

Still monitoring and logging temperatures manually?



Photo by Martin Vorel/Libreshot

Single-Solution temperature monitoring:

How healthcare can cut the cord, stop worrying and actually enjoy
a temperature audit

An ebook from Sonicu



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Single-Solution temperature monitoring:

How healthcare can cut the cord, stop worrying and actually enjoy
a temperature audit

Our refrigeration system was monitored manually. The problem with this type of monitoring is that you only know what the temperature is at the time of the reading. How do you know what is happening the other 23 hours and 59 minutes?

Tim Livesay, Hancock Regional Hospital Pharmacy Director

Where to start?

Obviously at the beginning; but for a healthcare system, finding the right place to start can be the larger part of the issue when considering remote temperature monitoring.

The problem, to use a healthcare analogy, is there are so many temperatures to take.

Operating suites, pharmacy refrigerators and freezers, clean rooms and dining services are just some of the environments that must be monitored to ensure safety, preserve quality and promote patient experience.

How does an enterprise adapt to all the various temperature applications; conform to differing regulatory reporting formats and requirements; alarm what needs to be alarmed, to whom at the appropriate time; and – oh, by the way – keep the folks in IT from melting down?

The urgent necessity: Failure is not an option

There is no alternative to effective healthcare temperature monitoring and logging; wellbeing and safety depend on it. Negative impacts from a significant undetected temperature excursion run from bothersome to catastrophic – spoiled food to spoiled vaccines, missed temperature reports to regulatory noncompliance.

The implications arising from a non-existent or inadequate remote temperature monitoring program are equally acute. Manual reading and temperature logging divert countless staff hours away from core functions. Indiscreet alarming fosters alarm fatigue. Multiple platforms measuring differing temperature

applications compound confusion, inefficiency and the potential for error from purchasing to patient care.

To effectively and efficiently take healthcare's temperature, it's necessary to find a single solution that seamlessly integrates all aspects and applications of temperature monitoring into one platform.

Setting the table

The long list of state and federal programs and requirements dictating what should be measured with specifics on how it should be measured is daunting.

The federal Vaccines for Children program, which doled out over 40 million vaccinations last year, *requires* continuous temperature monitoring and recording with a digital thermometer carrying a current, valid certification report. Probes must be certified, thermally buffered and fall within specific deviation parameters, and the entire system must be alarm-capable.

Similarly, the CDC and the Joint Commission on Accreditation of Healthcare Organizations all weigh in on the ways and means of temperature monitoring for a variety of applications throughout the system.

For surgical theaters, the American Society of Heating, Refrigeration and Air-Conditioning Engineers recommend temperatures range between 66 and 68 degrees. Failure to do so risks increased temperatures from heat-producing equipment that contributes to bacterial growth and shortened equipment life – not to mention the risk to patient safety.



The Association of Perioperative Registered Nurses endorse a maximum temperature of 130 degrees for blanket and warming cabinets and suggests that readings be checked and logged at regular intervals.



Solution warming cabinets and a host of other applications need to conform to individual manufacturer specifications.

The American Association of Blood Banks, Centers for Medicare and Medicaid, HACCP and a host of other oversight and advisory organizations all have their own guidelines and recommendations pertaining to proper storage and utilization of items and assets within their purviews.

With all the divergent applications, all the differing variables, all the potentially conflicting requirements, is it possible to find one temperature monitoring solution that performs seamlessly across the board?

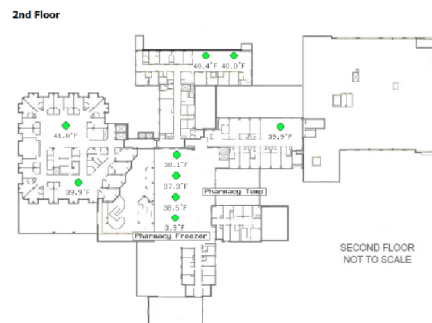
The answer is yes. There is a fully automated, remote, wireless program that automatically monitors temperature with the necessary precision *and* generates auto-formatted reports to meet healthcare's rigorous reporting requirements.

