HEADLINER AI in Diagnostic Radiology: How Today's Technology is Solving Real-World Problems

DR RICK ABRAMSON

Chief Medical Officer

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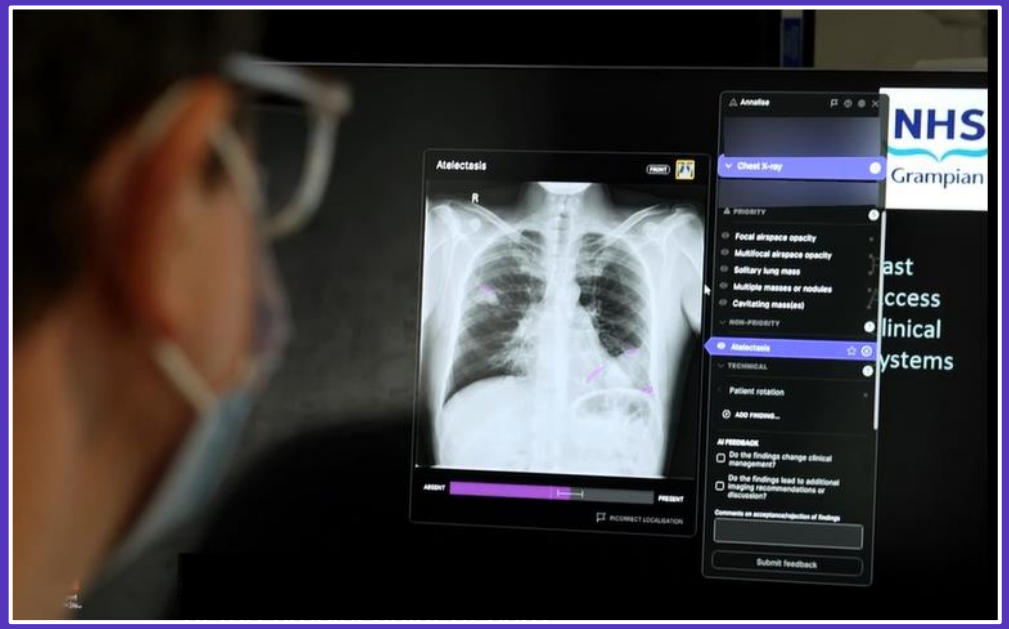

AI in Diagnostic Radiology: How Today's Technology is Solving Real-World Problems

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Adjoint Associate Professor of Biomedical Engineering, Vanderbilt University, Nashville, Tennessee

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Health system challenges

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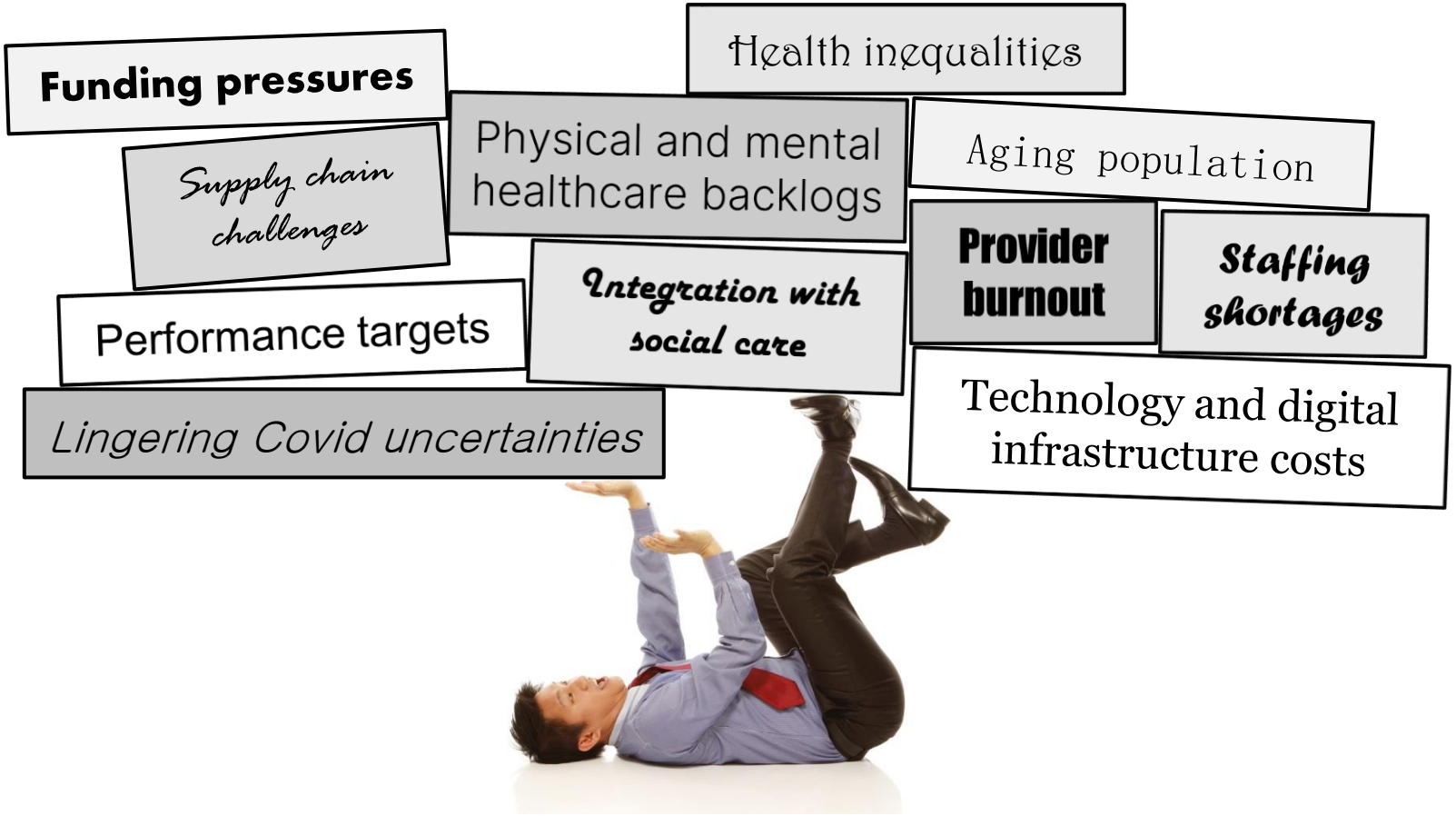

The imperative

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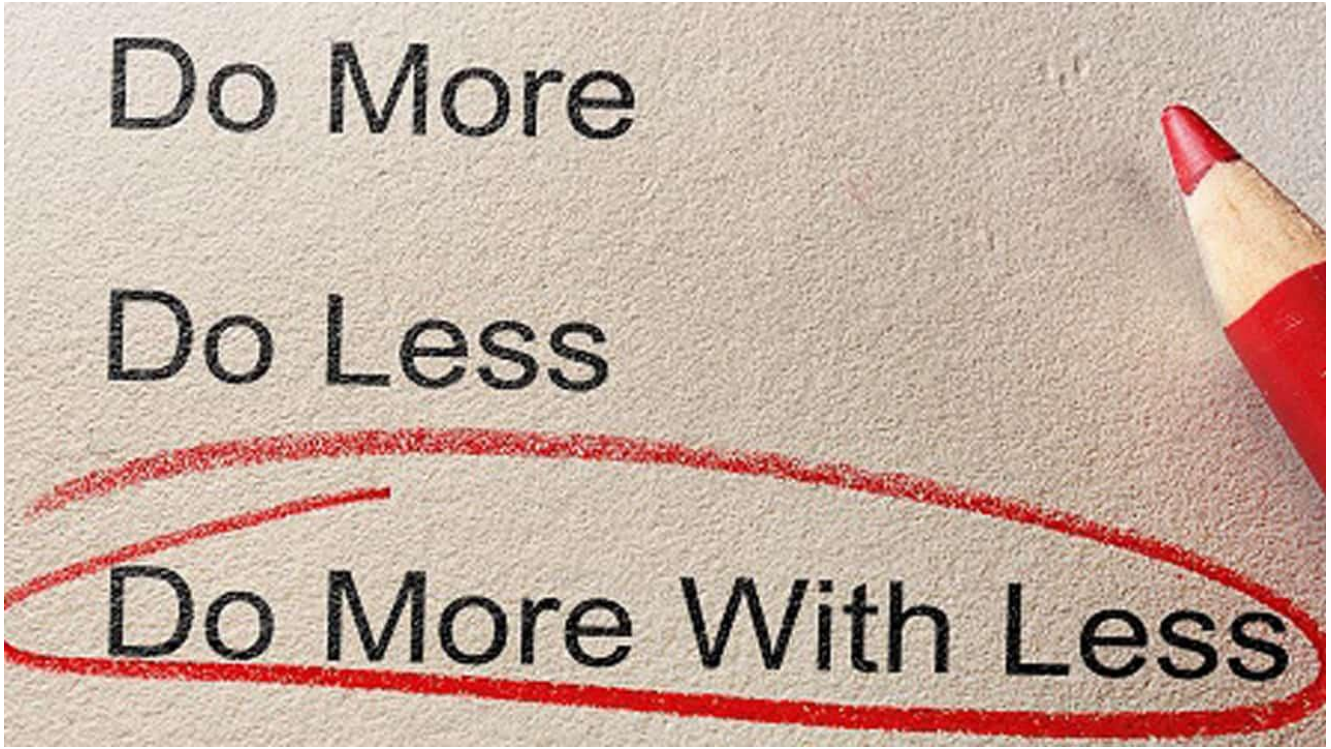

Diagnostic radiology

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How radiology sees itself...

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...and how radiology is often seen...

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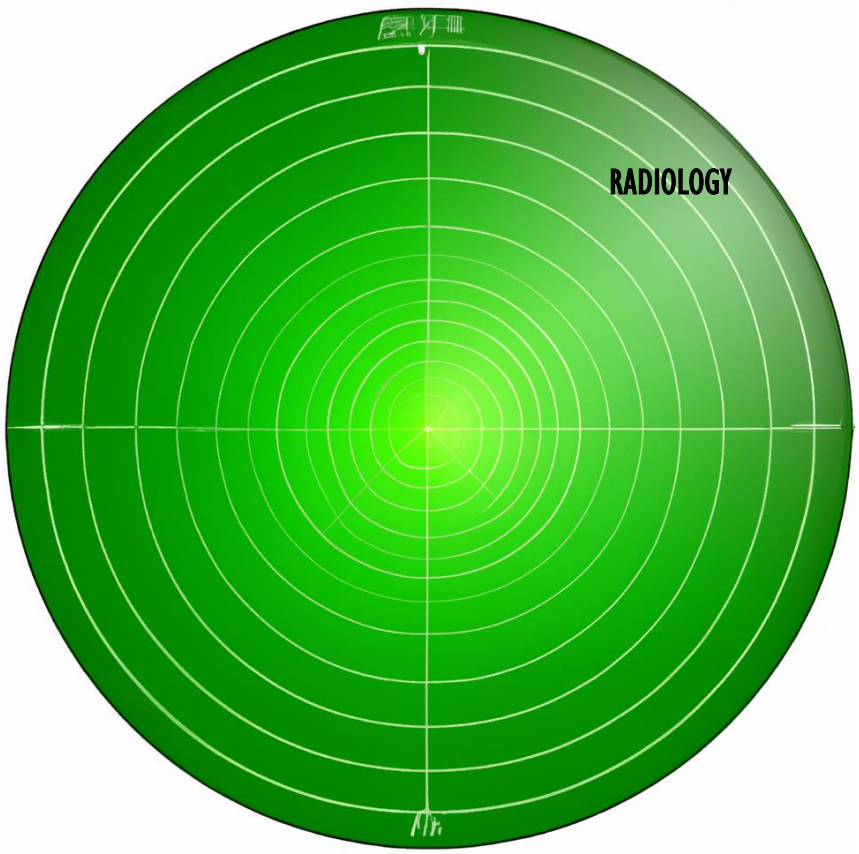

