

ORIGINAL ARTICLE

WAITING TIMES FOR INPATIENT CT AFTER THE INTRODUCTION OF A FIVE-LEVEL PRIORITY SYSTEM: A RETROSPECTIVE QUALITY-CONTROL STUDY IN A SWISS TERTIARY-CARE CENTRE

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LAUSANNE, SWITZERLAND

1,341 CT EXAMINATIONS

Single-centre retrospective evaluation

FIVE PRIORITY LEVELS

P1 immediate to P5 not urgent

DESCRIPTIVE RESULTS

Waiting times increased across final priority groups

CAUTIOUS INTERPRETATION

No causal or clinical benefit established

P1

P2

P3

P4

P5

Waiting times for inpatient CT after the introduction of a five-level priority system: a retrospective quality-control study in a Swiss tertiary-care centre

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Volume 35 · Issue 3 · Article 14

Swiss Journal of Radiology and Nuclear Medicine · www.sjoranm.com · SJORANM GmbH · Rosenweg 3 · CH-6340 Baar · Switzerland

Abstract

Objectives: Inpatient computed tomography (CT) is frequently scheduled on a first-come, first-served basis with fixed slots and remains under-studied relative to emergency and outpatient imaging. We described waiting times for inpatient CT after the introduction of a five-level priority system (P1–P5), with the institutional historical dashboard value reported separately for context.

Methods: Single-centre, retrospective quality-control study with a contextual historical comparison in the inpatient CT pathway of a Swiss tertiary-care hospital. A five-level priority system (P1, immediate, to P5, not urgent) was introduced on 1 May 2025. The post-implementation period (1 May to 31 July 2025) was compared with the same calendar window in 2024 as the historical reference. Waiting time was measured as the difference between the request date and the examination date, at calendar-day resolution. The historical dashboard value was reported separately because its measurement definition and inclusion criteria differed from those of the study cohort; placing each priority stratum against it required calibration and was retained only as an exploratory analysis. The ordering of waiting times across strata was assessed by Kruskal–Wallis and Dunn tests, with an urgent (P1–P3) versus non-urgent (P4–P5) contrast. Examinations that were manually accelerated or performed at a fixed time were excluded.

Results: Of 1847 examinations screened, 1341 were analysed. Mean waiting time on the measured calendar-day scale was 0.09 days for P1 ($n = 11$), 0.19 days for P2 ($n = 245$), 0.49 days for P3 ($n = 852$), 1.34 days for P4 ($n = 214$) and 3.00 days for P5 ($n = 19$); the proportion examined on the same day decreased from 91% for P1 to 5% for P5. Waiting time differed significantly across strata (Kruskal–Wallis $p < 0.001$), and the urgent strata (P1–P3) waited less than the non-urgent strata (P4–P5) (0.42 vs 1.47 days, difference 1.05 days, $p < 0.001$). Mean waiting time increased monotonically from P1 to P5. The institutional dashboard reported 1.28 days for the same months in 2024 and 1.06 days in 2025, on its own metric.

Conclusions: In this single-centre descriptive evaluation, observed calendar-day intervals increased across the final assigned priority categories from P1 to P5, while same-day examination proportions decreased. The findings describe the post-implementation pattern; they do not establish a causal improvement over the previous scheduling system or demonstrate clinical benefit.

Keywords: Computed tomography; inpatient; prioritisation; waiting time; triage; quality control.

1. Introduction

Waiting times are a persistent challenge for diagnostic radiology. Turnaround time has become a core quality metric, relevant not only to radiologists but also to referring physicians, hospital administrators and, ultimately, patients [1]. At the same time, imaging demand and examination complexity continue to rise while the radiology workforce grows more slowly, placing further pressure on timely access to imaging [2]. Most of this literature, however, concerns emergency or outpatient imaging, whereas inpatient imaging, and inpatient CT in particular, has received remarkably little attention; we are not aware of any study specifically addressing waiting times for inpatient CT, let alone how the inpatient CT queue should be organised or prioritised. This gap matters clinically, because hospitalised patients are frequently severely ill and rely on rapid diagnostic answers, and delayed diagnosis remains an important source of preventable patient harm [3]. In Switzerland, the inpatient setting faces an additional structural obstacle: inpatient care is reimbursed through diagnosis-related groups (DRG), a fixed per-case payment, whereas outpatient and emergency imaging generate separate revenue for the radiology department. This creates a risk that departments give inpatient CT lower priority and neglect its optimisation.[4, 5]

In our institution, inpatient CT was historically scheduled on a first-come, first-served basis. Each request was reviewed and accepted by a radiologist, who had no view of the CT schedule, and was then placed by the administrative team at the next available slot. The only exception was a request with a fixed time (for example, 24 h after surgery), for which the radiologist could impose a delay. Clinical urgency therefore had no route into the scheduling decision: it could not reorder the queue. Referring clinicians could not see the scheduled date and had to telephone the department to obtain it. When they judged that a patient had waited too long, they could redirect the examination to the emergency CT pathway. That pathway is separate, is not designed to absorb inpatient demand, and was often saturated, so the patient frequently waited again after transfer. These limitations motivated the introduction of a formal priority-based system; however, it remained uncertain whether, in the inpatient setting, such a system would genuinely benefit the patients who need it most. In emergency imaging, prioritisation and AI-based queue triage have already been shown to be feasible [6, 7], but the transposition of these principles to inpatient CT has not been evaluated, and the literature on inpatient imaging prioritisation is virtually absent.

To address these limitations, our department introduced a five-level priority system (P1–P5) for inpatient CT on 1 May 2025. Each examination request is assigned a priority level by the radiologist, from P1 (immediate) to P5 (not urgent). Rather than filling fixed slots in advance, requests are held on a virtual list and dispatched to the schedule only shortly before the examination (approximately two hours ahead) according to their priority. This design preserves flexibility during the day and keeps slots available for more urgent examinations added later, so that the most urgent inpatients can be accommodated within the inpatient pathway instead of being redirected to emergency CT. Figure 1 schematically compares the previous first-come, first-served model with the new priority-based system.

The aim of this study was to describe waiting times for inpatient CT after the introduction of a five-level priority system, and to situate them relative to the historical dashboard reference, which is reported separately because its measurement definition differs. We examined whether waiting times were ordered according to the assigned priority level, and described the overall dashboard values separately for context. Secondary exploratory analyses examined whether the ordering was consistent across specialties.

