



The Ten Commandments of Modern Laboratory Practice: Insuring the Survival of Your Hospital Emergency Department and Other Critical Care Areas

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Commentary

With all the current emphasis on the practice of Evidenced Based Medicine (EBM) in critical care areas like the Emergency Department and associated patient safety concerns, the laboratory has emerged as possibly the most important department in the hospital for those hospitals that wish to compete and survive. Indeed, the laboratory generates over 70 percent of the objective data on the patient's chart and hence for effective and timely patient care, reliable laboratory data must arrive at the patient's bedside in time, every time so that timely diagnoses and life-saving interventions can be made in critical care areas like the Emergency Department (ED).

Unfortunately, many laboratories are hunkered down in the basement with a level of performance and technology inadequate to achieve the lofty goals described above. Rather, they are mired down in "the old way of doing things" hoping perhaps 1) that these new demands for better, real-time patient care will simply go away, or 2) that old solutions and ideas will somehow solve the complex problems brought about with the demands of a market driven, patient focused healthcare system. Accordingly, in order to insure that your hospital's ED can compete effectively and survive, clinical hospital laboratories must now embrace all or most of the "The Ten Commandments of Modern Laboratory Practice" as outlined below:

Commandment Number 1

ED physicians shall directly order all laboratory tests in real-time using wireless, portable hand-held devices with testing performed on positively identified and barcode labeled specimens collected in real-time by an ED nurses (or ED phlebotomist) at the bedside and transported to the central core laboratory in real-time using an automated tube transport system

Commandment Number 2

The laboratory shall use standardized collection tubes in terms of size and barcode labeling with an anticoagulant present suitable for the type of test(s) being performed along with testing performed on a totally automated specimen track system to facilitate the electronic receipt of the specimen along with the automated centrifugation of the specimen if required for chemistry testing, coagulation testing, etc.

(Note: Serum or clot tubes should be avoided whenever possible for chemistry testing in order to avoid delays involved in the clotting step).

Commandment Number 3

Thou shalt eliminate all batch processes in the clinical laboratory.

(Note: This commandment requires that specimens be received and processed using an automated TLA system and that all testing is done in real-time with totally automated walk-away analyzers. Automation must include the "total" testing process and physical separation between laboratory sections must be eliminated with all high volume testing performed in real-time in a Central Core Laboratory on walkaway analyzers attached to an automated specimen track system which brings together testing for all disciplines including chemistry, hematology, coagulation, urinalysis, serology, toxicology, etc. The "total" testing process includes test orders, specimen collection, specimen transport, specimen processing, testing, verification/QC, and real-time, electronic reporting of laboratory results.

Commandment Number 4

The laboratory must embrace and facilitate the implementation of laboratory directed, computer interfaced, ED nurse performed point-of-care (POC) testing alternatives whenever central Core Laboratory services are not rapid enough to consistently meet ED patient care needs.

(Note: All POC testing performed on handheld, wireless devices must be implemented, monitored, and managed from the Central Core Laboratory. Even though POC testing tends to be more expensive, testing cost should ethically never be the issue in deciding where and by whom the laboratory test should be performed).

Commandment Number 5

All testing must be performed directly from the positively identified and barcode labeled specimens collected at the bedside and must never be manually split ("poured-off") into aliquot tubes prior to testing.

(Note: The laboratory must use total laboratory automation tools with attached/integrated automated analyzers to eliminate this error-prone practice. Compliance with Commandment #5 may not always be possible for tests done infrequently but for high volume assays, no splitting of the sample is acceptable. Rather, the sample must be delivered sequentially to testing analyzers/instruments all connected to a totally automated specimen track system).

Commandment Number 6

All laboratory testing must be done in real-time. Using "Lean" management principles, the laboratory must eliminate the need for Stat/Priority testing altogether by eliminating all batch processes and queues within the "total" testing process.

Commandment Number 7

The laboratory must physically store samples in a track compatible refrigerated, computerized specimen stockyard in order to facilitate

rules-based retesting protocols for issues like critical results and dilutions as well as for handling ad hoc physician add-on orders and clinically based reflex testing protocols.

(Note: Manually looking for samples in the laboratory is an error prone, stressful, and inefficient activity that must be eliminated).

Commandment Number 8

The laboratory must implement new, state-of-the art middleware computer solutions in order to eliminate older, less flexible, and expensive legacy laboratory information systems (LIS) software solutions which are not meeting laboratory needs for “total” automation.

Commandment Number 9

The laboratory must employ a “dashboard” approach with expert, decision making middleware software to detect and display data events relative to specimen adequacy, quality control, critical results, testing equipment issues and also facilitate real-time test validation and release of results to the real-time electronic reporting system.

(Note: Being able to identify and track where the sample is in the “total” testing process at any point in the testing process is absolutely essential and must be achievable with state-of-the art middleware software).

Commandment Number 10

The laboratory must insure that all testing services are consistently available on a 24/7 basis and at the same high level of timeliness and quality regardless of the date and time the test was requested and performed. Test results should be normalized to a standardized scale and reported graphically and in real-time on mobile devices including cell phones and tablets connected to Web applications and Cloud technology.

In conclusion, by following all or at least most of the above directives, laboratories have the potential to assume their proper and essential role in the effective, life-saving deliverer of evidence based care in the ED.