

## Zavod za intenzivnu kardiološku skrb Kliničkog bolničkog centra Sestre milosrdnice

### The Intensive Cardiac Care Department at the University Hospital Centre "Sestre milosrdnice", Zagreb, Croatia

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**SAŽETAK:** Šezdesetih godina prošloga stoljeća osnivaju se prve koronarne jedinice u svijetu sa svrhom osiguravanja optimalne kardiopulmonalne reanimacije u bolesnika s infarktom miokarda. Koronarna jedinica Kliničkoga bolničkog centra Sestre milosrdnice osnovana je 23. rujna 1970., kao prva i najstarija intenzivna jedinica za zbrinjavanje kardioloških bolesnika na području jugoistočne Europe. Tijekom desetljeća, usporedo sa svjetskim tendencijama, izrasta u Zavod za intenzivnu kardiološku skrb s deset intenzivnih kreveta osiguravajući sveobuhvatnu intenzivnu kardiološku skrb. Tim medicinskih sestara i liječnika godišnje se skrbi za oko 1600 bolesnika s prosjekom od 2,2 dana ležanja, što nas svrstava uz bok europskoga prosjeka. Od 2005. godine dio smo Hrvatske mreže intervencijskog liječenja akutnog infarkta miokarda i zbrinjavamo bolesnike iz dijela Zagreba i Zagrebačke županije te Sisačko-moslavačke i Karlovačke županije. Zdravstvena skrb i liječenje koje pruža tim zdravstvenih djelatnika potpomognuti su sofisticiranom aparaturom kojom je opremljen zavod.

**SUMMARY:** The first coronary units were founded in the 1960s with the goal of ensuring optimal cardiopulmonary reanimation in patients with myocardial infarction. The Cardiac Care Unit at the University Hospital Centre "Sestre milosrdnice" was founded on September 23, 1970 and was the first and oldest intensive care unit for cardiological patients in southeastern Europe. Over the next several decades it developed in line with global trends and grew into the Department for Intensive Cardiac Care with ten intensive care beds, ensuring comprehensive intensive cardiological care. The team of nurses and physicians cares for approximately 1600 patients annually with an average hospital stay of 2.2 days, which puts us in line with European averages. Since 2005 we have been a part of the Croatian Network for Interventional Treatment of Acute Myocardial Infarction and have managed patients from parts of the City of Zagreb and Zagreb County as well as the Sisak-Moslavina County and the Karlovac County. Healthcare and treatment provided by our team of health professionals are facilitated by the sophisticated medical devices with which the institute is equipped.

**KLJUČNE RIJEČI:** intenzivna kardiološka skrb, medicinski tim, organizacija.

**KEYWORDS:** intensive cardiac care, medical team, organization.

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Kardiovaskularne bolesti vodeći su uzrok smrtnosti suvremenog čovjeka, od čega najveću grupu bolesnika čine oni s akutnim koronarnim sindromom. Još šezdesetih godina prošloga stoljeća prepoznata je potreba za otvaranjem specifičnih intenzivnih jedinica u kojima bi se na specifičan način skrbrilo za kardiološke bolesnike s prvotnom svrhom osiguravanja optimalne kardiopulmonalne reanimacije u bolesnika u akutnoj fazi infarkta miokarda. Prvi opisi koronarnih jedinica u svijetu (CCU) objav-

Cardiovascular diseases represent the leading cause of mortality in modern humans, among which the largest group of patients is composed of those suffering from acute coronary syndrome. The necessity of introducing specific intensive care units that would provide specialized care for cardiological patients was recognized as early as the 1960, and the primary goal was to ensure optimal cardiopulmonary reanimation for patients at the acute stage of myocardial infarction. The first description of coronary care

ljeni su 1961. godine u *British Thoracic Society*, a one su bile smještene u gradovima Sydneyu, Kansas Cityu, Philadelphiji, Londonu i Edinburghu.<sup>1-4</sup>

