Research Square

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Evolution of radiology staff perspectives during artificial intelligence (AI) implementation for expedited lung cancer triage

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Abstract

Objectives

To investigate radiology staff perceptions of an AI tool for chest radiography triage, flagging findings suspicious for lung cancer to expedite same day CT chest examination studies.

Methods

Surveys were distributed to all radiology staff at three time points: at pre-implementation, one month and also seven months post-implementation of AI. Survey questions captured feedback on AI use and patient impact.

Results

Survey response rates at the three time periods were 23.1% (45/195), 14.9% (29/195) and 27.2% (53/195) respectively. Most respondents initially anticipated AI to be time saving for the department and patient (50.8%), but this shifted to faster follow-up care for patients after AI implementation (51.7%). From the free text comments, early apprehension about job role changes evolved into frustration regarding technical integration challenges after implmentation. This later transitioned to a more balanced view of recognised patient benefits versus minor ongoing logistical issues by the late post-implementation stage. There was majority disagreement across all survey periods that AI could be considered to be used autonomously (53.3 - 72.5%), yet acceptance grew for personal AI usage if staff were to be patients themselves (from 31.1% pre-implementation to 47.2% post-implementation).

Conclusion

Successful AI integration in radiology demands active staff engagement, addressing concerns to transform initial mixed excitement and resistance into constructive adaptation. Continual feedback is vital for refining AI deployment strategies, ensuring its beneficial and sustainable incorporation into clinical care pathways.

Introduction

Artificial intelligence (AI) is increasingly being integrated into radiology departments, with a growing emphasis on using these technologies for the trial of abnormal chest radiographs to expedite computed tomography (CT) chest studies for exclusion of potential lung cancer [1,2]. Whilst AI presents numerous benefits, its implementation is not without challenges – particularly concerning the impact on staff roles, changes to the care pathway and the broader organisational culture [3,4]. Successful deployment of AI hinges on a thorough understanding of these human factors (as well as the technical landscape) to ensure continued, smooth and sustainable operation of services [4].

Within one NHS trust, comprising of 2 district general hospitals that serve an estimated population of 500,000 people in the South of London, a commercially available AI tool [5] was trialled starting in December 2022 to support the National Optimal Lung Cancer Pathway (NOLCP) [6]. The AI tool was configured to highlight radiographic findings suspicious for lung cancer acquired from adults in the outpatient setting referred by their general practitioner (GP). If the AI tool marked a radiograph as suspicious, it would trigger the radiographer to

ask for a second review from either a consultant radiologist or reporting radiographer (i.e. 'the reporter'). The reporter would then authorise the radiographic report within 30 minutes, and if initial AI findings were corroborated, instruct the radiographer to arrange a same day CT chest examination for the patient. A few reserved slots for CT chest appointments each day were kept available and already factored into this care pathway.

Prior to the introduction of the AI tool, radiographs would populate a reporting list in the radiology information system (RIS) and reviewed by a reporter within 72 hours. Suspicious findings prompted the hospital administrative staff or general physician (GP) to contact the patient and schedule them for a CT chest appointment. The implementation of the AI tool sought to streamline this process, aiming for quicker and more efficient CT referrals, reducing patient anxiety through fewer hospital visits and decreasing reliance on the administrative team and local GPs. However, this necessitated additional tasks for the radiographers and greater availability of reporters for rapid chest radiograph assessments when flagged by the AI tool.

This shift in standard operating procedures underscored the need to capture staff feedback and opinions throughout the AI implementation process. The aim of this study was therefore to focus on evolution of staff attitudes at various phases of the implementation cycle. By gathering a range of staff insights, this research emphasises the critical role of human engagement in the adoption of AI within radiology services. The diagnostic accuracy of the AI tool or patient outcome measures are outside the scope of this work, which will be addressed in future publications.

Methods & Materials

Ethical approval was not required for this voluntary questionnaire of staff opinions. Respondents were not required to share their contact details and were allowed to remain anonymous in the survey.

Questionnaire

Three surveys were created, one version intended for circulation prior to implementation of the AI tool (called the "pre-implementation survey, P"), and the other two versions were intended for circulation after the AI tool was implemented (called the "post-implementation surveys"). The survey questions were adapted from a publication by Jones C et al [7] where radiologists provided feedback after using the same AI tool in general chest radiography reporting. Final approval of the survey questions was agreed in consensus amongst the research investigators and clinical lead for the department.

The pre-implementation survey (P) contained a total of 25 questions (**Supplementary Appendix 1**). The first section comprised of 5 multiple choice questions relating to respondent's demographic details (job role, age, years' experience, radiology reporting duties). This was followed by a section comprising of 17 general statements about AI divided into 4 core themes (AI Use Cases, AI autonomy and responsibility; patient flow/ logistics; personal opinion/attitudes to AI). Respondents were asked to rate each statement on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). The last section of the survey included two multiple choice questions asking respondents to pick one answer from a list regarding what they believed would be the main benefit and main drawback of introducing AI to the department. The final survey question was a free text box where respondents could provide any comments, thoughts, suggestions or feedback they wished.

The post-implementation surveys were identical, with a few additional questions. The early post-implementation survey (E) (**Supplementary Appendix 2**) included an additional question asking how much interaction the respondent had with the new AI tool and also two further sections specific to the AI tool feedback. One of these sections contained 5 questions (4 for scoring against a 5-point Likert scale, 1 free text comment) aimed at anyone who reported interaction with the AI tool (i.e. radiographers acquiring images or reporters). These questions were seeking general opinions regarding care pathway improvements and staff experiences. The other section was specific to reporters only (i.e. radiologists or reporting radiographers) containing 10 questions (9 for scoring against a 5-point Likert scale, 1 free text comment) relating to user experience of the AI tool during reporting.

