

Communicating Risk



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Concepts

- **Risk Communication - What it is.**
- **Risk Perceptions - What I see as RISKY?**
- **Factors that Influence Risk Perception**
- **Prioritizing Risks**
- **Toxico-Genomics & Risk: Synergisms & Susceptibilities**
- **A Holistic View of Risk: NEJAC Cumulative Risk**
- **The Precautionary Approach**
- **Robert Bullard's EJ Criteria**
- **CBPR: Combining Science, Education, Intervention, and Advocacy in One Package**

What is Risk Communication?

- An interactive process of information exchange & sharing of opinions among individuals, groups and institutions.
- It often involves multiple messages about the nature of risk, or expressing concerns, opinions or reactions to risk messages.
- Regulatory policy and disaster management protocols evolve as risk communications shapes perceptions of risk.
- Risk communication is usually based more or less exclusively on quantitative risk assessments.

Ruby E. Brown, PhD.

What Are Risk Perceptions?



Fence-line family circles together for protection when one of the children is diagnosed with leukemia. (Port Arthur 2004)

What Factors Affect Risk Perceptions?

Knowledge

Control

Benefits

Context

How Do EJ Communities See Their Situations:

- Life-Threatening & Urgent (personal experience of multiple health effects)
- Debilitating & Oppressive (“there’s nothing fair about how risk is distributed”)
- UNJUST: a Product of Racism, Class Bias & Deepening Economic Divides
- Evidence of Marginalization & Social Neglect (I live in a *Sacrifice Zone*.)

Community POVs: Life in a Sacrifice Zone

- Manchester, Milby, Magnolia-Harrisburg (East Houston TX)
- Corpus Christi TX
- 5th Ward / Bruce Elementary School / MDI Superfund Site (Houston TX)
- Mission TX
- West Port Arthur TX
- Grand Boise LA (U.S. Liquids Waste)
- Chalmette / Meraux LA (Murphy / Exxon)

West Port Arthur TX



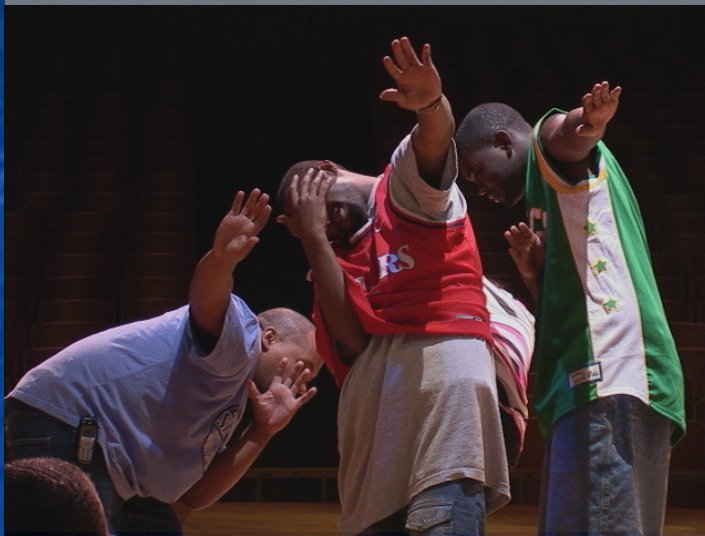
- Port Arthur “ringed” by refineries and chemical production facilities
- Extreme events on the fence-line are commonplace
- Higher than normal rates of cancers & respiratory problems
- West Port Arthur is 88% African-American

West Port Arthur TX



- VX hydrolysate shipments add to Port Arthur cumulative risk burden
- Community shut out of Dod / Veolia contracting process
- Shipment / incineration process will last up to 2 years
- DoD actions confirm pattern of E(I)J marginalization

The West Port Arthur POV (CIDA)



- “Fire in the Hole”: a worst case environmental threat scenario image



- A mother advocates for her ill son’s right to health care during a community Forum performance

Corpus Christi TX



- Valero / CITGO complex one of dirtiest in the U.S. (101, 014 lbs. of carcinogens per year)
- Fence-line community experiences high rates of cancer and respiratory disease
- Fence-line community primarily Latino & African-American
- Coastal bend area shows “cluster” of congenital heart defects

Corpus Christi POV (CfEJ)



- Members of CfEJ create image of the community's cumulative risk burden in Forum workshop
- CfEJ end Forum performance with community with cleansing ritual to lift this burden



East Houston / Manchester (T.e.j.a.s.)



- Homes in close proximity to Valero refinery
- Hartman Park built in “buffer zone” between fence line and neighborhoods
- Chronic low levels of exposure to benzene & other VOCs, NO_2 , SO_2 , Hydrogen Sulfide, et al.

