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## Regularity of laboratory supplies and delivery of histopathology services in the department of Pathology, Makerere University College of Health Sciences, Uganda, between January 2002 and April 2003

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#### ABSTRACT

A retrospective study was undertaken in the department of Pathology, Makerere University College of Health Sciences and Mulago Hospital, Uganda, between January 2002 and April 2003 to determine the regularity of laboratory supplies and delivery of histopathology services. The requisition forms and dates of final reporting were obtained from department of Pathology records. The information on delivery of supplies was retrieved from Mulago hospital stores. Formalin (450 L) and isopropyl (2,505 L) were requisitioned, but only 145 L (32.2%) and 70 L (2.8%) respectively were received. Xylene 5L (11.1%) were issued out of 45 L requisitioned. Paraffin wax (900 Kg) was ordered and 200 Kg (22.2%) were supplied. Hematoxylin (850 gms) and silver nitrate (3,700 g) were ordered and none of each was issued. Eosin (100 gms) was supplied out of 200 g requisitioned. Microscope slides (721 packets) and cover slips (520 packets) were requisitioned, only 127 packets (17.6 %) and 90 packets (17.3 %) respectively were supplied. Surgical blades (2,836) were requisitioned and 760 (26.8 %) were given. No detergents and disinfectants were supplied. On average, it took 5 days to get supplies. Turnaround time of making diagnosis was 9 days. Approximately 52 specimens were either lost or misplaced out of 6,700 samples processed during this period. The amount of supplies received was far much lower than the amount requested. Give the high turnaround time in the histopathology service, a computerized laboratory logistics and inventory management systems (LMIS) should be established at the health settings in the country in order to ensure continuous availability of laboratory supplies and improve the turnaround time in laboratory services.

**KEY WORDS:** *Laboratory; Supplies; Histopathology; Services*

## INTRODUCTION

Supplies are the driving force in any enterprise including medical laboratories<sup>1</sup>. Laboratory supplies are classified under equipment, consumables (chemicals, reagents) glassware and disposable items. Irregular and unreliable mechanisms in supply have been associated with poor service delivery and collapse of the operations<sup>2</sup>. It is therefore logical that supplies should be reliable and constant in order not only to ensure faster and smooth delivery of the service but also to avoid frustrations. The department of Pathology provides histopathology services to most of the districts in Uganda and Mulago hospital supplies and most of the reagents and consumables needed for the provision of these services. It was therefore with this background that this study was undertaken to determine the regularity of laboratory supplies and delivery of histopathology services in the department of Pathology, Makerere University College of Health Sciences, Uganda. The specific objectives were to:- evaluate laboratory items requisitioned by Pathology department and laboratory items supplied by Mulago hospital to Pathology department; determine the time taken by Mulago hospital to issue supplies and the turnaround time in service delivery in the department of Pathology.

The information generated would be used as a basis for proper planning of diagnostic service delivery in the department of Pathology and Mulago Medical Stores.

## MATERIALS AND METHODS

This was a retrospective study, which was conducted in the department of Pathology, School of Biomedical Sciences, Makerere University College of Health Sciences and Mulago hospital between January 2002 and April 2003. Given the fact that the department of Pathology orders for supplies

every week, it therefore implies that it orders for supplies 52 times in one year and 68 times in one and a quarter years (between January 2002 to April 2003). Sixty-eight requisition forms were consecutively retrieved from the departmental archives and the same number of supply vouchers was retrieved from the records available in Mulago hospital medical stores during this study period respectively. The items were grouped into the supplies used in processing (isopropyl, xylene, formaldehyde and paraffin wax), stains and ingredients (alcian blue, haematoxylin, sulphuric acid, eosin, sodium citrate, sodium chloride, silver nitrate and ethanol) and other accessories (microscope slides and cover slips, surgical blades, filter paper, labels, DPX, disinfectants, detergents, gloves, cotton wool, needles, syringes and plastics). The data was entered into a computer using EPI INFO software then edited and cleaned. Analysis was done using soft-ware package for social sciences (SPSS 10.0)<sup>3</sup>. The results were presented in form of tables and figures. The permission to carry out this study was obtained from the School of Biomedical Sciences Research and Ethical Committee and Mulago Hospital.