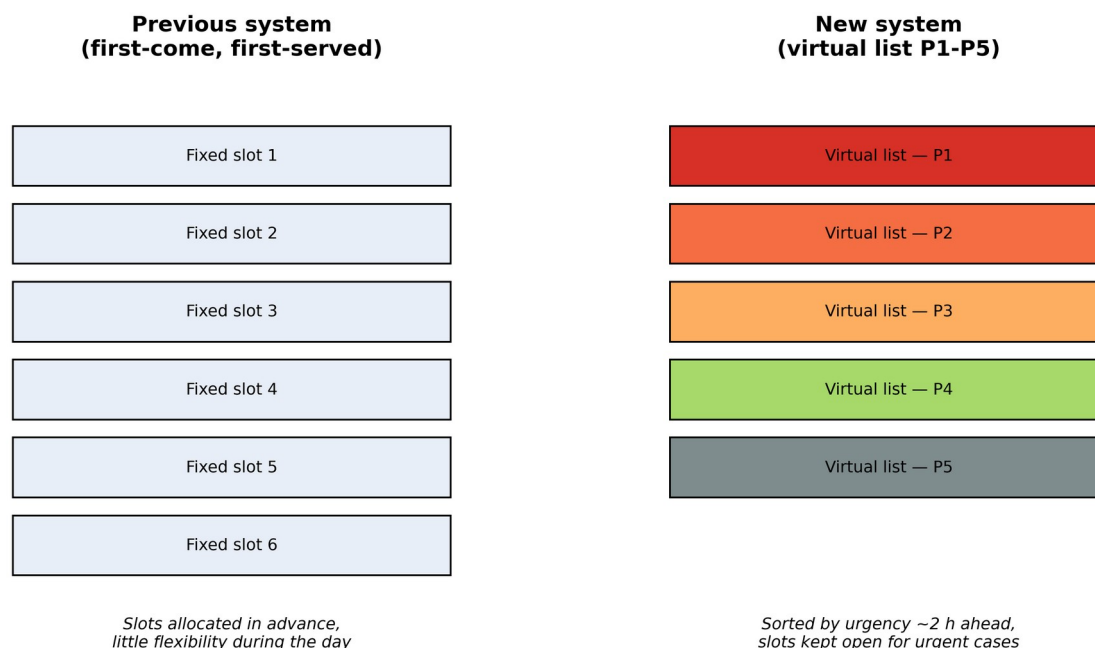


Figure 1. Schematic comparison of the previous (first-come, first-served) and the new priority-based scheduling system.

2. Methods

2.1 Study design and population

This was a single-centre, retrospective quality-control study of inpatient CT conducted in the Department of Diagnostic and Interventional Radiology of Lausanne University Hospital (CHUV), a tertiary-care centre in Switzerland. The inpatient CT pathway operates separately from the emergency CT pathway. It runs from 07:30 to 17:00, Monday to Friday; outside these hours, examinations are handled by the emergency CT pathway. Two CT rooms are used for scheduled inpatient examinations and also serve outpatients. Approximately 10 slots per room per weekday (range across days, 8 to 12) are reserved for inpatient requests, with slot durations of 15 to 30 minutes depending on the examination; slots not used by inpatients are reallocated to outpatients. The study describes each of the five post-implementation priority strata alongside a single historical, pre-prioritisation reference, and it is reported according to the STROBE statement for observational studies [8].

The five-level priority system was introduced on 1 May 2025. The post-implementation period was therefore 1 May to 31 July 2025, and the pre-prioritisation reference was drawn from the same calendar window one year earlier (1 May to 31 July 2024) to limit the influence of seasonality and staffing variations. The total number of scheduled inpatient CT slots was unchanged between the two periods, so that nominal capacity was constant. Effective capacity, throughput and demand were not measured. Other year-to-year variations (demand and case mix, effective staffing, equipment availability, patient flow) were not controlled for. The intervention and the local context are described following the domains of SQUIRE 2.0.

All consecutive inpatient CT examinations performed during the post-implementation window were screened. Examinations were excluded when the request carried the "NXT" tag (examination manually accelerated outside the normal pathway for exceptional clinical reasons) or the "SP" tag (examination at a fixed, pre-specified time, e.g. 24 h after surgery), because the timing of such examinations is externally imposed and therefore not governed by prioritisation. Every included examination carried a P1–P5 priority label; no examination was excluded for a missing priority. Age and sex were not available in the source export and were therefore not analysed, and no individual-level data were available for the pre-prioritisation period. Fixed-time (SP) examinations were excluded from the post-implementation cohort; the historical dashboard could not distinguish them and therefore included them. The export contains performed examinations only; cancelled, unperformed or pending requests were not captured. It contains no patient identifier, so repeat examinations could not be identified and clustering was not addressed.

2.2 Priority levels

Since 1 May 2025, every inpatient CT request is assigned one of five priority levels (Figure 2) by the radiologist at the time of protocolling:

P1: immediate (e.g. resuscitation; rare in the inpatient setting);

P2: very urgent (e.g. suspected pulmonary embolism, active bleeding, haemodynamic instability);

P3: urgent (e.g. infection, clinical deterioration);

P4: less urgent (e.g. follow-up, low clinical suspicion);

P5: not urgent (e.g. screening, or a request not appropriate for the inpatient pathway).

Under the new workflow, requests are held on a virtual list. A radiographer places each request on the schedule approximately two hours before the examination, according to its priority, instead of filling fixed slots in advance. Within a priority level, requests were dispatched in the order in which they were recorded on the list. This preserves flexibility during the day and keeps slots available for more urgent examinations added later. P1 requests are not subject to this horizon and are dispatched immediately. Requests could be escalated by telephoning the department. An escalation could be recorded as the NXT flag; otherwise it was reflected only in the final priority label, so the number of priority-level changes could not be determined retrospectively. Staff were trained before implementation, and no change was made to the workflow during the study period.

Inpatient CT priority levels

P1	Immediate — Resuscitation / life-threatening
P2	Very urgent — Suspected PE, bleeding, instability
P3	Urgent — Infection, clinical deterioration
P4	Less urgent — Follow-up, low suspicion
P5	Not urgent — Screening, inappropriate request

Figure 2. The five priority levels.

