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INVESTIGATION OF BIRTH DEFECTS KETTLEMAN CITY, CA

Presentation for Department of Pesticide Regulation
Pesticide Registration and Evaluation Committee
January 21, 2011



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State of California



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Brief History

- January 2010 report
 - Birth defects elevated in Kettleman City in 2008
- Former Gov. Arnold Schwarzenegger
 - California Department of Public Health (CDPH)
 - Investigation of birth defects
 - California Environmental Protection Agency (Cal/EPA)
 - Exposure assessment of Kettleman City environment



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Final Report - CDPH Investigation of Birth Defects in Kettleman City



Sumi Hoshiko, MPH
California Department of Public Health
January 21, 2011

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- 1: What did CDPH do?
- 2: What did we find?
- 3: What are the next steps?

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What did CDPH do?

- Looked for scientific info on what factors could increase risk of birth defects

- Consulted with experts



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What did CDPH do?



CALIFORNIA
BIRTH DEFECTS
MONITORING
PROGRAM

- Detailed review of birth defects registry records from 2007 - March 31, 2010

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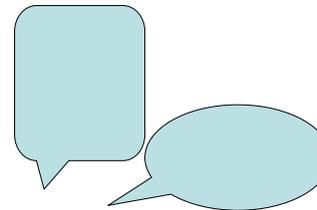
What did CDPH do?

Review additional medical records of mothers and children with birth defects



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What did CDPH do?



Detailed in-person interviews with 6 of 11 mothers

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What did CDPH do?

Questionnaire for mothers:

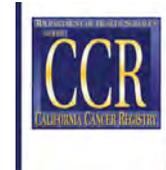


- Medical and pregnancy family history of birth defects
- Lifestyle factors (such as cigarettes and alcohol)
- Environmental and occupational exposures

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What did CDPH do?

- Cancer data review for the area (1996 – 2008)
- California Cancer Registry



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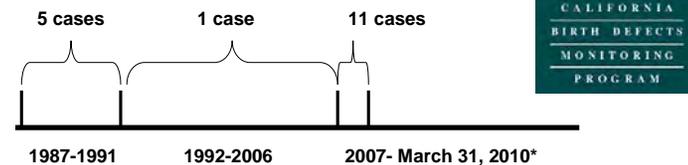
Privacy protection



- Safeguard families' privacy
- Comply with strict state laws re: confidential information
- Report does not include information that could identify any specific individual
- Summary information only

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What did we find?



- Most recent period - more than expected
- No additional birth defects in Kettleman City children 3/31/10 - 10/2010

* For the investigation period, children of mothers who had lived in Kettleman City during pregnancy but moved before delivery were included.

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What did we find?

Birth defects were all different,
though some had similar features



- Some “syndromes” with multiple birth defects
- Others were single defects
- Cleft lip or cleft palate can happen alone or as part of over 400 different syndromes

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What did we find?



- No unusual patterns or types
- Suggests no common exposure

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What did we find in interviews with 6 mothers?



- Mothers had pre-natal care and generally followed good health practices during pregnancy
- Mothers did not have significant medical conditions known to increase risk for birth defects
- None used alcohol, drugs, or tobacco

**Many results in the report and here are presented in general terms to protect mothers' and children's privacy and confidentiality*

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What did we find in interviews with 6 mothers?



- No specific cause identified
 - Most did not drink tap water
 - None spent time at hazardous waste landfill, abandoned oil fields, or near the freeway
 - None had hobbies with chemicals
 - None ate fish caught by family or friends

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What did we find in interviews with 6 mothers: pesticides (in community)



- Concern about risk from pesticide exposures from the nearby fields
- Mothers reported seeing and smelling pesticides being applied to fields surrounding the community

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What did we find in interviews with 6 mothers: pesticides (home)



- Used mainly in yard, not inside home
- Per consultation with DPR: Unlikely to have resulted in significant exposure

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What did we find in interviews with 6 mothers: pesticides (occupational)



- Some mothers worked in agriculture
- Reviewed types of work reported with DPR experts
- Planting, sorting and pruning
- Agricultural work did not involve handling pesticides
- No direct contact with chemicals on the job (agriculture or other industry).

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What did we find in interviews with 6 mothers: pesticides (take-home)



- Most fathers worked in agriculture
- Use of personal protective equipment reported, adequacy not assessed
- A few occupations involved chemical exposure, either in agricultural industry (handling pesticides) or other
- Fathers did not wear their work clothes / shoes in the home

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What did we find? Review of cancer, 1996-2008



- California Cancer Registry - no increase in cancer
 - 113 cases diagnosed; 143 expected
 - Most common - prostate, breast, and lung
- 5 childhood cancers (mainly leukemia); none since 2006
 - Most childhood cases occurred outside of Kettleman City itself

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What are the next steps?

