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RESEARCH ARTICLE

THE IMPACT OF SCHOOL HOLIDAYS ON EMERGENCY MEDICAL SERVICES:A STUDY AIMED TO IDENTIFY THE R ELATIONSHIP B ETWEEN SCHOOL DAYS AND SCHOOL HOL IDAYS AND THEIR IMPACT ON EMS SYSTEM IN NAJRAN REGION

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Abstract: In this research we are going to investigate the impact of School Holidays on Emergency Medical Services. This research aims to identify the relationship between School Days and School Holidays' impact on our EMS system. Previous literature suggested two outcomes; the first research negated our hypothesis stating a load on ED was primarily during weekdays not weekends (Faryar, 2013). The other two research back our hypothesis proving an increased load on EMS systems during holidays (Ho et al., 2025; Lin et al., 2020). Our methodology employed in this research module by analyzing saved data that has not been altered or audited as raw data from Saudi Red Crescent EMD programs. The methodology we are applying is a cross-sectional study with targeted life threating calls being taken into consideration to formulate a general idea about the impact of holidays and school days on our emergency medical service system. We extracted and analyzed related data from our Saudi Red Crescent secure platform and conducted data analysis with statics over a period of four months timeline, where the first two months is School Holidays and the other two is School Days. Data indicates an increase in Cardiac Arrest calls during School Days. Regarding MVC data show an increase in incoming calls. Data also shows a reduction in incoming calls related to Respiratory emergencies. When it comes to Drowning emergencies, data suggests no change in relation to School Days and School Holidays, the same thing almost applies to Psychologic emergencies. Although we notice an increase related to Fall down incoming calls that are consistent with School Days. A significant increase of Diabetic emergencies during School Days. Another finding related to Overdose & Poisoning; Data indicates a significant drop in incoming calls during School Days. The same thing almost certainly might apply on Bleeding emergencies were also a drop of incoming calls were marked. Regarding Electrocution Incidents a moderate reduction were marked during School Days. According to data analysis of key codes included in this research, there is a clear relationship indicating a rise in volume of incoming calls during School Days. Six key codes show an increase in volume related to incoming calls. Based on these findings, we should allocate more resources to reduce the impact on the EMS system that amounts to 13% increase in overall incoming calls during School Days. Another interesting finding was the conflicted data regarding cardiac arrests, an increased case load during School Days and a reduction in Chest pain incoming calls during School Days. To explain this result, we need to include more data that is more comprehensive including all related data such as demography, social and behaviors science.

Keywords: EMD, Code9, Code 29, Code17, Code 14, Code23, Code25, Code 21, Code 13, Code 4, Code 6, Code 10
EMD) Emergency Medical Dispatch (Code 9) Cardiac Arrest (Code 29) Motor Vehicle Accident (Code 17) Fall Down (Code 14) Drowning (Code 23) Poisoning & Overdoes (Code 25)
Psychological Patient (Code 21) Bleeding (Code 13) Diabetes (Code 4) Electrical Shock (Code 6) Respiratory (Code 10) Chest Pain

INTRODUCTION

This research is aimed at determining the relationship between the impact of holidays on the emergency medical services in comparison to schooldays and the effects on our resources.

Determining the issues:

Finding the relationship between vacations and school days and trying to measure their impact on the emergency medical service system in terms of incoming calls volume.

Hypothesis:

Based on the related literature, it shows an increase in EMS calls volume during holidays season, so to test this hypothesis we are conducting this research to our local system to prove this hypothesis (Ho et al., 2025; Lin et al., 2020).

Objectives:

To determine the variables and factors in place contributing to prove our hypothesis by conducting a cross-sectional study and studying life threating calls.

Pervious Studies:
According to Faryar (2013), the total number of ED visits were significantly associated with these variables. The average number of ED visits per day was 722.5. Monday had the highest ED volume (739.5±18.2 visits per day) and Saturday had the lowest number of patients. This negates our hypothesis.
Another study by Ho et al. (2025) studied 28,660 cases of OHCA and concluded that public holidays and weekends were associated with increased risk of OHCA and mortality, particularly during traditional holidays.
This study supports our hypothesis. According to Lin et al. (2020), Holiday and weekend admissions were associated with in-hospital AMI mortality, which is consistent with our hypothesis that during holidays an increase in EMS calls takes place.

Sample Study:
Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract.

Research Limitation:
We have limited specific time frame of a period of four months' timeline. Where we can conduct this study without fully addressing psychological, social and behaviorally which counted as Insufficient data.

Research Methodology and Tools:
In this module we will analyzing saved data that has not being altered or audit as raw materials from Saudi Red Crescent EMD Data programs. The methodology we are using is a cross- sectional study with targeted life threating call being taken into consideration so we can formulate a general idea about the impact of holidays and school days on our emergency medical service system.

Results:
Data indicates an increase in Cardiac Arrest calls during School Days. Regarding MVC data show an increase in incoming calls. Data also shows a reduction in incoming calls related to Respiratory emergencies. When it comes to Drowning emergencies, data suggests no change in relation to School Days and School Holidays, the same thing almost applies to Psychologic emergencies. Although we notice in an increase related to Fall down incoming calls that are consists with School Days. A Significate Increase of Diabetic emergencies during School Days.

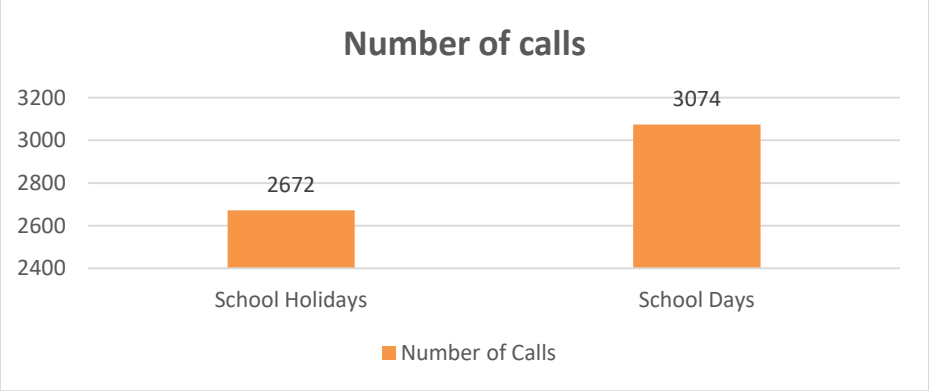
Conclusion:
According to data analysis of key codes included in this research, there is a clear relationship indicating a rise in between the volume of incoming and School days. Six key codes show an increase in volume related to incoming calls. Based on these findings. We should allocate more resources to reduce the impact on the EMS system that amounts to 13% increase in overall incoming calls during School days. Another interesting finding was the conflicted data regarding cardiac arrests, an increased case load during School Days and a reduction in Chest pain incoming calls during School Days. To explain this result, we need to include more data that is more comprehensive including all related data such as demography, social and behaviors science.

