

## ***Pre-hospital medical emergencies services activity during COVID-19 lockdown in an urban setting, in Greece: focused cases***

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### **ABSTRACT**

**Pre-hospital medical emergencies services activity during COVID-19 lockdown in an urban setting, in Greece: focused cases.**

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COVID-19 pandemic has created an unprecedented citation for the healthcare system; such that its effects are now started to become obvious. The main aim of this report is to describe the time trends of utilization of prehospital emergency medical system in a region of northern Greece from first confirmed case of the COVID-19 in the country, at 26/02/2020, till the first order for loosing lockdown at 04/05/2020. Use of data retrospectively collected for PEMS usage, in the regional unit of Thessaloniki, Northern Greece 26/02/2020, till the first order for loosing lockdown at 04/05/2020. The area of interest represents a little more than 10% of the total population of Greece. Daily cases of selected categories (suicides, assaults, animal bites, cardiac arrests, and car accidents) were recorded. Comparison with the daily cases in the previous 2 years (2019,2018), for the same period was performed. Comparison of suicides reveals larger daily case for 2020 in regard to both 2019 (p=0.049) and to 2018 (p=0.000438); while this was not the case in assaults (p=0.09 and 0.103 respectively) and animal bites cases (p = 0.38 and 0.101 respectively). Yet, for the later, the net number of animal bites cases was larger during the lockdown. Cardiac arrests were more in comparison with the previous 2 years (2019:p=1.88 x 10<sup>-5</sup>, 2018:p=7.12 x10<sup>-5</sup>); and , as expected, the opposite was valid for card accidents : they were more in 2018 that the same period of 2019

(p=1.03x10<sup>-6</sup>) and 2020 (p= 2.53 x10<sup>-12</sup>). It seems that lockdown has affected daily cases of suicides, cardiac arrests more than the other categories under research. Net number of

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animal bites cases were also increased. Assaults cases seem to be unaffected during the lockdown period, although more careful interpretation is needed. Finally, car accidents, due to travel limitations, were fewer in the same period. However, larger studies are needed -especially from highly affected from the pandemic areas- to reach certain conclusions.

## INTRODUCTION

Prehospital emergency medical services (PEMS) play a vital role in responding to requests for assistance, triaging patients and providing emergency medical treatment and transport. After the outbreak of COVID-19 pandemic in December 2019<sup>1</sup>, PEMS systems worldwide, along with Emergency Departments and Intensive Care Units, faced tremendous pressure.

And while, the vital role of PEMS staff and all first responders during pandemic has drawn mainstream media coverage in a way rarely seen before, and has brought both the accomplishments and struggles of EMS providers and agencies under the public spotlight, data about the PEMS activity during that time are still limited<sup>2</sup>. As the pandemic is still in progress, the energy of all PEMS systems is focusing on handling the pandemic<sup>3-4</sup>. Moreover, the diversity of PEMS systems worldwide<sup>5</sup> and the variety in the effects of pandemic in every country may explain the lack of large datasets.

Even less is known about the effect of lockdown on PEMS activity.

The main aim of this report is to describe the time trends of utilization of PEMS in a region of northern Greece from first confirmed case

of the COVID -19 in the country, at 26/02/2020, till the first order for loosing lockdown at 04/05/2020.

## MATERIAL AND METHODS

### *Study design and population*

The study was based on data retrospectively extracted from National Center of Emergency Care (“EKAB”) Thessaloniki Department’s Archive Registry, from 26/02/2020 till 04/05/2020. The area of interest is the regional unit of Thessaloniki, which is located in northern Greece, has an area of 3.683 km<sup>2</sup> and the population changed from 1.057.852 in 2001 to 1.101.312 in 2011, representing a little more than 10% of the total population of Greece<sup>4</sup> (Figure 1).