East Houston (Manchester)



- Frequency of “upsets,” explosions & fires in close proximity to homes
- Frequency of “shelter-in-place” incidents
- Lack of access to escape routes in railway emergencies due to interlaced maze of rail lines

Chavez High School / Milby Park



- Vulnerable members of communities placed at greater risk due to VOC emissions
- Large concentrations of school age children of color on fence-lines.
- Naming east side HS after Cesar Chavez considered by some an affront to the Latino community

CANCER STUDY AREA

Researchers at the University of Texas School of Public Health have found a 56 percent increased risk of acute lymphocytic leukemia among children living within two miles of the Houston Ship Channel, when compared with children living more than 10 miles from the channel.



& How Does This Translate for Families in East Houston ?



How Science Sees Air Quality in Manchester / Chavez Areas?

East Houston Definite Risk Pollutants

Census Tract Number	Total Pollutants	Acrolein	Chromium VI	Diesel Particulates	Formaldehyde	Benzene	Chlorine	1,3-Butadiene	Hexamethylene diisocyanate
3203	7	X	X	X	X	X	X	X	
2121	6	X	X	X	X	X	X		
2334	6	X	X	X	X	X	X		
2336	6	X	X	X	X	X	X		
2337	6	X	X	X	X	X	X		
3116	6	X	X	X	X	X		X	
3201	6	X	X	X	X	X		X	
3204	6	X	X	X	X	X	X		
2115	5	X	X	X	X	X			
2116	5	X	X	X	X	X			
2118	5	X	X	X	X	X			
2119	5	X	X	X	X	X			
2120	5	X	X	X	X	X			
2122	5	X	X	X	X	X			
3107	5	X	X	X	X	X			
3110	5	X	X	X	X	X			
3111	5	X	X	X	X	X			
3114	5	X	X	X	X				X
3115	5	X	X	X	X	X			
3108	4	X	X	X	X				
3109	4	X	X	X	X				
3112	4	X	X	X	X				
3113	4	X	X	X	X				
3202	4	X	X	X				X	
3205	4	X	X	X				X	
3206	3	X	X	X					
3207	3	X	X	X					
3217	3	X	X	X					

Institute for Health Policy



THE UNIVERSITY of TEXAS
SCHOOL OF PUBLIC HEALTH

How Science sees: health effects & sources by area in east Houston

Table 1. Definite Risk Pollutants

Air Pollutant	Health Effects ²		Emission Source ¹			
	Cancer endpoint	Chronic endpoint	Point	Mobile		Area
				On Road	Off Road	
Ozone		Respiratory /Cardiovascular/Immune	N/A	N/A	N/A	N/A
Fine Particulate Matter (PM 2.5)	Yes	Respiratory /Cardiovascular	X	X	X	X
Diesel Particulate Matter	Yes	Respiratory		X	X	
1,3-Butadiene	Yes	Female reproductive	X	X	X	X
Chromium VI	Yes	Respiratory	X	X	X	X
Benzene	Yes	Immune	X	X	X	X
Ethylene Dibromide (Dibromoethane)	Yes	Male reproductive	X			X
Acrylonitrile	Yes	Respiratory	X			X
Formaldehyde	Yes	Respiratory, Eyes	X	X	X	X
Acrolein	No	Respiratory	X	X	X	X
Chlorine	No	Respiratory	X			X
Hexamethylene Diisocyanate	No	Respiratory	X			X

¹Emissions taken from the National Emission Inventory (NEI), 1998; (U.S., EPA, 2006c)

²Only chronic health effects associated with chronic health value used in the analysis are depicted in the table.

How Science Sees: Concentrations of Benzene & 1,3 Butadiene in the Houston Metro

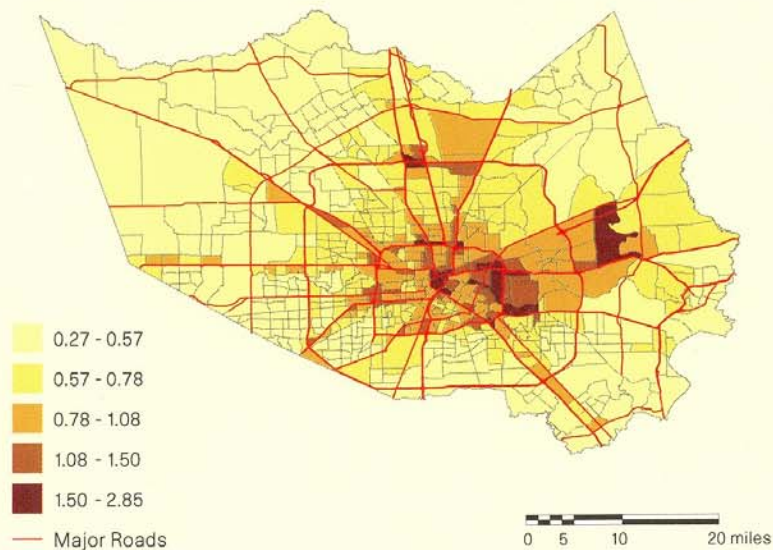


Figure 1: Benzene concentrations (ppb)

