US EPA ARCHIVE DOCUMENT

EPA's Community-Focused Exposure and Risk Screening Tool:

C-FERST

and its potential use for EJ efforts

Strengthening Environmental Justice Research and Decision Making Symposium

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What is the need for this tool?

- Communities want to understand their environmental issues in the context of risk
  - rely on risk perception if difficulties accessing, interpreting data

- EPA wants tools that rely on best available information
  - identify communities at risk and “hot spots” within communities
  - empower communities to make their own decisions

What is the need for this tool? (cont'd)

- EJ communities may have higher risks and limited access to resources
  - 2009 National Academy of Public Administration report and 2004 NEJAC Cumulative Risk report highlighted difficulties for communities/Regions regarding risk prioritization

- C-FERST initially designed to assist EPA CARE program in identifying and prioritizing environmental issues
  - could be enhanced to address needs specific to EJ programs
  - this assessment tool can link with other data viewing tools

What is C-FERST?

The Community-Focused Exposure and Risk Screening Tool (C-FERST; www.epa.gov/heasd/c-ferst) is a “one-stop shop” GIS and resource access Web tool for conducting community assessments.

It balances innovative, high quality science with user-friendliness to characterize the cumulative impact of multiple stressors for:

- prioritizing environmental issues within communities;
- identifying communities at risk; and
- ultimately, assessing impact of actions (accountability).

How Have We Shaped This Tool?

- Considered needs expressed by Regions and CARE for a one-stop web tool, along with EPA/ORD's human health goals
- Reviewed and applied (to 2 CARE projects) available tools & approaches for cumulative and community-based assessments
- Collaborated with CARE as an end user, with an eye on ORD research directions and other future end users, for tool design
- Developed C-FERST incrementally (science and user interface), soliciting feedback through presentations and on-line survey

What can be done with C-FERST?

- Access information, resources, and guidance
- Map multimedia exposures and risks
- Link to best practices in other communities
- Generate community issue profiles

C-FERST Home
Learn About Your Community
View Guidance on Selecting Issues
View Exposure & Risk Maps
View Environmental Issue Profiles
Rank the Selected Issues
Explore Potential Solutions
CARE Roadmap with C-FERST
PACE-EH with C-FERST
EPA Cumulative Risk Guidance with C-FERST
EPA EJ Toolkit with C-FERST
Other Community Tools
C-FERST Questions/Feedback

C-FERST: Community-Focused Exposure and Risk Screening Tool

Version 0.3, February 2010

ABOUT THIS TOOL

C-FERST is a user-friendly, web-based tool intended to assist with identifying communities at risk, and prioritizing environmental issues within communities. It is designed as a "one-stop shop" to: view available EPA information such as guidance, fact sheets, and maps for community environmental issues; add or share local information, if available; and generate community reports for environmental issue profiles. C-FERST links to and builds upon other EPA and Federal Agency tools for characterizing human exposures and cumulative risks, using best available science. The U.S. EPA Office of Research and Development, National Exposure Research Laboratory's Communities Research Program developed and funded C-FERST in collaboration with the U.S. EPA Community Action for a Renewed Environment (CARE) Program, and with assistance from EPA Region 1 and EPA contractors Alion Science and Technology, Inc. and CSC. Initially, C-FERST is being developed for EPA programs working with community partners, to more easily facilitate training for optimal use of the tool; future end users could include other federal, state, or local agencies working with community partners, and community leaders and members themselves. More information about C-FERST can be found at: http://www.epa.gov/heasd/c-ferst.

Disclaimer

Click here to see the full disclaimer.

This is an interim test version of C-FERST and has not been subjected to agency review. It is being circulated internally for comment.

C-FERST OPTIONS

C-FERST was designed with the intent that a first-time user can navigate the tool without assistance. You can use C-FERST by selecting any of the Main Options or Additional Options below or on the lefthand blue bar in any order you wish, OR you can use C-FERST in conjunction with available community guidance documents (see Additional Options below).

Main Options:

Would you like to:

- learn about your community?
- view guidance on selecting environmental issues of concern?
- view concentration, exposure and risk maps?
- view available information about your selected environmental issues?
- access existing approaches for ranking environmental issues?
- explore exposure/risk reduction actions and promising practices for solutions?

Additional Options:

Would you like to:

- use EPA's CARE Roadmap with C-FERST?
- use NACCHO's PACE-EH (Protocol for Assessing Community Excellence in Environmental Health) with C-FERST?
- use EPA's 2007 Cumulative Risk Guidance with C-FERST?
- use EPA's 2004 Toolkit for Assessing Potential Allegations of Environmental Injustice with C-FERST?
- learn about other tools for community assessments?

For more information (Qs & As) about C-FERST, please click here.

Contact Us

To communicate with us, please see our Contact Us page, call or email Dr. Valerie Zartarian (617-918-1541; Zartarian.Valerie@epa.gov), or email CFERSTMail@epa.gov with any questions, comments, or specific suggestions related to this version of C-FERST.

Click here to email comments on the C-FERST application

Click here to fill out feedback form on C-FERST website.

C-FERST

Main

Potential Roles of C-FERST

- C-FERST is the “flagship tool” for EPA/ORD/NERL cumulative/communities research program (http://www.epa.gov/heasd/communities/)

- Support EPA initiatives, programs, activities with similar science questions related to community-based cumulative exposure and risk, e.g.
  - CARE
  - Environmental Justice
  - Healthy Communities Initiative
  - National Children’s Study
  - Regional programs (e.g., compliance assistance, enforcement targeting)
  - Program Office prioritization

- Support Administrator priorities and Agency needs
  - cleaning up communities
  - working for environmental justice

Who are the intended end users?

- EPA Regional project officers (e.g., CARE) working with community partners
- Future: other EPA programs (e.g., EJ); federal, state, or local agencies; and communities or individuals
- C-FERST framework provides opportunities to collaborate within EPA, with other federal agencies and academia
- Potential C-FERST case studies
  - Region 5 – supporting Milwaukee, WI (CARE and EJ Showcase project)
  - Region 1 – Healthy Communities Initiative TBD
  - New FY11 CARE Level I Project?
  - Other (EJ)?

United States
Environmental Protection
Agency

Science Issues

C-FERST "Issue Profile" Reports

- Available information (fact sheets, weblinks, maps) for each environmental issue and report category:
  - General information
  - Health outcomes
  - Exposure and risk reductions
  - Population affected
  - Sources
  - Environmental concentrations
  - Human exposures (NERL Research Focus)
  - Health risks (cumulative where possible, in collaboration with others)
  - Link to ranking approaches
  - Other communities focusing on this issue
  - Solutions Implemented by Other Communities

MAIN SCIENCE FOCUS

- Framework highlights information gaps and research needs
  - Can be used as a communication tool for collaborative research

Environmental issues categorized by resource

Hammond et al. "Community Environmental Issues: A Summary and Analysis of Local and Federal Government Perspectives," DRAFT, in review. Note that some of the programs and reports in this table focused on grouped categories, and some on subcategories, when selecting and ranking environmental issues.

Environmental Issues	OEJ Grantee Directory[1]	CARE Program Directory[2]	EPA 1987 Report[3]	EPA 1990 Report[4]	EPA 1993 Report[5]	2002 NATA[6]	2007 RSEI[7]
Accidental Releases - Oil Spills			26 of 26		X		
Accidental Releases - Toxics			25 of 26		X		
Air Quality	X	X				X	X
Air Quality - Mobile Source/Near Road Pollution	X	X				X	
Air Quality - Point Source Emissions	X	X				X	X
Ambient Air Pollutants				X		X	X
Arsenic in Soil		X					X
Asbestos						X	X
Asthma	X	X				X	
Autobody Shops / Recyclers	X	X					
Cancer	X					X	
Children's Health		X					X
Consumer Exposure to Chemicals			4 of 26				X
Contaminanted Land	X						X
Contaminated Sludge			17 of 26				
Criteria Air pollutants			22 of 26		X		X
Diesel Exhaust	X	X	*	*	*	X	X
Direct Point Source Discharges to Surface Water			23 of 26				X
Dredging/PCBs	X	X					
Drinking Water	X	X	9 of 26	X	X		X
e. coli at beaches	X	X					
Environmental Tobacco Smoke			4 of 26				
Fish Consumption	X	X					X
Ground-water contamination			21 of 26		X		X
Hazardous /Toxic Air Pollutants			6 of 26		X	X	X
Hazardous Waste / Pharmaceuticals		X					
Hazardous Waste Sites - Active			13 of 26		X		X
Hazardous Waste Sites - Inactive			8 of 26		X		X
Hazardous Waste Sites - Abandoned/Superfund					X		X
Healthy Homes (Cleaning Products, Waste, Allergens)	X	X					
Housing/Property Maintenance	X						
Indirect, Point Source Discharges to Surface Water			24 of 26				X
Indoor Air Quality	X			X	X		
Indoor Pollution				X	X		
Indoor Vapor Intrusion			*	*	*		
Industrial Solid Waste Sites					X		X
Industrial Waste-Water Discharges to Surface Waters					X		X
Integrated Pest Management/Pesticides	X	X	12 of 26		X		
Land Use / Redevelopment/ Smart Growth	X	X					
Lead	X	X	#	#		X	X
Mercury		X				X	X
Mining Waste	X		18 of 26				
Municipal Solid Waste Sites					X		X
Municipal Waste-Water Discharges to Surface Waters					X		X
New Toxic Chemicals			15 of 26			X	
Nonhazardous Waste Sites - Industrial			14 of 26				X

Environmental Issues in C-FERST (FY10-12)

United States Environmental Protection Agency

ISSUES WITH FACT SHEETS AND SCIENCE FOR EXPOSURE/RISK MAPS

- air toxics
- arsenic in food, drinking water, soil
- diesel PM
- environmental tobacco smoke (ETS)
- fine particulates
- lead (multimedia)
- mercury in fish
- near roadway
- ozone
- radon
- residential pesticides
- ultraviolet radiation

ISSUES WITH FACT SHEETS ONLY

- autobody shops
- brownfields
- E. Coli at beaches
- hazardous waste/pharmaceuticals
- healthy homes
- methamphetamine labs
- microbials in drinking water
- land use/smart growth
- lead in drinking water
- mold
- recreational water quality
- runoff
- schools
- solid waste disposal/recycling

Cumulative Exposure/Risk Focus Areas

- **Asthma (onset and exacerbation)**
  - Exposure Model for Individuals (EMI)
    - for PM2.5, PM10 and ozone, possibly other; also near roadway work
  - Other pollutants, near-roadway exposure assessment, linking with NCER and other work on non-chemical stressors

- **Early neurotoxicity effects**
  - Lead (new modeling effort)
  - Mercury via fish (using SHEDS); possibly other metals w/ NCEA collaboration
  - Pesticides, especially those relevant to NCS hypotheses (using SHEDS)

- **Lung cancer risk from radon and ETS (cumulative exposure assessment)**
  - Currently underway for C-FERST
  - ETS modeling work may also be incorporated into the asthma outcome work

C-FERST Home

Learn About Your Community

View Guidance on Selecting Issues

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Rank the Selected Issues

Explore Potential Solutions

CARE Roadmap with C-FERST

PACE-EH with C-FERST

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EPA EJ Toolkit with C-FERST

Other Community Tools

C-FERST Questions/Feedback

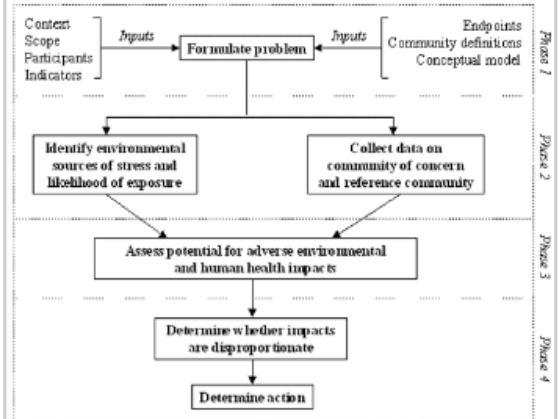
Using EPA's 2004 Toolkit for Assessing Potential Allegations of Environmental Injustice with C-FERST

1. **Problem Formulation:** Establishes context, management goals, and scope of the entire assessment; identifies the participants in the process, the endpoints that are going to be assessed to inform the decision-making process, and which environmental justice indicators will be used to assess those endpoints. During this step, an affected area also is identified in at least a general way, as are potential reference communities or statistical sources (e.g., national or statewide values).

