MARKETPLACE RELIABILITY PROPOSAL

Reducing late cancellations for shifts booked 24 to 72 hours before start

Metro A case data | Anonymized portfolio edition

An anonymized portfolio edition of a take-home case; source and cleaned rows are withheld. This is not the original submitted artifact.

Executive summary

Metro A's 24–72-hour booking window is a clear reliability opportunity for healthcare facilities (HCFs). This proposal tests a new booking process for healthcare professionals (HCPs) in that time window. Across 41,040 Metro A shifts, a late HCP cancellation affected 2,486 shifts, or 6.06%, and NCNS affected 1,253 shifts, or 3.05%.

The 24–72-hour time window is the clearest place to test this idea. Among shifts with one HCP booking recorded in the supplied log, 11.42% had a late cancellation. When we use the first HCP booking recorded for each shift, the rate is 13.62% (205 of 1,505 shifts).

Recommendation

Run a 16-week Metro A pilot. Each eligible open shift in the 24–72-hour time window is assigned by chance to either a treatment shift or a control shift. On treatment shifts, HCPs with at least 10 prior resolved shifts and a prior late-cancellation rate below 10% see the opening first for 30 minutes. If it remains unfilled, it opens to all qualified HCPs. Control shifts use the current booking process.

Proposed benchmark: bring the late-cancellation rate in this time window toward 7.5%[1]. The pilot decision threshold is a 3.5-percentage-point difference[2] between treatment and control. With 1,505 shifts in each group, this design has about 84% power to identify a decline from 13.62% to 10.12%. That threshold represents about 53 fewer late cancellations in the treatment group and about 105 fewer after full rollout over 16 weeks.

Why this is worth testing

The historical comparison supports testing this rule. Among 1,742 historical HCP bookings in the 24–72-hour time window, 589 were made by HCPs who would meet the proposed history screen. Their booked shifts had 44 late cancellations (7.47%). The other 1,153 bookings had 181 late cancellations (15.70%).

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1 Treatment shifts use the proposed new booking process; control shifts use the current process. Each eligible open shift is assigned by chance, so the two groups should receive about half of openings.

2 The 7.5% figure is a proposed benchmark. It is based on 44 late cancellations among 589 historical HCP bookings made by HCPs with at least 10 prior resolved shifts and a prior late-cancellation rate below 10%.

What the analysis found

We checked booking timing in two ways. One calculation uses the first HCP booking recorded for every shift. The other includes only shifts with one recorded HCP booking, which avoids mixing in shifts booked more than once. The 24–72-hour time window had the highest late-cancellation rate in both.

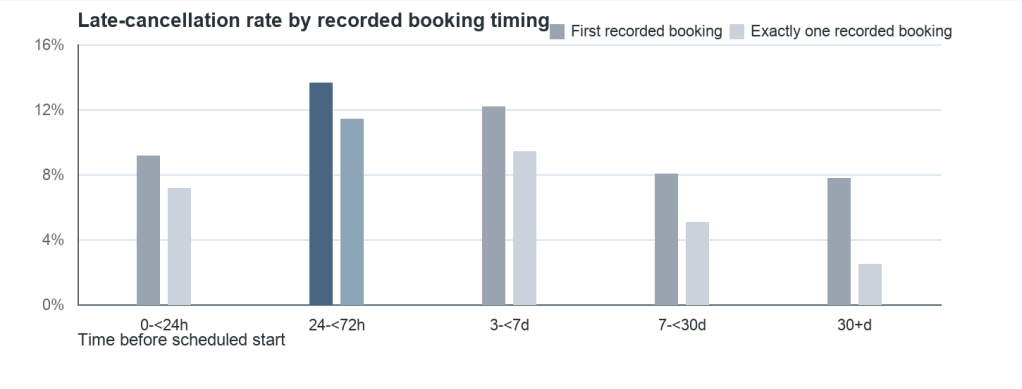

Figure 1. Late-cancellation rate by time between booking and shift start. Slate marks the 24–72-hour time window. Counts appear below each rate.

The 24–72-hour time window has the highest observed rate and enough volume for a controlled test. Other time windows remain under the current booking process.

HCP reliability

An HCP's prior late-cancellation rate uses only information available before the HCP books. It equals prior late cancellations divided by prior resolved shifts. A prior shift enters the history after it starts or a cancellation is recorded.

