

AIA INDIANA HEALTHCARE DESIGN AWARDS

RILEY MATERNITY TOWER AT RILEY HOSPITAL
FOR CHILDREN AT IU HEALTH



Special Delivery

As of 2019, the infant mortality rate in the United States was 5.6 per 1000 births. While Indiana had the 14th highest infant mortality rate in the country, at 8.04, the State and IU Health were determined to lower that rate—and the solution celebrated its grand opening in November 2021.

One step in reducing infant mortality, was upgrading the healthcare facilities focused on maternal and newborn health, specifically the renovation of five floors at Riley Hospital for Children at Indiana University Health in Indianapolis to create the Riley Maternity Tower.

In partnership with the Indiana University School of Medicine, Riley Hospital is now home to the largest group of maternal-fetal medicine physicians in Indiana. With the completion of the renovation, the hospital was able to house a labor and delivery unit, a 45-bed Level 3 neonatal intensive care unit (NICU), and a postpartum unit in one facility. The upgrade made Riley the first children's hospital in Indiana to establish an integrated, all-in-one program offering obstetric, delivery, newborn, and comprehensive pediatric sub-specialty services under one roof.

Before the renovation, high-risk babies and their mothers were treated in different facilities. Adding to the significant emotional trauma of separating mother and newborn, practical issues emerged, having delivery services in one location and the NICU in another. Babies would have to be whisked away to Riley. This disruption in continuity of care, even though brief, could have been harmful.

SUBMISSION CATEGORY: Adaptive Reuse/
Renovation/Interior Architecture
PROJECT TYPE: Women & Children's Hospital
ADDRESS: 702 Barnhill Drive,
Indianapolis, IN 46202
COMPLETION: November 2021



Atrium Renovation

Riley Hospital, a conglomeration of five different buildings, is widely respected by the medical community and the local community. They have a reputation for providing first-in-class medical care. By renovating the hospital, Riley was continuing a source of pride and a deeply treasured community asset.

Renovation, by its very nature, is always inherently challenging. Those challenges were only compounded by multiple reasons when it came to the renovation of Riley. The design team spearheaded the complex design of the five-story tower as the campus and portions of the same building continued operating 24/7 to serve patients and families.

Inside is a four-story atrium lobby filled with natural daylight and surrounded by balconies that help guests navigate the building. Four large-scale backlit glass panels with images of sliced stone introduce the geode concept for the new mother-baby department. Smaller lower-scale spaces with flexible seating and custom artwork further support the geode concept. Furnishings in the lobby are comfortable and evoke a homelike feel for families. They are durable, have clean outs, and upholsteries that can tolerate bleach and stringent cleaners for infection control. Two round, all-glass elevators greet visitors, inviting them to see all the way up the building.

In addition, the infrastructure at Riley was that of an aged, 40-year-old building. Updating the atrium meant bringing it up to code in all aspects which meant the addition of a complex smoke evacuation system for 202,800 cubic feet per minute (CFM) that was designed to meet the requirements without sacrificing the grand feel of the space. The engineers were able to design the exhaust and its 165,000 CFM of make-up air required to be installed in a way that did not make major design impacts in the artfully designed space.

BEFORE & AFTER ATRIUM | This portion of the hospital had an attached atrium and an original 1920s facade that is a focal point for the atrium. Each of these elements needed to remain within the footprint of the renovated Maternity Tower.





Left: Patient Corridor Before
Right: Patient Corridor After

When Form Does Not Follow Function

The existing footprint was not ideal for creating functional in-patient programs. For example, the NICU needed to be created in a footprint without exterior windows in every room. Compounding the challenge, the rooms needed to be separated as opposed to aggregated. Therefore, a major question needed to be considered before determining the layout and design of the renovated floors: When moms and newborn babies stay in the same facility, what happens in an emergency? Ultimately, the team needed to figure out the identity of each unit and how best to bring adults to a children's campus, what the perception of this would be, and what

the experience would look like.

To design the NICU so it met the hospital's needs, it was necessary to understand the processes and the needs of both the staff and the patients. While form follows function is a design principle, it was not the case at Riley. The team was given a form that couldn't be modified.

Part of the activities the project team went through to meet this need was to work side-by-side with operational planners. These planners were instrumental

in incorporating the operational workflows into the circulation design and the spaces. Integrating the operational flow into the design makes the space exceptionally efficient and incorporates the best use of the renovation envelope.

Other functional factors needed to be considered when developing the design of the renovated floors. There are multiple services at Riley beyond the NICU. These include research, pediatrics, and maternity—a rare combination.

