GE HealthCare

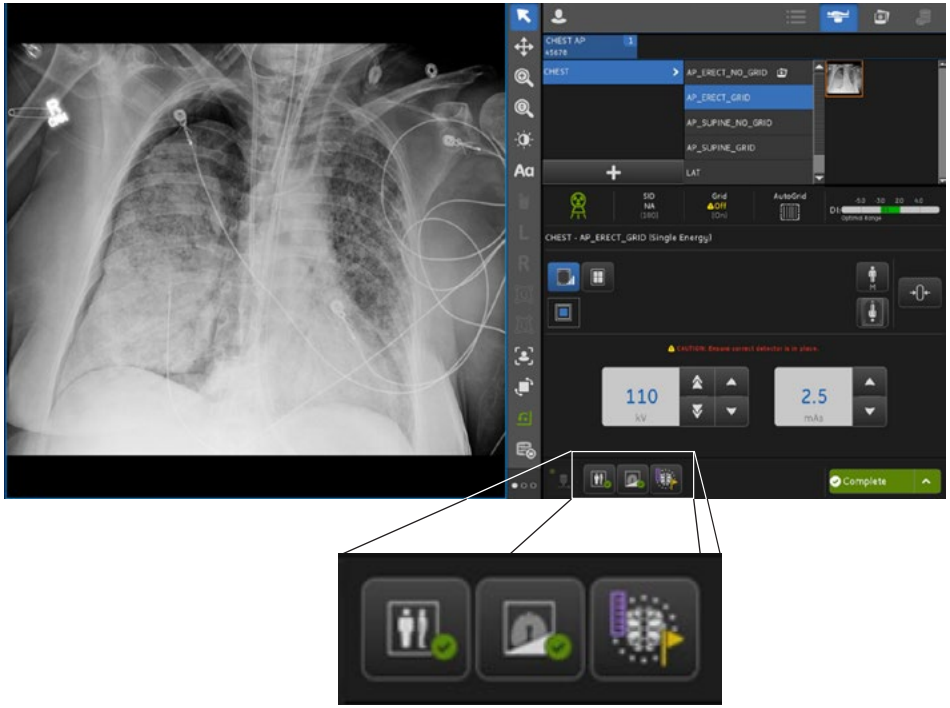
Critical Care Suite 2.1

On-device AI for X-ray

Critical Care Suite is a collection of on-device AI algorithms for automated measurements, case prioritization, and quality control

In these challenging times, technologists, radiologists, and physicians are all under tremendous pressure to manage an ever-increasing number of cases. Every minute counts when dealing with high-risk procedures such as tracheal intubation[1] and critical conditions like pneumothorax. When X-ray exams alone contribute to 60 percent of imaging,[2] it's crucial to highlight critical information and help clinicians respond fast without compromising diagnostic precision.

Delivering the highest-quality care to patients



Quality Care Suite 2.0

AI algorithms that operate in parallel and help technologists reduce image quality errors and improve efficiency

