



AMERICAN COLLEGE OF CLINICAL ENGINEERING

# 2024-2025 Educational Webinar Series

## How Predictive Planning Saves You Money and Time

November 14, 2024

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# About the Moderator



**Angelina Chiaracane-Guthrie, MS, CCE, CHTM**  
**Biomedical Engineer**  
**Department of Veterans Affairs**

Angelina is a Biomedical Engineer with the Department of Veterans Affairs of Tampa, Florida. She is responsible for the implementation of specialized equipment and complex capital projects and thoroughly involved in Patient Safety workgroups. Previously Angelina worked for Kaiser Permanente in Northern California, serving as a Clinical Systems Engineer responsible for the Respiratory Care and Cardiovascular Services portfolios in the Region, and has prior experience as a Clinical Technology Manager developing standardization practices and documentation for service delivery.

Angelina received her Bachelor's Degree in Bioengineering from Florida Gulf Coast University and received her Master's Degree in Clinical Engineering from the University of Connecticut.

# Logistics

- ❖ All attendees have their microphones muted during the presentation.
- ❖ Questions to the panelists must be submitted via the “Q&A” feature in Zoom at any time. They will be addressed at the Q&A portion.
- ❖ If there is any urgent issue, please use the “chat” feature to communicate with the host/moderator.
- ❖ Please remember to complete the webinar evaluation after attending. A link will be provided at the end.

# About the Speaker



**Marc Schlessinger, MBA, FACHE**

Principal Consultant & Investigator



Mr. Schlessinger has BS and MBA degrees in Health Care Administration and is board certified in healthcare management by the American College of Healthcare Executives.

Mr. Schlessinger has held leadership positions in health care organizations in the Philadelphia area overseeing ancillary services including Respiratory Care, Cardiology, Neurology, Physical Medicine, Radiology, Wellness, and Pharmacy.

In his current role at ECRI, Mr. Schlessinger is the Principal Consultant in the Accident and Forensics group, providing consulting services and assistance to hospitals and other healthcare institutions in matters concerning patient safety, alarm management, device integration, technology, strategic planning, operations, and capital planning.

# Session Description

A Predictive Replacement Plan is a deep dive into the capital medical equipment inventory of a health care system, which is then used to develop and coordinate an unbiased, objective, and quantifiable 10-year replacement schedule based on multiple factors.

# How Predictive Replacement Planning Saves You Money and Time

# What is a Predictive Replacement Plan (PRP)?

A Predictive Replacement Plan is a deep dive into the capital medical equipment inventory of a health care system, which is then used to develop and coordinate an unbiased, objective, and quantifiable 10-year replacement schedule based on multiple factors. A by-product of this PRP allows a health care system to standardize their devices, improving patient safety, lowering cost, and improving efficiencies.



# Key Benefits of a Predictive Replace Plan (PRP)

**Cost Optimization:** Ensure the hospital is investing resources where they matter most by replacing equipment at the right time, preventing premature replacements, and minimizing unexpected downtime costs.

**Operational Continuity:** Maintain uninterrupted patient care with proactive equipment replacement, reducing the risk of critical equipment failures that disrupt clinical operations.

**Data-Driven Insights:** Gain comprehensive visibility a hospital's device lifecycle, performance trends, and associated risks, enabling strategic planning and resource allocation.

**Streamlined Supply Chain:** Improve supply chain efficiency by aligning procurement with equipment replacement schedules, reducing excess inventory, and optimizing capital expenditures.

