

Vet research confirms a more accurate method for blood glucose testing

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Researchers found that, in pets, glucometers gave more accurate results using blood plasma or serum compared to whole blood.

For diabetics, a quick prick of the finger can give information about their blood glucose levels, guiding them in whether to have a snack or inject a dose of insulin. Point-of-care glucose meters, or glucometers, are also used in the veterinary world to monitor cats and dogs with diabetes or pets hospitalized for other reasons. In both cases, the device's readout can literally be a matter of life and death.

While glucometers have the advantage of being fast and requiring only a small drop of blood, they are not as accurate as some other methods of measuring blood glucose. In a new study, researchers from the University of Pennsylvania School of Veterinary Medicine have found a way of obtaining more accurate measurements from glucometers: by using [blood plasma](#) or serum rather than whole blood.

Their findings, reported in the *Journal of the American Veterinary Medical Association*, have already resulted in changes in practice at Penn Vet's Ryan Hospital and may inspire an investigation into whether the same should hold true for human patients who rely on glucometers to monitor their [blood glucose levels](#).

"It's a simple study, but it has changed the way we do things," said Rebecka Hess, senior author on the work and a professor of internal medicine at Penn Vet.

Hess collaborated on the work with fellow Penn Vet scientists Barbara S. Tauk, the study's lead author and a clinical studies resident; Kenneth J. Drobatz, director of emergency services and chief of critical care; and Koranda A. Wallace, formerly a lecturer in the Department of Pathobiology.

"It's widely known that glucometer readings come with a degree of inaccuracy, and until now we've just lived with it," Hess said.

To find a better way of maintaining the glucometer's conveniences while improving its accuracy, the Penn team assessed cats and dogs treated at Ryan Hospital. With their owners' consent, animals that were going to have blood drawn for another purpose were enrolled in the study. The researchers obtained 96 blood samples from 80 dogs and 90 [blood samples](#) from 65 cats.

Normally, glucometers are used to measure glucose on whole blood, but the researchers wanted to try measuring glucose on blood plasma and [blood serum](#) as well. Blood plasma is what's left of blood after removing the red and [white blood cells](#); blood serum is what's left of blood plasma after also removing clotting factors. Both can be obtained by spinning whole blood in a centrifuge for a few minutes.

The researchers tested each sample in both the glucometer and, as a control, a biochemical analyzer. The biochemical analyzer takes about five minutes to render a reading, requires more blood and is more expensive to operate than a glucometer, but its measurement of blood glucose from serum is considered the gold standard of accuracy.

The Penn researchers found that testing either blood plasma or blood serum in the glucometer gave results that were nearly the same as those given by the biochemical analyzer and were more accurate than whole blood.

"The plasma and serum results were very tightly clumped with the results from the gold standard machine," Drobotz said. "That gives us a lot of confidence in this method."

Drobotz said that using a glucometer is preferable to a biochemical analyzer in many cases in the emergency room, when results are needed quickly or when only a very small amount of blood can be obtained in hypoglycemic puppies and kittens.

"The analyzer requires 2 milliliters of blood while the glucometer only needs 0.6 milliliters," he said. "That can be meaningful to a small animal or an animal who is already anemic."

On the power of these results, Ryan Hospital changed its practices to use blood plasma or sera rather than whole [blood](#) when measuring [blood](#)

[glucose](#) with a glucometer.

"With technology becoming cheaper and smaller all of the time, I can easily envision people purchasing centrifuges to use at home for this purpose," Hess said

More information: "Correlation between glucose concentrations in serum, plasma, and whole blood measured by a point-of-care glucometer and serum glucose concentration measured by an automated biochemical analyzer for canine and feline blood samples." *Journal of the American Veterinary Medical Association* June 15, 2015, Vol. 246, No. 12, Pages 1327-1333 [DOI: 10.2460/javma.246.12.1327](https://doi.org/10.2460/javma.246.12.1327)

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