Discussion

The CAP introduced the Glucose-6-phosphate Dehydrogenase (G6PDS) Survey in 2006. Assays for Glucose-6-Phosphate Dehydrogenase activity are ordered to assess whether patients have deficient levels of this enzyme in their red blood cells. Patients with such deficiencies are prone to hemolytic anemias when exposed to certain oxidant drugs (anti-malarials, sulfa, etc.). Among the variables that affect G6PD activity are the number of RBCs (the level in a given amount of blood is less with anemia), the relative number of reticulocytes (which have higher concentrations than RBCs), the temperature at which the assay is run, and the storage conditions of the samples prior to assay.

Summarized below is the data from the G6PDS 2007-A mailing along with the data from the two 2006 testing events to compare the performance of participants and the methods they use.

Among the participants, at least three different methods were represented: a qualitative method, a semi-quantitative method, and a quantitative method. For this discussion, measurements reported at 30^{o}C are used, along with a reference interval (based on one manufacturer's package insert) of 4.6 – 13.5 U/g Hb. However, measurements reported at 37^{o}C showed similar results. Note, too, that reference intervals should be confirmed or determined by each participant.

	Intended Response	Quantitative Value	Quantitative Range	Qualitative Result	Semi-Quantitative Result
2006 G6PD-01	Normal	8.74	6.5-11.3	96% Normal	100% Normal
2006 G6PD-02	Deficient	1.37	0.0-2.4	98% Deficient	94% Deficient
2006 G6PD-03	Intermediate	3.86	2.3-5.3	Non-Consensus	Non-Consensus
2006 G6PD-04	Normal	8.79	5.0-11.5	99% Normal	94% Normal
2007 G6PD-01	Normal	8.41	4.7-10.5	93% Normal	96% Normal
2007 G6PD-02	Intermediate	4.18	1.8-6.7	Non-Consensus	Non-Consensus

As shown above, samples: 2006 G6PD-01, 02, 04 and 2007 G6PD-01 reached consensus for all methods where at least 90% of participants reported the intended response (normal or deficient). For samples: 2006 G6PD-03 and 2007 G6PD-02, which have an intermediate level of activity, neither the qualitative nor the semi-quantitative groups reached consensus, defined by the CAP as 90% agreement.

In the 2007-A mailing, laboratories using the quantitative method could also report interpretations. It's noteworthy that these laboratories, too, failed to reach a 90%

consensus on their interpretation of G6PD-02. Unlike the qualitative and semi-quantitative methods, though, laboratories using a quantitative method report a number and, presumably, a reference interval, so physicians can make their own interpretations.

These data indicate that samples with intermediate levels of G6PD activity present a challenge to participating laboratories. Laboratories should carefully consider how to handle reporting G6PD results from samples that are not clearly normal or deficient.

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