Belgian version of the HSPSC was developed and validated for use in Belgian hospitals, and is recognised by the AHRQ on their list of international survey users. The HSPSC measures 12 composite dimensions (42 items), including 10 safety dimensions and 2 outcome dimensions.<br>The staffing indicator is one of the 12 safety dimensions and measures the extent to which there are enough staff to handle the workload and work hours are appropriate to provide the best care for patients. This dimension includes 4 items measured on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):<br>•    We have enough staff to handle the workload. |

- Staff in this unit work longer hours than is best for patient care (negatively worded).

- We use more agency/temporary staff than is best for patient care (negatively worded).

- We work in "crisis mode" trying to do too much, too quickly (negatively worded).

The indicator "overall perceptions of patient safety" is one of the two outcome dimensions and measures the extent to which procedures and systems are good at preventing errors and there are no patient safety problems. This dimension includes 4 items measured on a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree):

- Patient safety is never sacrificed to get more work done.

- Our procedures and systems are good at preventing errors from happening.

- It is just by chance that more serious mistakes don't happen around here.

- We have patient safety problems in this unit.

Based on the responses to the items in each dimension, mean dimensional scores (range 1-5) are calculated at the respondent level. Answers to negatively worded questions are reversed. These individual scores are then dichotomized by considering scores higher than three as a positive attitude towards patient safety. Summary positive dimensional scores (average percentage of positive scores) are computed at the national level, hospital level and for groups of respondents (e.g. same work area or profession).[16]

**Secondary indicator**

Nurse staffing was calculated based on the RN4CAST survey (survey in 12 countries, 488 hospitals, 33 659 nurses, 2009 data) as a ratio of patients to nurses (P2N). Nurses on general surgical and internal medicine nursing units were asked how many patients they were responsible for during their last shift. The results were averaged across all nurses providing direct inpatient care in the sampled nursing units. Lower ratios indicated more favourable staffing.[13] The KCE report 325 updated results but for Belgium only.

| | |
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| Limitations | **Primary indicators** <br><br> Data are collected for hospitals that voluntarily submitted their data for comparison and did not represent a random sample of all Belgian hospitals. However, overall, the characteristics of the included hospitals are fairly consistent with the distribution of all Belgian hospitals. The number of hospitals included and survey respondents varied by year. The average response rates varied by year (from 62% in 2010 to 27% in 2022), language spoken, and profession. Included hospitals used different survey methods (paper, electronic or mixed-mode) and not all of the hospitals sent reminders, which could explain some of the differences in response rates. <br><br> **Secondary indicator** <br><br> Data are only available for 2009 (12 countries) and 2019 (Belgium). |
| International comparability | **Primary indicators** <br><br> These indicators are included in the OECD Patient Safety Culture Pilot Data Collection 2020-2021.[17] Careful comparison of this indicator across countries is required due to broad variations between countries in data reporting, including the scope and methods used in the patient safety culture measurement, particularly the total number of survey respondents, types and number of participating hospitals, response rates and |

required vs. voluntary reporting.[17] As data over time was only available in three other OECD countries (United States, Israel and France), an international comparison of trends over time was not included.

**Secondary indicator**

The European RN4CAST survey (2009 data) was performed in 12 European countries (Belgium, England, Finland, Germany, Greece, Ireland, Netherlands, Norway, Poland, Spain, Sweden, and Switzerland).[13] Primary data for nurse staffing allows the minimisation of differences in administrative reporting methods across countries and restrict staffing measures to nurses providing direct inpatient care. A "nurse" was defined as a fully qualified professional nurse by the standards of each country.

The KCE report 325 only updated results for Belgium. To learn from international practices, an international comparison of safe staffing policies in four countries (Australia: Victoria, Queensland; United States: California, Massachusetts; United Kingdom: England; Ireland) was also performed through literature review. The selection of countries was based on the following criteria: variation of policy approaches; implementation realised 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). 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.

| | |
|---|---|
| Performance dimensions | Quality (safety of care) |
| Related indicators | Indicators on workforce capacity |
| Reviewer | Annemie Vlayen (FPS – Public ) |

### 1.1.2    Results

#### 1.1.2.1    Perceptions of staffing levels in hospitals among health workers

The average percentage positive response for perceptions of staffing levels in hospitals among health workers was 53% in 2022 (see Figure 1 and Table 1 below). The rates of positive perceptions of staffing remained relatively stable between 2010 (43%) and 2022.