The final survey (late post-implementation survey (L), **Supplementary Appendix 3**) was identical to the other prior post-implementation survey with only two additional questions aimed at any respondent with some, or a lot of, interaction with the AI tool. These two questions asked the respondent to give an estimate of how the AI performed over the trial period, namely the sensitivity and specificity rates.

Dissemination

The surveys were conducted in English and hosted on the Google Forms platform. A link to the online survey was disseminated via email to the entire radiology department at three different time points and 'live' for one month each time. At least one email reminder was sent to all radiology staff during each dissemination period. Local AI champions at each of the two hospital sites were asked to help encourage staff responses.

The pre-implementation survey (P) was circulated from 1 October 2022 to 1 November 2022. The AI tool was first introduced on 19th December 2022. The early post-implementation survey (E) was circulated from 19th January 2023 to 19th February 2023 (1 month after AI implementation). The final survey (i.e. the "late" post-implementation survey, L) was circulated from 15th July to 15th August 2023 (7 months after AI was first implemented).

All staff members, irrespective of their professional designation, including clinical and non-clinical roles (e.g., administrative, secretarial, IT management, sonographers, radiologists, etc.) were invited to participate in this study. This deliberate inclusivity was motivated by the recognition that many staff members socialise both within and outside the workplace and these interactions sometimes lead to the exchange of perspectives and opinions of issues at work. By encompassing a broad spectrum of participants, we aimed to capture a comprehensive and diverse array of viewpoints. This approach allowed us to access the perspectives of individuals who may be less directly involved in AI utilization, as well as those with opinions who might be more inclined to share their views informally but hesitant to do so in a formal survey setting.

Data Analysis

Simple descriptive statistics were used (e.g. frequency, proportion of respondents etc) and analysed in Excel for Microsoft Office to depict frequency of responses. Free text comments, where appropriate, are included and collated according to sentiment shared by staff (i.e. positive, neutral or negative views) at different time points.

Results

Respondent demographics

The radiology department of both hospitals within the NHS trust evaluated comprised of 195 staff, with 20 having chest radiograph reporting responsibilities (i.e. radiologist or reporting radiographers) and 175 having either technical, administrative or IT roles. The response rate to our survey at pre-implementation was 23.1% (45/195), at early post-implementation was 14.9% (29/195) and at late post-implementation was 27.2% (53/195). With regards to the response rates from staff with reporting responsibilities, this was 65% (13/20), 45% (9/20) and 50% (10/20) respectively. The demographics of our respondents at each of the survey periods is provided in **Table 1**.

General Opinions of AI

1. Use Cases

Most respondents felt an AI tool for chest radiography should be used to triage all urgent chest findings on radiographs (range 75.9–82.7% agreement across time periods). Respondents frequently disagreed that the AI should be used for non-urgent findings, only life-threatening findings, only lung cancer triage or diagnosing and reporting all chest findings. **See Fig. 1, Supplementary Appendix 4: Table S1**.

2. AI autonomy / responsibility

There was marked disagreement (ranging from 53.3–72.5% across the course of the study) for AI to be allowed to report chest radiographs autonomously. The vast majority of respondents still felt that reporters should check the AI results (88.2% agreement at late implementation) and that they should be responsible for any errors made by the AI (64.7% agreement at late implementation). **See Fig. 2, Supplementary Appendix 4: Table S1**.

3. Patient flow / Department logistics

The majority of respondents believed throughout the study that AI would / did improve patient care. At the early post-implementation stage, 51.7% respondents felt that the AI was causing more logistical issues for the department, although this reduced to 26.4% by late post-implementation. There was a general reduction in agreement with the statement that AI required extra (unavailable) technical support during the study period (60% agreement at pre-implementation, only 24.5% agreement at late post-implementation). Most respondents disagreed that the AI was complicated to use (range 31–54.7% disagreement). **See Fig. 3, Supplementary Appendix 4: Table S1.**

4. Personal Attitudes

There was a stable level of agreement across the study period about being excited to have the new technology, although a gradual reduction in agreement regarding learning about the new technology was seen. There was also a gradual reduction in the degree of concern about what patients would think about the hospital using AI for their imaging (48.9% at pre-implementation, 18.9% at post-implementation). Almost half of the respondents (47.2%) would be happy for an AI to be used on their own chest radiograph if they were a patient by the late post-implementation stage, which was an increase from the 31.1% of respondents who felt this way at the pre-implementation stage. **See Fig. 4, Supplementary Appendix 4: Table S1.**

5. Perceived benefits and drawbacks

When asked what factors would be the main benefits of introducing an AI to the department, most respondents initially felt it would save time for the patient and the department (26/45, 50.8%), however after implementation (both early and late stages), the main benefit was perceived as patients getting faster follow-up care (15/29, 51.7% and 30/53, 50.8% respectively) (Fig. 5a). The main perceived drawback at the start of the study appeared to be in contradiction to the perceived benefit - i.e. increasing time for the department and patient (20/45, 44.4%), however at early post-implementation this had changed and was perceived to be an increase in workload for the radiology staff (12/29, 41.4%), and at late post-implementation stage the two most frequent responses were increased costs for the department (14/53, 26.4%) and no drawbacks (14/53, 26.4%) (Fig. 5b, **Table 2**).

