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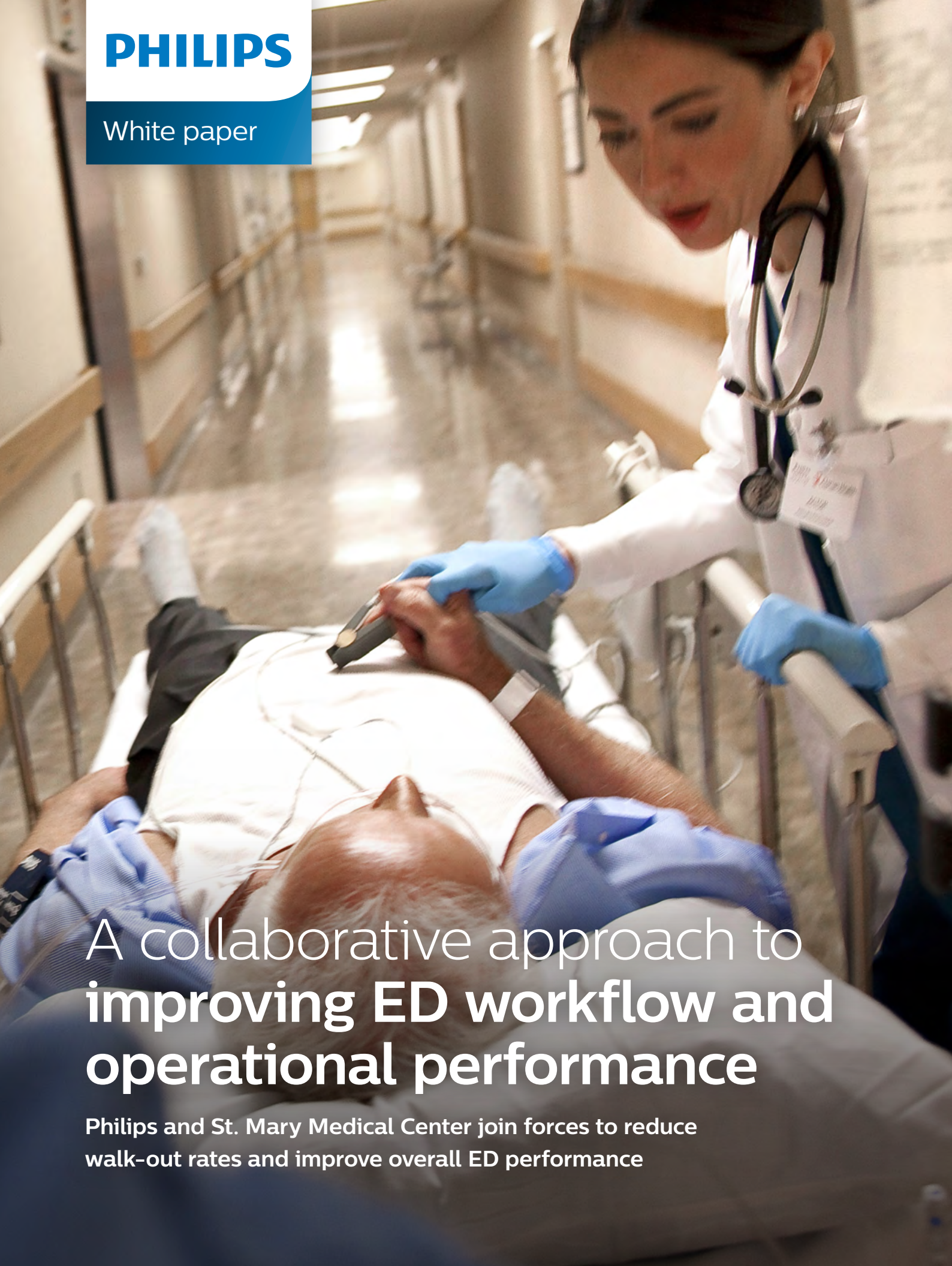
White paper



A collaborative approach to **improving ED workflow and operational performance**

Philips and St. Mary Medical Center join forces to reduce walk-out rates and improve overall ED performance

Introduction

When an emergency department's workflow is inefficient, wait times can increase, care is not always provided in a timely manner, and patient and staff satisfaction may suffer. This was the situation at St. Mary Medical Center (SMMC) in Apple Valley, California in early 2015.

