

Further Reading

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Small Dose for Small Patients



The Arnold Palmer Medical Center with the Arnold Palmer Hospital for Children (left) and Winnie Palmer Hospital for Women & Babies (right)

Arnold Palmer Hospital for Children in Orlando, Florida, USA, prides itself on providing advanced, specialized care for children. It comes as no surprise, then, that it was the first pediatric hospital worldwide to purchase Siemens' SOMATOM® Definition Flash computed tomography (CT) scanner, one of the fastest scanners with the lowest dose on the CT market. The system combines Dual Source technology with the fastest available hardware component and innovative features, enabling thoracic scanning without breath holds and, in many cases, high-quality images with doses of less than one millisievert (mSv). John Bozard, President of the Arnold Palmer Medical Center, remarks, "It is certainly going to give patients and their families a higher level of comfort about CT."

While reducing radiation exposure is important for all patients, pediatric patients in particular are more vulnerable to the adverse effects of ionizing radiation. This makes SOMATOM

Definition Flash an especially attractive choice for pediatrics. Joseph Foss, MD, Chair of Pediatric Radiology, adds, "We reviewed all of the systems available, and the Definition Flash definitely provided the lowest dose possible for our patients, which was very important to us."

The requirement for breath holding during CT scans has always been a challenge with pediatric patients and often resulted in the need for sedation. SOMATOM Definition Flash's speed can eliminate the need for breath holding and, therefore, result in a scan that is less burdensome and safer for patients. For the complete story about Arnold Palmer Medical Center's scanner acquisition, please use the link below.

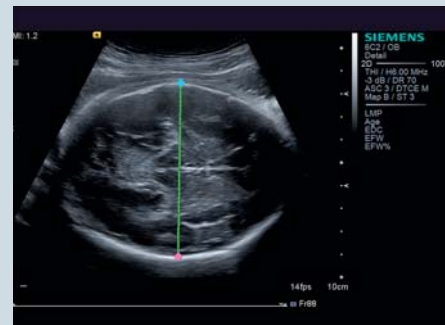
www.siemens.com/SOMATOM-Sessions-lowdose

Knowledge-based Automated Fetal Biometrics Using *syngo* Auto OB Measurements

Measuring fetal biometry has become standard practice in prenatal care to determine the growth development and well-being of the fetus. Obtained manually, fetal measurements are time-consuming and highly user-dependent. In addition, due to the multitude of keystrokes required to perform each measurement, users are prone to develop repetitive stress injury (RSI). Siemens Healthcare has developed an application addressing these issues. *syngo*® Auto OB measurements automate the manual process of fetal biometry measurements saving up to 75 percent of the keystrokes in routine fetal exams and improving standardization and reproducibility of results. Common fetal biometric measurements include: biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC), femur length (FL), humerus length (HL), and crown rump length (CRL). The American Institute of Ultrasound

in Medicine (AIUM) publishes guidelines for measuring these values. They help diagnose fetal pathology including growth restriction, microcephaly, and macrosomia. In addition, they are utilized to estimate the gestational age (GA) of the fetus (i.e., length of pregnancy in weeks and days). Accurate estimation of GA is important to determine the expected delivery date, assess the fetal size, and monitor fetal growth.

The most common current workflow requires expert users to perform biometric measurements manually. This paradigm yields several challenges, such as user dependency, time intensity, or RSI due to the multiple keystrokes needed to perform each measurement. *syngo* Auto OB measurements are based on advanced statistical pattern recognition technology enabling rapid automated measurement of fetal biometrics to increase consistency of results among users.



