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Retrospective Analysis Of Emergency Services In A Colombian City

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Abstract

Several legal and operational considerations have delimited health services dynamics in recent years. In this way, there are services that, although they are mandatory by law for technical reasons and care, are not provided with the necessary quality due to limitations both in time and in attention capacity. Due to this, the present research document contemplates the analysis and characterization of the emergency service in a hospital center in the city of Cucuta, determining the main technical considerations and capacity of the service as a whole of the characteristics of the users and the main reasons why they go to the medical center.

Keywords*:* Inmediate attention; Necessity; patients; Emergency Room; Services.

1. Introduction

Emergency rooms (ER) are a critical part of the healthcare system, with high complexity due to their different multiservice flows for various categories of patients. One of the most critical areas for fulfilling the mission function of Healthcare Provider Institutions (IPS by its acronym in Spanish) (Ajami et al., 2011; Guo et al., 2017; Velásquez-restrepo et al., 2011). ER's have been visited as follows: in the USA by about 43.3% of the total population in 2017 (Rui & Kang, 2017); in Taiwan, it increased by 34% between the years 1998 and 2011 (Chen & Wang, 2016); and Colombia 19.38% and 33.06% of the affiliates of the subsidized and contributory regime, respectively, in 2014. On average, about 19 million patients each year between 2010-2014 (ACEMI, 2017). The supply of low, medium and high-complexity emergency services in Colombia in 2016 was 1,115 enabled public IPS and 503 private ones (Rozo & Acosta, 2016).

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Initial emergency care should be provided on a mandatory basis by all public and private entities that provide health services to all persons, regardless of their ability to pay (CRC, 1993). In addition, individuals have the right to receive emergency care as required, with the opportunity that their condition warrants, without requiring any document or payment in advance (CRC, 2015).

This report was performed in the city of Cucuta, which presents similar problems as well as any city in Colombia in the attention of medical emergency services (Caicedo et al., 2020), and has ER's all complexity levels (high, medium and low). This city has an estimated population of 629,414 inhabitants and an immigrant population from Venezuela since years 2014-2018 of 43,310 inhabitants (DANE, 2019), ranking as the seventh most populated city in the country (DANE, 2020). This research book contains the following chapters: 1) Installed capacities. The number of consulting rooms, observation beds, physicians by speciality, head and auxiliary nurses, and availability of support and diagnostic services. 2) Patient characteristics. Patient demand by the hour, day, month, shift, gender, priority and age range. Diagnoses. Defined behaviour. Arrival method. Nationality and neighborhood. 3) Characteristics of the care process. Process and priorities in care, timeliness of care and length of stay; and 4) Health insurance entities.

2. Background of study

In the USA, the National Center for Health Statistics annually conducts a study of a sample of hospitals whose results present the most representative data on ER outpatient care visits (Rui & Kang, 2017). In Melbourne, they conducted a retrospective analysis based on data from the emergency department of public hospitals from 1999-00 to 2008-09, to describe trends in their use (Lowthian et al., 2012). In Ecuador, they analyzed care in the emergency medical services of first and second-level facilities, in the province of Azuay, through observation, interviews, surveys and documentary review (García, 2018). These researches identified sociodemographic characteristics, timeliness of care, length of stay, triage, diagnoses and most frequent reasons for consultation, among others.

The Colombian Association of Integral Medicine Companies (ACEMI by its acronym in Spanish) presented results of the health activities received by affiliates (emergencies, among others), from 2010 to 2015, and an approximation of the state of their health based on information sources from the ministry (ACEMI, 2017). In two high-complexity private university hospitals in Bogota, the following was established: the epidemiological profile of the adult emergency department, based on historical records (Picón et al., 2013); and the main characteristics of care in the emergency department in 2014 were determined (Flórez & López, 2014). These investigations identified sociodemographic variables, diagnoses, destination, costs, triage, waiting for time and length of stay, and moments of service congestion using the NEDOCS scale. And in Cartagena, the characteristics of emergency care were analyzed through a documentary search and statistics from different national and international secondary sources (Bedoya, 2017).

3. Method

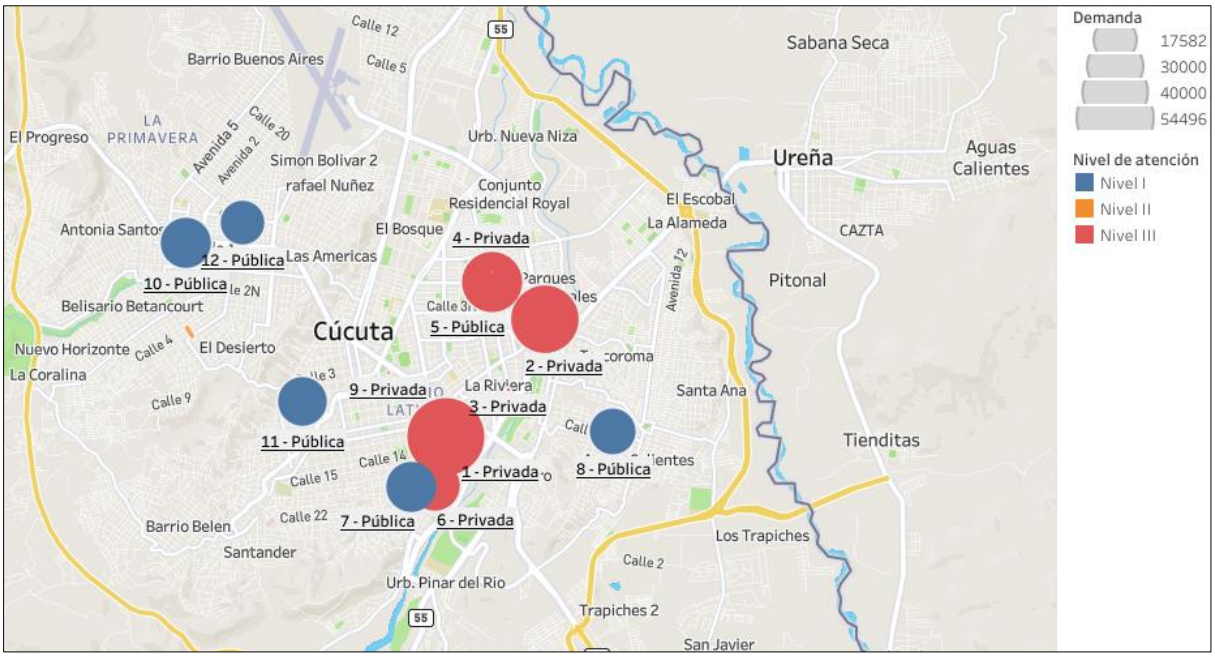
A descriptive study was carried out that considered the population of clinics and hospitals with emergency services in Cucuta (Table 1). The sample is equivalent to the population; however, clinic number four did not participate in the study. Figure 1 shows the location of the ER's in the city and other data that characterize them, as shown in Table 2.

Table 1. Clinics and hospitals with emergency services in the city of Cucuta.

Complexity	Care Level	No. Clinics or hospitals	Legal nature	Identification on the map (#)
High	III	4 Clinics	Private	1, 2, 3, 6
	III	1 Hospital	Public	5
Media	II	2 Clinics	Private	4, 9
Download	I	5 Basic Care Units	Public	7, 8, 10, 11, 12
Total				

Source: Prepared from the Special Registry of Health Service Providers - REPS. (MSPS, 2019b).

Figure 1. Location of emergency rooms in the study city.