# Predictive Replacement Plan

Deep dive into the capital medical inventory



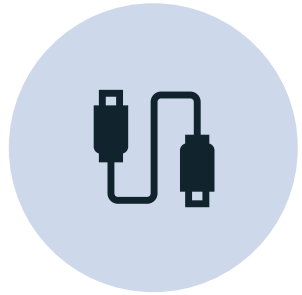
12-point analysis



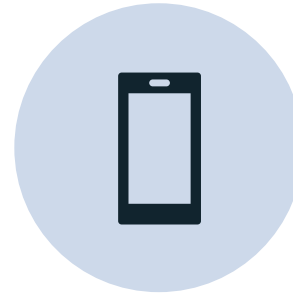
Quantifiable and objective 10-year replacement schedule

# Factors Looked at in a PRP

- Weighted objective data analyzed



Condition of the device



Safety of the device



Ability to support the device



Impact of the device if it fails

# 12 Point Analysis



## Condition of Device

- 1) Useful life using ECRI's biomedical benchmark database
- 2) Reliability as determined by interviews with stakeholders
- 3) Physical condition as determined by interviews with stakeholders



## Safety of Device

- 4) Recall data using ECRI's alert tracker data
- 5) Patient incidents as determined by interviews with stakeholders
- 6) Cybersecurity threat and review of operating system used and known vulnerabilities.



## Continuing Support

- 7) Parts availability
- 8) Service availability
- 9) End of Life and End of Support documentation by OEM
- 10) Service costs as determined by interviews with stakeholders



## Impact

- 11) Is the device critical to the mission of the institution as determined by interviews with stakeholders
- 12) Patient impact | Reputation impact | Throughput impact

# Additional Analysis based on Your Goals and Current State

## Organizational goals

Based on interviews with key stakeholders, COO, CNO, CIO, CFO, and others, our recommendations consider growth/decline of service lines and programs, and budget expectations.

## Cybersecurity

Identify devices that need to be replaced due to outdated operating systems and other inherent risks.

## Patient needs now and future

Consider the equipment already in place and whether it meets the needs of both the patient population and the clinician.

# An Imaging PRP/Standardization Project

## Goals

- Increase negotiating power and drive concessions from suppliers
- Promote standardization, lower capital funding requirements via greater price discounts, and improve total cost of ownership
- Develop a 10-year Capital Replacement Plan for Imaging
- Align replacement strategy to strategic and operational goals

# An Imaging PRP/Standardization Project Results

- Decreased from 17 vendors to 6 vendors for capital imaging
- Standardized to a single vendor for each imaging modality
- Material shift in vendor alignment
- Simplified capital budgeting and acquisition
- Simplified design and construction
- Simplified IT interfaces
- Enhanced HTM ability to service equipment

# Breakdown of Purchase Price Savings

| Type of Device        | Average Purchase Cost Before Standardization | Average Purchase Cost After Standardization | Anticipated Purchases Over 10 Years | Projected Savings Over 10 Years |
|-----------------------|--|---|-------------------------------------|---------------------------------|
| <b>Angiography</b>    | \$1,158,909                                  | \$1,114,335                                 | 16                                  | \$713,184                       |
| <b>CT</b>             | \$584,858                                    | \$555,615                                   | 14                                  | \$409,402                       |
| <b>DEXA</b>           | \$46,880                                     | \$44,590                                    | 6                                   | \$13,740                        |
| <b>Digital X-Ray</b>  | \$166,523                                    | \$145,500                                   | 70                                  | \$1,471,610                     |
| <b>Gamma Cameras</b>  | \$283,445                                    | \$270,110                                   | 6                                   | \$80,010                        |
| <b>Mammography</b>    | \$446,729                                    | \$428,859                                   | 18                                  | \$321,660                       |
| <b>MR</b>             | \$1,467,800                                  | \$1,409,088                                 | 12                                  | \$704,544                       |
| <b>PET/CT</b>         | \$2,089,556                                  | \$2,047,765                                 | 2                                   | \$83,582                        |
| <b>Portable C-Arm</b> | \$204,867                                    | \$192,575                                   | 28                                  | \$344,176                       |
| <b>Portable X-Ray</b> | \$166,923                                    | \$158,576                                   | 33                                  | \$275,451                       |
| <b>Rad/Fluro</b>      | \$465,198                                    | \$451,242                                   | 2                                   | \$27,912                        |
| <b>Ultrasound</b>     | \$161,896                                    | \$109,896                                   | 300                                 | \$15,600,000                    |
| <b>TOTAL</b>          |  |   |                                     | <b>\$20,045,271</b>             |

