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Autoverification tips and techniques

Learning objective: Optimizing deployment of autoverification

Ten years ago we started using autoverification for chemistry and immunoassays, gradually including hematology and differentials. We are now verifying 95% of the tests on our assay menu, and 80% of all specimens coming into the lab are autoverified. We continue to improve our autoverification process, and our turnaround time continues to drop. More important, we have achieved a consistent review process—the same rules are applied in verifying every patient specimen from tech to tech, shift to shift—improving quality. Autoverification also increases efficiency and reduces human errors by letting software perform a manual, repetitive task.

Five key filters of autoverification

1. The first question to ask is: Does the software have a useable mechanism for holding patient results if the QC fails?
2. Set up review ranges to determine when a result will be flagged for review. When setting up review ranges, think abnormal results, not reference ranges—an example would be results that are out of the linear range. Consider the patient population—gender, age, or even physician preference.
3. Delta checks can automatically flag a clinically significant change for a particular patient or something as simple as an incorrectly labeled patient specimen.

4. Instrument flags depend on your instrument and the discipline—e.g., hematology vs. chemistry. With CentraLink™ Data Management System, you can stop the results associated with these flags. You can also flag serum indices problems, which often can invalidate other results.
5. Complex rules, with “if” and “then” statements, are useful in identifying anomalies and holding results based on interferences such as lipemia, ictericia, or hemolysis. You can use complex rules to set up reflex testing—e.g., order a free T4 if the TSH result is out of range. In our lab, we use them to determine if a CBC requires a manual differential or a slide review to be done.

Getting started

One of the easiest ways to start out when you’re looking to set up autoverification for your assays is to set up a chart (use an Excel spreadsheet). Look at the review ranges; fill in the critical values and the delta checks. Review the information with staff members who look at these results all the time. Tackle the process by instrument or discipline, start with something that’s very basic or easy, and then expand out from there. Table 1 shows an example of our assay grid.

Assay	Critical low	Review low	Review high	Critical high	Delta
Glu	45	55	300	500	
BUN		4	75	100	100%
Creat		0.3	1.7		
Na	120	130	152	160	10%
K	2.8	2.9	5.9	6.0	20%
Cl		90	113		
Co2	10	20	36	40	
Calcium	6.5	7.5	11.0	12.0	20%
Alcohol			100	300	
Troponin I			0.10	0.40	0.10
Hgb	6.5	8.0	19.0	20.0	2.0
Platelets	20,000	50,000	600,000	1 million	50%

Table 1. Assay grid

Common pitfalls

An obvious resource that is frequently overlooked is the bench tech. Your technologists are the ones who have real information about day-to-day issues with patient samples, assays, and instrumentation. They should be the starting point as you formulate your autoverification strategy. Another pitfall is looking at rules in isolation, one assay at a time. For example, for creatinine and BUN, one rule may suffice. The same goes for reporting results. In our lab, we upload all results for a patient when they are completed, not one at a time. A case in point is the specimen redraw prompted by an abnormal calcium result. Keep it simple. Start by automating only what has been proven in manual processes before writing new rules.

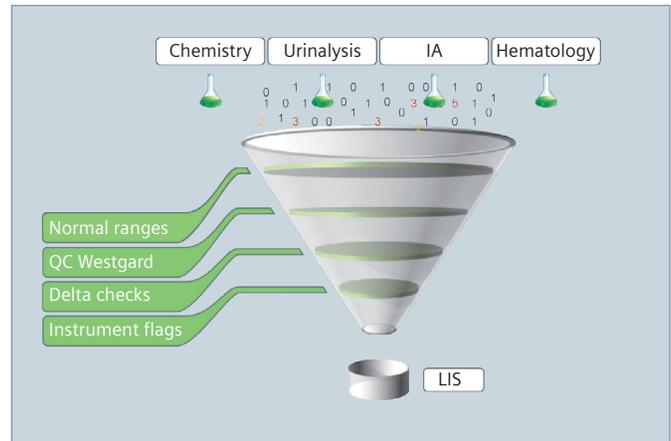


Figure 1. Simplify processes while raising quality

Regulatory considerations

The three biggest regulatory issues are that you must have the ability to turn autoverification on and off as needed. You must have an audit trail to be able to tell who’s doing what—when, where, and how; who resulted; and who validated the results. And you need to know where and how to handle repeats, delta checks, and QC monitoring.

Middleware or LIS?

An important consideration in deciding whether to locate the autoverification in the middleware or the LIS is the need to make changes quickly: turning rules on or off or implementing a new rule to address an issue that arises. Second, you want to avoid any redundancy. Look at capabilities already available. If your middleware or LIS has the capability to post flags generated by your instruments (e.g., linear limits, lack of calibration, insufficient reagent, insufficient sample, clotted specimens), you are ahead of the game. What about repeats and delta checks?

Remember...

Whether you’re just starting with autoverification or are an old hand, remember that it is a process. Keep soliciting feedback. Keep refining. Keep growing. And you’ll find that everyone’s comfort level increases—as do the benefits—as autoverification becomes an ally to your lab and clinicians.

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