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Annalise CXR

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Annalise CXR Performance Guide

English

annalise.ai

Manufacturer

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1. Performance

This document provides product performance information pertaining to Annalise CXR. For general user information please refer to the User Guide.

The following table includes all supported findings for Annalise CXR, presented in alphabetical order. Each row shows the finding name and the AUC.

These performance results are based on the data set that Annalise.ai has used to evaluate the product. Differences in demographics, imaging equipment or other variables may result in changes in performance.

2. AUC by Findings

Finding	AUC mean
Abdominal clips	0.9778
Acute clavicle fracture	0.9603
Acute humerus fracture	0.9740
Acute rib fracture	0.9688
Airway stent	0.9664
Aortic arch calcification	0.9759
Aortic stent	0.9942
Atelectasis	0.8825
Axillary clips	0.9964
Basal interstitial thickening	0.8870
Biliary stent	0.9994
Breast implant	0.9963
Bronchiectasis	0.9282
Diffuse bullae	0.9686
Lower zone bullae	0.9534
Upper zone bullae	0.9636
Calcified axillary nodes	0.9777
Calcified granuloma (< 5mm)	0.9303
Calcified hilar lymphadenopathy	0.8913
Calcified mass (> 5mm)	0.9534
Calcified neck nodes	0.9327
Calcified pleural plaques	0.9800
Cardiac valve prosthesis	0.9973
Cavitating mass with content	0.9712
Cavitating mass(es)	0.9285
Cervical flexion	0.9920
Incompletely imaged chest	0.9814
Chronic clavicle fracture	0.9624
Chronic rib fracture	0.9480

Chronic humerus fracture	0.9878
Clavicle fixation	0.9973
Clavicle lesion	0.9659
Coronary stent	0.9663
Diaphragmatic elevation	0.9332
Diaphragmatic eventration	0.9825
Diffuse airspace opacity	0.9787
Diffuse fibrotic volume loss	0.9603
Diffuse interstitial thickening	0.9380
Diffuse lower airspace opacity	0.9334
Diffuse nodular / miliary lesions	0.9793
Diffuse pleural thickening	0.9630
Diffuse spinal osteophytes	0.9871
Diffuse upper airspace opacity	0.9773
Distended bowel	0.9792
Electronic cardiac devices	0.9999
Focal airspace opacity	0.8508
Gallstones	0.8705
Gastric band	0.9748
Hiatus hernia	0.9914
Hilar lymphadenopathy	0.9363
Humeral lesion	0.9753
Hyperinflation	0.9643
Image obscured	0.9377
In position Central Line (CVC)	0.9951
In position Endotracheal Tube (ETT)	0.9971
In position Nasogastric Tube (NGT)	0.9966
In position Pulmonary Arterial Catheter (PAC)	0.9924
Inferior mediastinal mass	0.9687
Intercostal drain	0.9965
Internal foreign body	0.9328
Kyphosis	0.9761
Loculated effusion	0.9525
Lower zone fibrotic volume loss	0.9226
Lung collapse	0.9971
Lung sutures	0.9658
Mastectomy	0.9615
Mediastinal clips	0.9930
Multifocal airspace opacity	0.8954
Multiple masses or nodules	0.9565
Neck clips	0.9867
Nipple shadow	0.9712