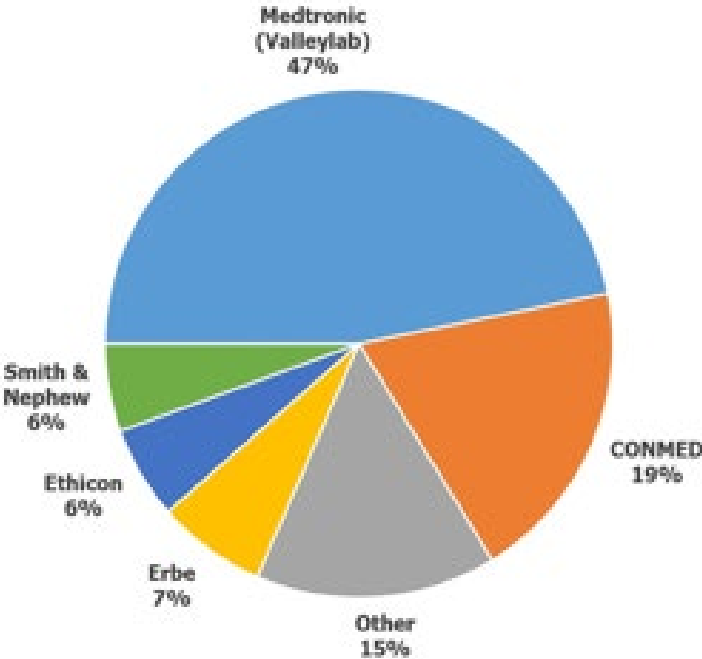


# Breakdown of Service Contract Savings

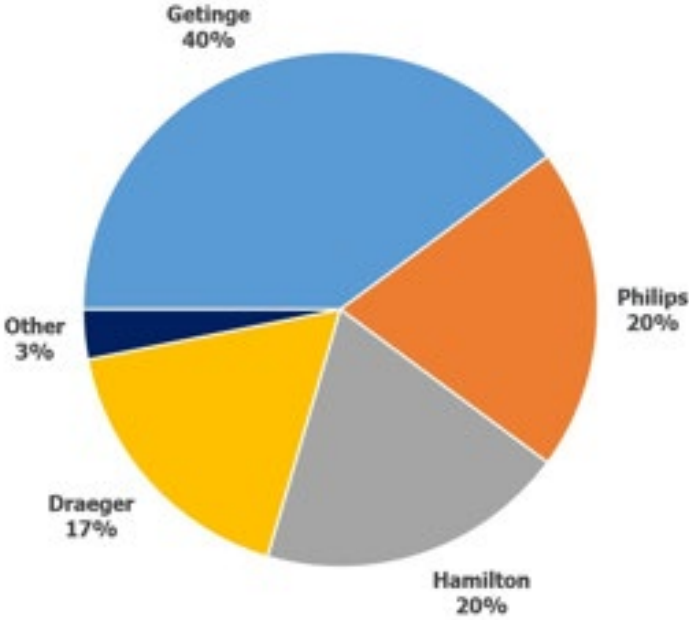
| Type of Device | Annual OEM Service Costs Before Standardization | Annual OEM Service Costs After Standardization | Total Number of Devices in System | Projected Yearly Savings |
|----------------|---|--|-----------------------------------|--------------------------|
| Angiography    | \$57,945  | \$35,926                                       | 28                                | \$616,540                |
| CT             | \$29,243  | \$18,131                                       | 46                                | \$511,166                |
| DEXA           | \$1,875   | \$1,163  | 18                                | \$12,826                 |
| Digital X-Ray  | \$6,661   | \$4,130  | 45                                | \$113,902                |
| Gamma Cameras  | \$11,338  | \$7,029  | 12                                | \$51,700                 |
| Mammography    | \$22,336  | \$13,849                                       | 44                                | \$373,465                |
| MR             | \$117,424                                       | \$72,803                                       | 34                                | \$1,517,118              |
| PET/CT         | \$167,164                                       | \$103,642                                      | 4                                 | \$254,090                |
| Portable C-Arm | \$4,097   | \$2,540  | 72                                | \$112,103                |
| Portable X-Ray | \$5,008   | \$3,105  | 56                                | \$106,564                |
| Rad/Fluro      | \$32,564  | \$20,190                                       | 13                                | \$160,865                |
| Ultrasound     | \$1,926   | \$1,194  | 375                               | \$274,455                |
| <b>TOTAL</b>   |   |  |                                   | <b>\$4,104,795</b>       |

