

## Results of the 2004 Belgian enquiry concerning Anesthesiology What kind of help do we need ?

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### INTRODUCTION AND DEFINITIONS

No uniform European concept of an anesthesia team exists. The competences of the different types of health workers who assist the anesthetist vary from country to country. Different modalities of anesthesia assistance are provided during the preoperative (pre-anesthesia consult, preparing drugs and equipment), intra-operative (induction, maintenance and awakening phases), and postoperative (Recovery Room, Pain Services) periods.

By law in Belgium only physicians are allowed to administer anesthesia. Physicians fully qualified in Anesthesiology (board certified) and residents will further be referred to as “*anesthesiologists*”. Training requires 5 years after medical school, which takes 7 years. Physicians in training will be referred to as “*residents*”. The Belgian law (1) describes in detail the technical activities in general patient care which can be delegated by physicians to nurses, distinguishing those that need direct supervision by a physician (which means within vocal and visual reach) from those that can be carried out in an autonomous fashion on medical order only (2, 3).

A national teaching and training program for nursing staff with emphasis on the anesthesia practice does not exist in Belgium. Some highschoools and hospitals or anesthesia departments offer an often limited training program.

Belgium has the highest number of physicians for its population in the world, and enjoys an excellent health care system with equal access for all citizens to all levels of care without waiting lists for medical or surgical care. Up to now the system functions at a reasonable cost to the community thanks mainly to low medical fee, contained within a strict reimbursement scheme negotiated on a yearly basis between representatives of the physicians, third party reimbursing organizations and the government. Despite the current number of physicians, the recent introduction of a *Numerus Clausus* for medical students (implemented start-

ing from 1996-7), combined with the ageing of the medical population itself, its feminization, and a tendency of younger colleagues of both gender to work part-time, provoked fear for a shortage of specialists in a variety of fields, a.o. Anesthesiology (4). The most recent data however, show that, for Anesthesiology at least, offer will probably meet demand until 2011. The reasons for the relative good situation of the specialty of Anesthesiology are first, the extraordinary effort of training large numbers of young physicians over the last ten years in the speciality, secondly, the fact that Anesthesiology has shown flexibility and adaptation years ago and found adequate functional solutions to respond to a.o. feminization of the profession, and finally, the fact that several valid studies provided the necessary data to predict the authorities exactly how many Anesthesiology residents would be needed to avoid serious dysfunctions in the hospitals, once the *Numerus Clausus* would take effect. On the long run, however, the possibility of a shortage in anesthesia providers remains if the *Numerus Clausus* will not be reconsidered. This is not expected to happen before 2012 to 2015. By then the expansion of the European Union will have produced its full effects and current predictions will probably have lost all relevance. It is indeed expected that a substantial number of physicians from the old communist countries will migrate to the west, and as a consequence make up for the feared shortages.

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Some organizations lobbied to create new professions in several fields of health care. For Anesthesiology, proposals were inspired by what already exists in other countries and they ranged from dedicated technicians to autonomous working nurse-anesthetists. After long discussions it became obvious that no single type of new profession could satisfy the needs of all fields of medicine and surgery, the ad hoc ministry committee was dissolved, and the question left to be considered by each specialty. The general message from the officials of the federal Ministry of Health was that one cannot consider creating new professions –which requires legislative action– without first defining precisely the profile of tasks these professionals could be asked to perform. If this profile enters within the prerogatives of existing professions, there would be no need for changing the law and no need to give these ‘new’ professionals specific titles and a status protected by law.

Considering the many possible solutions in the field of anesthesia, considering the absence of a European standard, and considering that the introduction of a new kind of professional could profoundly change the practice of anesthesia in our country, both Belgian Anesthesia Societies (the Society of Anesthesia and Resuscitation of Belgium, SARB, and the Professional Association of Physician Specialists in Anesthesia and Resuscitation, APSAR-BSAR) felt that the matter was of such importance that every member of the Belgian Anesthesiology community, as well as a significant number of future colleagues, should be consulted. This is why they organized this national enquiry.

