

Treye A. Thomas, Ph.D.

Consumer Product Safety Commission (CPSC) Co-Chair of the Nanotechnology Environmental and Health Implications Working Group

Nanoscale Science, Engineering, and Technology Subcommittee

Arlington, VA



December 2, 2013



HHS/CDC/ NIOSH

DOS

DOTr

DOT

IC/DNI

DOJ

The National Nanotechnology Initiative (NNI)

Collaborative research and development that will advance understanding and control of matter at nanoscale for:

- National economic benefit
 - National security
 - Improved quality of life

DHS





DOC/BIS



CPSC



ITC





NRC

USDA/ARS

SEPA EPA

USDA/FS



NNI Activities Are Coordinated with the National Science and Technology Council



• **NSET:** Nanoscale Science, Engineering, and Technology Subcommittee of NSTC

• **NNCO:** National Nanotechnology Coordination Office

• **GIN:** Global Issues in Nanotechnology Working Group (WG)

• **NEHI:** Nanotechnology Environmental and Health Implications WG

- **NILI:** Nanomanufacturing, Industry Liaison, and Innovation WG
- NPEC: Nanotechnology Public Engagement and Communications WG

The 2011 NNI Environmental, Health, and Safety **Research Strategy**

- Serves as a comprehensive and more detailed follow-up to a prior initial strategy (2008) and identification of research needs (2006)
- Provides guidance to Federal agencies on research activities, priorities, and program planning



The 2011 NNI Environmental, Health, and Safety Research Strategy

The NNI Environmental Health and Safety Mission

- Protect public health and the environment
- Employ science-based risk analysis and risk management
- Foster technological advancements that benefit society
- Engage stakeholders through workshops for input



Framing the Research Strategy



The 2011 NNI EHS Strategy: A conceptual framework that incorporates risk-assessment, risk management, and life cycle analysis to inform specific research principles



Product Life Cycle Stages



The 2011 NNI EHS Strategy: A conceptual framework that incorporates risk-assessment, risk management, and life cycle analysis to inform specific research principles



Structuring the 2011 NNI EHS Research Strategy: Six Core Research Areas

- 1. Nanomaterial Measurement Infrastructure
- 2. Human Exposure Assessment
- 3. Human Health
- 4. Environment
- 5. Risk Assessment and Risk Management Methods
- 6. Informatics and Modeling



Source: 2011 NNI EHS Research Strategy

Examples of Progress Towards the Implementation of the 2011 NNI EHS Research Strategy

Examples of Interagency Activities (one example per each EHS research area):

- 1. Nanomaterial Measurement Infrastructure: Standards Activities
- 2. Human Exposure Assessment: ILSI NanoRelease Consumer Products
- 3. Human Health: *Development of Toxicity Assays*
- 4. Environment : Interactions of engineered nanomaterials with the environment
- 5. Risk Assessment and Risk Management Methods: *Risk Assessment for Manufactured Nanoparticles*
- 6. Informatics and Modeling: Data Readiness Levels

Nanomaterial Measurement Infrastructure: ISO TC229 and ASTM E56 standards activities concerning the physico-chemical property measurements of nanomaterials

TECHNICAL SUBCOMMITTEES:



E56.01 Informatics and Terminology E56.02 Characterization: Physical, Chemical, and Toxicological Properties E56.03 Environment, Health, and Safety E56.04 International Law and Intellectual Property E56.05 Liaison and International Cooperation E56.06 Nano-Enabled Consumer Products E56.91 Strategic Planning and Review

ISO	Subcommittee/Working Group	Title
	ISO/TC 229/CAG	Chairman Advisory Group
	ISO/TC 229/JWG 1	Terminology and nomenclature The convener can be reached through the <u>secretariat</u>
	ISO/TC 229/JWG 2	Measurement and characterization The convener can be reached through the <u>secretariat</u>
	ISO/TC 229/TG 2	Consumer and societal dimensions of nanotechnologies The convener can be reached through the <u>secretariat</u>
	ISO/TC 229/TG 3	Nanotechnologies and sustainability The convener can be reached through the <u>secretariat</u>
	ISO/TC 229/WG 3	Health, Safety and Environmental Aspects of Nanotechnologies The convener can be reached through the <u>secretariat</u>
	ISO/TC 229/WG 4	Material specifications The convener can be reached through the <u>secretariat</u>

