Review Article

The state and future of emergency medicine in Macedonia

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BACKGROUND: Macedonia has universal public health care coverage. Acute and emergency patient care is provided in different care environments based on the medical complaint and resource proximity. While emergency medicine and well organized emergency departments (EDs) are an essential component of any developed health care system, emergency medicine as a specialty is relatively non-existent in Macedonia.

DATA RESOURCES: A system assessment regarding presence, availability and capacity of EDs was completed from 2013–2015, based upon assessments of 21 institutions providing emergency care and information provided by the Ministry of Health. This assessment establishes a benchmark from which to strategically identify, plan and implement the future of emergency medicine in Macedonia.

RESULTS: In general, emergency departments – defined by offering acute care 24 hours per day, 7 days per week – were available at all general and university hospitals. However, care resources, emergency and acute care training, and patient care capacity vary greatly within the country. There is limited uniformity in acute care approach and methodology. Hospital EDs are not organized as separate divisions run by a head medical doctor, nor are they staffed by specialists trained in emergency medicine. The diagnostic and treatment capacities are insufficient or outdated by current international emergency medicine standards and frequently require patient transfer or admission prior to initiation.

CONCLUSION: Most of the surveyed hospitals are capable of providing essential diagnostic tests, but very few are able to do so at the point or time of presentation. While emergency medical services (EMS) have improved system-wide, emergent care interventions by EMS and within all hospitals remain limited. Further system-wide acute and emergency care improvements are forthcoming.

KEY WORDS: Emergency medicine; Macedonia

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INTRODUCTION

The Republic of Macedonia, which peacefully declared independence in 1991, is situated in the middle of the Balkan Peninsula. A landlocked country bordered by Kosovo to the northwest, Serbia to the North, Bulgaria to the east, Greece to the south, and Albania to the west (Figure 1), it is 25 713 km² in size and has a population of 2.1 million.^[1] It has a population density of 81.3 (sq km) with the majority of the population (>65%) living in urban areas.^[2] Like many European countries,

it has a trended aging population with currently 17.4% under the age of 14 and 12.7% over the age of 65.^[1] Life expectancy is 73 and 79 years for men and women respectively.^[1–4] With a gross domestic product per capita of \$13 400 (USD) in 2014, Macedonia has made progress in liberalizing its economy and improving its business environment but still lags behind EU comparisons. The country is divided into 8 municipalities or regions. The largest cities in Macedonia are Skopje, Kumanovo, Bitola and Tetovo. Additionally, as a crossroads between

Europe, the Adriatic and Greece, tourist and motor vehicle traffic increasingly impacts medical capacity.^[5]

HEALTH CARE PROVISION

Macedonia has an improving standard of compulsory state-funded health care – available to all citizens and registered long-term residents. The health care system

Figure 1. Map of Macedonia. Source: www.wikipedia.com; Accessed February 2016.

Figure 2. Mortality data for the Republic of Macedonia.

in the Republic of Macedonia is organized on three levels: primary, secondary and tertiary. The health care is delivered at: health stations, health centers, general and specialized hospitals, clinical hospitals and university clinics and institutes, as well as at a University Dental Clinical Centre, Maxillofacial Surgery Clinic, Institute of Transfusion Medicine, Institute of Public Health, and Centers for Public Health. Health care is provided by public and private health care practitioners. The country is covered by a network of health facilities, creating favorable conditions for affordable health care and meeting population health needs. The number of private providers, especially in primary health care and dental practice, has been steadily growing over the last ten years. Pharmacies and dental services have been privatized at the primary health care level.