The aims were to know the opinion of Belgian anesthesiologists about the need for help, to get their opinion about the possible creation of a new profession, and to define a precise set of tasks these new professionals could be asked to perform. For the sake of clarity these hypothetical new professionals will be simply referred to as ‘*non-physicians*’ in this paper, obviating the need to list all theoretical possibilities, going from technician and technologist to anesthesia nurse, nurse anesthetist or even doctor in nursing sciences specialized in anesthesia.

#### MATERIALS AND METHODS

A task force of members from both societies prepared the questionnaire and organized the enquiry. Assistance was obtained from the depart-

ment of Sociology of the Katholieke Universiteit Leuven. After approval by both boards, the questionnaire was mailed to all board certified anesthesiologists registered by the Belgium Social Security Office (INAMI-RIZIV which is the organism in charge of controlling health and medical expenses). Questionnaires were also mailed to the trainees of the third, fourth and fifth year of residency. The INAMI-RIZIV list of specialists contains all active and non-active practitioners of a specialty, including retired colleagues and those who left the specialty or even the country. A system of continuous education makes those anesthetists who can demonstrate regular clinical activity and regular attendance to educational activities accredited specialists. Accredited specialists are probably most representative for the profession.

Two thousand and one hundred questionnaires were mailed. To avoid linguistic problems and possible differences in interpretation, the questions were presented in Dutch as well as in French on every questionnaire. The identity of the respondent was blinded and the answers were anonymous. This made a second mailing impossible. Time allowed for answers was one month. Data tables from returned questionnaires were generated by optic reading and prepared by the department of Statistical Analysis of the Middelheimziekenhuis, Antwerp.

Each question could be answered positively, negatively, or left blank. For each question results will be expressed as absolute numbers and percentages of accepted questionnaires featuring a yes, no, or no answer.

#### RESULTS

From the 2 100 questionnaires mailed, 875 were returned within the allocated time, giving a global response rate of 41.7%. Four questionnaires were discarded : one was incorrectly filled out for optical reading, and three came back totally blank, leaving thus 871 valid answers for analysis. Among those 731 came from accredited colleagues ; *a posteriori* verification showed that there were 1 110 accredited anesthesiologists in Belgium at the time of the enquiry, 731 answers represent therefore a response rate of 78.4% of the accredited specialists. There were 301 questionnaires mailed to residents, 126 of whom answered, which means a response rate of 41.9%. This response rate of the residents is comparable with the global response rate.

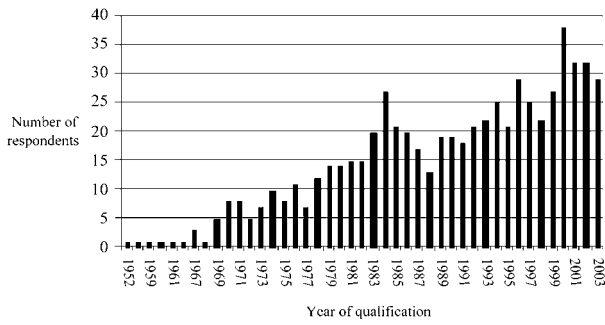


Fig. 1. — Distribution of respondent anesthesiologists, residents excluded (Blanks : 3,4%).

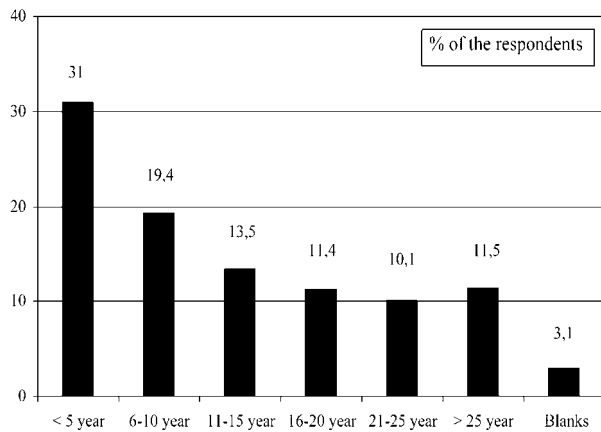


Fig. 2. — How long do you work as an anesthesiologist ?

