

Parkland Health and Hospital System



Improving Patient Satisfaction, Operational Control and Energy Performance in an Existing Hospital



Parkland

James Tucker
Sr. Program Manager
Energy and Sustainability

Michael Wood, CHFM, CHSP
Director of Engineering



Mandate

To furnish medical aid and hospital care to indigent and needy persons residing in the hospital district.

Vision

By our actions, we will define the standards of excellence for public academic health systems.

Mission

Dedicated to the health and well-being of individuals and communities entrusted to our care.

Key Statistics	
Adult inpatient beds	770
Neonatal beds	65
Pathology procedures per year	9.4 million
Surgeries per year	18,523
Outpatient visits per year	1.2 million



Parkland

**Current location since 1954
Founded 1894**

**5201 Harry Hines Boulevard
Dallas, Texas**

Campus Sustainable Initiatives



Laundry Wash Water Recycling



Bulb Recycling



Sustainable Processes



DART – Access to Public Transportation



Cardboard Recycling



Coca Cola Reverse Vending



Partnership with Rubbermaid/Guy Brown



Renewable Energy -Solar Tower Garage



Paper Recycling



Energy Efficiency Strategies



**Legacy Pneumatic
Thermostat**



- Temperature comfort issues
- Higher operational costs
- Wasted energy

Steam Trap



- 15-20% fail annually according to DOE
- Each failure can result in \$5K-\$10K of lost steam annually
- Failed traps can shorten asset life and increase safety risks



- New non-invasive technologies from Cypress Envirosystems promised simple solutions to known problems
- Parkland piloted the Wireless Pneumatic Thermostat (WPT) and Wireless Steam Trap Monitor (WSTM)
- Data-driven analysis to determine impact

Wireless Pneumatic Thermostat



- Provides DDC-zone control and comfort
- Installs non-invasively in 10 minutes
- 80% lower cost than DDC

Wireless Steam Trap Monitor



- Detects failed steam traps
- Installs in minutes while system is hot
- Pays back in 1-2 years

