

# Ambulatory Care Sensitive Conditions at Out-of-hospital Emergency Services in Croatia: A Longitudinal Study Based on Routinely Collected Data

Diana Kostanjšek<sup>1</sup>, Miro Benčić<sup>2</sup> and Mladenka Vrcić Keglević<sup>3</sup>

<sup>1</sup> Health Center Zagreb-East, Family Practice Njegoševa, Zagreb, Croatia

<sup>2</sup> Health Center Zagreb County, Family Practice Brdovec, Zaprešić, Croatia

<sup>3</sup> Foundation for the Development of Family Medicine in Croatia, Zagreb, Croatia

## ABSTRACT

*Conditions for which a hospital and emergency utilization can be considered avoidable are often referred as ambulatory care sensitive conditions (ACSCs). Until now, there has been no published research related to ACSCs in Croatia. This study was undertaken with the aim of determining the trends relating to ACSCs in out-of-hospital ES from 1995–2012. The study is based on data from the Croatian Health Service Yearbooks. Five chronic and three acute conditions were chosen: diabetes, hypertension, congestive heart failure, angina pectoris, asthma and COPD, bacterial pneumonia, urinary tract infections and skin infections. The results indicate that the ES in Croatia is overused, and consequently ACSCs are over-represented; 23.3% Croatian citizens visited the ES and around 15% of all diagnoses belonged to the ACSCs, with decreased trend. The leading diagnosis is hypertension, followed by asthma and COPD. For a better understanding of the importance of ACSC within the Croatian context, further research is needed.*

**Key words:** ambulatory care sensitive conditions, out-of-hospital, emergency service, family practice, Croatia

## Introduction

Faced with continuous increases in health care costs and consequent financial shortages, the concept of potentially avoidable hospitalization was developed in the 1990s as a reflection on problem with access to care and effective primary health care (PHC)<sup>1</sup>. Conditions for which hospitalization can be considered avoidable are often referred as ambulatory care sensitive conditions (ACSCs)<sup>2</sup>. The concept of avoidable hospitalization was expanded to include avoidable emergency service (ES) visits and avoidable specialist consultations<sup>3</sup>. In countries where access to PHC is universal and free at the point of delivery, the ACSCs were recognized as the measure of timely accessible and effective PHC<sup>4</sup>. These were the reasons for the inclusion of ACSCs into the quality indicators of the US Agency for Healthcare Research and Quality<sup>5</sup>. A substantial body of literature on ACSCs emerged, and results differed across countries and health care systems, but out of this a general agreement has emerged on the

conditions to be defined as ACSCs<sup>6,7</sup>. Among chronic diseases, diabetes, adult asthma, COPD, hypertension, angina (without procedures), and congestive heart failure are normally defined as ACSCs. At the next level, bacterial pneumonia, dehydration, cellulitis, pelvic inflammatory disease, gastroenteritis, and pyelonephritis are often defined as ACSCs<sup>5,8,9</sup>. Apart from the nature of their diseases and the characteristics of different health care systems, it is well known that many other factors, such as the socio-demographic and cultural characteristics of the patients, influence their health care utilization, including the ES<sup>10–12</sup>.

Family practice (FP) in Croatia has been for decade's an integral part of the health centers, responsible for the population of a defined community and it is recognized as a leading primary health care (PHC) service. But, in the mid 1990's, many health care (HC) reforms took place. The most far-reaching was the privatization of the

PHC. Family doctors (FDs), as well as other PHC providers, became private entrepreneurs with an obligation to contract with the Croatian Health Insurance Fund (CHIF)<sup>13</sup>. They were contractually obliged to employ a nurse and to provide curative and preventive care for the publicly insured patients who freely chose them. The previous community orientation, which had been the main characteristic of the former PHC and had been organized through the health centers, was replaced by the FDs as solo practitioners, responsible only for the patients on their lists. They were also required to take part in the provision of an out-of-hours service during weekend days, sharing the responsibility for this with other FDs from the same district. Out-of-hours service is office-based service, aimed to serve for acute not for emergency cases. FDs were largely reimbursed by a per capita-fee, depending on the number of patients on their lists, and in part by a fee-for-service, but they were not reimbursed for their out-of-hours service, the costs of which they were expected to cover themselves<sup>14</sup>.