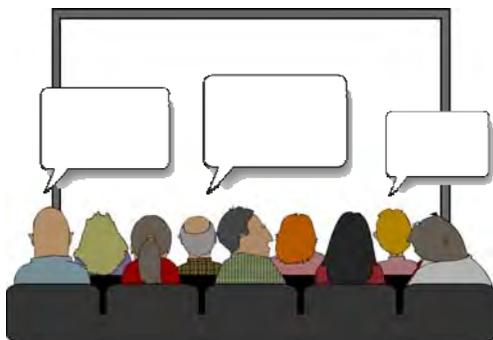


- Continue monitoring for birth defects
 - See whether recent increase continues or goes back to earlier pattern
- Continue monitoring for cancer
- Provide funding and technical assistance to local water district to identify a new source of water for the system

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Public Comment Period

following release on November 22, 2010



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How to bring drinking water into compliance with arsenic standard



- Kettleman City and now Elementary School out of compliance
- CDPH offer of funding for water treatment from State Revolving Fund
- Requirements of Fund

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Biomonitoring



- Few methods
- Time has passed
- Everyone has small amounts of many chemicals in their bodies
- Not known what this means for someone's health

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Evaluating number of birth defects

- In any given year, between 0 and 3 children would be expected to be born with birth defects to mothers who lived in Kettleman City.
- In the time period of investigation, there were 148 births.

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Autism, asthma, and low birth weight

- No apparent excess



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Copies of the report

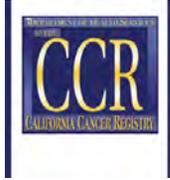


Available in English and Spanish at: Kettleman City post office, library, community center, elementary school.

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California Department of Public Health

- California Birth Defects Monitoring Program
www.cdph.ca.gov/programs/cbdmp/Pages/default.aspx
- California Cancer Registry: <http://www.ccrca.org/>
- Environmental Health Investigations Branch: <http://www.ehib.org/>

Kettleman City Exposure Assessment

Presentation for Department of Pesticide Regulation
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California Environmental Protection Agency

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Satellite view of Kettleman City showing residential [R] and commercial [C] areas

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What did we do?

- Tested for ~35 chemicals that may cause birth defects and that may be present in or near Kettleman City.
- Also tested for more than 150 other hazardous chemicals.
- Extensive testing of air, water, soil, and soil gas

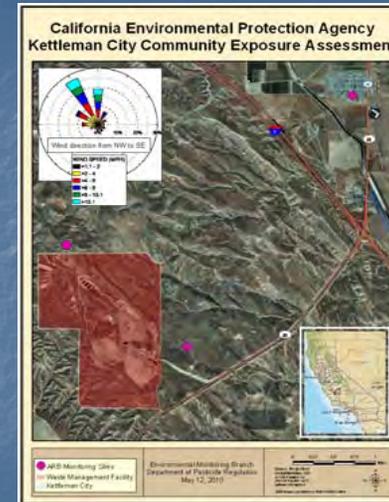
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Chemical	Monitored Media			Air Model ¹	Use(s)
	Soil	Air	Water		
Abamectin				X	Pesticide
Arsenic	X	X	X		Industrial/NO ₂
Azoxystrobin				X	Pesticide
Benzene	X	X	X		Industrial
Boscalid				X	Pesticide
Bromoxynil				X	Pesticide
Cadmium	X	X	X		Industrial/NO
Carbaryl				X	Pesticide
Carbon Disulfide		X			Industrial & Pesticide
Chlorpyrifos		X		X	Pesticide
Chlorinated dibenzodioxin and dibenzofuran congeners	X	X			Industrial Contaminant
Chromium	X				Industrial/NO
Chromium VI		X	X		Industrial/NO
Clethodim				X	Pesticide
Diazinon		X		X	Pesticide
DDT (Dichlorodiphenyl-trichloroethane), DDE	X				Pesticide
Diflufenzuron				X	Pesticide
2,4-D				X	Pesticide

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Chemical	Monitored Media			Air Model ¹	Use(s)
	Soil	Air	Water		
Endrin	X				Pesticide
Ethyl benzene	X	X	X		Industrial
Fenoxaprop-p-ethyl				X	Pesticide
Flumioxazin				X	Pesticide
Lead	X	X	X		Industrial/NO
Maneb				X	Pesticide
MCPA (4-chloro-2-methylphenoxy)acetic acid				X	Pesticide
Mercury and mercury compounds	X				Industrial/NO
MITC (methyl isothiocyanate)		X		X	Pesticide
Myclobutanil (Laredo)				X	Pesticide
Nickel	X	X	X		Industrial/NO
Oxyfluorfen		X		X	Pesticide
Polychlorinated biphenyl congeners	X	X	X		Industrial
Propiconazole				X	Pesticide
Pyraclostrobin				X	Pesticide
Sulfur dioxide		X			Pollutant/NO
Toluene	X	X	X		Industrial

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Wind rose

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What sources did we investigate?

