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## REVIEW

# Physician assistants in intensive care units in the Netherlands: a narrative review with recommendations

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## Abstract

This review is an overview of the current status of the advanced practice provider (APP) working in critical care. After describing the history of the profession, the paper focuses on the literature available. Although a lot of literature is available, the papers are often heterogeneous and comparison with other clinicians remains difficult. The paper zooms in on the situation in the Netherlands and describes the training courses for the physician assistant (PA), the equivalent of the APP, together with the legislation in place. Furthermore, the review elaborates on the potential superimposed value of the PA for the ICU. Because of the limited amount of studies performed in the Dutch situation this review finishes with the conclusions of 15-year-experience and the possible issues which could arise when implementing a PA on the ICU.

## Introduction and rationale

The number of physician assistants (PAs) working in Dutch Intensive Care Units (ICUs) is rising. The reasons for including PAs in the organisation of an ICU, however, differ. Sometimes a PA is a solution for physician shortages and sometimes PAs are more convenient than the ever changing medical residents who consider their mandatory ICU internship as a springboard for their future career. Sometimes rotating residents even seem to have little affinity with intensive care. Besides being a solution for the above-mentioned issues, the PAs currently practising in the ICU can solve the knowledge and continuity deficit present in the group of medical residents. The current work-hour restrictions for residents dictate a continuous rotating schedule during their short rotation. As such, an increasing number of ICUs recognise that the PA could be an efficient solution for the delivery of continuous and high-quality day and night intensive care. PAs are, after all, often familiar with the local protocols

to which they were already exposed during their ICU nursing careers and have learned effective communication techniques as nurses. This paper describes the current status of the acute care PA and provides recommendations for ICUs that are considering implementing PAs.

## History

The history of the profession goes back to the United States of America in the 1960s when both nurse practitioners (NPs) and PAs received an accredited diploma after following officially recognised courses for these specialties. A concise overview of the history can be found in a review article by Kleinpell et al.<sup>[1]</sup> In the years to follow both professions spread through several specialties of medicine including the relatively new profession of intensive care medicine. In the USA it was the NP, originally registered as ICU nurse, who initiated the first recognised subspecialty in ICU nursing: the acute care nurse practitioner (ACNP). The NP is a qualified nurse with a Master's degree in Advanced Nursing Practice, in which the entire medical ICU skill-set is taught, including technical interventions such as intubation and intravascular catheterisation. His/her colleague, the physician assistant, has a Bachelor's degree in a science or healthcare-related subject and two years of practical experience in patient care before receiving on the job training on the ICU.<sup>[2]</sup> Both professions undertake the same tasks, which are comparable to the ones residents, fellows and intensivists have to perform in the Netherlands. The responsibilities often extend beyond the ICU and also comprise the entire area of acute and emergency medicine including research, development of protocols and educating medical residents.

A decrease in resident work-hours implemented by the Accreditation Council for Graduate Medical Education (ACGME) in 2003 gave NPs as well as PAs a boost.<sup>[3]</sup> In addition,

a publication from the Committee on Manpower for Pulmonary and Critical Care Societies in 2001 predicted a shortage of intensive care medicine specialists of 22% by the year 2020 and 35% by 2030.<sup>[4]</sup> Both events caused an increasing visibility of the two specialties in ICUs. Nowadays some ICUs in the United States are completely run by ACNPs and PAs with remote supervision by intensivists. Because the differences in practice between the PA and ACNP are negligible, they are often both referred to as advanced practice providers (APP).

