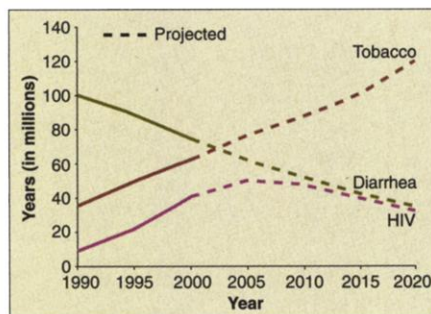


## Another Scourge for Africa

By 2025, tobacco could be Africa's biggest killer, says an official of the U.S. Centers for Disease Control and Prevention (CDC).

Cigarette sales in the developing world have increased by 80% since 1990. Smoking rates are highest in Asia. But at current rates of increase, smoking-related diseases will lead to more deaths in Africa than AIDS, malaria, TB, maternal mortality, auto crashes, and homicides combined by 2025, said Lawrence Green, director of CDC's collaboration with



Years of healthy life lost globally.

the World Health Organization (WHO) on tobacco and health, in a speech last month in Nairobi.

So far, says Green, many governments haven't done much more than endorse a "World No

Tobacco Day" sponsored by WHO, which is trying to muster support for an international treaty on tobacco regulation. African nations "still have time to head off the epidemic," says Green. Unfortunately, he adds, "one of the ironies" in Africa as in other developing re-

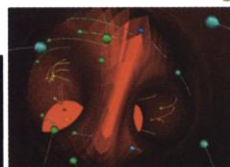
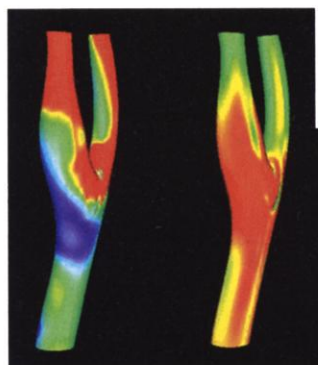
gions is that three groups who play key roles in reaching the general population—doctors, teachers, and preachers—all "have very high rates of smoking themselves."

## How the Blood Flows

Scientists at Imperial College in London have come up with an unprecedentedly detailed computer model of how blood courses through human arteries. The model may help scientists gain new insights into the interaction of factors that influence the body's cardiovascular plumbing, from blood flow's pulsating nature to artery curves, branches, and flexibility.

Researchers fed imaging data on blood flow and blood vessel architecture into a computer model that combines a computational fluid dynamics program and a solid mechanics program, says engineer Xu Yun. The result is a detailed image in three dimensions of how blood flow varies as the heart beats. Scientists already knew that, just as with pipes, pressures are greater at blood vessel junctures. The researchers were able to separate "shear" stress—which works on the cells lining vessel walls—from mechanical stress—the distending effect of blood pressure on vessels. A new finding, says Xu, is that some curved or branching stretches of an artery are simultaneously exposed to low shear and high mechanical stress. And that is where the blockages that cause heart disease seem to develop.

The images ultimately may help clinicians make predictions about individual patients, says Xu. "Does the geometry of a particular vessel predispose someone to arterial disease, for example? We will be able to quantify the areas where in the past people have been able only to debate and theorize."



A carotid artery shows swirling flow patterns where it bifurcates. Wall shear stress (left) and mechanical stress (right) distributions show high-risk regions where shear stress is low (blue) and mechanical stress high (red). (Inset) Platelet's-eye view of the motion of hypothetical particles in a carotid artery.

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## Fish in Hot Water



The tiger rockfish (left) is one of 82 species or subspecies of fish along North America's coasts that are threatened with extinction, according to a study in this month's issue of *Fisheries*. In the first-ever attempt to pull together information on endangered fish that live all or part of their lives in salt water, a team led by Jack Musick of the Virginia Institute of Marine Science in Gloucester Point found that those living in "hot spots" along Florida, the northern Gulf of Mexico, the northern Gulf of California, and Puget Sound are especially in trouble from overfishing, pollution, and habitat destruction.

## More Than Hot Air

Weather has become big business. The most recent El Niño oscillation jump-started demand for weather derivatives—options and futures—making them a fast-growing segment of the stock market. Not only suppliers of heating and cooling equipment but farmers and ski resort owners are looking for the inside scoop.

So where do you get the best forecast? The Kansas City-based Aquila Energy Corp. is staging a contest for the most accurate seasonal temperature forecasts for 13 U.S. cities. Over the next 3 years, two winners a year will each receive \$50,000 for the best forecast. There is a host of models for turning data into predictions, says Aquila meteorologist Bradley Hoggatt, but "no one has been able to objectively determine the most skillful one."

Individuals or groups must submit six overlapping 3-month forecasts for a 6-month season, with average temperature probabilities for each city. The units of measurement are based on the needs of utility companies: heating degree days (HDD) for winter and cooling degree days (CDD) for summer. One HDD equals 1 day when the temperature is 1°F below 65°F (18°C). CDDs are for temperatures above 65°F.

About 15 contestants have signed up so far. "I think we will get something very, very useful" out of the contest, says Ron McPherson, director of the American Meteorological Society, which helped design it. The first 3-month forecast is due on 15 December. (Rules are at [www.GuaranteedWeather.com](http://www.GuaranteedWeather.com)) Results will be published in the *AMS Bulletin*.