

## **SALINAS, CALIFORNIA: THE SALAD BOWL OF PESTICIDES<sup>1</sup>**

**Sheila Kaplan<sup>©</sup>**

Locals call this place the world's salad bowl. Dole, Naturipe and Fresh Express are here, where much of the global fruit and vegetable trade emerges in neat green fields just over the hills from the Pacific Coast. The difficulties facing migrant workers who plant and pick the crops is an old story. But in Salinas, a new story is emerging -- one with serious implications for the rest of the country and with an ending that has yet to be written. It is here that University of California, Berkeley public health professor Brenda Eskenazi and her colleagues have spent the past 12 years studying mothers and children who are exposed to pesticides used in the fields.

The Center for Health Assessment of Mothers and Children of Salinas (CHAMACOS) is a joint project of UC Berkeley, the Natividad Medical Center, Clinica de Salud Del Valle de Salinas and other community organizations. Its goal is to assess exposure to pesticides and other pollutants in pregnant women and young children to determine the effects on their health, and to try to prevent contact with the chemicals.

After forming partnerships with local health care providers, the researchers were able to recruit 600 women, who submitted to a series of tests to measure pesticide levels in their bodies. Investigators tracked the women throughout their pregnancies, waiting at hospitals as babies were born to collect the umbilical cord blood. As the children grew, Eskenazi and her team also charted their growth, mental development and general health. This group is now 10 ½ years old, and Eskenazi's work has set off alarms among public health officials. She and her colleagues have found that at age 2, the children of mothers who had the highest levels of organophosphate pesticide metabolites in their blood had the worst mental development in the group. They also had the most cases of pervasive developmental disorder.

At age 5, the children whose mothers were most exposed during pregnancy had poorer attention spans compared to those born to a mother who had lower levels of pesticide metabolites in their urine. Metabolites, as referred to here, are compounds that are formed as a chemical breaks down in the body. They are evidence that someone was exposed to a chemical. "We have very, very high reports by the mother of behaviors consistent with pervasive developmental disorder," said Eskenazi at a recent neurotoxicology conference. "These include signs like the child is afraid to try new things, can't stand anything out of place, and avoid looking others in the eye. This is considered to be autism spectrum behavior."

Researchers are currently studying whether children whose mothers were exposed to pesticides during the pregnancy are more likely to develop learning disabilities, behavior problems, asthma, diabetes and obesity than other children. The levels of pesticide metabolites found in the pregnant women in CHAMACOS are higher than women who don't live in agricultural settings. But the Centers for Disease Control and Prevention has found evidence that the pesticides contaminating kids around the country, regardless of proximity to agriculture, is high enough to raise questions about the impact those pesticides may have on their growing brains. These days, children are exposed to pesticides used in their homes, pesticide residue on foods and sprays that drifts into playgrounds and other sites. Eskenazi's work is being considered by the EPA as the agency decides what to do with dozens of pesticides and other chemicals

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suspected of being developmental neurotoxicants, that is, chemicals that can rewire the brain and nervous system while a fetus is growing and continuing to affect the brain in early life.

On a sunny day last summer, Eskenazi and Associate Director Kim Harley visited an old trailer, which serves as headquarters for the center, squeezed between a hospital and a county jail. The trailer is cozy, with low couches for the kids, teddy bears and dolls, videos of movies and cartoons. On the wall is a map of Salinas, with pins showing the neighborhoods where the participants live. The group has visited many of the participants at home, collecting samples of pesticides and using a GPS to determine how far they are from the fields. Off the main room are small offices where technicians take blood and urine samples from the children and their mothers, and examiners administer a battery of tests designed to assess their memory, attention span, IQ and other cognitive and emotional indicators.

On this day, child examiner Helen Aguirre is working with a 9-year-old boy. He is shy, but they coax him into allowing them to check his height. Then he follows them into the room for the other tests. They tell him a story about a fishing trip, and then ask him to repeat the salient facts. They talk about something else for a while, then ask him how much he remembers about the fishing tale. They allow breaks for snacks and a bit of television. The whole thing takes between 2 ½ and 3 ½ hours. This is considered an observational study, but the researchers refer the parents to a doctor if they find any health problems, such as asthma, which is increasingly prevalent in Salinas, or high blood pressure. Next door is a hospital, where almost all of the kids were born, and just across the street, rows of lettuce, celery and broccoli. "We have a high amount of pesticides used near this building," said Eskenazi. "There are fields close by. When the wind is right, the pesticides blow in."

The project has been so successful that the federal government has funded the researchers to add a few more chemicals to the testing. Their work also served as a model for the recently launched National Children's Study, run by the National Institutes of Health, which seeks to examine the effects of the environment on 100,000 children, tracking them from before birth until age 21.