

SEATTLE DAILY JOURNAL OF COMMERCE

HEALTH CARE DESIGN & CONSTRUCTION



THURSDAY, JULY 24, 2014

SEATTLE CHILDREN'S PSYCHIATRY UNIT WILL HELP KIDS FEEL AT HOME

The new space is designed to feel safe, familiar and supportive to patients and their families.

Perhaps no health care environment has the potential for direct influence on positive outcomes more than pediatric inpatient behavioral health. It's not something most people typically think about every day.



BY ANITA ROSSEN
ZGF ARCHITECTS

According to a report by the Centers for Disease Control and Preventions, 13 to 20 percent of children living in the United States experience a mental disorder in a given year, and the prevalence of these conditions is increasing.

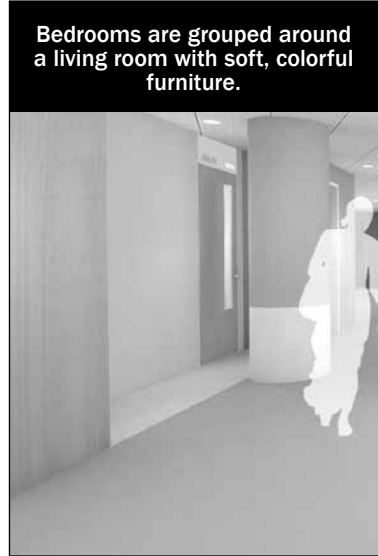
The state of Washington has fewer than 100 inpatient beds for this underserved patient population. Until recently, the 20-bed unit at Seattle Children's was one of the only specialized options for inpatient psychiatric

support and the only option for inpatient support for adolescent eating disorders in the state.

Seattle Children's is currently undergoing a renovation to create a 41-bed Psychiatry and Behavioral Medicine Unit to serve kids ages 3 to 18 across a broad spectrum of diagnoses, including autism, ADHD and eating disorders. The unit will open in the spring of 2015.

The design of the new unit creates an opportunity to look at innovative operational and environmental improvements to support an improved model of care for the treatment and support of these patients and their families.

The Center for Health Design reports that little attention has been focused on the role of the physical environment in behavioral health settings while studies have shown that the quality of the interior environment can have a profound effect on the psyche and even reduce the



Bedrooms are grouped around a living room with soft, colorful furniture.

IMAGE BY ZGF ARCHITECTS

number of patients who need to be restrained.

Health care designers and planners have understood the positive effects of creating nurturing and supportive interior environments

for some time. What makes a behavioral health unit different? Quite a lot, it turns out.

A safe place for kids

The design focus for the new behavioral health unit at Seattle Children's is on creating restorative, energized spaces laid out similar to the rooms of a house. This variety of spaces allows for choices and variation to replicate and normalize daily activities.

Patients awake in private rooms with modern amenities including

a space for parents to spend the night. Bedrooms are grouped around a living room with soft, sculptural and colorful furnishings, movies and games that encourage social interaction, and a safe place for kids to start and end their day, much like a home.

Daytime activities include day rooms for age-specific structured time, a classroom with cubbies for books, white boards, laptops and an integrated art wall to display patients' creations.

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ON THE COVER

Providence Medical Park, a \$32 million outpatient center, opened in April in Spokane Valley. Mahlum Architects designed the project and Bouten Construction was the general contractor.

PHOTO BY BENJAMIN BENSCHNEIDER, COURTESY OF MAHLUM ARCHITECTS

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WHAT'S NEXT FOR THE UW MEDICAL CENTER

Now that Montlake Tower is built, the \$93 million second phase will entail renovations and buildouts.

The second phase of the \$93 million University of Washington Medical Center project consists of a series of interior renovations in Pacific and Muilenburg towers, as well as infill of shell space in Montlake Tower.



BY MARK
BAUGHMAN
MORTENSON
CONSTRUCTION

Also, the central utility plant will receive a new generator and chiller.

The project team consists of NBBJ as the designer and Mortenson Construction as the GC/CM, with MacDonald-Miller as MC/CM and Cochran as

EC/CM for all phases of work.

A construction start ceremony was held in June. The first phase, which involved the construction of the 273,000-square-foot Montlake Tower, was completed in 2012.

Planning ahead

The UWMC project poses several challenges including complex phasing and proximity to patients and sensitive areas of the hospital. Construction will take place next to high-risk patients, creating even more need for pre-planning and infection-control management.

To address these challenges, the project team utilized technology tools including building-information modeling (BIM) to pre-plan the work and ensure certainty in scheduling and planning.

The team is utilizing laser scanning of existing slabs to evaluate and remediate floor flatness and evaluate above-ceiling conditions for feedback into the coordinated BIM model. Three-dimensional coordination of systems, including clash detection with existing construction and necessary maintenance areas prior to construction, will alleviate any schedule delay due to unknown conditions.

Through use of the fully coordinated 3-D model, the team is able to create and install prefabricated components including headwalls and multi-trade racks.

Due to limited laydown, storage area, and minimized construction work in the high-risk areas of the hospital, the team is driving to complete as much work away from the job site as possible to minimize the impact on patients and staff.

The team will install "multi-trade racks" in the corridors of the Montlake bed floors. These are fabricated steel racks in

which mechanical and electrical components are installed off site and then delivered as a prefabricated unit. The team will also prefabricate headwalls off site and pre-install hardware on doors prior to delivery.

Extensive noise testing for construction activities is being completed prior to the start of construction in any area. The testing ensures noise control expectations are met and allows the team and owner to evaluate if different scheduling is needed prior to beginning construction of that activity.

The UWMC project is being designed and constructed in several overlapping phases, referred to as design packages. The last of the phases are scheduled to finish in November 2017.

Design package 1

Valued at \$7 million, design package 1 includes renovation of several occupied and functioning portions of the existing hospital, including an inpatient cancer treatment bed floor, an outpatient cancer treatment clinic, renovations at the inpatient psychiatric unit and construction of an anticoagulation clinic.

The oncology spaces will be completed in phases to allow continued patient care during construction, and when complete, will also provide critical patient transport access between the existing cancer treatment services in Muilenburg and Montlake towers.

The renovations at the inpatient cancer treatment bed floor will modify mechanical systems to significantly enhance patient comfort, provide an improved patient care environment and upgrade several areas of provider space to improve staff satisfaction.

Patient care dictates that no more than 10 beds can be out of service at one time, so the construction work will be completed in four coordinated phases to eliminate duplicate periods of patient care disruption. Occupied rooms have patients with significantly compromised immune systems, making the infection-control planning and implementation a key factor in the process of this construction.

Room-by-room renovations at the inpatient psychiatric floor, including significant demolition, make this portion of construction exceptionally complex. Access into and out of the construction areas is difficult, carefully planned and tightly controlled.

