

# Lack of confidence in administering emergency care among Dutch-speaking family physicians in Belgium

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**Background:** Practical knowledge of emergency medical care among physicians seems to be insufficient worldwide. Research specifically aimed at family physicians is rather scarce. Additionally, in Belgium there are no data on this subject.

**Purposes:** Our aim was to ascertain how confident Belgian family physicians feel about their ability to give adequate emergency care and to examine their assessment of their knowledge of relevant medical conditions.

**Methods:** We used a web-based questionnaire for which a convenience sample of 974 Dutch-speaking family practitioners was invited through email. The survey assessed how these physicians perceived their own emergency skills and their knowledge of relevant medical conditions.

**Results:** The survey had a recruitment rate of 22% (n = 210), with a 75% completion rate. The minimum criteria formulated pertaining to skills and knowledge were met by 64% and 55% of the participants, respectively. The mean cumulative scores on skills and knowledge were 2.5 and 3.2, respectively (on a scale from 0 to 4). Physicians with additional training in emergency care (3.07 versus 2.72), or with a spirometry certificate (2.94 versus 2.72) scored better than those without. Practitioners from rural areas felt more confident than those from urbanized regions (3.25 versus 3.15). Physicians felt more competent in aspects of emergency care where they had experience.

**Conclusion:** Almost half of the Dutch-speaking family physicians in Belgium felt insufficiently competent to offer emergency medical care.

**Keywords:** emergency medical care, family physician, Dutch, Belgium, medical training

## Introduction

There is growing belief that administering emergency medical care is a key skill for physicians. But as early as 1981, an article in *The Lancet* reported a lack of skills among house-officers being tested on cardiopulmonary resuscitation.<sup>1</sup> Similar results were found in studies at the Addenbrooke's Hospital of Cambridge (UK) in 1984<sup>2</sup> and the Wellington School of Medicine (New Zealand) in 1989.<sup>3</sup> A study from 1989 among family physicians and pediatricians in Chicago (USA) reported that they were not trained in basic life support at all.<sup>4</sup> Possible inadequate competence of physicians relating to aspects of emergency care has later been confirmed by studies from Australia (1999),<sup>5</sup> the United States (2001),<sup>6</sup> Norway (2001),<sup>7</sup> Denmark (2002),<sup>8</sup> South Africa (2005)<sup>9</sup> and the Netherlands (2006),<sup>10</sup> indicating that little progress has been made since. In Belgium, no similar studies have been performed, but our own research in 2008 among medical students and junior graduates in their postgraduate training to

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become a family physician suggest at least a low confidence in their own skills and knowledge regarding emergency medical care.

A number of publications express the need for better education in medical emergency skills, and better and more accessible training modules for physicians.<sup>11,12,13</sup> Also, the need for repetitive and continuous re-education has been illustrated by numerous studies,<sup>14-17</sup> suggesting that 6 months is the optimal time interval with which skills should be recapped.<sup>18-20</sup>

Based on these scientific results, initiatives to improve education in clinical skills and emergency care were set up in several countries. These initiatives involve, for example, reviewing of university curricula in medicine,<sup>21</sup> supporting rural family physicians in acquiring and retaining urgency skills,<sup>22,23</sup> formulating clearer final qualifications for medicine graduates,<sup>24,25</sup> evaluating clinical skills using Objective Structured Clinical Examinations<sup>11</sup> and incorporating clinical skills assessments in medical license exams.<sup>25</sup>

Even though the study groups and assessed skills were rather heterogeneous among the different publications, we can safely say that practical knowledge of emergency medical care among physicians seems to be insufficient worldwide. However, almost no data is available concerning physicians in Belgium.<sup>11</sup> It is essential for Belgian family physicians to be able to manage emergency conditions. Basic emergency care is done by family physicians within their own practice or during on-call hours. Especially outside of the cities, people usually don't seek care in emergency departments without first seeing their own family physician. Belgium is said to have one of the highest health care standards in the world, which implies that its physicians are probably confident and skilled. The aim of this study was to ascertain how confident Dutch-speaking family physicians in Belgium feel about their ability to give adequate emergency medical care and to examine their assessment of knowledge of relevant medical conditions.