Where problems arise

In addition to the endless and changing array of varying applications, regulations and requirements, there are practical issues that are universal thorns embedded in healthcare temperature monitoring and reporting functions.

Inefficiency

One Central Indiana health system estimated it lost approximately 5,000 full-time employee hours annually to manual temperature monitoring and logging. Essentially, the system paid two staffers to do nothing but check and write down temperature readings throughout the system for an entire year.



By utilizing a remote wireless monitoring system with automatic reporting, the enterprise can recover lost hours and costs and convert them to increased productivity.

Further, consider that a staff member is called away from a core responsibility to check temperatures in the pharmacy department. After expending the necessary time to complete the round, read and log temperatures at several pharmacy refrigerators, did that staff member:

- Observe the temperature readout correctly?
- Record the observed digital temperature reading accurately?
- Properly log the temperature?
- Remember to repeat this process later in the day at the appropriate time utilizing proper procedure?

If the answer to any of the previous questions is NO, there is an immediate potential threat to the contents of those refrigerators with the possibility of serious consequences to inventory and patient safety down the line.

Additionally, an error in the manual logging process may cause future difficulty at audit time. Difficult, time consuming and inefficient in and of itself, an audit that uncovers inaccuracies will only compound underlying problems and issues, making the process even more taxing.

Uncertainty: Trusting the unknown

As one health system pharmacy director noted at the outset, he knew the temperatures and conditions of his department’s refrigerators when the readings were taken, but between temperature checks there was no way to know if his drugs and vaccines were safe.

He had no idea what his critical temperatures were at any given moment.

For those locations that are unstaffed overnight or at various other times, unattended equipment is of particular concern. There is simply no way to know whether proper temperature ranges are being maintained. There is no way to know whether a power interruption that resolved prior to opening has damaged sensitive drugs or vaccines there.

Even the most innocuous activity can have a devastating effect. Was a refrigerator that was unplugged for maintenance or cleaning installed correctly and plugged back into the wall? Absent an automated, remote temperature monitoring system, staff won’t know the answer until it’s time to check the temperature. And even then it can’t be said with certainty the contents were not exposed to an integrity-compromising temperature deviation.

Equipment, condensers, motors and other mechanical devices by their very nature are prone to wear and eventual failure. It’s hard to know whether or not a refrigerator is behaving erratically prior to failing completely.

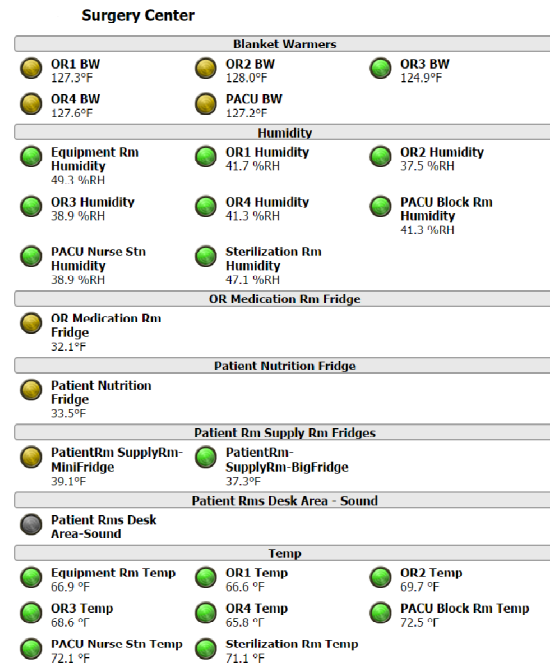
However, a temperature monitoring system that constantly records temperatures and temperature fluctuations can provide the insight necessary to avert a costly equipment failure and a catastrophic loss.

Uncertainty: Trusting what appears to be known

The digital temperature readout indicates 42 degrees Fahrenheit. But is that an accurate reading?

The CDC’s June 2016 *Vaccine Storage & Handling Toolkit* points out that “all temperature monitoring devices experience ‘drift’ over time that affects their accuracy.”