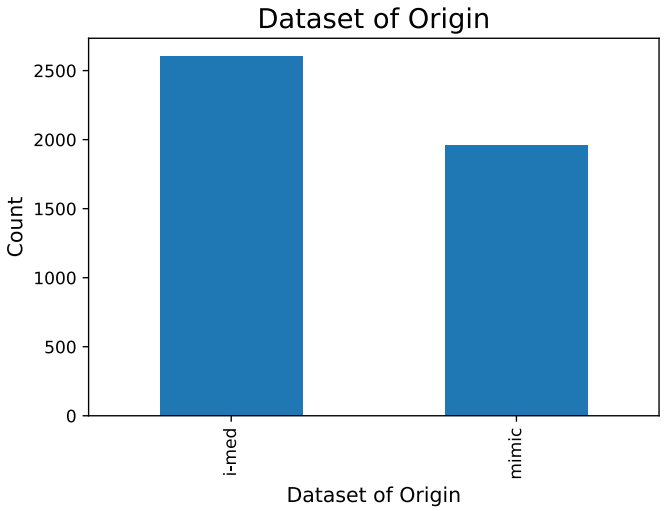
Oesophageal stent	0.9980
Osteopaenia	0.9551
Overexposed	0.9162
Patient rotation	0.9100
Pectus carinatum	0.9000
Pectus excavatum	0.9936
Peribronchial cuffing	0.8357
Pericardial fat pad	0.9251
Perihilar airspace opacity	0.9430
Pleural mass	0.9483
Pneumomediastinum	0.9689
Post resection volume loss	0.9795
Pulmonary artery enlargement	0.9420
Pulmonary congestion	0.9256
Reduced lung markings	0.9544
Rib fixation	0.9908
Rib lesion	0.9708
Rib resection	0.9860
Rotator cuff anchor	0.9996
Scapular fracture	0.9424
Scapular lesion	0.9518
Scoliosis	0.9547
Segmental collapse	0.9111
Shoulder arthritis	0.9829
Shoulder dislocation	0.9664
Shoulder fixation	0.9969
Shoulder replacement	1.0000
Simple effusion	0.9513
Simple pneumothorax	0.9804
Solitary lung mass	0.9455
Solitary lung nodule	0.8978
Spinal fixation	0.9993
Spinal arthritis	0.9378
Spinal lesion	0.9708
Spinal wedge fracture	0.9673
Sternotomy wires	0.9999
Subcutaneous emphysema	0.9964
Subdiaphragmatic gas	0.9958
Suboptimal Central Line (CVC)	0.9755
Suboptimal Endotracheal Tube (ETT)	0.9947
Suboptimal gastric band	0.9967
Suboptimal Nasogastric Tube (NGT)	0.9847

Suboptimal Pulmonary Arterial Catheter (PAC)	0.9933
Superior mediastinal mass	0.9520
Tension pneumothorax	0.9973
Tracheal deviation	0.9512
Underexposed	0.9463
Underinflation	0.9725
Unfolded aorta	0.8956
Upper interstitial thickening	0.8995
Upper zone fibrotic volume loss	0.9764
Widened aortic contour	0.9812
Widened cardiac silhouette	0.9510

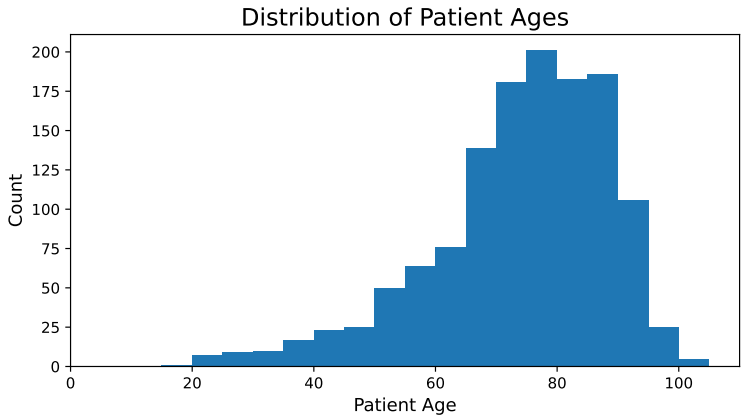
3. Model Validation Dataset Characteristics

The Annalise CXR product is validated on over 2,500 studies acquired from clinics across Australia and the United States of America.

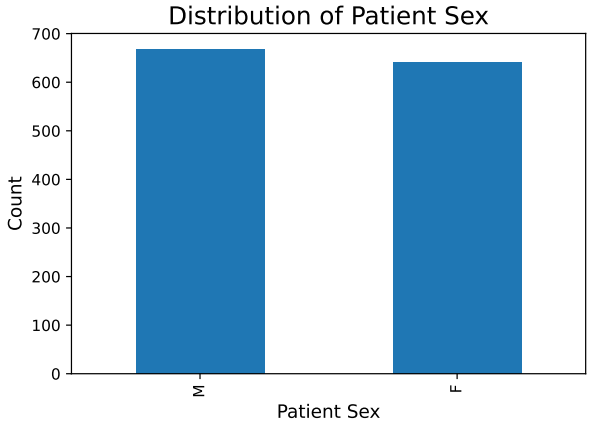
3.1Dataset of Origin of images:



