

DOI [10.35630/2023/13/2.404](https://doi.org/10.35630/2023/13/2.404)

Received 25 March 2023;
Accepted 19 April 2023;
Published 25 April 2023

TREATMENT AND DIAGNOSTIC ERRORS MADE BY EMERGENCY MEDICAL SERVICES PERSONNEL DURING HOSPITALIZATION OF PATIENTS

Evgeniy Barinov^{1,2} , **Andrey Barinov¹** ,
Svetlana Voyevodina¹ , **Sergey Dzhuvalyakov²** ,
Inna Osipova¹, **Ruslan Kalinin^{1,2}** ,
Olga Romanova^{2,3}  

¹ A.I.Yevdokimov Moscow State University of Medicine and Dentistry, Moscow;

² RUDN University, Moscow;

³ A.P.Avtsyn Research Institute of Human Morphology, Moscow, Russia



[download article \(pdf\)](#)

 olgpharm@yandex.ru

ABSTRACT

The aim of the study is to analyze treatment and diagnostic errors made by emergency medical services personnel during hospitalization of patients.

Materials and Methods: The analysis was made based on 412 report sheets to run sheets, taken at one EMS substation for one month. The sample included only report sheets for orders carried out by EMS fieldshers. Analyzed materials showed that 42 report sheets contain defects in filling out the documentation: for example, 3 of them did not indicate a referral diagnosis of the EMS team, and 39 – final diagnosis of the hospital, and, therefore, they cannot be included in the statistical data. Analysis of the remaining 370 report sheets showed that in 60 cases there was an overdiagnosis of the disease, and in 31 cases the diagnosis was incorrect.

Conclusion: From the analyzed materials, it is possible to identify the main treatment and diagnostic errors in the work of the EMS in cases of patient hospitalization: Incorrect tactics of managing patients at the prehospital stage due to overestimation/underestimation of symptoms, non-core hospitalization or hospitalization in a non-core hospital due to overestimation/underestimation of symptoms; replacement of a nosological unit with its symptoms or complications.

Keywords: emergency medical services, defect in the provision of medical services, prehospital stage

BACKGROUND

Nowadays, stories about harm to the health of patients gain the most popularity in the media – doctors are accused of untimely or incorrect medical manipulations or absence of such. This gives rise to numerous lawsuits against medical professionals, private and public clinics, making one think that medical services are not always provided by qualified specialists.

However, publication of the details of civil proceedings in the media, constant increase in the number of lawyers of the corresponding professional orientation and a number of other factors indicate the fact that in most cases a high number of lawsuits against medical organizations is not always an indicator of their poor

performance.

Emergency medical services (EMS) units, along with outpatient units, perform the largest volume of medical services for the population, which is related to the nature of its work and the tasks assigned thereto, the primary of which is the provision of emergency medical services at the prehospital stage.

Provision of emergency medical services is characterized primarily by:

- lack of time required for treatment and diagnostic manipulations;
- diagnostic uncertainty under severe time constraints, which requires to start the provision of services to a patient without a reliably verified diagnosis;
- transience of most emergency conditions and high risk of complications;
- change of diagnosis in the first hours after the patient's admission to the hospital after conducting examinations that are not available at the prehospital stage;

Therewith, in the work of EMS teams, unfortunately, there are various kinds of errors and defects that lead to adverse consequences [1-4].

In literature, there are various definitions of defects in the provision of medical services. According to Tomilin V.V. and Sosedko Iu.I., defect in the provision of medical services means an improper performance by a medical specialist of his/her professional duties, which led to incorrect diagnosis, treatment of patient and led to an adverse outcome [5]. Stetsenko S.G. provides the following definition of defect – improper diagnosis, treatment, rehabilitation of patient, organization of medical services, which led or could lead to an adverse outcome of medical intervention. Semkin L.B., Filatov V.V. and Gulyaev V.A. define defect in the provision of medical services as poor-quality provision of medical services with errors in the diagnosis and treatment of a patient or an omission in the organization of medical services which had or could have a negative impact on the treatment process and the patient's health [6].

In our opinion, defect in the provision of medical services at the prehospital stage means a violation of the treatment and diagnostic process and the organizational and technical measures, expressed in failure to comply with the established regulations, rules, customs and traditions of business conduct adopted in medical practice, non-compliance with medical procedures, clinical protocols and recommendations, or the results of implementation thereof, whether or not resulting in harm to the patient.

In 1999, I.V. Timofeev proposed a classification of defects at the prehospital stage of the provision of medical services, which includes not only a list of defects, but also reasons causing them.