In addition, the specific needs of the patients adjacent to the work dictate that noise-generating activities happen at only



Crews working near patients must take precautions to prevent the spread of infections.

IMAGE COURTESY OF MORTENSON CONSTRUCTION

specific times during the day, and crews must be prepared to stop work in deference to patients' needs. The construction schedule must be flexible to accommodate patient care.

An existing outpatient anticoagulation clinic is being replaced in a later phase but must remain functional during the entire construction process. The new anticoagulation clinic needs to be constructed prior to the work in the later phase. This "make ready" project will be built near the hospital's busy main entrance on the third floor.

Design package 4

The largest of the phases, design package 4, includes build-out of spaces within the recently completed Montlake Tower that were left unfinished during the first phase of the project. This phase of work is valued at approximately \$53 million.

The package includes construction of two floors of intensive care unit beds and one floor of medical/surgical beds, as well as all of the various support services that accompany patient care and family support.

The ICU construction at the fifth floor of the Montlake Tower must be built over the occupied neonatal intensive care nursery (NICU) and there are numerous service tie-ins such as plumbing that must penetrate the fifth floor and connect in the ceiling of the occupied fourth-floor NICU.

Work in and around the NICU is exceptionally sensitive and must be planned with extreme care. This construction is being planned on a room-by-room basis with numerous sub-phases and very careful management of access for people and materials.

Design package 7

Design work for this package, valued at \$25 million, is nearing completion.

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Spectrum, notes that “Health creates capacity; students whose health status is positive and flourishing have greater ability and readiness to learn and engage fully in all meaningful educational experiences...”

To this end, many campuses have been moving from a reactive model of care, with an emphasis on clinical services, to a more responsive, holistic approach with the following characteristics:

- Interdisciplinary model that integrates counseling and health services. This methodology provides benefits to the student including continuity of care and simplified access into the system, while also providing the potential to streamline resources and eliminate duplicated efforts.

- Expanded outreach efforts and wellness promotion. The new prototype for student health places an emphasis on outreach and wellness promotion. Services being offered can range from stress reduction workshops to vaccination programs and information about eating disorders. These services are taking full advantage of online and social networking methodologies to reach beyond the traditional health clinic environment.

- Direct ties to classroom learning and student life. Many colleges are looking at innovative ways of aligning student health with other available campus resources, such as schools of nursing,

Student health can be integrated with related programs such as nursing, public health and medical research.



PHOTO BY LARA SWIMMER PHOTOGRAPHY

public health programs and even student recreation facilities.

Design considerations

While current best practices for

the delivery of ambulatory care services are applicable in student health settings, a successful design response should also consider the following elements:
Access: Today’s students

are fully immersed in the digital world, and campus health services should be prepared to interact on various social media platforms as well as in a physical setting. The center should

be welcoming and easily identifiable within the larger campus setting.

Privacy: Confidentiality is one

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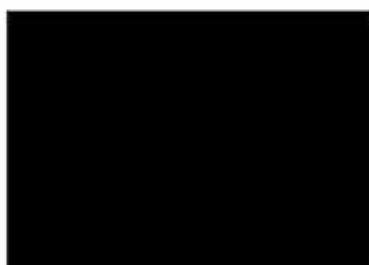


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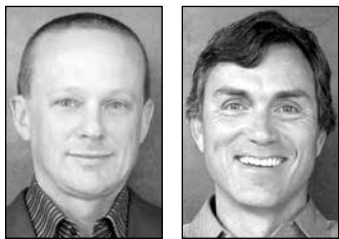
The building was designed so patients can quickly find where they're going.



PHOTOS BY BENJAMIN BENSCHNEIDER, COURTESY OF MAHLUM ARCHITECTS

HOW LEAN HELPED HYPER-FAST PROJECT TO CROSS THE FINISH LINE

It took just 22 months to build a 134,000-square-foot medical center, but the tight schedule created challenges.



BY ERIK
GOODFRIEND

DAVID
PERZIK

MAHLUM

Providence Medical Group sought a new facility that would provide a “one-stop shopping” patient experience for the growing community of Spokane Valley in Eastern Washington.

They envisioned a comfortable place where a patient could visit a primary care doctor, have diagnostic tests, pick up a prescription, and follow up with a specialist all in the same day under one roof.

The design team led by Mahlum Architects utilized lean concepts in their medical planning, site and facility design to create a hybrid facility that reduces wait times for patients, permits quicker diagnoses and allows faster treatment, resulting in better patient outcomes.

The new center, called Providence Medical Park, opened in April.

“Comprehensive outpatient centers are the way of the future, focusing on convenience and affordability,” says Mike Wilson, CEO of Providence Health Care.

For Providence’s new facility, the spirit of this philosophy was imbued throughout its operational model as well as its design and construction approach.

An easy entrance

Patients and visitors benefit from the team’s lean-planning approach even before they enter the facility. Prominently

located off the interstate, the 134,000-square-foot center has an intuitive entry sequence to easily move patients from the freeway to the lobby and into an exam room.

Two clearly marked entry drives direct patients to the clinic side of the building on the west or to the urgent care/ambulatory surgery entry on the east. Groves of native trees and plazas flank the entries, providing moments of “decompression” between the building and parking.

Once inside Providence Medical Park, a central hub with multiple registration and orientation stations greets visitors. The building revolves around the hub — major circulation routes, elevator cores and stairwells feed into this area, while adjacent lounge spaces overlook the landscape. Aided by transparency across the space, this straightforward organization quickly directs patients to their destinations.

Outside each care department

welcome desks and sitting areas mark the point of arrival. These spaces also provide quieter, dispersed waiting areas across the facility.

Lean operations

Key project stakeholders — from provider and nurse groups to departmental management and Providence leadership — embraced lean medical planning principles from the start of the project.

An intensive weeklong workshop defined the center’s goals and explored ways to ensure that the design would support improved workflows and provide coordinated, quality care. “3P” — production, preparation and process — sessions identified targeted metrics for wait times, patient visit times and projected volumes. By eliminating non-essential actions and setting aspirations based upon desired clinical outcomes, the design of

the medical center would help improve care quality and the patient experience.

To ensure lean theories would work for users, the design team mocked up exam rooms at full scale to develop a repeatable model that is efficient and user friendly. Double-sided exam rooms now support an onstage/offstage clinic model that keeps care team members in close proximity to patients and allows patients to “self-room.”

This organization also permits staff workstations to be closely located to patient rooms while benefiting from extensive daylight.

Design strategies

To simplify operations and maintenance and maximize future tenant flexibility, the team organized the building program into two wings connected by support services. Primary and specialty care fill a three-story

Lounges and quiet waiting areas are spread around the center.