Recommendations:
Based on this research, we should allocate more resources during School Days.

References:
Based on previous studies 1(Faryar, 2013), 2(Ho, 2025), 3(Lin, 2020) and extracted data from Saudi Red Crescent EMD Platform.

Conducting Data Analysis: Figure 1

Number of incoming EMS calls during school holidays and school days.
Note. The chart compares total call volume during school holidays (n = 2672) and school days (n = 3074).



Saudi Red Crescent have **34 codes** embedded in our Emergency Medical Dispatch centers, these codes designed and assigned to different medical emergencies to brief our EMS crews on which case they are dispatched to. In this research we took 11 key codes that are vital in our operations to study and analyze. As we data indicate, we have an increase in incoming calls during school days. Therefore, we should allocate more resources during this period to serve our community in best way possible.

Data shows an increase in terms of incoming calls by 13% in comparison to School Holidays and therefore it's only logical to allocate more resources during school days. We will analyze the data regarding the key codes and based on these findings we will draw our conclusions on this research.

Month Jun 2025 Analysis

Table 1

June 2025 Case Codes, Number of Calls, and Dual Response Units

Case Code	Number of Calls	Dual Response
Code 9	16	11
Code 29	183	60
Code 17	49	3
Code 14	2	2
Code 23	6	3
Code 25	28	3
Code 21	21	3
Code 13	26	4
Code 4	36	6
Code 6	115	12
Code 10	26	3
Total	**508**	**110**

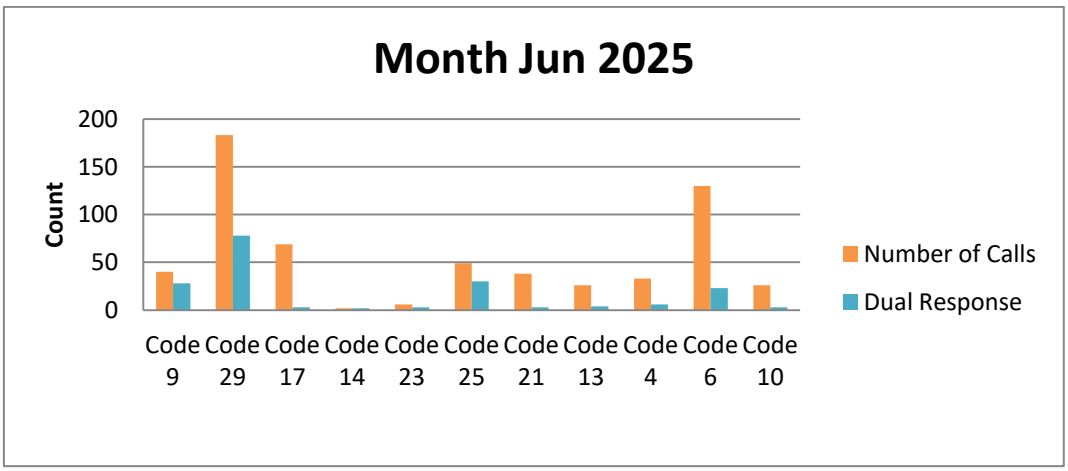
Note. This table summarizes June 2025 EMS data, including key case codes, total incoming calls, and additional units dispatched.

According to the Data analysis for month Jun 2025 which considered School Holidays, we notice an increase in MVC during the beginning of the school holidays that resulted in 183 calls with an additional 60 EMS units sent as supporting units. Data brings in light another code that is considered one of the highest numbers in incoming calls, we have noticed an increase in incoming calls related to respiratory disease that amount to 115 calls with an additional 12 EMS units sent as support.

Data also indicates during school holidays a total of 16 incoming calls related to cardiac arrest events where an additional 11 EMS units sent as reinforcement as part of our EMD-System new guidelines.

Figure 2 ***June 2025 EMS incoming calls and dual response by case code.***

Note. This figure displays the number of EMS calls and the number of dual-response units dispatched for each case code during June 2025.



Month July 2025 Analysis

Table 2 ***July 2025 Case Codes, Number of Calls, and Dual Response Units***

Case Code	Number of Calls	Dual Response
Code 9	15	17
Code 29	**166**	75
Code 17	74	7
Code 14	2	0
Code 23	9	0
Code 25	17	4
Code 21	38	5
Code 13	31	1
Code 4	33	5
Code 6	142	7
Code 10	29	8
Total	**556**	**129**

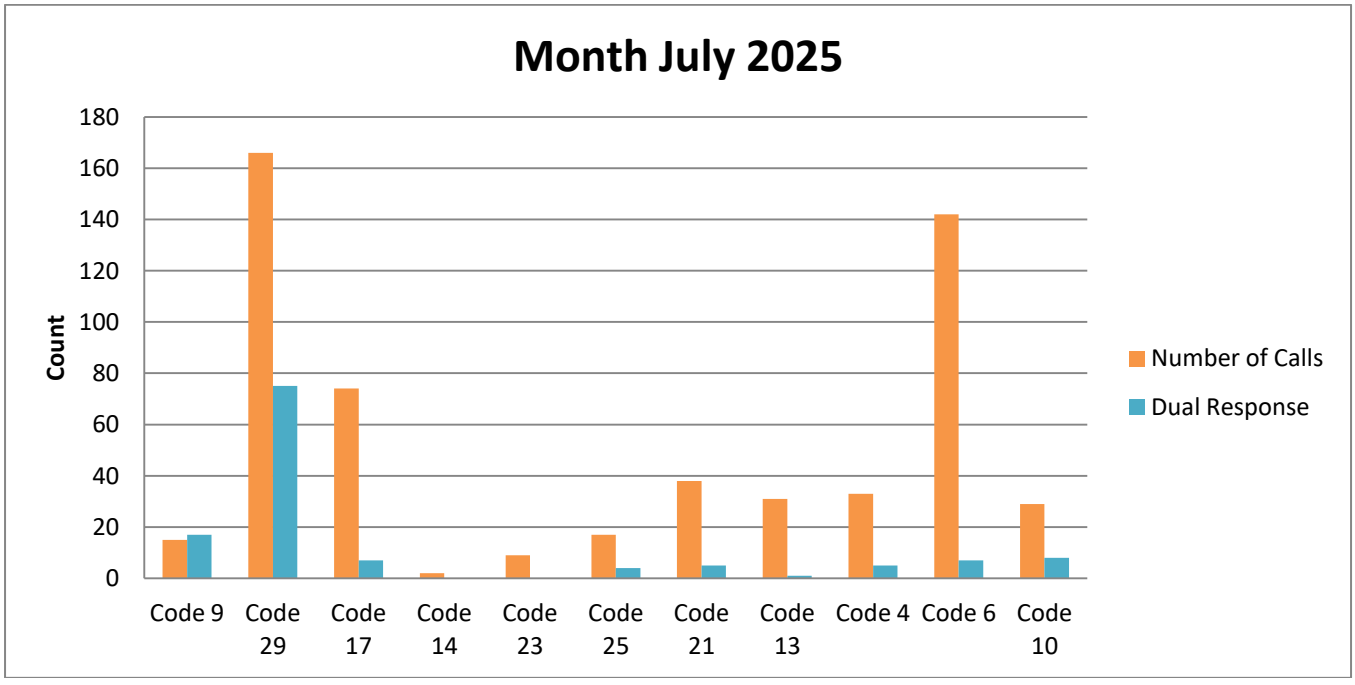
Note. This table summarizes July 2025 EMS activity including incoming calls and dual-response dispatches for all key case codes.

