Baseline Quality-of-Care Data From a Quality-Improvement Program Implemented by a Network of Diabetes Outpatient Clinics

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OBJECTIVE — To describe patterns of diabetes care and implement benchmarking activities at the national level.

RESEARCH DESIGN AND METHODS — A total of 86 clinics participated, all using electronic medical records. Quality indicators were identified, and software was developed, enabling the extraction of the information needed for quality-of-care profiling.

RESULTS — Overall, 114,249 patients with type 2 diabetes were seen during 2004. A1C was measured at least once in 88.0% of the patients, lipid profile in 64.6%, blood pressure in 77.2%, and microalbuminuria in 48.1%. Overall, 43.1% of individuals had A1C ≤7.0%, 36.6% had blood pressure ≤130/85 mmHg, and 29.8% had LDL cholesterol <100 mg/dl. Only 5.5% of the patients had achieved all the favorable outcomes. Wide between-center variation was documented for all indicators.

CONCLUSIONS — This study is the first step of a nationwide quality-improvement effort and documents the possibility of obtaining standardized information to be used for diabetes care profiling and benchmarking activities.

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M any studies have shown that treatment goals for diabetes and cardiovascular risk factors are not reached in a large proportion of patients (1–3). Furthermore, a close relationship between the quality of diabetes care and risk of cardiovascular events was documented (4).

Several American and European organizations have been working for the development and field-testing of measures for quality of diabetes care (5–7). These measures include process and intermediate outcome indicators, which are used to monitor quality of care and promote continuous improvement initiatives (8,9).

In Italy, all citizens are covered by government health insurance. Primary care for diabetes is provided by general practitioners and diabetes outpatient clinics. Patients can choose one of two ways to access their health care system or can be referred to diabetes outpatient clinics by their general practitioners.

In recent years, a continuous improvement effort has been implemented by a network of diabetes outpatient clinics all sharing the same system for data extraction from electronic medical records. This study describes patterns of diabetes care and benchmarking activities implemented at the national level using a prespecified set of quality indicators developed by the Associazione Medici Diabetologi (AMD).

RESEARCH DESIGN AND METHODS

— Process measures include percentages of patients monitored at least once during the previous 12 months for the following parameters: A1C, blood pressure, lipid profile, microalbuminuria, and foot examination. Intermediate outcome measures include the proportion of patients with A1C levels ≤7.0% or ≥8%, blood pressure values ≤130/85 or ≥140/90 mmHg, and LDL cholesterol levels <100 or ≥130 mg/dl.

A software program was developed to enable the extraction of the information needed from electronic medical record systems used for the everyday management of outpatients. Data from all diabetes outpatient clinics were centrally analyzed anonymously. All indicators were compared with reference values, or "gold standard," established by identifying the best performers. The gold standard for every indicator was represented by the 75th percentile of the ordered distribution of the results obtained in the centers.

Results were publicized through a specific publication (AMD Annals) and on a dedicated page of the AMD Web site (10) and discussed with participants in an annual meeting. Each individual center could also measure its performance directly from the electronic record system, using specific queries. The project was conducted without allocation of extra resources or financial incentives but through a physician-led effort made possible by the commitment of the specialists involved. We report here the re-

Table 1—*Process and outcome indicators in centers representing the best performers for each indicator and in the overall sample*

