Who are the South Valley Partners for Environmental Justice?

- A partnership of:
  - Community members
  - Rio Grande Community Development Corporation
  - Bernalillo County, Office of Environmental Health
  - UNM, Community Environmental Health Program

- The mission of the SVPEJ is:
  - to promote healthy, sustainable communities through participatory land-use decision making
Why are we here today?

To provide the community with

– results from our air quality monitoring study
– possible sources of air pollutants
– potential health effects from exposure to these air pollutants
– information on how to reduce exposures to these air pollutants
Why was the study done?

To answer residents’ concerns about

- potential air pollutants (VOCs) coming from industry
- the potential for these VOCs to impact health
- whether VOC levels differed among Mountain View, Los Padillas, & Pajarito Mesa
What are volatile organic compounds (VOCs)?

Compounds that

– evaporate easily and may be explosive
– have noticeable odors
  – gasoline
  – nail polish
– can easily enter the bloodstream when inhaled
– react with the body and are often toxic
– react with other air pollutants to form ozone

VOCs can cause cancer and other illnesses
Where do VOCs come from?

- Burning fuels like gasoline, heating oil & painted lumber
- Industrial processes
- Preserved woods
  - Landscaping timbers
  - Laminated flooring and paneling
- Chemicals in furniture and carpeting
- Paint
- Cleaning products
- Dry cleaning
- Smoking
How did we conduct the study?

- 29 study participants
  - 14 Mountain View residents
  - 8 Pajarito Mesa residents
  - 7 Los Padillas residents
- 3 badges
  - Indoor, outdoor, and on person
- 11 different volatile organic compounds
  - benzene, carbon tetrachloride, chloroform, ethyl benzene, methylene chloride, xylenes, MTBE, styrene, tetrachloroethylene, toluene, and trichloroethylene
- 3 continuous days
- Activity logs
How did we communicate results?

• All participants received their results by letter (in Spanish or English)

• Participants with high pollutant amounts, received personal consultation
  – Pollutants were generally associated with house cleaning, dry-cleaning, gasoline pumping, and painting activities
How did we determine whether pollutant amounts caused harm?

- Each pollutant amount from each of the monitoring badges was compared with Environmental Protection Agency (EPA) values.

- When dividing the observed pollutant amount by the EPA value, if the result was
  - Greater than 1, the pollutant amount was considered unsafe
  - Less than 1, the pollutant amount was considered “safer”

- EPA values are used for SCREENING ONLY -- identify POTENTIAL for concern, not actual likelihood of illness

- *First step* in evaluation
Were the pollutant amounts of the monitoring badges considered safe based on EPA’s non-cancer values?

• Yes

• When all of the pollutant amounts were added together, they were less than 1

• In general,
  – personal exposures were greater than indoor exposures and indoor exposures were greater than outdoor exposures
Non-cancer Risk Ratios

<table>
<thead>
<tr>
<th>Location</th>
<th>Outside</th>
<th>Inside</th>
<th>Wearable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Padillas</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Mtn. View</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Pajarito M.</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The graph shows combined risk ratios for Los Padillas, Mtn. View, and Pajarito M. with categories Outside, Inside, and Wearable. The unsafe zone is indicated by the red dashed line at a combined risk ratio of 1.
Were the pollutant amounts of the monitoring badges considered safe based on EPA’s cancer values?

- No

- When all of the pollutant amounts were added together, they were greater than 1
  - all three communities
  - outdoors, indoors and personal exposures
• Because the ratios are greater than 1, further investigation is needed.
Which pollutants had amounts that were considered unsafe?

- Benzene
  - WD-40, gasoline, cigarettes having processed tobacco, motor oil, paint thinner, lacquer, paint stripper, furniture polish and spray, engine degreaser, spray paint

- Carbon tetrachloride
  - Household usage was banned in the U.S. in the 1970’s. World-wide there are high amounts of carbon tetrachloride in the air

- Chloroform
  - Waste water from sewage plants, chlorinated drinking water, and anti-bacterial soaps with triclosan

- Tetrachloroethylene
  - Metal degreasers and dry cleaned clothing
Indicates 1 excess in 1,000,000 risk for cancer
Indicates 1 excess in 1,000,000 risk for cancer

Carbon Tetrachloride

<table>
<thead>
<tr>
<th>Location</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Padillas</td>
<td>3.09</td>
</tr>
<tr>
<td>Mt. View</td>
<td>3.86</td>
</tr>
<tr>
<td>Pajarito Mesa</td>
<td>4.63</td>
</tr>
</tbody>
</table>

- **Outside**
- **Inside**
- **Wearable**
Indicates 1 excess in 1,000,000 risk for cancer
Indicates 1 excess in 1,000,000 risk for cancer
How can I reduce my exposures?

• benzene
  – When fueling your car stand up-wind
  – Don’t smoke or allow others to smoke in your home
  – Ventilate your home when painting and wear a mask

• chloroform
  – Do not use products that contain triclosan

• tetrachloroethylene
  – Air out clothes outside that have been dry cleaned
  – Do not use metal degreasing products

• carbon tetrachloride
  – Do not purchase pesticides from other countries
What does it mean?

- Based on our study results, we are concerned about amounts of:
  - Benzene
  - Carbon tetrachloride
  - Chloroform
  - Tetrachloroethylene

- These chemicals were problems in all three communities, although amounts differed

- In general
  - personal exposures were greater than indoor exposures and indoor exposures were greater than outdoor exposures
How do VOC concentrations in the SV compare to other US communities?