According to the Data analysis for month Jun 2025 which considered School Holidays, we notice an increase in MVC during the beginning of the school holidays that resulted in 183 calls with an additional 60 EMS units sent as supporting units. Data brings in light another code that is considered one of the highest numbers in incoming calls, we have noticed an increase in incoming calls related to respiratory disease that amount to 115 calls with an additional 12 EMS units sent as support.

Data also indicates during school holidays a total of 16 incoming calls related to cardiac arrest events where an additional 11 EMS units sent as reinforcement as part of our EMD-System new guidelines.

Figure 3
July 2025 EMS incoming calls and dual response by case code.

Note. This figure shows the number of EMS calls and the number of dual-response units dispatched for each case code during July 2025.



Month August 2025 Analysis

Table 3

August 2025 Case Codes, Number of Calls, and Dual Response Units

Case Code	Number of Calls	Dual Response
Code 9	14	15
Code 29	179	140
Code 17	69	13
Code 14	3	4
Code 23	4	1
Code 25	24	24
Code 21	15	0
Code 13	33	9
Code 4	32	29
Code 6	**107**	13
Code 10	27	6
Total	**507**	**254**

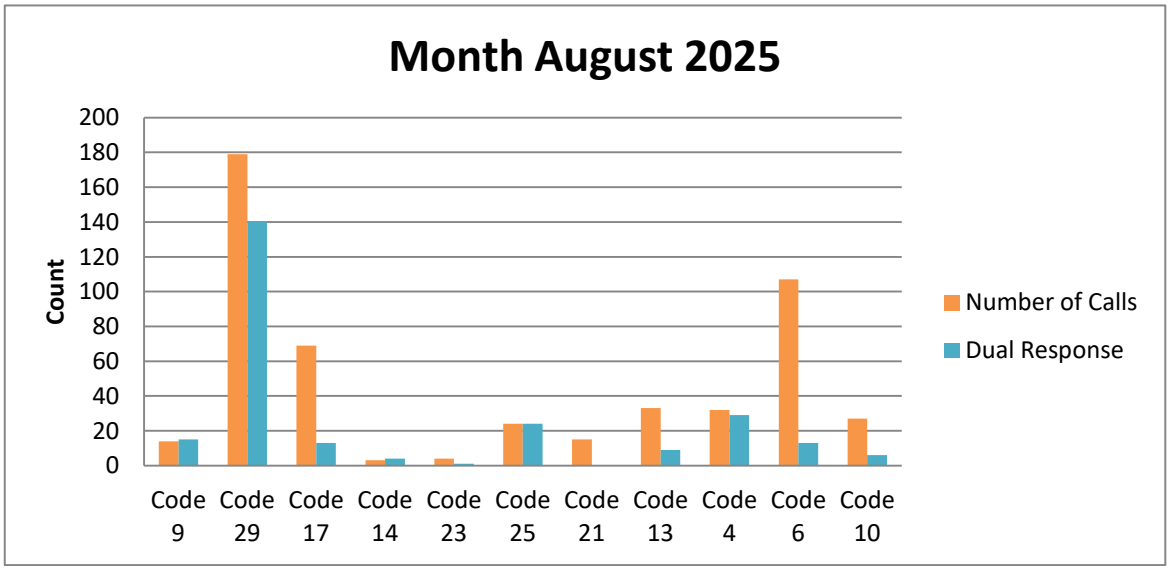
Note. This table summarizes August 2025 EMS data including total incoming calls and dual-response dispatches for all major case codes.

According to the Data analysis for month August 2025 which considered School days, we notice more increase in MVC toward the beginning of the school days that resulted in 179 calls with an additional 140 EMS units sent as supporting units.

Data brings in light another code that is considered one of the highest numbers among incoming calls, we have noticed decreased in incoming calls related to respiratory diseases that amount to 107 calls with an additional 13 EMS units sent as support. Data also indicates a total of 14 incoming calls related to cardiac arrest events with an additional 15 EMS units sent as reinforcement as part of our new EMD-System guidelines.

Figure 4 *August 2025 EMS incoming calls and dual response by case code.*

Note. This figure displays the number of EMS calls and the number of dual-response units dispatched for each case code during August 2025.



