

Program: Engineering a Better Future for Cancer Patients at the Joe & Shelly Schwarz Cancer Center at IU North Hospital

Speaker: Sara J. Grethlein, MD, Director, Joe & Shelly Schwarz Cancer Center, IU North Hospital

Introduced by: Marty Meisenheimer

Attendance: 127

Guests: Jim Bebee, Martin Maitz, John and Jean Nusbaum, Patricia Snyder, Barbara Solomon, Natalie Woodruff

Scribe: Carol and Jim Mutter

Editor: Carl Warner

In addition to an MD, Dr. Grethlein also has a degree in Chemical Engineering, has completed an Oncology Fellowship, and is currently working on an MBA from Kelley School of Business. As the project officer for the new IU Health Joe & Shelly Schwarz Cancer Center, she spoke about the process of designing the Center which opened this month and is physically connected to the IU Health North Hospital.

Joe Schwarz and his family came to the US from Argentina with no money; he was age 4 at the time. Throughout his life he started several businesses, owned and operated the Marriot on Shadeland Avenue, and became a successful real estate developer. He died of throat cancer in 2018. He and his wife learned first-hand what makes a difference for cancer patients and their families. They donated money to build a cancer center that puts the patient's experience front and center.

There were many connections with various types of engineers and other experts in the design of the new Center. It was most enlightening to hear how much went into the design, from traffic patterns on the streets outside (to ensure easy access to the emergency room at IU Health North, etc.) to patient traffic patterns inside. Their goals included providing cohesive (vs. fragmented) care for cancer

patients who already have multiple challenges in fighting their cancer and going through all of the debilitating treatments. The Center is Leadership in Energy and Environmental Design (LEED) certified at the Silver level. One particular challenge that came to light just 2 months before they opened was getting the right temperature chilled water to the new PET-CT scanner which required water 3 degrees cooler than the chilled water already available. Fortunately they had planned enough slack in the schedule and some reserve funds for unanticipated needs, so were able to handle this critical last minute challenge and still open six months early and under budget.

The major technology goal was to ensure cancer patients could be cared for in a multidisciplinary environment – all under one roof and with the systems aligned so the physicians and other members of the team could all be available on the same day in a single location for patient care. The design put the patients first and moved doctors and staff around instead. In addition to availability of financial counsellors, one of the more successful innovations was the inclusion of nurse navigators to help patients through all the processes and appointments. Process engineering goals were to: minimize fragmentation, focus on the patient experience, minimize paperwork, and embrace Lean principles (define customer value, map the value, create flow, establish flow, and ensure perfection). Computer systems also helped to ensure that the sequence of events in staffing, supplying and opening the Clinic was right. Computer systems ensure the patient has to check in only once regardless how many clinics and labs she/he needs to visit. Technology is also used to schedule coordinated treatment and track what medications the patient's insurance company will pay for among other things. Each station in the Clinic has a computerized visual representation of where the patient is to facilitate timely handling of patient needs. (They decided against using Real Time Patient Scanning of a band on the patient's arm because of privacy concerns.) Computer modeling and

simulation was used to chart patient flows as well as to help determine the number of stations and staff needed. Computer simulations were used to analyze alternative designs and test them against expected patient loading both now and in the future. (E.g., average number of daily patients is 101 in 2020 but is expected to be 144 in 2029.) There's even a low-tech but reliable pneumatic tube system to ensure prompt transfer of prescriptions, lab specimens, etc.

The Center was designed for the needs of today but also the needs ten years from now. For example, the Center is two stories high but built to enable three additional stories to be added as needed. And the facility construction will accommodate two linear accelerators even though they have only one now. In spite of all the engineering and studies, once opened a bottleneck was found that was not predicted. It was quickly identified and solved based on visual management, Lean processes, and daily huddles to discuss what is and isn't working.

Cerner Millennium is the contractor that helped implement Phase 1. Lean 6 Sigma (a process improvement methodology designed to eliminate problems, remove waste and inefficiency and improve working conditions to provide a better response to customers' needs) was used to optimize patient pathways for check-in and treatment. For example, nurse education of the patient takes place while the patient is in the infusion center. The pharmacy will even deliver medications to the patient, eliminating another stop in an already difficult day. There is a separate area for adolescents and young adults battling cancer. An Integrated Health Unit offers art and music therapy, massage, nutrition tips and a beauty salon among other things. The on-site offerings have been designed to provide as many resources as possible in one place.

A same-day clinic is to open in the Center this spring to help patients avoid the emergency room. The clinic will be open Monday through Friday from 8 to 5 for wound checks, fever, pain, etc.

The new Cancer Center also does clinical research in collaboration with clinical members of the IU Simon Cancer Center - an NCI Designated Comprehensive Cancer Center.



Sara J. Grethlein, MD