

## ECONOMICS

# Early opportunistic screening was cost effective in young adults with type 2 diabetes

CDC Diabetes Cost-Effectiveness Study Group. *The cost-effectiveness of screening for type 2 diabetes.* JAMA 1998 Nov 25;280:1757-63.

### Question

Is opportunistic screening for early detection and treatment of type 2 diabetes cost effective?

### Design

Cost effectiveness analysis using a semi-Markov Monte Carlo simulation model.

### Setting

A single payer healthcare system in the US.

### Patients

A hypothetical cohort of people  $\geq 25$  years of age without clinically diagnosed diabetes was used (screening module). For 10 000 individuals with diabetes in this cohort, the model simulated the development and progression of major complications of the disease (disease progression module).

### Intervention

People in the screening module were assigned to either 1 time opportunistic screening for diabetes or to current clinical practice. Screening was done during a routine physician visit. Diabetes was defined as a fasting plasma glucose  $> 6.1$  mmol/l (110 mg/dl) and confirmed by an oral glucose tolerance test. Patients in the disease progression module had follow up from diabetes onset until death or age 95 years.

### Main outcomes and cost measures

Incremental cost per life year gained and per quality adjusted life years (QALY) gained, estimated from diabetes onset; diabetes complications (retinopathy, nephropathy, neuropathy); and death. Costs were discounted at 3% and reported in 1995

US dollars. Cost and model assumptions about screening, treatment, the prevalence of undiagnosed diabetes, and complications were based on data from previous clinical trials, epidemiological studies, and population surveys.

### Main results

Opportunistic screening compared with current clinical practice had incremental costs per life year gained of US\$236 449 and per QALY gained of US\$56 649. Increasing age was associated with decreasing gains in both life years and QALYs. Costs per life year gained was 19 times lower for people aged 25 to 34 years (US\$35 768 and \$13 376/QALY) than for those aged 55 to 64 years (US \$681 989 and \$116 908/QALY). There were no gains in life years or QALYs for screening those  $\geq 65$  years of age. Screening was more cost effective for African-Americans than for whites. Sensitivity analysis showed that screening was more cost effective using a haemoglobin A<sub>1c</sub>  $\geq 7\%$  as the screening definition of diabetes, for populations with a higher prevalence of undiagnosed diabetes and at higher risks of complications, and if treatment used diet and exercise as compared with more intensive glycaemic treatments.

### Conclusions

Among a hypothetical cohort of people  $\geq 25$  years of age, early detection and treatment of type 2 diabetes by opportunistic screening increased life years and quality adjusted life years with incremental increases in costs. Screening was most cost effective for younger adults and African-Americans.

Source of funding: not stated.

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## Commentary

Economic evaluations are needed in the health services sector worldwide. This type of research makes an important contribution to the understanding of healthcare costs and affects decision making about interventions for improving overall public health.<sup>1-3</sup>

Type 2 diabetes is a serious disease with a typical delay between onset and diagnosis of about 9-12 years. As a result, about one third of those affected are unaware they have it,<sup>4</sup> and by the time of diagnosis, some have already developed complications. Retinopathy, nephropathy, cardiovascular disease, and neuropathy increase the risk of serious consequences such as lower extremity amputation. The American Diabetes Association currently recommends type 2 diabetes screening to

start at age 45 years. This study showed that early screening beginning at age 25 may postpone major complications and improve quality of life. Although the cost for each case detected was higher among younger adults, these extra costs were offset by the reduced costs of lifetime complications prevented. Therefore, detection through early screening starting at age 25, as recommended in this study, deserves serious consideration. This study also showed that screening was more cost effective among certain groups, such as African-Americans, who have a relatively high risk of developing diabetes and its complications.

Early screening during routine medical visits, and patient and family education about diet, exercise, and hypoglycaemic

drugs are nursing responsibilities. Based on the study findings, the responsibility for early detection and follow up should be taken seriously, especially by nurses working with groups at high risk of developing diabetes and its complications.

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