Specific AI tool feedback (for reporting staff and those stating some or a lot of interaction with the AI tool)

A high proportion of respondents at both early and late post-implementation periods subjectively agreed that chest radiograph reporting turnaround times i.e. time for patient/clinician to get an authorised chest radiograph report (68.4% and 79.5% respectively), reporting accuracy (47.4% and 53.8%), patients experience (45.0% and 56.4%) and referring clinician's opinions (63.2% and 69.2%) about the radiology service were better or significantly better after AI implementation, with fewer respondents having neutral or negative views with time (**Supplementary Appendix 5: Table S2, Supplementary Appendix 6: Figure S1**,). Interestingly, staff reported an average perceived sensitivity rate of 72.9% (median 80%, range 10–100%) and a specificity of 45.2% (median 40%, range 0–100%) for the AI tool in lung cancer detection.

Specific AI tool feedback (from reporters)

When addressing only the staff with reporting duties about their use and interaction of the AI tool (n = 9 at early implementation, n = 10 at late implementation period), there was a high level of agreement regarding enjoyment, intuition and confidence in knowing when to rely on the AI tool. Respondents however were less convinced that the AI tool had improved their accuracy, or reporting times. A greater proportion of respondents disagreed with the statement 'that they would be disappointed if they could no longer use the AI tool" (0% early post-implementation versus 22.2% at late post-implementation), and there was also an increase in proportion of respondents who disagreed that they felt they were becoming reliant on the tool (55.6% at early post-implementation versus 90% at late post-implementation) (Fig. 6, **Supplementary Appendix 7: Table S3**).

Free text responses

A table of free text responses across the three study periods are available in **Supplementary Appendix 8: Table S4** organised into positive, neutral and negative sentiment categories. At pre-implementation, several positive comments related to the excitement of using an AI tool in the near future, many neutral comments pertained to lack of understanding and training needs of the staff with some negative comments related to deskilling and fear of job loss. In the early post-implementation period there were no positive comments at all, with a majority of negative sentiments. Mostly these related to logistical issues such as adapting to new roles within the care pathway (e.g. having to call a reporter if the AI flagged an abnormality and reporter sometimes not being available over lunch) and issues with using the AI tool (e.g. slow in getting the AI output, not available on all computers). In the late post-implementation period there were almost equal positive and negative comments.

Many of the positive comments related to feeling happier that the AI tool was working well, seeing the difference this could make to patient care and appreciation for the technical implementation team. Negative comments mostly related to the AI tool overcalling pathologies and requesting for a better strategy in patient communication (i.e. explaining how the AI tool is used on their imaging, how to prevent them from worrying when they need to wait for their same day CT study because the AI flagged a potential abnormality and asking if some preliminary information could be disseminated to the patient prior to their hospital appointment).

Discussion

This study has demonstrated that perspectives of radiology department staff regarding AI evolve with experience of using an AI tool within their work environment. Initially there is an enthusiasm for the potential change and innovation, combined with a slight apprehension regarding alteration to job roles. This is then followed in the early implementation stages by frustrations due to technical and logistical setbacks. Over time, these attitudes mature into an acceptance and nuanced understanding of how the AI tool can be leveraged and refined to enhance patient care.

It is notable that prior to the implementation, a majority of respondents (57.8%) anticipated time savings for both the radiology department and patients, whilst just under half speculated an increase in time requirements. Post-implementation this perception shifted towards recognising improved patient follow-up care as the primary benefit. This is corroborated by responses from staff who felt that chest radiograph turnaround times (i.e. time to get an authorised chest radiograph report), patient experiences and referring clinician views of the radiology department improved following AI adoption. Nevertheless, these contrast to reporters views of not seeing any benefit from improved speed of their own chest radiograph reporting times nor perceived diagnostic accuracy.

Concerning drawbacks, a significant number of staff reported an increase in workload shortly after implementation. However, as time progressed, concerns shifted more towards the costs associated with the tool. This initial attitude during the early post-implementation period may stem from logistical adjustments needed for individual's roles within the care pathway such as coordinating same day CT appointments and checking the AI outputs with a reporter, necessitating more work for the radiographer. Encouragingly, there was also an increase in proportion of respondents who perceived 'no drawbacks' to using the AI tool – rising from 8.9% prior to implementation, to 17.2% in the early post-implementation phase, and further to 26.4% in the later stages. This trend suggests that many initial challenges were potentially effectively addressed by the technical and management teams overseeing the implementation project and underscores the importance of responding to the needs and concerns of staff promptly.

From a personal perspective, staff willingness to accept an AI tool for triaging their own chest radiograph (should they become patients) increased from 31.1% at pre-implementation to approximately 48% during both early and late post-implementation periods. Although there was no consensus on the AI tools' ability to save time for the department, the fear of using AI had shown some reduction. Staff still maintained a high level of prudence in their feelings however, with a significant majority advocating for human oversight of AI outputs (> 85% agreement) throughout the entire study. This sentiment is echoed by several international stakeholders in the wider literature [8].

Concerns have been raised in the literature regarding the potential for reporters to over-rely on AI in diagnosis leading to automation bias and a possible decline in skills [9,10]. Nevertheless, these concerns were not reflected by the responses from the staff survey with the vast majority disagreeing that they had become overly dependent on the AI tool at late post-implementation phase (90%). Most maintained confidence in their ability to judge when to override the AI's suggestions (80%) and only a minority expressed missing the tool if it were withdrawn (33.3%). Further research is needed to ascertain whether this self-reported subjective confidence correlates with objective changes in diagnostic accuracy (i.e. appropriately over-ruling erroneous AI outputs) and longer term observational work will be required with more experience using the AI tool, given that it may not have been sufficient time since implementation for reliance / automation bias to have occurred.