A 212-bed community hospital in the high desert of San Bernardino County, SMMC was challenged with significant ED volume growth over the course of several years. The 44-treatment space department was receiving approximately 82,800 visits annually and was struggling with a constrained physical plant space, recurring gaps in ED nursing leadership, prolonged ED lengths of stay, and high left without being seen rates, among others.

In 2015, hospital executive leadership engaged Philips to provide interim ED leadership. Through the course of the engagement, the consultants worked closely with hospital staff and providers from the ED physician group on multidisciplinary performance improvement initiatives. Philips involvement grew to include a project manager, interim ED director, interim ED manager, and PI team facilitator, all working closely with SMMC ED staff and providers from the contracted ED physician group.

To begin the assessment effort, Philips consultants engaged in:

- Data analysis of performance metrics and review of reporting tools
- In-depth assessments of both ED and inpatient processes and procedures including resourcing, cost, organization, and quality
- Direct observation of patient experience and work flow
- Interviews and insights from staff, management, and physicians

A multidisciplinary PI work team, led by Philips consultants and including providers, administrative leaders, ED staff and ancillary staff, was formed to review subsequent recommendations. From the outset, this PI work team considered a wide range of factors to jointly arrive at an action plan for ED improvement.

Assessment and methodology

Annual ED visits had increased from 77,200 visits in 2011 to 79,000 visits in 2014. The ED was consistently over-capacity with boarded admitted patients resulting in a mean door-to-triage time of 31 minutes, a door-to-provider time of 65 minutes, and overall admitted and discharge lengths of stay at 720 and 324 minutes respectively. The department was operating at 168% capacity without the use of hallway beds and 147% capacity with the use of hallway beds. The front-end processes were not able to support the demand, putting the organization at risk for patient safety and decreased satisfaction. Communication within the department and with patients was not as effective as desired. Throughput processes lacked true standardization and were not patient-centered. Space constraints significantly limited the ability for physical plant remodeling and state-mandated staff ratios needed to be accounted for in any process redesign. There was no organized educational plan for the ED staff.

The Philips assessment methodology included a review of data collected for patient volume, arrival patterns, staffing patterns, ESI level distribution, ED billing visit level distribution, disposition breakdown, and length of stay. The group conducted interviews with administrators, departmental leaders, and staff, addressing topics such as intake, triage, processes, and education. They also spent considerable time observing patient flow, departmental processes, and communication. Findings at the time of the assessment suggested that discrepancies between the realities at SMMC and leading practice indicators[1] were significant.

	Baseline	Leading practice
Arrival to provider	65	30
Arrival to triage	31	5
Admitted length of stay	720	195
Discharge length of stay	324	150

Fig. 1: Baseline to leading practice performance metrics.

All times are mean and expressed in minutes.

Following this detailed assessment, the Philips consultants identified several areas as needing improvement, including actions to:

- Revise front-end processes to include the intake and triage processes
- Re-educate staff on the ESI 5-level triage system, to include inter-rater reliability and competency validation
- Restructure leadership and clarify roles of each member of the ED team, increasing accountability for standards of practice and quality of patient care
- Examine utilization of existing space to optimize workflow
- Implement standard work processes to address the frequent capacity issues in the ED
- Create and agree to a shared vision and mission for the ED leadership team

Using SMMC's A3 performance improvement methodology, Philips consultants and SMMC team members developed a process solution termed **'Middle-Trac'**. Middle-Trac is a derivative of the widely known, evidence-based 'split-flow' process model. The key to split-flow is early triage to assess the severity of patient illness. In the split-flow model, patients are moved quickly into two parallel streams – one for acute/critical care and a second for patients with less complex problems. The goal is to achieve a balance between provider staffing and capacity, at any given moment, to meet demand, avoid queuing, and prevent the overstaffing that results in idle providers.[2]

Middle-Trac takes this a step further with a focus on patients in the 'middle' – those who do not require immediate lifesaving treatment, or non-urgent "fast track" care, but do require non-immediate comprehensive workups. These include ESI level 3 patients and as capacity surges, may include ESI level 2 patients. With Middle-Trac, an efficient 'assembly-line' flow process was created with special attention paid to California's mandated nurse-to-patient staffing ratios.