*Benzene concentrations (ppb) across Harris County census tracts.
Data from the US EPA's 1999 NATA [4].*

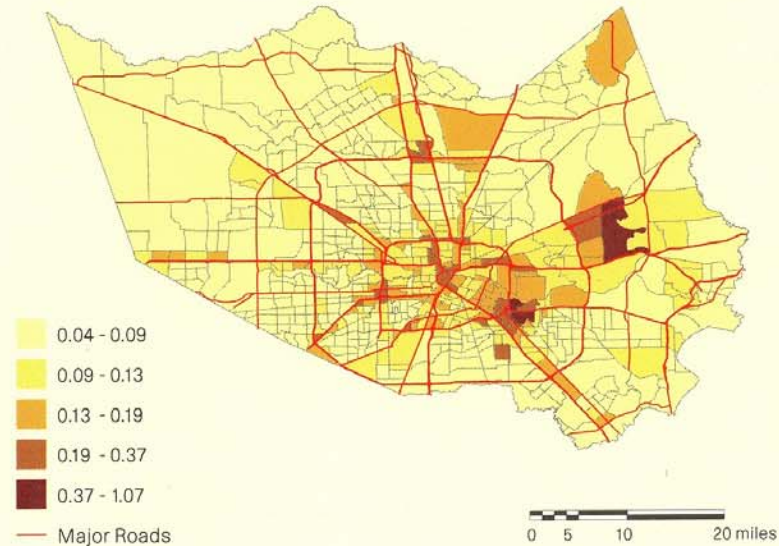


Figure 2: Concentrations of 1,3-butadiene (ppb)

*Concentrations of 1,3-butadiene (ppb) across Harris County census tracts.
Data from the US EPA's 1999 NATA [4].*

(in general) What's the Scientific POV

on Issues in EJ Communities?

- Cause & effect relationships are complicated by multiple variables
- The situation impacts local / regional economies: bread & butter issues are politically charged
- The situation is emotionally charged and difficult to “manage”
- The tension between objectivity & advocacy is problematic
- Community studies do not translate readily into clear, quantifiable data
- Race & social-economic indicators in EJ communities demonstrate institutionalized inequities: where does this lead politically?

**Disclaimer: There is a
Huge difference in levels
of engagement among
BENCH SCIENTISTS,
Community-Based Public
Health Scientists &
Clinical Practitioners**

Community Values vs. Scientific Values: What's the Difference?

- Our history is important
- Health & quality of life primary concerns
- Narratives of experience are important data
- Values *local knowledge* of pollution sources, exposure opportunities & economic power dynamic
- Passion, mutual support & commitment to struggle are keys to success
- ahistorical: only concerned with abstract systems
- Health effects as mechanistic process outcomes
- Must simplify complex site-specific relationships to perform analysis
- Expertise trumps local knowledge
- Commitment to “absolute” objectivity

This is What the Difference Looks Like as a Forum Image



- Various reactions to community's spike in congenital heart defects
- A community-based practitioner walks around inside the image
- A primarily bench toxicologist watches from outside the social dynamic

Local Knowledge v.s. Scientific Expertise

The *“myth of exclusivity”*

“By virtue of training & accomplishment, only scientists are entitled to the methods & fruits of scientific enterprise

vs.

“methodological pluralism”

Grassroots epidemiology & public health advocacy are essential to sound community-based environmental science.

(Dr. Marvin Legator)

**These two potentially
conflicting ways of knowing
may collaborate
under the rubric of
Environmental
Justice**

Aspects of Environmental Justice (Executive Order 12898)

- All people have a *right to be protected* from environmental degradation
- **Prevention** is the preferred EJ strategy: eliminate potential harm before it harms
- EJ framework rests on the *Precautionary Principle*
- EJ *shifts the burden of proof to polluters*, who harm, discriminate, & do not give equal protection to racial / ethnic / economic minorities
- EJ *redresses disproportionate impacts* by committing resources to substantive action
- Note: Ex. Order 12898 is NOT a LAW

(Robert Bullard, 2006)

***Community-Based
Participatory Research***

provides an **Action Methodology**

for Environmental Justice

serving both

Community Advocacy

&

Environmental Health Science

What is Community-Based Participatory Research (CBPR)?

“...a collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings...”