Constant temperature monitoring is not effective if the monitoring and measuring device has drifted beyond acceptable limits. Sensors and probes require periodic recalibration to ensure proper monitoring, and the CDC recommends testing every one to two years or according to manufacturer specifications.



Periodic testing or recalibration is a necessity for accurate temperature monitoring, and an effective temperature monitoring program must incorporate a simple and efficient recalibration process and provide documented proof that the equipment is accurate and meets national standards.

Uncertainty: Bridging to the digital world

For systems using analog temperature probes coupled to digital data loggers, yet another layer of calibration must be considered for optimal accuracy.

An analog system is much more susceptible to noise (small, undesirable voltage fluctuations, and analog signals must be digitized before they can be displayed in readable form.

Enter the Analog Digital Converter (ADC) that samples the free-flowing analog signal and quantizes it to a stream of 0s and 1s.

However, if the ADC is not properly calibrated, the accuracy of the digital signal being logged or transmitted remains questionable – even if the probe is accurate.

Accountability/Verification

How is log and report accuracy verified under a manual system?

For example, where a health system must submit to a monthly compliance audit showing temperature checks twice daily that record minimum and maximum temperatures, how can it be established that:

- The readings were taken when they appear to have been taken?
- The temperatures were recorded accurately?
- The document/log has not been altered?

And what are the long-term implications for the department if there is difficulty in the verification process?

Daily reports must be accurate *and* verifiable. Effective reporting leaves no doubt as to its credibility.

Taking the longer view, effective temperature monitoring must not only report the present and account for the recent past, it must also have a robust ability to archive and easily retrieve historical data to ensure regulatory compliance and provide sound management intelligence.

Putting it all together

Regardless of the application, Sonicu's Temperature Monitoring Program is healthcare's premier *single-source* solution. And it's incredibly simple to implement, customize and operate.

How it works

Digital temperature sensors, or, when required, glycol-based digital temperature probes constantly record temperatures and send those readings to Sonicu's cloud-based software platform, SoniCloud, via a cellular, WI-FI or Ethernet gateway where all data is viewable in real time.

SoniCloud is hosted on Amazon Web Services, the world's leader in cloud hosting services with unmatched security, encryption and multi-site backup capabilities to serve healthcare's stringent security and privacy demands and obligations.



In addition to being safe, reliable and secure, Sonicu's off-site cloud hosting does not impact or impose additional burdens on a healthcare system's existing IT structure.

Sonicu's platform allows users to set custom alarm parameters to manage virtually any temperature monitoring situation via text, email or phone call and can be programmed for automatic escalation and forwarding when necessary.

What it tells you

In a word: Everything.

First, temperature data and equipment performance information is available in real time, at a glance. There is never any doubt about the temperature environment. If temperatures go out of range, alarms are sent immediately, hastening response time, saving assets and maintaining safety and integrity.

Alarm criteria can be set to conform to a specific unit's characteristics, such as a particular pharmacy or clinic refrigerator; the contents of a particular unit – vaccines, pharmaceuticals or biologicals; the type of sensor being used; or by location or department.

High-level customization capability is essential to avoid unnecessary alarms and beat back the effects of alarm fatigue, which the Joint Commission has deemed a National Patient Safety Goal and issued a Sentinel Event Alert on the issue.

There's nothing quite like a good report

Real-time monitoring and alarming, however, are only one parts of a comprehensive remote temperature monitoring program.

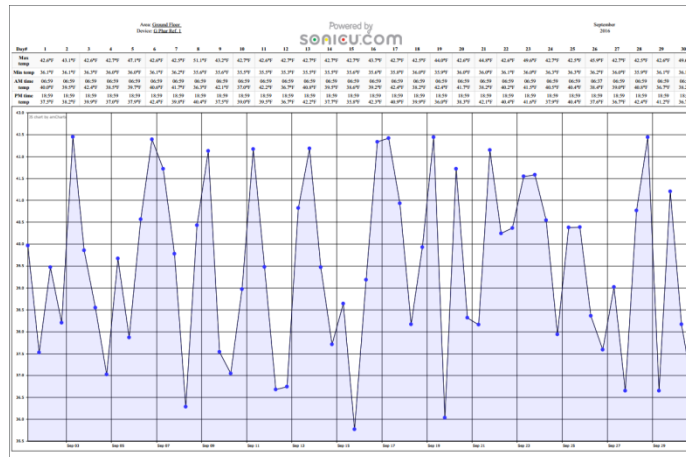
A program without an auto-generated reporting capability only goes half the distance toward automation that truly improves efficiency.