Staff can work near patients and still get lots of daylight.



required creative thinking was the time required for the steel detailer to calculate the drawings prior to steel fabrication. In response, the team moved concrete shear walls to allow their construction while the steel was being detailed.

Once steel was delivered, the concrete shear walls were completed and steel erection rapidly completed. Thus, the team shaved five weeks from the construction schedule.

In addition, the rooftop air-handling units were sized and designed ahead of the balance of mechanical systems, allowing an early order by the subcontractor. The early delivery was timed to coincide with the completion of steel erection.

The elevators were also documented and procured early to allow installation prior to the start of interior construction. When the hoistway enclosure was complete, the elevator sub-

contractor began installation the next week, saving the cost of a temporary construction lift.

Since the interior tenant improvement package was bid well after the start of core and shell construction, interior doors and frames were procured early. This would allow interior partition framing to begin while the building permit was under review.

Door frames, doors and hardware were all coordinated and documented early by the design team. When the building permit was issued, the general contractor could start interior partition framing with the door frames in place.

Uses for BIM

Mahlum leveraged BIM to ensure the finished interior environment of Providence Medical Park was not compromised by poorly coordinated building sys-

tems. The digital platform provided immediate, continuous project design feedback that was high-quality, reliable, integrated and coordinated.

With BIM, the team could customize specific casework for medical equipment and quickly resolve building system conflicts with the general contractor and vendors. Real-time digital information about each piece of medical equipment was shared among project team members, such as electrical or plumbing subcontractors, to ensure accurate modeling, coordination and installation.

Erik Goodfriend is the director of Mahlum's Healthcare Studio and served as principal-in-charge of the Providence Medical Park. David Perzik is an associate at Mahlum. He served as project manager and medical planner for the Providence Medical Park.

wing and robust clinical technologies fill a two-story wing.

This configuration allows mechanical and electrical systems to be tailored to specific programmatic requirements such as air changes, hours of operation and emergency power. Thus, clinical areas have the supporting systems they require and the building uses less energy overall.

The building systems chassis is designed to be easily modified, allowing clinical services to evolve as future needs and medical care and practices change.

Finishes were chosen for timeless aesthetics and low maintenance — concrete masonry anchor zinc metal panels, windows are set in aluminum storefront frames, and wood veneer accents add warmth.

Hyper-fast schedule

As lean medical planning and operations were embraced by staff and client leaders, the design and construction team deployed lean methods to drastically reduce design and delivery of the medical center to just 22 months. While this hyper-fast project schedule would allow the new building to capitalize on market conditions, it also created a number of challenges from the outset.

Mahlum worked hand-in-hand with the general contractor Bouten Construction to develop

a tailored fast-track approach to design and construction with a focus on limiting exposure to change orders and implementation risks.

There were two equally important goals of this approach: Offer the clinical users as much time as possible to make careful design decisions, and at the same time allow the general contractor to begin construction as early as possible.

Mahlum met both goals by basing the design process on three strategies: strategically sequencing the building systems and bidding, implementing a lean design process with clinicians, and harnessing the power of building-information modeling software.

Smart sequencing

To get construction documents to the general contractor as quickly as possible, Mahlum reconsidered the typical approach to designing and documenting a medical office building.

First, the team separated the exterior envelope from the interior construction and documented these components separately. Second, and perhaps more importantly, the team developed creative solutions to achieve elements that required extensive time to fabricate and deliver to the site.

One long-lead element that

HOLISTIC CARE

CONTINUED FROM PAGE 5

of the top concerns identified by students utilizing campus health services. Where primary care and counseling services have been integrated into a single facility, the design team should work closely with these users to understand how the check-in, waiting and rooming process will address student privacy and comfort.

Integration: Today we are seeing an innovative merging of services and campus resources around the concept of health and wellness for students and faculty. Primary care physicians and nurses are working alongside behavioral health counselors, nutritionists, massage therapists and medical researchers.

As these divergent elements are brought together, collaborative staff spaces should be incorporated into the design, much as the care team space has been incorporated into the medical home clinic model. There may also be opportunities to streamline shared support spaces and functions in this integrated setting.

Flexibility: The student health center should be able to respond to variations in services that will

occur throughout the school year: wellness promotions or seminars, vaccination clinics, a spike in flu cases. Beyond the ability to handle a flexible calendar of events, the student health center may be asked to play a central role in disaster preparedness on campus and potentially for the surrounding community.

Young adults beginning their college experience are asked to manage their personal health care decisions with little or no parental oversight. These students are making decisions and forming habits that will shape their well-being throughout their lifetimes.

The opportunity to design health care facilities that engage students and provide the necessary resources to make informed choices is one that architects and engineers should eagerly embrace.

Todd Olson brings nearly 30 years of programming, planning and design experience in health care and educational environments to McGranahan Architects.

UW MEDICAL CENTER

CONTINUED FROM PAGE 3

This phase includes extensive and delicate renovations at the second-floor spaces of the hospital, where imaging and surgery services are provided. The work will create a centralized prep/hold/recovery space to serve the surgery and diagnostic services.

Construction is exceptionally complex due to its proximity to existing patient care services. Disruption avoidance will be critical, including careful pre-investigation of the many mechanical and electrical services that must be renovated, many of which have not been modified for decades.

Flexibility of construction schedules and redundant task planning will be critical to the project's success.

Design package 8

While design is still in progress, work of this package includes new radiology services, new patient and visitor waiting spaces, and some additional prep and recovery space for certain diagnostic imaging services.

This \$8 million package is the final step in support of the upgraded surgery and patient care upgrades that are the focus of the project.

Overall, the UWMC project is very complex, and collaborative planning from the beginning by all players was vital. The dedicated project team and the university have been crucial in successfully formulating the project plan and execution.

Mark Baughman is a construction executive who focuses on health care for Mortenson Construction, a national general contractor with a local office in Kirkland. The company is focused on alternative project delivery methods and the innovative use of technology.

SEATTLE CHILDREN'S

CONTINUED FROM PAGE 2

There is also an indoor gym with yoga mats, exercise balls and equipment, and a bouldering wall to encourage kids to move their bodies, gain confidence and practice team-building social skills.

Perhaps the most important aspect of the design is not what the space has, but what it doesn't. The interior environment is designed to look seamless, with safety precautions and tools integrated into the design in a discreet manner so that they do not become the focal point of the space.

Eliminating plastic-glass cover panels and heavy-duty bolts to secure items to the wall and cabinetry does as much to soften and humanize the space as any other single design element. The walls are clad with natural wood for warmth and texture, and durable panels, routed, etched and painted in bright pops of color to protect the interior environment, provide wayfinding and integrate art.