## Literature

A fair number of studies on the subject of the advanced practice provider in critical care have been published but most of these studies are descriptive. Especially in the beginning of this young profession, the experiences of teams and individuals were shared. Studies published after 2000 started to address implementation in a standardised way and retrospectively or prospectively evaluated cohorts of patients treated by APPs. These cohort studies tried to identify the reasons for the success of this profession and attempted to elaborate on the potentially present, superimposed value of the APP for critical care. The studies can be divided into those that tried to demonstrate the value of APPs by determining either mortality benefit<sup>[5-9]</sup> or a decrease in length of stay<sup>[5,7,8,10-13]</sup> and studies that investigated more subtle parameters in which the APP was presumed to excel, such as communication or protocol adherence.<sup>[13-16]</sup> All of these retrospective and prospective studies showed either APPs being non-inferior to residents or attending physicians<sup>[7-9,12]</sup> or APPs having an additional benefit over physicians.<sup>[5,11,13]</sup> Most of these studies had a cohort design which is probably the most practical design in this research area.<sup>[1,17]</sup> Further analysis, however, also revealed problems. Often the studies were small and single-centred and the comparison between clinicians was diverse because APPs were either compared with residents, or fellows or even with specialists. Moreover, attending physicians always supervised the APP-initiated treatment. These confounders obviously mitigated the results.<sup>[17]</sup> One prospective study stands out because it evaluated a large patient group (n=9066) in a prospective cohort. This study showed a mortality benefit as well as a reduced hospital length of stay in the group of patients treated by APPs.<sup>[5]</sup> The other studies performed on subtle outcomes such as communication,<sup>[14,15]</sup> protocol adherence,<sup>[13,16]</sup> patient satisfaction,<sup>[18]</sup> the effectiveness of registering the mandatory ICU scoring systems and even one which scored the amount of laboratory requests, often showed a somewhat better performance of the APP.<sup>[19,20]</sup>

The literature also tells us that several other tasks are delegated to PAs. In-depth research has been performed regarding the APP as leader of the critical care outreach team<sup>[21-23]</sup> and the APP performing invasive interventions.<sup>[24-27]</sup> In these studies the comparison of the APP with the less experienced medical resident and the implementation of APPs in already well

performing teams obviously has its drawbacks. Recently, a published review and meta-analysis on the subject of the APP in critical care showed non-inferiority of APPs compared with other clinicians.<sup>[17]</sup> This meta-analysis did not show survival benefit or a shortened length of stay in patients treated by the APP group. In a lot of areas where the APPs are active, however, not enough literature was available to draw a solid conclusion about the position and value of the APP.

## Situation in Europe and the Netherlands

Healthcare systems differ between countries, and even the way hospitals are organised within a country differs. The position of the APP in critical care varies accordingly.<sup>[28]</sup> The healthcare system in the USA with its specific reimbursement facilitates a strong position for the APPs. Moreover, the shortages in physicians are more evident in the USA than in Europe.<sup>[3,29,30]</sup> However, there are shortages in Europe too. Some rural areas experience shortages of physicians and the accompanying increase in quality requirements in healthcare together with the ageing population will lead to an increasing demand for physicians.<sup>[31-35]</sup>

In Europe, except for the United Kingdom, there is a lack of awareness that APPs in the ICUs can be a solution for problems such as physician shortages or continuity and quality of care.. The literature about APPs published in Europe underpins this situation.<sup>[36]</sup> At this moment only three comparative cohort studies originate from Europe, two from the Netherlands and one from the United Kingdom.<sup>[9,37,38]</sup>

The increasing healthcare costs and need for containment of these costs play a role in the way budgets are spent. In the Netherlands this has resulted in task redirection towards APPs. Arguments such as continuity and quality of care as well as costs probably prevail over physician shortages as an argument for implementation of the APP. Although in the northern and eastern part of the Netherlands the physician shortages seem to play a larger role.<sup>[39]</sup>

## Legalisation in the Netherlands

In the year 2001 the first official courses for NPs in the Netherlands started. The official courses for PAs followed shortly thereafter. Two courses for PAs at the university of applied sciences in Utrecht and in Nijmegen were officially recognised in 2003.<sup>[40]</sup> In the meantime ICUs began implementing PAs and NPs. It became apparent that the PA was better equipped to support medical care than the NP. In contrast to the NPs, the PAs were trained in several medical sub-specialties. As a consequence, the PAs gained an increased popularity in the entire medical domain but their official status was uncertain.