Example of biparietal diameter measurement with *syngo* Auto OB

A whitepaper published by Siemens highlights the advantages of *syngo* Auto OB measurements and how it can be utilized to address the challenges of fetal biometry. It can be accessed using the link below.

www.siemens.com/clinical-OBGYN

E-prescribing: The Path to Physician Adoption of HIT

Adoption of health information technology (HIT) by physicians in the U.S. has progressed at a very slow pace. Admittedly, a recent confluence of developments in the specific HIT area of “e-prescribing” has opened the door for its wider general implementation. A whitepaper recently published by Siemens focuses on e-prescribing in the U.S. It summarizes various studies and lists the benefits that are being realized by physicians who have adopted either a full or basic system. Two factors contributing to the success of such efforts are the technical characteristics of these solutions and the practical workflow benefits that e-prescribing technology delivers. In general, these solutions are easy to install, maintain, and use. The implementations are efficient from a time and resource standpoint and do not, as a rule, disrupt the normal physician workflow. On the con-

trary, e-prescribing data and workflow enhancements address a set of readily identifiable pain points common to almost every practice.

These pain points include frequent medication-related phone calls either from patients or pharmacies, excessive chart pulls, lack of satisfactory medication history data, incomplete allergy and drug interaction data, and cumbersome formulary data access and management. By addressing these pain points with one user-friendly, relatively inexpensive solution, the chances for more widespread adoption and subsequent ongoing use of e-prescribing are greatly enhanced. As a result, the healthcare system should see broad adoption by physicians across the practice spectrum.

To download the full whitepaper, entitled *E-Prescribing – The Path to Physician Adoption of HIT*, please use the link below.

