

THE URGENT NEED TO DEVELOP SUSTAINABLE POLICY AND MANAGEMENT TOOLS FOR MEDICAL DEVICES PUBLIC PROCUREMENT IN BENIN

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ABSTRACT

Developing countries have very limited resources for procurement of medical devices. Usually, the scarcest resources they do have are not used in appropriate and optimal ways. Initial results of a study conducted in Benin are identified one of the basic factors that adversely affected the healthcare technology procurement management cycle. Key factors identified included high acquisition costs (≈ 2.50 to 4.75 times higher than the reference prices), lack of knowledge of medical devices market prices and lack of insight in the cost/performance ratio of various brands of medical devices. In a nutshell, the lack of an efficient medical device procurement policy tool as a reference for market prices or value-based prices lists. The study was based on data collected from executed medical device contracts from 1998 to 2008 and also included surveys using semi-structured interviews and friendly discussions with ten accredited medical device suppliers.

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INTRODUCTION

Healthcare technologies offer many benefits and have greatly enhanced the ability of health professionals to prevent, diagnose and treat diseases (Keller and Walker, 2004). They are one of the essential elements for the delivery of health services. The use of technology in health care systems in developing and transition countries face a great number of challenges. Since about 95% of the healthcare technology used in these countries is imported (WHO, 2003); mismatches occur because the technology development process has not considered the needs and realities of the target environments. These mismatches in the technology transfer process to countries with financial and technical constraints are often of great significance. Thus, in Benin, the acquisition of medical devices and equipment represent a significant proportion of national health care expenditures. Each year, more than 10.6 millions US\$: about 20%, (MSP, 2005) of the national health budget, is spent on procurement of medical devices and equipment for healthcare facilities. Despite this great amount of monetary resources spent each year on an ever-increasing array of medical devices and equipment, not enough attention is paid to equipment acquisition and utilization. (Guinand, 2000; MS, 2006^a; MSP, 2000^a; MSP, 2000^b; MS, 2006^b; MSP, 1995; MSP, 2002; MSP, 1998; MSP, 2000^c; MSP, 2005; MS, 2006^c).

The objective of the study, supported by the *Netherlands Organisation for International Cooperation in Higher Education* (NUFFIC) and conducted in Benin by the Ministry of Health and the University of Abomey-Calavi in collaboration with the Athena Institute, Vrije Universiteit Amsterdam is to identify the main factors appearing between 1998 and 2008 that adversely affected the healthcare technology procurement management cycle. The results will shed so light on the identification of key reasons underlying the mismanagement in order to improve the system by formulating recommendations to the central health authorities and policy makers.

Given the background information on the country, its health system and the state of its healthcare technology management, the methods used will be described and the results will be presented followed by discussions and recommendations to the health authorities.

BACKGROUND INFORMATION

Benin: The country:

Located on the West coast of Africa, the Republic of Benin is small (114,763 square kilometers), with a coastline on the Gulf of Guinea nestled between Nigeria, Niger, Burkina Faso, and Togo (Figure 1). The population, estimated at 7,839,914 in 2006, includes a multitude

of ethnic and linguistic groups. Benin remains one of the world's least developed country's and has been ranked 163 of 177 on the United Nations Human Development Index (2005). Demographic and health indicators are given below (Table 1) (BT, 2007; USAID, 2002; USAID, 2006).

Figure-1: Map of Benin



Table-1: Selected demographic and health indicators of Benin

Sources: *Human Development Reports: 2007/2008*, *Benin Demographic and Health Survey 2006*; *Benin Health Statistics Directory 2006* (GB, 2006; INSAE, 2006; MS, 2006^a):

Indicators	
Population in 2006	7,839,914
Human Development Index	0.437
Country rank	163/177
GPD per capita (Purchasing Power Parity US\$)	1,141
Life expectancy at birth (years)	55.4
Public expenditure on health (% of GPD) in 2004	4.5
Health expenditure per capita (PPP US\$) in 2004	40
Infant mortality rate per 1,000 live births	67
Maternal mortality ratio per 100,000 live births	474
HIV/AIDS prevalence (%)	2.0
Adult literacy rate (% ages 15 and older)	34.7

The health system:

The public healthcare system of the country has been reorganized according to the decentralization policy. It consists of three levels: *central* with the national referral hospital (≥ 600 beds), *intermediate* with six province hospitals (≥ 300 beds) and *peripheral* with 28/34 functional zone hospitals (≥ 85 beds). There are seventy seven communal health centres, four hundred eighty nine arrondissement health centres and five hundreds sixty two village health units and other private health facilities. Apart from that, the health system also has the following public hospitals: a mother and child hospital, a national centre for tuberculosis diagnosis and treatment, a national hospital for psychiatry, a national hospital for gerontology, two Buruli ulceration treatment centers and a leprosy treatment Center (MS, 2006^a) etc...

