The Global Burden of Diabetes: Action in Italy

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Number of persons with diabetes in Italy is high and is increasing

The disease is lasting more and more years (earlier diagnosis, longer survival)

The disease is often severe, not rarely already when it is diagnosed

The disease is complex and the care requires several professionals

Costs related to diabetes are high, increasing and largely underestimated
Prevalence of Diabetes in Italy According to ISTAT (Self-Reported)

- 1988: 2.6%
- 2000: 3.6%
- 2011: 4.9%
- 2025: ~7.0%
Prevalence of Diabetes in Italy
According to Observational Studies

- 1986: 2.6%
- 2003: 4.9%
- 2010: 5.8%
- 2025: ~8.5%

Verona Diabetes Study
Turin Study
ARNO Diabetes Study
Prevalence of Diabetes and Prediabetes in Italy in 2012 (about 1 out of 7 persons)

- Known Diabetes: ~3,000,000
- Unknown Diabetes: ~1,500,000
- Pre-diabetes: ~4,500,000
- TOTAL: ~9,000,000
Incidence of Diabetes in Italy (1990-2000)

New cases per year ~ 250,000
Expected Prevalence of Diabetes in Italy (year 2025)

Known Diabetes ~ 5,000,000
Type 2 Diabetes: a Long History Which Can Last Several Decades

- Genes & Environment
- Prediabetes
- Diabetes
- Chronic Complications

Earlier diagnosis, longer survival
Age at Diagnosis of Type 2 Diabetes in Verona

<table>
<thead>
<tr>
<th>Year</th>
<th>Verona Diabetes Study</th>
<th>Verona Newly Diagnosed Diabetes Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>55.9</td>
<td>50.1</td>
</tr>
</tbody>
</table>

Difference: ~6 years
Proportion of Diabetic Patients Older than 65 yr in Italy

Absolute Difference: +6.2%

Subjects older than 65 years (%)

1986
Verona Diabetes Study
58.9

2010
ARNO Diabetes Report
65.1
Diabetes: Systemic Organ Damage

- Eye (retina)
- Kidney
- Nerves
- Skin
- Gonads
- Gut
- Brain
- Immune system
- Bone & Joints
- Heart & Vessels
Hospitalization in Diabetes in Italy in Year 2010

CINECA-SID ARNO Database

- Percent of subjects hospitalized at least one time in the year:
  - No diabetes: 13.3%
  - Diabetes: 18.9%

- Average hospital stay:
  - No diabetes: 10 days
  - Diabetes: 12 days

- Average number of admissions per year:
  - No diabetes: 1.1
  - Diabetes: 1.3
Presence of Strip/Lab Monitored Diabetes in Patients of the Verona Hospital in Year 2010

Bonora et al - unpublished

- Known Diabetes: 78%
- No diabetes: 22%

Percent of subjects hospitalized who undergoing glucose monitoring
Diabetes: Severe and Disabling Complications

Major cause of blindness

Major cause of ESRD

First cause of non traumatic amputation

Major cause of AMI, ACS and stroke
Prevalence of Complications at Time of Diagnosis of Type 2 Diabetes in Verona
(Verona Newly Diagnosed Diabetes Study; Bonora et al; unpublished data)
Diabetes: a Complex Disease which Requires the Commitment of Several Health Professionals

Person with Diabetes

- General Practitioner
- Diabetologist
- Doctor in Physical Activities
- Dietitian
- Nurse
- Podiatrist
- Nephrologist
- Ophthalmologist
- Cardiologist
- Neurologist
- Psychologist
- Many others
# Diabetes: a Very Special Variety of Chronic Disease

<table>
<thead>
<tr>
<th>Disease</th>
<th>Organs involved</th>
<th>Lab Tests</th>
<th>Exams (e.g. ECG)</th>
<th>Classes of Drugs</th>
<th>Professionals Needed</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoarthrosis</td>
<td>Skeleton</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>Good</td>
</tr>
<tr>
<td>Peptic Disease</td>
<td>Stomach</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>Good</td>
</tr>
<tr>
<td>COPD</td>
<td>Lung</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>Can be poor</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>Heart</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>Poor</td>
</tr>
<tr>
<td>Diabetes</td>
<td>All</td>
<td>22</td>
<td>13</td>
<td>32</td>
<td>12</td>
<td>Poor</td>
</tr>
</tbody>
</table>
Annual Cost of Diabetes Care in Verona in Year 2008

€ 2,528 per patient
~80% complications
~20% standard care

% of overall costs

- Hospitalizations: 56%
- Outpatients visits Labs & Exams: 10%
- Drugs for Complications and Comorbidity: 21%
- Anti-Diabetic Drugs: 7%
- SMBG: 6%

Visits at Diabetes Center < 1%
Costs for Diabetes Care is Rapidly Increasing in Verona

<table>
<thead>
<tr>
<th>Year</th>
<th>Per person (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>2.512</td>
</tr>
<tr>
<td>2010</td>
<td>3.162</td>
</tr>
</tbody>
</table>
Diabetes-Related Costs are Higher than Calculated

Cost for hospitalization is calculated according to DRG reimbursement system and it was on average €3,600 in 2010 in Italy.

