



# e-Network Forum

## CALIFORNIA BLOOD BANK SOCIETY

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### ***What is the status of automated pre-transfusion compatibility testing in the USA?***

A blood banker is interested in knowing the status of pre-transfusion testing **automation** in the U.S. The inquiring blood banker is aware that most hospital transfusion services in the United States perform routine pre-transfusion testing using **tube technology**. However, he also realizes that newer technologies such as gel, Solid Phase Red Cell Adherence (SPRCA), and affinity column have improved testing sensitivity/specificity and have allowed for linkage of pre-transfusion testing to automation. For example, at least one institution in the United States has converted to an automated SPRCA and microtiter plate method using the ABS2000 (Sandler SG et al., Haematologia, No. 3, 2000). The ABS2000 (Immucor, Norcross GA) is an FDA-approved automated blood typing system that uses the SPRCA method (Capture-R) to perform ABO/Rh typing, antibody detection, and crossmatching, that has been reported by the same authors to have accuracy comparable to standard manual methods (Sandler SG et al., Transfusion, Feb., 2000), and is able to be linked to patient bar code wristbands, personal ID badges, and bar codes on patients' samples and blood components. Another system called the AutoVue is used in Europe. This system is fully automated, uses a gel type technology (BioVue;Ortho Clinical Diagnostics), and has been reported to compare favorably with that of standard methods (Morelati F et al., Transfusion, Oct., 1998).

Please submit your comments regarding your experience with automated blood bank systems, or comments regarding your plans to change from a manual to an automated system.

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Members of the e-Network have submitted the following responses:

1. A **Transfusion Service Medical Director** describes his medical center's experience with the 'automated' Ortho/MTS gel system. "In 1999 the University Medical Center transitioned pretransfusion patient testing from the standard tube method using PEG to Ortho/MTS gel. Initial implementation began with manual gel in July and incorporated automated pipetting using the Tecan MegaFlex-ID (MTS) in November. The Tecan's software maintains positive patient ID by linking gel card barcodes with barcoded labels on patient samples. Gel card test results can be interpreted manually or with an integrated reader. After technologist verification, results are transferred automatically through an interface with the laboratory information system. Since implementing the gel system and the Tecan MegaFlex-ID, we have seen **a significant decrease in detection of unwanted positive reactions due to antibodies** such as warm and cold autoantibodies, anti-P1, and Lewis antibodies. The detection rate of clinically significant antibodies remains comparable to our previous antibody detection method using PEG. We recently compared our experience in calendar year 2000, the first full year of gel implementation, with 1998, the last year of traditional testing with PEG. We found fewer reports of suspected transfusion-associated hemolytic events and fewer delayed serological reactions. [Combs, MR and Bredehoeft, SJ. Immunohematology - accepted for publication June 25, 2001.] In addition to these satisfactory serologic test characteristics in support of a complex patient population, the **automated system has proven well-suited for large-volume testing**. Though test volumes continue to rise, we have successfully maintained operational performance standards despite loss through attrition of nearly 10% of our technical workforce. Through adaptation of workflow, we have tripled our maximum throughput during surges in demand, including support of an active same-day surgery service. Two years into implementation, we remain highly satisfied with our conversion from traditional tube testing to automated gel." The medical director who submitted the above report hopes that members of the e-network find this information useful, and he appreciates the opportunity to share this information through the forum.
2. A **blood banker in Bulgaria** reported that her institution found reliable results when they used a semi-automated pre-transfusion testing system using column-agglutination cards and microplates. She reports that there has not been a big difference for ABO or Rh testing when comparing manual versus semi-automated card/microplate testing methods. However, **they did see a big difference in Antibody Screening** testing between tube and semi-automated card/microplate testing methods. They found that the semi-automated card/microplate testing methods to be more sensitive than the tube method.

3. Another individual mentioned the **ID-WalkAway analyser from DiaMed** and manufactured by Grifols. According to the member, this system is designed to automate the full range of DiaMed gel cards from primary and confirmatory grouping, combined Type & Screen, pooled, 2 or 3 cell antibody screen with or without auto controls, antibody identification panels, phenotyping, syphilis and crossmatching. His understanding is that it is in routine use in Europe, the United Kingdom and Australia. He did not know its status in other countries.