Numerous studies have explored healthcare professionals' perceptions of AI in radiology [8,11–22], but few have examined the evolution of these attitudes over time within a real-world implementation programme, particularly among those with hands-on experience with an AI tool. Many investigate theoretical attitudes towards AI, rather than practical engagement – a gap that is addressed in this work. While direct comparisons with the wider literature are challenging because of this reason, the most relevant study to contrast with this work was one that evaluated the opinions of 11 Australian radiologists using the same AI tool (as in this study) after a period of 6 weeks [7]. Whilst our use of the AI tool was tailored towards lung cancer triage, they applied the AI tool across a broader spectrum of acute pathologies. In that study, a majority (70%) of respondents reported no reduction in their reporting times and unanimously agreed on the tool's ease of use, similar to our findings. In contrast, a higher proportion of the Australian radiologists said they would be disappointed if they could not longer use the AI tool in practices (60% compared to 33.3% in this study), and 90% believed their reporting accuracy was improved (compared to only 20% in this study at late post-implementation)[7]. These discrepancies may be attributable to different applications of the AI tool, and potentially the high false positive rates perceived by staff in our study (supported by free text comments and perceived sensitivity and specificity rates of 72.9% and 45.2% respectively). Such outcomes might contribute to the less favourable appraisal of the AI tool in our study. Whilst not directly comparable, it is worth noting that previously published work on this AI tool has shown that sensitivity rates for the variety of individual pathologies indicative of suspected cancer were between 30–51% [5], however overall sensitivity and specificity rates of all these different pathologies taken together for lung cancer detection is unknown.

There are several limitations of our study. Despite efforts to publicise the survey, participation was limited to approximately one quarter of the staff at each survey period, with a notable dip during the early post-implementation phase. Possible factors contributing to this low response rate include survey fatigue, the overwhelming number of tasks and messages staff receive, absence during the survey's study period, or a perceived irrelevance of the survey due to either dissatisfaction with the AI tool or a belief that they had no substantive feedback to contribute. Additionally, the survey may reflect a response bias, as those with stronger opinions are often more inclined to participate, whether their views are positive or negative. Nevertheless we did still receive a diverse range of opinions and don't believe the replies were particularly polarised in any direction. Finally, our survey questions sought to strike a balance between being comprehensive, feasible but also not too tedious for staff to answer enabling completed within 10–15 minutes. Future work could benefit from conducting smaller focus groups or individual interviews to explore certain specific concerns amongst staff groups (e.g. radiographers or reporters) to garner further suggestions for enhancing the care pathway using AI.

In conclusion, throughout our AI implementation project, we observed that while staff attitudes were generally negative regarding the logistical challenges of integration, they were positive about the clinical application of AI and its potential to expedite patient access to same day CT chest examinations. This study underscore the necessity of engaging with all staff members to fully grasp the multifaceted impacts of AI integration. A clear understanding of the care pathway, including patient flow, department logistics, and the minimization of additional burdens on staff, is crucial for the successful adoption of AI tools. Those embarking on any AI implementation project should maintain an open mind, be ready to adapt their strategies based on staff feedback, and address any issues promptly. An awareness that initial resistance and negative sentiment may be transient, provided that concerns are acknowledged and addressed, is essential for fostering acceptance and optimizing the use of AI in clinical settings.

Abbreviations

AI Artificial Intelligence

AIDF Artificial Intelligence Diagnostic Fund

CT Computed Tomography

CXR Chest X-Ray

GP General Physician / Family Doctor

ML Machine Learning

NHS National Health Service

NOLCP National Optimal Lung Cancer Pathway

RIS Radiology Information System

UK United Kingdom

Declarations

Participants responding to the survey were informed in writing within the recruitment email that completing the survey would be taken as implied consent for contribution to publications on this topic. Participation was voluntary and no personal data or information was collected. The survey was registered as a local clinical service evaluation within our institute.

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Tables

Table 1. Demographics of survey respondents at different survey periods.

Percentages of responses at each of the three time periods is calculated by using the total responses as the denominator for the relevant time period.

	Pre-implementation	Post-implementation (Early)	Post-implementation (Late)
Date of survey	1 Oct – 1 Nov 2022	19 Jan – 19 Feb 2023	15 July – 15 Aug 23
Total Responses (response rate, n = 195)	45 (23.1%)	29 (14.9%)	53 (27.2%)
Job Role			
Radiologist (consultant)	10 (22.2%)	3 (10.3%)	1 (1.9%)
Radiographer (qualified)	26 (57.8%)	21 (72.4%)	36 (67.9%)
Sonographer (qualified)	2 (4.4%)	1 (3.4%)	9 (17.0%)
Assistant Practitioner	0	1 (3.4%)	2 (3.8%)
Administrative Staff	6 (13.3%)	3 (10.3%)	5 (9.4%)
IT/PACS staff	1 (2.2%)	0	0
Age			
under 21 years	1 (2.2%)	0	0
21– 30 years	7 (15.6%)	5 (17.2%)	12 (22.6%)
31– 40 years	10 (22.2%)	8 (27.6%)	14 (26.4%)
41– 50 years	13 (28.9%)	7 (24.1%)	14 (26.4%)
51– 60 years	7 (15.6%)	5 (17.2%)	7 (13.2%)
61 – 70 years	7 (15.6%)	4 (13.8%)	6 (11.3%)
over 71 years	0	0	0
Experience in job role (years)			
under 1 year	4 (8.9%)	1 (3.4%)	1 (1.9%)
1 – 5 years	6 (13.3%)	5 (17.2%)	12 (22.6%)
6 – 10 years	10 (22.2%)	5 (17.2%)	11 (27.8%)
11 – 20 years	10 (22.2%)	12 (41.4%)	19 (35.8%)
Over 21 years	15 (33.3%)	6 (20.7%)	10 (18.9%)
Direct patient contact in job role?			
Yes	37 (82.2%)	26 (89.7%)	48 (90.6%)
No	8 (17.8%)	3 (10.3%)	5 (9.4%)
Reporting responsibilities for chest radiographs?			
Yes	13 (28.9%)	9 (31.1%)	10 (18.9%)