Healthcare Technology Management and Maintenance

The application of organized knowledge and skills in the form of devices, medicine, vaccines, procedures and systems develop to solve health problems and improve the quality of lives is the recent definition given by WHO to the term *health technology* (Bloom and Temple-Bird, 1990; DHRSA, 1998; Fahlgren, 2004; Goodman and Ahn, 2004; Heimann and Poluta, 1997; Issakov, 1994; Keller and Walker, 2004). When used in this paper, the term healthcare technology means the different types of devices or equipment used in health facilities. Its encompasses: medical equipment for clinical use; hospital furniture; vehicles; service Supplies; plant; communication equipment; fire fighting equipment; fixtures built into the building; office equipment; office furniture; training equipment, walking aids and workshop equipment (Bloom and Temple-Bird, 1990).

Healthcare technology management, maintenance and utilization remains one of the main challenges of developing countries healthcare systems in general and Benin particularly. Although many financial resources are used for procurement of devices, not enough attention is paid to their future. While some of the equipment was donated, a significant portion was purchased with loans provided by bilateral and multilateral agencies and will have to be paid back with great sacrifice (Wang, 2003). One of the root causes of the equipment idleness is the lack of effective management. It is important to point out that despite the several initiatives undertaken by the ministry of health to improve the *healthcare technology management cycle* no significant changes have been made. (MSP, 2000^a; MSP, 2000^b; MS, 2006^b; MSP, 1995; MSP, 2002).

METHODS

This preliminary study was carried out in Cotonou, the economical capital of Benin and focused on the procurement management in the public healthcare sector. The goal is to identify the main weak points in the procurement cycle of medical equipment/devices from 1998 to 2007. It was based on data collected from national procurement magazines, executed contracts awarded by the Ministries of Health and Finances and, on semi-structured interviews and friendly discussions with ten accredited medical device local suppliers.

A comparative study was done on the selling price of ten medical devices procured by the Benin Ministry of Health further to open tenders. A modest methodology was developed and consist of the following steps: i) Ten medical device items were selected from the available essential medical device list according to their role and utility. ii) The mean reference selling price X based on the specifications were determined from the previous ten suppliers according to the prices the devices were sold for in the stores or the prices the same devices which were sold to the country's private health facilities. iii) The mean prices Y at which the same devices were sold to the Ministry of Health following competitive open tenders procedures were calculated for three periods (1998-1999; 2001- 2004 and 2005-2008) when the procurement evaluation procedures have been changed and improved. iv) The mean prices at which devices were sold to the Ministry of Health were compared to the mean reference selling prices provided by the companies and the ratio Y/X was calculated in each case.

RESULTS:

The results of the study are summarised in tables 1-3 and graphs 1-3 showing the mean reference selling prices of selected medical devices in comparison with the price the same devices were sold to the Ministry of Health from 1998-1999, 2001-2004 and 2005-2008. The ten essential equipment selected were: 1) blood pressure device, 2) spectrophotometer, 3) electric suction unit, 4-) electrocardiograph, 5) x-ray apparatus, 6) hot air sterilizer, 7) autoclave, 8) ventilator, 9) anaesthesia system and 10) blood bank refrigerator. The letter Y that may be a, b, c, d, e, f, g, h, i or j represents respectively the selling price (in FCFA: Benin currency) of each equipment to the Ministry of Health, by open tenders. The letter X that may be A, B, C, D, E, F, G, H, I or J are respectively the reference selling price of the same equipment. The key factors that have been identified so far include the high acquisition costs (≈ 2.50 to 4.75 times higher than the reference prices); the lack of knowledge

and experience of government procurement officials on medical device market prices, the lack of capacity to monitor competitive prices from suppliers and the lack of insight into the cost/performance ratio of various brands of medical devices.

Table 1: Comparison of the mean reference selling prices of medical devices to the price paid by the Ministry of Health from 1998 to 1999.

