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améliorer la santé et l'avenir de notre planète »
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Strategic Policy Directions for Air Quality Management: The NERAM Colloquium Series

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Contributors

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Outline

- What is NERAM?
- NERAM Colloquia on Air Quality Management:
Interpreting Science for Decision Makers
- NERAM V: Strategic Policy Directions:
Conference Statement and Conference Highlights
- Next Steps:
What Should be Done After NERAM?
- Acknowledgements



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What is NERAM?

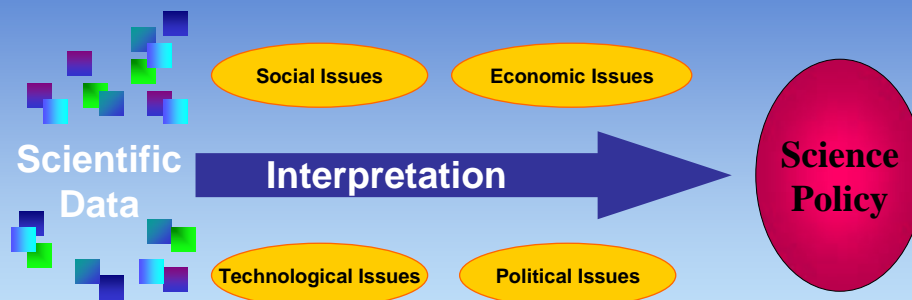
Network for Environmental Risk Assessment & Management

- ◆ A resource for independent, credible and multi-disciplinary scientific advice on environmental risk assessment and management
- ◆ NERAM is a NETWORK



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NERAM Colloquia on Health and Air Quality: Interpreting Science for Decision Makers



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NERAM Air Quality Risk Management: Colloquium Schedule

- 2001 University of Ottawa
Ottawa, Canada
- 2002 Johns Hopkins University
Baltimore, USA
- 2003 Santo Spirito Hospital
Rome, Italy
- 2005 National Institute for Public Health
Cuernavaca, Mexico
- 2006 Simon Fraser University
Vancouver, Canada



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NERAM V: October 16-18, 2006



NERAM V: Strategic Policy Directions for Air Quality Risk Management

Themes

1. Why will air pollution continue to be a public health concern for years to come?
2. What measurement, monitoring and modeling tools are available to guide air effective quality management strategies?
3. What evidence is available from the evaluation of implemented air quality policies to guide effective local, regional and global air quality management strategies?
4. What emerging challenges and opportunities are important in the development of sustainable clean air policy strategies considering possible co-benefits with other environmental policies?



NERAM V: Strategic Policy Directions for Air Quality Risk Management

October 16-18, 2006
Morris J. Wosk Centre for Dialogue
Simon Fraser University
Vancouver, B.C.

COLLOQUIUM STATEMENT

Current State of Science

Current State of Science

1. A diverse and growing range of scientific evidence demonstrates significant effects of air pollution on human health and the environment, thereby justifying continued local and global efforts to reduce exposures.



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Emerging Issues and Opportunities

Jonathon Samet

- **Health effects of PM, ozone well-established**; additional evidence of traffic related pollution
- Distinguish risk management needs in developing and developed countries
- Use comprehensive accountability framework
- Public engagement



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The Global Burden of Disease due to Air Pollution

Aaron Cohen

- CRA: Air pollution in context of other population health risk issues
- GBD: Cardiopulmonary disease and lung cancer due to PM (Pope et al., 2002)
- Magnitude: **AF of 4 - 5%, 1.6 M deaths annually**
- Uncertainties considered
- Avoidable burden in 2010 and 2020



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Communication of
Science of Policy Decisions

Communication of Science of Policy Decisions

2. Communication of the evidence on the health effects of air pollution and the benefits of control is critical to enhancing public awareness and demand for policy solutions. Novel approaches are needed for interpretation of scientific evidence to guide air quality managers in formulating local programs and policies.



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Air Quality Measurements for Policy Decisions

Jeff Brook

- Inform public of air quality (AQI)
- Source apportionment
- Satellite measurements at global & local level
- Targeted controls
- Better accountability by tracking interventions



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Communication of Science of Policy Decisions

3. A clearer articulation of the physical and policy linkages between air quality and climate change is needed to inform public opinion and influence policymakers. Care must be taken not to compromise air quality through actions to mitigate climate change. Similarly, air quality solutions must be reviewed in terms of impacts on climate.