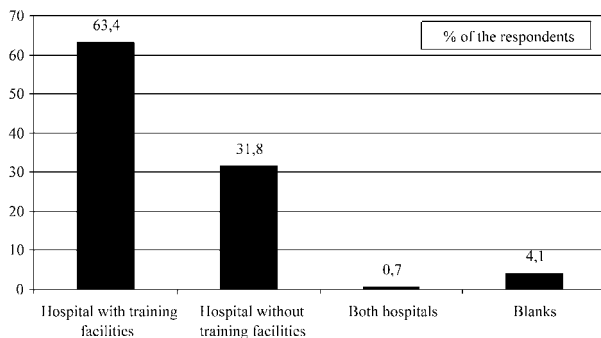


Fig. 3. — In what kind of hospital do you work ?

*I General questions*

In the section concerning the need for a new profession or professional title, 39.4% saw no need, 44.1% agreed with a possible new profession, and 16.5% expressed no opinion. (see appendix III). Thirty seven percent of respondents would welcome some help for anesthesia while maintaining the current one-table system, 45% would not, and 17.6% expressed no opinion. To the question if such new profession could be considered in a type

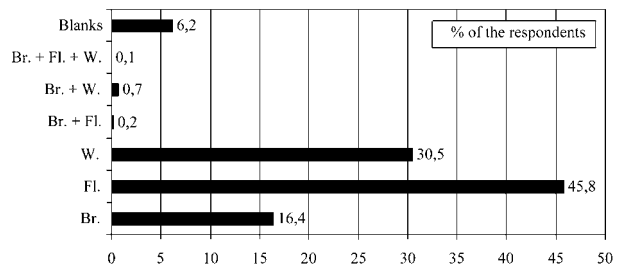


Fig. 4. — Where do you work ? (Regions of the Federal State Belgium : Brussels = Br. ; Flanders = Fl. ; Wallonia = W).

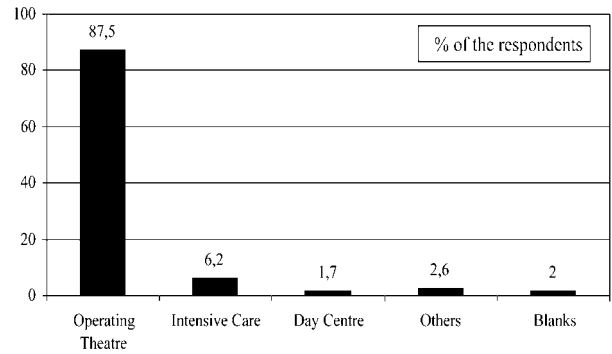


Fig. 5. — What is your main activity ?

of organization allowing for a two-table system, 47.7% answered yes, 43.6% disagreed, and 8.7% expressed no opinion.

*II Work profile*

The largest part of the questionnaire addressed the work profile of a possible new profession : the different possible activities and responsibilities were listed explicitly, each requiring approval or disapproval.

Preoperative tasks

Concerning preoperative screening, more than 80% of anesthesiologists would allow administrative preparation by non-physicians, more than 30% would deny them access to medical files wherever their location, more than 60% disagree with their taking a history, explaining the anesthesia technique or anesthesia care plan, prescribing premedication and ordering blood or blood products. Seventy-five percent would not allow non-physicians to perform a physical examination, order supplemental protocol based laboratory or technical exams (ECG or chest X-ray), nor would they allow them to adapt patients' treatments to preoperative requirements. The same proportion of respondents wants to maintain control over the pre-anesthetic evaluation.

### Perianesthetic period

A vast majority of respondents would accept dedicated non-physicians to maintain and inspect equipment and material (81 to 95%), to control the identity of patients (90%), to verify the availability and compatibility of blood and derived products (87%), to insert an IV line (90%), to connect the ECG monitor and non-invasive blood pressure monitor (96%).