Why we should all pay attention to radiology

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Screening

Diagnostic problem solving

Treatment planning

Surveillance and monitoring

Radiology challenges

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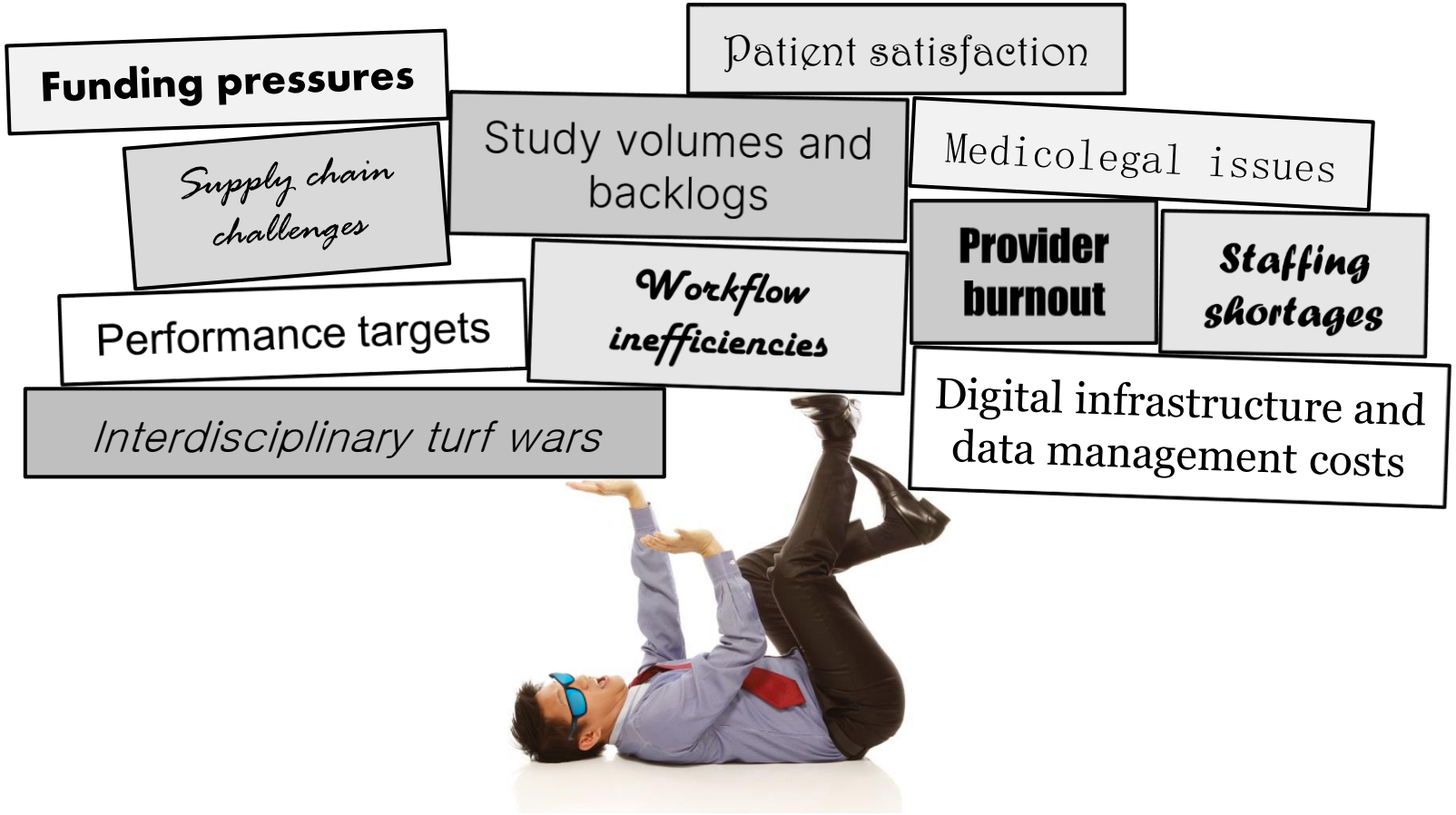

Shortage of radiologists

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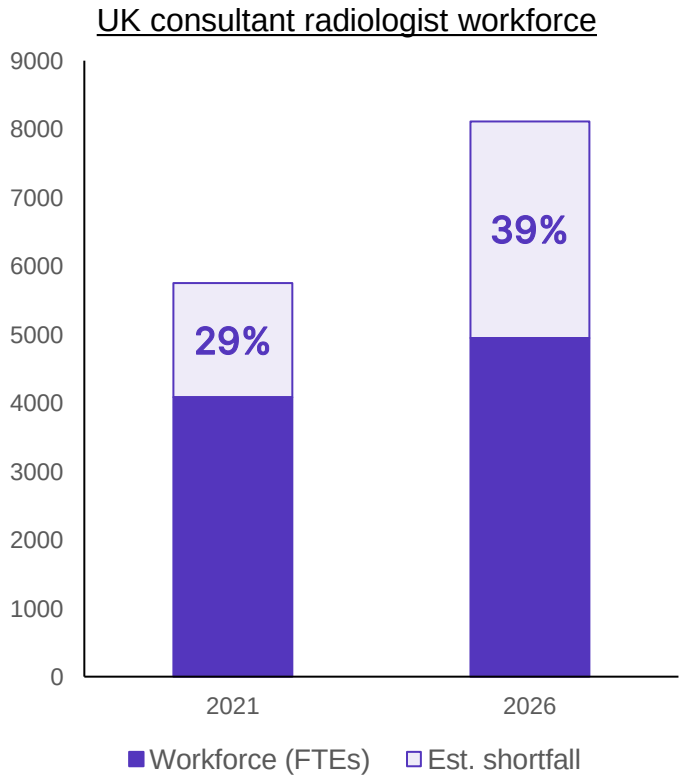

- Predicted shortfall of **over 3,000 consultants** by 2026
- New radiologists entering workforce not enough to meet increasing demand

RCR Clinical Radiology Census Report 2021

Radiologist shortage of particular concern in rural regions

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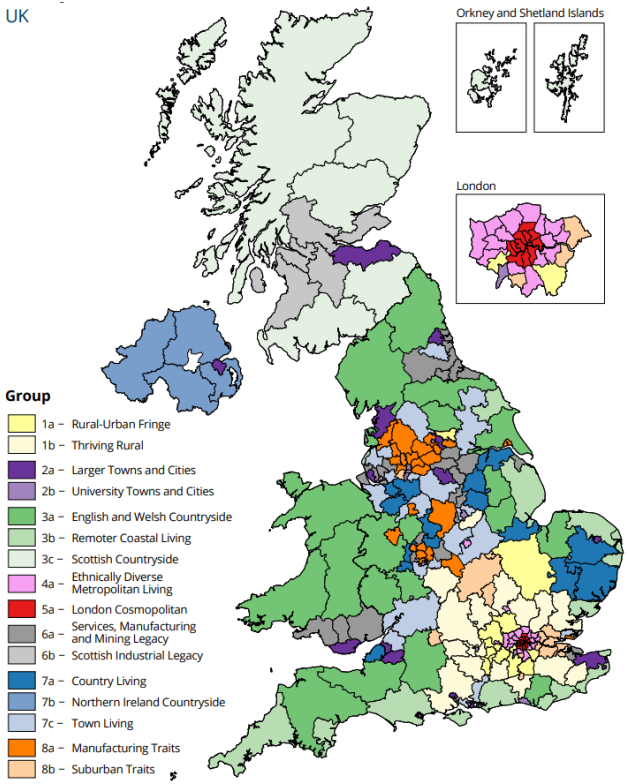

Office for National Statistics 2022

Effects on patient safety and physician morale

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63%

of clinical directors report that workforce shortages are significant enough to compromise **patient safety**

97%

of clinical directors are worried about **backlogs and delays** for patients

98%

of clinical directors are worried about **workforce morale, stress, and burnout**

RCR Clinical Radiology Census Report 2021

Patients face delayed diagnoses of critical conditions

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History 33 patients, 35 examinations

Study Priority Annaliseai	Date and time	Modality	Body part	Description	Name, sex and age	Date of birth	Institution	Name	Sex	Accessed	Current age
	29/06/2017, 1:37 PM	DX	CHEST	X-RAY CHEST	M, 62 years	1/01/1960	ANNALISE		M	19/01/2022, 5:50 AM	62 years
	14/03/2020, 4:09 PM	CR	CHEST	X-RAY CHEST	M, 62 years	1/01/1960	ANNALISE		M	1/02/2022, 1:52 PM	62 years
	15/06/2020, 10:24 AM	CR	CHEST	X-RAY CHEST	Potts, Pepper, F, 49 years	10/04/1972	ANNALISE	Potts, Pepper	F	2/02/2022, 4:51 PM	49 years
HIGH	1/01/2021, 5:00 PM	DX		Chest X-Ray	Nothrop, Marc, 2, 22 years	1/01/2000	ANNALISE	Nothrop, Marc	2	11/03/2022, 1:12 AM	22 years
	1/01/2021, 11:59 PM	CR	CHEST	CXR	Doe, Jon, M, 22 years	31/12/1999	ANNALISE	Doe, Jon	M	3/04/2022, 6:33 AM	22 years
	1/01/2021, 11:59 PM	CT		CT BRAIN	Smith, James, M, 22 years	31/12/1999	ANNALISE	Smith, James	M	3/04/2022, 6:36 AM	22 years
	7/07/2021, 7:32 AM	DX		CHEST X-RAY	Grimley, Donald, M, 58 years	5/12/1963	ANNALISE	Grimley, Donald	M	1/04/2022, 5:06 AM	58 years
	7/07/2021, 11:23 AM	DX		CHEST X-RAY	Rose, Randy, M, 58 years	5/12/1963	ANNALISE	Rose, Randy	M	9/03/2022, 8:11 AM	58 years
	7/07/2021, 11:30 AM	DX		CHEST X-RAY	Sparaco, Jackie, F, 58 years	5/12/1963	ANNALISE	Sparaco, Jackie	F	1/04/2022, 4:04 AM	58 years
	7/07/2021, 12:38 PM	DX		CHEST X-RAY	Hansen, Daniel, M, 58 years	5/12/1963	ANNALISE	Hansen, Daniel	M	1/04/2022, 3:14 PM	58 years
CRITICAL	7/07/2021, 2:04 PM	DX		CHEST X-RAY	Woods, Leslie, F, 58 years	5/12/1963	ANNALISE	Woods, Leslie	F	3/04/2022, 6:38 AM	58 years
	7/07/2021, 4:04 PM	DX		CHEST X-RAY	Franqui, Richard, M, 58 years	5/12/1963	ANNALISE	Franqui, Richard	M	1/04/2022, 7:03 AM	58 years
	7/07/2021, 4:05 PM	DX		CHEST X-RAY	Hahn, George, M, 58 years	5/12/1963	ANNALISE	Hahn, George	M	9/03/2022, 8:08 AM	58 years
	7/07/2021, 5:15 PM	DX		CHEST X-RAY	Shipman, Christine, F, 58 years	5/12/1963	ANNALISE	Shipman, Christine	F	1/04/2022, 4:04 AM	58 years
	7/07/2021, 6:40 PM	DX		CHEST X-RAY	Helms, Gerald, M, 58 years	5/12/1963	ANNALISE	Helms, Gerald	M	3/04/2022, 6:41 AM	58 years
	7/07/2021, 8:03 PM	DX		CHEST X-RAY	Perlman, Deanna, F, 58 years	5/12/1963	ANNALISE	Perlman, Deanna	F	1/04/2022, 5:06 AM	58 years
	7/07/2021, 8:14 PM	DX		CHEST X-RAY	Marrow, Amanda, F, 58 years	5/12/1963	ANNALISE	Marrow, Amanda	F	3/04/2022, 6:38 AM	58 years
HIGH	7/07/2021, 9:05 PM	DX		CHEST X-RAY	Edwards, Norma, F, 58 years	5/12/1963	ANNALISE	Edwards, Norma	F	1/04/2022, 5:06 AM	58 years
CRITICAL	8/07/2021, 2:00 PM	DX		Chest X-Ray	Rose, Randy, M, 58 years	5/12/1963	ANNALISE	Rose, Randy	M	9/03/2022, 8:12 AM	58 years
	8/07/2021, 2:00 PM	DX		Chest X-Ray	Schuh, Dennis, M, 58 years	5/12/1963	ANNALISE	Schuh, Dennis	M	9/03/2022, 4:12 AM	58 years
	18/08/2021, 12:39 PM	CR		Chest X-Ray (Mobile)	Herron, Spencer, M, 75 years	28/01/1947	ANNALISE	Herron, Spencer	M	21/01/2022, 4:13 AM	75 years
	22/11/2021, 12:15 AM	CT		RWG-CTB	Crews, Terry, M, 23 years	4/05/1998	ANNALISE	Crews, Terry	M	1/04/2022, 4:00 AM	23 years
HIGH	22/11/2021, 10:47 AM	CT	BRAIN	CGS-CT BRAIN	Battle, Florina, F, 30 years	6/05/1991	ANNALISE	Battle, Florina	F	11/03/2022, 12:40 AM	30 years

Costly short-term fixes to address backlogs

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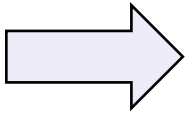
Spending on outsourcing, insourcing, and ad hoc locums (GBP)

Region	Spend (£)
England	157.9m
Northern Ireland	5.5
Scotland	9.1
Wales	6.0
Total UK	178.5m



equivalent to 1,875 consultant salaries, or approximately half of the entire clinical radiology workforce!