   −In C-FERST you can...

   - learn about your community's environmental indicators and demographic information by linking to Publicly Available EPA Mapping tools such as MyEnvironment and EJGAT;
   - view maps at the national and local scale for various chemicals, of concentration, human exposures, and risks by US census tract. These data maps can be overlaid with layers of source, demographic (including environmental justice-related population data), and physical feature data;
   - view Factsheets about Environmental Issues of concern, organized by general information, sources, concentrations and exposures, risks and effects, and risk reduction categories;
   - view Guidance Documents Developed by Other Groups to aid in establishing context, goals, scope, and indicators;
   - access statistical sources and information on potential reference communities through Links to Other Federal Tools such as the National Environmental Public Health Tracking Program; and
   - consider issues of concern to other community groups.

Source: EPA's EJ Toolkit (http://www.epa.gov/compliance/index.html) Methodology for Assessing Potential Allegations of Environmental Injustice (167pp, 1.3MB, About PDF)



2. **Data Collection.** Collect situation-specific data needed to conduct the analysis of whether the affected area is likely to or is already experiencing disproportionately high and adverse effects or impacts from the situation. In this phase, two types of data are collected: (1) Data on the environmental sources of stress and likelihood of exposure and (2) Health-related, demographic, social, and economic data on the affected area and on the potential reference communities.

   +In C-FERST you can...

3. **Assessment of the Potential for "Adverse" Environmental and Human Health Effects or Impacts.** In this phase, the Assessment Team uses the information collected above to determine whether the proposed actions or existing situation might cause adverse impacts on the environment in which the community members live or work and on the health and welfare of community members.

   +In C-FERST you can...

4. **Assessment of the Potential for "Disproportionately High and Adverse" Effects or Impacts.** The final question to determine the extent of an environmental situation is whether the potential for adverse effects on the environment or human health and welfare is disproportionately high in the affected area compared with the reference community. This involves a comparison of the likelihood, magnitude, and severity of potential effects in the affected area with the likelihood, magnitude, and severity of potential effects in the reference population(s).

   +In C-FERST you can...

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Other Community Tools

C-FERST Questions/Feedback

Learn About Your Community

- Publicly Available EPA Mapping Tools Focused on Communities
- Guidance For Collecting Local Data
- Measurement Methods for Collecting Local Data
- Upload Local Data

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Resources to Help Select Environmental Issues

Guidance Developed By Other Groups

- **EPA's CARE (Community Action for a Renewed Environment) Roadmap**
  Step 2, "Identify Community Concerns: Identify the environmental, health, and related social and economic concerns of the community," pp. 9-10.

- **NACCHO's PACE-EH (Protocol for Assessing Community Excellence in Environmental Health)**
  Task 5, "Generate a list of community-specific environmental health issues", p.24.

- **EPA's 2007 Cumulative Risk Guidance Document**
  Section 2.1, "Initiating Factors For Cumulative Risk Assessment", pp. 2-1 to 2-4.

- **EPA's 2004 Toolkit for Assessing Potential Allegations of Environmental Injustice**
  Phase 1, "Problem Formulation", pp. 58-63.

Factsheets

- **View Factsheets**
  View factsheets and web links organized by general information, sources, concentrations and exposures, risk and effects, and risk reduction categories.

EPA Community Projects

- **CARE Community Profiles**
  View all community projects undertaken through CARE, organized by year with links to descriptions of the projects.

- **Environmental Justice Grant and Program Projects**
  View summary of EJ community projects being conducted through grants, cooperative agreements, and other programs.

Tables of Categorized Issues

- **Environmental Issues Categorizes by Resource**
  View a table of issues categorized by EPA reports and community documents.

- **Environmental Issues Categorized by Type, Media, and Pathway**
  View a table showing media, exposure pathways, health endpoints, and chemicals associated with each issue.

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Environmental issues categorized by type, media and pathway

Hammond et al. "Community Environmental Issues: A Summary and Analysis of Local and Federal Government Perspectives," DRAFT, In review.

Environmental Issues	Affected or Influencing Media						Exposure Pathways				Health Endpoint(s) of Concern	Chemical(s) of Concern
	AIR	INDR	SOIL	WATR	FOOD	OTH	IH	IG	DT	DR		
SOURCES OF EXPOSURE												
Airport	•		•				•				hearing loss, asthma	VOCs, PM
Air Quality	•						•				asthma, COPD, heart disease	PM, O3
Air Quality - Mobile Source/Near Road Pollution	•						•				asthma, respiratory disorders	diesel exhaust, PM, HAPs
Air Quality - Point Source Emissions	•						•				asthma, respiratory disorders	metals, SVOCs, VOCs
Autobody Shops / Recyclers	•		•	•			•				asthma, neurological disorders	VOCs, metals
Brownfields			•	•				•		•	cancer	metals, PCBs
Contaminanted Land			•	•	•			•		•	cancer	metals
Contaminated Sludge			•							•	cancer, immune disorders	PCBs, plutonium, etc.
Drinking Water				•	•			•	•	•	cancer, liver/kidney disorders	pathogens, metals
Fish Consumption					•				•		neurological impairment	mercury
Ground-water contamination				•				•	•	•	cancer, liver/kidney disorders	nitrates, metals
Hazardous Waste / Pharmaceuticals			•	•						•	cancer	medications, acids, mercury
Hazardous Waste Sites - Active			•	•						•	cancer	refrigerants, chlorinated solvents, etc.
Hazardous Waste Sites - Inactive			•	•						•	cancer	refrigerants, chlorinated solvents, etc.
Hazardous Waste Sites - Abandoned/Superfund			•	•						•	cancer	metals, PCBs, etc.
Indoor Air Quality	•	•					•				asthma, allergies, cancer	radon, ETS, PM, VOCs
Indoor Pollution		•					•			•	asthma, cancer	lead, bioaerosols, asbestos
Indoor Vapor Intrusion		•					•				asthma, allergic reactions	VOCs, PM
Industrial Solid Waste Sites			•	•						•	cancer	metals, PAHs, pesticides etc
Methamphetamine Labs		•	•				•				respiratory disorders, nausea	VOCs, metals, acids, etc.
Mining Waste			•	•						•	cancer	radiation, metals, PM, etc.
New Toxic Chemicals	•	•	•	•		•	•	•		•	*unknown*	*unknown*
Nonhazardous Waste Sites - Industrial			•	•						•	cancer	PAHs, acids, etc.
Nonhazardous Waste Sites - Municipal			•	•						•	cancer	metals, PAHs, oils, etc.
Outdoor Air Quality	•						•				asthma, COPD, heart disease	PM, ozone, HAPs, etc.
Point sources - major except landfills	•			•			•				cancer, respiratory disorders	metals, PM, VOCs
Ports and Marine Terminals	•			•			•				asthma, cancer	diesel exhaust, PM, metals, etc.
Printers	•						•				asthma, allergic reactions	VOCs
School Buses (Retrofits)	•						•				asthma, allergic reactions	diesel exhaust, PM
Schools/Hazardous Waste	•	•		•			•			•	cancer	acids, caustic agents, etc.
Soil - unlined sumps			•	•					•	•	cancer, liver/kidney disorders	metals, PAHs, acids, etc.
Super-emitting cars	•						•				asthma, COPD	CO, NO2, PM
Uranium Mines (well water)			•	•		•		•	•	•	cancer	radiation
Water Quality - Wastewater / Sewage				•				•		•	cancer, liver/kidney disorders	pathogens, metals
Water Quality - Stormwater Runoff				•				•		•	cancer, liver/kidney disorders	petroleum, pesticides, nitrates, etc.
POLLUTANTS												
Ambient Air Pollutants	•						•				asthma, cancer	PM, VOCs
Arsenic in Soil			•	•	•			•	•	•	cancer	metals
Asbestos	•	•	•				•			•	mesothelioma	-
Coal Dust	•						•				pneumoconiosis	sulfur
Creosote	•						•	•		•	chemical burns, cancer	-
Criteria Air Pollutants	•						•				asthma, cancer	PM, ozone, lead, CO, NOx, SO2
Diesel Exhaust	•						•				asthma, cancer	PM, SO2, CO, CO2, NOx
Dioxins	•		•	•			•		•	•	cancer, skin lesions	2,3,7,8-TCDD, etc.
Dust From Construction Sites	-			-			-	-		-	silicosis, lung cancer	silica, PM, metals
e. coli at beaches			•	•				•		•	hemolytic uremic syndrome	-
Environmental Tobacco Smoke	•	•					•				lung cancer, asthma	benzene, acetone, PM
Fly Ash	•		•	•			•	•			cancer	silicon, aluminum and iron oxides
Hazardous /Toxic Air Pollutants	•						•				cancer	benzene, cadmium chromium VI, etc.
Integrated Pest Management/Pesticides		•					•			•	cancer, birth defects	organophosphates, methyl bromide, etc.
Lead	•	•	•	•			•	•			neurological, nervous system	-
Manganese (industrial emissions)	•		•	•			•				nervous system damage	-
Mercury	•		•	•	•		•				neurological impairment	-
Mold	-	-					-				allergic reactions, asthma	Stachybotrys chartarum, Aspergillus, etc.
Municipal Solid Waste Sites			•	•						•	respiratory disease, cancer	methane, dichlorobenzenes, VOCs

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C-FERST Questions/Feedback

Measurement Methods For Collecting Local Data

Screening Measurement Methods: Examples of Commercially Available Test Kits

- Air
- Surfaces
- Water

Quantitative Screening Methods: Instrument or Laboratory Analysis

- Air
- Surfaces
- Water

EPA and Other Federal Measurement Methods Tools

- Air
- Soil
- Water

Disclaimer

These links provide lists of weblinks to tools to support community measurements of local data. Inclusion of these tools in C-FERST does not imply endorsement of their use.

View a pdf of the information contained in these tables.

Reference: For more details: Medina-Vera M., Van Emon J., Melnyk L., Bradham K., Harper S., Morgan J. (2009) "An Overview of Measurement Tools Available to Communities for Conducting Exposure and Cumulative Risk Assessments." Journal of Exposure Science and Environmental Epidemiology, link.

