Morbidity and Mortality in People with Serious Mental Illness

National Association of State Mental Health Program Directors
Medical Directors Council
July 2006
Overview- THE PROBLEM

- Increased Morbidity and Mortality Associated with Serious Mental Illness (SMI)
- Increased Morbidity and Mortality Largely Due to Preventable Medical Conditions
  - Metabolic Disorders, Cardiovascular Disease, Diabetes Mellitus
  - High Prevalence of Modifiable Risk Factors (Obesity, Smoking)
  - Epidemics within Epidemics (e.g., Diabetes, Obesity)
- Some Psychiatric Medications Contribute to Risk
- Established Monitoring and Treatment Guidelines to Lower Risk Are Underutilized in SMI Populations
Overview - PROPOSED SOLUTIONS

- Prioritize the Public Health Problem
  - Target Providers, Families and Clients
  - Focus on Prevention and Wellness

- Track Morbidity and Mortality in Public Mental Health Populations

- Implement Established Standards of Care
  - Prevention, Screening and Treatment

- Improve Access to and Integration of Physical Health and Mental Health Care
Why Should we be Concerned About Morbidity and Mortality?

- Recent data from several states have found that people with serious mental illness served by our public mental health systems die, on average, at least 25 years earlier than the general population.
Increased Mortality From Medical Causes in Mental Illness

- Increased risk of death from medical causes in schizophrenia and 20% (10-15 yrs) shorter lifespan

- Bipolar and unipolar affective disorders also associated with higher SMRs from medical causes
  - 1.9 males/2.1 females in bipolar disorder
  - 1.5 males/1.6 females in unipolar disorder

- Cardiovascular mortality in schizophrenia increased from 1976-1995, with greatest increase in SMRs in men from 1991-1995

SMR = standardized mortality ratio (observed/expected deaths).

Recent Multi-State Study Mortality Data:
Years of Potential Life Lost

<table>
<thead>
<tr>
<th>Year</th>
<th>AZ</th>
<th>MO</th>
<th>OK</th>
<th>RI</th>
<th>TX</th>
<th>UT</th>
<th>VA (IP only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>26.3</td>
<td>25.1</td>
<td></td>
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<td>28.5</td>
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<td>1998</td>
<td>27.3</td>
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<td>28.8</td>
<td>29.3</td>
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<tr>
<td>1999</td>
<td>32.2</td>
<td>26.8</td>
<td>26.3</td>
<td>29.3</td>
<td>26.9</td>
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<td>13.5</td>
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<td>2000</td>
<td>31.8</td>
<td>27.9</td>
<td></td>
<td>24.9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Compared to the general population, persons with major mental illness typically lose more than 25 years of normal life span.

## Ohio Study-1998-2002

**Mean Years of Potential Life lost**

20,018 persons discharged, 608 deaths

<table>
<thead>
<tr>
<th>Cause</th>
<th>M</th>
<th>F</th>
<th>N</th>
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<tbody>
<tr>
<td>All</td>
<td>31.8</td>
<td>32.5</td>
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<tr>
<td>Intentional self-harm (suicide)</td>
<td>41.4</td>
<td>42.7</td>
<td>41.7</td>
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<tr>
<td>Assault (homicide)</td>
<td>42.3</td>
<td>35.8</td>
<td>41.6</td>
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<td>Accidents (unintentional injuries)</td>
<td>39.5</td>
<td>43.1</td>
<td>40.4</td>
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<td>Symptoms, signs, &amp; abnormal clinical &amp; laboratory findings, NEC</td>
<td>32.8</td>
<td>35.0</td>
<td>33.4</td>
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<tr>
<td>Diabetes mellitus</td>
<td>25.8</td>
<td>37.2</td>
<td>30.2</td>
</tr>
<tr>
<td>Pneumonia &amp; Influenza</td>
<td>29.4</td>
<td>25.0</td>
<td>28.3</td>
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<tr>
<td>Diseases of heart</td>
<td>27.7</td>
<td>26.6</td>
<td>27.3</td>
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<tr>
<td>Cerebrovascular diseases</td>
<td>20.7</td>
<td>32.8</td>
<td>25.5</td>
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<tr>
<td>Malignant neoplasms (cancers)</td>
<td>24.3</td>
<td>26.9</td>
<td>25.3</td>
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<tr>
<td>Chronic lower respiratory diseases</td>
<td>18.6</td>
<td>24.1</td>
<td>21.1</td>
</tr>
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</table>
Massachusetts Study: Deaths from Heart Disease by Age Group/DMH Enrollees with SMI Compared to Massachusetts 1998-2000
Maine Study Results: Comparison of Health Disorders Between SMI & Non-SMI Groups

