

June 19, 2000

Participant
Centers for Disease Control and Prevention (CDC)
Susceptibility Testing of *Mycobacterium tuberculosis* and Nontuberculous Mycobacteria
Performance Evaluation Program

Subject: Analyses of Participant Laboratory Results for the February 2000 Shipment

Dear Participant:

Enclosed are analyses of laboratory test results reported to the Centers for Disease Control and Prevention (CDC) by participant laboratories for the strains of *Mycobacterium tuberculosis*, *M. mucogenicum*, and *M. avium* complex shipped in February 2000. Participant laboratories received either 3 *M. tuberculosis* strains or all five *M. tuberculosis* and nontuberculous mycobacteria (NTM) strains. Testing results were received and analyzed from 149 of 155 (96.1%) of laboratories participating in this shipment. 15 of the participating laboratories are located in countries other than the U.S.A.

The enclosed aggregate report is prepared in a format that will allow laboratories to compare their results with results obtained by other participants for the same strain using the same method, drug, and concentration. The first three pages contain descriptive information about the participant laboratories. We encourage you to circulate this report to personnel who are involved with drug susceptibility testing, reporting, or interpretation for *M. tuberculosis* and NTM.

The addition of NTM strains to this performance evaluation is intended to provide an assessment of the various methods, drugs, and interpretations that are reported by laboratories that perform drug susceptibility testing for these different strains. The test results for NTM strains also provide information on interlaboratory agreement with different test methods and will assist with efforts to develop standard methods for NTM drug susceptibility testing. By reporting these practices and test results CDC is neither recommending nor endorsing these testing practices. Some of the test results reported by participants, may in fact, provide inappropriate or misleading information to the clinician. A consensus report by the American Thoracic Society is referenced to provide participants with recommendations for NTM test methods and drugs that have clinical relevance.

Page 2 - Participants, TB/NTM Program

If you have any comment or suggestions on the results in this report or have questions regarding the changes in this program, you may call me at (770) 488-8076.

Sincerely yours,

John C. Ridderhof, Dr.P.H.
Science Administrator
Division of Laboratory Systems
Public Health Practice Program Office

Enclosures

Analyses of the February 2000 Performance Evaluation Results for *M. tuberculosis* and Nontuberculous Mycobacteria Drug Susceptibility Testing Reported to the Centers for Disease Control and Prevention by Participating Laboratories

This report is an analysis of laboratory test results reported to the Centers for Disease Control and Prevention (CDC) by participant laboratories for the 3 strains of *Mycobacterium tuberculosis*, 1 strain of *M. mucogenicum*, and 1 strain of *M. avium* complex shipped in February 2000. Participant laboratories either received 3 *M. tuberculosis* or all five *M. tuberculosis* and NTM strains. Testing results were received and analyzed from 149 of 155 (96.1%) laboratories participating in this shipment.

Descriptive Information on Participant laboratories

Figure 1 shows the laboratory classification reported by 149 of the participants. Participants consisted of 80 health departments, 54 hospitals, 12 independents, and 3 “other” type of laboratories.

Figure 2 provides the distribution of the annual volume of *M. tuberculosis* isolates tested for drug susceptibilities by participating laboratories in calendar year 1999.

Figure 3 lists the biosafety levels reported by participant laboratories for *M. tuberculosis*. All laboratories are strongly encouraged to consult the CDC/NIH manual, Biosafety in Microbiological and Biomedical Laboratories (4rd edition) for recommendations and to determine their correct biosafety level.

Figure 4 provides a breakdown of the test procedures used by the participating laboratories for *M. tuberculosis* drug susceptibility testing. Participants were asked to check all of the test methods used. Some methods, such as the proportion method with Lowenstein-Jensen (LJ) media, may reflect procedures used by international participants. The 3 other methods listed were the E-test, microdilution MIC, and LJ resistance ratio methods. Figure 5 provides a breakdown of the test procedures used by the participating laboratories for *M. mucogenicum*. Figure 6 provides a breakdown of the test procedures used by the participating laboratories for *M. avium* complex.

M. tuberculosis test results:

The aggregate test results are provided in separate tables, representing cultures A, B, C, D, and E, to facilitate comparison among laboratories. Table 1 for the *M. tuberculosis* cultures A, B, and C is constructed to include the results for the radiometric (BACTEC), agar proportion, Lowenstein Jensen (LJ) proportion, and other methods at each concentration of drug. The results for 3 “other” methods are grouped together and include the E-test, LJ resistance ratio, and microdilution MIC. The test results are listed in the appropriate (susceptible or resistant) columns with a corresponding total number of tests (Sum) column provided as a denominator for

determining the level of consensus. This report contains all results reported by participating laboratories, including many drug concentrations with only one result.

In Table 1 the concentrations recommended by CDC and the NCCLS (tentative standard) for the primary (isoniazid, rifampin, pyrazinamide, ethambutol, and streptomycin) and secondary (ethionamide, kanamycin, capreomycin, cycloserine, p-amino-salicylic acid) antituberculosis drugs are highlighted for the conventional and radiometric method. Participants should note that these recommended combinations reflect the critical concentrations of antituberculosis drugs in 7H10 agar and those concentrations for the BACTEC method that directly correlate with the critical concentrations in the conventional method (1-6). When two concentrations are highlighted, such as for isoniazid, ethambutol and streptomycin, the lower concentration is the critical concentration that should always be included to determine whether the *M. tuberculosis* isolate is resistant.

Strain A was resistant to ethambutol, strain B was resistant to isoniazid and streptomycin, and strain C was resistant to rifampin. There was good agreement in detecting resistance among laboratories and methods for all 3 *M. tuberculosis* strains. Strain A was unusual with only resistance to ethambutol (ethambutol monoresistance). Ethambutol monoresistance that is confirmed in another method is extremely rare and usually represents false resistance when encountered in routine patient testing. When ethambutol monoresistance is detected, laboratories should report the susceptibility results for the other antituberculosis drugs and then confirm ethambutol results by testing in another method or repeating the test in the same rapid method (e.g. BACTEC).

Our providing test results for all drugs that are reported to CDC should not be construed as a recommendation or endorsement for testing particular drugs or concentrations with patient isolates of *M. tuberculosis*. It is assumed that some of the drugs are being tested for research purposes or potential use in the few referral institutions that may treat patients with *M. tuberculosis* isolates resistant to almost all standard drugs. Laboratories should not add drugs to their testing regimen without the consultation of physicians having expertise in treating multi-drug resistant tuberculosis. Laboratories may contact their local TB control program for referrals of physicians with experience and expertise in treating multi-drug resistant tuberculosis.

Nontuberculous Mycobacteria test results:

The aggregate test results are provided in Tables 2 and 4 for culture D, *M. mucogenicum* and Tables 3 and 5 for culture E, *M. avium* complex to facilitate comparison among laboratories. Tables 2 and 3, for *M. mucogenicum* and *M. avium* complex, respectively, represent either single or multiple drug concentrations with “breakpoint” susceptibility test results. In Tables 3 and 4, the participant laboratories reported an interpretation of either susceptibility or resistance for each drug concentration that was reported. Tables 4 and 5 represent all minimum inhibitory concentrations (MICs) susceptibility test results, for *M. mucogenicum* and *M. avium* complex, respectively, reported by participant laboratories. Tables 4 and 5 include all the quantitative MIC test results, regardless of whether the laboratory provided a test interpretation of resistant or susceptible for the reported MIC.

A total of 36 participants provided test results on culture D, *M. mucogenicum*: 24 participants reported breakpoint test results and 15 participants reported MIC test results. Table 2, representing all of the breakpoint susceptibility test results for *M. mucogenicum*, includes results reported for the agar proportion, BACTEC, disk elution, microtiter, LJ proportion, and other test methods. The species *M. mucogenicum* consists of mycobacteria strains that were formerly known as the *M. chelonae*-like organisms or MCLO. The American Thoracic Society (ATS) recommends (9) testing a primary panel of drugs for all rapidly growing mycobacteria, preferably with a microtiter MIC (10). This primary panel includes amikacin, ceftazidime, ciprofloxacin, clarithromycin, doxycycline, imipenem, and a sulfonamide. An additional study (11) found inter-laboratory variability using the microtiter MIC method for rapid growing mycobacteria and recommendations included different breakpoints for drugs and the need for laboratory experience with this type of testing. Some laboratories reported testing antituberculosis drugs, such as rifampin, rifabutin, and ethionamide, which are ineffective against the rapidly growing mycobacteria. Although the MICs reported by participants for culture D varied, 100% of *M. mucogenicum* isolates are susceptible to amikacin, imipenem, ceftazidime, and ciprofloxacin (12)

A total of 31 participants reported testing results for culture E, *M. avium* complex: 18 participants reported breakpoint test results and 15 participants reported MIC test results. Table 3, representing all of the breakpoint susceptibility test results for *M. avium* complex, includes results reported for the agar proportion, BACTEC, microtiter, and LJ proportion methods. Some participants reporting results for *M. avium* complex used the methods outlined above with concentrations of primary drugs recommended for *M. tuberculosis* (8). The American Thoracic Society (ATS) recommendations (9) for *M. avium* complex state, "Susceptibility testing with rifabutin and the antituberculosis drugs is not recommended. Routine testing against clarithromycin should not be performed, but that test should be performed on isolates from patients who have failed prior macrolide therapy or prophylaxis. Minimal inhibitory concentration of >32 µg/ml is the recommended resistance breakpoint." Strain E was susceptible to clarithromycin. For culture E, 78.6% (11/14) of MIC interpretations provided for clarithromycin and azithromycin were reported as susceptible. The clarithromycin MICs results reported for strain E ranged from 0.25 µg/ml to <16 µg/ml with 12/12 participants reporting an MIC <16 µg/ml.

