

## Discussion

Measurements of vitamin D concentrations (more precisely, 25-OH vitamin D) have received a great deal of attention over the past year. Why so many physicians are ordering vitamin D measurements on so many patients is not entirely clear. Most experts agree that people in temperate climates (like most of the United States), unless they are supplementing their diets with vitamin D, are probably vitamin D deficient in the winter months, when they do not get as much exposure to the sun, the “natural” way vitamin D is made. In response to the apparent overutilization of the test, it appears that a regional Medicare carrier is likely to implement coverage limitations in the near future.

Given all this attention, we wondered how reliable 25-OH vitamin D measurements performed in clinical laboratories might be. Survey Y-A typically includes 2 challenges for 25-OH vitamin D. In addition, we included an additional sample, which was actually fresh frozen serum and, therefore, would in all likelihood exhibit no “matrix effects”.

<u>Instrument</u>	<b>BGS-01</b>			<b>BGS-02</b>			<b>ABL-01</b>		
	<u># of Labs</u>	<u>Mean</u>	<u>CV</u>	<u># of Labs</u>	<u>Mean</u>	<u>CV</u>	<u># of Labs</u>	<u>Mean</u>	<u>CV</u>
IDS	25	119.75	58.2%	18	149.53	75.5%	8	23.54	12.3%
Diasorin Liaison	108	97.60	11.6%	94	128.75	10.0%	53	25.92	10.5%
Mass Spec	19	51.16	15.3%	19	70.16	15.1%	12	30.08	12.9%
Diasorin RIA	24	55.88	19.8%	24	75.08	15.5%	15	26.36	23.6%

As noted in the table above, there are marked differences in the mean values between the various methods on both BGS-01 and BGS-02. Mean values, by peer group, ranged from 51 to 120 ng/mL and from 70 to 150 ng/mL. In addition, one method demonstrated a peer group CV as high as 75%.

In marked contrast, on the fresh frozen serum sample, the mean values between the various groups were reassuringly close, ranging from 23 to 30 ng/mL. In addition, the peer group CVs were also more respectable, with a high value of 24%. Of note, the method with the 75% CV on Survey material had a very respectable CV of 12% with fresh frozen serum.

Two other notes are in order. The fresh frozen sample had a vitamin D concentration much closer to those typically seen in patient samples, making it more clinically relevant. Also, based on results from several mass spectrometry laboratories, the sample had virtually 100% D<sub>3</sub> 25-OH Vitamin D, the natural (endogenous) form of the vitamin. Thus, even though we did not ask people to distinguish D<sub>2</sub> from D<sub>3</sub> 25-OH Vitamin D, differences between methods and reporting cannot be used to account for the discrepancies between methods seen on the Survey material.

Once again, we have demonstrated the superiority of fresh frozen serum recoveries compared to conventional Survey material. Unfortunately, it is both difficult to achieve a range of analyte concentrations and prohibitively expensive to offer real human material for all proficiency testing. Also, due to the manufactured nature of Surveys specimens and the need for extended stability through mailing conditions and testing period, proficiency testing specimens do not always correlate well with fresh, clinical specimens. Grading proficiency testing results by peer group ensures that the manufactured nature of the material does not negatively impact laboratory performance.

Gary L. Horowitz, MD and William L. Roberts, MD, PhD  
Chemistry Resource Committee