## 1. International Survey of Medical Equipment

Completed South African paper surveys to be faxed to 0866 729 608.

This survey should be filled out by the main health technology (medical equipment) manager in your hospital. If your hospital has a separate clinical/biomedical engineering department, the manager of that department should fill it out. Please ensure that you have read the Letter of Information about the survey that was sent with this survey link. As a reminder, you are under no obligation to participate in this survey, you may skip any questions you wish, and your data is only collected at the end of the survey when you click the 'Submit' button. All responses are strictly confidential.

The results of the research will be shared with you if you indicate interest; it is possible that the results will benefit your health technology management practices! You will also be entered into a draw for the 'Clinical Engineering Handbook', edited by Joseph Dyro (2004). This Handbook, valued at $130.00 Canadian, is a great resource for health technology managers with contributions from 170 of the profession's leaders. According to the Journal of Clinical Engineering, it "provides a good background to the wide array of tasks, programs, innovations, and challenges to the clinical engineering profession".

Thanks in advance for your participation!

## 2. Hospital Information

This section gathers basic information about your hospital.

### 1. What type of hospital do you work at? Check all that apply:

- ☐ University-based / Teaching
- ☐ General / Non-teaching
- ☐ Government-funded
- ☐ Private
- ☐ Community / District
- ☐ Other (please specify)

### 2. How many beds are in your hospital?

☐ <50 ☐ 50-250 ☐ 250-500 ☐ >500 ☐ Don't Know

### 3. What is the average occupancy of beds in the last year?

☐ <25% ☐ 25-50% ☐ 50-75% ☐ >75% ☐ Don't Know

### 4. Intensive Care Unit (ICU) means intensive care for patients with acute, life-threatening illness or injury accompanied by monitoring and emergency services. What proportion of beds in your hospital are ICU beds?

☐ None ☐ <5% ☐ 5-10% ☐ 10-20% ☐ >20%

## 3. Equipment Maintenance Department

This section examines the department responsible for medical equipment maintenance. Sometimes this department is called the clinical or biomedical engineering department.

1. What is the name of your department that is responsible for medical equipment maintenance?

2. Is this department a separate department, or is it part of a larger department that has extra maintenance responsibilities?

- Separate
- Part of a larger department

If it's part of a larger department, which department does it belong to?

3. What are the names of the staff titles for this department? An example of a staff title is 'senior electronics technician'. Please write them in descending order of seniority, i.e. from the manager down.

4. Who does the manager of this department report to?

- Senior Administrator
- Medical Director
- Plant / Maintenance Director
- Other (please specify)

5. Are you satisfied with this reporting arrangement?

- Yes
- No

6. Which, if any, of the following infrastructure systems is this department responsible for?

- Power
- Medical Gas
- Sterilization
- Water
- Computers/Information Technology
- Heating, Ventilation and Air Conditioning (HVAC)

7. Does this department share maintenance and training services with other hospitals and/or health centres?

- Yes
- No

8. If so (i.e. if you answered yes to question 7), is your department the main service centre?

Yes | No | Not Applicable

9. If so (i.e. if you answered yes to question 7), how many hospitals and/or health centres use these shared services?

Hospitals

Health Centres

## 4. Equipment Maintenance Personnel

This section examines the personnel (staff) of the medical equipment maintenance department.

1. How many of each type of staff do you have in the equipment maintenance department?

| | Number in Department |
|---|---|
| Engineers | |
| Technicians/Technologists | |
| Students (engineering/technology) | |
| Clerical Staff | |

2. In your opinion, is the staffing of this department adequate (i.e. are there enough people for the workload)?

Yes | No

3. Do you provide biomedical and electronics technology training "on the job"?

Yes | No

4. Is it difficult to find qualified engineers and technicians locally?

Yes | No

5. How many of your staff were trained in biomedical or electronics technology before they started working for you?

| | All | Most | Half | Few | None |
|---|---|---|---|---|---|
| Trained in Biomedical Technology | | | | | |
| Trained in Electronics Technology | | | | | |

6. What is the highest level of education obtained by one of your staff engineers and technicians?

| | University (Doctorate) | University (Masters) | University (Bachelors) | Technical School (3-4 years) | Technical School (1-2 years) | High School | Under High School | Not Applicable |
|---|---|---|---|---|---|---|---|---|
| Engineers | | | | | | | | |
| Technicians/Technologists | | | | | | | | |

### 7. Have any of your staff received training outside of your country?

- Yes
- No
- Don't know

If so, where? List all known countries.