Pneumothorax detection and triage

On-device AI solution that detects and prioritizes pneumothorax

Endotracheal tube positioning

On-device AI solution that helps assess endotracheal tube positioning

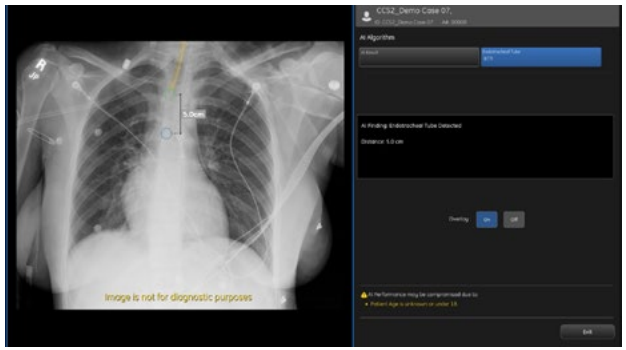
Endotracheal tube positioning

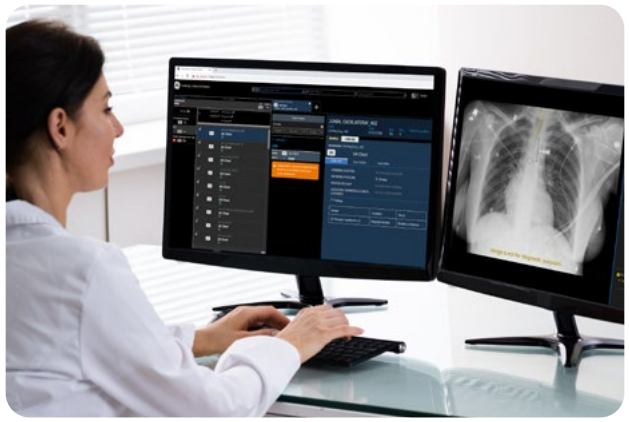
One of the high-risk procedures carried out in the ICU and ER is tracheal intubation. Improper positioning of the endotracheal tube (ETT) during intubation poses a serious health risk to patients. A major complication is accidental migration of the tube tip into a mainstem bronchus. If unrecognized, this can lead to hypoxemia and collapse of the contralateral lung, hyperinflation of the intubated lung with resultant tension pneumothorax, and cardiac arrest.

25%

Up to 25% of patients intubated outside of the operating room have mispositioned ETTs on chest X-rays[3-6]

The first on-device AI solution that helps assess ETT positioning





Confidence at point of care

- Provides an accurate and automated measurement of ETT position on the mobile X-ray device within seconds of image acquisition
- The on-device algorithm automatically detects the presence of ETT in AP chest X-ray images on mobile X-ray
- In 94% of cases, the ETT tip-to-carina distance calculation is accurate to within 1.0 cm[7]
- Vertical distance between the tube tip and the carina is automatically calculated and displayed on device

ETT cases at a glance

- Enables immediate access to AI-derived measurements in PACS worklist via configurable DICOM® tags
- Displays AI-generated measurements with an image overlay in PACS

Pneumothorax detection and triage

Given the high number of chest X-rays ordered as "STAT," i.e., with immediate priority, the triaging of true STATs has become challenging for bedside physicians and radiologists. Turnaround times can be as long as eight hours, even when chest X-rays are marked as urgent for patients with potentially life-threatening conditions such as pneumothorax (PTX) or collapsed lung.[8,9]

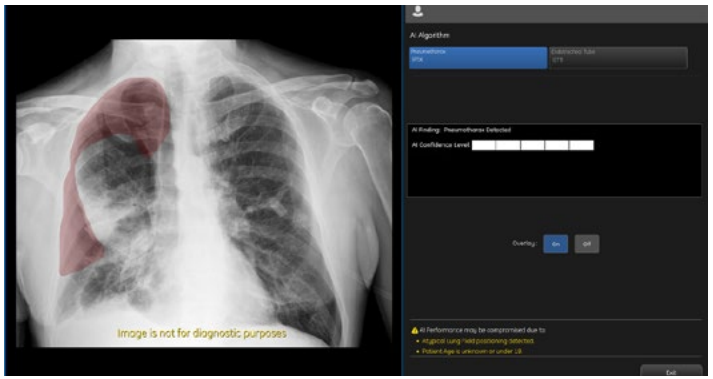
Critical Care Suite provides an immediate notification for the presence or absence of pneumothorax, along with a graphical representation of the AI algorithm's confidence level in detection. Additionally, an overlay helps localize a detected pneumothorax.

In detecting PTXs with Critical Care Suite, clinicians showed:

14% increase in AUC[10]

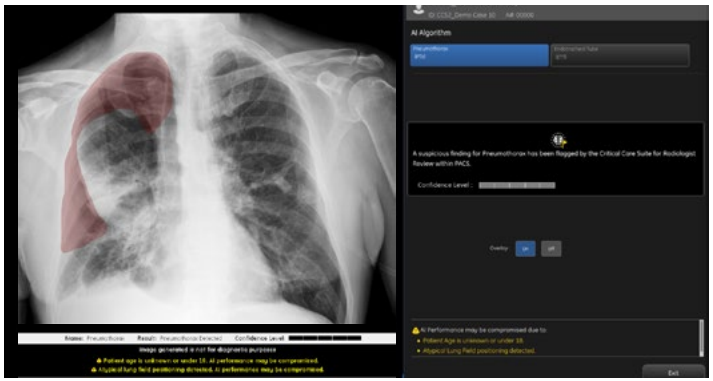
16% increase in sensitivity[10]

