MESSAGE FROM THE CIO

Penn Medicine is at the forefront of unifying world class patient care and research with information technology. The IT investments made by Penn Medicine have positioned Penn Medicine to rapidly respond to the ever changing healthcare environment. As organizations in all industries have recognized, a more digitized environment requires a higher performing Information Services organization.

Tied to this performance are the benefits associated with the Information Services efforts. This report focuses on the financial benefits that are the result of successfully completing multiple high profile projects over the past several years. Each highlighted project displayed exemplary teamwork and cooperation between the Information Services department and our operational colleagues. It is this collaborative spirit that serves as a cornerstone to support Penn Medicine’s ongoing efforts in transforming our Patient Care, Research and Education efforts.

Thanks to everyone who has partnered with the Information Services team to attain such a high level of success and benefits realization. I look forward to continuing to work with all members of the Penn Medicine community and driving even greater benefits in the future.
The contents following include a summary of financial benefits realized for a 1, 3, and 5 year period for each of the select IT projects in the following categories.
Purpose of the Report

This report reviews 23 high profile projects in which the Penn Medicine Information Services team collaborated with its operational partners in order to generate both financial and qualitative benefits. The projects are grouped into six different categories that define a particular strategic goal of Penn Medicine.

The purpose of this report is to demonstrate the measurable financial return on investment and benefits achieved from a cross section of IT projects from 2010 through 2015. Our mission in Information Services remains Transforming Data into Value in support of the Pathway to Personalized Medicine.

As projects have been completed, we have realized significant value from many of the investments of time, resources and technology together with our operational leaders in terms of:

- Quality patient care and safety;
- Patient, family, staff and physician satisfaction with the care and services provided; and
- Education and Research Support

In order to sustain the direct patient care value realized from the Corporate Information Services initiatives, it is critical to also measure the financial return on these investments. As evidenced by the projects in this report and the many others that have been completed, the Penn Medicine Information Services organization continually strives to exceed end-user expectations.
# Complete Review of Savings

## Empowering Technologies

<table>
<thead>
<tr>
<th>Project Name</th>
<th>1 Year</th>
<th>3 Year</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Desk Insourcing</td>
<td>$1,081,236</td>
<td>$3,541,279</td>
<td>$6,364,596</td>
</tr>
<tr>
<td>Insourcing End-User Support Services</td>
<td>$1,000,000</td>
<td>$3,000,000</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Enterprise Resource Planning Applications Hosting</td>
<td>$500,000</td>
<td>$1,300,000</td>
<td>$2,300,000</td>
</tr>
<tr>
<td>Vendor Neutral Archive (VNA)</td>
<td>$1,823,900</td>
<td>$6,411,264</td>
<td>$13,144,904</td>
</tr>
<tr>
<td>Penn Medicine Academic Computing Services (PMACS)</td>
<td>$849,000</td>
<td>$2,547,000</td>
<td>$4,245,000</td>
</tr>
<tr>
<td>Analytics Platform</td>
<td>$1,809,000</td>
<td>$5,427,000</td>
<td>$9,045,000</td>
</tr>
<tr>
<td>Epic Communication Manager</td>
<td>$1,266,293</td>
<td>$3,798,878</td>
<td>$6,331,464</td>
</tr>
<tr>
<td>Retired Application List</td>
<td>$484,800</td>
<td>$1,454,400</td>
<td>$2,424,000</td>
</tr>
<tr>
<td>Service Review Optimization</td>
<td>$921,000</td>
<td>$2,763,000</td>
<td>$4,605,000</td>
</tr>
<tr>
<td>Resiliency &amp; Downtime Avoidance</td>
<td>$3,496,860</td>
<td>$3,711,420</td>
<td>$3,925,980</td>
</tr>
</tbody>
</table>

**Savings**: $13,232,089 | $33,954,241 | $57,385,944

## Digital Healthcare

<table>
<thead>
<tr>
<th>Project Name</th>
<th>1 Year</th>
<th>3 Year</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Benefit of Ambulatory Medical Record</td>
<td>$985,380</td>
<td>$3,145,923</td>
<td>$5,597,516</td>
</tr>
<tr>
<td>Epic Ambulatory Practice Management</td>
<td>$9,240,000</td>
<td>$27,720,000</td>
<td>$46,200,000</td>
</tr>
<tr>
<td>Epic OR Management (OpTime)</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
</tr>
<tr>
<td>Epic Emergency Department and Trauma</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
</tr>
<tr>
<td>Knowledge Based Charting (KBC)</td>
<td>$28,200</td>
<td>$84,600</td>
<td>$141,000</td>
</tr>
<tr>
<td>Knowledge Based Med Administration (KBMA)</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
</tr>
</tbody>
</table>

**Savings**: $10,253,580 | $30,950,523 | $51,938,516

## Blueprint for Patient Quality & Safety

<table>
<thead>
<tr>
<th>Project Name</th>
<th>1 Year</th>
<th>3 Year</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Warning System (EWS)</td>
<td>$751,169</td>
<td>$2,253,506</td>
<td>$3,755,844</td>
</tr>
<tr>
<td>Physician Quality Reporting System (PQRS)</td>
<td>$750,000</td>
<td>$750,000</td>
<td>$750,000</td>
</tr>
<tr>
<td>CMS Two Midnight Rule</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
</tr>
</tbody>
</table>

**Savings**: $1,501,169 | $3,003,506 | $4,505,844

## Making Data Meaningful

<table>
<thead>
<tr>
<th>Project Name</th>
<th>1 Year</th>
<th>3 Year</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility Board</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
<td>QUALITATIVE</td>
</tr>
<tr>
<td>Meaningful Use Stage 1 and 2</td>
<td>$57,677,355</td>
<td>$57,677,355</td>
<td>$57,677,355</td>
</tr>
</tbody>
</table>

**Savings**: $57,677,355 | $57,677,355 | $57,677,355

## Making the Connection

<table>
<thead>
<tr>
<th>Project Name</th>
<th>1 Year</th>
<th>3 Year</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Portal - myPennMedicine</td>
<td>$5,408,961</td>
<td>$16,226,883</td>
<td>$27,044,805</td>
</tr>
</tbody>
</table>

**Savings**: $5,408,961 | $16,226,883 | $27,044,805

## Power to the Provider

<table>
<thead>
<tr>
<th>Project Name</th>
<th>1 Year</th>
<th>3 Year</th>
<th>5 Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unstructured Text Search - PennSeek</td>
<td>$93,300</td>
<td>$279,900</td>
<td>$466,500</td>
</tr>
</tbody>
</table>

**Savings**: $93,300 | $279,900 | $466,500

**Total Savings**: $88,166,453 | $142,092,408 | $199,018,963
BREAKDOWN OF SAVINGS CATEGORY

3 YEAR SAVINGS

$3,003,506 Blueprint for Patient Quality & Safety
$279,900 Power to the Provider
$16,226,883 Making the Connection
$33,954,241 Empowering Technologies
$57,677,354 Making Data Meaningful
$30,950,523 Digital Healthcare

EMPOWERING TECHNOLOGIES
These projects are focused on technologies and processes to address the administrative and physical infrastructure that includes financial services, operations, human resources, managed care contracting, billing, materials management and others.