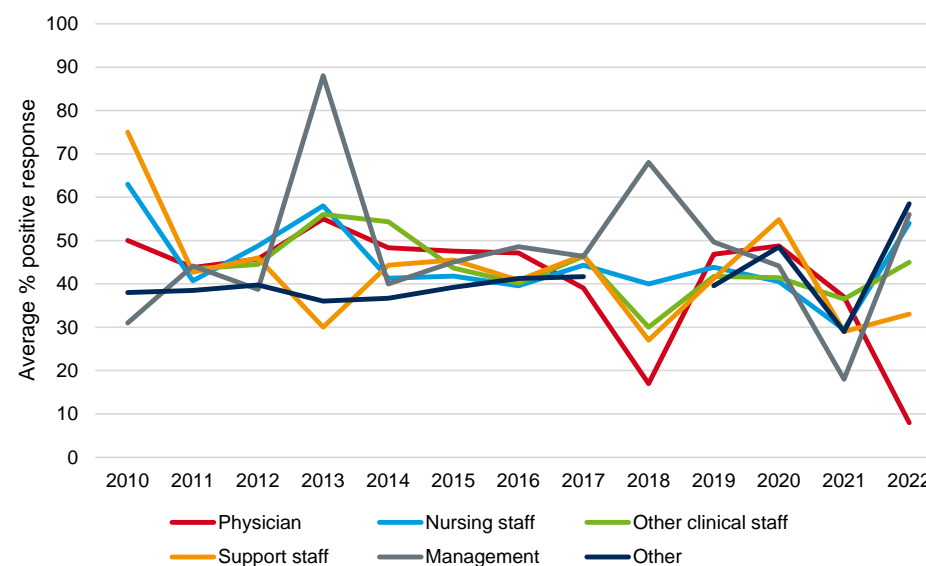**Figure 1 – Perceptions of staffing levels in hospitals among health workers (2010-2022)**
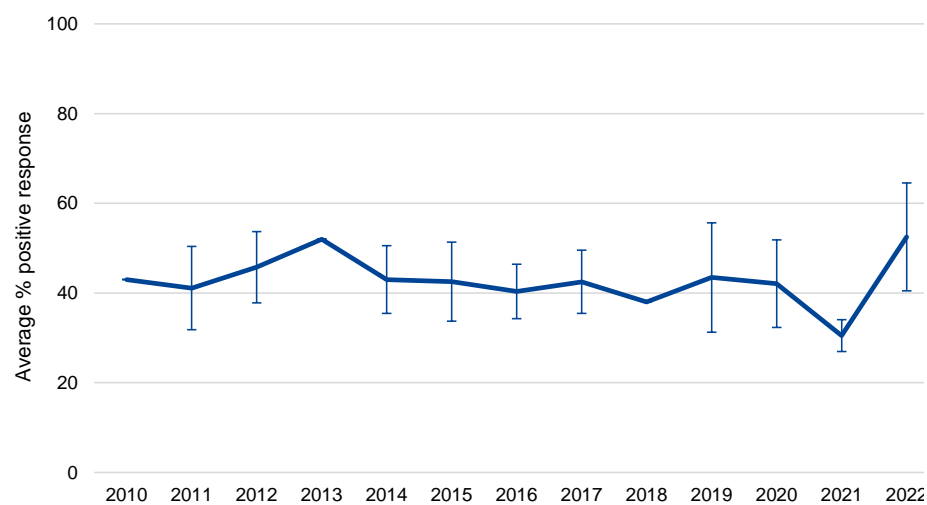


*Note: The size and composition sample of hospitals and health workers varied from year to year*

The perceptions of staffing levels in hospitals among health workers differed somewhat across staff types in Belgium between 2010 and 2022 (see, Figure 2 below). The perceptions of staffing varied the most between

management staff and support staff or physicians. For instance, there was a 51-58% points difference between the average positive response rates for management staff and physicians or support staff in 2013, 2018 and 2022. Physicians reported especially low average positive response rates in 2018 (17%) and 2022 (8%). However, variations in positive response rates over time might be related to the smaller sample of surveyed hospitals and respondents in some years.