The health composition in the Republic of Macedonia is characterized by a high representation of non-communicable diseases (NCDs) in overall morbidity and mortality. The etiology of non-communicable diseases is often related to lifestyle choices, such as smoking, alcohol abuse, shift toward high-fat diet, substance abuse, and at-risk sexual exposures. The leading causes of death in the Republic of Macedonia include: diseases of the circulatory system (57.9%); cancer (19.4%); and endocrine, nutritional and metabolic diseases (3.9%) (Figure 2).^[5,6] Traumatic injuries remain a rising cause of death and disability.^[6]

EMERGENCY CARE PROVISION

A system assessment regarding presence, availability and capacity of EDs was completed from 2013–2015, based upon assessments of 21 institutions providing emergency care and information provided by the Ministry of Health (Table 1). Site assessments were performed at 13 general, 3 clinical and 5 specialized university hospitals to gain insight into the process and capacity of care, as well as what resources are routinely available. Emergency departments exist in structure at all 21 general and university hospitals, but staffing,

Table 1. Facilities assessed in Macedonia

	General Hospitals		Clinical Hospitals	University/Specialty EDs Mother Theresa Hospital
8 th of September	Kichevo	Ohrid	Tetovo	Surgery/Traumatology
Veles	Kochani	Gostivar	Štip	Toxicology
Gevgelija	Kumanovo	Struga	Bitola	Pediatrics
Debar	Prelip			Cardiology
Kavadarci	Strumica			Infectology

diagnostics and therapeutic resources vary greatly.

As has been described in the literature, there are 3 stages of national EM development: mature, developing and underdeveloped.^[7] The delivery of emergency care in Macedonia remains in its developing stages. In addition, the maturation of EM is described along 4 schemes: patient care systems, management systems, specialty systems and academic EM. While there are some patient care systems and specialty systems in place in the country, they are not uniformly available.^[3-5,7,8] While the specialty of emergency medicine is not currently recognized in Macedonia, there are several physicians in Macedonia that received emergency medicine training in the early 1980s in the former Yugoslavia and remain proponents of its development.^[9] As of this manuscript, there remains no defined scope of practice for an EM provider nor is there a known movement toward a statute that defines the care provisions in EDs. The Ministry of Health, however, has recently made a move toward establishing the specialty of EM by creating a new training program focused in this field.^[8]

The Ministry of Health recognizes that many primary care doctors provide urgent care and are capable of managing minor emergencies, but this care is provided outside hospital emergency departments.^[4,8] Providers in the current EDs are increasingly dedicated to the care area, although their academic and training background specific to EM remains limited. Few have any structured specialty residency training within EM.

Despite these variations, EDs patient visits in Macedonia were more than 1.5 million in 2013, nearly two-thirds of the country's population.^[8] Many facilities have insufficient number of rooms, lack basic 24-hour diagnostic testing modalities, and have limited pharmacologic or interventional capacity for the volume of patients presenting with acute care issues. As a result, EDs become overcrowded when volume stressors increase, which has been shown to have a clear impact on quality of care.^[9]

It is important to recognize that some of the EDs assessed are specialty EDs, such as the Traumatology/Surgical, Toxicology, Pediatric, Cardiology and Infectology EDs at the large, academic tertiary referral center of Mother Teresa in Skopje. These specialty EDs, however, reflect a siloed approach to division of care and largely serve as intake and receiving areas for transferred and referred patients, as well as primary presentations of acute conditions. However, in many circumstances, acute conditions that remain undifferentiated pose a challenge for prompt diagnosis and treatment in a siloed

system. Outside Skopje, general EDs are more common, with most patient care management occurring within the hospital when necessary after initial triage, assessment and consultation in the ED is completed. As previously described, the academic and training background of doctors working in these EDs varies. Within Skopje, the 8th October Hospital functions as a general hospital separate from the academic center which recently opened a new emergency department and is working toward advanced training at its location.

EMERGENCY CARE AND EMS

In recent years, the Macedonian EMS system has been further developed to improve medical response in all situations. EMS vehicles are primarily run by non-specialty trained physicians who usually work exclusively in the emergency arena. While resources and interventional capacity are limited compared to those in a mature EM system, these EMS providers deliver essential transportation assistance to nearby hospitals.

In 2012, Macedonia transitioned from an EMS call system with separate contact numbers based on the service needed to a single emergency telephone number.^[8] Where police (192), fire (193), emergency medical (194) and crisis management (195) once had separate contact numbers, now all emergency services use a standard number (112) that has been similarly adopted throughout Europe. This change necessitated development of communication and geographic information systems, as well as an operative management system. Three regional but interconnected centers, in Skopje, Stip and Bitola, were recommended for system integration and coverage of emergency calls.