RCR Clinical Radiology Census Report 2021

Radiologists working harder and faster than ever before

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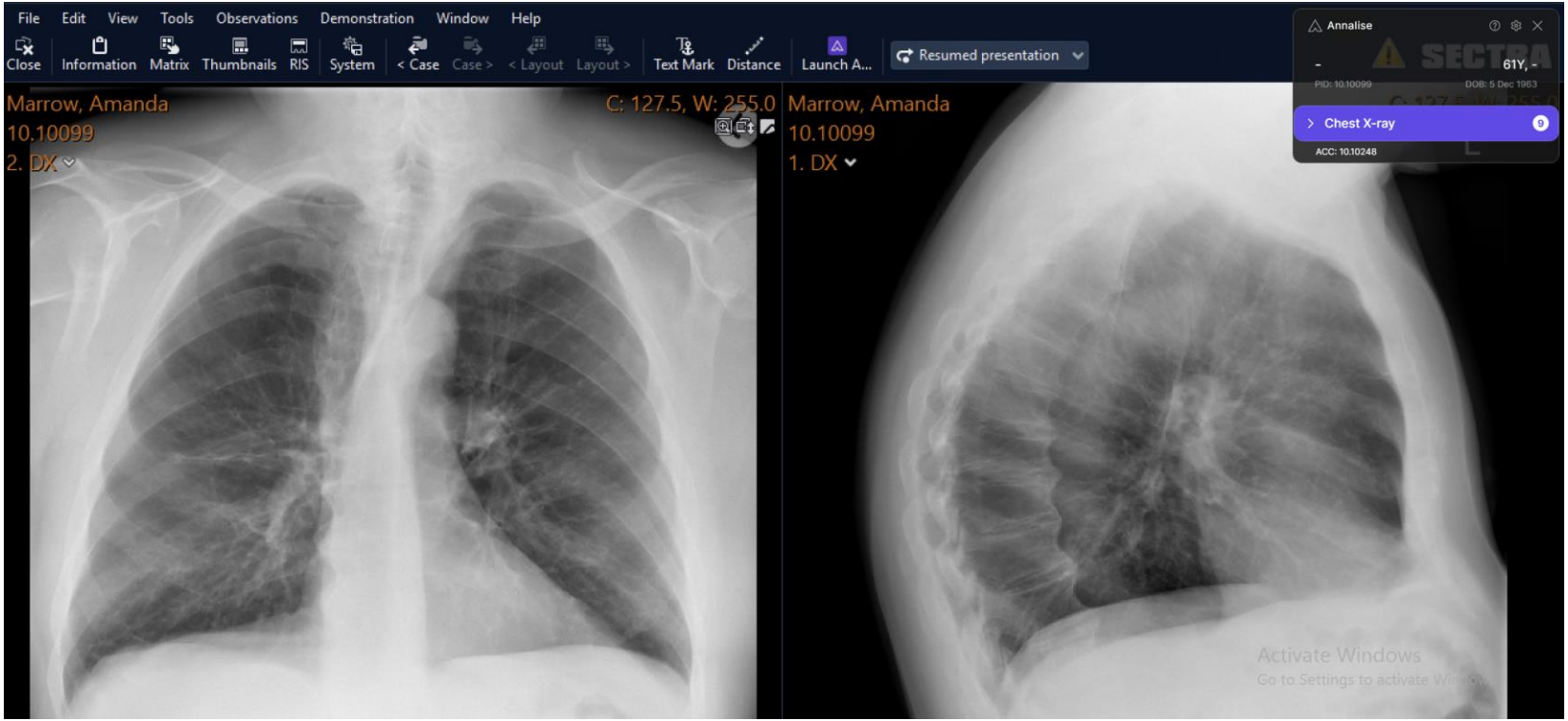

Radiologists working harder and faster than ever before

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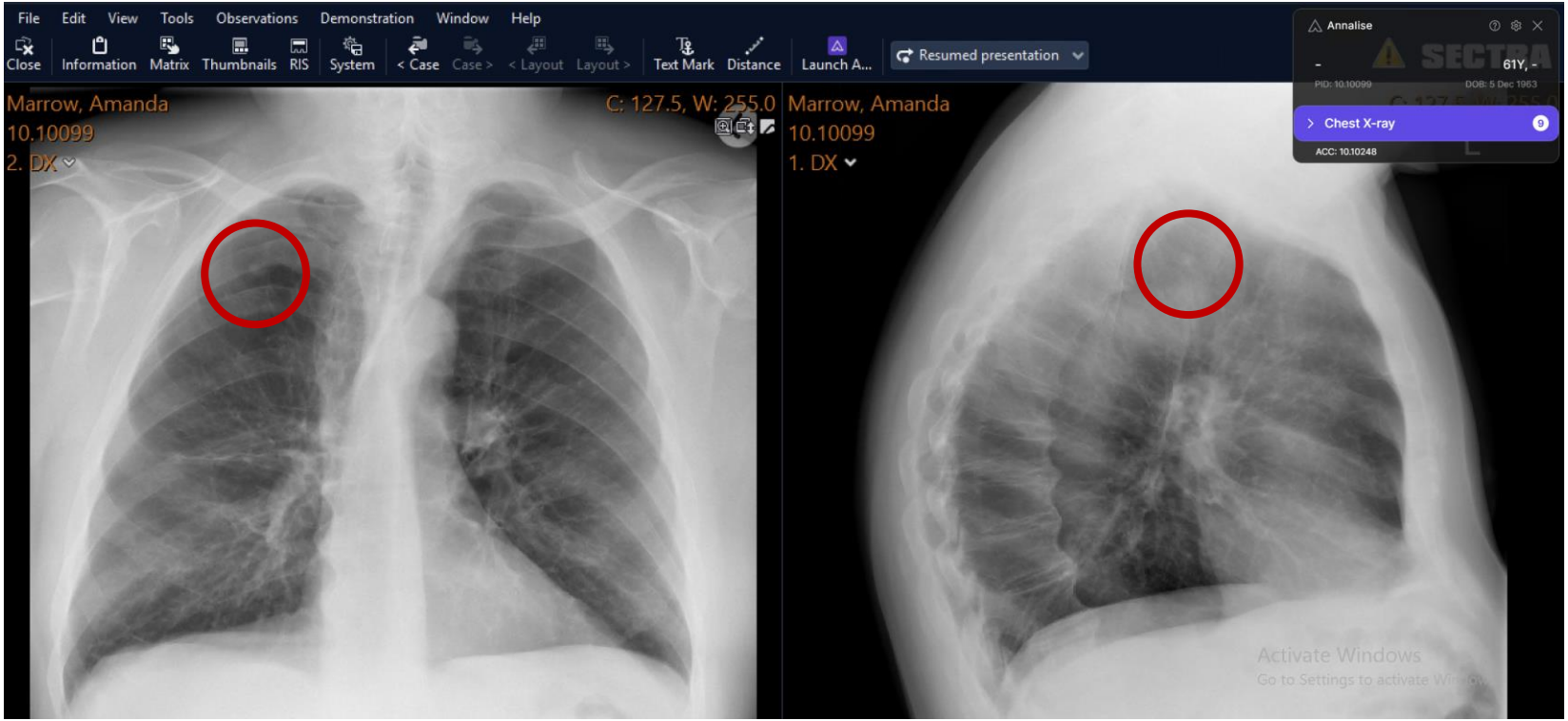

Radiologists working harder and faster than ever before

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Radiologists working harder and faster than ever before

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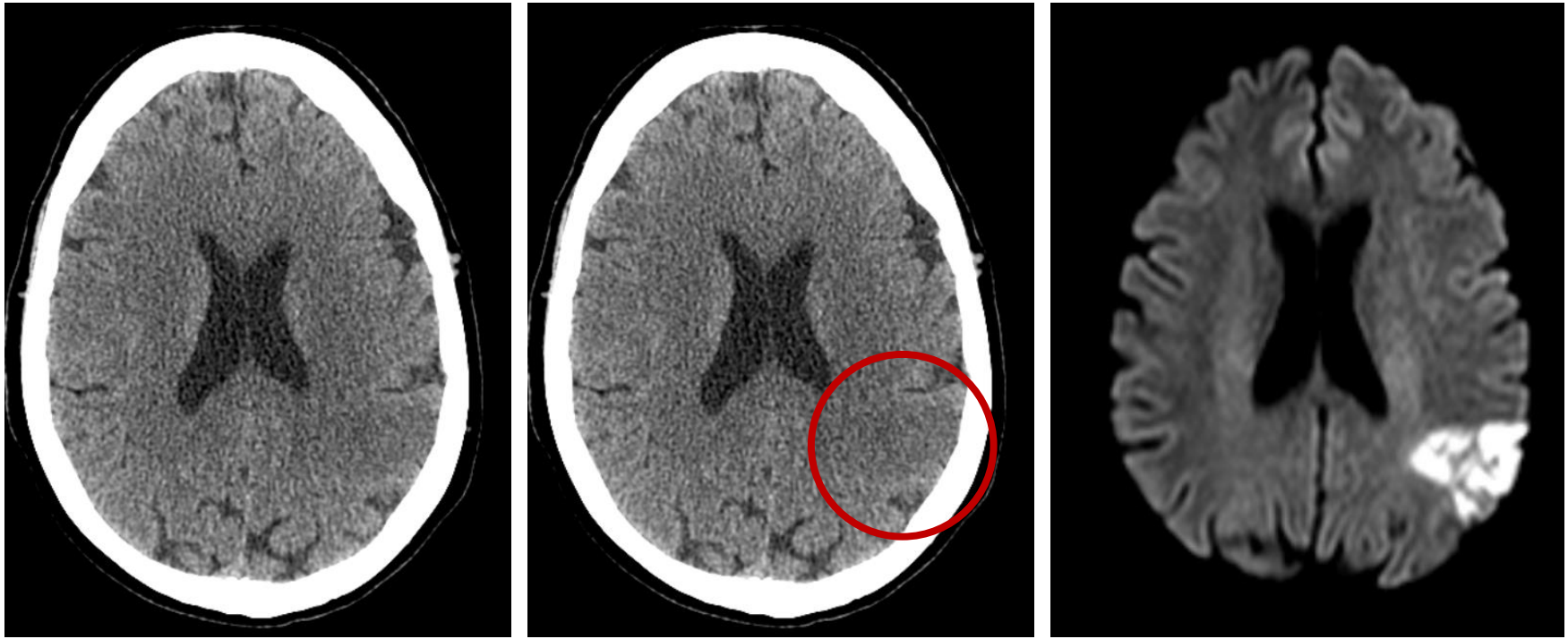

Radiologist burnout

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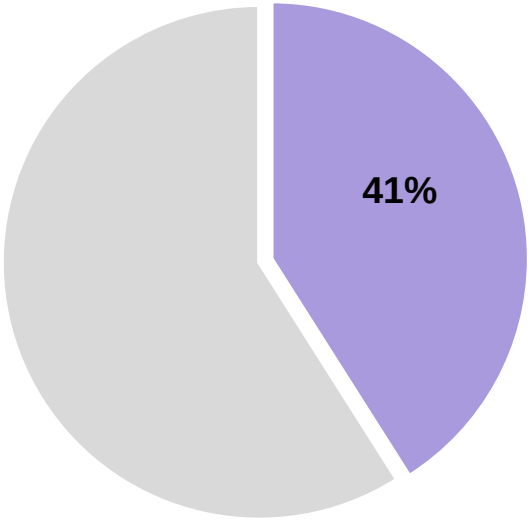
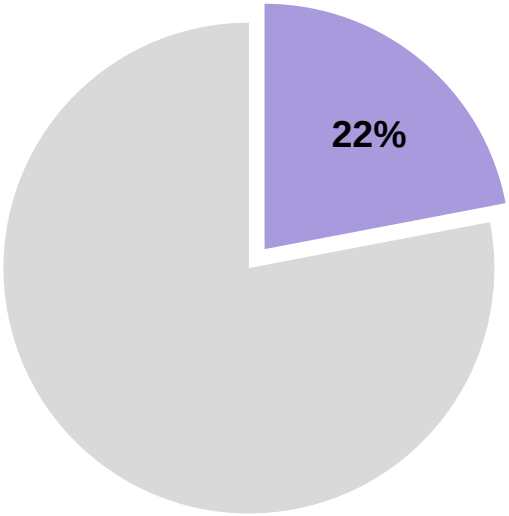
Moderately or severely demoralized in their jobs



Actively considering leaving the NHS



RCR Member Poll 2021

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Artificial intelligence in medical imaging

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Artificial intelligence in medical imaging

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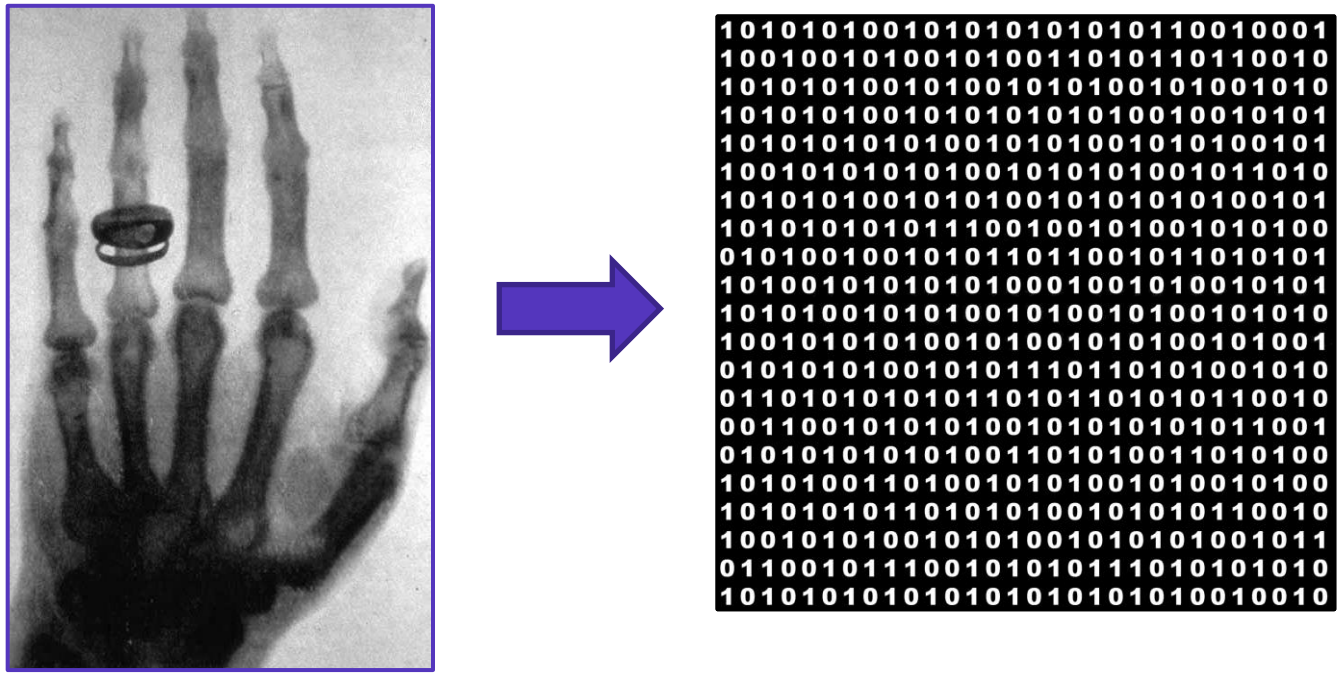

