Options for acquiring medical equipment: considerations for Low Income Countries

May 2012

This rapid response was prepared by the Uganda country node of the Regional East African Community Health (REACH) Policy Initiative.

Key messages

- Medical equipment planning, acquisition and management ought to be guided by the country's health policy, and evidence based needs assessment.
- The acquisition of medical equipment is only one step of the process of Health Technology Management, of which maintenance is paramount.
- Several options for financing and acquiring medical equipment exist, each with its pros and cons. These are (a) donations and (b) procurement (bidding, direct purchase, group purchasing and supply acquisition agreements). Procurements can be financed through leasing, cash down payments, higher purchase, rental, or loaning arrangements.
- The choice of equipment and options for acquisition are necessarily influenced by demand or disease burden (clinical or patient needs) and or financial considerations. However, the health system setting, advancements in technology and whether acquiring new equipment improves patient level outcomes are fundamental elements in decision making.

Who requested this rapid response?

This document was prepared in response to a specific question from a policy maker in Uganda.

! This rapid response includes:

- Key findings from research
- Considerations about the relevance of this research for health system decisions in Uganda

X Not included:

- Policy or practice related recommendations
- Detailed descriptions

What is SURE Rapid Response Service?

SURE Rapid Responses address the needs of policymakers and managers for research evidence that has been appraised and contextualised in a matter of hours or days, if it is going to be of value to them. The Responses address questions about arrangements for organising, financing and governing health systems, and strategies for implementing changes.

What is SURE?

SURE – Supporting the Use of Research Evidence (SURE) for policy in African health systems - is a collaborative project that builds on and supports the Evidence-Informed Policy Network (EVIPNet) in Africa and the Regional East African Community Health (REACH) Policy Initiative (see back page). SURE is funded by the European Commission's 7th Framework Programme.
www.evipnet.org/sure

Glossary

of terms used in this report:
www.evipnet.org/sure/rr/glossary

Background

Why is this important? Optimal use of medical equipment can result in improved health outcomes for patients (1). The advancements in health technology today demand that obsolete equipment are replaced to meet the urgent need for better patient outcomes, albeit with increased complexity and cost (1). At the same time, maintaining such equipment is an enormous challenge for Low Income Countries like Uganda (2). Mismanagement of the health technology acquisition process can lead to valuable medical equipment lying idle (2). Therefore, innovative strategies are needed to forecast, acquire and manage medical equipment in such settings of high demand but low income.

What is the National policy? The 2010/11-2014/15 Health Sector Strategic Plan outlines Health Infrastrucre Development and Management (HIDM) as a key objective, but does not emphasize the use of evidence to achieve this end (3). Currently, the Uganda National Medical Equipment Policy of 2009 (NMEP) (4) and Public Procurement and Disposable Assets Act of 2003 (PPDA Act) (5), provide guidance and regulations on acquisition and management of medical equipment. The National Advisory Commitee on Medical Equipment (NACME), HIDM division in the Ministry of Health (MoH) and procurement boards at the various health facilities implement this function. Since 2010 procurement of medical supplies was centralised under the National Medical Stores (6).

Although the recommended mode of procurement in Uganda is competitive bidding, the NMEP and PPDA Act are not explicit on alternative means of financing medical equipment acquisition for example through leasing, which is an increasing trend in developing countries (7). This lack of clear guidance is a grey area that restricts optimising the advantages of alternative methods of medical equipment acquisition. At the same time, hospitals which take up say leasing arrangements may lack the expertise to negotiate favourably or have no reference in case of litigation.

What literature was reviewed? This document complements an earlier *Rapid Response* on the management of (expensive) medical equipment (8) with focus on leasing medical equipment. Data is scarce from Low and Middle Income Countries, thus the report is synthesised from a survey of medical equipment management facilities and managers in Kenya and South Africa (9), a survey of hospital directors in Israel (10) as well as two case studies, one in Israel (11) and another in the United Kingdom (12). Available national (3, 4, 5) and international (13, 14, 15) guidelines and regulations were reviewed. Where relevant, expert opinion articles on technical and financial issues (16, 17, 18) have been consulted.

