Materiel Services Analysis of Utilization of Equipment Warranty and Service Agreements
Final Report

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Table of Contents

Executive Summary .................................................................................................................. 1

Introduction............................................................................................................................... 3
  Background ............................................................................................................................ 3
  Goals and Objectives .......................................................................................................... 3
  Project Scope ....................................................................................................................... 4

Approach and Methodology .................................................................................................. 4
  Data Collection ................................................................................................................... 4
  Data Analysis ...................................................................................................................... 5

Findings ................................................................................................................................... 5

Analysis of Findings .............................................................................................................. 8

Conclusions and Recommendations ....................................................................................... 9
  Action Plan .......................................................................................................................... 11
  Expected Impact .................................................................................................................. 11

Appendix A – Current State Flowcharts ............................................................................... A-1
  Equipment Arrival Process Flowchart ............................................................................... A-1
  Patient Equipment Repair Process Flowchart ................................................................... A-2
  Patient Transportation Repair Process Flowchart ............................................................ A-3
  Warehouse and Central Sterile Supply Repair Process Flowchart ..................................... A-4
  Equipment Removal Process Flowchart ............................................................................ A-5
  Equipment Warranty Information Flowchart ...................................................................... A-6

Appendix B – Future State Flowcharts ................................................................................ B-1
  Patient Equipment Repair Process Flowchart ................................................................... B-1
  Patient Transportation Repair Process Flowchart ............................................................ B-2
  Warehouse and Central Sterile Supply Repair Process Flowchart ..................................... B-3
  Equipment Removal Process Flowchart ............................................................................ B-4

Appendix C – Data-Findings-Conclusions-Recommendations Table ....................................... C-1
List of Figures and Tables

Table 1. Comparison of Databases (Patient Equipment) ........................................... 7
Table 2. Comparison of Databases (Patient Transportation) ..................................... 7
Table 3. Equipment Value and Coverage .................................................................. 7
Executive Summary

The Materiel Services Department of the University of Michigan Hospital is responsible for both receiving and distributing clinical equipment in the hospital. Materiel Services is questioning the proper utilization and cost effectiveness of equipment warranties, specifically the current methods of tracking, communicating and utilizing equipment warranties and service agreements. A project team of four senior Industrial and Operations Engineering students investigated this problem for Materiel Services.

The goals and objectives of the project were to form recommendations for improved utilization and tracking of service agreements and warranties, and develop a process to eliminate overpayment and to improve communication concerning warranties and service agreements.

The equipment warranty data and service agreements involved in the project pertained to four areas of the Materiel Services Department: Patient Equipment, Warehouse/Periodic Auto-Replenishment (PAR)/Shipping and Receiving, Patient Transportation, and Central Sterile Supply since fiscal year 2003.

The project team performed a literature search, interviewed twelve key personnel, and queried three databases to determine warranty and equipment information. The literature search was performed using health care search engines as well as the Solucient data system and produced one article on warranty and service agreement utilization along with contacts to four hospitals. The team interviewed the managers within Materiel Services along with other persons linked to the utilization of warranties and service agreements throughout the equipment lifecycle. Database queries were run on the PeopleSoft asset database, the Maximo database, and the Rosebud MEMS database to identify the equipment stored in each database.

The project team compared the three databases mentioned above to identify if the equipment stored in each database was common or if it was specific to one of the databases. There were two comparison methods performed. The first method was comparing all the items in one database against all the items in a second database. Each database was compared individually against the other two. The second method was a comparison between specific data in Maximo and PeopleSoft. The two categories analyzed were Patient Equipment and Patient Transportation. This information allowed the team to understand the flow of information from one database to another as well as identify any discrepancies between the information stored in each database and develop recommendations to limit those discrepancies. The team also used the resulting common equipment items to determine a total value of coverage for this equipment.

From the literature search the team found an article from Jeffrey Short titled Six Steps to Managing Service Contracts Effectively which provided recommendations for managing service contracts. Using Solucient the team surveyed five health systems as to their service and warranty tracking capabilities.
From information gathered from interviews the team created six flowcharts. These flowcharts represent the following processes: equipment arrival, Patient Equipment repair, Patient Transportation repair, Warehouse and Central Sterile Supply repair, equipment removal, and equipment warranty information flow.