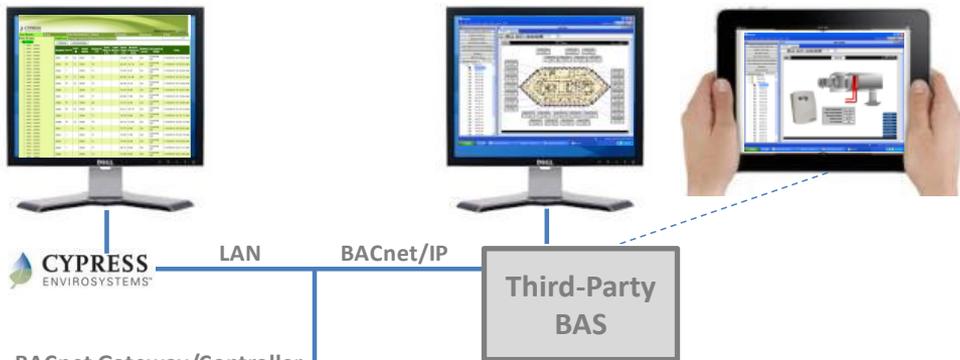


Parkland

Wireless Network

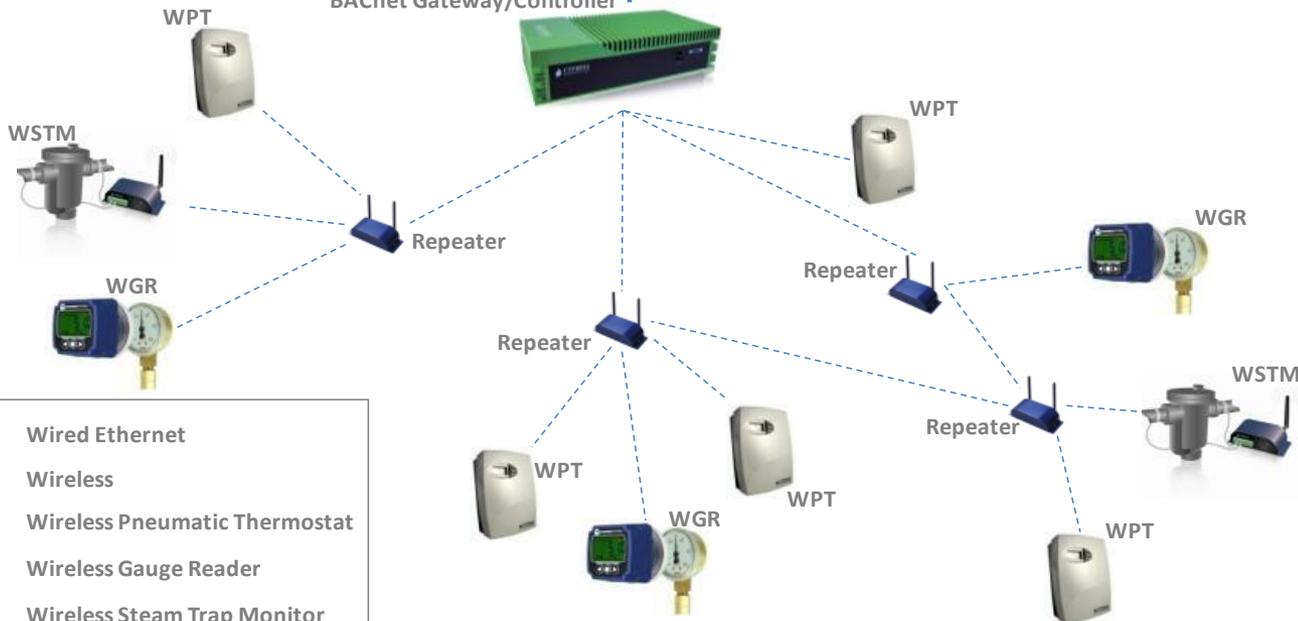
- ✓ No interference
- ✓ Wireless in 80MM devices
- ✓ Very reliable
- ✓ Integrates with BAS

BACnet interface compatible with:



BACnet Gateway/Controller

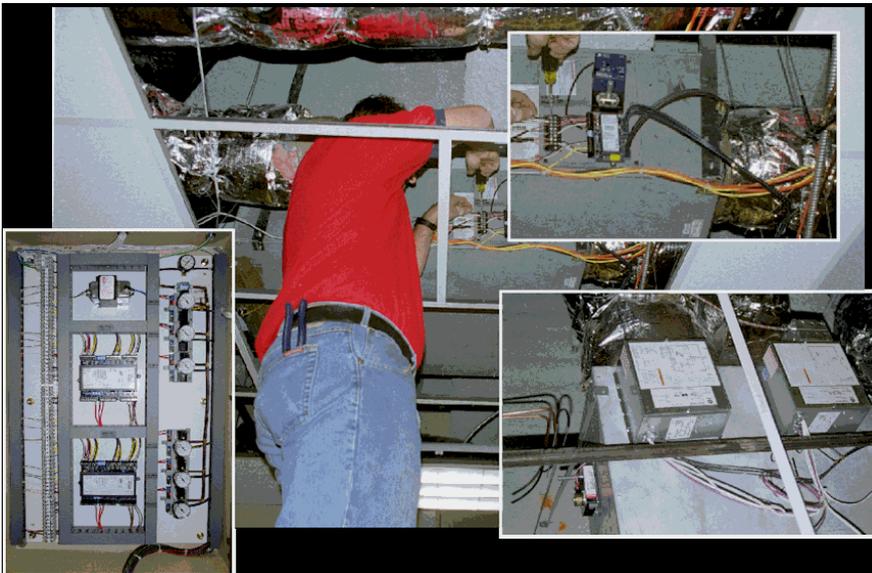
Third-Party BAS



- Wired Ethernet
- Wireless
- WPT Wireless Pneumatic Thermostat
- WGR Wireless Gauge Reader
- WSTM Wireless Steam Trap Monitor



