Ambulatory Staffing Optimization through the Development and Implementation of a Staffing Tool in a Community Based Primary Care and Specialty Clinic Setting

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Abstract

Allied Health staffing has been a multi-decade challenge for many healthcare organizations and has become a crisis for nearly all healthcare organizations throughout the COVID-19 global pandemic. Mayo Clinic Health System in the Southwest Minnesota Region was not immune to these challenges. Recognition that staffing issues needed to be clearly defined, articulated, and planned served as a catalyst for developing and implementing a novel systematic approach coupled with process optimization using the staffing to workload tool. This revelation led to the present study, which explored establishing a centralized prospective staffing model for ambulatory clinics in the health system region. The study leveraged agile methods, widely utilized as a project management technique in the software development life cycle. Agile methodology has also been referred to as a mindset and principle where continuous feedback is incorporated on the product or service line being developed, along with the progress made, which was also an essential element of this study. Apart from establishing a staffing model, achievements made within this study included benchmarking well-established staffing related key metrics to national benchmarks, setting up a structure to manage staffing guidelines and standards centrally, an overview of key performance indicators and metrics as a region apart from siloed managing of resources by clinical sections and departments, and setting up processes to manage staffing and metrics of success on an ongoing basis. The work resulted in effective staffing to workload tool, allowing frontline leadership to identify and articulate staffing needs based upon outpatient visits and predictive capabilities in a practice or provider template change. Findings were well received by the key stakeholders, leadership constituencies, frontline leadership, and staff.

Keywords

Outpatient staffing model, agile, Plan-Do-Study-Act, staffing to workload, ambulatory.

1. Introduction

According to National Health Expenditure Data, healthcare spending in the United States grew 9.7% in 2020, reaching $4.1 trillion, equivalent to approximately $12,530 per person (CMS, 2021). As a portion of the country's Gross Domestic Product (GDP), United States healthcare spending accounts for 19.7%. Staffing shortages in

healthcare have been a well-acknowledged long-time problem. However, the COVID-19 pandemic highlighted this issue more. Due to the increased shortages in staffing, hospitals are compelled to incur increased costs during the ongoing pandemic (AHA, 2021). This leads to added spending in healthcare costs in the United States. Among all types of healthcare workers, a shortage of doctors and nurses, especially in rural areas of the United States, has been a widely discussed, long-standing topic of concern and exploration for policymakers and healthcare organizations (Burrows et al., 2012). Kissi et al. (2021) reported 151 rural hospital closures from 2005 to 2020.

On the other hand, inefficient and unstandardized processes, matrixed, multilevel, and complex organizational structures, various non-value-added operational workplace waste, and non-value-added clinical variation waste contribute to the overburdened and costly healthcare systems in the United States (IHI, 2022). The United States healthcare ranks last in health outcomes, equity, access, and quality compared to most developed countries in the world. However, this is also one of the few developed countries globally leading in the use of innovations and advanced technology in healthcare (Bhandari et al., 2020). The use of predictive analytics in healthcare has increased significantly in the last couple of decades which can be attributed to, but is not limited to, increased transparency in high-quality patient data, increased collaboration between clinicians and industrial engineer type jobs in research, innovation, and optimization work, increased knowledge, and shift in the healthcare organizations regarding being proactive versus reactive in delivering high-quality care, and availability of advanced computer programs and infrastructure to support complex calculations (Liu et al., 2019; Benneyan & Balint, 2015). This study is regarding the use of predictive analytics in community-based primary care and specialty clinic at one of the health system regions of Mayo Clinic in the Midwest United States. Among many other opportunity areas in community-based outpatient settings, such as scheduling, flow, access, quality, etc., standardization in staffing practices is less explored.

Mayo Clinic Health System (MCHS) in Southwest Minnesota Region is one of four community-based health system sites offering 25+ ambulatory care departments through three main clinical sections - medical, surgical, and primary care, to approximately 160,000 unique patients equating to about 350,000 outpatient visits annually. Leadership support across all clinical sections includes dedicated triads, including physician, nursing leadership, and operations leadership. This project specifically called upon nursing administrators and managers, operations administrators and managers, management engineering, and finance colleagues to collaboratively build the analysis and recommendations, including staffing ratios, decision support toolsets, and disciplined processes for ongoing allied health clinic staffing management.

Each clinical area is supported by a Nurse Manager, Operations Manager, Nurse Administrator, and Operations Administrator. These leaders collaborate with the practice chair and frontline staff to develop a staffing model to provide patient care and support the practice. Each practice area includes allied health support roles of Certified Medical Assistant, Medical Assistant, Licensed Practical Nurse, and Registered Nurse. Desk Operations Specialists play a role in the specialty practice. During this project, Patient Care Specialists in the Primary Care practice were added to assume duties that the nursing staff completed that do not require a nursing license.

1.1 In and Out of Scope

This study only includes the following roles which are also termed as allied health staff:

- Nursing: Registered Nurse (RN), Licensed Practical Nurse (LPN), Certified Medical Assistant (CMA), Medical Assistant (MA)
- Desk Operations Specialist (DOS) and Patient Care Specialist (PCS)

This study does not include front desk staff, Physician, Nurse Practitioner, or Physician Assistant roles.

2. Statement of the Problem

With the onset of COVID-19, MCHS in the Southwest Minnesota Region realized an opportunity to bring all ambulatory practices together to review current staffing practices and processes. Staffing practices and processes were working well for individual departments. Because of this, a centralized, comprehensive approach was not taken previously, as each practice had grown organically, and depending on the need and available resources at the time of the practice formation, staffing standards and processes were established. Over the years, various leaders have made changes but mainly on a practice-by-practice basis versus as a single-specialty clinic.

3. Aim and Objectives

The aim of this study was to understand and build on the top of what was already done regarding outpatient staffing standards in the Southwest Minnesota region. Below are the objectives of the study:

(i) Develop and implement a novel staffing model which will encompass
   a. Types of nursing/non-nursing workload
   b. Rooming workload algorithm
   c. Non-visit care workload.

