

# UNC and UAE partner to protect the environment

Read the UAE project report at [www.sph.unc.edu/uae/report](http://www.sph.unc.edu/uae/report).

**R**apid development in the United Arab Emirates (UAE) has led to increased life expectancy and greater economic opportunity, but it also brings the potential for significant environmental and public health threats.

Since June 2008, researchers at UNC Gillings School of Global Public Health have collaborated with UAE officials in an effort to reduce and prevent such health challenges.

The UNC-UAE National Strategy for Environmental Health project, sponsored by the Environment Agency-Abu Dhabi, called for UNC researchers to assess the country's greatest environmental risks and develop a plan to strengthen the UAE's public health policy. UNC has partnered in that effort with UAE University's Department of Community Medicine and with the RAND Corporation, a global public policy research institution.

Researchers evaluated everything from water quality, to food safety, to global climate change. They found that outdoor air pollution is the top environmental threat to the country, followed by indoor air pollution and occupational exposures. (Read the UAE project

report at [www.sph.unc.edu/uae/report](http://www.sph.unc.edu/uae/report).)

Now, UNC epidemiologists are collecting data to determine the effects that indoor pollutants, diet and lifestyle have on Emiratis' health.

The project is an opportunity to help UAE officials manage environmental problems and set the future course of environmental protection, said principal investigator Jacqueline MacDonald Gibson, PhD, assistant professor of environmental sciences and engineering.

It also serves as a bridge to rebuilding relationships in the Middle East, she said.

"After September 11 (2001), so much damage was done to the relationship between the U.S. and the Middle East that I thought we needed to grab hold of this opportunity to



Dr. Jacqueline MacDonald Gibson (right) confers with colleague Rugaya Mohamed, from the Environment Agency-Abu Dhabi.

do constructive work in the Middle East," MacDonald Gibson said.

## Ranking the risks

Once UNC researchers identified public health threats facing the UAE, the next step was to prioritize the needs for action. Common environmental risks do not always make headlines, but they may be the biggest threat facing a nation, MacDonald Gibson said.

Researchers worked with about 75 UAE stakeholders to determine environmental risk priorities.

UAE government officials, scholars and representatives from industry and nongovernment organizations participated in workshops to rank their priorities. Information on each risk was provided in uniform summaries that included details such as the fatalities the risk was expected to cause in one year.

"Many of (the stakeholders) had never experienced a group process like that, and they felt empowered that they had a chance to influence their policy," MacDonald Gibson said.

The project marked the first time this process has been used on a national scale to rank environmental risks. It has not been employed in the United States because policy here often is drafted after a disaster, MacDonald Gibson said. However, the Army Corps of Engineers is using the process to assess risks along the Gulf Coast.

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Dr. Will Vizquete



Dr. Karin Yeatts

## Outdoor air quality

Outdoor air pollution is easily the greatest threat to the 4.8 million people who live in the UAE. UNC researchers estimate that 600 deaths each year can be attributed to outdoor air pollution, with 540 of those due to particulate matter. Particulates include sand, which can carry microbial fungi and other infections, and result from diesel engines used for massive construction, oil and gas production, and car and barge traffic. Pollution from Europe and Eastern Asia also blows into the region.

To determine the UAE's risk from outdoor air pollution, scientists developed one of the first air quality models in the region to simulate the atmosphere. The model stretched beyond the UAE to the Arabian Peninsula as far east as India, north into Turkey and west to Cairo.

"We made the first state-of-the-art air quality model for that part of the world, and we created it using the most advanced scientific methods and techniques available," said Will Vizquete, PhD, assistant professor of environmental sciences and engineering, who worked on the UAE outdoor air quality team.

With the model's design, scientists at the public health school have created the infrastructure to track pollutants plaguing the UAE, a critical step for making policy decisions to reduce emissions.

Researchers now are drafting recommendations on how to improve the country's ambient air-monitoring stations and designing a study to measure more precisely the pollutants in the air.

## Epidemiology study

The UAE-UNC Indoor Air, Health and Nutrition study is evaluating the air Emiratis breathe inside their homes, the food they eat and their general health and lifestyle patterns. The assessment will be done in 600 homes across the seven emirates.

The UNC team of 20 faculty and staff members are coordinating the study and working with faculty members from the United Arab Emirates University, who have hired more than 50 field interviewers to visit study participants' homes.

On their first home visits, field interviewers set up air monitors and make a list of the home's residents. Interviewers return seven days later to remove monitors and interview participants about their health histories, diets and lifestyles (e.g., whether they smoke or have recently exercised). Field interviewers record interview responses into a computer program that has been translated into Arabic. Our public health school's Collaborative Studies Coordinating Center (CSCC) developed the

Playing outdoors usually is a healthy activity, but outdoor air quality in the UAE threatens the country's 4.8 million people, especially children and the elderly.

program and will analyze responses, says C. Edward Davis, PhD, research professor in the Department of Biostatistics.

The air monitors measure seven pollutants, including nitrogen dioxide, carbon monoxide, sulfur dioxide and particulate matter. Particulate matter is of special concern because increased exposure to fine and coarse particles is related to increased cardiovascular and respiratory disease exacerbations and outcomes.

To monitor for these particles, researchers use an innovative device called a UNC passive aerosol sampler. The instrument was developed by UNC alumnus Jeff Wagner, PhD, when he was a graduate student in environmental sciences and engineering, and David Leith, ScD, professor and associate chair of the department.

The goal of the study is to provide useful information about potential health effects of indoor air pollutants and determine the general health and nutrition status of Emiratis, said Karin Yeatts, PhD, the study's co-principal investigator and research assistant professor of epidemiology. The project principal investigator is Andy Olshan, PhD, chair of the department.

"I hope that the study findings will help the Environment Agency-Abu Dhabi with their air quality regulations," Yeatts said, "either to strengthen the regulations or verify that what they currently have is useful for protecting the public's health." ■

—Natalie Gott