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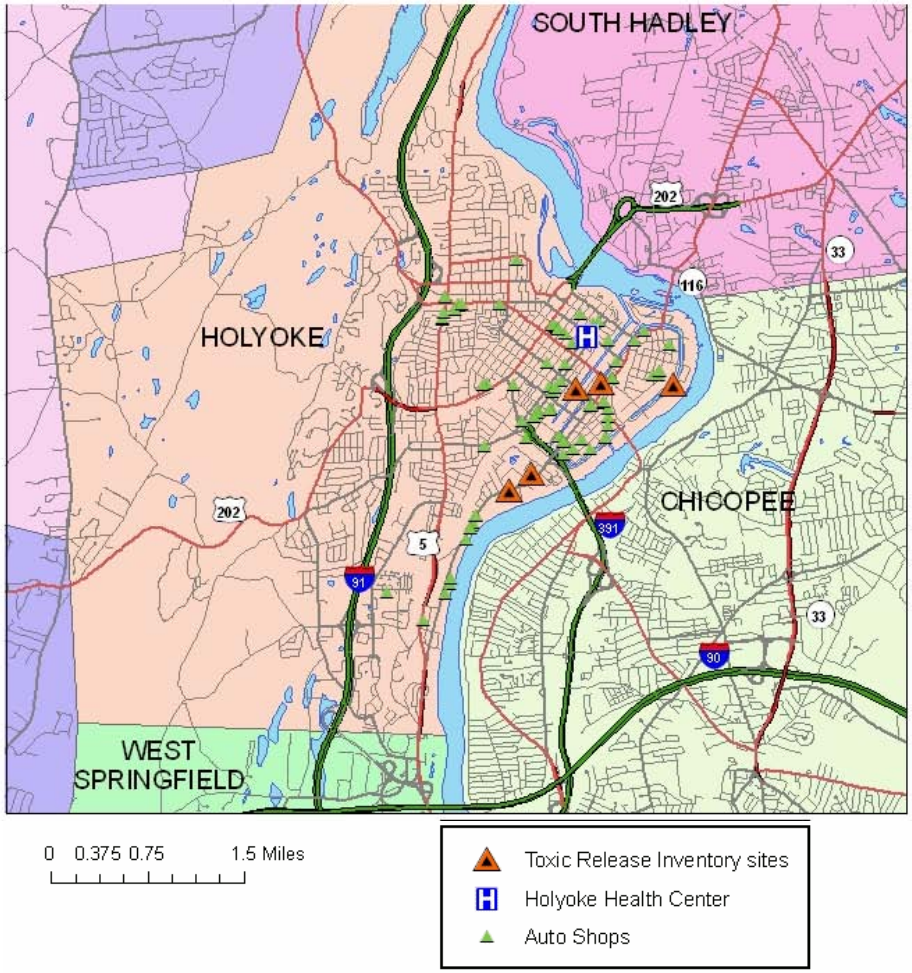
Enter Local Data - Point Sources



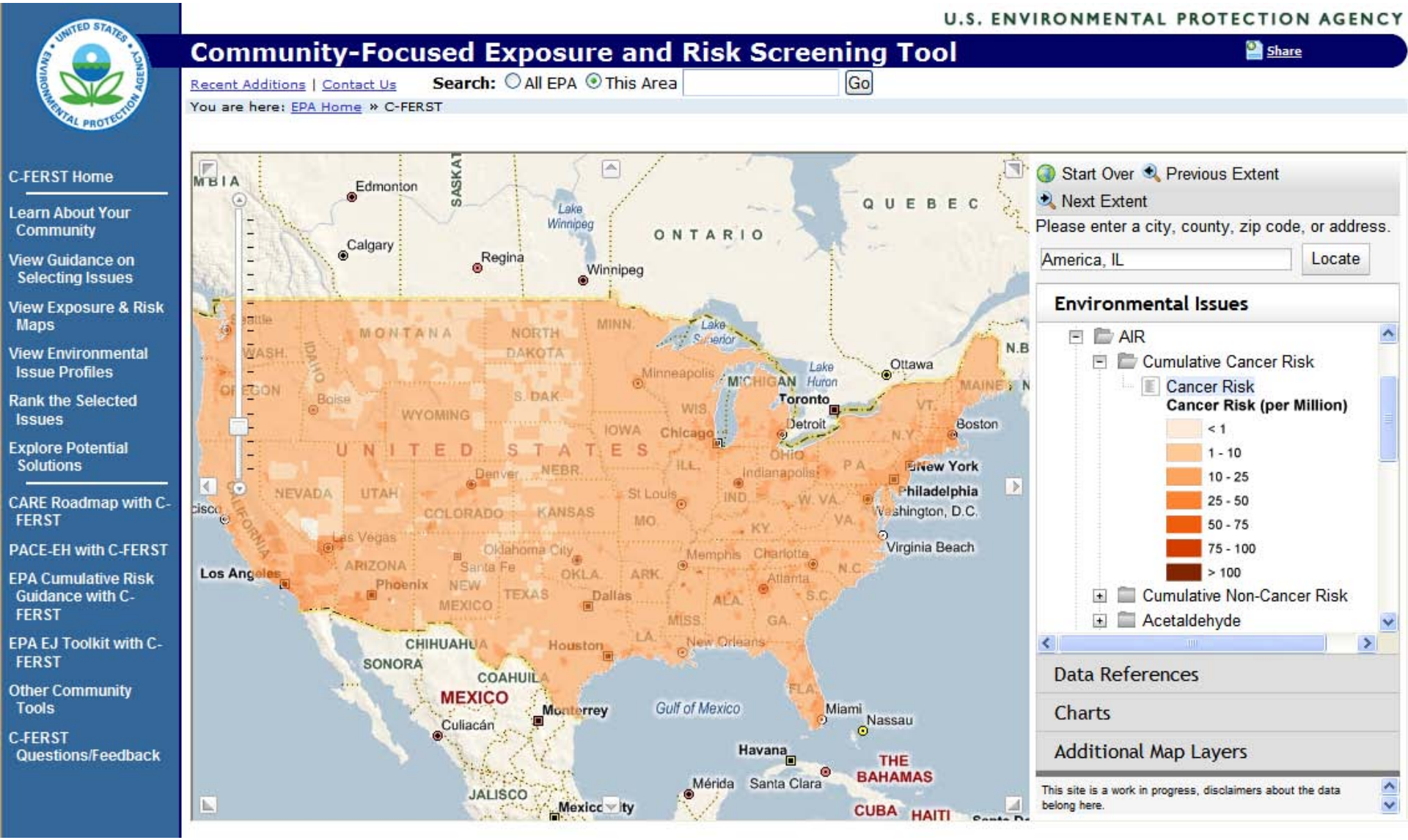
Example Map of

Locally Collected Data

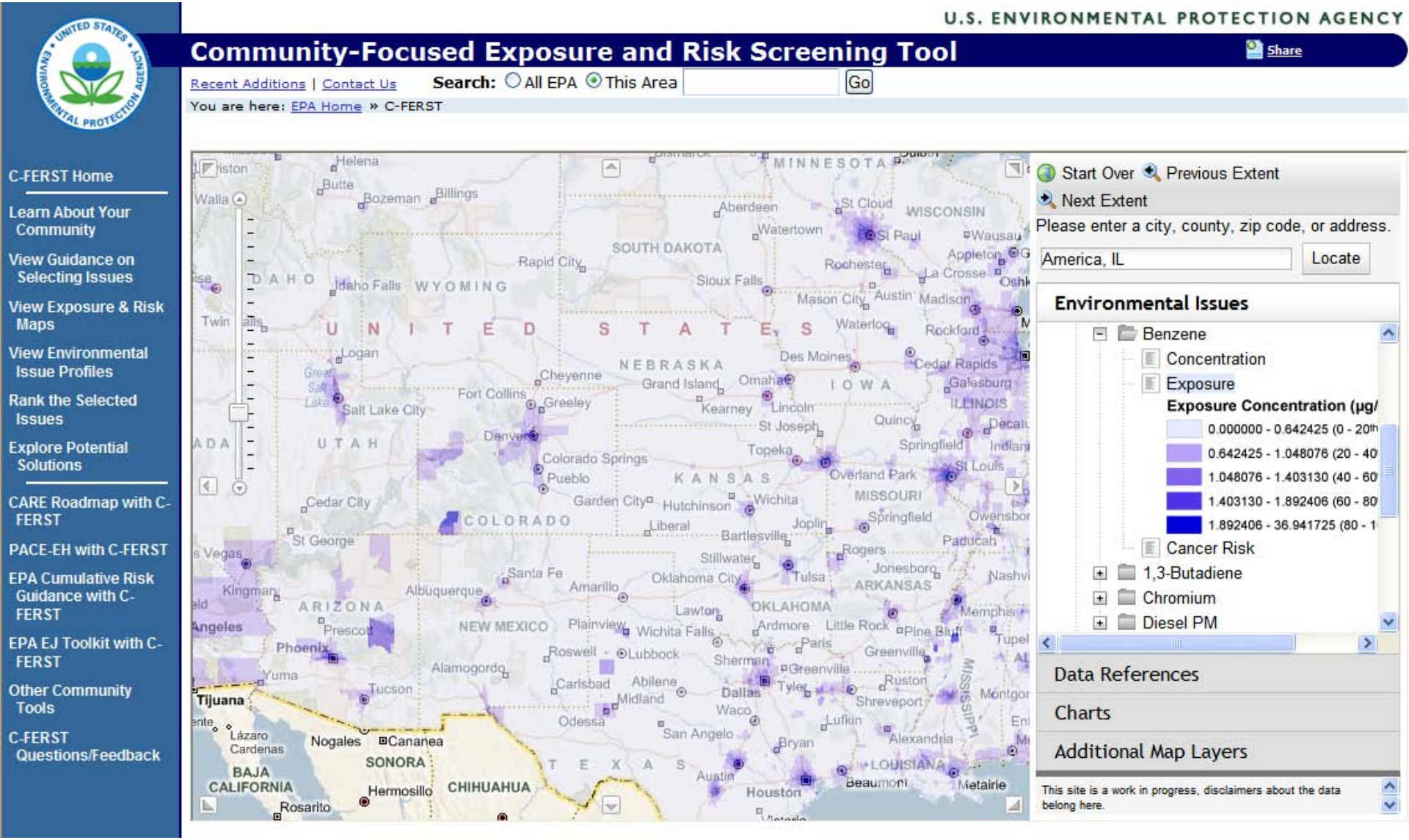
This is an example map created by the Holyoke, MA CARE community. This feature is under development.