12% increase in specificity[10]



High accuracy[10]

- Partially localizes 100% of all detected large PTXs and 96.23% of all detected small PTXs
- Detects nearly all large PTXs **(96% sensitivity)**
- Identifies 3 out of 4 small PTXs **(75% sensitivity)**
- Limits false alerts **(94% specificity)**
- Achieves Area Under the Curve (AUC) **of 0.96**



Triage notifications

- Provides immediate notification for the presence or absence of PTX
- When a PTX is detected, an overlay is displayed in the area where the PTX was located
- Provides a graphical representation of the AI algorithm's confidence level in detecting the presence or absence of PTX

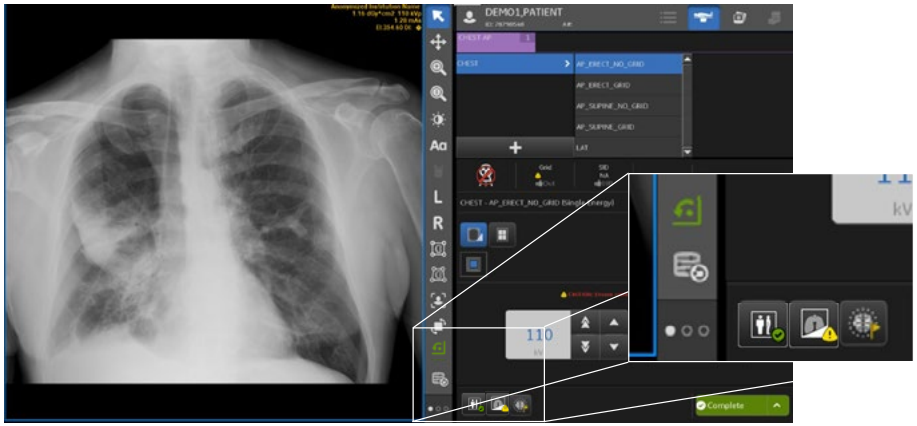
On-device AI application that helps detect and prioritize pneumothorax

Quality Care Suite 2.0

Quality Care Suite 2.0 operates in parallel with Critical Care Suite 2.1 to help technologists reduce image quality errors and save time in critical moments. By leveraging AI capabilities on common exams, including babygrams, chest, abdomen, and pelvis exams for both pediatric and adult patients, and hand, wrist, foot,and knee exams for adult patients, the solution helps ensure only diagnostic-quality images are sent for radiology review. Available as a software option for AMX™ Navigate mobile X-ray systems, Quality Care Suite 2.0 provides quality alerts by checking three key aspects of image quality.

Real-time quality alerts

Quality Care Suite includes AI algorithms that help technologists reduce image quality errors and improve efficiency.



Intelligent Auto Rotate

Automatically detects if an image is not upright and rotates the image to be upright for the viewer. It saves approximately 3–4 user interface clicks on 85% of mobile X-ray exams, saving approximately 187,000 clicks a year.[7]

Intelligent Protocol Check

Conducts an automated quality check to detect errors on the acquisition system, such as mismatch between the protocol used and the anatomy acquired.[10]

Intelligent Field of View

Detects errors on the acquisition, i.e. when a lung field is clipped in a frontal chest X-ray (AUC >0.99), and notifies the technologist of positioning problems. This allows technologists to determine if a repeat is required before sending the image to PACS.[11]

Seamless integration with your X-ray imaging workflow

Critical Care Suite's on-device AI algorithms automatically analyze X-rays without routing images to a server. The AI output is sent directly to PACS or RIS via DICOM.