Many laboratories perform drug susceptibility testing for NTM in the absence of clinical studies demonstrating the efficacy of particular drugs and/or drug concentrations and methods (8,9). The addition of NTM strains to this performance evaluation program should not be interpreted as recommendations for laboratories to adopt NTM drug susceptibility testing, especially if the laboratory has limited experience with these tests and methods. We encourage laboratories that perform NTM drug susceptibility testing to consult recommendations, references, and physicians with expertise in infectious diseases when selecting test methods, drugs, and test interpretations.

REFERENCES

1. **Inderlied, C. B. and M. Salfinger.** 1995. Antimicrobial Agents and Susceptibility Tests: Mycobacteria, p. 1385-1404. In Murray, Patrick R., Baron, Ellen Jo, Pfaller, Michael A., Tenover, Fred C., Tenover, Robert C. (ed.) Manual of clinical microbiology, 6th ed. American Society for Microbiology, Washington, D.C.
2. **David, H. L.** 1971. Fundamentals of drug susceptibility testing in tuberculosis. DHEW Publication No. (CDC) 712165. Center for Disease Control, Atlanta.
3. **Kent, P.T and G.P. Kubica.** 1985. Public health mycobacteriology: a guide for the level III laboratory. Centers for Disease Control, Atlanta.
4. **Siddiqi, S.H., J.E. Hawkins, and A. Laszlo.** 1985. Interlaboratory drug susceptibility testing of *Mycobacterium tuberculosis* by a radiometric procedure and two conventional methods. J. Clin. Microbiol. 22:919-923.
5. **Hawkins, Jean E., Wallace, Richard J. Jr., Brown, Barbara A.** 1991. Antibacterial Susceptibility Tests: Mycobacteria, p. 1138-1152. In Balows, Albert, Hausler, William J. Jr., Herrmann, Kenneth L., Isenberg, Henry D., Shadomy, H. Jean (ed.) Manual of clinical microbiology, 4th ed. American Society for Microbiology, Washington, D.C.
6. **NCCLS.** Antimycobacterial Susceptibility Testing for *Mycobacterium tuberculosis*; Tentative standard. NCCLS document M24-T, December, 1995
7. **Laszlo, A., Rahman, M. Raviglione, M., Bustreo, F., WHO/IUATLD Network of Supranational Reference Laboratories.** 1997. Quality assurance programme for drug susceptibility testing of *Mycobacterium tuberculosis* in the WHO/IUATLD Supranational Laboratory Network: first round of proficiency testing. Int.J. Tuberc. Lung Dis. 1 (3):231-238
8. **Woods, G.L., F.G.Witebsky.** 1996. Susceptibility testing of *Mycobacterium avium* complex in clinical laboratories: Results of a questionnaire and proficiency test performance by participants in the College of American Pathologists Mycobacteriology E survey. Arch.Pathol.Lab.Med. 120:436-439.
9. **American Thoracic Society.** 1997. Diagnosis and treatment of disease caused by nontuberculous mycobacteria. Am.J.Respir.Crit.Care Med. 156:S1-S25.
10. **Brown, B.A., J.M. Swenson, and R.J. Wallace Jr.** 1994. Broth microdilution MIC test for rapidly growing mycobacteria. P. 5.11.1. In H.D. Isenberg (ed.). Clinical microbiology procedures handbook. American Society for Microbiology. Washington. D.C.
11. **Woods, G.L., J.S. Bergmann, F.G.Witebsky, G.A. Fahle, A. Wanger, B. Boulet, M.**

- Plaunt, B.A. Brown, and R.J. Wallace.** 1999. Multi-site reproductibility of results obtained by the broth microdilution method for susceptibility testing of *Mycobacterium abscessus*, *Mycobacterium chelonae*, and *Mycobacterium fortuitum*. J. Clin. Microbiol 37:1676-1682.
12. **Wallace, R.J., V.A. Silcox, M. Tsukamura, B.A. Brown, J.O. Kilburn, W.R. Butler and G. Onyi.** 1993. Clinical significance, biochemical features, and susceptibility patterns of sporadic isolates of the Mycobacterium chelonae-like organism. J. Clin. Microbiol 31:3231-3239.
13. **Phyffer, G.E., D.A. Bonato, A Ebrahimzadeh, W. Gross, J Hotaling, J. Kornblum, A. Lazslo, G. Roberts, M. Salfinger, F. Wittwer, and S. Siddiqi.** 1999. Multi-center laboratory validation of susceptibility testing of *Mycobacterium tuberculosis* against classical second-line and newer antimicrobial drugs by using the radiometric BACTEC 460 technique and the proportion method of solid media. J. Clin. Microbiol 37:3179-3186.