**Figure 2 – Perceptions of staffing levels in hospitals among health workers by type (2010-2022)**



*Note: The size and composition sample of hospitals and health workers varied from year to year.*

**Table 1 – Perceptions of staffing levels in hospitals among health workers by type (2010-2022)**

| | All health workers | | | Physician | | Nursing staff | | Other clinical staff | | Support staff | | Management | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. of hospitals | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) |
| **2010** | 1 | 42 | 43 (0) | 3 | 50 (0) | 7 | 63 (0) | | | 1 | 75 (0) | 4 | 31 (0) | 27 | 38 (0) |
| **2011** | 141 | 56568 | 41 (9) | 5254 | 44 (14) | 34098 | 41 (12) | 6252 | 43 (10) | 2643 | 43 (14) | 2235 | 44 (19) | 6086 | 38 (13) |
| **2012** | 4 | 995 | 46 (8) | 87 | 46 (11) | 511 | 49 (12) | 161 | 45 (12) | 54 | 46 (15) | 21 | 39 (10) | 161 | 40 (7) |
| **2013** | 1 | 82 | 52 (0) | 5 | 55 (0) | 31 | 58 (0) | 20 | 56 (0) | 11 | 30 (0) | 4 | 88 (0) | 11 | 36 (0) |
| **2014** | 3 | 1314 | 43 (8) | 152 | 48 (16) | 791 | 41 (9) | 121 | 54 (6) | 53 | 44 (7) | 30 | 40 (16) | 167 | 37 (7) |
| **2015** | 118 | 43770 | 43 (9) | 3709 | 48 (14) | 26180 | 42 (10) | 5719 | 44 (11) | 2355 | 45 (16) | 2141 | 45 (15) | 3666 | 39 (12) |
| **2016** | 11 | 5400 | 40 (6) | 612 | 47 (8) | 3313 | 40 (7) | 697 | 40 (4) | 265 | 41 (15) | 122 | 49 (20) | 391 | 41 (10) |
| **2017** | 4 | 1222 | 43 (7) | 98 | 39 (18) | 660 | 44 (4) | 87 | 46 (15) | 38 | 47 (23) | 30 | 46 (12) | 309 | 42 (7) |
| **2018** | 1 | 272 | 38 (0) | 6 | 17 (0) | 171 | 40 (0) | 66 | 30 (0) | 11 | 27 (0) | 18 | 68 (0) | | |
| **2019** | 37 | 9050 | 43 (12) | 560 | 47 (20) | 5022 | 44 (13) | 1527 | 42 (14) | 427 | 41 (19) | 412 | 50 (23) | 1102 | 40 (18) |
| **2020** | 11 | 2025 | 42 (10) | 142 | 49 (17) | 1056 | 41 (15) | 504 | 41 (8) | 72 | 55 (15) | 119 | 44 (17) | 132 | 49 (21) |
| **2021** | 2 | 1454 | 31 (4) | 111 | 37 (10) | 1000 | 30 (4) | 173 | 37 (5) | 82 | 29 (3) | 26 | 18 (8) | 62 | 29 (3) |
| **2022** | 2 | 407 | 53 (12) | 3 | 8 (0) | 250 | 54 (11) | 42 | 45 (21) | 69 | 33 (11) | 20 | 56 (6) | 23 | 59 (23) |

**Impact of COVID-19 pandemic**

The impact of the COVID-19 pandemic on the perceptions of staffing levels in hospitals among health workers is not clear.