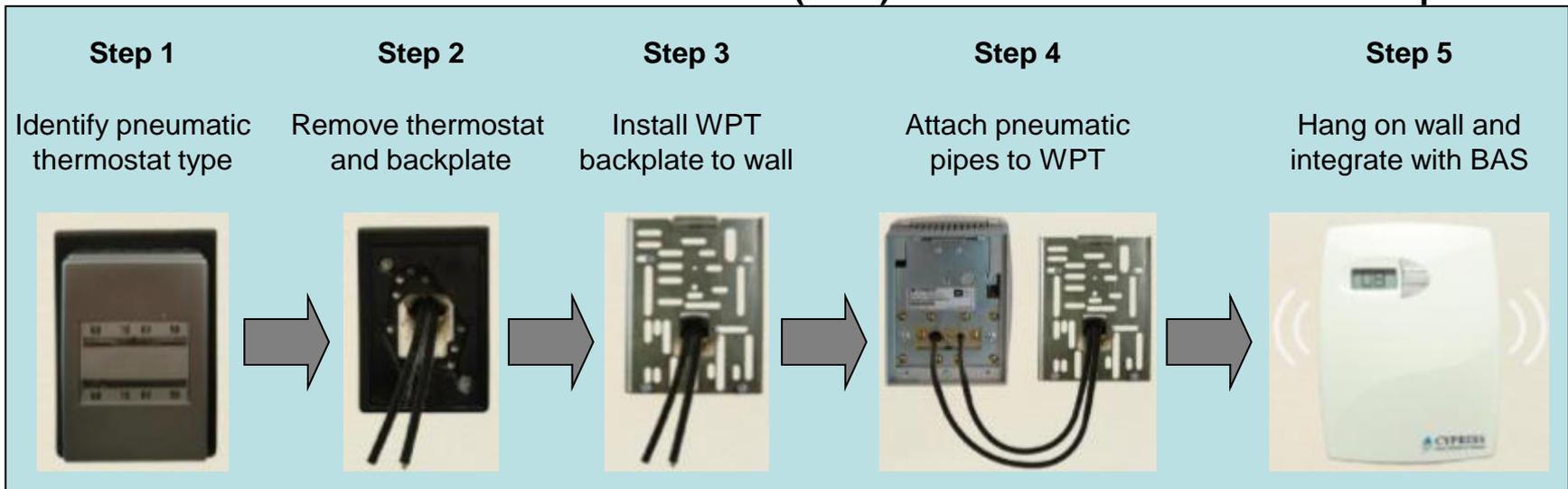
- Retrofitting pneumatic zones to traditional DDC disrupts hospital operations
- Opening of walls and ceilings require infection control barriers
- Typically DDC retrofits are put off until major renovations of whole floor (15-20 year cycle)
- Patient comfort, operations and energy are impacted until retrofit occurs





