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2013 update on the worldwide standardization of the hemoglobin A_1c measurement

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Hemoglobin A_1c (HbA_1c) reflects a time averaged blood glucose during the previous 2–3 months, and is used as the gold standard for long-term follow-up of glycemic control. The same HbA_1c method was used both in the DCCT study published in 1993 [1] and the UKPDS study published in 1998 [2]. Following the development of a true reference method by IFCC [3], it was stated in an international consensus that this reference method should be used by all manufacturers for the calibration methods used in the clinical laboratory [4]. A second consensus meeting was held in 2009, where the main issue was how the results should be presented to clinicians and patients, and how they should be reported in scientific journals [5]. In short, three conclusions were reached at this meeting:

1. HbA_1c results are to be reported by clinical laboratories worldwide in SI (Sistème Internationale) units (mmol/mol – no decimals) and derived NGSP units (% – 1 decimal), using the IFCC-NGSP master equation (DCCT units).

2. HbA_1c conversion tables including both SI (IFCC) and NGSP units should be easily accessible for the diabetes community.

3. Journals are strongly recommended to require that submitted manuscripts report HbA_1c in both SI (IFCC) and NGSP/DCCT units.

A third consensus meeting was held in Dubai in December 2011. At this meeting, points number 2 and 3 above were reiterated without any disagreement, and many journals are now considering how to implement dual reporting. A web calculator is available to facilitate this and the web address is http://www.hba1c.nu/eng. The participants stated that since 2009, different countries have moved in different directions regarding the double reporting of HbA_1c. Laboratories in the US continue to report HbA_1c results in % only (NGSP values), and clinicians are mostly unaware of SI (IFCC) units. Japanese manufactured laboratory instruments in use outside of Japan are IFCC calibrated with options to display IFCC or NGSP numbers, but Japan reports both JDS and NGSP numbers within the country. Across Europe most countries have adopted dual reporting, whereas some European countries following different time periods of dual reporting are now reporting SI units (mmol/mol) only. No new consensus was reached, but the participants agreed to the following:

The original consensus where results are reported in both SI units (mmol/mol) and in derived NGSP/DCCT percent units remains the ideal to achieve global standardization. Some countries which reported both units have now moved on to single reporting of SI units. It is particularly important to dual report for an agreed period of time if countries intend to move from percent to SI units. Some countries have decided to continue to report only NGSP/DCCT percent units as this better reflects clinical practice in that country. It is important that the whole country adopts a single approach to the reporting units so as not to cause confusion, and put patients at risk. Journals are recommended to use either HbA_1c or HbA1C as abbreviations.

Editors of journals and other printed material are strongly recommended to ensure that submitted manuscripts report HbA_1c in both SI (IFCC) and NGSP/DCCT units.

The 2010 statement was simultaneously published in eight journals: Annals of Clinical Biochemistry, Clinical
Chemistry, Clinical Chemistry and Laboratory Medicine, Diabetes Care, Diabetes Research and Clinical Practice, Diabetic Medicine, Diabetologia and Pediatric Diabetes. These journals either require papers to be submitted in both units or are discussing how best to implement this. We urge other journals within the diabetes field to adopt the same policy.

The consensus group will meet again in 2013 at the IDF meeting in Melbourne.

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Appendix

Consensus Committee
ADA: Sue Kirkman, Matt Petersen; EASD: Viktor Joergens, Andrew Boulton; IDF: Jean-Claude Mbanya, Stephen Colagiuri; IFCC: Garry John, Graham Beastall; ISPAD: Ragnar Hanas, Lynda Fisher; JDS: Izumi Takei; NGSP: David Sacks.

References