

Office of the Auditor General of Norway

How a Leakage Study can teach how effectively aid is transformed into Services

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Introduction

This paper is based on a value-for-money performance audit of Norwegian health aid to Malawi that was published in March 2013.¹ One of the audit questions addressed was whether the resource flow is efficient with respect to which extent medicine is reaching the health hospitals and clinics. As reported in the media, etc., it is known that the magnitude of leakage of medicine at hospitals may be considerable.² In this paper we focus on flows of drugs and medical supplies accounting for one third of Malawi's total health budget. The values involved, and the fact that medicines are a scarce commodity, entails a risk of various forms of leakage en route from the manufacturer to the patient.

There has been a significant increase in resources for health-related purposes in the past decade in many African countries, including Malawi. Beside the fact that this has led to various improvements, as for example a decrease in child mortality and maternal mortality, a substantial increase in resources in countries with weak health systems presents also risk of inefficient use of resources. One question is whether the systems for managing the resource flow are adequate enough to ensure that increased resources transform into improved health care at all levels and particularly in rural areas, where the vast majority of Malawians live.

To answer this question, the audit examined:

- 1 leakage of drugs and medical supplies at selected hospitals and clinics
- 2 availability of selected medicines/supplies at selected hospitals and clinics

1 Measuring leakage of medicine

Public Expenditure Tracking Surveys (PETS) have during the last 10-20 years been developed and used as a tool by donors and researchers to assess the extent of resource leakages in the administrative chain from central government to local authorities responsible for the production of welfare services such as health and education. The PETS methodology may also be used to assess where in the political-administrative chain the leakages occur. In some cases, however, the survey approach of PETS is not feasible. This is the case when inputs come in different categories (e.g. cash, drugs, medical equipment, payroll/personnel) from various sources (the government, different state authorities, various private or national donors) and reach the end points through different channels. In such cases a more partial approach can be used. The core idea is still the same – compare the answers between what A reports as transferred to B with what B reports as received from A. Each deviance indicates leakage.

¹ See the complete performance audit: *The Office of the Auditor General's investigation of Norwegian development aid to the health sector in Malawi*: <http://www.riksrevisjonen.no/en/Reports/Pages/Malawi.aspx>.

² E.g. BBC Panorama 24 November 2008 and Malawi Observer, 29 November 2007 and *Silent and lethal. How quiet corruption undermines Africa's development efforts*, African Development indicators 2010, The World Bank.