**International comparison**

In 2019, the percentage of positive response for perceptions on staffing among health workers was higher in Belgium (44%) than the average perception based on 13 OECD countries (40%; see Figure 3 below). The perceptions of staffing was lower in Belgium than in the United States, but higher than in France between 2012 and 2021 (see Figure 4, below).
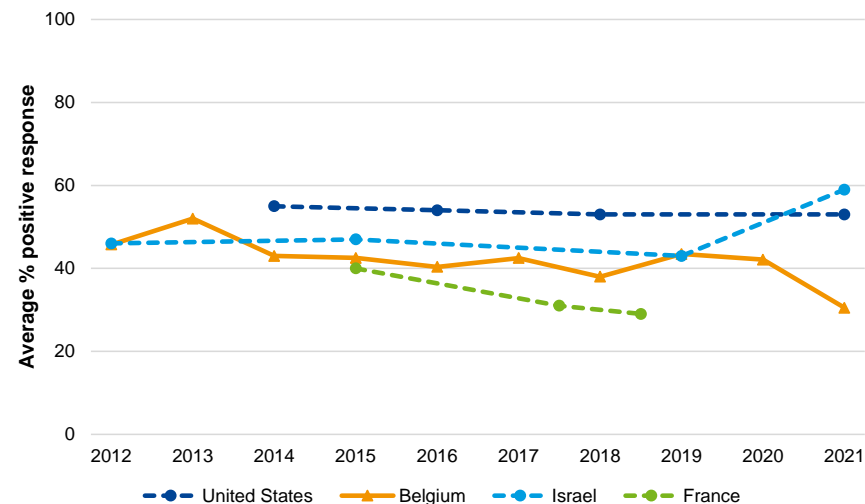
**Figure 3 – Perceptions of staffing levels in hospitals in 13 OECD countries in 2019 (or latest year available): international comparison**
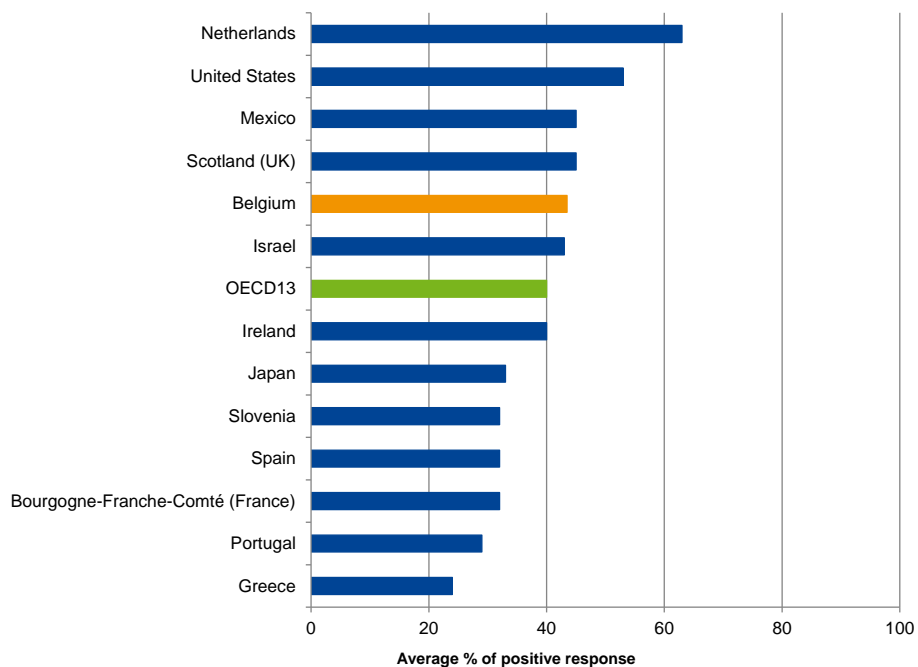


Source: OECD Patient Safety Culture Pilot Data (2020-2021)