No	32 (71.1%)	20 (68.9%)	43 (81.1%)
Have you had much experience interacting with the AI tool since it was implemented?			
Yes, a lot	Not applicable	7 (24.1%)	24 (45.3%)
Yes, some		11 (37.9%)	13 (24.5%)
Yes, indirectly		4 (13.8%)	10 (18.9%)
No, none		7 (24.1%)	6 (11.3%)

Table 2. Main perceived drawbacks and benefits of AI implementation for the radiology department (n, %).

	Pre-implementation (P) (n = 45)	Early Post-implementation (E) (n = 29)	Late Post-implementation (L) (n = 53)
Perceived Benefits			
Allow patients faster follow-up care	14 (31.1)	15 (51.7)	30 (50.8)
Cost saving for department	1 (2.2)	0 (0.0)	0 (0.0)
Increase digital education of AI for staff	3 (6.7)	5 (17.2)	2 (3.8)
Reduce workload on radiology staff	1 (2.2)	1 (3.4)	0 (0.0)
Time saving for the department and patient	26 (57.8)	8 (27.6)	18 (34.0)
No benefit	0 (0.0)	0 (0.0)	3 (5.7)
Perceived Drawbacks			
Cause disengagement with the use of AI in radiology	7 (15.6)	1 (3.4)	1 (1.9)
Increase time for the department and patient	20 (44.4)	0 (0.0)	8 (15.1)
Increase workload for radiology staff	5 (11.1)	12 (41.4)	9 (17.0)
No change to patient outcome or treatment	1 (2.2)	1 (3.4)	1 (1.9)
No drawbacks	4 (8.9)	4 (13.8)	14 (26.4)
Reduced satisfaction at work for staff	6 (13.3)	3 (10.3)	3 (5.7)
Challenging conversations with patients	1 (2.2)	1 (3.4)	1 (1.9)
Risk of job loss	1 (2.2)	0 (0.0)	1 (1.9)
Reduce skills of radiology staff	0 (0.0)	1 (3.4)	1 (1.9)
Increased costs to department	0 (0.0)	5 (17.2)	14 (26.4)
More mistakes in radiology reports	0 (0.0)	1 (3.4)	0 (0.0)

Figures

	Disagree	Agree	Neutral
AI should be used to triage all urgent chest findings (P)	6.7	77.8	15.6
(E)	3.4	75.9	20.7
(L)	1.9	82.7	15.4
AI should diagnose + report chest findings, not just triage (P)	24.4	26.7	48.9
(E)	44.8	27.6	27.6
(L)	38.5	32.7	28.8
AI should only be used to triage lung cases cases (P)	35.6	33.3	31.1
(E)	41.4	31.0	27.6
(L)	43.1	19.6	37.3
AI should only be used to triage life threatening findings (P)	42.2	35.6	22.2
(E)	44.8	27.6	27.6
(L)	49.0	19.6	31.4
AI should be used for non-urgent findings on chest X-rays (P)	42.2	35.6	22.2
(E)	44.8	20.7	34.5
(L)	47.1	19.6	33.3

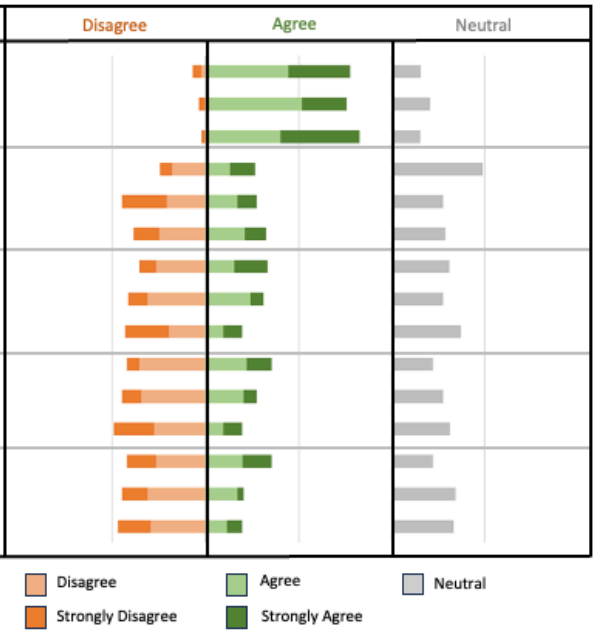


Figure 1

Divergent bar chart demonstrating differences in staff opinion on particular use-cases for AI relating to chest radiograph assessment across the three study periods. Values provided are all in percentages.