The Middle-Trac patient flow keeps patients vertical and moving through the department while not occupying valuable treatment spaces until a disposition decision is made.

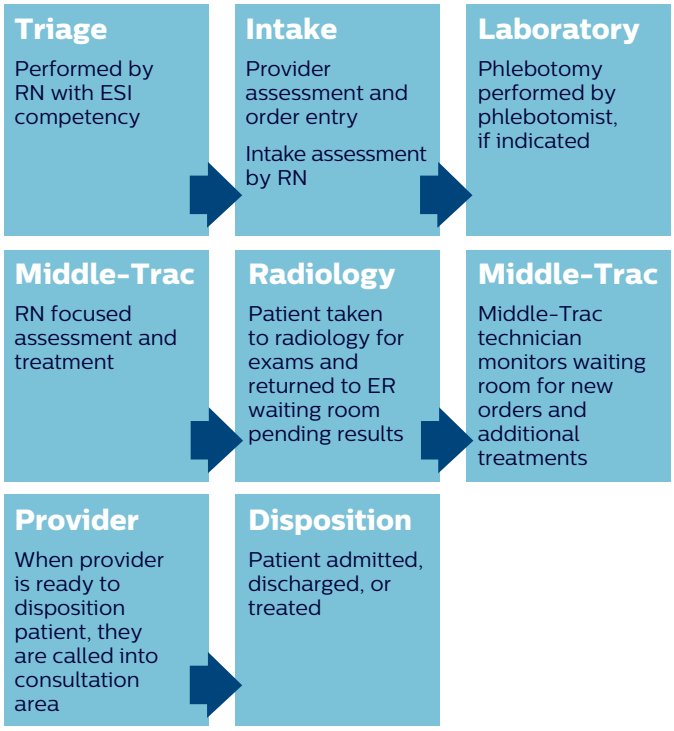


Fig. 2: Middle-Trac Process Solution.

Based on assessment findings and operational opportunities identified, and leveraging the Middle-Trac process solution, Philips consultants put together a list of recommendations which, when implemented, led to significant throughput improvements.

Recommendations, process redesign, and implementation

Performance improvement recommendations covered a broad range of topics categorized into several areas including front-end and triage, standards, turnaround time, leader support and development, environment of care and safety, use of daily dashboard, leadership, and accountability. The Middle-Trac process solution was employed in support of these recommendations.

Following is a list of recommendations that have been implemented, are currently being implemented, or are ongoing performance improvement criteria.

Front-end and triage:

- Revise front-end process – improve 'intake' and streamline 'triage'
- Provide ESI education and reinforce the proper use of ESI 5-level triage for all RNs
  - Determine inter-rater reliability and competency
  - Mentor and monitor staff for compliance
- Set performance expectations for RNs assigned to triage
  - Clinical competencies
  - Behavioral competencies
  - Interview skills
  - Customer service

Turnaround time for ED patients:

- Reinforce the current practice of immediate bedding when treatment space is open
  - Create a consistent "pull" environment within the ED
- Examine opportunities to better use alternative spaces within the ED
- Create parallel and eliminate linear process for all team members
- Examine nursing and provider staffing patterns to best meet patient demands
- Reassess and revise the response to ED saturation
- Explore possibilities for the transfer of admitted patients to non-traditional inpatient locations, e.g., temporary hallway beds

Standards:

- Refresh and refine standard work
- Educate and inform staff regarding standard work
- Hold staff accountable to the standard work
- Develop a process for staff feedback regarding process changes
- Identify the standard of care for inpatient holds