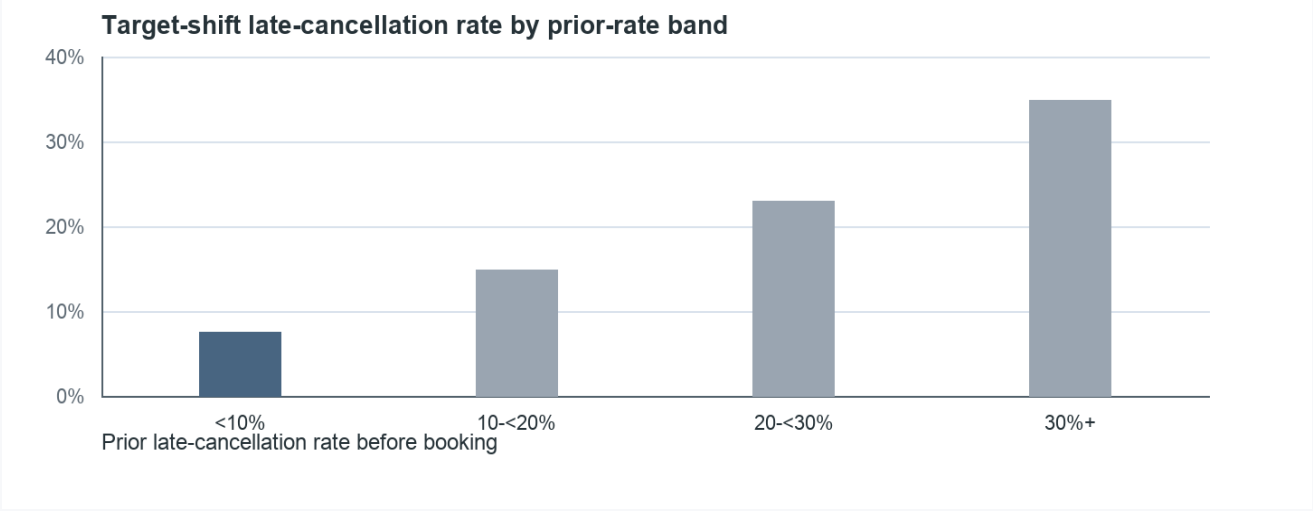

Figure 2. Late-cancellation rate on the booked shift, grouped by the HCP's prior late-cancellation rate. Each group has at least 10 prior resolved shifts.

The 10-shift minimum is close to the typical history in this time window: nine prior resolved shifts. At a five-shift minimum, 43.57% of historical HCP bookings qualify and their late-cancellation rate is 8.04%. At 15 shifts, 27.67% qualify and their rate is 7.88%. The 10-shift rule qualifies 33.81% at 7.47%.

Proposed pilot

MarketplaceCo assigns each eligible Shift ID to the treatment or control group when it enters the 24–72-hour time window. Treatment shifts use the new booking order. Control shifts keep the current booking order and the existing qualification checks and attendance process.

Stage	Treatment flow
Shift enters the window	Assign the Shift ID by chance to treatment or control and record the HCP-history inputs used for eligibility.
First 30 minutes	Treatment shifts open to qualified HCPs with 10 or more prior resolved shifts and a prior late-cancellation rate below 10%.

Stage	Treatment flow
After 30 minutes	Any open treatment shift returns to the existing qualified pool. HCPs with shorter histories can book at this point.
Control	Control shifts follow the current booking process for the full period.

Launch road map

Timing	Work
Weeks 0-1	Build the eligibility rule, add Shift ID randomization, instrument exposures and outcomes, and test the calculation against historical records.
Weeks 2-17	Run the pilot for 16 weeks. Review fill rate, time to fill, NCNS, and HCP access each week. Keep the treatment rule fixed unless a stop threshold is reached.
Week 18	Lock the pilot data and compare treatment with control. Decide whether to scale, adjust the rule, or end the test.

At the observed pace, a 16-week pilot would include about 3,010 shift openings, or roughly 1,505 in each group. Refresh the Metro A baseline and volume before launch, then confirm the sample-size calculation. The 7.5% figure remains a proposed benchmark, not a pilot forecast.

Measurement and decision rules

The primary metric is the share of pilot shifts with an HCP cancellation less than 24 hours before start. Treatment and control run at the same time. Assigning the whole Shift ID to one group keeps all booking and cancellation events for that shift in the same test condition.

Measure	Decision threshold
Late-cancellation rate	Proposed benchmark: move toward 7.5%. Pilot decision threshold: treatment is at least 3.5 percentage points below control.
NCNS rate	Treatment is no higher than control.
Fill rate	Treatment is no more than 1 percentage point below control.
Median time to fill	Treatment is no more than 30 minutes slower than control.
Access for HCPs with fewer than 10 prior shifts	Completed-booking share declines by no more than 5% relative to control.

Scale the rule only when the treatment group has a lower late-cancellation rate than the control group by the proposed threshold and every guardrail remains within range. End the test if NCNS rises, fill rate falls by more than one point, median time to fill increases by more than 30 minutes, or access for HCPs with shorter histories crosses its limit.

