

# W. Greg Miller, PhD

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Professor, Department of Pathology  
Co-Director of Clinical Chemistry  
Director of Pathology Information Systems  
Department of Pathology  
Virginia Commonwealth University  
Office: (804) 828-0375  
[Greg.Miller@vcuhealth.org](mailto:Greg.Miller@vcuhealth.org)

## Licenses & Certifications

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American Board of Clinical Chemistry, 1976

## Education

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Postdoctoral Fellow in Clinical Chemistry  
Department of Pathology, Division of Clinical Chemistry  
Ohio State University, College of Medicine, Columbus, Ohio 43210  
1973 - 1975

PhD Biochemistry  
University of Arizona, Tucson, Arizona 85721  
1973

## Awards

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European Organization for External Quality Assurance Providers in Laboratory  
Medicine, Adam Uldall Lectureship Award, 2018

Clinical and Laboratory Standards Institute, Russell J. Eilers Memorial Award, 2018

Wadim Roman Traveling Lectureship Award, Australasian Association of Clinical  
Biochemists, 2016

Featured on the cover of *Clinical Chemistry* for an "Inspiring Minds" article, 2016 volume 62 (May), pages 673-5.

Named on *The Pathologist* (UK) 2015 list of the 100 most influential laboratory medicine professionals.

Robert Schaffer Award for Outstanding Achievements in the Development of Standards for Use in Laboratory Medicine, International Federation of Clinical Chemistry and Laboratory Medicine, 2014

Past President's Award, American Association for Clinical Chemistry, 2013

Award for Excellence in Global Leadership in Standards Development, Clinical and Laboratory Standards Institute, 2012

Transatlantic Lectureship Award, Association for Clinical Biochemistry (UK), 2012

Outstanding Lifetime Achievement Award in Clinical Chemistry and Laboratory Medicine, American Association for Clinical Chemistry, 2007

Presidential Citation, American Association for Clinical Chemistry, 2007

Award for Excellence in Consensus Management, Clinical and Laboratory Standards Institute, 2007

Miriam Reiner (2006) and Joseph H. Roe (1997) Awards for Contributions to the Field of Clinical Chemistry, American Association for Clinical Chemistry, Capital Section

## Virginia Commonwealth University and Medical Center Appointments

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Professor, Department of Pathology  
Co-Director of Clinical Chemistry  
Director of Pathology Information Systems

## VCU Service

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Pathology Quality Management Program, Chair  
Pathology Performance Improvement Council  
Hospital Technology Governance Work Group  
Hospital Epic EHR Laboratory Leadership Team, Chair  
Hospital Keystone Governance Committee

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## Professional Organizations

American Association for Clinical Chemistry  
Clinical and Laboratory Standards Institute, Delegate for VCUHS

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## Professional Service (current)

National Kidney Foundation-Laboratory Engagement Initiative

Joint Committee for Traceability in Laboratory Medicine, Chair

National Institute of Diabetes and Digestive and Kidney Diseases (NIH),  
Laboratory Working Group, Chair

International Federation of Clinical Chemistry and Laboratory Medicine (IFCC);  
Working group for Commutability in Metrological Traceability, Chair

International Federation of Clinical Chemistry and Laboratory Medicine  
(IFCC); Scientific Division, JCTLM liaison

International Consortium for Harmonization of Clinical Laboratory Results,  
Harmonization Oversight Group

National Glycohemoglobin Standardization Program, Steering Committee

International Organization for Standardization (ISO), Technical Committee 212,  
Clinical laboratory testing and in vitro diagnostic test systems

United States Technical Advisory Group to ISO Technical Committee 212

## Editorial Advisory Boards

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*Clinical Chemistry*, Associate Editor

## Recent Invited Presentations

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Change in Albuminuria and GFR as End Points for Clinical Trials in Early Stages of Chronic Kidney Disease. A Scientific Workshop Collaboration by the National Kidney Foundation, the European Medicines Agency and the U.S. Food and Drug Administration. Silver Spring, MD. March 15-16, 2018. "Laboratory Considerations – Albuminuria and eGFR."

Siemens Healthineers, Tarrytown, NY, June 25, 2018.  
"Standardization/Harmonization, Traceability and Importance of Commutability."

American Association for Clinical Chemistry Annual Meeting, Chicago, IL, July 31, 2018; Symposium on Why are harmonized results difficult to achieve; "How to implement a harmonization protocol."

American Association for Clinical Chemistry Annual Meeting, Chicago, IL, July 31, 2018; Workshop on Quality Control, "Overview and Basic Concepts."

Eighth Meeting of the Athena Society, Corfu, Greece, September 6, 2018; "What's wrong with LOINC and aggregated lab data."