	Best performers (means ± SD or %)	Overall sample (means ± SD or %)	Intercenter variability (10th to 90th percentile)
Process measures			
A1C ≥1/year	96.8	88.0	66.0–96.9
Blood pressure ≥1/year	95.5	77.2	17.7–98.0
Lipid profile ≥1/year	88.4	64.6	15.5–89.9
Microalbuminuria ≥1 year	76.7	48.1	0.0–89.7
Foot examination ≥1/year	49.5	22.4	0.1–59.3
Outcome measures			
A1C	7.0 ± 1.3	7.4 ± 1.5	6.9–8.2
≤7.0%	58.1	43.1	20.9–59.5
≥8.0%	18.2	29.7	17.3–52.1
Systolic blood pressure (mmHg)	134 ± 16	141 ± 19	134–150
Diastolic blood pressure (mmHg)	77 ± 9	81 ± 10	77–85
≤130/85 mmHg	48.7	36.6	44.0–78.0
≥140/90 mmHg	45.4	66.2	20.1–50.6
LDL cholesterol (mg/dl)	110 ± 32	118 ± 33	113–125
<100 mg/dl	39.5	29.8	23.4–35.1
≥130 mg/dl	26.4	35.1	28.3–43.2

The last column reports the intercenter variability for the overall sample, adjusted for clustering effect, age, and sex.

sults relative to the year 2004 and concerning type 2 diabetes.

To account for the hierarchical nature of the data and to control for the possible confounding effects of the different variables, we used multilevel regression models to investigate intercenter variability expressed as the 10th to 90th percentile range, adjusted for sex, age, and clustering effect.

RESULTS — Overall, 114,249 patients were seen by 86 diabetes outpatient clinics during 2004. Of the patients, 53% were male, 56% were aged >65 years, 11.1% were on diet alone, and 63.3% were treated with oral agents and 25.3% with insulin ± oral agents.

Results relative to process indicators, reported in Table 1, show the gap between the gold standard and the whole sample of diabetes outpatient clinics. As for intercenter variability in the process measures, a moderate variation for A1C monitoring was documented, whereas a wide heterogeneity in between-center performance was present for blood pressure, lipid profile, microalbuminuria, and foot monitoring.

Results relative to outcome measures are reported in Table 1. A small minority of the patients had achieved all the favorable outcomes (5.5%), whereas in 8.8%, none of the goals were reached. The comparison with the gold standard showed a 10–20% lower rate of patients at target in the whole population compared with individuals cared for by the best performers.

A wide variation was also documented for the outcome measures; it was associated with a parallel intercenter variation in the use of specific drug classes. For example, prescription rates for statins and ACE inhibitors ranged between 13.2% and 35.5% and between 14.2% and 29.4%, respectively.

CONCLUSIONS — Our study documents the feasibility of conducting practice-based quality-of-care studies across large numbers of outpatient practices—after having reached a consensus on how to measure quality in priority areas. This was a preliminary fundamental step to promote continuous critical evaluation of current practice, develop process improvements, and reduce practice variation.

The "best performers" approach represented a key feature of the continuous quality-improvement effort implemented. In fact, clinicians were not faced with theoretical standards often perceived as unrealistic in their setting, but rather with the performance of centers operating in the same health care system under similar conditions. By comparing their own performance with that of centers reaching better results, specialists could easily realize the real margin of improvement made possible by increasing the level of attention to disease monitoring and treatment.

The analysis of process indicators shows that the level of performance is consistently higher for some parameters, such as A1C, blood pressure, and lipid monitoring, than for others such as microalbuminuria monitoring or foot examination. The evaluation of between-center variability further documents heterogeneity in the rate of performance of some process measures, such as lipids, microalbuminuria, and foot monitoring.

As for the outcomes considered, our study confirms the difficulties in reaching therapeutic goals. The comparison with the gold standard emphasizes the gap existing between the results achieved in the whole sample and those attained by the best performers. We also documented a wide variation in the ability to reach the targets recommended by existing guidelines, although part of this variation could be related to factors not taken into consideration (e.g., diabetes duration and complications). Nevertheless, such variability was paralleled by strikingly different rates of prescriptions of specific drugs, thus suggesting a strong need for treatment intensification.

In conclusion, our study describes the first step of a nationwide quality-improvement effort and documents that it is possible to obtain standardized information to be used for initiatives of diabetes care profiling and benchmarking. The yearly evaluation of patterns of care, the dissemination of results, and their discussion with the participants is expected to improve the performance of diabetes clinics and reduce variability (9).

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