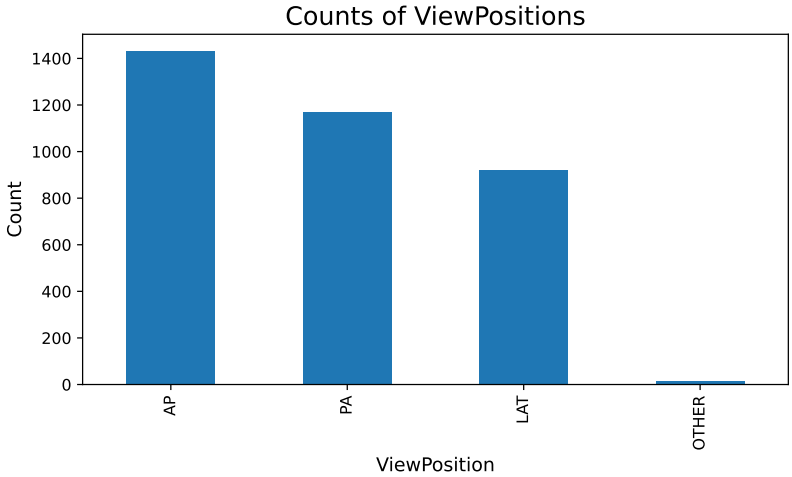
3.2 Patient Age



3.3 Patient Sex

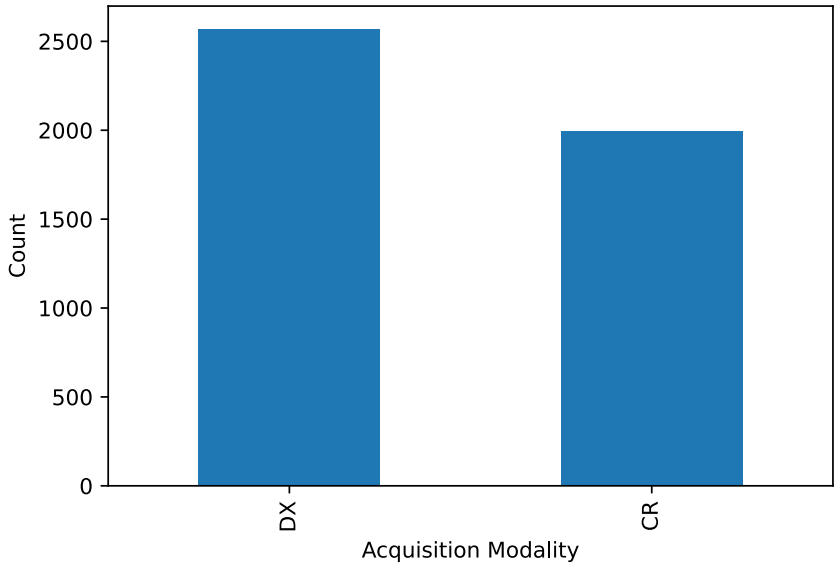


3.4 ViewPosition Characteristics



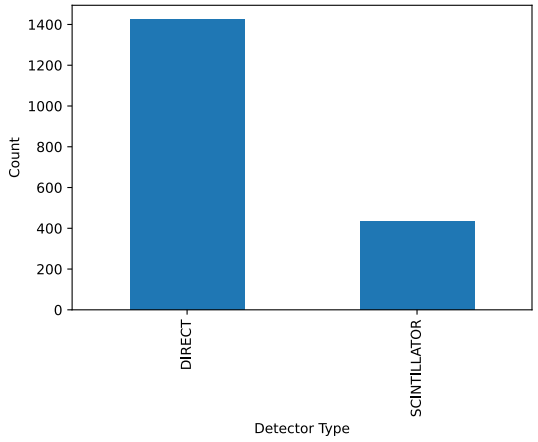
4. Acquisition Modality of Images

The Acquisition Modality is an important marker of image quality. Computed Radiography (CR) is an older technology which records information on a phosphor cassette prior to digitization while Digital Radiography (DX) records and digitizes information at the detector, leading to improved spatial resolution. Decreased spatial resolution may lead to difficulty in distinguishing fine detail on X-rays such as rib fractures or lung nodules.

