Supplementary

Appendix 1

study_id	GT	Celsus	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Care Mentor AI
1	0	45	0.18	11	0	34
2	0	1	0.01	5	0	28
3	1	77	0.96	52	99	28
4	0	40	0.01	6	0	28
5	0	4	0.01	1	0	30
6	1	94	0.95	84	99	68
7	0	61	0.04	12	0	27
8	0	56	0.06	9	0	28
9	1	54	0.03	15	0	28
10	0	5	0.01	15	0	25
11	0	7	0.16	6	0	54
12	0	52	0.02	5	0	89
13	0	6	0.01	3	0	13
14	0	4	0.01	7	0	31
15	0	29	0.25	5	0	7
16	1	77	0.43	19	0	42
17	0	0	0.01	7	0	28
18	0	0	0.02	4	0	14
19	0	0	0.01	8	0	28
20	0	0	0.01	2	0	28
21	1	76	0.96	84	84	91
22	0	3	0.01	2	0	8
23	0	30	0.16	91	0	98
24	0	0	0	1	0	7
25	0	1	0.01	2	0	6
26	1	65	0.77	83	99	28
27	0	57	0.1	83	87	34
28	0	21	0.05	6	0	28
29	0	11	0.16	4	0	33
30	0	24	0.01	56	0	21
31	0	6	0.07	3	0	33
32	0	9	0.01	5	0	33
33	0	17	0.01	5	0	28
34	0	70	0.05	12	99	28
35	1	88	0.85	93	99	80
36	0	0	0.01	6	0	13
37	1	92	0.94	64	92	21
38	0	3	0.01	3	0	28
39	0	6	0.04	9	0	28
40	0	1	0.01	8	0	28
41	0	5	0.01	3	0	14
42	0	1	0.02	2	0	28
43	0	8	0.01	3	0	28
44	1	11	0.04	12	0	28
45	0	38	0.2	9	0	31
46	0	6	0	17	0	32
47	0	4	0	7	0	10
48	0	8	0.07	3	0	5
49	0	1	0	6	0	25
50	0	59	0.02	5	0	25
51	0	55	0.1	11	0	13

Appendix 1 *(continued)*

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Appendix 1 *(continued)*

study_id	GT	Celsus	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Care Mentor AI
52	1	97	0.99	98	99	93
53	1	97	0.82	84	99	92
54	0	3	0.01	6	0	9
55	1	93	0.92	81	99	99
56	0	75	0.12	12	0	69
57	0	53	0.01	17	0	8
58	0	4	0.04	6	0	32
59	1	79	0.77	7	0	28
60	0	4	0.01	4	0	14
61	1	90	0.77	84	99	24
62	1	79	0.93	81	98	82
63	1	88	0.59	62	99	68
64	1	79	0.82	8	77	45
65	1	96	0.94	92	99	73
66	1	80	0.96	90	49	33
67	1	94	0.86	86	99	88
68	1	48	0.72	59	0	33
69	1	63	0.58	78	99	6
70	1	91	0.96	83	99	75
71	1	78	0.84	60	0	28
72	1	4	0.05	5	0	28
73	1	83	0.09	90	0	97
74	1	93	0.65	87	61	41
75	1	90	0.83	73	99	70
76	1	91	0.88	93	99	93
77	1	95	0.85	73	99	91
78	1	66	0.14	66	99	30
79	1	55	0.37	14	0	30
80	1	66	0.13	16	0	33
81	1	87	0.83	83	99	72
82	1	67	0.35	59	0	21
83	1	83	0.66	82	99	28
84	1	82	0.08	13	98	33
85	1	83	0.09	92	99	56
86	1	91	0.68	72	73	56
87	1	99	0.09	96	99	91
88	1	94	0.08	90	99	97
89	1	88	0.08	85	99	79
90	1	10	0.08	4	0	33
91	1	95	0.15	86	99	97
92	1	77	0.05	72	99	90
93	1	96	0.24	85	99	86
94	1	87	0.13	88	99	92
95	1	91	0.11	81	99	97

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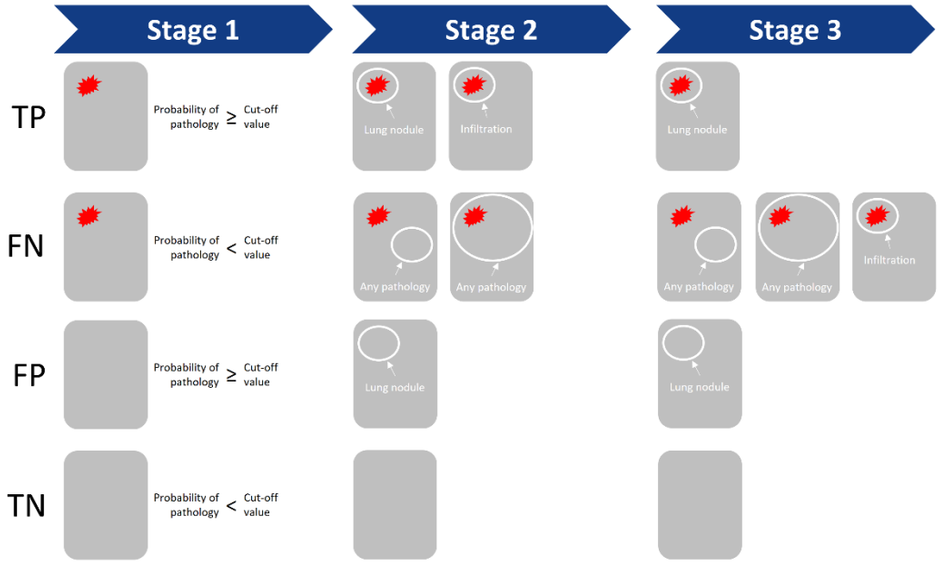

Figure S1 Schematic illustration of the three stages of our study. The red figure schematically indicates a lung nodule that actually exists on CXR. White outline schematically indicates segmentation performed by the AI, white text indicates classification performed by the AI. TP, true positive; FN, false negative; FP, false positive; TN, true negative; CXR, chest X-ray; AI, artificial intelligence.