Medical imaging AI evolving in waves

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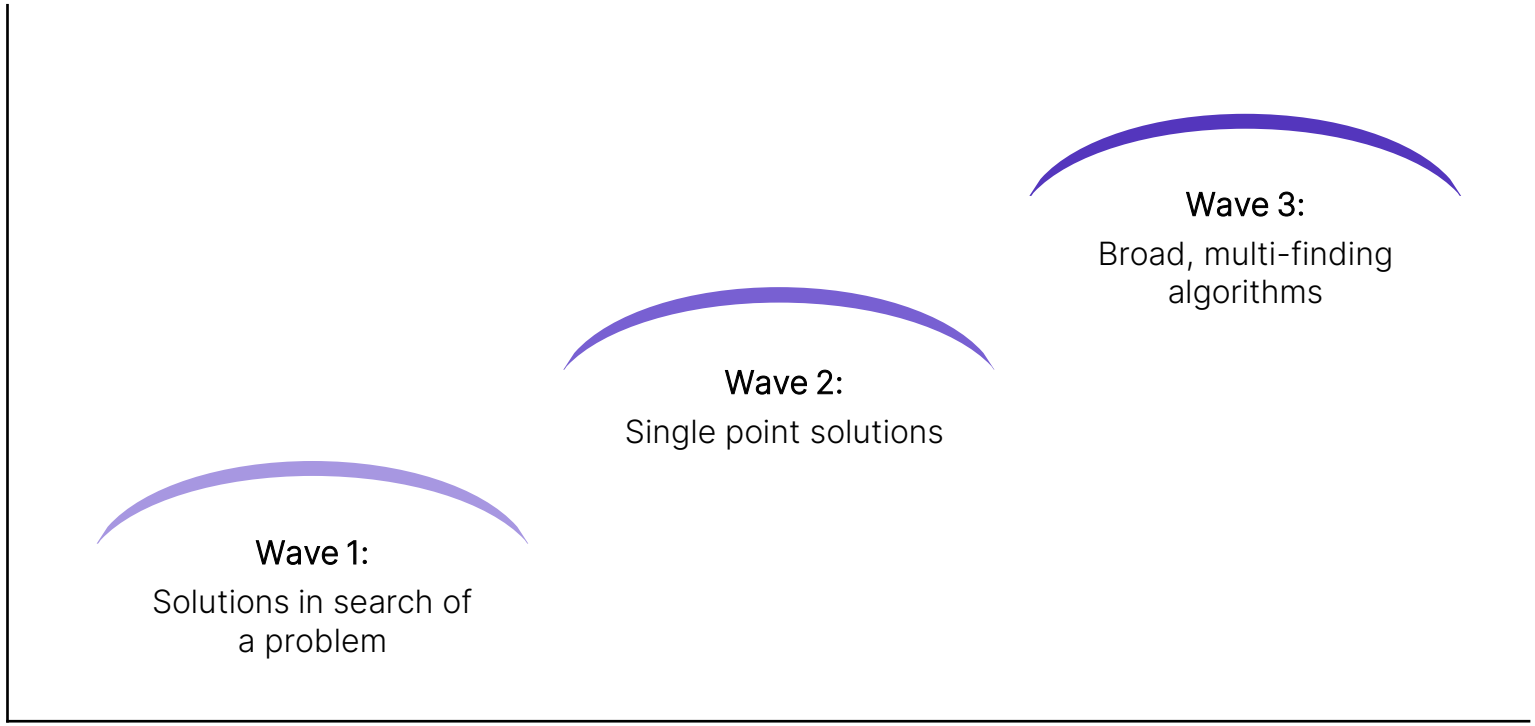

Modern radiology AI architecture

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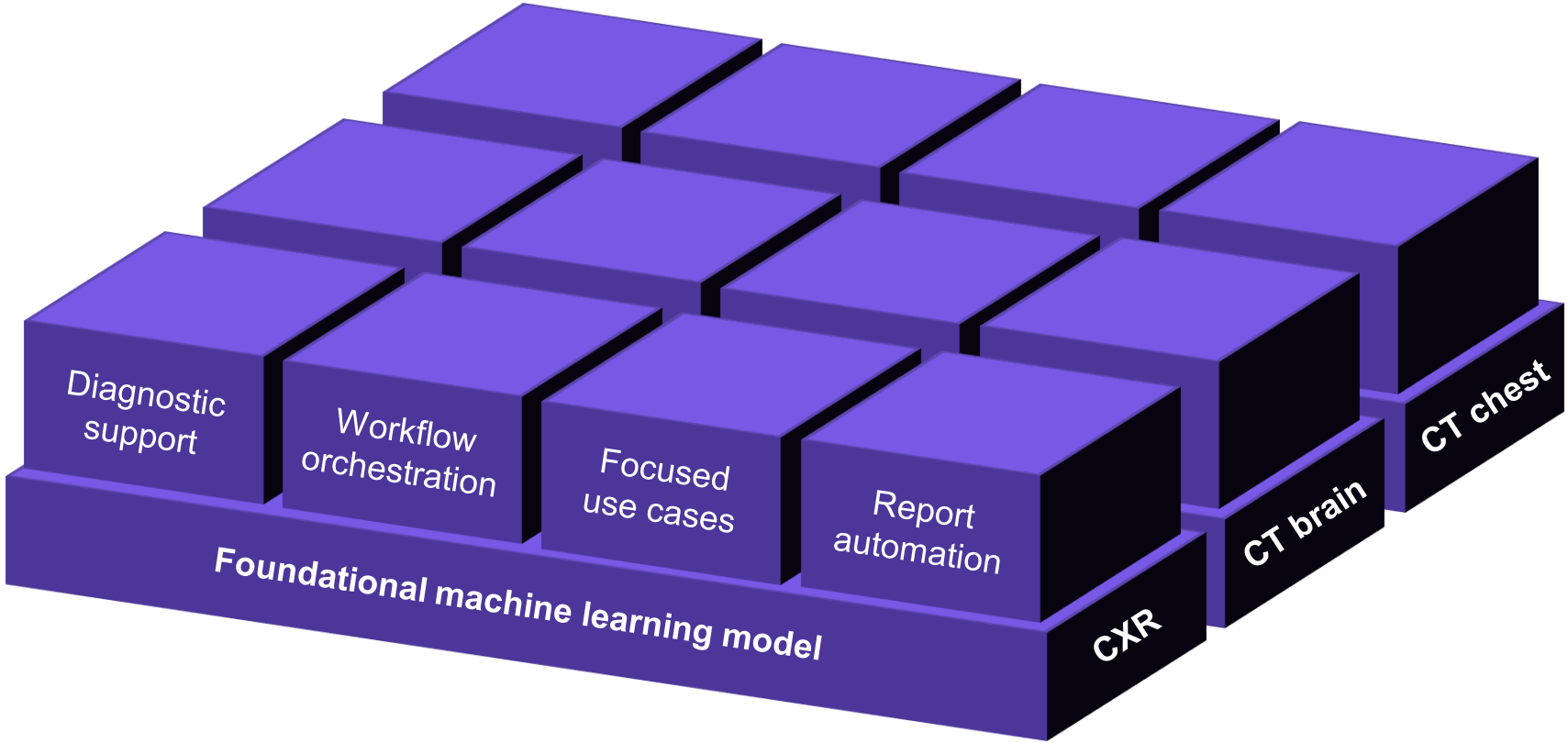

How AI addresses real-world challenges

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Efficiency

AI improves radiologist efficiency

Average examination reading time (seconds)

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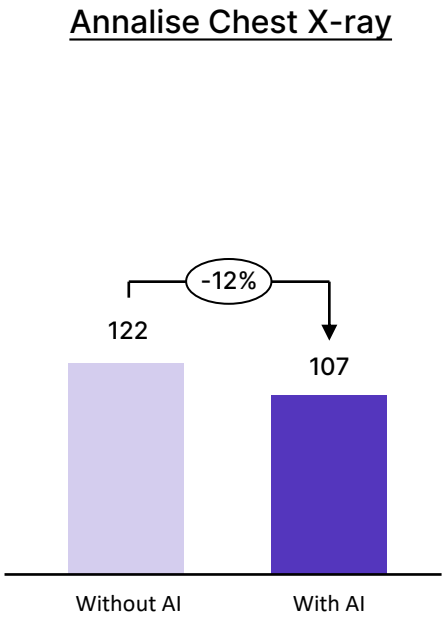
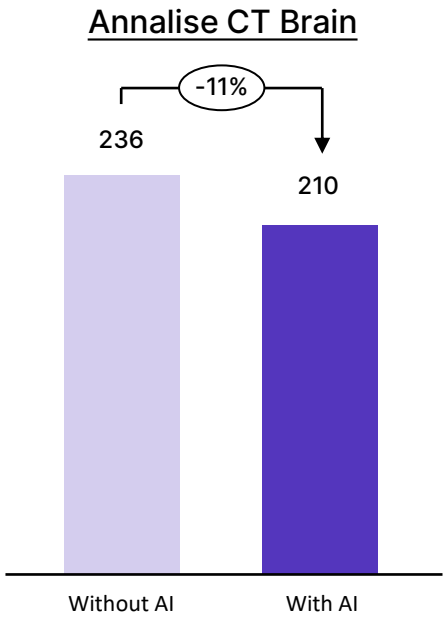




Seah, Lancet Dig Health 2021
Buchlak, Eur Radiology in review

Information delivered to radiologists

Annalise Enterprise CXR 2023

TECHNICAL FACTORS

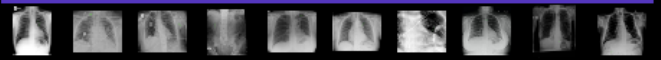
Patient Rotated | Obscured by Chin | Underinflation | Underexposed | Overexposed | Lungs Incompletely Imaged | Obscured by Object

LINES AND TUBES

Central Venous Catheter IN POSITION | Central Venous Catheter SUBOPTIMAL | Pulmonary Arterial Catheter IN POSITION | Pulmonary Arterial Catheter SUBOPTIMAL | Intercostal Drain | Nasogastric Tube IN POSITION | Nasogastric Tube SUBOPTIMAL | Endotracheal Tube IN POSITION | Endotracheal Tube SUBOPTIMAL

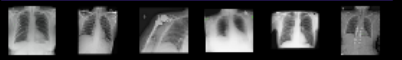
SURGICAL CLIPS AND STENTS

Mediastinal / Hilar Clips | Neck Clips | Axillary Clips | Abdominal Clips | Lung Sutures | Aortic Stent | Coronary Stent | Airway Stent | Oesophageal Stent | Biliary Stent



ORTHOPAEDIC IMPLANTS

Rib Fixation | Shoulder Fixation | Shoulder Replacement | Rotator Cuff Anchor | Clavicle Fixation | Spinal Fixation



CARDIAC DEVICES

Pacemaker / Electronic Cardiac Device or Wires | Valve Prothesis | Sternotomy Wires

RIBS

Chronic Rib Fracture | Rib Resection | Acute Rib Fracture

HUMERUS

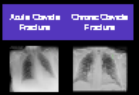
Acute Humerus Fracture | Chronic Humerus Fracture | Shoulder Dislocation | Shoulder Arthritis

SCAPULAR

Scapular Fracture (Any Age)

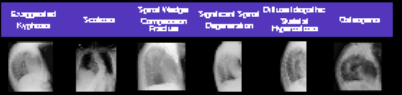
CLAVICLE

Acute Clavicle Fracture | Chronic Clavicle Fracture



SPINE

Exaggerated Kyphosis | Scoliosis | Spinal Wedge Compression Fracture | Significant Spinal Degeneration | Diffuse Idiopathic Skeletal Hyperostosis | Osteopenia

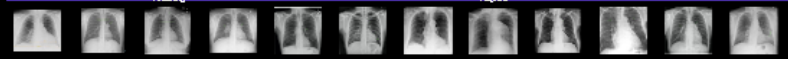


BONE LESIONS

Spine lesion | Scapular lesion | Humeral lesion | Rib lesion | Clavicle lesion

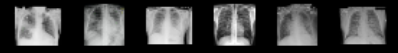
CARDIOMEDIASTINUM

Widened Cardiopericardial Silhouette | Mediastinal Mass / Nodes Except Superior | Superior Mediastinal Mass / Nodes / Widening | Hilar Lymphadenopathy | Hilar Lymphadenopathy – Calcified | Pneumomediastinum | Aorta – Unfolded / Ectatic | Aorta – Dilated / Contour / Dissection / Rupture | Aortic Arch Calcification | Pulmonary Venous Congestion | Pulmonary Artery Enlargement | Pericardial Fat Pad



