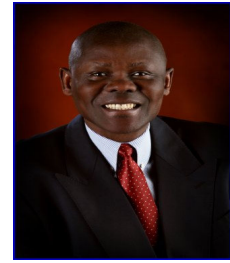




Competitive Management of Health Technology in Kenya and South Africa: From Essential Drugs List to Essential Equipment List

By

William Okelo Ogara and Michael Ogembo Kachieng'a



Abstract - In the selection and procurement of any health care equipment for deployment in the health system of a country like Kenya, evidence should be collected to demonstrate that the equipment is in the terminology of the World Health Organization, appropriate. Not every piece of equipment that is desirable is needed; not that is needed is essential; and finally not every item of equipment that is essential is affordable. It is a basic health market reality that choices have to be made in the rationalisation of health care services. It is in the process of making choices that standard essential equipment list (EEL) becomes invaluable. The ideals of EEL are comparable to those of essential drug list.

The paper discusses the development processes of EEL in Kenya and South Africa as a policy tool for competitive health care services delivery. Recommendations are made on how the competitiveness and cost-effectiveness of health care services can be enhanced through application of EEL in the selection and procurement processes of health technologies.

Keywords – Competitive Management, essential equipment list, cost-effectiveness

I. INTRODUCTION

Since the 1960s, the international community and foreign governments have supported health projects and programmes in Sub-Saharan Africa (SSA). The World Health Organisation, UNICEF and the World Bank have spear-headed the support for better health in the region ([1]). Most of the technical aid support has included health care equipment. In the 15 years, Kenya and South Africa governments have also acquired health care equipment through technical aid projects and through direct purchases with loans or grants from external sources [5]. The equipment acquisition was done without prior assessment of health needs, or of local capacity for equipment repair and maintenance or of budgetary support to these services. As a result most of the equipment is non-functional and health services have been compromised due to insufficient equipment maintenance.

II. MANAGEMENT OF HEALTH TECHNOLOGIES IN KENYA AND SOUTH AFRICA

While pieces of equipment alone are not sufficient to provide health care, they do play an important role in diagnosis, therapy, treatment and rehabilitation - in short restoring health to people. In recent years, there has been a tremendous increase in the number of pieces of equipment and devices; however there has not been a proportionate improvement in health outcomes ([1], [5], [8]). Many pieces of health care equipment are marketed with little attention for the different health needs and priorities of developing countries. Promotion activities of equipment manufacturers have created demands far greater than actual needs. Since over 40% of the total health budget in most developing countries is spent on health technologies (including drugs) [11], the result has been an increase in the cost of health care or reduction in funds available for other services.

The cost of health care has affected even the most affluent nations, and their governments are increasingly establishing control mechanisms to regulate the acquisition of expensive technologies [10]. Such mechanisms include Certificate of Need regulations, cost-benefit and financial analyses. Equipment problems in developing countries are characterised by limited economic resources, shortage of clinical engineers and technicians, and lack of organised equipment policies. These are exacerbated by the fact that equipment markets are not efficient, equitable or sustainable.

Cost-effective care is further compromised because individual public hospitals or clinics currently purchase essential drugs and essential equipment via more expensive routes, although they could procure in bulk at discounted prices. Because of such inefficiencies, insufficient maintenance, and waste, far more is being spent on equipment than is necessary,

thus erroneously reinforcing the view that the answer to equipment problems in Africa is more money. Far greater progress is likely to be achieved through effective planning of acquisitions, together with efficient maintenance and effective management of existing equipment stocks [5]. At the same time, though, ways must be found to sustain the budgetary allocations earmarked for maintenance and equipment imports. It is clear that for the optimal use of the available resources, equipment to be acquired must be limited to that proven to be effective, safe and meeting the health needs of the majority of the population. The selected equipment is referred to as 'essential' equipment, indicating that it is of the utmost importance, basic, indispensable and necessary for the health of the population.