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Air Quality and Climate Change

Quentin Chiotti

- **Co-benefits** related to emissions from energy, transportation, agriculture, and other sectors
- Focus on:
 - Chemical/atmospheric interactions
 - Actions to directly reduce GHGs and other air pollutants
 - Actions that indirectly reduce energy use
 - Adaptive responses to climate change



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Panel Perspectives

*Tony Clarke-Sturman, Hugh Kellas,
Quentin Chiotti & Kong Ha*

- **Greater Vancouver AQ goals:** (1) minimize public health risk, (2) improve visibility, and (3) **minimize global climate change** (*Hugh Kellas*)
- Opportunities to reduce marine emissions, with involvement of IMO (*Tony Clarke-Sturman*)
- Limits in sulfur content of industrial fuel resulted in immediate marked improvements in Hong Kong air quality (*Kong Ha*)
- Lessons learned from Alberta oil sands (GHG emissions) and coal fired power plants in Ontario (action to reduce emissions?) (*Quentin Chiotti*)



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Policy Approaches for Air Quality Management

Policy Approaches for Air Quality Management

4. Improving air quality is best approached at a systems level with multiple points of intervention. Policy solutions at the local, regional and international scale through cross-sectoral policies in energy, environment, climate, transport, agriculture and health will be more effective than individual single-sector policies.



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Integrated Assessment Modeling *Hadi Dowlatabadi*

- **Integrated models** including:
 - population
 - impacts
 - economic activity
 - atmosphere & climate change
 - fossil energy & land cover
- Value of information: alter policy choices



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Policy Case Studies from Europe

Martin Williams

- EU Thematic Strategy will use a range of (integrated, multi-sectoral) mitigation measures, with benefits expected to exceed costs
- UK action plan now undergoing consultation



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Policy Approaches for Air Quality Management

5. Ambient air quality standards based on exposure-response relationships continue to serve as a basis for air quality management for non-threshold pollutants such as PM. Interim targets set by WHO-Europe in 2006 provide achievable transitional air quality management milestones for parts of the world where pollution is high as progress is made towards reaching long-term air quality goals.



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Future Directions

Martin Williams

- Role of standards?
- Scenarios>emissions>exposures>health effects>BCA>targets>controls
- **AQGs increasingly difficult to achieve**
- Hemispheric transport (LRTAP Convention)
- Integrated climate, air pollution, and energy policies → cost savings (IASA Global IAM)



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Policy Approaches for Air Quality Management

6. Air quality management driven solely by air quality standards may not be optimal for non- threshold pollutants in areas where standards have already been attained or for “hot spots” where measures to achieve further air pollution reductions can be increasingly difficult and costly. Exposure reduction and continuous improvement policies are important extensions to ambient air quality standards.



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Reflections on Air Quality and Health

Ray Copes

- Moved away from tiered standards, to science based reference level with AQ management target
- New sources (marine vessels) being addressed
- Traffic has become a focus of concern
- Use of environmental monitoring, health surveillance, and burden of illness approaches to population health risk assessment
- Do we know what works? (accountability)



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Policy Approaches for Air Quality Management

7. Given economic growth projections, hemispheric transport of pollutants from Asian countries will continue to be a significant contributor to poor air quality globally. International scientific and technical collaboration to assess air quality and assist in controlling emissions, while enabling economic growth is critical.



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Air Quality Management Capabilities of Selected Asian Cities

Kong Ha

- Air quality improving in Asian cities
- PM10 standards still exceeded
- Benchmarking:
 - Air quality index
 - Monitoring stations
 - Assessment and availability
 - Emissions estimates
 - Management
- Increasing motorization (stricter vehicle emission standards)



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Policy Approaches for Air Quality Management

8. The health effects literature suggests that reducing exposure to combustion-generated particles should be a priority. This includes emission reduction measures related to fossil fuels and biomass. The evidence is sufficient to justify policies to reduce traffic exposures, especially if such policies serve to address other societal problems such as 'grid lock', increasing commute times and distances, and obesity.



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Modeling Exposures to Traffic-Related Air Pollution

David Briggs

- **Exposure assessment:** GIS, models (LUR, co-Kriging), **indicators (road density)**, monitoring
- Spatial/temporal resolution
- Long range vs traffic-related pollution
- GEMS: European exposure assessment study



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Policy Approaches for Air Quality Management

9. Prioritization of pollutants and sources for emission reduction based on the potential for exposure may be a useful alternative to rankings based on emission mass. The intake fraction concept assigns more weight to emissions that have a greater potential to be inhaled and therefore to impact health.



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Assessment of Emission Inventories in North America

William Pennell

- Major point sources well characterized
- Track emissions trends
- Uncertainties in mobile source emissions, and in other important sources (air toxics)
- Spatial-temporal resolution inadequate for modeling and forecasting



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Policy Approaches for Air Quality Management

10. Air quality management strategies focused on improving visibility may gain greater support from the public and policymakers than those oriented strictly towards the improvement of public health.



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Behaviour on Smoggy Days in Montreal

Tom Kosatsky

- How do people cope with hot smoggy weather, based on EC heat and smog warnings?
- Increased symptoms in susceptible people with COPD and CHF on smoggy days
- Perception of smog based on symptoms or **visible hazy air**, rather than EC smog warnings
- Protective behaviours (reduced physical activity, stay indoors) adopted on smoggy days



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Environmental Justice

Marie O'Neal

- Ethical component to EJ
- **“Right” to clean environment embedded in some legislation**
- Health is socially patterned (fundamental to field of population health)
- Individual and contextual effects
- SES an important effect modifier in air pollution-health associations



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Policy Approaches for Air Quality Management

11. International harmonization of air pollutant measurements and metrics, emission inventories, modeling tools, assessment of health effects literature and health-related guidelines are needed for efficient policy implementation.