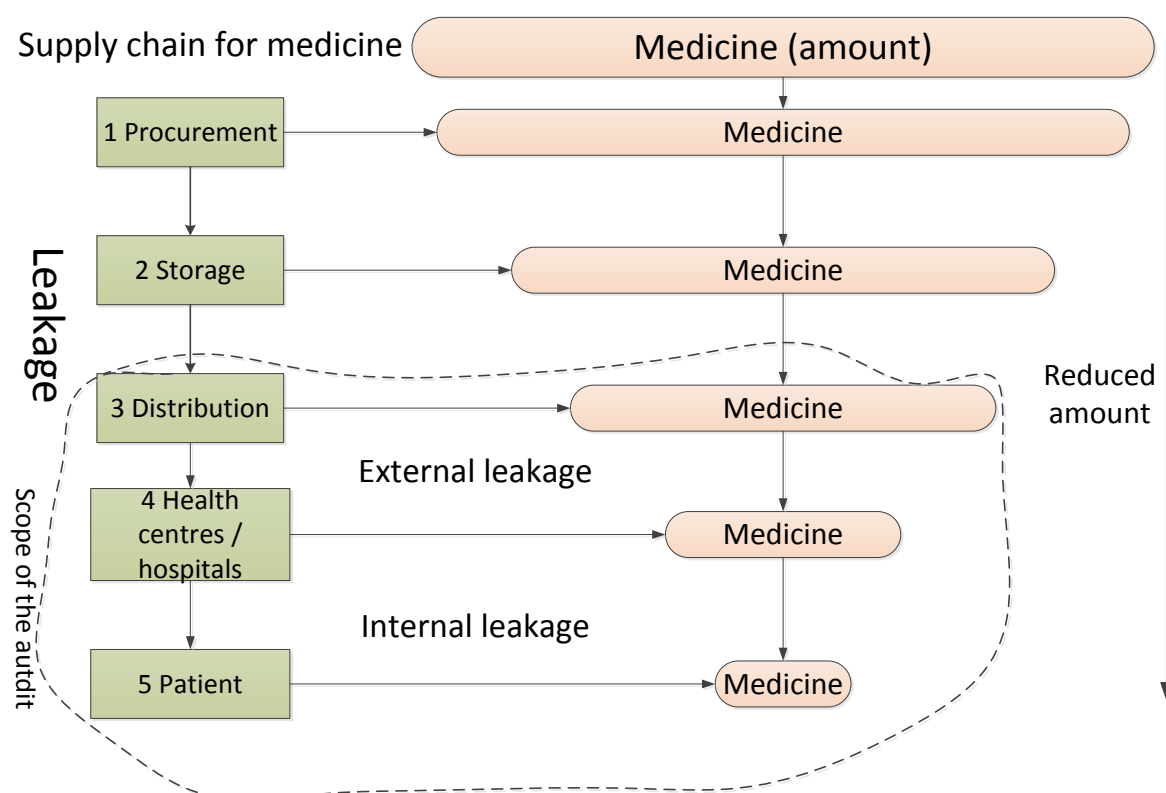
In all, the study refers to visits to 23 health facilities in Malawi's three regions. The sample covers health facilities at all levels – health centres, district hospitals and central hospitals – and has taken geographical distribution, population density and distance to nearest hospital (on the part of the health centres) into consideration. Several of the selected medicines are different types of antibiotics that are considered commercially attractive. Out at the health facilities, different data sources such as stock cards, delivery notes, orders, invoices, and patient records were used to examine the medicine situation.

In the study, leakage has been measured at various points in the distribution chain, including from the central medicine depot in Malawi (Central Medical Stores, CMS) to the health facilities, and internally at the hospital from the dispensary to outpatients. Thus, the study aims both at quantifying the medicine leakage and finding out where in the supply chain the leakage occurs. Figure 1 illustrates how medicine can leak through the whole supply chain:

In general, there were major data deficiencies, including in stock cards, orders, invoices and patient records. Missing data, deficient recordings, false entries, illegible entries, incorrect computations, etc. were found. As a result, there are fewer than 23 health facilities in several of the analysis.

A consultancy work carried out for the Office of the Auditor General of Norway by Liverpool Associates of Tropical Health Umoyo (LATH Umoyo) has been of crucial importance for answering these issues.

Figure 1



The figure indicates that medicine can leak through the whole supply chain. Donors have mainly focused on leakage in the procurement and distribution stages (see figure 1 stage 1–3 in the supply chain). One way to stop this leakage has been to use a parallel system of distribution. For example donor financed AIDS-medicines are distributed through a parallel system in Malawi. Still, all the medicine gets stored at the same place in hospitals and clinics, so a parallel distribution system will not prevent leakage within the hospitals and clinics (see figure 1 stage 4 and 5). This study looked at the leakage in the supply chain occurring on the way from the central medical depot to the hospitals and clinics (stage 3–4 in figure 1), "external leakage" and the leakage within the hospitals (stage 4–5 in figure 1), "internal leakage".

External leakage (Stage 3–4 in figure 1)

To calculate the external leakage from the central medical depot (Central Medical Stores, CMS) to the health facilities, the difference between what the CMS should have delivered according to the invoice and what the health facility recorded as received, was compared.

The standard distribution procedure is that once a month, the district hospitals order medicines by sending a purchase request to CMS. Provided that it has the medicines in stock the associated regional depot delivers the medicines and invoices the hospital. When a regional depot makes a delivery to the hospital's pharmacy/medicine store, the delivery note for the received medicines has to be signed. The quantity must be recorded on an accompanying stock card in the "received" column, and each time medicines are withdrawn,

the quantity and recipient must be noted in the "out" column. The inventory on the stock shelf shall be counted and checked each month against the stock card. This procedure is similar for the health centres.

