National Institutes of Health

Fact Sheet — *Heart Disease*

Thirty Years Ago

- In the 1960's, it was not uncommon for Americans to die of heart attacks in their 50's or 60's.
- The effects of smoking, cholesterol, high blood pressure, and obesity on the development of heart disease were unknown. Following a heart attack there were limited treatments for the damage suffered by the heart. Those patients that did not die from their heart attack remained severely debilitated.
- Had this rate of coronary heart death continued unabated, today, more than 1.6 million lives each year would be lost. Fortunately, the toll is much less, fewer than 500,000 deaths from heart disease. In addition, the death rate from stroke, the third most common cause of death, has declined by 70%.

Today

- The gain in longevity has been remarkable! Between 1970 and 2000, the life expectancy of the average American increased by 6 years, and nearly 4 years of this gain is due to reductions in cardiovascular disease deaths. We can attribute this remarkable improvement, in large part, to NIH research.
- For example, *The Framingham Heart Study* was the first to define the concept of risk factors for heart disease, which include high blood pressure, elevated serum cholesterol, smoking, obesity, diabetes, and physical inactivity. These findings were translated into messages for health care professionals, patients, and the public, which have guided prevention and treatment for many years.
- Beyond reducing risk factors for heart disease, advanced technologies are dramatically improving diagnosis and treatment. Implantable cardiac defibrillators significantly reduce sudden cardiac death. If detected early, tPA can be administered to patients to stop a heart attack before the heart muscle is severely damaged.
- Following angioplasty to widen a blocked section of an artery of the heart, the artery often re-clogs even with the insertion of a small mesh stent designed to hold the artery open. NIH scientists developed a stent imbedded with the cancer drug Taxol®, which is slowly released and inhibits artery-closing scar formation. This revolutionary drug-device combination dramatically reduced artery re-closing rates to 3 to 6 % and is expected to substantially reduce the 350,000 open-heart bypass surgeries-previously the only alternative for some patients.

Tomorrow

The NIH is poised to make major discoveries in the *prediction* of heart disease, to *personalize* individual treatments, and to use this information to *preempt* disease.

- *Predicting heart disease.* The new Framingham Genetic Research Study will identify in 9000 individuals genetic variations that predispose to the development of high blood pressure, high cholesterol, diabetes, obesity and heart disease. This knowledge will lead to early detection and improved treatments tailored to the individual's risk profile.
- *Personalized treatments.* Studies in animal models and in small human clinical trials suggest that transplantation of a patient's own bone marrow stem cells may improve cardiac function following a heart attack. In 2007, NIH will begin the Cardiovascular Cell Therapy Clinical Research Network to further investigate the feasibility of this personalized cell therapy approach. Research topics will include determining exactly how cell therapy improves heart function and developing screening methods to monitor cell therapy treatment in individual patients.
- *Preemptive approaches.* A clinical trial is testing aggressive strategies to reduce risk of heart disease in type II diabetes. Trials of cholesterol and blood pressure lowering, beyond current recommended thresholds, are planned.