Figure 1. Primary Classification of Participating Laboratories

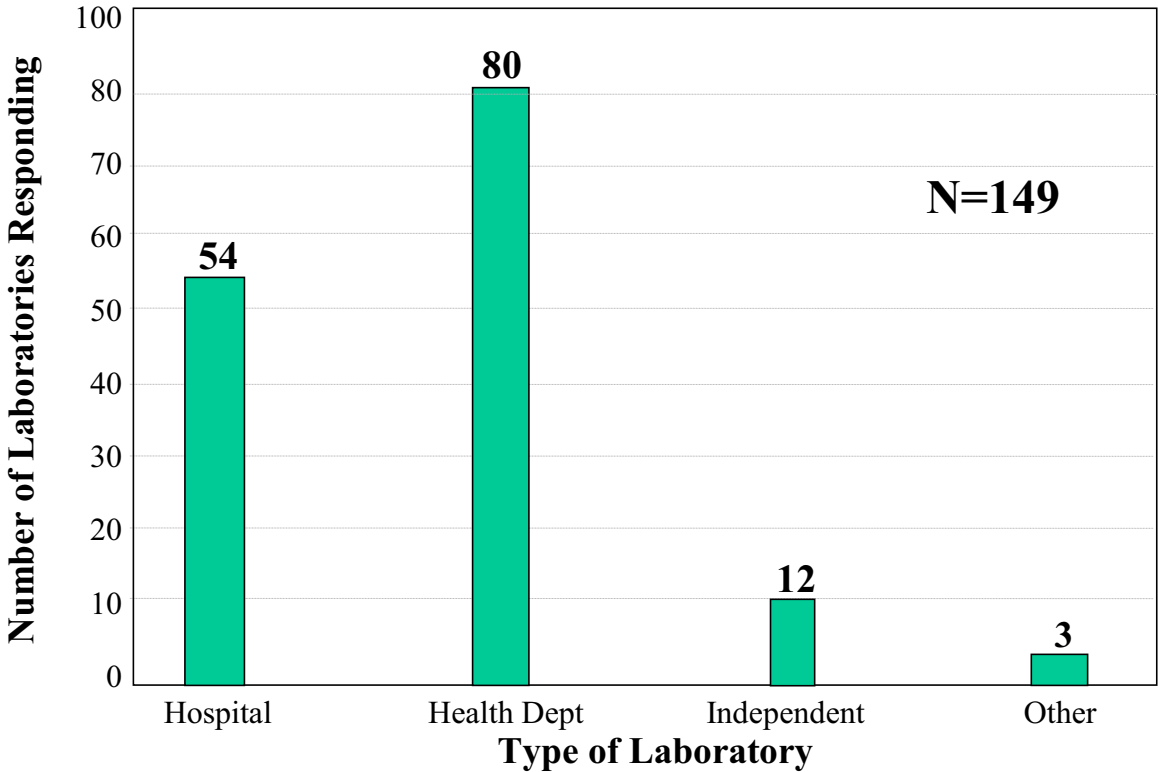
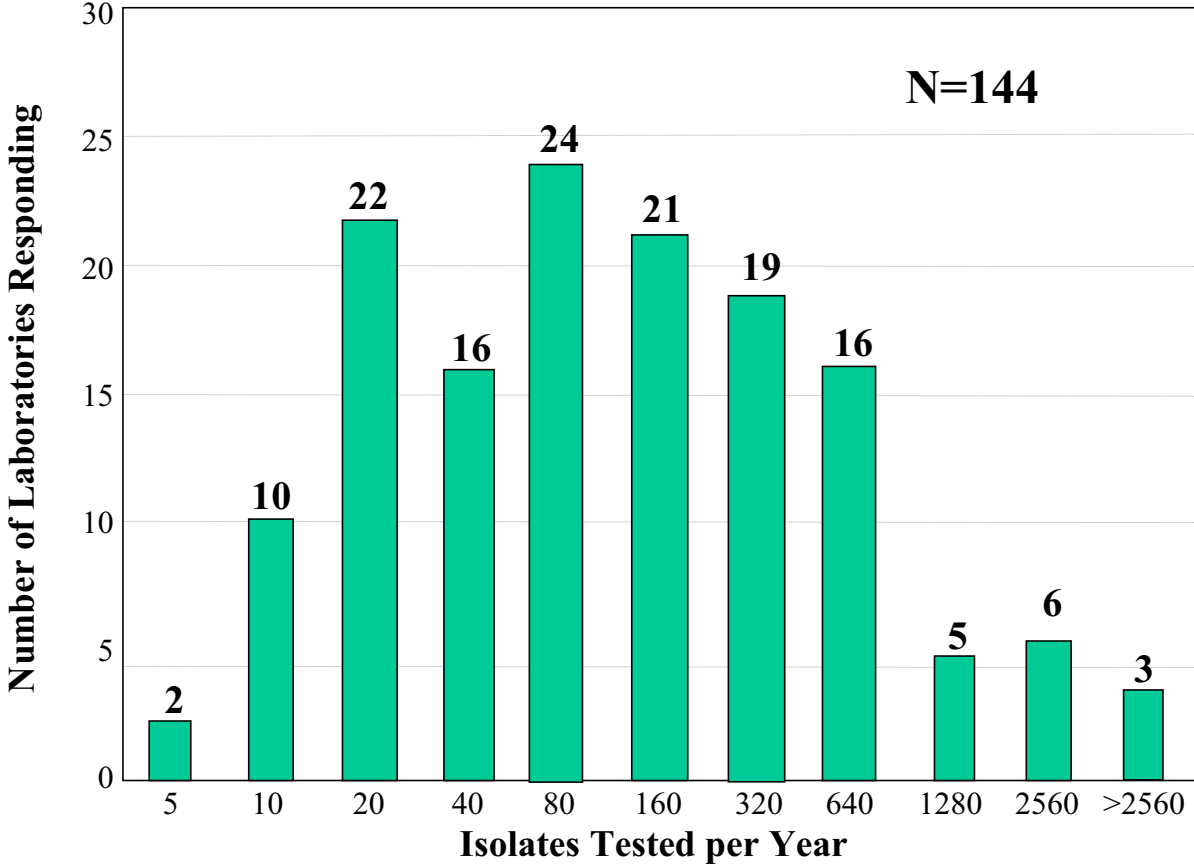
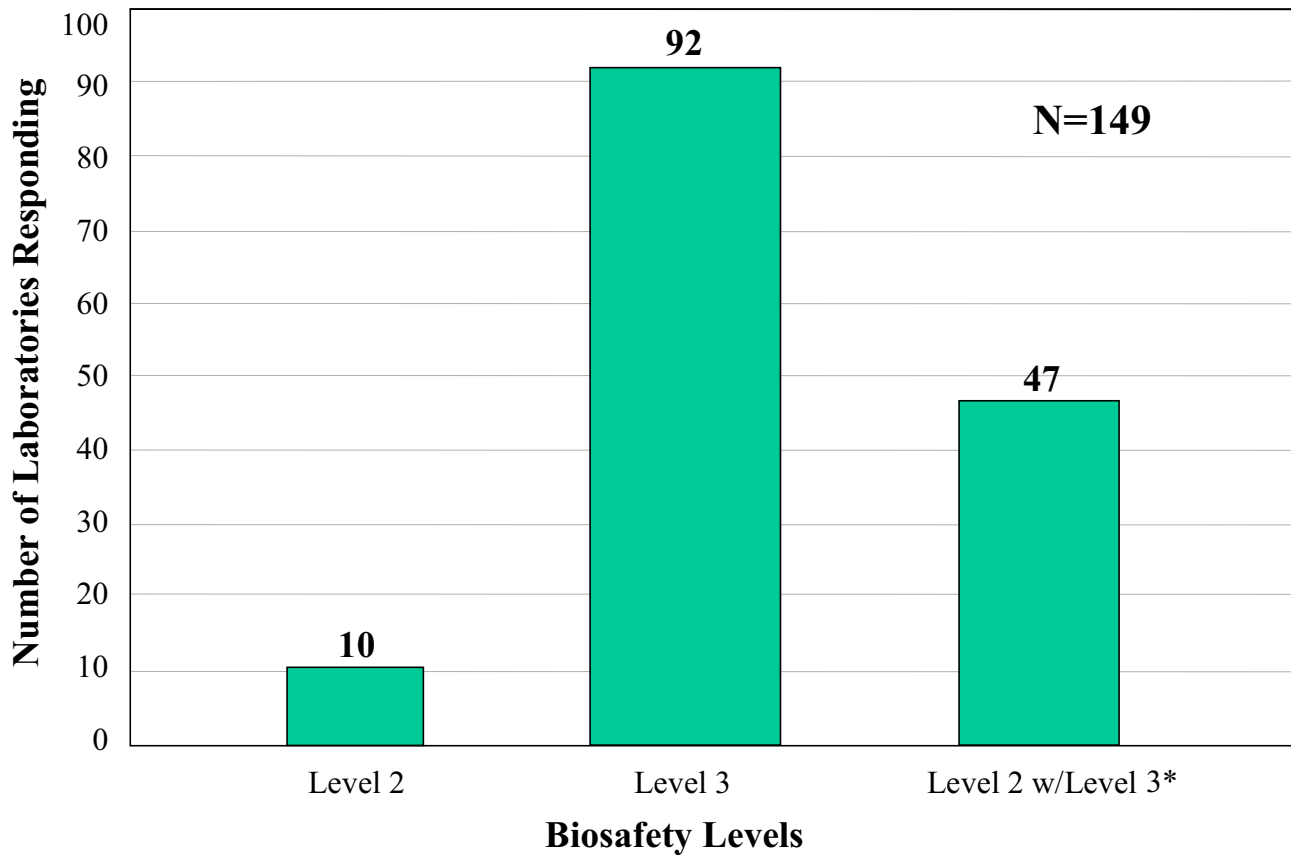


Figure 2. 1999 Annual Volume of *M. tuberculosis* Isolates for Participating Laboratories



Group labels indicate upper limit of the group.