Average stay in hospital of a diabetic person in Italy in 2010 was 12 days (whatever is the cause of admission).

The average cost for each day as an in-patient in Italy is estimated to be not less than €700.

Real average cost of an hospital stay in Italy for a diabetic person is €8,400.
Diabetes: a Very Expensive Disease

- **Social costs** (~10% of overall budget of Italian National Health System; as many as € 10 billions per year)

- **Personal costs** (copayments, private care, etc.)

- **Direct costs** (care of diabetes and chronic complications)

- **Indirect measurable costs** (hours of work lost by patients or relatives, loss of income, travel expenses, etc.)

- **Indirect incommensurable moral costs** (poor quality of life, disability, years of life lost)
Diabetes in Italy: The Figures We Would Like not to Know but We Cannot Neglect or Overlook

- Every 2 minutes a person is told to have diabetes (new diagnosis)
- Every 7 minutes a diabetic person has a heart attack
- Every 26 minutes a person with diabetes develops a renal insufficiency
- Every 30 minutes a person with diabetes has a stroke
- Every 90 minutes a person with diabetes has a diabetes-related amputation
- Every 180 minutes a person with diabetes begins hemodialysis
- Every 20 minutes a person with diabetes dies for a diabetes-related problem
Diabetes kills
Diabetes: Actions in Italy

- A national law dedicated to persons with diabetes was approved in 1987 (one of the first in the world)
- Specific laws and decrees on diabetes were approved or issued by most Italian Regions since 1987
- Specific sections dedicated to diabetes prevention and care were included in all National Health Plans
- Initiatives on the rights of persons with diabetes were promoted by members of the Parliament and specific documents were shared with diabetes scientific societies
- An investigation on diabetes care in Italy was recently conducted by the Senate
- A specific National Diabetes Plan was recently issued
- All these initiatives ameliorated diabetes care in Italy (intermediate and final outcomes are better than in the past) but further improvement is needed
Hospitalization for Acute Complications in Italy

Lombardo et al – PLOS One 2013; 8:e63675

**Rates per 1000 diabetic people**

- **Year 2001**: 14.4%
- **Year 2010**: 7.1%
Non-Traumatic Amputations in Diabetes in Italy

Anichini et al – Diabetologia 2009

Rates per 1,000 diabetic person per year

Overall

Major

Standardized for sex and age
Intermediate Outcome Indicators in T2DM Subjects Attending the Diabetes Centers in Italy

AMD Annals - 2012

- HbA1c >8%
  - Year 2004: 34.9%
  - Year 2011: 27.2%

- LDL <100 mg/dl
  - Year 2004: 26.2%
  - Year 2011: 48.1%

- Untreated high BP
  - Year 2004: 60.4%
  - Year 2011: 30.2%
Process Indicators of Target Organ Damage Assessment in Italy in Year 2010

CINECA-SID ARNO Database – Bruno et al, Diabetes Care 2012

![Graph showing the percentage of tests for Creatinine, Albuminuris, ECG, and Eye examination.]

- Creatinine: 59%
- Albuminuria: 27%
- ECG: 25%
- Eye examination: 11%

N=126,163
Recommended Diabetes Care in Italy

- All persons with diabetes followed by GPs and Diabetes Teams with shared disease management since time of diagnosis
- Patient-centered approach with personalized care but using protocols consistent with national/international guidelines
- Multidimensional and multidisciplinary approach when necessary
- Careful care of persons with diabetes admitted in hospital for other diseases (infections, trauma, surgery, CVD accidents, etc.)
- Adequate care of diabetes in institutionalized persons
- Active role of the associations of persons with diabetes
The Network of Diabetes Clinics in Italy
Five-year Mortality According to Attendance of the Diabetes Clinic in Verona

(Verona Diabetes Study – Verlato G et al; Diabetes Care 19: 211, 1996)

All-Cause Mortality

Cardiovascular Mortality

n=7,488
17-Year Cardiovascular Mortality According to Attendance of the Diabetes Clinici in Casale Monferrato

Casale Monferrato Study – Bruno et al – Diabetes Care 2005

Kaplan-Meier survival estimates

Adjusted HR 0.76

Adjusted for age, sex, smoking, hypertension, apoB/ApoA1, HbA1c, uric acid, fibrinogen, AER
The burden of diabetes is very heavy for individuals and the society in Italy.

The care of diabetes in Italy is of good quality and this has yielded appreciable clinical results. However, a substantial improvement is needed in order to provide equity in diabetes care.

Interventions for diabetes prevention and for optimization of diabetes care are recommended by the National Italian Diabetes Plan.

Concrete actions by policy makers at national, regional and local level are urgently needed in order to implement these recommendations and to alleviate the burden.

Conclusions
The End
Thank You