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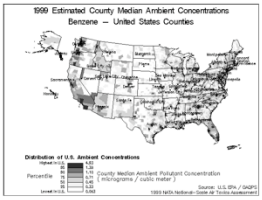
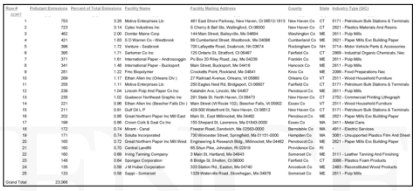
Agency

Publicly Available Assessment Tools

Tools available to communities for conducting cumulative exposure and risk assessments
(In press, *J Expo Sci Environ Epidemiol*)

Timothy M. Barzyk Kathryn C. Conlon, Teresa Chahine, Davyda M. Hammond, Valerie G. Zartarian, Bradley D. Schultz





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Several Issues, Separate Tools

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Compiling Information is Challenging

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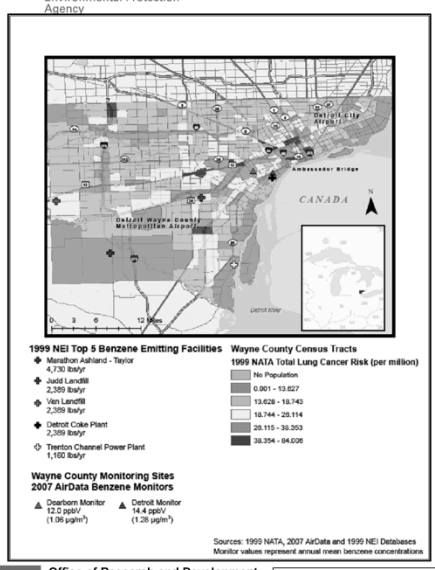

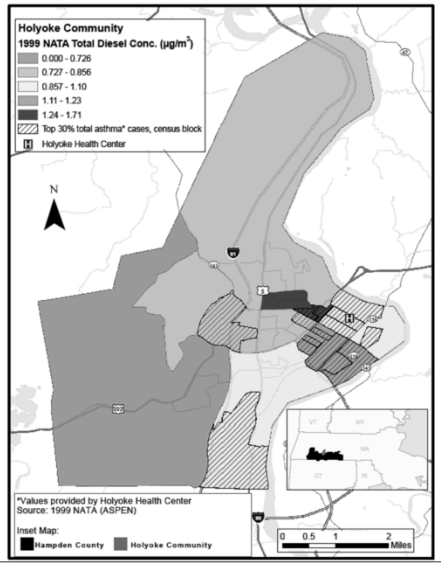

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Hammond et al. (In Review) Application of National Databases and Mapping Tools at the Local Level to Two Community Case Studies

3

Types of Available Tools
(most on-line)

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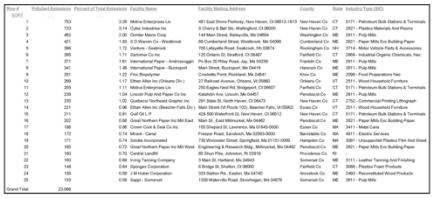
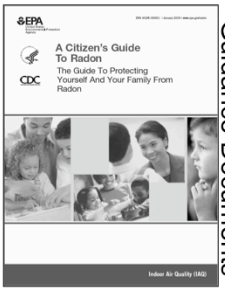
GIS Mapping

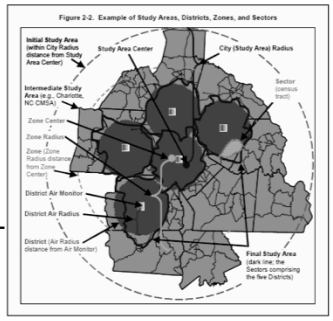
Databases

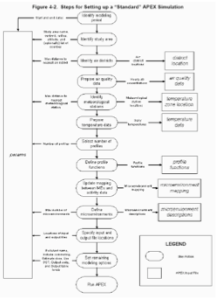


Guidance Documents



Exposure Models





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http://www.epa.gov/heasd/risk/projects/c3a_risk_assessment_tools.htm

Scientific Tools

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- Measurements
  - Medina-Vera et al. (2009) did address publicly available test kits
- Biomarkers
- Modeling
- Epidemiology

Ongoing Question

How can components of these be used by and for communities?