DIGITAL HEALTHCARE
These projects are focused on implementation and enhancement of the Electronic Medical Records applications in which clinical documentation is captured and used to support patient care delivery.

BLUEPRINT FOR QUALITY AND SAFETY
These projects are focused on using the features of various applications to support quality improvement in care delivery and both internal and external quality reporting requirements.

5 YEAR SAVINGS

$4,505,843 Blueprint for Patient Quality & Safety
$466,500 Power to the Provider
$27,044,805 Making the Connection
$57,385,944 Empowering Technologies
$57,677,354 Making Data Meaningful
$51,938,515 Digital Healthcare

MAKING DATA MEANINGFUL
These projects are focused on effective capture and use of data from the clinical and financial systems to support improved care delivery, financial management and quality improvement.

MAKING THE CONNECTION
These projects are focused on using technology to enhance the communication and sharing of information between providers and patients across the continuum of care.

POWER TO THE PROVIDER
These projects focus on using the tools and features of the EMR to enable Providers to quickly access clinical data to support documentation and care delivery.
BREAKDOWN OF REVENUE BY TYPE
COST AVOIDANCE, COST SAVINGS, & INCREMENTAL REVENUE

COST AVOIDANCE
Avoided specified costs due to changes in practice or operations. The projects associated are: Knowledge Based Charting, Early Warning, and myPennMedicine.

- **1 YEAR PROJECTED REVENUE**: $6,188,329
- **3 YEAR PROJECTED REVENUE**: $18,564,989
- **5 YEAR PROJECTED REVENUE**: $30,941,649

COST SAVINGS
Changes to the current cost structure of the organization which lowers the expense run rate of a given service or department. This data is relevant to the following projects: Retired Application List, Service Desk Insourcing, Ambulatory Medical Record, Resiliency & Downtime Avoidance, Service Review Optimization, PQRS, Patient Centered Medical Home, OpTime, PennSeek, Analytics Platform, Vendor Neutral Archive (VNA), Lawson Insourcing, and Insourcing End-User Support Services.

- **1 YEAR PROJECTED COST SAVINGS**: $72,738,123
- **3 YEAR PROJECTED COST SAVINGS**: $95,807,419
- **5 YEAR PROJECTED COST SAVINGS**: $121,877,315

INCREMENTAL REVENUE
Activities that bring in new top-line revenue to the organization.
The following data is relevant to the Epic Ambulatory Practice Management & Meaningful Use

- **1 YEAR PROJECTED REVENUE**: $9,240,000
- **3 YEAR PROJECTED REVENUE**: $27,720,000
- **5 YEAR PROJECTED REVENUE**: $46,200,000
EMPOWERING TECHNOLOGIES

PROJECT NAME
Service Desk Insourcing

BACKGROUND DESCRIPTION
Prior to 2012, the IS Help Desk was outsourced to a 3rd party vendor. The outsourced IS Help Desk was limited in their Penn Medicine institutional knowledge and heavily dependent on corporate processes and antiquated ticketing tools when delivering Help Desk service. Being located in another part of the country, there was an institutional disconnect with both the end-users and the Tier II resolver teams. The net result was overall customer dissatisfaction at a premium price. The project was a phased implementation from 2013-2015.

QUALITATIVE RESULTS
Since insourcing the IS Service Desk, significant improvements in end user service has been recognized along with a reduction in overall operating expense.

Several of the service improvement metrics include:

- Call abandonment rate: 0.57% (10/1/2014 – 9/30/2015)
- Calls answered within 30 seconds: 91.0% (10/1/2014 – 9/30/2015)
- First call resolution: 61.5% (10/1/2014 – 9/30/2015)
- Commitment to improving end user service, prompting the renaming of the IS Service Desk.
- Improved call handling (abandon rate / wait times / etc.)
- Trained analysts on Penn Medicine applications and processes
- Reduced cost per contact
- Added support responsibility (Radiology, Telecom, Telephony)
- Improved end user satisfaction
- Customized new ticketing system to meet Penn Medicine workflow with an end user IS self-service tool
- Created a real-time “pulse” of the overall IS activities at any given time
- Improved Command Center phone support
- Enhanced relationships with Tier II teams

SAVINGS INCLUDE
Savings of $1,081,236 per year were achieved through staffing efficiencies, reduced expenditures, and improved processes.

FINANCIAL BENEFITS

Five year projected savings
$6,364,596

Three year projected savings
$3,541,279

One year projected savings
$1,081,236
**PROJECT NAME**

Insourcing End - User Support Services

**BACKGROUND DESCRIPTION**
Re-align outsourced services from a third party firm to Penn Medicine from 2011-2013. The re-alignment included the following services:

- Desktop Support
- Network Support
- I/T Security Support
- Messaging Support
- 3440 Data Center Operations Support

**QUALITATIVE RESULTS**
Insourcing the end-user support services has resulted in a significant improvement in technical productivity, responsiveness and prioritization.