2.3 Waiting time

Waiting time was measured as the difference between the request date and the examination date, at calendar-day resolution. Both dates were recorded by date only: the examination time was recorded to the minute, but the request only by date, so intervals are whole days and an examination performed on the day of the request has an interval of zero. Prescription, protocolling and clinical readiness were not separately timestamped. No operational target was defined, so target attainment cannot be reported, and hour-level timeliness for P1 and P2 cannot be evaluated at daily resolution. Historical dashboard values were reported separately for context because their measurement definitions and inclusion criteria differed from those of the study cohort; the calibrated comparison described below is retained only as an exploratory sensitivity analysis.

The historical reference waiting time, denoted W_{pre} , was the unweighted mean of the three monthly dashboard values for May, June and July 2024: 1.313, 1.404 and 1.138 days (mean 1.285 days, range 1.138–1.404). Monthly counts were not available in the dashboard export, so the three months could not be weighted by volume. The post-implementation summaries are weighted by examination, whereas W_{pre} is an unweighted mean of three monthly values; the two are therefore not strictly equivalent in weighting. Because monthly volumes were unavailable this could not be corrected, and every comparison involving W_{pre} is reported descriptively only. The dashboard reports the interval from prescription to first image in minutes, excluding zero-minute intervals, for all inpatient CT examinations; it carries no priority labels and no NXT or SP tags, so it could not apply the same exclusions as the post-implementation cohort. It covers the inpatient CT pathway; we could not verify whether examinations diverted to the emergency pathway were recorded in it. W_{pre} was therefore used as an external benchmark and not as a population constant. Because no formal priority system existed before 1 May 2025, waiting time in the pre-period could not be stratified by urgency. One comparison does not require any calibration: the dashboard reports the same metric in both periods, so its value for

May–July 2025 (1.056 days) can be compared directly with W_{pre} (1.285 days), although case-mix differences and emergency-pathway diversion are not removed by that comparison.

Exploratory calibration. Because the two sources share neither a start event nor the same exclusions, a fixed offset of 0.45 days was estimated to place the cohort on the dashboard scale; it equals the difference between the 2025 dashboard mean (1.056 days) and the date-based mean of the cohort (0.606 days). The offset was derived from aggregated post-implementation values: it is a presentation constant, not a measurement. Adding it shifts every stratum equally, so the differences among post-implementation strata and the pairwise contrasts are unaffected. Comparisons with W_{pre} , by contrast, depend entirely on the assumption that the same offset applies to the historical period, and nothing in the available data supports that assumption: only three monthly aggregates exist for 2024, and the composition of the offset — the gap between prescription and request, and the exclusion of zero-minute intervals — cannot be assumed stable across a year. Subtracting the offset from W_{pre} yields an arithmetic equivalent of 0.835 days on the calendar-day scale, but this is a re-expression of the assumption, not an independent estimate of the historical calendar-day interval. Results on the calibrated scale are therefore reported as an explicitly exploratory sensitivity analysis (Table 2, panel B; Figure 4B), and the unadjusted calendar-day intervals and same-day proportions are the primary findings.

2.4 Analytical approach (primary analysis)

The analysis was descriptive. In the pre-intervention process, no priority information reached the scheduling step and no mechanism allowed a request to be reordered; waiting time in the pre-period could not therefore be stratified by urgency, and the historical overall mean was used as a single-queue benchmark. As an exploratory analysis, each post-implementation stratum was placed against this benchmark on the calibrated scale. This comparison is contextual: it describes where each priority stratum sits relative to the previous single queue, and it rests on a calibration that could not be verified, so it does not by itself establish an effect of the intervention. For descriptive purposes, we examined where each stratum fell relative to this benchmark; because the calibration could not be verified, this was not treated as a directional hypothesis test. The primary post-implementation objective was the ordering of waiting times across priority levels ($P1 \leq P2 \leq P3 \leq P4 \leq P5$). We also examined whether this ordering was consistent across clinical subgroups, defined by specialty (thoraco-abdominal, neurology, osteo-articular, cardiovascular, oncology, paediatrics). Specialty subgroups were derived from request tags and were not mutually exclusive.

2.5 Statistical analysis

Analyses were performed in Python using SciPy [9] and scikit-posthocs [10]. Continuous variables are reported as mean $\pm$ standard deviation and median [interquartile range]. Confidence intervals for means were obtained by percentile bootstrap (100,000 resamples, fixed seed), and confidence intervals for proportions by the Wilson score method. The normal approximation was not used. Waiting times take few discrete values and their distribution is right-skewed, so a symmetric interval is not appropriate; with 11 examinations in P1, ten of them performed on the same day, it gave a lower bound below zero, which is inadmissible for a waiting time. The same defect affects proportions close to 0 or 1, for which the Wald interval also extends below zero; the Wilson interval does not. For each priority stratum, the exploratory calibrated mean (calendar days + 0.45) was compared descriptively with W_{pre} ; no test was performed against this reference, and the five comparisons were therefore not subject to multiplicity adjustment. All tests were two-sided, with a significance threshold of $p < 0.05$.

Waiting time was compared across the five strata with a Kruskal–Wallis test, followed by Dunn's test for pairwise comparisons with Bonferroni adjustment and a correction for tied values; the tie correction is relevant because waiting times take a limited number of discrete values. The contrast between the urgent strata (P1–P2–P3) and the non-urgent strata (P4–P5) was tested with a Mann–Whitney U test. This contrast and the expected direction of the effect were defined during the analysis of these data and were not registered in advance. Specialty subgroups were described without between-group testing, because request tags overlap and several cells contained few examinations.

2.6 Ethics

This study was a retrospective quality-control project submitted through the CHUV research sponsor office (Bureau du Promoteur de Recherche, BPR; file 1811). On 14 July 2026, the CHUV Legal Affairs Department determined that it falls outside the scope of the Swiss Federal Act on Research Involving Human Beings (Human Research Act, HRA, SR 810.30, art. 2); ethics committee authorisation and informed consent were therefore not required. Data were anonymised before analysis and handled in accordance with institutional data-protection rules.

