



Measuring the Cost of Inefficient Use of Laboratory Resources: Ecuador

The Quality Assurance Project (QAP) investigated strategies for increasing efficiency in hospital laboratory services, an area of hospital operations frequently identified as high cost. The study developed measurement methodologies for seven types of economic waste in hospital laboratories (Figure 1) and tested them in three public hospitals in Ecuador.¹ The methodologies were intended to quickly measure the value lost for each type of waste, so they relied on data from existing hospital records and relatively short-turnaround surveys. Economic waste was estimated by comparing actual costs to what the costs would have been if standards had been met.

Figure 1: Seven types of economic waste investigated

Clinical Use (External)	Laboratory Processes (Internal)	Administration / Procurement (External)
1. <i>Unneeded tests</i> : Laboratory exams that do not contribute/add to improved diagnosis or clinical care 2. <i>Unclaimed tests</i> : Lab results not retrieved from the lab, so not used	3. <i>Resource use inefficiency</i> : Unnecessary overuse of laboratory inputs for conducting tests 4. <i>Staffing inefficiency</i> : Under-utilization of lab personnel 5. <i>Expired reagents</i> : Expiration of lab reagents 6. <i>Poor quality control</i> : Lack of major quality/waste control practices	7. <i>Inefficient procurement</i> : Use of high cost inputs where alternatives of equal or better quality are available

Results

Unneeded tests proved the largest source of waste. The research team had assumed that the hospitals would have national or international standards to indicate which tests were needed for different disease categories, but this proved wrong, in part because the desired tests were not always available. Consequently, the team studied test use in six disease categories: acute diarrhea in children and adults, pneumonia in children and adults, appendicitis, and cholecystitis. Also, a committee formed in each study hospital to identify which tests were needed and available for each category. Expert clinical staff from each hospital developed standards incorporating local, national, and international evidence. The standards indicate *what types* of tests are appropriate for each disease category and *how many* tests should be given in each category. This approach proved feasible in all three hospitals.

Of the three methods used by the committees to determine whether tests were unneeded, two (expert opinion and explicit criteria) proved useful, while the third (statistical analysis) proved unworkable. Unneeded tests in the largest hospital were 44% of the total number of tests reviewed in the demonstration disease categories (1074 out of 2441) using the explicit criteria method (the expert opinion method was not used in this hospital). In the medium-to-large hospital, the unneeded tests ranged from 28% (explicit criteria) to 60% (expert opinion) of all tests, while in the small hospital unneeded tests ranged from 37% (explicit criteria) to 67% (expert opinion) of all tests. These findings led the research team to conclude that approximately half of the tests assessed were unneeded. They recommended that 1) all hospitals consider establishing standards for lab tests using the methods described in this study, and 2) procedures for developing standards for other disease categories be devised to ensure a representative selection that can be generalized to all tests.

Economic waste from the other six sources ranged from quite high to negligible. For example, estimated losses due to staffing inefficiency ranged from 15% to 25% of the total laboratory budget across the three hospitals, while losses due to

inefficient use of other resources was negligible. Some losses varied by hospital: inefficient procurement of reagents and materials was estimated to cause considerable waste at one hospital but less at the others. Other types of waste could not be estimated at all in the short run (unclaimed tests, expired reagents), as discussed below.

An underlying study assumption was that one-time surveys and available hospital data could be used to generate reasonable estimates of hospital lab waste attributable to the seven sources. Such short-term assessments proved feasible for four, but possibly not for three, sources. The feasible sources were: resource use inefficiency, staffing inefficiency, poor quality control, and inefficient procurement. The sources deemed questionable for short-term assessments of economic waste were: unneeded tests, unclaimed tests, and expired reagents. Creation of lab standards and their application by local committees for unneeded lab tests may or may not be possible in the short term. Poor record keeping and erratic discard practices for unclaimed tests and expired reagents suggest that improved ongoing monitoring and reporting of these problems may be necessary to acquire valid data.

Conclusions: Nevertheless, this study concludes that the measurement methodologies were useable in developing countries, in the sense that they could be applied and the requested data obtained. They could form the groundwork for a broad program aimed at measuring and reducing economic waste in hospital labs. The report identifies improvements that can be made in each methodology to make the data more reliable. Examples include standards for unneeded tests for other disease categories, ongoing management information systems for unclaimed tests and expired reagents, accounting properly for benefits and time spent on indirect and other productive tasks in the analysis of staffing inefficiency, and a broader range of market opportunities for procurement. These and other refinements should be made to improve the validity of the methodologies. Finally, the issue of double-counting should be addressed as the economic information discussed here is incorporated into management decision-making.

¹ This document summarizes a Quality Assurance Project (QAP) operations research study carried out by QAP's office in Quito, Ecuador. The citation for the full report is: Abdallah H and Ayabaca P. 2003. Measuring the Cost of Inefficient Use of Laboratory Resources: Ecuador. *Operations Research Results* 2(14). Published for USAID by the Quality Assurance Project, University Research Co., LLC, Bethesda, MD. QAP publications are available at www.qaproject.org.