III. ROLE OF ESSENTIAL EQUIPMENT

Definition: Essential Equipment

Essential equipment can be defined as that which supports the health care needs of the majority of the population. It should therefore be available at all times in adequate quantity and quality, in technically sound condition and at a medically acceptable standard for health care facilities.

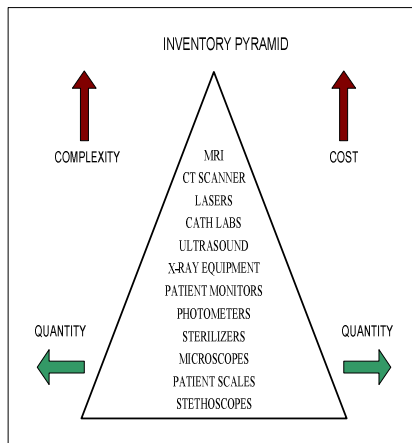
Most developed countries have instituted technology planning and assessment as a means of selecting effective technologies in health care ([1], [5]). Hospitals in these countries use planning methods and assessment tools to match clinical needs with technology requirements. They have established equipment assets management systems to monitor maintenance and operational costs on the basis of cost of ownership (CO) [2] and returns on investment (ROI) ([3], [11]). In the Kenyan and South Africa health environment, however, the enormous growth in health care technology during the last

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decade has not been accompanied by a concomitant growth in management capacity and control of resources [11], [4], [6]. In addition, the ability of the international equipment industry to develop new HT has vastly exceeded the technical capacity of most African countries to assess the clinical value and cost-effectiveness of such innovations. Several studies ([11], [5], [8]) have reported equipment problems in African countries. Therefore, the development of IEE is intended to promote prudence in equipment selection and procurement and cost-effective in utilization of health technologies in the delivery of health care services.

Figure 1 presents an equipment inventory pyramid for a modern hospital in the Kenya and South Africa.

Figure 1: Health equipment inventory pyramid



IV. METHODOLOGY

The original essential equipment list was developed in 1992 by the authors to equip Kenya's hospitals in a World Bank sponsored Health Facilities Rehabilitation Programme (HFRP) [9]. The present Kenya and South African study has been carried out using direct interviews corroborated by physical audits of equipment at various facilities, and perusal of tender and purchase documents. The interview pyramid used in the field data collection and interactive interviews is presented in Figure 2. Table I shows the

field survey coverage in terms of facilities and experts interviewed.

The essential equipment survey was carried out in Kenya and South Africa from September 1996 to March 1998 and updated in 2006. Principal methods used were as follows:

- Field study – data collection through visits to hospitals (small, medium and large).
- Site visits – data collection through visits to different wards and departments, laboratories, medical stores, clinical engineering departments and purchase offices.
- Telephonic and interactive interviews on the equipment usage were carried out with physicians, matrons, sisters, nurses, clinical engineers, technologist and technicians.
- Telephonic and interactive interviews on equipment planning, selection and procurement were carried out with physicians, administrators, planners, clinical engineers and technicians, equipment committee officials and tender board officials.

V. DATA COLLECTION

Instruments

Purchase documents, tender documents, physical equipment audit, field visits and interactive interview, equipment manufacturers and supplier visits, price quotations from the manufacturers.

Data collection period: 12 months

Figure 2: Interview Pyramid

Interview Tool: The Interview Pyramid

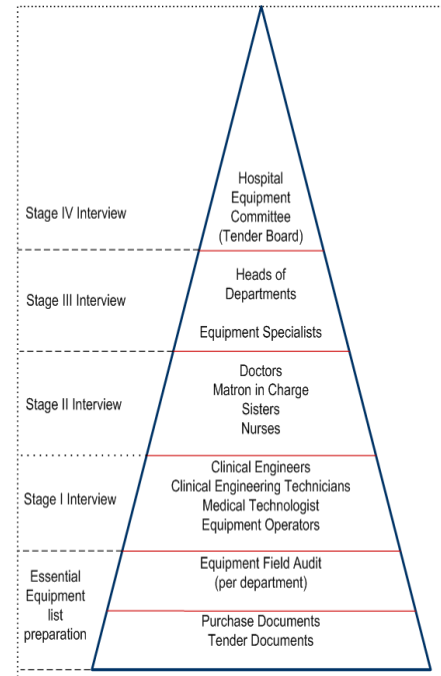


Table I: EEL field interview coverage by hospitals and experts

Hospital Type	Hospital Size (Beds)	Kenya	South Africa	Experts Interviewed
Small	75–300	3	3	17
Medium	300–600	3	3	33
Large	> 600	3	3	42
	Total	9	9	102