Devet godina poslije, 23. rujna 1970., u Kliničkom bolničkom centru (KBC) Sestre milosrdnice osnovana je Koronarna jedinica kao prva i najstarija intenzivna jedinica za zbrinjavanje kardioloških bolesnika na području jugoistočne Europe. Imala je četiri intenzivna kreveta i pripadajući monitoring. U lipnju 1989. godine Koronarna se jedinica seli u nove prostore i povećava kapacitet na osam intenzivnih kreveta. Od 2005. godine dio smo Hrvatske mreže intervencijskog liječenja akutnog infarkta miokarda i zbrinjavamo bolesnike iz dijela Zagreba i Zagrebačke županije, te Sisačko-moslavačke i Karlovačke županije. Prvog listopada 2015. Zavod za kardiovaskularne bolesti postaje samostalna Klinika za bolesti srca i krvnih žila KBC-a Sestre milosrdnice odvajajući se od Klinike za unutarnje bolesti. Koronarna jedinica 2016. godine prerasta u Zavod za intenzivnu kardiološku skrb.

Zavod danas ima deset intenzivnih kreveta, od kojih su četiri u zasebnim boksovima u kojima se prema potrebi provodi izolacija bolesnika ili specifične intervencije kao što je terapijska hipotermija, izvantjelesna membranska oksigenacija (ECMO) i sl.<sup>4-8</sup> Za bolesnike se zajednički skrbi 20 medicinskih sestara / tehničara, 3 liječnika specijalista kardiologa i različit broj mlađih liječnika na edukaciji. Medicinske sestre / tehničari rade u jutarnjem radu i u smjenskom 12-satnom radu (12 – 24 – 12 – 48), a liječnici u jutarnjem radu, u 24-satnim dežurstvima i u pripravnosti (slika 1). Godišnje se primi oko 1600 bolesnika, a prosječan broj dana ležanja jest 2,2 dana (slika 2), što nas svrstava uz bok europskoga prosjeka.

Provođenje kvalitetne zdravstvene skrbi i njege bolesnika, kao i liječenje potpomognuti su sofisticiranom aparaturom kojom je zavod opremljen. Osim centralnim i pojedinačnim

units (CCU) in the word was published in 1961 in the *British Thoracic Society* journal, and the units were located in the cities of Sydney, Kansas City, Philadelphia, London, and Edinburgh.<sup>1-4</sup>

Nine years later, the CCU at the University Hospital Centre (UHC) "Sestre milosrdnice" was founded on September 23, 1970 as the first and oldest intensive care unit for cardiologic patients in southeastern Europe. It had four intensive care beds with the requisite monitoring systems. In June 1989 the CCU moved to a new location and increased its capacity to eight intensive care beds. Since 2005 we have been a part of the Croatian Network for Interventional Treatment of Acute Myocardial Infarction and have managed patients from parts of the City of Zagreb and Zagreb County as well as the Sisak-Moslavina County and the Karlovac County. On October 1, 2015 the Department for Cardiovascular Diseases became an independent Clinic for Cardiovascular Diseases of the UHC "Sestre milosrdnice", separating from the Clinic for Internal Diseases. The Cardiac Care unit became the Department for Intensive Cardiological Care in 2016.

Today the department has ten intensive care beds of which four are have hospital boxes where patient isolation can be performed if necessary or specific interventions are required, such as hypothermia, extracorporeal membrane oxygenation (ECMO), etc.<sup>4-8</sup> Patients are cared for by a team of 20 nurses, three cardiologists, and a varying number of younger residents. Nurses work the morning shift and two 12-hour shift (12-24-12-48), whereas physicians work the morning shift and 24-hour shifts and call duty (Figure 1). Approximately 1600 patients are admitted annually, and the average hospital stay is 2.2 days (Figure 2), placing us in line with the European average.

Providing high-quality healthcare and treatment for patients is facilitated by the sophisticated medical devices with which the department is equipped. These include central and individ-