The team compared the unique asset tags from equipment in all three databases. It was found that the number of common items between databases differed depending on the databases queried. The comparisons also served to support the flow of information observed by the team. A financial picture of the warranty coverage of equipment was also obtained.

From the interviews, flowcharting and database findings the team developed many conclusions and recommendations. First, the Maximo inventory sheets are the most accurate measure of the equipment inventories. In addition, the asset inventory sheets taken out of PeopleSoft and the Maximo inventory sheets do not correlate. The recommendation is to investigate further the integration of Maximo to PeopleSoft, to remove equipment off of PeopleSoft when it is removed from Maximo. The team also concludes the MEMS inventory sheets and the Maximo inventory sheets also do not correlate, as well as excess time and labor are spent by workers in Patient Equipment manually inputting equipment information from Maximo into MEMS. The recommendation is to integrate the MEMS and Maximo systems to be able to have a direct file transfer of inventory information from Maximo to MEMS. This integration will require an upgrade of the current MEMS system, or a new version of the MEMS system. The warranty information on equipment is not always checked during the repair process, when a repair is required. The team’s recommendation for this issue is to add a process step in the current repair processes for each area within Materiel Services. The new step includes a warranty and service agreement check on the Maximo system to check warranty and service agreement status, to insure that proper actions are taken. In turn the team recommends opening accessibility of the Maximo system to all areas of Materiel Services, even if on a read-only basis. Finally, the team concludes the most recent version of PeopleSoft is difficult to find warranty and service agreement information to input into Maximo. The team’s recommendation is to provide an option to provide training on how to operate current and future versions of PeopleSoft.

The recommendations should result in the following expected impact. To improve communication of warranties and service agreements, opening the access of Maximo to more personnel within the next month will help solve this issue. Integrating the MEMS, PeopleSoft and Maximo database within a year will also improve the communication issue. To improve the current process of repairing equipment, adding the process step to check Maximo for warranty and service agreement information before taking repair action should be implemented and standardized. Finally, to eliminate any unnecessary expenses, a better warranty and service agreement look up process should be utilized, and that process is a combination of the above mentioned recommendations.
Introduction

The Materiel Services Department of the University of Michigan Health System (UMHS) is responsible for both receiving and distributing clinical equipment in the hospital. Materiel Services is questioning the proper utilization and cost effectiveness of equipment warranties, specifically the current methods of tracking, communicating and utilizing equipment warranties and service agreements. The manager of Materiel Services wishes to know whether the hospital is properly utilizing equipment warranties and service agreements, whether they could be paying for repairs that are included in the initial purchasing contracts, and whether they are keeping service contracts in place even after the equipment has been discarded. Therefore, a team consisting of four senior Industrial and Operations Engineering students investigated the utilization of warranties and service agreements in Materiel Services. The team's task was to analyze and review the utilization and tracking of warranty and service agreement information and develop recommendations to eliminate overpayment for equipment repairs and upgrades. The purpose of this report is to present the background, methods, findings, conclusions, and recommendations for this project.

Background

The team focused mainly on the equipment in the Patient Equipment area because this area had the most amount of equipment. The team also inspected equipment warranty data and service agreements in Warehouse/PAR/Shipping and Receiving, Patient Transportation, and Central Sterile Supply areas. Materiel Services' hypothesis was that individual departments may not be aware of the warranties covering the equipment in their respective departments. Thus, they may pay the vendor for services covered in the warranty or pay to repair the equipment in-house, which could cause double payment in repairs. Materiel Services had not previously studied this issue.

Specifically, the following key issues have led to this project:

- Potential unnecessary expense due to current warranty utilization.
- Confusion on which equipment is covered by warranties.
- Lack of clarity on what is actually covered by the warranties.
- Lack of direct access to warranties and service agreements.

