

Using Nurse Staffing and Scheduling “Big Data” to Improve the Quality of Nursing Worklife

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Agenda

- 1 The importance of staffing in Nursing's Worklife
- 2 The current challenges
- 3 Addressing complexity with a big data solution
- 4 Logistics science & mathematical modeling
- 5 Optimizing Worklife: Case study

The International Evidence Is Overwhelming

Chinese study demonstrated nurse staffing associated with job dissatisfaction...	<i>Lu et al in Journal of nursing management 2015</i>
Finnish study demonstrated effective of staffing on nurse well being...	<i>Heponiemi et al in International journal of nursing studies 2011</i>
Mandatory OT, floating...	<i>Hendren in HealthLeaders 2016</i>
Sufficient staffing, flexible scheduling...	<i>Lengerich et al in JONA 2017</i>
Relationship between staffing, care quality & staff satisfaction...	<i>Koy et al in International journal of research in medical sciences 2015</i>
Staffing a significant positive predictor for staff satisfaction...	<i>Kalisch in the Journal of nursing management 2012</i>
Improved staffing likely improves job satisfaction...	<i>Hairr, et al in Nursing Economics 2014</i>

The Intractable Nature of the Problem

Nurse staffing problem is a combination of mathematical complexity and process challenges

Overstaffing or understaffing occurs when staffing is based on average daily census and HPPD alone

Staffing and scheduling policies and practices which are not data driven often lead to unintended consequences

Improving staffing and scheduling requires both a qualitative as well as quantitative solution



UPS Optimization Problem

The average driver makes **120 stops/day...**

*How many **alternatives** are there for ordering the stops?*

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* Wall Street Journal February 17, 2015

The Solution

A heuristic exercise, requiring a **1,000 page** Orion algorithm which was written by **50 UPS engineers** searching for the *Best* possible answer.

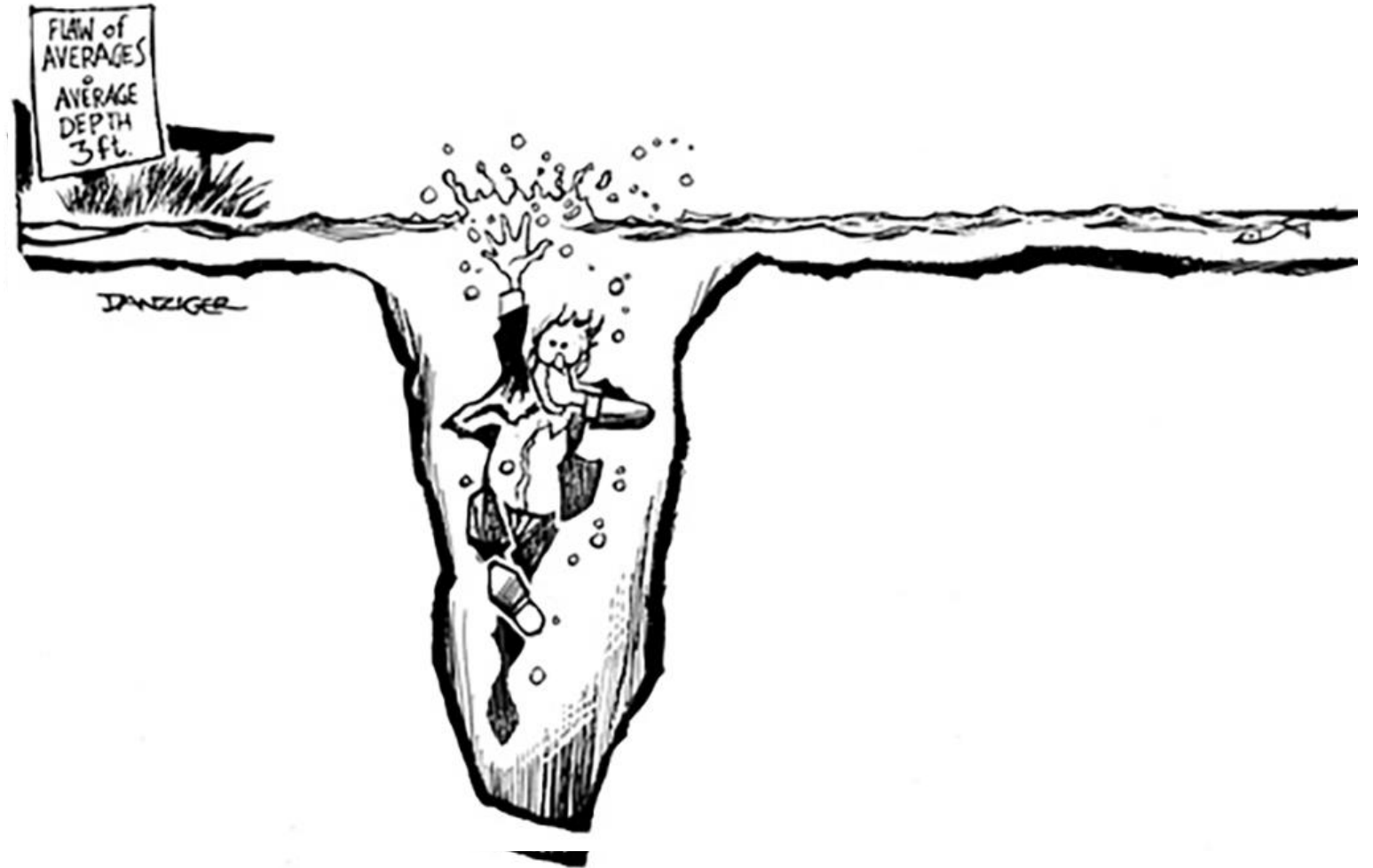
It took them **6 months**.

