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Medical technology and the "Fifth continent"

Today, one of the most densely populated landmasses, the sub-saharan African continent, is rapidly becoming known as the "fifth continent" in many aspects of development help, most notably with regard to medical technological progress.

In the industrialised world by comparison, the concepts of "modern health care" and medical technology are synonymus, mainly due to the efficiency of our health care structures which support the development, growth and maintenance of technical installations.

Unfortunately, despite the assistence and intervention of the international organisations, the situation in Africa remains grave, as problems instead of deminishing over time, are simply growing more massive year by year. Why, for instance, is one of the most commonly used pieces of medical apparatus "the laser", only available in large sophisticated medical centres (some areas ie; West Africa, there are none at all)? Without a doubt, more widespread distribution of such equipment within the regions would provide modern medical treatment for some of the most basic yet common and debilitating ailments, to a vast range of the population simply, efficiently and cost effectively.

Why then is sub-saharan Africa finding itself "left behind" regarding medical technology?

The answer is complex and must be attributed not only to supervening problems existing within the continent itself, but also due to factors imposed by us, the international organisations — the donors and financiers.

Accumulative analysis of the problems reveals the following facts: —

1. Equipment itself

(a) Absence of standardisation of equipment.
— several brands
— often too old and outdated
— incomplete documentation sent - frequently not in the language required.
— too sophisticated (ie. with microprocessors)

(b) Budget restraints.
— absence of logistics inhibits the planning of calculations of requirements for spare parts and work materials
— budget is often inadequate for provision of a proper maintance service or for needed spares and consumables

(c) Location of equipment
— inadequate pre-planning performed for good site location
— lack of protection from hostile environments - ie. dust heat, humidity, poor ventilation...
— inconsistent power supply / water supply leading to increased incidence of damage to sensitive equipment
— no storage facilities for spare parts etc.,

(d) Prestige decision making
— donated equipment often accepted without considering the following factors: -
who shall install it? where shall it be installed?
how does it operate? is there a trained operator?
spare parts and work materials are not usually part of a donation, so where do they come from?
usually there is no warranty, so who shall maintain it?

2. Restrictions imposed by financiers (world Bank/IMF) on loans and employment in the public health service

— budgets for maintenance either not calculated or insufficient for replacement of spares, consumables or apparatus itself. (Normally, 10-15% p.a. of investment costs should be provided to meet the daily running requirements of the equipment).
— conditions on loans remain with only poor resources for repayment
— no further employment of public service personnel is now a condition from the World Bank/IMF (rare exceptions made in the case of doctors).

3. Lack of recognised technical training facilities locally

— inadequate training facilities for both operators and maintenance technicians/engineers locally
— operators and technicians are often inexperienced - then having gained experience, they are often transfered
— even with a competent in-house

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Es necesario poner en prática una serie de medidas tendientes a mejorar las condiciones de prevención y seguridad, y que ayuden a optimizar las condiciones ergonómicas del espacio de trabajo del personal asistencial.
Estas medidas van desde el mismo diseño y construcción del edificio hasta la existencia de adecuados planes de prevención, mantenimiento, emergencia, actuación y evaluación.
Es grande la tarea que tenemos como diseñadores del Recurso Físico en Salud, de generar condiciones seguras de trabajo, de riesgo disminuido para todo el personal de un establecimiento.

D - Algunos ejemplos de Standares de Acreditación Hospitalaria

Nos interesa hacerles saber que todo lo expuesto hasta aquí está incorporado en un Manual de Acreditación Hospitalaria que evalué proceso y resultados, programa que tiene un importante impulso a partir del Acuerdo General de Cooperaciónn entre la Federación Latinoamericana de Hospitales (F.L.H.) y la Organización Panamericana de la Salud (O.P.S. Washington - Junio 1990), acuerdo que aportó el marco de referencia global, en pos de la "transformación de los sistems de salud", otorgando la mayor prioridad al desarrollo y mejoramiento de la infraestructura de salud.

maintenance service, an outside service from the supplier/manufacture is required on occasions
— centralized technical services of public health departments are not efficient due to lack of experience, limited training and lack of time capacity
— demotivation } low salary / inadequate training / no work materials
— if training has been given abroad especially for a prolonged period, this can lead to major re-integration problems with personnel returning to their previous home/work environment.