This efficiency has translated not only into financial savings, but also improved end-user satisfaction and productivity. Additional benefits to Penn Medicine include:

- Assumed direct control of End User Support Services
- Discontinued resource floating and pooling; replaced with permanent entity assignment
- Dramatically improved technician productivity
- Provided direct oversight and control of resource work effort allocation
- Moved to a ‘dispatch’ model using Service Coordinators to schedule EUS services that require ‘touch’
- Blended desktop and entity network staff responsibility and accountability to reduce unnecessary handoffs
- Balanced internal resources resulting in a more efficient and cost effective model
- Built a strong Central Support Function to handle services that do not require ‘touch’
- Established a Central Desktop Engineering group and entity EUS groups that collaborate to establish device and configuration standards

**FINANCIAL BENEFITS**

- **$5,000,000**
  Five year projected savings
- **$3,000,000**
  Three year projected savings
- **$1,000,000**
  One year projected savings

**SAVINGS INCLUDE**

$1,000,000 savings in personnel costs realized from outsourced vendor by managing internally. Additional savings recognized from operational efficiency and productivity improvements.
A smooth transition to an insourced environment has resulted in the recognition of the following benefits:

- Increased end user support
- Greater control over Lawson environment utilizing local talent
- Increased stability of technical environment
- Effective Project Management
- Improved response to end user needs
- Enhanced flexibility in supporting new entities

**SAVINGS INCLUDE**

$500,000 per year savings comes from:

- Increased end user support
- Greater control over Lawson environment utilizing local talent
- Increased stability of technical environment

**FINANCIAL BENEFITS**

- **$500,000**
  - One year projected savings
- **$1,300,000**
  - Three year projected savings
- **$2,300,000**
  - Five year projected savings
Vendor Neutral Archive (VNA)

BACKGROUND DESCRIPTION
A Vendor Neutral Archive is a medical imaging technology in which images are stored (archived) in a standard format with a standard interface, such that they can be accessed in a vendor-neutral manner by other systems. The goal of the project is to condense the multiple existing image repositories into one image repository for all medical images. The archive provides the ability to configure rules to direct when studies are moved from one tier of storage to another (i.e. from expensive fast disk to slow inexpensive disk after X number of years). The project led to reduced storage costs and the ability to launch a non-diagnostic image viewer within Penn Medicine’s EMR and patient portal providing greater functionality for the clinicians and patients. Note: The VNA has been rebranded as PennChart Image Library (PennCIL). The project was implemented in three phases from 2014-2015.

QUALITATIVE RESULTS
As departmental image archives are migrated to the VNA, Penn Medicine is on-track to recognize the projected financial and clinical benefits.

- Storage capacity is able to grow by 380% by 2017
- The VNA will reduce the amount of storage actually needed, which in turn will reduce the cost of storage across the health system
- Liberated all images to enhance patient care through a common vendor

SAVINGS INCLUDE
Savings of $1,823,900 in year 1, and $6,411,264 by year 3 achieved by:

- Reduced terabytes in use and reduced storage costs which include active storage, archive storage, and archive backup storage
- Elimination of duplicative image technologies and associated maintenance costs
- Reduced personnel costs and enhanced operational productivity and efficiency

FINANCIAL BENEFITS

- One year projected savings: $1,823,900
- Three year projected savings: $6,411,264
- Five year projected savings: $13,144,904
Penn Medicine Academic Computing Services (PMACS)

BACKGROUND DESCRIPTION
The Penn Medicine Academic Computing Services (PMACS), a consolidation of previously decentralized computing resources into one central team, was created with the understanding that information technology is an increasingly critical component of basic science, clinical research, education delivery and medical school operations. The previously isolated systems resources had been the source of high-turnover of Penn Med IT professionals, leading to an understaffed and under-trained workforce. The Project was implemented from 2012-2014.

QUALITATIVE RESULTS
The aggregation of disparate resources into the PMACS organization has reduced redundant skill sets and provided additional breadth and depth of support services to the School of Medicine end-user community. Additional qualitative results are as follows:

- Provides a single point of contact and accountability for the provision of computing services for the entire Medical School
- Added depth in support coverage for researchers when individual computer staff is unable to provide necessary services
- Closer alignment with the health system Information Services staff – improving communication, collaboration and problem resolution for projects across Penn Medicine
- Optimal utilization of spare service capacity for both staff and computing
- Enhanced career opportunities for computing-focused staff
- Improved the overall depth and breadth of the technical team
- Improved responsiveness to end users
- Established a tighter relationship and overall improved end user satisfaction

SAVINGS INCLUDE
PMACS has saved the Center for Clinical Epidemiology and Biostatistics (CCEB) $849,000 annually through:

- Achieved staff economies of scale through consolidation
- Provided high performance computing services at a reduced rate as compared to industry standard services.
- Improved application development speed to value by nearly 6% through the use of central management and improved tools.
- Reduced software maintenance and report fees through centralized consolidation.

FINANCIAL BENEFITS

$4,245,000
Five year projected savings

$2,547,000
Three year projected savings

$849,000
One year projected savings
PROJECT NAME
Analytics Platform

BACKGROUND DESCRIPTION
In an effort to maximize the value of its data, Penn Medicine has invested in analytics databases which provide meaningful information to clinical and other key stakeholders across the system. The analytics platforms were implemented from 2010-2015; the following datamarts are currently operational:

<table>
<thead>
<tr>
<th>DATAMART</th>
<th>INITIAL LAUNCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>QDM - Quality and patient safety information</td>
<td>2012</td>
</tr>
<tr>
<td>SDS - Strategic Decision support</td>
<td>2010</td>
</tr>
<tr>
<td>Ambulatory Analytics - Dashboards &amp; Trending data for CCA and CPUP</td>
<td>2013</td>
</tr>
<tr>
<td>Faculty Analytics - Management tool for school of medicine to track specific performance metrics</td>
<td>2015</td>
</tr>
<tr>
<td>Labor Analytics - Staff productivity management system for optimized staffing models</td>
<td>2015</td>
</tr>
<tr>
<td>Clinical Capacity Calculator - Provider revenue management tool</td>
<td>2014</td>
</tr>
<tr>
<td>Optime Universe - Financial outcomes of surgical procedures</td>
<td>2014</td>
</tr>
</tbody>
</table>

QUALITATIVE RESULTS
As indicated in the chart, providing end users with the data necessary to make improved clinical and operational decisions has had a significant impact. This impact and associated benefits are ongoing and continue to accumulate over time. Expected benefits include:

- Foster an environment for data driven decision making
- Enable objective vs. subjective decision making
- Extend data driven decision making throughout the entire organization
- Improve operational performance transparency

SAVINGS INCLUDE
The full savings details are included in the chart on page 17.
Please see the chart below regarding the Analytics Platform:

<table>
<thead>
<tr>
<th>DATAMART</th>
<th>CURRENT PHASE</th>
<th>INITIAL LAUNCH</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optime Universe</td>
<td>Clinical Variation / Major Joints</td>
<td>Estimated opportunity to manage variation in implant costs among physicians on major joint cases</td>
<td>$120,000</td>
</tr>
<tr>
<td>Optime Universe</td>
<td>Clinical Variation / Spinal Fusion</td>
<td>Opportunity to shift patients from SICU to Med/Surg (Ravdin 6; consistent with PAH treatment)</td>
<td>$94,000</td>
</tr>
<tr>
<td>SDS</td>
<td>Move TAVR to HUP</td>
<td>Shift TAVR cases from PPMC to HUP to take advantage of higher MC rate</td>
<td>$315,000</td>
</tr>
<tr>
<td>Labor Analytics</td>
<td>PPCM Nurse Staffing Management</td>
<td>Move PPCM nurse staffing from ‘high’ to ‘average’ occupancy assumption with additional use of swing staff. Move average staffing levels closer to target levels (lower than current)</td>
<td>$1,250,000</td>
</tr>
<tr>
<td>Labor Analytics</td>
<td>Early Punch-In at PPMC</td>
<td>Identified issue with employees punching in early resulting in increased hourly pay</td>
<td>$30,000</td>
</tr>
</tbody>
</table>
EMPOWERING TECHNOLOGIES

PROJECT NAME
Epic Communication Manager

BACKGROUND DESCRIPTION
Communication Manager is a function within Epic that allows clinicians a simple way to write, route, fax, and print letters and other communications to other providers and recipients. The tool offers flexibility to meet the communication needs of the recipient (mail, fax, In Basket, My Chart) with one tool rather than multiple tools in the application. Communication Manager was implemented in 2014.

QUALITATIVE RESULTS
- Clinicians can create high quality letters in less time by utilizing standardized text and speed buttons
- Letters for other clinicians and patients are created using a single tool
- Clinicians can send patient letters directly to the patient’s MyChart account, cutting printing and postage costs
- Allows for eFaxing of letters to referring providers outside of the health system
- Based on results in pilot sites, higher letter utilization and recipient satisfaction across specialties is expected.
- Decrease in turnaround time for letter generation and letter faxing/ printing
- Increased utilization of the tool as clinician and operational comfort has increased

FINANCIAL BENEFITS

SAVINGS INCLUDE
$1,266,293 annual savings from personnel time, supply costs, and mailing costs for letters previously sent through the mail, which are now replaced with the message transfer technology of Epic Communication Manager.

Five year projected savings
$6,331,464

Three year projected savings
$3,798,878

One year projected savings
$1,266,293
Retired Application List

BACKGROUND DESCRIPTION
As Penn Medicine deploys new application systems, it is common that data contained in the legacy system is not converted to the new system. Therefore, it is important that data on the legacy system be extracted and made available to end users prior to retiring the legacy system. Retirement of the legacy system is important so that there is an official end to the Penn / vendor relationship and also to eliminate legacy system operational costs. Retired Applications have been tracked beginning in 2012-2015 and the applications were retired in three major phases.

QUALITATIVE RESULTS
Corporate IS has developed a strategy and associated processes for extracting data and placing that data in a secure, HIPAA compliant application that is running on low cost, current hardware and OS technologies. This strategy allows Penn to terminate the legacy system vendor agreement and decommission the hardware, eliminating costs and preserving key data. Additional qualitative results include:

- Migration to a common platform provides for enhanced resource support
- Fewer contracting and business associate agreements; additional HIPAA compliance; less upgrades and patching

SAVINGS INCLUDE
Savings of $2.4 million over 5 years from applications that were retired. These savings include the cost of vendor conversion services, software licenses and replacement hardware.

- Revenue application savings: $51,000
- Clinical application savings: $1,599,000
- Administrative application savings: $750,000

FINANCIAL BENEFITS

<table>
<thead>
<tr>
<th>Savings Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five year projected savings</td>
<td>$2,424,000</td>
</tr>
<tr>
<td>Three year projected savings</td>
<td>$1,454,400</td>
</tr>
<tr>
<td>One year projected savings</td>
<td>$484,800</td>
</tr>
</tbody>
</table>
Service Review Optimization

BACKGROUND DESCRIPTION
Service review optimization aimed to eliminate unnecessary costs through Penn servers and backup procedures. The overarching strategy for this project is to keep Penn Medicine’s IT infrastructure functioning on the highest performing technology. It is part of Penn Medicine’s standard operating process to constantly review technology for upgrades and additional functionality through partnering with vendors in the most cost effect manner. The project implementation occurred in 2013 and the project goals were as follows:

- Reduce cost of all UPHS server backups where possible
- Realize savings due to timely decommission of old/outdated servers.
- Realize savings due to timely retirement of old/unused Storage Area Network (SAN) space.

QUALITATIVE RESULTS
Leveraging new technology, virtualizing servers and matching the proper level of storage to the ever changing end-user requirements has generated a culture of efficiency within the organization. Additional QUALITATIVE RESULTS are:

- Improved integrity and effectiveness of backups and restores.
- Backup procedure functionality is comprehensive, accurate, and timely.

SAVINGS INCLUDE
$1,000,000 annual savings was achieved through decommissioning servers, reconfiguring server backups for efficiency gains, and through the retirement of unused SAN space.

- Server backup changes: $600,000/yr. (209 servers)
- Server decommissions: $214,000/yr. (48 servers)
- SAN changes: $107,000/yr. (18 TB)

FINANCIAL BENEFITS

- $921,000 One year projected savings
- $2,763,000 Three year projected savings
- $4,605,000 Five year projected savings
PROJECT NAME
Resiliency: Downtime Avoidance and Cost Savings Activities

BACKGROUND DESCRIPTION
Enterprise Infrastructure Services initiated a program to implement infrastructure redundancy and resiliency in an effort to reduce enterprise outages. Clinical or Information Services FTE’s are not added during network downtime, therefore there is not a direct cost savings to Penn Medicine but many qualitative results to the health system. The network downtime program was initiated in 2012 and continues today through monthly tracking and reporting.

The decrease in downtimes since the initiative began are outlined below:

The Information Services organization within Penn Medicine also led a cost savings initiative in 2014 and 2015 where existing IS contracts, consultants agreements, and other business arrangements that fell within the Penn Medicine IS infrastructure were evaluated to reduce the IS cost structure. These savings are listed in the financial section below.