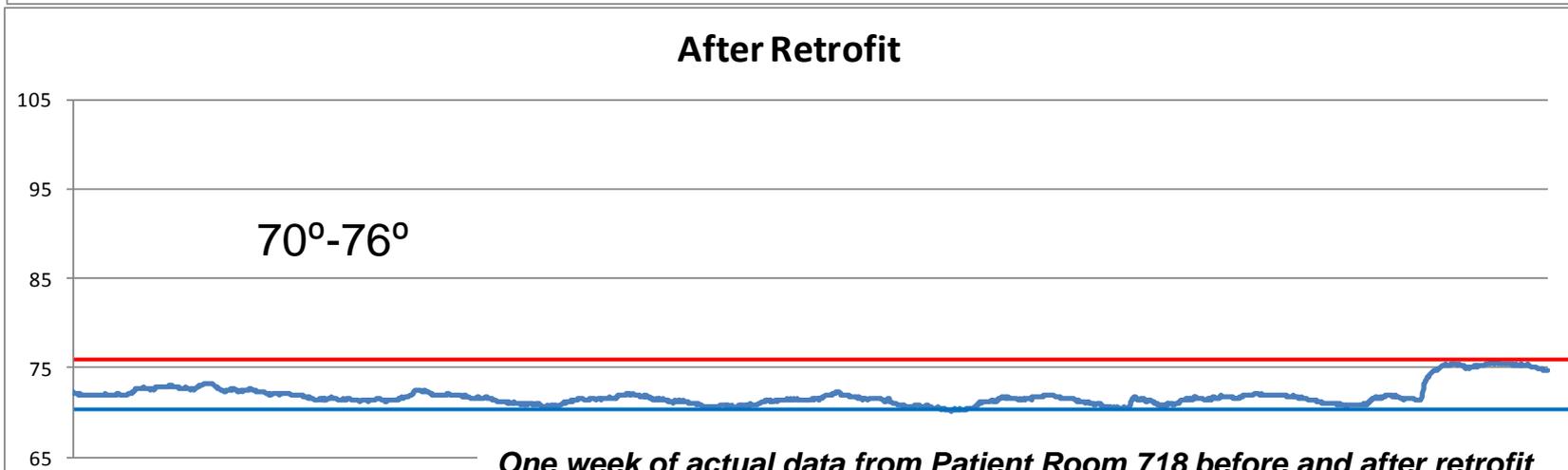
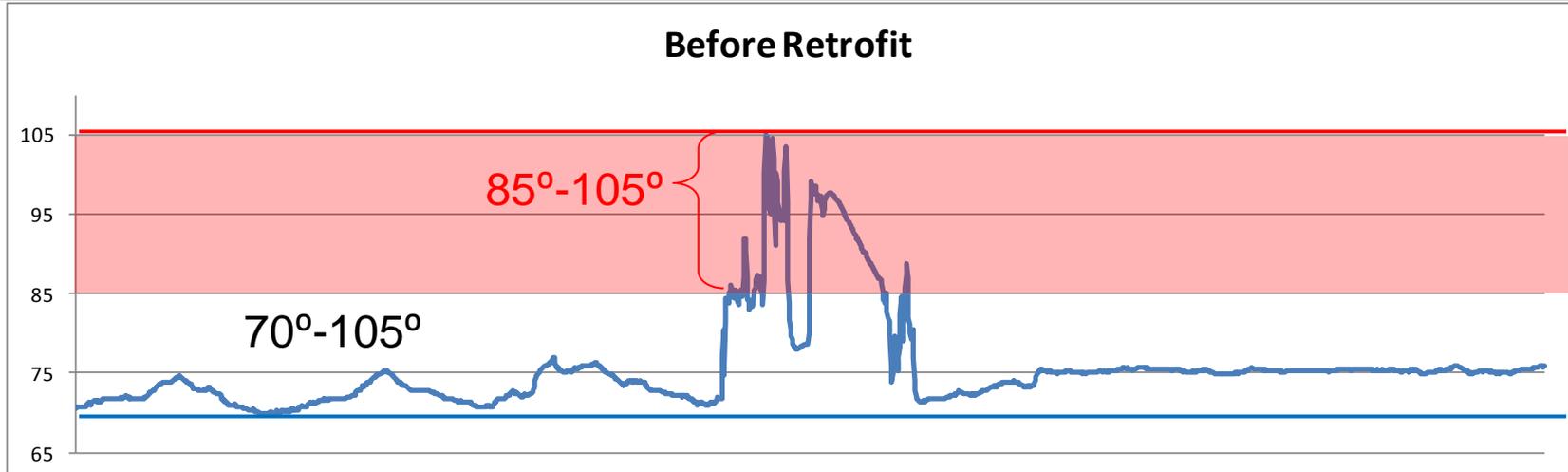
- The WPT retrofits existing pneumatics noninvasively
- Only ten minutes in each room
- No downtime—retrofit can take place in occupied room or between patients
- No infection control barrier required
- Costs 80% less than traditional DDC conversion

The Wireless Pneumatic Thermostat Provides (WPT) DDC Zone Control without Disruption





- Problems in patient rooms were not visible centrally with traditional pneumatic thermostats
- Problems persisted until patients or nurses complained
- Digital zones allow for tighter control and alarm problems