Improve environment of care and patient safety:

- Improve the environment of care, agree to an organizational commitment to support and maintain it, and hold staff accountable
- Limit access to all entry points to the ED 24/7
- Return to standardized uniforms for the ED staff

Enhance the use of a daily dashboard:

- Establish baseline metrics and targets for process improvement
  - Develop commonly accepted definitions
  - Set targets – approved by leadership team
- Establish daily metrics and scorecard
  - Assign responsibility for population of scorecard
- Report metrics daily
- Share metrics with all staff
- Establish mechanism to use metrics to make "real time" decisions

Leadership:

- Create a leadership team consisting of nursing, medicine, and administration that:
  - Meets weekly on a scheduled basis
  - Defines vision and goals
  - Reviews quality and patient satisfaction issues
  - Reviews operational metrics and targets
  - Develops and implements action plans to improve operations
  - Establishes practice and behavioral expectations and holds staff accountable
- Create a more effective nursing leadership structure
  - Consider a team made up of a director, day manager, evening manager, clinical coordinators, and clinical educator
  - Create or revise written job descriptions for all positions

Team leader support and development:

- Clearly define the team leader role and responsibilities and hold staff accountable, with a focus on flow
- Improve hiring practices so that positions are filled with the right individuals to support success
- Provide education on topics to include:
  - Crucial conversations, delegation, critical thinking skills, coaching, mentoring, and teamwork
- Mentor and monitor behaviors on an ongoing basis
- Reinforce the need for consistency in patient care and communication

Create a culture of accountability:

- Determine a process to inform and educate all staff and disciplines regarding process or practice changes
- Clearly articulate expectations and communicate these expectations to staff and providers
- Provide formalized customer service education for ED team members
- Educate and hold staff accountable for customer service principles

Each recommendation underwent careful consideration before implementation. The PI work team met weekly for several months to focus on the desired future-state and concluded with an all-day retreat. The desired future-state was mapped out, staff trained, and the FTE-neutral Middle-Trac process for optimized patient flow implemented. The team paid particular attention to compliance with California's mandated nurse-to-patient staffing ratios.

Similar to an assembly-line, elements of the Middle-Trac process work cohesively, one to the other, occupying 14 treatment spaces. For the SMMC ED, these elements include:

- Keeping patients moving through the system and not occupying treatment spaces until a disposition decision is determined
- Triage RN to sort arriving patients into one of three categories:
  - Immediate bed needed (ESI Level 1 and some ESI level 2 patients including confirmed STEMI, Code Stroke, unresponsive patients, etc.)
  - Fast track appropriate (SMMC's fast track excludes all ESI level 1-3 patients. It also excludes some ESI level 4 and ESI level 5 patients. Exclusion examples include but are not limited to: All repeat visits within one week, all MVCs, all patients >65 years age presenting status post fall, all patients less than 6 months of age)
  - Remaining patient population (Middle-Trac)
- 4 curtained chair intake spaces for initial joint evaluation by MD/DO/PA/ARNP with RN; intake is staffed by RNs 24/7 and by a MD/DO/PA/ARNP 18 hours per day
- Implementation of a provider staffing model that maximizes continuity of care and minimizes provider hand-offs
- Utilization of Emergency Department Care Cards (description follows) so that the patient is aware of where they are in the throughput process
- Lab draw area with two dedicated lab draw chairs for 24/7 blood specimen collection by phlebotomy
- Dedicated 4 curtained spaces for initial nursing assessment and implementation of treatments/ interventions, staffed by 2 RNs and 1 tech 24/7
- Separate dedicated 4 curtained spaces with stretchers for administration of IV fluids, IV infusions, and IV narcotic injections, staffed by 1 RN 24/7
- Converting IVs to a saline lock following infusion completion
- Limitation of maintenance IV fluid utilization
- Dedicated 4 chairs for radiology to return patients to following their imaging studies
- Utilization of the waiting room for patients awaiting their diagnostic results and provider re-evaluation
- Dedicated 2 curtained spaces for provider procedures and/or reassessment
- Dedicated area for provider consultation for disposition conversations
- Dedicated discharge area to discharge Middle-Trac patients, staffed by a RN 24/7

The department also has a private examinations room exclusively used for all pelvic exams.

