



**PHILIPS**

Digital radiography

DigitalDiagnost C90

# Never compromise

Setting new standards for pediatric care

# Getting the most from complimentary technologies

Children are not small grown-ups. They are different from adults in age, size, weight, physical metabolism, activity levels, and critical development. Our most sensitive patients deserve quality images acquired at the lowest acceptable doses – every time.

## Advantages

- Dedicated pediatric protocols cover all patient types
- Automated selection of optimized parameters help keep dose low
- System features are specifically developed for pediatric use
- Environmental design eases patient discomfort



The Philips portfolio of digital radiography systems has been designed from the ground up to excel in diagnostic imaging across all patient types, from newborn to adult. DigitalDiagnost C90 and MobileDiagnost wDR are exceptional solutions to showcase strength in innovative dose management and techniques for acquisition of quality pediatric images.

Every feature set and technology employed in a Philips DR system works in harmony to administer dose that is “As Low as Reasonably Achievable” in a fast, easy and diagnostically relevant, pediatric exam.

With over 9,000 DR systems installed worldwide, Philips has an extensive and proven history of X-ray success. Philips has taken into account the entire patient experience and imaging chain, applying technologies and methodologies designed to enhance the patient experience, simplify technologist workflow, and enhance image quality. The DigitalDiagnost C90 and MobileDiagnost wDR demonstrate the very latest in imaging to help enable you to provide your littlest patients the best care.

### Pediatric acquisition protocols – fast and automatically adjusted

A challenging task, when imaging children, is the proper definition of patient types to allow for distinct acquisition protocols. The Eleva User Interface has been designed with seven different patient types from which to choose. Three of these patient types; newborn, baby, and child, are specific to your younger pediatric patients. A fourth, small adult, can be used for teenagers.

Eleva patient type	Definition	Criteria
Newborn	Infant: <1 year	Has to be carried
Baby	Toddler: 1 – 4 years	Can walk at hand
Child	Child: 4 – 8 years	Can walk on his/her own
Small adult	Adolescent: >8 years (teens)	Dependent on size/weight
Medium adult		Dependent on size/weight
Large adult		Dependent on size/weight
X-large adult		Dependent on size/weight

Selection of the pediatric patient type is based on patient age and is automatically populated on the system when the patient is registered. This allows the pediatric protocols for each specific patient to be activated without action from the technologist. Once the patient type is identified, twelve imaging parameters are automatically adjusted (including kV, mAs and focal spot size settings) to optimize low dose and high image quality for that patient.

**Pediatric extremity imaging – bringing clarity to low contrast anatomy**

Because the structures in distal pediatric extremities (hands and feet) are particularly low in contrast, providing images that can display contrast between tissues in these anatomies can be challenging. Radiation exposure must also be used appropriately to balance optimal image quality with consideration for the patient’s one-time and lifetime cumulative radiation exposure.

Research by Philips DXR Advanced Development suggests that the traditional dose- management approach of increasing tube voltage (kV) and adding Al + Cu pre-filtration for beam hardening, is not appropriate for pediatric extremities when using DR. Typically, harder beam quality leads to less contrast in the image and, consequently, to a reduced contrast-to- noise ratio (CNR). However, due to the inherent low contrast of pediatric bone structures, it is the softer photons that can offer a better quality, high contrast image.

It has been determined that optimal conditions for acquiring images of the highest contrast for these structures of low inherent contrast involve using the wireless detector (without a grid) at a lower kVp, and without pre-filtration. With this combination, the contrast-to-noise ratio (CNR) can be increased by approximately 20%-40%, resulting in better visibility of tiny structures such as bone trabeculae in small anomalies, leading to a more confident diagnosis. This combination of factors allows for optimized CNR for these tiny structures while maintaining a similar mean absorbed dose. This imaging technique is available as an integral part of the DR system’s pediatric feature set.

The following table shows an overview of the CNR gain through careful adjustment of the factors that matter most. All actions are made under the assumption that the patient dose is the same.

You do	You win in CNR
From 50 kV to 40 kV tube voltage	18%
From 66 kV to 40 kV tube voltage	50%
Remove the grid	12%
Do not use filter (Cu, Al)	10%
X-ray on vertical stand detector instead table	14%

**Target and deviation indexing – real time dose reporting**

Target and deviation indexing helps maintain dose and protocol consistency. Values are displayed automatically during image review, helping enable good exposure and acceptable IQ on every image. Red, yellow and green indicator lights show the target and related deviation to easily identify optimum, under, or overexposure. This feature results in real-time dose feedback and can be used as a quality management and training tool. The ability to make quick adjustments to the exposure can improve image quality consistency.

