

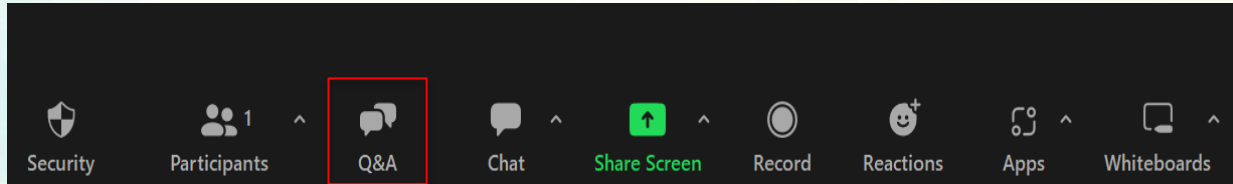


CARB Indoor NO₂ Guidelines Workshop #1

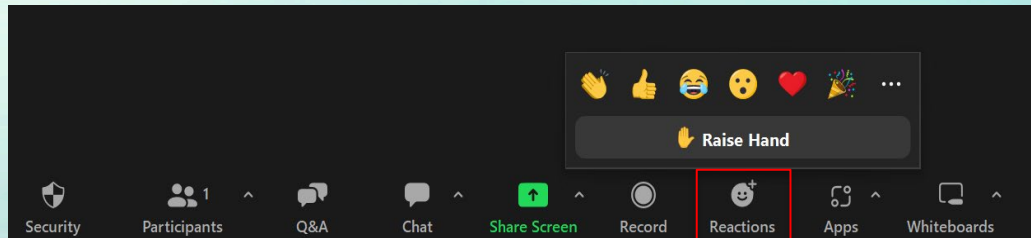
May 16, 2023

Housekeeping Items

- If you have a written question, please enter it into the Q&A using the icon at the bottom of the screen.



- If you wish to ask a question verbally, raise your hand using the reactions icon. We will unmute you during the Q/A sessions at the end of the panel.
- When called on, please identify yourself and your affiliation, and whether you have a question or comment.





Housekeeping Items

- We ask that you keep any comments to under 2 minutes. You can also submit comments on our webpage (see link below)
- If we are unable to get to your question during the Q/A session, or if you would like to submit additional information, you are welcome to email us at IAQGuidelines@arb.ca.gov and we will respond to you.
- If you are having any technical difficulties during the workshop, please email Victoria Villa at Victoria.Villa@arb.ca.gov.
- This meeting will be recorded, and the presentations posted to our webpage at <https://ww2.arb.ca.gov/our-work/programs/indoor-air-quality/indoor-no2-guidelines-update>
- We will send registered participants an email when the posting is completed.



CARB Staff Leads for IAQ Workshop

- Elizabeth Scheehle – Chief, Research Division
- Bonnie Holmes-Gen – Branch Chief, Health and Exposure Assessment Branch
- Pat Wong, Ph.D. – Manager, Building and Indoor Environments Section (BIES)
- Jeff Williams, Ph.D. – Lead for IAQ Guidelines, BIES
- Zoe Zhang, Ph.D. – Staff APS, BIES
- Victoria Villa – APS, BIES



Agenda

9:00 AM Welcome and Background and Objectives (CARB)

9:15 AM Panel 1: International Agencies: Guideline Development and Scientific Foundations

9:45 AM Q/A

9:55 AM Panel 2: State Agency Perspectives: Recent Research on Indoor Air Quality, State Programs Affecting Indoor Air Quality

10:40 AM Q/A

Break – 5min

10:55 AM Panel 3: Nonprofits, Community Groups: Community Perspectives on Indoor Air Quality and Guideline Development

11:40 AM Q/A

11:50 AM Panel 4: Academic Experts: Recent Research Findings on NO₂ and Indoor Air Quality, Children's Health and NO₂

12:20 PM Q/A

12:30 PM Questions, Discussion, Closing Remarks 1:00 PM Adjourn

Workshop Objectives



Information Gathering

- What is the latest health research on NO₂?
- What are the most successful approaches to guideline development?
- What have been the biggest challenges?



Hear from Other Agencies and Improve Collaboration

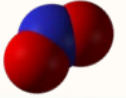
- Who else is working on developing guidelines?
- How might the guidelines be used. What are the benefits?
- What health research is being done by other agencies?



Hear from Stakeholders

- What are the main IAQ health concerns for EJ communities?
- What are major challenges for EJ communities to reduce exposures?
- How can we improve our outreach efforts and expand our reach?