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Policy Case Studies for North America

Bart Kroes

- Up to 3X differences in air quality standards in Canada, US, CA & Mexico
- NARSTO assessments can promote harmonization
- Primarily technology driven control programs – effective in achieving emissions reductions
- Limited emissions trading for SO₂ and NO_x



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U.S. - Canada Air Quality Agreement

Brian McLean & Jane Barton

- Originally motivated by transboundary acid rain issues:
 - Emissions limits
 - Reduction timetables
 - Compliance monitoring
 - Research collaboration
- Ozone Annex established in 2000
- Acidic deposition reductions expected to lead to \$122 B annually by 2010
- Scientific activities key to providing evidence on which air quality management is based
- Successful U.S. experience with cap and trade – cap key to success



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Science and Policy for Global Air Quality Management

Michal Krzyanowski

- WHO air quality guidelines
- Health effects at near ambient levels, which often exceed established guidelines
- Integration of air quality policy with that in other sectors (energy, climate, transport, agriculture, social)
- Global approach needed

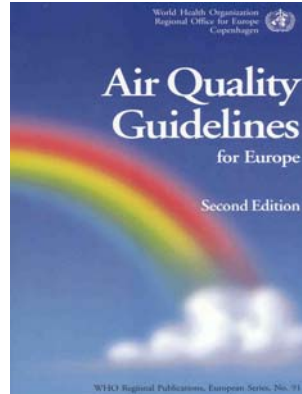


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Science and Policy Assessment Needs

Science and Policy Assessment Needs

12. A major scientific challenge is to advance understanding of the toxicity-determining characteristics of particulate matter (composition, size and morphology, including surface chemistry) as well as the role of gaseous co-pollutants to guide the development of source-specific air quality management strategies.



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Source-Receptor Relationships

Philip Hopke

- **PM speciation networks now in place**
- Receptor models used for source apportionment (with source profiles known or unknown)
- Source apportionment subject to less uncertainty than health effects assessment



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Science and Policy Assessment Needs

13. The effectiveness of local, regional and global policy measures must be scientifically evaluated to confirm that the expected benefits of interventions on air quality, human health and the environment are achieved and if not, that alternate measures are implemented quickly.



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Mortality Risk Evaluation for Air Quality Policy

Alan Krupnick

- **BCA now widely used in environmental decision making**
- WTP preferred for valuation
- VSL using WTP < \$6 M
- VSL/VSLY – either constant or lower for elderly



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Impact of Air Pollution on Public Health in Hong Kong

Anthony Hedley

- Benefits of reducing sulfur content of fuel (1% reduction in mortality per 10 $\mu\text{g}/\text{m}^3$ SO_2)
- Visibility used as an AQI
- Health benefits of air pollution reduction quantified (\$246 M direct benefits + \$2.2 B indirect benefits)
- Multi-sectoral mitigation strategies



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Evaluation of Interventions: Accountability

Annemoon van Erp

- Accountability chain:
 - Regulatory action
 - Emissions
 - Ambient air quality
 - Exposure/dose
 - Human health
- Case studies of:
 - Traffic reduction
 - Replacement of wood stoves
 - Coal ban in Irish cities
 - Switch from brown coal to natural gas and diesel in eastern Germany
 - Regulated decreases in SO_2 from eastern US power plants)



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What should be done after NERAM?


- Promotion of NERAM Air Quality Guidance Document.
- Further scientific research, emphasizing data gaps such as traffic.
- Development of integrated assessments across sectors.
- Development of cross-sectoral risk management strategies.
- Demonstration of accountability.
- Enhanced communication with all stakeholders.
- Mobilization of action.
- Evaluation of NERAM process, and its impact.

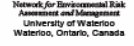



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Planning Committee and Sponsors


PRELIMINARY PROGRAM & REGISTRATION
NERAM V
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Network for Environmental Risk Assessment and Management
University of Waterloo
Waterloo, Ontario, Canada






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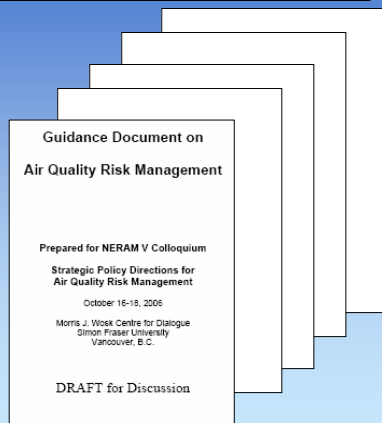
Dr. John Shortreed: Co-founder (with Dr. Robert Willes) of the NERAM Colloquium Series



Lorraine Craig:
Manager, NERAM Colloquium Series



Dr. Sam Kacew, Editor-in-Chief
Journal of Toxicology and Environmental Health



**NERAM V Proceedings
Dedicated to Dr. David Bates:
A Pioneer in Air Pollution Risk Assessment**