### 8. Which of the following tasks do your staff perform? Check all that apply.

| | Engineers | Technicians/Technologists |
|---|---|---|
| In-house repair | | |
| Incoming inspection | | |
| Preventive maintenance | | |
| User training / education | | |
| Pre-purchase consultation | | |
| Research | | |
| Clerical work | | |
| Other | | |

## 5. Equipment Inventory

This section examines the inventory of your medical equipment, if your hospital has one.

### 1. Do you have an inventory of your medical equipment?

- Yes
- No

### 2. If so (i.e. if you answered yes to question 1), how is this inventory information stored?

- Written by hand, tracked on paper
- Done on a computer with generic spreadsheet software (MS Excel, etc.)
- Done on a computer with a specialized software designed for medical equipment inventories (AIMS, VHTemp, Four Rivers, HECS, etc.)

3. If so (i.e. if you answered yes to question 1), what information is included in the inventory? Check all that apply:

- Model Number
- Age
- History of Work Orders
- Unique Asset Number
- Main Service Technician
- Purchase Information
- Preventive Maintenance Schedule
- Replacement Priority
- Condition
- Infrastructure Requirements (physical space, power, gas, etc.)
- Warranty Duration for Parts and Labour
- Spare Parts
- Vendor, Manufacturer and Support Information
- Serial Number
- Original Cost
- Other (please specify)

## 6. Medical Equipment

This section examines what medical equipment your hospital has, and what resources you have for this equipment. If you do not have an inventory of your equipment, please provide your best guesses for the following questions. An estimate is fine!

Medical equipment can be categorized by complexity: very basic, simple, complex and highly specialized.

Very Basic Equipment: very simple mechanical parts and no electrical parts, requires very minimal user training (less than 15 minutes), very simple to repair or disposable. Examples: needles, stethoscopes, and manual sphygmomanometers

Simple Equipment: simple mechanical parts and electrical parts (no complex circuit boards or microchips), requires some user and maintenance training (less than 2 days). Examples: incubators, centrifuges, and nebulizers

Complex Equipment: more complex mechanical and electrical parts (mircochips), requires substantial user and maintenance training (less than 1 week). Examples: ultrasound, x-ray, electro-surgical equipment, monitors, and specialized lab equipment

Highly Specialized Equipment highly complex mechanical and electrical systems, requires extensive user and maintenance training (more than 1 week). Examples: MRI, CAT scanning, nuclear medicine

1. How much of your hospital's medical equipment (based on # of devices) is very basic, simple, complex and highly specialized? Please enter an estimated percentage value for each. NOTE: your answer should total 100%. Remember than an estimate is fine!

| | |
|---|---|
| Very Basic Equipment | |
| Simple Equipment | |
| Complex Equipment | |
| Highly Specialized Equipment | |

2. How much equipment at your hospital is out of use or obsolete?

| | <25% | 25-50% | 50-75% | >75% |
|---|---|---|---|---|
| Simple Equipment | | | | |
| Complex Equipment | | | | |
| Very Specialized Equipment | | | | |

3. In your opinion, what is the most common condition of your equipment? Condition is based on reliability and frequency of repairs.

| | Excellent | Good | Fair | Poor | Very Poor |
|---|---|---|---|---|---|
| Simple Equipment | | | | | |
| Complex Equipment | | | | | |
| Very Specialized Equipment | | | | | |

4. How much of your equipment is standardized (i.e. the same manufacturers and models for each device)?

| | None | <25% | 25-50% | 50-75% | >75% | All |
|---|---|---|---|---|---|---|
| Simple Equipment | | | | | | |
| Complex Equipment | | | | | | |