3. Results

3.1 Overall results

Study population

A total of 1847 inpatient CT examinations were performed during the post-implementation period and were screened for inclusion. Between 598 and 627 examinations were screened per month. Of these, 506 examinations were excluded because the request carried the "NXT" tag ($n = 357$) or the "SP" tag ($n = 160$), or both ($n = 11$). No examination was excluded for a missing priority label. The final analytic cohort comprised 1341 examinations (Figure 3). NXT examinations were predominantly P2 ($n = 124$) and P3 ($n = 216$), with few P1 ($n = 2$), P4 ($n = 14$) or P5 ($n = 1$) examinations; 215 of 357 (60%) were performed on the same day as the request and the mean interval was 1.01 days. That interval should not be read as evidence that NXT examinations were slower than prioritised ones. For example, a request initially graded P4 may have been accelerated after escalation and recorded as P3. Because only the final label was retained, the NXT subgroup mixes initial priority levels, and neither its priority distribution nor its mean interval can

be compared with those of the included strata. SP examinations showed a similar distribution (P1 n = 3, P2 n = 35, P3 n = 94, P4 n = 26, P5 n = 2), with 100 of 160 (62%) performed on the same day and a mean interval of 1.04 days.

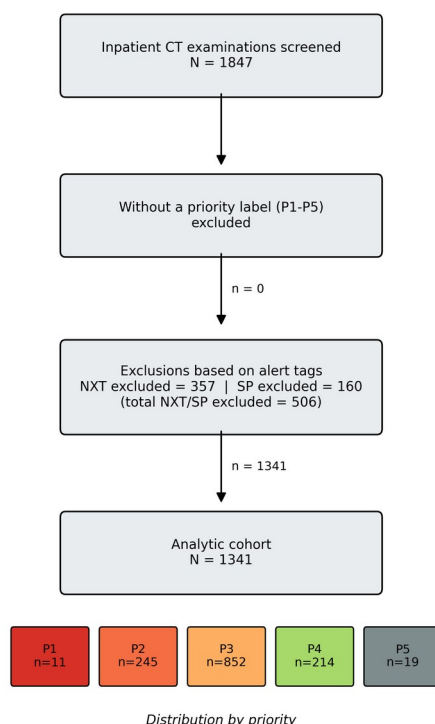


Figure 3. Study flowchart (inclusion and exclusion of inpatient CT examinations).

Cohort characteristics are shown in Table 1. P3 was the largest priority stratum (n = 852, 63.5%), followed by P2 (n = 245, 18.3%) and P4 (n = 214, 16.0%); P1 (n = 11, 0.8%) and P5 (n = 19, 1.4%) were rare. By specialty, thoraco-abdominal examinations were the most frequent (n = 318, 23.7%), followed by cardiovascular (n = 195, 14.5%), osteo-articular (n = 107, 8.0%), neurology (n = 94, 7.0%), oncology (n = 46, 3.4%) and paediatrics (n = 11, 0.8%). Specialty tags were present in 755 examinations (56.3%): 739 carried one tag and 16 carried two. The remaining 586 examinations (43.7%) carried no specialty tag. The six specialty counts therefore sum to 771 tags rather than to the 1341 examinations.

Table 1. Cohort characteristics

Characteristic	Value
N total	1341
Priorities	
P1	11 (0.8%)
P2	245 (18.3%)
P3	852 (63.5%)
P4	214 (16.0%)
P5	19 (1.4%)
Specialty	
Thoraco-Abdominal	318 (23.7%)
Neurology	94 (7.0%)
Osteo-articular	107 (8.0%)
Cardiovascular	195 (14.5%)
Oncology	46 (3.4%)
Paediatrics	11 (0.8%)

Specialty rows count request tags, not examinations: 16 examinations carried two tags, so the six counts sum to 771 tags. Overall, 755 examinations (56.3%) carried at least one specialty tag; 586 (43.7%) carried none.

Waiting time by priority (primary analysis)

The historical pre-prioritisation dashboard value was $W_{pre} = 1.28$ days. Waiting times by priority level are presented in Table 2 and Figure 4.

Mean waiting time on the measured calendar-day scale was 0.09 days for P1, 0.19 days for P2 and 0.49 days for P3, and 1.34 days for P4 and 3.00 days for P5 (Table 2, panel A; Figure 4A). The medians were 0, 0, 0, 1 and 3 days. At daily resolution, the proportion of examinations performed on the same day as the request decreased from 10/11 (91%) for P1 to 207/245 (84%) for P2, 506/852 (59%) for P3, 61/214 (29%) for P4 and 1/19 (5%) for P5; the corresponding 95% confidence intervals are given in Table 2. The P1 estimate rests on ten same-day examinations and is correspondingly imprecise (mean 0.09 days, 95% CI 0.00–0.27); for P1 the same-day proportion (91%, 95% CI 62–98%) therefore characterises the finding better than the mean does.

On the exploratory calibrated scale, mean waiting time was 0.54, 0.64, 0.94, 1.79 and 3.45 days for P1–P5, corresponding to differences from W_{pre} of –0.74, –0.64, –0.34, +0.50 and +2.17 days (Table 2, panel B; Figure 4B). All five calibrated means fell outside the range of the three monthly reference values (1.138–1.404 days): P1–P3 below the lowest monthly value and P4–P5 above the highest. These differences depend on the offset and are therefore conditional on its validity; only the differences among post-implementation strata are invariant to it (Methods 2.3).

Averaged across the whole cohort, the measured mean was 0.61 days. On the dashboard's own metric, which is defined identically in both periods, the mean was 1.06 days for May–July 2025, compared with 1.28 days for the same months in 2024. In the sensitivity analysis including NXT-tagged examinations that were not also SP ($n = 346$; 357 NXT in total, 11 also SP), the ordering was unchanged: on the measured scale, mean waiting times were 0.08, 0.19, 0.54, 1.34 and 2.95 days for P1–P5 ($n = 13, 366, 1060, 228$ and 20), and same-day proportions were 92%, 84%, 57%, 28% and 5%.