The PI work team also devised an **'Emergency Department Care Card'** which is a physical card (see Fig. 3) that accompanies the Middle-Trac patient each step of the way through the ED. Printed on brightly colored cardstock, the card measures 5x7" and is available in both English and Spanish versions . It details what labs, radiologic studies, and treatments have been ordered. The caregiver initials and time stamps the card as the patient receives their care. It is used as a way to communicate to the patient where they are in the process, noting approximate times for longer activities. At the end of a visit, upon discharge, patients are invited to drop their card in a secure box. The Middle-Trac team reviews cards weekly for staff compliance as well as any patient comments.

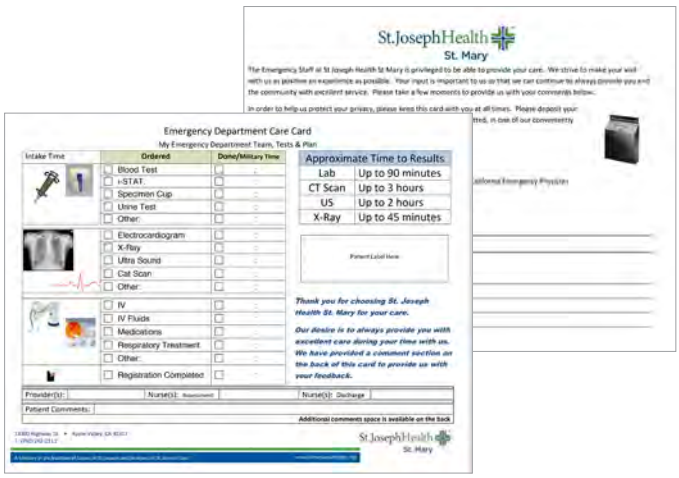


Fig. 3: SMMC Emergency Department Care Card.

Engagement results

The PI work team was successful in implementing performance improvements that significantly improved door-to-provider times, ED length of stay, and the left without being seen rate for ED patients. SMMC triage nurses consistently selected 68%-72% of patients each day (approximately 160 patients) to receive care through the Middle-Trac process.

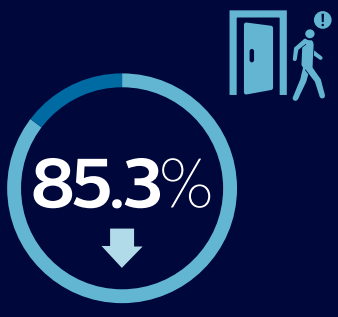
ED patients who left without being seen dropped from a baseline of 7.5% to an average of 1.1% in 2017 for an 85.5% improvement. Arrival to provider time decreased from a baseline of 74 minutes to just 25, an improvement of 66.2%. Discharge patient length of stay that was more than six hours when the initiative began, dropped to under four.

While all key performance indicators improved in 2016 compared to baseline, only door-to-provider and LWBS rates continued an improvement trend into 2017. Both admitted and discharge patient lengths of stay increased in 2017, secondary to an increase in overall boarding time of admitted patients.

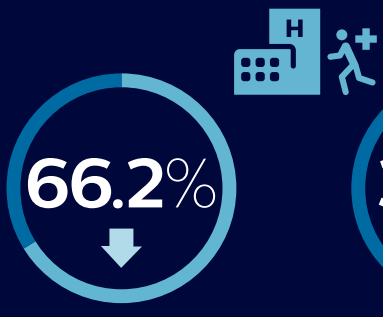
While Middle-Trac was not initially designed to include ESI level 2 patients, staff found during implementation that moving some ESI level 2 patients through this process was a faster way for the patient to receive evaluation, treatment, and care. As such, many ESI level 2 patients also receive care through this process. Some patients move through the process and then to a bed when one becomes available, while others are discharged.