European Organization for External Quality Assurance Providers in Laboratory Medicine, 2018 Symposium, Zagreb, Croatia, 18-19 October 2018; Adam Uldall Award Lecture: "Future challenges in EQA, with special emphasis on harmonization and commutability."

International Conference on Laboratory Medicine; Laboratory Medicine 25 Years On, Padova, Italy, 30 October 2018; "The Standardization Journey and the Path Ahead."

IFCC General Conference, Budapest, Hungary, 10-11 November 2018;  
"International Consortium for Harmonization of Clinical Laboratory Results."

Johns Hopkins Renal Grand Rounds, Baltimore, MD, February 1, 2019;  
"Laboratory Considerations – Albuminuria and eGFR."

Mayo Clinic Clinical Biochemistry & Immunology, Clinical Core Laboratory Services, Biochemical Genetics Seminar, Rochester, MN, March 7, 2019; "Standardization of Biomarker Measurements for Chronic Kidney Disease."

Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology, Sevres, France, April 10-11, 2019; workshop on global coordination of standardization activities.

IFCC EuroMedLab 2019, Barcelona, Spain, May 19-23, 2019; conference participant; working group on commutability meeting.

American Association for Clinical Chemistry Annual Meeting, Anaheim, CA, August 7, 2019; Symposium on Putting Quality Control into Practice.

American Association for Clinical Chemistry Annual Meeting, Anaheim, CA, August 8, 2019; Symposium on Removing Laboratory Barriers to CKD Detection and Monitoring: The Laboratory's Role.

North American Menopause Society, Workshop on Normal Ranges for Estradiol in Postmenopausal Women, Chicago, IL, September 23-24, 2019; "Theoretical and Practical Means of Harmonizing Assays and the Ongoing Process of Quality Control."

Joint Committee for Traceability in Laboratory Medicine, Members and Stakeholders Conference, Sevres, France, December 2-3, 2019. Presentation on: "Understanding and Implementing Commutability" and "ISO 21151 Harmonization Protocol." Workshop on reference materials, procedures and measurement laboratories, December 4, 2019.

Labquality Days, February 6-7, 2020, Helsinki, Finland. Harmonization of Medical Laboratory Practices. "The harmonization journey: where are we going."

American Association for Clinical Chemistry Annual Meeting, Virtual, December 13-17, 2020; Symposium on QC and Proficiency Testing: Myths vs. Best Practices; "What really matters in a QC plan."

American Association for Clinical Chemistry Annual Meeting, Virtual, December 13-17, 2020; Symposium on Fighting CKD together: the patient, clinician, and laboratorian perspective; "Laboratory Tests for the Kidney

Profile: Opportunities for Improvement in 2020."

Equalis Expert Groups Colloquium, Sweden (virtual) February 4, 2021; "Why Commutability Matters."

National Kidney Foundation Spring Clinical Meetings (virtual) April 9, 2021; Reflections from the NKF/ASN eGFR Task Force on Reassessing the Inclusion of Race in Diagnosing Kidney Diseases; "Challenges for national standardization guided by insights from the past."

Canadian Society of Clinical Chemistry, Working Group on Reference Interval Harmonization (virtual), April 27, 2021; "New tools for harmonization of results."

Joint Committee for Traceability in Laboratory Medicine, World Metrology Day (virtual) May 20, 2021: Measurement for health; "What is laboratory medicine?"

The Global Creation and Monitoring of the Traceability of Test Results in the Medical Laboratory. September 28, 2021, Winterswijk, the Netherlands (virtual): "The Importance of Commutable Reference Materials and EQA Samples."

Siemens Healthineers, 1st Assay Development TRS Expert Group Annual Conference (virtual), September 24, 2021: "Standardization and Harmonization in Laboratory Diagnostics."

European Organization for External Quality Assurance Providers in Laboratory Medicine, 2021 Symposium (virtual) 13-14 October 2021: "Harmonization through EQA data aggregation."

European Union, TraceLabMed Stakeholder Workshop on Measurement Challenges in Laboratory Medicine. "How aggregated EQA data contributes to harmonisation of clinical laboratory results" 10 November 2021 (virtual).

Joint Committee for Traceability in Laboratory Medicine, International Consortium for Harmonization of Clinical Laboratory Results, International Federation of Clinical Chemistry and Laboratory Medicine Workshop - Overcoming challenges to global standardization of clinical laboratory testing: reference materials and regulation. Organizing committee chair,

panelist and speaker. "New metrological traceability tools; ISO 21151 harmonization protocol and IFCC recommendations for correction for non-commutability of matrix-based CRM." 6-10 December 2021 (virtual).

