***INTRODUCTION***

The current article focuses on analyzing the activity of the hospitalization departments at Meir Hospital during the years 2020-2023.The study is based on data provided by the hospital, from the various hospitalization departments and from the medical center. The purpose of this article is to examine the relationship between various variables and the length of time that elapses between the first and second hospitalizations.   
The variables studied include age, weight, height, BMI, level of urgency, reception and release diagnoses, hospital ward, releasing doctor, hospitalization days, CT scans, medications, chronic diseases, marital status, and number of children.   
With the help of these variables, statistical calculations were performed using machine learning models and neural networks models, to obtain a broad picture of the factors influencing the target variable – duration between the first and second hospitalizations.

The article is a collaborative article created by the joint work of eleven pairs of students from Afeka College, in the master's degree in field of study - intelligent systems.

Characteristics of the associations for duration between the first and second hospitalizations:  
The study found that some variables significantly affect hospitalization time, while others have no effect at all. Data analysis indicates associations between various variables, as well as causal relationships between first and second hospitalizations: overload on a doctor or inpatient ward, age and gender of the patient, BMI, common diagnoses, overload in the inpatient ward and re-hospitalization, type of releasing doctor, load on the releasing ward, doctor with a high average releases, number of admissions in each unit by time, average duration in admission by department, time analysis of inpatient ward in initial hospitalization, time analysis of dates - in which there were more re-hospitalizations, association between medications treatment and re-hospitalization, occupancy rate in each unit, whether the reason for the second hospitalization was related to the reason for the first hospitalization, times when there were more re-hospitalizations, association between releasing ward and   
re-hospitalization.

An in-depth understanding of these associations will help predict re-hospitalizations and improve the quality of medical care, based on insights that enable identification of influential factors and adjustment of clinical interventions accordingly.