P = pre-implementation period (n = 45), E = early implementation period (n = 29), L = late implementation period (n = 53)

	Disagree	Agree	Neutral
I would be happy for AI to report autonomously (P)	53.3	15.6	31.1
(E)	75.9	13.8	10.3
(L)	72.5	9.8	17.6
I think reporters should still check the AI results (P)	2.2	86.7	11.1
(E)	0.0	89.7	10.3
(L)	2.0	88.2	9.8
I think responsibility for errors likes with the reporters (P)	13.3	60.0	26.7
(E)	6.9	55.2	37.9
(L)	5.9	64.7	29.4



Figure 2

Divergent bar chart demonstrating differences in staff opinion on issues pertaining to AI autonomy and responsibility across the three study periods. Values provided are all in percentages.

P = pre-implementation period (n = 45), E = early implementation period (n = 29), L = late implementation period (n = 53)

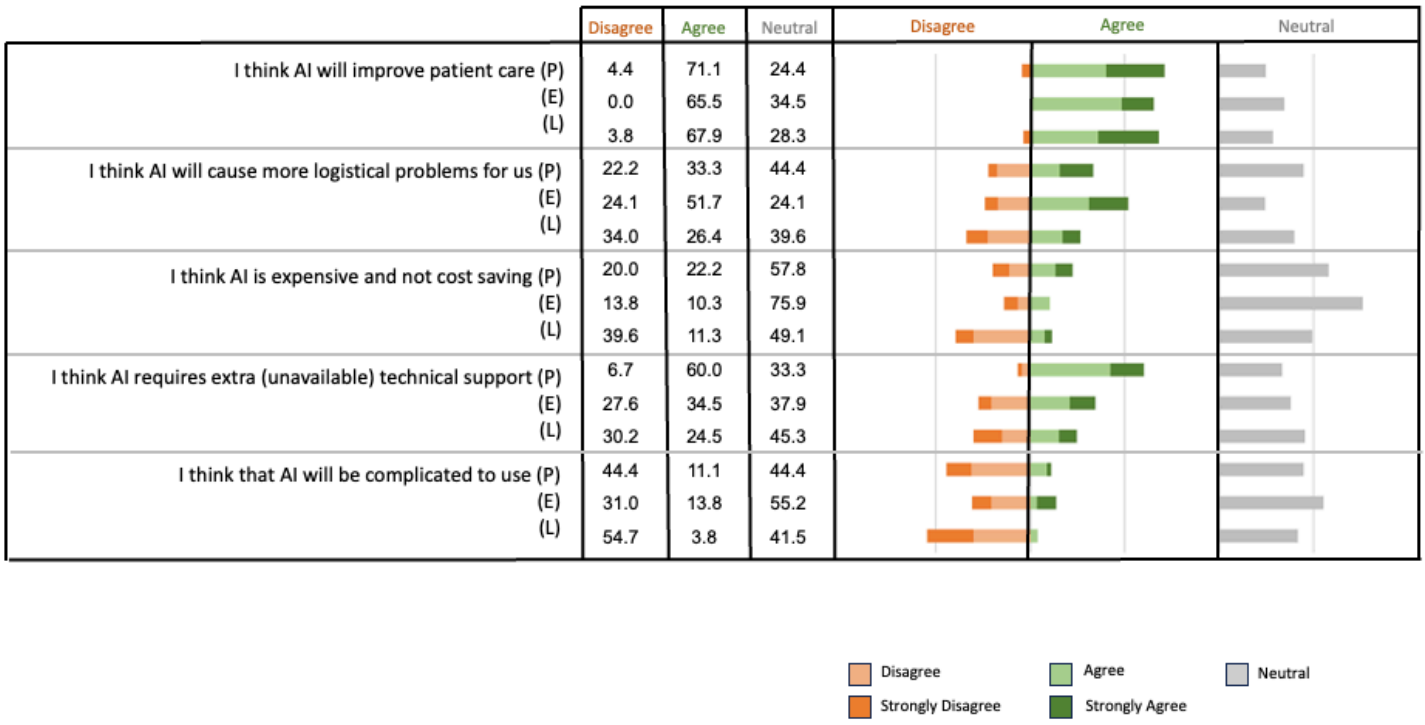


Figure 3

Divergent bar chart demonstrating differences in staff opinion on issues pertaining to AI's impact on patient flow and department logistics across the three study periods. Values provided are all in percentages. *P = pre-implementation period (n = 45), E = early implementation period (n = 29), L = late implementation period (n = 53)V*