4. Major demographical problems

(a) With the ever increasing population growth rate and subsequent economical problems which develope, people are moving on mass from their regional environment leaving the main town centres to absorb the migrants;
e.g. In Senegal the population growth rate is increasing by 3.3% per annum
In Kenya the population growth rate is increasing by 3.2% per annum (1989)
(In Senegal alone from 1900 to 1955, the population doubled, whereas from 1955 to 1989 - a 33 year gap only, the population has trebbled).
Consequently, large proportions of populations are centred in main town areas and are being more and more deprived of basic resources ie. education, health care, employment and social welfare. These statistics acknowledge the enormous need for technical medical facilities to be ready available within the towns medical centres to deal with the many medical problems which prevail when a major demographical change occurs within such a short period.
(b) Due to strong inter-cultural influences (mainly in the rural areas with strong village leaders), people are hesitant and often discouraged to approach modern medical centres for primary care, until such time as it is too late and more sophisticated intervention is required and often not available.
While reflecting on these factors, the following question must arise: -
Q" given the pre-existing factors, can we justify the general decline that is emerging in medical technology on the sub-saharan continent of Africa, while simultaneously, the industrialized continents strive daily to enhance developments and improvements in medical technologyal services to their own populations?
The answer: must come individually from each donor nation. In my opinion however, we cannot justify or accept such a situation; so what can we do to improve it?
Indeed there is no one simple solution!
By addressing the matter today, it is my hope to awaken your awareness to this major problem, which is no longer a hypothesis, rather a stark reality.
Steps must be taken now to minimise this decline.
It is my belief that the following recommendations are worthy of consideration: -

Reccomendations

A: Establishment of a consulting board for medical equipment

This could be a non governmental institution, consisting of competent persons with experience in the field of medical technology (ie. doctors, engineers, decision makers at ministry level), authorized to review all matters concerning medical equipment and to make decisions in accordance with guidelines which should be compiled with regard to the standardization of equipment within the country.
The presence of such a board should ensure that
— advance consultation with donors and recipients occurs prior to the presentation of a donation. Consequently, the specific factors related to equipment standardization, budgets for spare etc. equipment location, operation and maintenance, can be effectively approached, thus reducing the incidence of "prestige decision" making and its associated problems.

B: Promotion of recognised training centres locally

The GTZ (German Technical Co-Operation) in conjunction with several African countries has established technical training centres, promoting the concept of providing officially recognised training programmes at local level. One such example is our project in Senegal, established in the region of Diourbel (de-centralized) where hospital maintenance technicians are trained and developed. The course has been incorporated into the Senegalese education system and the certificate is officially recognised by the government and in neighbouring countries. Our first class of technicians who qualified in July 1991 have all been re-integrated into various medical centres throughout the regions as hospital maintenance technicians.
Such local training programmes seek to be realistic for the needs of the country taking into consideration the resources available.
Decentralization of training institutions must be encouraged to promote the desemination of technological knowledge into the regions - the most deprived areas.

C: Improved awareness of family planning education

Increased attention must be given by the major donor organisations in conjunction with relevent organisations such as (IPPF) International Planned Parenthood Federation, to help adress effectively the problem of the ever increasing birth rate and its associated cultural influences in sub saharan Africa, in order to try and reduce the demographic imbalance which exists at this point in time.

Conclusion

Indeed the road forward in improving medical technology is never easy, especially in sub-saharan Africa, where such obstacles as those mentioned earlier are ever present and unaccommodating.
In order to improve the effectiveness of our medical technological assistence to this continent, I feel these reccommendations should be explored and implemented where feasible.
However, for Africa to regain her rightful place alongside other developing nations, we must face this problem today, for the ever increasing pressures of "donor fatigue" that is emerging towards the enormous rate of disators unfolding worldwide, could mean that tomorrow may already be too late!!!

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Essais réels des installations électriques de secours

Prove reali degli impianti elettrici di soccorso.
L'affidabilità degli impianti elettrici di Soccorso non può essere garantita se non procedendo a delle prove reali degli impianti elettrici di Soccorso.
Limitarsi a delle prove di avviamento con messa a carico fittizia è insufficiente.
Alla Clinica St. Luc, il numero di prove reali è stato fissato a cinque per ogni anno dalle ore 6,15 alle 6,30 del mattino.
L'informazione degli utenti è molto importante. Diversi metodi d'informazione sono stati messi in opera nel corso degli anni con contatti personali note d'informazione, messaggi con altoparlanti, affissioni elettroniche, etc...
Queste prove sono dirette e seguite dal Centro di Controllo che è in collegamento radio con i tecnici che si trovano al Quartiere operativo, Cure Intensive, Cabine di Alta Tensione e Bassa Tensione.
I Tecnici dispongono di consegne scritte che definiscono chiaramente il lavoro da effettuare.
Queste prove:
— aumentano l'affidabilità delle installazioni elettriche di Soccorso
— permettono di adattare le installazioni di Soccorso ai bisogni reali
— assicurano la formazione dei Tecnici
— evitano il panico agli utenti.