Chemical-Related Community Concerns

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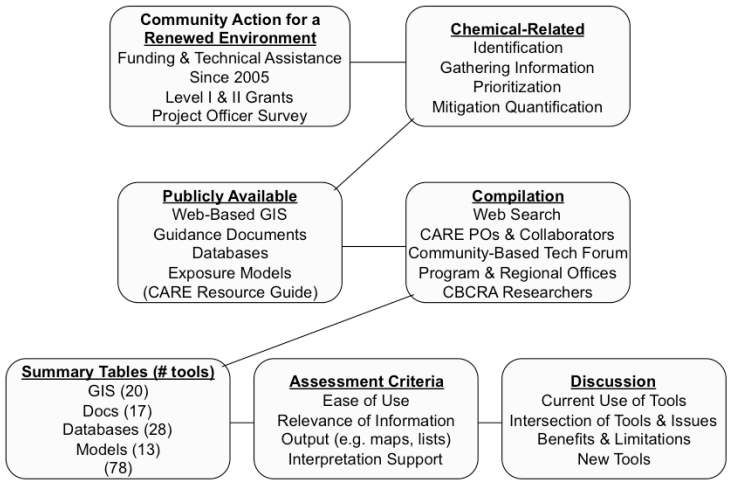
Accidental Releases - Oil Spills	Criteria Air pollutants	Industrial Solid Waste Sites	Physical Degradation of Water & Wetlands
Accidental Releases - Toxics	Diesel Exhaust	Industrial Waste Discharges to Surface Waters	Point Sources - Major Other than Landfills
Agriculture	Direct Point Source Discharges to Water	Integrated Pest Management / Pesticides	Printers
Airport	Dredging/PCBs	Land Use / Redevelopment/ Smart Growth	Radiation (Other than Indoor Radon)
Air Quality	Drinking Water	Lead	Radon
Mobile Source Pollution (Highways)	E. Coli at Beaches	Mercury	School Buses (Including Diesel)
Air Quality - Point Source Emissions	Environmental Tobacco Smoke	Methamphetamine Labs	Schools/Hazardous Waste
Ambient Air Pollutants	Energy Conservation	Mining Waste	Soil – Unlined Sumps
Arsenic in Soil	Fish Consumption	Mold	Solid Waste Disposal (Bulky Items, Landfills)
Asbestos	Groundwater Contamination	Municipal Solid Waste Sites	Recycling
Asthma	Hazardous /Toxic Air Pollutants	Municipal Waste Discharge to Surface Waters	Storage Tank Releases
Autobody Shops / Recyclers	Hazardous Waste / Pharmaceuticals	New Toxic Chemicals	Super-Emitting Cars
Brownfields	Hazardous Waste Sites – Active	Nonhazardous Waste Sites - Industrial	Ozone Depletion (UV Exposure)
Burning	Hazardous Waste Sites – Inactive	Nonhazardous Waste Sites - Municipal	Uranium Mines
Children's Health	Hazardous Waste Sites - Abandoned/ Superfund	Nonpoint Source Discharge to Surface Water	Vector Diseases
Coal Dust	Healthy Homes (Cleaning Products, Allergens)	Odor and Noise Pollution	Water Quality - Wastewater / Sewage
Consumer Exposure to Chemicals	Indirect Point Source Discharges to Water	Particulate Matter (Fine)	Water Quality - Stormwater Runoff
Contaminated Sludge	Indoor Pollution	Pesticide Application	Chemical Exposures (Industry & Agriculture)
Creosote	Indoor Vapor Intrusion	Pesticide Residue on Foods	Worker Health

From 10 References

Hammond et al. (in preparation) – Expanding on this topic

Assessment of Current Tools
Methods



Assessment of Current Tools
Results – Chemical-Related Community Stressors

Description (References)	Results
• EPA 1987 Report • EPA 1990 SAB Report • EPA 1993 Report • 1999 NATA • Region 5 Assessment • Pacoima CARE • Detroit CARE • CARE Workbook • CARE Directory • CARE PO Survey	• Each community different • List as reference for stressor identification • Expanding with other initiating factors • Non-chemical Stressors: – National Environmental Justice Advisory Council (2004) • Emerging issues, e.g., – caulk PCBs – turf lead

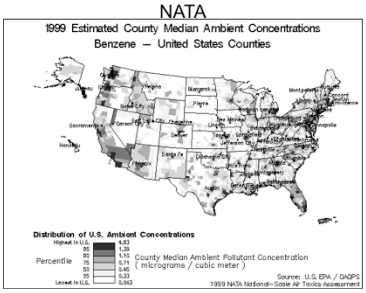
Assessment of Current Tools

Results – GIS

Description

- Features (information, resolution)
- Databases Accessed

NATA



Results, e.g.