Figure 3. Biosafety Levels of Participating Laboratories for *M. tuberculosis*



* Biosafety level 2 for facilities with level 3 containment equipment

Figure 4. Test Procedures used by Laboratories for *M. tuberculosis*

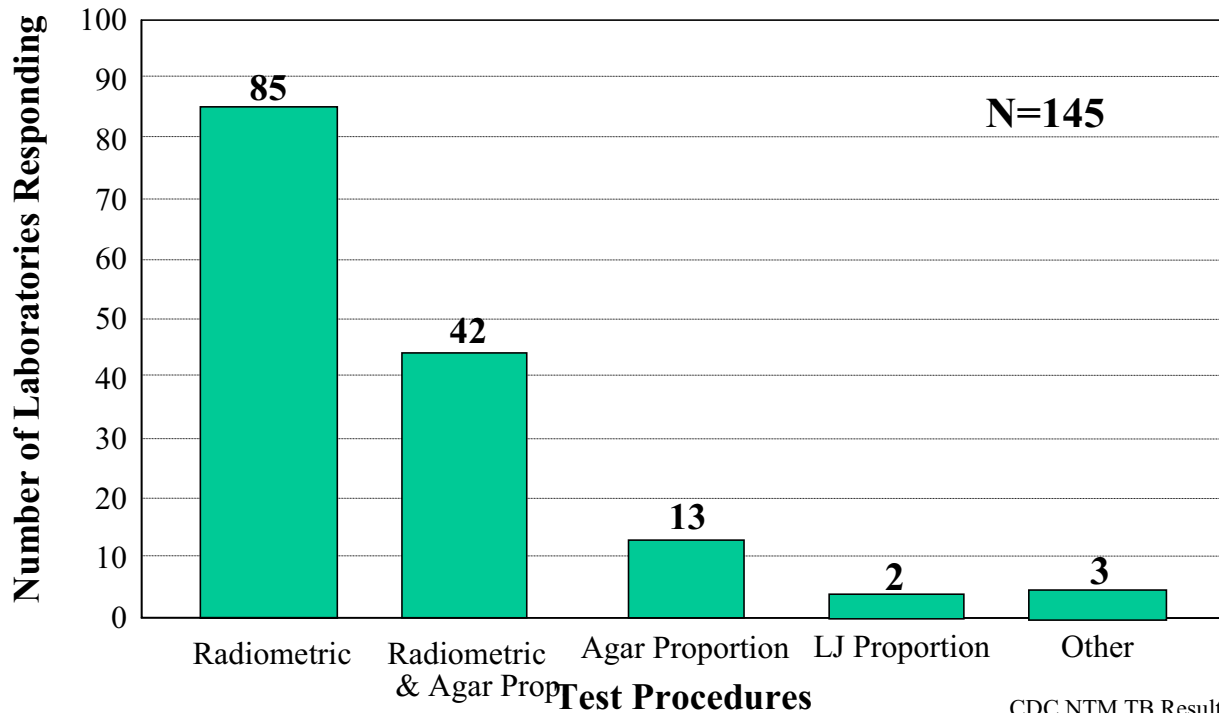
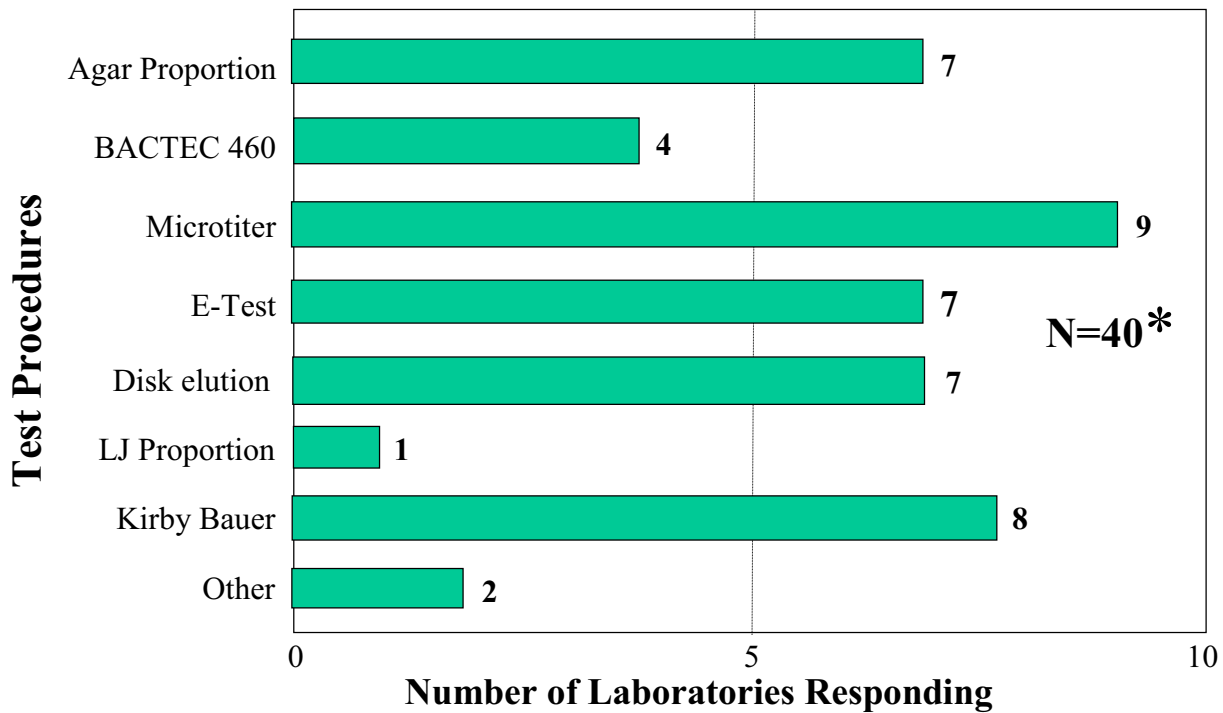
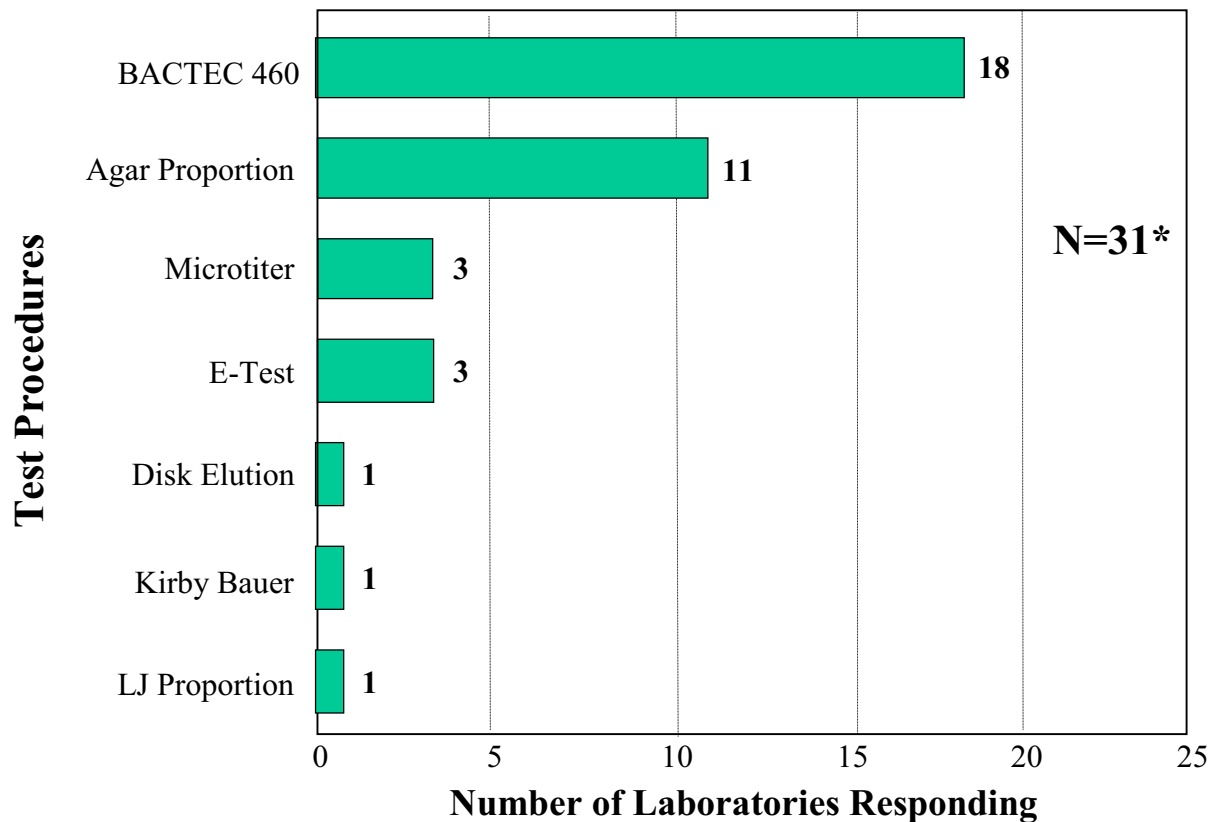


Figure 5. Test Procedures used by Laboratories for Strain D - *M. mucogenicum*



* Some participants reported more than one test method

Figure 6. Test Procedures used by Laboratories for Strain E - *M. avium* complex



* Some participants reported more than one test method

Table 1. Participant Results for Culture A, *M. tuberculosis*

DRUG	Conc.	Test Method														
		Agar Prop. Results			BACTEC Results			LJ Prop. Results			Other Tests Results					
		S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum			
Isoniazid	0.01				1		1									
Isoniazid	0.05												1			1
Isoniazid	0.10				106	1	107						1			1
Isoniazid	0.20	39		39	7		7	3		3			2			2
Isoniazid	0.40				26		26									
Isoniazid	0.50							1		1						
Isoniazid	1.00	38		38	6		6	2		2			1			1
Isoniazid	5.00	5		5									1			1
Isoniazid	10.00							2		2						
Isoniazid	100.00							1		1						
Rifampin	0.50				2		2									
Rifampin	1.00	42		42	8		8		1	1			1			1
Rifampin	2.00				113		113									
Rifampin	5.00	7		7				1		1						
Rifampin	14.00												1			1
Rifampin	28.00												1			1
Rifampin	40.00							2		2						
Rifampin	50.00							1		1						
Rifampin	56.00												1			1
Rifampin	100.00				1		1									
Pyrazinamide	0.10				1		1									
Pyrazinamide	25.00	1		1	1		1									
Pyrazinamide	50.00				1		1									
Pyrazinamide	64.00												1			1
Pyrazinamide	100.00				88	1	89	2		2						
Pyrazinamide	300.00				1		1									
Pyrazinamide	400.00							1		1						
Ethambutol	1.00								1	1						
Ethambutol	1.60												1			1
Ethambutol	2.00								3	3						
Ethambutol	2.50				4	100	104									
Ethambutol	3.75					4	4									
Ethambutol	4.00					1	1									
Ethambutol	5.00	1	36	37		9	9	1		1			1			1
Ethambutol	6.00		1	1												
Ethambutol	6.40												1			1
Ethambutol	7.50	3	2	5	1	13	14									
Ethambutol	10.00	7	5	12	1		1						1			1