(ii) Optimize the base model towards staff working at the top of their licensure.

(iii) Develop and implement Desk Operations Specialist (DOS) and Patient Care Specialist (PCS) role to support non-nursing work and functions.

(iv) Develop and implement an executive leadership metrics dashboard to provide departmental view, clinical section view, and regional roll-up of key performance indicators.

4. Methodology

This study is applied research where available and understood knowledge in the field of study was used to solve real-world healthcare problems. Bhandari et al. (2021) applied to lean Six Sigma DMAIC tool for inpatient surge planning in light of the COVID-19 pandemic. The present study used the following framework, which is closely aligned with the agile methodology of a software development life cycle and project management as well as a lean methodology where trial and error in terms of Plan, Do, Study, and Act (PDSA) cycle is utilized before the developed staffing model and processes were fully rolled out. Agile and waterfall methodologies have been widely used in most industries, apart from the software sector, such as healthcare and manufacturing. Under the New Product Development (NPD) philosophy, as new product or service lines are developed, the 'one size does not fit all' approach is widely used. In other words, based on various internal and external factors, the product development methodology or style needs to be adjusted (Schuh et al., 2017). The agile methodology involves flexibility and a continuous improvement technique paired with a team consensus approach. Agile also requires ongoing regular touchpoints where constant feedback is gathered and incorporated in developing and implementing a product or service line (Pool et al., 2019). Hence, the methodology for this study involved agile methodology centrally aligned with a Build Measure Learn (BML) cycle approach shown in Figure 1, where learnings are being continuously incorporated on an ongoing basis (Chang, 2018; Macfarlane, 2014).

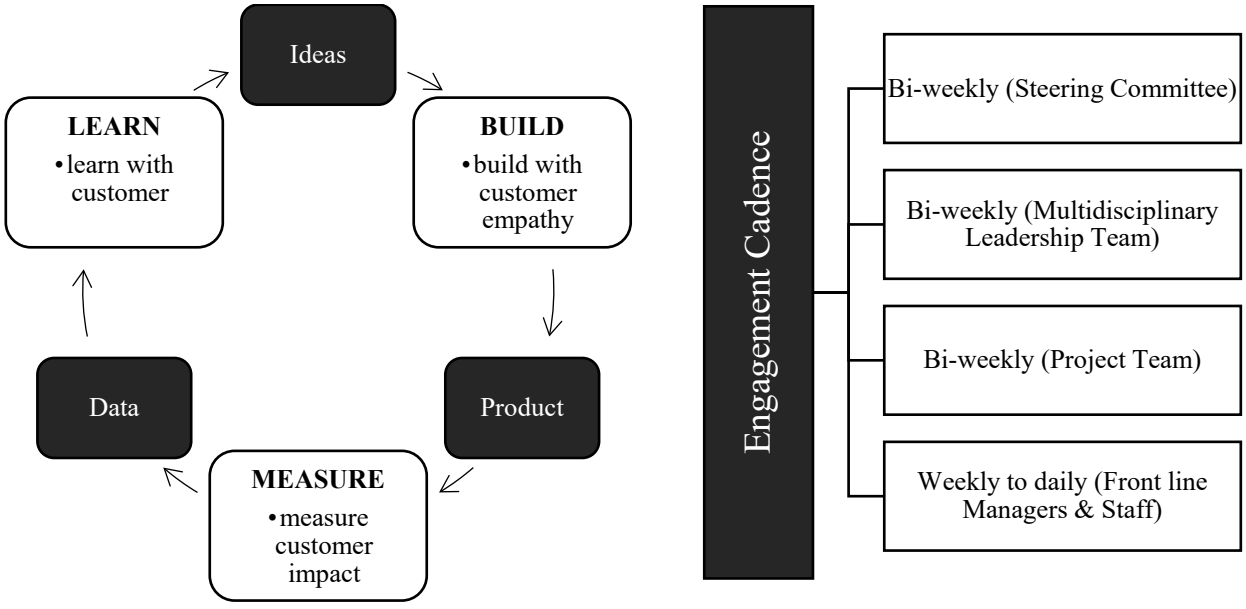

Figure 1. Study Framework and Engagement Cadence

The ***Discover phase*** involved understanding different practices within three clinical sections, i.e., medical specialty, surgical specialty, and primary care. Documentation of current state staffing standards and processes was also part

of the discovery phase. The ***Design phase*** involved drafting various input factors and the output that would translate to the number of staff on the floor for a specific department. This was determined at a clinical section level. One of the essential components of information gathered during this phase was the data sources for the metrics used as input factors. ***The Develop phase*** involved the creation of an actual staffing model in Microsoft Excel. Primarily, this was carried out with only one clinical section, i.e., medical specialty. First, the tool's rollout was launched in a 2-week window where one medical and one surgical specialty was chosen. Learnings from the trial period were documented, and feedback was taken back to the developer of the staffing model. This process continued as other clinical sections started piloting the staffing model in their areas. Once the staffing model was considered mature enough and ready to be live, the model was implemented with appropriate processes and process owners in place, which was part of the ***Implement phase***. As part of the ***Sustain phase***, the last but critical phase of the framework was to sustain the achieved positive outcomes of the project, where the development and implementation of the staffing model was the core of the entire study. This was assured through an ongoing once-per-month meeting where key leadership proponents were invited. Appropriate protocols were established, such as standard agenda items, executive leadership metrics dashboard, coordination through the staffing office, etc. Throughout the lifecycle of the project, engagement cadence was utilized to sustain continued gains in operational excellence; however, as the project team transitioned from the project phase to day-to-day operations, an ongoing structure was deemed appropriate, which was established in the form of the monthly meeting titled "Staffing-to-Workload Standards and Metrics Review" meeting.