- Particulate Matter
- Regulated Facilities
- Demographics
- Watersheds

Additional Tools

- Scorecard.org – Ranking
- AirNow.gov – Real-time AQ + Educational Resources

Assessment of Current Tools
Results – Guidance Documents

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Description

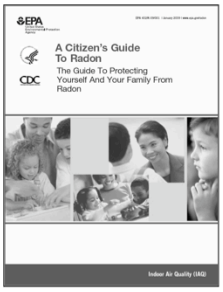
- Stand-Alone Publications
- Step-by-step process
- Air toxics, lead, radon, asbestos, etc.

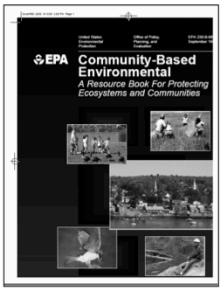
Results

- Table describes application & audience
- ~1/4 designed for community groups

Non-EPA

- PACE EH – ID & Rank
- THRIVE – Environmental & Social Factors





Assessment of Current Tools
Results – Databases

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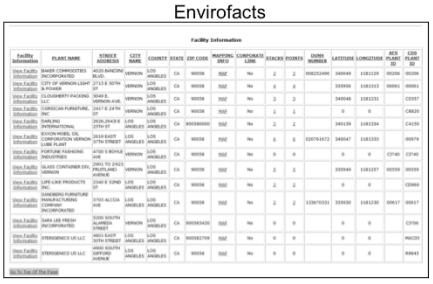
Description

- On-line Query
- Multi and Single Media

Results

- Table describes updates and content
- Envirofacts Data Warehouse & EnviroMapper
- NATA
- Found across agency websites

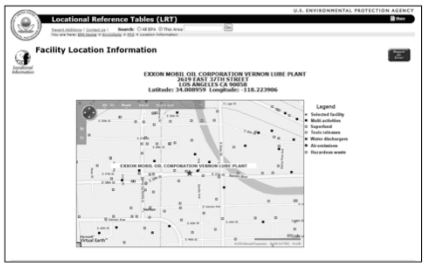
Envirofacts



Facility Information

Facility Information	PLANT NAME	STREET ADDRESS	CITY NAME	COUNTY	STATE	ZIP CODE	MAPPING INFO	CORPORATE LINK	STACKS	POINTS	DUNS NUMBER	LATITUDE	LONGITUDE	AES PLANT ID	CEIS FLAG ID
View Facility Information	BAKER COMMODITIES INCORPORATED	4020 BANDINI BLVD	VERNON	LOS ANGELES	CA	90058	Map	No	2	2	006252496	340049	1181229	00206	00206
View Facility Information	CITY OF VERNON LIGHT & POWER	2712 E SOTA ST	VERNON	LOS ANGELES	CA	90058	Map	No	4	4		339956	1181313	00061	00061
View Facility Information	CLOVERBITY PACKING LLC	3049 E. VERNON AVE.	VERNON	LOS ANGELES	CA	90058	Map	No	3	3		340048	1181233		C0357
View Facility Information	CORSICAN FURNITURE,	2417 E 24TH ST	VERNON	LOS ANGELES	CA	90058	Map	No	1	1		0	0		C8620
View Facility Information	DARLING INTERNATIONAL	2626 2643 E 25TH ST	LOS ANGELES	LOS ANGELES	CA	900580000	Map	No	2	2		340139	1181334		C4150
View Facility Information	EXXON MOBIL OIL CORPORATION VERNON LUBE PLANT	2619 EAST 37TH STREET	LOS ANGELES	LOS ANGELES	CA	90058	Map	No	6	6	020763372	340047	1181333		00679
View Facility Information	FORTUNE FASHIONS INDUSTRIES	4700 S BOYLE AVE	VERNON	LOS ANGELES	CA	90058	Map	No	0	0		0	0	C3740	C3740
View Facility Information	GLASS CONTAINER DEL VERNON	2401 TO 2923 DALELAND AVENUE	VERNON	LOS ANGELES	CA	90058	Map	No	3	3		339949	1181257	00559	00559
View Facility Information	LIFE-LIKE PRODUCTS INC	2340 E 52ND ST	LOS ANGELES	LOS ANGELES	CA	90058	Map	No	2	2		0	0		C0969
View Facility Information	SANDBERG FURNITURE MANUFACTURING COMPANY, INCORPORATED	5703 ALCOA AVE	LOS ANGELES	LOS ANGELES	CA	90058	Map	No	2	2	133670331	339930	1181230	00617	00617
View Facility Information	SARA LEE FRESH INCORPORATED	5350 SOUTH ALAMEDA STREET	VERNON	LOS ANGELES	CA	900583420	Map	No	0	0		0	0		C3726
View Facility Information	STERIGENICS US LLC	4401 EAST 50TH STREET	LOS ANGELES	LOS ANGELES	CA	900582709	Map	No	0	0		0	0		MAC05
View Facility Information	STERIGENICS US LLC	4400 SOUTH BOYLE AVENUE	LOS ANGELES	LOS ANGELES	CA	90058	Map	No	0	0		0	0		R9841

