ICU Patient Analysis: Key Findings on Survival and Recovery Time

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What We Found (In a Nutshell)

After digging into the data for 10,000 ICU patients, a few key patterns emerged that tell us a lot about patient outcomes.

The main takeaway is that a patient's age and their maximum heart rate are the two biggest red flags we found. They are strongly linked to both a higher risk of death and a longer, more complicated stay in the ICU.

Here are the other key findings:

- About 1 in 6 patients (15.6%) didn't survive their ICU stay.
- We found that men faced a much higher risk of a negative outcome than women.
- Only about 5% of patients needed long-term care for over a month, but a high heart rate was a strong indicator that a patient might have a longer recovery time.

Our analysis was split into two parts to answer two key questions:

- To find out what factors predict patient survival, we built a predictive model using the R language. This approach allowed us to scientifically measure the precise impact of each health variable, like age and heart rate, on the outcome.
- To understand what influences a patient's recovery time, we created an interactive dashboard in Power BI. This provides a visual way to explore the data, making it easy to see trends and patterns in the length of stay.

What We Learned About Patient Survival (The R Analysis)

Our model confirmed that some factors carry more weight than others when it comes to a patient's survival.

- Age is a huge factor. For every additional year of a patient's life, the odds of a negative outcome increase by about 5%.
- A high heart rate also significantly increases the risk.
- One of the most striking findings was related to gender. Even after we accounted for other health factors, men were nearly twice as likely to die in the ICU as women.

- On a positive note, higher arterial pressure was linked to a better chance of survival.

What We Learned About Recovery Time (The Power BI Dashboard)

The dashboard we built made it easy to spot a few key trends related to how long patients stay in the ICU.

- First, we confirmed that long-term stays are relatively rare, with only 510 out of 10,000 patients staying for more than 30 days.
- When we looked for the factor most linked to a longer stay, one variable stood out again: Highest Heart Rate. The scatter plot on the dashboard showed a clear upward trend—the higher a patient's max heart rate, the longer they tended to stay.
- The dashboard also lets us filter and compare specific groups, like patients with hypertension or diabetes, to see how their recovery times differ.

Putting It All Together: Key Takeaways and Next Steps

The story the data tells is clear: an older male patient with a high heart rate is the most at-risk individual in the ICU. This single profile connects both of our analyses.

So, what can we do with this information?

> Pay extra attention to patients with high heart rates. This seems to be the most critical, actionable signal. These patients are the most likely to have a longer, more complicated stay and a higher risk of death. Extra monitoring for this group right from admission could be crucial.