Data utilized in this study included all the information and metrics that did not have any patient related information or identifiers. This study does not meet the human subjects research criteria so Institutional Review Board (IRB) request and approval was not required.

5. Results

5.1 Benchmark Commonly Used Metrics in Outpatient Staffing

Through the engagement of an expert from an external business consulting firm, staffing ratios for all three clinical sections (medical specialty, surgical specialty, and primary care) were established for all clinical activities. The analysis utilized Medical Group Management Association (MGMA) outpatient staffing ratio guidelines. At the 50th percentile reference point, the primary care clinical section stood out as an outlier, while medical and surgical clinical sections were closer to the national benchmark staffing ratios.

5.2 Development and Implementation of Desk Operations Specialist (DOS) role

The formal DOS role already existed in the MCHS Southwest Minnesota region before the launch of this initiative. However, it existed only within the access and scheduling groups and not the direct patient care teams. There was an overlap in duties between envisioned DOS roles within the direct patient care teams versus DOS within the access and scheduling group, but they were strategically two distinct roles. Utilizing DOS within the care team was initiated based on the learnings from outpatient practices at Mayo Clinic, Rochester. To formally understand the scope and duties of the DOS role within the direct patient care setting, a team of leadership from Southwest Minnesota outpatient practices conducted a site visit at Mayo Clinic, Rochester, and documented learnings. Based on Mayo Clinic, Rochester site visit findings, steering group feedback, and leadership approval, it was suggested to initially pilot the clinical DOS role in the region as part of the care team on a smaller scale. Through the project work, two pilot departments (Pulmonology and Orthopedics) were selected, where it was determined that the DOS role would be piloted, and lessons learned documented. Based on the feedback collected and overall pilot success, the project plan would be developed accordingly regarding a soft rollout of DOS roles in the region.

In developing the DOS role in the Southwest Minnesota region, high-level visioning sessions were conducted to identify the vision, the why for the role, and the scope of work and to determine the list of top 5 tasks the DOS role would perform. Below is the list of top 5 tasks identified by the team:

TASK 1: Paperwork, administrative and clerical task
TASK 2: Review of pre-appointment completion and available reports (also includes pending orders & chart prep)
TASK 3: Supply chain functions (Ordering supplies and putting them away, checking out dates, stocking exam rooms, ordering patient education materials, sending instruments to sterile processing department, fire extinguisher check, etc.)
TASK 4: Rooming and vitals (also includes cleaning the room and chaperoning)

TASK 5: Scheduling/reception tasks, including complex scheduling

After the successful trial of 2 DOS roles in the region, a preliminary reporting structure, training, orientation materials, and an ongoing hiring plan were established. In the fourth quarter of 2021, the Southwest Minnesota region began preparing for expected staffing shortages due to Mayo Clinic's COVID-19 vaccine mandate and general staffing shortages in several outpatient areas. Thus, leadership approved the recruitment of an additional five DOS roles within the care team setting in December 2021.

5.3 Novel Staffing Model for Specialty Clinic (Primary Care, Medical, and Surgical Specialties)

To achieve the regional goal of streamlining staffing to workload management, it was essential to take stock in the learnings from departmental history and evolution, their unique needs, past and continued work in the outpatient staffing to workload space, and learnings from COVID-19 pandemic staffing challenges. A novel STW Model/Tool was desired to build on these learnings and move the practice forward. A complete overview of the STW modeling tool and the surrounding ecosystem of infrastructural components needed to establish an overall strategy for managing closed loop staffing to workload system is detailed in Figure 2.

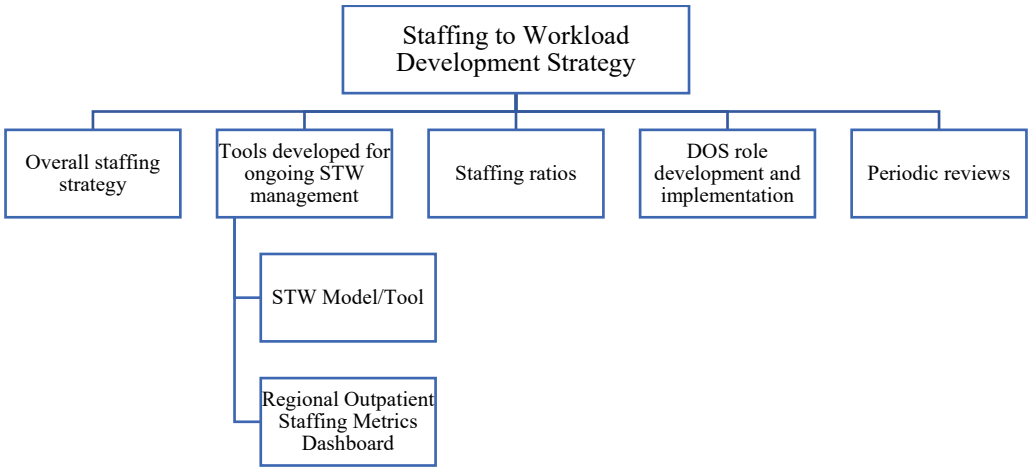

Figure 2. Staffing to Workload Development Strategy

5.4 Traditional Staffing Strategies

Ambulatory staffing is multifactorial and based on outpatient visits (OPVs), procedures, provider support, patient panel support outside of the visit, nurse visit support, virtual care, and quality work. The LPN/CMA role supports face-to-face, virtual visit care and pre/post-visit care planning, while the RN promotes coordination of care, patient education, triage, non-visit care, and nurse visits. Unlike Mayo Clinic, Rochester's outpatient practice, the DOS role was not utilized within the care team setting in Southwest Minnesota Region.