### *Description of the Thessaloniki Department PEMS*

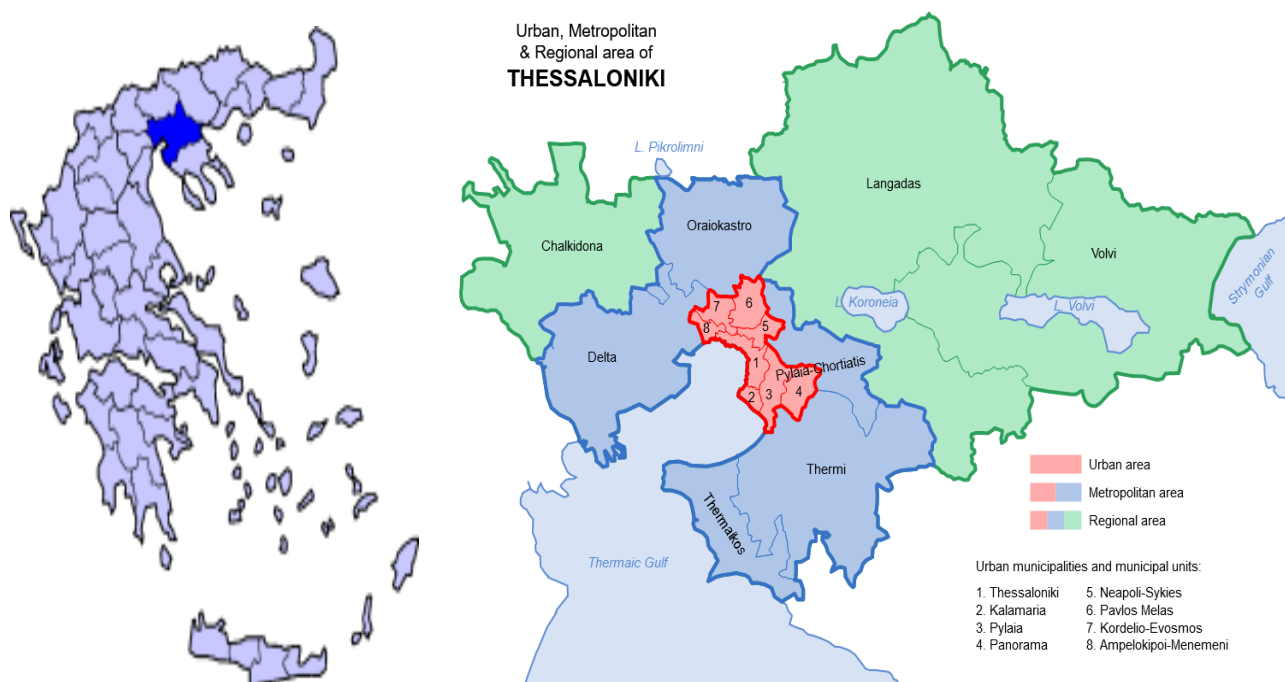
In the area of interest, the vast majority (>95%) of the emergency calls is served by the EKAB. The funding of EKAB is governmental and all citizens within the Greek territory (both EU and non-EU citizens) have equal access to its services. On the contrary, private medical centers, which are eligible to provide ambulance services, care only for selected cases.

Thessaloniki PEMS Department (TPEMS) includes a unique emergency call center (ECC), which receives about 31000-34000 calls per month. There is also a physician –manned emergency resuscitation vehicles (Mobile Intensive Care Units-MICU) available 24/7, while a second MICU is deployed only for 5 days/week. All ambulances' staff is EMTs, motorcycles' staff is EMTs with paramedic training and ECC staff is EMTs with additional dispatching training<sup>6-7</sup>.

In the area of interest seven hospitals out of eight accept emergencies. Yet, the system is organized in a manner that only one or two can accept 24hourly emergencies each day (e.g hospitals A, C in Monday, D in Thursday, H

and F in Wednesday.).There is also a military hospital that accepts selected emergencies (mainly military, police, coast guard, fire departments staff and their families). No hospital serves purely as Trauma center; and there are not all the medical specialties available in all hospitals. During the pandemic, one central university hospital was assigned as reference center, all hospitals were asked to assign extra beds for suspected and confirmed COVID-19 cases , and 5 out 7 hospitals assigned dedicated ICU – both from existing and deploying new-beds (in total 60 ICU beds) for possible critical ill COVID -19 patients.