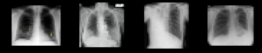
AIR SPACE OPACITY

Air Space Opacity – Focal | Air Space Opacity – Multifocal | Air Space Opacity – Diffuse (LOWER) | Air Space Opacity – Diffuse (UPPER) | Air Space Opacity – Diffuse (CENTRAL PERIHILAR) | Air Space Opacity – Diffuse (ALL Zones)



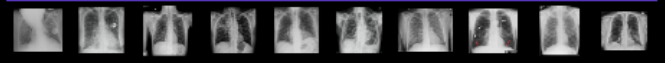
COLLAPSE

Atelectasis | Lobar / Segmental Collapse | Whole Lung or Majority Collapse | Post Lung Resection Volume Loss



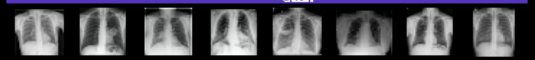
INTERSTITIAL

Interstitial Thickening (UPPER Zones) | Interstitial Thickening (LOWER Zones) | Interstitial Thickening (DIFFUSE) | Interstitial Thickening with Volume Loss (UPPER) | Interstitial Thickening with Volume Loss (LOWER) | Interstitial Thickening with Volume Loss (DIFFUSE) | Diffuse Nodular / Miliary Lesions | Bullous Disease (UPPER ZONES) | Bullous Disease (LOWER ZONES) | Bullous Disease (DIFFUSE)



PULMONARY LESION

Solitary Nodule (less than 3cm) | Solitary Mass (over 3 cm) | Multiple Well-Defined Masses or Nodules | Cavitating Masses | Cavitating Mass(es) with Air Fluid Level / Air Crescent | Calcified Granuloma (<5mm) | Calcified Nodule (>5mm) | Nipple Shadow

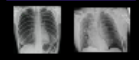


AIRWAYS

Reduced Lung Markings (Hyperlucency) | Peribronchial Cuffing | Hyperinflation | Bronchiectasis | Tracheal Deviation

PNEUMOTHORAX

Simple Pneumothorax | Tension Pneumothorax

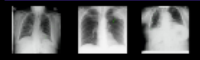


PLEURAL EFFUSION

Simple Effusion | Loculated Effusion

PLEURAL THICKENING

Calcified Pleural Plaques | Pleural Mass | Diffuse Nodular Pleural Thickening

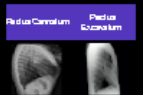


DIAPHRAGMATIC CONTOUR

Raised Hemidiaphragm | Eventrated Hemidiaphragm

CHEST WALL CONTOUR

Pectus Carinatum | Pectus Excavatum



SOFT TISSUES

Subcutaneous Emphysema | Mastectomy | Breast Implant | Calcified Axillary Nodes | Calcified Neck Nodes

ABDOMEN

Free Abdominal Gas | Distended Bowel | Hiatus Hernia | Gallstones | Gastric Band IN POSITION | Gastric Band SUBOPTIMAL

FOREIGN BODIES

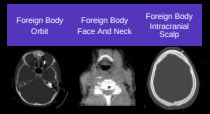
Non-Surgical Internal Foreign Body

Information delivered to radiologists

Annalise Enterprise CTB 2023

TUBES CLIPS & DEVICES

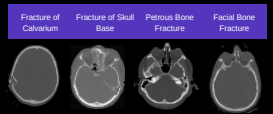
FOREIGN BODIES



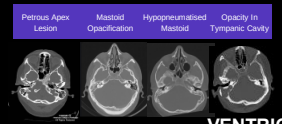
POST SURGICAL PROCEDURE

SKIN AND SCALP

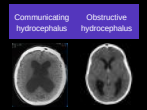
FRACTURE



PETROUS TEMPORAL BONES

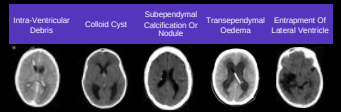


HYDROCEPHALUS

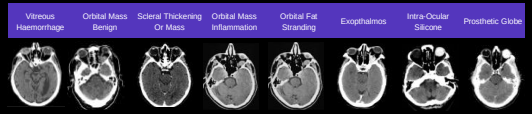


SKULL LESION

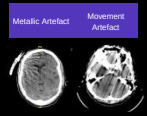
VENTRICLES



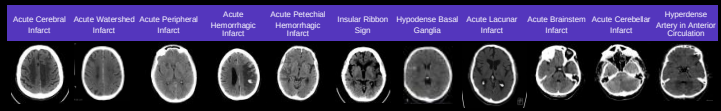
ORBITS



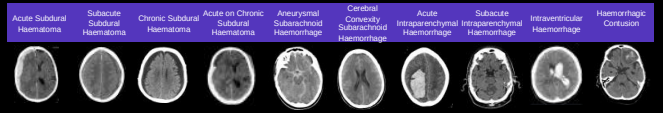
ARTEFACT



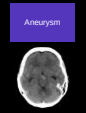
STROKE



INTRACRANIAL HAEMORRHAGE

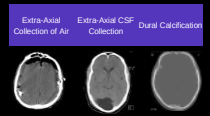


VASCULAR

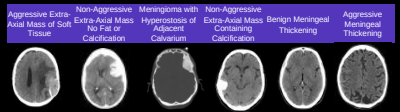


INTRA-AXIAL MASS

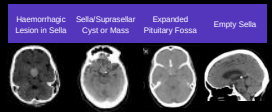
EXTRA-AXIAL COLLECTION



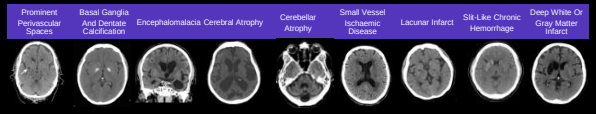
EXTRA-AXIAL MASS



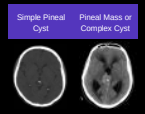
SELLA LESION



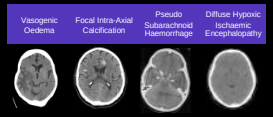
CHRONIC CHANGES



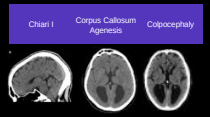
PINEAL LESION



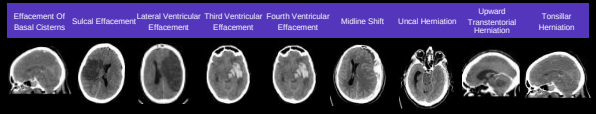
INTRA-AXIAL ABNORMALITY



CONGENITAL ABNORMALITY



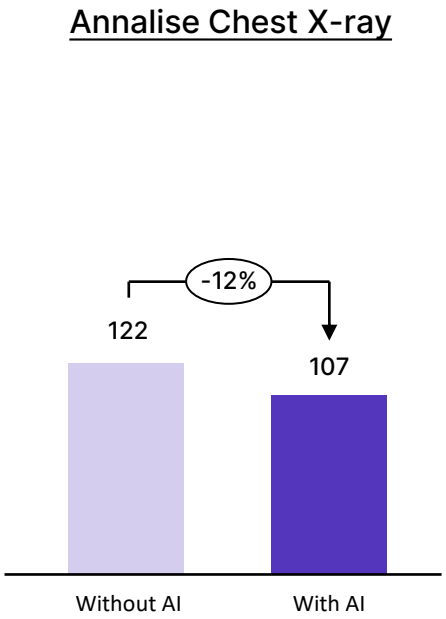
MASS EFFECT

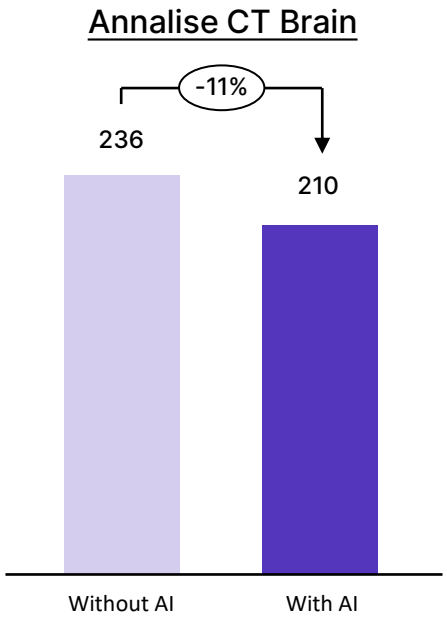


AI improves radiologist efficiency

Average examination reading time (seconds)

annalise.ai





Seah, Lancet Dig Health 2021
Buchlak, Eur Radiology in review

AI enables new, more efficient radiology workflows

Batch reading with “triaged” normal vs abnormal radiographs

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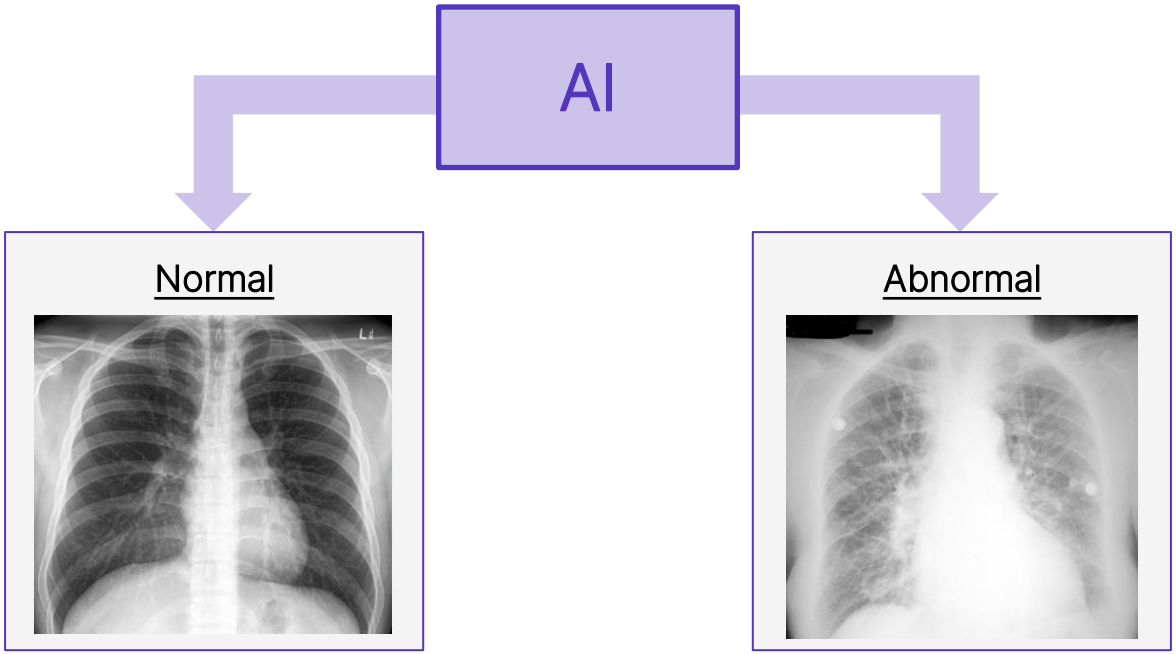

AI enables new, more efficient radiology workflows

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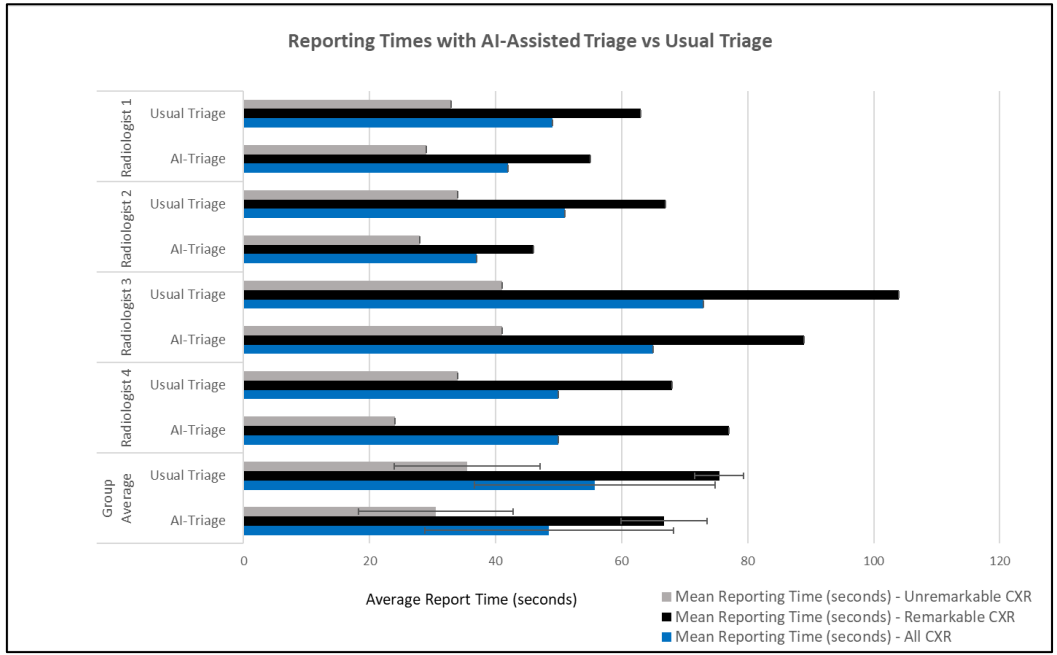

