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This Week's Citation Classic

Young D S & Hicks J M. Method for the automatic determination of serum iron. *J. Clin. Pathol.* **18**:98-102, 1965.
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The existing time-consuming and cumber-some procedures for the determination of serum iron and iron-binding capacity prompted the adaptation of the method to the Technicon AutoAnalyzer. This greatly simplified the performance of the test in routine clinical laboratories. [The *SCI*[9] indicates that this paper has been cited over 220 times since 1965.]

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"I started this work after I had completed my PhD and shortly after I had begun a residency in the department of chemical pathology at the Royal Post-graduate Medical School in London. Jocelyn Hicks, now director of clinical laboratories at Children's Hospital National Medical Center in Washington, DC, was at that time a biochemist in the same department and responsible for several of the tests in the routine laboratory.

"As part of their training in clinical chemistry, residents were expected to become familiar with all the routine tests. For me to learn the intricacies of AutoAnalyzer operation, it seemed logical to attempt to set up a new method on the instrument that might improve the efficiency of the laboratory. We decided to adapt the serum iron method to the AutoAnalyzer because the then manual procedure[1] for measuring iron was time-consuming and required great care in the preparation of glassware and reagents to ensure that they were iron-free. The need for absolutely iron-free reagents and equipment could be avoided with the AutoAnalyzer as a low iron background could be tolerated. To adapt the procedure to the AutoAnalyzer meant experimenting with one of the two AutoAnalyzer systems available in the laboratory, but not until after the daily work-load of other tests had been completed and neither instrument was required for routine tests.

"The major problems encountered in setting up the procedure were identifying the most effective reducing agent, avoidance of turbidity caused by the use of acid to disrupt the iron-protein complex, and obtaining adequate sensitivity so that low concentrations of iron could be accurately determined. To minimize the latter problem, a large volume of serum had to be aspirated into the analytical system. This actually caused some differences in the rate of dialysis of iron from the serum and standard solutions, which we did not recognize at the time, which led to some inaccuracy in results. This was pointed out by Babson and Kleinman,[2] who overcame the problem by a simple modification of the original procedure. With the second generation of Auto-Analyzers inadequate sensitivity has been much less of a problem.

"Even though AutoAnalyzers are now used much less in clinical laboratories for single tests on a specimen, they are still widely used for iron measurements because totally iron-free reagents and equipment are not necessary as each specimen is read against a continuous reagent blank. There are several other widely used serum iron methods on AutoAnalyzers including procedures by Zak and Epstein[3] and Ciovanniello *et al.*,[4] and because of this I am surprised that our paper has been cited so often."

1. **Ramsay W N M.** The determination of iron in blood plasma or serum. *Biochemical J.* 53:227-31, 1953.
2. **Babton A L & Kleinman N M.** A source of error in an AutoAnalyzer determination of serum iron. *Clin. Chem.* **13**:163-6, 1967.
3. **Zak B** & **Epstein** E. Automated determination of serum iron. *Clin. Chem.* **11**:641-4, 1965.
4. **Gtovannlello T J, DiBenedetto G, Palmer D W & Peten T, Jr.** Fully and semi-automated methods for the determination of serum iron and total iron-binding capacity. *J. Lab. Clin. Med.* **71**:874-83, 1968.