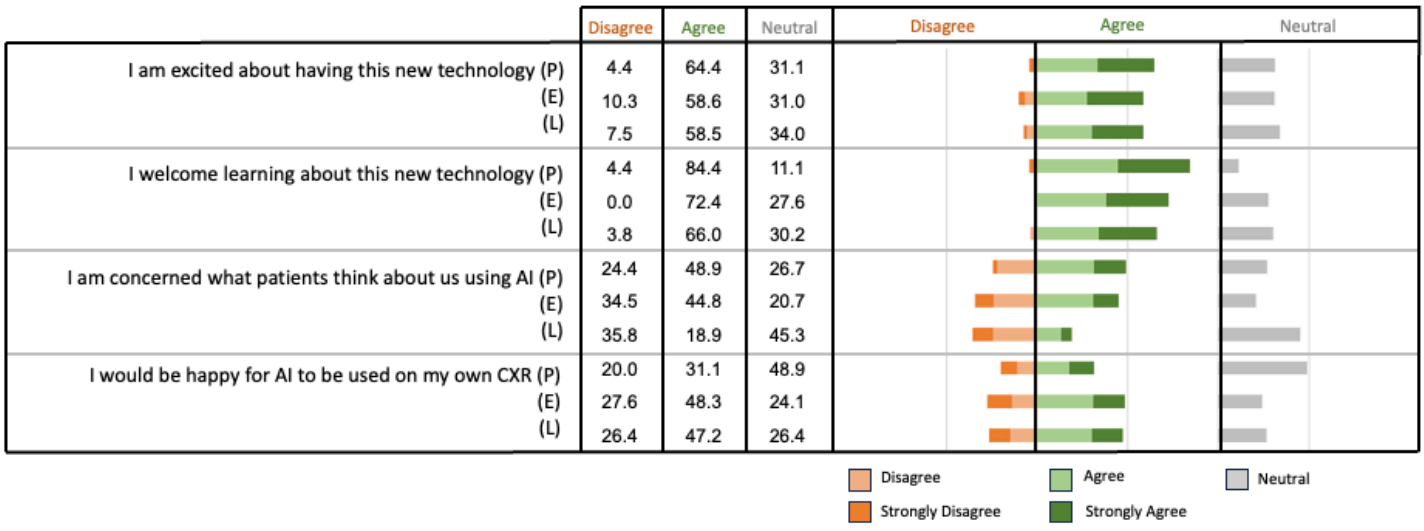


Figure 4

Divergent bar chart demonstrating differences in staff's personal opinions and attitudes towards implementation of an AI tool in the department across the three study periods. Values provided are all in percentages. *P = pre-implementation period (n = 45), E = early implementation period (n = 29), L = late implementation period (n = 53)*

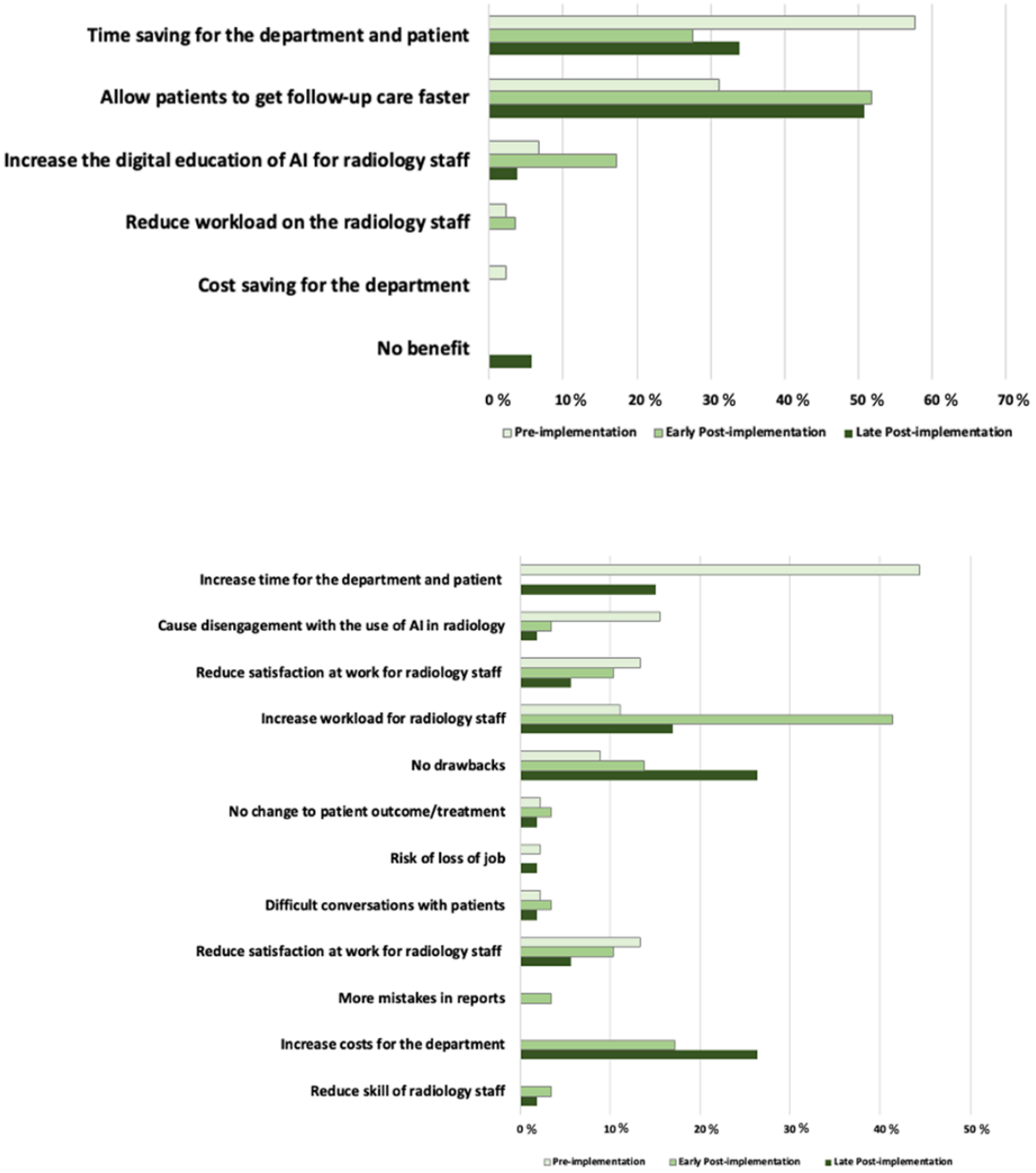
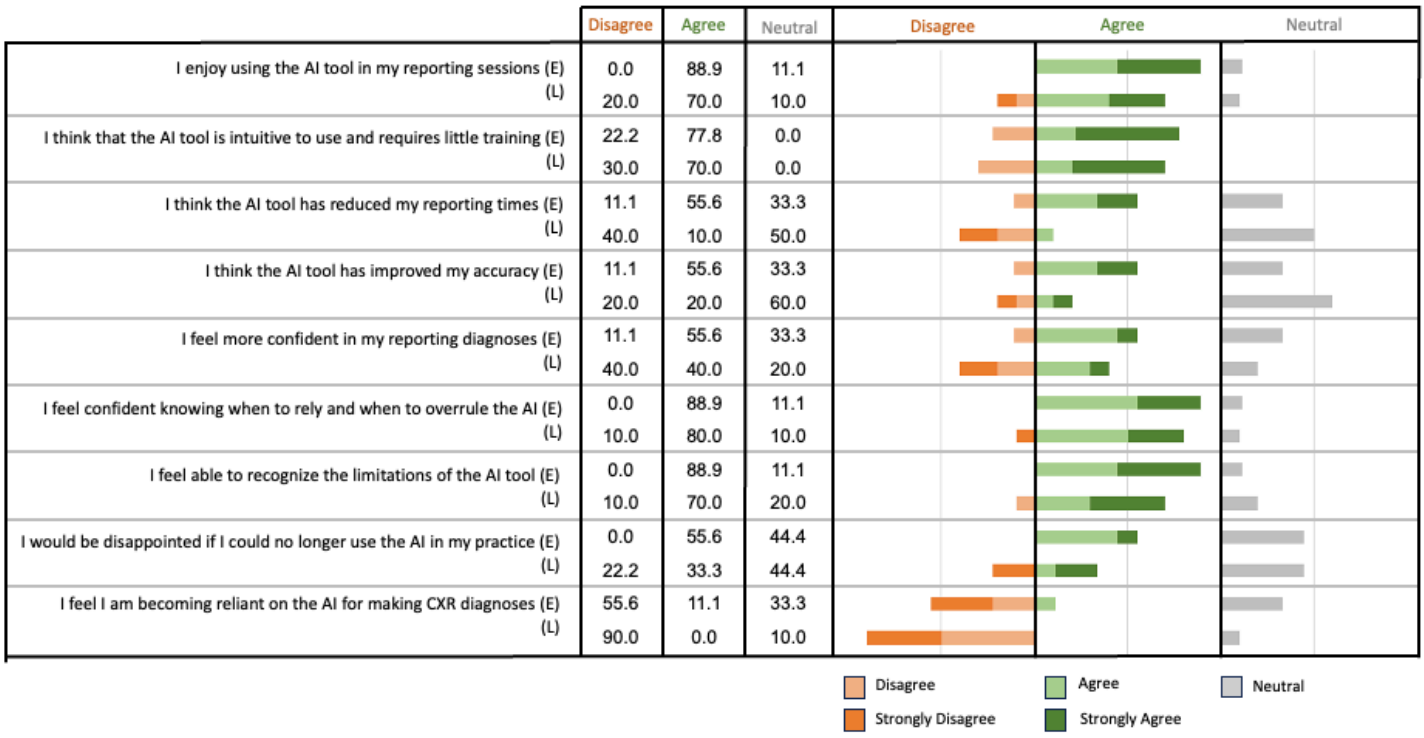