Table S1 The results of the dataset analysis by the AI-based software solutions (translated into binary scale and compared to GT)

Results	Celsus	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Care Mentor AI
True positive	42	44	43	36	29
False negative	6	4	5	12	19
True negative	45	38	41	45	43
False positive	2	9	6	2	4

GT, ground truth; AI, artificial intelligence; CXR, chest X-ray.

Table S2 The results of the dataset analysis the AI-based software solutions, manually inspected by three radiologists for establishing the true/false segmentation of the nodule by the software

Results	Celsus	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Care Mentor AI
True positive	37	27	31	33	20
False negative	11	20	17	15	28
True negative	47	47	47	47	47
False positive	0	0	0	0	0

AI, artificial intelligence; CXR, chest X-ray.

Table S3 The results of the dataset analysis the AI-based software solutions, manually inspected by three radiologists for establishing the true/false segmentation and classification of the nodule by the software

Results	Celsus	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Care Mentor AI
True positive	30	27	28	18	16
False negative	18	20	20	30	32
True negative	47	47	47	47	47
False positive	0	0	0	0	0

AI, artificial intelligence; CXR, chest X-ray.

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Stage 1 of the study

Sensitivity

	Care Mentor AI	Program for automated analysis of digital fluorograms	qXR	Lunit INSIGHT CXR	Celsus
Care Mentor AI	0.604	0.043	0.001	0.001	0.001
Program for automated analysis of digital fluorograms		0.750	0.114	0.070	0.041
qXR			0.854	1.000	0.683
Lunit INSIGHT CXR				0.920	1.000
Celsus					0.875

Specificity

	Care Mentor AI	Program for automated analysis of digital fluorograms	qXR	Lunit INSIGHT CXR	Celsus
Care Mentor AI	0.910	0.617	0.724	0.077	0.617
Program for automated analysis of digital fluorograms		0.960	0.221	0.016	1.000
qXR			0.830	0.386	0.289
Lunit INSIGHT CXR				0.810	0.016
Celsus					0.960

Accuracy

	Care Mentor AI	Program for automated analysis of digital fluorograms	qXR	Lunit INSIGHT CXR	Celsus
Care Mentor AI	0.760	0.239	0.002	0.000	0.010
Program for automated analysis of digital fluorograms		0.850	0.024	0.001	0.018
qXR			0.880	0.331	0.423
Lunit INSIGHT CXR				0.860	0.077
Celsus					0.916

Stage 2 of the study

Sensitivity

	Care Mentor AI	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Celsus
Care Mentor AI	0.417	0.136	0.015	0.002	0.000
Lunit INSIGHT CXR		0.574	0.823	0.332	0.027
qXR			0.646	0.546	0.096
Program for automated analysis of digital fluorograms				0.690	0.221
Celsus					0.770

Specificity

	Care Mentor AI	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Celsus
Care Mentor AI	1.000	1.000	1.000	1.000	1.000
Lunit INSIGHT CXR		1.000	1.000	1.000	1.000
qXR			1.000	1.000	1.000
Program for automated analysis of digital fluorograms				1.000	1.000
Celsus					1.000

Accuracy

	Care Mentor AI	Lunit INSIGHT CXR	qXR	Program for automated analysis of digital fluorograms	Celsus
Care Mentor AI	0.705	0.136	0.015	0.002	0.000
Lunit INSIGHT CXR		0.787	0.823	0.332	0.027
qXR			0.820	0.546	0.096
Program for automated analysis of digital fluorograms				0.842	0.221
Celsus					0.884

Stage 3 of the study

Sensitivity

	Care Mentor AI	Program for automated analysis of digital fluorograms	qXR	Lunit INSIGHT CXR	Celsus
Care Mentor AI	0.333	0.803	0.006	0.019	0.002
Program for automated analysis of digital fluorograms		0.375	0.024	0.029	0.014
qXR			0.583	1.000	0.803
Lunit INSIGHT CXR				0.574	0.789
Celsus					0.625

Specificity

	Care Mentor AI	Program for automated analysis of digital fluorograms	qXR	Lunit INSIGHT CXR	Celsus
Care Mentor AI	1.000	1.000	1.000	1.000	1.000
Program for automated analysis of digital fluorograms		1.000	1.000	1.000	1.000
qXR			1.000	1.000	1.000
Lunit INSIGHT CXR				1.000	1.000
Celsus					1.000

Accuracy

	Care Mentor AI	Program for automated analysis of digital fluorograms	qXR	Lunit INSIGHT CXR	Celsus
Care Mentor AI	0.663	0.803	0.006	0.019	0.002
Program for automated analysis of digital fluorograms		0.684	0.024	0.029	0.014
qXR			0.789	1.000	0.803
Lunit INSIGHT CXR				0.787	0.789
Celsus					0.810

Figure S2 Paired comparison of five models in terms of sensitivity, specificity, and accuracy (using McNemar's test). Statistically significant results are colored green. The numbers colored in peach represent the values obtained at a certain stage of the experiment. AI, artificial intelligence; CXR, chest X-ray.

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