



# Development of Critical Care Medicine in Post-War Republic of Srpska - Banja Luka Region

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## Abstract

Critical care medicine as relatively young discipline, started developing in mid-1950s in response to epidemic of poliomyelitis. This branch of medicine evolved much faster in high-income countries (HIC) than in low resource settings (LRS) where the Republic of Srpska (Western Balkan) belongs. The experience of setting up a modern critical care program under the LRS constraints as a promising way forward to meet the increased demand for critical care worldwide is described. Main tool was systematic analysis of written documents related to the establishment of the first multidisciplinary MICU and its development to the present day. Successful development is contingent on formal education and continued mentorship from HIC, establishment of a multidisciplinary team, the support from local healthcare authorities, development of a formal subspecialty training, academic faculty development and research. Critical care medicine is a critical public health need in HIC and LRS alike.

**Key words:** Critical care medicine; Low-middle-income countries; Development.

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## Introduction

The development of critical care medicine began in mid-1950s in response to a poliomyelitis outbreak at the time, but the modern critical care as an independent specialty began to develop in the 1970s in the United States, while in Western European countries this process was delayed by ten to twenty years.<sup>1-5</sup>

When it comes to developing critical care in low-to middle-income countries (LMICs), the data is very scarce. In these settings, surgical critical care has traditionally been provided by anaesthesiologists in most areas while access to medical critical care is still limited.<sup>4,5</sup> Currently, the World Bank classifies Bosnia and Herzegovina (as well as the Republic of Srpska) as an upper-middle income country,<sup>6</sup> but its healthcare system and

problems related to treatment of critically ill patients are quite similar to LMICs and accordingly it can be defined as a low resource settings (LRS). When talking or writing about LRS, it is necessary to know that these countries are not situated somewhere in Africa, but in the heart of Europe (the Western Balkan where the Republic of Srpska is situated). The definition of LRS is used throughout this article to refer to healthcare systems in LMICs (as well as upper middle-income countries), acknowledging that LRS exist even in HICs.<sup>7</sup>

In post-war Republic of Srpska (as well as Bosnia and Herzegovina), no Medical Intensive Care Unit (MICU) existed until December 2008, when the first modern MICU in the country opened in

Banja Luka.<sup>8</sup> Until the establishment of the MICU, medical critically ill patients were treated in poorly equipped classical general wards without cardiovascular and respiratory support and usually without haemodynamic monitoring (Figure 1). Invasive mechanical ventilation and other advanced life support interventions were only possible in surgical intensive care units, to which only a small number of medical critically ill patients gained access to.<sup>5,8</sup>



**Figure 1:** Medical Intensive Care Unit 2007 at Clinic for Pulmonary Diseases, University Clinical Centre of the Republic of Srpska. Treatment of critically ill patient without haemodynamic and respiratory monitoring

A similar situation can still be found in other countries of Eastern Europe and in low- and middle-income countries worldwide.<sup>9</sup> In the case of Bosnia and Herzegovina, a four-year war caused the country's health system to collapse. The immediate post-war years resulted in isolation from the surrounding countries and the flow of information and exchange of medical knowledge was very poor. All these events – the war and the post-war period, devastation of medical structures and equipment and the transition of the country from one political structure to another – were a great burden on the health system.<sup>10</sup> Especially for new and young medical disciplines, it was practically impossible to establish effective patient care. Generally speaking, all three crucial links of medicine (clinical practice, education and research) had stagnated and regressed during the war and post-war period. The devastated health and education system did not recognise critical care as a discipline; critical care topics were not taught during undergraduate and postgraduate

training and there was no significant research work in this field.<sup>4,5,8,11</sup>

In order to aid its post-war recovery, the European Commission and other European institutions like the *Coimbra* group and the *Union Internationale Contre Le Cancer* (UICC) have created various projects to help the mobility of young researchers and doctors from Bosnia and Herzegovina.<sup>5</sup> The main objective was to assist the health and education system and to facilitate the exchange of knowledge and experience between clinicians and researchers in the region. The first physician to receive such a grant for the purpose of education in critical care was Dr Peđa Kovačević of the University Clinical Centre of the Republic of Srpska (UCCRS). During his training periods at the University Hospital Heidelberg between 2005 and 2007, Dr Kovačević was mentored by Prof. Dr F Joachim Meyer, a board-qualified specialist in the field of internal medicine, cardiology, respiratory medicine and critical care. He was head of the MICU at Heidelberg University Hospital. Dr Kovačević added training in invasive bronchoscopy techniques at Heidelberg's renowned *Thoraxklinik* under the supervision of Prof. Dr Heinrich Becker, then chief of the endoscopy unit. In 2006, under the guidance and referral of Prof. Meyer, Dr Kovačević applied successfully for the prestigious Travel Award for Young Fellows in Developing Countries by the American Thoracic Society (ATS). Dr Kovačević attended the ATS meeting in San Diego, where he met Bosnian-born critical care specialist Prof. Ognjen Gajić, MD from the Mayo Clinic in Rochester, USA.