According to the system, there should be no deviance in the number of delivered and received medicines. In our study, however, external leakage was calculated as the difference between what the CMS should have delivered according to the invoice, and what the health facilities recorded as received for the fiscal year 2010–2011. This difference is expressed relatively as the percentage of external leakage. In the study it was only possible to obtain invoices for between two to seven facilities depending on the type of medicine.

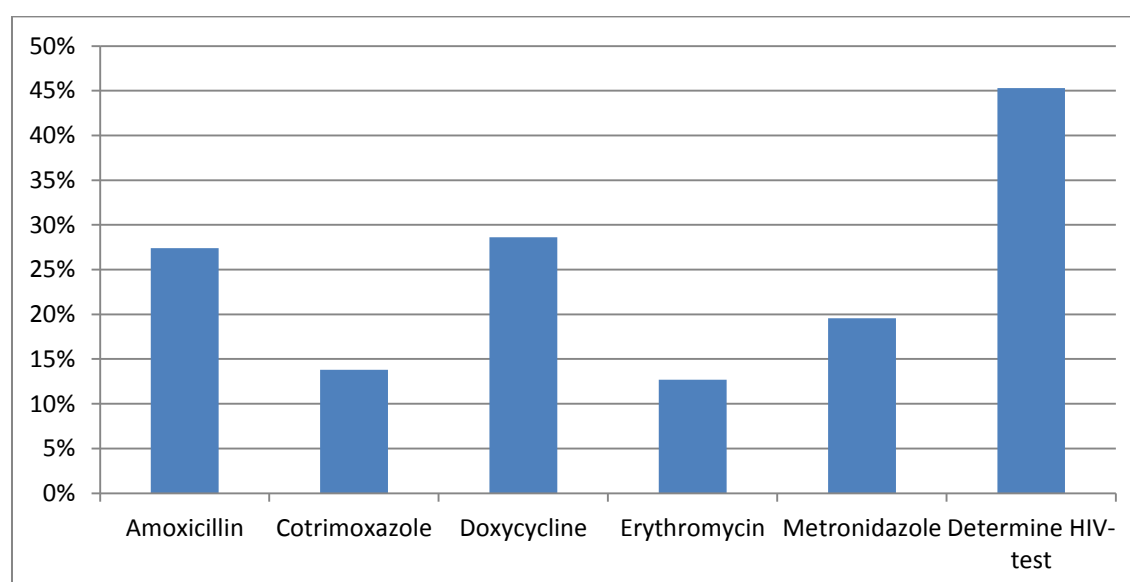
Findings

External leakage between the central medical depot and the health facilities

The study looked at leakages between CMS in the regions and the health facilities. Figure 2 summaries the results for cases where facilities have been charged for larger quantities than recorded in the stock cards. In the figure, data for medicines is based on three to seven facilities, while for HIV tests there is data for only two facilities.

Some facilities also recorded larger quantities of medicines on the stock card than what they were billed for, and thus have "positive leakage". These are not included in the figure.

Figure 2 Share of medicines/materials that are billed and assumed delivered from regional medicine depots, but has not been recorded on the hospital's stock cards, fiscal year 2010–2011



For antibiotic drugs in the sample, the difference between the amount billed by CMS and the amount recorded at the hospital/health centres ranges from 13-14 per cent to 27 per cent. The leakage for the HIV test Determine is 45 per cent (for the two facilities examined). This

implies that for at least two of the types of antibiotics – amoxicillin and doxycycline – and the HIV test, the health facilities had received much less than what they were invoiced. Thus, the health facilities are paying for drugs they are not receiving, with the consequence that patients might not get essential medicines.

Internal leakage (Stage 4–5 in figure 1)

Internal leakage occurs at the health facilities. To calculate the internal leakage, information from patient records was checked against what had been recorded on the stock card. Provided that there was no leakage, the number of doses from the pharmacy to the outpatient department and the number of doses prescribed and dispensed from the outpatient department for a given month should ideally be equal. If not, it is likely that there is an internal leakage or incorrect registration.

Patient records and stock cards in the local hospitals were followed and compared during four months (August and November 2010, and February and May 2011). For those who were prescribed one of the medicines in question, this was multiplied by the standard dosage as stated in the Malawi Standard Treatment Guidelines. The difference is expressed relatively as a percentage of internal leakage.

