Preface

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Biographical notes: Tara Barton-Maclaren manages a risk assessment division in the Existing Substances Risk Assessment Bureau at Health Canada. Her academic background includes a PhD in pharmacology and therapeutics with a specialisation in reproductive toxicology. As a regulatory scientist, her interests include the development of strategies for the integration of emerging data and novel methodologies for the assessment of chemicals existing in the Canadian marketplace. She participates in international initiatives under the Organization for Economic Cooperation and Development and focuses on the areas of quantitative structure-activity relationship modelling, adverse outcome pathways, integrated approaches to testing and assessment, and evolving approaches to human health risk assessment in support of regulatory decision making.

Shalu Darshan works at the McLaughlin Centre for Population Health Risk Assessment, University of Ottawa. Her academic background includes a PhD in Chemistry and Interdisciplinary Training in Population Health Risk Management. Her research interests include risk management and policy of prion diseases, along with management strategies for developing countries to deal with the challenges posed by prion diseases, and chemical and food toxicology. She has served as a Guest Editor for over ten special issues in peer-reviewed journals, such as the *Journal of Toxicology and Environmental Health* (*JTEH*), *International Journal of Risk Assessment and Management* (*IJRAM*), and *Neurotoxicology*.

Donald Mattison is the Chief Medical Officer of Risk Sciences International and Associate Director of the McLaughlin Centre for Population Health Risk Assessment, University of Ottawa. He also serves as the Medical Advisor to QuarterWatch, Institute for Safe Medication Practices, and is a Senior Research Fellow of the International Prevention Research Institute. His research interests include reproductive and developmental toxicology, pharmacovigilance and pharmacology, observational research in pharmacoepidemiology, drug safety and efficacy research.

With the publication of the US National Research Council Report on *Toxicity Testing in the 21st Century* (*TT21C*) in 2007, toxicological risk assessment has been undergoing a transformation towards a more efficient paradigm for testing the large number of potentially toxic agents present in our environment to which we may be exposed. This paradigm shift has spawned concomitant changes in the manner in which toxicity data on environmental agents is evaluated from an environmental health perspective.

This special issue *Risk Science in the 21st Century* summarises the proceedings organised by Risk Sciences International for the Existing Substances Risk Assessment Bureau in Health Canada, and held at the University of Ottawa on March 4–6, 2013. Following completion of the workshop, speakers were invited to prepare full manuscripts based on the presentations made at the workshop. This special issue includes a collection of invited papers prepared by the speakers, focusing on: the current state-of-the-science in risk assessment (Fitzpatrick et al.); issues with toxicology requiring adaptation to meet the challenges of the 21st century (Hartung); current progress in chemical risk assessment strategies (Ritter et al.); and advanced risk science technologies (McBride; Thomas et al.), such as high through-put screening (Hsu et al.) and human biomonitoring (Gurusankar et al.). The paper by Locke et al. outlines the various challenges and opportunities encountered in the implementation of TT21C. The paper by Borotkanics and Locke provides a succinct description of the methodology employed by the United States Environment Protection Agency (USEPA) to evaluate new or significant new uses of existing chemicals under the Toxic Substances Control Act (TSCA). The penultimate paper, by Westphal et al., discusses the evolution of the NexGen risk assessment framework for risk science and how it continues to evolve as technologies and decision analytic approaches advance. The final paper, by Barton-Maclaren et al., summarises challenges and opportunities in the risk assessment of existing substances in Canada and the lessons learned from the international community, based on the presentations and discussions that occurred during the workshop.