NO₂ in the Indoor Environment



- People spend most of their time indoors
 - Rule of 1,000 – Prof. Kirk Smith
- Sources include combustion appliances
- NO₂ levels indoors can regularly exceed the levels of the NAAQS
- NO₂ emissions released indoors affect both indoor and outdoor air quality



NO₂ Health Effects



- Effects of elevated NO₂
 - Increased incidence of asthma
 - Children in homes with gas stoves have increased asthma symptoms and higher risks of current and lifetime asthma
 - 12.7% of current childhood asthma attributable to stove use
 - Respiratory disease, decreased lung function
 - Respiratory symptoms like wheeze and cough related to elevated NO₂ exposures
 - Health impacts to vulnerable communities, children, and the elderly

Indoor Air Guidelines History

CARB's most recently published IAQ guidelines
1-hr NO₂: 250 ppb

CARB lowered AAQS 1-hr NO₂:
180 ppb

Health Canada lowered IAQ guideline
1-hr NO₂: 90 ppb

CARB IAQ guidelines update

2005

2007

2010

2015

2021

Now

US EPA lowered AAQS 1-hr NO₂:
100 ppb

WHO set IAQ guidelines
1-hr NO₂: 106 ppb

WHO set annual IAQ guideline of 5 ppb (with higher interim targets)



Current Indoor NO₂ Guidelines/Standards

Guideline	Methodology - Target Value	Agency - NO ₂ Concentration (year)
1-hour indoor guidelines	Maximum indoor level at 1 hour or more	Canada ----- 90 ppb (2015) California --- 250 ppb (2005) US EPA ----- N/A WHO ----- 106 ppb (2010)
24-hour indoor guidelines	Maximum indoor level at 24 hours or more	Canada ----- 11 ppb (2015) California (WHO) -- 80 ppb (2005) WHO ----- 5 ppb annual (2021) 21,16,10 ppb (Interim target values)



The Need to Update NO₂ Guidelines

- Incorporate advanced state of science
 - CARB IAQ guidelines are almost 20 years old
 - Other health agencies and experts have developed more recent guidelines
 - Updated science-based guidelines can better reflect needs of vulnerable groups
- Address the concerns of our communities
 - CARB responding to calls for action
 - Higher exposures and health effects of NO₂ more often experienced in low-income homes
- Inform Research and Public Outreach
 - Motivate research and technology to achieve healthy IAQ and meet guidelines
 - Provide the most current information about what levels of NO₂ are healthy
- Inform state building decarbonization efforts

Current Timeline for CARB Guideline Development



Workshop Panels and Topics



International Agencies (EPA/WHO, Health Canada)
Guideline Development and Scientific Foundations



State Agency Perspectives (OEHHA, CDPH, CEC)
Recent Research on Indoor Air Quality and State Programs Affecting IAQ



Nonprofits, Community Groups (CCAC, WE ACT, PSR)
Community Perspectives on Indoor Air Quality and Guideline Development



Academic Experts (LBNL, PEHSU)
Recent Research Findings on NO₂ and IAQ, Children's Health and NO₂



Thank You!

IAQguidelines@arb.ca.gov

<https://ww2.arb.ca.gov/our-work/programs/indoor-air-quality/indoor-no2-guidelines-update>



Panel 1 (Pat Wong, moderator) Guideline Development and Scientific Foundations

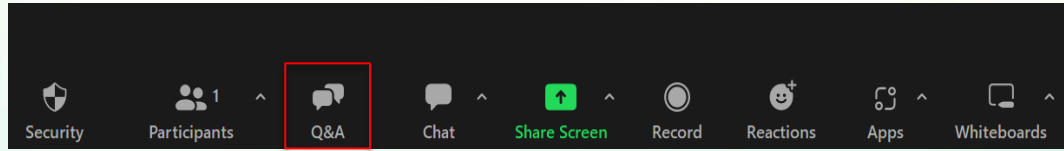
Jocelyn Moore, Ph.D. and Stephanie Wille MSc. – Health Canada

Thomas Luben, Ph.D. – Environmental Protection Agency

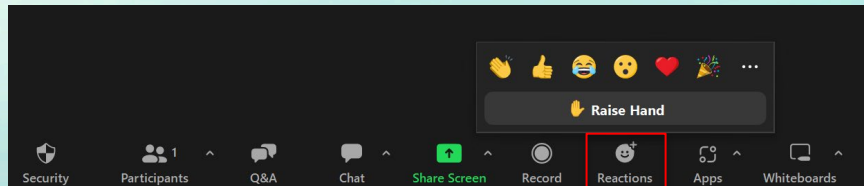


Panel 1 Questions and Answers

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Panel 2 (Zoe Zhang, moderator)