These design elements eliminate the potential for self-injury while also reducing the potential for harmful behavior by introducing elements of nature and art to reduce stress and aggression. Lighting was also carefully selected to minimize the look of durability and emphasize playful shapes, the calming qualities of defused light and natural light wherever possible. Throughout the unit, great effort was taken to connect patients to natural daylight, or when not possible, to use

LED lighting and design elements to bring a sense of the outdoors in.

Pops of color

You might think that a psychiatric environment should use muted, calming colors. In fact, color and movement play an important role in the therapeutic process.

According to the book "Color, Environment and Human Response" by Frank H. Mahnke, color in the built environment has a far more integral role to play psychologically and physiologically than just positive distraction. The ability to focus and engage is affected and enhanced by the use of bright color, art and sculptural elements.

At Seattle Children's, color is used as placemaking, providing clarity to the wayfinding and variety to the day's activities. Colorful furnishings provide pops of contrasting color and sculptural playfulness to the spaces. Groupings of seating within the unit are as striking as a modern sculpture as they are durable and functional. The classically designed Panton chair by Verner Panton and stylized lounge seating is indestructible yet the material is soft in contrast to the more commonly prescribed hard, molded plastic variety.

Seattle Children's recognizes the important role families play in the quality of outcomes for patients. With this mind, great care was taken to

support families and encourage their engagement in the treatment process.

Family respite spaces, both inside and outside patient rooms allow families to stay overnight with their children, dine inside the unit, check in with work, meet with extended family and gain information and education from the care team. Amenities include a family kitchen, computers, flat-screen TVs, secured storage for personal belongings and comfortable furnishings. These family rooms provide a place for families to step out for a minute or an hour to recharge themselves.

The role of design of the new Psychiatry and Behavioral Medicine Unit at Seattle Children's is to support high-quality teams, to enhance the odds of success, minimize stress and improve safety. The goal of bringing kids and families to wholeness and maintaining positive and supportive experiences for everyone who enters the space, and allowing perceptions to change while providing a sense of hope that all kids have a chance to feel safe and cared for is well worth the extra effort and persistence in design.

Anita Rossen is a principal and senior interior designer with over 15 years of experience creating functional and innovative interior environments.



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BEHAVIORAL HEALTH PROJECTS PRESENT UNIQUE CHALLENGES

Work can require fencing off and monitoring jobsites so patients don't enter and get hurt.



BY ERIK WESTOVER



JIM CHARPENTIER

BNBUILDERS

Behavioral health facility design and construction is an important part of patient care. The external architecture, the interior design, the surrounding environment, as well as the ongoing construction process impact patients and users of these specialized facilities.

New inpatient and outpatient facilities today reflect a modern design approach to healing and recovery, a major departure from clinical hospital envi-

ronments and culture.

Behavioral health facilities represent unique design features and construction challenges. Project teams must understand the client's client — the patient — in delivering state-of-the-art facilities with an emphasis on homelike environments.

The vision for hospitals, health providers and design teams is a model of innovative care and a recovery-centered environment, one that is peaceful, serene and free of distraction.

A variety of settings

Behavioral health facilities provide varying services of care, have unique programmatic requirements, and serve different segments of the population. As a result, working with the staff to identify appropriate building components is critical in delivering a facility that meets their



The 21-unit Valor Apartments in Seattle will serve veterans dealing with behavioral health issues.

IMAGE COURTESY OF BNBUILDERS

specific needs.

In March, BNBuilders completed construction of a two-story, 68-bed addition to Fairfax Hospital in Kirkland using integrated project delivery. BNBuilders,

along with the architect Boulder Associates, worked closely with the project team and hospital staff to identify alternate products, such as tamper-proof and anti-ligature systems, that pro-

vide a safe environment for both patients and staff, while still providing a setting for recovery.

The resulting facility meets

BEHAVIORAL HEALTH — PAGE 9



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HOW TO DESIGN AND BUILD A PLASTIC SURGERY CENTER IN LESS THAN 5 MONTHS

To pull it off, team members worked closely, used lean processes and stuck to the schedule.

The process for health care construction projects is becoming faster, better and less expensive.

Health care organizations need to take advantage of opportunities to increase and improve patient services, add new product lines, increase market share, maintain revenues, reduce the cost of delivery of medicine, and better utilize their tight capital dollars.



BY R. DAVID FRUM
CLARK/KJOS
ARCHITECTS

The Polyclinic seized the its opportunity with a new plastic surgery center in Nordstrom Tower in Seattle's First Hill neighborhood.

The project team included The Polyclinic, Clark/Kjos Architects, Sellen Construction, MacDonald-Miller, and H&M Electric.

The team charged into the process on Sept. 15 last year and had to have the new clinic ready for the physicians by Jan. 2. They would be operating in a fully licensed and certified ambulatory surgery center by February 2014 — less than 5 months from the start of the process.

The brief period included design, city permitting, state Department of Health reviews and approvals, and state licensing and construction. All parties involved were required to have had experience in both ambulatory surgical centers and complex remodeling projects.

The 16th-floor location of the project added extra levels of complexity.

A tight space

Initial test-to-fit plans were produced earlier in the year but the actual design work began in mid-September.

Clark/Kjos started the process by setting up a "pull schedule," which utilized the contractor's preferred lean process. This helped to identify the latest possible date when a decision could be made so that sufficient time could be allowed for documentation, production and installation.

Limited space was another lean challenge. The center was just 7,000 square feet, an unheard of footprint when considering that there would be four 400-square-foot operating rooms, sterile pro-

cessing, pre- and post-operation spaces, and staff areas.

The project demanded that the owners, construction and design teams collaborate closely throughout the process.

The surgeons held weekly meetings with the director of facilities, Randal Brand, and with the design team leader, Dale Anderson. Randal made it clear that the project's pace would require that decisions must be made to meet schedule, so decisions would be made whether a stakeholder was present or not. There was no need to backtrack on or delay a decision — physicians and clinical staff were present available whenever needed.

The early inclusion of the code authorities in every step of the process proved essential to staying on schedule. The city Department of Planning and Development and the state Department of Health's Construction Review Services departments maintained a collaborative approach throughout the process.

They were brought into the process at the appropriate times to review, advise and approve. The DPD and CRS understood the urgency for the completion of the project and were fully collaborative in their response. Their early input eliminated potential late changes and their speedy approvals were invaluable to the successful conclusion of the project.

Help from the contractor

General contractor Sellen Construction, along with design-build MEP of H&M Electric and MacDonald-Miller, partnered in the design. Their close coordination included casework, careful demolition to retain key elements, and reuse of existing doors.