## RESULTS

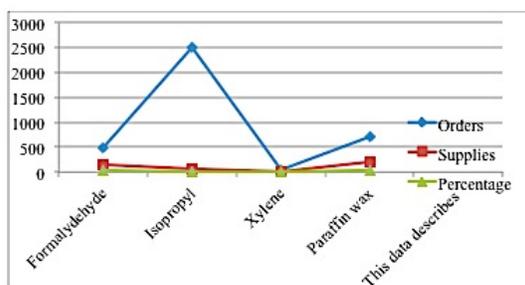
**Table 1** and **figure 1** show the quantity of stains and ingredients that were ordered by the Pathology department and supplied by Mulago hospital between January 2002 and April 2003. A total of 68 requisition forms and 68 supply vouchers were retrieved from archives and analysed. Formalin (480 L) was requisitioned and 145 L (30.2 %) were supplied. Isopropyl (2,505 L) was requisitioned and 70 L (2.8 %) were issued. The same trend was seen for xylene and paraffin wax.

**Table 2** and **figure 2** show the quantity of stains and ingredients that were ordered by

department of Pathology and supplied by Mulago hospital between January 2002 and April 2003. There was inconsistency in the supply of items. All 100 g of alcian blue that were requisitioned were supplied. Hematoxylin (8,750 g) and silver nitrate (3,700 g) were requisitioned, but none (0%) was supplied. 100 g Eosin were supplied out of 200 g requisitioned (50%). Sodium chloride 17 g were requisitioned and 15 g (88.2%) were supplied. Surprisingly, sodium citrate (53 g) was ordered and 500 g were delivered. Out of 91.5 L of ethanol ordered, only 7 L (7.7%) were issued.

**Table 1: Summary of the quantity of the items used in processing that were requisitioned by department of Pathology and supplied by Mulago hospital between January 2002 and April 2003**

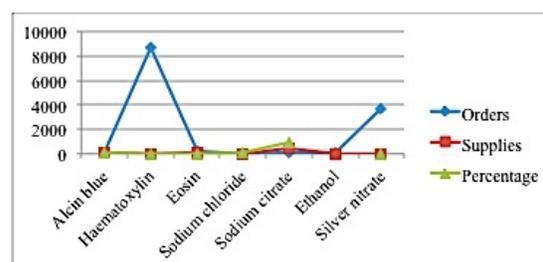
Item	Requisitions	Issuances	%
Formaldehyde	480 L	145 L	30.2
Isopropyl	2,505 L	70 L	2.8
Xylene	45 L	5 L	11.1
Paraffin wax	900 L	200 kg	22.2



**Figure 1: Summary of the quantity of the items used in processing that were ordered by department of Pathology and supplied by Mulago hospital between January 2002 and April 2003**

**Table 2: Summary of the quantity of stains and ingredients that were ordered by department of Pathology and supplied by Mulago hospital between January 2002 and April 2003**

Item	Requisitions	Issuances	%
Alcian Blue	100 g	100 g	100
Haematoxylin	8,750 g	0 g	0.0
Eosin	200 g	100 g	50
Sodium chloride	17 kg	15 kg	88.2
Silver nitrate	3,700 g	0 g	0.0
Sodium citrate	53 g	500 g	943
Ethanol	91.5 L	7.0 L	7.7



**Figure 2: Summary of the quantity of stains and ingredients that were ordered by department of Pathology and supplied by Mulago hospital between January 2002 and April 2003**

**Table 3** shows other accessories that were ordered and supplied. Surgical blades 760 pkts (26.8 %) were supplied out of 2,836 pkts that were requisitioned. Microtome knives (15 packets) were requisitioned by Pathology department, but only 2 packets (13.3 %) were issued. Cover slips (520 pkts) and microscope slides (721 packets) were

requisitioned, but only 90 packets (17.3 %) and 127 packets (17.6 %) were supplied respectively. Fifty-nine bottles of DPX were requisitioned and none was supplied. Disinfectants and detergents were ordered, but none was issued.

