



# One room that has it all

Combined DR and fluoroscopy solution helps staff do their best for patients

## Who/where

Dr. Donald P. Frush, Pediatric Radiologist and Chief of Pediatric Radiology  
Dr. Caroline Carrico, Pediatric Radiologist and Assistant Professor  
Eric Porter, Technical Administrator  
Anja Ancarana, Pediatric Radiological Technologist

Duke Children's Hospital and Health Center, Durham, North Carolina, USA  
Part of Duke University Medical Center

## Challenge

Complement Duke Children's commitment to delivering compassionate world class patient care with state-of-the-art digital radiographic and fluoroscopic technology. Find equipment that maximizes staff efficiency, helps shorten exam time, delivers outstanding clinical results, and at the same time helps minimize X-ray dose to their predominantly pediatric patient population.

## Solution

Philips two-in-one DRF room solution, a full digital radiography and fluoroscopy room. With a digital vertical stand and overhead tube assembly for radiographic exams, an EasyDiagnost Eleva for fluoroscopic studies, with an additional static digital flat detector built in the table for radiographic use.

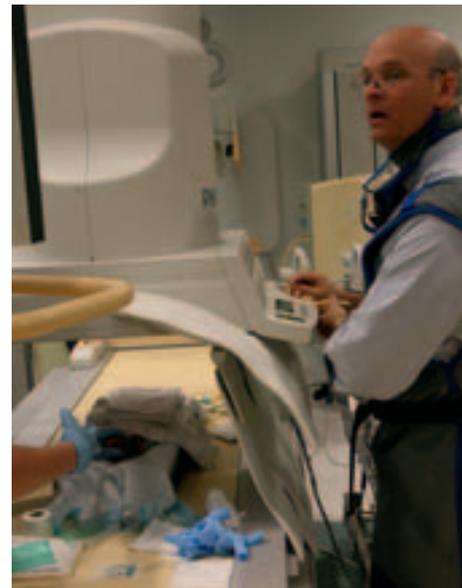
Duke Children's Hospital and Health Center is a hospital within a hospital at the Duke University Medical Center in Durham, North Carolina. Supporting over 175,000 pediatric outpatient visits a year, Duke Children's is consistently ranked among the top pediatric specialty programs throughout the country.

Within the Pediatric Radiology Department of Duke Children's sits a two-in-one Digital Radiography and Fluoroscopy (DRF) room that fits in quite well in this busy and highly regarded environment. This one room incorporates Philips latest digital radiographic and fluoroscopic technology and helps Duke's pediatric radiologists and technologists perform a wide range of applications. By selecting this DRF configuration, Duke's personnel are able to provide confident diagnostic results to referring physicians quickly, efficiently, and in a way that minimizes the radiation exposure their patients receive.

## Challenges associated with pediatrics

Dr. Donald Frush, Chief of Pediatric Radiology points out that Duke's pediatric patient population poses some specific challenges. "These patients are often quite ill and the amount of time that they can spend away from their care facility is sometimes very limited. They may be getting multiple radiographic studies and our need to monitor carefully the amount of radiation they get during fluoroscopy is very important," he says. He also notes that his patients and their parents have extremely high expectations

for the quality of care that they are going to receive at Duke. "We simply have to be able to provide them with excellence in diagnostic capabilities that includes both the equipment and our own expertise".



Dr. Donald P. Frush performs a fluoroscopy study in the DRF room

# PHILIPS

### Equipment to deliver optimal care

Duke Children's overriding commitment to providing the absolute best care for their patients was a key driver in helping them decide which technology to choose when upgrading their radiographic and fluoroscopic capabilities.

**"We needed to have a way to maximize our use of time and efficiency"**

Reviewing their top priorities, Dr. Frush says, "We had to have state-of-the-art dose reduction technology, certainly Grid Controlled Fluoroscopy was a must.



