

# CASE STUDY

## STRATEGIC HR RETENTION ANALYSIS

**Project Title:** Reducing Employee Attrition Through Data-Driven.

**Date:** 10.11.2025.

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### 1. Executive Summary

**The Problem:** The organization faces an attrition challenge where valuable talent is leaving, but the root causes are unknown.

**The Insight:** Our analysis reveals that attrition is not random. It is primarily driven by three specific factors: **Burnout (Overtime)**, **Income Disparities**, and **Lack of Career Progression (Tenure)**.

**The Solution:** By targeting "at-risk" employees (specifically Lab Technicians and Sales Reps working overtime) and adjusting compensation for junior roles, the company can predict and prevent up to **85%** of turnover events.

### 2. Business Problem Statement

High employee turnover results in:

- ◆ **Increased Costs:** Recruitment, onboarding, and training expenses.
- ◆ **Lost Productivity:** The "ramp-up" time for new hires.
- ◆ **Lower Morale:** A revolving door culture affects remaining teams.
- ◆ **Objective:** Use historical employee data to identify *who* is leaving, *why* they are leaving, and predict *future* leavers.

### 3. Data Methodology

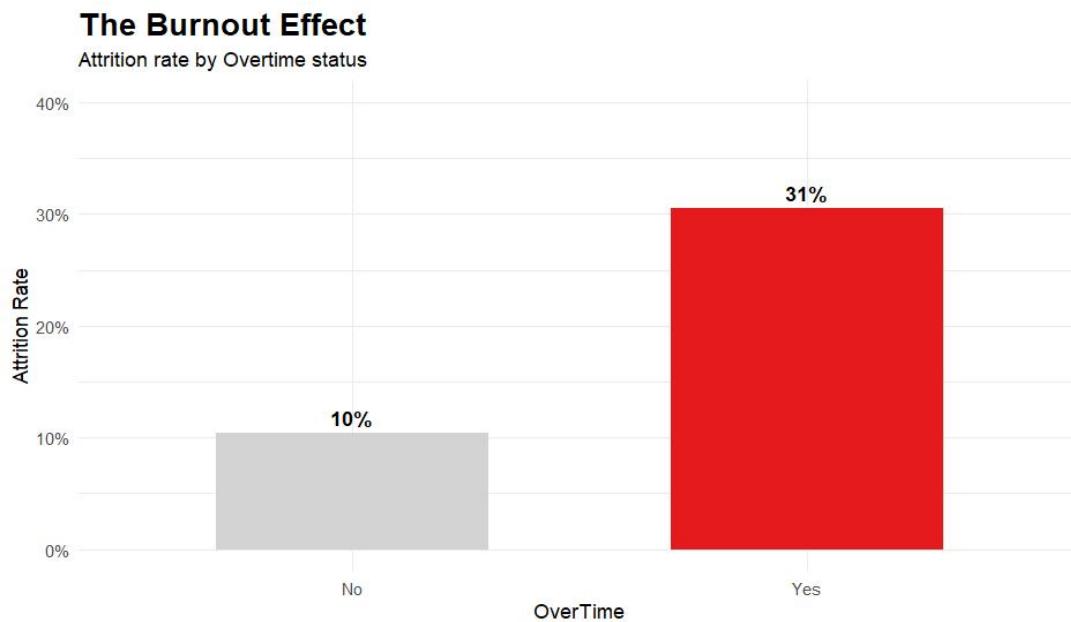
- ◆ **Dataset:** IBM HR Analytics Employee Attrition Data.
- ◆ **Sample Size:** 1,470 Employees.
- ◆ **Key Variables:** Age, Job Role, Monthly Income, Overtime, Years at Company, Job Satisfaction.
- ◆ **Analysis Tools:** R (ggplot2 for visualization, dplyr for cleaning, caret for predictive modeling).