Goals and Objectives

To improve utilization of hospital warranties and service agreements, the student team performed the following tasks:

- Created flowcharts of the equipment purchasing, repair, and removal processes, with focus on warranty information.
- Interviewed department managers and other staff.
- Collected data concerning the cost of both equipment warranties and service agreements.
With this information, the team:

- Formed recommendations for improved utilization and tracking of service agreements and warranties.
- Developed a process to eliminate overpayment and to improve communication concerning warranties and service agreements.

Project Scope

The project scope included the warranty and service agreement data and the service cost data from fiscal year 2003 to:

- Patient Equipment.
- Warehouse/PAR/Shipping and Receiving
- Patient Transportation
- Central Sterile Supply

Any tasks not connected to the warranty or service agreements of the equipment in these departments were excluded from this project.

Approach and Methodology

This section describes the project team’s approach and methodology to gather as well as analyze process, database, interview, literature search and benchmarking information.

Data Collection

Literature Search and Benchmarking
The project team performed an extensive literature search to learn about the handling of equipment warranty and service agreements at other hospitals around the United States. To locate potential sources, the project team used health care search engines and submitted questions through Solucient. The search resulted in an article regarding service agreement utilization as well as contacts to four hospitals. The knowledge gained from the literature search was used as a benchmark for the project as well as an aid for the project team to form recommendations.

Interviews
The project team interviewed twelve individuals to gain knowledge about the utilization of warranty and service agreements in the UHMS. The individuals interviewed were the managers of Materiel Services and persons linked to the tracking of warranty and service agreements throughout the equipment lifecycle. Information from the interviews led to the creation of the process flowcharts.

Database Queries
The project team contacted the financial senior manager of Material Services, our client; the assistant manager of biomedical engineering; and a facilities maintenance mechanic
to run database queries to identify the Materiel Services equipment in specific databases. The client provided the query results from the asset (PeopleSoft) and MEMS databases. The results from queries of the Maximo database were supplied by the assistant manager of biomedical engineering and the facilities maintenance mechanic.

**Data Analysis**

*Database Comparisons*
The project team compared the PeopleSoft, MEMS, and Maximo databases to identify if the equipment stored in each database was common or if it was specific to one of the databases. This information allowed the team to determine the flow of information from one database to another as well as to identify discrepancies between the information stored in each database and develop recommendations to limit those discrepancies.

*Flowchart Analysis*
Using the information acquired through the interview process, the project team created five flowcharts. Each flowchart represents a process within the lifecycle of equipment at UMHS; the equipment arrival, patient equipment repair, patient transportation repair, warehouse and central sterile supply repair, and equipment removal processes. The project team analyzed the flowcharts and developed recommendations for each process.

**Findings**

This section introduces the team’s findings from the literature search and benchmarking, interviews and database queries.

*Literature Search and Benchmarking*
From the literature search the team found an article from Jeffrey Short titled Six Steps to Managing Service Contracts Effectively which provided recommendations for managing service contracts, but more importantly put the team in contact with Mr. Short for guidance.

The team surveyed five health systems as to their service and warranty tracking capabilities. Of these four tracked capital equipment service and warranty information using a defined system. Two, University of Pennsylvania Health System and Partners Healthcare, outsource the tracking; Penn uses an outsourced biomedical department and Partners tracking is done by their corporate parent’s contract department. The other two, the University of Arizona Medical Center and the Hurley Medical Center, use their internal biomedical departments to track capital equipment. The fifth health system, Robert Wood Johnson University Hospital, does not have a tracking program; rather, they have each department be responsible for its equipment.

*Process Flowcharts (Interviews)*
The Equipment Arrival Process Flowchart (Appendix A-1) displays the steps that take place from when a piece of equipment is purchased until it is put into service for UMHS. The purchased equipment is received at the shipping docks at which point an invoice is
sent to the Facilities Administrator for a work order. Once a work order is generated the equipment is inspected by Biomedical Engineering. If the equipment fails the inspection the vendor is contacted for replacement; however, if the equipment passes it is assigned an asset tag number and preventive maintenance sticker. Information from the inspected equipment is then recorded into the Maximo database and the equipment is sent to its assigned department where it is put into service.

