

# A Quality Improvement and Patient Safety Initiative using an Emergent and Critical Care Imaging Simulation for Resident Training toward Entrustable Professional Activity

Ashish Sethi MD MHA, Philip Scherer MD, Linda Lanier MD, Anthony Mancuso MD, David Wymer MD  
Department of Radiology, University of Florida, Gainesville, Florida

## Purpose

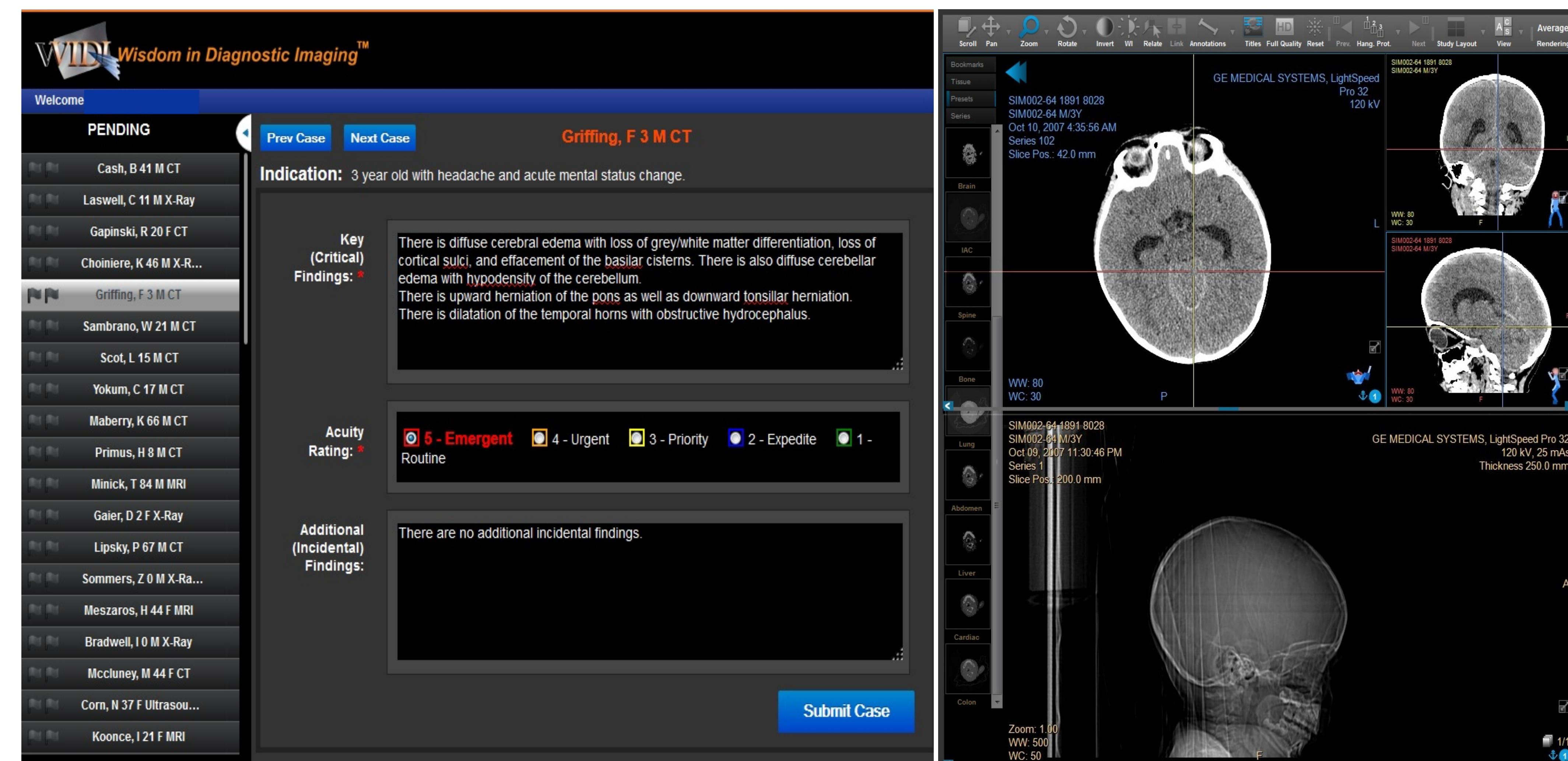
The Emergent and Critical Care Imaging Simulation was created at the University of Florida as an innovative tool to assist in assessing resident preparedness and competency prior to entrustable professional activity (EPA) involving emergent and critical care imaging.

## Methods

- The simulation was created as a joint venture with the American College of Radiology and other developmental partners. It is conducted in a manner as to simulate a normal emergency radiology experience. The simulation consists of 65 emergent and critical care cases delivered in a workflow style during an eight hour shift at a PACS workstation. A full DICOM set of images are provided covering all modalities and radiologic subspecialties.
- The competencies assessed by the simulation include identifying critical findings, determining the acuity level of a study, identifying normal examinations, and communicating findings to appropriate referring physicians.
- Upon completion of the simulation, each case is associated with a short tutorial on the approach to the case to allow for case based education with the ability to reference materials and literature relevant to each topic. Results and analysis are provided to program directors and residents to allow for remediation if there are individuals that fall outside of their peer performance range.

## Preliminary Data

- There is improvement in individual and group performance with increasing PGY level. A sample program demonstrated average scores of 61% (R1), 71% (R2), and 75% (R3).
- Common topics with lower scores for diagnosis included epidural abscess, coalescent mastoiditis, septic joint, and necrotizing fasciitis.
- Common topics with lower scores for communication included non accidental trauma, ruptured ectopic pregnancy, ruptured AAA, necrotizing fasciitis, and intra abdominal free air.



Diagnosis	Descriptors	Points	Acuity
Cerebellar Edema	Diffuse cerebral edema loss of grey/white matter differentiation (1) loss of cortical sulci (1) effacement of basilar cisterns (1)	3	Emergent
	Diffuse cerebellar edema hypodensity of cerebellum (2)	2	Emergent
Herniation	upward (pons) (1) downward (tonsils) (2)	3	Emergent
	Obstructive hydrocephalus dilatation of temporal horns	2	Emergent

## Results

- The simulation has been shown to be valid, consistent, and reliable in the assessment of individuals prior to entrustable professional activity.
- User surveys have also confirmed that the simulation is a useful exercise with realistic case scenarios.
- The results and analyses provided to program directors include individual scores with specific areas of weakness, overall program scores, comparison with other anonymized institutions, overall areas of program weakness with topic information provided for curriculum enhancement, and case-based, specific remediation materials.
- The results and analyses provided to residents include total percent correct, subspecialty and modality specific scores, percent of correctly called normal studies, percent of over called normal studies, and peer comparison.
- The program has currently expanded to nine programs nationwide during its developmental phase and once completed will become available nationwide.

## Conclusions

- The Emergent and Critical Care Imaging Simulation is a powerful tool for assessing and improving resident preparedness and competency prior to EPA.
- Recognizing areas of strength and weakness has allowed for focused education prior to engaging in radiologic interpretation of diagnostic imaging studies in the emergent and critical care setting. This will assist in improving the quality of health care delivery and patient safety by quantitatively assessing the ability to interpret and communicate clinically significant findings.