# Just How Unstandardized Are Health Care Systems?

System Wide - Electrosurgical Units

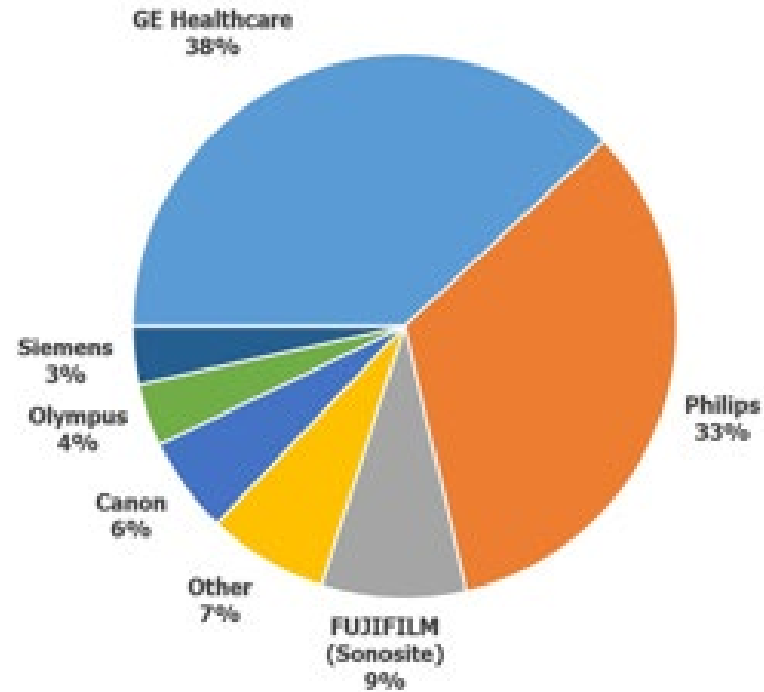


System Wide - Ventilators

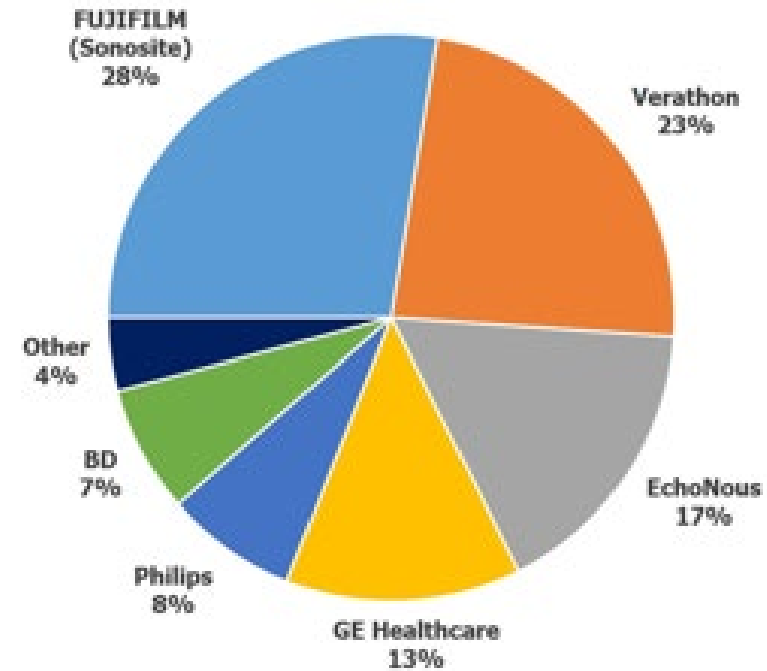


# Just How Unstandardized Are Health Care Systems?

System Wide - Ultrasound, Diagnostic



System Wide - Ultrasound, Point of Care



# What Are The Potential Savings With Standardization?

- Vendors were provided with the information on the following slide and they provided probable discount data.
- Replacement volume was based on a four-hospital system, total bed count of 1,265.
- Replacement volume based on a 10-year capital replacement plan.

# What Are The Potential Savings With Standardization?

| DEVICE TYPE          | QTY.  | QUOTED \$ | TOTAL \$     | DISCOUNT | DISCOUNT \$                   | SAVINGS \$         |
|----------------------|-------|-----------|--------------|----------|-------------------------------|--------------------|
| Anesthesia Units     | 66    | \$58,172  | \$3,839,352  | 6%       | \$3,608,991                   | \$230,361          |
| Beds                 | 950   | \$17,519  | \$16,643,050 | 10%      | \$14,978,745                  | \$1,664,305        |
| Infusion Pumps       | 5,250 | \$2,058   | \$10,804,500 | 4%       | \$10,372,320                  | \$432,180          |
| Ultrasound Units     | 75    | \$126,128 | \$9,459,600  | 12%      | \$8,324,448                   | \$1,135,152        |
| Ventilators          | 92    | \$39,201  | \$3,606,492  | 5%       | \$3,462,232                   | \$144,260          |
| POC Ultrasound       | 310   | \$42,247  | \$13,096,570 | 9%       | \$11,917,879                  | \$1,178,691        |