Summary of findings

Options for medical equipment acquisition

The options are outlined below, with their descriptions, pros and cons separately detailed in **table 1**. These include:

1. Donations of medical equipment
2. Procurement of medical equipment which can be broken down to:
    a. Direct purchase
    b. Group purchase and supply
    c. Competitive bidding (open or restricted; international or national)
3. Financing options for medical equipment are often simultaneously discussed with procurement. For purposes of clarity these have been separated in this article and include:
    a. Lease options: financial lease or operating lease
    b. Cash down payments
    c. Higher purchase
    d. Loan arrangements
    e. Rental arrangements

How this Response was prepared

After clarifying the question being asked, we searched for systematic reviews, local or national evidence from Uganda and countries of similar context and other relevant research. The methods used by the SURE Rapid Response Service to find, select and assess research evidence are described here:

www.evipnet.org/sure/rr/methods

Special considerations for Low and Middle Income Countries

Systematic evaluation of medical equipment needs: In the 2008/09 annual health sector performance report only 40% of available equipments were in good condition and about 17% needed replacement (19). A priority setting exercise for medical equipment is a fundamental starting point. The National Infrastructure Health and Development Plan written by MoH back in 2002 may require revision. This task should be informed by routine data from the Health Management Information System, updated medical equipment inventory and operations research (10). It should be widely consultative and incorporate international donor agencies views.

Because of escalating health care costs, Israel conducted a priority setting exercise for health technology acquisition in 1999. The Minister of Health appointed a public committee which was able to allocate 35 million USD available out of a needed 350 million USD (10). Uganda could consider a national medical equipment evidence-based priority plan that is tied to the national health policy. Such a document answers the questions: what is needed, where, when and how will it be optimized for maximum societal benefit?

Table 1: Options for medical equipment acquisition and financing – description, advantages and disadvantages

OPTION	DESCRIPTION	ADVANTAGES	DISADVANTAGES
Acquisition			
Donations	Medical equipment given as assistance by international donors or foreign governments. Should embrace principles of *Good Donation Practice* (13)	**>** Can be beneficial especially low-tech equipment like stethoscopes, basic surgical instruments, etc (9) **>** No requirement or minimum investment of capital **>** Suitable for disasters and emergency situations	**x** Donated equipment (and technology) may be outdated, with a limited lifespan particulalry high-tech equipment (9); hence the notion of "dumping" in LMICs **x** Additional costs for maintenance (lack of spare parts) and disposal which are usually unforeseen
Direct purchasing	This is characterized by limited and often single price quotations; sometimes referred to as single or sole source bidding (5, 15).	**>** Short lead times and may be more efficient **>** Familiarity with supplier in case of sole manufacturers **>** Potential for quality particularly for brand products and discounted prices for LMICs if purchased through United Nations/World Health Organisation mechanism **>** May be necessary where the producer/supplier is the sole one	**x** Absence of competition thus potential for higher prices **x** Supplier may not be pre-qualified by World Bank or other donors for donor funded acquisitions **x** This is also a major area for corruption which is rampant in LMICs because of the absence of transparency and open competition
Group purchase and supply agreements (pooled procurement)	Bulk purchasing done through joint contract negotiations among countries in a region or among sub-national purchasers (15).	**>** Potential for lower prices through bulk purchasing but also better bargaining power **>** May be less costly if certain maintenance costs are shared e.g. quality assurance **>** Enhances regional cooperation and information sharing	**x** Politicial and regulatory barriers may exist **x** Limited access to donor funds and loans for such joint ventures **x** Requirement to maintain a common basket fund capitalisation
Competitive bidding	Price competition is open to a wide variety of potential suppliers (open bidding) or limited to a more select group of invited potential suppliers (restricted bidding). This can be at international or national (domestic) suppliers and manufacturers (5, 15).	**>** Potential for low prices due to competition **>** Restricted bidding facilitates familiarity with suppliers; may enhance potential for quality; convenience for smaller bids; lowering of delivery costs and promote local industry. **>** Generally a more acceptable practice by regulatory authorities and donor agencies, hence falititates access to such funds.	**x** Requires scarce human resource expertise and experience in procurement management in LMICs **x** Is a protracted process, administratively complex and requires pre-qualification of suppliers all of which cause longer lead times **x** Litigation by rejected bidders can further complicate the procurement process **x** Restricted bidding may overlook better qualified suppliers and lower prices, but invite lower quality.