QUALITATIVE RESULTS
Downtime
- Created a more stable computing environment through the introduction of redundant and resilient technologies
- Reduced outages has improved productivity and reduced “lost changes” documentation
- Reduced outages have improved patient safety risks
- Improved staff satisfaction
- Improved wait times and delays

IS Cost Savings
- Less HIPAA and security risks

Paper Savings
- Better access to data that was previously in paper form.
- Culture of resource stewardship

SAVINGS INCLUDE
- IS Cost Savings: $3,389,000 from contract terminations for resources that are no-longer needed in the Penn Medicine Information Services infrastructure, or renegotiations of existing contractual agreements.
- Paper Savings: $107,280 cost savings includes the reduction of sheets of paper consumed and consolidation of Xerox printers.

FINANCIAL BENEFITS

<table>
<thead>
<tr>
<th>Period</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>One year</td>
<td>$3,496,860</td>
</tr>
<tr>
<td>Three years</td>
<td>$3,711,420</td>
</tr>
<tr>
<td>Five years</td>
<td>$3,925,980</td>
</tr>
</tbody>
</table>

Five year projected savings

Three year projected savings

One year projected savings
PROJECT NAME
Overall Benefit of Ambulatory Electronic Medical Record

BACKGROUND DESCRIPTION
By moving from paper based charts to electronic chart review, order management, and documentation, Penn Medicine was able to organize patient information, suggest actions, and guide coordinated care across physical care settings. As part of Penn Medicine’s overall strategy to move to a common Epic core platform, the EMR was implemented as the first Epic patient electronic record within the health system. The implementation of Epic EMR in the outpatient setting began in 2008.

QUALITATIVE RESULTS
Leveraging technologies such as speech recognition has simplified physician documentation in the ambulatory setting while also significantly reducing transcription related expenditures and vastly improving patient clinical documentation.

OTHER AMBULATORY EMR BENEFITS
- Reduction of manual chart audits, eliminates unrecognizable content and saves manual hours
- Chart check compliance rose to 100% with automation – overall improved compliance, readiness for surveys/audits by Joint Commission, etc.
- Potential to reduce malpractice rates because of better documentation
- Increased communication regarding patient care
- Better access to real-time patient information
- Increased reliability of an electronic solution
- Better communication and flow of information between sites of care

SAVINGS INCLUDE
Transcription Savings: Transcription expenses were tracked as a KPI for the Epic EMR roll-out and were reduced after go-live of the EMR.

- $170,145 savings in CPUP per year due to the electronic information entry capabilities of the new EMR that reduced the need for medical transcriptionists.
- The greatest cost reduction in CPUP occurred in Medical Oncology.
- Chart transports costs $2.2 million visits, estimated 20% chart pulls at $4.50 per chart.
- Saving of $985,380 annually from the automation of transferring patient information which replaced the manual process of retrieving, printing, and shipping charts to another provider’s office as part of a patient’s treatment. Savings number includes replacement of regular chart retrieval and STAT chart retrievals which were more resource intensive.

FINANCIAL BENEFITS
- $985,380 annually included for the growth of CPUP
- $5,597,516 five year projected savings
- $3,145,923 three year projected savings
Epic Ambulatory Practice Management System (APM) was implemented in all 250+ ambulatory practices in 2011, replacing a non-integrated, dated technology. This software is used to manage the ambulatory business, specifically, scheduling, professional billing, and registration across Penn Medicine. Epic APM integrates with the ambulatory medical record already in place to provide a common platform for ambulatory operations across the enterprise.

- Epic Prelude-enterprise ambulatory registration
- Epic Cadence-enterprise ambulatory patient scheduling system
- Epic Professional Billing Module-Resolute professional patient billing modules

Effectively implementing the new Epic ambulatory practice management solution into the integrated clinical and practice management workflows has yielded significant financial and operational benefits. No project within Penn Medicine displayed as much teamwork as this one.

SAVINGS INCLUDE
- Gross charges increase of 1% from better information and documentation capture for CCA and CPUP with an annual savings of $5,280,000.
- Reduction in billing costs of 15% due to automation for CCA and CPUP with an annual savings of $3,960,000.

FINANCIAL BENEFITS

- One year projected savings: $9,240,000
- Three year projected savings: $27,720,000
- Five year projected savings: $46,200,000

AMBULATORY EMR BENEFITS
- Realigned processes from back end to front end placing emphasis on proper documentation
- Implemented 30 days to chart close program which closes out charts with outstanding documentation after 30 days eliminating audit and no-payment risks
- Moved to electronic payment posting which eliminated the manual payment posting process
- Eliminated manual charge entry which increased gross charges by 1%
- Ability to qualify for CMS pay for performance programs (PQRS, GPRO, etc.)
- Enable and standardize registration process across the enterprise
- Shifted resources from back end to front end, focusing on error reduction and accuracy
Epic OR management (OpTime)

BACKGROUND DESCRIPTION
The goal of Epic OR Management implementation was to reduce the cost per surgical case through Optime/Anesthesia and other supporting systems including Lawson. The Epic OpTime/Anesthesia project included over 120 surgical operating rooms and endoscopy suites at HUP, PPMC, PAH, Tuttleman, and Perelman. The software helps manage the operating rooms and ambulatory surgical centers throughout Penn Medicine. Optime/Anesthesia replaced PHS scheduling, HSM documentation, and Docusys in the ORs and Endoscopy suites. Additionally, paper charting has been replaced with online tools. Optime go live helped to achieve Penn Medicine’s strategy of having a single integrated patient record. Epic implementation began in 2010 and the final site went live in 2013.

QUALITATIVE RESULTS

- Improved billing accuracy and charge capture
- Improved operational efficiency
- Improved surgeon productivity
- Increased schedule utilization
- Implemented Perioperative documentation in the operating room setting
  - Scheduling
  - Preference card management
  - Anesthesia record keeping
- Pre-op assessments
- Procedure record
- PACU documentation

Epic Emergency Department and Trauma (ASAP)

BACKGROUND DESCRIPTION
The system replaced the existing EMTRAC home-grown patient tracking and electronic medical record. The PennChart Emergency Department Information System is designed to allow clinical staff to track patients through their visits and document their treatment. It supports workflows for providers in an ED setting by streamlining the tasks doctors and nurses perform every day and connecting them with up-to-date clinical records. PennChart ED will be fully integrated to all ambulatory facilities upon implementation, and inpatient once PennChart Phase 2 project is completed (2016). ASAP go live helped to achieve Penn Medicine’s strategy of having a single integrated patient record.

