



MODS laboratory validation

Background

All laboratories introducing MODS testing for patient care must first undergo a period of validation to ensure that laboratory personnel are proficient in performing the assay and that results are accurate and reliable. This *validation period* is the first element of MODS quality assurance; the laboratory must achieve the *validation targets* before MODS can enter into routine use. Thereafter ongoing quality control and external quality assurance (as described elsewhere in the document *MODS Quality Assurance*) are essential to guarantee that MODS results remain reliable and can continue to be used with confidence for clinical decision-making.

Validation samples

Given the central importance of ongoing quality assurance (QA) once MODS enters routine use, the number of samples required to validate the initial performance of a laboratory with MODS is relatively modest (120). The results of culture and rifampicin and isoniazid drug susceptibility testing (DST) from samples cultured in MODS in the implementing laboratory must be compared to results from the same samples subjected to reference method testing. The reference testing can be (a) QA-compliant MODS performed in a supervising laboratory, (b) validated, QA-compliant standard culture and DST performed in a supervising laboratory, or (c) validated, QA-compliant standard culture and DST performed in the implementing laboratory. The results of this parallel testing form the standard against which the validation targets are measured.

Fresh samples should be obtained from patients undergoing TB diagnostic testing (TB suspects) - 100 should be AFB smear-positive from newly diagnosed patients not yet receiving treatment and 20 should be AFB smear-negative (most of which will be expected to be culture-negative).

Validation targets

The results of MODS testing in the implementing laboratory, when compared to reference method testing, must meet the following targets before MODS results can be used for clinical decision-making:

1. 100% of positive control samples should be MODS culture-positive in the implementing laboratory
2. 100% of negative control samples should be MODS culture-negative in the implementing laboratory
3. 100% of MDR positive control samples should be MDR positive in MODS in the implementing laboratory
4. 100% of isoniazid and rifampicin susceptible control samples should be susceptible in MODS in the implementing laboratory
5. 100% of smear-positive samples should be MODS culture-positive in the implementing laboratory
6. $\geq 97\%$ of samples yielding positive cultures by reference methods should be MODS culture-positive in the implementing laboratory
7. $\geq 97\%$ of samples yielding negative MODS cultures in the implementing laboratory should be culture-negative by reference methods
8. $\geq 95\%$ of samples identified as MDR by MODS in the implementing laboratory should also be identified as MDR by reference methods
9. $\geq 95\%$ of samples identified as non-MDR by MODS in the implementing laboratory should also be identified as non-MDR by reference methods

Validation period

The duration of the validation period depends upon the time it takes for the laboratory to receive and process 120 samples and its success in meeting the validation targets. If the targets are not met with the first group of 120 samples, laboratory procedures and MODS test performance will require review, followed by an additional validation period during which a second group of 120 samples are processed and compared to reference standard results.

Validating laboratories

Any laboratory delivering a QA-compliant, reference standard methodology may validate a laboratory starting to use MODS. A laboratory that has performed at least 2000 QA-compliant MODS tests may be considered as a suitable validating laboratory if MODS is used as the reference standard.