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VI. ESSENTIAL EQUIPMENT LIST DEVELOPMENT

The physical equipment audit was done per department by the authors and two research assistants with assistance from clinical engineering personnel, users, operators and medical staff. The interactive interviews with health professionals at all levels of the pyramid were structured around the core services offered by each department and the equipment required by the department to deliver these services effectively and efficiently. The essential equipment from the lower level was passed to the next level on the pyramid for ratification and comments. The feedback from the higher level was passed back to the lower level for consideration and comments. This process was repeated until there was significant agreement between the adjacent levels of the pyramid. Thereafter, the process was repeated at the other higher levels of the pyramid. In the development of EEL all the interviews were interactive and consultative. The same procedure was used in all hospitals. Where data were suspect, revisits to facilities were made and repeat face to face interviews were conducted.

To avoid repeating the same equipment in the three hospital categories, an accumulative step-on system was developed so that equipment registered in the lower categories is not repeated in the upper categories. The step-on is represented in Table 2. The total equipment contained in the block represents essential equipment list for a particular department accumulated from all hospitals – small, medium and large.

The Essential Equipment Lists for 20 hospital departments were developed. Table 3 shows the 20 hospital departments covered during the survey. Example of an essential equipment list for Renal Unit is presented in Table 4. Although the equipment in the EEL tables are presented as units, it should be noted that in hospital situation the actual equipment required will tailored to work load and patient traffic.

Table 2: Step-on System for Development of EEL.

		Essential Equipment	Large Hospitals (Tertiary)
	Essential Equipment	Essential Equipment	Medium Hospital (Provincial)
Essential Equipment	Essential Equipment	Essential Equipment	Small Hospital (District)

Table 3: Development of IEE by Department and Hospital Type.

No.	Department	Hospital Size		
		Small (District)	Medium (Provincial)	Large (Tertiary)
1.	Anaesthesia	X	X	X
2.	Central Sterile Supply	X	X	X
3.	General Wards	X	X	X
4.	Gynaecology	X	X	X
5.	Intensive Care		X	X
6.	Internal Medicine	X	X	X
7.	Logopaedics	X	X	X
8.	Nuclear Medicine			X
9.	Obstetrics	X	X	X
10.	Occupational Therapy	X	X	X
11.	Ophthalmology	X	X	X
12.	Paediatric	X	X	X
13.	Physiotherapy	X	X	X
14.	Radiation Therapy			X
15.	Radiology	X	X	X
16.	Renal Unit		X	X
17.	Surgery	X	X	X
18.	Surgical Sets	X	X	X
19.	Theatre	X	X	X
20.	Trauma	X	X	X

VII. RESULTS AND DISCUSSION

Essential Equipment List versus Essential Drugs List

The Essential Equipment List (EEL) has been developed to complement the essential drugs list which has been successfully used in several countries [5], since its first printing in 1977 by the World Health Organization (WHO). Special essential drugs lists have been compiled for community clinics, and district, regional and teaching hospitals [12]. The model list of essential drugs has been adopted by numerous international and bilateral agencies, and several countries are using the list for evaluating drug donations [12]. The essential equipment list is in line with World Health Organisation ideals of providing technical support to affordable and accessible health care services in African countries.

Potential Benefits from EEL

The need for information and guidelines on selection of health care equipment in Kenya and South Africa has been stressed in a number of documents ([11], [6], [8]).