The following stages proposed by Ruiz for the instrument's design were carried out (2002). First, the *purpose of the instrument* was determined. Second, it was decided to use a *questionnaire* as the type of measurement instrument, which is suitable for descriptive studies. Third, *the construct* was *conceptualized* based on the review of the aforementioned background; the 5Ps of operations management (personnel, parts, plant, processes, and planning and control system); and the legal aspects that apply to operations management (personnel, parts, plant, processes, and planning and control system); and legal aspects apply to operations management. (Noori & Radford, 2000) and legal aspects that apply to the object of studies, such as resolution 2003 of 2014, which defines the procedures and conditions for the registration of health service providers and the authorization of health services. (MSPS, 2014).

In the fourth step, for the *operationalization* plan *of the construct or variables*, a matrix was prepared to consist of the following parts: the variable, the factors and sub-factors of the construct or variable, the indicators of each sub-factor, and the items. In addition, the nature of the item or variable (qualitative or quantitative), the level of measurement of the item (nominal, ordinal, interval, ratio), and the category of every item (dichotomous, categorical or polytomous, discrete and continuous) were also considered (Annex A). In the *integration of the instrument*, the fifth stage, the spatial organization of the questions on the

document was carried out, and a brief introduction was written, including the objective and instructions for its completion. Finally, the *content validation of the instrument was* carried out, in order to determine to what extent the questions of the instrument are representative of the domain or universe of content of the property to be measured. (Ruiz, 2002). The validation was carried out by means of expert judgment. The final questionnaire consisted of 29 items and was applied to the eleven coordinators of the emergency departments in the city.

Patient characteristics and timeliness of care (waiting times) were determined from the statistical information provided by health institutions regarding patients seen during 2017. Subsequently, this information was statistically processed using the *Tableau Public version 2019.2* tool, whose descriptive analyses were validated by the emergency coordinators and contrasted with the indicators of the Ministry's Quality Observatory. (MSPS, 2019a). To determine the characteristics of the care process, guided visits were made to the ER's.

The following are the results of the characterization, which have the following limitations: 1) Partial results are reported for ER´s 3 and 9; 2) For institutions 2 and 5, waiting times in the adult ER´s are reported; 3) The provision of statistical information was not complete by some institutions, because they did not record what was requested or they do not have a computer system; and 4) Results are reported for adult ER number 5."

4. Results

4.1. Installed Capacity

Table 2 shows that facilities 2 and 5 have separate ER's for adults and paediatrics. ER's 1 and 6 have exclusive medical offices for the care of patients insured with prepaid medicine, and ER's 3 has complete observation room beds for these patients. Public ER 5 has 38.5% of the total number of high-complexity observation beds surveyed. Given the increased demand in the ER, the institutions have placed chairs in the observation room, called VIP (Very Important Person). The public sector has been responsible for providing low-complexity emergency care in vulnerable regions of the city. ED 10 does not separate beds in the adult and pediatric observation rooms in low complexity. All EDs have resuscitation and procedure rooms (small surgeries). Public low-complexity EDs do not have a plaster room.

Initial care in the ER is provided by general practitioners with experience in emergency medicine, some of whom work in public and private institutions. Table 2 shows that high-complexity ER's 2 and 5 have the highest average number of general practitioners per shift. Respecting specialist physicians, ER 1 has the largest number of physicians available in the three shifts of the day, and the specialties who are available in person are: internal medicine; orthopedics; gynecology and obstetrics; general surgery; gastroenterology; maxillofacial, thoracic and hand surgery; intensive care medicine; and urology. The other emergency specialties are available on an as-needed basis. These physicians are shared with all departments of the health institution. ER's 5 and 6 do not have a specialist in gastroenterology, which is one of the most frequent diagnoses in the city.

Table 2. Resource availability and patient demand in emergency rooms.

Complexity	High					Media		Download			
Legal nature	Private				Public	Private		Public			
Level of care	III	III	III	III	III	II	I	I	I	I	I
Identification Map	1				5						
Adult Triage Offices[1] /all		1	1	1	1	1	1	1	1	1	1
Triage pediatrics offices	-	-	1	-	1	-	-	-	-	-	-
Adult/all medical offices						1					
Pediatric/prepaid medical offices[2]	1			1		-	-	-	-	-	-
Adult observation beds/all[3]			42							5	
Observation beds in pediatrics / prepaid[4]						-					
Chairs under observation		-		-		-	-	-	-	-	-
General practitioners (Half shift)	5,7	1,2	8,3	5,3	8,3	1,7	3,3	3,3	2,7		3,3
Head Nurses (Half Shift)		1,7	5,7	1,7		1	0,7	1	0,7	0,7	0,7
Auxiliary nurses (Half shift)							5,7	6,7	4,7	5,7	6,7
Annual demand	54.496	23.183	41.850	-	33.385	-	19.298	22.882	21.933	23.333	17.582
Annual demand	21,1		16,2	-	12,9	-	7,5	8,9	8,5		6,8

1ER's 2 and 5 have a triage clinic for adults only, the other ER's have a triage clinic for all (adults and children).

2In ER's 1 and 6, there are 1 and 2 medical offices exclusively for patients with prepaid medicine, respectively. The others are -medical offices for pediatrics.

3In ER 10 there are 5 observation beds for all patients (adult and pediatric).

4In ER's 1 and 3 there are 4 and 10 observation beds exclusively for patients with prepaid medicine, respectively. In the other ER's there are observation beds for pediatrics.

Table 3 shows that ER 5 gave the management of the intensive care unit (ICU) as a commodatum, but it has an intermediate care unit in the ED, where the patient remains until the ICU is authorized by the Health Promoting Entity (EPS) or until there is availability of beds. Some EDs subcontract services such as blood transfusion, nutrition, endoscopy and basic and medicalized transport. In low complexity, EDs 10 and 11 did not have radiology and diagnostic imaging services, failing to comply with the authorization conditions established in resolution 2003 of 2014. (MSPS, 2014).

Table 3. Support and diagnostic services in emergency rooms (interdependency)

Complexity	High					Media	Download				
Legal nature	Private				Public	Private	Public				
Level of care	III	III	III	III	III	II	I	I	I	I	I
Identification Map	1				5						
Clinical Laboratory	1	1	1	-	1	1	1	1	1	1	1
Blood transfusion	1	1[1]	1	-	1	1[1]	-	-	-	-	-
Radiology and diagnostic imaging low complexity	0	1	-	-		1	1	1	-	-	1
Radiology and diagnostic imaging, medium and high complexity	1	1	1	-	1	0	-	-	-	-	-
Intensive care unit	1	1	1	-	1 [2]	0	-	-	-	-	-
Surgery	1	1	1	-	1	0	-	-	-	-	-
Hospitalization	1	1	1	-	1	1	1	1	-	1	1
Endoscopy	1	1	1	-	1	1[1]	-	-	-	-	-
Pharmaceutical service	1	1	1	-	1	1	1	1	1	1	1
Basic care transport	0	1[1]	1[1]	-		0	1	1	1	1	1
Medical transport for medical assistance	1	1[1]	1[1]	-	1	0	-	-	-		
Sterilization process	1	1	1	-	1	0	1	1	1	1	1

Nutrition	1	1	1	-	1	1[1]	-	-	-	-	-
Physiotherapy	1	1	1	-	1	0	-	-	-	-	-
Cardiology Center	0	1[1]	-	-	-	0	-	-	-	-	-

[1] subcontratado [2] Comodato

To the north of the city (Figure 1) there is no public ER supply, being this area of high population concentration. (DANE, 2019). As in Manizales, Colombia, where there are no emergency and ambulance centers in low socioeconomic neighborhoods, Latin American and developing countries require regulation for equitable access to health facilities. (Holguín et al., 2017).