QUALITATIVE RESULTS

- Better-informed and faster medical decisions
- Streamlined workflows for better patient throughput
- Established standards of care and treatment protocols
- The system offers Access, Security, and Intuitive Workflow (ED Manager, Track Board, Navigators, NoteWriter, Narrator)
- Active decision support functionality
- Seamless, instantaneous access to comprehensive information and can be simultaneously accessed by multiple users at multiple locations
- PennChart secures medical records by restricting access to charts with role-based, user-based, and context-based record access
- Necessary information is just a few mouse clicks away at any time
- Provides an “at-a-glance” summary of all patients in your emergency department
- Displays detailed information about a patient’s status and order status

SAVINGS INCLUDE
- Epic OR Management (OpTime) & Epic ASAP benefits are qualitative only at this time.
PROJECT NAME
Knowledge Based Charting (KBC)

BACKGROUND DESCRIPTION
KBC (Knowledge Based Charting) is an interdisciplinary, clinical documentation module within the Allscripts Sunrise EMR system. It integrates evidence-based content built by the Clinical Practice Model Resource Center (CPMRC), and is based on academic literature and feedback from nearly 300 medical centers on best practice for all clinicians. The content within this module is called Clinical Practice Guidelines (CPGs), and users refer to this library of content to guide them in specific workflows. These CPGs were reviewed, validated, and specifically configured for Penn Medicine. It is designed to increase standardization of care across all disciplines, improve communication, and facilitate collaboration among healthcare providers.

A system-wide Partnership Council was developed and included representatives from all Penn Medicine entities comprised of nurses, respiratory therapists, physical therapists, social workers, nutrition support, pharmacists, and others to define a unified method to deliver patient care.

The implementation timeline was from 2010 to 2011. Full details are below.

QUALITATIVE RESULTS
- Increased standardization of care
- Improved communication about patient care
- Better collaboration between care teams
- Evidence based medicine, best practice guidelines
- Improved patient care and outcomes

SAVINGS INCLUDE
- After implementation, fewer patient records were scanned due to the discrete entry of patient data. The savings incurred from reduced scanning was $28,200 per year.

FINANCIAL BENEFITS
- $141,000
  Five year projected savings
- $84,600
  Three year projected savings
- $28,200
  One year projected savings
Knowledge Based Medication Administration (KBMA)

Ensuring the 5 rights of medication administration-the right patient, drug, dose, route and time- for patient safety is of utmost concern in medication administration. The goal of this project was to provide a technological solution using Penn's existing electronic medical record to maximize patient safety. Additionally the initial pilot was launched to comply with Meaningful Use Stage 2 requirements for 10% entity Bar Code Medication Administration.

The Penn Medicine inpatient electronic medical record (EMR) was enhanced with the implementation of the Bar Code Medication Administration (BCMA) module. This addition interfaced the scanning capability into the Medication Administration Record (MAR) where nurses document medication administration at the point care.

The overwhelming success of the pilot units at all four entity hospitals allowed full adoption of BCMA across the health system on all inpatient units. Hardware was ordered and fitted by Information Services (IS) for all inpatient rooms and units. Nursing has undergone extensive training to ensure proficiency in the new system. With the valuable support from pharmacy, processes are now in place to inventory and catalog new medications as well as troubleshoot any scan issues with stock. Other benefits include:

- Reduced Medication Errors
- Intercepted Medication Near Misses
- Improved patient safety through the reduction of administration errors while minimally increasing nurses staffing time
- Increased patient satisfaction
- Improved Employee (Nurse and Pharmacy) worklife satisfaction

SAVINGS INCLUDE

- Knowledge Based Medication Administration (KBMA) benefits are qualitative only.
**Benefit Category**

**Blueprint for Patient Quality & Safety**

**5 Year Savings**

- Physician Quality Reporting System (PQRS)
  - $750,000

- Early Warning System (EWS)
  - $170,145

**3 Year Savings**

- Physician Quality Reporting System (PQRS)
  - $510,435

- Early Warning System (EWS)
  - $510,435

**1 Year Savings**

- Physician Quality Reporting System (PQRS)
  - $751,169

- Early Warning System (EWS)
  - $750,000
A clinical decision support (CDS) tool, the Early Warning System (EWS), was developed to notify providers about inpatients at risk for developing sepsis. Early recognition and timely intervention significantly reduces sepsis-associated mortality. The availability of vital sign and provider data in our EHR created the opportunity to detect sepsis early and notify providers with the goal of reducing our sepsis mortality rates. Patients with sepsis, which accounts for 17% of all hospital deaths nationwide, have a severe response to bacteria or other germs. THE EWS Project and accompanying academic study by Penn Medicine researchers was conducted from 2011-2012.

**QUALITATIVE RESULTS**

- Reduced likelihood of sepsis-associated deaths
- Allowed providers to better manage patient care
- Improved patient safety through the reduction of administration errors while minimally increasing nurses staffing time
- Improved patient satisfaction
- Improved nurse job satisfaction
- Enabled early clinical intervention
- Reduced patient length of stay
- Reduced ICU days where infection can occur
- Improved sepsis documentation and care plans

**SAVINGS INCLUDE**

Over $750,000 saved annually by the avoided cost of Sepsis ICU days through use of the early warning system, with vulnerable Sepsis patients in Penn Medicine ICU settings. The cost savings assumes that without the EWS, Sepsis patients would not receive early interventions and would have greater ICU average length of stay.

**FINANCIAL BENEFITS**

- **$751,169**
  - One year projected savings
- **$2,253,506**
  - Three year projected savings
- **$3,755,844**
  - Five year projected savings
Physician Quality Reporting System (PQRS)

BACKGROUND DESCRIPTION
The Physician Quality Reporting System (PQRS) is a quality reporting program that encourages individual eligible professionals (EPs) and group practices to report information on the quality of care to Medicare. PQRS gives participating EPs and group practices the opportunity to assess the quality of care they provide to their patients, helping to ensure that patients get the right care at the right time. The Epic PQRS functionality allows Penn Medicine to provide the proper documentation needed to report PQRS outcomes and avoid applicable penalties. PQRS began in 2006, transitioned to GPRO in 2014 and will coalesce with MU into MIPS in 2017.