- Comparison studies in
  - Minneapolis
  - Baltimore
  - LA, Houston, Elizabeth (NJ)

- Studies used similar methods

- SV had lower amounts than other communities
  - Tetrachloroethylene - higher for personal, outdoor, indoor exposures
  - Chloroform – higher for outdoor exposures only
  - Benzene – higher for personal exposures only
  - Carbon tetrachloride – lower for personal, outdoor, indoor exposures
Other communities – outdoor amounts

Outdoor Exposure Comparisons

<table>
<thead>
<tr>
<th>Compound</th>
<th>South Valley study</th>
<th>Payne - Baltimore</th>
<th>Sexton - Minneapolis</th>
<th>Weisel - LA, Houston, Elizabeth</th>
<th>EPA cancer value</th>
</tr>
</thead>
<tbody>
<tr>
<td>benzene</td>
<td>0.75</td>
<td>1.79</td>
<td>1.3</td>
<td>1.68</td>
<td>0.25</td>
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<tr>
<td>carbon tetrachloride</td>
<td>0.25</td>
<td>0.47</td>
<td>0.9</td>
<td>0.6</td>
<td>0.64</td>
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<tr>
<td>chloroform</td>
<td>0.30</td>
<td>0.22</td>
<td>0.1</td>
<td>0.17</td>
<td>0.08</td>
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<tr>
<td>tetrachloroethylene</td>
<td>0.56</td>
<td>0.28</td>
<td>0.3</td>
<td>0.56</td>
<td>0.33</td>
</tr>
</tbody>
</table>
Other communities – indoor amounts

Indoor Exposure Comparisons

Median Concentrations Measured (ug/m³)

- South Valley study
- Payne - Baltimore
- Sexton - Minneapolis
- Weisel - LA, Houston, Elizabeth
- EPA cancer value

<table>
<thead>
<tr>
<th>Substance</th>
<th>South Valley study</th>
<th>Payne - Baltimore</th>
<th>Sexton - Minneapolis</th>
<th>Weisel - LA, Houston, Elizabeth</th>
<th>EPA cancer value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>1.12</td>
<td>2.45</td>
<td>1.9</td>
<td>2.19</td>
<td>0.56</td>
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<tr>
<td>Carbon tetrachloride</td>
<td>0.25</td>
<td>0.40</td>
<td>0.85</td>
<td>0.5</td>
<td>0.62</td>
</tr>
<tr>
<td>Chloroform</td>
<td>0.13</td>
<td>0.54</td>
<td>0.9</td>
<td>0.92</td>
<td>0.08</td>
</tr>
<tr>
<td>Tetrachloroethylene</td>
<td>0.08</td>
<td>0.73</td>
<td>0.5</td>
<td>0.6</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.33</td>
</tr>
</tbody>
</table>
Other communities – personal amounts

Personal Exposure Comparisons

<table>
<thead>
<tr>
<th>Substance</th>
<th>South Valley study</th>
<th>Payne - Baltimore</th>
<th>Sexton - Minneapolis</th>
<th>Weisel - LA, Houston, Elizabeth</th>
<th>EPA cancer value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>3.91</td>
<td>2.94</td>
<td>2.39</td>
<td>0.25</td>
<td></td>
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<tr>
<td>Carbon tetrachloride</td>
<td>0.402</td>
<td>0.82</td>
<td>0.6</td>
<td>0.61</td>
<td></td>
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<tr>
<td>Chloroform</td>
<td>0.483</td>
<td>1.04</td>
<td>1</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>Tetrachloroethylene</td>
<td>0.924</td>
<td>0.91</td>
<td>0.9</td>
<td>0.61</td>
<td>0.33</td>
</tr>
</tbody>
</table>
Cancer in the Mountain View

• Based on a previous study comparing observed cancers in Mountain View with Bernalillo County:

  – Mountain View had a greater than expected number of lung cancer, bladder cancer, brain cancer, thyroid cancer, and leukemia cases.

  – VOCs may contribute to lung cancer, bladder cancer and leukemia; however factors other than exposure to VOCs could also cause these types of cancers.

  – For example, cigarette smoking is known to cause lung cancer and bladder cancer.
Other considerations

• Short sampling period – 3 days
• Small sample size – 29 participants
• How does EPA calculate their “safe” values
• Did not consider place (e.g., industry) specific air pollutants, but rather community air pollutants
• Patterns of personal exposure may vary based on length of stay in community, length of duration at work, wind patterns, etc.
• Illness may be based on an individual’s susceptibility
• VOCs can come from industrial emissions and from chemical use in the home
• You can reduce your VOC exposure by using products that are environmentally safe
Potential Follow-up

• Identify funding for a more in-depth study
• Identify the types and quantities of pollutants that industries are emitting
• Strengthen the air monitoring network and sample for more types of pollutants
• Provide residents with access to health care providers that understand the links between environmental quality and health
• Educate residents on ways to reduce their pollutant exposures
• Inform health care providers and policy makers of study results and pollutants of concern


Contact Information

• South Valley Partners for Environmental Justice – (505) 452-8525
• Bernalillo County, Office of Environmental Health – (505) 314-0310
• UNM, Community Environmental Health Program – (505) (fill in)