

Supplementary Table S1. Specialty-level AI-readiness scores and rankings

Specialty	MSAIR	SD	Minimum	Maximum	Rank	Tertile	Quartile
Pathology	2.543	0.338	1.857	2.857	1	High	Q4
Radiology	2.543	0.347	1.857	2.857	1	High	Q4
Nuclear Medicine	2.333	0.467	1.571	2.857	3	High	Q4
Medical Genetics and Genomics	2.324	0.413	1.714	3	4	High	Q4
Occupational and Environmental Medicine	2.286	0.281	1.714	2.714	5	High	Q4
Family Medicine	2.238	0.444	1.429	3	6	High	Q4
Internal Medicine	2.2	0.414	1.429	3	7	High	Q3
Ophthalmology	2.2	0.451	1.714	2.857	7	High	Q3
Pediatrics	2.181	0.387	1.714	2.857	9	Moderate	Q3
Emergency Medicine	2.171	0.383	1.714	3	10	Moderate	Q3
Neurology	2.143	0.471	1.286	2.857	11	Moderate	Q3
Radiation Oncology	2.143	0.393	1.571	2.714	11	Moderate	Q3
Psychiatry	2.133	0.308	1.571	2.857	13	Moderate	Q2
General Surgery	2.114	0.355	1.571	2.857	14	Moderate	Q2
Urology	2.105	0.368	1.571	2.714	15	Moderate	Q2
Physical Medicine and Rehabilitation	2.095	0.361	1.571	2.857	16	Low	Q2
Dermatology	2.067	0.328	1.571	2.571	17	Low	Q2
Allergy and Immunology	2.057	0.485	1.429	2.857	18	Low	Q1
Otolaryngology	2.057	0.428	1.429	3	18	Low	Q1
Obstetrics and Gynecology	2.048	0.479	1.429	2.857	20	Low	Q1
Orthopaedic Surgery	2.019	0.451	1.429	2.857	21	Low	Q1
Anesthesiology	2.010	0.317	1.714	2.714	22	Low	Q1

Supplementary Table S2. AI-readiness scores across clinical task categories

Task category	Tasks	Specialties	Mean task-level AI-readiness score	SD	Minimum	Maximum
Documentation	17	17	2.874	0.086	2.714	3
Diagnostic interpretation	40	18	2.7	0.246	2	3
Clinical reasoning	35	20	2.367	0.209	1.714	2.714
Prevention	8	6	2.321	0.250	1.857	2.571
Treatment planning	45	20	2.311	0.170	1.857	2.714
Quality improvement and systems-based practice	19	16	2.211	0.198	1.714	2.571
Monitoring	24	20	2.196	0.269	1.571	2.571
Communication	17	15	2.143	0.242	1.714	2.571
Patient assessment	35	21	2.024	0.278	1.714	2.714
Multidisciplinary collaboration	24	22	1.821	0.212	1.714	2.429
Procedures	49	19	1.720	0.218	1.286	2.714
Emergency decision making	17	15	1.639	0.153	1.429	1.857

Supplementary Table S3. Explanatory value of medical specialty and clinical task category

Outcome	Model	n	R ²	Adjusted R ²	RMSE
Primary	intercept only	330	0	0	0.411
Primary	specialty only	330	0.124	0.064	0.385
Primary	task category only	330	0.726	0.716	0.215
Primary	specialty plus task category	330	0.760	0.734	0.202
No centrality	intercept only	330	0	0	0.502
No centrality	specialty only	330	0.156	0.098	0.461
No centrality	task category only	330	0.785	0.778	0.233
No centrality	specialty plus task category	330	0.818	0.799	0.214

Supplementary Table S4. Principal component loadings of the six AI-readiness dimensions

dimension	PC1	PC2	PC3	PC4	PC5	PC6
Codifiability	0.765	0.091	-0.529	-0.107	-0.283	-0.195
Data-structure dependence	0.910	-0.040	-0.151	0.164	-0.102	0.337
Transferability of decision authority	0.836	-0.091	-0.023	0.409	0.326	-0.148
Physical dependence	0.630	-0.108	0.718	0.048	-0.264	-0.083
Clinical governability	0.774	-0.186	0.091	-0.551	0.237	0.020
Specialty centrality	0.269	0.951	0.142	-0.046	0.071	0.013

Supplementary Table S5. Principal component analysis: explained variance and alignment

Component	Eigenvalue	Explained variance	Cumulative	Pearson r with primary task score
PC1	3.180	0.528	0.528	0.957
PC2	0.968	0.161	0.689	0.256
PC3	0.847	0.141	0.830	0.138
PC4	0.514	0.085	0.916	-0.009
PC5	0.328	0.054	0.970	-0.024
PC6	0.181	0.030	1	0.002

Supplementary Table S6. Specialty-level comparison of primary AI-readiness scores and PCA-derived profiles

Specialty	Mean PC1	Primary MSAIR	Primary rank	PC1 rank	Rank difference	Tertile match
Allergy and Immunology	-0.056	2.057	18	8	-10	False
Anesthesiology	-0.482	2.010	22	18	-4	True
Dermatology	-0.137	2.067	17	11	-6	False
Emergency Medicine	-0.164	2.171	10	13	3	True
Family Medicine	0.156	2.238	6	6	0	True
General Surgery	-0.421	2.114	14	17	3	False
Internal Medicine	-0.114	2.2	7	9	2	False
Medical Genetics and Genomics	0.590	2.324	4	4	0	True
Neurology	-0.242	2.143	11	14	3	True
Nuclear Medicine	1.025	2.333	3	3	0	True
Obstetrics and Gynecology	-0.653	2.048	20	21	1	True
Occupational and Environmental Medicine	0.160	2.286	5	5	0	True
Ophthalmology	-0.117	2.2	7	10	3	False
Orthopaedic Surgery	-0.875	2.019	21	22	1	True
Otolaryngology	-0.617	2.057	18	20	2	True
Pathology	1.714	2.543	1	1	0	True
Pediatrics	-0.163	2.181	9	12	3	True
Physical Medicine and Rehabilitation	-0.315	2.095	16	15	-1	False
Psychiatry	-0.512	2.133	13	19	6	False
Radiation Oncology	-0.041	2.143	11	7	-4	False
Radiology	1.674	2.543	1	2	1	True
Urology	-0.409	2.105	15	16	1	False

Supplementary Table S7. Stability of specialty-level AI-readiness rankings across alternative methods

Specialty	Rank range	Maximum absolute rank change	Same tertile	Same quartile
Allergy and Immunology	9	9	False	False
Anesthesiology	2	2	True	True
Dermatology	12	9	False	False
Emergency Medicine	5	5	True	False
Family Medicine	1	1	True	True
General Surgery	6	6	False	False
Internal Medicine	1	1	True	True
Medical Genetics and Genomics	0	0	True	True
Neurology	5	4	True	False
Nuclear Medicine	0	0	True	True
Obstetrics and Gynecology	2	2	True	True
Occupational and Environmental Medicine	1	1	True	True
Ophthalmology	5	5	False	False
Orthopaedic Surgery	1	1	True	True
Otolaryngology	1	1	True	True
Pathology	0	0	True	True
Pediatrics	1	1	False	True
Physical Medicine and Rehabilitation	3	3	False	True
Psychiatry	3	3	False	True
Radiation Oncology	4	4	False	True
Radiology	1	1	True	True
Urology	3	2	False	True