Systems using temperature probes to forward information to digital data loggers still fall short of complete automation. Data loggers must be dumped and the information downloaded, collated and formatted into reports for compliance and management. Time is still being unnecessarily consumed by the monitoring process.



Sonicu's Temperature Monitoring Program is a ground-to-cloud platform that does not utilize data loggers or other intermediary devices. All temperature data is seamlessly transmitted via digital sensors to Sonicu's proprietary platform where the information is available in real time and archived.

Sonicu auto-generates daily reports showing multiple temperature (and relative humidity) readings along with min/max levels over the 24-hour period. Weekly reports summarize average, minimum and maximum readings along with the number of alarm events for the week for all monitored points.



Temperature data can be automatically tailored to comply with all federal, state and local regulatory reporting requirements and formats for instant reporting and audit compliance.

Unparalleled Accuracy and reliability



Sonicu's digital temperature sensors and probes are calibrated prior to shipment to maximize operational life prior to recalibration. All Sonicu equipment is NIST (National Institute of Standards and Technology) traceable and arrives with a certificate of traceability. Sonicu testing conforms to ISO 17025.

Recalibration is a SNAP

Sonicu Temperature Monitoring Program removes worry, guesswork and uncertainty from the recalibration process. With its proprietary SNAP recalibration program, recalibration deadlines are calendared and a newly recalibrated probe or sensor is shipped on schedule. Sonicu sensors and probes are designed for easily installation. Out-of-date probes are snapped out, and fresh probes are snapped in, eliminating the downtime required to have sensors shipped off site or a recalibration team to take the system off-line for recalibration.

Summing up: The whole is greater than the sum of its parts

Sonicu temperature monitoring is more than a system. More than equipment and software.

It's a comprehensive temperature monitoring program that offers a single-source solution to span the broad needs and demands of healthcare temperature monitoring.



Features

- Simple implementation.
- Temperature monitoring that meets and exceeds all federal, state and local regulatory requirements, including those of the CDC, VFC, CMM and others.
- Comprehensive, automated reporting capabilities to comply with all regulatory formats.
- 24/7/365 remote temperature monitoring, alarming and management.
- SNAP Calibration program makes required recalibrations as easy as snapping freshly calibrated probe into place. Eliminates downtime and uncertainty.

Advantages

- Automated logging and report generation for efficient, error-free reporting compliance.
- Intuitive, user-friendly interface.
- SMART alarming can be individually tailored to use, contents, location and application.
- Data-Sync feature virtually eliminates data loss from power loss or other interruptions.
- Fully scalable to grow with enterprise needs.

Benefits

- Increased efficiency, accuracy and reliability.
- Eliminates manual temperature reading and logging.
- Single-source temperature monitoring system for all healthcare applications.