| OR Tables            | 72    | \$70,265  | \$5,059,080  | 7%       | \$4,704,944                   | \$354,136          |
| Physiologic Monitors | 410   | \$17,933  | \$7,352,530  | 7%       | \$6,837,853                   | \$514,677          |
| Endoscopes           | 170   | \$34,850  | \$5,924,500  | 11%      | \$5,272,805                   | \$651,695          |
| Stretchers           | 814   | \$10,049  | \$8,179,886  | 4%       | \$7,852,691                   | \$327,195          |
|                      |       |           |              |          | <b>TOTAL SAVINGS</b>          | <b>\$6,632,652</b> |
|                      |       |           |              |          | <b>AVERAGE YEARLY SAVINGS</b> | <b>\$663,265</b>   |

# Common Findings & Cost Savings Realized Through the PRP Process

- Portable Vital Sign monitors
  - Convert from one monitor per room to 3-4 monitors per unit
  - \$918k saving for a 350 bed hospital
- Infusion Pumps
  - Inventory showed a very large number of pump brains and large volume modules as compared to similar sized and types of institutions
  - \$1.7M saving for a 500 bed hospital
- Portable Ultrasound Systems
  - Moved from an outright purchase to a 5-year lease
  - \$900k savings over 5 years for a 300 bed hospital while also saving \$125k in repair costs

# Common Findings & Cost Savings Realized Through the PRP Process

- Ventilators
  - Moved to a single model rather than separate adult/pediatric/neonatal models
  - \$200k savings for a 250 bed hospital
- CT Scanner
  - Recommended purchasing a 128 slice CT rather than the proposed 256 slice model the physician requested
  - \$450k savings