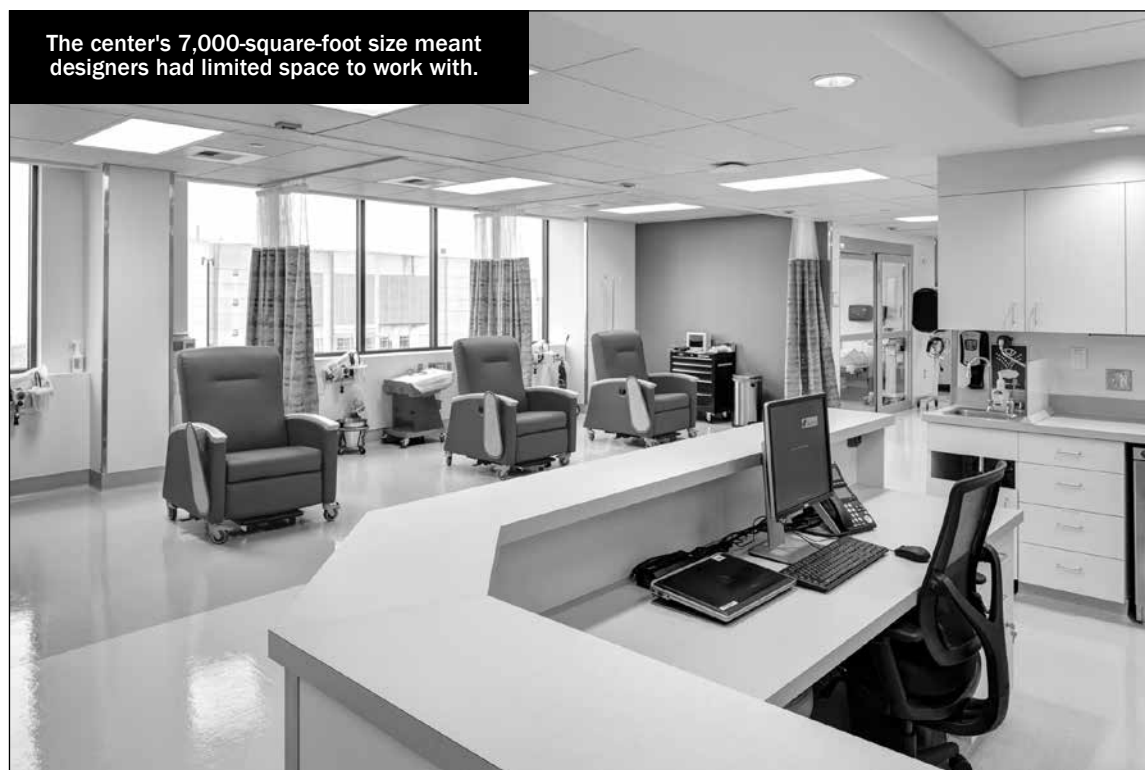
The project required a new rooftop mechanical system built from off-the-shelf components to meet the rigid schedule. Casework shop drawings by Pacific Cabinets served a dual purpose as construction documents and shop drawings — they were produced from design development sketches.

The mechanical package unit was raised to the roof the week-end before Christmas, which necessitated the closing of a street and use of the tallest movable crane available. An emergency generator was installed at



The surgery center houses four 400-square-foot operating rooms.

The center's 7,000-square-foot size meant designers had limited space to work with.



PHOTOS BY NATHANIEL WILLSON

the building's street-level loading dock.

Finally, coordination of the trades by the Sellen team was admirable. Like a well-coordinated dance routine, each one moved through the spaces in its turn reaching a "crescendo" as well as the desired completion dates.

Most importantly, though, was the fact that in spite of this compressed timeline the design

was not compromised. The plastic surgeons said their practice requires a highly efficient process with minimal steps and standardized procedures. They also asked for a clinic that would reflect the aesthetics of their practice.

The comments from patients, physicians and staff in the completed spaces have been very complimentary of the way the facility functions and feels.

The team accomplished a faster, better and less expensive process for The Polyclinic, meeting a seemingly unrealistic schedule and the need for an enhanced lean design at an effective cost.

R. David Frum is a principal with Clark/Kjos Architects, a firm specializing in design for health care, with offices in Seattle and Portland.

HOSPITALS HAVE A LOT TO LEARN FROM LEAN

Whether you're building a new medical center or just looking for ways to cut costs, getting lean can be a boon to the bottom line.

There are numerous names, titles, certificates and facilitation types for lean. But the benefits, process and potential outcomes are the same.

"Leaning" any work environment is meant to improve operational efficiencies. So what does that mean for a health care facility?



BY CINDY COX
SODDERSTROM
ARCHITECTS

Value: Determined by your paying customer, in this case the patient and families, but also the bottom line for the hospital.

Value stream: The set of activities for each process that produces value. In this case, the care and treatments of patients.

Flow: You increase flow by removing "waste" from the processes, eliminating the bottlenecks, extra steps, overstocking and so on.

Pull: Providing a service or supply when needed. Outcomes can range from shortening wait times for testing to not overstocking supplies in units.

Perfection: Comes from the perspective of the customer, and the hospital's bottom line.

What can leaning your health care facility do? Major impacts include improving staff efficiencies, reducing waste in inventory and cutting waiting times for patients, just to name a few.

Less tangible impacts, though just as beneficial, include producing better environments for patient care and reducing complications and infection rates.

Additionally, the lean process helps staff break old habits and analyze their decisions more carefully.

Financial benefits

Adhering to lean principles can pay off financially in a number of ways, including though improved revenues, reduced costs, avoided costs, capital reduction and capital avoidance.

Revenue improvements can come from providing new services that will increase market share. By providing better service, hospitals can garner higher patient satisfaction scores and increase repeat business. Lastly, faster turnover times mean the

hospital can perform more surgeries.

Cost reduction incorporates savings in a number of key areas, from requiring fewer FTEs to reducing ongoing maintenance costs and identifying waste in the overstocking of supplies.

Cost avoidance can be time saved by increased production time and reductions in unnecessary potential future spending by cutting waste from processes. In updated or new facilities, promoting a better environment helps reduce infection rates and workers' compensation claims.

Capital reduction in updated or new facilities provide more energy-efficient environments, reducing overall utility cost.

Capital avoidance can be achieved by eliminating waste streams. Look for opportunities to share resources between departments. In updated or new facilities look to decommission older buildings or adapt them to new functions that do not require future investments in infrastructure.

What to watch out for

Make sure first that the busi-

ness plan for your hospital has been developed based on the market share available. Lean is meant to prevent overbuilding, increase throughput and reduce the need for physical space. However, the facility must determine through analysis and their business plan what their appropriate needs are.

Health care providers must remember that their throughput is their patients. Patient satisfaction is critical in hospitals. If your patients feel they are a car on the assembly line it will create a negative experience.