Not dramatic until you consider there are **55,000 routes/day** in the US alone

The Flaw of Averages

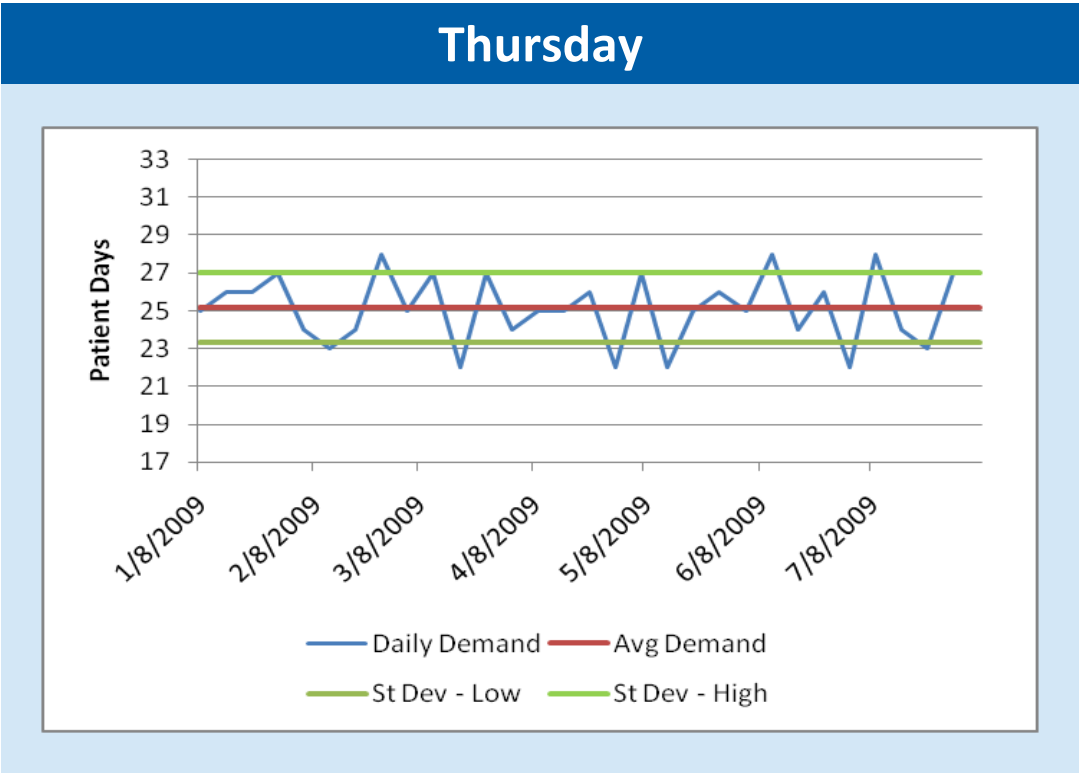
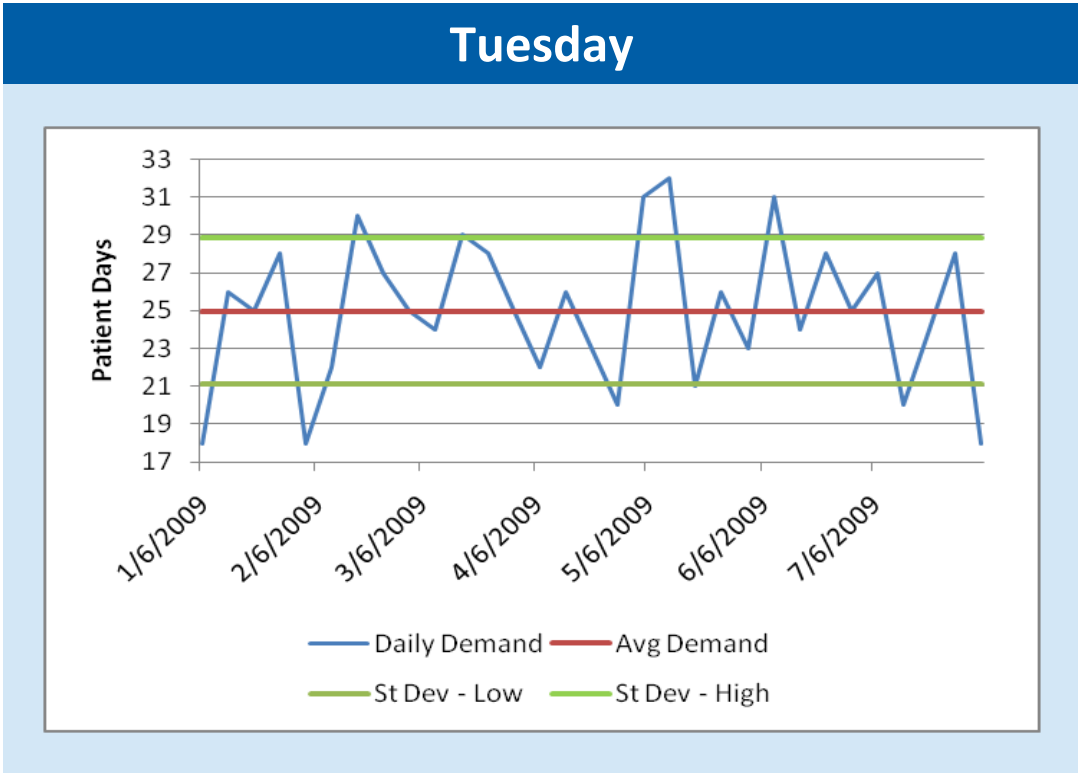
A classic case of the Flaw of Averages involves a statistician who drowns while crossing a river that is 3 ft. deep on average.

This poignant rendition by Jeff Danziger accompanied Dr. Savage's October 2000 article in the San Jose Mercury