Return To Local Data Page

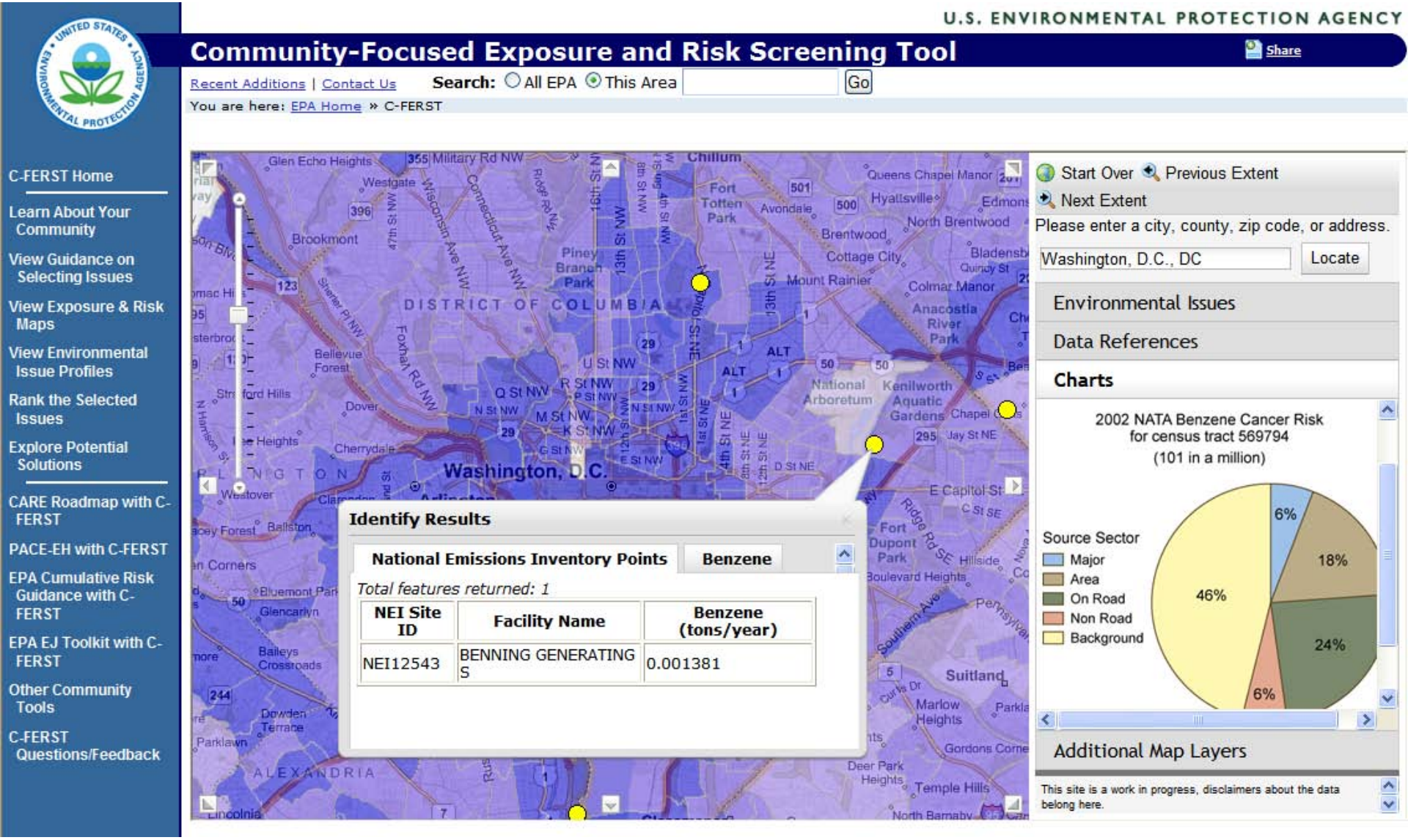
National Map of Cumulative Cancer Risks



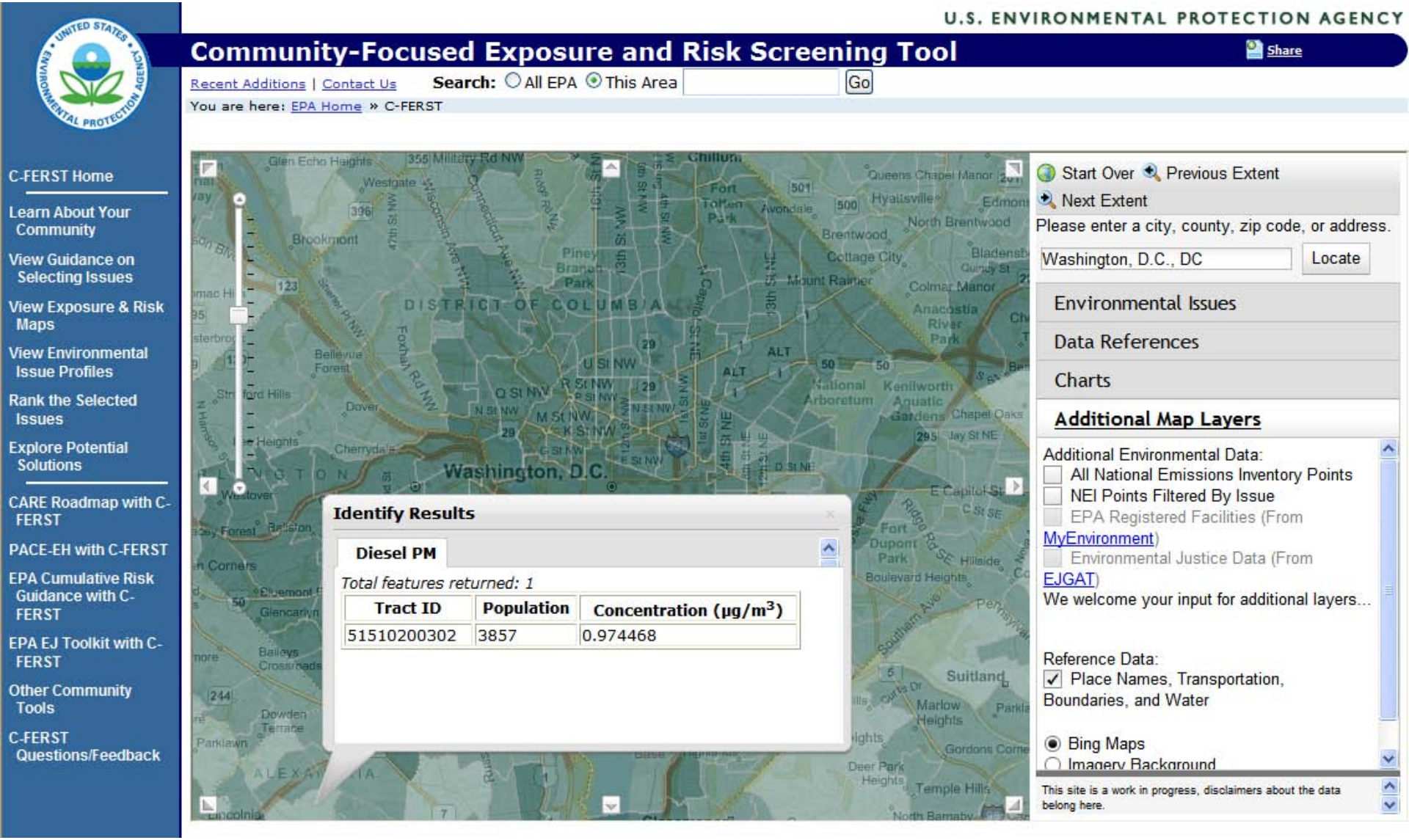
National Map of Benzene Exposures



Local Map of Benzene Exposures



Local Map of Diesel PM Concentrations



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View Environmental Issue Profiles

To generate a report, set the local area (if desired), select one or more issues using the checkboxes below, and click the Generate Report button below.

Limitations and Future Plans

Benzene is the only report fully populated in this version of C-FERST. Additional reports will be added.

Set Local Area

The reports contain information about the following:

- **General Information** (links to fact sheets)
- **Health outcomes** (links to other (e.g., CDC) tools)
- **Exposure and risk reductions** (links to fact sheets)
- **Population affected** (relevant information (e.g. maps, statistics of vulnerable sub-populations))
- **Sources** (links to factsheets and relevant information (e.g. databases, other tools, and maps when available))
- **Environmental Concentrations** (links to available databases, information for collecting local measurements, maps)
- **Human Exposures** (summary of contributing behaviors, other exposure factors, maps)
- **Health risks** (ranges within a community, comparisons to national averages, key factors/vulnerabilities/risk modifying factors, links to factsheets, maps when available)
- **Other Communities Focusing on this Issue** (links to community reports and promising practices documents)
- **Solutions Implemented by Other Communities** (links to community reports and promising practices documents)

- Alphabetical List of Issues
  - [ ] 1,3 Butadeine
  - [ ] Acetaldehyde
  - [ ] Acrolein
  - [ ] Arsenic in Soil
  - [ ] Arsenic in Water
  - [ ] Auto body Shops
  - [ ] Benzene
  - [ ] Brownfields
  - [ ] Childhood Asthma
  - [ ] Chromium
  - [ ] Copper in Drinking Water
  - [ ] Diesel Exhaust
  - [ ] Drinking Water Contaminants
  - [ ] E. coli at Beaches
  - [ ] Environmental Tobacco Smoke (ETS)
  - [ ] Fine Particulates
  - [ ] Fish Consumption
  - [ ] Formaldehyde
  - [ ] Hazardous Waste/Pharmaceuticals in Water
  - [ ] Healthy Homes
  - [ ] Land Use/Smart Growth
  - [ ] Lead
  - [ ] Lead in Drinking Water
  - [ ] Mercury
  - [ ] Methamphetamine Labs
  - [ ] Microbes in Water
  - [ ] Mobile Sources
  - [ ] Mold
  - [ ] Naphthalene
  - [ ] Non-chemical Stressors (Risk Modifying Factors) TBD
  - [ ] Outdoor Air - Near Roadway
  - [ ] Ozone
  - [ ] Polycyclic aromatic hydrocarbons (PAHs)
  - [ ] Ports
  - [ ] Radon
  - [ ] Recreational Water Quality
  - [ ] Residential Pesticides
  - [ ] Runoff
  - [ ] Schools
  - [ ] Solid Waste Disposal/Recycling
  - [ ] Stationary Sources
  - [ ] Ultraviolet (UV) Radiation
- + Specific Toxic Substances of Concern
- + Media
- + Sources of Exposure
- + Health Effects of Concern
- + Other Topics

Report Type

Community Report Generate Report

View Environmental Issue Profiles

U.S. ENVIRONMENTAL PROTECTION AGENCY

Community-Focused Exposure and Risk Screening Tool

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LOCATION

- This is located in Zip Code 48209 (Detroit, Wayne County, MI)

ISSUE

- Benzene

GENERAL INFORMATION

- For more information on this issue, go to: EPA's Office of Air and Radiation
- Relevant Web Links:
  Care Resource Guide References:
  - CARE Resource Guide (key word search: Air Pollution)
  - EPA's OPPT Community Assistance Program (CAP)
  - EPA's Office of Pollution Prevention and Toxics

  Additional External Links:
  - Safety and Health Topics: Benzene (Occupational Safety and Health Administration) EXIT Disclaimer
  - Facts About Benzene (CDC) | PDF version (4pp, 316KB, About PDF) EXIT Disclaimer
  - Benzene: ToxFAQs (ATSDR) (PDF) (2pp, 30KB, About PDF) EXIT Disclaimer

HEALTH OUTCOMES

- Under Development: This will include summary bullets, and links to other tools.

EXPOSURE AND RISK REDUCTION ACTIONS

- Relevant Web Links:
  Care Resource Guide References:
  - Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)

  Additional External Links:
  - Benzene: ToxFAQs (ATSDR) (PDF) (2pp, 30KB, About PDF) EXIT Disclaimer

SCALE (POPULATION AFFECTED)

- Under Development: Will provide a summary of vulnerable sub-populations.

SOURCES

- Relevant Web Links:
  Care Resource Guide References:
  - EPA's Technology Transfer Network: Air Toxics Website
  - EPA's High Production Volume Challenge Program

  Additional EPA Links:
  - Air Toxics Risk Assessment Reference Library, Volume 1, Chapter 4, Air Toxics: Chemicals, Sources, and Emissions Inventories (PDF) (32pp, 1MB, About PDF)
  - National Air Toxics Assessment (NATA) Website
  - EPA's Toxic Air Pollutant Website

  Additional External Links:
  - Benzene: ToxFAQs (ATSDR) (PDF) (2pp, 30KB, About PDF) EXIT Disclaimer
- Upload and map local data

Report:
Benzene

ENVIRONMENTAL CONCENTRATIONS

- Under Development: Will include a summary of concentration information and maps where available.