4.2. Patient characteristics

Behavior of patient demand. From Table 2, it is determined that 257,942 patients were seen in the city in 2017, 53.7% were seen in public entities and 59.3% in high complexity ER's, level III, which is observed in the size of the red circles in Figure 1. The hours of the day with the highest demand in high complexity were between 7 a.m. and 12 m., and 2 p.m. and 7 p.m., and shift 1 was the one with the highest patient demand (Figure 2). In high complexity, there was the highest demand on Mondays and Tuesdays, while in low complexity on Tuesdays, Wednesdays and Thursdays. Sundays were the days with the lowest patient demand. The last quarter of the year was the one with the highest demand in high complexity, while in low complexity it was in the first quarter. Figure 3 shows that most private ER's attended patients with moderate clinical condition, while the public hospital was the one that attended more triage I and II patients, since it is the institution with more experience in emergency care. Figure 4 shows that there is a slight total difference between both genders of patients attending ER's.

Figure 2. Patient demand by work shift in high complexity.

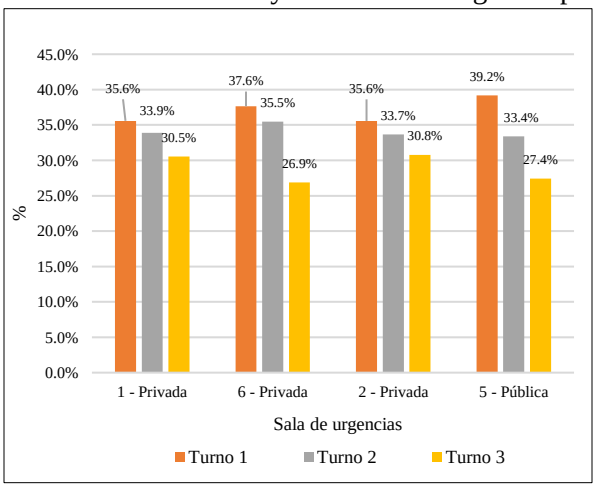


Figure 3. Patient demand for high complexity triage

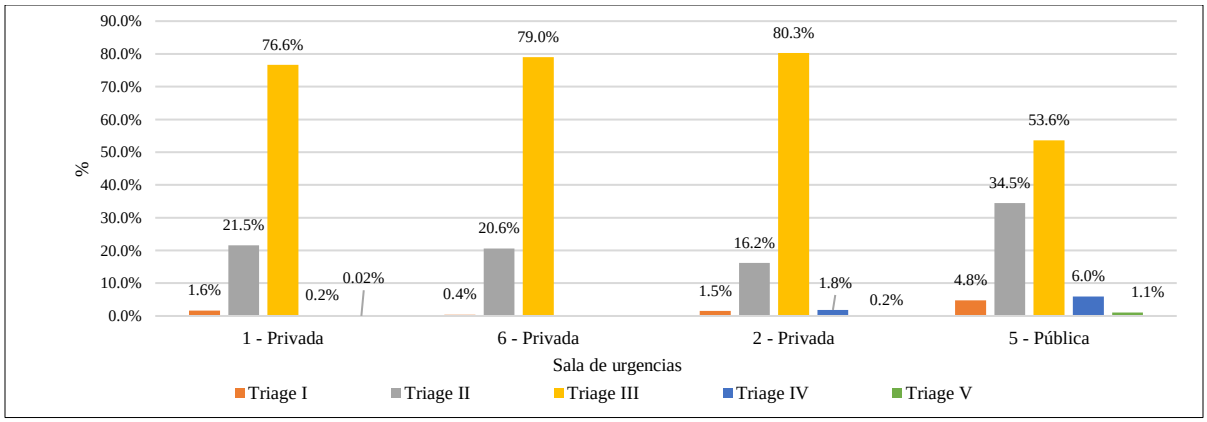
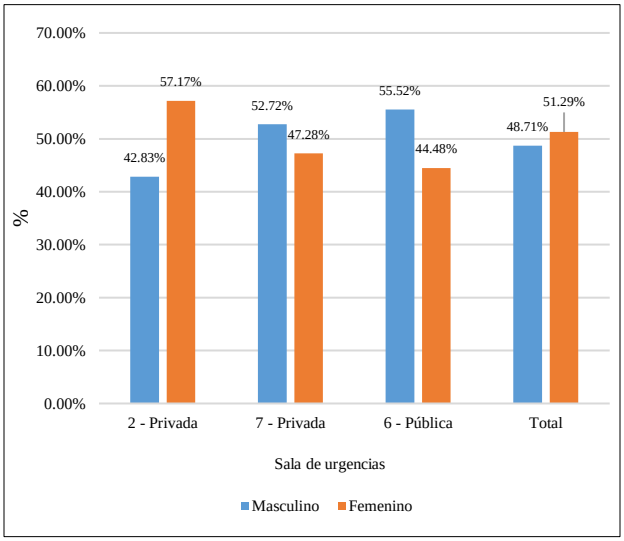


Figure 4. Patient demand by gender in high complexity



Regarding patient demand grouped by every five years, Figures 5 and 6 show that the patients who visited the ER's the most were children under 5 years of age, with 11 % and 13.6 % of the total demand in high and low complexity, respectively. In high complexity, in second place, was the adult population between 20 and 34 years of age with 26.5%, and in low complexity, children between 5 and 9 years of age and young people between 15 and 19 years of age, with 10.1% and 9.0%, respectively. Adults over 60 years of age accounted for 21.1 % and 15.6 %, in high and low complexity, respectively. These results are partially similar to those obtained in Melbourne between 1999 and 2009, and in Colombia between 2010 and 2014, where the patients who most visited the ER of public hospitals were children under 5 years of age and those over 75 years of age; and in Argentina, 13.3 % of patients visited the ER of public hospitals between 1999 and 2009. (ACEMI, 2017; Lowthian et al., 2012). and in Argentina, 13.3% of the patients seen were adults over 60 years of age. (Castro, 2012).

Figure 5. Patient demand by age range in high complexity

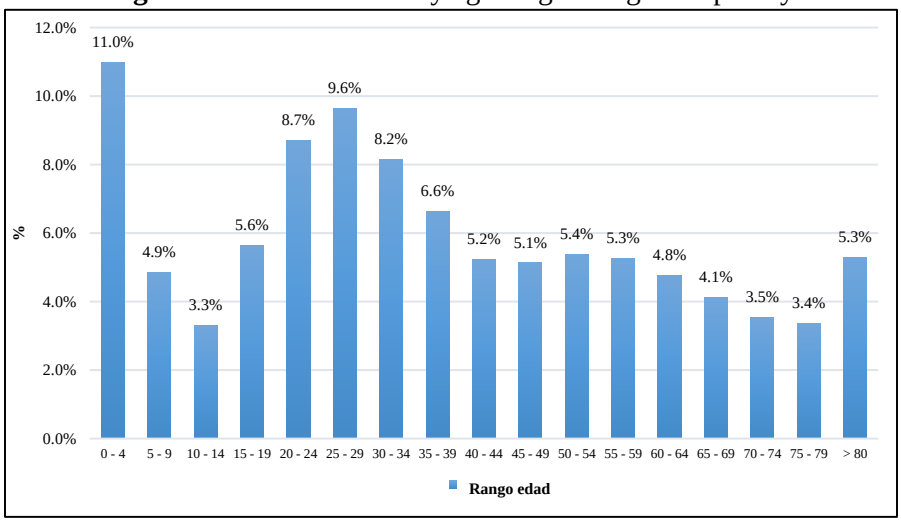
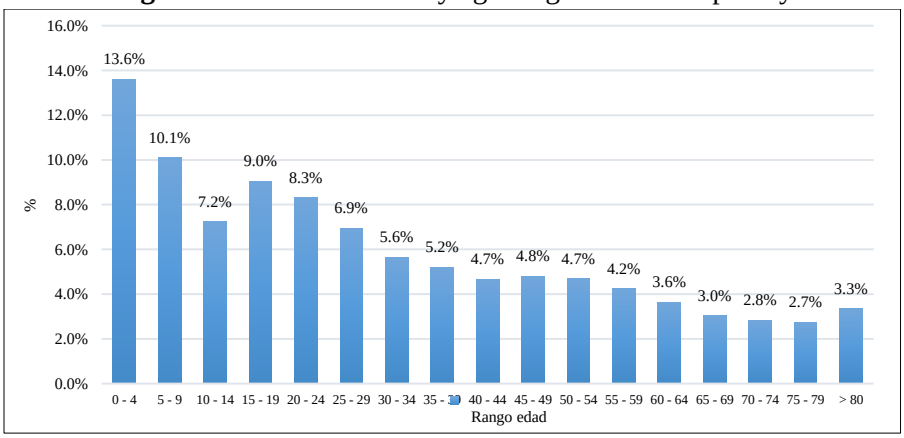