Seventy-two percent would allow non-physicians to prepare medications for general or regional anesthesia, 55% would allow them to inject antibiotics or non-steroidal anti-inflammatory drugs according to local guidelines, 61% would allow them to perform the final inspection of the suctioning apparatus, anesthesia machine and intubation equipment. Arterial catheterization before induction of a general anesthesia would not be allowed by 81%.

Fifty-six percent would allow non-physicians to inject anesthetic drugs while the anesthesiologist maintains a free airway (43% would not); 37% would allow tracheal intubation by non-physicians while the anesthesiologist induces anesthesia. Adjusting ventilator settings is denied by 63%, and arterial catheterization in an asleep patient by 74%. More than 90% would refuse the following actions to be delegated to non-physicians: central vein catheterization, TEE probe insertion, flow directed catheter insertion into the pulmonary-artery, induction of anesthesia without the presence of an anesthesiologist. The non-physician would also not be allowed to induce an anesthesia independently even with verbal consent from the anesthetist.

About three-quarters (74%) of respondents would allow a qualified non-physician to monitor a patient during maintenance of general anesthesia, during regional anesthesia, and to make entries on the anesthesia record. The non-physician would, however, not be allowed to administer IV drugs, to adapt the concentration of inhaled anesthetics, to change respiratory settings, and to give fluids or blood on their own initiative, nor to wake the patient up or to proceed to extubation: all those acts face a 73 to 86% refusal rate.

Initiating a spinal, epidural, plexus or peripheral nerve conduction block anesthesia is refused by more than 90% of respondents. Initiating an intravenous Bier block is refused by 85%. Injecting a test dose or a loading dose of local anesthetics is rejected by 75 and 84% respectively. Monitoring a patient under regional anesthesia would be accepted by 82%, but 80% would not accept non-physicians to decide on and inject a top-up dose.

Performing a monitored sedation without direct supervision of an anesthesiologist would not be allowed by 90%; while 62% would allow sedation under direct control of an anesthesiologist provided it is performed in the OR; for outside the OR activity the approval rate falls to 44%.

Transporting the patient to the Recovery Room or to the Intensive Care Unit would be acceptable and depends on the condition of the patient and on the type of surgery.

### The postanesthesia period

More than 75% would allow a non-physician to monitor and care for the patient in the Recovery Room, administering anti-emetics and analgesics, initiating PCA according to guidelines of the anesthesia department. Changes in PCA infusion rates and changes in local anesthetics or any other drug administration by a non-physician would need consultation with the anesthesiologist in charge (63%).

### On-call

Fifty-six percent judge that possible anesthesia non-physicians should perform night duties; however, 93% would deny permission to undertake any action in the absence of the anesthesiologist in charge.

### Administration

Any kind of administrative work (entering data on the anesthesia record, preparing the bill, recording medications used) could be done by non-physicians, provided there is a final control with signature by the anesthesiologist, according to about 80% of respondents.

### *III Education*

The third part of the questionnaire concerned the education level and competence needed by the possible new non-physicians anesthesia professionals. Forty-three percent answered they should have a specific bachelor degree, 20% would agree with a lower diploma such as registered nurse, while 20% would prefer a higher diploma, such as a master degree. A majority (57%) of respondents would like them paid by the hospital, but the level of the basic salary should be that of an auxiliary nurse, not that of holders of a bachelor or a master degree. Only 22% would agree with the anesthesia department paying the non-physicians' salary, on the other hand 43% would agree with the anesthesia department paying a supplementary fee or premium on

top of their basic salary. Sixty-one percent of respondents would consider the anesthesia department legally and medically responsible for the non-physicians, but 32% would like the nursing department to hold responsibility.

#### IV The future

One percent of respondents (seven anesthesiologists) favor the creation of a new profession of completely autonomous non-physicians in anesthesia; 3.4% (23 anesthesiologists) expressed no opinion; 40% (52% in Brussels, 39% in Wallonia and 36% in Flanders) favor the maintenance of a one-table system; 56% (62% in Flanders, 58% in Wallonia, 45% in Brussels) would accept non-physicians working under supervision of anesthesiologists and allowing for a two-table system type of organization. Forty-five percent of anesthesiologists think that abandoning the one-table system would affect in a negative way the quality of anesthesia in the country, 50% do not agree, and 5% have no opinion.