Equip No	Selling price (FCFA) to the MoH by tender (Y)	Reference selling price (FCFA) (Selling price to the private hospital by the same supplier) (X)	(Y)/(X) Ratio
1	a	(A=0.32a)	3.13
2	b	(B=0.25b)	4.00
3	c	(C=0.35c)	2.85
4	d	(D=0.42d)	2.38
5	e	(E=0.47e)	2.12
6	f	(F=0.42f)	2.38
7	g	(G=0.45g)	2.22
8	h	(H=0.35h)	2.85
9	i	(I= 0.30i)	3.33
10	j	(J= 0.43j)	2.32
			Mean = 2.75

Graph1: Comparison of the mean reference selling prices of medical devices to the price paid by the Ministry of Health from 1998 to 1999.

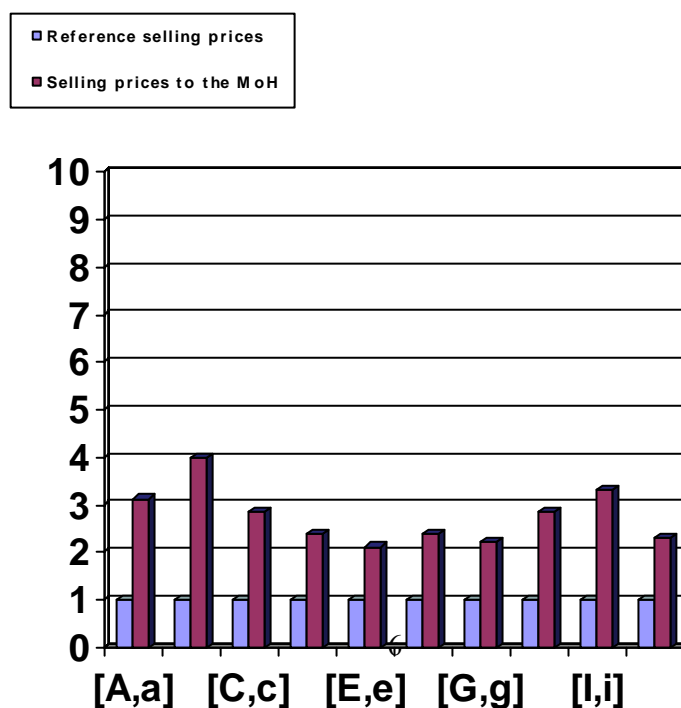


Table 2: Comparison of the mean reference selling prices of medical devices to the price paid by the Ministry of Health from 2001 to 2004.

Equip No	Selling price (FCFA) to the MoH by tender (Y)	Reference selling price (FCFA) (Selling price to the private hospital by the same supplier) (X)	(Y)/(X) Ratio
1	a	(A= 0.15a)	6.66
2	b	(B= 0.18b)	5.55
3	c	(C= 0.15c)	6.66
4	d	(D= 0.25d)	4.00
5	e	(E= 0.32e)	3.13
6	f	(F= 0.38f)	2.63
7	g	(G= 0.20g)	5.00
8	h	(H= 0.25h)	4.00
9	i	(I = 0.23i)	4.34
10	j	(J = 0.33j)	3.03
			Mean= 4.50

Graph 2: Comparison of the mean reference selling prices of medical devices to the price paid by the Ministry of Health from 2001 to 2004.