Figure 6. Patient demand by age range in low complexity



***Diagnoses*.** Table 4 and Figure 7 show that the main pathologies in all age groups were fever, diarrhea, gastroenteritis and other abdominal pain. In the population under 9 years of age, lower respiratory tract infection, acute rhinopharyngitis and nausea and vomiting were more frequent. In those over 55 years of age, arterial hypertension and urinary tract infection were more frequent. Headache occurred in the population between 10 and 60 years of age. And adults between 30 and 55 years suffered from renal colic and lumbago. In ER five, it was identified patients from neighborhoods located in the peripheral areas of the city, of low socioeconomic status, were ones who presented more diarrhea, gastroenteritis and other abdominal pain, and urinary tract infection.

The results of the most frequent diagnoses coincide with: two hospitals in Bogota, whose most prevalent diagnoses were those of the gastrointestinal system (Flórez & López, 2014; Picón et al., 2013); the ACEMI study where the most frequent diagnoses in children under 15 years of age were diseases of the respiratory system, infectious and digestive system diseases, and in those over 60 years of age, diseases of the circulatory system, respiratory system and trauma (ACEMI, 2017) In Medellin, the main diagnoses were respiratory and intestinal infections; and in Azuay, the main diagnoses were respiratory and intestinal infections. (Valencia-Sierra et al., 2007) In Azuay, the majority of visits were for upper respiratory, gastrointestinal and urinary tract infections. In Ecuador, the main causes of morbidity are diseases of the respiratory and digestive tract, as in other Latin American countries, portraying poverty and the health conditions of the population as an aggravating factor for these diseases. (García, 2018). It is contradictory that SU 5 and 6 do not have a physician specialized in Gastroenterology.

Table 4. Most frequent diagnoses by age range

#	Diagnosis	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75 - 79	> 80	Number of patients	% patients
1	Fever, unspecified	5.551	3.048	1.570	1.122	873	729	567	484	420	414	447	393	348	321	305		469	17.331	13,45%
2	Diarrhea and gastroenteritis of presumed infectious origin	4.001	1.506	894	771	1.079	1.083	856	727	643	575	595	557	502	397	355	361	491	15.393	11,94%
2	Other abdominal pain and unspecified pains	285	615	707	1.190	1.153	1.082	940	734	616	572	556	462	372	378	251	241	313	10.467	8,12%
4	Urinary tract infection, unspecified site	495	436	261	894	975	835	609	469	415	394	361	379	324	321	346	262	432	8.208	6,37%
5	Headache			487	737	751	866	716	673	684	605	566	440	320	220	184		194	7.959	6,18%
6	Unspecified acute lower respiratory tract infection	2.255	732						188				249	230	201	217	216	429	6.186	4,80%
7	Acute rhinopharyngitis (common cold)	2.024	706		278		228				114								5.055	3,92%
8	Nausea and vomiting	1.629	855	467	275	261	227	183	146					102					4.879	3,79%
9	Unspecified low back pain					314	424	398	423	357	434	426	379	272	231		148		4.400	3,41%
10	Localized upper abdominal pain		213		431	497	446	363		245	249	272	247	195					4.396	3,41%
11	Renal colic, unspecified				248	447	651	601	565	471	389	349	218						4.330	3,36%
12	Localized pain in other parts of the lower abdomen	101		253	404	501	473	359	278	230		205		146					3.976	3,09%
13	Essential (primary) hypertension		-	-					148	236	288		438	426	418	364	386	426	3.689	2,86%
14	Chest pain, unspecified						193		253	260	291		328	272	266	202		227	3.346	2,60%
15	Tonsillitis, acute, unspecified	948	551	387	267	205													3.296	2,56%
16	Viral infection, unspecified	946	359	285								103				58			3.114	2,42%
17	Acute bronchitis, unspecified	792	469	173							102					82			3.051	2,37%
18	Acute upper respiratory tract infection, unspecified	971	337							58									2.599	2,02%
19	Gastritis, unspecified				263	249				110								42	1.688	1,31%
20	Migraine, unspecified				102	148				110									1.265	0,98%

