



# Creating an Effective Oversight System for Nanotechnology

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# Why this Paper?

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- Nanotechnology has arrived in several industries
- Environmental health and safety is an issue
  - Data suggest some materials could be hazardous
- Public is expecting some kind of oversight
- Yet public debate has not focused on the core principles that should guide oversight
  - More focus on research and legal jurisdiction
- Need to “ask the right questions” on principles
  - Then multiple parties can pursue common goals



# Why Now?

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- Government agencies are making decisions
  - Criteria being used are not transparent
- Industry is developing internal policies for worker protection and product screening
- Insights for research priorities
- Focus on core issues improves engagement
- Guide to technology innovators
- Informs business models that will succeed



# Core Building Blocks for Oversight

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- Risk Criteria
  - What is and is not a problem?
  - What are acceptable risks?
- Information Needs
  - What information is needed to make a reasonable judgment about risk?
- Risk Management Measures
  - What technologies and practices work?
  - Is a “performance-standard” approach feasible?



# Risk Criteria

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- What would make a nanomaterial risky?
  - Size affects exposure potential
  - But unique characteristics may dictate hazard
- Issue: What are the relevant analogies?
  - Without specific data, what is a comparable material?
  - Ex: crystalline silica vs. titanium dioxide?
- Issue: How to consider exposure?
  - During use, nanomaterial is usually in a mixture
  - But at disposal, it may take new form in environment



# Information Needs

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- Data needs likely to be greater for nano than for macroscale versions of same chemical
  - Need to account for migration in the body
  - Importance of unique structural properties
- Issue: When is new testing needed
  - Reliance on data from other chemicals?
  - Tradeoff between controls and additional data
- Issue: Who can commercialize nano?
  - Costs affect business models, product viability



# Risk Management

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- Nano oversight is seen as product oversight
  - Inherent limits to what can be achieved
  - Better at product design, manufacturing controls
  - Not as good at downstream use, disposal scenarios
- Issue: do performance standards work?
  - Depends on the ability to conduct monitoring that may never be feasible or cost-effective
- Issue: role of labeling?
  - What is the public message?



# The Transparency Challenge

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- As a broad principle, transparency can improve decisions and enhance public credibility
- Yet many product-specific data are confidential
  - Formula, process technology, production volume
  - Customers, distribution networks
- What information needs to be in the public domain, for policy and personal choices?
  - What decisions do people want to make?
  - What data are useful for that purpose?
  - How can data be assembled to inform those decisions, without revealing trade secrets?