- **13%** overall reporting time savings

Karunasena, BIR 2023

AI can decrease reliance on expensive teleradiology

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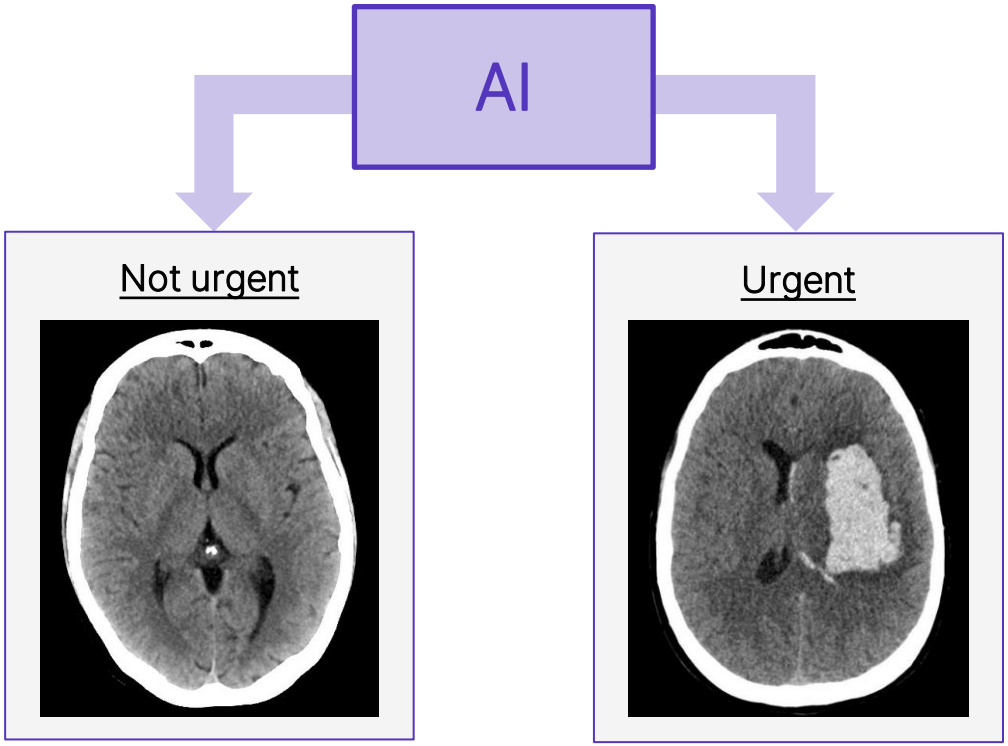

- 60-80% of head CTs ordered in A&E are normal
- Triaging only urgent cases for overnight teleradiology reads could save up to £175,000 per annum at a single NHS trust

Pak, J Med Sci 2019
Kelly, Emerg Med 2000

AI may reduce A&E, ICU, and hospital length of stay

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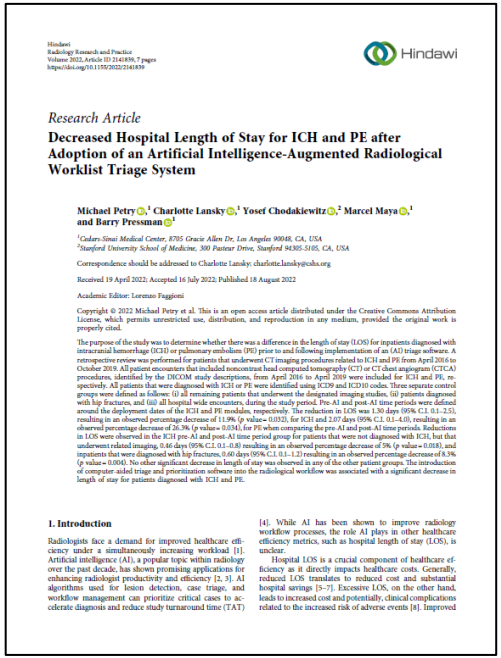

Hindawi
Radiology Research and Practice
Volume 2022, Article ID 2141839, 7 pages
https://doi.org/10.1155/2022/2141839

Research Article

Decreased Hospital Length of Stay for ICH and PE after Adoption of an Artificial Intelligence-Augmented Radiological Worklist Triage System

Michael Petry,[1] **Charlotte Lansky**,[1] **Yosef Chodakiewitz**,[2] **Marcel Maya**,[1] **and Barry Pressman**[2]

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Academic Editor: Lorenzo Faggioni

The purpose of the study was to determine whether there was a difference in the length of stay (LOS) for inpatients diagnosed with intracranial hemorrhage (ICH) or pulmonary embolism (PE) prior to and following implementation of an (AI) triage software. A retrospective review was performed for patients that underwent CT imaging procedures related to ICH and PE from April 2016 to October 2019. All patient encounters that included noncontrast head computed tomography (CT) or CT chest angiogram (CTCA) procedures, identified by the DICOM study descriptions, from April 2016 to April 2019 were included for ICH and PE, respectively. All patients that were diagnosed with ICH or PE were identified using ICD9 and ICD10 codes. Three separate control groups were defined as follows: (i) all remaining patients that underwent the designated imaging studies, (ii) patients diagnosed with hip fractures, and (iii) all hospital wide encounters, during the study period. Pre-AI and post-AI time periods were defined around the deployment dates of the ICH and PE modules, respectively. The reduction in LOS was 1.30 days (95% C.I. 0.1–2.5), resulting in an observed percentage decrease of 11.9% (p value = 0.032), for ICH and 2.07 days (95% C.I. 0.1–4.0), resulting in an observed percentage decrease of 26.3% (p value = 0.034), for PE when comparing the pre-AI and post-AI time periods. Reductions in LOS were observed in the ICH pre-AI and post-AI time period group for patients that were not diagnosed with ICH, but that underwent related imaging, 0.66 days (95% C.I. 0.1–0.8) resulting in an observed percentage decrease of 7% (p value = 0.018), and inpatients that were diagnosed with hip fractures, 0.60 days (95% C.I. 0.1–1.2) resulting in an observed percentage decrease of 8.3% (p value = 0.004). No other significant decrease in length of stay was observed in any of the other patient groups. The introduction of computer-aided triage and prioritization software into the radiological workflow was associated with a significant decrease in length of stay for patients diagnosed with ICH and PE.

1. Introduction

Radiologists face a demand for improved healthcare efficiency under a simultaneously increasing workload [1]. Artificial intelligence (AI), a popular topic within radiology over the past decade, has shown promising applications for enhancing radiologist productivity and efficiency [2, 3]. AI algorithms used for lesion detection, case triage, and workflow management can prioritize critical cases to accelerate diagnosis and reduce study turnaround time (TAT) [4]. While AI has been shown to improve radiology workflow processes, the role AI plays in other healthcare efficiency metrics, such as hospital length of stay (LOS), is unclear.

Hospital LOS is a crucial component of healthcare efficiency as it directly impacts healthcare costs. Generally, reduced LOS translates to reduced cost and substantial hospital savings [5–7]. Excessive LOS, on the other hand, leads to increased cost and potentially, clinical complications related to the increased risk of adverse events [8]. Improved

Journal of Medical Systems (2022) 46: 49
https://doi.org/10.1007/s10916-022-01833-z

CLINICAL SYSTEMS

Pilot Report for Intracranial Hemorrhage Detection with Deep Learning Implanted Head Computed Tomography Images at Emergency Department

Hung-Wei Chang Chien[1] · Tsung-Lung Yang[2] · Wang-Chuan Juang[2,3] · Yen-Yu Arthur Chen[4] · Yu-Chuan Jack Li[4] · Chih-Yu Chen[2,5]

Received: 23 March 2022 / Accepted: 16 May 2022 / Published online: 8 June 2022

Abstract
Hemorrhagic stroke is a serious clinical condition that requires timely diagnosis. An artificial intelligence algorithm system called DeepCT can identify hemorrhagic lesions rapidly from non-contrast head computed tomography (NCCT) images and has received regulatory clearance. A non-controlled retrospective pilot clinical trial was conducted. Patients who received NCCT at the emergency department (ED) of Kaohsiung Veteran General Hospital were collected. From 2020 January-1st to April-30th, the physicians read NCCT images without DeepCT. From 2020May-1st to August-31st, the physicians were assisted by DeepCT. The length of ED stays (LOS) for the patients was collected. 2,999 patients were included (188 and 2811 with and without ICH). For patients with a final diagnosis of ICH, implementing DeepCT significantly shortened their LOS (560.67 ± 604.93 min with DeepCT *vs.* 780.83 ± 710.27 min without DeepCT; $p = 0.0232$). For patients with a non-ICH diagnosis, the LOS did not significantly differ (705.90 ± 760.86 min with DeepCT *vs.* 679.45 ± 681.97 min without DeepCT; $p = 0.3362$). For patients with ICH, those assisted with DeepCT had a significantly shorter LOS than those without DeepCT. For patients with a non-ICH diagnosis, implementing DeepCT did not affect the LOS, because emergency physicians need same efforts to identify the underlying problem(s) with or without DeepCT. In summary, implementing DeepCT system in the ED will save costs, decrease LOS, and accelerate patient flow; most importantly, it will improve the quality of care and increase the confidence and shorten the response time of the physicians and radiologists.

Keywords Intra-cranial hemorrhage (ICH) · Deep learning · Artificial intelligence (AI) · Head non-contrast computed tomography · Convolutional neural network · Cost efficacy

This article is part of the Topical Collection on *Clinical Systems*

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Springer

- **12%** hospital length-of-stay reduction from ICH and PE detection

- **28%** ED length-of-stay reduction for patients diagnosed with ICH

Petry, Rad Res Pract 2022
Chien, Clin Systems 2022

A warning

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Quality

AI improves radiologist accuracy

Mean AUC improvement across all findings

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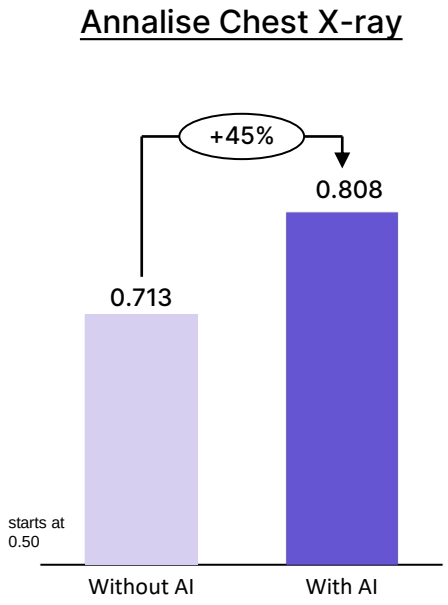

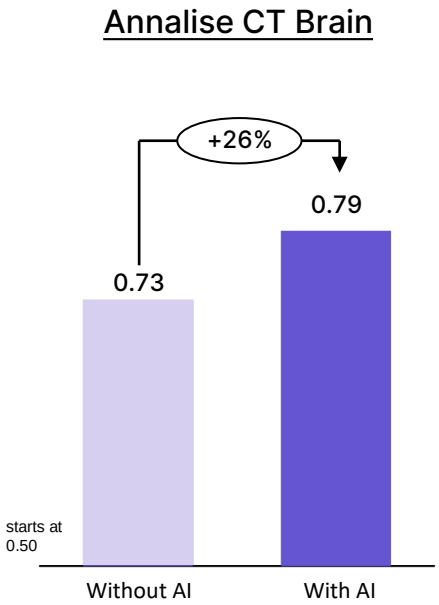

Seah, Lancet Dig Health 2021
Buchlak, Eur Radiology in review

AI reduces dangerous errors and misses

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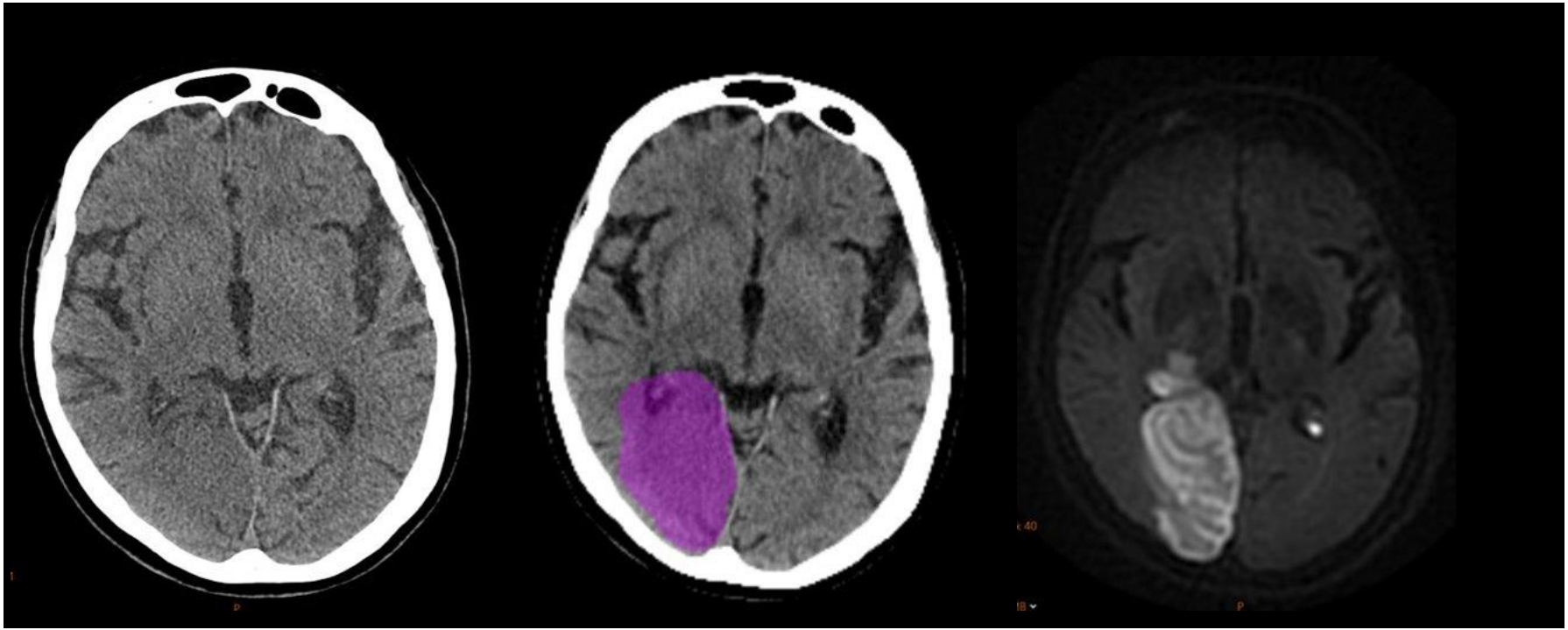