1. CLASSIFICATION OF DEFECTS AT THE PREHOSPITAL STAGE

Defects in the provision of medical services:

- failure to perform emergency medical services (including resuscitation);
- delayed performance of emergency medical services (including resuscitation);
- improper performance of emergency medical services (including resuscitation);
- late referral to inpatient treatment;
- improper (unreasonable) transportation of patients;
- other defects in the provision of medical services.

Defects in evacuation:

- unreasonable leaving of patients (wounded, injured) at the scene of the incident when there are signs of a disease present;
- early (not indicated) evacuation of patients (wounded, injured);
- late evacuation (delivery) of patients (wounded, injured) to the stage of the provision of qualified and specialized medical services;
- evacuation for other purposes.

Defects in diagnosis:

- underlying disease (injury, damage) is not identified;
- combined nature of a disease (competing diseases, comorbidities, background injuries, damages) was not identified;
- leading (in the case of lethal outcome – fatal) complication was not identified;

- late diagnosis of the underlying disease (wound, injury);
- late diagnosis of the leading (in the case of lethal outcome – fatal) complication;
- incorrect diagnosis (underestimation of severity) of the condition of patients (wounded, injured);
- other defects in diagnostics.

Defects in treatment:

- untimely (not fully implemented) outpatient treatment;
- incorrect prescription of drugs, other treatment methods;
- other defects in treatment.

Other defects at the prehospital stage:

- improper maintenance of medical records;
- defects in medical examination;
- other defects.

2. CAUSES OF DEFECTS

1. Inattentive attitude towards patients;
2. Violation of deontological principles in relations with patients (and their relatives);
3. Insufficient qualification of a medical specialist:
 - low level of clinical thinking of a doctor;
 - inability to logically comprehend the revealed data;
 - inability to formulate correct diagnosis based on clinical data;
 - insufficient level of professional (special) training, including little clinical experience and lack of knowledge of the possible consequences of specific methods of diagnostics and treatment;
4. Late seeking of medical attention;
5. Shortcomings in the organization of preventive, diagnostic and treatment measures;
6. Objective difficulties in the performance of treatment and preventive measures;
7. Other causes of defects in the provision of medical services.

Based on literature, the most common defects occur during the provision of emergency medical services (53.2%). Therewith, the number of defects in the performance of professional duties by EMS doctors is quite large. The most common diagnostic defects are expressed in incomplete and insufficient examination of patients [7].

Such a large number of defects arises due to the fact that the provision of medical services at the prehospital stage causes certain difficulties, primarily related to objective difficulties in diagnosing patient's disease, establishing a diagnosis, and, as a result, choosing the right treatment tactics. This is due to the following factors:

1. Limited scope of diagnostic examinations. Usually, only such diagnostic methods as glucometry, ECG and pulse oximetry are available to an EMS specialist, which are sometimes carried out under difficult conditions (interior of an EMS vehicle, public places, etc.), which significantly complicates the diagnosis.
2. Limited call time. In Moscow, based on internal order, the time the team is on call does not exceed 20 minutes, during which the team is required to carry out not only diagnostic, but also treatment measures. There is also a time standard for medical evacuation of patients with acute infarctions and strokes to the hospital within 72 minutes from the moment the call was received at the station (previously – from the moment the team arrived at the call site).
3. Work of EMS specialists alone due to a shortage of personnel. Despite the fact that, in accordance with the Procedure for the Provision of Emergency, Including Emergency Specialized, Medical Services, approved by Order of the Ministry of Health of Russia dated June 20, 2013 No. 388H, general feldsher and general physician teams should have at least two medical specialists. However, usually, this requirement is not met due to the high turnover and shortage of personnel, mobile teams are not properly staffed, and EMS teams usually have only one medical specialist. Such circumstances significantly complicate the provision of medical services by EMS personnel, especially in emergency situations.

4. Frequent conflicts with patients. In a number of cases, when an EMS team is called, patients and their relatives, being in an extremely excited emotional state, present certain requirements to the EMS personnel, for example, unconditional hospitalization, including unreasonable one. Often, in order to minimize conflict, medical specialists comply with such requirements, including in coordination with higher management. In such cases, in run sheets, a referral diagnosis is made in a probabilistic form ("in question"), which often does not correspond to the objective picture, is unmotivated and unreasonable. Such referral diagnoses of EMS teams, being the cause of conflicts with medical specialist of the emergency department of hospitals, ultimately do not correspond to the final diagnosis established in the hospital, thereby there is a discrepancy in diagnoses, which indicates violations and errors in the diagnostics of patient's disease at the prehospital stage.

