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**American Heart Association 2008 Top Ten Research report:**

**Top research advances include studies that influence medical care, apply science to ‘real world’ communities**

DALLAS, Jan. 21 – Clinical studies that may influence medical care and research that demonstrates how science can be effectively applied in the real world top the list of heart disease and stroke advances from 2008, said Timothy Gardner, M.D., president of the American Heart Association.

The American Heart Association has been compiling an annual list of the top 10 major advances in heart disease and stroke research since 1996.

“It’s always difficult to choose from among such a broad array of new discoveries,” Gardner said. “This year we included not only novel work in fundamental or basic science, but also important clinical studies that we believe will influence medical care in the future. In addition, we have chosen a number of studies that demonstrate the effectiveness of science applied in the real world, from hospitals to schools to whole communities. These implementation studies are of increasing importance as we try to determine how best to translate basic and clinical science for the benefit of the public.”

Achievements in 2008 include:

**1. Breathing cleaner air**

***Smoke-free legislation and hospitalizations for acute coronary syndrome***

Data regarding the dangers of first-hand smoke exposure is generally accepted, but the concept that secondhand smoke exposure can cause serious harm still meets resistance. This has made passing effective clean air legislation more difficult, though there has been substantial progress, with many states in the United States and several European countries passing smoke-free legislation. Previous studies of the effects of such legislation in individual towns and cities, while positive, have been criticized by some for lack of controls and incomplete data collection. However, a study in 2008, addressing many of these concerns, makes a very strong case for this type of public health initiative. In Scotland, after smoke-free legislation covering all enclosed places was implemented, hospital admissions for acute coronary syndrome decreased by 17 percent. This compared with only a 4 percent decrease in England, where there was no such legislation. The decrease in Scotland was highest in never-smokers, but there was also a smaller decrease in former smokers. Smokers had the lowest decrease, but still saw a 14 percent decline. A total of 67 percent of the decrease in hospital admissions involved nonsmokers, supporting the argument that protection for these individuals is an important benefit of this legislation, and that it should be extended more broadly.

**Source:** *New England Journal of Medicine*, July 31, 2008; *N Engl J Med* 2008; 359; 482-49.

[www.nejm.org](http://www.nejm.org).

**Funding:** Supported by a National Health Service Health Scotland project grant and salary support from the British Heart Foundation.

## **2. The acute care of patients with heart attack or stroke: Can we do better?**

### ***Hospital treatment of patients with ischemic stroke or transient ischemic attack using the “Get With The Guidelines” program; An organized approach to improvement in guideline adherence for acute myocardial infarction***

Because evidence-based therapy to improve heart attack and stroke outcomes was not being uniformly delivered in hospitals across the country, quality improvement programs were developed. Their goal was to facilitate the work of healthcare providers, and ensure that each patient receives the appropriate therapy. Now, more than one million patients have been treated with the assistance of one of these programs, the American Heart Association’s Get With The Guidelines (GWTG), and the effect of these programs on delivered care is now being reported. Two studies, evaluating the GWTG - Stroke and the GWTG - Coronary Artery Disease (CAD) modules of GWTG, demonstrate that participation in hospital-based quality improvement programs such as GWTG is associated with substantially improved hospital performance.

**Source:** 1) *Archives of Internal Medicine*, Feb. 25, 2008; *Arch Intern Med* 2008; 168:411-17; 2) *Archives of Internal Medicine*, Sept. 8, 2008; *Arch Intern Med* 2008; 168:1813-19; [www.jama.ama-assn.org](http://www.jama.ama-assn.org).

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## **3. Type 2 diabetes: What is the legacy of intensive treatment?**

### ***10-year follow-up of intensive glucose control in type 2 diabetes; Long-term follow-up after tight control of blood pressure in type 2 diabetes***

The UKPDS (UK Prospective Diabetes Study) has now followed patients with type 2 diabetes for 10 years after the initial period in which the benefits of HbA1c (blood sugar) control by drug treatment were established. In 2008, follow-up data demonstrated that, while the improvement in HbA1c levels was lost after the first several years, the reduction in diabetes-related endpoints and microvascular disease continued, and over time, a significant reduction in heart attacks and deaths from any cause emerged. This reinforces the benefit of good diabetes control in type 2 diabetes, adding importantly to the benefits demonstrated by the earlier Diabetes Control and Complications Trial. In contrast, in another section of the study, when the group in whom blood pressure was tightly controlled during the study was followed over the same 10-year period, the early reductions in any diabetes-related endpoint, including death, as well as in microvascular complications and stroke, was lost. This suggests that continued blood pressure control is critical to the maintenance of this risk reduction.