Month September 2025 Analysis

Table 4

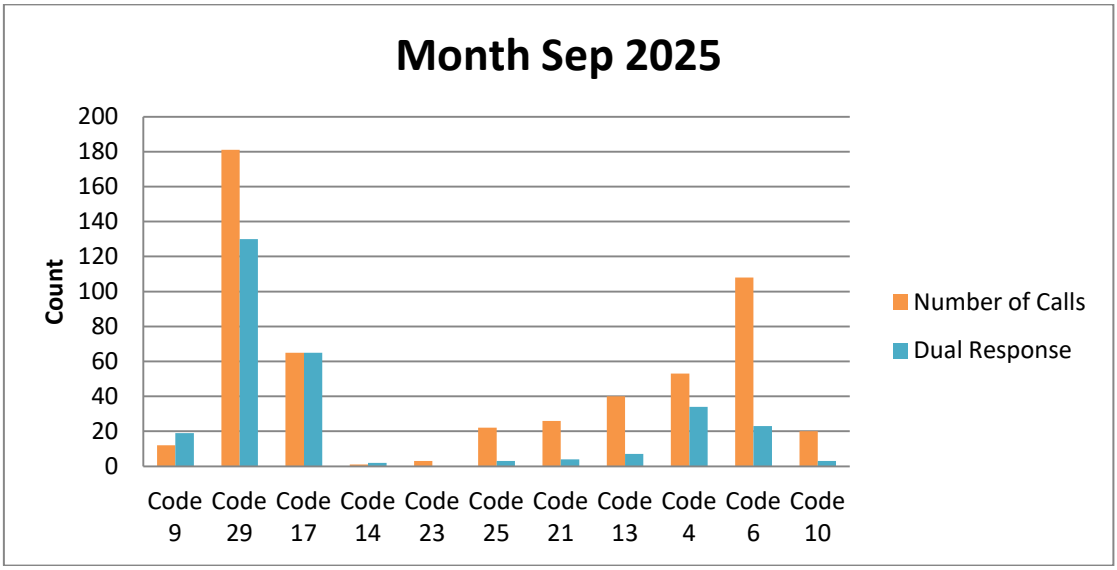
September 2025 Case Codes, Number of Calls, and Dual Response Units

Case Code	Number of Calls	Dual Response
Code 9	12	19
Code 29	**181**	130
Code 17	65	65
Code 14	1	2
Code 23	3	0
Code 25	22	3
Code 21	26	4
Code 13	40	7
Code 4	53	34
Code 6	**108**	23
Code 10	20	3
Total	**531**	**290**

Note. This table summarizes September 2025 EMS data, including incoming calls and dual-response dispatches for all major case codes.

According to the Data analysis for month September 2025 which considered School days, we notice more increase in MVC during school days that resulted in 181 calls with an additional 130 EMS units sent as supporting units. Data brings in light another code that is considered one of the highest numbers among incoming calls, we have noticed similar volume in incoming calls related to respiratory diseases that amount to 107 calls with an additional 23 EMS units sent as support. Data also indicates a total of 12 incoming calls related to cardiac arrest events with an additional 19 EMS units sent as reinforcement as part of our new EMD-System guidelines.

Figure 5
September 2025 EMS incoming calls and dual response by case code.
Note. This figure displays the number of EMS calls and the number of dual-response units dispatched for each case code during September 2025.



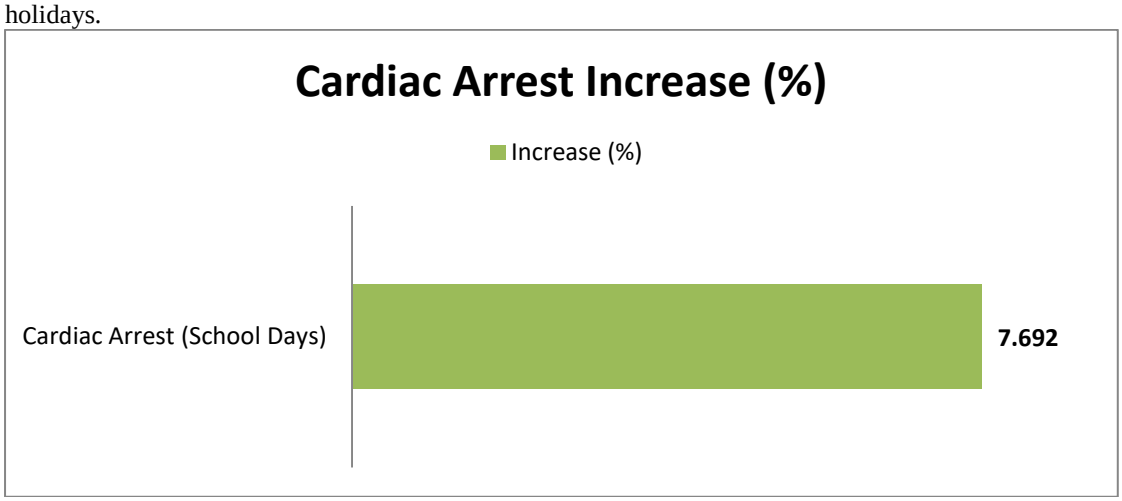
Data Analysis:
Cardiac Arrest
According to Data Analysis when it comes to code 9 an increase in Cardiac Arrest took place during school days which we might attribute that to many factors such as the routine day of a normal family when parents wake up early and set their children for school and leaving towards their jobs leaving the elderly and children s unattended in some way, it s extremely difficult to pinpoint the reason behind this surge in cardiac arrest events due insufficient data . To come up

with an explanation we need to Borden our study to include many variables such as demography and social behaviors science.

Figure 6

Increase in cardiac arrest calls during school days.

Note. This figure illustrates a 7.692% increase in cardiac arrest emergencies during school days compared to school holidays.



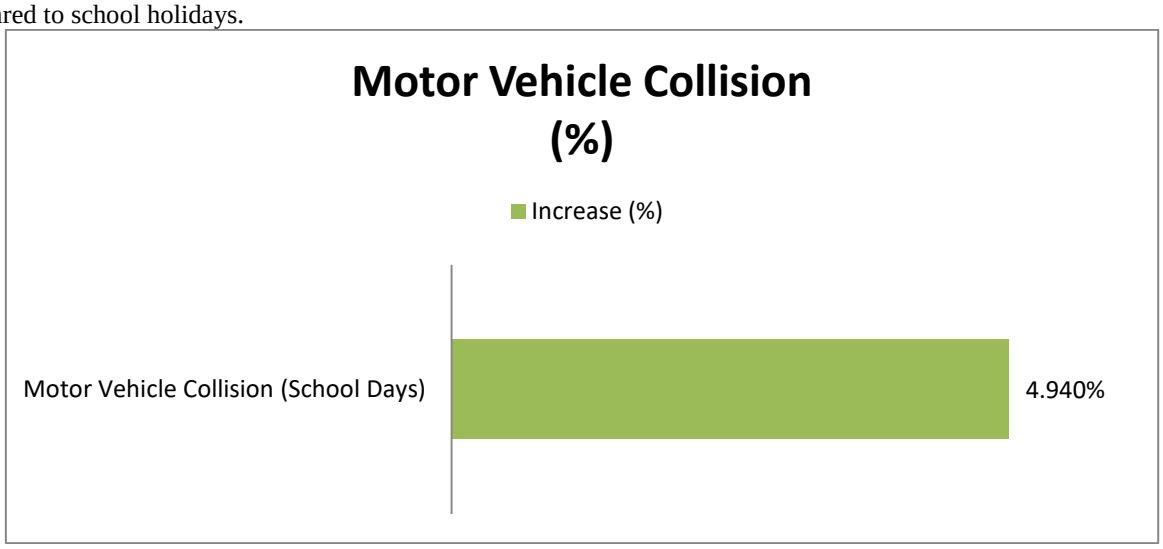
Motor Vehicle Collision

According to Data analysis when it comes to **code 29** an increase in motor vehicle collision took place during school days which is anticipated due to high volume of traffic during rush hours.