Remember that your staff are customers too. Ultimately, staff retention is critical to a hospital's success. Leaning a process without full and enthusiastic buy-in by all those providing the services can lead to resistance and thus failure.

Don't let outside consultants and facilitators tell you how to provide your service. A good facilitation team will guide your groups but not give them answers. No one should be saying you can cut your needed square footage by 30 percent, or you wouldn't need all that storage space if your staff was

5 lean principles

- Provide the value customers desire.
- Identify the value stream and eliminate waste.
- Line up the remaining steps to create continuous flow.
- "Pull production" provides a service or product when it's needed.
- Start over in a pursuit of perfection, "the happy situation of perfect value provided with zero waste."

more efficient. Your team will determine their needs based on their optimal flow with the help of the design team.

Keys to success

In approaching a new building project or major remodel, or if you just want to lean your processes for your hospital, there are key elements to follow first:

- Time, resources and financial

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Great Healthcare Facility Design Begins at the Human Scale



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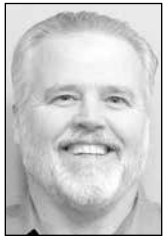
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YOU CAN PROTECT PATIENTS WITH CLEAN CONSTRUCTION

High infection rates can hurt hospital revenues. Clean construction protocols play a role in reducing risks for patients.



BY DAN
SWANSON



TOM
KELLY

MCKINSTRY

As the Affordable Care Act's implementation drives the health care industry toward pay-for-performance, there is an increasing focus on improving patient satisfaction, reducing readmittance rates and eliminating the spread of health care-acquired infections (HAIs).

Reimbursements from the Center for Medicare and Medicaid Services (CMS) are directly tied to a hospital's performance in these categories, and the lowest performers will see their CMS payments reduced. With CMS reimbursements generally accounting for 60 percent of a typical hospital's revenue, hospitals have a major incentive to improve performance.

Many factors affect the spread of HAIs. Much of the existing literature and discussion centers on how clinical best practices can reduce the rate of HAIs, but the environment of care also plays a major role. This begins during construction; without proper clean construction protocols, patients can potentially be put at risk from dislodged mold and bacteria, volatile organic compounds, construction noise and vibration, or dust particulates.

All players in the health care industry have a role to play in maintaining patient health and safety. The construction industry, which improves and maintains our nation's health care facilities, has an especially significant responsibility to bear. However, the construction industry's overriding focus on cost and schedule tends to overshadow the potential risks to clinical operations, which are difficult to quantify.

Fortunately, the industry is changing. Environment of care specialists with health care facility-management experience are bringing a clinical operations perspective to construction.

Developing and following clean construction protocols that protect patient spaces is a crucial

Patients in other areas of the hospital were unaffected by the construction of the new Seattle Children's tower.



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goal the construction industry must have when working in the health care sector. The process

of creating these protocols demands an integrated, collaborative approach that includes the design and construction team and hospital staff. By integrating ownership over patient outcomes between the designer, constructor and hospital, the health care industry reduces risk, saves money and, most importantly, protects patients.

Covering the bases

Planning

Planning is important to identifying and mitigating risk. To start, the team must create an infection-control risk assessment, which is a documented process that allows the team to anticipate potential risks of infection throughout the design and construction process.

Developing the plan relies on a matrix between the invasiveness of the construction and the criticality of the space. Highly invasive construction (such as major renovations) in highly critical spaces (such as surgery rooms) requires extremely rigorous clean construction protocols, while less invasive construction projects (such as installing telephone cables) in less critical spaces (such as administrative offices) requires fewer protocols.

In the end, getting buy-in from all stakeholders, including the hospital, architect, engineer, general contractor and subcontractors is the key step in ensuring the plan is comprehensive and will be followed.

Separate spaces

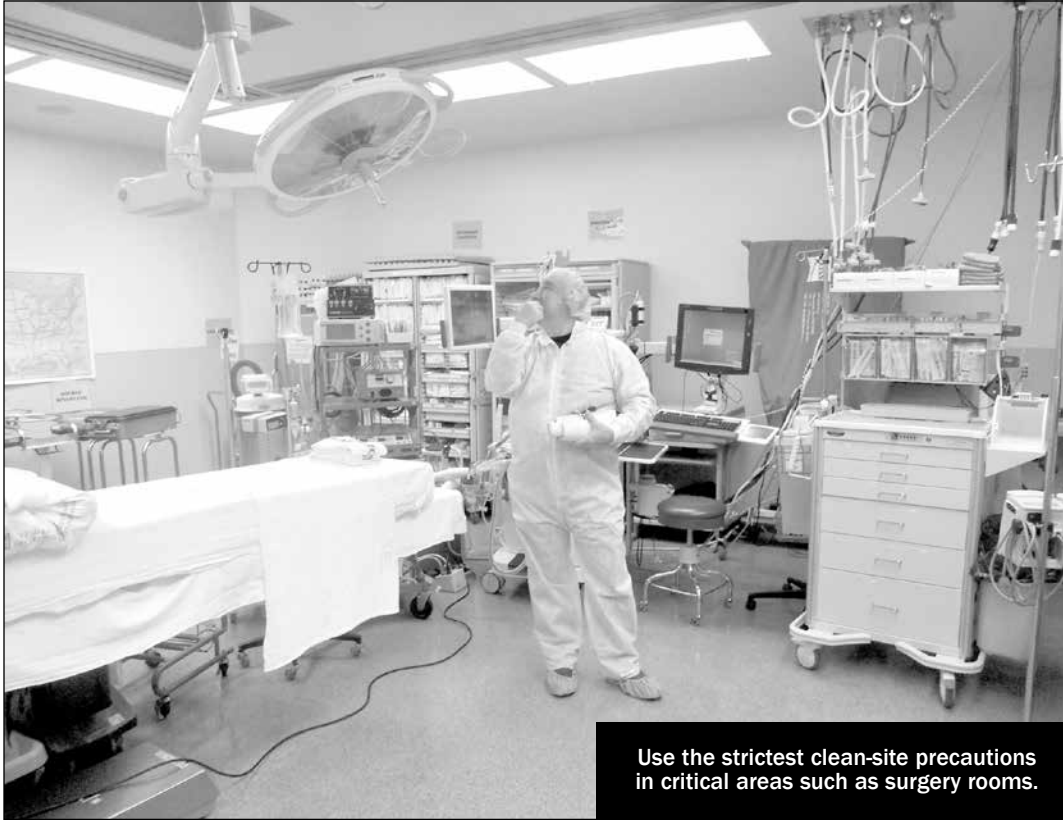
The construction space must be completely sealed from patient spaces. In ideal circumstances, the construction will happen in an unoccupied space.