Due to the increase in healthcare expenses and the aim to reduce this spending, the Ministry of Health, Welfare and Sport in the Netherlands started a project called 'task reshuffling' (translated from 'taakherschikking'). The purpose was to organise

healthcare more efficiently and effectively by improving the use of the existing healthcare capacity and by adapting the system to an increasing and changing healthcare demand. In short, the goal was to increase the quality of care and to reduce costs. One of the tools that the Ministry of Health used was to implement opportunities by which medical care could be directed to PAs. The ministry anchored this profession legally by temporarily adding it under Article 36a of the Healthcare Professional Act (wet BIG) in January 2012.<sup>[41]</sup> This provided PAs with the authorisation to autonomously perform activities within the medical domain. The evaluation after a period of five years showed the profession to be opportune and efficient without an increase in costs and lawsuits. This in turn resulted in the addition of this profession to Article 3 of the 'BIG' Act, the part which describes the responsibilities of the professions listed in the BIG registry.<sup>[42]</sup>

In the meantime, PAs were participating in intensive care medicine at quite a few ICUs. Following this development, the Dutch Society of Intensive Care (NVIC) and the Netherlands Association of Physician Assistants (NAPA) developed a consensus document which describes the rights and responsibilities of physician assistants and ICU organisations.<sup>[43]</sup>

### Education

The Dutch PA follows a joint theoretical and practical course to gain a Master's degree. The duration of this course is two and a half years and the course is completed by a Master's thesis: a literature study on an ICU-relevant subject.<sup>[44]</sup>

The theoretical part consists of lessons in several specialties regarding physiology and pathophysiology. The practical side of the course is provided in hospital, during internships on several different wards. After obtaining a Master's degree, the generic fundamentals for exercising the PA profession are present. Specific knowledge of ICU pathophysiology and ICU skills such as airway management and vascular access have to be acquired on the job.

### Superimposed value to the ICU team

In 2020 there are 51 PAs currently working on ICUs in the Netherlands. The specific APP of acute care as an entity, as in the USA, does not yet exist. In the Dutch situation, most of the PAs working in acute care are based on ICUs and not in adjacent areas such as the emergency department. The often-heard reasons for implementing PAs on ICUs in the Netherlands are: either the PA functions as a replacement equivalent for the medical resident in case of shortages or the PA addresses continuity of care. We do not yet know how the Dutch ICUs evaluate their PAs but in general discussions the PAs are often perceived as having a positive impact on several aspects of ICU care.

One of the important values of the PA mentioned is they are able to take over tasks normally assigned to intensivists.<sup>[17,45]</sup>

Because PAs have often already settled in an area during their nursing career and have a network or family in place, there is no urge to change to another job or employer which in turn facilitates the cooperation. The time investment of teaching the PA certain skills, thus pays off.

The continuity of the PA translates to the fact that the PA has an in-depth knowledge of intensive care and local protocols from the period as an ICU registered nurse. Together with the social attitude it makes the PA an autonomous clinician who is easy to work with, bridging the gap between nurses and physicians. It also makes the PA the ideal person to familiarise new residents with the ICU protocols and educate the resident and nurses in ICU pathology. Their experience supports other residents during the shifts or educational sessions.

Because the PA can perform some technical and invasive procedures autonomously it is easy for the team to delegate these tasks to the PA which in turn generates a lot of exposure. Because of this exposure, the PA becomes skilful in these procedures. For the PA to practice these skills without any supervision, however, requires extra time and effort from the ICU team because these skills have to be taught on the job.

One other remark seems appropriate: when an ICU is considering implementing PAs, the ICU staff should bear in mind that the collective labour agreement in the Netherlands provides the right to refrain from night shifts after the age of 57.

### Considerations when implementing PAs: a single-centre experience

Guidelines on how to implement PAs in the Dutch system are not available. Even the general information on the PA in the ICU in the Netherlands is limited.<sup>[37,38]</sup> This section covers the practical issues which were encountered when starting with PAs in a single-centre ICU. In 15 years of experience, several issues keep returning when training PAs. *Table 1* shows a list of issues and required actions from the perspective of the staff of the ICU and the PA. Recognition of these issues may help in successfully implementing PAs in the ICU.

Before employing PAs, the ICU staff and management should decide which problem the PA has to solve. It should be clear whether the PA has to perform specific tasks, is being implemented because of resident shortages or for quality improvement. This is essential for the development of the PA because PAs experience a lot of changes during their training and will more easily adapt when they know what to expect.