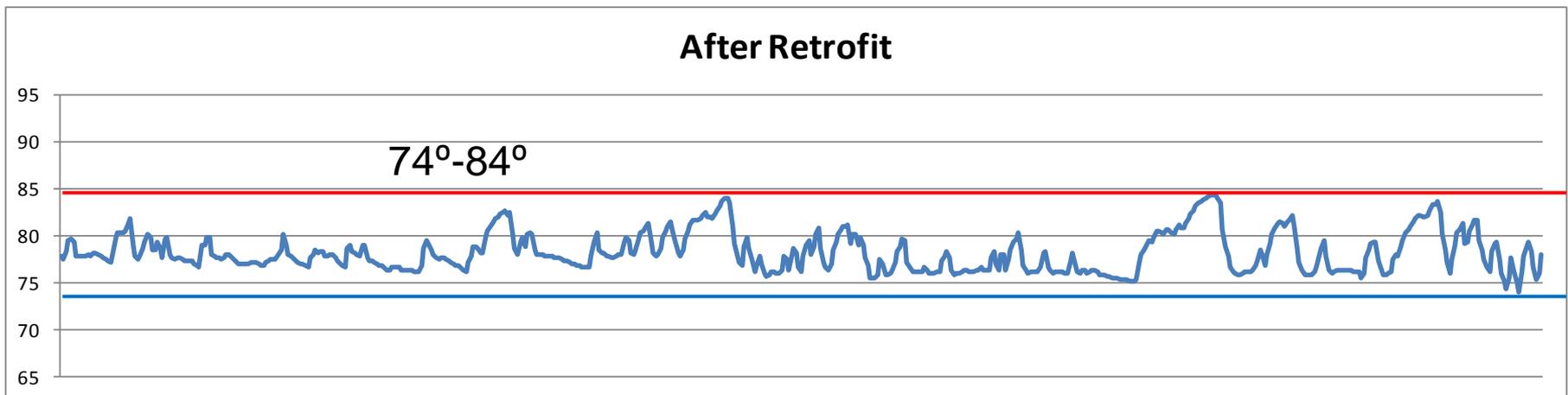
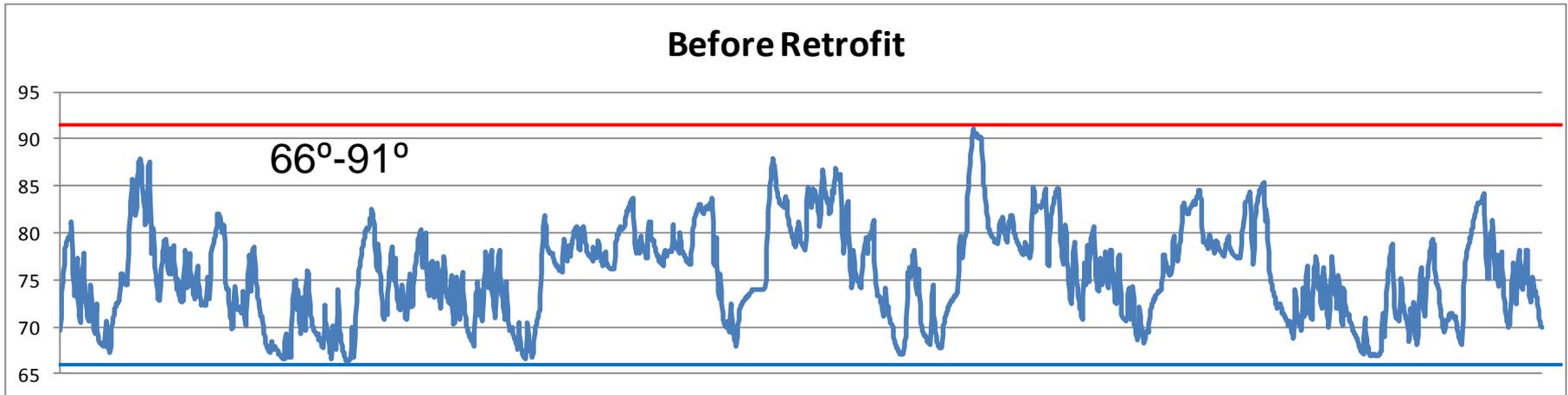


One week of actual data from Patient Room 718 before and after retrofit



Parkland Who Controls the Nurses' Station?

