COLLEGE of AMERICAN PATHOLOGISTS

Educational Discussion: Glucose-6-phosphate Dehydrogenase (G6PD)

2015-A Glucose-6-phosphate Dehydrogenase Survey (G6PD)

The CAP introduced the Glucose-6-phosphate Dehydrogenase (G6PS) 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 (antimalarials,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.

In the table below, we have summarized the responses from the current Survey. G6PD-01 was intended to have an intermediate level of G6PD activity; G6PD-02, a normal level. As shown by the results from the quantitative assays, this was in fact what was seen. Although there was some G6PD activity in G6PD-01, the mean value was only one-third the mean value in G6PD-02; the range of values for G6PD-01 did not even overlap with the range of values for G6PD-02.

	Intended Response	Quantitative Value	Quantitative Range	Qualitative Result	Semi-Quantitative Result
G6PD-01	Intermediate	4.19	2.5-6.0	Non-consensus	Non-consensus
G6PD-02	Normal	14.44	8.4-19.8	97.7 % Normal	95.8 % Normal

We did not grade the results for G6PD-01, even though it is pretty clear that the correct response is “Intermediate”. There are three reasons for our decision. First, the CAP has a policy that it typically does not grade survey samples when there is not a consensus (<90% agreement on a single response). Second, these samples are not commutable (i.e., they do not behave like genuine human samples). Third, and more important, the decision limits defining normal, intermediate, and deficient for G6PD activity may vary from method to method and from laboratory to laboratory. (Indeed, even laboratories using quantitative methods did not reach a consensus on their interpretations: 5.8% said it was normal, 19.8%, intermediate, 74.4%, deficient.)

The reason we include an intermediate challenge periodically is to illustrate the difficulties associated with samples that are not clearly normal and deficient. We encourage all laboratories to carefully consider how they report such values and to work with their clinicians to agree upon what the appropriate next steps might be in these situations.

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Chemistry Resource Committee