



2024

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Recommended Citation

Lucas, Brendan K. and Gietzen, Lindsay (2024) "Global Perspective: Comparison of Prehospital Use of PAs in the United States and the Netherlands," *Pacific Journal of Health*: Vol. 7: Iss. 1, Article 3.

DOI: <https://doi.org/10.56031/2576-215X.1043>

Available at: <https://scholarlycommons.pacific.edu/pjh/vol7/iss1/3>

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Global Perspective: Comparison of Prehospital Use of PAs in the United States and the Netherlands

Abstract

The prehospital use of advanced clinicians, including physician assistants (PAs), can potentially improve clinical outcomes and reduce unnecessary burdens on emergency departments. This literature review offers a global perspective by comparing the use of PAs in the prehospital setting in the United States and the Netherlands. While there is limited research on clinical outcomes and the clinical utility of advanced clinicians in alternative transport models, the domestic and international examples evaluated in this review have the potential to impact the American healthcare system significantly. The Dutch healthcare system, which utilizes PAs in the prehospital setting, is known for being accessible, affordable, and providing high-quality care. The findings of this literature review may provide a framework for the widespread domestic implementation of advanced clinicians in prehospital medicine in the United States.

Keywords

prehospital care, physician assistants in EMS, advanced clinicians in prehospital care, ambulance PA, prehospital use of PAs

INTRODUCTION

Prehospital care is defined as the healthcare provided to patients in a time of emergency before reaching a conventional healthcare facility (i.e. emergency department/hospital) [1]. Most provided by first responders, EMTs (emergency medical technicians), firefighters, and paramedics, there were roughly 28 million emergency calls requiring EMS (emergency medical services) in 2020 [2]. These millions of EMS calls were responded to by less than 75,000 emergency apparatus, representing an average of more than 380 individual calls per apparatus annually [3]. This number varies significantly based on geography, and is more heavily weighted in large metropolitan areas such as New York City, Dallas-Fort Worth, Seattle, etc. The Netherlands utilizes physician assistants/associates (PAs) and other advanced clinicians (nurse practitioners, nurses) in the EMS and prehospital setting. This country's novel approach to EMS medicine can be used as a foundational comparison to lessen the burden on the American system.

The Netherlands has a unique approach to healthcare, known as the 'managed chaos' system, which consistently earns the country high rankings for its healthcare system globally. This system is a mix of public and private healthcare providers. It is funded through mandatory health insurance contributions from individuals and employers, ensuring everyone in the country can access affordable healthcare [4, 5]. PAs were first introduced into the Dutch healthcare system in 2001 based heavily on the American PA model. The PA workforce in the Netherlands has grown to over 1,800 since that time [6]. The PA title protection and autonomous practice was achieved less than 20 years after the introduction of the profession [6]. For comparison, there are currently more than 170,000 board certified PAs in the United States [7]. However, it is important to acknowledge not all PAs in the United States are required to maintain board certification; thus, it's

likely this number is higher. PAs are uniquely positioned to guide the emergency medical system to a more sustainable path.

One of the Dutch healthcare system's primary features is patients' freedom in selecting their healthcare providers. This includes primary care physicians, specialists, and hospitals, giving patients greater control over their healthcare and promoting healthy competition among providers [4]. Primary care and preventive medicine are highly valued in the Dutch healthcare system, which reduces the need for more expensive treatments and promotes overall wellness. The Dutch healthcare system is known for being accessible, affordable, and providing high-quality care [4]. The combination of public and private providers and a focus on patient choice and preventive care creates an effective and efficient system [5].

PAS IN PREHOSPITAL MEDICINE

The prehospital and out-of-hospital use of advanced clinicians is believed to benefit the healthcare system. Advanced clinicians include PAs, nurse practitioners (NP), registered nurses (RN), and physicians. Utilizing advanced clinicians in this setting is believed to reduce unnecessary emergency department visits. Currently, there are over 131 million visits to emergency departments in the United States with only about 14% of those visits resulting in hospital admission [8]. The potential impact for advanced clinicians to improve clinical outcomes and reduce unnecessary burden on emergency departments certainly warrants further investigation.

While the research is lacking on clinical outcomes and clinical utility of advanced clinicians in alternative transport models in the United States, there are global examples of models

that have the potential to significantly impact the American healthcare system by improving the utilization of EMS and reducing unnecessary emergency department visits.