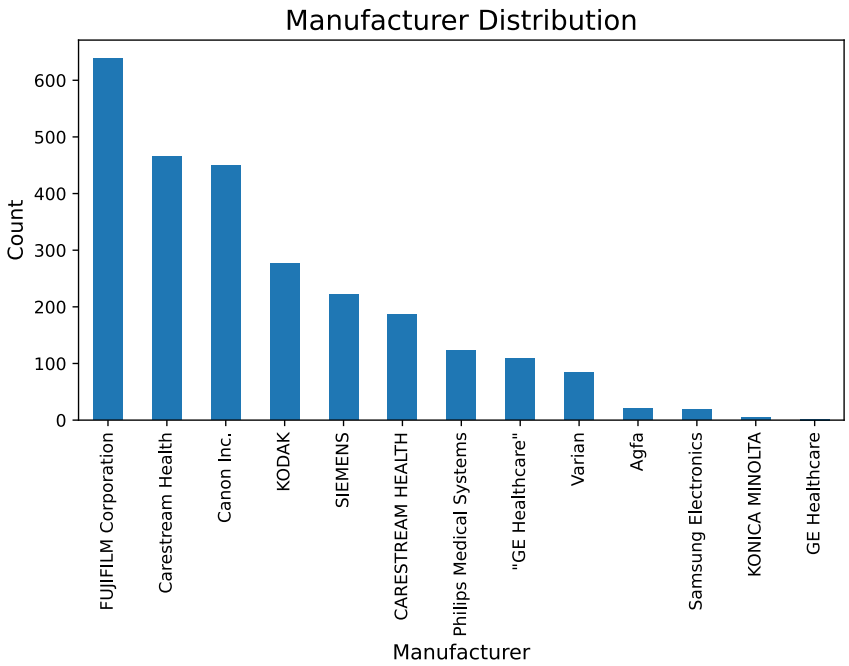


5. Detector Type

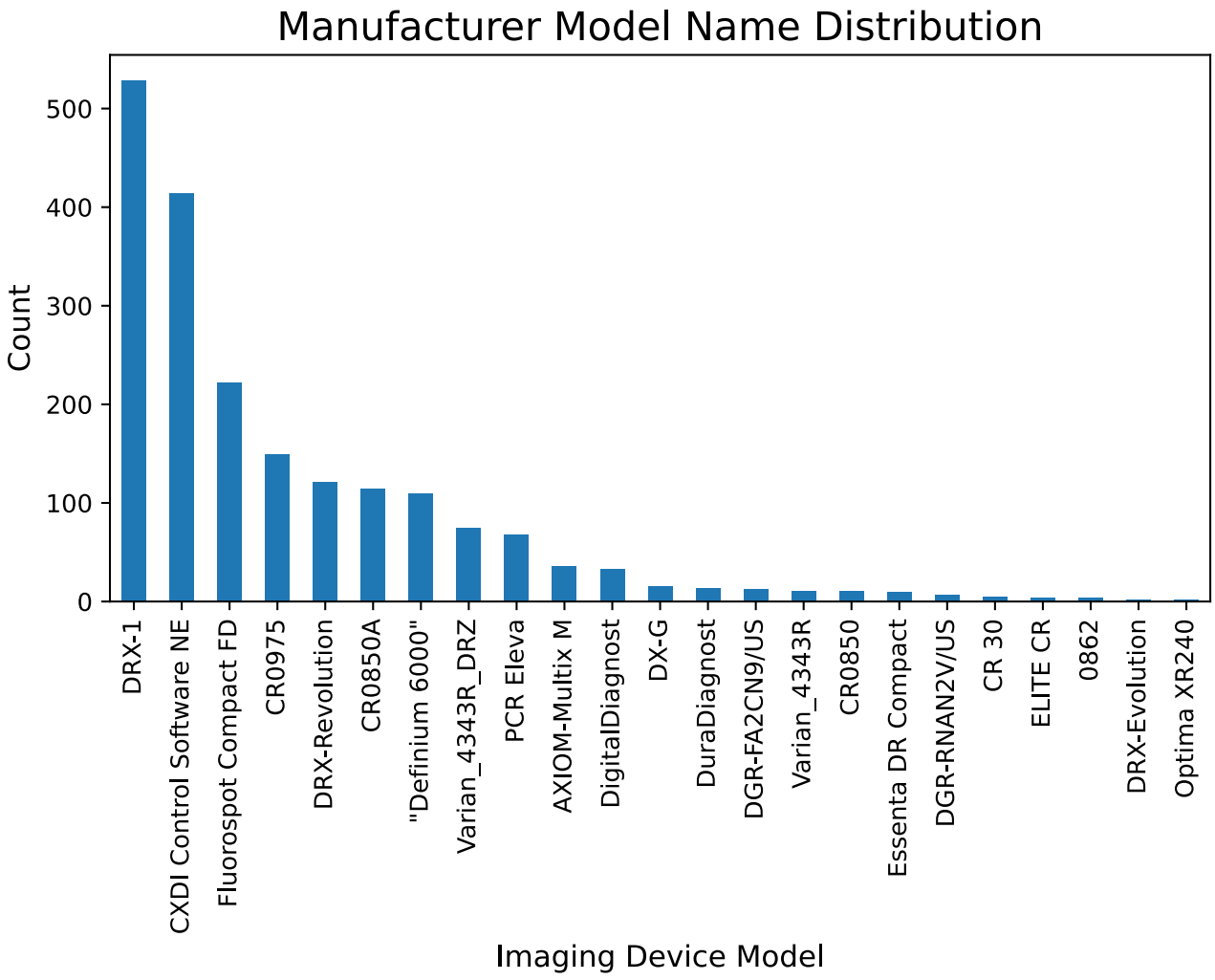
When Digital Radiography is used, the type of detector also changes the image quality. Scintillator detectors are older technologies which convert X-ray photons to visible photons via scintillation crystals while Direct detectors detect X-ray photons without an intermediate step. Direct detectors tend to have improved modulation transfer function and spatial resolution. Decreased spatial resolution may lead to difficulty in distinguishing fine detail on X-rays such as rib fractures or lung nodules.