OPTION	DESCRIPTION	ADVANTAGES	DISADVANTAGES
Financing			
Lease	Medical equipment acquisition financed through installments for a specified period and conditions of use, with the view of owning or not owning the equipment after the expiry of the agreement. Depending on the agreement,leases can be capital or operational.	**>** Costs are spread out and a large initial capital investment is avoided, hence suitable for budget/ cashflow constraints. **>** Protects against risk of technological obsolescence by allowing equipment upgrades and or replacements. **>** Protects the client from the "sell and run" philosophy of shrewed manufacturers	**x** Non-ownership and therefore limited control over the medical equipment. **x** Can be more expensive in the end arising from costs due to risk transfer and profit margins. **x** Tender process is extensive since it may have to be done twice i.e. for the equipment and for the lease package. In Uganda, clearance by the PPDA is a requirement (5) for Government funded acquisitions. **x** Lease conditions may be restrictive or costly to enable practical use of the equipment e.g. servicing arrangements (12)
Cash down payments	Medical equipment is paid for fully in cash, with immediate tranfer of ownership	**>** Potential to attract the least price as interest rates due to delayed payment are not regarded **>** Efficient and suitable for small medical equipment, particulalry if local expertise and experience exists	**x** Unsuitable for high-tech expensive equipment as large capital investment is locked up **x** Subject to the "sell and run" philosophy of shrewd manufacturers. Careful research needs to be done prior to adopting this option, on a case by cae basis. x Problems of untimely budget releases
Higher purchase	Medical equipment is acquired by making payments in installments over an agreed period, after which ownership is tranferred.	**>** May have more flexible terms for equipment use compared to lease arrangements as the intention is to finally transfer ownership **>** Suitable for limited cash flows/constrained budgets, as costs are spread out over time.	**x** Higher prices due to delay in payments and increase with extended payment periods **x** Attracts penalties for non-payemnts per agreed schedule
Rental arrangements	Medical equipment is acquired at a fee payable monthly, for temporary use. The equipmet supplier or manufacturer retains full owneship with no intention of tranfer.	**>** Suitable for emergencies and short term use, commonly less than 6 months **>** Convinient for budgetary/cashflow constraints as total rental fee tends to be much lower than total purchasing fee **>** Can provide an option after expiry of a lease agreement, usually at a nominal fee (12).	**x** Potential for high rental fees due to tranfer of risks and profit margins **x** May require hired labour/expertise to operate the equipment **x** Damage, loss and maintainance are crucial areas for conideration that may incur unforeseen costs **x** Limits technology tranfer to Low Income Countries for short term rentals

Formal evaluation of specific medical equipment: The purpose of health technology assessment is to demonstrate problems and potentials and the way to handle them in a particular setting (20). Prior to acquisition, any new medical equipment should be carefully assessed by a competent body of experts for example, NACME using formal and preset criteria (20). This can be a combination of desk analysis using existing data from the manufacturer, a background check from regulatory authorities, informational sharing from other countries or a feasibility study for health system specific implementation issues. For example the National Institute for Clinical Excellence (NICE) in the UK (21) was constituted to appraise the clinical benefits and the costs of healthcare interventions, and make judgment on cost-effective use of the available resources.

Technical considerations: Procurement boards dealing with medical equipment acquisition should have a comprehensive composition, particulalry for high-tech expensive projects. Ogembo & Ogara noted that equipment management technical staff were not routinely invited to participate in tender board meetings for medical equipment acquisitions; were restricted to writing technical specifications and their departments treated as repair depots (9). Yet inappropriately procured equipment is the beginning of maintenance problems (9, 14). Scarcity of biomedical equipment engineers in Low Income Countries may imply lack of expertise at the health facilities to populate the procurement boards and hence hiring private consultants or secondment from relevant government departments may be an option.