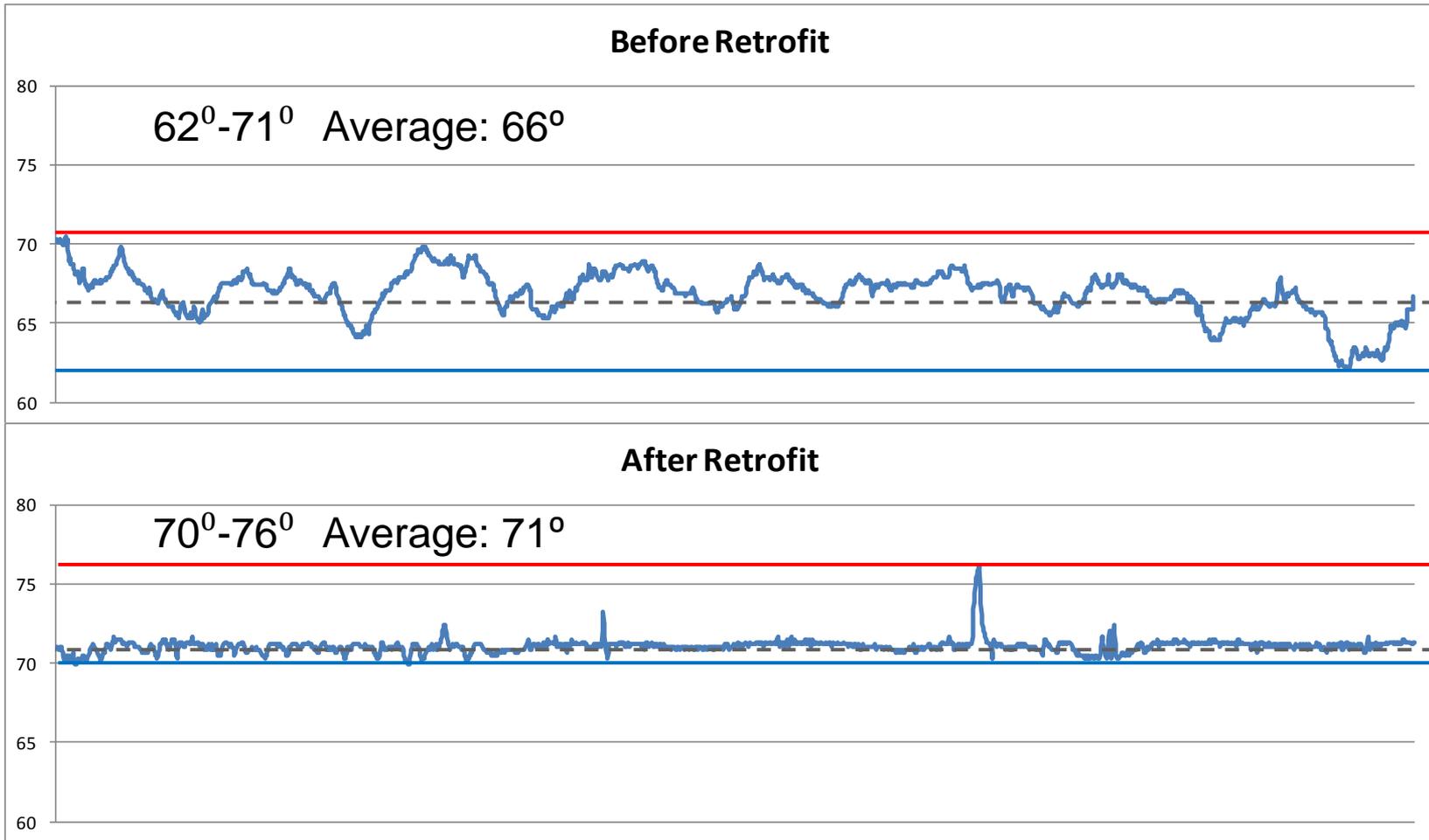
- Nurses changed setpoints frequently
- Lack of digital display resulted in extreme setpoints and temperature swings
- The digital feedback on the thermostat changed behavior, i.e. less drastic setpoints