It really is that simple

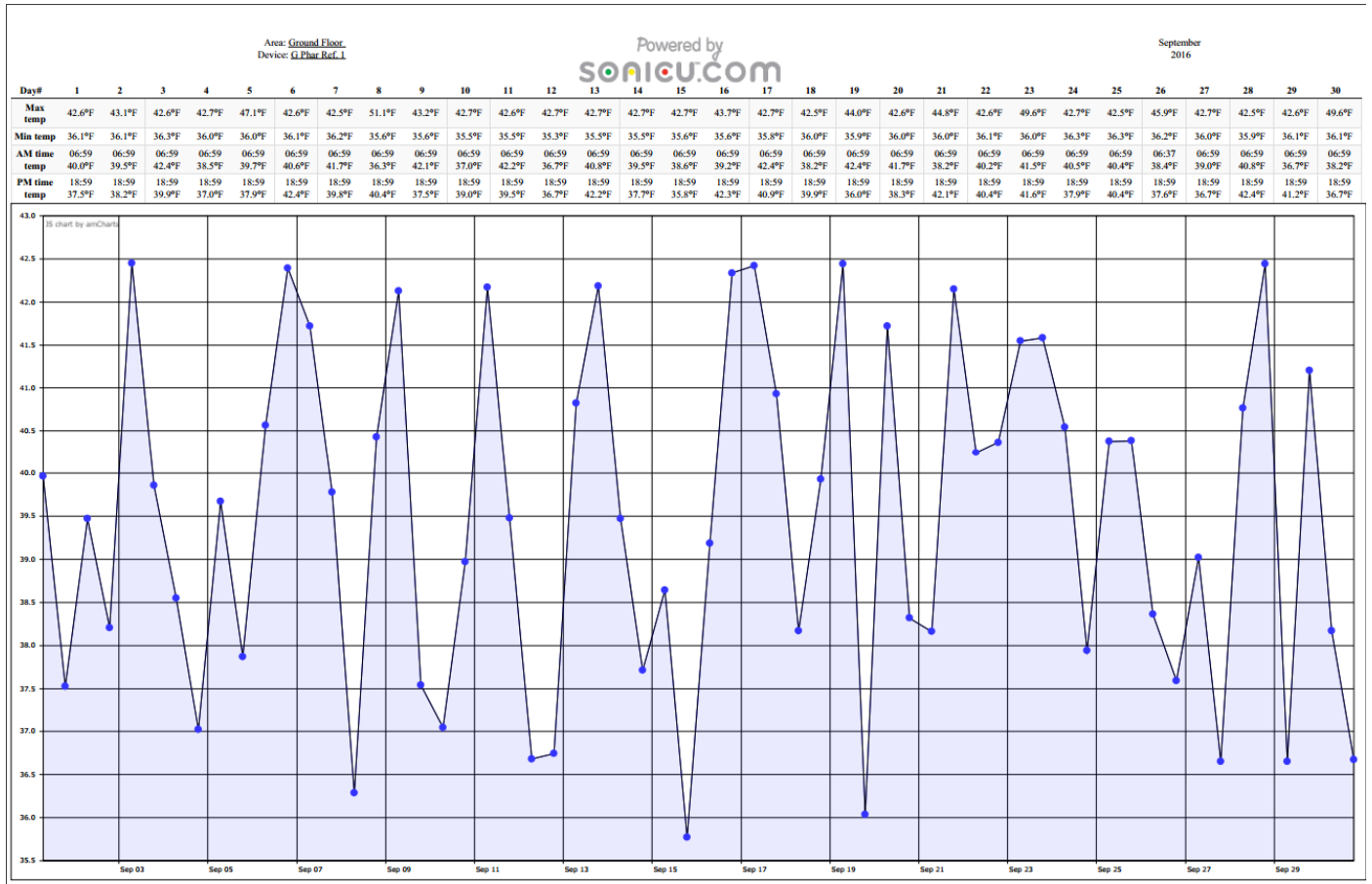
Sonicu temperature monitoring is easy to install and implement. It can work independently of existing IT infrastructure, and it is fully scalable to grow with enterprise needs.

Sonicu's Temperature Monitoring Program provides healthcare leaders a single-source platform to measure any enterprise temperature application for improved safety, increased efficiency and enhanced patient experience.



Appendix A

Sonucu Daily Temperature Report



About SONICU

Based in Greenfield, Ind., Sonicu is an IoT innovation company offering industry-leading Sound Monitoring and Temperature Monitoring programs along with the first system-wide environmental monitoring solution for health care enterprises. Sonicu's patented wireless sensors and Cloud-based infrastructure provide a platform scalable to health care enterprises of any size. Sonicu solutions also work independently or in conjunction with existing IT systems. For more information, go online to www.sonicu.com.