

TEMPERATURE SENTINEL

Continuous Monitoring in Hospitals

- JCAHO PC.17.10 (Tissue)
- JCAHO MM.2.20 (Medication)
- JCAHO EC.6.10 (Equipment)



Tissue

JCAHO PC.17.10 standard is for storage of tissue, which may include areas outside of the clinical laboratory, for example, surgery and outpatient centers and tissue banks. Examples of tissue specimens that might be found in an organization include bone, cornea, skin, heart valves/conduits, tendons, fascia, dura, bone marrow, veins, arteries, cartilage, sperm, embryos, eggs, stem cells, cord blood, synthetic tissue (artificially prepared, human and non-human based), and other cellular- and tissue-based transplant or implant products.

- B6. Maintain continuous temperature monitoring for storage refrigerators and freezers.
- B8. Storage equipment has functional alarms and emergency backup.
- C5. The organization's records including storage temperatures are retained for a minimum of ten years, or longer if required by state and/or federal laws.
- C7. Maintain daily records to show that tissues were stored at the required temperatures.

Medication

JCAHO Standard MM.2.20 requires that medications be stored under necessary conditions to ensure stability. EC.6.10 additionally requires that you describe and implement processes to maintain and monitor equipment performance. If your organization chooses to use temperature monitoring to achieve this, the monitoring method must track temperature in an ongoing fashion to indicate whether or not internal temperature has deviated from the required ranges for all drugs stored. In addition, the organization should have a defined process outlining disposition of medication from a refrigerator or freezer which has deviated from the recommended temperature range.

Blood Banks

Red blood cells must be stored under refrigeration and can be kept for a maximum of 42 days or frozen for up to 10 years. Platelets can be stored at room temperature for a maximum of 5 days. Fresh frozen plasma can be kept frozen for up to 1 year. Cryoprecipitate AHF made from fresh frozen plasma can be stored frozen for up to 1 year.

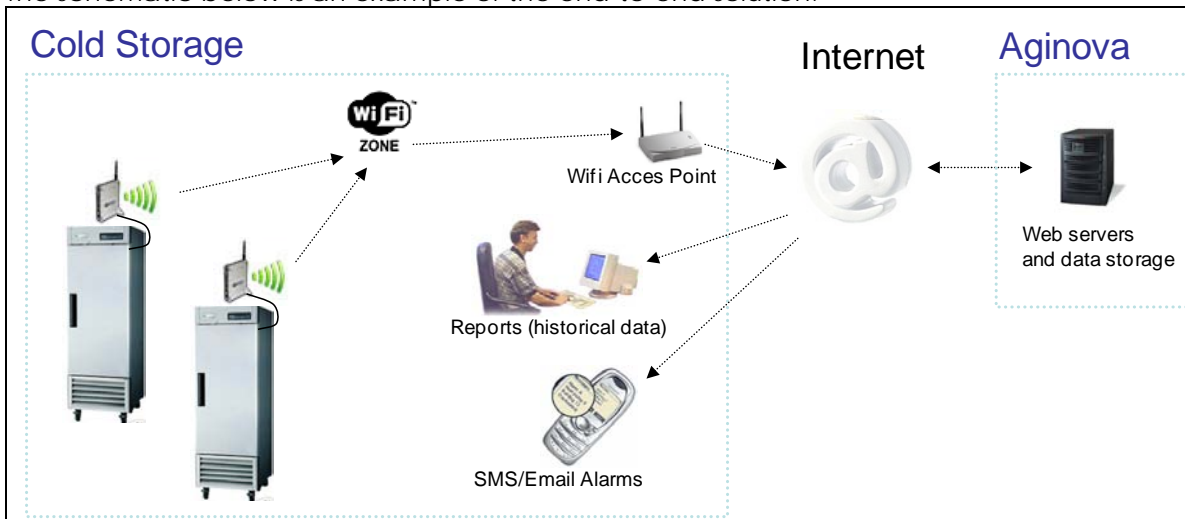
INSTALLATION & SETUP

Mount the Temperature Sentinel near the tissue storage refrigerator and freezer. Position each probe in the refrigerator or freezer to be monitored. The probes are normally placed in the unit to be monitored. Avoid mounting the probe near the ceiling of a freezer because during the defrost cycle the air temperature in this area could be as high as 55°F thereby triggering a false alarm. For blood banks the probes are normally placed in a vial of liquid so that the displayed temperature is the same as the stored blood. This gives a more accurate reading of the stored blood temperature rather than just the air temperature in the refrigerator.

Sampling Rate	Once/min
Data Storage	At least 5 days of sensor data at sampling rate of once/min
Data Transmission Frequency	Once/3 minutes
Security ON	WPA2, Authentication, AES Encryption 802.11i CCMP
Channels	1, 6 and 11 scanned
Expected Life (Using a single Li AA battery)	Up to 5 years
Monitoring Temperature Range	Typical Freezers – 0 to 5°F Typical Refrigerators – 34 to 44°F Vaccines Storage conditions – 35 to 46°F [Note Freezing temperatures for vaccines reduces its potency]
Alerting System	Email Alerts – Emails can be escalated until alert is acknowledged in the portal Cell Phone Text Message – Here too escalate until alert is acknowledged in the portal
JCAHO PC.17.10 – B6	T Sentinel monitors continuously with sampling of once/min
JCAHO PC.17.10 – B8	The Alerting system will comply with this requirement
JCAHO PC.17.10 – C5	All data is stored in a database with backup copies
JCAHO PC.17.10 – C7	Print daily reports from the portal
Record Keeping	All alerts and corresponding remediation actions are stored in the portal
Export	All sensor data can be exported as CSV files (can be opened in excel)

SOLUTION

The schematic below is an example of the end-to-end solution:



The visualization of the sensor is done using a browser. The screenshot below is the portal for the sensor data.