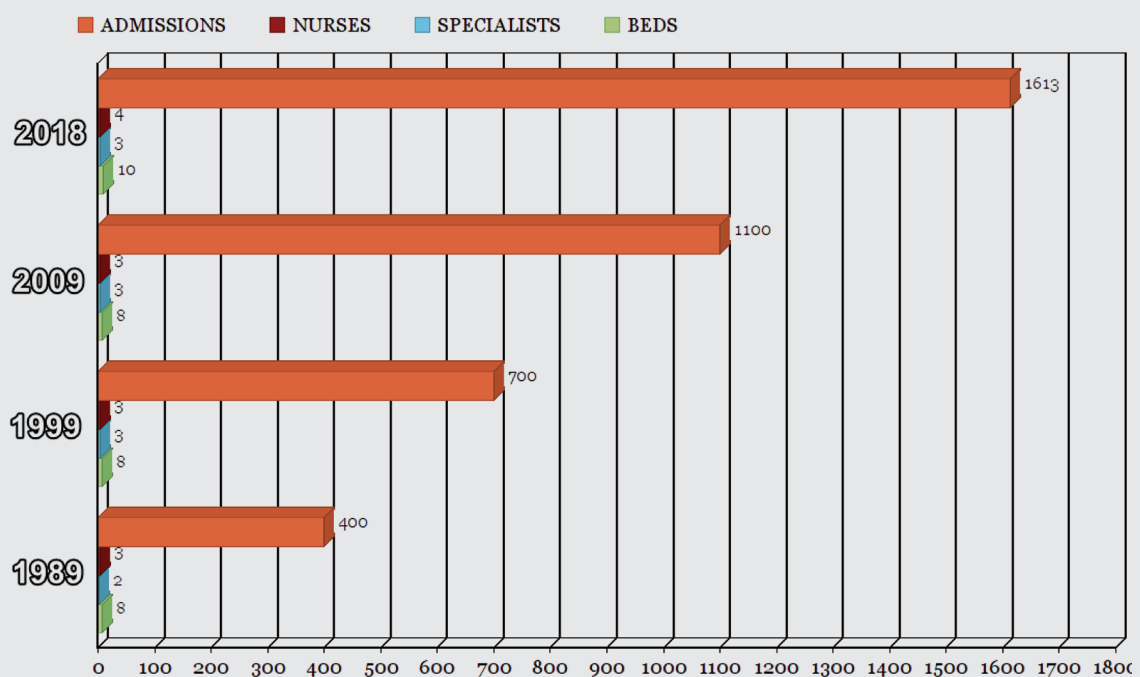
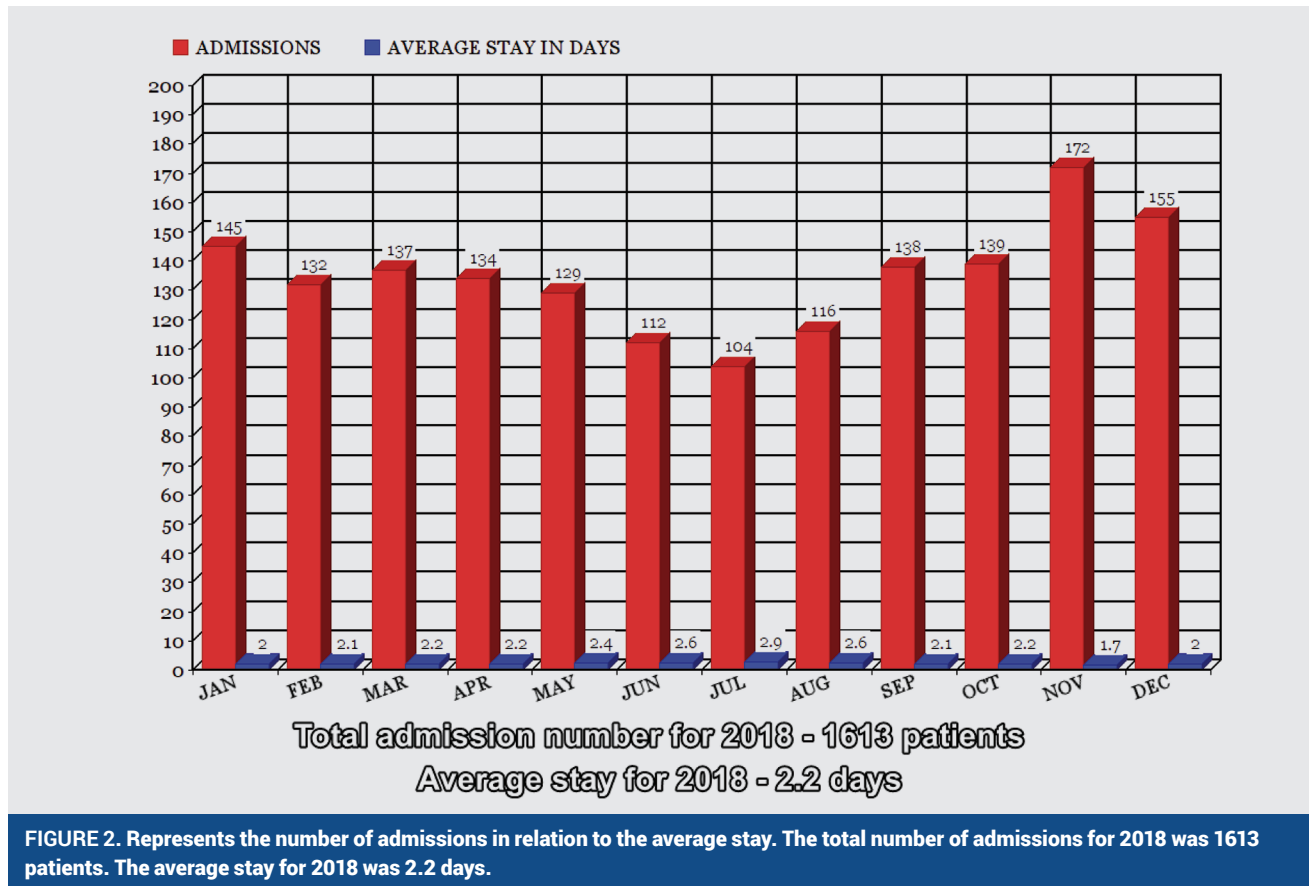