A possible source of error with this method may be if the patients receive larger doses than standard ones, which may unfairly indicate a large leakage. However, it is unlikely that this occurs due to the general scarcity of medicine. There is, however, indications that the opposite may occur, i.e. that the patient receives less than the prescribed dose.

Only facilities where data for all four sample months could be collected were included. This gives between 6 and 13 facilities depending on the type of medicine.

Findings

Internal leakage at hospitals and health centres

Although it is known that the leakage of medicines at hospitals may be considerable, so far no real effort has been made to quantify this type of pilferage (internal leakage). As part of the audit an estimation was therefore made to determine the extent of this type of leakage. Table 1 shows the leakage for five types of antibiotics for between 6 and 13 health facilities.³

³) The figures in the table are for those facilities that have data for all four selected months for both medicine delivered from warehouses and for patients. The intention has been to exclude facilities where poor recording practices provide data that indicated pilferage. In the table all facilities with monthly observations where, according to the stock card, no amoxicillin has been delivered but, according to the patient registry, amoxicillin has been dispensed to a number of patients, have been removed. This reduces the number, N, in the table for some medicines. If such observations were included, N would increase to between 10 and 15 without the results changing by more than one percentage point, except for amoxicillin: 4 per cent.

Table 1 Internal leakage of medicines at selected health facilities*

	Difference between quantity delivered (stock card) and prescribed (Patient Records) - doses	Delivered to outpatient departments/outpatients according to stock card - doses	Leakage as a percentage of the quantity delivered to outpatient departments/outpatients (according to stock card)	N = number of hospitals/ health centres
Amoxicillin	1 044 880	1 512 000	69 %	7
Cotrimoxazole	1 044 606	1 454 740	72 %	11
Doxycycline	331 681	430 000	77 %	13
Erythromycin	212 245	303 250	70 %	6
Metronidazole	678 090	909 800	75 %	12

* Measured as a proportion of the total number of doses dispensed from medicine stocks to the outpatient departments/outpatients, total for four month in fiscal year 2010–2011.

It is evident from the table that over 70 per cent of what is recorded as dispensed from the medicine stores at the hospitals/health centres to the outpatient departments cannot be accounted for. Despite some uncertainties regarding the quality of the underlying data, it clearly indicates that the leakage is of a considerable size. This is supported by statements from several interviews, e.g. the top administrative manager for the health service in one district stated:

"Pilferage of drugs and supplies is indeed a problem. Sometimes you may feel that all is well and yet somebody somewhere is taking away drugs without your knowledge. And you go to records and find that everything is in order. Oftentimes you wonder that we have been buying all the drugs and all the necessary supplies but in two or three days' time they are not there and you wonder what is really happening. So you tend to wonder as what is happening."

The consultants, who did the registration, observed at a district hospital that employees intentionally gave patients smaller doses than were recorded on the patient cards.

Conclusion

The audit shows that there are significant drug leakages in the chain from the Central Medical Depot (CMS) to the health facilities. For the hospitals and health centres in the sample, the leakage in the chain between the CMS to the health facilities was calculated to between 13 and 27 per cent for antibiotics. The percentage of medicine that cannot be accounted for in the chain between the hospital pharmacy and the dispensing point for medicines to outpatients is even higher – about 70 per cent on the part of antibiotics. Earlier the main focus on corruption has been on administrative and political corruption at the highest governmental levels, cf. the procurement and distribution part of the supply chain for medicine. However, there is a growing awareness to malpractice by frontline providers, e.g. doctors, teachers, that do not involve monetary exchange.⁴

⁴ *Silent and lethal. How quiet corruption undermines Africa's development efforts*, African Development indicators 2010, The World Bank.

Overall, this paper shows that there are significant inefficiencies in resource flows from the central level to health services in the districts, but especially at the level of the local health services itself. The consequence of this petty corruption is the lack of medicine leading a poor population to pay for services that ordinary should be free of charge. Furthermore this undermines the legitimacy of health institutions in these countries as well as the general legitimacy in development aid.