

# An essential Precision Staffing Model component: The Predictive Analytics and Optimization Application

## An OSF Innovation Case Study

### THE OPPORTUNITY

Like many health care systems across the country, OSF HealthCare has struggled with the national nursing shortage and its effects across the Ministry, resulting in unpredictable schedules, difficulty matching staffing resources with patient demand, fatigue and high rates of turnover. The health care system has also experienced increased costs in premium labor, which includes overtime pay and having to hire contracted nurses. These factors have led to a need to find innovative ways to have the right nurse at the right time in the right location every time.



### THE SOLUTION

A cross-functional ecosystem of departments that included front line, middle and senior leadership Mission Partners came together to design the OSF Precision Staffing Model. This included identifying ways to optimize every clinical department across the organization; designing staffing standards for scheduling, staffing practices and workflows; and leveraging the Clinical Resource Team to build a flexible workforce. As part of this model, Advanced Analytics, a part of OSF Innovation, partnered with nursing and finance leadership to create an easy-to-use predictive analytics and optimization application to better match patient volume to scheduling.

### THE IMPACT

The Precision Staffing Model was used in three of the largest hospital facilities within OSF HealthCare over a six-month period, primarily for inpatient care. This resulted in a .7% reduction in the cost of overtime, incentive shifts and travel—equating to \$2 million in savings. The model has now been deployed in most inpatient departments. Once the model is fully implemented in the inpatient departments, the estimated impact is projected to be about \$7.6 million.

#### OSF HEALTHCARE

OSF HealthCare, headquartered in Peoria, is owned and operated by The Sisters of the Third Order of St. Francis, and consists of nearly 21,000 employees in 126 locations, including 13 hospitals, 11 Centers for Health and 15 OSF PromptCares throughout Illinois and Michigan. More at [osfhealthcare.org](http://osfhealthcare.org).

#### OSF INNOVATION

Launched in 2016, OSF Innovation is the overall umbrella initiative for the planning, structure, goals and services OSF HealthCare uses to innovate for the improvement and transformation of health care.

To learn more, visit [osfinnovation.org/CaseStudies](http://osfinnovation.org/CaseStudies)

## CREATING THE RIGHT WORKFORCE

The scheduling and staffing of nurses has remained problematic in health care systems around the U.S. for years. Many times, nurses are either called in on days when they aren't supposed to work or sent home due to low patient census. In some cases, these members of the clinical staff are putting in overtime, leading to a lack of work-life balance and fatigue.

Research suggests overworked caregivers feel they have less time to provide adequate care for patients and are less likely to be engaged, more prone to make mistakes and less inclined to take care of themselves—resulting in burnout and high rates of turnover. Struggles with over- and understaffing of nurses also lead to increased costs for health care systems.

OSF HealthCare wanted to find innovative ways to improve its scheduling and staffing processes across the Ministry with the purpose of having the right clinician at the right time at the right place. The overall goal is to retain care givers, achieve quality care and enhance its financial stewardship.

## BUILDING A PREDICTIVE MODELING AND OPTIMIZATION APPLICATION

OSF HealthCare enlisted an ecosystem of departments to brainstorm ways to optimize every clinical department across the organization. What was developed was an overarching Precision Staffing Model that includes new standards for scheduling, staffing practices, nursing hour per patient day targets by type of unit, position control and variance reports.

As the standardization process was taking place, Advanced Analytics, a part of OSF Innovation, worked with nursing and finance leadership to develop an easy-to-use predictive analytics and optimization application to better match patient volume to scheduling. The solution allows end users to predict staffing demand based on historical patient volume data as well as benchmarking with similar institutions.

The application also forecasts the probability of needing a certain number of nurses every hour of every day over a year-long period. All of that information goes through a two-stage optimization with the first taking into account the cost for varying levels of nurse types, including core, flexible and planned premium labor to inform staffing levels.

The second stage estimates how many members of each staff are needed to meet patient volume demands with consideration for those who might not be available due to clinical mandatory training, time-off and other issues. This helps determine how many flexible and overtime nurses may be needed.

Clinical departments are provided with the number of Mission Partners who need to be scheduled and staffing grids, allowing them to have the right amount of nurses and techs to care for their patient demand.

## PHASED IMPLEMENTATION OF THE MODEL

The Precision Staffing Model was used in three of the largest hospital facilities within OSF HealthCare over a six-month period, primarily for inpatient care.

This resulted in a .7% reduction in the cost of overtime, incentive shifts and traveler contracts—equating to \$2 million in savings as well as the development of more consistent work schedules, improvement in work-life balance and needed workforce support from flexible staff.

The Precision Staffing Model was expanded across the Ministry in February 2019 for inpatient care. At the last report, the cost of overtime, incentive shifts and traveler contracts were reduced by more than 7.5%.

The estimated impact of a fully implemented Precision Staffing Model to inpatient departments is projected to be about \$7.6 million, and will lead to improved quality care, patient experience and increased Mission Partner engagement.

*“This is nursing driven. While there is some financial benefit, this project is about matching resources with patient needs, balancing the workload for staff, improving Mission Partner engagement and delivering great quality care and service for our patients.”*

—DAVID STENERSON, VICE PRESIDENT OF FINANCE  
FOR THE CENTRAL REGION

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