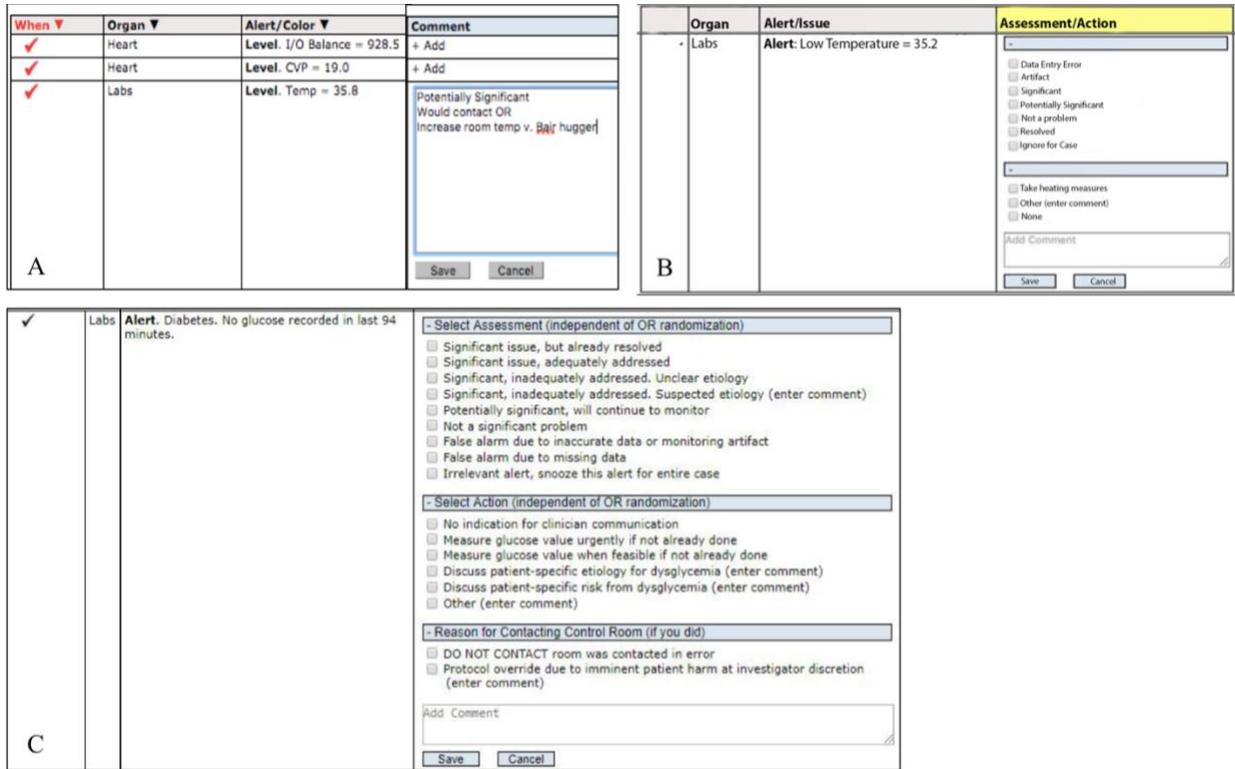**Multimedia Appendix 3. Summary of changes to AlertWatch® Tower Mode platform.**

Components of the Anesthesiology Control Tower (ACT), including the layout of the room, orientation documents, and the AlertWatch® Tower Mode platform, were modified and refined in an iterative fashion during the ACTFAST1 study based on results from Phase 1 and Phase 2 qualitative and quantitative data. Seven iterations of AlertWatch® Tower Mode were tested over the study period. Changes to the platform are summarized in Table 1; Figure 1 and Figure 2 demonstrate revisions to the software display.

Table 1. Description of changes in the 7 iterations of the AlertWatch® Tower Mode software.	
Version	**Major features or changes**
1	First platform. ACT clinicians able to address checkmark alerts using free text (Figure 1A).
2	Introduction of limited pick lists for Assessment and Action (Figure 1B). Green checkmarks added to indicate completed/previously addressed alerts.
3	Pick list added for Reaction. Patient ID added to Case Review dialogue to help ensure that documentation is on correct patient.
4	Option added to dismiss an "irrelevant" alert for remainder of case. 17 checkmark alerts removed.
5	4 additional checkmark alerts removed. All alerts programmed to prevent from recurring for specific, individualized periods of time.
6	Significantly expanded and customized pick lists for assessment/action (Figure 1C). Enhanced Census View (Figure 2) with prioritization of alerts and additional case information.
7	Minor modifications to Census view.