Figure 7

Increase in motor vehicle collision calls during school days.

Note. This figure illustrates a 4.940% increase in motor vehicle collision (MVC) emergencies during school days compared to school holidays.



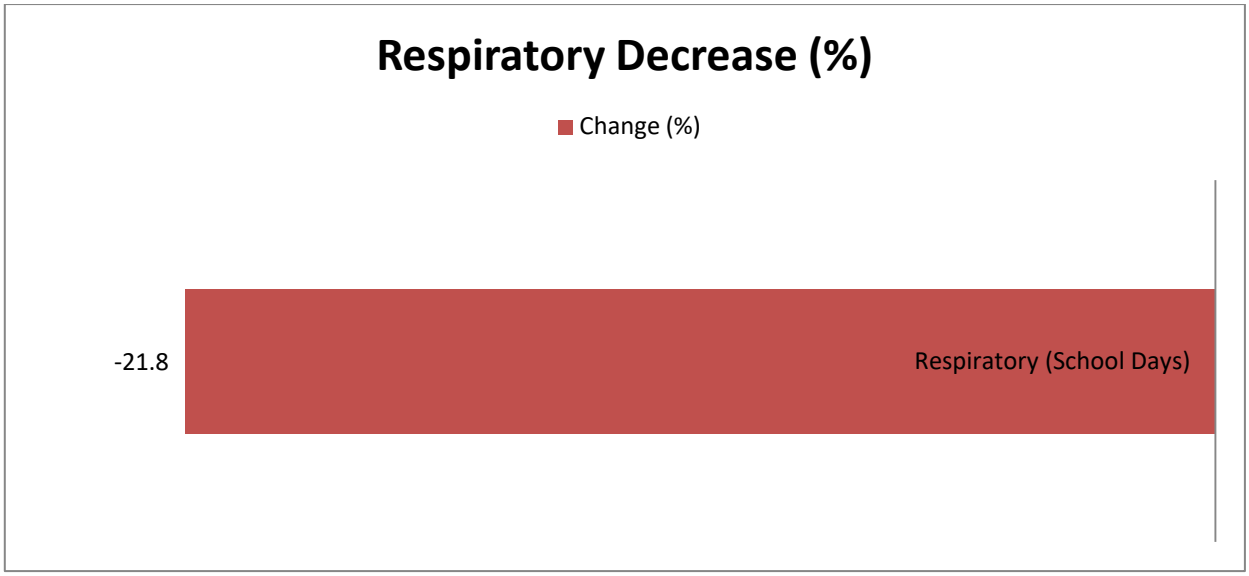
Respiratory Emergency

According to Data analysis when it comes to **code 6** related to respiratory diseases a reduction in incoming calls were marked which we can attribute to high hygiene discipline in schools, universities and public spaces post covid 19 measures. Other factors might participate and play key roles in this result that won t be covered in this research due to insufficient data.

Figure 8

Decrease in respiratory-related emergency calls during school days.

Note. This figure shows a −21.8% reduction in respiratory emergency calls during school days compared to school holidays.



Drowning Emergencies

According to Data analysis when it comes to **code 14** related to drowning incoming calls, data indicate no difference between school days and school holidays. This result is associated with culture and land nature where water sports are not common as cities that are located on the coast.

Drowning No Change

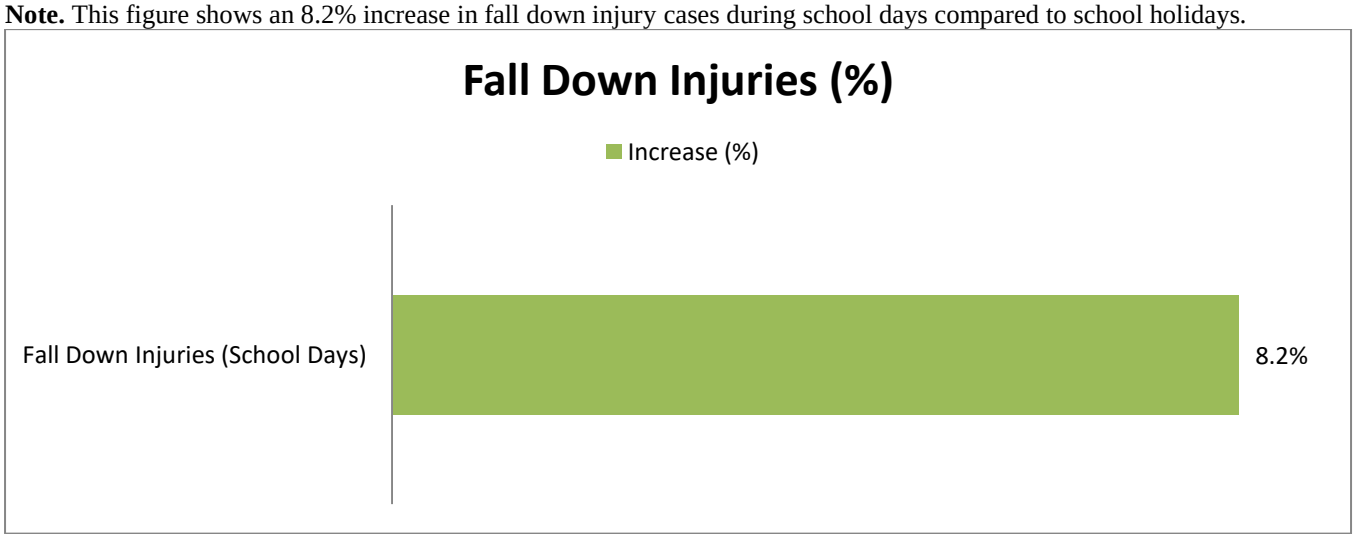
Fall Down Injuries

According to Data analysis associated with **code 17** related to fall down injuries data point to a mild increase in incoming calls during school days which may be attributed to rush hours and other key factors in place. To determine this increase in incoming calls we need to study demography, social and behaviors science which is not part that we are covering in this research.