Figure 7. Most frequent diagnoses by age range

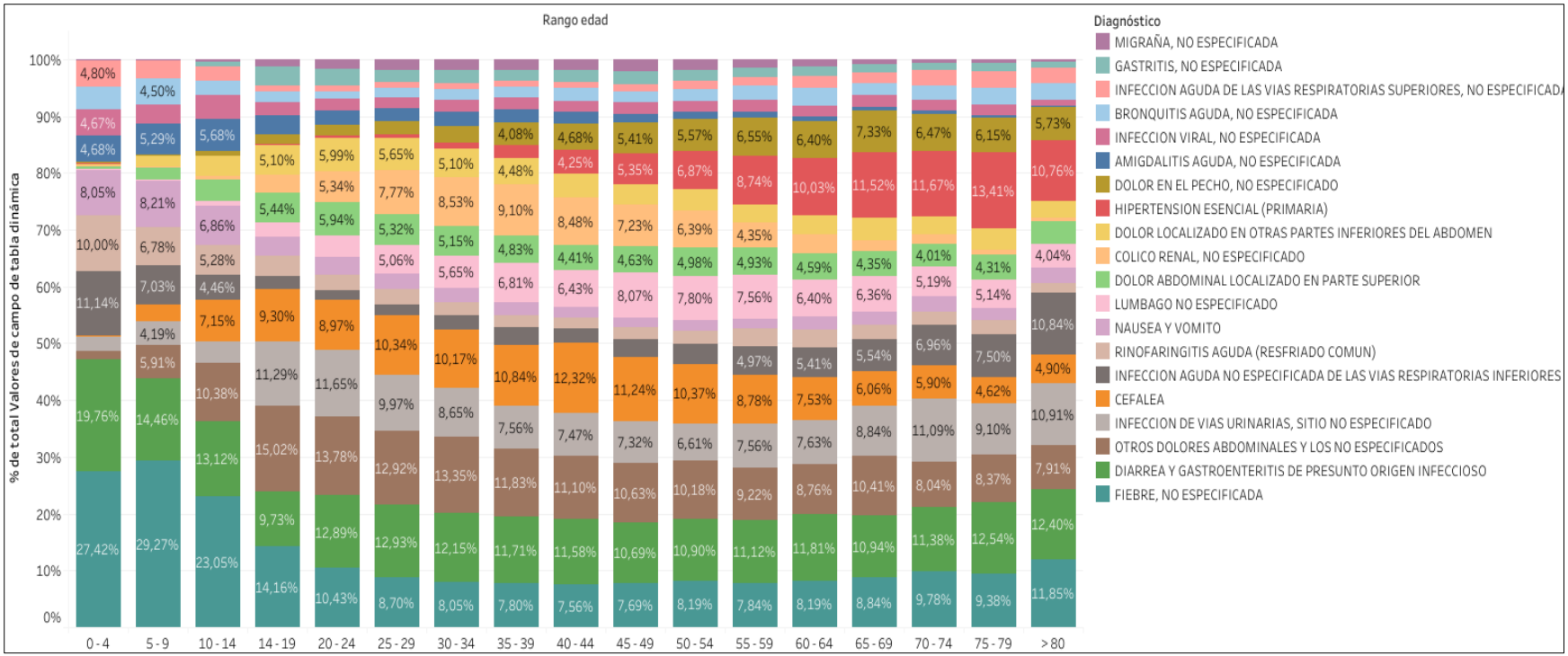

Rango edad
% de total Valores de campo de tabla dinámica
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 4
5 - 9
10 - 14
14 - 19
20 - 24
25 - 29
30 - 34
35 - 39
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
75 - 79
> 80
Diagnóstico
MIGRAÑA, NO ESPECIFICADA
GASTRITIS, NO ESPECIFICADA
INFECCION AGUDA DE LAS VIAS RESPIRATORIAS SUPERIORES, NO ESPECIFICADA
BRONQUITIS AGUDA, NO ESPECIFICADA
INFECCION VIRAL, NO ESPECIFICADA
AMIGDALITIS AGUDA, NO ESPECIFICADA
DOLOR EN EL PECHO, NO ESPECIFICADO
HIPERTENSION ESENCIAL (PRIMARIA)
DOLOR LOCALIZADO EN OTRAS PARTES INFERIORES DEL ABDOMEN
COLICO RENAL, NO ESPECIFICADO
DOLOR ABDOMINAL LOCALIZADO EN PARTE SUPERIOR
LUMBAGO NO ESPECIFICADO
NAUSEA Y VOMITO
RINOFARINGITIS AGUDA (RESFRIADO COMUN)
INFECCION AGUDA NO ESPECIFICADA DE LAS VIAS RESPIRATORIAS INFERIORES
CEFALEA
INFECCION DE VIAS URINARIAS, SITIO NO ESPECIFICADO
OTROS DOLORES ABDOMINALES Y LOS NO ESPECIFICADOS
DIARREA Y GASTROENTERITIS DE PRESUNTO ORIGEN INFECCIOSO
FIEBRE, NO ESPECIFICADA

Figure 8 shows that acute myocardial infarction, hypertension, cerebrovascular disease and head trauma are the most frequent critical diagnoses presented in the study city. Of the patients who suffered traffic accidents, the most frequent pathologies were knee contusion, multiple trauma and head trauma (Figure 9). And the employees who had suffered occupational accidents mostly presented lumbago, knee contusion, and contusion of the fingers and ankle (Figure 10). These accidents occurred in the population between 15 and 40 years of age.

Figure 8. Most frequent critical diagnoses in triage I patients.