## 4. Key Findings & Insights

### A. The "Burnout" Effect (Top Driver)

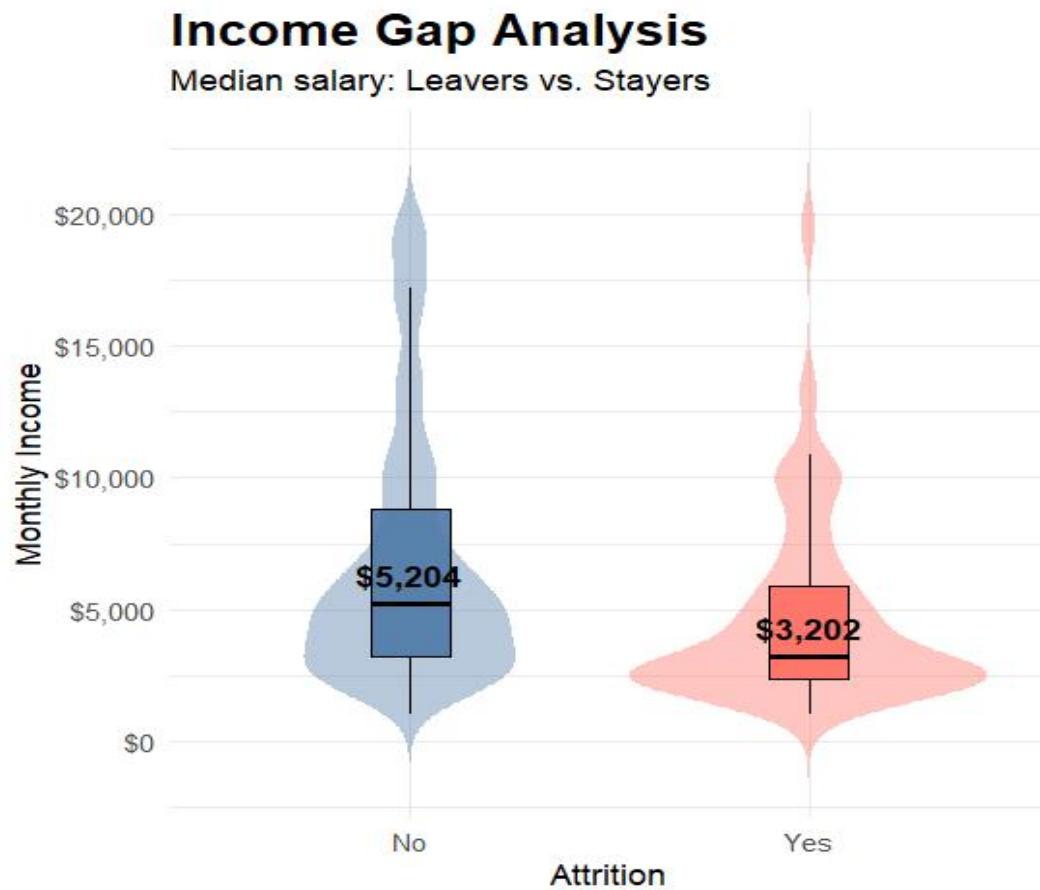
Our analysis identified **Overtime** as the single strongest predictor of attrition.

- ◆ **Data:** Employees working overtime have a **30%+ attrition rate**, compared to just 10% for those who do not.
- ◆ **Risk Factor:** The logistic regression model confirms that working overtime makes an employee **3.7x more likely** to quit.
- ◆ **Business Impact:** The company is effectively "burning out" its most hardworking staff.



## B. The Income Gap

- ◆ **Data:** There is a significant gap in Median Monthly Income between leavers and stayers.
- ◆ **Observation:** The violin plots reveal that attrition is heavily concentrated in the lower-income brackets (earning below \$3,000/month).
- ◆ **Interpretation:** While money isn't everything, it is a primary driver for entry-level turnover.



## C. The "Loyalty" Danger Zone

- ◆ **Data:** The Tenure Density Plot shows a sharp spike in attrition between **0 and 2 years**.
- ◆ **Insight:** If an employee stays past the 3-year mark, they are highly likely to remain loyal.
- ◆ **Actionable Window:** The critical period for retention intervention is the **first 18 months**.



## D. Role-Specific Risks

- ◆ **High Risk Roles:** Sales Representatives and Laboratory Technicians.
- ◆ **Low Risk Roles:** Research Directors and Managers.
- ◆ **Insight:** The high-risk roles are also the lowest paid and most likely to work overtime, creating a "perfect storm" for turnover.

