

Analytics for Hospitals Healthcare Data

S. No	Title	Author	Year	Short abstract	Data set	Performance metrics	Future work suggested	Algorithm
1	Prediction of COVID-19 Hospital Length of Stay and Risk of Death Using Artificial Intelligence-Based Modeling	Bassam Mahboub, Laila Salameh, Mohammad T. Al Bataineh, Rifat Hamoudi, Abdulrahim Shamayleh, Hussam Alshraideh	2021	The two DT-based predictive models were constructed to provide rapid clinical decision-making support. Both models were built and trained using all of the existing data of COVID-19 patients to predict with high, 96%, accuracy .	clinical data of 2017 COVID-19 cases reported in the Dubai health authority	The model showed excellent performance with sensitivity and specificity of 96.5 and 87.8%, respectively, and overall prediction accuracy of 96%	Need to work with a large data sample improve the prediction of LOS of patients	Decision Tree Learning
2	A Machine Learning Algorithm Predicts Duration of hospitalization in COVID-19 patients	JosephEbinger MatthewWells DavidOuyang acTodDavis bNoyKaufman dSusanCheng aSusanmeetChugh ac	2021	The COVID-19 pandemic has placed unprecedented strain on the healthcare system, particularly hospital bed capacity in the setting of large variations in patient length of stay (LOS). Using	966 patient records from Cedars-Sinai Medical Center	A total of 966 patients were included in this study: 525 of whom had a LOS of ≤ 8 days, while 441 patients had an LOS of > 8 days	Need to enhancing clinicians' ability to make early determinations.	logistic regression , K-nearest Neighbors classifiers, residual neural classifier

				electronic health record data from 966 COVID-19 patients				
3	Hospital length of stay among COVID-19-positive patients	Tze Chiam, Keshab Subedi, David Chen, Eric Best, Federica B. Bianco, Gregory Dobler, and Mia Papas	2021	This study aimed to identify the hospital admission risk factors associated with the length of stay (LoS) by applying a relatively novel statistical method for count data using predictors among COVID-19 patients Through generalized linear model, Hurdle model	The analysis dataset was extracted from ChristianaCare EHR system and includes only patients diagnosed with COVID-19 admitted to ChristianaCare	Length of stay increased by 2 %	As this study is a single site study with limited sample size, the analysis only shows patients admitted to ChristianaCare and may not be representative of COVID-19 patient characteristics and LOS for other hospitals.	Kaplan–Meier curves and log-rank tests for bivariate analyses
4	COVID-19 length of hospital stay: a systematic review and data synthesis	Eleanor M. Rees, Emily S. Nightingale, Yalda Jafari, Naomi R. Waterlow, Samuel Clifford, Carl A. B. Pearson,, CMMID Working Group, Thibaut Jombart	2020	The COVID-19 pandemic has placed an unprecedented strain on health systems, with rapidly increasing demand for healthcare in hospitals and intensive care	Dataset is extracted from UK Public hospitals	This model predicts the loss of patient 90%	The majority of the data presented in this review comes from China, and as more data become available, it will be important to update this with setting-specific	IQR or standard deviation Nelder-Mead optimisation

		, Simon R. Procter and Gwenan M. Knight.		units (ICUs) worldwide. As the pandemic escalates, determining the resulting needs for healthcare resources (beds, staff, equipment) has become a key priority for many countries. Projecting future demand requires estimates of how long patients with COVID-19 need different levels of hospital care			LoS estimates.	
5	Hospital length of stay for COVID-19 patients: Data-driven methods for forward planning	Bindu Vekaria, Christopher Overton, Arkadiusz Wiśniowski, Shazaad Ahmad, Andrea Aparicio-Castro, Jacob Curran-Sebastian.	2020	Predicting hospital length of stay (LoS) for patients with COVID-19 infection is essential to ensure that adequate bed capacity can be provided without unnecessarily restricting care for patients with other conditions. Here, we demonstrate the utility of three complementary methods for predicting LoS using UK national- and hospital-level	Nationally collected dataset and local data from a large inner city hospital Trust in the UK	The AFT model Predicts the LOS of patient 88% accurately	<ul style="list-style-type: none"> • This cannot handle non-random case missingness. • This method does not include censored cases but does consider these different outcomes. • we obtain more power in prediction 	Accelerated Failure Time (AFT) survival model and a truncation corrected method (TC)

				data			ons through a larger amount of complet e data, but also a better understa nding of how the complex interacti ons between the virus and backgro und risk factors affect disease severity.	
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