## Methods

### Participants

All local family physician organizations of Dutch-speaking physicians in Belgium were asked to invite their members to take part in our study in September 2009. A convenience sample consisting of 974 family practitioners was contacted through email and asked to complete a web-based questionnaire. Physicians in their postgraduate training to become a family physician were also included, since they work independently as qualified physicians and are an inte-

gral part of the Medical Corps in Belgium. We opted for this subgroup of Belgian physicians because they consist of a homogenous group. The two main language groups in Belgium (French and Dutch) have a different organization of medical studies. Curricula are different, and contrary to their French-speaking counterparts, Flemish physicians have been trained in an interuniversity setting for more than 25 years. Because the vast majority of Dutch-speaking physicians work in Flanders and Brussels, we performed our study only in these two parts of the country.

### Questionnaire

We opted for an online questionnaire, hosted on server space of the Vrije Universiteit Brussel. Access to the database was protected using password authorization. The interface was tested by two independent researchers. Completion of all items was enforced using Javascript by displaying an alert. Cookies as well as IP address analysis were used to avoid single users filling in the questionnaire multiple times. The use of the web-based questionnaire was supported by skilled information technologists.

In addition to sociodemographic data, the questionnaire consisted of two parts. The first part had 22 questions about the participant's skills in emergency care. For each skill, the participant was asked for a self-assessment, using a Likert scale with the following possibilities: 0, has no experience or knowledge whatsoever; 1, has theoretical knowledge; 2, has had a demonstration of the skill or has observed it; 3, is able to perform the skill independently; and 4, has proficiency in the respective skill.

The second part consisted of 31 questions ascertaining the participant's knowledge of conditions relevant to urgent medical care. Again, a Likert scale was used as follows: 0, has never heard of the disease or condition; 1, has heard of the disease/condition but is unable to manage it; 2, can manage the disease/condition; 3, can diagnose the disease/condition; and 4, can independently treat the disease/condition.

Our questionnaire was based on a list used by Hekkert in a similar study in the Netherlands.<sup>21</sup> A test study has been performed on medical students, using the same methodology and questionnaire.<sup>11</sup> Using the information gained from that study, changes were made to scales, descriptions, questions, and questionnaire setup. However, we limited these changes to the essential ones, in order to maintain our possibility to compare. It is unclear in what way the original instrument was validated by the composers, but since Hekkert used the validated criteria set from the Dutch Raamplan 2001<sup>24</sup> and based on consistency within and comparison with other

studies using the same questionnaire, we estimated the questionnaire to be valid and reliable. The Dutch Raamplan is also used in Belgium, as a basis for the final qualifications in medical studies.

## Interpretation

The participants were divided into subgroups: based on sex, age (five groups), geographical location (rural, urban, metropolitan), size of the family practice (four groups), and on the organization of the practice (five groups). Participants were asked if they had obtained an official ECG or spirometry certificate. They were also asked if and when they had taken any additional training in emergency care. The context of this training was not further defined, meaning that every initiative being regarded as additional training by the participant was included. For each participant, a mean score for skills and one for knowledge was determined. Although a decimal score on a Likert scale has no meaning as such, we assumed that means would provide more information than the raw score itself. In order to interpret these means, we considered the results as continuous variables. Questionnaires in which a participant indicated the same score on each question, or where the pattern of answers showed a consequent algorithm, were assumed to be intentionally misleading and were excluded.

