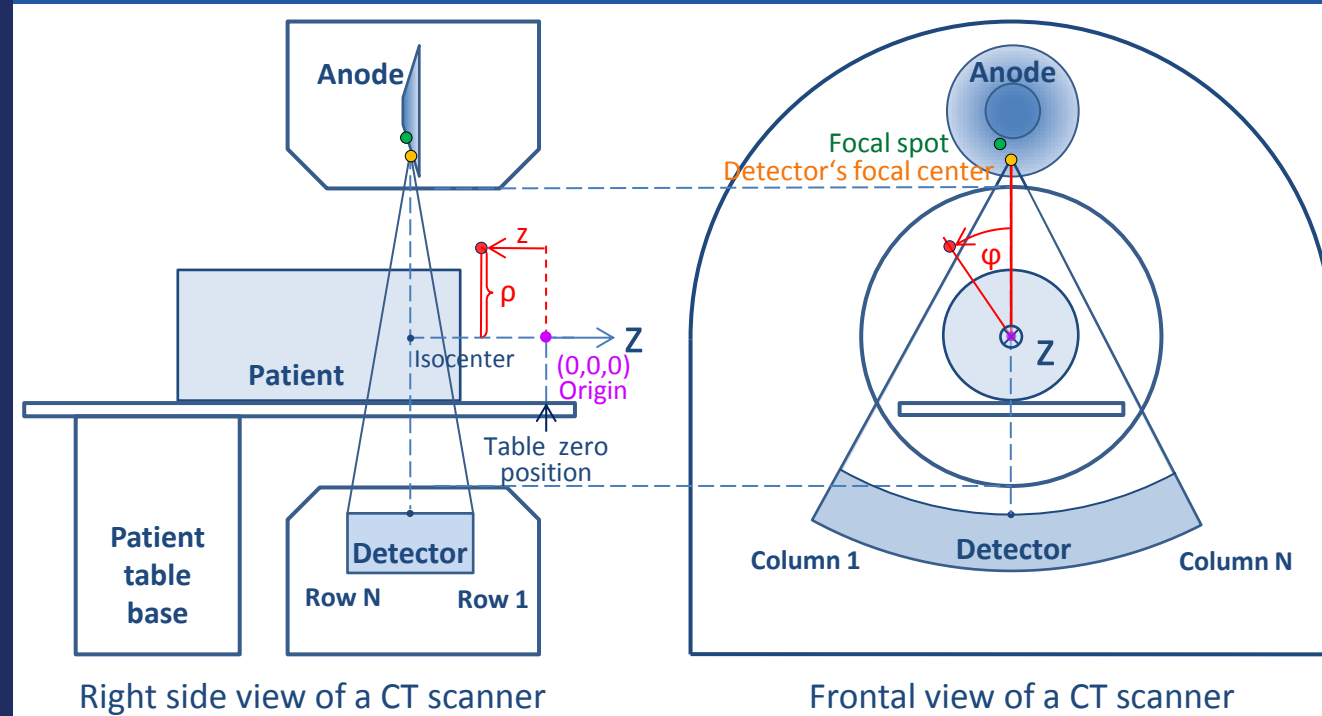


Purpose

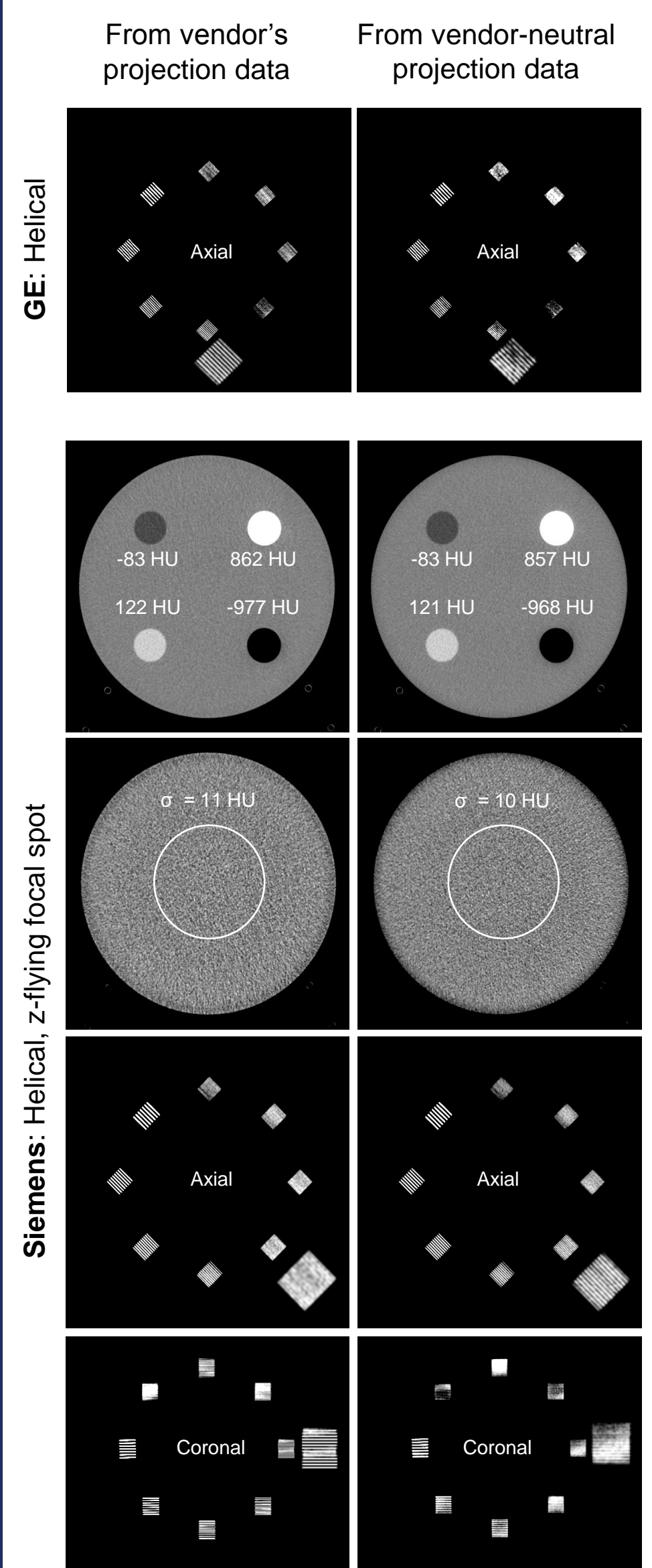
Lack of access to projection data from patient CT scans is a major limitation for development and validation of new reconstruction algorithms.