Recent Research on Indoor Air Quality, State Programs Affecting IAQ

May Wu, Ph.D. – Office of Environmental Health Hazard Assessment



Wenhao Chen, Ph.D. – California Department of Public Health

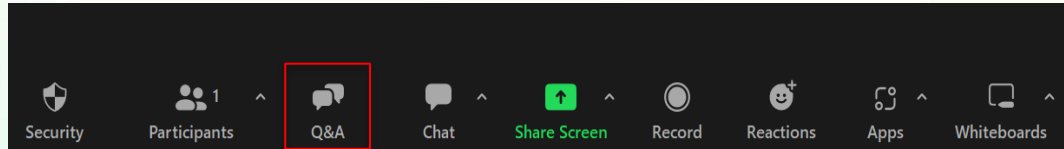


Maninder Thind, Ph.D. – California Energy Commission

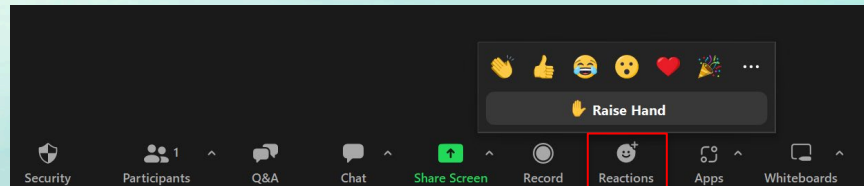


Panel 2 Questions and Answers

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5 Minute Break





Panel 3 (Victoria Villa, moderator) Community Perspectives On Indoor Air Quality and Guideline Development

Annie Carforo – WE ACT



Kevin Hamilton, RRT – Central California
Asthma Collaborative

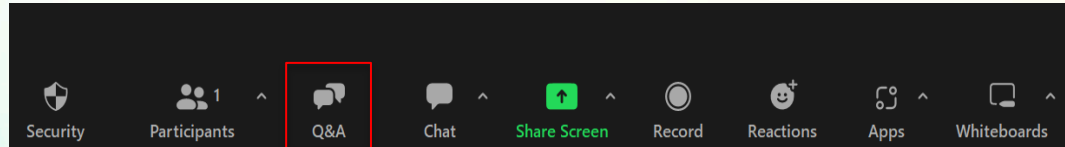


Zach Williams, MPH – Physicians for Social
Responsibility

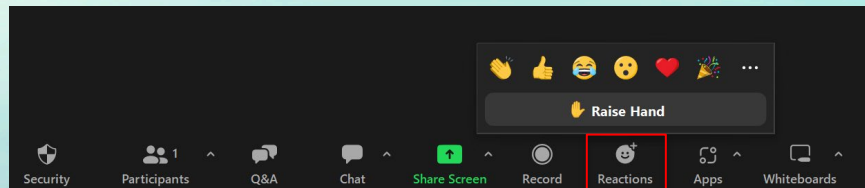


Panel 3 Questions and Answers

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Panel 4 (Jeff Williams, moderator) Research Findings on NO₂ and IAQ, Children's Health and NO₂

Brett Singer, Ph.D. – Lawrence Berkeley
National Laboratory

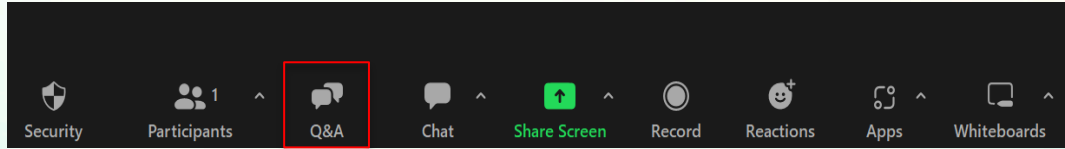


Stephanie Holm, MD, Ph.D., MPH – Western
States Pediatric Environmental Health
Specialty Unit

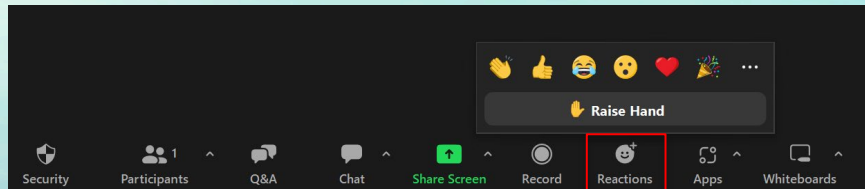


Questions and Answers

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Questions and Comments

Bonnie Holmes-Gen, moderator



Thank You for Attending

- Thank you to our panelists who presented today!
- We will post the video and slides in the next couple of weeks.
- Look on our IAQ Guidelines webpage for updates about our next meetings: <https://ww2.arb.ca.gov/our-work/programs/indoor-air-quality/indoor-no2-guidelines-update>
- Please provide comments via email at IAQGuidelines@arb.ca.gov