Indicator of discrepancy between EMS team and hospital diagnoses characterizes the level of diagnostics and continuity in the work of EMS teams and hospitals. The indicator is calculated by the following formula (%):

$$\text{Discrepancy between EMS team and hospital diagnoses} = \frac{\text{Number of cases of discrepancy between EMS team and hospital diagnoses}}{\text{Total number of hospitalized patients from among those delivered by the EMS teams to hospitals}} \times 100.$$

The recommended indicator is not more than 5%.

The aim of the study is to analyze treatment and diagnostic errors made by emergency medical services personnel during hospitalization of patients.

MATERIALS AND METHODS

The analysis was based on 412 report sheets to run sheets, taken at one EMS substation for one month. The sample included only report sheets for orders carried out by EMS feldshers.

It was detected that 42 report sheets contain defects in filling out the documentation. For example, 3 of them did not indicate a referral diagnosis of the EMS team, and 39 – final diagnosis of the hospital, and, therefore, they cannot be included in the statistical data.

Analysis of the remaining 370 report sheets showed that in 60 cases there was an overdiagnosis of the disease and in 31 cases – diagnosis was not correct.

Table 1. General results of in-house study

Concurrence of diagnosis		Incorrect diagnosis		Overdiagnosis		Defects in filling out report sheet	
Number of cases	% of cases	Number of cases	% of cases	Number of cases	% of cases	Number of cases	% of cases
279	68	31	7	60	15	42	10
Total: 412 cases of patient hospitalization in Moscow hospitals							

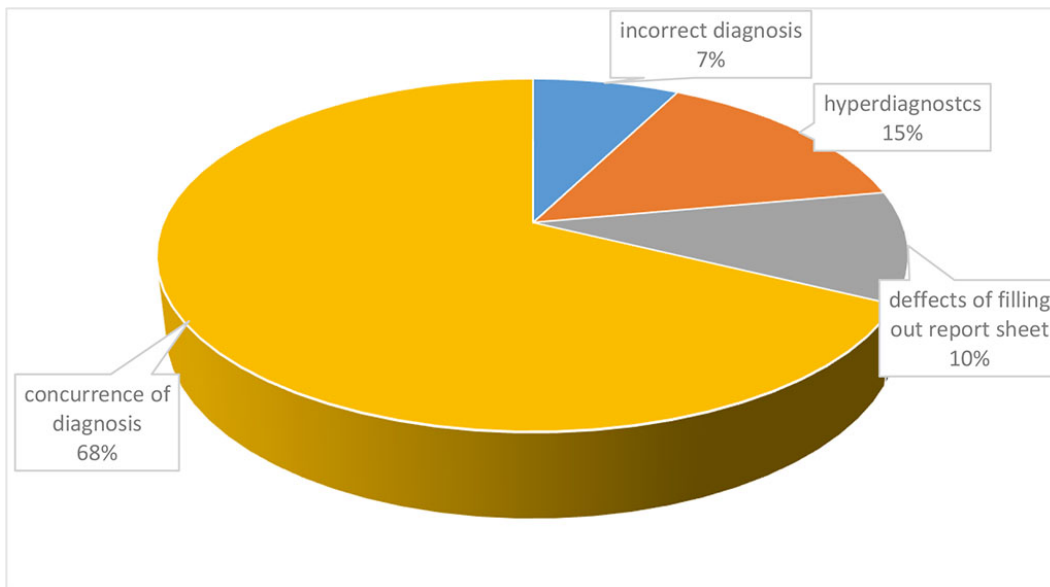


Diagram 1. General results of in-house study

If we consider the frequency of incorrect clinical diagnosis of individual nosological entity, then, as a result, we get the following data presented in Table 2.