FIGURE 1. Represents increasing number of patient admissions to the Intensive Cardiac Care Department in relation to number of nurses taking care of them, cardiology specialists treating them and available hospital beds from 1989 to 2018.

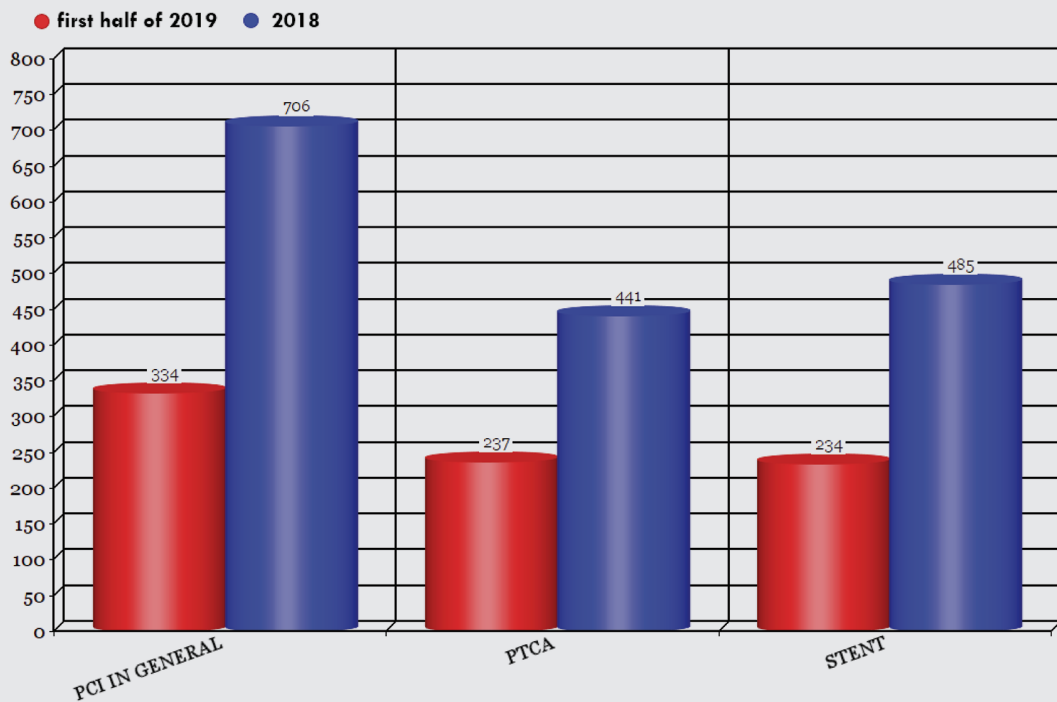


praćenjem (monitoringom), srčane akcije i druge vitalne funkcije prate se također defibrilatorima, ehokardiografskim aparatom, EKG aparatom, ECMO-om i intraaortnom balonskom pumpom (IABP), aparatima za umjetnu ventilaciju, privremenim elektrostimulatorima, sustavom za invazivno mjerenje tlakova, sustavom za brzu analizu krvi, infuzomatima, aspiratorima, kolicama za reanimacijske postupke. Tijekom hospitalizacije bolesnika provode se raznolika neinvazivna i invazivna dijagnostika i terapija. Provode se također postupci kontinuiranog monitoringa srčane akcije, invazivno mjerenje tlakova, provođenje kardiopulmonalne reanimacije, endotrahealna intubacija, hitne perikardiocenteze pod nadzorom ehokardiografije, terapijska