## Recent Publications

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**Miller WG**, Sandberg S. Quality control of the analytical measurement process. In: Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, 6th Edition, ed. by Rifai N, Horvath AR, Wittwer C. Elsevier 2017.

Ngo A, Gandhi P, **Miller WG**. Frequency that Laboratory Tests Influence Medical Decisions. J Applied Lab Med 2017;1(4):410-4.

Bachmann LM, Yu M, Boyd JC, Bruns DE, **Miller WG**. State of Harmonization of 24 Serum Albumin Measurement Procedures and Implications for Medical Decisions. Clin Chem 2017;63:770-9.

Phinney K, Sempos C, Vesper H, Botelho J, Tai S, Camara J, Wise S, Myers G, Durazo-Arvizu R, Tian L, Eckfeldt J, Hoofnagle A, **Miller G**, Bachmann L, et al. Baseline Assessment of 25-Hydroxyvitamin D Reference Material and Proficiency Testing/External Quality Assurance Material Commutability: A Vitamin D Standardization Program Study. J AOAC Int. 2017;100(5):1288-93.

**Miller WG**. Harmonization; its time has come. Clin Chem 2017;63:1184-6.

Myers GL, **Miller WG**. Challenge to Coordinate Harmonization Activities on an International Level. Clin Chem 2017;63:1429-30.

**Miller WG**, Seegmiller JC, Lieske JC, Narva AS, Bachmann LM. Standardization of Urine Albumin Measurements: Status and Performance Goals. J Applied Lab Med 2017;2:423-9.

Seegmiller JC, **Miller WG**, Bachmann LM. Moving towards standardization of urine albumin measurements. eJIFCC 2017;28:258-67.

**Miller WG**. Commentary on a Clinical Case Study of a Transgender Man Being Evaluated for a Kidney Transplant. Clin Chem 2017;63:1683.

**Miller WG**, Schimmel H, Rej R, Greenberg N, Ceriotti F, Burns C, Budd JR, Weykamp C, Delatour V, Nilsson G, MacKenzie F, Panteghini M, Keller T, Camara JE, Zegers I, Vesper HW, for the IFCC Working Group on Commutability. IFCC Working Group Recommendations for Assessing Commutability Part 1: General Experimental Design. Clin Chem 2018;64:447-54.

Nilsson G, Budd JR, Greenberg N, Delatour V, Rej R, Panteghini M, Ceriotti F, Schimmel H, Weykamp C, Keller T, Camara JE, Burns C, Vesper HW, MacKenzie F, **Miller WG**, for the IFCC Working Group on Commutability. IFCC Working Group Recommendations for Assessing Commutability Part 2: Using the Difference in Bias Between a Reference Material and Clinical Samples. Clin Chem 2018;64:455-64.

Budd JR, Weykamp C, Rej R, MacKenzie F, Ceriotti F, Greenberg N, Camara JE, Schimmel H, Vesper HW, Keller T, Delatour V, Panteghini M, Burns C, **Miller WG**, for the IFCC Working Group on Commutability. IFCC Working Group Recommendations for Assessing Commutability Part 3: Using the Calibration Effectiveness of a Reference Material. Clin Chem 2018;64:465-74.

**Miller WG**, Jones GRD. Estimated Glomerular Filtration Rate; Laboratory Implementation and Current Global Status. Adv Chronic Kidney Dis 2018;25:7-13. Schwartz GJ, Wang H, Erway B, Nordin G, Seegmiller J, Lieske JC, Bäck S-E, Miller WG, Eckfeldt JH. Multicenter Laboratory Comparison of Iohexol Measurement. J Applied Lab Med 2018;2:711-24.

**Miller WG**, Greenberg N. Commutability of Certified Reference Materials. JCTLM Database Newsletter, Special Report, April 2018.

Myers GL, **Miller WG**. The roadmap for harmonization: status of the International Consortium for Harmonization of Clinical Laboratory Results. Clin Chem Lab Med 2018;56:1667-72.

**Miller WG**. The standardization journey and the path ahead. J Lab and Prec Med 2018;3:87.

**Miller WG**, Bachmann LM, Fleming JK, Delanghe JR, Parsa A, Narva AS. Recommendations for Reporting Low and High Values for Urine Albumin and Total Protein. Clin Chem 2019;65:349-50 (letter).

McEnroe RJ, Dimeski G, Durham AP, Miller JJ, **Miller WG**, Petrides V, Rheinheimer



DW, Smith MB, Sonntag O, Warren KL, Zaharik ML. Interference Testing in Clinical Chemistry, Third Edition. CLSI document EP07, Clinical and Laboratory Standards Institute, Wayne, PA, 2018.