6. Imaging Device Manufacturers

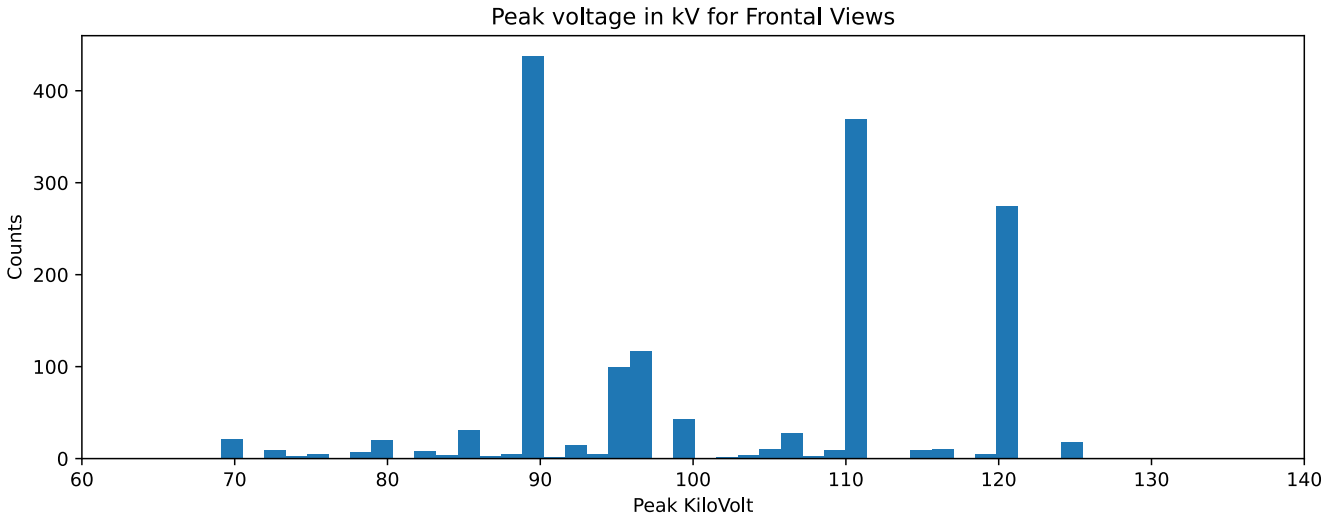


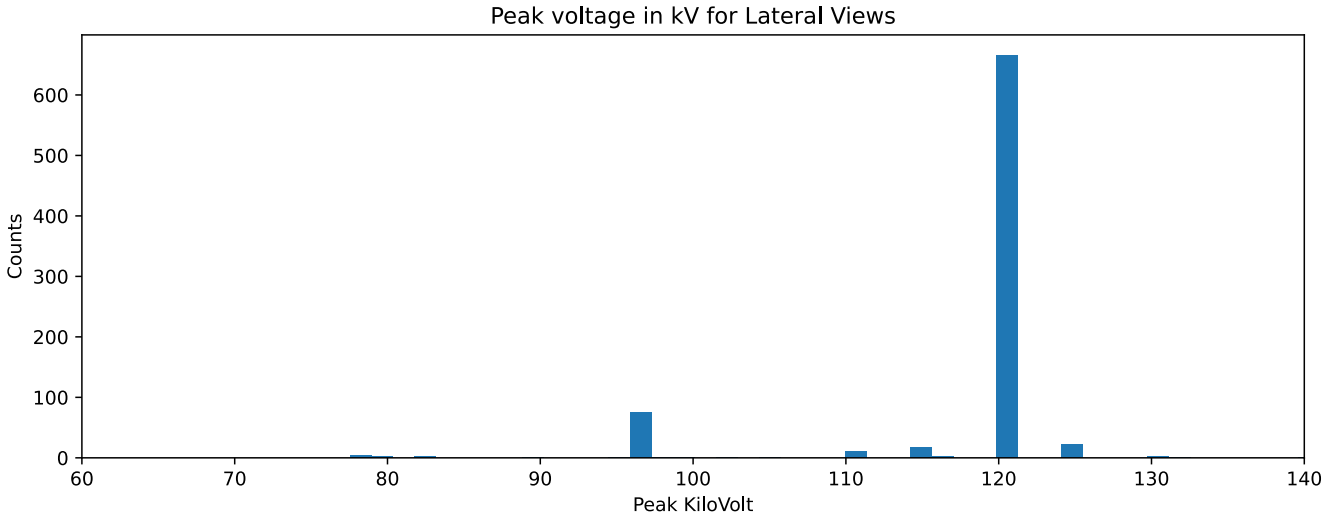
7. Imaging Device Model



8. Distribution of Peak kV

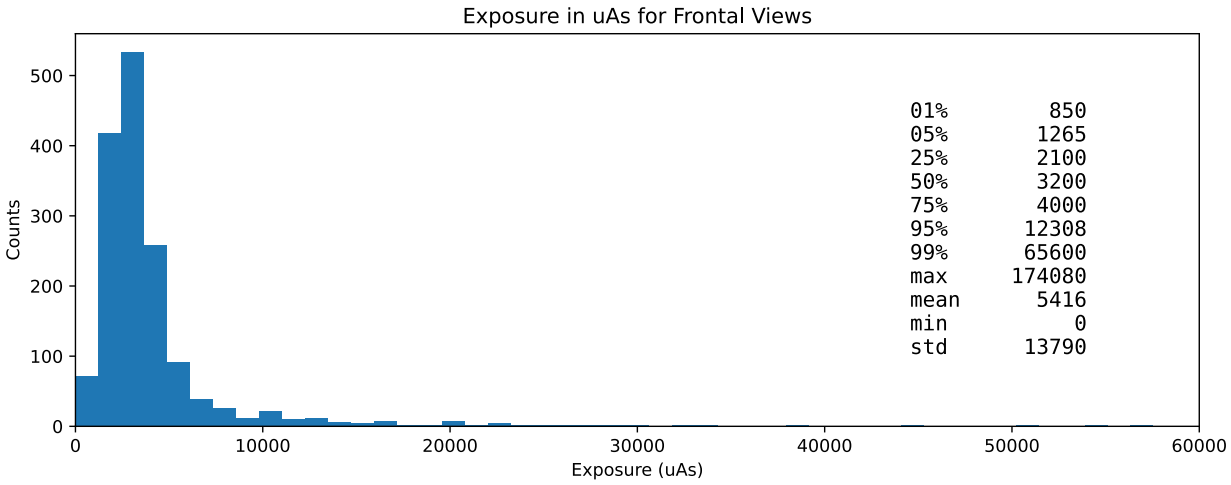
The Peak KV is selected by the radiographer at the time of imaging and can affect image quality. With automatic exposure control in most systems, higher KVP leads to more x-rays passing through the body and reaching the detector, reducing dose but also reducing contrast resolution. Lower KVP improves contrast resolution but increases dose to the patient. Too high KVP may lead to difficulty in distinguishing low contrast structures like lung opacities.