hipotermija, ECMO, potpora IABP, invazivna i neinvazivna mehanička ventilacija, perkutana i privremena elektrostimulacija, perkutana traheotomija, postavljanje centralnih venskih katetera, pleuralna i abdominalna punkcija, kontinuirana vensko-venska hemodijafiltracija (slika 3, slika 4).<sup>9,10</sup>

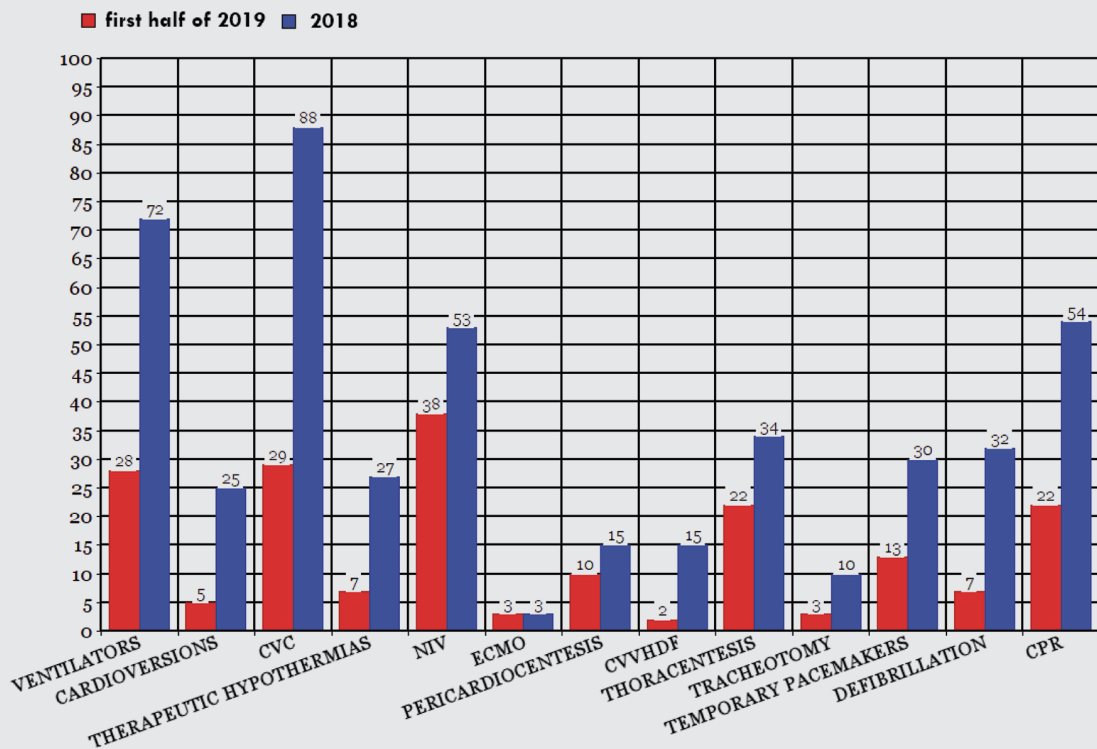
Medicinske sestre / tehničari kontinuirano tijekom 24 sata provode zdravstvenu njegu i unaprjeđuju njezinu kvalitetu u okviru svojih kompetencija, sudjeluju u provođenju sestrijskih i sestrijsko-medicinskih intervencija, vode sestrijsku dokumentaciju te se koriste listom Hrvatske komore medicinskih sestara, u pisanom i elektroničkom obliku, pružanu psihološku potporu bolesniku i obitelji, prvi započinju edukaciju bolesnika usmjerenu na promjene i utjecaje čimbenika rizika te na način i kvalitetu života oboljelih od različitih srčanožilnih bolesti, trajno se educiraju i aktivno sudjeluju u raznim oblicima edukacija, pohađajući predavanja, tečajeve, kardio-