Table 2. Incorrect referral diagnosis of EMS teams for individual nosologies

Referral diagnosis	Final diagnosis
Otorhinolaryngology: total – 1 ➤ foreign body in airways	• foreign body in GIT
Surgery: total – 11, including ➤ acute pancreatitis ➤ acute appendicitis ➤ acute cholecystitis ➤ intestinal obstruction ➤ gastrointestinal bleeding ➤ pneumothorax	• intestinal obstruction • hydronephrosis • renal colic ovarian apoplexy • ovarian cyst rupture • perforated stomach ulcer • pneumonia • umbilical hernia • renal colic • nose bleed • pneumonia
Emergency cardiology: total – 2, including ➤ unstable angina ➤ pulmonary embolism	• pneumonia • thrombophlebitis of the deep veins of the leg
Therapy: total – 4, including ➤ pneumonia	• acute pancreatitis • pyelonephritis • cirrhosis of the liver • rheumatic heart disease
Urology: total – 4, including ➤ pyelonephritis ➤ CRD	• acute gastritis • acute prostatitis • acute respiratory viral infection, myalgia • pyelonephritis
Neurology: total – 1 ➤ TIA	• CTBI. Cerebral contusion
Neurosurgery: total – 1 ➤ CTBI	• OTBI
Infectious diseases: total – 1 ➤ acute respiratory viral infection with meningism	• meningitis
Vascular surgery: total – 6, including ➤ thrombophlebitis ➤ thrombosis	• erysipelas • thrombosis (2 cases) • suppurated phlegmon • hematoma • mononeuropathy

The above data shows that the main treatment and diagnostic defects are:

1. Incorrect tactics of managing patients at the prehospital stage.
2. Hospitalization of patients in non-core hospitals.
3. Lengthening of the time required to make a correct clinical diagnosis and, as a result, delay in the provision of medical services to patients in a hospital. It is especially worth noting that doctors of admission departments of hospitals are primarily obliged to exclude the referral diagnosis of an EMS team.

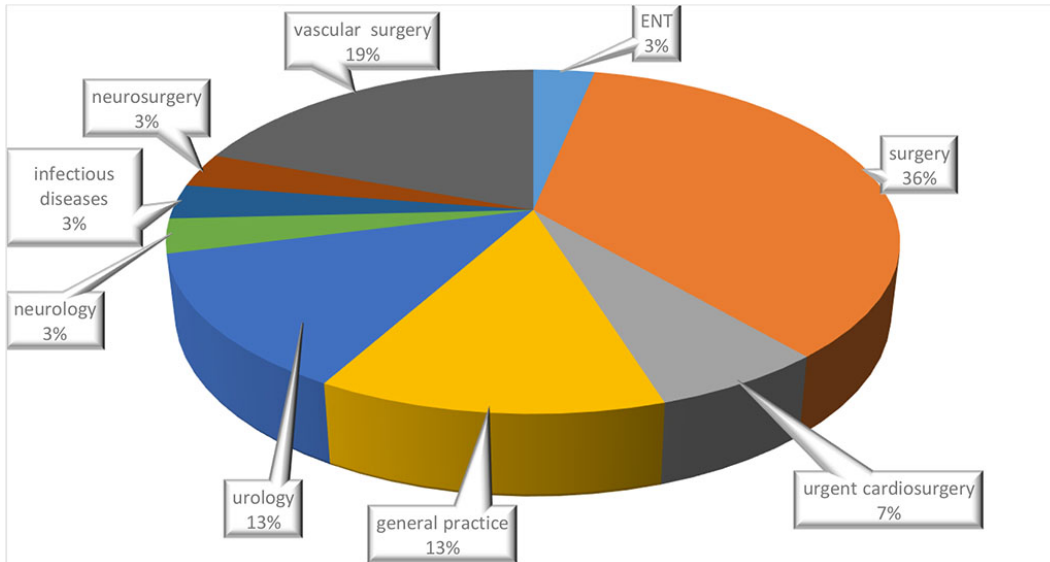


Diagram 2. Incorrect referral diagnosis of EMS teams for individual nosologies

Table 3. Overdiagnosis by EMS feldshers of certain nosologies

Referral diagnosis	Final diagnosis
Surgery: total – 33, including ➤ acute cholecystitis – 6 cases ➤ acute pancreatitis – 7 cases ➤ acute appendicitis – 20 cases	Functional bowel disorder
Purulent surgery: total – 1 ➤ Abscess of the anterior abdominal wall	• Infected suture wound
Traumatology: total – 2, including ➤ fracture ➤ subluxation	• luxation • muscle strain
Neurosurgery: total – 14 ➤ CTBI: concussion	• contusion of the soft tissues of the head
Neurology: total – 4, including ➤ NDV – 2 cases ➤ stroke, unspecified – 2 cases	Chronic cerebral ischemia. Dyscirculatory encephalopathy
Infectious diseases: total – 2, including ➤ tonsillitis ➤ meningitis	• pharyngitis • influenza
Therapy: total – 4 ➤ pneumonia	• acute respiratory viral infection

The above data shows that the main treatment and diagnostic defects are:

1. Incorrect tactics of managing patients at the prehospital stage.
2. Non-core hospitalization of patients (patients did not require hospitalization).