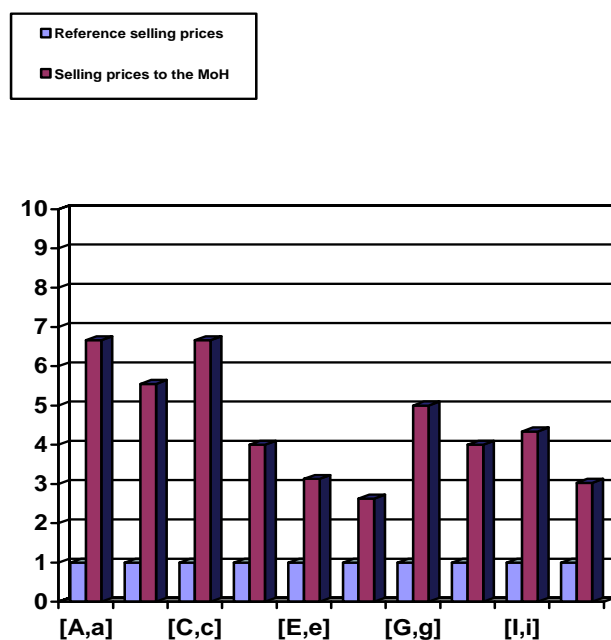
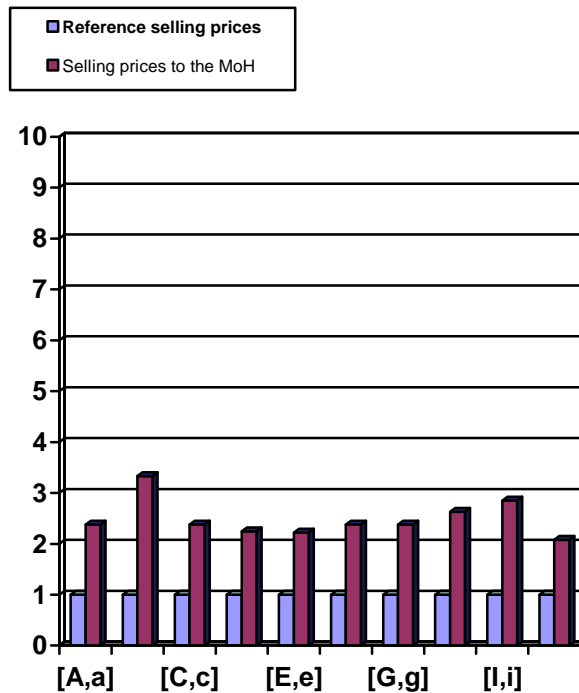


Table 3: Comparison of the mean reference selling prices of medical devices to the price paid by the Ministry of Health from 2005 to 2008.

Equip No	Selling price (FCFA) to the MoH by tender (Y)	Reference selling price (FCFA) (Selling price to the private hospital by the same supplier) (X)	(Y)/(X) Ratio
1	a	(A=0.42a)	2.38
2	b	(B=0.30b)	3.33
3	c	(C=0.42c)	2.38
4	d	(D=0.40d)	2.25
5	e	(E= 0.45e)	2.22
6	f	(F=0.42f)	2.38
7	g	(G=0.42g)	2.38
8	h	(H=0.38h)	2.63
9	i	(I = 0.35i)	2.85
10	j	(J = 0.48j)	2.08
			Mean= 2.48

Graph-3: Comparison of the mean reference selling prices of medical devices to the price paid by the Ministry of Health from 2005 to 2008.



DISCUSSION

Effective and efficient acquisition, especially healthcare technology, represents an important part of any health budget and needs to be carefully reviewed. Through the results shown in tables 1-3 and graphs 1-3, it is obvious that, despite the independent procurement years, the device acquisition costs by the Ministry of Health remain higher than the ad hoc and circumstantial reference costs. Although the Benin Goods and Services Procurement Code have improved during the years 2001 to 2004 and also from 2005 to 2008, no significant improvements were found regarding the highest cost of medical equipment paid by the Ministry of Health especially during the 2001 to 2004 period (4.5 times higher than the reference prices). It is important to critically analyze the reasons that underlie this fact. Many cultural, social and political factors could then be explored and examined which may compete with cost considerations during public procurement process. One of the common and most knowing factors is corruption which is the “misuse of entrusted power for private gain”. It occurs when public officials who have been given the authority to carry out goals which further the public good, instead use their position and power to benefit themselves and others close to them (Transparency International, 2006).

Health systems in general and sub Saharan African countries health systems in particular prone to corruption because of the five actors (government regulators: health ministries, parliaments, specialised commissions; payer: social security institutions, government office, private insurers; providers: hospital doctors, pharmacists; consumers: patients and suppliers: medical equipment and pharmaceutical companies) involved and the complexity of their multiple forms of interaction (Savedoff and Hussmann, 2006). The health sector is particularly vulnerable to corruption due to uncertainty surrounding the demand for services, many dispersed actors interacting in complex way and the asymmetric information among the different actors. These three features increase the occurrence of corruption and making it difficult to identify and control for diverging interests (Vian, 2008). Corruption in the health sector could be understood when analysing the roles and relationships among the different actors to identify potential abuses that likely to occur (Ensor and Antonio, 2002); (Figure 2) is an illustration.