Figure 9

Increase in fall down injury calls during school days.

Note. This figure shows an 8.2% increase in fall down injury cases during school days compared to school holidays.



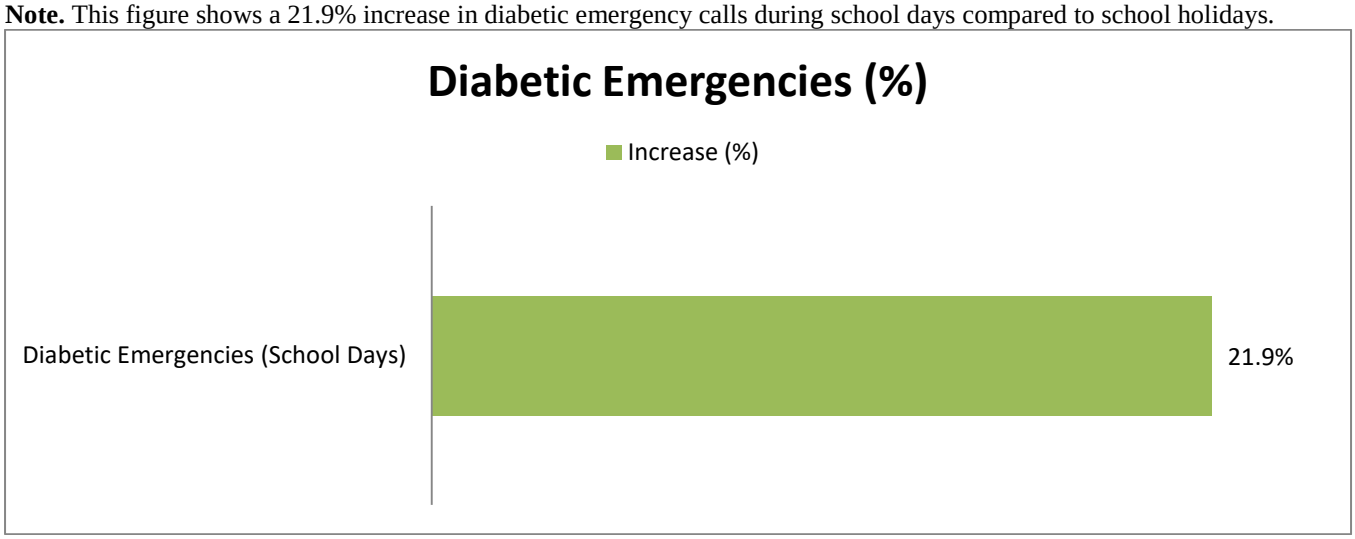
Diabetic Emergency

According to Data analysis regarding **code 13** related to diabetic emergencies incoming calls, data indicate an increase in term of incoming calls in comparison to holidays which again something we can't explain unless we broaden our research to include other key factors.

Figure 10

Increase in diabetic emergency calls during school days.

Note. This figure shows a 21.9% increase in diabetic emergency calls during school days compared to school holidays.



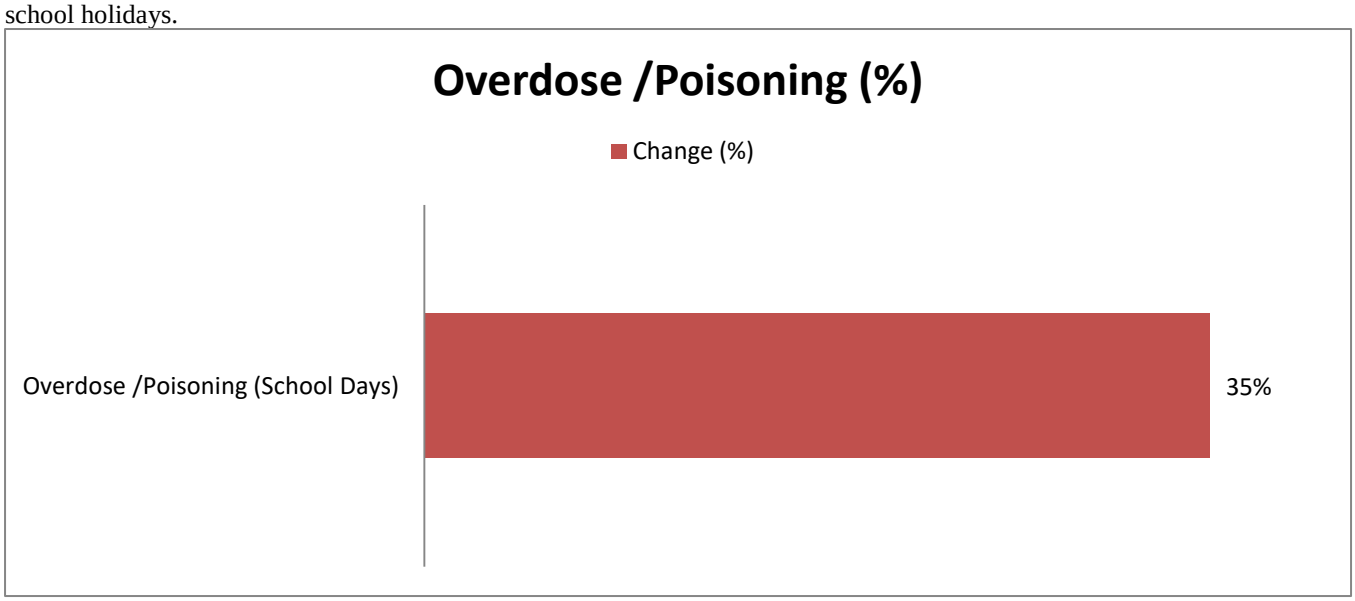
Overdose and Poisoning Emergency

According to Data analysis regarding **code 23** related to overdose /poisoning a significant reduction in incoming calls during school days which we might attach this result with discipline imposed by parents on children and the number of hours people in general spent at work. Once again, we can't state the reason for this result without considering all aspects that would lead to broadening our research beyond its objectives.

Figure 11

Decrease in overdose and poisoning calls during school days.

Note. This figure shows a 35% reduction in overdose and poisoning emergency calls during school days compared to school holidays.