**Figure 1.** Area of interest of the study: right –relational position, left –urban and regional map.



### Variables and statistical analysis

Selected types of cases: suicides, violence (assaults), animal bites cases, cardiac arrests and car accidents were recorded. Records for the same type of cases were selected for the same periods of 2019 and 2018 also. Descriptive presentation and comparisons were performed for every type. We assumed independency for all, even if it was not possible to guarantee this assumption because working on an anonymized database. Patients could have used PEMS more than once. However, we hypothesized that, due to the low frequency of these situations among the large number of cases included, this had a negligible

impact on the results. Moreover, cross examination of the data with the course of the pandemic in the country, as presented for the official data were performed<sup>8</sup>. All analyses were performed with Microsoft Excel 2020.

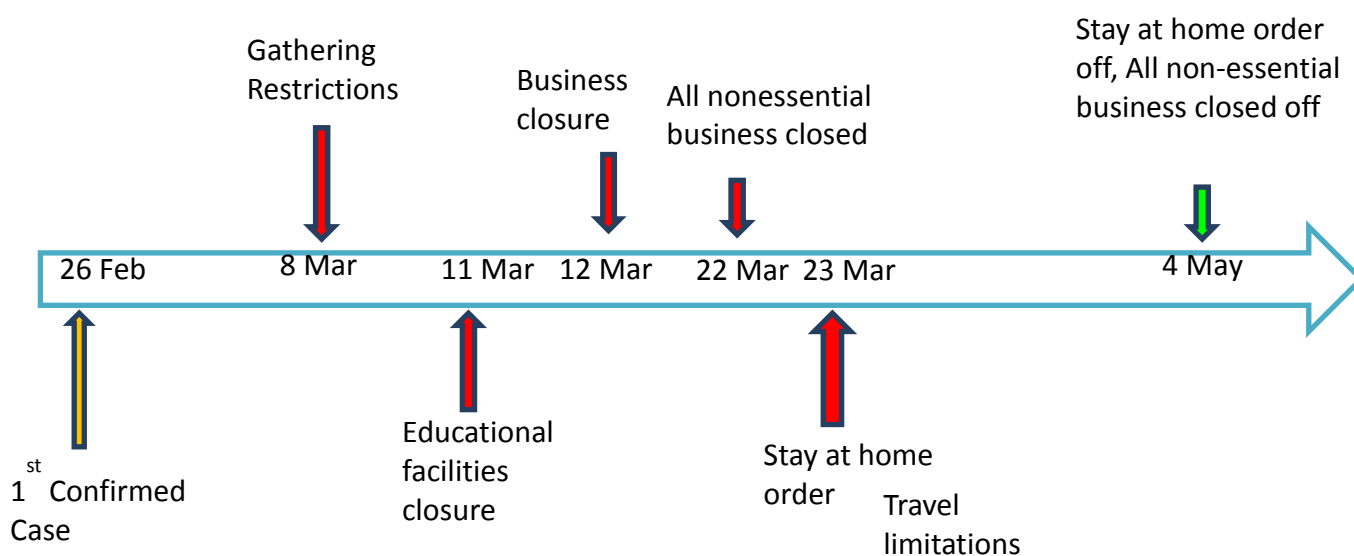
### Ethical aspects

This study was performed on anonymously collected or anonymized health-related data; therefore, there was no need of written informed consent from individual patients.

## RESULTS

Measures taken after confirmation of first positive COVID-19 case in the country are displayed in Figure 2.