The essential equipment list (EEL) is a reference and resource document for health policy makers, planners, health care managers, health institutions, equipment committees and tender boards. Equipment manufacturers and suppliers also need EEL for equipment quantification and the monitoring of demand gap. The effective usage and integration of EEL in many Kenya and South Africa will depend on national governments, bilateral and multilateral organisations, donor agencies and non-governmental organisations supporting and investing in health care in Africa [5]. The EEL is intended to be flexible and adaptable to different situations; which specific items of equipment are regarded as essential will remain an institutional or a national responsibility.

Essential Equipment List and Primary Health Care

Most equipment in use today is designed

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for hospital- or clinic-based health care, not primary health care, which is not a problem in the developed countries where most items of equipment are researched and manufactured. Primary health care represents a unique technological challenge to developing countries. The technologies for primary health care in these countries must be focused on prevention of tropical diseases, nutritional deficiencies, promotion of hygiene and social health care education. A significant proportion of the technologies required will have to be developed and manufactured locally, nationally or regionally, in the countries which will ultimately use them.

Table 4: Essential equipment list for Rental

Unit

Essential Equipment for Medium/ Large Hospital			
Renal Unit	Unit Price		
Essential Equipment	Rands	Ksh	US\$
Dialysis machines (6 suggested)	372 000	4 905 302	79 657
Re-use equipment	276 000	3 639 418	59 101
Reverse osmosis equipment	290 000	3 824 026	62 099
Apheresis equipment	264 000	3 481 182	56 531
Electronic weighing scale	36 000	474 707	7 709
Infusion pumps	30 000	395 589	6 424
Electronic bed scale	11 000	45 049	2 356
Defibrillator	23 000	303 285	4 925
Incubator	17 000	224 167	3 640
Hermeneutics	336 000	4 430 595	71 949
Blood warmer	11 000	45 049	2 356
Kitchen scale (0-5 kg)	400	5 275	86
Overhead projector (for teaching purposes)	6 000	79 118	1 285
TV + video recorder (patient self-care education/entertainment)	12 000	158 236	2 570
Computer + printer system + Internet access	62 000	817 550	13 276
Unit Budget	1 954 000	25 766 021	418 415
Renal Laboratory Equipment (may not be necessary if support from main laboratory is readily available)			
Na ⁺ /K ⁺ analyser (if not available in main laboratory)	28 000	369 216	5 996
Microscope	11 000	45 049	2 356
Centrifuge	6 000	79 118	1 285
Refrigerator	2 000	26 373	428
Freezer	2 000	26 373	428
Laboratory Budget (if required)	49 000	646 129	10 493

All prices are calculated at the exchange rates ruling on 24 September 2006. Note: Due to sophisticated technology involved and high capital investment required, renal departments are normally established at

referral/tertiary hospitals. The running of a renal department requires highly trained and motivated support staff. Renal equipment requires specialised maintenance services covering mechanics, hydraulics and electronics.

VIII. CONCLUSION

Equipment plays a strategic role in health care improvement, but poor management of equipment, insufficient maintenance budgets and insufficient technical expertise render equipment use in Kenya and South Africa highly inefficient. Hence, there is a great potential for increasing equipment utilisation while reducing ownership costs. Appropriate action to reduce waste is required at all stages of the equipment supply chain — selection, procurement, maintenance and replacement.

Despite high investment in health care technologies by both countries; common diseases continue to be a significant drain on human and economic resources, producing human suffering and higher health costs. One aspect of minimising both human and economic waste in these countries is by selecting and procuring appropriate health care equipment that meets the primary care needs of the populations. The purpose of an essential equipment list (EEL) is to provide a base-line document for planning, selecting, procuring, maintaining and managing health care equipment. From a financial management point of view, it is a budgeting tool for both capital investments and recurrent costs. It can be used for planning the training of equipment users, operators and maintenance technicians. It is also an essential document for an equipment asset management system.

The need for EEL is driven by economic necessity for cost-effective management of technological investments in health care systems. The final goal of EEL is to ensure that health care delivery can be technically and financially supported, and cost-effectively utilised and managed without creating undue financial pressure at facility and national levels.

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