The ES in Croatia is organized as both a hospital and out-of-hospital service. Out-of-hospital ES, which is the focus of this research, is an integral part of PHC in Croatia: in the larger cities it usually functions as a separate service, and in small cities as a part of the health centers. Along to other PHC services, ES is reimbursed by The Croatian Health Insurance Fund (CHIF). Hospital ES is an integral part of hospital service and it is reimbursed through hospital budgets, again by the CHIF. Only in rural and remote areas are FDs expected to carry the responsibility for the 24 hours of service provision, including ES.

The out-of-hospital ES is completely professional: doctors, nurses and medical technicians, together with auxiliary staff, are employed. No lay persons and no non-health care organizations are involved in the provision of ES. The main scope of ES work is to cover medical emergencies and acute diseases, but they are open for twenty four hours a day, and therefore many, non-emergency, patients make use of them<sup>15</sup>. In 2008, a reorganization of the ES was initiated, with its full implementation occurring in 2013, but it still retains its hospital and out-of-hospital format, with both served by professionals<sup>16</sup>.

Until now, there has been no published research related to ACSCs in Croatia. Therefore, this study was undertaken with the aim of determining the trends relating to ACSCs in out-of-hospital ES from 1995–2012, and to consider whether the organization and functioning of the PHC, based mainly on the FP, and the organization and functioning of the out-of-hospital ES, could have some bearing on these trends.

## Methods

The study is observational and retrospective, based on routinely collected data obtained from the National statistics data; Croatian Health Service Yearbooks, published by the Croatian Institute of Public Health. From

these records morbidity data, as recorded for the ES, were extracted for the period 1995 to 2012, period of time in which the same registration and reporting methodology were used<sup>17</sup>. Data on hospital ES were not collected as they were not presented in the yearbooks as separate data, and therefore they are not within the scope of this study. The morbidity data were registered and reported in the yearbooks according to the Instruction for data collection followed by the entire Croatian health care system<sup>18</sup>. Due to the Instruction, each intervention of the ES, independently of whether it was performed at the surgery, in the patients' home, or in the field, has to be registered under one diagnostic code. If the same patient gets an ES intervention in the same calendar year, and for the same diagnosis, it is again registered as a new morbidity case. If patients receive an intervention for several reasons, than the most important reason is registered as the single diagnostic code. This means that one visit to the ES is reflected as one diagnosis, regardless of whether the same patient visits the ES several times in the calendar year for the same illness.

Since 1995 Croatia has used the International Disease Classification, version X (ICD-X), for the registration of morbidity. Since 2008, when the informatization of PHC was introduced, registrations and reporting have been atomized. Morbidity is reported in the yearbooks according to the disease groups, from group A to group Z. Only certain diagnoses are presented as separate diagnostic codes, and the rest are presented as a cumulative codes. Additionally, the morbidity data is presented in the yearbooks in relation to the four age groups: 0–6 years, 7–19 years, 20–64 years and over 65 years.

For the purposes of this study, to determining the trends relating to ACSCs being treated at the ES, five chronic and three acute conditions were chosen. The five chronic conditions chosen were: diabetes (ICD-X, codes E10-E14), hypertension (ICD-X, codes I10-I15), congestive heart failure (ICD-X, codes I26-I52), angina pectoris (ICD-X, codes I20, I24, I25), asthma and COPD (ICD-X, codes J40-J44 i J47). The three acute conditions chosen were: bacterial pneumonia (ICD-X, codes J12-J18), urinary tract infections (ICD-X, codes N30) and skin infections (ICD-X, codes L00-L08).