Table 2. Waiting time by priority level

Panel A — Measured calendar-day intervals (primary analysis)				
Priority	n	Mean (95% CI), days	Median [IQR], days	Same day, n (%) [95% CI]
P1	11	0.09 (0.00–0.27)	0 [0–0]	10 (91%) [62–98]
P2	245	0.19 (0.13–0.27)	0 [0–0]	207 (84%) [79–88]
P3	852	0.49 (0.45–0.54)	0 [0–1]	506 (59%) [56–63]
P4	214	1.34 (1.17–1.51)	1 [0–2]	61 (29%) [23–35]
P5	19	3.00 (2.00–4.16)	3 [1–3.5]	1 (5%) [1–25]
Panel B — Exploratory calibrated scale (calibrated scale = calendar days + 0.45)				
Priority	n	Mean (95% CI), days	Difference vs W_{pre} , days	
P1	11	0.54 (0.45–0.72)	–0.74	
P2	245	0.64 (0.58–0.72)	–0.64	
P3	852	0.94 (0.90–0.99)	–0.34	
P4	214	1.79 (1.62–1.96)	+0.50	
P5	19	3.45 (2.45–4.61)	+2.17	

Panel A gives the measured calendar-day intervals. Panel B is an exploratory presentation: means are the measured means plus the fixed 0.45-day calibration constant used to place them on the institutional dashboard scale, and differences are expressed against W_{pre} . $W_{pre} = 1.285$ days is the unweighted mean of the three monthly dashboard values (May 2024: 1.313; June 2024: 1.404; July 2024: 1.138; range 1.138–1.404). Monthly counts were not available, so the months could not be weighted by volume, whereas the post-implementation means are weighted by examination; the two summaries are therefore not strictly equivalent in weighting, and no test was performed against W_{pre} . The calibration constant is a presentation value, not a measurement: it was estimated from aggregated post-implementation data, its composition (the gap between prescription and request, and the exclusion of zero-minute intervals) could not be verified, and it cannot be shown to apply to the historical period. Differences between post-implementation strata are unaffected by the constant; the differences against W_{pre} in panel B are conditional on it. P4 is the lowest stratum above the benchmark, and its position is the most sensitive to this assumption. Confidence intervals: percentile bootstrap for means (100,000 resamples), Wilson score for proportions. Values were computed from unrounded data: P4 mean = 1.336 days (difference +0.501); overall measured mean = 0.606 days (exploratory calibrated cohort mean 1.056 days, difference –0.229 against W_{pre}).

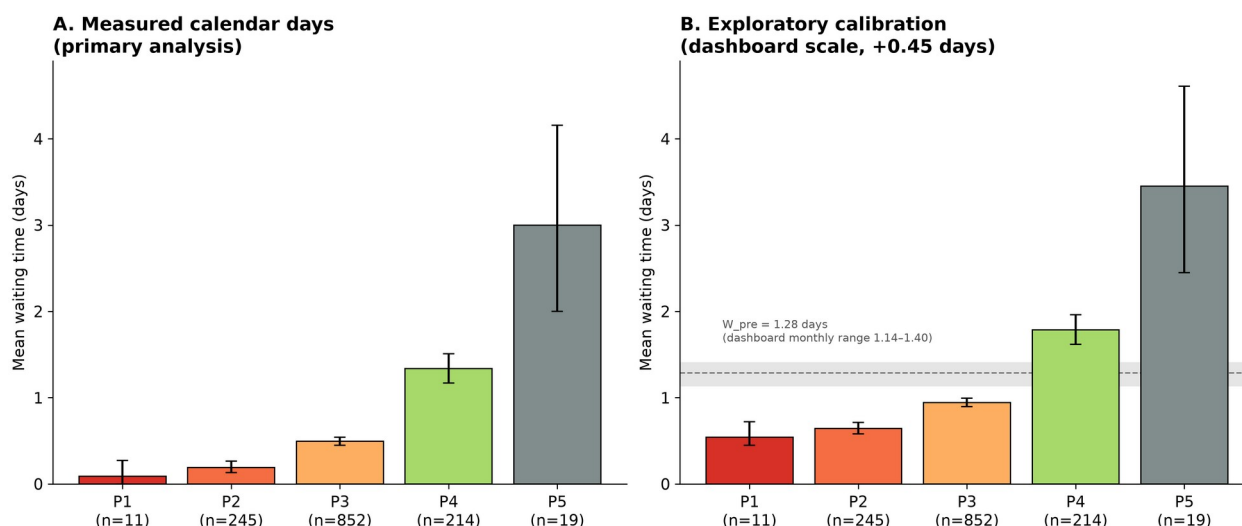


Figure 4. Mean waiting time by priority level. (A) Primary analysis: measured calendar-day intervals. (B) Exploratory analysis: the same means placed on the institutional dashboard scale by adding the 0.45-day calibration constant (Methods 2.3). Bars show means; error bars show 95% confidence intervals (percentile bootstrap). In (B), the dashed line is the historical dashboard value ($W_{pre} = 1.28$ days) and the grey band the range of the three monthly dashboard values (1.14–1.40 days). The calibration underlying (B) could not be verified, and (B) should be read as a sensitivity analysis only.

Ordering of waiting times across priority levels

Mean waiting time increased monotonically from P1 to P5 (0.09, 0.19, 0.49, 1.34 and 3.00 days; Table 2). Waiting time differed across the five strata (Kruskal–Wallis $H = 225.8$, $p < 0.001$). The urgent strata (P1–P2–P3) waited less than the non-urgent strata (P4–P5) (0.42 vs 1.47 days, difference 1.05 days; Mann–Whitney $U = 67,369.5$, $p < 0.001$). In the Dunn comparisons with Bonferroni adjustment, every pair differed significantly ($p < 0.05$) except P1 versus P2 ($p = 1.00$) and P1 versus P3 ($p = 0.46$), consistent with the small P1 sample ($n = 11$). Full pairwise results are given in Table 3. The monotonic ordering describes the sample means and was not tested as a complete ordering.

Table 3. Pairwise comparisons of waiting time between priority levels (Dunn's test, Bonferroni-adjusted).

Comparison	Difference in mean waiting time (days)	Bonferroni-adjusted p
P1 vs P2	−0.10	1.000
P1 vs P3	−0.40	0.462
P1 vs P4	−1.25	<0.001
P1 vs P5	−2.91	<0.001
P2 vs P3	−0.30	<0.001
P2 vs P4	−1.14	<0.001
P2 vs P5	−2.81	<0.001
P3 vs P4	−0.84	<0.001
P3 vs P5	−2.51	<0.001
P4 vs P5	−1.66	0.032

Differences were computed from unrounded means. Negative values indicate a shorter mean waiting time for the first stratum of each pair. Ties were handled with the tie correction of Dunn's test.

3.2 Subgroup results

Figure 5 shows mean waiting time by specialty and priority level. The sequence $P2 < P3 < P4$ was observed in all five specialties in which these levels were represented. Paediatrics contained no P2 examination. The only departure from this sequence was one paediatric P5 examination, performed on the same day as the request (0 days), which waited less than the paediatric P3 examinations (0.67 days, $n = 9$) and the single paediatric P4 examination (1.00 day). Several cells contained fewer than five examinations, so these subgroup estimates are descriptive only. P1 examinations carried no specialty tag and are therefore absent from all specialty cells.