David Katz, 2004

CBPR “Rules”

- Community & Scientists COLLABORATE in Framing Research Focus
- Community Contributes LOCAL KNOWLEDGE to Research Expertise
- Researchers Contribute EXPERTISE to Enhance Community Knowledge
- Community Actively Participates in LOCAL INTERVENTIONS & DATA MANAGEMENT
- Community & Researchers Collaborate on INTERPRETATION of data
- Researchers Support Community ADVOCACY with Facts & Credible Scientific Process
- Community Enhances Credibility of Process by Acknowledging Study Parameters While Pursuing Advocacy

The SPECIAL MANDATE of CBPR:

“...restructure the undemocratic expert / client relationship because hypotheses, analysis and interpretation directly affects the social power dynamic...”

(Frank Fischer, 2000)

A Community-Based POV combining Science, EJ & a “Bias Toward Action”

**ENSURING RISK REDUCTION
IN COMMUNITIES WITH MULTIPLE STRESSORS:
ENVIRONMENTAL JUSTICE AND
CUMULATIVE RISKS/IMPACTS**

**NATIONAL ENVIRONMENTAL JUSTICE ADVISORY COUNCIL
CUMULATIVE RISKS/IMPACTS WORK GROUP**



**DRAFT REPORT
JANUARY 31, 2004**

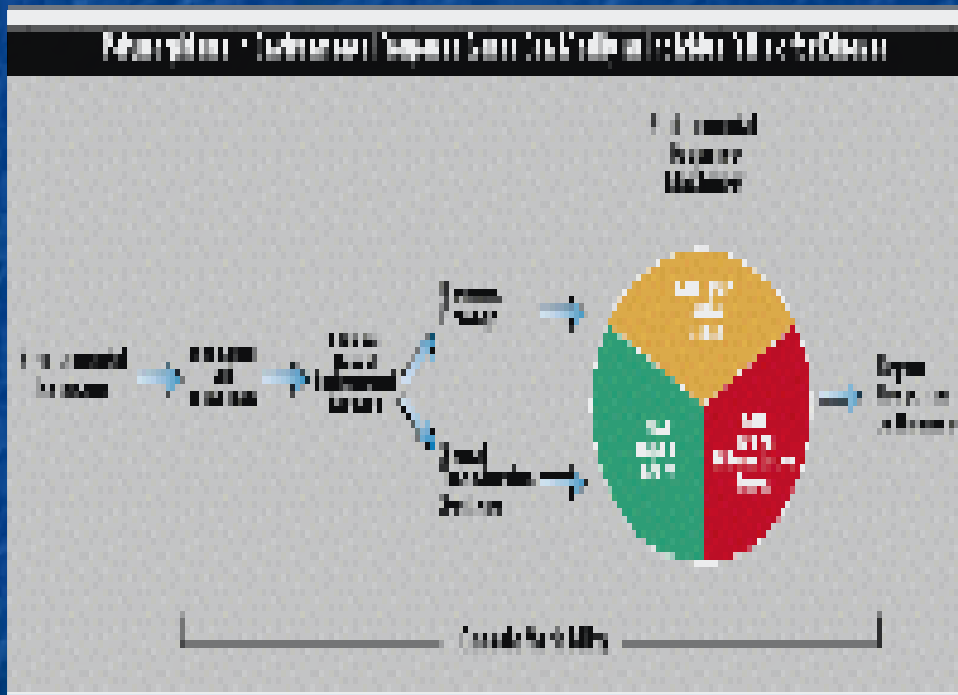
volume 1 of 2

Produced for Purposes of Discussion at the
NEJAC Meeting
New Orleans, Louisiana
April 13 through 16, 2004

Cumulative Risk / Multiple Stressors

Toxico-Genomics & Risk

- Chemical Synergies
- Relationship of Cumulative Risk to Susceptibility
- Vulnerable Populations: Why?
- Epigenetics: How May Exposures Affect Human Development?
- Immuno - Suppression & Endocrine Disruptors



Addressing Cumulative Risk through a Precautionary Approach

- **Preventive Action in the face of Uncertainty**
- **Shift Burden of Proof to Proponents of an Action, Which is Potentially Dangerous to Public Health**
- **Exploring a Wide Range of Alternatives to Potentially Harmful Actions**
- **Increasing Public Participation in Decision-Making**

Project COAL: An EJ / CBPR Hybrid



When landlords won't cooperate with lead mitigation projects, families are at risk.

(DMAM, 2004)

- NIEHS / DMAM / Casa de Amigos collaboration
- Community focus on lead exposure / respiratory disease in near north Houston TX
- TO troupe used to COMMUNICATE RISK
- 2003 - 2007 with 2nd iteration as lead / asthma focus CBPR (2008 - 2013, pending)



El Teatro Lucha por la Salud del Barrio sets up “fluid image” during Project COAL outreach performance. (Houston TX, 2005)