One week of actual data from Nurses' Station before and after retrofit



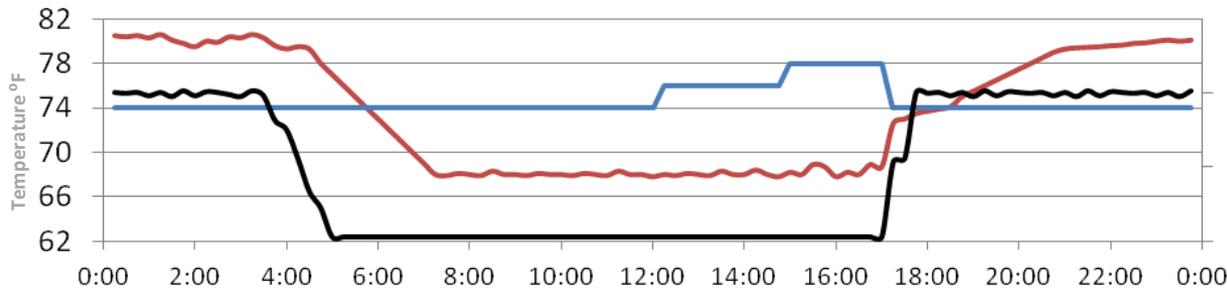
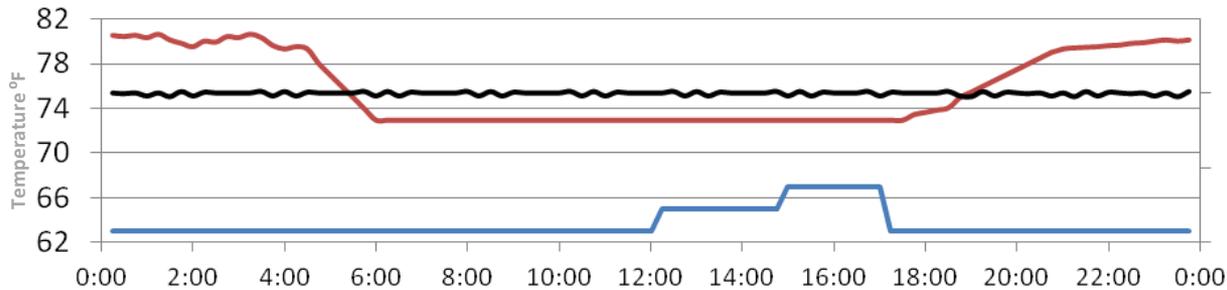
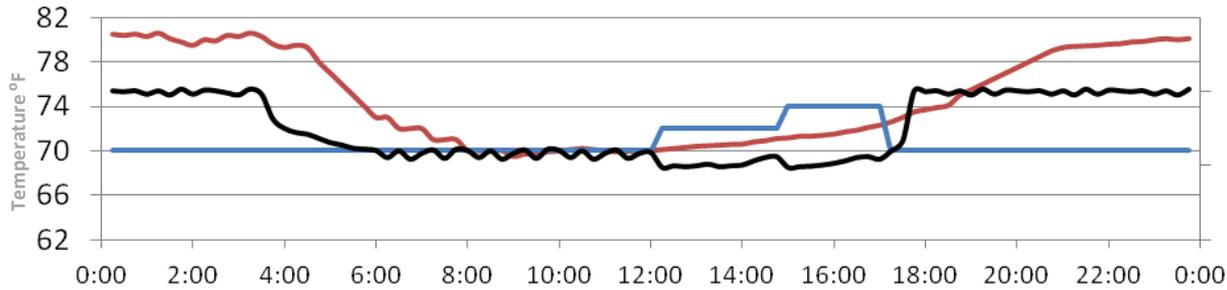
- Low temperatures persisted with old pneumatic thermostats
- Average temperatures (old vs. new): 66° vs. 71° ($\Delta 5^\circ \approx 10\text{-}20\%$ energy savings*)
- Outdoor temperatures: 92°-107°



*Note: <http://energyexperts.org/EnergySolutionsDatabase/ResourceDetail.aspx?id=3998>



Diagnostic Data



 Setpoint Temp
  Room Temp
  Branch Pressure

Alarm	Possible Faults
	<ul style="list-style-type: none"> • None
	<ul style="list-style-type: none"> • Faulty Reset Velocity Controller • Stuck damper • Broken spring • Undersized cooling capacity design
	<ul style="list-style-type: none"> • Faulty Reset Velocity Controller • Electric reheat and AC on • VAV Box Fault • Adjacent Zone Overcooling



- **Temperature setpoint control**
- **Temperature resets**
- **Night/Weekend Setbacks (with override)**
- **Deadband**
- **Optimal Start/Stop**
- **Pre-Cooling/peak shifting**
- **Supply Air Temperature Resets**
- **Duct Static Pressure Resets**



- **Improves environment for patient comfort**
- **Provides better control and digital feedback**
- **Enables faster troubleshooting with diagnostic data**
- **Eliminates calibration**
- **Saves energy**



- 2 of 7 traps were identified as failed during pilot
- Failures would have persisted until next annual inspection
- Avoided steam loss was approximately 500K pounds or \$7K

Example of WSTM Dashboard



WSTM Executive Summary Report

Overview

Total Number of Traps: 12		
Health Status	Count	% of Total
Nodes with low battery	0	0.00
Nodes with poor RF signal strength	0	0.00

Energy Summary

Steam loss (lbs/hr)	35.70
Dollar loss (\$/yr)	4,691.38

Condition Summary



Condition	Count	% of Total
Good	8	66.67
Out of Service	3	25.00
Blowing	1	8.33
Error	0	0.00
Flooded	0	0.00
Leaking	0	0.00



- **Cypress's non-invasive approach enables improvements that would not be feasible otherwise**
- **These technologies help improve patient satisfaction, operational control, and energy performance**
- **WPT and WSTM have less than two-year simple payback**