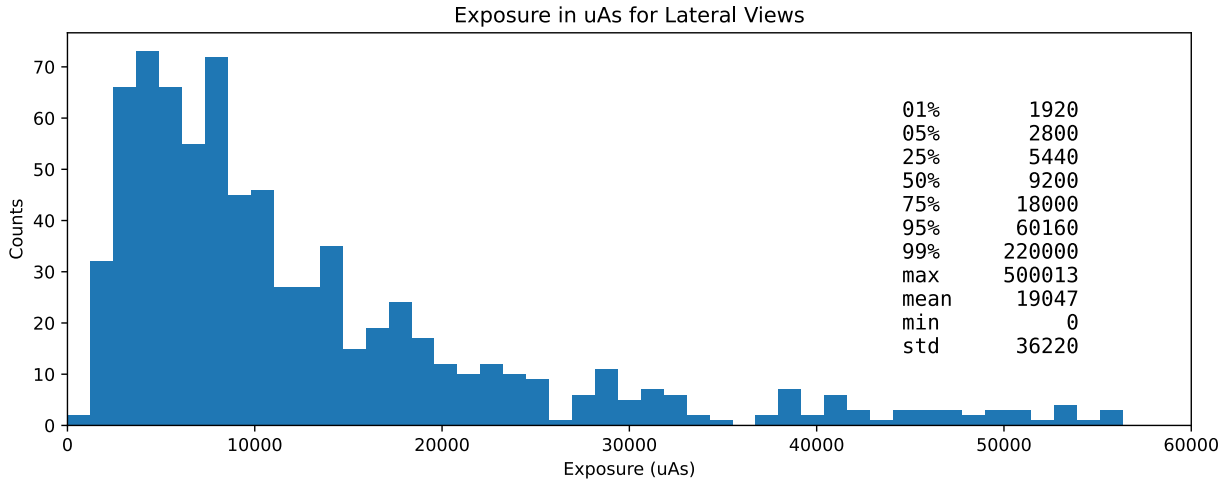




9. Distribution of Exposure in uAs

The exposure in micro-ampere-seconds is the total output of the X-ray tube and is usually automatically controlled through the use of Automatic Exposure Control, which aims to maintain image quality while reducing exposure as low as reasonably achievable. Hence, lateral views where there is more tissue for the X-ray photons to pass through will require more exposure. Changing the exposure manually will change the Exposure Index and Deviation Index



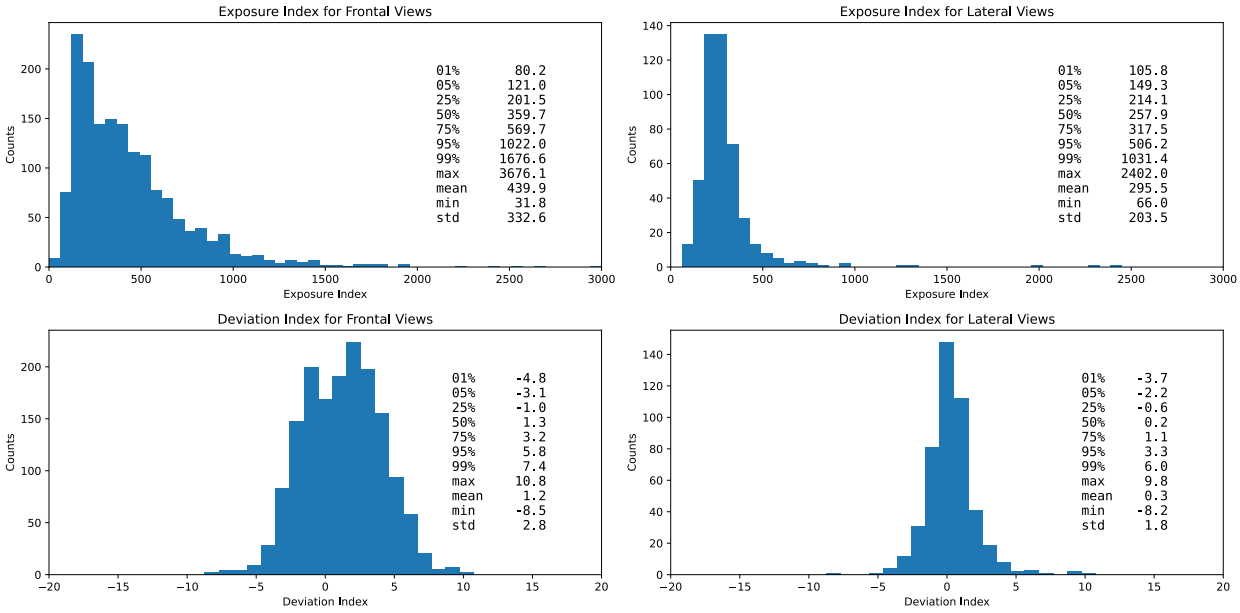


10. Radiograph Quality Indices

The exposure index is a measure of the incident radiation on the detector plate. When automatic exposure control is used, this should be roughly similar within the same exam type (e.g. frontal chest radiographs) as AEC aims to maintain exposure at a target exposure index

The deviation index is a logarithmic measure of the difference between the target exposure index and the actual target exposure. High deviation index indicates overexposure while low deviation index indicates underexposure (likely to cause the image to appear more white than necessary)