5. How much of your equipment currently has the following support resources at your hospital?

| | None | <25% | 25-50% | 50-75% | >75% | All |
|---|---|---|---|---|---|---|
| Spare Parts | | | | | | |
| User Manuals | | | | | | |
| Maintenance Manuals | | | | | | |
| Test Equipment | | | | | | |
| Trained Users | | | | | | |
| Trained Maintenance Technicians | | | | | | |

6. How often are the following support resources discontinued or no longer available when needed?

| | Always | Often | Sometimes | Rarely | Never |
|---|---|---|---|---|---|
| Spare Parts | | | | | |
| Accessories & Reagents | | | | | |
| Manufacturer Sales Support | | | | | |
| Troubleshooting & Repair Assistance | | | | | |

7. Is there anything else you'd like us to know about the state of your medical equipment and resources?

## 7. Equipment Repairs

This section examines medical equipment repairs. Repairs can be done "in-house" by staff of the equipment maintenance department, or "externally" by sending the device away to be repaired.

1. Where do you get your spare parts? Check all that apply:

- Scavenge from obsolete equipment
- Order from manufacturer or vendor
- Make from locally available supplies
- Other (please specify)

2. Do you have an adequate budget for spare parts?

Yes | No | Don't know

3. When you order spare parts from a manufacturer or vendor, how long on average do they take to arrive (in number of months)?

4. How much of your equipment is repaired in-house (as opposed to externally)?

| | None | <25% | 25-50% | 50-75% | >75% | All |
|---|---|---|---|---|---|---|
| Simple Equipment | | | | | | |
| Complex Equipment | | | | | | |
| Highly Specialized Equipment | | | | | | |

5. If most of your repairs for an equipment type are either in-house or external, why? Please explain.

6. What is the average repair time per device for in-house repairs (in number of hours)?

Simple Equipment

Complex Equipment

7. What is the average time a device is out of service due to an in-house repair (in number of days)?

Simple Equipment

Complex Equipment

8. If you do send equipment away for repairs, what is the average time a device is out of service due to an external repair (in number of days)?

Simple Equipment

Complex Equipment

Highly Specialized Equipment

9. If you do send equipment away for repairs, what is the average cost of the external repair (as a percentage of the total cost of the equipment)?

Simple Equipment

Complex Equipment

Highly Specialized Equipment

10. Do you perform preventive maintenance on your equipment?

Yes  No  Don't know

11. Is there anything else you'd like us to know about your equipment repairs?

## 8. Equipment Acquisition

This section examines where your medical equipment comes from. It can be (1) procured (selected and bought by your hospital), (2) donated by an organization, or (3) leased, rented or loaned to your hospital.

1. Where has your medical equipment come from? Please enter an estimated percentage value of how much was acquired through procurement, donation and lease/rental/loan. NOTE: your answer should total 100%. Remember than an estimate is fine!

Procurement

Donation

Lease/Rental/Loan

Other

2. Does your hospital have a formal policy or procedure for equipment procurement?

Yes  No  Don't Know

3. Who helps decide which equipment the hospital procures? Who most often leads the team that decides? Check all that apply:

| | Helps decide | Leads team that decides |
|---|---|---|
| Hospital administrator | | |
| Doctor / other equipment user | | |
| Consultant | | |
| Medical equipment maintenance department manager | | |
| Medical equipment maintenance department staff | | |

4. How involved are the medical equipment maintenance department manager and personnel in this decision?

Very  Somewhat  Very little  Don't know

5. Which requirements are considered before equipment is procured?

- Approved source of operating budget
- Adequate infrastructure support
- Availability of qualified users
- Available maintenance support and services
- Demonstrated clinical needs and benefits
- Regulatory compliance (if applicable)
- Standardization with other equipment

6. Is there anything else you would like us to know about equipment procurement at your hospital?

## 9. Equipment Donation

This section examines equipment donations, which can come from many different types of organizations: (1) equipment donation organizations, (2) hospitals in other countries, and (3) large aid agencies and global health programs.