Results

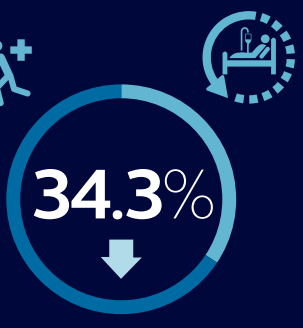
in average daily census



reduction in LWBS
(7.5% to 1.1%)



reduction in arrival to provider
(74 to 25 mins)



reduction in discharge patient LOS
(361 to 237 mins)

Capacity reduction	Baseline	2016	2017
Census	79,052	81,057	82,758
Average LOS (all ED patients)	6.61 Hours	4.47 Hours	5.23 Hours
Occupancy Hours	522,533	362,325	432,824
Bed Hours Available without Hall Beds	310,980	350,400	350,400
Capacity without Hall Beds	168%	103%	124%
Bed Hours Available with Hall Beds	354,780	373,760	373,760
Capacity with Hall Beds	147%	96.9%	116%

Fig. 4: SMMC ED capacity, Improvement % is compared to baseline.

Conclusion

When St. Mary Medical Center began the engagement with Philips, ESI level 3 patients often found themselves in the ED waiting room not knowing what the plan was for their care, with no ownership from staff, for a stay that could seem like an eternity. The goal of this project was to develop and implement a process flow that greatly expedited care to these patients.

Philips recommendations and the Middle-Trac process solution have proven to be successful for SMMC. The team's next steps include an in-depth hospital-wide inpatient throughput assessment to identify opportunities for improvement with inpatient flow. Further performance improvement initiatives/ monitoring include:

- **Accountability** for adhering to the standard work
- **Implementation** of a Middle-Trac "Surge Nurse" role, to be used on days of extreme volume
- **Security repositioning** within the waiting room to increase patient and staff safety
- **Review** of phlebotomy work space and bottlenecks resulting from their workflow

About the authors

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Larry is a Certified Emergency Nurse with years of experience in providing clinical and leadership expertise in the emergency care setting. He has been successful in implementing evidence-based leadership tactics to improve ED performance. He is an active member of the Emergency Nurses Association, American Association of Critical Care Nurses, and the American College of Healthcare Executives. Larry has a BSN from Western Governors University, a BBA from Drury University, and a MBA in Healthcare Management from Western Governors University.

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In addition to practicing as an emergency department physician, Dr. Bolowich is Assistant Medical Director and Scribe Program Director at St. Mary Medical Center Emergency Department, Senior Partner with CEP America, and Medical Director of the Apple Valley Fire Protection District. Practicing as a paramedic before medical school, he actively collaborates on multidisciplinary performance improvement work teams to develop innovative solutions to patient care barriers. He has a BA in Mathematics from Cal State University San Bernardino, and Doctorate in Osteopathic Medicine from Western University of Health Sciences. He completed his Emergency Medicine Residency at SUNY Stony Brook University Hospital.

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Nick is a results-driven healthcare leader with expertise in emergency care and clinical informatics. He has extensive experience working in data analysis and informatics and hardwiring processes to provide real-time objective feedback to staff regarding performance. He has helped many EDs lower LWBS and improve performance and the patient experience. Nick has a BSN from Mount Carmel College of Nursing and a MSN with Academic Distinction from Capital University. He is a Certified Emergency Nurse, a Certified Nurse Manager and Leader, holds a Nurse Executive Board Certification, and is a fellow in the Academy of Emergency Nursing.

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Cyndi is a staff nurse with fourteen years' experience at St. Mary Medical Center Emergency Department. As a practicing emergency nurse for the past eleven years, Cyndi was an active participant, contributor, and floor champion with the SMMC Middle-Trac performance improvement work team and subsequent process implementation. She has a has a BSN from Grand Canyon University.

References
1. Leading Practices are a combination of references from ACEP, ENA and Advisory Board Company.
2. Harris M, Wood J, Resuscitate ED metrics with split-flow design, *Healthcare financial management*, 12/2012; 76-79, hfma.org.

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