The Patient Equipment Repair Process Flowchart (Appendix A-2) shows the steps that occur from when a piece of equipment that falls under the jurisdiction of Patient Equipment needs repair through the repair process to when the repaired piece of equipment is put back into service. Once equipment in need of repair arrives at the Patient Equipment area the party responsible for the repair is determined and the equipment is put into the assigned location. If Biomedical Engineering is responsible for repair, a diagnostic test is run on the equipment to see if the equipment is fixable. If unfixable the equipment goes into the discard process, otherwise it is repaired. After being repaired, the preventive maintenance date for the equipment is checked. If the preventive maintenance date is within two months of the repair, the maintenance is done to the equipment prior to its return; otherwise the equipment is returned directly to the Patient Equipment area. It is then scanned into the MEMS system and put back into service.

The Patient Transportation Repair Process Flowchart (Appendix A-3) shows the process for repair in this department. The main focus of the process is the health of the patient. If able to fix the equipment while the patient is still in it, the process is a short three step process. If not, the next decision that must be made is as to whether or not the patient can transfer to the new device immediately. If not, then the nursing staff must move the patient into a replacement. Then, the equipment is ready to be taken to Biomedical Engineering for repair. After being repaired, the equipment returns to Patient Transportation and is put back into service.

The Warehouse and Central Sterile Supply Repair Process Flowchart (Appendix A-4) displays the equipment repair process for these departments. It is a five step process from when the part is broken to when the part is fixed. Three to four people are involved in the process, depending upon whether an outside person is needed to repair the equipment.

The Equipment Removal Process Flowchart (Appendix A-5) shows the process for removing a piece of equipment from Maximo. It is an eight step process to remove the equipment. Once the decision has been made to discard a piece of equipment, a Declaration of Surplus is created. Then, Property Disposition comes to the respective department and picks up the equipment for removal along with its Declaration of Surplus. The Declaration of Surplus is sent to the finance department and then to the Facilities Administrator who then removes the equipment from Maximo.

The Equipment Warranty Information Flowchart (Appendix A-6) displays the communication of equipment warranty information. The information is entered into the
PeopleSoft database after the equipment is purchased. From there information is sent to the vendor who delivers it to Biomedical Engineering along with the equipment. Once the equipment arrives at Biomedical Engineering, the warranty information along with other equipment information is entered into Maximo from Peoplesoft and the equipment invoice, and if the equipment belongs to Patient Equipment it is also put into MEMS.

**Database Query Data**
The team noticed several discrepancies between the databases. For Patient Equipment, the PeopleSoft, Maximo, and MEMS databases held 4412, 4251, and 4497 entries respectively (excluding rental equipment in MEMS). By comparing the unique asset tag numbers the team found 3130 pieces of equipment to be common to all three databases. Table 1 presents individual comparisons of databases for Patient Equipment.

<table>
<thead>
<tr>
<th></th>
<th>PeopleSoft</th>
<th>Maximo</th>
<th>MEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PeopleSoft</td>
<td>4412</td>
<td>3577</td>
<td>3193</td>
</tr>
<tr>
<td>Maximo</td>
<td>3577</td>
<td>4251</td>
<td>3620</td>
</tr>
<tr>
<td>MEMS</td>
<td>3193</td>
<td>3620</td>
<td>4497</td>
</tr>
</tbody>
</table>

For Patient Transportation Equipment, the MEMS database was not included in the comparison because by design it is only used for Patient Equipment. Table 2 presents the comparison of PeopleSoft and Maximo databases for Patient Transportation Equipment.

<table>
<thead>
<tr>
<th></th>
<th>PeopleSoft</th>
<th>Maximo</th>
</tr>
</thead>
<tbody>
<tr>
<td>PeopleSoft</td>
<td>204</td>
<td>39</td>
</tr>
<tr>
<td>Maximo</td>
<td>39</td>
<td>45</td>
</tr>
</tbody>
</table>

The team then found the dollar value of equipment in the databases. The MEMS database was excluded from this comparison as it does not hold financial data. For Patient Equipment, an additional comparison was made excluding equipment made by the vendors Huntleigh, Abbott Laboratories, and Omniflow because these vendors repair their own equipment. Table 3 presents the financial comparisons.