The misuse of entrusted power for private has been presented in a conceptual or theoretical framework (Klitgaard 1988; Di Tella and Savedoff 2001; Miller et al. 2001; Duncan 2003; Ramos 2003; Brinkerhoff 2004; Olivier 2004; Lewis 2006; Fung et al 2007) (Figure 3). From this framework, it can be seen that corruption is driven by three main forces: government officials or agents who abuse public power and position for private gain because they feel *pressured to abuse*, because they can *rationalize* their behaviour and because they have the *opportunity* to abuse power (Vian, 2007). Corruption opportunities increase when; i) the officials/agents have *monopoly power* over clients; ii) have a great deal of *discretion*, or autonomous authority to make decisions, without adequate control on that discretion; iii) and there is not enough *accountability* for decisions or results (Klitgaard 1988). Corruption (C) may be represented as following formula: $C = [(M + D) - (A + Cv + T + E) - (R + Pa)]$, where M is the monopoly, D the *discretion*, A the *accountability*, Cv the citizen voice, T the transparency, E the enforcement, R the rationalization and Pa the pressure to abuse. It appears when an organization or a person has monopoly power over a good or service, has the discretion to decide who will receive it and how much that person will get, and is not accountable. When bribes are large, the likelihood of being caught and punished is low, many officials may succumb.

Figure 2: Five key actors in the health system

Source: *Savedoff and Hussmann, Chapter 1. The cause of corruption in the health sector: a focus on health care system, in transparency international, global corruption report 2006.*

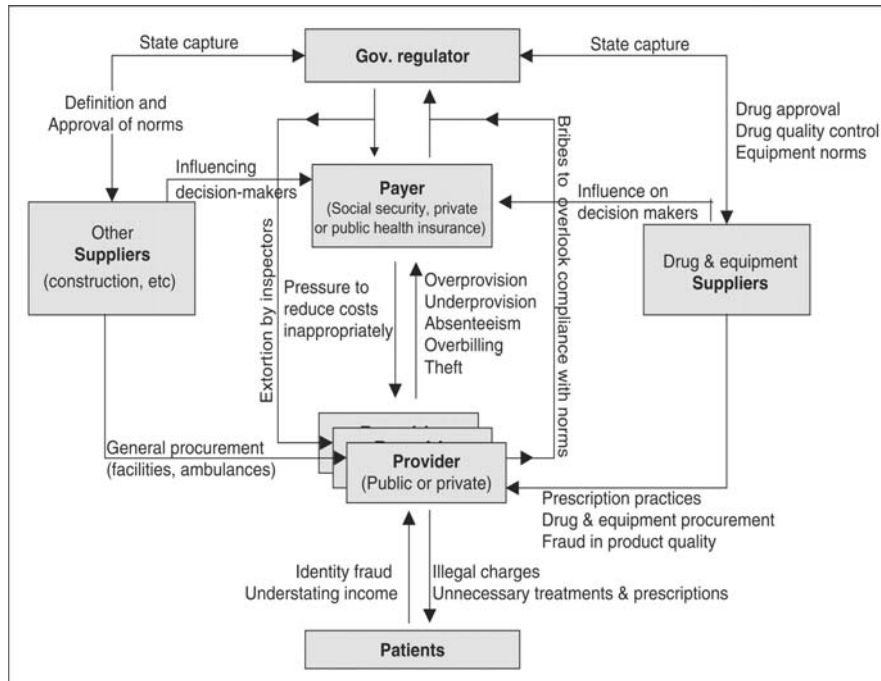
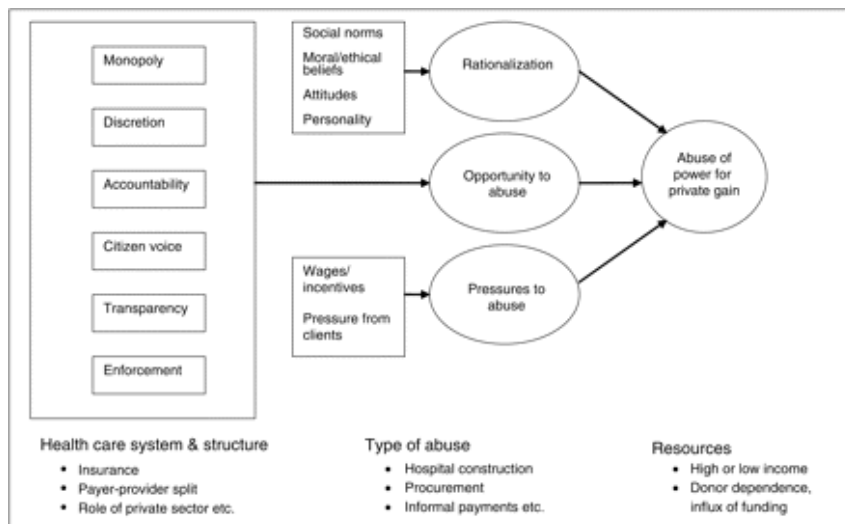