Based on the current state practice, all three clinical sections rely on Electronic Health Record (EHR), Epic, data to understand the provider schedule, scheduled provider and nurse visits, and non-visit care-related work for their departments. Allied health staffing was based on an individualized approach for each department, considering a prospective posted schedule and day-to-day staffing adjustments. These scheduling strategies were unique to each clinical section, specific to each department or location, and often unique to each scheduler. They relied mainly on a combination of EHR information, knowledge of the nuances of some departments, needs of individual providers or types of visits, and tactical adjustments needed to accommodate for vacation, unplanned PTO (Paid Time Off), low need, etc. It was also evident that historical STW data was not systematically reviewed to determine future staffing needs. The MCHS Southwest Minnesota region had not in recent years evaluated staffing ratios involving providers, nursing, OPVs, RVUs, etc., with benchmarks available within Mayo Clinic or from the industry.

A high-level summary of the current state practice of STW strategies in the three clinical sections are:

- ***Medical Specialties*** staffing was based on outpatient visits, providers in the clinic, nurse visits, and non-visit care work. The source of truth for visits was the provider/resource schedule in the EHR. The LPN/MA role currently supports patient visits at a 1:1 ratio, and the RNs support nurse visits at a 1:1 ratio with additional FTE for non-visit care work. Other considerations included virtual visits, clinic procedure support, and walk-in visit support.
- ***Surgical Specialties*** were staffed based on outpatient visits, providers in the clinic, nurse visits, and non-visit care work. The source of truth for the patient load was provider visits, nurse visits, and nurse procedures. The workload was determined via OPVs for a short-term outlook and templates for a long-term perspective. The LPN/MA role supported patient visits at a 1:1 ratio; the RNs supported nurse visits at a 1:1 ratio with additional FTE for non-visit care work. Other considerations included virtual visits, clinic procedure support, high-level disinfection compliance, and walk-in visit support.
- ***Primary Care*** was staffed based on outpatient visits, providers in the clinic, nurse visits, quality, and non-visit care work. The source of truth for visits was the provider/resource schedule in the EHR. Providers' schedules were staffed at an LPN/MA to provider ratio with the reduction in staff at reduced fill rates (either 1:1 or 1:1+1). RN resources were staffed based on the current weighted panel size ratio. Additional considerations include virtual visits, clinic procedure support, and walk-in visit support.

The Staffing process also showed significant variation from team to team in tandem with different scheduling strategies, needs of the department, preferences of the scheduler, and size of the team. A sample process for the Medical Specialties team in Mankato is provided in Figure 3.

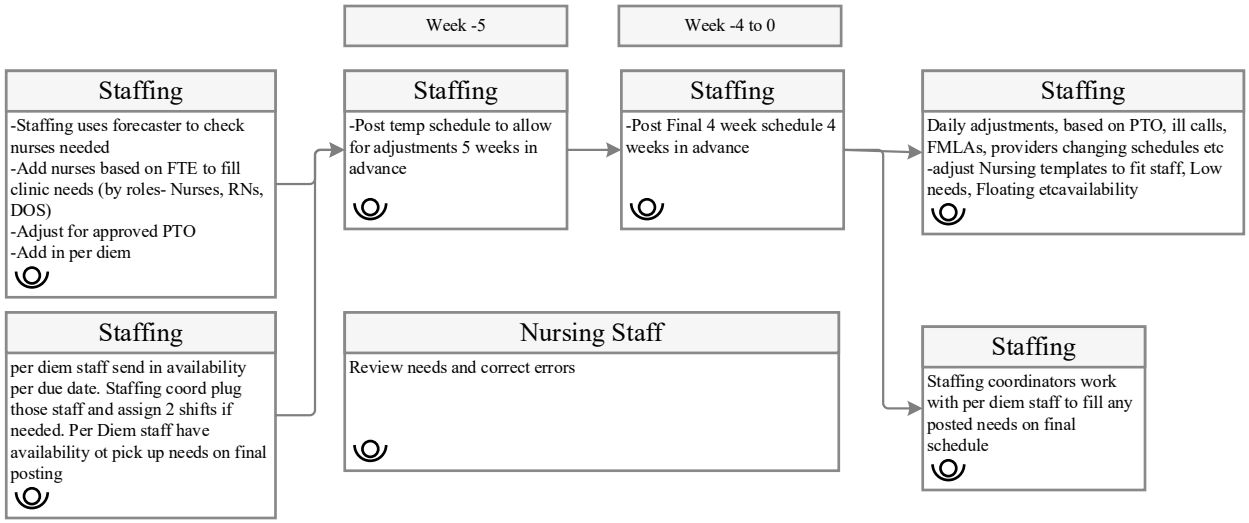

Figure 3. Scheduling Process for Medical Specialties, Mankato

5.5 Historical approaches to STW management and key learnings

A large body of work has been done in the Staffing to Workload management space. From an agile perspective, the storyboard direction for tool development determined that leadership needed a tool to predict staffing needs accurately. The staffing predictions allowed for proactive planning from multiple perspectives of capacity sizing, proactive hiring, and budget planning. To address development strategies, various potential solutions, including seasonal trend analysis, overall department staffing ratios, and fill rate probability-based approaches, were explored to achieve more accurate predictions.

Small teams were formed consisting of nurse managers, operations managers, and development leads who worked with a Build Measure Learn Approach to rapidly ideate, build, measure, validate, and quickly pivot as needed while developing a Minimum Viable Product to meet the goal of STW management.

Several insights were fleshed out from past challenges and the current work review. Some of the significant learnings were:

- Validating the effectiveness of predictive tools was challenging as no objective criteria or metric currently exists. Validation is based on the opinion of nurse schedulers, and variances in the preferences and opinions of the schedulers make validation and consensus difficult.
- Given the complexity of variables and multiple staffing strategies, staffing outcomes have a high level of variance. While predictive approaches might average close to actual staffing, accuracy proved to be a concern in terms of day-to-day staffing. Predicted staffing levels created a perceived benchmark against which actual staffing was measured. This led to an ongoing need for nursing to defend actual staffing levels, thereby reducing the team's ability to use prediction-based plans for budget and recruitment confidently.
- The three sections, medical, surgical, and primary care, did not possess a common language or platform regarding staffing ratios or efficiency metrics.
- Staffing and Scheduling within the Department of Nursing include multiple stakeholders. Three key stakeholders included nursing, operations, and leadership. While independent entities, nursing and operations worked closely together and needed a staffing metric that unified the teams and improved collaboration. Additionally, robust fiscal planning and budgetary compliance was key goal of leadership.