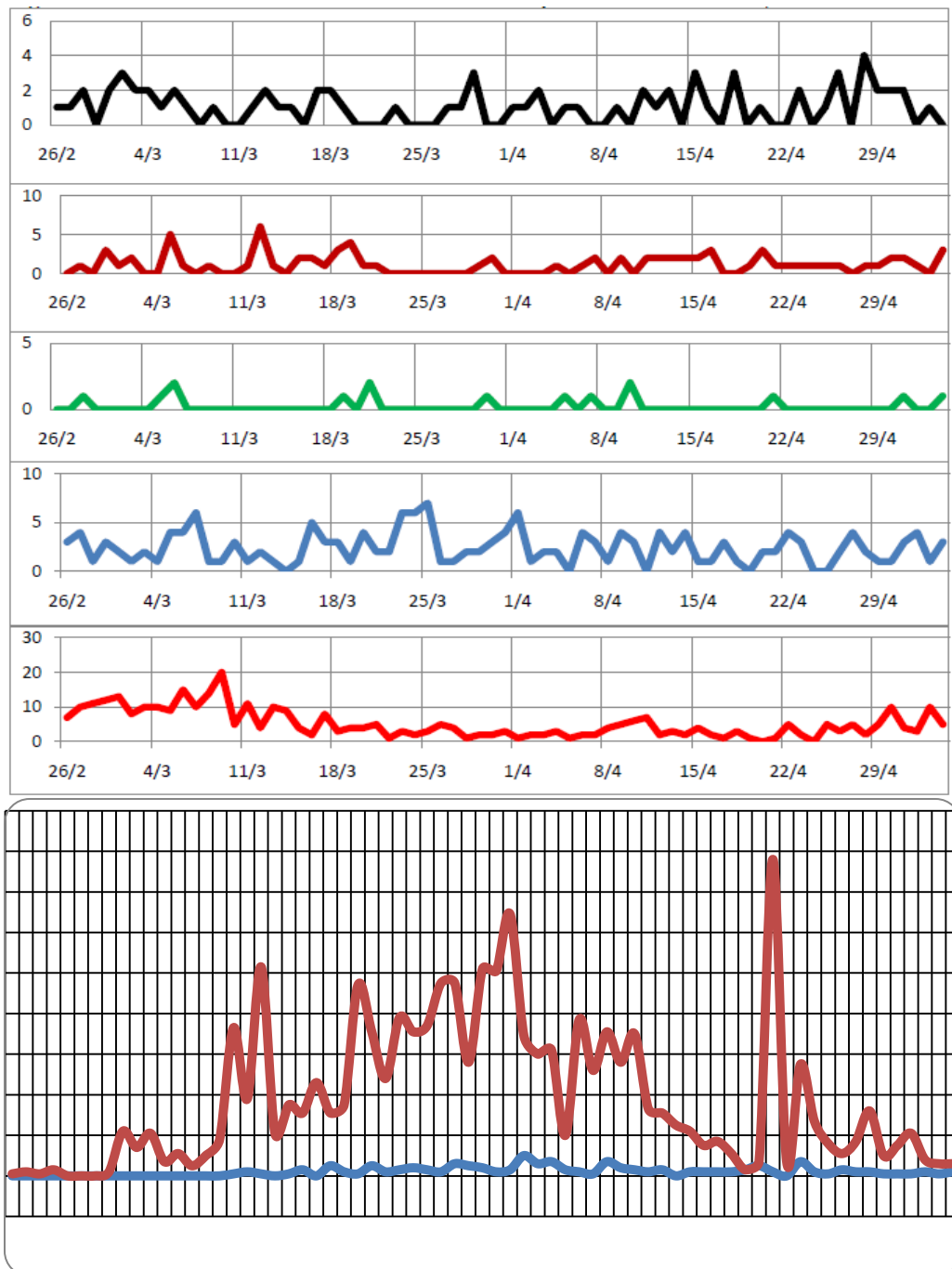
**Figure 2.** Timetable of measures taken for COVID -19 pandemic in the country.



Relation among the number of daily cases in each category and the course of the pandemic in the country is displayed in the second graph.

For the latter, information selected was new confirmed cases and new death of COVID 19 cases (Figure 3).

**Figure 3.** Timetable of daily cases of suicides (black, above), assaults (dark red) , animal bite cases (green), cardiac arrest (light blue) and car accidents during the period of interest. New confirmed COVID-19 cases (dark red) and new deaths from COVID-19 (blue) for the same period, for the country.



