

Confusing Glucometer Results

Glucometers are devices used to perform point-of-care (POC) glucose testing in the hospital setting to monitor and manage high and low blood glucose levels. Errors related to the use of these devices may result from factors such as delays in testing due to lack of properly trained staff; failure to correctly identify patients prior to testing; and the effects of hematocrit, ascorbic acid levels, maltose-containing medications and parenteral solutions on glucose levels.

A serious error that has been reported is the misinterpretation of glucose results on glucometer devices that use error messages and alarm codes. Devices like the ACCU-CHECK Inform II may display results in several different ways including the use of out-of-range abbreviations such as RR LO (out of reportable range; low limit) or CR LO (out of critical range; low limit), numeric alarm codes (i.e. W-510) and low numerical results (i.e. < 40 mg/dL). Both RR LO and CR LO messages have been misunderstood as high blood glucose levels along with the numeric alarm code W-510 which was confused as the actual glucose result. Insulin was erroneously given to two patients with one resulting in a patient death.

One study conducted by the Veterans Health Administration (VHA) found that displaying a numeric blood glucose result instead of an abbreviation could prevent misinterpretation errors. Prior training on the glucometer devices may be helpful but will not completely remove the risk of errors when abbreviations are shown. The study also found that nurses can interpret numeric blood glucose readings faster than abbreviations which is optimal when treating patients with hypo- or hyperglycemia. While not studied, these results may be applicable to the abbreviations RR HI (out of reportable range; high limit) and CR HI (out of critical range, high limit).

The following strategies may help reduce confusing glucometer readings:

- **Accu-Check Inform II Glucometers:**
 - Set the range to coincide with the entire measurement range of the device (10 mg/dL to 600 mg/dL) to prevent the display of RR LO or RR HI abbreviations.
 - Ensure the critical results display as a numeric value to prevent display of CR LO or CR HI abbreviations.
 - Provide education and simulation training on out-of-range abbreviations, unusual alarm codes, and alert wording that may appear on the glucometer screen along with their meaning, and risk of misinterpretation.
- **For other types of glucometers:**
 - Assess the glucose results display and determine if it contains confusing wording, terminology, alarm codes, or abbreviations. If possible, configure the glucometer to display the actual numeric blood glucose value instead of out-of-range codes and alarm messages.
 - If the glucometer cannot be configured, contact the manufacturer for assistance or switch to a different manufacturer that produces a device that can be configured.
 - Educate staff on the alarm codes and warning messages if they must be displayed, particularly if they include numeric values.

References

1. Institute for Safe Medication Practices. (2018). *Nurse Advise-ERR*. Retrieved from Institute for Safe Medication Practices: <http://www.ismp.org/newsletters/nursing/issues/NurseAdviseERR201901.pdf>