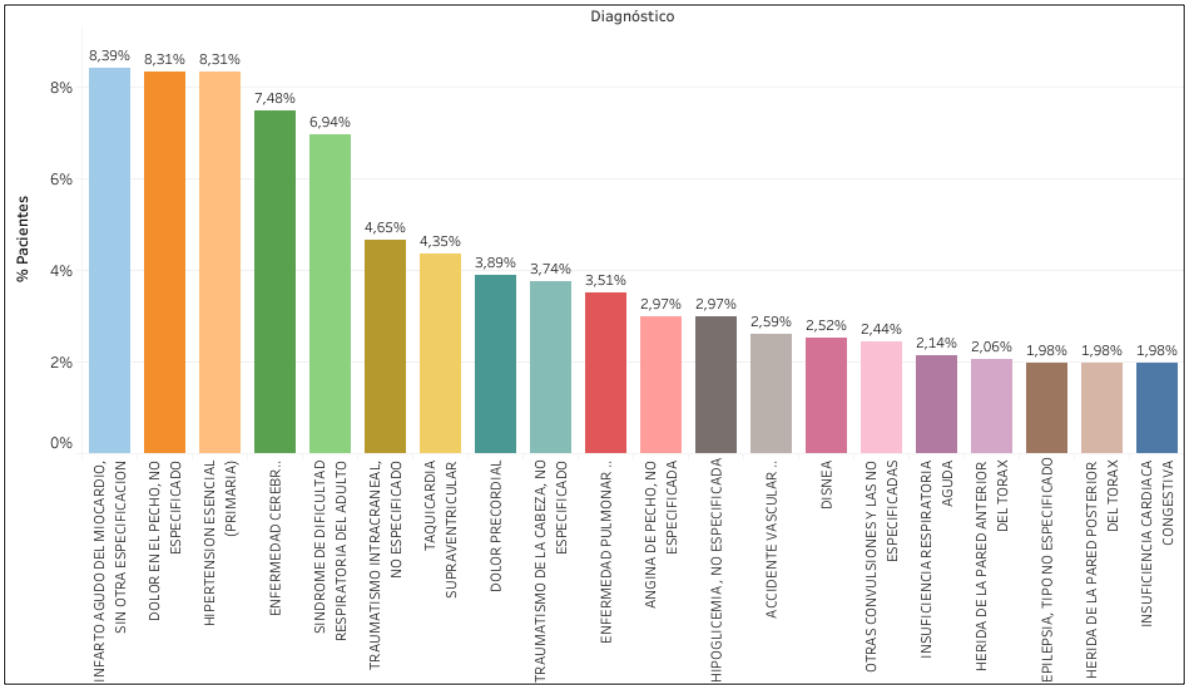


Figure 9. Most frequent diagnoses due to traffic accidents

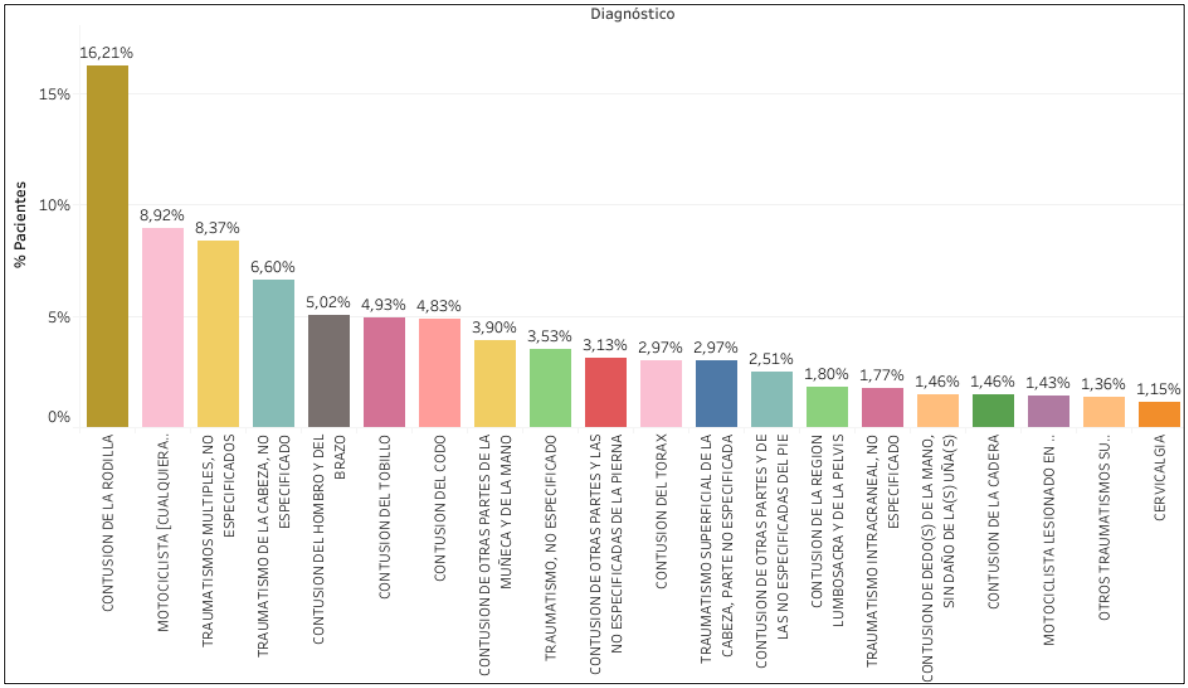
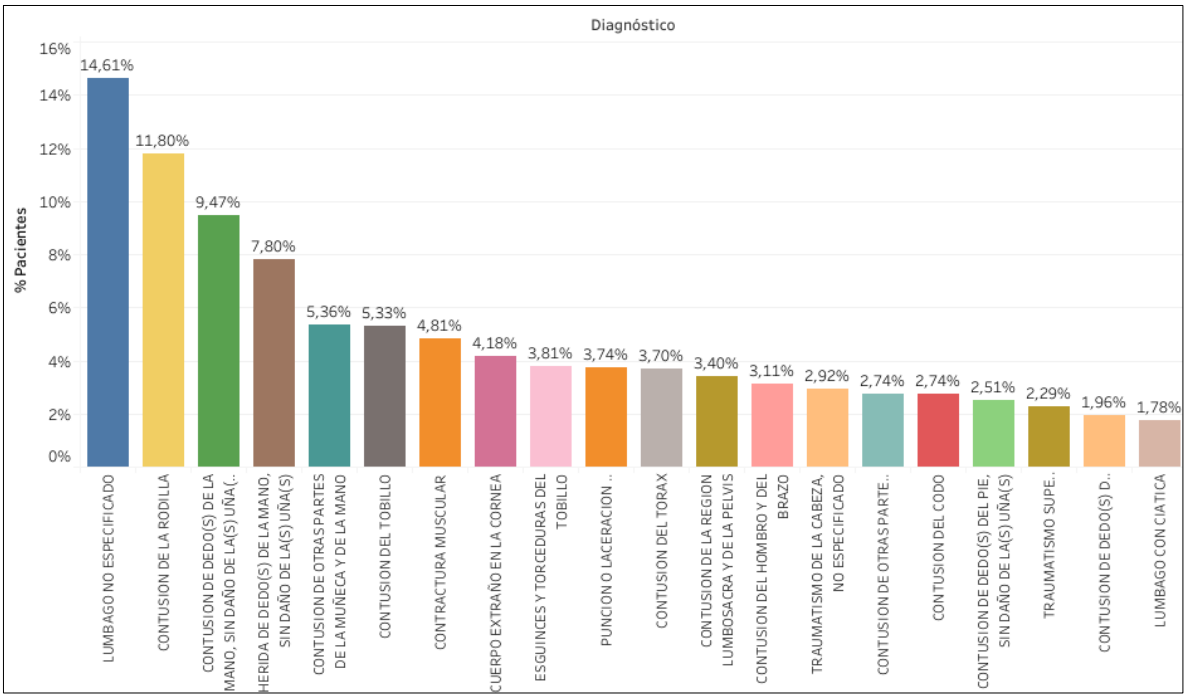


Figure 10. Most frequent diagnoses due to occupational accidents



Patients living in the Antonia Santos, Comuneros and Motilones neighborhoods, northwest of the city (Figure 1), their pathologies could have been treated in low complexity public ER's 10 or 12. Molano et al. (2016) Molano et al. mention that the reasons for the use of emergency services, in a large number of cases, could have been resolved at other levels of health care. Culture, social context and the model of care are factors that generate the inadequate use of ER's. In Medellín, level III ER's attended patients with respiratory problems and acute infections, which can be resolved at level I or II. (Valencia-Sierra et al., 2007). In Ecuador and Italy, ER's presented demands that should be handled by the primary care units of the user's place of residence, and that the ER physician should handle. (Garcia, 2018; Leo et al.,

2016). and that the ER physician should insist to patients on the importance of prior and subsequent care by primary care. (Rivas-Clemente et al., 2019).

***Defined behavior*.** Patients in ER 5 and 6 were defined as observation room stay (76.3 % and 70 %), outpatient management (14.6 % and 28.7 %) and hospitalization (9 % and 1.2 %), respectively.

Method of arrival. In ER's 1, 5 and 6, 1%, 2.7% and 13.7% of the total number of patients attended arrived by ambulance, respectively; the other patients arrived by their own means. ER 6 is the one that most commonly attends patients who are victims of traffic accidents, who are the ones who generally arrive by ambulance. Most institutions do not record how patients arrive.

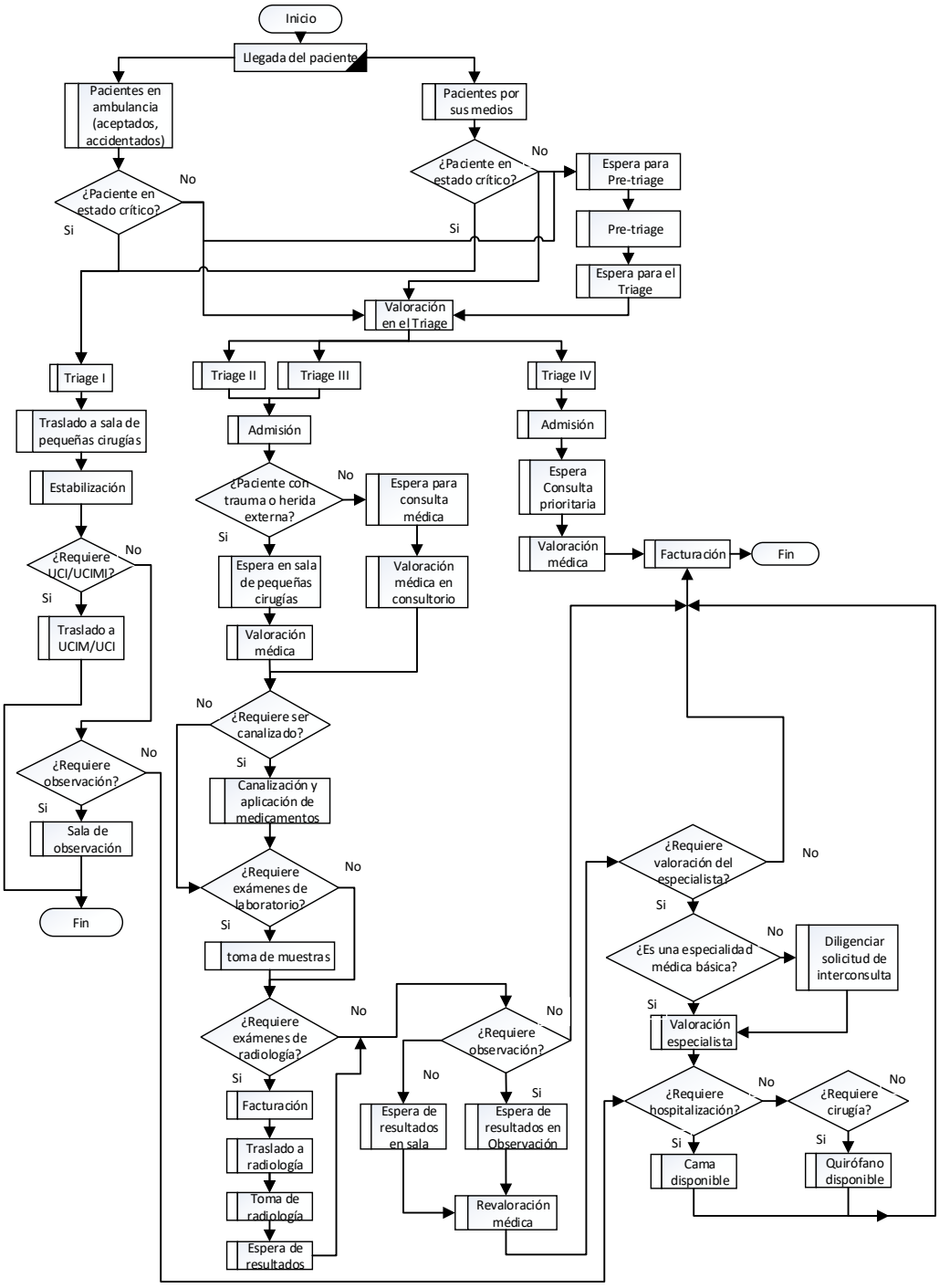
***Nationality*.** Regarding patients of Venezuelan nationality, the high complexity public ER attended 1,933 adults and those of low complexity 2,831 of all ages, during 2017, whose monthly demands increased from 0.1 % and 1.3 % in January to 11.6 % and 5 % in December, respectively, registering the highest attention of foreign patients between (03/2017 - 05/2018), in Norte de Santander (MSPS, 2017) which collapsed the capacity by 200 % in the high complexity ER. (HUEM, 2019). Similar situation occurred in Italy in the face of the increase of often illegal immigrants. (Leo et al., 2016).