Live testing of the emergency electrical installations.
The reliability of the emergency electrical installations can only be guaranteed through live testing.
Restricting testing only to a start up and a off-line dummy charging of the equipment is insufficient.
At St Luc's Hospital, 5 real tests are performed each year between 6.15 a.m. - 6.30 a.m.
It is very important to inform the hospital staff. Several communication channels have been developped over the years, including personal contacts, memorandums, messages through the public address system and through the electronic notice board.
These tests are managed from the Control Centre which is in radio contact with the technicians, who are located in the Operating Theatre, Intensive Care, the High - Low Voltage Stations and other important areas.
The responsabilities of the technicians are clearly defined in written instructions.
These tests:
— increase the reliability of the emergency electrical installations
— enable the emergency procedures and installations to reflect real needs
— ensure that the technicians are well trained to carry out their responsibilities
— avoid panic among the hospital staff in a real life situation.

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1. Les cliniques St. Luc en quelques chiffres

Les Cliniques Universitaires St. Luc se situent dans la périphérie de Bruxelles et dépendent de l'Université Catholique de Louvain.
Quelques chiffres:

nombre de lits	900
nombre de patients hospitalisés par an	28.300
nombre de journées d'hospitalisation par an	260.000
durée moyenne de séjour	8,94
nombre de consultations par an	320.000
nombre d'urgences par an	42.000

Les Cliniques St. Luc font partie intégrante du Site de Louvain en Woluwe qui abrite:
— la Faculté de Médicine.
— des Ecoles paramédicales
— une zone de logements pour étudiants
— des laboratoires de recherche
Du point de vue technique le poids des Cliniques St. Luc par rapport à l'ensemble du Site peut être résumé par ces deux chiffres:
St. Luc représente
55% des consommations éléctriques
45% des consommations de chauffage

2. Réseaux électriques (fig. 1)

Le raccordement au réseau électrique de distribution se fait au niveau de la Cabine HT située à la Centrale Technique. A partir de cette cabine deux "Feeder", suivant des chemins différents, alimentent les Cliniques St. Luc en haute tension, où celle-ci est transformée part vingt-deux transformateurs de 1.000 kVA.
Quant à l'alimentation électrique de secours, elle est porduite par deux groupes électrogènes de 1.250 kVA chacun sous une tension de 11 kV et distribuée vers les Cliniques St. Luc à l'aide d'une boucle HT pour alimenter 4 transfos de 1.000 kVA.
Du côté Basse Tension, nous avons 12 inverseurs NS. Un by-pass nous permet de vérifier et entretenir l'inverseur NS.
Pour éviter une surcharge lors de la mise en route des Groupes de Secours, les équipements ont été répartis en:
U1 dès que la tension de Secours est disponible
U2 + 5"
U3 + 10" et pour autant que les 2 Groupes de Secours soient opérationnels.
A noter que seuls le Centre d'Informatique et la gestion informatisée des alarmes techniques sont pourvus d'un onduleur.
Lors de la réapparition de la tension normale, un programmeur réenclenchera, suivant une séquence définie les disjoncteurs HT et BT. et les inverseurs N.S. changeront de position.

3. Nécessité des essais réels

Ce schéma unifilaire a été bien entendu simplifié à l'extrême et ne fait pas ressortir la complexité réelle des installations électriques. En réalité, pour assurer le fonctionnement correct de l'installation électrique de Secours, il y a une multitude de conditions qui doivent être remplies pour qu'en finale, la salle d'opération par exemple, soit alimentée en courant de Secours.
Quelques exemples:
— contact de mise à niveau du réservoir journalier de fuel
— état des batteries de démarrage
— automatisme de mise en parallèle des groupes

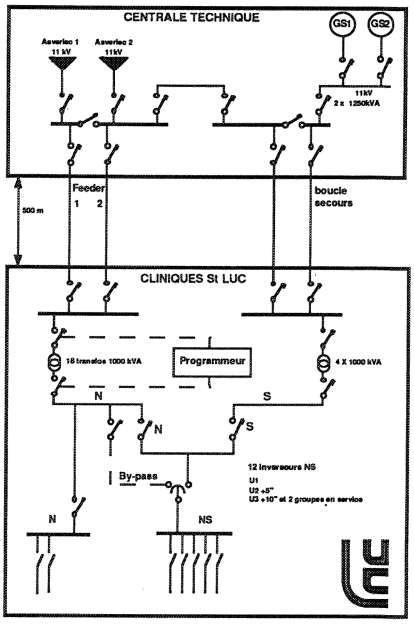

Fig. 1