Quantitative data supplied by the 2002 National Air Toxics Assessment (outdoor sources only):

- Estimated county average concentration = 2.689 µg/m3
  This is higher than the county and national averages
  - estimated background concentration = 0.643 µg/m3
  - estimated contribution from major point sources = 0.024 µg/m3
  - estimated contribution from area and other sources = 0.176 µg/m3
  - estimated contribution from on-road mobile sources = 1.658 µg/m3
  - estimated contribution from non-road mobile sources = 0.188 µg/m3
- Range of Concentrations:
  Concentration estimates range from 1.901 to 4.542 µg/m3 (5th & 95th percentiles).This is higher than the national average. Comparison Table
- Relevant Web Links:
  Additional EPA Links:
  - EPA Exposure Factors Handbook - 1997 | PDF version (1193pp, 11MB, About PDF)
  - EPA's Integrated Risk Information System (IRIS) Database

  Additional EPA Links:
  - National Air Toxics Assessment (NATA) Website
  - Benzene: ToxFAQs (ATSDR) (PDF) (2pp, 30KB, About PDF) EXIT Disclaimer
- View map of Benzene concentrations.

HUMAN EXPOSURES

Quantitative data supplied by the 2002 National Air Toxics Assessment (outdoor sources only):

- Estimated county average exposure concentration = 3.867 µg/m3
  This is higher than the county and national averages
  - estimated background exposure concentration = 0.487 µg/m3
  - estimated contribution from major point sources = 0.199 µg/m3
  - estimated contribution from area and other sources = 0.169 µg/m3
  - estimated contribution from on-road mobile sources = 2.840 µg/m3
  - estimated contribution from non-road mobile sources = 0.169 µg/m3
    These estimates were generated by the HAPEM5 model using 2002 NATA data.
- Range of Exposures:
  Exposure estimates range from 1.912 to 4.550 µg/m3 (5th & 95th percentiles).This is higher than the national average. Comparison Table.
- View map of Benzene exposure.

HEALTH RISKS

Quantitative data supplied by the 2002 National Air Toxics Assessment (outdoor sources only):
NON-CANCER

- Local non-cancer health estimates not available for benzene in 2002.
- On average, the hazard quotient for benzene at a national level does not exceed 1, indicating that harmful non-cancerous health effects are not likely.

CANCER

- Estimated lifetime cancer risk attributable from benzene in Wayne County = 30.16 in one million.
  This is higher than the county average.
  - estimated contribution from background sources = 3.80 in a million
  - estimated contribution from major point sources = 1.56 in a million
  - estimated contribution from area and other sources = 1.32 in a million
  - estimated contribution from on-road mobile sources = 22.17 in a million
  - estimated contribution from non-road mobile sources = 1.32 in a million
- Range of Risks:
  Cancer risk estimates range from 14.91 to 35.49. (5th & 95th percentiles).This is higher than the national average. Comparison Table.
- Relevant Web Links:
  Care Resource Guide References:
  - Voluntary Children's Chemical Evaluation Program (VCCEP)

  Additional EPA Links:
- National Air Toxics Assessment (NATA) Website
  Additional External Links:
  - Benzene: ToxFAQs (ATSDR) (PDF) (2pp, 30KB, About PDF) EXIT Disclaimer
- View map of Benzene risks.

OTHER COMMUNITIES FOCUSING ON THE ISSUE

- Under Development - will include links to community reports and promising practices documents.

SOLUTIONS IMPLEMENTED BY OTHER COMMUNITIES

- Under Development - will include links to community reports and promising practices documents.

Report:
Benzene

(continued)

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PACE-EH with C-FERST

EPA Cumulative Risk Guidance with C-FERST

EPA EJ Toolkit with C-FERST

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C-FERST Questions/Feedback

Issue Ranking Methods

Below are links to resources for ranking the relative exposures and risks associated with different environmental issues. Inclusion of these in C-FERST does not necessarily imply endorsement of their use.

- NACCHO's Protocol for Assessing Community Excellence in Environmental Health (PACE-EH) (PDF) (111pp, 964KB, About PDF) EXIT Disclaimer
  Task 10, "Rank The Issues", pp50-56.
- Others - TBD

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- Fact Sheets on Exposure/Risk Reduction Actions
- Promising Practices for Solutions Implemented by Communities

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Exposure/Risk Reduction Actions

+Arsenic in Soil Risk Reduction Actions
+Arsenic in Drinking Water Risk Reduction Actions
+Auto Body Shop Risk Reduction Actions
+Benzene Risk Reduction Actions
+Brownfields Risk Reduction Actions
+Children's Asthma & Allergy Risk Reduction Actions
+Diesel Exhaust Risk Reduction Actions
+Environmental Tobacco Smoke Risk Reduction Actions
+Fine Particulates Risk Reduction Actions
+Fish Consumption Risk Reduction Actions
+Hazardous Waste/Pharmaceuticals in Water Risk Reduction Actions
+Healthy Homes Risk Reduction Actions
+Land Use/Smart Growth Risk Reduction Actions
-Lead Risk Reduction Actions

-Care Resource Guide References

- Protect Your Child From Lead Poisoning

-Additional EPA Links

- Health Specialist: Lead Poisoning Prevention (PDF) (2pp, 45KB, About PDF)
- Give Your Child the Chance of a Lifetime (Keep Your Child Lead Safe) (PDF) (2pp, 136KB, About PDF)
- Lead Poisoning Home Checklist (PDF) (1pp, 42KB, About PDF)
- Fight Lead Poisoning with a Healthy Diet (PDF) (10pp, 375KB, About PDF)
- Reducing Lead Hazards When Remodeling Your Home (PDF) (26pp, 932KB, About PDF)
- Testing Your Home for Lead - in Paint, Dust and Soil (PDF) (20pp, 203KB, About PDF)
- Protect Your Family From Lead in Your Home (PDF) (17pp, 674KB, About PDF)
- Renovate Right: Important Lead Hazard Information for Families, Childcare Providers and Schools (PDF) (20pp, 3MB, About PDF)
- Lead Safety During Renovation (PDF) (2pp, 629KB, About PDF)

Lead Links

- General Links
- Source Links
- Concentration and Exposure Links
- Risks and Effects Links
- Risk Reduction Links

+Lead in Drinking Water Risk Reduction Actions
+Mercury Risk Reduction Actions
+Methamphetamine Lab Risk Reduction Actions
+Microbes in Drinking Water Risk Reduction Actions
+Mobile Sources Risk Reduction Actions
+Mold Risk Reduction Actions
+Outdoor Air - Near Roadway Risk Reduction Actions
+Ozone Risk Reduction Actions
+Ports Risk Reduction Actions
+Radon Risk Reduction Actions
+Recreational Water Quality Risk Reduction Actions
+Residential Pesticides Risk Reduction Actions
+Runoff Risk Reduction Actions
+School Air Quality Risk Reduction Actions
+Solid Waste Disposal/Recycling Risk Reduction Actions
+Stationary Sources Risk Reduction Actions
+Ultraviolet (UV) Radiation Risk Reduction Actions

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Additional Tools for Communities

EPA/ORD Compendium of Tools for Community Assessments:

The following links provide information on other tools available for conducting community exposure and cumulative risk assessments, based on a 2009 review and journal publications.

- Summary of available tools (18pp, 323 KB, About PDF)
- Searchable compendium of tools

Future Plans

Please provide input via CFERSTmail@epa.gov on other tools you would like to see listed here.

Links to Other Federal Tools:

This is a partial list (not in any particular order) of weblinks to user-suggested tools to support community assessments. Inclusion of these tools in C-FERST does not imply endorsement of their use.

- CARE Resources Guide
- CDC's National Environmental Public Health Tracking Program
- CDC National Center for Environmental Health
- PACE-EH (Protocol for Assessing Community Excellence in Environmental Health)
- 2002 National-Scale Air Toxics Assessment
- Diesel Emissions Calculator
- Healthy School Environment Resources
- ATSDR Brownfields Site Inventory Tool
- EPA Internet Geographical Exposure Modeling System (IGEMS)
- EPA's Assessing Outdoor Air Near Schools
- EPA's Regional Vulnerability Assessment (ReVA) Program
- Others TBD

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Needs for C-FERST to Inform EJ Assessments

- Establish partnerships for tool refinement and information gaps
- Develop science to address more environmental issues of concern
- Quantify concentration, exposure, and risk data for disproportionately impacted communities (i.e., subset data for general population)
- Pilot uploading and mapping locally collected data
- Incorporate fact sheets specific to EJ issues
- Link more with other GIS tools and databases (e.g., EJGAT, CenRANK, ECHO)
- Incorporate non-chemical stressors information for vulnerable populations
- Apply to community case studies and refine tool to support EJ efforts

What enhancements would be needed to make C-FERST useful for EJ assessments?

U.S. ENVIRONMENTAL PROTECTION AGENCY

Community-Focused Exposure and Risk Screening Tool

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C-FERST Feedback Survey
Contact Us

Click here to provide feedback on C-FERST for the following questions:

- What is your role with respect to community programs?
- How do the various C-FERST options meet your needs with assisting communities?
- What additional environmental issues would you like to see included?
- Do you have specific suggestions to make C-FERST more applicable for your purposes?
- Please rate the flow and layout of C-FERST.
- What type of C-FERST training would you prefer?
- Would you use C-FERST currently for information sources?
- Would you use C-FERST in the future after it is more complete?
- Would you recommend this tool to others?
- What do you like most? least?
- Other comments?

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Last updated on Thursday, March 04, 2010
http://172.20.35.131:8992/CFERST5-Prj-root/app/SurveyQuestions.jsp
Print As-Is

What are anticipated impacts of C-FERST?

- Improve public health in communities by facilitating identification of “at risk” communities and “hot spots” within communities, and providing information to develop solutions
- Empower regions and communities with a user-friendly tool to understand local exposure information (based on solid science) so that they can make informed, cost-effective decisions and take action
- Address NAPA, NEJAC, NRC, other report recommendations for improving risk prioritization tools and approaches
- Advance human exposure science for cumulative risk assessments
- Provide framework for collaborative research and information sharing to support community assessments

Acknowledgments

- C-FERST Development Team in ORD NERL
- ORD Management for C-FERST Support
- C-FERST Development Contractors (Alion Science and Technology, Inc. and CSC) and National Computing Center
- C-FERST Collaborators in ORD, CARE (e.g., R1, R5, R7, R9), Program Offices (e.g., OAQPS), Region 1 (e.g., GIS team)

Disclaimer

Although this work was reviewed by EPA and approved for presentation, it may not necessarily reflect official Agency policy.