The digital vertical stand increases the range of applications

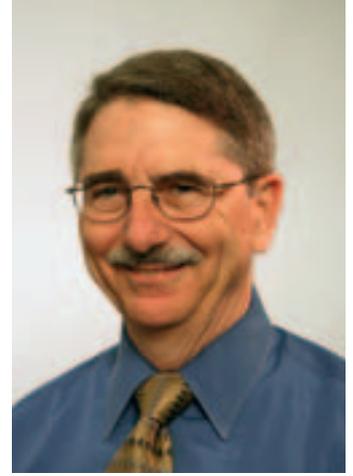
We had to have equipment with optimal image quality. We needed to have a way to maximize our use of time and efficiency. And we needed to have DR capability." Dr. Frush also pointed out that the ability to integrate the new equipment with the department's existing PACS was a key criterion. Eric Porter, Technical Administrator for the Department of Radiology at Duke University Medical Center, was actively involved in Duke

Children's equipment selection process. "For this particular room," Mr. Porter explains, "we asked for input from several quarters internally." Both the pediatric and adult radiologists, as well as the technologists, were asked to participate. Each group worked independently to come up with their own recommendations. Of the final decision, Mr. Porter recalls, "Both from the children's side of it, as well as the adult side of it, and from the technologists, everybody came back with the same recommendation, independently. They all preferred the Philips."

### New approach to maximize efficiency

Philips ability to combine the latest DR and fluoroscopic capabilities into a single

room represents a new approach in room configurations. The concept was to help institutions better utilize their radiography and fluoroscopy rooms and improve their overall workflow. Radiographic cases can come in at any time, but most fluoroscopic studies are scheduled for the mornings. Consequently the fluoro system and the room itself may often be under used the rest of the day.



Eric Porter, Technical Administrator for the Department of Radiology

While there are three different possible DRF configurations available from Philips, Duke Children's features a vertical stand, with a large 17 x 17" digital detector, and a ceiling suspended X-ray tube. There is also an EasyDiagnost Eleva fluoroscopic system which includes an identical static digital detector located in the table as well. The Duke staff can perform the full range of digital radiographic exams with the wall unit. The EasyDiagnost Eleva handles all fluoro studies. However, when the fluoro unit is not needed, the Scopo control tower can be moved up to the head end of the table and parked back and out of the way. This allows for routine radiographic studies to be accomplished right on the table using the overhead tube assembly and the table's digital detector.

**"It allows much more efficient use of technologists' time"**

Dr. Frush reports, "Having radiography in the same room where you are able to provide fluoroscopic evaluation is a tremendous advantage in terms of efficiency. It allows much more efficient use of technologists' time and control of patient flow. I think it is very, very helpful to have these centralized so that it decreases the extra efforts that are made for obtaining both these kinds of evaluations." In describing the expanded capabilities of having a digital detector in the

vertical stand in the same room with the fluoro unit, Mr. Porter notes, “This makes the room especially useful because of the multitasking and multi-procedure use of the room.” Additionally there is just one investment needed to profit from two kinds of reimbursements.

“My workflow has improved tremendously because of the instant images”

#### Digital workflow saves time

The technologists clearly appreciate the time savings they are achieving with the digital aspects of the DRF room. The speed of the digital radiographs, the inherent image quality optimization, and the fact that they accomplish these with minimum exposure to patients are benefits they frequently mention. Anja Ancarana, Pediatric Radiological Technologist at Duke Children’s, says, “I believe that the digital room with the digital detectors has made my life as an X-ray tech a lot easier. My workflow has improved tremendously because of the instant images, because we can see them faster, we can send them out to the radiologist faster. The clinicians can see the images faster, everything is digital and we can let our patients go back and be seen by the clinicians that need to be seeing them.”

“The DRF room enables me to spend quite a bit of time with my patients”

Ms. Ancarana points out that the digital equipment gives her more confidence that she’ll get an excellent image the first time, reducing the need for retakes. “The image quality in the DRF room is outstanding. The UNIQUE system that they use to process their images is very detail oriented. Subtle things are caught and seen much easier now.” Since there’s no film or cassettes to handle, she has more time to focus on her patients. “The DRF room enables me to spend quite a bit of time with my patients, because I’m not having to leave the room to run films or view images in a different area. The computer system is all in one place. And I can talk to the patients and see them the whole time,” says Ms. Ancarana.