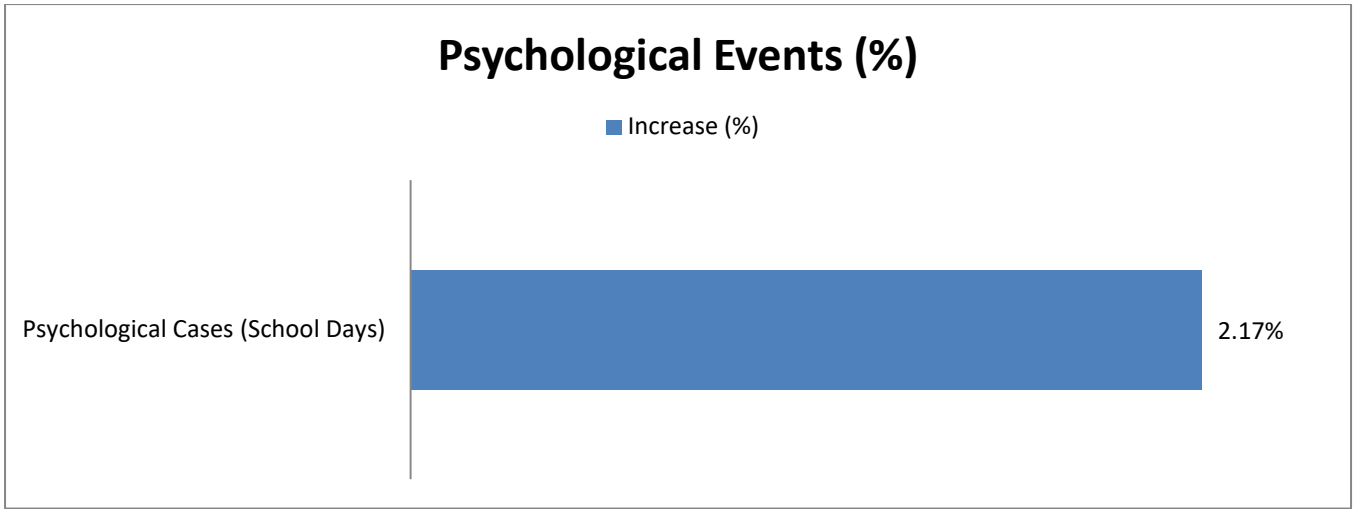
Psychological Events

According to Data analysis regarding **code 25** related to psychological events, data indicates no significant change in incoming calls where holidays and school days have almost no effect, we all see mild changes in case volume

Figure 12

Increase in psychological-related emergency calls during school days.

Note. This figure shows a 2.17% increase in psychological emergency cases during school days compared to school holidays.



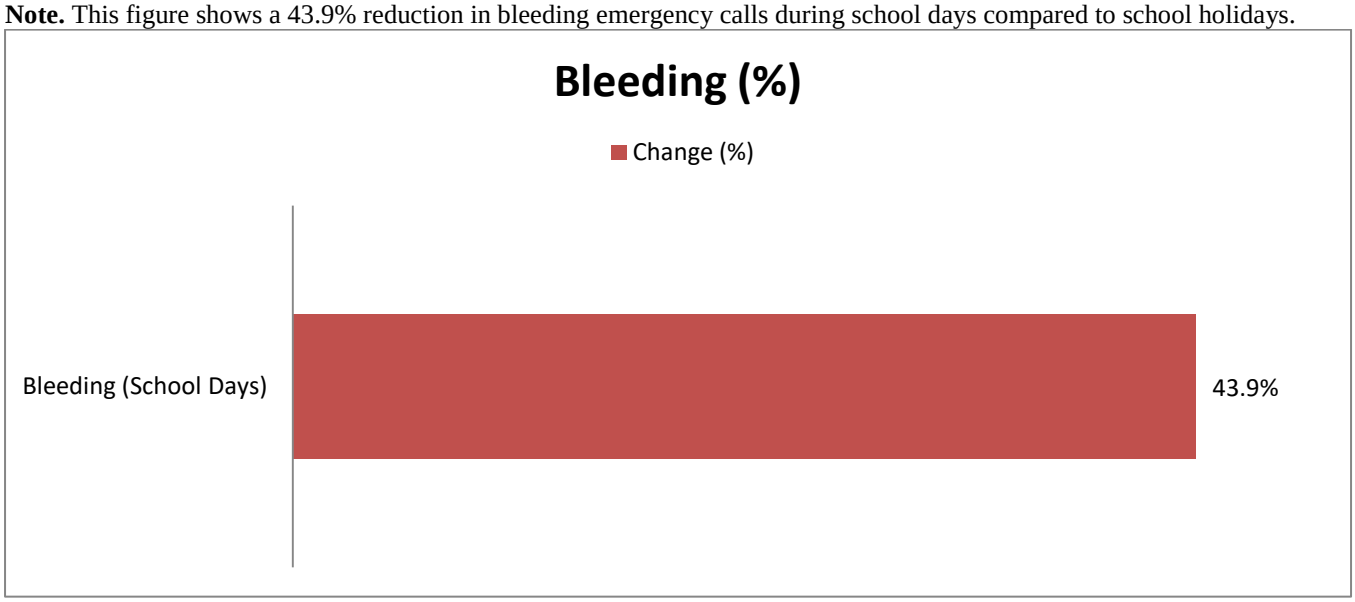
Bleeding

According to data analysis regarding **code 21** related to Bleeding, data indicates a significant reduction in incoming calls. We attribute this to less exposure and less time for children outdoors where they might sustain injuries. Besides, the control environment where students are safe and sound. To explain this result, we need to employe more data that is comprehensive including all related data such as demography, social and behaviors science.

Figure 13

Decrease in bleeding-related emergency calls during school days.

Note. This figure shows a 43.9% reduction in bleeding emergency calls during school days compared to school holidays.



