The sample was reanalyzed in the extended mode, which revealed 95.5% of an Hb that eluted with Hb A2 and an Hb F of 2.2% (Fig 1 B). The likely diagnosis was homozygosity for Hb E, a clinically benign condition common in Southeast Asia (1). Because there is no Hb A, ion exchange HPLC will not detect glycated Hb in such individuals. Immunoassay methods are felt to be reliable at detecting glycated Hb E, although there may be differences between assays. In this case, the result was 7.2% by Roche Tina-quant Hb A1c (2). There are several other factors that affect A1c results, such as any condition that shortens erythrocyte survival (recovery from acute blood loss, hemolytic anemia). Increased fetal Hb and carbamylated Hb also influence A1c measurement (3).

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References


News & Views

2011 Consensus Meeting on the Worldwide Standardization of Hemoglobin A1c Measurement

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The measurement of hemoglobin A1c (Hb A1c) is integral to the management of patients with diabetes. Hb A1c is used in the evaluation of long-term (8–12 weeks) glucose control, to alter therapy and predict the risk for development of microvascular complications, and as a criterion to diagnose diabetes. Early Hb A1c assays measured different forms of glycohemoglobin and lacked standardization. The publication of the Diabetes Control and Complications Trial (DCCT) in 1993 motivated the development of standardization programs in Japan, Sweden, and the US. The National Glycohemoglobin Standardization Program (official name later shortened to the acronym NGSP) was by far the most widely implemented program around the world, being used in the vast majority of countries that had Hb A1c standardization. The subsequent development of a reference measurement system by the IFCC led to several meetings to effect universal standardization of Hb A1c. At the initial meeting in 2004, participants reached consensus for the adoption of the IFCC reference method as the standard for calibration of Hb A1c assays. All participants agreed that the same Hb A1c values should be reported globally.

These decisions were endorsed at subsequent meetings in 2007 and 2009. Additional recommendations, published in 2010 in Clinical Chemistry (1), were:

1. Hb A1c results should be reported by clinical laboratories worldwide in Système International (SI) units (mmol/mol, no decimals) and derived NGSP units (% , 1 decimal), using the IFCC–NGSP master equation (DCCT units).
2. Hb A1c conversion tables including both SI (IFCC) and NGSP units should be easily accessible to the diabetes community.

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† Nonstandard abbreviations: Hb A1c, hemoglobin A1c; DCCT, Diabetes Control and Complications Trial; NGSP, National Glycohemoglobin Standardization Program; SI, Système International.
3. Editors of journals were strongly recommended to require that submitted manuscripts report Hb A1c in both SI (IFCC) and NGSP/DCCT units.

The most recent meeting was held in December 2011 in Dubai. The objective of the deliberation was to evaluate the progress of implementation of the prior recommendations. Unfortunately, the goal of reporting the same units worldwide has not been realized. Dual reporting has been adopted by very few countries and has been transitory for the vast majority of these countries. Some countries have elected to report only SI units, while other countries have decided to maintain NGSP/DCCT units. Notwithstanding these developments, the meeting attendees recommended that both SI (IFCC) and NGSP/DCCT units be used for reporting Hb A1c in journals and other printed materials. To facilitate this goal, calculators to convert between millimoles per mole and percentage have been made available (http://www.hba1c.nu/eng2.html and http://www.ngsp.org/convert1.asp). Several journals have adopted this policy and all journals are encouraged to do so.

Meeting Participants


Author Contributions: All authors confirmed they have contributed to the intellectual content of this paper and have met the following 3 requirements: (a) significant contributions to the conception and design, acquisition of data, or analysis and interpretation of data; (b) drafting or revising the article for intellectual content; and (c) final approval of the published article.

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Quality Guidelines for Next-Generation Sequencing

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Next-generation sequencing (NGS) technology has been embraced for its ability to revolutionize genetic testing, owing to its massively high–throughput nature. Sanger sequencing, the current gold standard for sequencing, is being replaced in many instances by NGS because of the latter’s capacity to sequence large gene panels, including entire exomes and genomes, at a lower cost. Although both Sanger and NGS are methods for sequencing, the technologies are vastly different, and therefore the quality definitions and metrics for the Sanger method do not necessarily apply to those of NGS. Given that so many laboratories are offering or gearing up to offer NGS-based tests, it has become imperative to establish consistent quality guidelines to help ensure that NGS results can be used for clinical decision-making.

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