The Raamplan states that at the end of the medical studies, a physician should be able to perform skills “in an appropriate manner, not always by acting independently but also by referring out, if needed.”<sup>24</sup> In our opinion, having had a demonstration of a skill (Likert score 2) does not comply with this criterion. Therefore, we set the minimum criterion to meet our standards at Likert score 3, meaning the participant was able to perform the skill independently. Even though it could be theoretically assumed that a licensed physician meets this criterion in all mentioned skills, this assumption is highly unrealistic. Hence, we assumed that a participant met our standards in a reasonable manner when scoring 3 on at least half of the questioned skills.

For assessing knowledge of relevant conditions, we used the appendix to the Raamplan, which differentiates between the conditions. Therefore, each condition or disease has a different minimum level. We assumed that a participant fulfilled the criteria in a reasonable way if he or she met the set criterion on at least half of the questioned pathologies.

## Statistics

For statistical interpretation, we used SPSS Statistics for Windows, version 19.0 (IBM Corporation, Armonk, NY, USA). Due to the small subgroups and the presence of some

extreme results, we could not assume a normal distribution of our data, as was indicated by a Shapiro–Wilk test for most parameters of the subgroups. However, we decided to include extremes in our statistics, in line with growing statistical belief.<sup>26</sup> In most cases, we used a Kruskal–Wallis test to compare subgroups. We used a Mann–Whitney *U*-test to compare men and women, and to compare holders of an ECG or spirometry certificate to those without. In order to compare the number of physicians in the subgroups meeting our set standards, we used a chi-square test. The level of significance was set at  $P < 0.05$ .

Dichotomizing the groups allowed us to assume normal distribution and use parametric tests. However, we kept the nonparametric results, with their stronger stratification and bigger distribution independence, since this did not differentiate any additional significance.

## Results

### Participants

The recruitment rate to our email invitation was approximately 22% ( $n = 210$ ). After exclusion of incomplete questionnaires ( $n = 51$ ) or those with obviously intentional misleading answers ( $n = 1$ ), our study group consisted of 158 family physicians, meaning a completion rate of 75%. This sample size was adequate, and by comparing its composition to the demographic composition of Belgian family physicians, it seemed to be highly representative. The study group consisted of 99 men and 59 women. Additional training in emergency medical care had been completed by 39% of participants, an ECG certificate was held by 92%, and 61% held a spirometry certificate.

### Self-assessment of skills and knowledge

The mean Likert cumulative score on skills and knowledge was 2.86. Holders of a spirometry certificate scored higher than their colleagues without such a certificate (2.94 and 2.72 respectively;  $P = 0.035$ ). Also, family physicians with an additional training in emergency care had clearly higher scores than those without ( $P < 0.001$ ; means, 3.07 and 2.72 respectively). Any influence of time (delay) pertaining to additional training could not be proven from our results ( $P = 0.091$ ). No other significant differences between subgroups were found.

The mean Likert score on skills was 2.50. Based on the questionnaire results, the least-known skills were: tilting to recovery position (mean, 1.30), use of an external defibrillator (1.79), and resuscitation of a child (1.93). The best-known skills were: removal of a foreign body (3.53),

applying bandages (3.09), and external heart massage (3.08). Our minimum criteria were met by 64% of participants. In 14 of the 22 skill items, at least half of the physicians met our criteria. The skills criteria met by the highest number of participants were: removal of a foreign body (92%), external heart massage (87%), and applying bandages (80%). The skills criteria met by the lowest number of participants were: tilting to recovery position (19%), use of the external defibrillator (28%), and safe transport of an accident victim (29%) (Table 1). Holders of a spirometry certificate scored higher than their colleagues without such a certificate (2.61 and

2.34 respectively;  $P = 0.035$ ). Also, family physicians with an additional training in emergency care had clearly higher scores than those without ( $P < 0.001$ ; means, 2.81 and 2.31 respectively), with more meeting our criteria (77% versus 56%;  $P = 0.006$ ). No other significant differences between subgroups were found (Table 2).