**Source:** *New England Journal of Medicine*, Oct. 9, 2008; *N Engl J Med* 2008; 359: 1577-89. [www.nejm.org](http://www.nejm.org).

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## **4. The epidemic of childhood obesity: Can anything be done?**

### ***A policy-based school intervention to prevent overweight and obesity***

There is no lack of concern about the increasing numbers of children suffering from overweight and obesity, especially as the related development of other cardiovascular risk factors has become clear. Literally hundreds of programs have been developed to address this major public health problem, but very few have been adequately evaluated with hard clinical outcomes. This past year a school intervention based on changes in policy, carried out in grades 4-6 in 10 urban schools, was conducted. The intervention's design incorporated school self-assessment, nutrition education, nutrition policy, social marketing, and parent outreach. Over a two-year period, this multi-component program led to a 50 percent reduction in the incidence of overweight in the intervention schools compared with the control schools. While there was no reduction in the incidence or prevalence of obesity, these results suggest that carefully designed, multi-component programs can have an important impact on this serious epidemic.

**Source:** *Pediatrics*, April 1, 2008; *Pediatrics* 2008;121:e794-802. <http://pediatrics.aappublications.org>.

**Funding:** This study was supported by grants from the Centers for Disease Control and Prevention and the US Department of Agriculture/Food and Nutrition Service through the Pennsylvania Nutrition Education Program as part of Food Stamp Nutrition Education.

## **5. As we age – treating valvular heart disease**

***Transcatheter valve implantation for patients with aortic stenosis: a position statement from the European Association of Cardio-Thoracic Surgery (EACTS) and the European Society of Cardiology (ESC), in collaboration with the European Association of Percutaneous Cardiovascular Interventions (EAPCI)***

The treatment of severe aortic stenosis has remained in the realm of surgery, with no significant medical options and with balloon valvuloplasty offering no sustained symptomatic benefit and no survival benefit. While traditional aortic valve replacement improves symptoms and survival, it is accompanied by morbidity and mortality, especially in the elderly and those with co-morbid conditions. Over the past six years, transcatheter valve implantation for patients with inoperable or very high-surgical-risk aortic stenosis has gradually improved, with increasing operator experience and a number of devices available and others in development. As experience has grown, this percutaneous, catheter-based technique is beginning to offer a reasonable alternative to conventional surgery for high-risk patients with aortic stenosis.

**Sources:** *European Heart Journal*, May 13, 2008; *Eur Heart J* 2008; 29:1463-70.

[www.eurheartj.oxfordjournals.org](http://www.eurheartj.oxfordjournals.org).

**Funding:** Edwards Lifesciences provided an unrestricted grant for the practical organization of the meeting.

## **6. Stable coronary artery disease: what treatment is optimal?**

***Effect of PCI on quality of life in patients with stable coronary disease***

Advances in the technology underlying percutaneous coronary interventions (PCI) have allowed an approach to more technically difficult vessels, and this has encouraged the use of PCI for treating stable angina. Indeed, the presence of a lesion has almost seemed to mandate that it be corrected. However, head-to-head comparisons with optimal medical treatment have not been done. In the COURAGE trial, patient outcomes, including quality of life, after PCI with optimized medical therapy were compared with patient outcomes of those on optimized medical therapy alone who had stable coronary disease. Both patients treated with PCI and medical therapy and those treated with medical therapy alone had marked improvements in health status during follow-up, suggesting that many patients currently are not receiving optimized medical treatment. Although the PCI group had small, but significant, incremental benefits during the first two years, by 36 months there was no

difference in health status. This trial should lead to more aggressive medical treatment of patients with stable coronary disease, and more thoughtful utilization of PCI.

**Source:** *New England Journal of Medicine*, Aug. 14, 2008; *N Engl J Med* 2008;359: 677-87. www.nejm.org.

**Funding:** No specific funding of this study was noted, although full author disclosures are available on the manuscript.