Human Exposure Assessment: The ILSI NanoRelease Consumer Products project aims to foster the safe development of nanomaterials NIOSH, EPA, CPSC, NIST, OSHA, NSF, Industry, EU, Canada, and many other organizations



Steering Committee Members and Advisors At-A-Glance

Affiliations

Members

Myriam Hill (co-chair) Wendel Wohllenben (co-chair) Aleksandr Stefaniak, PhD, CIH Andy Atkinson Barbara Karn, PhD Bernd Nowack, PhD Bill Kojola Cathy Fehrenbacher, MS, CIH Charles Geraci, PhD Christopher Kingston, PhD Darrell Boverhof, PhD Debra L. Kaiser, PhD Derk Brouwer Janet Carter, MPH Jo Anne Shatkin, PhD John Monica Jr Lie Chen Philip Sayre, PhD Richard Canady, PhD, DABT Richard Zepp Shaun Clancy, PhD Treve Thomas, PhD Vladimir Murashov, PhD Yasir Sultan, PhD

Health Canada BASF US National Institute for Occupational Safety and Health Health Canada National Science Foundation EMPA AFL-CIO US Environmental Protection Agency US National Institute of Occupational Safety & Health National Research Council Canada The Dow Chemical Company US National Institute of Standards & Technology TNO Research Group Q&S US Occupational Safety & Health Administration **CLF** Ventures Porter Wright Morris & Arthur LLP Health Canada US Environmental Protection Agency ILSI Research Foundation US Environmental Protection Agency Evonik Degussa Corporation US Consumer Product Safety Commission US National Institute for Occupational Safety and Health Environment Canada

Advisors

Carolyn Cairns, MPH Michael Hansen, PhD

Consumers Union Consumers Union

Human Health: Performing safety and efficacy assessments of missionrelated, nanotechnology-enabled materials and devices for the broad understanding of ENM toxicity

NCI/NCL, FDA, and NIST



Environment: Interactions of naturally derived, incidental, and engineered nanomaterials with living organisms.

NSF, EPA, and other organizations



Source: CEINT, Duke University

Risk Assessment and Risk Management Methods: Risk

Assessment for Manufactured Nanoparticles Used in Consumer Products (RAMNUC) framework and aims

EPA, CPSC, and UK



Informatics and Modeling: Nanotechnology Knowledge Infrastructure's Data Readiness Level (DRL) discussion document (*NKI Nanotechnology Signature Initiative*)

CPSC, DoD, DOE, EPA, FDA, NASA, NIH, NIOSH, NIST, NSF, and OSHA

Data Readiness Levels

Seven graded definitions (0-6) are defined

- **0.** Invalid data
- **1.** Raw or unscaled data
- 2. Scaled data
- **3.** Scaled data with defined precision or noise level
- **4.** Scaled data with defined precision and noise levels, but not related to the larger body of scientific knowledge
- **5.** DRL 4 data related to the larger body of scientific knowledge, but with measurement uncertainty too large for data standard
- **6.** Standards-quality data of X % measurement uncertainty



Nanotechnology Signature Initiative echnology Know Jolge Initiative uture (NKI): w National Loui cyclin in Statainal I- Decim

Source: http://www.nano.gov/node/1015 17

Collaborating, Moving Forward...

- The 2011 NNI EHS Research Strategy is the multi-component Federal research framework for:
 - Nanotechnology-related risk management
 - Regulatory decision making
 - Product use
 - Research planning, and
 - Public outreach
- Importance of focused, sustained coordination, and stakeholder engagement
- Coordination of international research efforts
 - Europe
 - Asia

THANK YOU

