The Biochemical Service: The Professional Function of the Clinical Chemist in the Hospital

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Ed. note: Continuing comment on the role of the clinical chemist [cf. Clin. Chem. 23 1961 (1977)]. A major step in rectifying the "disastrous impact" mentioned here was the first Arnold O. Beckman conference [cf. Clin. Chem. 23, 1379 (1977)], the proceedings of which will be published by AACC later this year. This conference has received a good deal of praise from the participants, and was evidently very successful.

Clinical chemistry has grown exponentially in the past 20 years, spurred by the rapid development of newer subdisciplines, technological developments, methods for data processing, and the requirements of a more demanding medical practice.

Confronted by such a rapid evolution, the clinical chemist must reassess his professional goals. We discuss the function of the clinical chemist in the hospital and propose that, to be really efficient, his role definitely must extend beyond technical-analytical aspects.

The Biochemical Service

The primary function of the clinical chemist is to provide certain services appropriate to the needs of his institution. Assuming that these services involve the chemical analysis of human biological materials (mostly serum or plasma, urine, cerebrospinal fluid, and feces), each one consists of three aspects: a pre-analytical, an analytical, and a post-analytical component.

Pre-analytical component. This part extends from the initiation of the test request to the execution of the analysis. The clinical chemist should be responsible for:

- editing, up-dating, and disseminating a catalog of biochemical tests describing the volume of specimen needed, the type of preservative or anticoagulant, the availability, the conditions to be observed by the patient (such as fasting) and the clinical relevance;
- knowing the stability of chemical constituents under various transport, handling and storage conditions;
- interacting with the nursing department to improve the validity of the specimens sent to the laboratory; and
- discussing with clinicians the specificity and rational utilization of laboratory tests.

Analytical component, the execution of the analysis. The clinical chemist needs to master a wide array of analytical techniques so that he can:

- choose appropriate analytical principles, procedures, and instrumentation. This choice must take into consideration cost, precision, accuracy, ease and rapidity of operation, and sample volume;
- define precision, accuracy, and specificity of the procedure as set up in the laboratory, not just as these are claimed in the company's advertising;
- implement a reliable quality-control program; and
- prepare a manual of analytical procedures for the laboratory personnel.

Post-analytical component, the clinical utilization of the result. Because of the many tests and the many factors affecting laboratory data, it is becoming more and more difficult for the busy clinician to interpret laboratory results correctly.

The clinical chemist can assist by:

- providing relevant reference values according to age, sex, diet, etc.;
- indicating possible drug interferences (physiological or analytical) and sample characteristics (turbidity, hemolysis, icterus) that may alter results; and
- interpreting the various possible meanings of a result or a set of results, to help the clinician to establish his diagnosis.

The Need for a Composite Biochemical Service

Up to now, most of our efforts have been devoted to the second component, the analytical aspect. Because

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Received Aug. 17, 1977; accepted Sept. 22, 1977.
of his strong interest in the triad "accuracy-specificity-precision," the clinical chemist too often is considered in the hospital as simply a technological expert.

The failure of the clinical chemist to become involved in what comes before and after the chemical analysis has had a disastrous impact on the central laboratory. The absence of communication with clinicians has transformed some of our laboratories into mail-order supermarkets where automation is used more and more to cope with the ever-increasing demand from insatiable and unknown consumers. Unless corrected, this trend may lead to such absurdity as using sophisticated instrumentation to provide high-quality chemical analyses on specimens that are of doubtful quality, or producing results at high cost that will be ignored or improperly used.

In this era of economic restraint it is our duty to step out of our laboratory to help rationalize the use of the biochemical tests we produce so carefully. Only when we offer a complete biochemical service with attention to all three components will our role be fully appreciated in the hospital and will we be more generally recognized as an integral part of the health-care team.

We thank Doctors Samuel W. Levy, John K. Todd, and William C. Walker for helpful suggestions in the preparation of this article.