| Device Type, UMDNS                                | UMDNS Code | Life expectancy, X Maximum Years | Current Device Age | Calculated Replacement Year (Based Strictly on Life-Cycle) | Evaluated Replacement Year | Replacement Price | Replacement Priority Point Total | Condition   |             |                    | Safety  |                   |               | Ability to Support |                      |                   |               | Clinical Impact     |                | PRP Ranking |
|---|------------|----------------------------------|--------------------|--|----------------------------|-------------------|----------------------------------|-------------|-------------|--------------------|---------|-------------------|---------------|--------------------|----------------------|-------------------|---------------|---------------------|----------------|-------------|
|   |            |                                  |                    |  |                            |                   |                                  | Useful Life | Reliability | Physical Condition | Recalls | Patient Incidents | Cybersecurity | Parts Availability | Service Availability | EOL/EOS Documents | Service Costs | Mission Criticality | Patient Impact |             |
| Radiographic Units, Mobile                        | 13272      | 10                               | 7                  | 2025   | 2023                       | \$147,522         | 4.23                             | 0.18        | 0.4         | 0                  | 0       | 0                 | 1.2           | 0                  | 0                    | 0                 | 0.45          | 1                   | 1              | 100         |
| Sterilizing Units, Germicidal Gas, Ethylene Oxide | 13740      | 0                                | 17                 | 2023   | 2023                       | \$46,026          | 4.1                              | 0.6         | 0           | 0                  | 0.9     | 0                 | 0             | 0.45               | 0                    | 0.15              | 0             | 1                   | 1              | 97          |
| Radiographic Systems, Digital                     | 18430      | 10                               | 7                  | 2025   | 2023                       | \$203,062         | 3.86                             | 0.18        | 0.24        | 0.24               | 0       | 0                 | 1.2           | 0                  | 0                    | 0                 | 0             | 1                   | 1              | 91          |
| Scanning Systems, Computed Tomography             | 13469      | 10                               | 7                  | 2025   | 2023                       | \$1,016,981       | 3.62                             | 0.18        | 0.24        | 0                  | 0       | 0                 | 1.2           | 0                  | 0                    | 0                 | 0             | 1                   | 1              | 86          |
| Ventilators, Intensive Care                       | 17429      | 10                               | 8                  | 2024   | 2023                       | \$35,833          | 3.44                             | 0.24        | 0           | 0                  | 0       | 0                 | 1.2           | 0                  | 0                    | 0                 | 0             | 1                   | 1              | 81          |
| Scanning Systems, Ultrasonic, Cardiac             | 17422      | 7                                | 5                  | 2024   | 2023                       | \$177,988         | 3.36                             | 0.24        | 0.24        | 0                  | 0       | 0                 | 1.2           | 0                  | 0                    | 0                 | 0.18          | 1                   | 0.5            | 79          |
| Infusion Pumps                                    | 16495      | 10                               | 6                  | 2026   | 2023                       | \$37,353          | 3.16                             | 0.12        | 0           | 0.24               | 0       | 0                 | 0.8           | 0                  | 0                    | 0                 | 0             | 1                   | 1              | 75          |
| Anesthesia Units                                  | 10134      | 10                               | 9                  | 2023   | 2023                       | \$54,820          | 3.1                              | 0.3         | 0           | 0                  | 0       | 0                 | 0.8           | 0                  | 0                    | 0                 | 0             | 1                   | 1              | 73          |
| Humidifiers, Artificial Airway, Heated            | 12050      | 7                                | 6                  | 2023   | 2024                       | \$5,497           | 2.88                             | 0.3         | 0           | 0                  | 0       | 0.18              | 0.4           | 0                  | 0                    | 0                 | 0             | 1                   | 1              | 68          |
| Monitoring Systems, Physiologic, Acute Care       | 12647      | 10                               | 7                  | 2025   | 2024                       | \$63,429          | 2.54                             | 0.18        | 0.16        | 0                  | 0       | 0                 | 1.2           | 0                  | 0                    | 0                 | 0             | 1                   | 0              | 60          |
| Hemodialysis Units                                | 11218      | 10                               | 8                  | 2024   | 2024                       | \$18,205          | 1.84                             | 0.24        | 0.24        | 0                  | 0       | 0.18              | 0             | 0                  | 0                    | 0                 | 0.18          | 0                   | 1              | 43          |
| Radiographic/Fluoroscopic Systems                 | 16885      | 10                               | 8                  | 2024   | 2024                       | \$485,380         | 1.69                             | 0.24        | 0           | 0                  | 0       | 0                 | 0             | 0                  | 0                    | 0                 | 0.45          | 0                   | 1              | 40          |
| Centrifuges, Tabletop                             | 10780      | 18                               | 20                 | 2023   | 2025                       | \$4,522           | 1.43                             | 0.48        | 0           | 0                  | 0       | 0                 | 0             | 0.45               | 0                    | 0                 | 0             | 0                   | 0.5            | 34          |
| Cameras, Gamma                                    | 15944      | 12                               | 10                 | 2024   | 2025                       | \$1,107,408       | 1.4                              | 0.24        | 0.16        | 0                  | 0       | 0                 | 0             | 0                  | 0                    | 0                 | 0             | 0                   | 1              | 33          |
| Sterilizing Units, Steam, Bulk                    | 16141      | 15                               | 10                 | 2027   | 2025                       | \$927,383         | 1.4                              | 0.06        | 0.16        | 0.18               | 0       | 0                 | 0             | 0                  | 0                    | 0                 | 0             | 0                   | 1              | 33          |
| Lasers, Ho:YAG, Surgical                          | 17769      | 7                                | 7                  | 2023   | 2026                       | \$137,895         | 1.36                             | 0.36        | 0           | 0                  | 0       | 0                 | 0             | 0                  | 0                    | 0                 | 0             | 0                   | 1              | 32          |
| Electrosurgical Units, Monopolar/Bipolar          | 18221      | 7                                | 6                  | 2023   | 2026                       | \$18,478          | 1.3                              | 0.2         | 0           | 0                  | 0       | 0                 | 0             | 0                  | 0                    | 0                 | 0             | 0                   | 1              | 31          |