Specific issues requiring equipment management specialists during the procurement process include installation, compatibility, upgrades, modifications, spare parts, training needs, preventative maintenance, quality assurance et cetera. All these need to be built into the acquisition contracts particularly if financed by leasing arrangements (12, 16, 17, 18), as they are more complicated. The current procurement regulations and medical equipment policy guidelines in Uganda are not explicit on leasing, rental or loaning arrangements and state that the PPDA Authority should be consulted (4, 5).

Financial analysis: Low Income Contries have limited budgets for equipment purchase and maintenance which are frequently donor funded. In one study in Kenya and South Africa, tender boards commonly focused on the purchase price of the medical equipment (9). Selecting the lowest cost option does not necessarily imply savings or guarantee quality (16, 17), but a more expensive option has to be justified.

Key financial and economic considerations particularly for leasing arrangements include: the equipment's optimum price as determined by demand and supply (fair market value); its effective useful time as designed and manufactured (product life years); as well as its effective useful time when operated in a particular environment (useful life years) (12, 18). Noteworthy, with rapid evolution of medical technology the life cycle of equipment are generally shorter today (9). A medical equipment's useful life years is usually shorter than product life years (18) and once a technology is replaced, its fair market value declines and thus payment arrangements should take this into account. Such issues are particularly important deliberations when procuring high-tech expensive equipment.

Due to the nature and complexities of leasing arrangements multidisciplinary teams from relevant government agencies (legal, finance and procurement) should be closely consulted. Costs for ownership are compared to leasing, depending on the equipment under question. Thorough leasing arrangements take into regard the start, cancellation and extension of the lease period; its current monetary worth compared to the future taking inflation and returns into account (net present value); discounting rates (depreciation); equipment value at the end of the lease period (residual value) and the effect of market flactuations. Equipment return and negotiations at the end of the lease period (12, 17, 18), responsibility for equipment loss or damage and financial penalties for non-compliance to the lease agreement (12) should all be handled *a priori*.

Health related outcomes: Acquisition of medical equipment may be influenced by requests from health workers as new technology broadens the scope of health service delivery, thereby attracting more patients and enhancing the profile of a health facility (11). The question therefore is, will the new equipment change practice and will it ultimately improve patient outcomes? Greenberg and colleagues surveyed 31 directors of public, private and missionary hospitals in Israel as the first step in developing decision making criteria for medical equipment acquisitions (11). The respondents ranked clinical considerations and implications (increased efficacy, safety/lower side-effects, fewer complications and availability of clinical trial information) as the most important factor overall when planning acquisition of medical technology. The Uganda National Medical Equipment Policy is in line with this finding. However, capital investment dominated among directors of larger hospitals (>500 beds).

How does a policymaker in Uganda make a choice? Lessons from the UK

Foremost none of these strategies is a panacea. The litmus test is to weigh the potential benefits and drawbacks of each option. In certain situations, more than one option can be applied for example rental at nominal fee is an exit strategy after expiry of a lease agreement. The ultimate choice of an option is dependent on a number of environmental factors including the health system and availability of money, plus the type of equipment under consideration.

In a case study by Nesbit and Ward (12), Raigmore Hospital in the UK opted to acquire new state of-the-art radiotherapy equipment by lease as it passed the so called "Operating Lease Test". They argued that although demand for the service was high, a relatively low amount of cash was leaving the UK National Health Service. Additionally, this equipment was expensive and sophisticated. On the one hand the lease option not only allowed for lower initial payments compared to purchase. It also protected the hospital from the rapid advancement in technology, which would render the equipment less valuable in the future. Further, prudent negotiations with the supplier ensured some level of flexibility, for example: unscheduled equipment downtime did not attract any financial penalty, allowance for in-house servicing by non ISO9000 certified but "adequately trained" staff and obtaining spare parts from alternative sources. On the other hand it is crucial to point out that the agreement required Raigmore Hospital to bear the risk of loss or damage whether insured or not, packaging and transporting the equipment on expiry of the lease.

Donations are potential sources for major equipment for Low Income Countries. However, these should follow the principles of *Good Donations Practice* clearly spelt out in the National and WHO guidelines (4, 14). For example, donated equipment are an investment that require a maintenance budget. The downside is if obsolete equipment are donated and lack spare parts or servicing arrangements. Otherwise, when dealing with less sophisticated equipment and cash flows are not constrained then purchasing may be considered. Rental or donations are suitable for emergencies.