The mean Likert score of knowledge for relevant pathologies was 3.21. The least-known diseases or conditions were: a fall from great height (mean, 2.09), skull base fracture (2.28), and electrocution (2.28). The best-known diseases or conditions were: superficial wounds (3.91), insect bites (3.86), and hyperventilation (3.85). Our minimum criteria were met by 55% of participants. On 24 of the 31 diseases/conditions, at least half of the physicians met our criteria. The skills criteria met by the highest number of participants were: superficial wounds (99%), cerebrovascular abnormalities (99%), and epilepsy (97%). The skills criteria met by the lowest number of participants were: electrocution (11%), poisoning (11%), and a fall from great height (13%) (Table 3). More holders of a spirometry certificate met our criteria than their colleagues without this certificate (63% versus 43%;  $P = 0.013$ ). Also, family physicians with additional training in emergency care had clearly higher scores than those without ( $P = 0.003$ ; means, 3.33 and 2.14 respectively), with more meeting our criteria (70% versus 45%;  $P = 0.002$ ). The mean score of physicians working in rural areas was higher than that of those working in urban or metropolitan areas ( $P = 0.033$ ; means, 3.25 and 3.15 respectively). More physicians from rural areas met our criteria compared to those from urban or metropolitan areas (61% versus 45%;  $P = 0.047$ ) (Table 2).

No significant differences between men and women, age groups, or practice size could be found. Whether or not the physician was the holder of an ECG certificate did not have a significant influence on the results.

## Discussion

Based on the results of our study, we can confidently state that Dutch-speaking family physicians in Belgium do not feel able to adequately administer most aspects of emergency care. As described in the introduction, this is in line with studies in many other countries.<sup>1-10</sup> Our results were also highly comparable with those obtained in our similar study from 2008 by junior doctors in their postgraduate training to become family physicians.<sup>11</sup>

Factors of influence on skills and knowledge relating to urgent medical care seem limited. Having taken an additional training in emergency medicine is the most influencing posi-

**Table 1** List of questioned skills, mean scores, and percentages of Dutch-speaking family physicians (n = 158) in Belgium that met our minimum criteria pertaining to emergency medical care

| Skills  | Mean score (out of 4) | Participants that fulfilled our minimum criteria |
|---|-----------------------|--|
| Removal of a foreign body                             | 3.53                  | 94% (n = 149)                                    |
| External heart massage                                | 3.08                  | 87% (n = 137)                                    |
| Applying bandages                                     | 3.09                  | 80% (n = 126)                                    |
| Recognizing impaired consciousness                    | 2.96                  | 78% (n = 124)                                    |
| Mouth-to-mouth ventilation                            | 2.89                  | 76% (n = 120)                                    |
| Staunch bleeding                                      | 2.89                  | 75% (n = 118)                                    |
| Recognizing breathing difficulties                    | 2.67                  | 72% (n = 113)                                    |
| The most important aspects of administering first aid | 2.82                  | 70% (n = 110)                                    |
| Recognizing disorders of circulation                  | 2.72                  | 67% (n = 106)                                    |
| Chin lift and fast mouth inspection                   | 2.63                  | 66% (n = 105)                                    |
| Applying a triangulated bracing                       | 2.61                  | 62% (n = 98)                                     |
| Turning a victim from their back to their side        | 2.57                  | 62% (n = 98)                                     |
| Help a choking victim                                 | 2.56                  | 56% (n = 88)                                     |
| Determining the extent of burns                       | 2.39                  | 50% (n = 79)                                     |
| Mask ventilation                                      | 2.24                  | 46% (n = 73)                                     |
| Immobilizing the cervical spine                       | 2.30                  | 42% (n = 66)                                     |
| Turning an unconscious victim on their back           | 2.11                  | 41% (n = 65)                                     |
| Mouth-to-nose ventilation                             | 2.01                  | 36% (n = 57)                                     |
| Resuscitation of a child                              | 1.93                  | 30% (n = 48)                                     |
| Safe transport of an accident victim                  | 2.01                  | 29% (n = 46)                                     |
| Use of an external defibrillator                      | 1.79                  | 28% (n = 44)                                     |
| Tilting a victim to the recovery position             | 1.30                  | 19% (n = 30)                                     |