Risks and assumptions

Assumption or risk	Why it is reasonable and how the pilot handles it
Metro A represents the case market	The case permits this assumption. Recalculate the baseline and worker-history distribution before expansion to another market.
Production history is available at booking	The eligibility rule needs booking, cancellation, and resolved-shift history. Missing history moves the HCP to the wider-access period after 30 minutes.
HCP ID and Shift ID links are accurate	The analysis excludes missing HCP IDs and reconciles Shift IDs. Monitor identifier and event corrections during the pilot.
The 24–72-hour pattern continues	Both historical timing views rank this window highest. The control group provides a live baseline.
Prior HCP history remains informative	Historical booked-shift rates separate across prior-rate groups. The 7.47% qualifying-group rate informs the proposed benchmark; the pilot measures the effect of preferred access.
10 shifts and a rate below 10% are workable starting rules	The 10-shift sensitivity row balanced coverage and observed risk. Freeze the rule during the pilot and review it after the test.
A 30-minute head start preserves	All qualified HCPs regain access after 30 minutes. Stop or shorten the window if fill-rate or

Assumption or risk	Why it is reasonable and how the pilot handles it
fill performance	time-to-fill limits are crossed.
Target volume remains near 3,010 shifts over 16 weeks	That estimate comes from the supplied period. Refresh volume and power before launch.
HCPs with short histories retain access	They can book after the head-start period. Track their completed-booking share against control.
Existing qualification and attendance rules continue	The pilot keeps clinical qualification checks, reminders, attendance enforcement, and the event-correction process.

The rule, sample estimate, and guardrails are starting values for a pilot. Confirm them with production data before randomization, then freeze the test settings. The table below lists the assumptions that could change the recommendation.

Trade-off

A 30-minute preference may delay fill or reduce early booking opportunities for HCPs with shorter histories. The release window caps the delay. Fill rate, time to fill, and HCP access determine whether the trade-off is acceptable. Review results by HCP type, HCF, and shift start hour before expanding the rule.

Decision

Approve the build and a 16-week Metro A pilot for open shifts 24 to less than 72 hours from start. Treatment shifts give HCPs with at least 10 prior resolved shifts and a prior late-cancellation rate below 10% the first 30 minutes to book. Control shifts keep the current booking process.
Before launch, confirm current volume, data completeness, and the sample-size calculation. Treat 7.5% as the proposed benchmark. Scale only when the treatment group clears the 3.5-point decision threshold and NCNS, fill rate, time to fill, and HCP-access guardrails remain within range.

APPENDIX

Supporting analysis

A. Baseline and timing detail

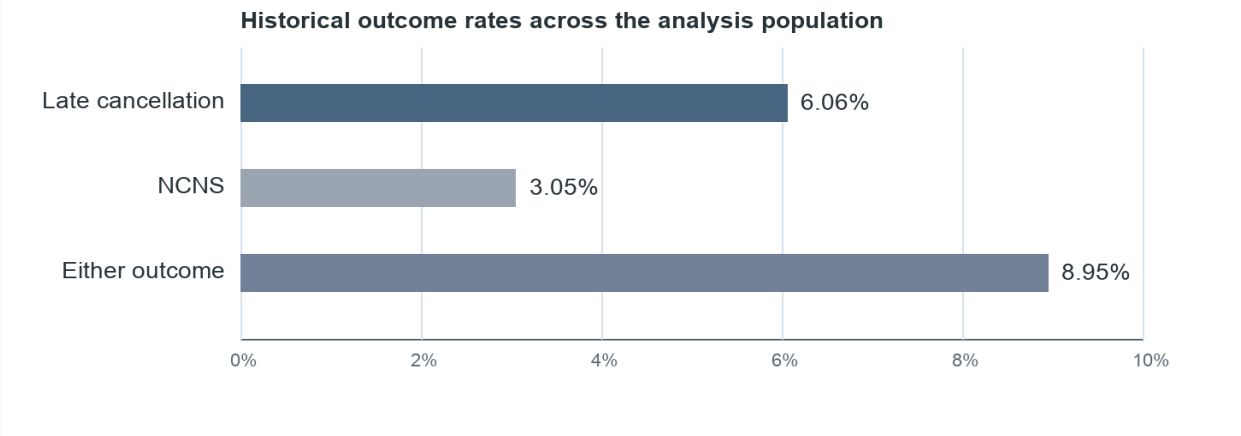

Figure A1. Shift-level outcome rates across 41,040 Metro A shifts. Slate marks the report's primary outcome.

Late-cancellation flag	NCNS absent	NCNS present	Total
Absent	37,368	1,186	38,554
Present	2,419	67	2,486
Total	39,787	1,253	41,040

Analysis records B-01 to B-03. A Shift ID can contain both flags because the logs record multiple events at the shift level.