Conclusions:

This paper has outlined the options of acquiring and financing medical equipment spelling out their merits and demerits. A robust medical equipment acquisition plan should be evidence based and guided by national health policy and an equipment priority plan. The choice of options should be arrived at on a case by case basis analysing all possible options considering the level of the health system, technical and financial aspects and health related outcomes.

References

1. Newhouse JP. **Medical care costs: How much welfare loss**. *J Econ Perspect. 1992;6:3-21.*
2. J E Cook. **Healthcare Technology Management Problems in Developing Countries, Business Briefing: Hospital Engineering & Facilities Management,** *World Markets Research Centre*: *London (2001), pp. 24–27.*
3. Government of Uganda, Ministry of Health. **Health Sector Strategic Plan III 2010/11-2014/15**.
4. Ministry of Health, Government of Uganda. **National Medical Equipment Policy** 4th Edition 2009
5. The **Uganda Public Procurement And Disposal Of Public Assets Act**, 2003
6. The **Uganda National Medical Stores Act,** 1993.
7. World Bank, **Report on Medical Equipment Procurement Study (MEPS).** *Development Finance International, Inc. & ECRI, 1998.*
8. Rhona Mijumbi. **Management of (expensive) medical equipment; lessons from other countries**. *A SURE Rapid Response. March, 2012.*
9. M. Ogembo-Kachienga and W.O Ogara. **Strategic Management of Health Care Equipment in Kenya & South Africa**. *East African Medical Journal* Vol. *81 No. 6 June 2004*
10. Greenberg D. **Decision Making in Acquiring Medical Equipment in Israeli Medical Centre.** *International Journal of Technology Assessment in Health Care, 19:1 (2003), 194–201.*
11. Segev S, Siebzehner M, Luxenburg O, Shemer J. **Setting Priorities for Adoption of Health Technology in Israel.** *Health Policy 54 (2000) 169–185*
12. Nisbet A and Ward A. **Equipment for Radiology - To Lease or Tender?** *The British Journal of Radiology, 74 (2001), 735–744*
13. World Health Organisation. **Guidelines for health care equipment donations**. World Health Organisation. 2011.WHO/ARA/97.3
14. World Health Organisation. **Procurement process resource guide**. WHO Medical device technical series. World Health Organisation. 2011.
15. Rao R, Mellon P, Sarley D. 2006. **Procurement Strategies for Health Commodities: An Examination of Options and Mechanisms within the Commodity Security Context.** *Arlington, Va.: DELIVER, for the U.S. Agency for International Development.*
16. Zimmermann M and Maier R. **Leasing Equipment Minimizes Capital Investment.** *Healthcare Financial Management; Mar 1989; 43, 3; ABI/INFORM Global*
17. Conbeer GP. **Making the right long-term prescription for medical equipment financing.** *Healthcare Financial Management; Jun 2007; 61, 6; ABI/INFORM Global*
18. Conbeer GP. **Leasing Can Add Flexibility to Asset Management**. *Healthcare Financial Management;* Jul 1990; 44, 7; ABI/INFORM Global
19. Ministry of Health. (2009). **Annual health sector performance report 2008/09**. Kampala, Uganda.
20. Banta D. **Introduction to the EUR-ASSESS report**. *International Journal of Technology Assessment in Health Care 1997;13: 133–43.*
21. National Institute for Health and Clinical Excellence. *www.nice.org.uk*

This summary was prepared by

The Rapid Response Service, Supporting Use of Research Evidence for Policy (SURE Project), Office of the Principal, College of Health Sciences, Makerere University, New Mulago Hospital Complex, Administration Building, 2nd Floor, P.O Box 7072, Kampala, Uganda

Conflicts of interest

None known

Recommendations for citation

* Ekwaro Obuku, Rhona Mijumbi and Robert Basaza. **Options for acquiring medical equipment; considerations for Low Income Countries.** A SURE Rapid Response, May, 2012.

For more information contact

Rhona Mijumbi: mijumbi@yahoo.com