Figure 1A table:

When ▼	Organ ▼	Alert/Color ▼	Comment
✓	Heart	**Level.** I/O Balance = 928.5	+ Add
✓	Heart	**Level.** CVP = 19.0	+ Add
✓	Labs	**Level.** Temp = 35.8	Potentially Significant Would contact OR Increase room temp v. Bair hugger

A

Save   Cancel

Figure 1B table:

	Organ	Alert/Issue	Assessment/Action
·	Labs	**Alert:** Low Temperature = 35.2	☐ Data Entry Error ☐ Artifact ☐ Significant ☐ Potentially Significant ☐ Not a problem ☐ Resolved ☐ Ignore for Case ☐ Take heating measures ☐ Other (enter comment) ☐ None Add Comment

B

Save   Cancel

Figure 1C:

| ✓ | Labs | **Alert.** Diabetes. No glucose recorded in last 94 minutes. | ... |

- Select Assessment (independent of OR randomization)
☐ Significant issue, but already resolved
☐ Significant issue, adequately addressed
☐ Significant, inadequately addressed. Unclear etiology
☐ Significant, inadequately addressed. Suspected etiology (enter comment)
☐ Potentially significant, will continue to monitor
☐ Not a significant problem
☐ False alarm due to inaccurate data or monitoring artifact
☐ False alarm due to missing data
☐ Irrelevant alert, snooze this alert for entire case

- Select Action (independent of OR randomization)
☐ No indication for clinician communication
☐ Measure glucose value urgently if not already done
☐ Measure glucose value when feasible if not already done
☐ Discuss patient-specific etiology for dysglycemia (enter comment)
☐ Discuss patient-specific risk from dysglycemia (enter comment)
☐ Other (enter comment)

- Reason for Contacting Control Room (if you did)
☐ DO NOT CONTACT room was contacted in error
☐ Protocol override due to imminent patient harm at investigator discretion (enter comment)

Add Comment

C

Save   Cancel

Figure 1. Changes to AlertWatch® Tower Mode Case Review Dialogue.
Figure 1A (top left). Clinicians in the ACT use the Case Review dialogue to address alerts generated by the AlertWatch® Tower Mode software. Full documentation includes the ACT clinician's assessment of the significance of the alert, what action they would recommend, and the response of the operating room clinician (for operating rooms in the experimental arm). The initial Case Review required participants to enter free text as they addressed individual alerts.

Figure 1B (top right). In the second iteration, a limited pick list was introduced that captured potential response.

Figure 1C (bottom). The final Case Review included an expanded pick list menu that was customized for each of the individual actionable alerts in the AlertWatch® Tower Mode program.

OR-219
- Consider measuring SPV or PPV.
- High cumulative vasopressor bolus dose. Phenylephrine = 600 mcg
- Art Line procedure note not completed.
- H&P has not been signed.
- Attending has not signed in.

OR-220
- High cumulative vasopressor bolus dose. Phenylephrine = 500 mcg

OR-222
- Glucose = 255. Consider starting insulin infusion 1.0 units / h
- Consider measuring SPV or PPV.

OR-226
- Tachycardia. HR = 101.
- High cumulative vasopressor bolus dose. Ephedrine = 50 mg

✓ OR-327   2:38   **Surgery** |Smith   Nephrectomy Partial Robotic Assisted Laparoscopic
- 2.3 hour   Glucose = 0
- 2.5 hour   H&P incomplete. ASA Status, Airway Exam

✓ CPC-TR7   0:48   **Ind End**   Chen | Doe   4   Pacemaker Placement
- 28.4 mins   Hypotension: MAP = 55
- 17.8 mins   Cumulative time for MAP < 60 = 25 minutes.
- 19.9 mins   High Temperature = 38.0 ºC (adjusted)

✓ OR-221   3:10   **Surgery**   Rao |Brown   Neck Dissection Bilateral/Laryngectomy
- 2.5 hour   Cumulative time for MAP < 60 = 14 minutes.

✓ OR-302   7:18   **Surgery** |Torres   Transplant Liver (Hepatic)
- 1.3 hour   Cumulative time for MAP < 60 = 30 minutes.
- 23.2 mins   Low Temperature = 35.3 ºC
- ✓ 7.2 hour   H&P incomplete. Diagnosis, ASA Status, Airway Exam

Figure 2A (left). **Original Census List View**

This view displayed active text alerts without any context, and was arranged only in order of operating room. Participants in Phase 1 had difficulty prioritizing alerts and stated a preference for assistance in determining alert severity.

Figure 2B (right). Modified Census List View

In the updated Census List view, introduced in the sixth iteration of the program, alerts are listed in order of priority, and additional information regarding the surgical procedure, assigned anesthesia providers, and duration of surgery is provided. Alerts that were previously addressed by the ACT are indicated by green checkmarks.