Booking time before start	First booking: shifts	First booking: late-cancellation rate	One booking: shifts	One booking: late-cancellation rate
0-<24 hours	822	9.12%	798	7.14%
24-<72 hours	1,505	13.62%	1,427	11.42%
3-<7 days	2,299	12.14%	2,071	9.42%
7-<30 days	4,458	8.01%	3,362	5.06%
30+ days	206	7.77%	121	2.48%

The first timing view uses the first HCP booking recorded for each shift. The second uses only shifts with one recorded HCP booking. Shifts with negative booking lead times or no booking record are outside this comparison.

B. HCP-history detail

The HCP-history analysis covers 1,742 recorded HCP bookings made 24 to less than 72 hours before shift start. These bookings represent 1,701 shifts and 393 HCPs. Median prior resolved history was nine shifts. The late-cancellation rate on the booked shift was 12.92%. Prior history includes HCP–Shift ID associations known and resolved before the booking.

HCP late-cancellation rate before booking	Historical HCP bookings	Late cancellations on booked shift	Late-cancellation rate after booking
<10%	589	44	7.47%
10-<20%	142	21	14.79%
20-<30%	74	17	22.97%
30%+	46	16	34.78%

Analysis record W-02. Every row shown above has at least 10 prior resolved associated shifts.

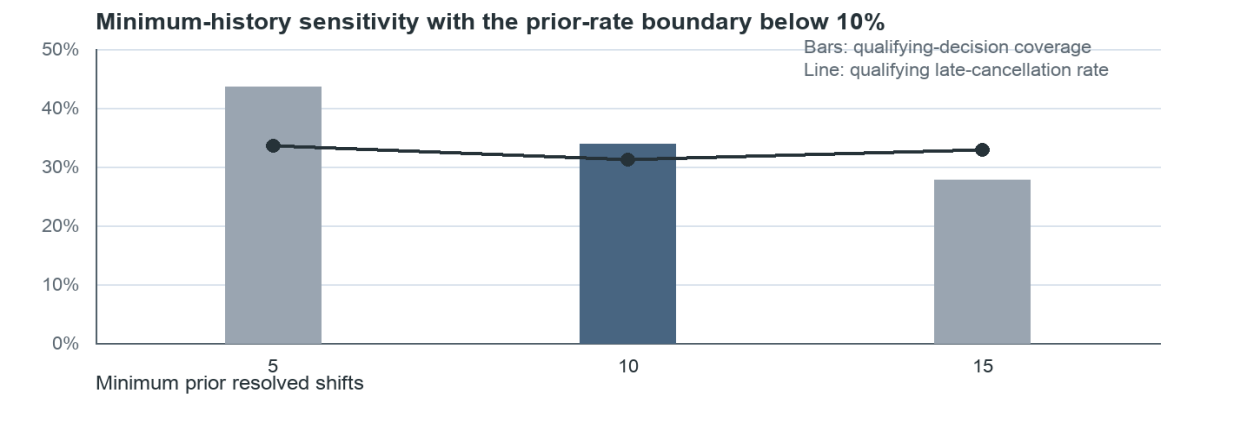

Figure B1. Share of HCP bookings that qualify and their late-cancellation rate, using a prior late-cancellation boundary below 10%. Slate marks the proposed 10-shift minimum.

Minimum prior resolved shifts	Historical HCP bookings that qualify	Share that qualify	Late-cancellation rate: qualifying bookings	Late-cancellation rate: other bookings
5	759	43.57%	8.04%	16.68%
10	589	33.81%	7.47%	15.70%
15	482	27.67%	7.88%	14.84%

Calculation steps

For each HCP booking, the analysis identifies earlier shifts associated with the same HCP. A shift enters the history after its start time or a recorded cancellation. The HCP's prior late-cancellation rate equals prior late-cancellation shifts divided by prior resolved shifts. The outcome checks whether that HCP then canceled the booked shift less than 24 hours before start. 3.5 percentage points equals 13.62% minus 10.12%. The 84% figure comes from a standard two-group sample-size calculation using 1,505 shifts in each group, a 13.62% starting rate, and a two-sided 5% test. If the true reduction is 3.5 points, similar tests would identify it about 84 times out of 100. This is a planning calculation, not a predicted result.

Missing HCP IDs are excluded. The supplied logs may omit earlier activity outside the case files. Production implementation should set a formal lookback period and confirm that booking, cancellation, and completed-shift records are available at the decision time.

C. Validation and source

Check	Result
Metro A shift population	41,040 shifts; baseline totals reconcile.
HCP bookings in the 24–72-hour window	1,742 bookings across 1,701 shifts; PASS.
HCPs in the history screen	393 unique HCPs; PASS.
First-booking shifts in the 24–72-hour window	1,505 shifts; PASS.
Time-window filter	24 hours or more and less than 72 hours; PASS.
Chronology	Prior history resolves before each booking; the booked shift is excluded.

Source: anonymized take-home case materials and supplied aggregate evidence.