Among anesthesiologists working in teaching hospitals 43% favor a one-table system, 43% did not and 14% expressed no opinion; among those working in a non-teaching environment, 26% favored a one-table system, 50% did not and 25% expressed no opinion. Reciprocally, 49% of those working in teaching hospitals would accept a two-table system, vs. 58% of those working in non-teaching settings; again, the abstention rates were high (7% and 12% respectively) for these questions, and 4% of respondents did not state in which kind of hospital they worked.

#### DISCUSSION

This enquiry provides strong and unequivocal answers to the main questions asked:

- 99% of those who expressed their opinion reject the perspective of independent non-physician coworkers in anesthesia (barely 3% did not express their opinion).
- The opinion about the acts non-physicians could perform, is so evident that one may call this a consensus about the task profile of a possible new profession, which was the core of the questionnaire and the very matter that started the idea of the enquiry. Most of the tasks that would be accepted are already part of the current list of tasks that nurses may perform according to the Belgian law.

#### Strength and weaknesses of the enquiry.

The major criticisms that could be voiced against this type of enquiry are the lack of previous information to participants, the lack of clarity of questions asked, and the fact that respondents do not adequately represent the concerned population.

In the present exercise, Belgian anesthesiologists have been thoroughly informed by widely attended conferences given during the congresses of the SBAR and APSAR-BSAR, starting as early as the year 2000. They concerned the changes induced by the *Numerus Clausus*, the perspectives concerning the anesthesiologists' workforce, the theoretical possible solutions within the Sorbonne-Bologna European restructuring of high school and university diplomas, the expected consequences of creating new professions (organizational, legislative, psychological, educational, medico-legal, and financial consequences, etc). Several articles dealing with these topics and concerning Belgium were published over the last few years in the pages of this journal and in European journals. (4-9).

The questions asked have received much consideration and deliberation by the boards of both societies and were reviewed by a non-involved department of Sociology. Although there remained ambiguities, these were few and do not affect the overall results: they actually come from the only questions asked twice in a slightly different format (questions about the type of future organization) which allows for checking for coherence. As said earlier a large non-response rate to these questions prevents drawing strong conclusions.

The very high return rate allows us to consider the results as highly representative. The expected return rate for such an enquiry is at best 30%. It is impossible to know the exact number of fulltime professional active anesthesiologists working in Belgium which is a potential weakness of this enquiry. Indeed, in order to reduce the chances of missing an anesthesiologist, the task force decided to send the questionnaire to all anesthesiologists ever registered by the INAMI-RIZIV, with the danger of obtaining a substantial number of responses by marginally active or no longer active individuals. The mailing technique followed the strategy advised by the sociologists, using pre-paid return envelopes, preceding the enquiry with a warning letter, and setting a short time window for answering. Late answers returned (according to post mark) were not considered for the preliminary report presented during the March 2004 congress of the APSAR-BSAR but were included for this

article (they increased response rate but did not change the data presented at the meeting by more than half a percent), those which were returned by mail after the congress were excluded. All this ensured a very high response rate of 41.7%. Concerning the accredited specialists the response rate is actually 78.4% of these 1 110 anesthesiologists. This means that this enquiry is no longer to be considered as a random sample in a given population, but acquires *the power of a census*. The extremely low number of blanks for each question further adds to the strength of the results. Most often less than 5%, with an average of 2.8% for the questions concerning the task profile. There is one important exception: questions concerning the possibility of a two-table system feature a 8.7% to 17.6% of "no opinion", leaving no solid majority for either proponents of a two-table or one-table system.

Finally, the distribution of respondents faithfully reflects the linguistic, regional, and age distribution of working anesthesiologists in the country, as well as their distribution between training and non-training hospitals. Gender was not asked in the questionnaire.