Table 1. Participant Results for Culture A, *M. tuberculosis*

DRUG	Conc.	Test Method												
		Agar Prop. Results			BACTEC Results			LJ Prop. Results			Other Tests Results			
		S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	
Streptomycin	1.00								1		1			
Streptomycin	2.00	38		38	101	1	102					1		1
Streptomycin	3.00				1		1							
Streptomycin	4.00				1		1	2		2				
Streptomycin	5.00							1		1				
Streptomycin	6.00				18		18							
Streptomycin	7.50											1		1
Streptomycin	10.00	29		29				1		1		1		1
Streptomycin	15.00											1		1
Streptomycin	30.00											1		1
Ethionamide	1.00				1		1							
Ethionamide	1.25				2		2							
Ethionamide	2.00				1		1							
Ethionamide	2.50				1		1							
Ethionamide	5.00	29		29	4	1	5							
Ethionamide	10.00	5		5								1		1
Ethionamide	15.00											1		1
Ethionamide	20.00								1	1				
Ethionamide	30.00							1		1		1		1
Ethionamide	40.00							1		1				
Kanamycin	5.00	11		11	3		3							
Kanamycin	6.00	20		20										
Kanamycin	10.00							1		1				
Kanamycin	20.00							1		1				
Kanamycin	40.00							1		1				
Capreomycin	0.50											1		1
Capreomycin	1.00				1		1					1		1
Capreomycin	1.25				1		1							
Capreomycin	2.00				1		1							
Capreomycin	5.00				6		6							
Capreomycin	10.00	20		20										
Capreomycin	12.50												1	1
Capreomycin	50.00											1		1

Table 1. Participant Results for Culture A, *M. tuberculosis*

DRUG	Conc.	Test Method											
		Agar Prop. Results			BACTEC Results			LJ Prop. Results			Other Tests Results		
		S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Cycloserine	4.00							1		1			
Cycloserine	8.00							1		1			
Cycloserine	15.00										1		1
Cycloserine	20.00								1	1			
Cycloserine	25.00	2		2									
Cycloserine	30.00	14		14				2		2	1		1
Cycloserine	40.00							1		1			
Cycloserine	50.00	1		1									
Cycloserine	60.00	1		1							1		1
p-Aminosalicylic acid	1.00						1	1			1		1
p-Aminosalicylic acid	2.00	14		14			1	1			1		1
p-Aminosalicylic acid	4.00						1	1					
p-Aminosalicylic acid	8.00	3		3									
p-Aminosalicylic acid	10.00	5		5									
Amikacin	0.50										1		1
Amikacin	1.00										1		1
Amikacin	2.00	1		1	2		2						
Amikacin	2.50				1		1						
Amikacin	4.00	5		5	1		1						
Amikacin	5.00	2		2	1		1						
Amikacin	6.00	4		4							1		1
Amikacin	8.00	1		1									
Amikacin	12.00	2		2									
Ofloxacin	0.50										1		1
Ofloxacin	1.00	6		6	2		2				1		1
Ofloxacin	1.25										1		1
Ofloxacin	2.00	4		4	6		6	1		1			
Ofloxacin	2.50										1		1
Ofloxacin	4.00	1		1		1	1						
Ofloxacin	5.00										1		1
Ciprofloxacin	0.50										1		1
Ciprofloxacin	1.00	3		3	4		4				1		1
Ciprofloxacin	2.00	12		12	2		2				2		2
Ciprofloxacin	4.00										1		1
Ciprofloxacin	8.00										1		1
Ciprofloxacin	10.00	1		1									
Levofloxacin	2.00				1		1						
Rifabutin	0.50	1		1									
Rifabutin	1.00	2		2	1		1						
Rifabutin	2.00	4		4									
Clofazimine	0.06				1		1						
Clofazimine	0.12				1		1						
Clofazimine	0.50				1		1				1		1
Clofazimine	1.00	1		1							1		1
Thiacetazone	2.00							1		1			

Table 1. Participant Results for Culture B, *M. tuberculosis*

		Test Method											
		Agar Proportion Results			BACTEC Results			LJ Proportion Results			Other Tests Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Isoniazid	0.01					1	1						
Isoniazid	0.05										1	1	
Isoniazid	0.10				4	103	107				1	1	
Isoniazid	0.20		40	40		8	8		3	3	2	2	
Isoniazid	0.40				1	28	29						
Isoniazid	0.50								1	1			
Isoniazid	1.00		40	40	2	5	7		2	2	1	1	
Isoniazid	2.00				2		2						
Isoniazid	5.00	2	3	5	2		2				1		1
Isoniazid	10.00							2		2			
Isoniazid	100.00							1		1			
Rifampin	0.50				2		2						
Rifampin	1.00	42		42	8		8		1	1	1		1
Rifampin	2.00				114	1	115						
Rifampin	5.00	7		7	1		1	1		1			
Rifampin	14.00										1		1
Rifampin	28.00										1		1
Rifampin	40.00							2		2			
Rifampin	50.00							1		1			
Rifampin	56.00										1		1
Rifampin	100.00				1		1						
Pyrazinamide	0.10				1		1						
Pyrazinamide	25.00	1		1	1		1						
Pyrazinamide	50.00				1		1						
Pyrazinamide	64.00										1		1
Pyrazinamide	100.00				87	4	91	2		2			
Pyrazinamide	300.00				1		1						
Pyrazinamide	400.00							1		1			
Ethambutol	1.00							1		1			
Ethambutol	1.60										1		1
Ethambutol	2.00							3		3			
Ethambutol	2.50				103	3	106						
Ethambutol	3.20										1		1
Ethambutol	3.75				4		4						
Ethambutol	4.00				1		1						
Ethambutol	5.00	34		34	8		8	1		1	1		1
Ethambutol	6.00	1		1									
Ethambutol	6.40										1		1
Ethambutol	7.50	5		5	12	1	13						
Ethambutol	10.00	11		11							1		1

Table 1. Participant Results for Culture B, *M. tuberculosis*

		Test Method											
		Agar Proportion Results			BACTEC Results			LJ Proportion Results			Other Tests Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Streptomycin	1.00								1	1			
Streptomycin	2.00	38	38		4	99	103					1	1
Streptomycin	3.00					1	1						
Streptomycin	4.00					1	1		2	2			
Streptomycin	5.00							1		1			
Streptomycin	6.00				2	18	20						
Streptomycin	7.50											1	1
Streptomycin	10.00	30	30					1		1		1	1
Streptomycin	15.00											1	1
Streptomycin	30.00											1	1
Ethionamide	1.00				1		1						
Ethionamide	1.25					4	4						
Ethionamide	2.00				1		1						
Ethionamide	2.50				2		2						
Ethionamide	5.00	29	1	30	4	1	5						
Ethionamide	10.00	5		5							1		1
Ethionamide	15.00										1		1
Ethionamide	20.00								1	1			
Ethionamide	30.00							1		1	1		1
Ethionamide	40.00							1		1			
Kanamycin	2.50				1		1						
Kanamycin	5.00	12		12	5		5						
Kanamycin	6.00	20		20									
Kanamycin	10.00							1		1			
Kanamycin	20.00							1		1			
Kanamycin	40.00							1		1			
Capreomycin	0.50										1		1
Capreomycin	1.00				1		1				1		1
Capreomycin	1.25				2		2						
Capreomycin	2.00				1		1						
Capreomycin	2.50				2		2						
Capreomycin	5.00				6		6						
Capreomycin	10.00	21		21									
Capreomycin	12.50										1		1
Capreomycin	25.00										1		1
Capreomycin	50.00										1		1
Cycloserine	4.00							1		1			
Cycloserine	8.00							1		1			
Cycloserine	15.00										1		1
Cycloserine	20.00								1	1			
Cycloserine	25.00	2		2									
Cycloserine	30.00	14		14				2		2	1		1
Cycloserine	40.00							1		1			
Cycloserine	50.00	1		1									
Cycloserine	60.00	2		2							1		1

Table 1. Participant Results for Culture B, *M. tuberculosis*

		Test Method											
		Agar Proportion Results			BACTEC Results			LJ Proportion Results			Other Tests Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
p-Aminosalicylic acid	1.00							1		1			
p-Aminosalicylic acid	2.00	14		14							1		1
p-Aminosalicylic acid	4.00				1		1						
p-Aminosalicylic acid	8.00	4		4									
p-Aminosalicylic acid	10.00	5		5									
Amikacin	0.50										1		1
Amikacin	1.00				1		1				1		1
Amikacin	2.00	1		1	2		2						
Amikacin	2.50				1		1						
Amikacin	4.00	5		5	1		1						
Amikacin	5.00	2		2	1		1						
Amikacin	6.00	4		4							1		1
Amikacin	8.00	1		1									
Amikacin	12.00	2		2									
Ofloxacin	1.00	6		6	2		2				1		1
Ofloxacin	1.25				1		1				1		1
Ofloxacin	2.00	4		4	8		8	1		1			
Ofloxacin	2.50										1		1
Ofloxacin	4.00	1		1	1		1						
Ofloxacin	5.00										1		1
Ciprofloxacin	1.00	3		3	4		4				1		1
Ciprofloxacin	2.00	12		12	2		2				2		2
Ciprofloxacin	2.50				1		1						
Ciprofloxacin	4.00										1		1
Ciprofloxacin	8.00										1		1
Ciprofloxacin	10.00	1		1									
Levofloxacin	2.00				1		1						
Rifabutin	0.50	1		1	2		2						
Rifabutin	1.00	2		2	1		1						
Rifabutin	2.00	4		4									
Clofazimine	0.06				1		1						
Clofazimine	0.12				1		1						
Clofazimine	0.50				2		2				1		1
Clofazimine	1.00	1		1							1		1
Thiacetazone	2.00							1		1			