AI reduces dangerous errors and misses

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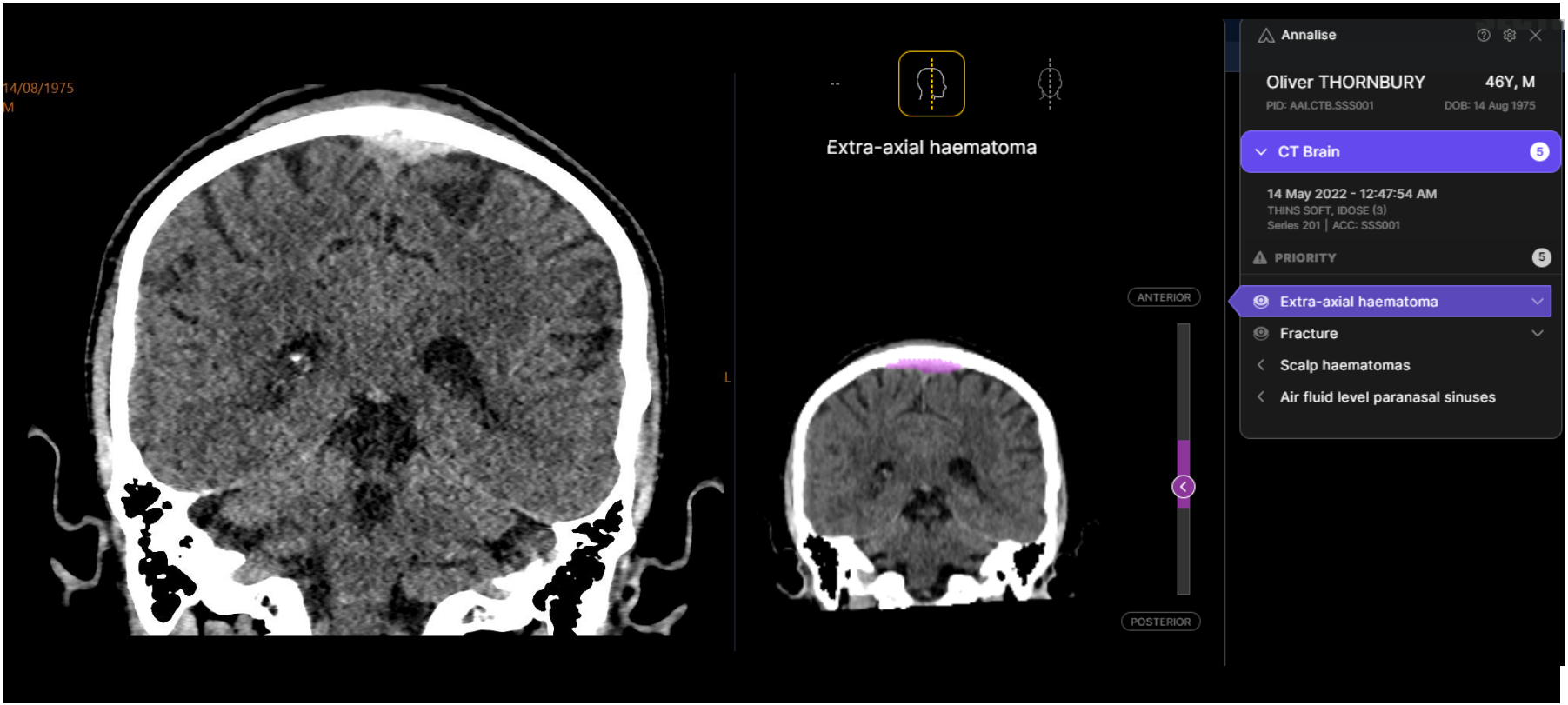

AI reduces dangerous errors and misses

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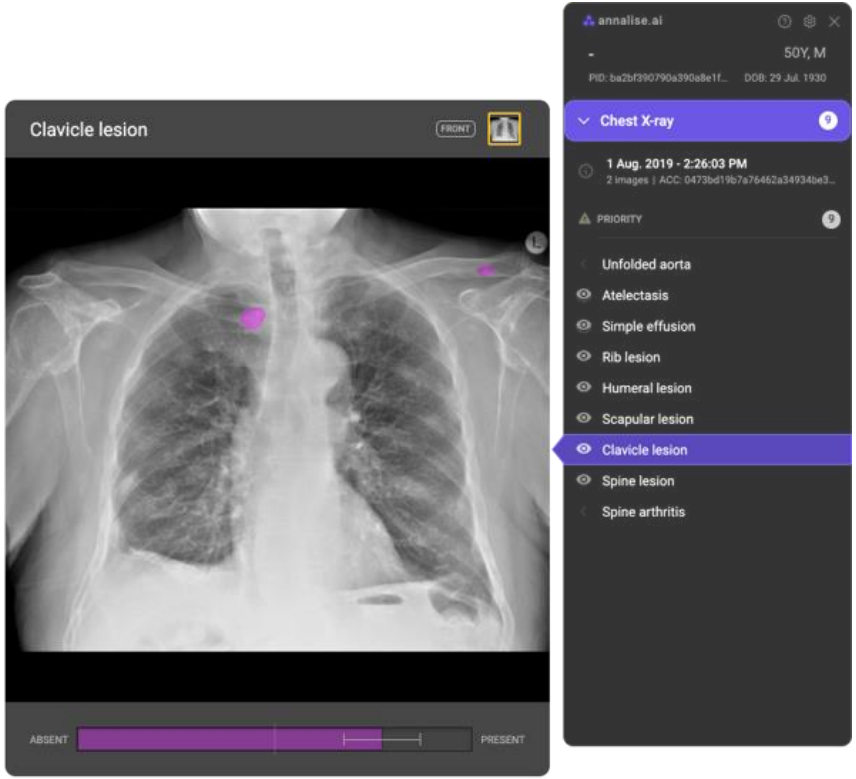

AI reduces dangerous errors and misses

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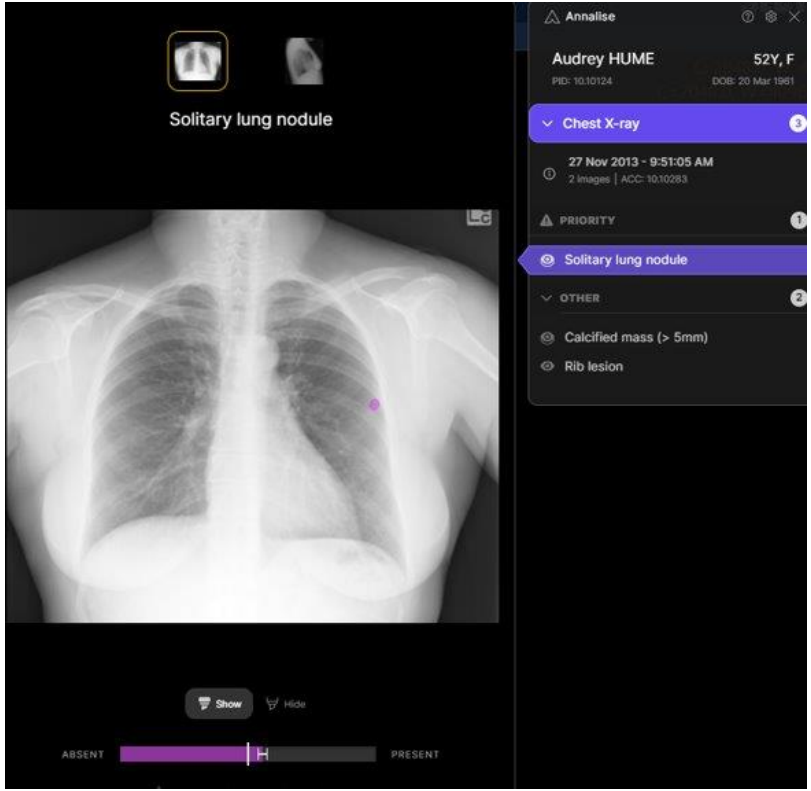

AI can be used for automated quality assurance

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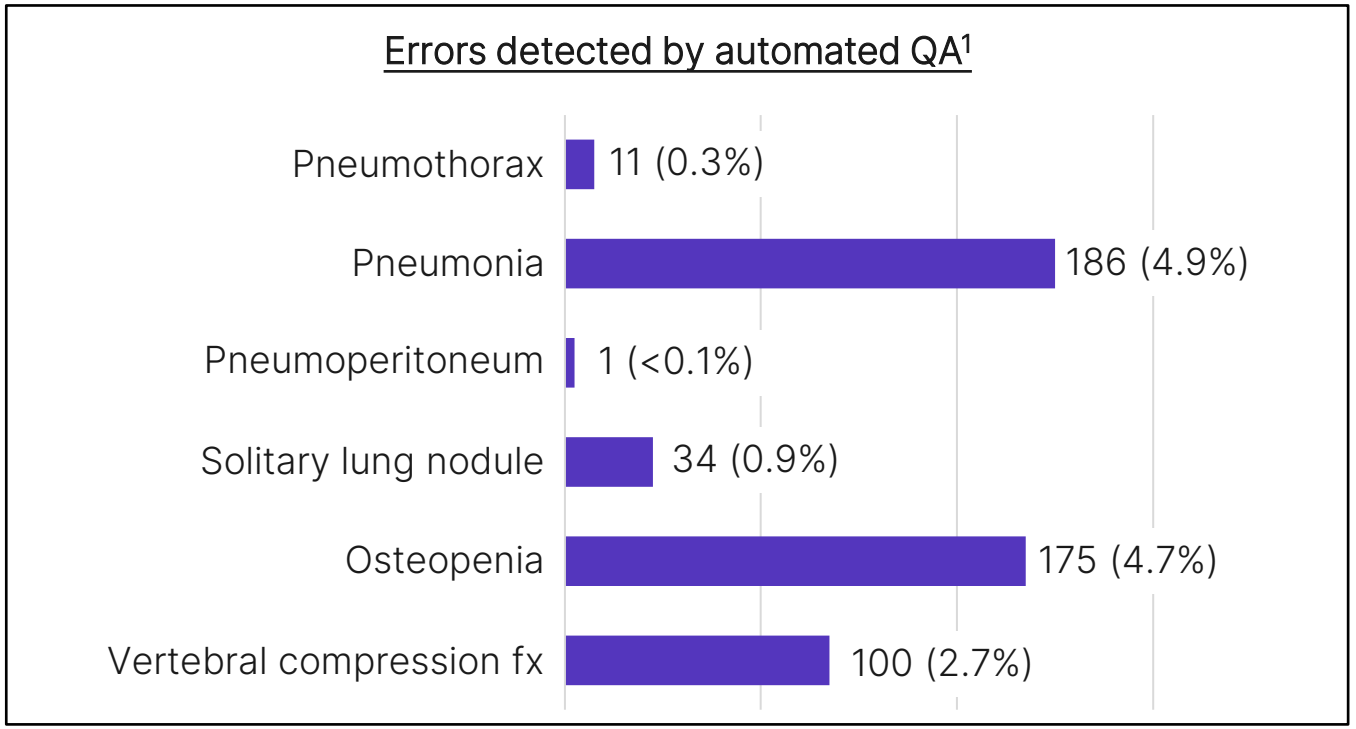

[1]AI performed on images compared to natural language processing (NLP) performed on reports. Results verified by independent subspecialty thoracic radiologists. Cohort size = 3,760 consecutive CXRs.

