Clinical labs should report plasma hydrogen ion concentration in nanomoles/L, in addition to reporting pH

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- Hydrogen ion activity is conventionally reported using the pH scale, wherein pH is the negative logarithm of the hydrogen ion activity. In general, this is convenient in that the hydrogen ion concentration of various body fluids, reagents, and solutions can span several orders of magnitude.

- In clinical medicine, especially in the context of arterial blood gas data interpretation, the disadvantage with reporting hydrogen ion concentration using the pH scale alone is that one cannot readily obtain a sense of the magnitude of the change in hydrogen ion activity from baseline, unless one is deeply familiar with the logarithmic scale. For instance, it may not be readily apparent to clinicians and students of medicine that a pH of 7 reflects a 2.5-fold higher concentration of hydrogen ions (equivalent to 100 nanomoles/L) relative to a pH of 7.4 (equivalent to 40 nanomoles/L), the normal pH of arterial plasma.

- While it is true that smartphones and computers come with calculators that have logarithmic functions that can convert pH to hydrogen ion concentration, it would be much more convenient if clinical laboratories routinely reported plasma hydrogen ion concentration in the linear scale (i.e., nanomoles/L), in addition to reporting the pH. It would be a matter of time before users get used to the linear scale.

- Furthermore, this would allow for analysis of acid-base disorders at the bedside using the easy-to-use (logarithm free) Henderson equation which reads thus: **Hydrogen ion concentration in nanomoles/L = 24 {[$PaCO_2$]/[HCO_3]},** where $PaCO_2$ is the partial pressure of carbon dioxide in arterial blood in mm Hg, and [HCO_3] is the bicarbonate concentration in arterial plasma in mmol/L [1].

- Similarly, it would be useful if the hydrogen ion concentration in cerebrospinal fluid, urine and other body fluids were reported in the linear scale, in addition to the pH scale.