(1) Equipment donation organizations connect equipment donors (hospitals, equipment and drug companies) with recipient hospitals. Examples: IMED (the International Medical Equipment Distribution program), IMEC (the International Medical Equipment Collaborative program), MedShare International and REMEDY.

(2) Hospitals in other countries often donate their used equipment directly to recipient hospitals.

(3) Large aid agencies and global health programs often donate equipment to hospitals and health centres are part of their technical assistance, or for a specific global health program. Examples: CIDA, DFID, SIDA, USAID, UNAIDS, The Gates Foundation, and the World Bank.

1. Where has your donated medical equipment come from? Please enter an estimated percentage value of how much was donated by the following types of organizations. NOTE: your answer should total 100%. Remember that an estimate is fine!

| | |
|---|---|
| Equipment donation organizations | |
| Hospitals in other countries | |
| Large aid agencies and global health programs | |
| Other | |

2. How much of your hospital's donated equipment (based on number of devices) is very basic, simple, complex and highly specialized equipment?

| | None | <25% | 25-50% | 50-75% | >75% | All |
|---|---|---|---|---|---|---|
| Very Basic Equipment | | | | | | |
| Simple Equipment | | | | | | |
| Complex Equipment | | | | | | |
| Highly Specialized Equipment | | | | | | |

3. How much of your donated equipment was in the following state when it arrived at your hospital?

| | None | <25% | 25-50% | 50-75% | >75% | All |
|---|---|---|---|---|---|---|
| New | | | | | | |
| Used | | | | | | |
| Refurbished (fixed up) | | | | | | |
| Obsolete | | | | | | |

4. How often do donation shipments arrive with the following resources?

| | Always | Often | Sometimes | Rarely | Never |
|---|---|---|---|---|---|
| Spare Parts | | | | | |
| User Manuals | | | | | |
| Maintenance Manuals | | | | | |

5. How often are donation shipments accompanied by the following support resources?

| | Always | Often | Sometimes | Rarely | Never |
|---|---|---|---|---|---|
| User training | ☐ | ☐ | ☐ | ☐ | ☐ |
| Maintenance training | ☐ | ☐ | ☐ | ☐ | ☐ |
| Maintenance support | ☐ | ☐ | ☐ | ☐ | ☐ |

6. Do you ever receive donation shipments with equipment tagged "for parts only"?

☐ Yes ☐ No ☐ Don't know

7. How would you rate the level of consultation with your hospital prior to the shipment, if any?

☐ Excellent ☐ Good ☐ Fair ☐ Poor ☐ Very Poor ☐ No consultation

8. If your hospital was consulted prior to the shipment, what were you consulted on? Check all that apply:

- ☐ Regulatory compliance (if applicable)
- ☐ Availability of qualified users
- ☐ Approved source of operating budget
- ☐ Adequate infrastructure support
- ☐ Standardization with other equipment
- ☐ Demonstrated clinical needs and benefits
- ☐ Available maintenance support and services

9. Is there anything else you would like us to know about equipment donations to your hospital?

## 10. Contact Information

Please enter in your contact information. Remember that your answers are confidential.

1. Would you like to know the results of this research?

☐ Yes ☐ No

2. Would you like to be entered into the draw for the 'Clinical Engineering Handbook'?

For more information about the Handbook, visit: http://www.amazon.ca/Clinical-Engineering-Handbook-Joseph-Dyro/dp/012226570X/ref=sr_1_12?ie=UTF8&s=books&qid=1197297135&sr=8-12

Yes  No

3. Contact Information:

Name:

Email Address:

Hospital/Organization:

Address:

City/Town:

State/Province:

ZIP/Postal Code:

Country:

For online surveys, please click 'Submit' to submit your results and be entered into the draw.
For paper surveys, please fax to 0866 729 608 to submit your results and be entered into the draw.

The winner will be notified in March 2008. Research results will be shared with you in May 2008 if you have indicated interest. If you have any questions about this survey, contact Shauna Mullally, the principal investigator, at shaunam@sce.carleton.ca.

Thank you for your contribution to this research!