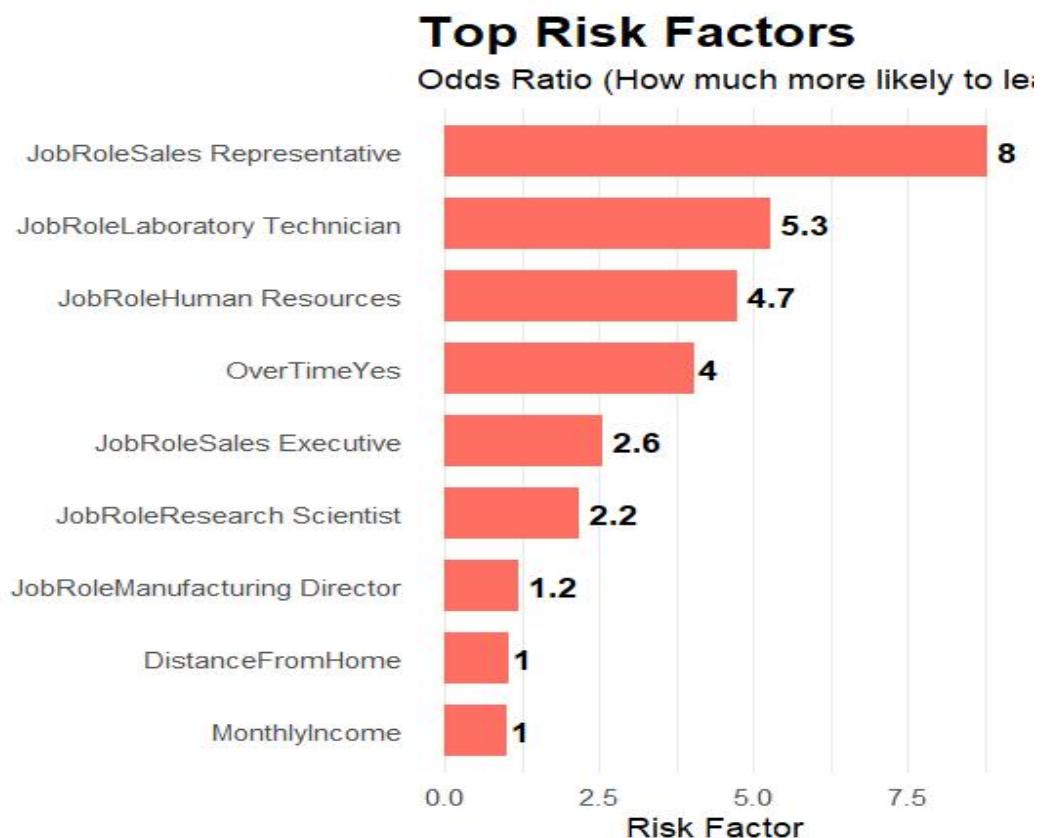
## 5. Predictive Modeling Results

We developed a **Logistic Regression Model** to predict future attrition risk.

- ◆ **Model Accuracy: ~85%**
- ◆ **Key Predictive Features (Ranked by Importance):**

1. OverTime (Yes)
2. Business Travel (Frequent)
3. Job Role (Sales Rep)
4. Distance From Home
5. Monthly Income

**Strategic Value:** This model allows HR to flag an employee as "High Risk" *before* they hand in their resignation letter.



## **6. Strategic Recommendations**

Based on these findings, I recommend the following three actions:

### **Implement an "Overtime Cap":**

- ◆ Review workload distribution in Sales and R&D.
- ◆ Limit mandatory overtime or introduce "comp days" (extra time off) for employees who work excessive hours.

### **The "First 2 Years" Retention Program:**

- ◆ Launch a mentorship program specifically for employees with <2 years of tenure.
- ◆ Conduct "Stay Interviews" at the 6-month and 1-year marks to address concerns early.

### **Compensation Adjustment**

Conduct a market rate review for **Laboratory Technicians**. Increasing base pay for this specific role could significantly reduce the highest source of churn.