#### The message revealed by the enquiry

It is clear that the Belgian anesthesiologist wants a dedicated anesthesia aid in the OR, similar to the scrub nurse for the surgeon. He/she does not want the advent of independent co-workers to provide anesthesia. With an answer rate of 96.6% and 99% rejecting the principle of autonomous co-workers, the answer to that question is clear-cut. Anesthesiologists are trained and educated for five years after seven years of medical school. Many take one or two years additional training in pediatric anesthesia, intensive care, emergency medicine, pain therapy, regional anesthesia, anesthesia for cardiothoracic procedures, or in other fields of special interest to their future team. Previous enquiries told us that they consider the resulting quality of care as excellent, rewarding, and worth the personal 12 to 14 year investment. (7-8) The present enquiry tells us they are not ready to entrust the job into the hands of professionals trained in a 3-to-5-year nursing or paramedical program, how advanced these programs may be.

The help of non-physicians is judged necessary for administrative and maintenance functions, but not for medical acts. Nurses care, doctors cure. Many tasks described as potentially assignable to non-physicians are already delegated to nurses

today in some hospitals. All these tasks however enter already in the current listing of what a nurse legally may do (ref. Heylen). Some answers come as a surprise, though e.g. 26% of anesthesiologists would forbid non-physicians to prepare the anesthetic medications. The ban concerning medical acts extends throughout the patients' passage through the complete anesthesia circuit: preoperatively it concerns the clinical exam, drug prescription, changes in therapy, intraoperatively it concerns general as well as regional anesthesia. Anesthesiologists judge the art of anesthesia as part of medical practice, with its preventive and therapeutic aspects. Until now in Belgium, anesthesia is a medical act performed exclusively by physicians. Administration of anesthesia by anyone else is unlawful practice of the art of healing. In the current state of law, if an anesthesiologist entrusts nurses or technicians with giving anesthetics, he/she could be prosecuted for allowing or organizing illegal medicine.

A remarkable answer must be highlighted: 74% of anesthesiologists would allow non-physicians to monitor a patient during the maintenance phase of a general anesthesia and to enter vital signs on the anesthesia record, and 84% would allow this during regional anesthesia. In the latest update of the Belgian Standards for safety in anesthesia (10) (also known under the name 'Safety First'), section IV-2.09 states that, "except in cases of vital emergencies, simultaneous anesthesia is forbidden" and that "the anesthesiologist is expected to attend the patient in close vicinity and permanently" (*ibid* section IV 2.07 and IV 2.09). The text goes on: *If by exception to these rules he must leave his patient for a short time, he will designate a skilled person who will ensure the surveillance of the patient to the exclusion of any other activity during his absence. The surveillance remains the sole responsibility of the anesthesiologist in charge of the patient.* The term 'must' is particularly strong and underlines the exceptional nature of the circumstances justifying this substitution. Until now the 'skilled person' of the text has been left undefined. In contrast to previous versions of the text, it can no longer be the surgeon as he cannot 'ensure patient surveillance to the exclusion of any other activity'. At such difficult moments, anesthesiologists are expected to be flexible improvisators and to make the best possible use of the available personnel.

This enquiry opens a way to a solution: anesthesiologists say that they need a specially trained person to take over patient monitoring during

maintenance of anesthesia ; a person who would however not have permission to interfere with the course of anesthesia and would have the obligation to call the anesthesiologist in charge, as described by the rules of the anesthesia department whenever the anesthesia management needs to be adjusted. This would, however, not offer the possibility of a more-table system within the current set of national standards and recommendations, but could increase flexibility of anesthesiologists in the operating theatre, especially during emergencies.

To a first question on the topic 47.7% of anesthesiologists would favor a two-table system, while to a second, similar question 56% said they would accept it 'in the future'. It is interesting to note that 49.5% of anesthesiologists expressed the opinion that shifting to a two-table system would not affect the quality of anesthesia care, while 45% believed it would, and 5.5% expressed no opinion.