Graphical comparison between years 2020, 2019 and 2018 of the daily cases of the

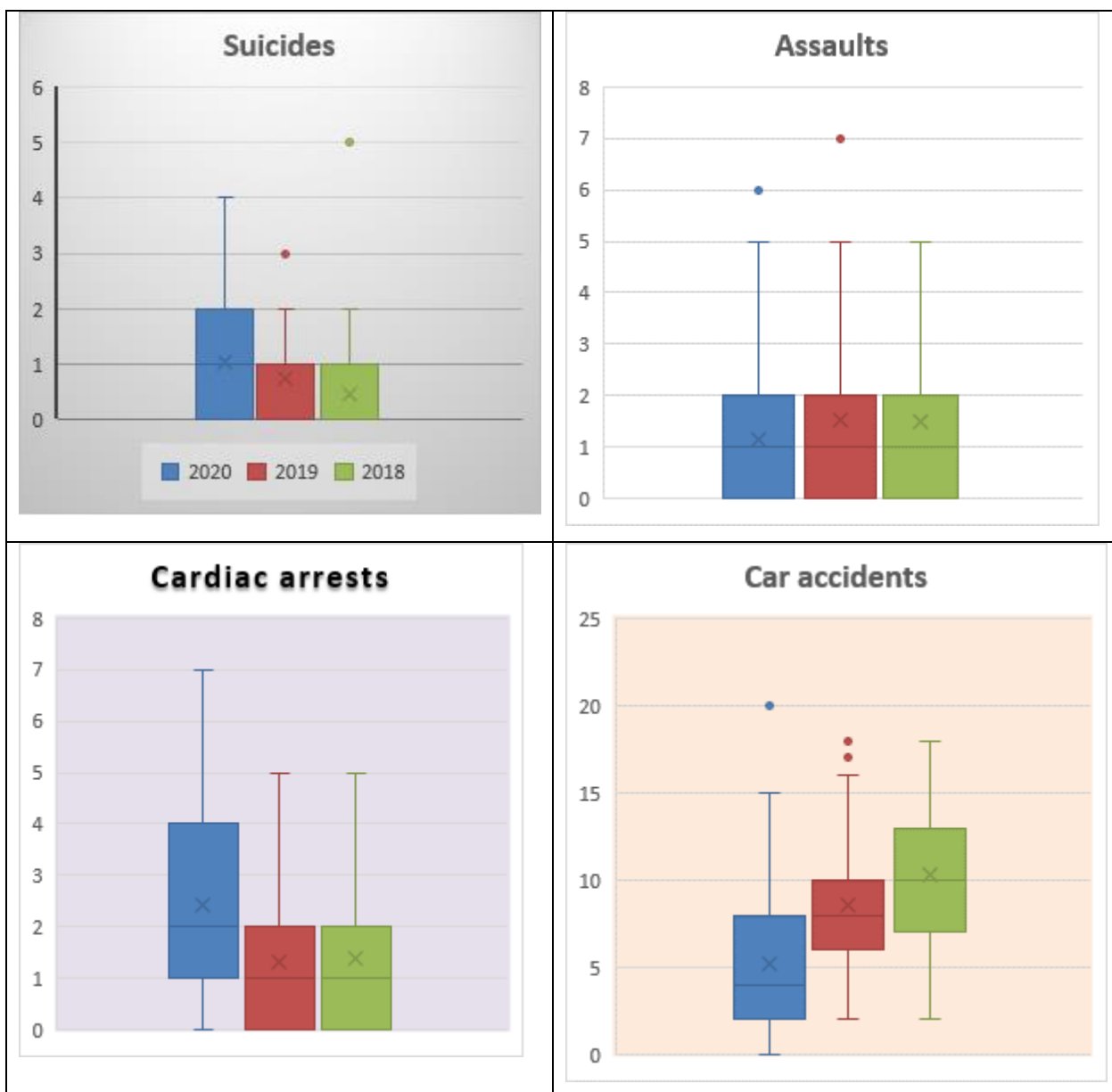
selected categories for the same period is displayed in the next figure. (Figure 4).

**Figure 4.** Graphical comparison of the daily number of cases for suicides (A), assaults (B), animal bites (C), cardiac arrests (D) and car accidents (E) for the year 2020 (red), 2019 (green) and 2018 (blue) for the period of interest.



Box plot categories are displayed in the next table (Table 1).

**Table 1.** Box plots of selected categories, displaying variation between the three years. X mark is the mean value.



Comparison of suicides reveals larger daily case for 2020 in regard to both 2019 (two tail  $p=0.049$ ) and to 2018 (two tail  $p=0.000438$ ); while this was not the case in assaults ( $p=0.09$  and  $0.103$  respectively) and animal bites cases ( $p = 0.38$  and  $0.101$  respectively). Yet, for the later, the net number of animal bites cases was

larger during the lockdown. Cardiac arrests were more in comparison with the previous 2 years (2019: $p=1.88 \times 10^{-5}$ , 2018: $p=7.12 \times 10^{-5}$ ); and, as expected, the opposite was valid for card accidents: they were more in 2018 than the same period of 2019 ( $p=1.03 \times 10^{-6}$ ) and 2020 ( $p=2.53 \times 10^{-12}$ ).