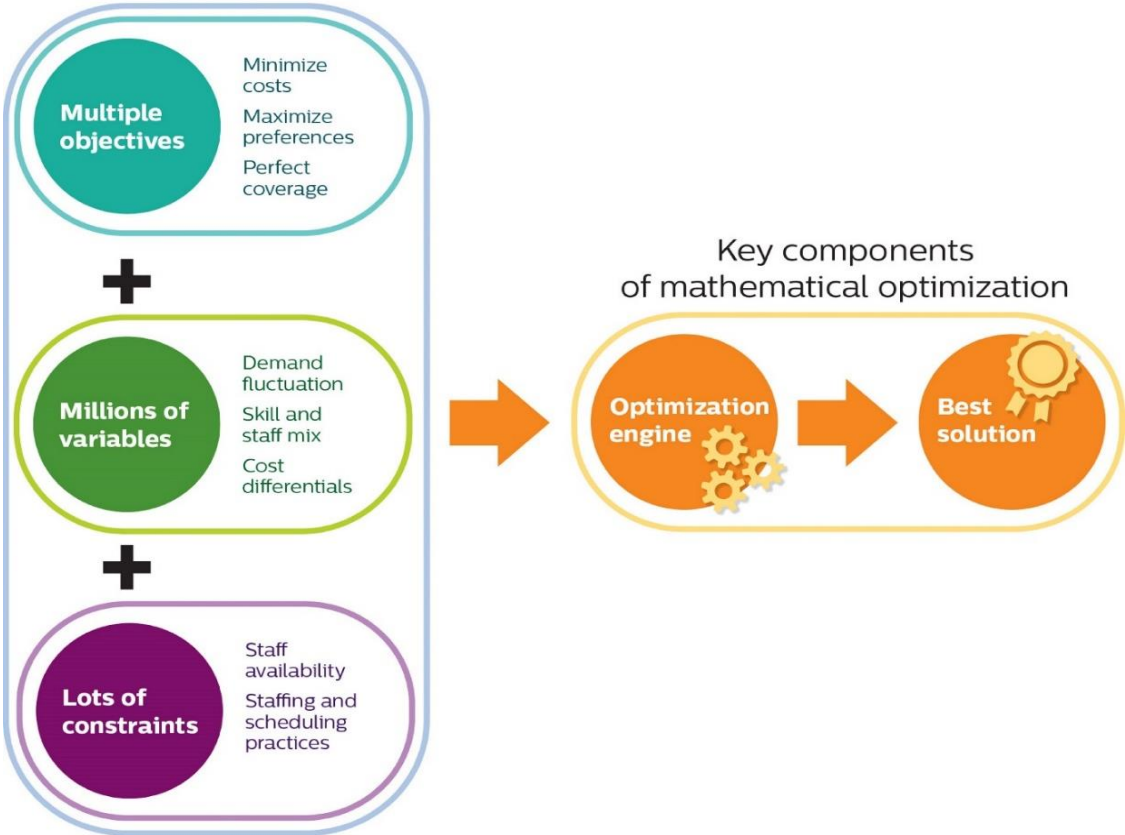
The Flaw of Averages Impacts Staffing

The two days below have the **same average demand**, but Tuesday fluctuates