**Table 3: Summary of other accessories that were ordered by department of Pathology and supplied by Mulago hospital between January 2002 and April 2003**

Item	Requisitions	Issuances	%
Surgical blades	2,836 packets	760 packets	26.8
Cover slips	520 packets	90 packets	17.3
Microscope slides	721 packets	127 packets	17.6
Microtome knives	15 packets	02 packets	13.3
Immersion oil	2,800 mL	100 mL	3.6
Gloves	2,900 packets	2,200 packets	75.9
Cotton wool	134 rolls	50 rolls	37.3
Disinfectants	95 bottles	28 bottles	29.5
DPX	59 L	0 L	0.0
Filter paper	33 packets	0 packets	0.0
Lens paper	112 packets	0 packets	0.0
Liquid soap	20 L	0 L	0.0

## DISCUSSION

This study sought to determine the regularity of laboratory supplies and delivery of histopathology services in the department of Pathology, Makerere University College of Health Sciences, Uganda, between January 2002 and April

2003. The findings of this study are herewith discussed.

As general trend, there were few or no supplies registered despite the high demand depicted by the level of requisitions made by the department of Pathology (**Tables 1, figure 1, Table 2 figure 2 and Table 3**). This observation was in conformity with the findings by Adams et al; who asserted that poor or inconsistent quality of health care is due to inaccessibility to timely supplies, which are cardinal for efficient delivery of any service<sup>4</sup>. Notably, although 2,505 L of isopropyl were ordered for, in the period between January 2002 and April 2003, only 70 liters (2.8%) quantities were supplied. This could have directly contributed to the high turnaround of results and loss of samples during this period given the fact that a total of 6,700 samples were received and recorded in the department of Pathology during this period.

Eosin was supplied by Mulago hospital. Hematoxylin, which is used together with eosin in hematoxylin and eosin staining method (H&E), was not supplied at all during this study period (**Table 2, figure 2**). This is probably the reason why there was total decline of laboratory service delivery throughout this period as was reflected by poor turnaround time. Another likely reason for this observation is that there is no vibrant procurement and supply systems in the department of Pathology and Mulago stores respectively, leading to inadequate supplies. This is in conformity with USAID Delivery Project Task Order 1 2008 on "Guidelines for managing the laboratory supplies" which noted that poor planning and monitoring of supply pipeline was responsible for inadequacies in supply and interruption in laboratory service delivery. The report further noted that the quantities ordered should always be matched with the workload available and the order should be done before the supplies run out<sup>5</sup>. The

observation of this study is also in line with the studies by Elbireer et al<sup>6</sup> and Nkengasong et al<sup>7</sup> which found that weak procurement and supply systems were responsible for poor delivery and/or collapse of laboratory services especially in developing countries including Sub-Saharan Africa.

Besides, lack of computerized laboratory logistics and inventory management systems (LMIS) at the health settings in Uganda probably further aggravated the situation since LMIS ensures that there is uninterrupted supply chain of commodities to the laboratories. However, the Ministry of Health (MoH) is automating the management of some of the medical supplies in the hospitals<sup>8</sup>.

While this study did not show in tables or in the plotted graphs the actual periods or peaks (months) of the release of the items, it could also be possible that late release of government funds which is always in quotas could have had effect on the procurement of these items<sup>1</sup>. Delays in dispatching funds was actually found to be associated with poor health service delivery in most of the hospitals in the country as was noted by the audit report on health delivery systems in Uganda<sup>2</sup>. This is in agreement with the study by Nkengasong et al<sup>7</sup> which also noted that lack of adequate funding for the laboratory services by Health Ministries was responsible for poor laboratory services and patient care<sup>8</sup>.

Given the fact that Mulago hospital took long to issue most of the supplies after the requisitions were made, perhaps greatly affected the turnaround time of the service due to over accumulating specimen which could have led to losses and or misplacement of some specimen and thus affecting patient management. This is in agreement with Hawkins who found that turnaround time of the laboratory results was very crucial in patient management<sup>9</sup>. Besides poor laboratory results and

turnaround time has been shown to affect laboratory accreditation<sup>10</sup>.

## CONCLUSION AND RECOMMENDATIONS

The findings of this study showed that there are weak procurement and supply systems of laboratory supplies in the health facilities. Computerized laboratory logistics and inventory management systems (LMIS) should therefore be established at the health settings in the country in order to ensure continuous availability of laboratory supplies and improve on turnaround time.

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