Go To Top Of The Page



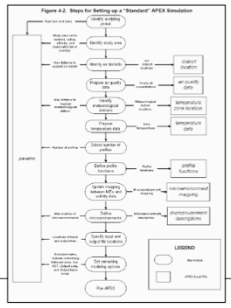
Assessment of Current Tools
Results – Exposure Models

Description

- Chemical contact with skin, nostrils, mouth, etc.
- Fate & Transport, and Dose Models not included

Results

- Table – Objectives, Inputs, Outputs, Availability
- As a group – all routes covered
- Most are inhalation
- Human activity patterns
- Quite technical – few screening level



Assessment of Current Tools
Discussion – Current Use

Findings	Implications
• Majority not used	• Round table discussions
• PACE EH popular	• Risk perception
• TRI & NEI by technical users	• Myriad issues – prioritization difficult due to challenge of gathering information (health effects, predominance, mitigation steps)
• Non-chemical not addressed by tools	
• General lack of awareness of available tools	• Interpreting & presenting tool output

Assessment of Current Tools
Discussion – Intersection of Tools & Needs

Findings

- Issues addressed independently
- Output formats incompatible
- Comparative risk unavailable
- Integrated risk unavailable

Implications

- Group covers range of media & pollutants
- GIS – air, water, facilities
  - Enviromapper – 10 tools, different databases
- Docs – Few geared towards communities, typically for specific issue
- Databases – multimedia & data-rich – analysis and interpretation difficult

Assessment of Current Tools
Discussion – Benefits & Limitations

Overall
Benefits – Wide breadth of coverage
Limitations – Risk ranking, cumulative & integrated risk

Tool	Benefits	Limitations
GIS	Issue identification Mapping	Separate tools Different outputs
Guidance Documents	Overview of cumulative risk	Singular issues
Databases	Data-rich Multi media, pollutants	Analysis & interpretation Coverage of community issues
Exposure Models	Thorough exposure & risk characterizations	Technical expertise Environmental inputs

Assessment of Current Tools
Discussion – New & Improved Tools

Development	Features
• Feedback from communities, POs, CBCRA researchers • Allow communities to: 1. Define the problem 2. Supply local knowledge 3. Interpret results in local context • Transparent • Accessible to non-scientists • Reflective of local input • Targeted to solutions • Quick output	• Cumulative exposure & risk • Integrated exposure & risk • Non-chemical stressors 1. Socio-economic 2. Behavioral factors 3. Built environment • Ecosystem effects

Community-Focused Exposure & Risk Screening Tool C-FERST

- Web-based tool to assist with identification & prioritization
- One-stop Shop:
  - View EPA information at national or local scale
  - Access report on community-specific exposure & risk characterizations
    1. General information
    2. Susceptible populations
    3. Sources
    4. Concentrations
    5. Exposures
    6. Health risks & effects
    7. Reduction actions
  - Access fact sheets, technical papers, web links, dynamic maps
  - Links to other tools
- Initially C-FERST is being developed for EPA project officers working with community partners
  - Future end users could include other federal, state, or local agencies working with community partners, or community partners themselves

Measurement Kits

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. *J Expo Sci Environ Epidemiol*