4.3. Standard ER patient care process.

Based on observation, unstructured interviews with ER coordinators and feedback received, Figure 10 shows the flow of the standard process followed by patients within the ER's. In the high complexity private ER's, the care process is similar to that developed in public hospital 5 (Figure 10), except that in ER's 1 and 6, patients arriving are registered in the computer system with their personal data (admission) and the reason for consultation, and are then evaluated in triage. ER's 2 and 5 register the patient in the system (admission) after the triage assessment, i.e., when the patient arrives at the ER an auxiliary nurse registers him/her in a form with the reason for consultation (Pre Triage). Another difference is that in private institutions, triage IV and V patients are sent to priority and outpatient consultation, respectively.

In low complexity ER's, the process is similar to that developed by high complexity private ER's 1 and 6, and to that described in Figure 10. If the patient presents a critical clinical condition or requires a highly complex diagnostic examination or assessment by a specialist, he/she is referred to a high complexity ER according to the patient's emergency care network, with respect to his/her insurance company. Even so, with the minor differences identified in the first stages of the care process and in the complexity of the diagnostic tests performed, it can be defined that this process (Figure 10) is a standard that could be generalized to all ER's of different levels of complexity in the city under study and in Colombia. The following is a description of the care process.

Figure 10. Flow of the process of care in the ER



Description of the process. The process begins with the arrival of patients to the system who are distributed as follows: 1) Critical patients (triage I), who go directly to the minor surgery room to receive immediate attention by a general practitioner; 2) Triage II patients who go directly to the triage consultation; and 3) Triage III and IV patients who must go through pre-triage before the triage consultation. Prior to medical consultation in the general practice or small surgery room (patients with trauma, fractures and wounds), triage II and III patients gather in a queue for the first or second medical attention. After the patient's first medical visit, he/she may require diagnostic tests that are taken in the ancillary room and/or radiology, or discharge from the emergency system. If the patient has had samples taken for laboratory analysis, he/she waits in the external room for the second visit in the medical office

(revaluation). If the patient was referred, samples were taken and/or medication was administered, the patient must wait for the revaluation in the observation room. After the second medical consultation, patients may be directed to wait for consultation with a specialist or exit the system.

***Priorities in care*.** There are two criteria for establishing priorities: first, the level of severity and, second, the insurer to which the patient is affiliated. For the first criterion, in the triage stage, the head nurse (in high complexity) or the general practitioner (in low complexity), defines the priority of care for patients according to their reason for consultation. In the medical consultation and re-evaluation stages, the physician prioritizes care according to the triage and the reason for consultation. If the patient presents a critical clinical condition and requires an urgent diagnostic examination, the physician authorizes its performance without waiting for authorization from the patient's EPS.

Regarding the second criterion, which applies to IPS's that have an agreement with insurers in prepaid medicine, ER 1 and 6 have a medical office assigned exclusively to attend these patients. The EPS's of the contributory and subsidized systems that have debts with private IPS's only attend critical patients, so most patients whose emergency care network is blocked due to lack of payment go to the high complexity public hospital where they are generally attended.

5. Discussion

5.1. Timeliness of medical care in the ER

Figures 11 and 12 show the average waiting times to receive medical attention for triage II and III patients, respectively. Figure 11 shows that in ER's 2 and 5, the average waiting time at various times of the day exceeds the 30 minutes regulated in resolution 5596 of 2015 (MSPS, 2015). The median waiting time with its interquartile range (IQR) is a measure of central tendency suitable for statistical analysis, due to the high variation of the average waiting times (Table 5).

Figure 11. Average waiting time per hour in high complexity - patient triage II

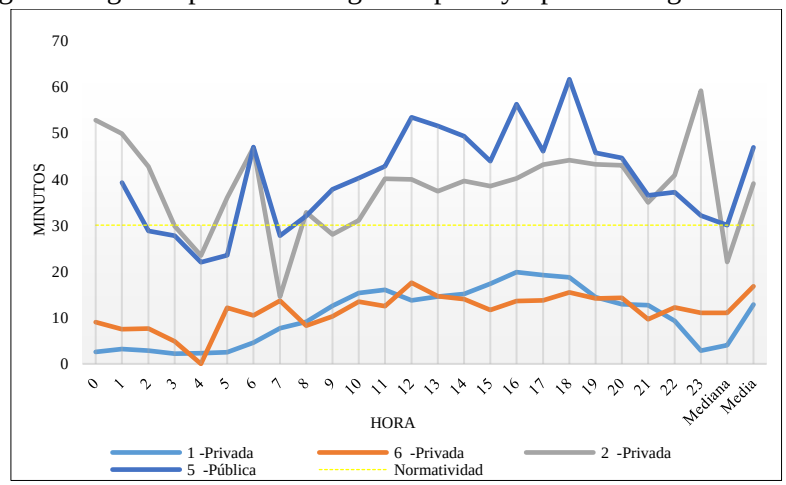


Figure 12. Average waiting time per hour in high complexity - triage patient III

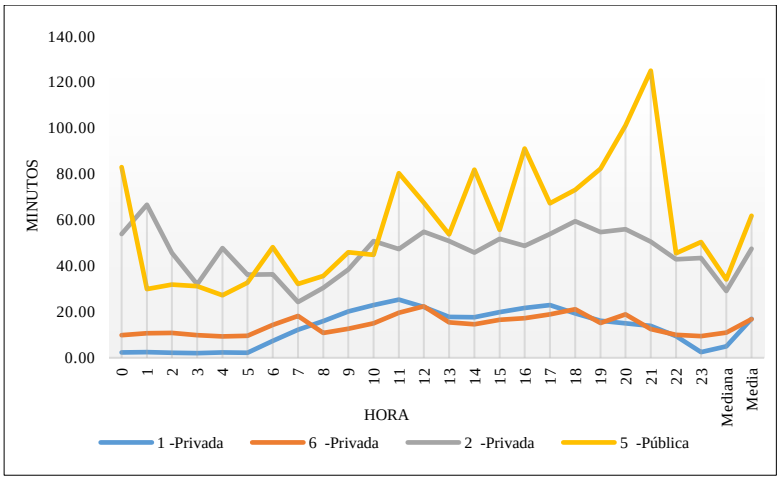


Table 5 shows that EDs 1 and 6 had the highest coverage of triage II and III patients attended, with waiting times of less than 30 minutes, and patients insured with prepaid medicine had shorter waiting times (average, median, RIC) than patients from all insurance companies. Likewise, these EDs defined conduct to a higher percentage of patients in less than 6 hours, who were transferred to other areas of the hospital or were indicated for outpatient management of the clinical condition.