ual monitoring of heart function and other vital functions, defibrillators, an echocardiography device, an ECG device, ECMO and intra-aortic balloon pump (IABP), mechanical ventilation devices, temporary pacemakers, a system for invasive pressure measurement, a point-of-care blood testing device, infusion pumps, aspirators, and reanimation carts. Various non-invasive and invasive diagnostic and treatment procedures are performed during patient hospitalization. We perform continuous heart function monitoring, emergency pericardiocentesis with echocardiographic monitoring, hypothermia treatment, ECMO, IABP support, invasive and non-invasive mechanical ventilation, percutaneous and temporary pacemaker treatment, percutaneous tracheotomy, central venous catheter implantation, pleural and abdominal puncture, and continuous veno-venous hemofiltration (Figure 3, Figure 4).<sup>9,10</sup>

Nurses work in continuous 24-hour shifts to provide care and treatment for patients and improve its quality within their fields of competence, while also participating in conducting nursing and medical nurse interventions, administering nursing documentation and using the lists of Croatian Chamber of Nurses in both written and electronic forms, providing psychological support to the patients and their families, initiating patient education focused on the effects and possible changes in risk factors, lifestyle habits, and quality of life for patients suffering from cardiovascular diseases, and constantly participating in various forms of education by attending lectures, courses, cardiological conferences, and congresses and developing their skills and competencies. In



**FIGURE 3.** Represents the number of percutaneous coronary intervention (PCI) procedures with separated percutaneous transluminal coronary angioplasty and stent numbers. In the first half of 2019 there were about half as much PCI procedures compared with 2018. PCI = percutaneous coronary intervention; PTCA = percutaneous transluminal coronary angioplasty.



**FIGURE 4.** Represents the number of all the procedures done in Intensive Cardiac Care Unit (ICCU) throughout 2018 and the first half of 2019. Central venous catheters and ventilators take the lead as the most common procedures in our ICU, followed by non-invasive ventilation in third place. CVC = central venous catheter; NIV = noninvasive ventilation; ECMO = extracorporeal membrane oxygenation; CVVHDF = continuous veno-venous hemodiafiltration; CPR = cardiopulmonary resuscitation.

loške simpozije i kongrese i razvijajući sposobnosti i vještine za rad da bi što kvalitetnije zadovoljile potrebe bolesnika i pratile napredak medicine i sestinstva usvajajući znanje, vještine i sposobnosti koje se nužne za siguran i djelotvoran rad.

## Zaključak

Otvaranje koronarnih jedinica i njihov razvoj u jedinice intenzivne kardiološke skrbi, te suvremene dijagnostičko-terapijske mogućnosti pridonijeli su poboljšanju ishoda liječenja najtežih kardioloških bolesnika. Uspješnost rada i kvaliteta skrbi za bolesnike zahtijeva kontinuiranu i cjeloživotnu edukaciju cjelokupnoga kardiološkog tima. Uloga medicinske sestre specijalizirane za rad u ovakvim pogonima, kao nezaobilaznog i ravnopravnog člana medicinskog tima, od neprocjenjive je važnosti za postizanje optimalnih rezultata.

order to satisfy the needs of patients to the highest degree and follow advancements in medicine and nursing, they also acquire knowledge, skills, and competencies necessary for safe and effective work and healthcare.

## Conclusion

The introduction of coronary care units and their development into intensive cardiology care units as well as the introduction of modern diagnostic and treatment options have contributed to improving treatment outcomes for the most severe cases of cardiological diseases. The efficacy and quality of care for such patients requires continuous, life-long education on part of the whole cardiological team. The role of nurses specialized in working at such institutes as necessary and equal members of the medical team is invaluable in achieving the optimal results.

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