QUALITATIVE RESULTS
- Increased accountability for high-quality care
- Better preventative care for patients
- Improved chronic and acute care management
- Better care coordination and documentation
- Improved reportable quality metrics
- Evidence based practice administration through adherence of protocols and documentation
- Provider specific scorecards and outcomes through the Epic functionality
- Better management of PQRS reportable conditions

SAVINGS INCLUDE
The project supported penalty avoidance which would have occurred if PQRS metrics were not met, totaling $750,000 a year. The Epic PQRS outpatient functionality enabled Penn Medicine providers to have the electronic reporting and information capture needed to avoid the penalty.
- Note: Savings penalty is calculated off of 2% annual total Medicare payments in the Penn Medicine outpatient practices
Centers of Medicare and Medicaid Services (CMS)

Two Midnight Rule

BACKGROUND DESCRIPTION
Centers for Medicare and Medicaid Services (CMS) established a two midnight benchmark for physicians to use in determining patient status for inpatient or outpatient care. CMS specifies that when the physician expects the patient to require care that spans two midnights or more, CMS would require authentication and certification by the inpatient admitting physician. For stays within two midnights, no authentication is needed. This rule only applies to patients with Medicare as their payor. Re-certification is also necessary every 12 days (12th day, 24th day, etc.).

The CMS Two-Midnight electronic solution notifies attending providers when their patient is approaching a two midnight stay and seeks documentation for the patient’s hospital stay to remain in compliance with the CMS regulation. A compliance report is then generated on a monthly basis which notifies administration of which providers are not documenting the necessary information to be compliant with the regulation. The CMS two-midnight electronic solution ensures that Penn Medicine providers are following the new CMS Two-Midnight guidelines and reduces audit and denial risk for the health system. Entity-wide implementation was on December 4, 2013.

QUALITATIVE RESULTS

- Increased accountability for high-quality care
- Those who report satisfactorily for the 2015 program year will avoid the 2017 PQRS negative payment adjustment
- Reduce possible Medicare denials
- Better payment and documentation compliance
- Improved patient understanding of observation status
- Improved individual physician compliance
- Better throughput for short stay patients

SAVINGS INCLUDE
Two Midnight Rule benefits are qualitative only.
Note: Costs of Denials resulting from 2 month rule non-compliance have not been calculated at this time.
BACKGROUND DESCRIPTION
The Facility Board provides a summary view of high priority patient-specific elements to facilitate patient level care planning. Clinical systems and Sunrise Clinical Manager in particular, typically excel at providing single patient-centric views of clinical data. The goal of the Facility Board is to provide a population level view of a hospital unit or service.

The Facility Board is a census of the selected floor, service, or attending physician with key indicators for each patient, grouped into the following categories:

- Patient Flags
- Daily Review
- Risk Factors
- High Risk Conditions

Each indicator displays based on data from Sunrise (including KBC), MedView, Epic OpTime, and/or Epic ASAP. The data for the Facility Board from MedView and Sunrise is refreshed every 15 minutes, and from Epic every four hours. The top of the Facility Board page indicates when the data was last refreshed. The population view allows providers and clinical staff to be better informed about their patient’s risks and current status. The project was implemented from 2013 to 2014.

QUALITATIVE RESULTS
Facility Board enables our staff to more efficiently plan their daily reviews of patients, assess patient care levels, and manage high risk conditions.

- Clinical and provider satisfaction due to increased information about their patients
- Early interventions for patients that are starting to decline
- Enhanced patient safety
- Better unit level communications among providers and staff about their patients
- Improved patient satisfaction
- Improved nurse job satisfaction

SAVINGS INCLUDE
Facility Board benefits are qualitative only.
Meaningful Use Stage 1 and 2

BACKGROUND DESCRIPTION
Meaningful Use is the Medicare and Medicaid EHR incentive program to provide financial incentives for the “meaningful use” of certified EHR technology. To receive an EHR incentive payment, providers need to show that they are “meaningfully using” their certified EHR technology. Those organizations that do not meet the CMS specified meaningful use criteria are subject to annual reductions of up to 2% of Medicare and Medicaid claims.

There are three stages that are anticipated for meaningful use. The first two stages have been completed and CMS has just proposed stage 3. Each of these three stages has increasing requirements. CMS has provided objectives and quality measures which must be presented from certified systems to get the incentives. There is one set of requirements for inpatient and another set for ambulatory.

QUALITATIVE RESULTS
- Create an IT infrastructure that supports delivery of higher-quality patient care
- Better patient outcomes through advanced technology
- Complete and accurate information
- Improve coordination of patient care across the health system
- Implement an IT infrastructure that is sustainable in the changing landscape

SAVINGS INCLUDE
- Medicare and Medicaid incentive payments from 2012-2015 for HUP, PPMC, PAH, UPHS
- Note—Meaningful Use is a one time savings, does not compound for 3 and 5 year savings
- Savings also include penalty avoidance of $6,066,553=1% of Medicare billing for the system, penalty would have been incurred in 2015.

FINANCIAL BENEFITS

$57,677,355*
Five year projected savings

SAVINGS INCLUDE
- Medicare and Medicaid incentive payments from 2012-2015 for HUP, PPMC, PAH, UPHS
- Note—Meaningful Use is a one time savings, does not compound for 3 and 5 year savings
- Savings also include penalty avoidance of $6,066,553=1% of Medicare billing for the system, penalty would have been incurred in 2015.

PENN MEANINGFUL USE INCENTIVE PAYMENTS

MEDICARE | TOTALS

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<tr>
<th>FISCAL YEARS</th>
<th>HUP</th>
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<th>PAH</th>
<th>UPHS</th>
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<td>2013-2015</td>
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MEDICAID | TOTALS

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<tr>
<th>FISCAL YEARS</th>
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<th>UPHS</th>
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<td>2011-2015</td>
<td>$3,775,467</td>
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GRAND TOTAL

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<th>FISCAL YEARS</th>
<th>HUP</th>
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<th>PAH</th>
<th>UPHS</th>
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<tbody>
<tr>
<td>2012-2015</td>
<td>$9,476,844</td>
<td>$7,659,374</td>
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* Included 6 million of MU avoided Penalty 2015 | Calculated same savings number for 1-5 years. Did not calculate as compounding savings.
Patient Portal - myPennMedicine

**BACKGROUND DESCRIPTION**

myPennMedicine (MPM) is Penn Medicine’s patient web portal. In addition to providing a secure means to communicate with their practice and providers, the portal gives patients access to their lab and radiology results, visit summaries, medication lists, and other information that makes up their health record. Functionality also includes the ability to make or cancel appointments online, request renewals for prescribed medicines, and complete health questionnaires. The portal was initially rolled out in 2010 to a select group of primary care providers.