Finding a way to merge two cultures and bringing adults into a children's hospital were two of the project goals and ultimately are visibly evident in the renovation.

Satisfying both requirements came down to the placement of the units. The NICU was placed between the labor/delivery unit and the postpartum unit. Because the NICU is easily accessible, this positively affected the workflow and efficiency of the medical staff and, of course, helped keep mothers and their babies together as much as possible.



Patient Unit Upgrades

Designed to encourage discovery and exploration of the natural world, the Riley Maternity Tower draws inspiration from some of the earth's most beautiful formations: geodes and mineral crystals. The true beauty lies within the stone, requiring exploration beyond the surface. Geodes are treasured for the beautiful and precious creations that develop from within; a process that reflects the experience of an expectant mother and her growing child.

Across the main corridor is a beautiful new café with plenty of seating and outdoor views. As patients and families begin making their way toward the patient units, they pass by the geode wall that introduces the concept of the relationship between these beautiful crystals inside the stone and the new baby about to be born.

Geode graphics enhance the upper floor corridors, the patient unit corridors, and the patient rooms. These are digitally printed on durable wall materials to continue the concept and integrate art into the architecture of the entire mother-baby wing.

Floors two through five of the original structure were demolished and fully renovated – along with partial demolition of the first floor – to reimagine purposeful design leading to optimal function and beauty of the spaces. Variable air volume and LED lighting controls were implemented throughout for energy efficiency.

The second floor – the largest floor plate of all five stories – includes a 10-room OB emergency department and a labor and delivery unit with 16 rooms, three of which are designated as obstetrics ICU rooms to serve more critical patients prior to their deliveries. A small surgery suite is also located on this floor, consisting of four operating rooms – one of which is for fetal surgery. The design also includes an infant resuscitation room with a window connected to the ORs so critical babies can be passed to the neonatal surgical team nearby.

The second floor also includes 14 patient rooms for high-risk antepartum patients who need to remain on bed rest prior to delivering their babies.

ABOVE | Before and After Dining
RIGHT | Geode Wall Graphics
BELOW | Labor and Delivery Room/ High Risk Patient Room



Third floor is comprised of 45 private, Level 3 NICU rooms, some of which accommodate siblings from multiple births. A Ronald McDonald House family space is designed to provide a place for family members to rest, relax and refresh. This space touts a family room, full kitchen, beauty bar and quiet area where individuals may seal themselves up into a pod and nap.

Floors four and five have been renovated to house a 38-bed postpartum unit. Each patient unit within the newly renovated tower is equipped with a private toilet and shower room, warming cabinet for baby, space for families, a headwall for mom’s treatment and a baby and nurse area. The fourth floor also includes three patient rooms for babies born with neonatal abstinence syndrome.

The Riley Outpatient Center has been updated to house an outpatient maternal-fetal medicine clinic. The design includes a new comprehensive fetal center to diagnose and treat fetal patients with congenital anomalies. The tower provides a full menu of maternity services, from lowest risk to highest risk, and is equipped to accommodate more than 3,800 deliveries annually.

Infrastructure Upgrades

The project consisted of replacing the entire HVAC infrastructure which consisted of eight custom air handling units totaling 334,000 CFM (cubic feet per minute), five of which are tethered together via plenums to allow for redundancy. Each have very custom designs that allow the units to fit precisely beneath existing utilities, including an oxygen pipe, and major telecom

lines that serve the entire campus. All the outside air intake for these units was switched from a tunnel at ground level to the roof for all the units, including the six in the lower level of the building. This complex change was done to provide a cleaner and more secure outside air system for the building. Adding to the complexity, the installation of each AHU needed to be phased to consistently serve the radiology and kitchen area on the first floor that serves patients on the entire campus throughout construction. The air handling unit’s system design also includes a water side economizer sequence with the addition of a heat recovery chiller. The design team analyzed the application and the data showed that this system would be more energy efficient than a regular air side economizer. The heat recovery chiller allows for the two existing 600-ton chillers from 1984 to not need to run in the winter and provides the winter cooling and summer reheat loads for the building. To meet LEED requirements, a plan for the replacement of the large chillers within five years was also developed.

The engineers were tasked with keeping electrical equipment operational as the renovation ensued because the equipment also feeds other critical operations in the kitchen, radiology, and phase two and four (separate buildings) of the medical campus. The process of bringing the new systems into operation was phased to prevent any overloads that could impact service to other areas on campus. Tight spaces in which to locate and add necessary systems and equipment added complexity to the project, as did the use of temporary electrical panels to transfer loads to the new electrical switchgear. This daunting task was accomplished by the detailed coordination of the design.



Bottom Images: Basement Mechanical Room Before