## DISCUSSION

This is the first study of such type in Greece. It seems that lockdown has affected daily cases of suicides, cardiac arrests, and animal bites more than the other categories under research. On the contrary assault's cases seem initially not to be affected during the lockdown period. Finally, as expected car accidents, due to travel limitations, were fewer in the same period.

Due to the dimensions of the pandemic, health effects of the lockdown are a subject research with high interest. Initially, the report was focusing on the spread course of SARS-CoV2 virus<sup>9</sup>, yet with more and more countries under lockdown; it was obvious that all aspects of health care are effected<sup>10-12</sup>. Recently, the Covid Surg Collaborative has projected that, based on a 12-week period of peak disruption to hospital services due to COVID-19, 28.4 million elective surgeries worldwide will cancelled or postponed in 2020<sup>13</sup>. The problem may be larger, considering the struggle of health systems to cope with COVID-19 patients and the effects of the lockdown to the community. A more concerning problem are lockdown and pandemic related mental problems, as both can affect not only the health systems personnel<sup>14</sup> but also wider community<sup>15</sup>.

A recent report confirms the severity of negative psychological impact on psychiatric patients during the COVID-19 epidemic with strict lockdown measures<sup>16</sup>. As this is an

ongoing citation that affects every aspect of social and financial life of the community, more studies are expected in the future.

The current results are only a snapshot of a region of Greece during lockdown. Further interpretation can only be performed under several limitations. Regarding suicides cases, we do not know if the former concerned persons with previous psychiatric history or not; or the effect of the pandemic (i.e. media coverage) and the lockdown of their behaviour. In case of assaults, though phenomenally cases have not been increased during the lockdown; we could not confirm that 2019 and 2018 cases concern only home violence. However, we do know that every case recorded in 2020 (for the same period) were assaults happened in home. Further analysis is needed to reach a definite conclusion. Cardiac arrest cases were more than the previous 2 year; yet we cannot claim that this increase was due to the limited access to healthcare or increased fear/anxiety because of the pandemic and the lockdown measures. Apart from the, this study was neither designed to explore specific characteristics of the cases, such as ethnicity/age/sex/ /geographical distribution nor relations between EMS interventions and practices under the light of the pandemic and outcome. Therefore, this kind of analysis was omitted. Along with that the given region was not highly affected from COVID-19 pandemic.



According to Greek National Public Health Organization- till 03/05/2020- though Central Macedonia had the third highest number of COVID-19 cases (198 out 2626 in total) in the country and 85 cases in the city of Thessaloniki, this is far lower than regions like Attica. The latter, which *encompasses the entire metropolitan area of Athens*, had 55.9% of the total cases (1496 out 2626). Finally, we believe that the results are affected by the regional PEMS and healthcare network organisational and functional characteristics (orders and staffing during the pandemic, available ambulances, available private medical sector facilities, etc); thus any interpretation should be done within the frame the given PEMS system operates.

Future studies from regions that were more affected by SARS-CoV2 will surely provide us with a different picture of the regional PEMS activity during the lockdown. In fact, we might need to differentiate the affect of the pandemic itself and the one caused by the lockdown. This differentiation is necessary if we want to be prepared for a next outburst of the pandemic and, at the same time, avoid any negative consequences of a potential future lockdown.

## CONCLUSIONS

It seems that lockdown has affected daily cases of suicides, cardiac arrests more than the other categories under research. Net number of animal bites cases were also increased.

Assaults cases seem to be unaffected during the lockdown period, although more careful interpretation is needed. Finally, car accidents, due to travel limitations, were fewer in the same period. However, larger studies are needed -especially from highly affected from the pandemic areas- to reach certain conclusions.

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**Author Disclosures:**

Authors Apostolidis K, Aslanidis Th, Nikolaidou O, Charitidou S, Syrmou E, Allios D, Tsioupa A, Iliadis K and Karabelidou Ch have no conflicts of interest or financial ties to disclose.

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