Of course, anesthesiologists are not the only ones concerned. First, one might wonder what the general public, and specifically patients scheduled for a surgical procedure, would think about being anesthetized by a non-physician. A pilot study performed in the University of Ghent found an overwhelming 91% of patients would prefer a physician, as they would prefer an obstetrician to perform a delivery rather than a midwife. Such preliminary evidence needs, of course, a more formal confirmation. Similarly, word came from the Belgian Society of Surgeons during a recent (October 2003) international symposium organized by the department of Anesthesiology of the University in Leuven that our operating colleagues would not support the idea of non-physicians giving anesthesia to their patients. Their speaker pointed out that *'twelve years of education cannot be replaced by a set of cookbook recipes put in the hands of people trained in three years'* and stated that *'surgeons wanted the best possible solution for their patients'*. Furthermore, one should keep in mind the often repeated ruling of the National Council of the *Ordre des Médecins – Orde der Geneesheren* sustaining the ban on simultaneous anesthesia. Third payers also will have their say : it would be no surprise if they would consider reducing anesthesia reimbursement fees if this activity became open to non-physicians, because this is the way things evolved in other countries such as the USA. Finally, the position of an often overlooked class of actors, namely insurance companies, is still largely unknown.

If any redistribution of workload is to be contemplated, the very balanced results of this enquiry concerning the possibility to adopt a two-table sys-

tem (with no convincing majority in any region of the country) could certainly open the topic for debate, but can definitely not settle the matter. In the meantime, the ban on simultaneous anesthesia remains. The demand of anesthesiologists as expressed in the present enquiry is for help in the OR by a qualified person a.o. able to take over a monitoring function during maintenance of anesthesia. This would give the anesthesiologist the possibility to have other activities in the OR for a short time such as providing help with a difficult intubation or solving a problem in the Recovery Room.

Would non-physician anesthesia personnel alleviate duty load or evening, night, or week-end work for the anesthesiologist ? As 93% of respondents state that the anesthesiologist remains the sole responsible person who takes charge for anesthesia even during so-called non-working hours, decreasing the burden of duty rotas sounds elusive.

Concerning the level of competence non-physicians should achieve to help with anesthesia, in the OR, the weight of answers point to an A1 registered nurse level, with 42% preferring this specific solution and equal numbers (20% each) asking for more or settling for less. What is currently called an A1 level will soon become a bachelor professional-type degree, in the new so-called 'Bologna' European classification.

In contrast with the required level of competence, nobody seems willing to pay for the new help since about 90% of respondents propose the hospital to pay the salary of these new professionals, and even then, only at the bottom of the salary scale i.e. the level of auxiliary nurse ! Under current law in Belgium the salary of the OR nurse is to the account of the hospital and not of the physician or medical department. One might wonder whether people with a bachelor or a master degree would feel interested in a proposal for the remuneration revealed by the enquiry. Maybe realizing this inconsequence, 50% of respondents would allow the department of Anesthesiology to pay a supplement to the basic salary. What makes a job interesting is not only the work environment, or its intellectual challenge, but also its financial recompense.

## CONCLUSIONS

The present enquiry is highly representative of the Belgian anesthesiologists' opinion, because of the high response rate, the low abstention rate for the different questions on returned questionnaires, and the overwhelming consensus on the core matters of the enquiry.

Ninety-nine percent of anesthesiologists, expressing an opinion, refuse the advent of co-workers who could deliver anesthesia in an independent way.

What appears from the enquiry is that the Belgian anesthesiologists want a dedicated nurse assuming a role comparable to that of scrub nurses for surgeons.

The current level of competence and education of nurses is theoretically and legally acceptable to match the work profile defined by the answers to this enquiry. In contrast to most other European countries the nurses' responsibilities are strictly defined by the Belgian law and are limited to administrative and preparative tasks, and to monitoring of the patient. Considering the good agreement between existing laws and the results of this enquiry, there is no need for a new non-physician profession to deliver anesthesia in Belgium.

However there may be a need for a uniform quality controlled dedicated teaching and training program for nursing staff to be involved in anesthesia.

Probably there is also room in certain areas of the anesthesia practice for a larger participation of nursing staff without compromising the responsibility of the anesthetist.

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