The total number of diagnoses registered at ESs annually were collected from the Croatian Health Service Yearbooks for the years 1995 to 2012, as well as the number of diagnoses of the eight selected ACSCs. The percentages of the morbidity from ACSCs (cumulative) in relation to total morbidity registered at ES were calculated. The percentages for the separate ACSCs against total ACSCs morbidity were calculated as well. The morbidity structure of ACSCs with regard to the age groups, as defined in the yearbooks, was also calculated. The study results are based on data from the yearbooks which do not differentiate the serious cases from less serious ones. Therefore, the diagnoses of all eight chosen ACSC conditions were obtained without applying any selection criteria.

Because there were no data on the expected, or normal prevalence of ACSCs in ES to compare with, the four most frequently registered ACSCs diagnoses (hypertension, congestive heart failure, asthma and COPD, and urinary tract infections) were compared with four conditions that are clearly emergencies: myocardial infarction (codes I21-I23), acute stroke (codes I60-I64), urolithiasis (N20-23) and fractures (S codes).

To estimate if the organization of the ES could have some influence on the morbidity trends of the chosen ACSCs conditions, the data on the place of the ES interventions, whether in the surgery, at home, on site/field, were collected from the yearbooks also. The data relating to the organization and functioning of the FP service were obtained from the existing literature.

The collected data were analyzed using Microsoft Office Excel. The results are presented graphically in terms of frequency, and trends are displayed as line charts

### Results

From 1995 to 2007 the total morbidity registered in ESs almost doubled, from 688 768 diagnoses registered in 1995, to 1 416 373 diagnoses in 2007. Since then, a decreasing trend is observed, with 1 036 538 diagnoses registered in 2012. The average number of diagnoses per 1000 Croatian inhabitant increased, from 154,7 in 1995, to 319,2 in 2007, and then decreased to 214,9 diagnoses in 2012. Morbidity trends from the ACSCs follow the total morbidity trend, from 97 830 diagnoses registered in 1995, to 206 919 registered in 2007, followed by a decrease to 150 407 diagnoses in 2012 (Figure 1).

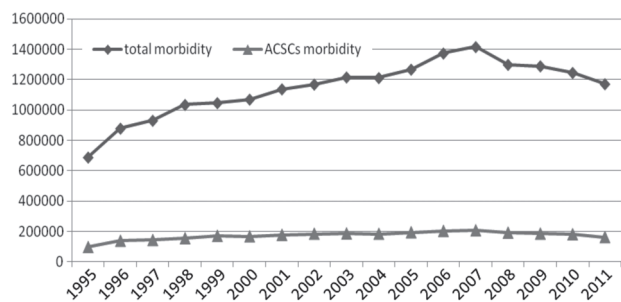


Fig. 1. Trends in total morbidity and the morbidity trends from ACSCs registered at ES in Croatia, 1995 – 2012.

Although, the absolute number of diagnoses increased, the percentages of ACSCs against total morbidity were relatively stable, oscillating between 13.9% and 16.3%, with a slightly decreasing trend after 1999 (Figure 2).

Among the eight chosen ACSCs, the most prominent was hypertension, codes I10-I15, accounting for almost one third of the total ACSC morbidity (27.3–36.1%). This was followed by asthma and COPD, codes J40-J44 i J47, (16.3–11.3%), congestive heart failure, codes I26-I52, (13.7–7.8%) and angina pectoris, codes I20, I24, I25, (10.1–13.1%). Continuous decreasing trends were observed in diabetes, codes E10-E14, (from 8.8% in 1995 to

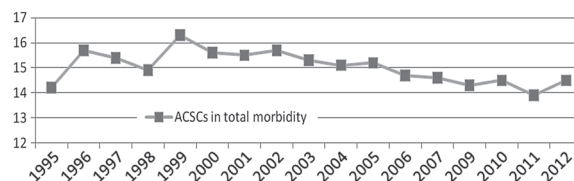


Fig. 2. Trends in the percentages of ACSCs against total morbidity registered in ES in Croatia, 1995 – 2012.