The deviation index (DI) indicates the deviation of the actual exposure index (EI\_S), from its target value (EI\_T). The units show below are presented in ‘exposure points’.

- **Green light**, DI = 0 to +/- 2.9 indicates optimal exposure
- **Yellow light**, DI = +/-3 to +/-5.9 indicates slight under or overexposure
- **Red light**, DI = +/-6 or more indicates significant under or overexposure

**“I am very satisfied with the images.** They have helped greatly with our tiniest patients, especially with small cortical lesions, exostoses, and subtle changes due to trauma.”

*Dr. Nancy Fisher, Gillette Children’s Specialty Healthcare, Saint Paul, Minnesota*



# Improving productivity in pediatric workflow

The features of DigitalDiagnost C90 and MobileDiagnost wDR assist you in maintaining an efficient, reproducible exam workflow with time saving innovations and improved image acquisition/processing technologies.

### **Eleva tube head and live camera – easing exams for patients and staff**

Successful imaging of pediatric patients requires a closer, more hands-on approach than with adults. Gaining trust and calming nerves is best done right at the patient's side. The DigitalDiagnost C90 employs our advanced Eleva tube head with a large 12" touchscreen monitor. Here you can confirm patient identity and check/change all relevant system parameters right next to the patient without having to move back to the workstation.

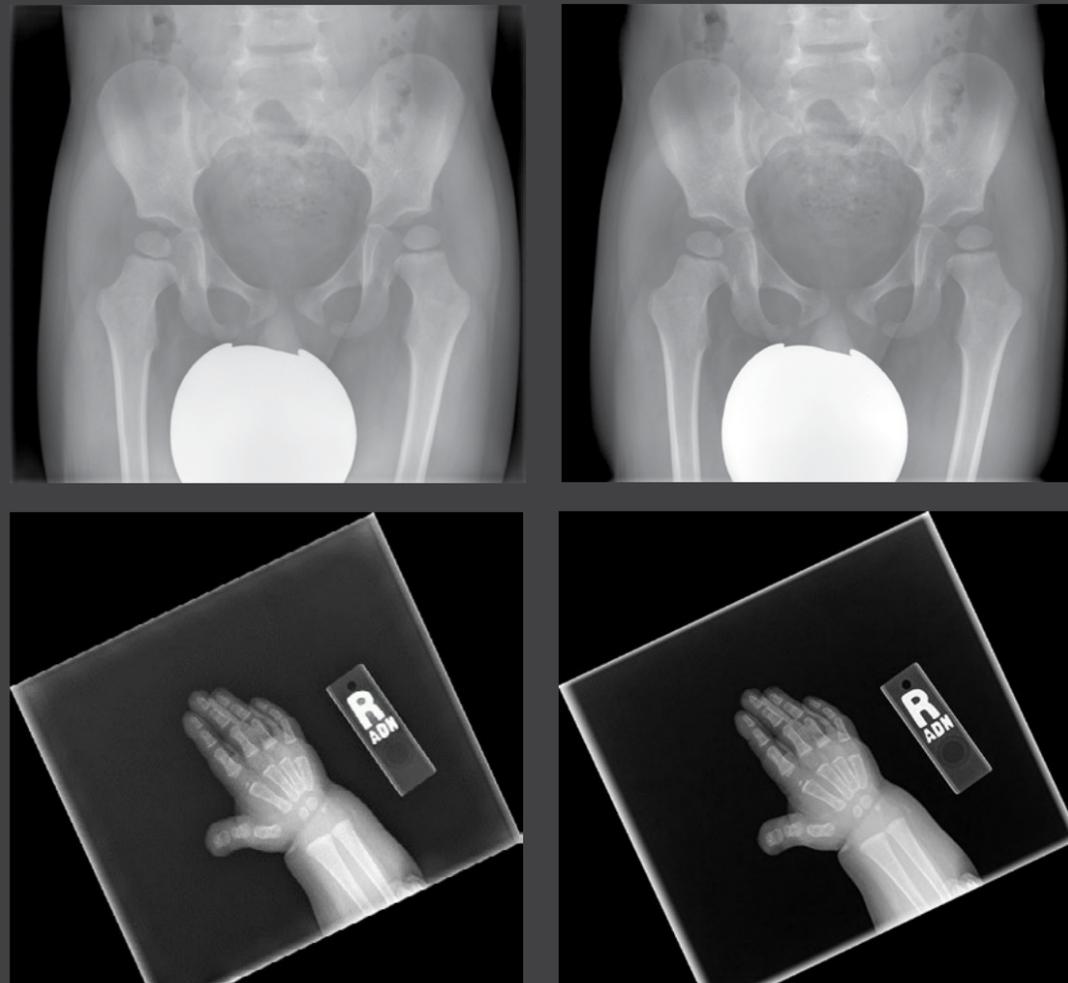
An image preview appears directly on the Eleva tube head immediately after exposure. There is no need to wait back at the workstation. Image confirmation, next view selection, or ending the exam can all be done right on the tube head. The intuitive Eleva interface helps speed the exam, allowing for more time to focus on the patient.