Also, the selection of new PA students requires a few considerations. During this process it is important to assess the cognitive capabilities of the PA, which have to be of an academic level. During the training the PA has to be able to process a lot of new information in a short time frame and eventually function like a resident. The PA has to be able to

**Table 1.** List of issues and actions

	Issue	Action
Perspective of staff	Future position within ICU team	Clear understanding why a PA is implemented in the ICU
	Capability of the PA	Selecting ICU nurses accustomed to your ICU and who have already completed several projects
	Limited ICU knowledge	Allow for a period of 4-5 years until final judgment: 2.5 years general education and 2 years building experience
Perspective of PA	ICU too small for a PA	Consider implementing PA in the entire area of emergency care
	The difficult transition from nursing domain to medical domain	Support and facilitate PA as much as possible
	Sharing experiences	Training of more PAs at once
	Interacting with former nursing colleagues	Guidance regarding attitude to nurses and the medical staff displaying confidence towards the PA
	Low patient exposure	Collaboration with high-volume centres during training and thereafter

operate on both an operational and strategic level. Although the entry requirements for acceptance to the Master course are graduation from a university of applied sciences, the period during which the applicant functions as a nurse can be used to assess personality traits such as cooperation and determination. An assessment might be part of the selection process.

A sometimes-heard presumption is that the PA is not up to the task because of lack of specific knowledge about ICU pathology. This is certainly true during training, but also during the two years after graduation. Like everyone, the PA has to gain experience. This time investment takes four to five years, two and a half during official training and two years on the job. After this investment the PA can alleviate the workload of an intensivist: invasive procedures are performed autonomously and because of the relatively long working relationship between intensivist and PA, the consultation moments are easy.

A high level of exposure to patients and their problems is crucial. Low volume ICUs, therefore, need to consider cooperating with a high volume ICU during PA training and possibly, intermittently during the following years. On a low volume ICU the problem may arise that the PA is not satisfied due to the absence of enough challenges, or that the PA is not cost-effective from the hospital's point of view. Therefore, smaller hospitals might consider deployment of the PA on multiple critical

care wards (coronary care unit, ICU, stroke unit and emergency department) or even the normal wards. In our experience, this will increase the satisfaction of both the PA and the hospital. In contrast to the smaller ICUs the academic centres have larger ICUs with often enough fellows and experienced medical residents. Even in these centres the continuity and the quality of the PA proves to be advantageous. Besides their high quality clinical work, the PA can mentor the starting clinicians and guide and support them during their acquaintance with ICU medicine.

The PA experiences a transition from the well demarcated situation of the ICU nursing domain to a more creative problem-solving environment of the medical domain. Easily answered questions like whether to start diuretics in patients are suddenly handled with a lot more difficulty than an easy remark by the nurse during the rounds. The responsibilities and increasing understanding of pathophysiology which accompany this transition have to be coped with. The diagnostic uncertainty is something to which the PA has to adapt. In addition, leaving the peer group of ICU nurses means leaving behind professional colleagues and obtaining a place within the relatively unknown medical staff. If an ICU has no experience with PAs, its nursing team and physician team will need to get used to the entity PA and the accompanying changes in daily practice. This will be experienced as a barrier by the PA. Therefore, it is important to support and facilitate the PA during the entire training and the years thereafter, until the PA and team are accustomed to each other.

Regarding this professional development it helps when the PA takes his or her first practical steps together with another PA with whom experiences can be shared and reflected on.

### Conclusion

The recognition of PAs as valuable team members in daily ICU practice is increasing. In the Netherlands, support of the government and agreement between the NVIC and the NAPA have effectively removed the barriers for implementation. This arrangement opens up opportunities for both critical care medicine and the PA, and results in a front-runner position in Europe regarding this profession. The in-depth training of the PA facilitates opportunities for hospitals to consider deployment of the PA on other wards than the ICU, such as coronary care units, emergency departments, or even the normal wards. Irrespective of these opportunities, care has to be taken to preserve the quality of this care provider by safeguarding the selection process. When fully trained, the ICU staff will have a capable, well-trained professional which sustains quality and continuity in the management of every critically ill patient.

### Disclosures

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