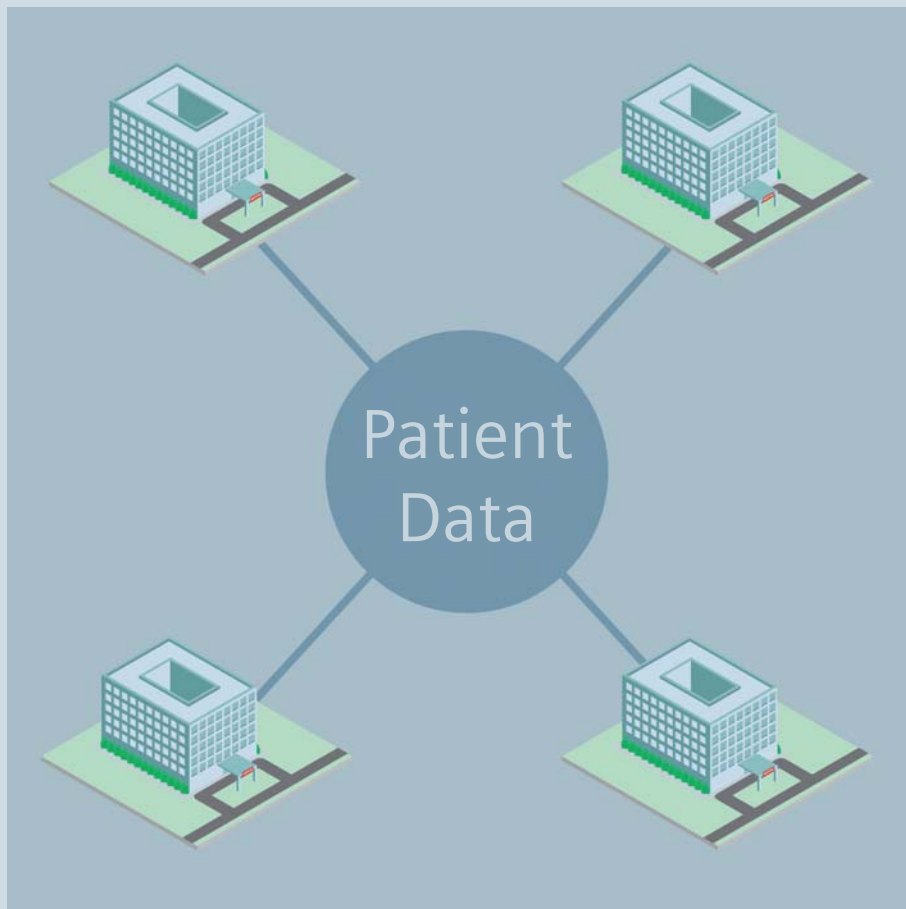


www.siemens.com/e-prescribing

Step-by-step IT Implementation

Brookhaven Memorial Hospital Medical Center, a 306-bed, acute-care, non-for-profit, independent community hospital in East Patchogue, Long Island, New York, USA, strives to provide leading-edge healthcare solutions through a compassionate team as well as technologically advanced facilities. Serving a population of more than 350,000, Brookhaven's laboratory currently runs about 3.3 million tests per year. This, coupled with the facility's focus on providing quality healthcare with the leading technology, led Brookhaven to adopt an IT initiative with the help of Siemens and its comprehensive portfolio of performance-driven healthcare IT products and solutions. In 2000, Brookhaven installed the NOVIUS® laboratory information system (LIS) to meet growing demands and provide quality care by improving turnaround times, delivering quicker clinical results, and expediting patient care. The LIS is configured to handle hematology, chemistry, urinalysis, coagulation, microbiology lab workflows, and reporting, aiding in workflow optimization and seamless interoperability between multiple lab settings. Joe Bak, Brookhaven's LIS manager, appreciates its scalability, "It has been able to grow with us to meet our needs and has given us great flexibility in configuring the system, especially with reporting."

In 2007, Brookhaven deployed Siemens' Soarian® Clinicals, a complete hospital information system (HIS) that helps ensure a seamless flow of information within the hospital enterprise. The LIS infrastructure was further complemented in 2009 with the fully integrated Web-based EasyLink™ Informatics System to implement autoverification, manage quality-control data, and optimize the performance and productivity of the laboratory. By connecting the lab's multiple instruments to its LIS through EasyLink, Brookhaven can now consolidate patient



data management while at the same time gain greater control over its workflow and operational performance. "Now that we've gone to autoverification, we've achieved a 19-percent improvement in STAT turnaround times," Administrative Director Jim Carr says. "That's one of the biggest changes we've ever seen and it's significant because our work predominantly comes out of the ED [emergency department]." To provide Brookhaven the tools to quickly build interfaces and enable the exchange of complex information, Siemens suggested the implementation of OPENlink™. This application-independent interface engine can bridge lab, clinical, imaging, financial, administration, and other systems that require online data. This allows users to transfer

data between heterogeneous systems and applications, even when they utilize different communication standards and protocols. Step-by-step, Siemens has helped Brookhaven meet its objectives with solutions – NOVIUS Lab, Soarian Clinicals, EasyLink, and OPENLink – that improve performance and productivity as well as connect every patient touch-point across the care continuum. To read in more detail about the implementations as well as Brookhaven's future plans for the initiative, use the link provided below, and click on "case studies."

www.siemens.com/diagnostics-it

Justifying the Investment

More than two years ago, the Institute of Diagnostic Radiology at the University Hospital Zurich invested in two unique systems from the high end of Siemens' computed tomography (CT) scanner range: Dual Source SOMATOM® Definition and SOMATOM Definition AS. The institute's head of radiology, Professor Borut Marincek, MD, justified the investment on the basis of reduced dosage. "For the sake of our patients," he says, "we will always opt for the latest technology that offers the best results with the lowest

possible dosage." Now, after having time to evaluate the new technology, Siemens' CT customer magazine, *SOMATOM Sessions*, went back to the institute to ask the burning question: Was the investment worthwhile?