For example, when Children's Hospital in Seattle added the eight-story Building Hope tower that connected to the existing facility through skybridges on each floor, the project remained physically separate from all patient spaces. No staff or materials ever passed through patient spaces.

However, most projects occur in fully operational facilities. When Harborview Medical Center in Seattle replaced a surgery supply fan at the end of its life with a fan array system, the team encountered numerous infection-control hurdles in order to replace the fan while keeping the operating room suites operational. By using the above processes the team was able to uncover creative solutions to reduce the risk of HAIs.

The team used air from a neighboring fan during off-hours work to maintain minimum airflow and proper pressure relationships in the operating rooms while the main supply fan was down for repairs. This avoided costly terminal cleaning while still maintaining proper infection-control standards.

On another project at Harborview, the team was able to build a temporary pressurization chamber attached to the air-handling unit, which allowed



Use the strictest clean-site precautions in critical areas such as surgery rooms.



Harborview Medical Center faced hurdles replacing a surgery supply fan.

for equipment to be moved in and out of the air-handling unit without shutting it down. This allowed for continued airflow, proper pressurization of patient spaces, and thus proper infection control.

Clean materials

Materials need to be properly cleaned before installation. For example, piping, ducts, and

HVAC equipment should all be thoroughly cleaned (with an approved cleaning product if it's for patient care and support areas) with the ends wrapped in plastic and the interiors wiped down.

Clean sites

All dust and debris can contain potential contaminants that may jeopardize the health of patients.

Site staff should remove all dust daily using a vacuum with a HEPA filter.

Personnel entering or exiting the construction site should be vacuumed or wear removable cloth or paper overalls that remain on site. Workers should also wear shoe covers that are changed every time they exit the work area, and a sticky mat should be placed anywhere a

worker enters or leaves any project site adjacent to a health care environment.

Quality assurance

Finally, there must be a robust quality assurance and control plan in place to ensure that the established processes are maintained. It is the responsibility of both the hospital and the construction team to ensure that

all agreed-upon processes are followed and standards are met.

Much like the early stage ICRA or pre-construction risk assessment, there needs to be buy-in from both the hospital and the construction team so that all can hold each other accountable to the plan and the results.

Other steps include the hourly

PROTECT PATIENTS — PAGE 15



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BEHAVIORAL HEALTH

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the critical need for expanded behavioral health services for the region, and the addition of this new wing creates the largest private behavioral health hospital in Washington state.

Navos' Behavioral Healthcare Center of Excellence under construction in Burien is a multi-building campus serving at-risk children, youth, and young adults and their families and caregivers. The expansion includes independent residential quarters for young adults, living cottages and classrooms, a primary care clinic, a multipurpose building, and a full complement of outpatient counseling services.

To achieve Navos' vision, the project team is creating a safe and secure environment for healing within the natural setting on Lake Burien. The expanded campus and new buildings will give patients the feel of a Pacific Northwest learning community resort.

Spaces were also designed to be flexible so they could be adapted for future needs. The project is scheduled for completion in early 2015.

Treatment centers and clinics are not the only facilities that provide support; a range of supportive housing and residential options provide a safe, healthful and therapeutic environment.

BNBuilders is working with the Community Psychiatric Clinic and SMR Architects to build the 21-unit Valor Apartments, a four-story residential building in Seattle for veterans dealing with behavioral health issues. Community Psychiatric Clinic will

be managing the project and providing recovery-focused services to the residents. Valor Apartments will provide a critical link for veterans transitioning from homelessness to independence.

Patient safety

While distinct aesthetic and functional features create warm and welcoming settings for patients, project teams prioritize patient safety during design and in construction. Healing and safety are compatible practices in delivering these facilities.

These safety procedures become especially important when the facility is occupied. At Navos, fencing around the site has additional safeguards with reinforced joints at each panel and privacy screens, to help deter patients from entering the jobsite and getting injured. Additionally, security cameras are posted on the site so that the area is regularly monitored.

Additional safety measures are implemented by owners as well. Navos has classified the construction site as an "imminent danger zone" which allows facility staff to treat their clients with a certain level of care if they do attempt to enter the site.

At Fairfax Hospital, 80 percent of patients are involuntary so facility security is critical, especially with the existing hospital being occupied. Those working on site participated in an orientation where they were made aware of security concerns and the appropriate measure to take if a security breach were to occur. Site

access and egress were strictly monitored and many of the same site protection measures as the Navos project were used.

At both facilities, patient privacy, recovery and safety are the top priority, and coordination with hospital staff is paramount in ensuring minimal impacts to those processes.

Embracing AIP

Mental and behavioral health facilities of today require a transformational change in the design and construction process. As the industry continues to evolve, contractors are finding the need to be more integrated and collaborative with the entire project team — architects, owners, subcontractors, users and staff — in order to deliver added value and a facility that meets the needs of the user. Through this approach the project team creates a high-performing environment of teamwork and innovation throughout the duration of the project.

The relationship gap between contractors and designers is narrowing with the onset of new technology, a focus on creating partnerships, and the development of innovative methods for reducing waste. A new design and construction standard, known as advanced integrated practice (AIP), encompasses all of these methods and tools and sets the stage for a superior approach to building.

BNBuilders' successful delivery of complex projects rests in our culture's embracing of the philosophical tenets of AIP.

Delivery methods such as integrated project delivery, design-build, GC/CM and CM-at-risk are most often associated with AIP and represent a large percentage of BNBuilders' projects.

Each of these delivery methods require coordination and collaboration that is best approached through a strong partnership in which the general contractor works as a resource for designers and an advocate for the owner. Advanced integrated practices are the blueprint for more innovation and less waste.

The AIP philosophy of early coordination also includes pre-design involvement by the general contractor.

Fairfax Hospital in Kirkland was delivered using integrated project delivery. The BNBuilders team helped Universal Health Services with cost modeling, site selection, completion of the certificate of need application, and revenue evaluations before design began.

This input proved extremely valuable to Universal Health Services and was the beginning of a partnership that has continued on several current projects in Seattle and the Bay Area. For

Fairfax Hospital, the result of our partnership is a facility that was built for a significantly lower cost than if a traditional delivery had been used.

Ultimately, the adoption of integrative and collaborative processes, such as AIP, creates value for all involved. Developing partnerships with members of the project team, aligning project goals, utilizing smart technology, reducing waste, and identifying an efficient path to project completion take priority over maximizing profits. Along with partnership and integration, client advocacy makes up the foundation upon which project success is built.

Through recent and current construction of behavioral health facilities in the Puget Sound region, we have recognized that collaborative delivery techniques provide the best value for our clients.

Erik Westover, a project executive at BNBuilders, has spent his career delivering technical health care projects in the Seattle area. Jim Charpentier has over 16 years of experience in the health care industry in Washington.