between 18 and 32, whereas Thursday only fluctuates between 22 and 28.



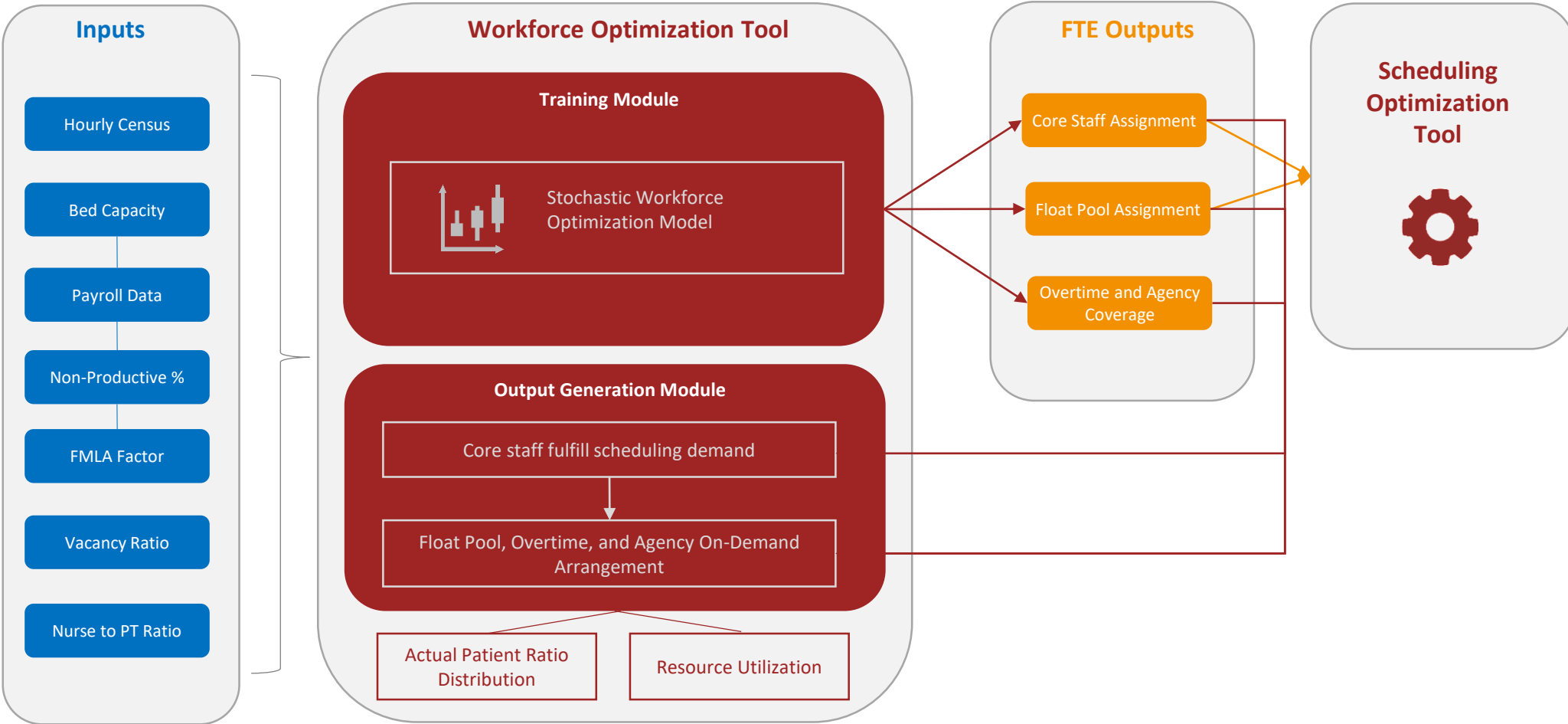
Workforce Optimization: Optimization Concepts