Critical Care Suite

On-device AI notifications to technologist:

- Intelligent Auto Rotate
- Intelligent Protocol Check
- Intelligent Field of View
- Pneumothorax detection and triage
- Endotracheal tube positioning

DICOM

Modality-Performed Procedure Step (MPPS)

- MPPS N-set message

DICOM images

- Original DICOM image
- Secondary capture DICOM image for AI output

Radiology Information Systems (RIS)

- Configurable PTX flagged text via DICOM tags

PACS

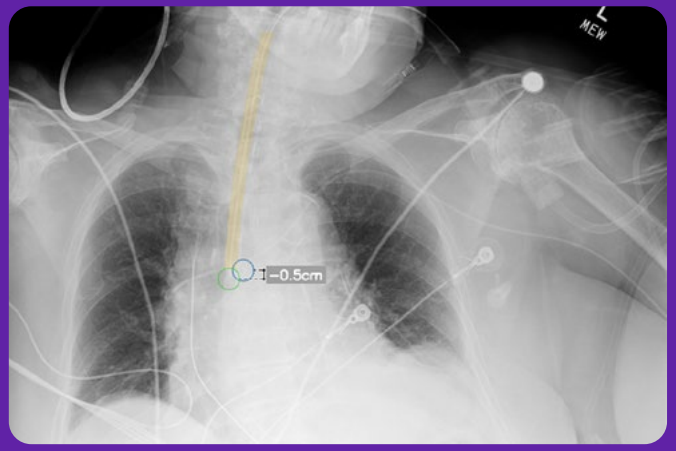
- Original DICOM image
- Configurable PTX flagged text via DICOM tags
- Secondary capture (PTX and ETT)
- ETT measurement via DICOM tags

Built to improve the standard of care you're delivering to patients

AI is embedded on device, at point of care without need for additional IT infrastructure.

The robust AI algorithm is trained on a large, global, diverse data set that includes more than 30,000 images and multiple countries and institutions.

Seamless integration with PACS allows for rapid review by the radiologist. The AI-derived measurement is sent to PACS within configurable public DICOM tags.



About GE HealthCare

GE HealthCare is a leading global medical technology, pharmaceutical diagnostics, and digital solutions innovator, dedicated to providing integrated solutions, services, and data analytics to make hospitals more efficient, clinicians more effective, therapies more precise, and patients healthier and happier. Serving patients and providers for more than 100 years, GE HealthCare is advancing personalized, connected, and compassionate care, while simplifying the patient's journey across the care pathway. Together our Imaging, Ultrasound, Patient Care Solutions, and Pharmaceutical Diagnostics businesses help improve patient care from prevention and screening, to diagnosis, treatment, therapy, and monitoring. We are an $18 billion business with 51,000 employees working to create a world where healthcare has no limits.

Follow us on Facebook, LinkedIn, Twitter, Instagram and Insights for the latest news, or visit our website gehealthcare.com for more information.

Crititcal Care Suite 2.1 is not commercially available in all markets. Check with your local GE HealthCare representative for availability in your country.

References:

1. Stephen E. Lapinsky. Endotracheal intubation in the ICU. Crit Care. 2015; 19(1): 258.
2. World Health Organization Report -Communicating Radiation Risks in Pediatric Imaging.
3. Jemmett ME, Kendal KM, Fourre MW, Burton JH. Unrecognized misplacement of endotracheal tubes in a mixed urban to rural emergency medical services setting. Acad Emerg Med 2003;10:961–5.
4. Katz SH, Falk JL. Misplaced endotracheal tubes by paramedics in an urban emergency medical services system. Ann Emerg Med 2001;37:32–7.
5. Lotano R, Gerber D, Aseron C, Santarelli R, Pratter M. Utility of postintubation chest radiographs in the intensive care unit. Crit Care 2000;4:50–3.
6. McGillicuddy DC et al. Is a postintubation chest radiograph necessary in the emergency department? Rachh, Pratik, et al. "Reducing STAT Portable Chest Radiograph Turnaround Times: Int J Emerg Med 2009;2:247–9.
7. GE HealthCare data on file (DOC2296463).
8. "A Pilot Study." Current problems in diagnostic radiology (2017).
9. Lorenz, Jonathan, and Matthew Blum. "Complications of percutaneous chest biopsy." Seminars in interventional radiology. Vol. 23. No. 2. Thieme Medical Publishers, 2006.
10. GE HealthCare 510(k) K223491.
11. GE HealthCare data on file.

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