SAN DIEGO COUNTY
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Implications of IBM Study on Miscarriages

■ Workplace: The two chemicals involved have a wide range of uses. But computer companies are downplaying the significance of the report.

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SAN FRANCISCO—A new study showing a high incidence of miscarriage among some women who assemble computer chips raised renewed concerns Monday about the health effects of chemicals known as glycol ethers, which are used in a wide range of manufacturing processes and products.

The study, commissioned by International Business Machines Corp., focuses on two compounds. One is used as a solvent in lacquers, wood finishes, resins, waxes, oils, printed textiles, photographic film and silk-screening inks. The other is used to make chemicals that bond metals to hydrocarbons.

"It's a serious threat, because these two chemicals in particular are going to be used in materials used in consumer environments," said medical toxicologist Daniel T. Teitelbaum. "This is the stuff that you're going to be exposed to if you get your house painted, or if you go out and buy a can of spray lacquer," said Teitelbaum, adjunct professor of environmental sciences at the Colorado School of Mines.

Electronics firms, however, said they were aware of potential dangers posed by the chemicals and were taking precautions while awaiting the results of additional research.

IBM and other companies said they had notified their workers of the hazards and given pregnant women a chance to move to other jobs until an adequate substitute can be found for the two chemicals.

But workers' health advocates said chip manufacturers were dragging their feet in eliminating a known workplace hazard, and that further studies would only reinforce what is already known.

"That these [two chemicals] are reproductive toxins is not news," said Amanda Hawes, director of the Santa Clara Center for Occupational Safety and Health. "I'm not satisfied with 10 years of study. They need to change their procedures."

The IBM study, carried out by researchers at Johns Hopkins University, found a 33% miscarriage rate among pregnant women who worked with two acid-like chemicals in IBM chip plants between 1980 and 1989. Ten out of 30 pregnant women who worked with the chemicals in two specific processes had miscarriages, compared to 62 miscarriages out of 398 pregnancies for all chip plant workers.

The two compounds cited in IBM's study are diethylene glycol dimethyl ether and ethylene glycol monethyl ether acetate. The larger group of glycol ethers to which they belong includes some chemicals considered innocuous to human health, as well as several suspected of causing harm.

Glycol ethers are used by chip makers to etch away a photographic substance that's used to create circuit patterns in chips.

IBM said that one of the processes involving the glycol ethers had been eliminated, and that it was taking other measures to reduce their use. "Any employee that expresses a concern will be accommodated," added IBM spokesman Jim Ruderman. "That might include a transfer to other areas."

IBM last month told other manufacturers about its study via the Semiconductor Industry Assn.

Companies including Intel, Advanced Micro Devices and Cypress Semiconductor said they had notified their employees and were taking measures to reduce exposure to the chemicals, though most were not planning an immediate phase-out. They added that it was routine policy to allow workers to opt out of certain jobs.

T. J. Rodgers, chief executive of Cypress Semiconductor, said his company had begun phasing out the chemicals 18 months ago. A substitute chemical was available from a Japanese company, he said, but Cypress wanted to develop one with its American supplier.

The IBM study was conducted by epidemiologist Ronald Gray and his colleagues at the Johns Hopkins University School of Hygiene and Public Health. Gray said Monday that he had reported the increased incidence of miscarriages to IBM as soon as they discovered it, but that the studies were "far from complete."

In particular, he said, the researchers have compiled data about the workers' levels of exposure to the glycol ethers, "but we have not yet completed our analyses of that data. . . . As researchers, it is difficult for us to say very much more about what are still very preliminary findings."

The results were not surprising to other researchers. In 1983, the National Institute of Occupational Safety and Health summarized results of more than 25 separate studies of the effects of glycol ethers on rats and mice. Those studies found a variety of adverse effects, ranging from testicular atrophy and malformations to embryonic deaths.

"The general sense was that there is strong evidence of reproductive toxicity in animals," said toxicologist David Savitz of the University of North Carolina.

The Johns Hopkins study also echoes a 1986 study of workers at a Digital Equipment Corp. semiconductor plant in Hudson, Mass.

University of Massachusetts researchers also found a miscarriage level double the normal rate and attributed their finding to glycol ethers.

The definitive answer may be provided by a UC Davis study of 18,000 workers at 15 chip makers, but results are not expected to be reported until next year.

"If that study points in the same direction [as the two earlier studies], it would be fairly strong evidence" of the chemicals' hazard, Savitz said.

Hawes said, however, that the results were already clear enough, and that electronics firms still had a much too reactive approach to toxic chemicals in the workplace.

"They developed some of the procedures [that use glycols] after some of the data was already available," she said.

It was not clear to what extent glycols might pose a hazard in other industries.

Dr. Albert Materazzi, a consultant to the National Assn. of Printers and Lithographers, said they had been used in that business as a wetting agent. The two suspect chemicals were used in the printing industry until the early 1980s, recalled Materazzi, a health and safety specialist.

But an incident in New Haven, Conn., in which workers came down with aplastic anemia, caused printers to search for substitutes, said Materazzi. The National Assn. of Printing Ink Manufacturers began to alert members as early as 1982, he recalled.

Times science writer Thomas Maugh also contributed to this report.

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