United States Environmental Protection Agency

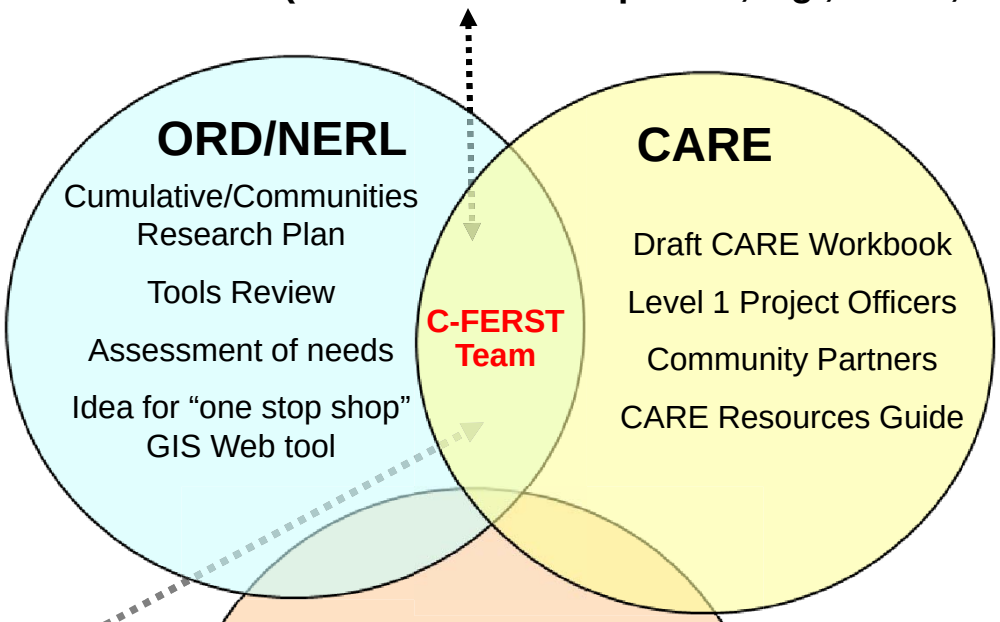
Extra Slides for Questions

Partners in C-FERST Development

Regional needs (e.g., Regions 1, 4, 5, 7, and 9)

Program Offices expertise (for exposure/risk characterizations, e.g., OAR)

ORD collaborators (cumulative risk expertise, e.g., NCEA, NHEERL, NCER)



Future:

ORD/NRMRL, OEI, External Collaborators (e.g., CDC, academia, NCS)

Additional EPA Program Office and Regional Programs

e.g., Compliance Assistance, Enforcement Targeting, Healthy Communities, EJ, Asthma Campaigns, Tribal

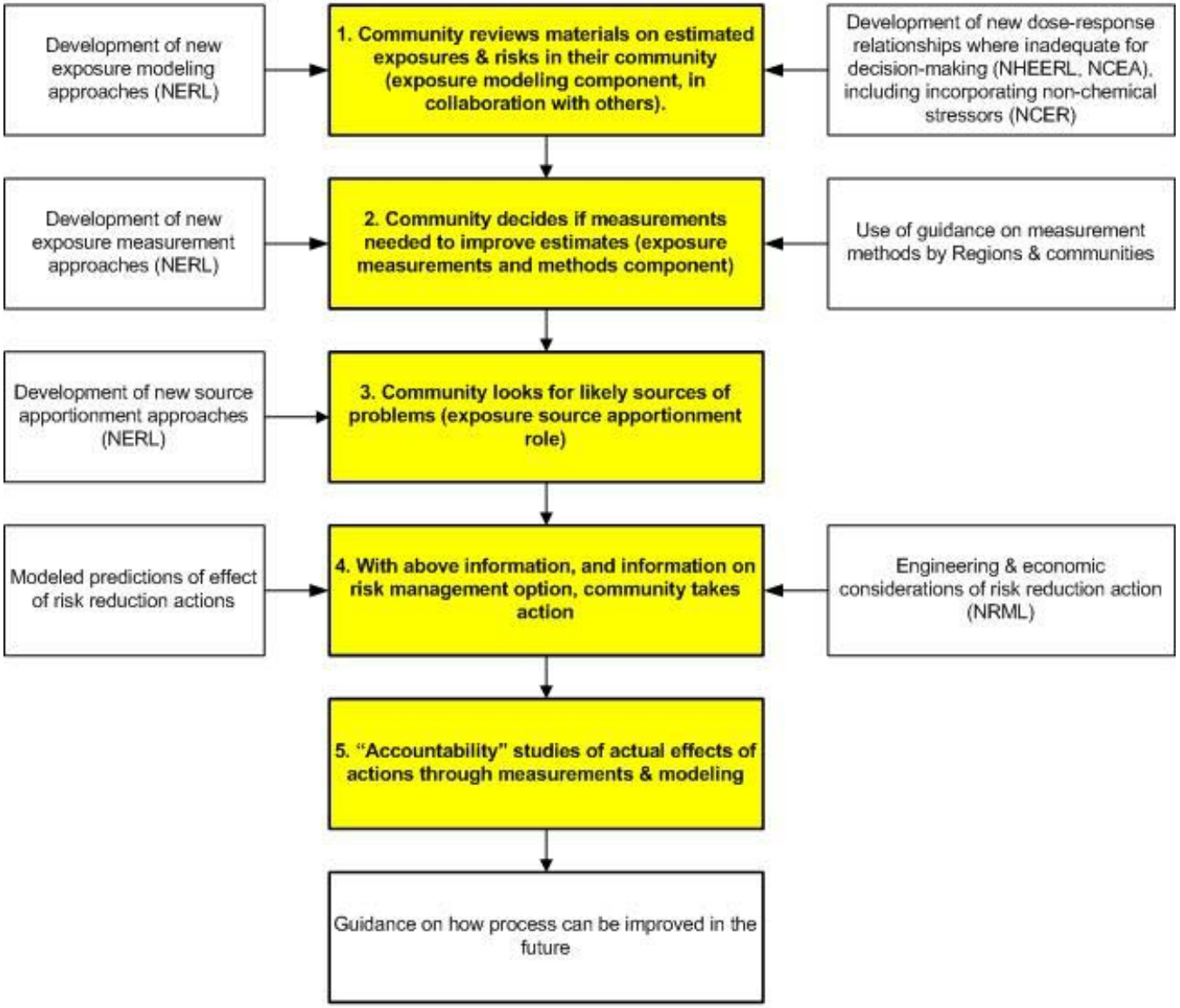
When Will C-FERST Be Ready?

- C-FERST Intranet version 1 (June 2010)
  - Internal EPA testing and use
  - Guidance, web links, fact sheets, interactive maps for air toxics (NATA)

- C-FERST Extranet version 1 (winter 2010?)
  - Beta testing by communities, academia, other Federal Agencies
  - Internet with password protection for limited public access
  - Inclusion of additional issues (e.g., radon) and data layers

- C-FERST Internet version 1 and beyond for public use (2011→)
  - Maps for additional issues (e.g., drinking water, lead, fish consumption)
  - Links to tools, incorporation of cumulative risk research (e.g., non-chemical stressors)
  - Ability to upload or link to locally collected data,
  - Applications for community case studies
  - Blog/Wiki to facilitate sharing results

Community-Regional Assessment as Part of the US EPA CARE Program (www.epa.gov/care) & Related Programs: Flowchart of Science Aspects. See www.epa.gov/heasd/c-ferst for more details. CARE program decisions shown in yellow boxes; ORD science contributions shown with un-shaded boxes



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Publicly Available EPA Mapping Tools Focused on Communities

This is a partial list of weblinks to GIS tools to help users learn more about their communities. Inclusion of these tools in C-FERST does not necessarily imply endorsement of their use.

Note

Following these links will lead the user out of C-FERST.

- **EPA's MyEnvironment**
  The MyEnvironment search application is designed to provide a cross-section of environmental information based on the user's location.
- **EPA's Environmental Justice Geographic Assessment Tool (EJGAT)** The Environmental Justice Geographic Assessment Tool, provides information for preliminary analysis of Environmental Justice areas of concern. Assessment variables include demographics, such as persons per square mile, per capita income, and percent below the poverty line. The EJ Assessment tool provides the ability to review these assessment variables and others with respect to several types of regulated facilities.
- Others TBD

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View Factsheets About Environmental Issues

Click on the hyperlinked issues below to view factsheets and web links currently available in C-FERST. These are organized by general information, sources, concentrations and exposures, risk and effects, and risk reduction categories. Note: Some of the concerns below appear under multiple categories.

-Alphabetical List of Issues

1,3 Butadeine
Acetaldehyde
Acrolein
Arsenic in Soil
Arsenic in Water
Autobody shops/recyclers
Benzene
Brownfields
Childhood Asthma (CDC Public Health Tracking Network) EXIT Disclaimer
Chromium
Copper in Drinking Water
Diesel Exhaust
Drinking Water Contaminants
E.coli at beaches
Environmental Tobacco Smoke (ETS)
Fine Particulates
Fish consumption
Formaldehyde
Hazardous Waste/ Pharmaceuticals in Water
Healthy homes (cleaning products, waste, allergens)
Land Use/Smart Growth
Lead
Lead in Drinking Water
Mercury
Methamphetamine labs
Microbials in Drinking Water
Mobile Sources
Mold
Naphthalene
Non-chemical Stressors (Risk Modifying Factors) TBD
Outdoor Air - Near Roadway
Ozone
Polycyclic aromatic hydrocarbons (PAHs)
Ports
Radon
Recreational Water Quality
Residential Pesticides
Runoff
Schools
Solid Waste Disposal/Recycling
Stationary Sources
Ultraviolet (UV) Radiation/Ozone Depletion

+Specific Toxic Substances of Concern

+Media

+Sources of Exposure

+Health Effects of Concern

+Other Topics

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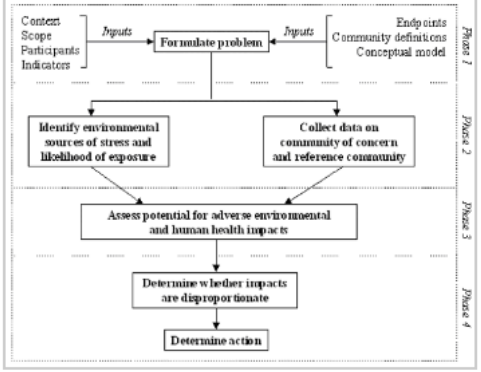
Using EPA's 2004 Toolkit for Assessing Potential Allegations of Environmental Injustice with C-FERST

1. **Problem Formulation:** Establishes context, management goals, and scope of the entire assessment; identifies the participants in the process, the endpoints that are going to be assessed to inform the decision-making process, and which environmental justice indicators will be used to assess those endpoints. During this step, an affected area also is identified in at least a general way, as are potential reference communities or statistical sources (e.g., national or statewide values).
   - In C-FERST you can:
     - learn about your community's environmental indicators and demographic information by linking to Publicly Available EPA Mapping tools such as MyEnvironment and EJGAT;
     - view maps at the national and local scale for various chemicals, of concentration, human exposures, and risks by US census tract. These data maps can be overlaid with layers of source, demographic (including environmental justice-related population data), and physical feature data;
     - View Factsheets about Environmental Issues of concern, organized by general information, sources, concentrations and exposures, risks and effects, and risk reduction categories;
     - View Guidance Documents Developed by Other Groups to aid in establishing context, goals, scope, and indicators;
     - access statistical sources and information on potential reference communities through Links to Other Federal Tools such as the National Environmental Public Health Tracking Program; and
     - consider issues of concern to other community groups.

Source: EPA's EJ Toolkit (http://www.epa.gov/compliance/index.html) Methodology for Assessing Potential Allegations of Environmental Injustice (167pp, 1.3MB, About PDF)



2. **Data Collection.** Collect situation-specific data needed to conduct the analysis of whether the affected area is likely to or is already experiencing disproportionately high and adverse effects or impacts from the situation. In this phase, two types of data are collected: (1) Data on the environmental sources of stress and likelihood of exposure and (2) Health-related, demographic, social, and economic data on the affected area and on the potential reference communities.
   - In C-FERST you can locate potential sources in your community by linking to Publicly Available EPA Mapping tools such as MyEnvironment and EJGAT.
   - You can also read about Data Collection Guidance and Methods, and Enter Local Data for mapping.
   - To assess "hot spots" for selected environmental issues of concern, you can view Maps of Environmental Concentrations, Human Exposures, and Health Risks and generate Environmental Issue Profiles. These C-FERST issue profile reports contain, in a consistent format across issues, available information (fact sheets, weblinks, maps) for each selected environmental issue and report category: General information, Health outcomes, Exposure and risk reductions, Population affected, Sources, Environmental Concentrations, Human Exposures, Health risks (cumulative where possible), Other Communities Focusing on this Issue, and Solutions Implemented by Other Communities.