Mean waiting times on the measured calendar-day scale ranged from 0.44 days (neurology) to 1.11 days (cardiovascular). The proportion of P4–P5 examinations ranged from 13.8% (neurology) to 52.2% (oncology), which is consistent with these differences.

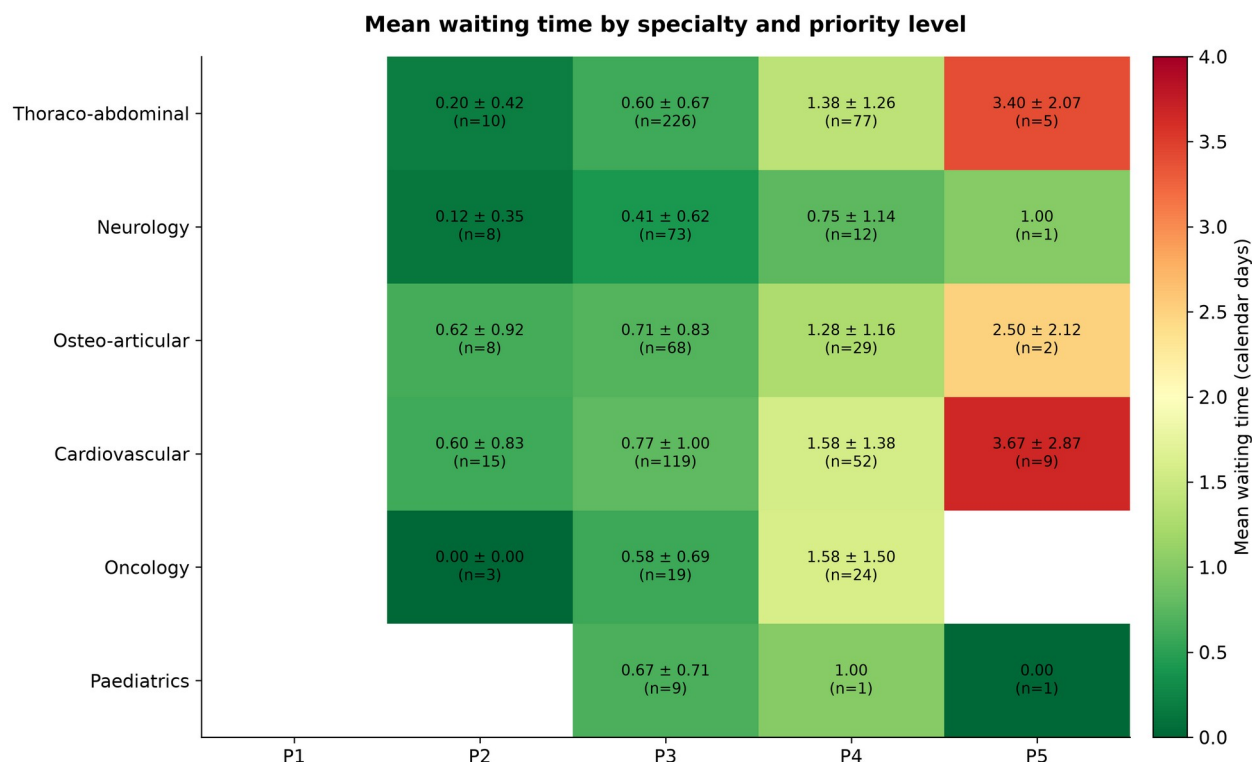


Figure 5. Mean waiting time by specialty and priority level. Each cell shows the mean ± standard deviation of the measured calendar-day intervals and the number of examinations (n). Standard deviation is not shown for cells with a single examination. White cells indicate that no examination of that priority was recorded in that specialty. Colour scale: mean waiting time from 0 to 4.0 days.

4. Discussion

In this single-centre quality-control study, examinations with higher assigned urgency generally had shorter observed calendar-day intervals after the introduction of a five-level priority system for inpatient CT (P1–P5). Mean waiting time increased monotonically from P1 to P5, the urgent strata waited less than the non-urgent strata (0.42 vs 1.47 days, difference 1.05 days, $p < 0.001$), and same-day examination fell from 91% of P1 to 5% of P5. On the exploratory calibrated scale, P1–P3 lay below the historical dashboard value and P4–P5 above it. That placement is conditional in two ways. First, it rests on the 0.45-day calibration, which was estimated within the post-implementation period and cannot be verified for 2024: the P4 difference (+0.50 days) is the smallest above the benchmark and the most sensitive to it, whereas the P5 difference (+2.17 days) is not. Second, even a perfect calibration would not turn a historical aggregate into a comparison group, because the composition of the historical cohort differed. On the measured calendar-day scale, which requires no calibration, the P4 mean (1.34 days) is numerically close to the dashboard value (1.28 days), but that proximity cannot be read as equivalence, because the dashboard interval begins at prescription and excludes zero-minute intervals. We therefore describe the benchmark comparison as contextual rather than as an estimate of effect. The historical aggregate provides context only and does not establish comparability between the cohorts.

On the dashboard's own metric, which is defined identically in both periods, the overall mean waiting time fell from 1.28 days in 2024 to 1.06 days in 2025. This decrease cannot be confidently attributed to the priority system. It may reflect a secular trend or year-to-year fluctuation, a change in demand or case mix, or a genuine organisational effect: because a control examination is often awaited before a patient is discharged, performing examinations sooner could shorten some hospital stays, reduce overall congestion and, in turn, modestly lower waiting times. We did not collect data on downstream outcomes such as length of stay or bed occupancy and therefore cannot distinguish these explanations. The effect of the new system on the overall waiting time thus remains uncertain, whereas the ordering of post-implementation mean waiting times across priority levels is the more robust observation.