**Figure 4 – Trends in perceptions of staffing levels in hospitals: international comparison**
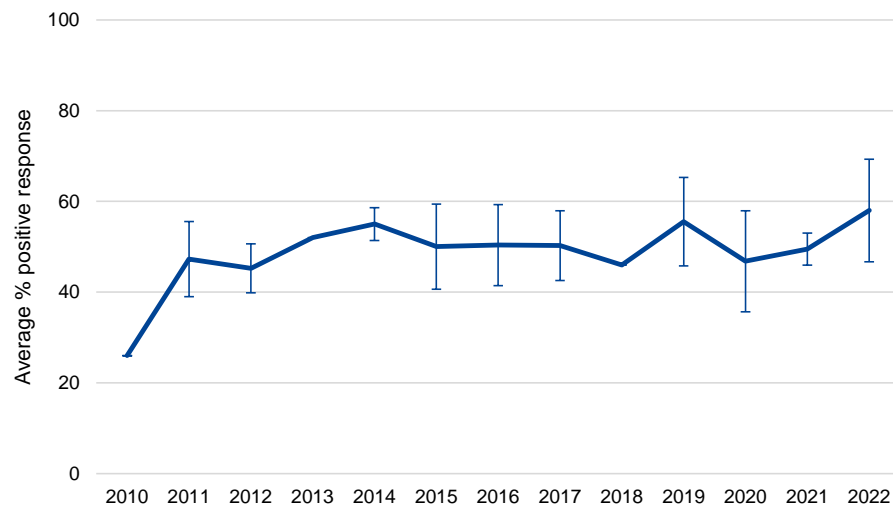


*Note: The size and composition sample of hospitals vary from year to year (within and between countries).*

### 1.1.2.2    *Overall perceptions of patient safety in hospitals*

The average percentage positive response for overall perceptions of patient safety in hospitals was 58% in 2022 (see Figure 5, below). The overall perceptions of patient safety was stable between 2011 (47%) and 2021 (50%). The increase between 2010 (26%) and 2011 (47%) must be interpreted with caution because of the limited number of respondents in 2010.
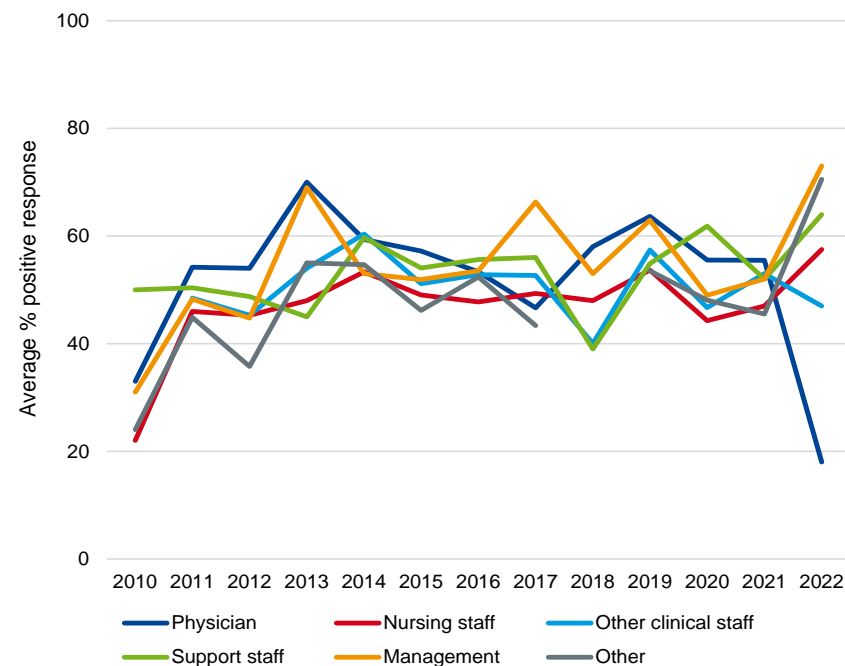
**Figure 5 – Overall perceptions of patient safety in hospitals (2010-2022)**



*Note: The size and composition sample of hospitals and health workers varied from year to year.*

The overall perceptions of patient safety were relatively similar across health workers types in Belgium between 2010 and 2021 (see Figure 6, below). In 2022 the overall perceptions of patient safety by physicians decreased (from 56% in 2021 to 18% in 2022) while it increased for other health workers. Nevertheless, 2022 results should be interpreted with caution because this is based on a limited number of respondents (only 3 respondents for physicians in 2022).