<table>
<thead>
<tr>
<th></th>
<th>PeopleSoft Total</th>
<th>Common to Both</th>
<th>Uncovered by Maximo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Equipment</td>
<td>$6,946,728</td>
<td>$5,235,725</td>
<td>$1,711,003</td>
</tr>
<tr>
<td>PE (Vendors Removed)</td>
<td>$5,538,439</td>
<td>$4,073,026</td>
<td>$1,465,413</td>
</tr>
<tr>
<td>Patient Transportation</td>
<td>$1,331,747</td>
<td>$148,935</td>
<td>$1,182,812</td>
</tr>
</tbody>
</table>
Analysis of Findings

This section discusses the team’s analysis of process information from interviews and database query data.

Process Flowcharts (Interviews)
The equipment arrival process displays no process errors and proves to be effective and free from mistakes.

The Patient Equipment repair process displays a process error in the lack of checking for a warranty or service contract when equipment needs to be repaired. This new process step to check for existing warranties or service contracts should take place between taking the equipment to Biomedical Engineering satellite facility process and the running of the diagnostic test process.

The Patient Transportation repair process shows a process error in the lack of checking for a warranty or service contract when the equipment needs to be repaired. When Biomedical Engineering goes to the care unit and determines that the equipment needs to be fixed, a new process step should be added to check for existing warranties and service agreements.

The Warehouse and Central Sterile Supply repair process shows a process error in the lack of checking for a warranty or service contract when equipment needs to be repaired. To check for existing warranties or service agreements, a new process step should take place between when the maintenance mechanic inspects broken equipment and when the mechanic performs diagnostics and talks to operators.

The equipment removal process has no process step errors, but opportunity for improvement in the final process steps. When a piece of equipment is discarded and the equipment information is removed from Maximo, there is a lack of communication to the MEMS and PeopleSoft databases for the removal of the discarded equipment’s information. Equipment information is not removed from MEMS and PeopleSoft properly or in a timely fashion when it is removed from Maximo.

Database Query Data
For Patient Equipment, 84% (all percentages rounded to nearest whole number) of the equipment in Maximo was also found in PeopleSoft and 85% of the equipment in Maximo was also found in MEMS. Similarly, 81% of the equipment in PeopleSoft was also found in Maximo and 72% of the equipment in PeopleSoft was also found in MEMS. In addition, 71% of the equipment found in MEMS was also found in PeopleSoft and 80% of the equipment found in MEMS was also found in Maximo. Therefore, a piece of equipment in Maximo is 7% more likely on average to be found in another database than a piece of equipment from PeopleSoft; it is also 8% more likely to be found in another database than a piece of equipment from MEMS.
For Patient Transportation Equipment, 87% of the equipment in Maximo was also found in PeopleSoft. In addition, 19% of the equipment in PeopleSoft was also found in Maximo.

The team found that 25% ($1,711,003) and 89% ($1,182,812) of the PeopleSoft Patient Equipment and Patient Transportation Equipment values, respectively, is not easily checked for warranty information in Maximo. The team cannot, however, determine the amount, if any, that has been spent to repair equipment that was under warranty. In addition, when the team removed patient equipment asset tags from vendors Huntleigh, Abbot Laboratories, and Omniflow from the comparison, 26% ($1,465,413) of the PeopleSoft Patient Equipment value is not easily checked for warranty information in Maximo. The reason these vendors were removed from the comparison is that these vendors repair their equipment and, as is shown in the Patient Equipment Repair Process Flowchart (Appendix A-2) their equipment is set aside for them to repair.

Possible sources of error include incorrect manual entry of MEMS database numbers into the comparison program, missing unique asset tag numbers for equipment pieces, and different times of data capture from the databases.

**Conclusions and Recommendations**

After the reviewing the findings, the team’s conclusions to assist in achieving the original project goals are as follows.

**Conclusions:**

- Asset inventory sheets and Maximo inventory sheets do not match.
- MEMS inventory sheets and Maximo inventory sheets do not match.
- These are findings not conclusions.
- Excess time and labor is spent manually inputting information into MEMS from Maximo.
- Warranty information on equipment is not always checked every time a repair is required.
- New version of PeopleSoft proves difficult to locate warranty and service agreement information, for the input into the Maximo database.
- Maximo inventory sheets are the most accurate.