In a different way, ED 5 presented the highest results of a stay longer than 24 hours. In low complexity there are also long stays in the ED, because some EPS do not authorize in time the performance of diagnostic tests, surgeries, hospitalization or referral to a higher level of complexity, therefore, patients must remain in the observation room, hindering the access of new patients and generating overcrowding. Ceballos-Acevedo et al. (2014) conclude that the main failures of the health system that affect the length of stay are the difficulty in referring patients to another level of complexity, and the delay in authorizations by the EPS.

Table 5. Timeliness of care in high complexity - triage II and III patients

Complexity		High		
Legal nature		Private		Public
Level of care	IV	III	III	III
Identification Map	1			5
Waiting times - patient triage II - All insurers				
Mean (SD) (min)	12,8 (20,7)	16,8 (19,4)	38,9 (75)	46 (44,8)
Median (RIC) (min)	3,7 (1,4 - 14,8)	11 (5 - 21)	22 (11 - 42)	30 (18 - 51)
Waiting times - triage II patient - Asegurador Medicina Prepagada				
Mean (SD) (min)	4,1 (9,4)	15,9 (17,3)	-	-
Median (RIC) (min)	2 (1 - 3,5)	11 (5 - 20)	-	-
Waiting time ranges for medical attention - triage II patient (%)				
< 30 min	86	86,9	62,1	49,9
30 - 59 min	9,5	10,5	21,2	31,5
1 - 2 h		1,8	11,3	14,7
2 - 3 h	0,4	0,1	2,3	2,9
3 - 4 h	0,03	-	0,5	0,6
4 - 6 h	-	0,06	0,6	0,3
> 6 h	-	0,6	1,9	0,2
Ranges length of stay - triage II patient (%)				
< 6 h	74,2	68,7	-	27,6
6 - 12 h		7,9	-	12,9
12 - 24 h	8,7	6,1	-	6,0
> 24 h	4,1	17,3	-	53,5
Median (RIC) (h)	3,5 (1,3 - 9,7)	2,5 (1,3 - 9,7)	-	33,3 (5,4 - 178,5)
Waiting times - patient triage III - All insurers				
Mean (SD) (min)	17 (25,2)	16,8 (64,2)	47,4 (133,2)	61,8
Median (RIC) (min)	5,4 (1,7 - 22,9)	11 (5 - 21)	29,15 (15,1 - 55)	34,1(19,7 - 59,8)
Waiting times - patient triage III - Asegurador Medicina Prepagada				

Mean (SD) (min)	5 (12,34)	16,1 (15,4)	-	-
Median (RIC) (min)	2,2 (1,4 - 3,9)	11 (5 - 21)	-	-
Waiting time ranges for medical attention - triage III patient (%)				
< 30 min	80,7	86,8	50,4	44,1
30 - 59 min	12,6	10,7	26,5	30,9
1 - 2 h	5,9	1,7	16,4	18,2
2 - 3 h	0,7	0,2	3,6	4,5
3 - 4 h	0,1	0,1	1	1,2
4 - 6 h	-	-	0,5	0,7
> 6 h	-	0,5	1,5	0,4
Ranges length of stay - triage III patient (%)				
< 6 h	82,6	71,7	-	47,8
6 - 12 h	8,7	10,1	-	14,3
12 - 24 h	5,5	8,0	-	4,0
> 24 h	3,3	10,2	-	33,9
Median (RIC) (h)	2,8 (1,7 - 4,7)	2,4 (1,3 - 7)	-	6,5 (3 - 70,9)
Ranges length of stay - triage I patient (%)				
< 6 h			-	11,3
6 - 12 h	25,7	12,9	-	9,3
12 - 24 h	13,7	12,9	-	7,1
> 24 h	5,7	45,2	-	72,4
Median (RIC) (h)	5,2 (2,7 - 9,8)	15 (4,4 - 51)	-	90,6 (18,5 - 238)

5.1. Health insurance companies

Table 6 shows that ER 6 has not established agreements with EPS of the contributory and subsidized regimes; most of the patients seen are from private insurers, victims of occupational and traffic accidents, special regimes, individuals and prepaid medicine. While ER 5 has attended patients from 233 different insurance entities, including the contributory and subsidized regimes, and the foreign population, most of whom are Venezuelan immigrants. It can also be seen that ER's 1 and 2 have used most of their capacity to attend patients from one insurance company. Table 7 shows that the low complexity public ER's have attended patients from the subsidized regime, the uninsured poor population and the foreign population, mostly Venezuelans.

Table 6. Insurance entities of patients treated in high complexity

Legal nature	Private						Public	
Level of care	IV		III		III		III	
Identification Map	1		6		2		5	
INSURANCE	New EPS S.A.	72,90%	Insurers	32,07%	Coomeva EPS S.A.	62,86%	IDSNS	13,65%
	PONAL of Cucuta	14,58%	ARL	22,06%	Medimas EPS S.A.S.	12,52%	Medimas EPS-S SAS	9,29%
	EPS Sanitas S.A.	5,92%	SOAT	13,68%	New EPS S.A.	9,21%	Cafesalud EPS S.A.	9,03%
	Comfaoriente EPS-S	0,69%	Prepaid Medicine	11,52%	Cooperativa Solidaria de Salud y Desarrollo Integral	4,83%	IDSNS foreign population	6,17%
	Seguros del estado S.A.	0,61%	Ecopetrol Employee	10,00%	Comfaoriente EPS-S	3,79%	Comfaoriente EPS-S	5,76%
	Colsanitas S.A.	0,53%	Individuals	8,67%	Coosalud EPS S.A.	2,47%	New EPS-S S.A	5,56%
Total, patients	93,39%		98%		95,68%		49,45%	
Number of entities served	60		10		38		233	

Table 7. Insurance entities of patients treated in low complexity

Health Insurance Company	Identification Map				
Comfaoriente EPS-S	17,72%	17,25%	14,74%	16,60%	16,33%
Cafesalud EPS-S	12,30%	14,07%	15,22%	14,37%	12,57%
Saludvida EPS-S	15,06%	11,90%	11,71%	11,40%	12,76%
Coosalud EPS-S	14,60%	11,95%	13,03%	9,78%	11,02%
Medimas EPS-S S.A.S	8,40%	9,47%	10,12%	8,54%	9,42%

Secretary of Health of Cucuta	8,07%	8,56%	10,31%	9,52%	9,24%
Total patients	76,14%	73,20%	75,13%	70,21%	71,35%
Number of entities served	51	64	55	77	67

6. Conclusions

Based on the characterization, the following strategic, tactical and operational decisions are proposed: investment in new EDs and/or expansion of installed capacity; planning and scheduling of medical and care personnel; physician training program; investment in computer systems; programs to reduce waiting and stay times; analysis and improvement of the care process; and the implementation of indicators to measure ED congestion, for example, NEDOCS (National Emergency Department Overcrowding Study). In addition, the mayor's office should include in its government program, investment in health institutions in peripheral sectors of the city.

As a future study, it is proposed to design a methodology for measuring, evaluating and improving the performance of emergency room services based on the indicators used in this characterization.

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Appendix A. An example appendix

Authors including an appendix section should do so after References section. Multiple appendices should all have headings in the style used above. They will automatically be ordered A, B, C etc.

A.1. Example of a sub-heading within an appendix

There is also the option to include a subheading within the Appendix if you wish.

Makalenin Türkçe başlığı buraya yazılır….

Özet

Türkçe özet.

Anahtar sözcükler: anahtar sözcükler1; anahtar sözcükler2; anahtar sözcükler3