4.6% in 2010) as well as in bacterial pneumonia, codes J12-J18, (from 7% in 1995 to 4.8% in 2012). Continuous increasing trends were observed in urinary tract infections, cod N30, (from 1% in 1995 to 11.5% in 2012) and in skin infections, codes L00-L08, (from 8.6% in 1995 to 10.1% in 2012) (Figure 3). The highest percentage of ACSCs registered in ES were observed in the age group over 65 years, as being between 30–68%. Only the groups with urinary and skin infections were less prevalent in that group of patients (less than 20%).

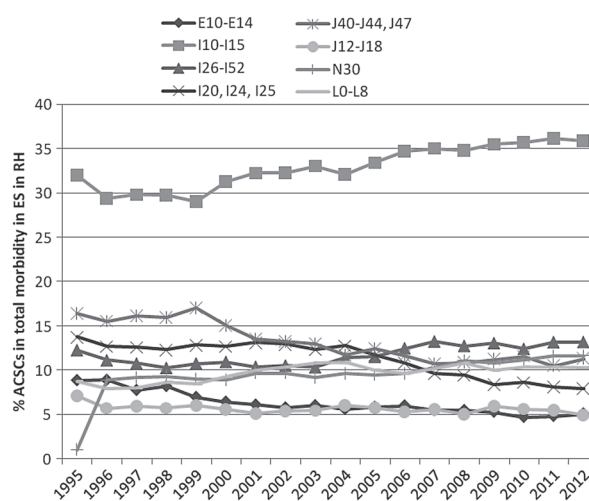


Fig. 3. Trends in the morbidity of eight chosen ACSCs registered in ES in Croatia, 1995 – 2012.

The morbidity from the four most frequent ACSCs (hypertension, congestive heart failure, asthma and COPD, and urinary tract infections) in total morbidity were almost two times higher (9.9 to 10.5%) than the morbidity from the four chosen emergency conditions (myocardial infarction, acute stroke, urolithiasis and fractures), which represented 3.9 to 4.5% of total morbidity registered in ES in Croatia during the period under investigation (Figure 4).

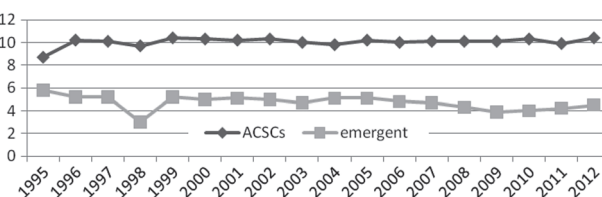


Fig. 4. Trends in the proportion (in percentages) of the four ACSC and four »emergency« conditions against the total morbidity registered in ES in Croatia, 1995–2012.

The results of the functioning of out-of-hospital ES in Croatia are now presented through the structure of the interventions, that is whether they were performed at the surgeries, in the patients' homes or at the site where an accident happened. The majority of interventions were performed at the surgeries, varying from 81% of the total number of interventions in 1996, to 73.9% of interventions in 2012. In 1996, only 1.5% interventions were

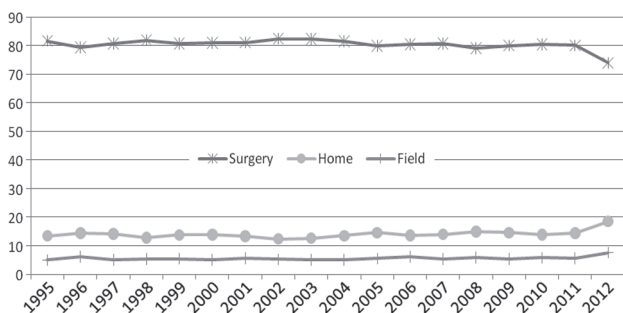


Fig. 5. Trends in the structure of the interventions (surgeries, patients' homes, field) registered in ES in Croatia, 1995 – 2012.

done at the patients' homes, while in 2012, 18.5% of the total number of interventions were done at home. The number of interventions performed at the site where an accident had happened was relatively stable, varying between 5 and 7.5% (Figure 5).