Manuscript under preparation

AI triage reduces reporting times for critical findings

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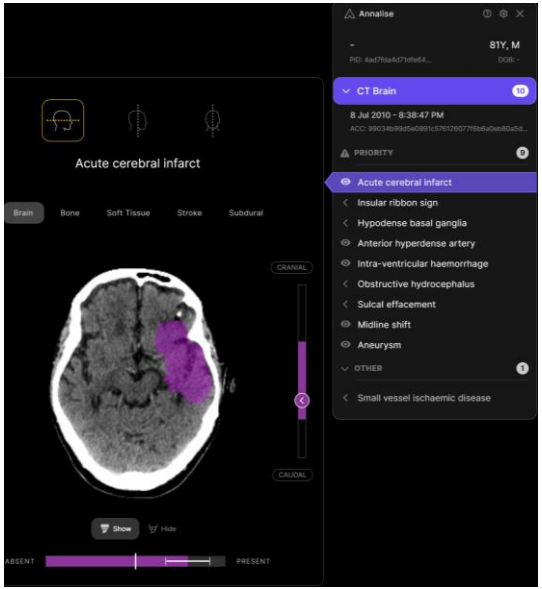
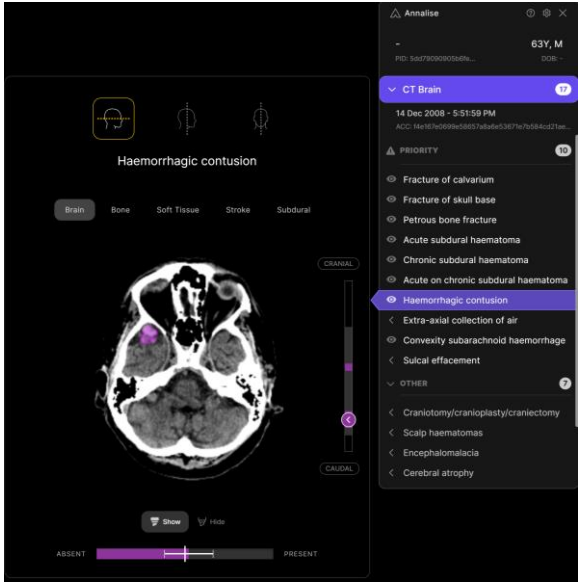
Pneumothorax



Ischemic stroke



Brain hemorrhage

AI empowers providers at the point of care

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“It's an extra pair of eyes for us and that's very welcome on a really busy ward round.”

- Dr. Ben Dobb
  Consultant in Acute Medicine
  Emergency Department
  NHS Grampian

AI helps prevent “never events”

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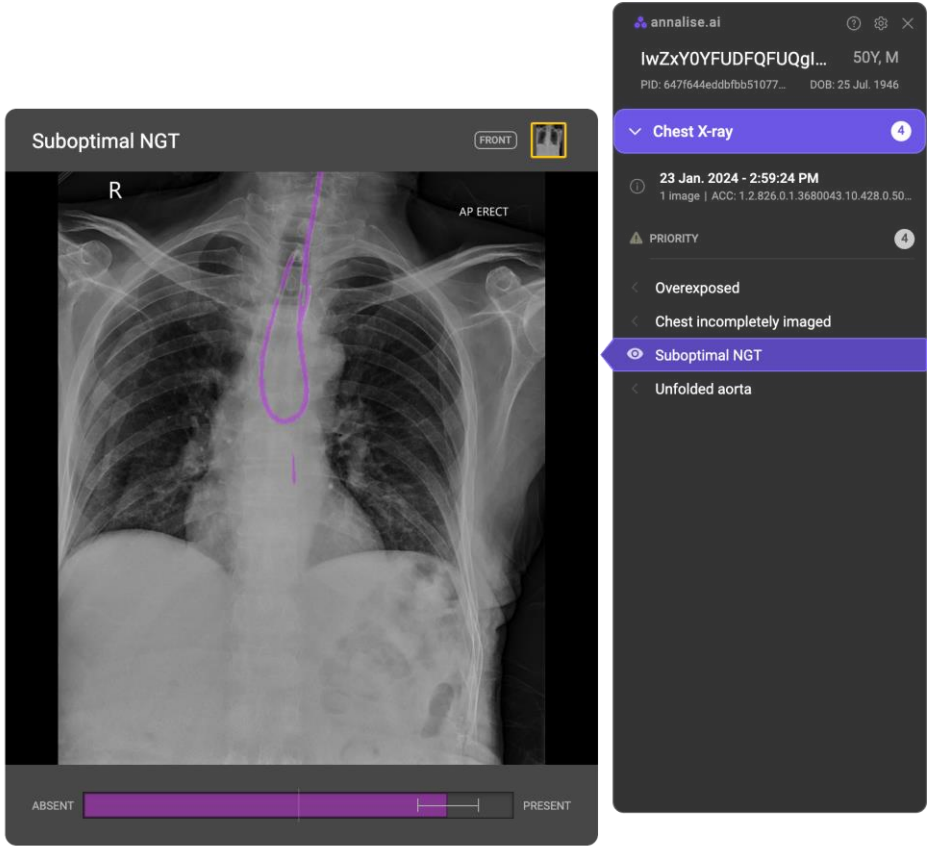

AI empowers lung cancer screening

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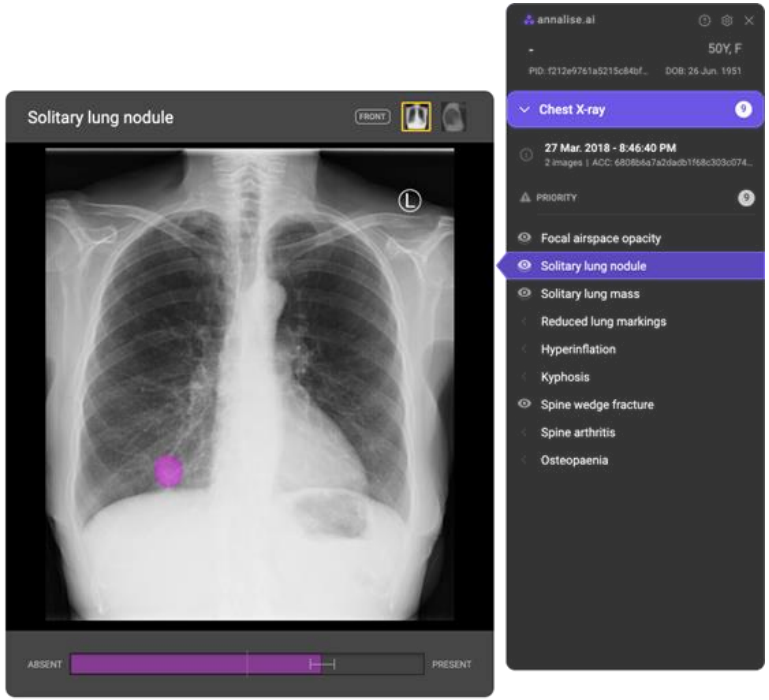

1. Increases detection rates for early lung cancers
2. Decreases false positives
3. Clears reporting backlogs → decreases delay to subsequent diagnosis and treatment

AI can detect chronic disease and its exacerbations

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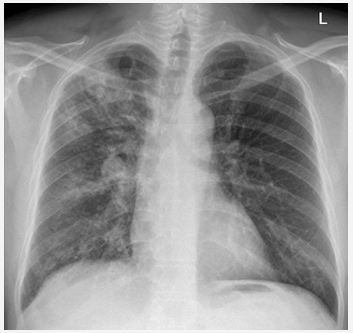
CHF

Tuberculosis



COPD

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Access

Global shortage of radiologists

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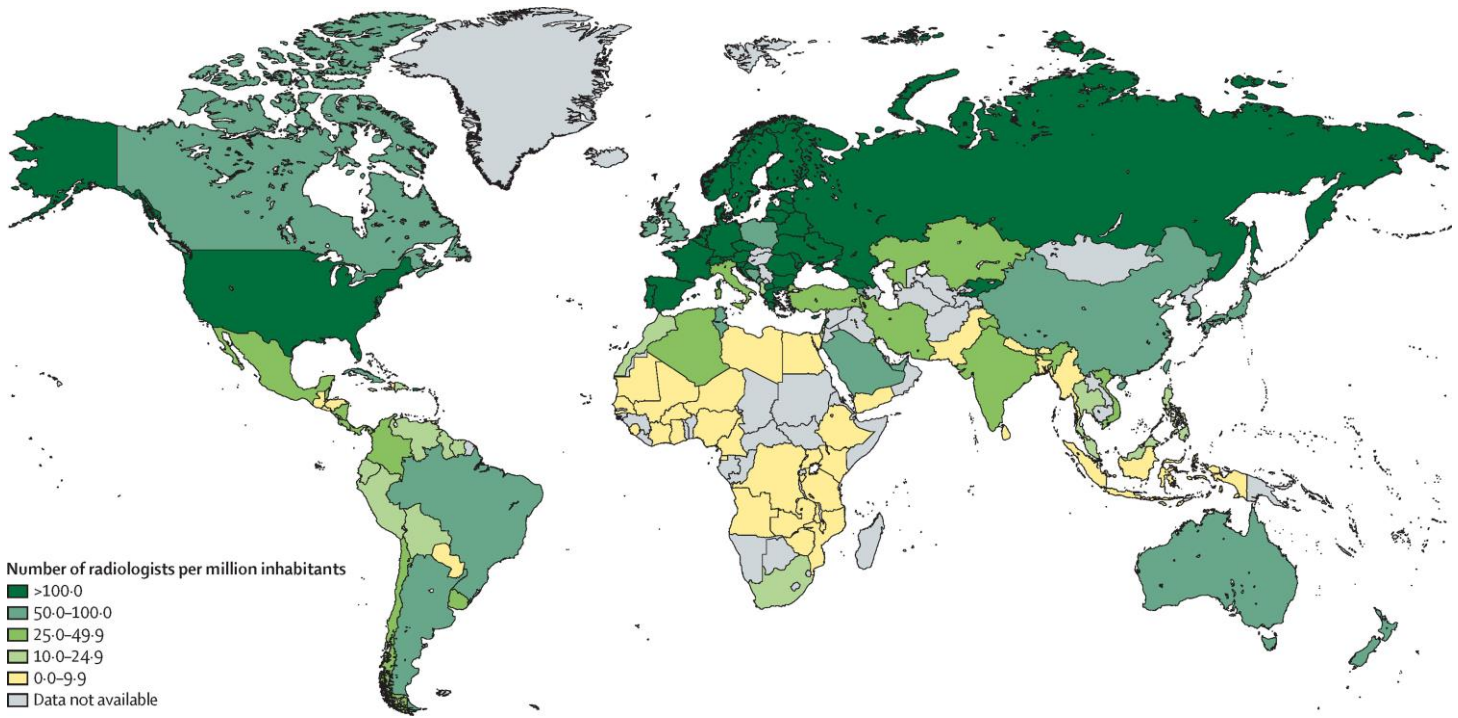
Radiologists per 1 million inhabitants



Hricak, Lancet Oncology 2021

AI expands access in underserved areas

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Thanh An, Vietnam

Thanh An island is located 70km east of Ho Chi Minh, and home to nearly 5,000 people. For medical treatment, people often have to travel to the mainland by boat, taking at least 1-2 hours. In Q4 2022, the Harrison Foundation partnered with ASIF and Fujifilm to deliver a portable X-ray machine equipped with Annalise CXR Edge for immediate AI decision-support helps improving health care within this community.

ASIF AUSTRALASIA SOCIAL IMPACT FOUNDATION FUJIFILM

Goma, Democratic Republic of Congo

Goma, located in the northeast of the DRC, near the Rwandan border has a population of nearly 1 million people. In addition to being located in a geographically challenging region, bordered by the active volcano Mount Nviragongo, experiencing limnic eruptions, Goma has been the site of intermittent fighting for decades, with UN peacekeepers present. In Q1 2023, together with the Sonic Foundation, the Harrison Foundation is aiming to deploy Annalise Enterprise at Heal Africa Hospital in Goma.

SONIC HEALTHCARE FOUNDATION harrison.ai

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Questions stakeholders should be asking

Questions for investors to ask

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Problem	Does the solution address a real clinical or operational problem?
Opportunity	What is the market size and growth potential?
Competitors	Who are the competitors and why is this AI solution unique?
IP	What is the intellectual property status of the AI solution?
Funding	What is the company's funding status and runway?
Management	Who is the management team and what is their experience?
Regulatory	What are the required regulatory approvals and timeline?

Questions for administrators to ask

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Scope	What modalities, conditions, and care pathways are supported?
Benefits	What are the expected benefits for both economics and quality?
Cost	What is the cost relative to the expected benefits?
Integration	How will the AI integrate with existing workflows and systems?
Security	How will the AI comply with data security and privacy policies?
Support	What training, support, and update mechanisms are provided?
Acceptance	What is the level of trust and acceptance among providers?

Questions for providers to ask

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Validation	Has the AI solution been validated in real-world clinical trials?
Performance	How does the AI perform for both sensitivity and false-positives?
Outcomes	How does the AI affect patient outcomes and care efficiency?
Workflows	Does the UX allow for easy adoption into existing workflows?
Model	Was the AI solution constructed using manual labeling?
Representation	Was the AI training dataset representative of your population?
Bias	What mechanisms are in place to address model drift and bias?

Questions for entrepreneurs to ask

annalise.ai

Customer	Do you know who your customer is?
Value	Can you succinctly explain the value proposition?
Team	Can you recruit a team with the necessary experience?
Investment	What are the estimated development costs and funding options?
Data	Is there sufficient data to create and validate the AI?
Partnerships	Can any partnerships accelerate product launch and adoption?
Ethics	How will you ensure ethically responsible use of the AI solution?

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Closing thoughts

AI poses existential threat and risk to health of millions, experts warn

What could an AI-caused existential catastrophe actually look like?

Is Artificial Intelligence Dangerous? 6 AI Risks Everyone Should Know About

Elon Musk and Others Call for Pause on A.I., Citing 'Profound Risks to Society'

Artificial General Intelligence: can we avoid the ultimate existential threat?

Can AI be dangerous?

Threats by artificial intelligence to human health and human existence

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INTELLIGENT HEALTH UK 2023

Breaking down the barriers between tech and healthcare