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Global Health: Asia in the 21st Century

Join us Fridays through April 3 for a five-part series as we take you around the world highlighting global health issues. (There will be no series publication on March 20.)

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Workplace Exposure and Cancer in Shanghai Textile Workers

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The number of "made in China" labels on clothes leaves little doubt that China manufactures much of what the world is wearing. The huge number of products China manufactures and exports worldwide has earned it the label of "factory of the world." China has a long legacy of textile and clothing manufacturing that dates back to the 1920s. Currently, China employs millions of textile workers. Despite the economic advantages that producers and consumers get from mass-scale textile production, there are some downsides, particularly for workers.

The spotlight on endotoxin

One of the chemicals with the most widespread exposure in textile manufacturing is endotoxin, a contaminant of cotton dust. Endotoxin is made by certain bacteria (known as gram-negative, like the common E. coli). Since cotton is a good breeding ground for bacteria, endotoxin is often found at high levels in the cotton dust that textile workers breathe. Endotoxin has a number of known harmful effects. In particular, breathing endotoxin causes a respiratory disorder similar to asthma called byssanosis.

The Henry M. Jackson School of International Studies

View of Shanghai's growing skyline from above the Huangpu River.

Research studies conducted in England and the United States dating back to the 1970s found, somewhat surprisingly, that cotton textile workers had lower-than-average lung cancer rates. That led to the idea that something about cotton dust, perhaps endotoxin, may actually protect against lung cancer. Unproven theories suggest that endotoxin may stimulate the body's immune system to kill cancer cells before they grow into tumors.

A ten-year University of Washington (UW) study of 267,000 women textile workers in Shanghai, China, is the largest, most detailed study to date of workplace endotoxin exposure and cancer. China is especially well suited for research on workplace exposures and health because large numbers of workers do not move much between jobs or cities, unlike in the United States, and exposures to hazardous factors have been well documented by the governmentally controlled industry in past years. Employment in the Shanghai textile industry was long considered desirable by both men and women because jobs paid reasonably well, there was job security and workers received very good medical care and pensions. Women workers typically started work in their early 20s and retired in their late 40s.

The UW study showed that women who had the most exposure to endotoxin, especially during their earliest years of working in the textile industry, had the lowest lung cancer rates. There were also some unanticipated results. Endotoxin seemed to protect against various other types of cancer as well, including cancers of the esophagus, stomach, liver, pancreas, breast and ovary. Early career exposure was most strongly related to lowered risks for these other cancers, as with lung cancer.

Does endotoxin prevent cancer?

Should endotoxin be given to people, perhaps as a cancer treatment or vaccine? Although endotoxin has been used as a cancer therapy in a fairly small number of patients, the results do not yet suggest that endotoxin is clearly a better treatment than conventional methods. Before endotoxin is tried as a cancer preventive, like a vaccine, more research is needed to explain exactly how endotoxin can kill cancer cells and at what levels it works best.

The answers will ultimately come from studies of cancer patient volunteers treated with endotoxin and from laboratory experiments on animals and cells. Of course, studies involving humans must be performed very cautiously since endotoxin has known dangerous properties, such as inflammation in many organs of the body.

In the meantime, the UW team led by Dr. Checkoway will continue to follow the group of Shanghai textile workers to see how endotoxin relates to cancer risks over a longer time period. Other studies of occupational groups exposed to endotoxin, such as cotton textile workers and dairy and poultry farmers, are underway in other countries, including Italy, the United Kingdom, the Netherlands and the Ukraine. These studies should shed more light on the questions about endotoxin and cancer.

Next:
HIV AIDS Awareness and Education in India

EXPAND YOUR WORLD

1) What is endotoxin and how does it impact workers' health?

2) What do scientists need to know in order to recommend using endotoxin to treat cancer?

3) Why is China a good place to study effects of endotoxin?

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We're pleased to join The Henry M. Jackson School of International Studies in bringing you the five-part series "Global Health: Asia in the 21st Century." Each week we'll highlight an emerging health issue and offer students an opportunity to explore it further through discussion questions. For more information, please visit http://jsis.washington.edu/earc.

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