PRINCIPLES

CONTINUED FROM PAGE 11

commitments will be required. If this process is part of a building project, it can add as much as 50 percent to the length of the initial phases. An existing facility staff that is lean trained can and should get used for much of this, but often a facilitator is brought in by the design team or owner. These costs are in addition to physicians and staff that are paid to attend the process outside of their regular jobs.

- There must be a full commitment that is emphasized to all the staff involved in the process. This includes doctors, nurses, support staff, administration, as well as public representation.

- If the facility has an existing "lean team," they should be the ones engaging the key departments on current state and future state mapping. These flows create a visual representation of a department's operational processes in regard to people, technology and organization. This is in preparation for the "3P" events and is critical to successful "3P" workshops, which will be discussed below.

- Administration must select team members for all key departments that will commit to being actively involved in meetings and 3P events. Attendance should be across the board, nursing staff, technicians, physicians, administration and facilities.

- Staff that will be involved in

process will be required to do "gemba" walks of their departments to help understand problems and opportunities going into the flow-mapping sessions.

- 3P (production, preparation and process) workshops: These are four- to five-day events generally broken down by departments for hospitals. The 3P workshops will develop the basic layout for the primary departments and will produce detailed design for key rooms through mock-ups.

At this point design development and equipment planning will start for all other spaces in the departments, as well as design development for the minor departments not included in the 3P process.

Embracing lean

Next step: Engage your team. The value stream mapping of the current state and future states is the first step in identifying the waste in your facility and, more importantly, getting your staff engaged in the process.

You can start implementing these future state operations in your existing facilities before any construction. Don't wait for the building to support the change — the change is the people.

Cindy Cox is an architect at Soderstrom Architects in Portland and has 28 years experience in the health care field.



Photo courtesy of:
Providence St. Mary Medical Center, Walla Walla, WA

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Ducts must be thoroughly cleaned before they're installed.

PROTECT PATIENTS

CONTINUED FROM PAGE 13

review of both air and physical barriers, appropriate training, and final air-quality testing via an independent lab to ensure acceptability for patient care. It is important to work closely with the hospital infection prevention officer to ensure continual compliance with the hospital's standards.

Focus on outcomes

Clean construction protocols aren't simply a list of steps to take in keeping construction spaces clean. They are the catalyst to establishing an integrated, outcome-focused approach to construction in the health care industry.

Integrated ownership over patient safety requires both the construction team and the health care staff to engage in a proactive discussion about reducing the spread of infections. The construction industry shares an important responsibility with their health care clients: to protect patients, visitors and staff from harm.

Establishing and following clean construction protocols is a means to achieving this safe and a clean patient care environment.

Dan Swanson, project director, has over 30 years of direct health care facilities experience. He manages the delivery of the majority of McKinstry's health care projects. Tom Kelley, account executive, focuses on the health care industry for McKinstry's energy services division.



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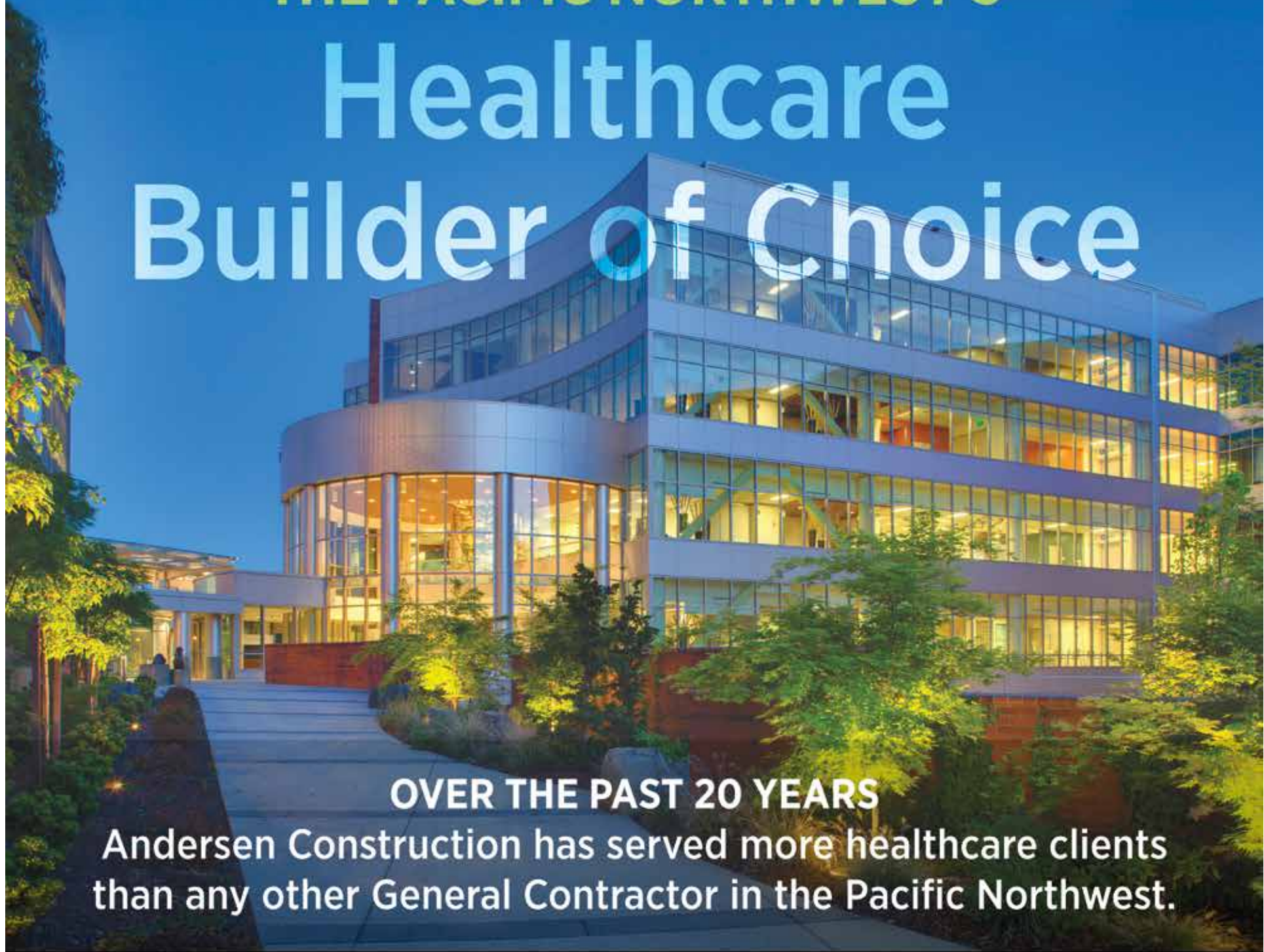
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