**Figure 6 – Overall perceptions of patient safety in hospitals by health worker type (2010-2022)**



*Note: The size and composition sample of hospitals and health workers varied from year to year.*

**Table 2 – Overall perceptions of patient safety in hospitals by health workers type (2010-2022)**

| | All health workers | | | Physician | | Nursing staff | | Other clinical staff | | Support staff | | Management | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. of hospitals | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) | No. of staff | Average % (std) |
| **2010** | 1 | 42 | 26 (0) | 3 | 33 (0) | 7 | 22 (0) | | | 1 | 50 (0) | 4 | 31 (0) | 27 | 24 (0) |
| **2011** | 140 | 56568 | 47 (8) | 5254 | 54 (15) | 34098 | 46 (9) | 6252 | 48 (10) | 2643 | 50 (15) | 2235 | 48 (19) | 6086 | 45 (16) |
| **2012** | 4 | 995 | 45 (5) | 87 | 54 (15) | 511 | 45 (5) | 161 | 45 (2) | 54 | 49 (17) | 21 | 45 (23) | 161 | 36 (4) |
| **2013** | 1 | 82 | 52 (0) | 5 | 70 (0) | 31 | 48 (0) | 20 | 54 (0) | 11 | 45 (0) | 4 | 69 (0) | 11 | 55 (0) |
| **2014** | 3 | 1314 | 55 (4) | 152 | 59 (9) | 791 | 53 (4) | 121 | 60 (7) | 53 | 60 (11) | 30 | 53 (9) | 167 | 55 (3) |
| **2015** | 118 | 43770 | 50 (9) | 3709 | 57 (15) | 26180 | 49 (10) | 5719 | 51 (11) | 2355 | 54 (15) | 2141 | 52 (18) | 3666 | 46 (12) |
| **2016** | 11 | 5400 | 50 (9) | 612 | 53 (11) | 3313 | 48 (9) | 697 | 53 (12) | 265 | 56 (16) | 122 | 54 (17) | 391 | 52 (15) |
| **2017** | 4 | 1222 | 50 (8) | 98 | 47 (20) | 660 | 49 (9) | 87 | 53 (16) | 38 | 56 (30) | 30 | 66 (13) | 309 | 43 (7) |
| **2018** | 1 | 272 | 46 (0) | 6 | 58 (0) | 171 | 48 (0) | 66 | 40 (0) | 11 | 39 (0) | 18 | 53 (0) | | |
| **2019** | 37 | 9050 | 56 (10) | 560 | 64 (22) | 5022 | 54 (10) | 1527 | 57 (13) | 427 | 55 (19) | 412 | 63 (17) | 1102 | 54 (18) |
| **2020** | 11 | 2025 | 47 (11) | 142 | 56 (18) | 1056 | 44 (10) | 504 | 47 (13) | 72 | 62 (16) | 119 | 49 (15) | 132 | 48 (17) |
| **2021** | 2 | 1454 | 50 (4) | 111 | 56 (16) | 1000 | 47 (4) | 173 | 53 (1) | 82 | 52 (3) | 26 | 52 (3) | 62 | 46 (13) |
| **2022** | 2 | 407 | 58 (11) | 3 | 18 (0) | 250 | 58 (11) | 42 | 47 (21) | 69 | 64 (16) | 20 | 73 (6) | 23 | 71 (42) |

**Impact of COVID-19 pandemic**

The impact of the COVID-19 pandemic on the overall perceptions of patient safety in hospitals is not clear.

**International comparison**

In 2019, the percentage of positive response for overall perceptions of patient safety was lower in Belgium (47%) than the average perception based on 13 OECD countries (53%; see Figure 7 below).