**Notes:** List of questioned skills, mean scores, and percentages of Dutch-speaking family physicians in Belgium that met our minimum criteria pertaining to emergency medical care. Scores were determined on a Likert scale with the following possibilities: 0, has no experience or knowledge whatsoever; 1, has theoretical knowledge; 2, has had a demonstration of the skill or has observed it; 3, is able to perform the skill independently; 4, has proficiency in the respective skill. We assumed that a participant met our standards in a reasonable manner when scoring at least 3 on the questioned skill.

**Table 2** Mean scores and percentages of Dutch-speaking family physicians in Belgium that met our minimum criteria pertaining to emergency medical care

| Subgroups                                  | n   | Skills                 |  | Medical conditions     |  | Cumulative             |
|--|-----|------------------------|--|------------------------|--|------------------------|
|  |     | Mean scores (out of 4) | Percentage of participants that fulfilled our minimum criteria | Mean scores (out of 4) | Percentage of participants that fulfilled our minimum criteria | Mean scores (out of 4) |
| Men  | 99  | 2.54                   | 65% (n = 64)   | 2.89                   | 59% (n = 58)   | 3.24                   |
| Women                                      | 59  | 2.44                   | 63% (n = 37)   | 2.80                   | 49% (n = 29)   | 3.16                   |
|  |     | <i>P</i> = 0.20        | <i>P</i> = 0.81  | <i>P</i> = 0.24        | <i>P</i> = 0.25  | <i>P</i> = 0.29        |
| With ECG certificate                       | 145 | 2.49                   | 63% (n = 91)   | 2.85                   | 56% (n = 81)   | 3.21                   |
| Without ECG certificate                    | 13  | 2.65                   | 77% (n = 10)   | 2.94                   | 46% (n = 6)  | 3.23                   |
|  |     | <i>P</i> = 0.38        | <i>P</i> = 0.57  | <i>P</i> = 0.34        | <i>P</i> = 0.50  | <i>P</i> = 0.54        |
| With spirometry certificate                | 97  | 2.61                   | 69% (n = 67)   | 2.94                   | 63% (n = 61)   | 3.28                   |
| Without spirometry certificate             | 61  | 2.31                   | 56% (n = 34)   | 2.72                   | 43% (n = 23)   | 3.10                   |
|  |     | <i>P</i> = 0.034*      | <i>P</i> = 0.09  | <i>P</i> = 0.035*      | <i>P</i> = 0.013*  | <i>P</i> = 0.038*      |
| With additional training in emergency care | 61  | 2.81                   | 77% (n = 47)   | 3.07                   | 70% (n = 43)   | 3.33                   |
| Without training in emergency care         | 97  | 2.31                   | 56% (n = 54)   | 2.72                   | 45% (n = 44)   | 3.14                   |
|  |     | <i>P</i> < 0.001*      | <i>P</i> = 0.006*  | <i>P</i> < 0.001*      | <i>P</i> = 0.002*  | <i>P</i> = 0.003*      |
| Working in rural areas                     | 98  | 2.60                   | 69% (n = 68)   | 2.92                   | 61% (n = 60)   | 3.25                   |
| Working in urban or metropolitan areas     | 60  | 2.55                   | 55% (n = 33)   | 2.75                   | 45% (n = 27)   | 3.15                   |
|  |     | <i>P</i> = 0.074       | <i>P</i> = 0.07  | <i>P</i> = 0.056       | <i>P</i> = 0.047*  | <i>P</i> = 0.033*      |
| <1,000 contacts/year                       | 3   | 2.55                   | 67% (n = 2)  | 2.66                   | 67% (n = 2)  | 2.78                   |
| 1,001–5,000 contacts/year                  | 67  | 2.39                   | 57% (n = 38)   | 2.78                   | 48% (n = 32)   | 3.17                   |
| 5,001–10,000 contacts/year                 | 79  | 2.57                   | 70% (n = 55)   | 2.91                   | 59% (n = 47)   | 3.24                   |
| >10,000 contacts/year                      | 9   | 2.80                   | 67% (n = 6)  | 3.07                   | 67% (n = 6)  | 3.35                   |
|  |     | <i>P</i> = 0.165       | <i>P</i> = 0.08  | <i>P</i> = 0.33        | <i>P</i> = 0.44  | <i>P</i> = 0.816       |
| Aged <30 years                             | 14  | 2.68                   | 86% (n = 12)   | 2.98                   | 50% (n = 7)  | 3.29                   |
| Aged 30–39 years                           | 37  | 2.54                   | 59% (n = 22)   | 2.89                   | 54% (n = 20)   | 3.25                   |
| Aged 40–49 years                           | 38  | 2.61                   | 68% (n = 26)   | 2.95                   | 53% (n = 20)   | 3.29                   |
| Aged 50–59 years                           | 55  | 2.44                   | 60% (n = 33)   | 2.81                   | 62% (n = 34)   | 3.18                   |
| Aged >59 years                             | 14  | 2.23                   | 57% (n = 8)  | 2.59                   | 43% (n = 6)  | 2.94                   |
|  |     | <i>P</i> = 0.50        | <i>P</i> = 0.38  | <i>P</i> = 0.29        | <i>P</i> = 0.72  | <i>P</i> = 0.179       |
| Working as family physician in training    | 5   | 2.48                   | 100% (n = 5)   | 2.81                   | 0% (n = 0)   | 3.13                   |
| Working alone                              | 63  | 2.56                   | 60% (n = 38)   | 2.89                   | 56% (n = 35)   | 3.21                   |
| Working in a duo practice                  | 35  | 2.55                   | 69% (n = 24)   | 2.88                   | 60% (n = 21)   | 3.21                   |
| Working in a group practice                | 41  | 2.45                   | 65% (n = 33)   | 2.85                   | 59% (n = 30)   | 3.25                   |
| Other                                      | 4   | 1.94                   | 25% (n = 1)  | 2.36                   | 25% (n = 1)  | 2.77                   |
|  |     | <i>P</i> = 0.52        | <i>P</i> = 0.19  | <i>P</i> = 0.53        | <i>P</i> = 0.08  | <i>P</i> = 0.49        |
| Total                                      | 158 | 2.50                   | 64%  | 2.86                   | 55%  | 3.21                   |