#### Technologies that reduce X-ray dose

Duke Children’s is very interested in taking full advantage of their new equipment’s dose limiting technology. Dr. Frush sees this as a key objective in their overall mission. He says, “I have to personally know that we are doing everything we can to minimize the dose to children. That we can reassure parents that

when their child is undergoing an examination, we have equipment that has state-of-the-art dose reduction technology and that we are watching out for the welfare of their children.”

Understandably the radiologists and technologists at Duke have high praise for the DRF room’s EasyDiagnost Eleva system and its grid controlled and pulsed fluoroscopy technologies. These techniques from Philips are regulated by a highly advanced in-pulse control circuit that optimizes each pulse independently. Immediately, within the first pulse, the beam’s penetration is optimized to provide the relevant diagnostic information.

This allows the radiologists to reduce the X-ray dose to the patient while still achieving outstanding image quality in their exams. Referring to the need to reduce cumulative radiation to their patients, Ms. Ancarana says, “These are just kids and we don’t want them to carry too much dose from their childhood into their adulthood. The Grid Controlled Fluoroscopy carries an 85%\* less dose rate. And we’re very proud of that.”



Technologist Anja Ancarana prepares the EasyDiagnost Eleva for a fluoroscopy procedure



Dr. Caroline Carrico, Pediatric Radiologist and Assistant Professor

Dr. Caroline Carrico, Pediatric Radiologist and Assistant Professor, believes the option of doing certain complex studies in the new DRF room is a real advantage, explaining, "It is beneficial to have a fluoroscopy unit that lets us manipulate the pulse rate and other parameters during the exam. With pulsed fluoroscopy we are able to both reduce our patients' exposure to ionizing radiation and to still perform high quality examinations."

Duke configured their EasyDiagnost Eleva to start fluoro exams at a very low pulse rate (two pulses per second) with the option of increasing the frequency, all the way to 30 pulses per second, if needed. With complete tableside control the radiologists have the ability to change the pulse frequency, and other variables during the procedure to ensure they achieve the necessary diagnostic information. Dr. Frush emphasizes, "I find

the console on the fluoro equipment in the room to be very user friendly in making those quick adjustments."

Another feature of the EasyDiagnost Eleva that the Duke radiologists find very useful is FluoroGrab. Dr. Carrico says she uses it to easily capture key images at critical points in the study. "Most of our studies are single contrast examinations. The fluoro store images obtained during the study or from the last image hold are quite often more than adequate quality for diagnosis."

She adds that it's very helpful to be able to select the images right from tableside, using the tower control or the remote control. Both Dr. Frush and Dr. Carrico value the feature which allows collimation using the last image from the fluoro frame grab. As Dr. Frush explains, "I particularly like the ability to collimate the examination without having the fluoroscopy on. This allows us to target ideally what we are looking for and substantially decreases the radiation dose."

#### **A room that works for staff and patients**

By all accounts, the DRF room at Duke Children's Hospital and Health Center is enhancing the staff's efficiency and their ability to deliver the highest level of care to their patients. The Philips equipment has proved a good fit for the challenges that are inherent in pediatric radiology. Mr. Porter describes the DRF room as the "unit of choice" since its installation. He credits the ease of use and efficiency, especially as it relates to the digital rad. In describing the

DRF room, Dr. Frush concludes, "All of our needs have been met in terms of combining a state-of-the-art digital radiography system with a fluoroscopy system, and the ability to interface quite easily with a PACS that is from a different vendor. And I have to say with the Philips (equipment) and the image quality I have been very pleased with what we've seen, both in the room and the translation of this information to our PACS."

**"The best thing is the dose saving for our patients"**

Ms. Ancarana says simply, "We as technologists actually gravitate towards the room now. It takes beautiful pictures, it has an ease of work with it, and it's a good room." She also believes the room is helping them do the best for their patients. "The room allows us to do exams in a very very timely manner, and allows the patient to be in and out of the room in a very fast time frame."

Dr. Carrico's conclusion on the benefits of the DRF room for her and her patients, "I appreciate having that unit. I think it works quite well. The best thing is the dose saving for our patients. Kids have an amazing spirit. They are very special, and they touch your heart, so we try and do our best for them."

\* results may vary



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