Table 1. Participant Results for Culture C, *M. tuberculosis*

		Test Method											
		Agar Prop. Results			BACTEC Results			LJ Prop. Results			Other Tests Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Isoniazid	0.01				1		1						
Isoniazid	0.10				109		109				1		1
Isoniazid	0.20	40		40	7		7	3		3	2		2
Isoniazid	0.40				26		26						
Isoniazid	0.50							1		1			
Isoniazid	1.00	39		39	6		6	2		2	1		1
Isoniazid	5.00	5		5							1		1
Isoniazid	10.00							2		2			
Isoniazid	100.00							1		1			
Rifampin	0.50					2	2						
Rifampin	1.00		43	43		8	8		1	1		1	1
Rifampin	2.00				1	115	116						
Rifampin	5.00		8	8		1	1		1	1			
Rifampin	10.00					1	1						
Rifampin	14.00											1	1
Rifampin	28.00											1	1
Rifampin	40.00								2	2			
Rifampin	50.00								1	1			
Rifampin	56.00											1	1
Rifampin	100.00				1		1						
Pyrazinamide	0.10				1		1						
Pyrazinamide	25.00	1		1	1		1						
Pyrazinamide	50.00				1		1						
Pyrazinamide	64.00											1	1
Pyrazinamide	100.00				90	2	92	2		2			
Pyrazinamide	300.00				1		1						
Pyrazinamide	400.00							1		1			
Ethambutol	1.00							1		1			
Ethambutol	1.60										1		1
Ethambutol	2.00							3		3			
Ethambutol	2.50				105	1	106						
Ethambutol	3.20										1		1
Ethambutol	3.75				4		4						
Ethambutol	4.00				1		1						
Ethambutol	5.00	35		35	8		8	1		1	1		1
Ethambutol	6.00	1		1									
Ethambutol	6.40										1		1
Ethambutol	7.50	6		6	13		13						
Ethambutol	10.00	11		11							1		1

Table 1. Participant Results for Culture C, *M. tuberculosis*

		Test Method											
		Agar Prop. Results			BACTEC Results			LJ Prop. Results			Other Tests Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Streptomycin	1.00							1		1			
Streptomycin	2.00	40		40	102	1	103				1		1
Streptomycin	3.00				1		1						
Streptomycin	4.00				1		1	2		2			
Streptomycin	5.00							1		1			
Streptomycin	6.00				18		18						
Streptomycin	7.50										1		1
Streptomycin	10.00	30		30				1		1	1		1
Streptomycin	15.00										1		1
Streptomycin	30.00										1		1
Ethionamide	1.00				1		1						
Ethionamide	1.25				3		3						
Ethionamide	2.00				1		1						
Ethionamide	2.50				1		1						
Ethionamide	5.00	30		30	4	1	5						
Ethionamide	7.50										1		1
Ethionamide	10.00	5		5							1		1
Ethionamide	15.00										1		1
Ethionamide	20.00							1		1			
Ethionamide	30.00							1		1	1		1
Ethionamide	40.00							1		1			
Kanamycin	2.50				1		1						
Kanamycin	5.00	12		12	4		4						
Kanamycin	6.00	20		20									
Kanamycin	10.00							1		1			
Kanamycin	20.00							1		1			
Kanamycin	40.00							1		1			
Capreomycin	0.50										1		1
Capreomycin	1.00				1		1				1		1
Capreomycin	1.25				1		1						
Capreomycin	2.00				1		1						
Capreomycin	2.50				1		1						
Capreomycin	5.00				6		6						
Capreomycin	10.00	21		21									
Capreomycin	12.50											1	1
Capreomycin	50.00										1		1

Table 1. Participant Results for Culture C, *M. tuberculosis*

		Test Method											
		Agar Prop. Results			BACTEC Results			LJ Prop. Results			Other Tests Results		
		S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
DRUG	Conc.												
Cycloserine	4.00							1		1			
Cycloserine	8.00							1		1			
Cycloserine	15.00										1		1
Cycloserine	20.00								1	1			
Cycloserine	25.00	2		2									
Cycloserine	30.00	14		14				2		2	1		1
Cycloserine	40.00							1		1			
Cycloserine	50.00	1		1									
Cycloserine	60.00	1		1							1		1
p-Aminosalicylic a	1.00				1		1	1		1			
p-Aminosalicylic a	2.00	14		14							1		1
p-Aminosalicylic a	4.00				1		1						
p-Aminosalicylic a	8.00	3		3									
p-Aminosalicylic a	10.00	5		5									
Amikacin	0.50										1		1
Amikacin	1.00				1		1				1		1
Amikacin	2.00	1		1	2		2						
Amikacin	2.50				1		1						
Amikacin	4.00	5		5	1		1						
Amikacin	5.00	2		2	1		1						
Amikacin	6.00	4		4							1		1
Amikacin	8.00	1		1									
Amikacin	12.00	2		2									
Ofloxacin	0.50										1		1
Ofloxacin	1.00	6		6	2		2				1		1
Ofloxacin	1.25				1		1				1		1
Ofloxacin	2.00	4		4	7		7	1		1			
Ofloxacin	2.50										1		1
Ofloxacin	4.00	1		1	1		1						
Ofloxacin	5.00										1		1
Ciprofloxacin	0.50										1		1
Ciprofloxacin	1.00	3		3	4		4				1		1
Ciprofloxacin	2.00	12		12	2		2				2		2
Ciprofloxacin	4.00										1		1
Ciprofloxacin	8.00										1		1
Ciprofloxacin	10.00	1		1									
Levofloxacin	2.00				1		1						
Rifabutin	0.50	1		1	1		1						
Rifabutin	1.00	2		2		1	1						
Rifabutin	2.00	4		4									
Clofazimine	0.06				1		1						
Clofazimine	0.12				1		1						
Clofazimine	0.50				1		1				1		1
Clofazimine	1.00	1		1							1		1
Thiacetazone	2.00							1		1			

Table 2. Participant Results for Culture D, *M. mucogenicum*

		Test Method																	
		Agar Prop. Results			BACTEC Results			Microtiter Results			Disk Elution Results			LJ Proportion Results			Other Test Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Amikacin	0.30		1	1															
Amikacin	0.50							1		1									
Amikacin	0.60		1	1															
Amikacin	1.00							1	1	2									
Amikacin	1.20		1	1															
Amikacin	2.00								1	1									
Amikacin	2.50		1	1															
Amikacin	5.00	1		1															
Amikacin	6.00	1		1							1	1	2						
Amikacin	8.00							1		1									
Amikacin	10.00	1		1															
Amikacin	12.00	2		2							1		1						
Amikacin	16.00							1		1									
Amikacin	20.00	1		1															
Amikacin	30.00	2		2							4		4				4		4
Amikacin	32.00							1		1									
Amikacin	64.00							1		1									
Amikacin	128.00							1		1									
Augmentin	30.00																1		1
Azithromycin	2.00							1		1									
Clofazimine	1.00		1	1															
Clarithromycin	0.06		1	1					1	1									
Clarithromycin	0.12		1	1					1	1									
Clarithromycin	0.13							1		1									
Clarithromycin	0.25	1		1				1	1	2									
Clarithromycin	0.50	1		1															
Clarithromycin	1.00	1		1				1		1									
Clarithromycin	2.00	1		1				1		1									
Clarithromycin	3.00	3		3							4		4						
Clarithromycin	4.00	2		2				1		1									
Clarithromycin	8.00	1		1				1		1									
Clarithromycin	15.00																2		2
Clarithromycin	16.00	1		1				1		1									
Clarithromycin	30.00																1		1
Clarithromycin	32.00	1		1				1		1									
Clarithromycin	64.00	1		1				1		1									
Clarithromycin	128.00							1		1									
Capreomycin	10.00		1	1															