1. Screening level measurement methods
2. Quantitative screening methods – Instruments or lab
3. Refined quantitative methods – EPA methods

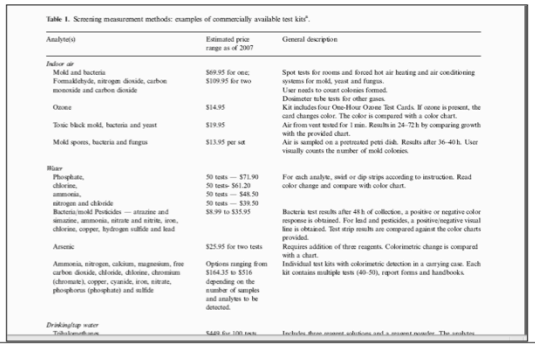


Table 1. Screening measurement methods: examples of commercially available test kits[a].

Analyte(s)	Estimated price range as of 2007	General description
Indoor air		
Mold and bacteria	$69.95 for one; $109.95 for two	Spot tests for rooms and forced hot air heating and air conditioning systems for mold, yeast and fungus. User reads to count colonies formed.
Formaldehyde, nitrogen dioxide, carbon monoxide and carbon dioxide		Dosimeter tube tests for other gases.
Ozone	$14.95	Kit includes four One-Hour Ozone Test Cards. If ozone is present, the card changes color. The color is compared with a color chart.
Toxic black mold, bacteria and yeast	$19.95	Air from vent tested for 1 min. Results in 24–72 h by comparing growth with the provided chart.
Mold spores, bacteria and fungus	$13.95 per set	Air is sampled on a pretreated petri dish. Results after 36–40 h. User visually counts the number of mold colonies.
Water		
Phosphate,	50 tests — $71.90	For each analyte, swirl or dip strips according to instruction. Read color change and compare with color chart.
chlorine,	50 tests- $61.20	
ammonia,	50 tests — $48.50	
nitrogen and chloride	50 tests — $39.50	
Bacteria/mold Pesticides — atrazine and simazine, ammonia, nitrate and nitrite, iron, chlorine, copper, hydrogen sulfide and lead	$8.99 to $35.95	Bacteria test results after 48 h of collection, a positive or negative color response is obtained. For lead and pesticides, a positive/negative visual line is obtained. Test strip results are compared against the color charts provided.
Arsenic	$25.95 for two tests	Requires addition of three reagents. Colorimetric change is compared with a chart.
Ammonia, nitrogen, calcium, magnesium, free carbon dioxide, chloride, chlorine, chromium (chromate), copper, cyanide, iron, nitrate, phosphorus (phosphate) and sulfide	Options ranging from $164.35 to $516 depending on the number of samples and analytes to be detected.	Individual test kits with colorimetric detection in a carrying case. Each kit contains multiple tests (40–50), report forms and handbooks.
Drinking/tap water		
Trihalomethanes	$449 for 100 tests	Includes three reagent solutions and a reagent powder. The analytes

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Assessment of Current Tools
Conclusions

1. Tables present an overview based on a comprehensive sample of tools, stakeholders and researchers
2. Can be used to facilitate community-based cumulative exposure & risk assessments
3. Current tools cover a wide breadth of information, but separately
4. Cumulative & integrated risk, and risk ranking, typically not addressed
5. Compiling information from separate tools is challenging
6. Comparing risks is challenging
7. Communities generally unaware of available tools
8. C-FERST being developed as a user-friendly, web-based resource to address research needs

Acknowledgements

- CARE administrators, project officers and community members
- Matt Lakin, Region 9
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References

1. Zartarian, V.G., Schultz, B.D. (2009) The EPA's human exposure research program for assessing cumulative risk in communities. *J Expo Sci Environ Epidemiol*

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4. Hammond, D.M., Conlon, K.C., Barzyk, T.M., Zartarian, V.G., Schultz, B.D. (In Review) Application of National Databases and Mapping Tools at the Local Level to Two Community Case Studies.

5. Conlon, K.C., Barzyk, T.M., Hammond, D.M., Lakin, M., Zartarian, V.G. (In Preparation) Community-Based environmental assessments and mitigation efforts: Results from a survey of US EPA CARE project officers.

6. CARE Program – www.epg.gov/care

1,2 and tables from 3 available:
www.epa.gov/heasd/risk/projects/c3a_risk_assessment_tools.htm

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