Given this context, a strategic pivot was deemed appropriate, and the agile storyboard was rewritten with new modified storylines. The modified storyboard was:

- As a Nurse Manager, I need a tool that consistently applies my chosen scheduling strategy to the current patient load with 100% accuracy.
- As an Operations Manager, I need efficiency metrics and projected staffing levels that Nurse Managers would validate with high confidence.
- As a leader, I need a common platform that unifies the Operations and Nursing teams and the three sections over a shared metric for staffing that I can use for recruitment and fiscal planning.

This development strategy led to several vital choices. First, a predictive approach was abandoned. Instead, the new effort was to build an algorithmic model that replicated the actual staffing strategies of the Nurse Schedulers allowing the ability to make staffing projections that would match schedulers' opinions with 100% accuracy. Second, given the sheer scale of complexity and the large number of teams involved, creating a Minimum Viable Product (MVP) in Excel was deemed essential rather than a more robust approach utilizing IT resources to program a custom solution. The idea was to remain nimble and be able to respond quickly as new learnings came to light. Finally, the 'Nail it before you scale it' approach of Lean Startups was the guiding philosophy to avoid the higher cost of labor and time if every solution iteration was operationalized with higher probabilities of inaccuracy. In keeping with the agile approach of Build-Measure-Learn, every iterative change in the product was followed up by immediate validation with small teams for accuracy in a continuous learning cycle (Chang, 2018).

5.6 Novel staffing model for Staffing to Workload

Using an agile approach, a novel staffing model and forecaster for STW were developed and implemented. A vital component of the STW tool was the three staffing forecasters that were developed: one for each section. The tools predict desired staff scheduling based on filled or expected patient load. Figure 4 depicts a staffing projection example for the Ear Nose Throat (ENT) department.

1		ENT	Mon	Tue	Wed	Thu	Fri	Mon	Tue	Wed	Thu	Fri
PROVIDER VISITS	AM	Filled	31	15	21	44	13	12	23	31	39	1
	PM	Filled	32	21	16	16	7	20	14	22	21	2
PROVIDERS	AM	All	3	2	2	3	1	1	2	3	3	1
	PM	All	3	2	2	2	1	2	1	2	2	2
	Providers: Mankato	Staff-AM	3	2	2	3	1	1	2	3	3	1
		Staff-PM	3	1	2	2	1	2		2	2	2
LPN/CMA STAFFING	Projected Total	Staff-AM	4	3	2	3	2	2	3	3	3	2
		Staff-PM	4	3	3	3	2	3	2	3	3	3
		OPVs Per Hr	3.88	2.25	2.24	3.58	2.50	1.97	2.28	3.31	3.69	4.7
RN STAFFING	Projected	Staff-AM	1	1	1	1	1	1	1	1	1	1
		Staff-PM	1	2	1	1	1	1	2	1	1	1
		OPVs Per Hr	4	2	2	4	3	2	2	3	4	2

Figure 4. Staffing Forecaster

5.7 Staffing efficiencies and working to Top of Licensure

The staffing model mirrors the staffing strategy for Mayo Clinic regarding working to the top of licensure. Within this construct, the model is designed to optimize accurate nursing capacity in proportion to provider support needs, patient rooming needs, and other non-visit care work needed to continue day to day functions of the department. The model is outlined in Figure 5.