Table 2. Participant Results for Culture D, *M. mucogenicum*

		Test Method																	
		Agar Prop. Results			BACTEC Results			Microtiter Results			Disk Elution Results			LJ Proportion Results			Other Test Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Ciprofloxacin	0.12								1	1									
Ciprofloxacin	0.25								1	1									
Ciprofloxacin	0.50							1	1	2									
Ciprofloxacin	0.60		1	1															
Ciprofloxacin	1.00	1		1					1	1									
Ciprofloxacin	1.20	1		1															
Ciprofloxacin	2.00	3		3							4		4						
Ciprofloxacin	2.50	1		1															
Ciprofloxacin	4.00							1		1									
Ciprofloxacin	5.00	1		1							1		1				2		2
Ciprofloxacin	8.00							1		1									
Ciprofloxacin	16.00							1		1									
Cycloserine	30.60		1	1															
Cycloserine	40.00													1		1			
Cefoxitin	4.00								1	1									
Cefoxitin	8.00								1	1									
Cefoxitin	10.00																1		1
Cefoxitin	30.00	4		4							4		4				2		2
Cefoxitin	32.00							1		1									
Cefoxitin	64.00							1		1									
Cefoxitin	128.00							1		1									
Cefoxitin	256.00							1		1									
Cefoxitin	512.00							1		1									
Doxycycline	0.25								1	1									
Doxycycline	0.50								1	1									
Doxycycline	0.60		1	1															
Doxycycline	1.20	1		1															
Doxycycline	2.00							1		1									
Doxycycline	2.50	1		1															
Doxycycline	4.00							1		1									
Doxycycline	5.00	2		2															
Doxycycline	6.00	2		2							4		4						
Doxycycline	8.00							1		1									
Doxycycline	16.00							1		1									
Doxycycline	30.00										2		2				1	1	2
Doxycycline	32.00							1		1									
Doxycycline	64.00							1		1									
Doxycycline	128.00							1		1									
Ethambutol	0.10					1	1												
Ethambutol	2.00													1		1			
Ethambutol	2.50				1	1	2												
Ethambutol	5.00		1	1															
Ethambutol	10.00	1		1															

Table 2. Participant Results for Culture D, *M. mucogenicum*

		Test Method																	
		Agar Prop. Results			BACTEC Results			Microtiter Results			Disk Elution Results			LJ Proportion Results			Other Test Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Erythromycin	0.60		1	1															
Erythromycin	1.20		1	1															
Erythromycin	2.50		1	1															
Erythromycin	3.00		1	1															
Erythromycin	5.00		1	1															
Erythromycin	15.00										1		1				1		1
Gentamicin	4.00		1	1															
Gentamicin	10.00										1	1	2					1	1
Imipenem	2.00							1		1									
Imipenem	4.00							1		1									
Imipenem	8.00	1		1				1		1	4		4						
Imipenem	10.00		1	1							1		1				3		3
Imipenem	16.00							1		1									
Imipenem	32.00							1		1									
Imipenem	64.00							1		1									
Isoniazid	0.10					2	2												
Isoniazid	0.20		1	1															
Isoniazid	1.00		2	2										1		1			
Isoniazid	100.00													1		1			
Kanamycin	6.00		1	1															
Kanamycin	12.00	1		1															
Kanamycin	20.00													1		1			
Kanamycin	30.00										1		1				2		2
Minocycline	0.25								1	1									
Minocycline	0.50								1	1									
Minocycline	1.00								1	1									
Minocycline	2.00								1	1									
Minocycline	6.00	1		1							1		1						
Minocycline	8.00							1		1									
Minocycline	16.00							1		1									
Minocycline	30.00																4		4
Minocycline	32.00							1		1									
Minocycline	64.00							1		1									
Minocycline	128.00							1		1									
Ofloxacin	0.50								1	1									
Ofloxacin	1.00							1		1									
Ofloxacin	5.00																	1	1
p-Aminosalicylic acid	2.00		1	1															
p-Aminosalicylic acid	8.00		1	1															
Pyrazinamide	100.00					1	1												
Rifabutin	2.00							1		1									
Rifampin	1.00		2	2															
Rifampin	2.00					3	3												
Rifampin	5.00		1	1										1		1			

Table 2. Participant Results for Culture D, *M. mucogenicum*

		Test Method																	
		Agar Prop. Results			BACTEC Results			Microtiter Results			Disk Elution Results			LJ Proportion Results			Other Test Results		
DRUG	Conc.	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Streptomycin	2.00		1	1		3	3												
Streptomycin	2.50				1		1												
Streptomycin	8.00													1	1				
Streptomycin	10.00	2		2							1	1	2	1	1			1	1
Sulfamethoxazole	0.25																1		1
Sulfamethoxazole	2.00							1		1									
Sulfamethoxazole	4.00							1		1									
Sulfamethoxazole	8.00							1		1									
Sulfamethoxazole	32.00							1		1									
Sulfamethoxazole	64.00							1		1									
Sulfamethoxazole	100.00																1		1
Sulfamethoxazole	128.00							1		1									
Sulfamethoxazole	250.00																	1	1
Thiacetazone	5.00													1	1				
Tetracycline	2.00							1		1									
Tetracycline	4.00							1		1									
Tetracycline	6.00										1		1						
Tetracycline	8.00							1		1									
Tetracycline	16.00							1		1									
Tetracycline	30.00																2		2
Tetracycline	32.00							1		1									
Tetracycline	64.00							1		1									
Tetracycline	128.00							1		1									
Ethionamide	10.00		1	1															
Ethionamide	40.00													1	1				
Trimethoprim-Sulfam	0.60	1		1															
Trimethoprim-Sulfam	1.20	1		1															
Trimethoprim-Sulfam	1.25																1		1
Trimethoprim-Sulfam	1.50	1		1							1		1						
Trimethoprim-Sulfam	25.00																	1	1
Trimethoprim-Sulfam	30.00	1		1							3		3						
Tobramycin	2.00									1		1							
Tobramycin	4.00									1		1							
Tobramycin	6.00		1	1															
Tobramycin	8.00		1	1							2	2	4						
Tobramycin	10.00										1		1					2	2
Tobramycin	16.00							1		1									
Tobramycin	32.00							1		1									
Vancomycin	30.00										2		2						

Table 3. Participant Results for Culture E, *M. avium* Complex

DRUG	Conc.	Test Method											
		Agar Prop. Results			BACTEC Results			Microtiter Results			LJ Proportion Results		
		S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum
Amikacin	0.50							1		1			
Amikacin	1.00							1		1			
Amikacin	2.00						1	1					
Amikacin	6.00		1	1									
Amikacin	8.00				2		2						
Amikacin	12.00		1	1									
Azithromycin	4.00								1	1			
Azithromycin	8.00							1		1			
Clofazimine	0.06				1		1						
Clofazimine	0.25				1		1						
Clofazimine	1.00	2		2									
Clofazimine	2.00				1		1						
Clarithromycin	0.12		1	1									
Clarithromycin	0.25		1	1					1	1			
Clarithromycin	0.50		1	1				1		1			
Clarithromycin	1.00		1	1									
Clarithromycin	2.00	1		1	1		1						
Clarithromycin	3.00	2	1	3									
Clarithromycin	4.00	1		1	2		2						
Clarithromycin	6.00	1		1									
Clarithromycin	8.00	1		1									
Clarithromycin	9.00	1		1									
Clarithromycin	16.00	1		1									
Clarithromycin	32.00	2		2	1		1						
Clarithromycin	64.00	1		1									
Capreomycin	5.00					1	1						
Capreomycin	8.00		1	1									
Capreomycin	10.00		3	3									
Ciprofloxacin	1.00		1	1		1	1						
Ciprofloxacin	2.00		2	2				1		1			
Ciprofloxacin	4.00				1		1						
Ciprofloxacin	8.00				1		1						
Cycloserine	16.00		1	1									
Cycloserine	30.00		2	2									
Cycloserine	40.00										1	1	
Cycloserine	50.00				1		1						
Ethambutol	2.00					1	1				1		1
Ethambutol	2.50				3	1	4						
Ethambutol	3.75				1		1						
Ethambutol	4.00		1	1									
Ethambutol	5.00	1	3	4									
Ethambutol	7.50				1		1						
Ethambutol	8.00				2		2						
Ethambutol	10.00	1	1	2									

Table 3. Participant Results for Culture E, *M. avium* Complex

DRUG	Conc.	Test Method												
		Agar Prop. Results			BACTEC Results			Microtiter Results			LJ Proportion Results			
		S	R	Sum	S	R	Sum	S	R	Sum	S	R	Sum	
Isoniazid	0.10					4	4							
Isoniazid	0.20		4	4		1	1							
Isoniazid	0.40					1	1							
Isoniazid	1.00		5	5								1	1	
Isoniazid	2.00	1		1										
Kanamycin	5.00				1		1							
Kanamycin	6.00		2	2										
Kanamycin	8.00		1	1										
Kanamycin	20.00											1	1	
Ofloxacin	1.25		1	1										
Ofloxacin	2.00		1	1										
Ofloxacin	4.00								1	1	1			
Ofloxacin	8.00								1		1			
p-Aminosalicylic aci	2.00		2	2										
p-Aminosalicylic aci	8.00		1	1										
Pyrazinamide	100.00					1	1							
Rifabutin	0.12				1		1							
Rifabutin	0.50							1		1				
Rifabutin	1.00	1		1	1		1	1		1				
Rifabutin	2.00				1		1							
Rifampin	1.00	1	5	6										
Rifampin	2.00				4		4							
Rifampin	5.00	1	1	2								1	1	1
Rifampin	50.00											1	1	1
Streptomycin	2.00		4	4	2	2	4							
Streptomycin	3.00					1	1							
Streptomycin	6.00				1		1							
Streptomycin	8.00		1	1										
Streptomycin	10.00	1	3	4								1	1	
Thiacetazone	5.00											1	1	
Ethionamide	4.00		1	1										
Ethionamide	5.00	2		2		1	1							
Ethionamide	10.00	1		1										
Ethionamide	40.00											1	1	