Figure 5

Bar chart demonstrating differences in (a) perceived benefits and (b) perceived drawbacks of AI implementation by all staff respondents during the three different study periods. *Pre-implementation period, light green (n = 45), Early implementation period, green (n = 29), Late implementation period, dark green (n = 53)*



	Disagree	Agree	Neutral
I enjoy using the AI tool in my reporting sessions (E)	0.0	88.9	11.1
(L)	20.0	70.0	10.0
I think that the AI tool is intuitive to use and requires little training (E)	22.2	77.8	0.0
(L)	30.0	70.0	0.0
I think the AI tool has reduced my reporting times (E)	11.1	55.6	33.3
(L)	40.0	10.0	50.0
I think the AI tool has improved my accuracy (E)	11.1	55.6	33.3
(L)	20.0	20.0	60.0
I feel more confident in my reporting diagnoses (E)	11.1	55.6	33.3
(L)	40.0	40.0	20.0
I feel confident knowing when to rely and when to overrule the AI (E)	0.0	88.9	11.1
(L)	10.0	80.0	10.0
I feel able to recognize the limitations of the AI tool (E)	0.0	88.9	11.1
(L)	10.0	70.0	20.0
I would be disappointed if I could no longer use the AI in my practice (E)	0.0	55.6	44.4
(L)	22.2	33.3	44.4
I feel I am becoming reliant on the AI for making CXR diagnoses (E)	55.6	11.1	33.3
(L)	90.0	0.0	10.0

Figure 6

Divergent bar chart demonstrating changes in staff opinions (with reporting duties) on their personal experiences using the AI tool across the two post-implementation study periods. Values provided are all in percentages. *E = early implementation period (n = 9), L = late implementation period (n = 10)*

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- 02.HighlightsESTHStaffsurvey.docx
- 04.SupplementaryAppendixStaffSurvey.docx