Figure: 3 Theoretical framework of corruption in the health sector
 Source: Taryn Vian, *Review of corruption in the health sector: theory, method and intervention. Health policy and Planning 2008;23: 83-94*



The highest prices (≈ 2.50 to 4.75 times higher than the reference prices) paid by the Benin Ministry of Health for acquisition of healthcare technology through public procurement show the lack of good governance practices in the procurement activities. Bribes, kickbacks, collusion, bid rigging, lack of good management tools and political considerations can influence each step of the procurement cycle for the selection of inappropriate winners of bids. Widely distributed surveys need to be done in the next papers to analyze the interests and behaviours of some public procurement stakeholders.

To overcome these cost inefficiencies, the abnormal high cost of medical device prices, the Ministry of Health needs a national procurement management tool as a reference price lists for the most widely used devices. Despite the normal profit margins of suppliers, it is accepted that the device acquisition costs paid by the government through public open tenders may be slightly higher than the reference set prices because of administrative and financial fees engaged by the potential suppliers for preparing and submitting their tender offers. The average device acquisition prices paid by the ministry of health could be **1.1 to 1.2 times** higher than the set reference prices. But, when the device prices are higher than that they can be considered as *outbidding prices*. It is thus urgent for Benin government to address this challenge and to encourage the development of policies and laws regarding a reference price lists for medical devices. The availability of this important policy tool that will fix the reserve and outbidding prices for each healthcare technology item will allow the health sector authorities to monitor and limit the usual financial diversion which occurs during the procurement acquisition activities. It is obvious and expected that effective tendering could achieve substantial savings for the country.

The method described to obtain competitive and/or circumstantial reference prices which provide a basis of comparison of the costs in this study is a modest and evidence-based method to explore the magnitude of acquisition costs of devices paid by the government in the absence of a national reference prices list. One of the limitations of this method is the small sample size used (the number 10 of selected devices used and the number 10 of the accredited suppliers interviewed). It can be improved by increasing the number to at least 100 for the devices and also 100 for the accredited suppliers. Increasing supplier numbers will give more reliable and competitive ad hoc reference prices. A scientific designed reference prices list will also give more efficient results.

Another point that could also be interesting in this study is the validity of the method. Its implementation for similar studies in other developing or poor countries will be possible if the number of medical device suppliers in each country is higher to allow an acceptable circumstantial reference prices.

CONCLUSION

Procurement of healthcare technology in Benin remains a challenge. It is urgent to the Benin Ministry of Health to strengthen its procurement capacity building by developing a precise and comprehensive sector-specific policy and management tools such as procurement procedures manual with standard bidding documents, essential medical device and spare part lists..., a concise set of clear rules and guidelines to significantly improve transparency of the procurement process in order to safeguards the quality of the procurement process. The development of sustainable policy tools such as the reference prices or a value-based prices list that could be up dated each three years will be a powerful procurement tool to fight against corruption in the public healthcare sector. The linking of proper forecasting, stock management and consumption analysis into the procurement cycle will also be vital to make any meaningful progress in implementing best practices.

From the above theoretical framework and the formula of corruption derived, it has been seen that effective prevention of “misuse of entrusted power for private gain” in the public procurement of medical devices/health care technology in Benin could be achieved by minimising rationalization, opportunity to abuse and pressure to abuse. Rationalisation could be minimised or decreased by increasing the implementation of social norms, moral/ethical beliefs, attitudes and personality. Pressure to abuse could be minimised when the wages/incentives earned by official are very attractive. Opportunity to abuse will be significantly minimised when *monopoly and the discretion* power of the officials over clients are reduced and the accountability, citizen voice, transparency and enforcement /detection increase. The fulfilment in implementing all the above conditions depends on the full involvement of each stakeholder, but the main responsibility is with the government. Political will and commitment are needed to recognize the procurement of medical devices as an integral part of public health policy in order to improve the quality and access to healthcare in Benin.

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