## Discussion

The results obtained indicate that the out-of-hospital ES in Croatia is overused, and consequently ACSCs are over-represented in comparison to really emergency conditions<sup>15,16</sup>. Recognizing that one registered diagnosis is in fact represents one visit<sup>18</sup>, then one in every four Croatian citizens (23.3%) visited the ES in 2012; possible some of them frequently. Around 14–15% of all diagnoses registered at ES in the period under investigation belonged to the ACSCs. Additionally, the four most frequent ACSCs made up approximately 10% of the total diagnoses/visits at ES, while the four really emergency conditions occupied only around 4% of visits. Among the observed ACSCs, hypertension was the most frequently registered (27.3% – 36.1% of all ACSCs). The highest percentage of ACSCs in ES were observed to be in the age group over 65 years; making the proportion of elderly between 30–68%, which is far higher than the proportion of the elderly population in the whole of Croatia (which is around 16%). But it is promising that, from 2007, a decreasing trend in overall used of ES was observed. The ACSCs all followed the same decreasing trend.

Looking at the results from the perspective of the structure of the ES interventions there is very little difference between the FP and the ES. Around 73–81% of interventions took place at the ES surgeries, and not at the patients' homes or at the site/field where the emergency incident happened. Therefore, despite the over-

-presence of the ACSCs in the ES, the diversion of the ACSAs to ES can hardly be attributed only to the FPs in Croatia being unavailable and ineffective. The reasons would appear to lie with both services, and also, as suggested by the literature, could lie within the patients' own characteristics<sup>19–22</sup>.

The ES in Croatia is usually positioned within the community, as a regular part of the PHC service, and as it is open for twenty four hours it is normal for patients to enter even just to measure their blood pressure. It is hard to believe that the diagnosis of hypertension is established for the first time in ES with patients over 65, especially taking into account that the average number of visits to a FP is around 10 visits per patient, per year<sup>23</sup>. On the other hand, an FP, particularly if it is based on FDs working as solo practitioners, is not usually accessible to patients out of working hours and of working days. They are accessible to patients only during weekends. This restricted accessibility has been, in some cases, compensated for by an inter-collegial agreement on shared-care for the patients on their lists, but only during the day-time. There is no organized service during the night, and the weekend service is poorly organized. Besides, FDs are already overloaded by the number of patients on their lists, and the number of daily visits<sup>23,24</sup>. Waiting for a convenient appointment, or waiting at the waiting room, is often too long, and together with the decreasing number of home visits made, patients tend to switch to those services that are more accessible. The fact that the ES is completely free of charge to all patients, and that FP visits have to be partially charged to patients not having additional health insurance, should also be taken into consideration in explaining the overuse of the ES. In addition, the large number of visits observed throughout the entire Croatian health service are explained by the tradition of free-access to health care services, and an understanding of health care as a basic citizens' right<sup>23</sup>. In a study done by Agarwal and colleagues in the East Midlands, England, »access to general practice, anxiety about the presenting problem, awareness and perceptions of the efficacy of the services available in the ES, and a lack of alternative pathways are important predictors of attendance rates at ES«<sup>10</sup>. At least some of those factors must be at work among the Croatian patients as well, but until now there has been no published research on the patients' characteristics and attitudes regarding their utilization of the ES within the Croatian context.