**Figure 7 – Overall perceptions of patient safety in hospitals in 13 OECD countries in 2019 (or latest year available): international comparison**
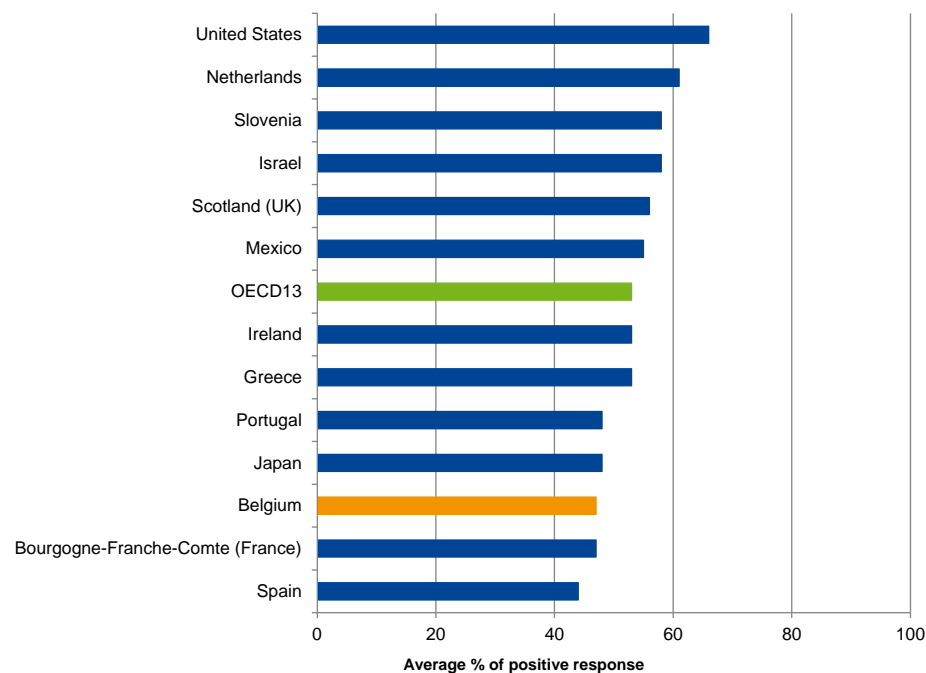


Source: OECD Patient Safety Culture Pilot Data (2020-2021)

### 1.1.2.3 Patient-to-nurse ratio on general nursing units

**Previous data from NR4CAST**

In 2009, the average patient-to-nurse ratio in Belgium (10.7) was high compared to other EU countries studied (average for 12 countries: 9) as shown in Table 3. The average number of patients assigned to one nurse was only higher in Germany (13.0) and Spain (12.6), and nearly twice as high as in Norway (5.4). If on top of registered nurses lesser trained staff is also counted, the number of patients per staff member is 7.9 in Belgium, which is only higher in Germany (see Table 3).

**2009-2019 Evolution from KCE report 325**

In 2019, the overall patient-to-nurse ratio improved to 9.4 on average (based on the 84 hospitals participating to the 2019 survey). This ratio, however, varied across hospitals from 6.1 to 12.7. Large differences in ratios were 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.
If we focus on the 49 hospitals for which we have both 2009 and 2019 data, the analysis showed a significant improvement in the patient-to-nurse ratio, overall but also per type of shift (morning – day – night), see Figure 8.

Based on the literature review, the international comparison reported that, when available, the patient-to-nurse ratio in Belgium was worse than in the studied countries (see Table 4) and seemed too high still. Indeed, the observed patient-to-nurse ratios in Belgium are still far above what is internationally considered as safe. In California, Victoria and Queensland, a maximum number of patients per nurse is defined by law, reflecting what is considered as safe and in England, based on NICE guidance, a P2N superior to 8 is considered as manifestly unsafe. Moreover, because the intensity of nursing care increased (CIPPD) simultaneously, one can conclude that not much happened during the last decade to improve nurse staffing levels in Belgian hospitals. Additional results can be found in the KCE report 325, including data on the intensity of nursing care and the importance of missed nursing care.[14]

