

Apply It.

The math behind CARDIOLOGY and HEART ATTACKS...

Math that's used for discoveries in cardiology:

Mathematical imaging, fluid dynamics, nonlinear dynamics theory

Uses and Applications:

Preventing, treating, and understanding heart attacks and/or heart defects

How it works:

Mathematical imaging methods allow us to "see" the heart through reconstructive techniques that build medical images through computerized axial tomography (you've probably heard of a CAT Scan), magnetic resonance imaging (also known as MRI), or positron emission tomography (PET). With these techniques, thousands of separate measurements are mathematically combined to create a single image that can show tumors and other abnormalities in, for example, the brain, lungs, and kidneys, as well as the heart. Mathematics researchers, biologists and physicians suspect that the heart might be acting as if it were a deterministically chaotic system - an example of nonlinear dynamics system. Mathematical work shows that high-risk patients are more easily identified using electrocardiograms where suspect patterns are more readily detected and recognized.

Another way that mathematics increases understanding the heart is by modeling the flow of blood using computer approximations in equations of fluid dynamics. In determining the dynamics of blood flow, scientists must also solve equations for the unknown that is the motion of the heart walls.

Interesting Fact:

Several studies have shown that depression significantly increases the risk of developing coronary heart disease. One study of 1,551 people in the Baltimore area who were free of heart disease in 1981 found that those who were depressed were more than four times as likely to have a heart attack in the next 14 years.

Info excerpted from: mathforum.org/mam/94/essay.html, Math and Medicine Theme Essay San Francisco Medical Society, "New Discoveries in Coronary Heart Disease," Dean Ornish, M.D.