Table 4. Minimum Inhibitory Concentrations for Culture D, *M. mucogenicum*

DRUG	Test Method	MIC	Interpretation			Sum
			S	R	None	
Amikacin	BACTEC 460	4.00			1	1
Amikacin	E-test	1.00			1	1
Amikacin	E-test	≤2.00	2			2
Amikacin	E-test	3.00	1			1
Amikacin	E-test	4.00	1			1
Amikacin	Microtiter	2.00	3			3
Amikacin	Microtiter	≤4.00	3			3
Amikacin	Microtiter	8.00	1			1
Amikacin	Microtiter	<16.00	1			1
Amikacin	Other	>8.00		1		1
Azithromycin	E-test	6.00			1	1
Azithromycin	Other	>4.00		1		1
Clofazimine	BACTEC 460	>0.25			1	1
Clarithromycin	BACTEC 460	<2.00	2			2
Clarithromycin	E-test	0.12	1			1
Clarithromycin	E-test	0.25	1			1
Clarithromycin	E-test	<2.00	1			1
Clarithromycin	Microtiter	≤0.25	3			3
Clarithromycin	Microtiter	≤0.50	2			2
Clarithromycin	Microtiter	1.00	1			1
Clarithromycin	Disk elution	0.25	1			1
Clarithromycin	Other	1.00	1			1
Ciprofloxacin	BACTEC 460	2.00			1	1
Ciprofloxacin	E-test	0.05			1	1
Ciprofloxacin	E-test	≤1.00	2			2
Ciprofloxacin	Microtiter	0.50	1			1
Ciprofloxacin	Microtiter	≤1.00	3			3
Ciprofloxacin	Microtiter	1.50	1			1
Ciprofloxacin	Microtiter	≤2.00			3	3
Ciprofloxacin	Other	<0.50	1			1
Cefoxitin	E-test	3.00	1			1
Cefoxitin	E-test	4.00			1	1
Cefoxitin	E-test	6.00	1			1
Cefoxitin	E-test	12.00	1		1	2
Cefoxitin	Microtiter	8.00	2			2
Cefoxitin	Microtiter	12.00		1		1
Cefoxitin	Microtiter	<16.00	4		1	5
Doxycycline	E-test	0.03			1	1
Doxycycline	E-test	0.25	1			1
Doxycycline	E-test	0.38	1			1
Doxycycline	E-test	<1.00	1			1
Doxycycline	Microtiter	<0.25	1			1
Doxycycline	Microtiter	≤0.50	3			3
Doxycycline	Microtiter	≤1.00	2			2
Doxycycline	Other	>8.00		1		1
Ethambutol	BACTEC 460	>8.00		1		1
Ethambutol	E-test	0.50	1			1
Erythromycin	Microtiter	4.00			1	1
Erythromycin	Microtiter	8.00		1		1

Table 4. Minimum Inhibitory Concentrations for Culture D, *M. mucogenicum*

DRUG	Test Method	MIC	Interpretation			Sum
			S	R	None	
Gentamicin	Microtiter	16.00		1		1
Imipenem	E-test	0.38			1	1
Imipenem	E-test	0.50	1			1
Imipenem	E-test	1.00	2			2
Imipenem	Microtiter	0.50	2			2
Imipenem	Microtiter	≤1.00	3			3
Imipenem	Microtiter	<4.00	1			1
Imipenem	Microtiter	>32.00		1		1
Imipenem	Other	>32.00		1		1
Kanamycin	Microtiter	8.00	1			1
Levofloxacin	E-test	2.00	1			1
Levofloxacin	Microtiter	2.00	1			1
Levofloxacin	Other	1.00	1			1
Minocycline	E-test	0.05	1			1
Minocycline	Microtiter	<0.25	1			1
Minocycline	Microtiter	≤0.50	2			2
Minocycline	Microtiter	1.00	1			1
Minocycline	Microtiter	<4.00	1			1
Ofloxacin	Other	4.00			1	1
Rifabutin	BACTEC 460	>0.50		1		1
Rifabutin	BACTEC 460	>2.00		1		1
Rifabutin	Other	>4.00			1	1
Rifampin	E-test	>256.00		1		1
Rifampin	Microtiter	>4.00		1		1
Rifampin	Other	>8.00		1		1
Streptomycin	E-test	12.00		1		1
Sulfamethoxazole	Microtiter	≤16.00	2			2
Sulfamethoxazole	Microtiter	32.00		1		1
Sulfamethoxazole	Microtiter	64.00		1		1
Sulfamethoxazole	Microtiter	>512.00		1		1
Tetracycline	E-test	0.19	1			1
Tetracycline	Microtiter	<1.00	1			1
Tetracycline	Microtiter	2.00	1			1
Ethionamide	Other	>4.00		1		1
Trimethoprim-Sulfamethoxazole	E-test	0.01			1	1
Trimethoprim-Sulfamethoxazole	E-test	0.09	1			1
Trimethoprim-Sulfamethoxazole	E-test	0.13	1			1
Trimethoprim-Sulfamethoxazole	Microtiter	0.04	1			1
Trimethoprim-Sulfamethoxazole	Microtiter	0.12	1			1
Trimethoprim-Sulfamethoxazole	Microtiter	<0.50	1			1
Trimethoprim-Sulfamethoxazole	Microtiter	<2.00	1			1
Trimethoprim-Sulfamethoxazole	Other	4.00	1			1
Tobramycin	E-test	4.00	1			1
Tobramycin	E-test	16.00		1		1
Tobramycin	Microtiter	≤8.00			4	4
Tobramycin	Microtiter	16.00		1		1
Vancomycin	Microtiter	>16.00		1		1

Table 5. Minimum Inhibitory Concentrations for Culture E, *M. avium* complex

DRUG	Test Method	MIC	Interpretation			Sum
			S	R	None	
Amikacin	BACTEC 460	4.00	1		2	3
Amikacin	BACTEC 460	≥8.00		3		3
Amikacin	Microtiter	4.00			1	1
Azithromycin	BACTEC 460	>1.00		1		1
Azithromycin	BACTEC 460	8.00	1			1
Clofazimine	BACTEC 460	<0.06	3			3
Clofazimine	BACTEC 460	0.12	1			1
Clofazimine	BACTEC 460	>0.25		2		2
Clarithromycin	BACTEC 460	≤2.00	5			5
Clarithromycin	BACTEC 460	<4.00	3			3
Clarithromycin	BACTEC 460	<8.00	1			1
Clarithromycin	BACTEC 460	<16.00	1			1
Clarithromycin	E-test	2.00	1			1
Clarithromycin	Microtiter	0.25	1			1
Capreomycin	Agar proportion	>16.00		1		1
Capreomycin	BACTEC 460	>2.00		1		1
Ciprofloxacin	BACTEC 460	2.00	1			1
Ciprofloxacin	BACTEC 460	≥4.00	1	4		5
Ciprofloxacin	E-test	>32.00		1		1
Ciprofloxacin	Microtiter	0.50	1			1
Cycloserine	Agar proportion	>32.00		1		1
Ethambutol	Agar proportion	>8.00		1		1
Ethambutol	BACTEC 460	≤2.00	4			4
Ethambutol	BACTEC 460	4.00	1		1	2
Ethambutol	BACTEC 460	8.00		1		1
Ethambutol	E-test	64.00		1		1
Ethambutol	Microtiter	2.00	1			1
Isoniazid	Agar proportion	>4.00		1		1
Kanamycin	Agar proportion	>16.00		1		1
Kanamycin	BACTEC 460	4.00			1	1
Levofloxacin	BACTEC 460	8.00		1		1
Rifabutin	BACTEC 460	≤0.12	2			2
Rifabutin	BACTEC 460	<0.50	2			2
Rifabutin	BACTEC 460	>0.50		1		1
Rifabutin	BACTEC 460	<2.00	1			1
Rifabutin	Microtiter	2.00		1		1
Rifampin	Agar proportion	4.00	1			1
Rifampin	BACTEC 460	<0.50	1			1
Rifampin	BACTEC 460	<1.00	1			1
Rifampin	BACTEC 460	≤2.00	1		1	2
Rifampin	BACTEC 460	>8.00		1		1
Rifampin	E-test	1.50			1	1
Rifampin	Microtiter	0.25	1			1
Streptomycin	Agar proportion	>16.00		1		1
Streptomycin	BACTEC 460	<2.00	2			2
Streptomycin	BACTEC 460	4.00	1		2	3
Ethionamide	Agar proportion	<8.00	1			1
Ethionamide	BACTEC 460	>2.00		1		1
Ethionamide	BACTEC 460	>4.00		1		1