We are not aware of a previous evaluation of a formal priority system for inpatient CT. The inpatient imaging literature remains scarce and has addressed adjacent problems rather than waiting-time prioritisation: standardised "care level" guidelines and an electronic dashboard have been used to improve the safety and workflow of inpatient MRI [11], and a nationwide survey of referring physicians identified scheduling delays and the need for real-time workflow tracking as major barriers to timely inpatient diagnostics [12]. Evidence on reducing CT waiting time comes almost exclusively from the emergency department (ED), where workflow redesign such as moving CT requests onto a monitored electronic list [13], targeted technologist and post-processing interventions [14], and multi-phase data-driven quality-improvement programmes [15], has reduced turnaround time. Simulation work has further shown that, at fixed CT capacity, access time depends on how the shared resource is allocated across emergency, inpatient and outpatient demand [16]. Our findings extend these observations to the inpatient pathway by suggesting that explicit priority levels may help align access with clinical urgency at constant nominal capacity, although the study cannot separate such an effect from concurrent changes in demand, case mix or effective staffing.

The direction of our results is consistent with the literature: prioritising urgent examinations and shortening their waiting time is feasible and clinically desirable, and shorter CT turnaround time has itself been associated with better diagnostic and management outcomes in acute abdominal pain [17]. Conversely, P4 and especially P5 waited longer than P1–P3. This is consistent with priority-based ordering, in which urgency rather than arrival order determines the position in the queue [18]; it does not by itself demonstrate that shorter waits for the most urgent examinations came at the expense of less urgent ones. Nominal slot numbers were unchanged, but demand, effective capacity and case mix were not measured, so the study cannot quantify such a trade-off: the observed ordering could equally reflect differences in case mix, in the number of requests per priority level, or in when within the day the requests were recorded. Longer waits for P4 and P5 were not assumed to be harmless. Requests could be escalated at any time by telephoning the department, which converted them into NXT examinations or into a higher priority level, and P1 requests bypassed the two-hour horizon. No maximum waiting time was defined for P4 or P5. The observed tail was nevertheless bounded: the longest P4 interval was 5 days (5.45 days on the calibrated scale), and only three examinations in the cohort waited 7 days or more (one P3 and two P5; maximum 9 days, 9.45 on the calibrated scale). Prospective monitoring of the proportion of low-priority requests waiting beyond a defined threshold, of unplanned escalations, and of adverse events during waiting would be the appropriate balancing measures.

In our view, a pattern in which the most urgent examinations are performed earlier is desirable, provided that the assigned priority reflects genuine clinical need, and whether or not it is accompanied by longer waits for other examinations. Ideally, every patient would undergo CT as soon as it is required; when resources are constrained, however, it seems both clinically and ethically preferable for patients with a genuine, time-sensitive indication to be examined before those with non-urgent or lower-benefit indications. This consideration may be particularly relevant in the Swiss inpatient setting. Inpatient care is funded through diagnosis-related groups [4], while dual reimbursement systems have been associated with supplier-induced demand for diagnostic imaging [5]. This low-threshold environment can encourage examinations that are not strictly necessary, routine "safety" controls, or oncology work-ups performed because the patient is already in hospital, which compete for the same capacity as time-sensitive studies. An explicit priority system does not eliminate such requests, but by making the queue and its ordering visible it may partly discourage, or at least defer, low-benefit examinations.

Our results suggest a natural extension toward automated triage, consistent with the broader digital augmentation of radiology workflows [19]. A systematic review of deep-learning worklist triage found consistent reductions in report turnaround time across acute conditions [20]; in a prospective real-world study, an AI-triaged worklist reduced turnaround times compared with a standard FIFO workflow [21]. These worklist tools prioritise the reading of images that have already been acquired. They do not change when the examination is performed, whereas the system we describe acts on acquisition scheduling. Machine-learning models using triage-time features have been proposed to prioritise CT acquisition and to outperform both first-in-first-out ordering and the Emergency Severity Index [18], and similar approaches are being explored across imaging subspecialties [22]. Applied to our setting, such tools could help assign P1–P5 automatically and pre-triage requests, thereby reducing the subjective component of priority assignment and relieving the radiologist, although prospective clinical evaluation of the deployed algorithms would be required [23].

Several limitations should be acknowledged. First, this was a single-centre, retrospective quality-control study, so the findings may not be generalisable. Second, urgent examinations could be redirected to the emergency CT pathway before implementation. Diversion to the emergency CT pathway may have affected the composition and the recorded waiting times of the historical cohort; the direction and the magnitude of this influence could not be established. The composition of the inpatient cohort may also have changed, because requests that would previously have been diverted now remain in the inpatient pathway; the post-implementation cohort may therefore be more urgent, and more time-sensitive, than the historical aggregate. Third, priority assignment remains subjective and operator-dependent, and inter-rater reliability was not assessed. Fourth, P1 and P5 were rare ($n = 11$ and $n = 19$), so comparisons involving these strata had limited power, and non-significant differences should not be read as equivalence. Waiting times were recorded at daily resolution and were therefore discrete and right-skewed; medians and interquartile ranges are reported alongside means. Fifth, the priority label is the final label recorded in the export; the initial label and any subsequent change were not available, so reclassification during waiting could not be determined or quantified. This affects the NXT subgroup in particular: acceleration was accompanied by a change of priority level, so the final label does not describe the urgency at which the request entered the queue. The number of priority-level changes was not recorded, and the NXT flag captures only escalations that were explicitly tagged; no systematic monitoring of harm from longer waits was in place. Sixth, no patient identifier was available, so repeat examinations could not be identified and clustering was not addressed. Finally, no clinical balancing outcome was measured: adverse events during waiting, unplanned escalations, and downstream consequences such as costs, length of stay or clinical outcomes were not recorded, so the absence of harm from longer waits for P4 and P5 could not be verified. The study should therefore be regarded as descriptive and hypothesis-generating, and prospective confirmation, ideally including patient outcomes, would be warranted.

5. Conclusion

In this single-centre descriptive evaluation, observed calendar-day intervals increased across the final assigned priority categories from P1 to P5, while same-day examination proportions decreased. The findings describe the post-implementation pattern; they do not establish a causal improvement over the previous scheduling system or demonstrate clinical benefit. Prospective evaluation is warranted.

Declarations

Conflict of interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability: The de-identified derived dataset, data dictionary and analysis code supporting the findings of this study are available from the corresponding author on reasonable request, subject to institutional data-protection rules. They are not publicly deposited because the derived data could be re-identifiable in combination with institutional scheduling data, and the raw hospital export cannot be shared.