A global perspectives comparison using existing research data on alternative response units and advanced clinicians was performed. The literature review search was limited to those models that included PAs in the prehospital setting and may have included other healthcare professionals. Using an EBSCO search, keywords for the article search included physician assistants in EMS, advanced clinicians in prehospital settings, PAs in EMS, and advanced response units in EMS. The aim of the review was to evaluate, analyze, and offer a global perspective by comparing the use of advanced clinicians in the United States to models around the world, particularly in the Netherlands, although other locations were included as a foundational comparison.

To understand models for correcting a problem, one must first understand the problem itself. Ebben *et al.* [9] outlines and analyzes the overutilization of EMS and emergency care in the Netherlands, which provides a foundational understanding to the utilization of advanced clinicians in the prehospital setting. In the southeastern portion of the Netherlands, over 30% of ambulance runs of the highest two dispatch priorities resulted in the patient not being transported after on-scene evaluation by medical staff [9]. The EMS agency provides emergency medical services for roughly 750,000 people, with approximately 35,000 calls classified in the top two dispatch priorities. Of those, loss of consciousness and fainting complaints were of the highest frequency for not needing transport. While this model was only inclusive of a small geographic area in the Netherlands, it provides a foundation that there is a significant percentage of patients that could potentially be treated by advanced clinicians in the prehospital settings. Lower acuity complaints often cripple EMS and emergency department systems, removing valuable resources needed for higher acuity complaints. Additional data from other European countries further underscores the

importance of reducing utilization of EMS by lower acuity complaints [10]. 42% of abdominal and genitourinary complaints evaluated in the prehospital setting in Sweden did not need ambulance transport to the ED (emergency department) [10]. Additionally, only 18% of chest pain and 17% of trauma-related complaints didn't require ambulance transport for treatment [10]. These two studies are not without limitations. Both involve small sample sizes, limited geographic areas, and potential subjectivity in the determination of not needing transport. Both establish that overutilization of EMS and emergency departments is a fundamental global problem.

The Dutch have investigated the work that PAs and NPs in the Dutch EMS system have performed [11]. This study aimed to clarify the scope of practice and types of tasks performed in prehospital care. With a 76% response rate, it provides valuable insight into the scope of practice for these individuals in such a unique role [11]. More than half of the respondents reported being involved in indirect patient care tasks (medical policy advice, developing training, research, incident investigations, etc.) Many advanced clinicians in the Dutch EMS system also work as general practitioners. There was some variance in the working conditions of advanced clinicians in this system. Some worked as solo providers in a rapid responder vehicle without transport capabilities while others worked in a traditional team role on an ambulance. There were significant concerns over master's level trained providers being restricted by the national ambulance protocols. Some had arranged an expanded scope with their medical supervisors, while others worked in the country's traditional EMS scope of practice. There are many different roles in which PAs and NPs can contribute to the EMS and prehospital system, as exemplified by the EMS system in the Netherlands. Acknowledging significantly different regulatory landscapes, this system could serve as a model to the overrun American EMS system.

Other studies have compared clinical care delivery by ambulance nurses and PAs [12]. The assessment, treatment, referral, and follow-up contact of emergency services components of healthcare delivery was compared between these two disciplines. The care provided by PAs resulted in fewer referrals to other healthcare professionals. Patients who received care by PAs also had a lower rate of recontacting emergency services after being treated. The patient cases reviewed in this study involved both medical and trauma cases with varying acuity levels. PAs can aid in reducing the burden on EMS systems and emergency departments by decreasing visits by the highest utilizers. The positive financial impact this could have on medical systems warrants further investigation.

There have been few published articles in the United States on the implementation of advanced clinicians in prehospital care. The Los Angeles Fire Department (LAFD) implemented an Advanced Provider Response Unit (APRU) to help address the increasing number of low-acuity patients in the 911 system [13]. An advanced clinician was paired with a LAFD firefighter/paramedic in a response vehicle. This study evaluated all patients that the APRU evaluated during the first 18 months of operation. Of the more than 800 patients evaluated by the APRU, over half were either treated and released from the scene or transported to a site other than the emergency department. Some of these patients were transported directly to a psychiatric facility, reducing the psychiatric boarding burden on emergency departments in the area. Roughly two-thirds of the patients classified as high-utilizers in the 911 system decreased their use of EMS services in the 90 days following an evaluation by the APRU. Very few (roughly 6%) of the patients not transported to the ED by the APRU recontacted emergency services in the subsequent 72-hour period and none of those who recontacted EMS received any prehospital intervention.