Prof. Meyer and Prof. Gajić organised the first donation of non-invasive ventilators to the Pulmonary Department of the UCCRS. After his return from Heidelberg in 2007, Dr Kovačević was able to develop a modern medical critical care service there. In the same year, Dr Kovačević visited the Critical Care Department at Mayo Clinic under the supervision of Prof. Gajić, mainly for intensified training in mechanical ventilation, both invasive and non-invasive. One year later, the management of UCCRS and the Ministry of Health of the Republic of Srpska, an entity of Bosnia and Herzegovina, approved the establishment of the first modern MICU in Bosnia and Herzegovina.<sup>5,8</sup> Dr Kovačević was assigned a responsible leadership role in this process.

During the following ten years, Prof. Meyer (Figure 2) and Prof. Gajić (Figure 3) provided con-

tinuous support for the development of medical intensive care, which proved to be a difficult process with multiple obstacles. Prof. Meyer visited UCCRS and worked as a visiting physician and mentor on several occasions in 2007, 2014 and 2016. He gave a series of lectures on intensive care medicine, carried out the first invasive monitoring by pulmonary catheter, the first percutaneous tracheostomy and provided education at the bedside. These activities were also supported by the Erasmus Mundus Plus project of the European Commission.



Figure 2: Prof. Dr Joachim Meyer, FCCP, University of Heidelberg

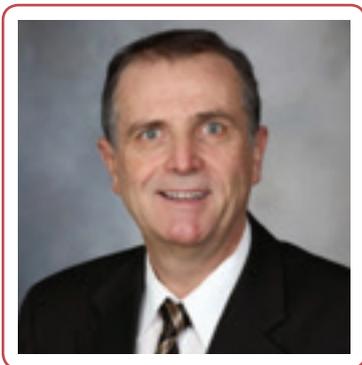


Figure 3: Prof. Ognjen Gajić, MD, MSc, FCCP, FCCM, Mayo Clinic, Rochester, MN, USA

In order to enhance the development of critical care in Bosnia and Herzegovina, the first draft of the curriculum for critical care specialisation training was proposed in 2010 by Dr Kovačević, Prof. Dr Guillaume Thiéry (University Hospital of Saint-Etienne, France), Prof. Ognjen Gajić MD, MSc (Mayo Clinic, USA) and Prof. F Joachim Meyer. In the spring of 2014, this proposal was accepted with Dr Kovačević becoming the country's first critical care training fellow. Prof. Meyer became the program's first international mentor in Bosnia and Herzegovina. In September 2016, Dr Kovačević successfully passed the board exam in front of an international jury and became the first critical care specialist in Bosnia and Herzegovina

and among the first in ex-Yugoslavia region. Two years later, he was assigned as the first program coordinator for the critical care fellowship at the University of Banja Luka Medical School.



Figure 4: Very first modern Medical Intensive Care Unit at University Clinical Centre of the Republic of Srpska, December 2008



Figure 5: Modern MICU at the University Clinical Centre of the Republic of Srpska, December 2022, today this is the only ICU lever III with possibilities for veno-venous extracorporeal membrane oxygenation (vvECMO)

Together with Prof. Meyer and Prof. Gajić, Dr Kovačević started the first research projects in the field of respiratory and critical care at UCCRS. In June 2019, Dr Kovačević published a paper titled "Impact of weekly case-based tele-education on quality of care in a limited resource medical

intensive care unit” in the prestigious journal *Critical Care*.<sup>12</sup> With this, the development of all three crucial links in critical care medicine has begun: the treatment of the critically ill, education and research (Figure 4 and 5).

## Conclusion

“It takes a village” – many highly motivated enthusiasts were necessary to create and realise the care of the sickest medical patients in post-war Republic of Srpska (and Bosnia and Herzegovina as well). Today critical care medicine is an enormous public health need of all communities, in HIC and LRS alike. Today, the MICU in Banja Luka is certified by ISO standard (9001:2015 and EN:15224) and serves as a tertiary referral centre for medical intensive care for the Republic of Srpska and provides health services for a population of 1,000,000 inhabitants. The contribution of High Income Countries (Heidelberg University, Mayo Clinic and University Clinical Centre of Ljubljana) for this project is indisputable and enormous. The great challenge of the COVID-19 pandemic should serve as a wake-up call for rapid development of critical care programs around the world. One of benefits that should come out of this pandemic is a more rapid implementation of critical care medicine programs into LRS. It is important to emphasise that trained staff is far more important than “ICU bed” or equipment. HIC in Europe are moving toward critical care medicine harmonisation with the main goal of standardising critical care practice. LMIC have to follow this pathway without delay to include modern multidisciplinary, evidence based critical care medicine into their healthcare systems.

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## Conflict of interest

None.

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