**ADDENDA** July 14, 2001

4. A **blood banker in Pennsylvania** reported that his group compared the performance and fiscal impact of manual and automated methods. An abstract of the results is available ([Bunker et al., Transfusion, May 2001](#)).

**ADDENDA** Jan. 8, 2006

5. **Editor's query:** Colleagues are encouraged to respond to this question, now that five years have passed since this issue was last discussed and the [College of American Pathologists has been offering Proficiency Testing for assessment of automated pre-transfusion testing performance](#) for a few years.

**ADDENDA** Jan. 10, 2006

6. A **colleague in Southern California** reports that she works at a 450 bed hospital where the medical technologists (with the exception of one blood bank specialist) rotate between one or more laboratory sections. Her laboratory went 'live' with an automated blood bank testing system that employs the GEL methodology in June 2004. The automated equipment is currently NOT interfaced with their Laboratory Information System (Misys 5.3), but even with a manual test ordering and results entry process, the **use of the automated equipment has improved their workflow**. She acknowledges that their **rotating staff** took to the automation like "ducks to water", and stated that the automation **actually increased their confidence and lowered the stress of working in the blood bank**. The equipment has required minimal maintenance and has had very little down time.

**ADDENDA** Jan. 19, 2006

7. A **colleague in Phoenix, Arizona** reports that they are using an automated blood bank laboratory system based on a **solid phase platform**. She acknowledges that their analyzer (Galileo) uses a **continuous loading process which can accommodate STAT specimens** and can process many more samples per hour than could their previous equipment. She also reports that her laboratory can program the analyzer to perform ABO/Rh testing of samples, with or without reverse grouping. She reports that they perform ABO/Rh testing without reverse grouping for infants, and when they are confirming the blood group labeling of red cell units that they receive from their supplier, before placing the units into their transfusable inventory. The test menu also includes antibody screening, antiglobulin crossmatching, IgG Direct Antiglobulin Testing, and Antibody Identification. She concludes by saying that their instrument **accepts micro-container samples**, which limits the volume of sample needed from patients.

**ADDENDA** Jan. 25, 2006

8. A **Senior Scientist at a hospital in Australia** reports that the laboratory landscape has changed a lot in the last five years over which the present e-Network Forum discussion has taken place. He attended the AABB meeting in Seattle in October 2005 and was **surprised at the number of transfusion service laboratories still using a tube testing method**. He reports that his hospital laboratory was the first in the state of Victoria to **automate the blood bank**; they chose the Ortho AutoVue **in 2001**. They recently upgraded their instrument to a newer configuration, the Innova. He acknowledges that automating their laboratory has had a **dramatic effect**.

He sums up what he believes they have achieved as follows:

1. Better **consistency** in testing.
2. Shortening turnaround time. They do not batch testing. They load samples on the machine as they arrive.
3. The instrument is a **walk-away design**. The cassette selection, dilution, centrifugation and reading are all done by the AutoVue and the raw data are downloaded to the LIS (in their case Cerner Classic)
4. **Reading of results** in the columns is **automated** and the parameters for manual review of results are set by the lab.
5. They report **not having had any transcription errors** since they set up the automated system
6. They run a 24 hour service with a lone clinical laboratory scientist from 11pm till 8 am. The AutoVue downloads the results and the lone scientist checks and verifies them.
7. Their **workload has increased** 9% per annum for the last 3 years without requiring

additional staffing.

8. The printed report from the instrument is ISO compliant and records all the details they need to maintain compliance. Hard copies are kept for 3 days and can be used as a backup if the lab computer system is down and results of a testing are not available.
9. They have found the BioVue AHG to be **slightly more sensitive** than the tube AHG and now perform panels on the AutoVue.

In summary automation has bought major improvements to their laboratory, increasing efficiency, reducing the error rate, and simplifying training for new staff members. He concludes that, as noted in the SHOT report, the **risk of transcribing results** from the tube manually into the lab computer system is significantly reduced by automation, and in his opinion, **elimination of that risk is a most important reason for automating a blood bank.**

Please submit comments to the [e-Network Forum](#).



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CBBS e-Network Forum Editor & Moderator

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**Addenda:** July 14, 2001; Jan. 8, 10, 19 & 25, 2006

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