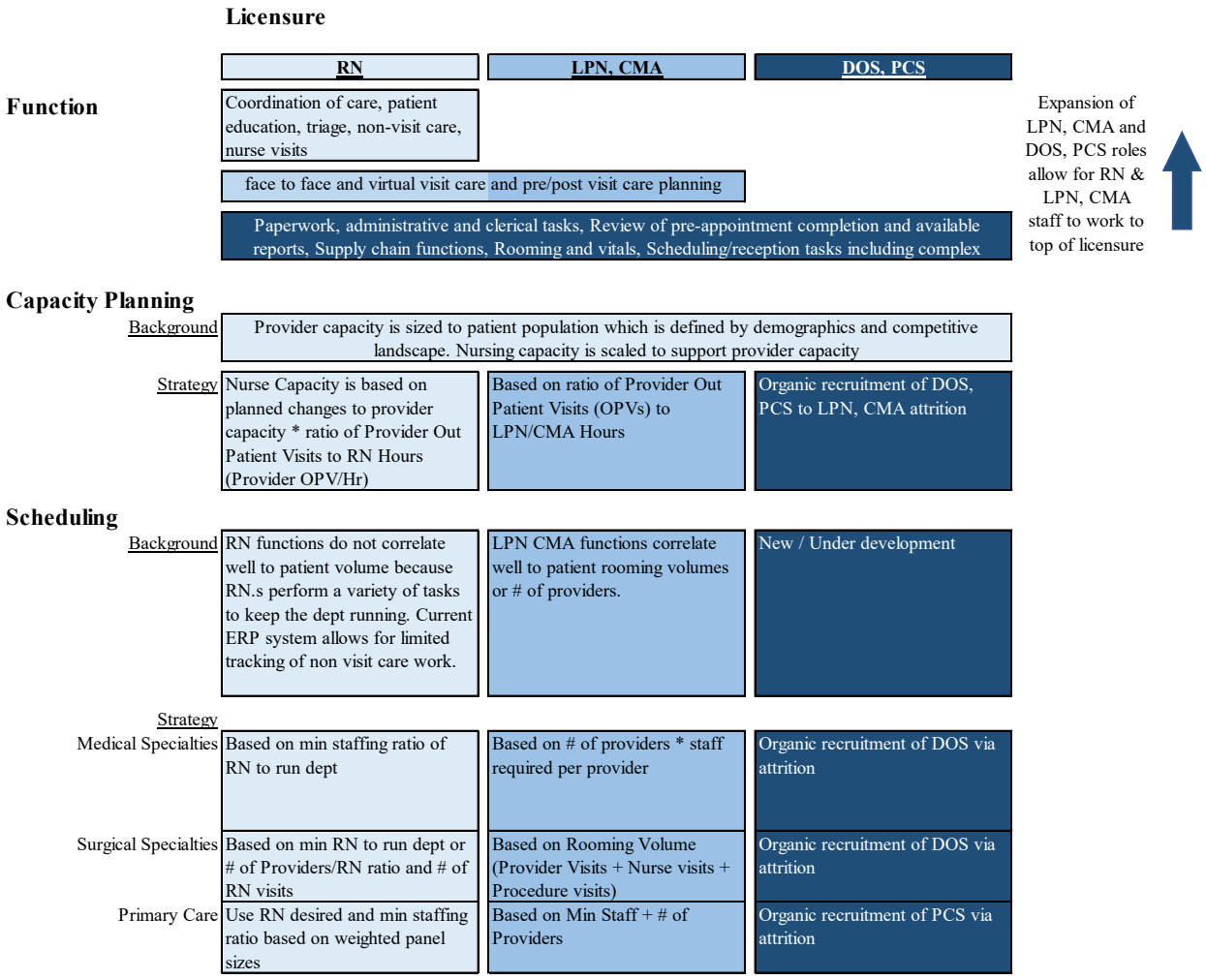

Figure 5. Scheduling History with budget control

Other components of the Staffing to Workload tool include:

Scheduling history and trends: A monthly trending graphical summary is provided for budgeted and actual OPV loads, hours scheduled, and OPV/hr staffing ratios.

Single-day staffing snapshot: This component provides a quick snapshot overview of a single-day staffing forecast across all locations. Expandable panels provide additional informational overlays, including provider OPVs and nurse OPVs. A separate panel overlay can be viewed with granular staffing forecasts in 15-minute buckets for the day.

Modeling accuracy: The tool calculates model accuracy on an ongoing basis and provides variances from actual to predicted staffing.

Budgetary alignment: The component of the tool provides budgeted hours, OPVs, staffing ratios, and variances from actual. A 'YTD Hrs. Var %' uses the reservoir of underused budget hours and provides each department with a calculation of how much variation from average hours is possible for the remainder of the year without going over budget.

Nursing staffing adjustments based on a change to provider capacity: The planned changes tool was developed to project 'what-if' scenarios for providers joining or leaving the department. Provider and Nurse Schedule reports**.** Each tool includes schedules for providers, templates, LPN/CMAs, nurses, etc. with relevant scheduling details to avoid the need for schedulers to navigate through multiple screens on the EHR.

Examples of these components are provided in Figures 6 to 11.

Figure 6. Scheduling history with budget control

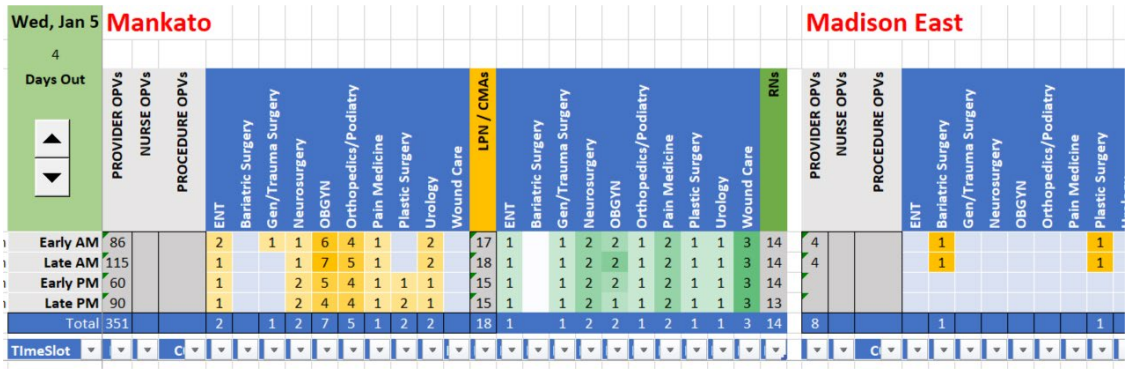

Figure 7. Single day staffing snapshot

MODEL ACCURACY	Hours	Actual	8.3	16.3	8.3	16.0	7.8	8.0	16.3	15.5	12.3	8.0	2.0	24.5
		Projected	12.0	16.0	16.0	24.0	16.0	12.0	16.0	16.0	16.0	16.0	8.0	16.0
		Variance	(3.8)	0.3	(7.8)	(8.0)	(8.3)	(4.0)	0.3	(0.5)	(3.8)	(8.0)	(6.0)	8.5

Figure 8. Modelling accuracy

VARIANCE TO BUDGET	Hours	Budgeted	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
		Hrs Var	(55)	(56)	(57)	(58)	(59)	(61)	(62)	(63)	(65)	(67)	(69)
		Hrs Var % YTD	-370%	-377%	-385%	-392%	-401%	-411%	-419%	-428%	-438%	-450%	-463%
	OPVs Per Hour	Actual	0.61	0.68	0.36	1.50	0.77	0.13	0.49	0.32	-	0.75	-
		Budgeted	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
		Variance	0.40	0.47	0.16	1.29	0.57	(0.08)	0.29	0.12	(0.21)	0.54	(0.21)

