

## Benefits

### Bacteriology

Reducing the QC testing requirements for bacteriology results in a significant decrease in costs for the laboratory, including savings in reagents, supplies, and labor. To estimate the impact of these reductions, the QC cost associated with the changes must be compared to the current cost of QC testing. We assumed laboratories are currently performing QC testing for each batch, lot number, and shipment of reagents; therefore, this practice is not affected by these QC changes. For catalase, coagulase, oxidase, and beta-lactamase, eliminating the daily QC requirement results in a savings for each of these tests equivalent to the cost of the daily QC. Similarly, by eliminating the weekly QC requirement for bacitracin, optochin, ONPG, X, V, and XV strips and disks, there is a savings for each of these tests equivalent to the cost of the weekly QC. For antisera (for example, *Salmonella*, *Shigella* typing sera), we

are reducing QC testing from every month of use to testing once every 6 months after the initial QC testing of each batch, lot number, and shipment of reagent. Assuming an average shelf life of 2 years before expiration results in cost saving of 20 QC tests.

In addition to the direct financial savings in bacteriology laboratories, reducing the QC testing will also result in a time savings equal to the time previously required to perform the testing and maintain QC records on a daily, weekly, or monthly basis. This time saving could lead to increased productivity in bacteriology laboratories.

To calculate the savings by reducing requirements for QC testing in bacteriology, we estimated the baseline expenses per laboratory for performing each QC test. In calculations for beta-lactamase testing, as per the ASM study, we assume laboratories use Cefinase™ as their method of testing. After estimating the cost per individual QC test (positive and negative controls), we

then determined the change in cost per day, week, and year (Table 10). In determining these changes, we considered the decrease in frequency of testing for each reagent (previously daily vs. weekly vs. monthly). To calculate weekly changes, we used an average of 6 days per week for laboratory operations, recognizing that while most hospital laboratories operate 7 days a week, physician office laboratories (that perform some culture and identification procedures) may only operate 5 days a week. Since we estimate all bacteriology laboratories use all tests for which QC is reduced, to determine the total annual savings per laboratory, we added the QC savings for each individual test.

To estimate the total annual savings in QC costs for all bacteriology laboratories, we multiplied the total annual savings per laboratory by the number of laboratories affected (27,443), and estimated a total cost savings of \$62.4 million the first year.

TABLE 10.—CHANGE IN COST PER TEST FOR REVISED BACTERIOLOGY QC REQUIREMENTS

Reagent	Labor cost*	Reagent amount	Reagent cost	Total cost per test	Change in cost per day	Change in cost per week	Change in cost per year
Catalase .....	\$0.60	1 drop .....	\$0.08	\$0.68	– \$0.68	– \$4.08	– \$212.16
Coagulase .....	0.60	2 drops .....	0.17	0.77	– 0.77	– 4.62	– 240.24
Oxidase .....	0.60	1 drop .....	0.06	0.66	– 0.66	– 3.96	– 205.92
Cefinase .....	0.60	2 discs .....	2.65	3.25	– 3.25	– 19.50	– 1,014.00
Bacitracin .....	0.60	2 discs .....	0.40	1.00	– 0.17	– 1.00	– 52.00
Optochin .....	0.60	2 discs .....	0.33	0.93	– 0.16	– 0.93	– 48.36
ONPG .....	0.60	2 discs .....	0.98	1.58	– 0.26	– 1.58	– 82.16
X .....	0.60	2 strips .....	1.60	2.20	– 0.37	– 2.20	– 114.40
V .....	0.60	2 strips .....	1.60	2.20	– 0.37	– 2.20	– 114.40
XV .....	0.60	2 strips .....	1.60	2.20	– 0.37	– 2.20	– 114.40
Antisera .....	0.60	2 drops .....	6.98	7.58	– 0.24	– 1.46	– 75.80
Total .....	.....	.....	.....	.....	.....	.....	– 2,273.84

\* Labor cost estimate for each reagent includes one minute to perform QC test and one minute for recording and monitoring QC results.

### Mycobacteriology

Erroneous test results can lead to inaccurate diagnoses and unnecessary or inappropriate therapy. When this pertains to *M. tuberculosis* or other mycobacteria currently emerging as significant pathogens, it could have substantial cost implications or adverse health outcomes due to the side effects of drugs used to treat infections caused by these organisms. Therefore, it is critical for laboratories to rapidly detect mycobacteria and accurately identify individual species within this genus. For laboratories performing acid-fast and/or fluorochrome acid-fast stains, accuracy is best ensured by including positive and negative controls each day (acid-fast) and each time (fluorochrome acid-fast) of use. For laboratories using

conventional biochemical tests to identify mycobacteria, erroneous test results can most likely be prevented by including a positive and negative control organism for each test each day of use. Although difficult to quantify, the increased costs for additional QC testing are outweighed by the benefits of prompt, accurate mycobacterial detection and identification, and appropriate therapy for mycobacterial infections.

### Mycology

Reducing the QC testing requirements for the germ tube test and lactophenol cotton blue stain will result in a cost and time savings for mycology laboratories. Since weekly QC is eliminated for the germ tube test, the

financial savings will equal the cost of weekly QC, and the time savings will equal the time spent on a weekly basis performing and recording QC for this test. For lactophenol cotton blue, required QC testing each day of use is now eliminated. The cost and time savings resulting from this reduction is based on calculations assuming this test is performed an average of twice a week, when positive fungal cultures are detected.

We estimated the savings for QC testing in mycology by determining baseline expenses for each germ tube test labor (\$0.90) and materials (\$0.73), and each lactophenol cotton blue test labor (\$0.60) and materials (\$0.06), followed by calculation of the weekly and annual savings that will be realized