**Table 3 – Patient-to-Nurse ratios in European Hospitals: NR4CAST international comparison (2009-2010)**

| Country | Nurse staffing ratio | |
| --- | --- | --- |
| | **Patients to professional registered nurses** | **Patients to total nursing staff (registered nurses + lesser trained care personnel)** |
| **Belgium** | 10.7 (2.2) | 7.9 (1.7) |
| **England** | 8.6 (1.5) | 4.8 (0.6) |
| **Finland** | 8.3 (2.2) | 5.3 (0.8) |
| **Germany** | 13 (2.3) | 10.5 (1.6) |
| **Greece** | 10.2 (2.8) | 6.2 (2.1) |
| **Ireland** | 6.9 (1.0) | 5.0 (0.8) |
| **Netherlands** | 7 (0.8) | 5.0 (0.7) |
| **Norway** | 5.4 (1.0) | 3.3 (0.5) |
| **Poland** | 10.5 (1.9) | 7.1 (1.4) |
| **Spain** | 12.6 (1.9) | 6.8 (1.0) |
| **Sweden** | 7.7 (1.1) | 4.2 (0.6) |
| **Switzerland** | 7.9 (1.5) | 5.0 (1.0) |

*Source: RN4CAST [5]*

**Table 4 – Patient-to-nurse ratio in selected states**

| | California | Victoria | Queensland | England |
| --- | --- | --- | --- | --- |
| **Patient-nurse ratio** | 5:1 | 4:1 (day)<br>8:1 (night) | 4:1 (day)<br>7:1 (night) | N/A (*More than 8 patients per nurse is considered as an unsafe ratio*) |

*N/A not available*

**Figure 8 – Patient-to-nurse ratio: evolution between 2009 and 2019 (n = 49 hospitals)**
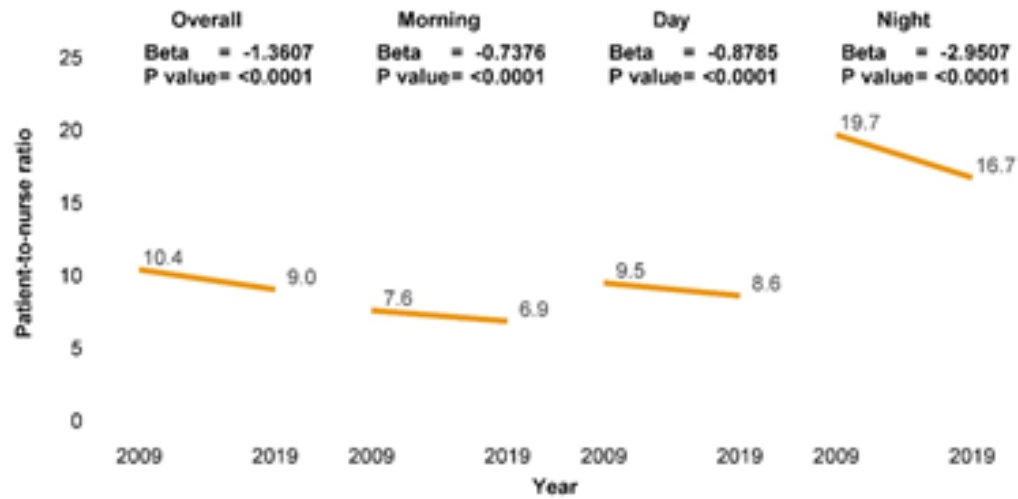
## Key points

- **The perception of staffing levels in hospitals varied among type of health workers with greater differences between management staff and physicians or support staff.**

- **The positive response rate for perception of staffing levels in hospitals in Belgium was higher than the average across 13 OECD countries in 2019.**

- **In 2010-2022, around half of surveyed health workers in Belgium had positive overall perceptions of patient safety in hospitals – meaning that on average 49% of the staff thought the procedures and systems at their workplace are good at preventing errors and that there is a lack of patient safety problems.**

- **The positive response rate for overall perceptions of patient safety in hospitals varied little over time and across staff types, and was lower in Belgium than the average across 13 OECD countries in 2019.**

- **In 2010-2022, less than half of surveyed health workers in Belgium believed that the staffing levels at their workplace are appropriate for ensuring patient safety.**

- **The average patient-to-nurse ratio slightly improved from 10.7 in 2010 to 9.4 in 2019 but this is far above what is internationally considered as a safe patient-to-nurse ratio. Moreover, because the intensity of nursing care increased (CIPPD) simultaneously, one can conclude that not much happened during the last decade to improve nurse staffing levels in Belgian hospitals.**

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