Figure 9. Budgetary alignment

ENT			YTD Avg Avg	Planned Avg	Diff	Current Mix%	Desired Mix%	Adj Hrs	Adj FTE
OPVs - Budgeted									
OPVs - Actual	OPVs		676	720	44.3				
Hrs - Budgeted									
Hrs - Actual	Hours	Total	432	460	28.3			28.3	0.2
LPN/CMA Hrs		LPN/CMA	244	260	16.0	56%		16.0	0.1
RN Hrs		RN	188	200	12.3	44%		12.3	0.1
Hrs - Var									
YTD Hrs - Var %									
Budgeted OPVs/Hr									
Actual OPVs/Hr	OPVs/Hr	Dept Total	1.57	1.57					
LPN/CMA OPVs/Hr		LPN/CMA	2.77						
RN OPVs/Hr		RN	3.59						

Figure 10. Nursing staffing adjustments based on change to provider capacity

	1/4/2021			1/5/2021			1/6/2021			1/7/2021		
Group Name	Providers	Patients	Fill Rate	Providers	Patients	Fill Rate	Providers	Patients	Fill Rate	Providers	Patients	Fill Rate
Eastridge FM_Bethany Lutheran												
AM												
PM												
Eastridge FM_Residency	24	267	95%	24	235	93%	22	243	93%	20	229	93%
AM	22	140	94%	19	120	94%	20	136	95%	19	120	94%
PM	20	127	97%	19	117	92%	17	107	91%	19	110	93%
Mkto_Eastridge_CIM	3	27	88%	3	24	80%	3	35	88%	4	41	86%
AM	3	18	92%	3	14	73%	3	16	79%	3	20	88%
PM	2	9	81%	2	10	92%	3	19	96%	4	21	84%
Mkto_Eastridge_Peds	3	53	102%	3	37	78%	3	32	76%	3	30	69%
AM	3	23	98%	3	17	76%	2	11	73%	3	16	67%
PM	3	30	106%	3	20	80%	3	21	78%	3	15	70%

Figure 11. Provider and nurse schedule reports

5.8 Development and Implementation of Executive Leadership Metrics Dashboard

The Executive Leadership Metrics Dashboard visualizes both by practice and pillar, historical and projected performance to budgeted staffing hours and Outpatient visits (OPV). The dashboard is driven directly from the staffing model, allowing it to serve our front-line staffing coordinators and executive leadership by reviewing trends and performance to budgeted volumes.

This tool has brought a clear line of sight to staffing levels across all practices. Front line nurse managers and staffing coordinators use this tool to monitor individual department performance and staffing levels and communicate across practices to bring a cross-functional approach to staffing. For example, the team can now leverage specialties with high nursing to provider ratios due to low provider presence in the clinic on specific days (vacation, orientation, leave of absence, or other non-clinic activities) and shift that excess nurse staffing to temporarily cover other specialties with particularly high provider presence in clinic on those same days.

Another benefit gained through this project is integrating this tool into the new hire approval process. Previously, practice leaders underwent extensive gathering of finance and practice performance data to prove the need for each replacement or incremental hire. The integration of this tool created a common reporting platform that is reviewed monthly by leadership. These “Staffing-to-Workload Standards and Metrics Review” meetings are scheduled ahead of the Operations Coordinating Group (OCG) meetings to help the group prepare and review current state staffing challenges and identify staffing issues. OCG is one of the key leadership venues where hiring a new or Full-Time replacement Equivalent (FTE) is reviewed.

The dashboard visualizes historical and future staffing and key performance indicators (KPIs) for all practices within each clinical section (Figure 12). Leaders reviewing Figure 12, for example, can see nursing staff in this department working above budgeted hours in November and December of 2021. Interestingly, we also see actual OPVs were below budgeted volumes during that same timeframe. This view of practices in a common platform helps drive meaningful conversations and affect change.

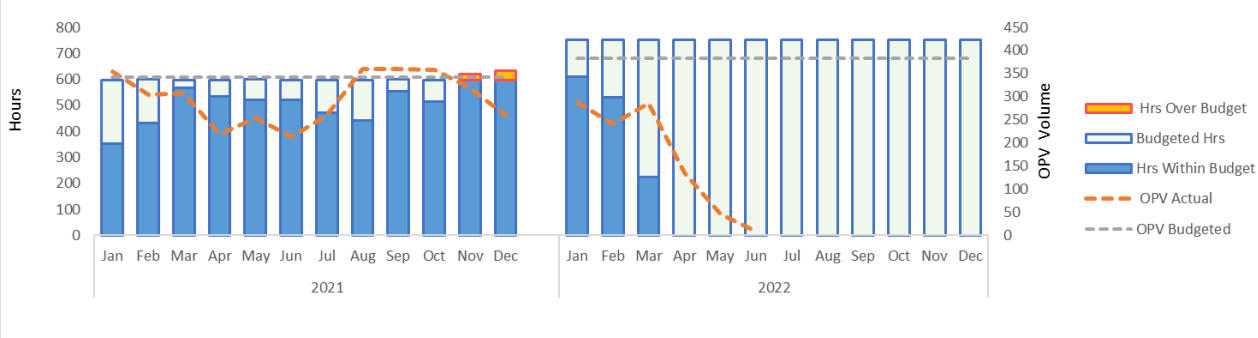

Figure 12. Snapshot of a component of the Executive Leadership Metrics Dashboard

5.9 Data Structure

Automated data streams were leveraged from multiple data sources. Sustainable tools are automated, easily maintained, and most importantly, trusted sources of truth. The team worked diligently to build a robust tool that incorporated automated data extracts, simple end-user data maintenance, and a detailed listing of all data definitions. A cross-functional team comprised of analytics, strategy, and nursing colleagues worked for hand in hand to build a fully customized tool. Involving key players from the start allowed the team to leverage strengths and empower nursing to improve their scheduling process through the tool build. This resulted in a trusted and highly utilized Staffing Tool that created efficiencies for frontline staff and visibility to staffing ratios and performance to budget for leadership.