# Predictive Replacement Report (PRP) by Year

| Device Type, UMDNS                                | Manufacturer            | Product                            | Replacement Cost | Priority Ranking |
|---|-------------------------|------------------------------------|------------------|------------------|
| <b>2023</b>                                       |                         |                                    |                  |                  |
| Radiographic Units, Mobile                        | GE Healthcare           | AMX 4                              | \$147,522        | 100              |
| Sterilizing Units, Germicidal Gas, Ethylene Oxide | 3M Health Care          | Steri-Vac 8XL                      | \$46,026         | 97               |
| Radiographic Systems, Digital                     | SEDECAL                 | Sedecal X Plus LP                  | \$203,062        | 91               |
| Scanning Systems, Computed Tomography             | Philips Healthcare      | Extended Brilliance Workspace      | \$1,016,981      | 86               |
| Ventilators, Intensive Care                       | Bio-Med Devices Inc     | Crossvent 2i+                      | \$35,833         | 81               |
| Scanning Systems, Ultrasonic, Cardiac             | GE Healthcare           | Vivid E95                          | \$177,988        | 79               |
| Infusion Pumps                                    | Ivac                    | 560                                | \$37,353         | 75               |
| Anesthesia Units                                  | GE Healthcare           | Aestiva 3000                       | \$54,820         | 73               |
| <b>2024</b>                                       |                         |                                    |                  |                  |
| Humidifiers, Artificial Airway, Heated            | Philips Respironics Inc | System One REMstar Auto Humidifier | \$5,497          | 68               |
| Monitoring Systems, Physiologic, Acute Care       | Philips Healthcare      | Dual Channel Modular Recorder      | \$63,429         | 60               |
| Hemodialysis Units                                | Outset Medical Inc      | Tablo                              | \$18,205         | 43               |
| Radiographic/Fluoroscopic Systems                 | GE Healthcare           | XR860                              | \$485,380        | 40               |

**A Predictive Replacement Plan will bring order to your hospital's capital budgeting plan and save capital dollars and time in the process.**



## Questions ?

Please type your questions to the Zoom Q&A window



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# Thank You

Please complete the online evaluation form at  
<https://www.surveymonkey.com/r/11-14-24>