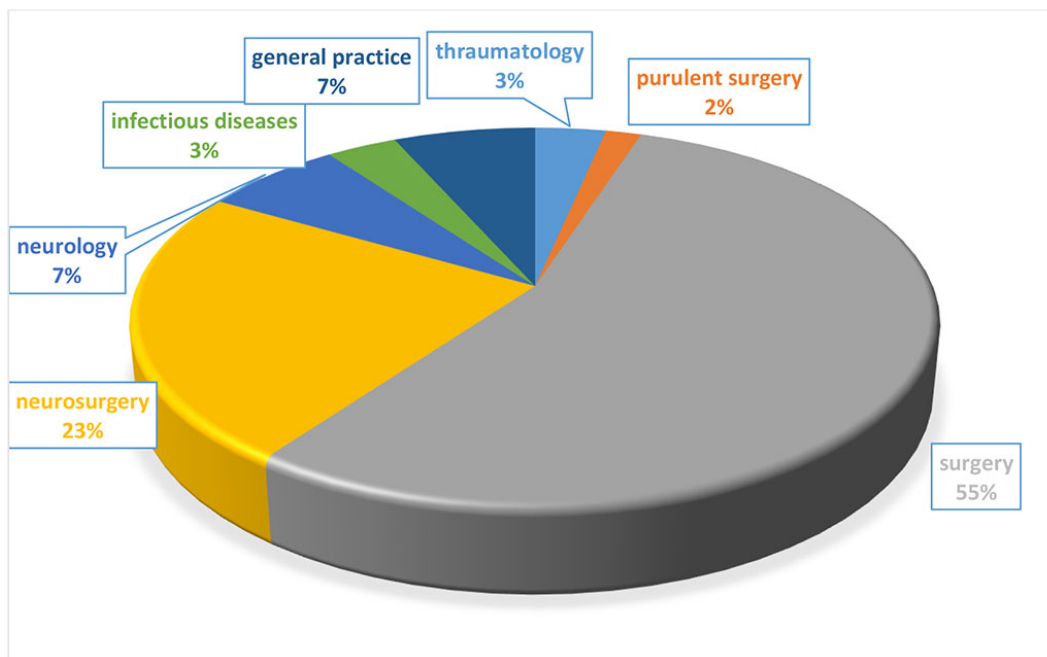


Diagram 3. Overdiagnosis by EMS fieldshers of certain nosologies.

CONCLUSION

From the analyzed materials, it is possible to identify the main treatment and diagnostic errors in the work of the EMS in cases of patient hospitalization.

- Incorrect tactics of managing patients at the prehospital stage due to overestimation/underestimation of symptoms;
- Non-core hospitalization or hospitalization in a non-core hospital due to overestimation/underestimation of symptoms;
- Replacement of a nosological unit with its symptoms or complications.

REFERENCES

1. Rodziewicz TL, Houseman B, Hipskind JE. Medical Error Reduction and Prevention. 2022 Dec 4. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. PMID: 29763131.
2. Battard J. Nonpunitive response to errors fosters a just culture. Nurs Manage. 2017 Jan;48(1):53-55. - PMID: 28033214 DOI: [10.1097/01.NUMA.0000511184.95547.b3](https://doi.org/10.1097/01.NUMA.0000511184.95547.b3)
3. Robertson JJ, Long B. Suffering in Silence: Medical Error and its Impact on Health Care Providers. J Emerg Med. 2018 Apr;54(4):402-409. PMID: 29366616 DOI: [10.1016/j.jemermed.2017.12.001](https://doi.org/10.1016/j.jemermed.2017.12.001)
4. Hines S, Kynoch K, Khalil H. Effectiveness of interventions to prevent medication errors: an umbrella systematic review protocol. JBI Database System Rev Implement Rep. 2018 Feb;16(2):291-296. PMID: 29419613 DOI: [10.11124/JBISRIR-2017-003481](https://doi.org/10.11124/JBISRIR-2017-003481)
5. Tomilin V.V., Sosedko Yu.I. Substantiation of the basic concepts of defects in the provision of medical care. Sudebno-mrditsinskaya expertiza (Forensic medical examination). 2000; 6: 4-8 [In Russ.]
6. Guliaev VA, Filatov VV, Semkin LB. Methodological basis for analysis of shortcomings in rendering medical care. Voen Med Zh. 2001;322(4):15-20. Russian. PMID: 11547659 [In Russ.]
7. Tyagunov D.V., Samoilichenko A.N. Characteristics of defects in the provision of medical care based on materials of commission forensic medical examinations Meditsinskoye pravo (Medical law). 2008;4: 26-29 [In Russ.]