Our conclusion that the Maximo inventory sheets are the most accurate is based upon interviews and flowcharting.
Based upon these conclusions the team’s recommendations are as follows.

Recommendations:

- Integrate MEMS system and Maximo to have a direct file transfer of inventory information from Maximo to MEMS. This integration will require an upgrade of the current MEMS system.

The integration recommendation is based upon data, interviews and flowcharting. The interviews and flowcharting suggest the equipment information is being manually entered into MEMS from Maximo, which is a waste of time and labor. Also, the data shows the inventory in MEMS differs from the inventory in Maximo, which could be caused by the manual input of equipment information. The integration would save this time and labor as well as eliminate the possibility of human error during this inventory data input process step.

- Add a process step in the repair processes for each area within Materiel Services that includes a warranty and service agreement check on the Maximo system that checks warranty and service agreement status to insure that proper actions are taken.

The addition of a process step to check Maximo for warranty and service agreement information is based upon our interviews and flowcharting. There is currently no step in the repairs processes that include the check of warranty and service agreements information, and this information is considered assumed or not assumed. Adding this step will eliminate the possibility of human error by overlooking an item’s warranty or lack of warranty.

- Open accessibility of the Maximo system to all areas of Materiel Services, even if on a read only basis.

The addition of opening accessibility of the Maximo system to all areas of Materiel Services is based upon interviews that suggest the current limitation of this access. By opening access, if just on a read-only capability, individuals within Materiel Services in question of warranty and service agreement information will be able to directly check the information themselves if desired, thus opening communication within departments and allowing for further checking of this information.

- Provide training to the Facilities Administrator and other necessary personnel on how to operate current and future versions of PeopleSoft.

The recommendation to provide an option for training on the current and future versions of PeopleSoft is based upon interviews. Lack of training has created a difficulty in finding warranty and service agreement information in PeopleSoft during the time this information is input from PeopleSoft into Maximo. This lack of training creates a potential for having lost warranty and service agreement information, which actually
exists in PeopleSoft but is not transferred to Maximo. By providing training on PeopleSoft this warranty and service agreement information will be easier to find and input into Maximo, which in turn will protect this information from loss.

- Investigate further on the integration of Maximo and PeopleSoft to more accurately remove equipment from PeopleSoft.

The recommendation to further investigate the integration of Maximo and PeopleSoft is based upon data that shows the asset sheets which get their information from PeopleSoft differ from the inventory sheets in Maximo. By integrating the two systems, the asset sheets will be more accurate.

**Action Plan**

**2-4 Weeks**
- Provide access to Maximo to key personnel.
- Training for new version of PeopleSoft to Facility Administrator and other necessary personnel.
- Add process step to repair processes.

**3-12 Months**
- Integrate MEMS and Maximo database systems.
- Integrate Maximo and PeopleSoft database systems.

**Expected Impact**

The recommendations and action plan should result in the following expected impact. To improve communication of warranties and service agreements, opening the access of Maximo to more personnel will help solve this issue. Integrating the MEMS, PeopleSoft and Maximo database will also improve the communication issue. To improve the current process of repairing equipment, adding a process step to always check Maximo for warranty and service agreement information before taking repair action on a piece of equipment, should be implemented and standardized. Finally, to eliminate any unnecessary expenses, a better warranty and service agreement look up process should be utilized, and that process is a combination of the above mentioned recommendations.
Appendix A-2 – Current State Patient Equipment Repair Process
Flowchart

1. Scan tag number to put equipment into Bioned
2. Patient takes equipment to Bioned satellite facility
3. Biomedical Engineering runs diagnostic test
4. Is it fixable?
5. No
6. Discard process
7. Yes
8. Repair
9. Verify proper operation
10. Check preventive maintenance (PM) date
11. Is PM date within 2 months?
12. Yes
13. Do preventive maintenance
14. No
15. Return to Patient Equipment
16. Return equipment to service
17. Scan into Patient Equipment and MEMS
18. Is vendor repair?
19. Yes
20. Put in vendor location
21. No
22. Is rental?
23. Yes
24. Put in rental cart for repair by vendor
25. No
26. Department sends equipment to Patient Equipment
27. Equipment Breaks
Appendix A-3 – Current State Patient Transportation Repair Process Flowchart
Appendix A-5 - Current State Equipment Removal Process Flowchart

