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*Eff Clin Pract. 2001;4:281–283.*

# Finding Undiagnosed Type 2 Diabetes: Is It Worth the Effort?

In this issue of *ecp*, O'Connor and colleagues<sup>1</sup> evaluate a strategy for finding undiagnosed diabetes mellitus within an HMO population. They identified patients with dyslipidemia and hypertension from their health information database and then did a clinic-based, random, plasma-glucose measurement test. Their yield of new patients was rather low (about 1% of the targeted population [5/469]), a range similar to other diabetes screening programs.<sup>2</sup> O'Connor and colleagues do not directly address the question of whether clinicians should screen for type 2 diabetes—a debate that has been ongoing for decades. In this editorial we examine several important screening issues to help answer this question.

## Why Consider Screening for Diabetes?

The driving forces behind diabetes screening efforts come from several sources: undiagnosed type 2 diabetes is common and widespread; diabetic complications are common at clinical diagnosis; recommendations exist that support screening (that are primarily based on expert opinion); and a widespread contention, without empirical evidence, that treatment of early disease improves health outcomes and saves resources.<sup>2</sup>

Type 2 diabetes does impose a substantial burden on the population. Diabetes also has a natural history that is understood and a recognizable preclinical (asymptomatic) stage during which reliable screening tests can detect it.<sup>2</sup> However, the main controversy surrounds the lack of direct evidence that treatment after early detection would yield significant benefit over delayed treatment. A randomized, clinical trial could provide sufficient evidence of the benefits of early detection. No such study has been done to date, however, and perceived ethical concerns (e.g., a perception that it would be unethical not to screen because recommendations based on expert opinion support screening) and resource factors (e.g., a need to follow a large number of participants for several years to detect even a small benefit) may preclude such studies in the future. A statistical model of the lifetime effect of screening suggests that it may modestly decrease the lifetime occurrence of microvascular complications, particularly for younger persons who will live more years with diabetes and can therefore accrue more benefits from earlier diagnosis.<sup>3</sup> However, this model found that as glycemic control is improved after routine clinical diagnosis (not from screening) of diabetes, the lifetime benefits would diminish because major reductions in lifetime complications reduce the potential benefit of earlier treatment. Finally, it should be noted that the effects of delivering established, diabetes-specific treatment algorithms for dyslipidemia and hypertension—treatments that have been shown to have substantial benefit<sup>4,5</sup>—were not considered in the lifetime model. The bottom line is: The net benefit of diabetes screening has not yet been established, nor has the best screening strategy been identified.

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## How To Screen for Diabetes

Nonetheless, there is substantial enthusiasm for screening. What should we do if we decide to screen? Because of low prevalence and low yield, we and others (e.g., U.S. Preventive Services Task Force)<sup>2,6</sup> believe that population-based screening does not merit consideration. Screening high-risk persons with major diabetes risk factors with simple methods, such as questionnaires or an administrative database (as was done in the O'Connor study), is likely to be more efficient.<sup>2</sup>

Opportunistic screening (i.e., screening during routine contact with the health care system) is probably a better strategy than the kind of outreach program used by O'Connor and colleagues, which requires more resources than does opportunistic screening. The reported cost of \$4000 per patient with diabetes detected by outreach screening (expended mostly on mailings and tracking patients)<sup>1</sup> is not trivial and is in the range found in other studies.<sup>2</sup> We must also consider that this cost does not account for the additional resources required for ongoing diabetes clinical care once new patients are identified. If we assume that, on average, screening will diagnose diabetes in patients 5 years earlier and that the cost of routine care for persons with newly diagnosed diabetes is roughly \$1000 per year, this adds \$5000 to the cost of caring for screen-detected patients over those with clinically detected diabetes.<sup>3</sup> However, the benefit of early detection and treatment may result in reduced lifetime complications and reduced costs of care. Thus, valid judgment of screening must count lifetime benefits and costs. A study of the lifetime cost-effectiveness of opportunistic screening found that it was in the range where it may be considered as an appropriate diabetes control measure (\$56,000 per quality-adjusted life-year [QALY]).<sup>3</sup>

## What Should We Do?

Currently, it seems that there are better investments to control diabetes, other than screening. First, there is good evidence that we can do a better job delivering evidence-based and cost-effective care for those who are already known to have diabetes.<sup>7</sup> Various interventions have more favorable cost-effectiveness profiles than does opportunistic screening. For example, among persons with type 2 diabetes, intensive glycemic control costs \$16,000 per QALY,<sup>8</sup> tight blood pressure control costs \$700 per additional life-year,<sup>9</sup> and improved lipid control with statins costs \$2100 per QALY.<sup>10</sup> Second, if we decide to screen, opportunistic strategies aimed at high-risk patients probably make the most sense.

Finally, we should think about preventing diabetes altogether. Two studies, the Da Qing study in China<sup>11</sup> and the diabetes prevention study in Finland,<sup>12</sup> have demonstrated effective interventions for preventing or delaying diabetes thus far, and a third study, the Diabetes Prevention Program in the United States, has announced similar preliminary findings.<sup>13</sup> All three studies applied lifestyle or medication interventions among persons with screen-detected, impaired glucose tolerance. In these studies, impaired glucose tolerance was detected through screening strategies that also incidentally detected undiagnosed diabetes. Thus, the future of screening for undiagnosed type 2 diabetes may soon be linked to the merits and demerits of finding impaired glucose intolerance.

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