Three primary data sources power this tool; staffing hours worked, clinic scheduling, and budgeted hours worked/OPV. Automatic, daily extracts were created to pull data directly from the payroll tracking system, understand staffing hours worked and the EHR, and gather clinic scheduling information. As with any data source in healthcare, accuracy depends on how the tool is used. During validation of the data extracts, the team worked through multiple challenges to modify and enhance the use of each dataset. Through this work, each specialty adapted its use of the payroll system and the EHR to best suit its immediate needs. Throughout the validation process, the team worked together to access each nuance and determine how best to either correct the issue or transform the data once extracted. See Figure 13 for an overview of the data structure.

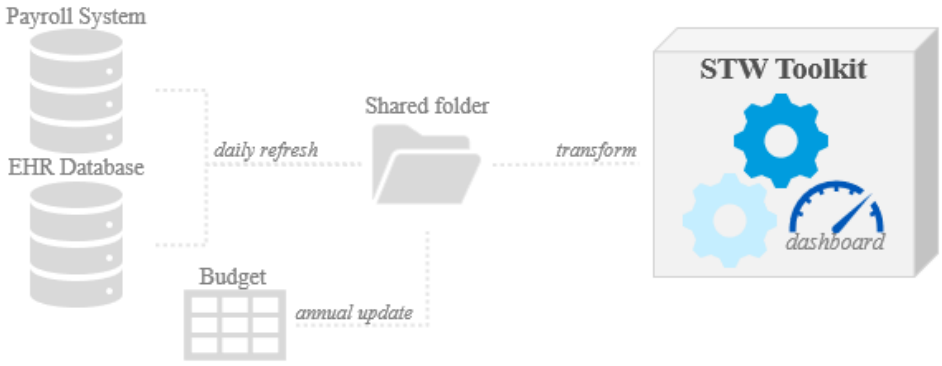

Figure 13: Data Structure

Payroll system data is used to retrospectively visualize total nurse staffing hours worked by the department and help determine staffing ratios. To appropriately track hours worked, front-line nursing staff are responsible for accurately documenting their time by specialty. For example, if Nurse A typically works in Specialty 1 but then floats to help Specialty 2 for a day, that time needs to be recorded to maintain the accuracy of this data pull. The team used initial extracts to uncover areas of improvement and educate nursing on the importance of appropriately tracking time. As stated previously, this project has inspired a new line of thinking for all practice areas. For nursing, the benefits of a trusted staffing tool outweighed the extra work required to document time in the system appropriately.

Data from the EHR is used to drive clinic scheduling metrics for both provider and nursing staff. As with the payroll system, the team worked through multiple nuances in the extracted data and developed solutions to accurately represent daily: provider count, provider and nursing time in the clinic, and clinic visit volume, both retro- and prospectively. These data elements calculate clinic fill rates, nursing to provider ratios, and overall OPV for each specialty. Budgeted nursing hours and budgeted OPV are sourced directly from the finance team and are updated annually to compare performance to actuals by month.

6. Conclusion and Discussion

Defined clinical staffing ratios within and outside the organization were the central issue concerning demonstrable staffing to workload processes. Previous internal attempts at staffing to workload in the ambulatory setting did not partially sustain effectiveness due to the complexity of applying a consistent, standardized approach to highly diverse clinical settings in siloed operating models. While implementing the tool and process to support this work sustainably into the future is in its infancy, three primary lessons learned were identified upon completion of the project.

- Transparency of the staffing ratios across all disciplines is key to the success of any staffing to workload model. Having a transparent staffing model with less than a 100% degree of consensus and confidence in the staffing ratios far exceeds not having a transparent planned FTE per clinic. Leaders at all levels of the organization will argue the merits of the calculated staffing ratios. Therefore, attempting to achieve perfect staffing numbers prior to implementation will result in delayed project timelines and arduous meetings with multiple stakeholders. Dashboard development within the tool allows for the ability to demonstrate practice transparency with staffing in comparison to budget and outpatient volumes or provider templates.
- Development of a practice management staffing to workload decision support tool requires heavy engagement from key stakeholders across multiple disciplines. The inclusion of providers, nursing, operations, finance, and management engineering in the standardization of the data inputs led to a learning tool that will evolve with practice changes, including new and yet-to-be-defined care team models. The same approach should be taken whether the toolset is developed in-house or purchased as off-the-shelf software. Change management, including ownership and accountability to leveraging the tool in daily staffing decisions, is critical to the ongoing success and sustainability of staffing to workload as a practice.
- Implementation of the staffing to workload model is a two-part process. Beginning with care team definition, including the roles and assigned duties of staff across the care team. There were significant opportunities to develop top-of-licensure strategies, which led to the development of clinical desk operations specialist roles taking on more responsibility both during the patient visit and in support of the care team non-visit support. The second part is the development and ongoing refinement of the calculated care team staffing ratios. This two-part process will allow for continuous staffing efficiency improvements including the consistency of having predictable resources identified to support the care team and ensuring the resources dedicated to each care team are justified based on the input variables that led to the development of the staffing ratios.

Clinic staffing has become a multi-perspective crisis as labor shortages for skilled workers seeking work in traditional healthcare settings is requiring organizations to ration resources and find new ways to meet patient demands. This along with the rising cost of healthcare, especially in labor expenses, puts enormous pressure on healthcare organizations to seek systemic and predictable flex staffing models based on predetermined staffing ratios.

This study will allow for the continued growth of clinical practices sustainably and efficiently with predictable clinical and financial outcomes. This tool will enable teams to predict a staffing model change need as the care team grows or shrinks or as practice models change. Further work in this area of study would include the expansion of the use of the tool to generate a database of staffing practices to allow for comparison and benchmarking. Additional work consists of the development of software that can be tailored to specific ambulatory practices to enable teams to measure and predict staffing composition and patterns within their organization.

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