1. Place surplus equipment in pick-up location
2. Call property disposition for work order
3. Attach Declaration of Surplus to equipment
4. Declaration of Surplus created
5. Property disposition picks up equipment
6. Declaration of Surplus sent to financial department
7. Copy of Declaration of Surplus sent to Facility Administrator
8. Facilities Administrator removes equipment from Maximo
9. Is Patient Equipment?
   - Yes: Remove Equipment from MEMS
   - No: Remove Equipment from PeopleSoft
Appendix A-6 – Current State Equipment Warranty Data Information Flowchart
Appendix B-1 - Future-State Patient Equipment Repair Process
Flowchart

- Scan tag number to put equipment to vendor
- Clean Equipment
- Is it rentable?
  - Yes: Put in rental cart for repair by vendor
  - No: No vendor for repair?
    - Yes: Equipment Breaks
    - No: Patient Equipment takes to Biomed Satellite Facility
- Biomedical Engineering runs diagnostic test
- Is it fixable?
  - No: Discard process
  - Yes: Repair
- Verify proper operation
- Check Preventive Maintenance (PM) date
- Is PM date within 2 months?
  - Yes: Do preventive maintenance
  - No: Return to patient Equipment
- Return equipment to service
- Scan into Patient Equipment and MNEs
Appendix B-2 – Future-State Patient Transportation Repair Process Flowchart

1. Care unit calls Center to generate work order
2. Care unit calls Patient Transport to request replacement
3. Patient Transport takes replacement device up to care unit
4. Can patient transfer to new device immediately?
   - Yes: Patient Transport takes broken device to Biomed for repair
   - No: Device is repaired and returned to service
5. Is equipment feasible?
   - Yes: Device is repaired and returned to service
   - No: Discard Process

Additional steps:
- Biomed goes to care unit to assess equipment
- Check Maximo for warranty and service agreement information
- Nursing staff moves patient when able to do so
Appendix B-3 – Future-State Warehouse and Central Sterile Supply Repair Process Flowchart

Maintenance mechanic does diagnostic test and talks to operator.

Fixable by mechanic?

Yes

Maintenance mechanic fixes equipment

No

Is equipment beyond repair?

Yes

Discard Process

No

Contact correct person to repair equipment

Dispatch calls maintenance mechanic

Department calls Dispatch

Part is broken
### Appendix C-1 – Data-Findings-Conclusions-Recommendations Table

<table>
<thead>
<tr>
<th>Data, Logic, and/or Observations</th>
<th>Findings</th>
<th>Conclusions</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E. and P.T Inventory in Maximo and Asset Sheets</td>
<td>4496 in Asset 4297 in Maximo 3576 in common</td>
<td>Asset sheet and Maximo Inventory do not match</td>
<td>Integrate systems</td>
</tr>
<tr>
<td>P.E. Inventory in Maximo and MEMS</td>
<td>4251 in Maximo 4498 in MEMS 3620 in common</td>
<td>MEMS database and Maximo do not match</td>
<td>Integrate systems</td>
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<tr>
<td>Interviews</td>
<td>Inventory manually entered into Maximo and Mem</td>
<td>Extra labor taking place and potential for error</td>
<td>Integrate systems to have a file transfer</td>
</tr>
<tr>
<td>Flowcharting</td>
<td>Warranty info accessible but not checked regularly</td>
<td>Warranty info may be overlooked</td>
<td>Change in processes to include check of warranties before every repair</td>
</tr>
<tr>
<td></td>
<td>New PeopleSoft release difficult to find warranty data</td>
<td>Inadequate training with PeopleSoft</td>
<td>Classes/Seminar for new PeopleSoft release</td>
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</table>