**Introduction**

This article focuses on analyzing the factors that influence the time between the first and second hospitalizations in various departments at Meir Hospital during the years 2020-2023. The study is based on data collected from the medical center and the hospitalization departments, aiming to investigate the impact of different variables on the interval between hospitalizations.

The variables examined include age, weight, height, Body Mass Index (BMI), clinical urgency, admission and discharge diagnoses, hospitalization ward, discharging doctor, length of hospitalization, CT scans, prescribed medications, chronic diseases, marital status, and number of children. This research utilizes advanced machine learning models and neural networks to identify relationships and effects between these variables and the dependent variable—the duration between hospitalizations.

This collaborative study involves 11 pairs of students from the master's program in intelligent systems at Afeka College and aims to provide data-driven insights that can help identify key factors influencing hospital readmissions and offer recommendations for appropriate clinical interventions.