Live camera collimation on the Eleva tube head provides a bird's eye view of the collimated area. This helps alleviate potential imprecise collimation and assists with patient positioning. In addition, the live camera image is also visible at the workstation allowing for constant monitoring of the patient and confirmation of collimation and centering – a significant advantage for youngsters who often move around before acquisition and a way to help reduce retakes and manage dose to your most sensitive patients.

### **SkyPlate wireless portable detectors – high quality detectors wherever you need them**

Philips offers the ruggedly designed, Cesium iodide SkyPlate wireless detectors, which come in two sizes; a large 14"x17" detector and a small 10"x12" (approx.) detector. The small SkyPlate is very lightweight at only 1.6kg/3.5 lbs. and is designed for use in conjunction with the MobileDiagnost wDR in neonatal applications where it can be easily placed for patients in incubators.





**Ambient Experience - creating a welcoming environment**

One of the most important steps in acquiring quality pediatric images involves gaining a child's trust and co-operation before and throughout the examination. If a child can be made comfortable with pleasant distractions during exams, the benefits can include minimizing procedure times, motion artifacts, and additional patient dose through unnecessary image repeats.

Philips systems are designed to make the exam process as easy as possible for both patients and staff, but Philips can also go beyond the system to the environment itself. Philips has developed an approach to clinical environment design aimed at improving the patient and staff experience. Implemented in over 1300 sites around the world, Philips Ambient Experience is based on years of design research and collaboration,

incorporating dynamic lighting, projection, and sound, to provide a comfortable, calming setting for patients and families and an efficient and motivating workspace for caregivers. Putting your patients at ease can go a long way in ensuring that exams proceed more smoothly.

Ambient Experience solutions for your DigitalDiagnost C90 installation typically consist of ambient and perimeter lighting. You may also choose from a variety of child oriented visual themes such as fish or nature scenes to enhance the comforting atmosphere. Options expand beyond that with consultative design for your entire department, from waiting room, to preparation room, to exam room. Clinical, physical, demographic, and budgetary considerations are always considered to help you structure a unique and differentiating pediatric environment.

**UNIQUE 2 image processing – bringing sight to the invisible**

UNIQUE 2 is the next generation of Philips well established image processing software. It is tailored to provide optimal contrast harmonization with enhanced detail across all exams and all patient types, by focusing on the most relevant structures in each view.

These contrast improvements prove especially valuable in pediatric imaging by removing any distracting noise in the image, most prevalent in low dose acquisitions, to help improve visualization of pediatric bone structures. In addition, UNIQUE 2 delivers a solid black background for easier visualization of pediatric extremities, and offers the ability to select detail

down to 1 mm in size to be enhanced in specific anatomical structures for better focus and visualization of that area of interest.

UNIQUE 2 offers dedicated presets, specifically tailored for all anatomies and patient types. The presets work automatically, and are tuned to the patient type (newborn, baby, child, etc.) and the requirements of the examination. They allow UNIQUE 2 to be fully automatic, easy to use, and enable a well-balanced representation of the clinical image, in every case. UNIQUE 2 processing parameters can be individually tailored, to meet your specific clinical challenges. Customized settings for clinical routines can be amended and easily stored.

Innovative application of technologies offer greater control of your healthcare environment to provide a pleasant experience for patients and health professionals alike. Comfort is increased, stress reduced.



# The right choice

Proper imaging of children is never an afterthought. Philips digital radiography systems are designed to provide high quality images at low dose and facilitate easy and low stress procedures through ergonomic design and features. By selecting DigitalDiagnost or MobileDiagnost wDR, you will not compromise.

The youngest patients have their whole lives ahead of them. They deserve the best care for their future.