**Notes:** Mean scores and percentages of Dutch-speaking family physicians in Belgium that met our minimum criteria pertaining to emergency medical care. Scores were determined using a Likert scale with the following possibilities: 0, has no experience or knowledge whatsoever; 1, has theoretical knowledge; 2, has had a demonstration of the skill or has observed it; 3, is able to perform the skill independently; 4, has proficiency in the respective skill (pertaining to skills) or; 0, has never heard of the disease or condition; 1, has heard of the disease/condition but is unable to manage it; 2, can manage the disease/condition; 3, can diagnose the disease/condition; 4, can independently treat the disease/condition (pertaining to relevant conditions). We assumed that a participant fulfilled the criteria in a reasonable way if he or she met the set criterion on at least half of the questioned pathologies. Statistically significant *P*-values are marked with \*.

tive factor on both skills and knowledge. This sounds logical, but could be a result of the profile of the participant rather than of the training itself. Holding a spirometry certificate proves to be of positive influence on the physician's self-assessed skills and knowledge. Holding an ECG certificate, however, had no influence on the physician's skills and knowledge in emergency medical care, probably because the

certified training is incorporated in the basic curriculum for most medicine students and is therefore independent of the student's profile. In most cases, obtaining an ECG certification is independent of the physician's personal interests and preparedness to take additional training, whereas obtaining a spirometry certificate is highly influenced by these factors. It is plausible that a doctor seeking additional training has an