- Agricultural operations
- Hazardous Waste Facility
- Industries and oil
- Water
- Homes
- Others

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Oil fields around Kettleman City

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What did we find?

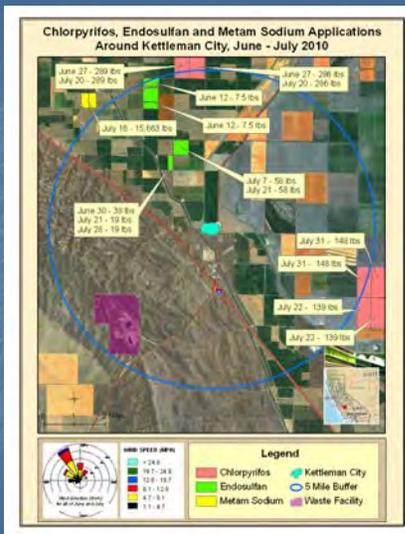
- Extensive testing did not find exposures to hazardous chemicals that could explain the birth defects.
- Levels of environmental pollutants in Kettleman City are not different than other Valley communities.

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Agricultural Operations

- Pesticide use is lower in Kettleman city than many other Central Valley communities
- For a few days between 2006 and 2009 the modeled air levels were estimated to be above screening levels for possible general health effects for three pesticides (MITC, chlorpyrifos, diazinon)

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Agricultural Operations

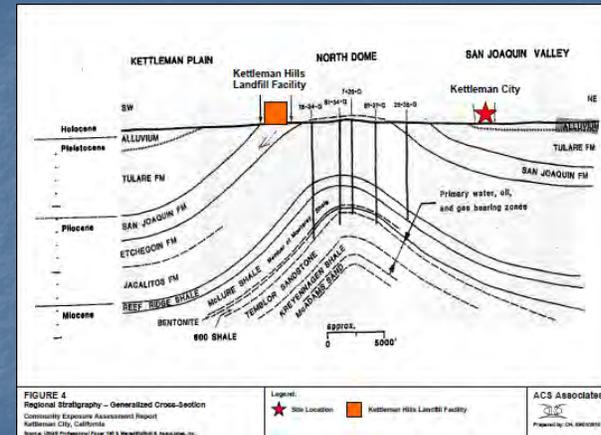
- On one day the modeled air levels for MITC was calculated to be higher than a screening level for possible reproductive effects
- Recommendation: DPR continue to take measures to reduce statewide exposure to these pesticides.

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Hazardous Waste Facility

- No evidence that the facility operations in 2007 – 2009 affected air quality in Kettleman City or posed risks to residents
- PCBs: No detections in soil and soil gas; in air is found at background levels
- Groundwater is not moving from the facility to Kettleman City

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WATER

- Arsenic levels in drinking water in Kettleman City exceed state standards but are similar to other San Joaquin Valley communities.
- Most mothers of children with birth defects who were interviewed said they did not drink tap water.
- RECOMMENDATION: Dept. of Public Health and KC Community Services District should continue efforts to reduce arsenic levels in the water.

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WATER cont.

- Lead levels in school's well and one municipal well detected (below regulatory level). Subsequent retesting of the school well did not find lead in the water.
- Elevated benzene levels in air found at treatment unit at one municipal well. RECOMMENDATION: Air Resources Board and San Joaquin Valley APCD investigate and take appropriate action.

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Homes

- Chlordane was found at a high level in the soil at one home. RECOMMENDATION: Dept. of Toxic Substances Control will further investigate.
- U.S. EPA plans to measure pesticide levels in house dust.

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Other

- Some evidence of illegal dumping of trash or automobiles but they are not a source of contaminant exposure to the community.
- Arsenic levels below state drinking water standard found in California Aqueduct and a drainage canal. The drainage canal sediment contained arsenic levels similar to soil in the community.
- Lead found in California Aqueduct below state action level.
- Diesel exhaust exposure less than comparison county (Kern)

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Conclusions

- Extensive testing of air, water, soil, and soil gas did not find any exposures to hazardous chemicals likely to be associated with birth defects.

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