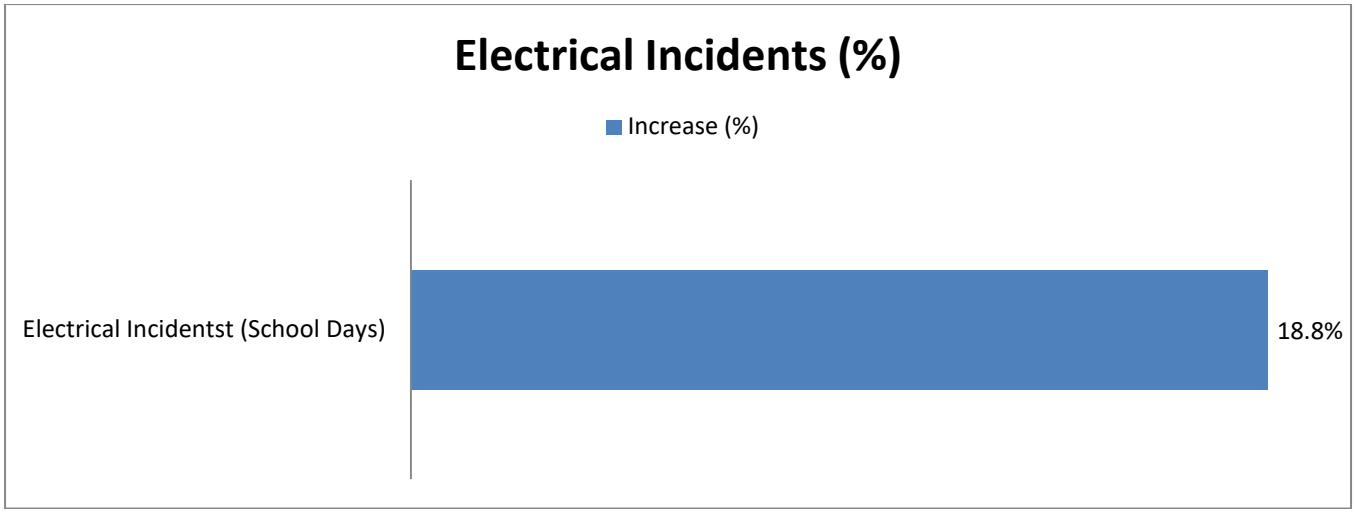
Electrical incidents

According to data analysis regarding **code 4** related to Electrical incidents, data indicates a mild surge in incoming calls. To explain this result, we need to employe more data that is comprehensive including all related data such as demography, social and behaviors science.

Figure 14

Increase in electrical incident emergency calls during school days.

Note. This figure shows an 18.8% increase in electrical incident emergencies during school days compared to school holidays.



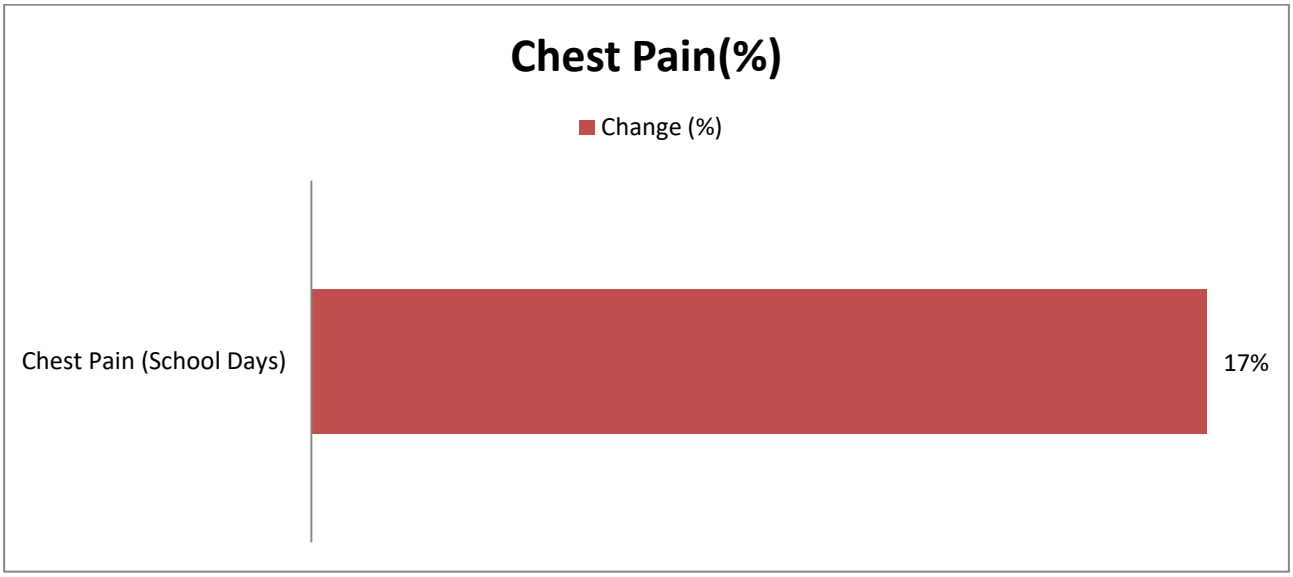
Chest Pain

According to data analysis regarding **code 10** related to Chest pain, data indicates a mild reduction in incoming calls. This result conflicts with our findings related to code 9. To explain this result, we need to employe more data that is comprehensive including all related data such as demography, social and behaviors science.

Figure 15

Increase in chest pain related emergency calls during school days.

Note. This figure shows a 17% increase in chest pain emergency cases during school days compared to school holidays.



CONCLUSION

According to data analysis regarding the key codes included in this research data suggest a clear relationship between the volume of incoming call and School days. Six key codes show increase in volume related to incoming calls. Based on these findings. We should allocate more resources to reduce the impact on the EMS system that amounts to 13% increase in overall incoming calls than School holidays. Another interesting finding was the conflicted data regarding cardiac arrests, increase case load during School Days and the reduction in Chest pain incoming calls during School Days. To explain this result, we need to employe more data that is more comprehensive including all related data such as demography, social and behaviors science.

REFERENCES

1. Faryar, K. A. (2025). *The Effects of Weekday, Season, Federal Holidays, and Severe Weather Conditions on Emergency Department Volume in Montgomery County, Ohio*. CORE Scholar. https://corescholar.libraries.wright.edu/mph/94/
2. Ho, J. S. Y., Earnest, A., Siddiqui, F. J., Hong, D., Chia, M. Y. C., Poh, K.-K., Leong, B. S.-H., Ng, Y. Y., Ong, M. E. H., Ho, A. F. W., & Singapore

PAROS Investigators. (2025). The risks of out-of-hospital cardiac arrest and mortality on public holidays and weekends: A time-series study. *Resuscitation*, *215*, 110749. https://doi.org/10.1016/j.resuscitation.2025.110749

3. Lin, X., Green, J. C., Xian, H., Cai, M., Skrzypek, J., & Tao, H. (2020). Holiday and weekend effects on mortality for acute myocardial infarction in Shanxi, China: a cross-sectional study. *International Journal of Public Health*, *65*(6), 847–857. https://doi.org/10.1007/s00038-020-01443-x