3. **Assessment of the Potential for "Adverse" Environmental and Human Health Effects or Impacts.** In this phase, the Assessment Team uses the information collected above to determine whether the proposed actions or existing situation might cause adverse impacts on the environment in which the community members live or work and on the health and welfare of community members.
   - In C-FERST you can obtain estimates on the adverse health effects on the local population in the Environmental Issue Profiles and Maps of Environmental Concentrations, Human Exposures, and Health Risks for selected environmental issues of concern. You can also link to CDC's National Environmental Public Health Tracking Program.

4. **Assessment of the Potential for "Disproportionately High and Adverse" Effects or Impacts.** The final question to determine the extent of an environmental situation is whether the potential for adverse effects on the environment or human health and welfare is disproportionately high in the affected area compared with the reference community. This involves a comparison of the likelihood, magnitude, and severity of potential effects in the affected area with the likelihood, magnitude, and severity of potential effects in the reference population(s).
   - In C-FERST you can compare adverse effects between different communities using the Environmental Issue Profiles and Maps of Environmental Concentrations, Human Exposures, and Health Risks for selected environmental issues of concern. Exposure and risk ranking tables, including one for sensitive populations, are also available, as well as fact sheets and promising practices for potential solutions.

Using the EJ Toolkit with C-FERST

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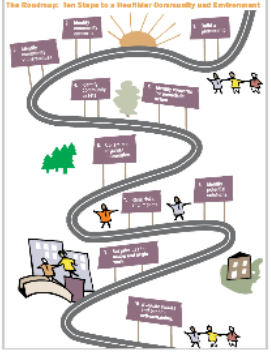
Using the CARE Road Map with C-FERST

Source: EPA CARE Program (http://www.epa.gov/care) The CARE Roadmap: 10 Step Plan to Improve Community Environment and Health (20pp, 3MB, About PDF)



1. **Build a Partnership:** Build a collaborative partnership representing a broad range of interest that is able to identify environmental risks and impacts, build consensus, and mobilize all the resources necessary to achieve community goals.

2. **Identify Community Concerns:** Identify the environmental, health, and related social and economic concerns of the community.
   +In C-FERST you can...

3. **Identify Community Vulnerabilities:** Identify community vulnerabilities that may increase risks from environmental stressors.
   −In C-FERST you can...
   view maps for various chemicals, of concentration, human exposures, and risks by US Census Tract. These data maps can be overlaid with layers of source, demographic (including environmental justice-related population data), and physical feature data. Links to available exposure and risk ranking tables, including one for sensitive populations, are also available.

4. **Identify Community Assets:** Develop a list of community assets in order to build on the existing strengths of the community.

5. **Identify Concerns for Immediate Action:** Identify and begin to address immediate concerns and vulnerabilities.
   +In C-FERST you can...

6. **Collect and Organize Information:**
   1. **Collect and Summarize** available information on stressors, concerns, and vulnerabilities.
      +In C-FERST you can...
   2. **Identify Gaps** where the information on stressors, concerns, and vulnerabilities is missing or inadequate.
      +In C-FERST you can...

7. **Rank Risks and Impacts:** Compare and rank community concerns to help identify those that have the greatest impact.
   +In C-FERST you can...

8. **Identify Potential Solutions:** Identify and analyze options for reducing priority concerns and vulnerabilities for filling information gaps.
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9. **Set Priorities for Action and Begin Work:** Decide on an action plan to address concerns, fill information gaps, and mobilize the community and its partners to carry out the plan.

10. **Evaluate Results & Become Self-Sustaining:** Evaluate the results of community action, analyze new information, and develop a plan to restart the Roadmap process. You can restart the process as needed to reestablish priorities, develop new plans for action, collect information, and make your partnership self-sustaining.

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Using the CARE Road Map with C-FERST

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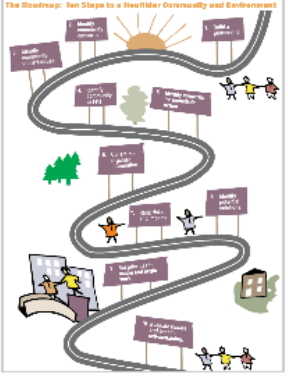

5. **Identify Concerns for Immediate Action:** Identify and begin to address immediate concerns and vulnerabilities.
   - In C-FERST you can consider issues pursued by other CARE groups and research specific issues by viewing factsheets or generating Environmental Issue Profiles for your community.

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   1. **Collect and Summarize** available information on stressors, concerns, and vulnerabilities.
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      - In C-FERST you can generate Environmental Issue Profiles to identify collected and missing data.

7. **Rank Risks and Impacts:** Compare and rank community concerns to help identify those that have the greatest impact.
   - C-FERST provides links to available risk ranking methods. You can also view maps for various chemicals, of modeled risk estimates by US Census Tract. These data maps can be overlaid with layers of source, demographic (including environmental justice-related population data), physical feature data. Links to available health data are also provided.

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Using the CARE Road Map with C-FERST

U.S. ENVIRONMENTAL PROTECTION AGENCY

Community-Focused Exposure and Risk Screening Tool Share

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Using NACCHO's Community-Based Environmental Health Assessment Process (PACE EH) with C-FERST

Source: NACCHO's PACE-EH Program PACE-EH Guidebook: Protocol for Assessing Community Excellence in Environmental Health (92pp, 6.5MB, About PDF)

1. **Determine community capacity.**
2. **Define and characterize the community.**
   - In C-FERST you can...
     learn about your community's environmental and demographic information by linking to EPA Mapping tools such as MyEnvironment and EJGAT. You can also view maps of your community for various chemicals, of concentration, human exposures, and risks by US Census Tract. These data maps can be overlaid with layers of source, demographic (including environmental justice-related population data), and physical feature data.
3. **Assemble a community-based environmental health assessment team.**
4. **Define the goals, objectives, and scope of the assessment.**
5. **Generate a list of community-specific environmental health issues.**
   + In C-FERST you can...
6. **Analyze the issues with a systems framework.**
   + In C-FERST you can...
7. **Develop locally appropriate indicators.**
8. **Select standards against which local status can be compared.**
9. **Create issue profiles.**
   + In C-FERST you can...
10. **Rank the issues.**
    + In C-FERST you can...
11. **Set priorities for action.**
12. **Develop an action plan.**
    + In C-FERST you can...
13. **Evaluate progress and plan for future.**

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Last updated on Tuesday, March 02, 2010
http://172.20.35.131:8992/CFERST5-Prj-root/app/PACE_EH.action
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6. **Analyze the issues with a systems framework.**
   - In C-FERST, you can analyze the issues of concern by viewing or printing Environmental Issue Profiles in a consistent report format. These C-FERST profile reports contain available information (fact sheets, weblinks, maps) for each selected environmental issue and report category: General information, Health outcomes, Exposure and risk reductions, Population affected, Sources, Environmental Concentrations, Human Exposures, Health risks (cumulative where possible), Other Communities Focusing on this Issue, and Solutions Implemented by Other Communities.
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Using PACE-EH with C-FERST

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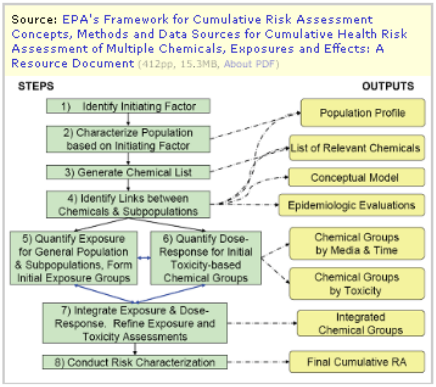
Using EPA's Cumulative Risk Guidance Document with C-FERST



1. **Identify Initiating Factor:** Determine whether your assessment is driven by a) a health endpoint or increases in illnesses in the population, b) elevated chemical concentrations in humans or the environment, or c) multiple pollutant sources within the community.
   +In C-FERST you can...

2. **Characterize Population based on Initiating Factor:** Provide a physical description of the study area and a demographic description of the population in that study area. These descriptions may be further refined as the investigation progresses.
   +In C-FERST you can...

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   See also information from the EPA Offices of:
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   - Solid Waste and Emergency Response: http://www.epa.gov/swerrims/
   - Air Quality Planning and Standards: http://www.epa.gov/air/oaqps/

4. **Identify Links between Chemicals and Subpopulations:** Identify the population groups which, because of either higher exposure or increased vulnerability, are particularly sensitive to the chemicals of interest. Occupational, dietary, or other exposure sources to toxicologically-similar chemicals may exist for some population subgroups; community involvement is important for the identification of such factors. A conceptual map may be useful for this step and would include the sources, chemicals, exposure pathways, exposure routes, subpopulations and health endpoints to be analyzed.
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5. **Quantify Exposure for General Population & Subpopulations:** Using the previously defined population and study area, identify all existing and future completed pathways. Exposure modeling may be helpful here; useful tools for this step include monitoring data for chemical concentrations and information from epidemiologic studies or public health databases. It will be useful to include relevant exposure factors, including those unique factors which cause differential exposures for sensitive subpopulations.

6. **Form Initial Exposure Groups:** Simplify the gathered information by grouping the chemicals according to a) timing of exposure (both duration and intermittency) and b) either medium or pathway.
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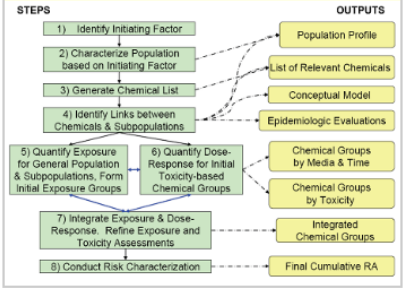
Using EPA's Cumulative Risk Guidance Document with C-FERST

Source: EPA's Framework for Cumulative Risk Assessment Concepts, Methods and Data Sources for Cumulative Health Risk Assessment of Multiple Chemicals, Exposures and Effects: A Resource Document (412pp, 15.3MB, About PDF)



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6. **Form Initial Exposure Groups:** Simplify the gathered information by grouping the chemicals according to a) timing of exposure (both duration and intermittency) and b) either medium or pathway.
   - In C-FERST, you can view maps of human exposure at the census tract level for chemicals with sufficient information. These modeled exposure estimates are being generated by EPA's Office of Research and Development, EPA's Office of Air Quality Planning and Standards, and others. Information about the modeled estimates, including methodology and uncertainties, are provided with the maps.

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Using EPA Cumulative Risk Guidance with C-FERST

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Other Community Tools

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Enter Local Data

Note: Entering local data will not alter EPA databases.

Upload File with Local Coordinates or Addresses

Browse...

Upload File

Return to C-FERST Home

Limitations and Future Plans

This feature is not yet functional, and will be implemented in a future version.

Click here for an example map with locally plotted auto shops. Click here for example local maps from Duke University's Children's Environmental Health Initiative (CEHI). Click here for example local maps from Duke's CEHI, Community Assessment Project.