A national survey of 15 general and four university hospitals, as well as pre-hospital EMS, published in 2013 identified areas of improvement for quality of emergency medical services.^[8] Key findings of the assessment included that pre-hospital EMS was poorly integrated, underdeveloped and underutilized. EMS quality improvement related to patient care outcomes was non-existent.^[8,10] This study led to an official national strategy for EMS development and some prehospital care standards. Despite these recommendations and an influx of additional EMS vehicles, many of the trucks remain largely underequipped. However, basic splinting and wound care, venipuncture kits and intravenous fluids, and portable monitoring with defibrillators are commonly present on current vehicles.

EMERGENCY MEDICINE DEVELOPMENT

As in most of the world, the demand for emergency care has grown at an annual rate of over 4% during the last decade. This percentage, which was greater than the 2% population increase during the same period, has outpaced growth in ED capacity. Therefore, Macedonian EDs become overcrowded when the system exerts minimal stress. With this growing acute care caseload, presumed increased severity index, and evidence-based literature on the time-value of emergent care, the Minister of Health has recognized the value of an EM specialty by allowing the country's first EM residency to be created.^[7,8] This is a required first step toward the modernization of emergency health care provision in Macedonia. The residency program, which currently proposes 5 years to complete, focuses heavily on surgical sciences and lacks many of the elements of exposure to treating medical emergencies, such as stroke and acute coronary syndrome, as put forth by the International Federation of Emergency Medicine (IFEM).^[11] The IFEM curriculum represents a composite of global EM curricula with specific focus to ensure development of a well-rounded EM provider trained for all types of acute care presentations from every subset of surgical, medical and psychiatric specialties, while recognizing resource limitations.^[11,12] With the limited number of enrollees in this new field of specialization and the duration of training, it will be decades before a sufficient number of graduates will be available to staff the country's existing EDs.

As has been delineated by many international emergency medicine specialty societies, the practice of emergency medicine includes the initial evaluation, diagnosis, treatment and disposition of any patient requiring expeditious medical, surgical, or psychiatric care.^[7,10-12] This assessment of the current state of emergency medicine in Macedonia identifies early activity toward development in this area. International standards for curriculum and training should be foundational and revised according to the resources available within Macedonia. Collaborative efforts between the Ministry of Health, international emergency medicine development and educational experts, and physician champions of this field within Macedonia will provide the necessary expertise and support for successful planning and development.

Although training Macedonian physicians to practice emergency medicine is the ultimate goal and some early steps were initiated in 2015, EM residency programs require resources and time to mature to the point of

having system-wide coverage. Concurrent operational changes and up-training of both physician and nursing providers currently working in the EDs nationwide would shore up the foundation of emergency care for Macedonia in the interim. Further specialization and training to have emergency care nursing designation would be an equally important, but secondary goal to further the cohesive clinical approach to this unique medical environment. Additional training and refinement regarding the national EMS would further support the system process change. This would include training processes related to focused, resource-appropriate emergency care through short training academies, improved system communications, early appropriate patient transfers to high levels of care, and essential database development.

EMERGENCY MEDICINE AND MEDICAL STUDENTS

Concurrent to this multi-year assessment, the Macedonia student representatives of the European Medical Student Association initiated the Emergency Medicine Summer School in Macedonia, an interactive summer conference focused on didactic and hands-on education for medical students from across Europe.^[13] This well-received summer offering continues to foster ongoing discussion of specialty development, educational opportunities, and planning around how improved acute care training would impact patient outcomes.

In conclusion, Macedonia provides healthcare to its citizens through a tiered system comprised of public and private facilities with increasing services available at each level. Emergency care is available free for everyone, including those without state health insurance, and treatment is provided in the emergency department of all general hospitals. However, the model by which care is provided and resources allocated to the emergency department remains fragmented across the system. Macedonia stands ready to improve its delivery of emergency care with specialty training development, increasing mentorship, and specialty development assistance from healthcare professionals and organizations from countries in which Emergency Medicine is a mature specialty. Macedonian leadership recognize the value in the investment as development of a more advanced system of emergency care improves the health of the country and reduces morbidity and mortality and is taking positive steps in this direction.

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