"Definitely," answers Marincek's colleague, Sebastian Leschka, MD. With the new scanners, the institute is not only lowering patient exposures, it also is saving time, money, and hassle in the day-to-day workflow as a result of the systems' high scanning speeds and optimized

workflows. "They have provided significant economic benefits," says Leschka, adding that the "next-next" generation scanner, the SOMATOM Definition Flash, promises to trump these improvements even more. To read the entire story regarding the hospital's investments, including improvements in cardiac CT and thoracic scanning, use the link provided below.

www.siemens.com/SOMATOM-Sessions-investment

Whole Blood Total Bilirubin Determination in Neonates

About 60 percent of newborn babies display mild jaundice (yellowing of the skin) within the first two days after birth due to shortened lifespan of red blood cells coupled with slow maturation of liver glucuronyl transferase activity. Mild jaundice is usually not detrimental; however, some newborns develop severe jaundice from high levels of unconjugated bilirubin circulating in the blood.



Nearly 60 percent of newborn babies display mild jaundice, which can be a result of unconjugated bilirubin circulating in the bloodstream.

If left untreated, unconjugated bilirubin may deposit in the basal ganglia and brainstem, causing irreversible neurologic damage, a condition known as kernicterus. Kernicterus can cause cerebral palsy; problems with hearing, vision, and teeth; and mental retardation. Simple and noninvasive phototherapy is the first approach to reduce high levels of neonatal bilirubin. However, if phototherapy does not lower the baby's bilirubin blood levels, an exchange transfusion may be required. Since untreated hyperbilirubinemia may cause severe permanent health problems, all newborns should be checked for jaundice. The practice guidelines of the American Academy of Pediatrics include provisions for measurement of total bilirubin to evaluate the degree of jaundice and the necessity for intervention.

Because of the complication of collection, limited blood volume, and higher hematocrit, testing neonatal blood can be challenging. Large reagent-based chemistry analyzers require the separation of plasma from the red blood cells prior to analysis. Blood gas analyzers offer an alternate method for assessing the risk of developing kernicterus using direct

multi-wavelength spectrophotometry on small volumes of whole blood. Siemens Healthcare Diagnostics magazine *Perspectives* presents a neonatal whole-blood total bilirubin performance evaluation of two blood gas systems: the RAPIDLab® 1245 from Siemens Healthcare Diagnostics compared to the Radiometer ABL 735, a member of the Radiometer ABL 700/800 family of systems.

As demonstrated in the hospital setting using diverse clinical specimens from neonates, whole-blood total bilirubin analysis on the Siemens RAPIDLab 1245 blood gas analyzer is accurate and precise when compared to the Radiometer ABL 735. Analysis of unhemolyzed whole blood using the RAPIDLab 1245 or RAPIDLab 1265 is a clinically acceptable method for monitoring the development of pathologic concentrations of bilirubin in neonates. The full results for this new alternative for monitoring bilirubin in newborns can be accessed using the link below.