**Table 3** List of questioned medical conditions, mean scores, and percentages of Dutch-speaking family physicians (n = 158) in Belgium that met our minimum criteria pertaining to emergency medical care

| Medical conditions        | Mean score | Percentage of participants that fulfilled our minimum criteria |
|---------------------------|------------|--|
| Superficial wounds        | 3.91       | 99% (n = 156)  |
| Cerebrovascular disorders | 3.46       | 99% (n = 156)  |
| Epilepsy                  | 3.58       | 97% (n = 154)  |
| Luxations                 | 3.27       | 96% (n = 151)  |
| Distortions               | 3.77       | 95% (n = 150)  |
| Burns                     | 3.65       | 94% (n = 148)  |
| Insect bites              | 3.86       | 89% (n = 141)  |
| Hyperventilation          | 3.85       | 87% (n = 138)  |
| Fractures                 | 3.27       | 87% (n = 138)  |
| Hypoglycemia              | 3.82       | 86% (n = 136)  |
| Shock                     | 3.22       | 86% (n = 136)  |
| Suicide attempt           | 3.20       | 83% (n = 131)  |
| Syncope                   | 3.76       | 82% (n = 130)  |
| Skull base fracture       | 2.28       | 82% (n = 129)  |
| Spinal cord transection   | 2.39       | 81% (n = 128)  |
| Contusions                | 3.74       | 80% (n = 127)  |
| Acute nose bleeding       | 3.68       | 77% (n = 122)  |
| Addiction                 | 2.92       | 73% (n = 116)  |
| COPD                      | 3.66       | 72% (n = 114)  |
| Eye injury                | 2.90       | 69% (n = 109)  |
| Pneumothorax              | 2.76       | 69% (n = 109)  |
| Myocardial infarct        | 3.64       | 68% (n = 108)  |
| Anaphylactic reaction     | 3.59       | 68% (n = 108)  |
| Penetrating wounds        | 3.35       | 51% (n = 80)   |
| Hyperthermia              | 3.08       | 39% (n = 61)   |
| CO poisoning              | 2.95       | 34% (n = 54)   |
| Drowning                  | 2.32       | 27% (n = 43)   |
| Freezing                  | 2.72       | 26% (n = 41)   |
| Fall from a great height  | 2.09       | 13% (n = 21)   |
| Poisoning                 | 2.61       | 11% (n = 18)   |
| Electrocution             | 2.28       | 11% (n = 17)   |

**Notes:** List of questioned medical conditions, mean scores, and percentages of Dutch-speaking family physicians in Belgium that met our minimum criteria pertaining to emergency medical care. Scores were determined on a Likert scale with the following possibilities: 0, has never heard of the disease or condition; 1, has heard of the disease/condition but is unable to manage it; 2, can manage the disease/condition; 3, can diagnose the disease/condition; 4, can independently treat the disease/condition. We assumed that a participant fulfilled the criteria in a reasonable way if he or she met our set criteria on at least half of the questioned conditions.

**Abbreviations:** COPD, chronic obstructive pulmonary disease; CO, carbon monoxide.

overall more proactive professional approach. Therefore, the found link between the certified emergency, ECG or spirometry training, and the assessed confidence could be a result of the physician's profile rather than of the certified training itself. This seems likely, because spirometry is of little practical use in emergency medical care. According to our results, family physicians in rural areas are more confident about relevant knowledge than their urban or metropolitan

counterparts. This could be explained by the proximity of hospital emergency services for urban patients, lowering the threshold and thus surpassing the family physician. Even though the participants indicated a lack of confidence in skills and knowledge relating to emergency care, this needs to be seen in perspective. Most physicians felt quite confident in topics they had experience with or that were common in daily practice. The items on which they indicated low confidence were generally less common and mostly treated by specialist care anyway. This may limit the practical implications of our results. Also, we need to stress that it was not our aim to test individual skills, but to assess the overall confidence of the physician. However, we did include a mention of individual skills, since this provides a good idea of the specific areas in which the physician lacks confidence. Specific confidence or skill in the different aspects of individual emergencies needs to be the subject of further research.

