It is assumed that pK' and S do not change significantly in the particular patient's blood with change in pCO₂. With [HCO₃⁻] determined, S, and then pK', for this particular blood can be readily calculated by substituting in equations 1-4.

When techniques were not available for direct measurement of certain parameters, there was some justification for approximating the concentration of certain blood components by calculation from those that could be measured. Where convenient procedures are available to measure the components directly it should be apparent that this is the method of choice.

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A Modified Retainer for Prolonging Uninterrupted Use of the Oxygen Sensor in the Beckman Glucose Analyzer

To the Editor:

Although the Beckman Glucose Analyzer is a valuable instrument in both the emergency and the pediatric clinical laboratory, the construction of the oxygen sensor limits its uninterrupted use and, therefore, the assurance of 24-h emergency glucose determination. According to the operating manual the oxygen sensor must be recharged once a week to ensure a minimum of down time. The reason for this frequent recharging is that the electrolyte gel soon dries because of the limited and relatively small volume (one droplet) of it that must be introduced. This may be the reason that this oxygen sensor often functions for only a few days in our hands. Therefore we constructed an alternative retainer that can contain more than 400 µl of electrolyte solution.

Figure 1 shows the construction of the modified retainer, made of methyl methacrylate and installed in our analyzer (type ERA 2002, Beckman Instruments, Inc.) with use of the original sensor body. The O-ring (3), which tightly fits the sensor body (11) by an extra pressure of the sleeve (2) initiated by the screw cap (1), prevents the presence of electrolyte solution at the rear end of the sensor body. This construction prevents false contact between the electrical connections of the anode and the cathode at the rear end of the sensor body, caused by the electrolyte solution. The O-ring (8), combined with the sleeve (7), ensures a perfect fixing of the original Teflon membrane, while the O-ring (9) is used for outside sealing of the oxygen sensor in the sample cup. The small wedge originally present at the rear end of the sensor body is removed.

To recharge the oxygen sensor, sleeve 2, O-ring 3, and retainer nut 5 are put into place. Screw cap 1 is loosely put into place and the sensor body is pushed gently from the rear end into the container just as far as past O-ring 3. About 0.5 ml of a nonviscous electrolyte solution (for this we use pO₂-electrolyte supplied by Instrumentation Laboratory) is brought into the container and the sensor body is pushed into position as depicted in Figure 1. The Teflon membrane is put into place by means of sleeve 7 and O-ring 8.

Check the recharged sensor tip for air bubbles; if any are present, hold the oxygen sensor (including the electrical connections) in one hand and tap the sensor firmly with the tip downwards. Once a week the sensor should be inspected. If air bubbles are observed then these are removed in the same manner.

During nearly three years we have had to recharge our modified oxygen sensor only six times.

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Effect of Posture of Subject on Reference Values

To the Editor:

In an attempt to provide an ongoing physician educational service, we publish a small Pathology Newsletter in which we address, succinctly, a single topic of general interest. In one of our future issues we were going to discuss the topic of reference values vs. hospital population values while simultaneously publishing revised reference values for several analytes. These analytes were determined on a sample of 115 volunteer Red Cross blood donors. The combination of these circumstances made the article (1) by Humphrey et al. extremely interesting and led to the discovery of an oversight on the authors’ part. I find no fault with the manipulation of the data or the overall philosophy of the article; however, I must question the procurement of the specimens from the “normal reference group.” As is well known, blood donors donate in the supine position with a time variable for completion of the donation. In our experience, the donation, itself, would have a median time interval of 15-20 min. In the article the authors have neglected to define the time at which the samples were procured. Obviously, if the samples were procured at the same time as the pilot tubes, post donation, then their own work indicates that the serum protein and calcium concentrations are in a state of flux rather than equilibria as the article indicates. If this is so, then the deviation from “Reference Group” to “Hospital Population” is even more profound.

It is apparent that in this particular article the referent values (2) should have been more rigidly defined concerning posture and time of specimen procurement.