To meet this critical need, this work developed a standardized and vendor-neutral format (extended DICOM) for CT projection data.

Methods



Validation



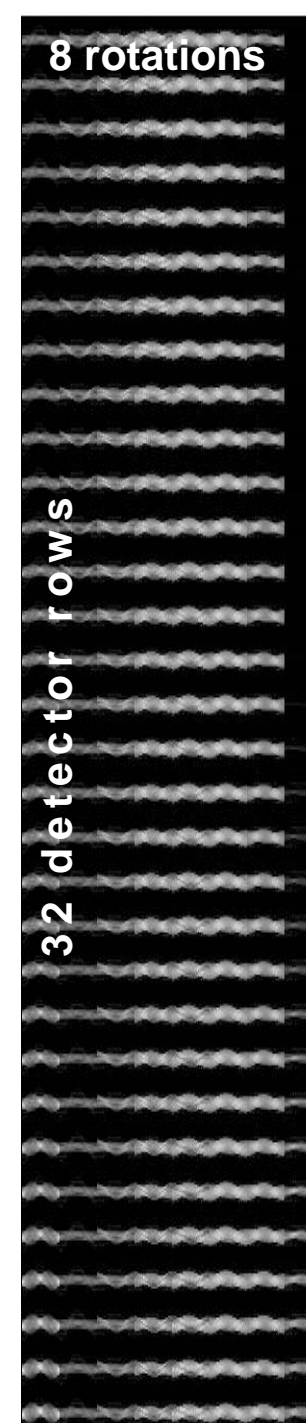
DICOM header:

Acquisition parameters

Tag	Attribute Name
(0008,0070)	Manufacturer
(0018,0060)	KVP
(0018,1157)	X-ray Tube Current Array
(7029,1010)	Number of Detector Rows
(7029,1011)	Number of Detector Columns
(7029,1002)	Detector Element Transverse Spacing
(7029,1006)	Detector Element Axial Spacing
(0018,9311)	Spiral Pitch Factor
(7031,1001)	Detector Focal Center Angular Position Array
(7031,1002)	Detector Focal Center Axial Position Array
(7031,1003)	Detector Focal Center Radial Distance Array
(7031,1031)	Constant Radial Distance
(7031,1033)	Detector Central Element
(7033,100B)	Source Angular Position Shift Array
(7033,100C)	Source Axial Position Shift Array
(7033,100D)	Source Radial Distance Shift Array
(7033,1013)	Number of Source Angular Steps
(7037,1009)	Type of Projection Data

DICOM image:

Attenuation info.



Discussion

Challenge

The formats of CT projection data are distinctly different and proprietary for each manufacturer.

As a result, accessing patient projection data from commercial CT scanners has always been difficult.

Our solution to the challenge

A vendor-neutral format for CT projection data has been developed.

A library of patient projection data using this format is under construction, which will include cases from a range of acquisition techniques and patients.

Validation of our solution

Images reconstructed from vendor's projection data and from our vendor-neutral projection data were consistent in terms of CT number, noise, and high contrast resolution

Potential applications

Head-to-head comparisons of reconstruction algorithms with patient data, such that more rapid consensus on better-performing algorithms can be reached and clinically adopted.

Determination of the dose reduction potential: With the open format, quantum noise can be added to patient projection data to simulate lower dose acquisitions.