## 7. Selecting patients for prevention

### *Rosuvastatin to prevent vascular events in men and women with elevated C-reactive protein*

Substantial evidence demonstrates the effectiveness of lowering low density lipoprotein (LDL or “bad”) cholesterol to prevent repeat cardiovascular events, so-called secondary prevention. While lifestyle modification is important, and several types of medications can be used to lower the LDL, most patients are prescribed statins, (HMG CoA reductase inhibitors). For primary prevention to reduce the risk of an individual’s first event, the decision about whether to add medications to a healthy lifestyle is based on the patient’s overall risk of an event, assessed by a measure such as the Framingham risk score. In the JUPITER (Justification for the Use of Statins in Prevention: an Intervention Trial Evaluating Rosuvastatin) trial, individuals (median age 66) were recruited if they had no known coronary disease and had LDL levels below 130, which usually would not mandate treatment with a statin. Some had Framingham scores indicating moderate risk, but a substantial number did not. All, however, were included in the study because of elevated hs-CRP levels, a marker of inflammation, a process that has been speculated to be another cause of atherosclerosis. Treatment with rosuvastatin in both groups resulted in nearly halving LDL cholesterol and highly sensitive C-reactive protein (hs-CRP) levels and produced a significant relative reduction in nonfatal heart attack (55 percent), nonfatal stroke (48 percent) and the composite endpoint including cardiovascular death (47 percent). This large (17,802 patients) study and its many subgroups have generated extensive discussion about its implications for expanding indications for the use of statins, and the findings will be considered as primary prevention guidelines are revised in 2009.

**Source:** *New England Journal of Medicine*, November 20, 2008; *N Engl J Med* 2008;359:2195-207. www.nejm.org; also presented at the American Heart Association’s Scientific Sessions 2008.

**Funding:** Supported by AstraZeneca

## 8. A platform for new hearts

### *Perfusion-decellularized matrix: using nature’s platform to engineer a bioartificial heart*

In patients with very severe heart failure, mechanical artificial hearts are of substantial benefit. However, their limitations provide the background for the much greater potential of new biologic, or “bioartificial” hearts, in which the pumping is done by actual heart muscle, rather than metal and plastic. There are multiple problems to be solved before new hearts can be grown for patients dying from heart failure, but one hurdle was overcome this year. In a study using a rat model, researchers demonstrated that it is possible to create a functioning bioartificial heart using a matrix from which cells had been removed as a platform in which new immuno-compatible cardiac cells could survive and function.

**Source:** *Nature Medicine*, Jan. 13, 2008; *Nature Med.* 2008; 14: 213-21. www.nature.com/nm

**Funding:** This study was supported by a Faculty Research Development Grant to H.C.O. and D.A.T. from the Academic Health Center, University of Minnesota, Minneapolis, and by funding from the Center for Cardiovascular Repair, University of Minnesota, and the Medtronic Foundation to D.A.T.

## 9. The building blocks of new hearts

### *Human cardiovascular progenitor cells develop from a KDR1 embryonic-stem-cell-derived population*

To grow a new heart, it is necessary to have not only heart muscle cells, but also endothelial cells to line the inside of the heart as well as cells that develop into blood vessels. This year it was demonstrated that all three kinds of cells can be derived from a common cardiovascular progenitor cell, and that these progenitor cells can be derived from human embryonic stem cells. This is a critical observation for the process of building new hearts for those suffering from scarring or damage to their heart muscle.

**Source:** *Nature*, April 23, 2008; *Nature*.2008; 453: 524-28. [www.nature.com](http://www.nature.com).

**Funding:** No specific funding was listed for this study although several of the researchers are supported by the National Institutes of Health/National Heart, Lung and Blood Institute.

## 10. Hypertension: who is too old to treat?

### *Treatment of hypertension in patients 80 years of age or older*

It is well accepted that the effective treatment of high blood pressure is a very important factor in preventing cardiovascular complications such as stroke and heart failure. And while isolated systolic hypertension was a “normal” aspect of aging, we have also learned from the Systolic Hypertension in the Elderly Program (SHEP) study that control of this form of high blood pressure is also important. But questions remained about the very elderly, as they have usually been excluded from previous trials. This year, a critical piece of evidence was added, when the HYVET (Hypertension in the Very Elderly Trial) was completed. The results of this important trial provide evidence that effective antihypertensive treatment, even in persons 80 years old or older, is beneficial in reducing the risk of cardiovascular events, and thus extends the group in whom prevention must be pursued.

**Sources:** *New England Journal of Medicine*, May 1, 2008; *N Engl J Med* 2008; 358:1887-1898. [www.nejm.org](http://www.nejm.org).

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