

science

# Scientists studying dangers from diesel engine exhaust

**United Press International**  
BALTIMORE — In 10 years, the government figures that one or two of every 10 cars on the road will be powered by fuel-saving diesel engines.

That means air pollution will be significantly different chemically from what we face today, because diesels emit 60 to 80 times more particulate matter — soot — than gasoline engines.

An estimated 50 laboratories across the nation are trying to determine if the diesel emissions are as hazardous and in particular, if they can cause cancer.

Dr. Terence Risby, associate professor of environmental chemistry at the Johns Hopkins School of Hygiene and Public Health, said the present debate on the need for diesel emission standards "ranges from those who claim there is no problem to those who speak as though serious hazards were proven."

"In fact," he said, "we are just beginning to acquire the knowledge needed for a sound judgment."

Risby and two colleagues at Penn State are conducting a variety of studies of diesel exhaust with support from the Environmental Protection Agency.

In their experiments, the diesel soot was collected on filters and subjected to various chemical and biological tests. The results so far have been contradictory.

Compounds adhering to the surface of the particles were extracted with an organic solvent, analyzed chemically, then evaluated in a bacterial test for evidence of a capability of causing genetic changes — an indication that a substance might be able to cause cancer.

Risby said those compounds were, in fact, found to be positive — meaning they could be a serious health hazard.

But when the raw particulate matter was tested without extraction of surface compounds, no such biological activity was seen.

"This could mean that the active compounds, as they normally occur on the particles, are not readily freed to cause trouble and therefore do not represent a serious public health hazard," Risby said at a recent seminar on environmental health.

He said the studies at Hopkins and Penn State have shown the compounds produced by diesel engines are the result of the diesel combustion process, not the type of fuel used.

Diesel fuel is thought to contain more than 500 compounds, while the exhaust of diesels contains more than 10,000 different compounds.

Risby said the problem with diesel emissions is that 95 percent of the particles are small enough to be inhaled and deposited deep within the lungs, where they remain for long periods.

Even if the particles themselves are not hazardous, Risby said they can pick up other compounds in the environment that might be.

"It's got to be a hazard," he said. "Will it be a significant hazard? We don't know the answer to that."

Anticipating the 1981 Hajj will draw three times as many pilgrims as in 1961 — 1 million of them foreigners — Saudi Arabian authorities have taken early action to deal with the situation, including sponsoring research on the problems and control of heat stroke by two experts at the School of Tropical Medicine.

Professor J. S. Weiner of the Environmental Physiology Unit and Dr. Mustafa Khogali induced a reasonable facsimile of the intense heat liable to be experienced in the crush around the tomb called the Kaaba, Islam's holiest shrine, by having volunteers in plastic clothing exercise in a hot room until their temperatures reached 103 degrees Fahrenheit.

When victims have a such a high temperature — and in heat stroke 107 F. is not uncommon — there must be rapid cooling or the chances of fatal stroke are as high as 80 percent. This drastic cooling was the goal Weiner and Khogali have been seeking since 1978, according to the bulletin of the Medical Research Council.

Lopez notes that no surgery is without risk although only a very small percentage of patients have serious complications from implants such as bacterial infections and uncontrolled hemorrhaging, which can also occur after cataract extraction without implants.

# Heatstroke being fought

**United Press International**  
LONDON — The next great pilgrimage to the Moslem holy city of Mecca that coincides with the hot months comes in 1981. Scientists say heat prostration is likely to fell hundreds of the estimated 2 million worshippers expected there.

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# Lens implants improve sight

**United Press International**  
CHICAGO — The operating room at Chicago's Grant Hospital could have been a scene from science fiction movie. A green sheet covered the body with only an eyeball exposed.

Dr. Andrew Lewicki was meticulously removing a cataract from the right eye of an elderly woman. Nothing unusual. The procedure that followed is also becoming commonplace. The fogged lens was replaced by a plastic implant.

Over 100,000 intraocular lenses were implanted in the United States last year. They offer an alternative to thick glasses which are far from adequate and to contact lenses which can be difficult for elderly people to handle.

"I had a devil of a time getting the contact off my finger," said Edward Rog, 58, of Chicago, who had an intraocular lens implanted in his right eye Aug. 5, 1978, because of his inability to wear a contact lens.

"On Aug. 6, I could see. The girl took the bandage off and says, 'can you see what I'm doing,' and I said, 'yeah, you're holding up fingers. That's the eighth wonder,'" laughs Rog.

Lewicki said there is a 90 percent chance that a patient will have normal vision in the eye that accepts the intraocular lens although some people still need glasses after the operation for nearsightedness or farsightedness.

Dr. Osvaldo Lopez says the type of implant he uses is determined beforehand by the patient's age and lifestyle.

Despite their success, questions continue to be raised about the use of lens implants. Because the effects of lens implants beyond 20 years are unknown, a report from a National Institutes of Health panel of ophthalmologists last year recommended the implants generally be restricted to elderly patients.

Some eyes are better candidates than others for an implant operation and ophthalmologists say there are some people that should not have the operation. These are patients with uncontrolled glaucoma, eye in-

flammation, advanced diabetes, very nearsighted vision and retinal detachments.

The cataract and implant operation usually lasts about an hour and can be done under local anesthetic. The day after a normal operation, the eye is only slightly red and there is no indication the person had surgery.

Lopez notes that no surgery is without risk although only a very small percentage of patients have serious complications from implants such as bacterial infections and uncontrolled hemorrhaging, which can also occur after cataract extraction without implants.

# Zinc is snake venom's poison

**United Press International**  
FORT COLLINS, Colo. — The venom of a rattlesnake inflicts damage because it contains zinc which causes blood vessels to rupture, researchers have determined.

Dr. Anthony T. Tu, professor of biochemistry at Colorado State University, said his team of researchers have isolated five poisonous compounds in rattlesnake venom which contain zinc.

"The major health problems from rattlesnake bites are hemorrhaging and destruction of muscle tissue around the location of a bite," Tu said. "The poison's ability to trigger capillary cell damage and bleeding

was stopped when we removed zinc from them."

Tu said the use of antivenoms in the United States reduced the number of deaths from rattlesnake bites from about 200 to 20 a year. He said his research could improve treatments further and reduce the death rate even more.

The professor, the author of a book on snake venoms, said the venom of western rattlesnakes usually does not kill adults because the snakes are too small to inject enough venom. However, rattlesnakes in Texas, Florida and other southern states are more dangerous because they are

larger and inject more venom.

Tu said a snake's potential to kill depends on how poisonous its venom is and how much venom it injects. He said large snakes that inject neurotoxic venoms tend to be the most deadly.

"Some of the most deadly snakes — cobras and kraits, for example — inject venom that is neurotoxic," he said. "The venom essentially paralyzes, stopping heartbeat and respiration."

Tu said the Arizona Mojave rattlesnake has neurotoxic venom and therefore is more dangerous than other western rattlers.



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