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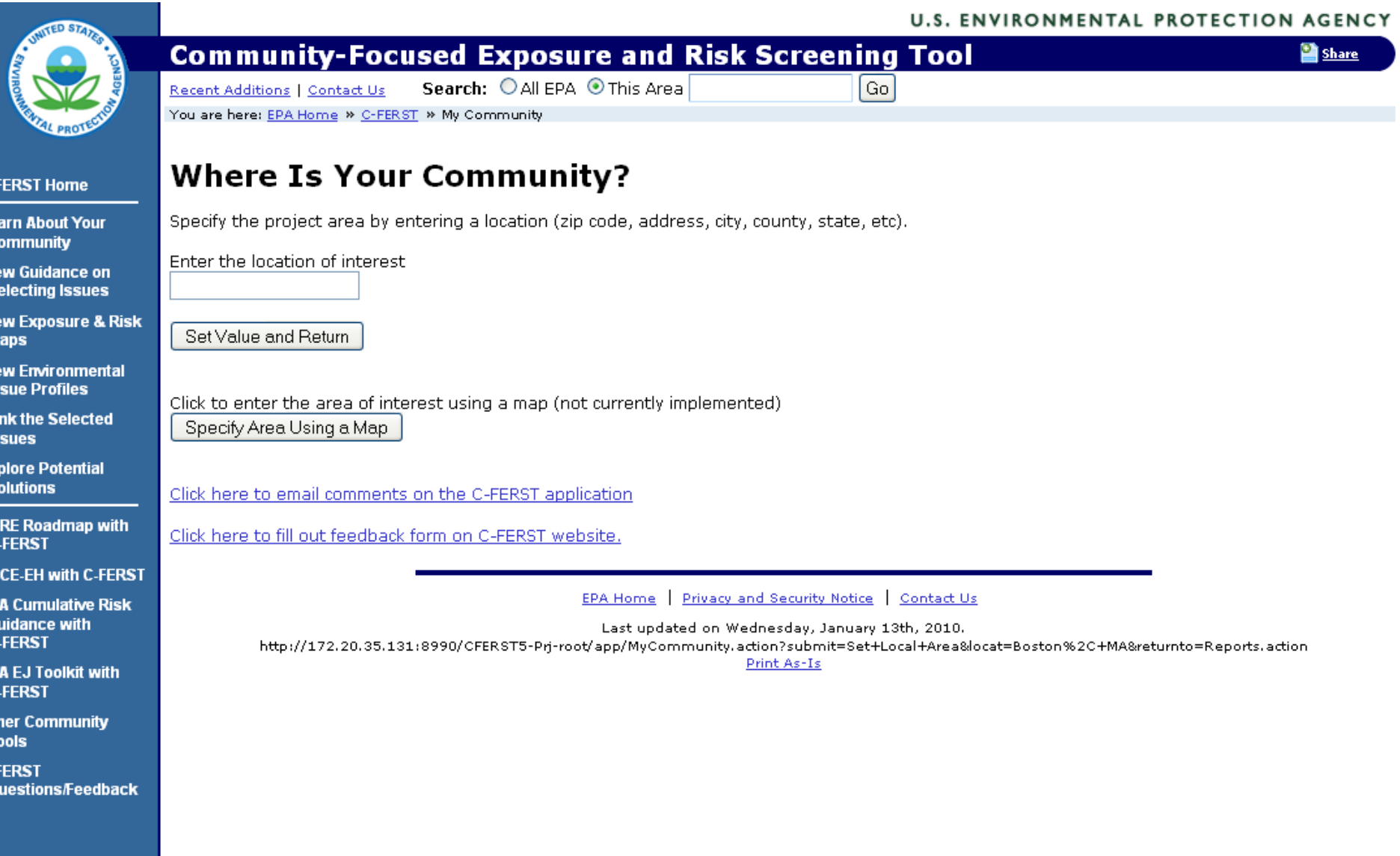
Where is Your Community?

United States Environmental Protection Agency



Other Planned Products for FY10 APM 164

"Provide program, regional, states and tribal offices with new/updated tools and/or approaches for characterizing community exposures to environmental contaminants that lead to cumulative risks"

- "Application of National Databases and Mapping Tools at the Local Level to Two Community Case Studies" (Hammond et al.)
  - could help design C-FERST tutorial
- "Community-Level Radon Exposure-Risk Estimates Using a Multilevel Model" (Chahine et al.)
  - will be used for C-FERST radon maps at census tract level
- "Multi-Level Modeling of Residential Exposure to Environmental Tobacco Smoke" (Chahine et al.)
  - will be used for C-FERST ETS maps at census tract level
- "Feasibility of Community Food Item Collection for the National Children's Study"(Knuth et al.)
  - C-FERST could link to this for guidance on collecting dietary data

Other FY10 Planned Research Products

- "Are measurements needed for a community project?" (Medina-Vera, Thomas et al. for FY10 APM77)
  - C-FERST could link to this guidance on measurement needs in a CBRA
- "Relevant analytes for residential exposure assessments" (Medina-Vera, et. al. for FY10 APM77)
  - C-FERST could link to this for guidance on collecting local data
- "Community Environmental Issues: A Summary and Analysis of Local and Federal Government Perspectives" (Hammond et al. possibly for APM164)
  - This provides basis for environmental issues included in C-FERST
- "Community-Based Environmental Assessments and Mitigation Efforts: Results from a Survey of US EPA CARE Project Officers" (Conlon et al.)
  - This supports need for tool like C-FERST
- "Evaluation of 2002 NATA benzene estimates in Detroit with DEARS" (George et al.)
  - This provides confidence in NATA benzene maps used in C-FERST
- "Community Duplicate Diet Methodology" (Melnyk et al.) (for FY11 APM40)
  - C-FERST could link to this for guidance on collecting local data

FY11 Planned Research Products that could inform C-FERST

- Community-level exposure modeling efforts for Hg, As, pesticides, lead (EMRB)
- "EPA's Community-Focused Exposure and Risk Screening Tool" (Zartarian, Schultz)
- "Characterization of Community Exposure and Melanoma Risk from Ultraviolet Radiation" (?)
- Near-Road Screening Tool to assess air pollution exposure and risk at local spatial scales (Barzyk et al.)
- Census-tract level childhood lead exposure screening tool (tentative: Schultz and George, collaboratively with HUD, OPPT, OEI)
- "Using National and Local Extant Data for Cumulative Exposure Assessments for Asthma-related Air Pollutants" (Breen et al.)
- "Comparison of modeled and measured personal exposures: SHEDS-2005 NATA-DEARS" (Barzyk et al.)
- "Air Pollution Exposure Model for Individuals (EMI) in Health Studies" (Breen et al.)

Other Research that Could be Incorporated into C-FERST

- Collaborations with ecological research
- Near roadway research
- Other measurements and related methods for key chemicals
  - Soil arsenic and bioavailability data/methods
- Geographically specific estimates of human activity patterns
- Source apportionment for high risk contaminants
- Cumulative risk issues with NCEA (e.g., fish consumption)
- Non-chemical stressors research (with NCER and NHEERL)
- Tribal research
- Other Ideas???

Remaining Needs for C-FERST

- **Environmental Issues**
  - Review content for all issues (weblinks/fact sheets)
- **Other Tools**
  - Assess additional tools C-FERST could link to
  - Keep compendium of tools and links up-to-date
- **Local Data**
  - Provide input on type of data to upload and share
  - Pilot uploading local data and mapping; QA and communication issues
  - Consider how to share information without altering EPA databases
- **Maps and Reports**
  - Populate conc., human exposure, and health risk maps for Tier 1 issues
  - Incorporate “cumulative” assessment and possibly ranking approaches
  - Link to CDC tools and other health data
  - Include tutorials and risk communication language
  - Consider applications to identify communities at risk and “hot spots”

How C-FERST Fits into ORD/NERL's Communities/Cumulative Research Program

- Overall Research Goal: To develop, apply, and provide tools* for advancing the science and understanding of cumulative risk to communities and individuals

  *information, strategies, exposure models, databases, measurement methods, GIS maps

- C-FERST Goal 1: Provide program offices, regions, states with new/updated tools or approaches for characterizing community exposures to environmental contaminants that lead to cumulative risks [FY10 APM164]

- C-FERST Goal 2 (FY11 ->): Deliver provisional assessment of application of tools and approaches used in selected communities [supports FY11 APM40]

Science Questions

(from Zartarian, V.G., and B. D. Schultz (2009), "The EPA's human exposure research program for assessing cumulative risk in communities," *Journal of Exposure Science and Environmental Epidemiology*.)

1. How to systematically identify and prioritize key chemical stressors within a given community?

   - by providing tools to characterize geographical and temporal "confluence of multiple stressors (chemical and non-chemical)"

2. How to develop individual estimates of exposure to multiple stressors for epidemiologic studies?
3. What tools can be used to assess community-level distributions of exposure for the development and evaluation of the effectiveness of risk reduction strategies?

Online C-FERST Survey Questions

(developed with CARE to obtain feedback)

- What is your role with respect to community programs?
- How do the various C-FERST options meet your needs with assisting communities?
- What additional environmental issues would you like to see included?
- Do you have specific suggestions to make C-FERST more applicable for your purposes?
- Please rate the flow and layout of C-FERST.
- What type of C-FERST training would you prefer?
- Would you use C-FERST currently for information sources?
- Would you use C-FERST in the future after it is more complete?
- Would you recommend this tool to others?
- What do you like most? least?
- Other comments?

Community-Focused Exposure and Risk Screening Tool (C-FERST) Feedback Form

1. What is Your Role?

1. What is your role with respect to community programs?

- [ ] CARE Program Administrative Team
- [ ] CARE Project Officer
- [ ] Other (please specify)

2. C-FERST Functionality

2. How do the various C-FERST options meet your needs for assisting communities? (Please rate on a scale of 1 - 5 with 5 being very well).

	Poorly				Very Well	N/A
Gather information about community environmental issues	○	○	○	○	○	○
Generate maps to visualize information and communicate results	○	○	○	○	○	○
Obtain guidance on local data collection	○	○	○	○	○	○
Generate a community report to assist with issue identification/prioritization	○	○	○	○	○	○
Learn about exposure/risk reduction actions for environmental issues of concern	○	○	○	○	○	○
Learn about other tools for communities (e.g., databases, mapping tools)	○	○	○	○	○	○
Assist with the CARE Roadmap process	○	○	○	○	○	○

2. C-FERST Functionality

3. What ADDITIONAL environmental issues would you most like to see included in C-FERST?

- [ ] Hazardous waste
- [ ] Pharmaceutical waste
- [ ] Indoor pollution/indoor air quality
- [ ] Integrated pest management/pesticides
- [ ] Land use
- [ ] Mercury
- [ ] Mold
- [ ] Healthy homes (cleaning products, allergens)
- [ ] Solid waste disposal (landfills, recycling)
- [ ] Stormwater runoff
- [ ] Wastewater/sewage
- [ ] Other environmental issues (please specify)
- [ ] Manganese
- [ ] Vector-borne diseases (West Nile Virus)
- [ ] Housing stock/property maintenance
- [ ] Fish consumption
- [ ] Groundwater contamination
- [ ] Consumer exposures to chemicals
- [ ] Agriculture
- [ ] Arsenic in soil
- [ ] Storage tank releases
- [ ] Worker health
- [ ] Cancer

4. Do you have specific suggestions to make C-FERST more applicable for your purposes (e.g., modifying these existing options; adding or deleting other user options)?

3. C-FERST Usability

5. Please rate the flow and layout of C-FERST (on a scale from 1-5 with 5 being most user-friendly)

	Least User-Friendly				Most User-Friendly
Please rate the flow of C-FERST	○	○	○	○	○
Please rate the layout of C-FERST	○	○	○	○	○

Please provide any specific suggestions for improving the flow and layout.

6. What type of C-FERST training would you prefer? (Please check all that apply.)

- ☐ No training needed
- ☐ Hands-on training
- ☐ Online tutorial
- ☐ User guide

4. Likelihood of Using or Recommending C-FERST, and Your Overall Impressions

7. Based on your experience, please answer the following. (Please rate on a scale of 1-5 with 5 indicating the highest likelihood.)

	Unlikely				Very Likely
Would you use C-FERST currently for information resources?	○	○	○	○	○
Would you use C-FERST in the future after it is more complete?	○	○	○	○	○

4. Likelihood of Using or Recommending C-FERST, and Your Overall Impressions

8. Based on your experience, would you recommend this tool to others? (why or why not?)

9. What do you like most about C-FERST?

10. What do you like least about C-FERST?

11. Other Comments?