After a successful pilot, rollout continued to remaining primary care and specialty practices. The majority of practices at Penn Medicine now offer myPennMedicine to their patient population. From 2013 to 2014, MPM saw enrollment more than double with over 219,000 active users at the beginning of 2015.

**QUALITATIVE RESULTS - 2014 USAGE RESULTS (APPROXIMATES)**

| Total Radiology Results Released | 300,000 |
| Lab Results Released | 1,800,000 |
| Appointment Auto-schedule (Direct Appointment) | 6,000 |
| Appointment Direct Cancel | 19,000 |
| Appointment Schedule (Request) | 40,000 |
| History Questionnaire | 3,000 |
| Medication Renewal Request | 66,000 |
| Questionnaires | 12,000 |
| Messages sent by patients to their Care Team | 572,000 |
| Messages sent by the Care Team or system reminders | 2,552,000 |
| Mobile Logins | 32,000 |

**ADDITIONAL BENEFITS**

- Patient Satisfaction and patient loyalty tool
- Staff and provider satisfaction
- Patient ease of access to obtain information from medical record
- Better communication between patients and providers
- Better medication management and adherence with patients
- Tool to help manage chronic diseases and stay closely in touch with vulnerable patients

**SAVINGS INCLUDE**

$5,408,961 annual savings which includes the cost savings from lab results that would have been sent on paper through the mail and were instead provided to patients electronically in 2014. This cost savings assumes the staff time to prepare and mail the letters and the actual paper and postage.

* Epic assumes $3.00 savings per test result based on 1998 study. Industry best practice assumptions range from $3.00-$5.00 on potential savings.
Unstructured Text Search - PennSeek

BACKGROUND DESCRIPTION
PennSeek is a search tool that uses pattern recognition to abstract information from patient charts. PennSeek allows providers to quickly data mine records for selected clinical patterns and reduces the need for manual abstraction of clinical documentation. This process helps with clinical research, quality monitoring and improvement efforts, and decision support functionality.

The first phase of development completed in March 2014. During the following months leading into the summer of 2014, additional source categories were added, such as radiology, echocardiograms, administered medications, and myPennMedicine messages.

QUALITATIVE RESULTS
Clinical Research Applications:

- **Penn Cardiology**
  PennSeek is displaying early indicators of development of aortic stenosis, which has traditionally been difficult to identify in its early stages.

- **Penn Gastroenterology**
  PennSeek is dynamically determining patients who meet three complex criteria consisting of discrete ICD 9 codes, positive identification of unstructured text patterns, and specific treatment regimens.

- **Penn Dermatology**
  PennSeek is using pattern recognition to recognize the annotation style of three physicians for the presence of zoster (shingles) and utilization of zostavax treatment.

ADDITIONAL QUALITATIVE BENEFITS

- Reduced errors through manual documentation
- Time saver for researchers and data analysts
- Greater reliability of information for research and quality improvement
- Increased access to patient information abstracted at a population level

SAVINGS INCLUDE

$93,300 annual labor savings includes the reduction of manual abstraction hours through automation of the previous data abstraction process.

FINANCIAL BENEFITS

- **$466,500**
  Five year projected savings

- **$279,900**
  Three year projected savings

- **$93,300**
  One year projected savings
GLOSSARY

ARRA: American Recovery and Reinvestment Act
BCMA: Barcode Medication Administration
CCA: Clinical Care Associates
CDS: Clinical Decision Support
CIO: Chief Information Officer
CMIO: Chief Medical Information Officer
CPOE: Computerized Physicians Order Entry
CPUP: Clinical Practices of University of Pennsylvania
DAC: Data Access Center
ED: Emergency Department
ePD: Electronic Provider Documentation
EHR: Electronic Health Record
EMR: Electronic medical record
ENIAC: First programmable electronic computer
EIO: Entity Information Officer; This is the IS Executive at each entity, including HUP, PAH, PPMC, HCHS, & CPUP/CCA
Epic APM: Ambulatory Practice Management
EpicCare: The enterprise ambulatory EMR system
e-Prescribing: The workflow of ordering a non-controlled medication in order entry and electronically transmitting it to a (retail) pharmacy using a certified e-prescribing vendor.
EUS: End User Support, the desktop and network support technicians who work at each entity facility
EWS: Early Warning System
HIE: Health Information Exchange
HIPAA: Health Insurance Portability & Accountability Act of 1996
HPC: High Performance Computing
HSX: HealthShare Exchange
HUP: Hospital of the University of Pennsylvania
ICU: Intensive Care Unit
KBC: Knowledge Based Charting (Allscripts / Eclipsys) Clinical Documentation component of Sunrise (all Clinical documentation except physicians)
MedView: Web-based clinician portal that displays patient data from over 25 UPHS systems
MeSH: Medical Subject Headings
MDM: Mobile Device Management
MU: Meaningful Use
Navigare: Patient Census & Location Tracking
NIH: National Institutes of Health
NLP: Natural Language Processing
OpTime: Epic Perioperative Management system
MDM: Mobile Device Management
MPM: myPennMedicine
MU: Meaningful Use
Navigare: Patient Census & Location Tracking
NIH: National Institutes of Health
NLP: Natural Language Processing
OpTime: Epic Perioperative Management System
OR: Operating Room
PACS: Picture Archiving & Communication System
PaH: Pennsylvania Hospital
PAM: Penn Access Manager
PCAM: Perelman Center for Advanced Medicine
PDA: Personal Digital Assistant
PDS: Penn Data Store (Clinical Data Warehouse)
PHCHS: Penn Home Care and Hospice Services
PMACS: Penn Medicine Academic Computing Services
PMAR: Penn Medicine at Rittenhouse
LTAC (Long Term Acute Care), Rehab facility (partners with Good Shepherd) and Inpatient Hospice
PMO: Project Management Office
PMR: PennOmics Medical Record
PPMC: Penn Presbyterian Medical Center
PSOM: The Perelman School of Medicine
RFID: Radio Frequency Identification
SAN: Storage Area Network
SCM: Sunrise Clinical Management System
SICU: Surgical Intensive Care Unit