In comparison, the literature on the utilization of ES is growing in many developed countries, such as the US, Canada, Australia and the UK<sup>25–28</sup>. While the trends in other countries are increasing, in this study the trends both, for overall utilization of the ES and for the utilization of ES for ACSCs, have decreased since 2007. It is hard to explain these decreasing trends because no major organizational changes have happened since then. But, some minor changes in functioning are visible from the results, such as the increased percentage of interventions performed at the patients' homes, meaning that the ES is slowly reverting to its primary purpose. It seems

that the number of FDs sharing responsibility for the patients on their lists, or formally working in group practices, is increasing, making the FP more accessible. But, this is only the authors' impression and the phenomenon should be investigated further.

This is the first study in Croatia to deal with health service utilization in relation to ACSCs. The data on which the study is based are routinely collected in a consistent manner, making them reliable for the investigation of longitudinal trends. The data do not allow a deeper understanding of the overall utilization of the ES, or the accessibility of FPs, or the influence of other factors. Another study limitation arises from the Instruction for the registration of morbidity at ES: resulting in a mismatch between morbidity and patients' visits<sup>18</sup>. Each patient's visit should be recorded as one diagnostic code, independently of whether the patient is coming for the first time or whether he/she is a frequent attender. In the latter case the same diagnostic code is registered several times, and this does not represent the real morbidity. It should also be taken into the consideration that some parts of the emergency services are not covered by this study. In the rural and remote areas they are usually taken care of by the FDs. The data about those interventions are reported in the yearbooks within the general FP service report. Additionally, the records of hospital emergency departments have not been included in this study, because they are presented in the yearbooks as part of the cumulative data on hospital morbidity.

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Apart from its limitations, the study brings to light some factors to be taken into consideration in future health service planning. According to the results, a certain amount of ES resources are unnecessarily spent, especially when dealing with the ACSCs. Therefore, a new organizational scheme for the ES might look to some improvements. It would also be worth introducing changes to make the FM more accessibility to its patients, such as encouraging the establishment of group-practices, or regulations concerning out-of-hours duties. According to the study results, the local circumstances, such as those in Croatian out-of-hospital ES, should also be taken into account when determining which conditions should be included within the ACSCs. Especially in their use as a quality indicator of timely and effective PHC. Just coping the lists of ACSCs from other countries and circumstances seems not applicable, therefore, further research is needed for a better understanding of the problem of ACSC within the Croatian context.

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*D. Kostanjšek*

*Health Center Zagreb-East, Family Practice, Njegoševa 10, 10 000 Zagreb, Croatia  
e-mail: dianakostanjsek@gmail.com*

## **TRENDOVI KRETANJA POBOLA OD »AMBULANTNO LIJEČIVIH BOLESTI« U DJELATNOSTI HITNE MEDICINSKE POMOĆI U HRVATSKOJ: LONGITUDINALNA STUDIJA NA TEMELJU RUTINSKI PRIKUPLJENIH PODATAKA**

### **S A Ž E T A K**

Abulantno liječive bolesti (ALB) su one bolesti koje bi se mogle uspješno liječiti u primarnoj zdravstvenoj zaštiti (PZZ) i ne bi se smjele pojavljivati na drugim razinama zdravstvene zaštite, pa se smatraju mjerilom kvalitete P. Cilj studije je bio istražiti trendove pojave odabranih ALB u djelatnosti hitne medicinske pomoći (HMP) u Hrvatskoj u periodu od 1995–2012. Podaci o pobolu su prikupljeni iz Hrvatskih zdravstveno-statističkih ljetopisa za promatrane godine, a odabrano je osam ALB: diabetes, hipertenzija, angina pektoris, kronično zatajenje srca, astma i COPB, bakterijska pneumonija, urinarne i kožne infekcije. Dobiveni rezultati ukazuju da se HMP u Hrvatskoj često koristi, oko 25% stanovnika godišnje, najčešće stariji ljudi, a na ALB otpada oko 15% svih zabilježenih dijagnoza, najčešće hipertenzija i astma i KOPB. Zbog dostupnost HMP, teško da bi se pojava ALB, mogla u Hrvatskim uvjetima definirati kao mjerilo dostupnosti i učinkovitosti PZZ.