Workforce Optimization Model



Optimization takes decision making from **what if** to **what is best** solutions, arranging the elements of this Optimization Engine to produce a staffing strategy **optimized to best coverage at the lowest cost**, while recognizing the importance of work-life balance.

Workforce Optimization: Two-Stage Model Construction



Measures of Success

Case Study: 12 Hospital System

Key Result Areas from 2020 Strategy	Metric	2015	2016
Quality	Unassisted Patient Falls: Target 80 th Percentile	87 th Percentile	87 th Percentile
Service – Associate Engagement	AHRQ Survey – Perception of Staffing Composite Score: Target 50 th Percentile	39 th Percentile	54 th Percentile
Service & Funding Our Future	% of Units Meeting Targeted HPPD: Target 80%	50	80
Funding Our Future	Nursing Labor Cost as a % of Net Patient Service Revenue (year over year analysis) Target < 0.0%	12.77%	11.66%
Funding Our Future	Nursing Labor Cost as % of Cost Per Discharge	\$1,193.19	\$1,171.81

Therese Fitzpatrick, *Senior Vice President*

Therese Fitzpatrick is a Senior Vice President of Kaufman Hall and a member of the firm's Strategic and Financial Planning practice, specializing in Strategic Cost Management. Her responsibilities focus on providing consultation to hospitals and health systems across the country in assessing their clinical and operational performance, and developing effective strategies to enhance efficiencies and optimize staffing.

Dr. Fitzpatrick has 40 years of healthcare experience spanning operations and policy development in local, regional, and global markets. Her areas of expertise include strategic management of clinical and administrative services, analytic and financial competencies, labor relations and contract negotiations, and strategic workforce optimization with specialty focus in developing clinical staffing algorithms based on advanced modeling and scheduling policy.

Prior to joining Kaufman Hall, Dr. Fitzpatrick was a Principle and Practice Operations Lead for Philips Healthcare North America. In that role she provided strategic and analytical support to governments, regional entities, and individual hospitals and health systems in creating sustainable population health solutions and clinical/business performance improvement across the continuum of care. Her previous positions include serving as Executive Vice President at Assay Healthcare Solutions and The Optime Group, as Senior Vice President at Evanston Northwestern Healthcare, and as Senior Vice President and Chief Nursing Officer at St. Francis Hospital in Milwaukee.

Dr. Fitzpatrick holds a Ph.D. in Urban Studies from the University of Wisconsin, Milwaukee, and a Masters in Nursing Administration and a B.S.N., both from DePaul University. She was inducted into the American Academy of Nursing in 2016, and is an Assistant Clinical Professor in the College of Public Health at the University of Illinois at Chicago.

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