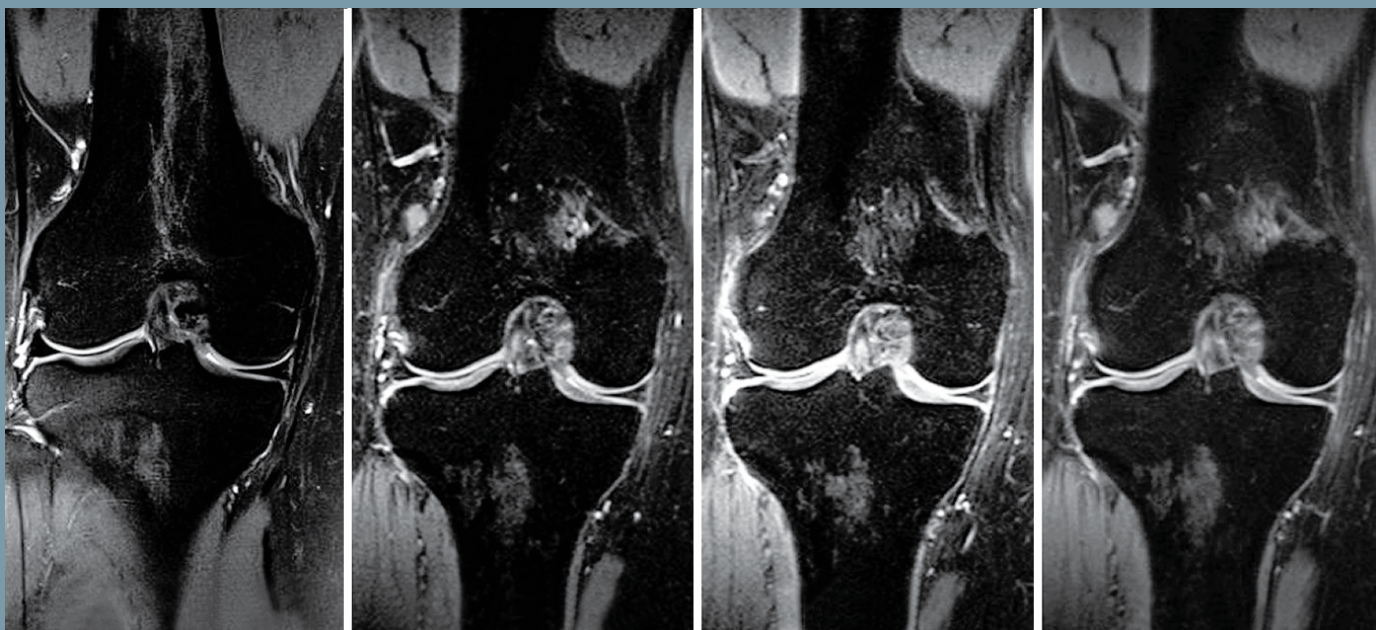
www.siemens.com/bili

3D High-resolution MRI of the Knee

Magnetic resonance imaging (MRI) of the knee is justifiably one of the most commonly performed MRI examinations, as it offers excellent direct depiction of cartilage, ligaments, menisci, and periarticular soft tissue. This can be achieved by standard application of fat-saturated moderately T2-weighted 2D Turbo Spin Echo (TSE)-sequences in three orientations. However, conventional TSE-sequences are not isotropic, hence structures and signal alterations/lesions with a size less than the usual slice thickness of three to six millimeters (mm), i.e., meniscal roots, may not be completely detected. A slice thickness below three mm is rarely acquired because of its reduced signal-to-noise ratio (SNR) and contrast-to-noise ratio (CNR) as well as the prolonged acquisition time for complete joint coverage. Furthermore, postprocessing options are limited for 2D sequences for the assessment of structures which are captured in an oblique course through several slices, like the anterior cruciate ligament or the femoral trochlear cartilage. In this setting, the introduction of a highly resolved 3D moderately T2-weighted (3D-T2w-TSE) sequence may be useful. In research, time-efficient 3D-T2w-TSE sequences have already been evaluated for the central nervous system and recently for the body trunk. They enable data acquisition with high isotropic

spatial resolution and allow for interactive three-dimensional visualization. Such postprocessing after an initial isotropic data acquisition has been proven successful in many other MRI and computed tomography-based applications. The application *syngo*[®] SPACE, a 3D-TSE-sequence with moderate T2-weighting standing for 'Sampling Perfection with Application optimized Contrasts using different flip angle Evolutions' might establish a new approach to MRI for the knee. Parallel imaging facilitates blockwise 3D-data acquisition with isotropic spatial resolution for evaluation of the whole knee in a reasonable time window. Radiologists at the University Hospital of Munich's Department of Clinical Radiology investigate the application of *syngo* SPACE for imaging the knee and present their results, including shorter acquisition times as compared to two-dimensional datasets, in a recent article published in Siemens' MRI customer magazine, *MAGNETOM Flash*. That article can be accessed using the link below.

www.siemens.com/MAGNETOM-Flash-knee



As compared to the T2w-2D-TSE-fs in 3 mm (far left), coronal *syngo* SPACE reconstructions in 0.5 mm (middle left), 1 mm (middle right), and 2 mm (far right) show good homogeneity throughout the image.