While this study only encompasses a small geographic location in comparison to the United States, this model of prehospital use of PAs shows extraordinary promise. The authors further analyze the APRU in LAFD and underlined the need for further billing capability for these units to be successful. The funding of these units and billing practices were not topics included in this study but are areas for future research

Alternative response units have also been deployed within the Philadelphia Fire Department in a funded research study to evaluate the effects of alternative response units on two specific populations [14]. One of these units was deployed on the university campus responding to students with low acuity medical or alcohol intoxication-related complaints. The second unit was deployed in an area heavily impacted by the opioid crisis. Responders would seek individuals who had overdosed, were treated with naloxone, and subsequently refused EMS transport to help place them in opioid treatment programs the day of the overdose. While this article does not particularly include data on outcomes or utilization rates, it presents an idea for different target populations that may benefit from alternative response units. Like the LAFD model [13], there was concern for the program's sustainability given the financial support from external sources and the inability to bill for services [14].

In Pennsylvania, one study particularly challenges the sentiment that prehospital use of PAs is beneficial [15]. In addition to the traditional EMS staff, the Pennsylvania system utilizes registered nurses, physician assistants, and physicians in both 911 response and interfacility transports. Evaluating more than 1,500 unique clinicians and over 194,000 EMS records, researchers found no statistically significant differences between clinicians in the level of skills used. There was also no statistically significant difference in skill or medication usage rate during emergent calls. While this study is interesting in challenging the above arguments, the findings

could potentially be attributed to the EMS purpose of stabilizing a patient with quick transport to a medical facility. The sample size included was particularly large, but assumptions and weakness included the completeness of the state maintained EHR system. While this study is consistent in suggesting that advanced clinicians can be successfully integrated into prehospital settings, it raises questions regarding the efficacy and utilization of advanced clinicians with a higher scope of practice.

CURRENT STATE, FUTURE PLANS

Comparing models of pre-hospital care by advanced clinicians in the United States to different global models allows for innovation in the American healthcare system in reducing overutilization of EMS systems. The research on this issue is significantly limited. While some models show significant promise in advanced clinicians in prehospital care, others challenge the sentiment that PAs and advanced clinicians benefit this setting.

Clinical outcomes and clinical utility related to care provided by advanced clinicians in prehospital care are two areas of research gaps. The potential decrease in overutilization of the EMS and emergency department is undoubtedly an area for focused future research. Comparing the use of advanced clinicians in the United States to models worldwide, particularly in the Netherlands, offers foundational research in understanding where the system is currently with advanced clinicians in the prehospital setting. Evaluating the global impact of these models may yield positive results and provide a framework for widespread domestic implementation in the United States.

While there have yet to be any published direct observational studies evaluating the care provided by advanced clinicians in EMS, a current trial is underway in the Netherlands. The IMPACT Study seeks to evaluate patient safety and experience associated with the implementation of an advanced practice provider unit in EMS [16]. The research is concordant in the need for alternative response units but the utilization of PAs and NPs in this field needs further widespread, direct observational studies to investigate.

Much of the research in the United States fails to present a financially feasible, long-term option or solution to the overburdened EMS system. Many different departments in the United States have implemented systems that certainly have impacted the lives of patients, but challenges arise with funding. Many of these programs are grant-funded or institutionally sponsored, limiting the potential impact. The global models tend to be longer term and in place for many years, but do not include clinical outcomes-based questions.

CONCLUSION

More research is needed to assess the utility of advanced clinicians in EMS and the prehospital setting, particularly investigating clinical outcomes associated with the use of advanced clinicians in prehospital care. The current literature contributes foundational understanding of the overutilization of EMS globally. The Dutch system has successfully implemented PAs into the EMS system, providing a guide to countries such as ours in providing alternatives to ED transport. However, a consistent gap in American research lies with the financial feasibility of deploying alternative response units. The current research has yet to provide a sustainable financial method of implementing alternative response methods given the billing limitations in place. The American

healthcare system should seek understanding of what our European partners have established that has proven to be beneficial in providing the correct care to patients.

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