**Miller WG**, Sandberg S. Quality Management. In: Tietz Fundamentals of Clinical Chemistry and Molecular Diagnostics, 8th Edition, ed. by Rifai N, Horvath AR, Wittwer CT. Elsevier 2019, p 90-107.

**Miller WG**, Plebani M. Why harmonization is essential to realize the manifesto for the future of laboratory medicine. Clin Chim Acta 2019;495:76 (letter).

**Miller WG**, Bachmann LM, Delanghe JR, Inker LA, Jones GRD, Vasalotti JA. Optimal use of biomarkers for chronic kidney disease. Clin Chem 2019;65:949-55.

Danilenko U, Vesper HW, Myers GL, Clapshaw PA, Camara JE, **Miller WG**. An updated protocol based on CLSI document C37 for preparation of off-the-clot serum from individual units for use alone or to prepare commutable pooled serum reference materials. Clin Chem Lab Med 2020;58:368-74.

**Miller WG**, Budd J, Greenberg N, Weykamp C, Althaus H, Schimmel H, Panteghini M, Delatour V, Ceriotti F, Keller T, Hawkins D, Burns C, Rej R, Camara JE, MacKenzie F, van der Hagen E, Vesper H, for the IFCC Working Group on Commutability. IFCC Working Group Recommendations for Correction of Bias Caused by Noncommutability of a Certified Reference Material Used in the Calibration Hierarchy of an End-User Measurement Procedure. Clin Chem 2020;66:769-78.

Ellis AD, Gross AR, Budd JR, **Miller WG**. Influence of reagent lots and multiple measuring systems on estimating the coefficient of variation from quality control data; implications for uncertainty estimation and interpretation of QC results. Clin Chem Lab Med 2020;58:1829-35.

Van der Hagen EAE, Weykamp C, Sandberg S, Stavelin AV, MacKenzie F, **Miller WG**. Feasibility for aggregation of commutable external quality assessment results to evaluate metrological traceability and agreement among results. Clin Chem Lab Med 2021;59:117-25.

**Miller WG**, Greenberg N. Harmonization/standardization: where are we now. J Applied Lab Med 2021;6:510-21.

**Miller WG**, Greenberg N, Budd J, Delatour V, for the IFCC Working Group on Commutability. The evolving role of traceability in metrological traceability. *Clin Chim Acta* 2021;514:84-9.

**Miller WG**. Uncertainty in estimated glomerular filtration rate is much larger than the race adjustment term. *Clin Chem* 2021;67:693-5 (letter).

**Miller WG**. Perspective on new equations for estimating glomerular filtration rate. *Clin Chem* 2021;67:820-2.

Delgado C, Baweja M, Ríos Burrows N, Crews DC, Eneanya ND, Gadegbeku CA, Inker LA, Mendu ML, **Miller WG**, Moxey-Mims MM, Roberts GV, St. Peter WL, Warfield C, Powe NR. Reassessing the Inclusion of Race in Diagnosing Kidney Diseases: An Interim Report from the NKF-ASN Task Force. *J Am Soc Nephrol.* 2021;32:1305-17 and *Am J Kidney Dis* 2021;78:103-15.

Wiencek JR, Bachmann LM, Dinwiddie K, **Miller WG**, Bazydlo. Cross-Institutional Evaluation of the Abbott Architect SARS-CoV-2 IgG Immunoassay. *Lab Med* 2021;52:e137-46.

Delgado C, Baweja M, Crews DC, Eneanya ND, Gadegbeku CA, Inker LA, Mendu ML, **Miller WG**, Moxey-Mims MM, Roberts GV, St Peter WL, Warfield C, Powe NR. A unifying approach for GFR estimation: recommendations of the NKF-ASN Task Force on Reassessing the Inclusion of Race in Diagnosing Kidney Disease. *J Am Soc Nephrol.* 2021 and *Am J Kidney Dis.* Online September 23, 2011, <https://doi.org/10.1053/j.ajkd.2021.08.003>

**Miller WG**, Kaufman HW, Levey AS, Straseski JA, Wilhelms KW, Yu H-Y, Klutts JS, Hilborne LH, Horowitz GL, Lieske J, Ennis JL, Bowling JL, Lewis MJ, Montgomery E, Vassalotti JA, Inker LA. National Kidney Foundation Laboratory Engagement Working Group Recommendations for Implementing the CKD-EPI 2021 Race-Free Equations for Estimated Glomerular Filtration Rate: Practical Guidance for Clinical Laboratories. *Clin Chem* 16 December 2021 hvab278, <https://doi.org/10.1093/clinchem/hvab278>.