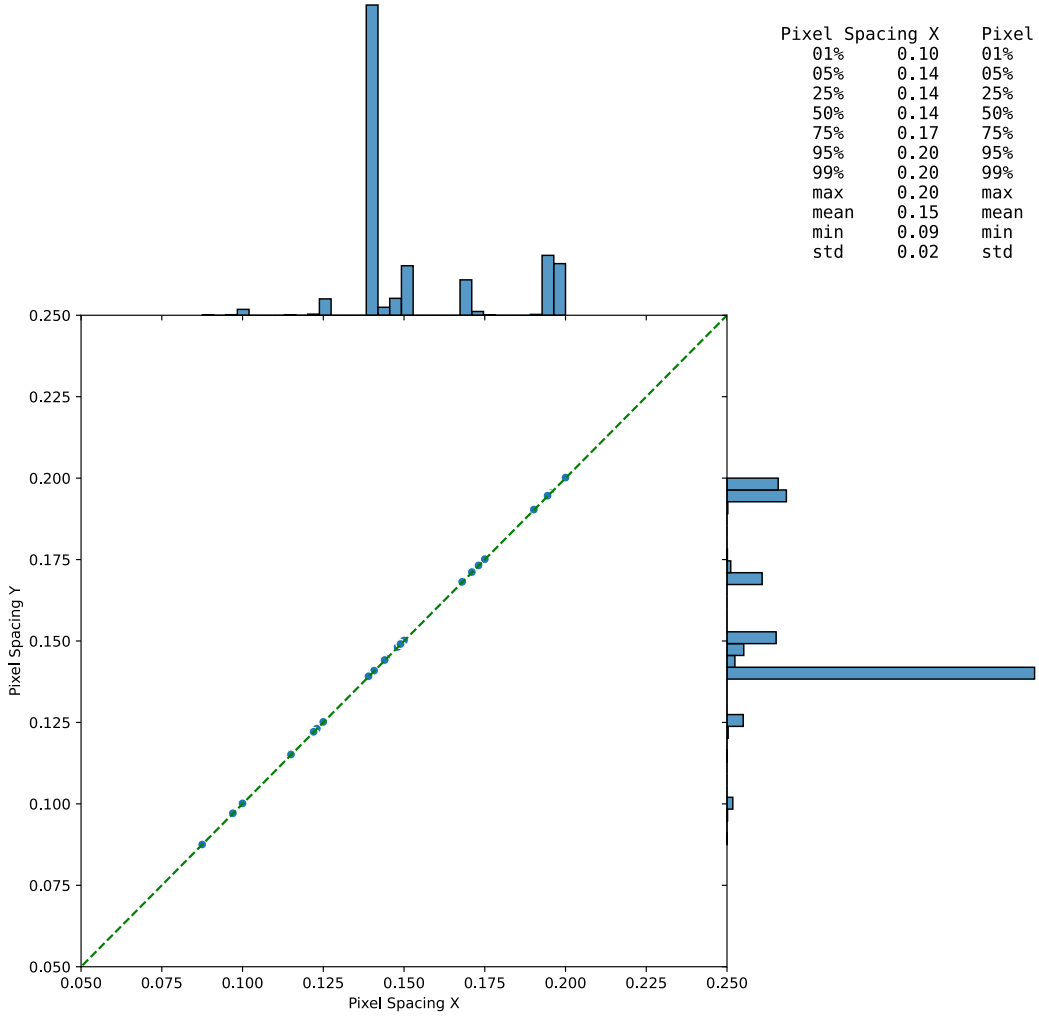
Different EIs and DIs may lead to difficulty in visualizing structures with poor contrast resolution such as lung opacities.



11. Pixel Spacing Values

Pixel spacing is the measure of the physical distance between each recorded pixel on the detector. It is not adjusted for geometric magnification. Higher pixel spacing values typically indicate improved spatial resolution unless post-processing has been applied to the image. Decreased spatial resolution may lead to difficulty in distinguishing fine detail on X-rays such as rib fractures or lung nodules.

	Pixel Spacing X	Pixel Spacing Y
01%	0.10	0.10
05%	0.14	0.14
25%	0.14	0.14
50%	0.14	0.14
75%	0.17	0.17
95%	0.20	0.20
99%	0.20	0.20
max	0.20	0.20
mean	0.15	0.15
min	0.09	0.09
std	0.02	0.02



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