Ethics approval: This study was a retrospective quality-control project submitted through the CHUV research sponsor office (Bureau du Promoteur de Recherche, BPR; file 1811). On 14 July 2026, the CHUV Legal Affairs Department determined that it falls outside the scope of the Swiss Federal Act on Research Involving Human Beings (Human Research Act, HRA, SR 810.30, art. 2); ethics committee authorisation and informed consent were therefore not required. Data were anonymised before analysis and handled in accordance with institutional data-protection rules.

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References

1. Ritchie B, Summerville L, Sheng M, et al (2026) Impact of turnaround time in radiology: The good, the bad, and the ugly. *Current Problems in Diagnostic Radiology* 55:268–272. <https://doi.org/10.1067/j.cpradiol.2025.04.018>
2. Bredella MA, DeStigter K, Jankharia B, et al (2026) A Strategic Framework to Address Growing Imbalances between Physician Supply and Demand for Radiology: A Review from the International Society for Strategic Studies in Radiology. *Radiology* 320. <https://doi.org/10.1148/radiol.260425>
3. Newman-Toker DE, Nassery N, Schaffer AC, et al (2023) Burden of serious harms from diagnostic error in the USA. *BMJ Quality & Safety* 33:109–120. <https://doi.org/10.1136/bmjqs-2021-014130>
4. Boes S, Napierala C (2021) Assessment of the introduction of DRG-based reimbursement in Switzerland: Evidence on the short-term effects on length of stay compliance in university hospitals. *Health Policy* 125:739–750. <https://doi.org/10.1016/j.healthpol.2021.01.010>
5. Zabrodina V, Dusheiko M, Moschetti K (2020) A moneymaking scan: Dual reimbursement systems and supplier-induced demand for diagnostic imaging. *Health Economics* 29:1566–1585. <https://doi.org/10.1002/hec.4152>
6. Silva E, Tang K, Chiacchia S, et al (2026) Simulation of AI-driven CT Queue Prioritization in the Emergency Department. *Radiology: Artificial Intelligence* 8. <https://doi.org/10.1148/ryai.260110>
7. Ahmad HK, Kitzing YX, Bond V, et al (2026) Artificial Intelligence Triage of Urgent Versus Non-Urgent CT Brain Findings to Support Expedited Emergency Department Disposition: A Retrospective Validation Study. *Emergency Medicine Australasia* 38. <https://doi.org/10.1111/1742-6723.70353>
8. von Elm E, Altman DG, Egger M, et al (2007) The Strengthening of Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for Reporting Observational Studies. *Annals of Internal Medicine* 147:573–577. <https://doi.org/10.7326/0003-4819-147-8-200710160-00010>
9. Virtanen P, Gommers R, Oliphant TE, et al (2020) SciPy 1.0: fundamental algorithms for scientific computing in Python. *Nature Methods* 17:261–272. <https://doi.org/10.1038/s41592-019-0686-2>
10. Terpilowski M (2019) scikit-posthocs: Pairwise multiple comparison tests in Python. *Journal of Open Source Software* 4:1169. <https://doi.org/10.21105/joss.01169>
11. Garner J, Krishnan P, Yacoub JH (2026) Enhancing Inpatient MRI Safety and Workflow Using Standardized MRI Care Level Guidelines and Electronic Medical Record-Integrated Dashboard. *Academic Radiology*. <https://doi.org/10.1016/j.acra.2026.08.111>
12. Reschke P, Gruenewald LD, Booz C, et al (2026) Radiology appointment management in German hospitals: a survey of referring physicians. *Insights into Imaging* 17. <https://doi.org/10.1186/s13244-026-02303-7>
13. Bhayana R, Wang CD, Menezes RJ, et al (2020) Optimising after-hours workflow of computed tomography orders in the emergency department. *BMJ Open Quality* 9:e000969. <https://doi.org/10.1136/bmjopen-2020-000969>
14. Wood EJ, Stabo N, Garrett JW, et al (2023) Factors Contributing to Computed Tomography Trauma Scan Times at a Tertiary Center: Improving Emergency Department Trauma Imaging Workflow Through Targeted Interventions. *Journal of Computer Assisted Tomography* 47:621–628. <https://doi.org/10.1097/rct.0000000000001449>
15. Gupta D, Gupta P, Gupta N, Bhandari A (2026) Optimising radiology workflow in a high-volume academic medical centre: a multi-phase, data-driven quality improvement initiative. *Abdominal Radiology*. <https://doi.org/10.1007/s00261-026-05607-w>

16. Maass KL, Halter E, Huschka TR, et al (2021) A discrete event simulation to evaluate impact of radiology process changes on emergency department computed tomography access. *Journal of Evaluation in Clinical Practice* 28:120–128. <https://doi.org/10.1111/jep.13606>
17. Guo H, Jia Y-J, Li H-L, et al (2026) Impact of CT turnaround time on diagnostic and clinical outcomes in acute abdominal pain: A retrospective cohort study. *The American Journal of Emergency Medicine* 99:9–16. <https://doi.org/10.1016/j.ajem.2025.09.011>
18. Jarrett P, Kuriki PE de A, Diercks D, et al (2026) Triage-Time Machine Learning for Computed Tomography Acquisition Prioritization in the Emergency Department. *Academic Radiology*. <https://doi.org/10.1016/j.acra.2026.08.017>
19. Saliba T, Rotzinger DC, Fahrni G (2026) Digitally-Augmented Radiology: From tablets to AI, a narrative review of technologies empowering the modern radiologist. *F1000Research* 15:1081. <https://doi.org/10.12688/f1000research.182574.1>
20. Momin E, Cook T, Gershon G, et al (2025) Systematic review on the impact of deep learning-driven worklist triage on radiology workflow and clinical outcomes. *European Radiology* 35:6879–6893. <https://doi.org/10.1007/s00330-025-11674-2>
21. Sridharan S, Png N, Seah AXH, et al (2026) Impact of AI-Triaged Worklists and AI-Assisted Report Generation on Radiology Turnaround Times: Prospective Real-World Study. *Journal of Medical Internet Research* 28:e92181. <https://doi.org/10.2196/92181>
22. Bhatia H, Bhatia A, Singh A, et al (2025) Triage and workflow optimization with artificial intelligence in pediatric imaging. *Pediatric Radiology* 56:1849–1857. <https://doi.org/10.1007/s00247-025-06485-y>
23. Jayet A, Fahrni G (2026) A call for clinical evaluation of open-source algorithms in radiology. *European Journal of Radiology Artificial Intelligence* 5:100068. <https://doi.org/10.1016/j.ejrai.2025.100068>