

## Modeling Prioritization of Health Care for Complex Patients Using Archimedes

Principal Investigator: Dewey C. Scheid, MD  
Institution/Partners: University of Central Oklahoma  
Project Period: 09/01/08-08/31/11  
Grant Number: R21 HS17633-01

### Description

Although clinical practice guidelines created by professional organizations and government agencies to address specific chronic illnesses offer the potential benefits of improving the quality of medical care and reducing health care costs, they have the drawback of not addressing the complexity of individual patients. This research examined the impact of health care interventions on patients with diabetes, hypertension, and hypercholesterolemia with and without pre-existing complications.

### Specific Aims

1. Use a unique simulation software program, Archimedes, to examine the impacts of health care interventions for a set of prototypical patients with diabetes, hypertension, and hypercholesterolemia with and without pre-existing macrovascular and/or microvascular complications (coronary artery disease, myocardial infarction, congestive heart failure, stroke, retinopathy, nephropathy, and peripheral vascular disease).
2. Investigate predictors, patterns, and outcomes of blood pressure management among patients with diabetes and coexisting health conditions in order to optimize existing blood pressure management guidelines for patients with diabetes.

### Findings

- Aspirin alone was nearly as effective in reducing heart attack risk as were all combinations of interventions.
- Smoking cessation was as effective as combinations of any other interventions in reducing stroke risk over 10 and 20 years, though combinations of statins, ACE-inhibitors, and beta blockers or aspirin appeared to be more effective over 30 years.

### Main Objective

Use a simulation software program, Archimedes, to examine the impact of health care interventions on patients with diabetes, hypertension, and hypercholesterolemia with and without pre-existing complications.

### Chronic Conditions Considered

Diabetes  
Hypertension  
Hypercholesterolemia

### Preventive Service Considered

This project did not address a specific clinical preventive service.

### Study Design, Data Sources & Sample Size

Computer simulation model

### Strategies Addressed from the HHS Strategic Framework on Multiple Chronic Conditions

- 1.D. Implement and successfully use health information technology
- 3.C. Address multiple chronic conditions in guidelines

# Modeling Prioritization of Health Care for Complex Patients Using Archimedes (Continued)

## Implications

Because modeling techniques like Archimedes can account for the complexity of individual patients with multiple chronic conditions, they may contribute to the development of guidance that can set priorities for possible clinical interventions that maximize benefit, reduce burden, and minimize harm for patients with diabetes and other chronic conditions.

## Publications (as of September 2013)

Scheid DC, Hamm RM., Ramakrishnan K, McCarthy LH, Mold JW and the Oklahoma Physicians Resource/Research Network. Improving colorectal cancer screening in family medicine: an Oklahoma Physicians Resource/Research Network (OKPRN) study. *J Am Board Fam Med* 2013;26:498–507.