The lack of confidence found is most likely due to a complex set of reasons. These may be the organization of education in emergency medicine in our universities, the lack of additional training and recapping, a noticeable inconsistency for some guidelines, or the frequency with which these guidelines change.<sup>27–29</sup>

Finally, it is important to underline that this study only assessed physician's confidence in a very specific area. It is impossible to conclude anything about the actual skills of Belgian doctors. It is reasonable to think that they are highly educated and well skilled. Our study does show, however, that Dutch-speaking Belgian family physicians don't feel very confident in the area of emergency care, regardless of the quality of the care they provide.

## Quality and limitations of our study

Throughout our study, we have guarded the validity and reliability of the instruments used, thus ensuring the quality and relevance of our results. We used an existing questionnaire<sup>11,21</sup> based on final qualifications described in the Raamplan.<sup>24</sup> The relevancy of our results obviously depends on the relevancy of the criteria set in the Raamplan. But these qualifications were established after a long and careful process, likely ensuring their relevancy. We tried to avoid as many confounders as possible and limit expectation and confirmation bias by carefully designing and respecting the study protocol. We are aware of the fact that our method held a risk of selection bias, but by randomly choosing the potential participants, we attempted to limit this as well.

The practical implications of not meeting particular criteria are still unclear. Self-assessment is not the most adequate

**Table 4** Demographic structure of our sample

|            | KCE 2005 | Study 2009   |
|------------|----------|--------------|
| Age groups |          |              |
| <30        | 1%       | 9% (n = 14)  |
| 30–39      | 19%      | 23% (n = 37) |
| 40–49      | 32%      | 24% (n = 38) |
| 50–59      | 34%      | 35% (n = 55) |
| >59        | 14%      | 9% (n = 14)  |
| Gender     |          |              |
| Female     | 28%      | 37% (n = 59) |
| Male       | 72%      | 63% (n = 99) |

**Notes:** Comparison of the demographic structure of our sample (n = 158) with the demographic structure of the Belgian family physicians as published in the 2005 KCE report. Separate data for the Dutch-speaking physicians are not available.

**Abbreviation:** KCE, Federaal Kenniscentrum voor de Gezondheidszorg (Belgian Health Care Knowledge Centre).

instrument to evaluate skills.<sup>9,30</sup> An Objective Structured Clinical Examination would have been more appropriate,<sup>18</sup> but was not feasible within the context of this study. Also, the tested items are only surrogate markers. The real clinical relevance of emergency care is determined by patient outcome. It is plausible that with lesser confidence, training, or knowledge a good outcome is still possible with a proper attitude and awareness of the physician's own limitations.

It is regrettable that only a small sample of family physicians were prepared to take part in our study. It is possible that due to the small study group, we were not able to prove the influence of all relating factors. However, in comparison to the official rapport of the Belgian medical corps,<sup>31</sup> we are confident that our study group is representative of the entire population of family physicians (Table 4). Many epidemiological studies have been performed with a representative sample of only 1%–2%.<sup>32</sup>

Even with the limitations of our study in mind, we feel secure in stating that the scientific value of our study is assured.

## Conclusion

Almost half of the family physicians in the Dutch-speaking area of Belgium feel insufficiently competent to offer most aspects of emergency medical care. These results are in line with studies in many other countries. It is not clear if this lack of confidence has any consequences for the quality and outcome of patient care. It does prove, however, that family physicians know the limits of their own medical skills.

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The authors report no conflict of interest in this work.

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