<table>
<thead>
<tr>
<th>Disorder</th>
<th>SMI (N=9224)</th>
<th>Non-SMI (N=7352)</th>
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<tbody>
<tr>
<td>Skeletal-Connective</td>
<td>30</td>
<td>28.4</td>
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<tr>
<td>Gastro-Intestinal</td>
<td>28.6</td>
<td>28</td>
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<td>COPD</td>
<td>22.8</td>
<td>21.7</td>
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<tr>
<td>Hypertension</td>
<td>16.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Dental Disorders</td>
<td>11.1</td>
<td>11.1</td>
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<tr>
<td>Diabetes</td>
<td>6.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Cancer</td>
<td>6.3</td>
<td>5.9</td>
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<tr>
<td>Pneumonia/Influenza</td>
<td>3.9</td>
<td>3.3</td>
</tr>
<tr>
<td>Liver Disease</td>
<td>3.3</td>
<td>2.9</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>2.9</td>
<td>2.5</td>
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</tbody>
</table>

Percent Members
<table>
<thead>
<tr>
<th>Cause</th>
<th>ICD-9 Codes</th>
<th>ICD-10 Codes</th>
<th>M</th>
<th>F</th>
<th>N</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Diseases of heart</td>
<td>390-398, 402,</td>
<td>I00-09, I11,</td>
<td>83</td>
<td>43</td>
<td>126</td>
<td>20.7</td>
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<tr>
<td></td>
<td>404, 410-429</td>
<td>I13, I20-51</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Intentional self-harm (suicide)</td>
<td>E950-959</td>
<td>X60-84,</td>
<td>84</td>
<td>24</td>
<td>108</td>
<td>17.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y87.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Accidents (unintentional injuries)</td>
<td>E800-869,</td>
<td>V01-X59,</td>
<td>61</td>
<td>22</td>
<td>83</td>
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<tr>
<td></td>
<td>E880-929</td>
<td>Y85-86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malignant neoplasms (cancers)</td>
<td>140-208</td>
<td>C00-C97</td>
<td>27</td>
<td>17</td>
<td>44</td>
<td>7.2</td>
</tr>
<tr>
<td>Symptoms, signs, &amp; abnormal</td>
<td>780-799</td>
<td>R00-99</td>
<td>23</td>
<td>9</td>
<td>32</td>
<td>5.3</td>
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<tr>
<td>clinical &amp; laboratory findings, NEC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Chronic lower respiratory diseases</td>
<td>490-494, 496</td>
<td>J40-J47</td>
<td>17</td>
<td>14</td>
<td>31</td>
<td>5.1</td>
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<tr>
<td>Diabetes mellitus</td>
<td>250</td>
<td>E10-14</td>
<td>11</td>
<td>7</td>
<td>18</td>
<td>3.0</td>
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<tr>
<td>Pneumonia &amp; Influenza</td>
<td>480-487</td>
<td>J10-18</td>
<td>12</td>
<td>4</td>
<td>16</td>
<td>2.6</td>
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<tr>
<td>Cerebrovascular diseases</td>
<td>430-434,</td>
<td>I60-69</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>1.6</td>
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<tr>
<td></td>
<td>436-438</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assault (homicide)</td>
<td>E960-969</td>
<td>X85-Y09,</td>
<td>9</td>
<td>1</td>
<td>10</td>
<td>1.6</td>
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<tr>
<td></td>
<td></td>
<td>Y87.1</td>
<td></td>
<td></td>
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</table>
## Ohio Study

### Standardized Mortality Ratios

<table>
<thead>
<tr>
<th>Cause</th>
<th>Overall</th>
<th>N</th>
<th>SMR</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes of death</td>
<td>608</td>
<td></td>
<td>3.2†</td>
</tr>
<tr>
<td>Intentional self-harm (suicide)</td>
<td>108</td>
<td></td>
<td>12.6†</td>
</tr>
<tr>
<td>Symptoms, signs, &amp; abnormal clinical &amp; laboratory findings, NEC</td>
<td>32</td>
<td></td>
<td>9.7†</td>
</tr>
<tr>
<td>Pneumonia &amp; Influenza</td>
<td>16</td>
<td></td>
<td>6.6†</td>
</tr>
<tr>
<td>Chronic lower respiratory diseases</td>
<td>31</td>
<td></td>
<td>5.5†</td>
</tr>
<tr>
<td>Accidents (unintentional injuries)</td>
<td>83</td>
<td></td>
<td>3.8†</td>
</tr>
<tr>
<td>Diseases of heart</td>
<td>126</td>
<td></td>
<td>3.4†</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>18</td>
<td></td>
<td>3.4†</td>
</tr>
<tr>
<td>Assault (homicide)</td>
<td>10</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>Cerebrovascular diseases</td>
<td>10</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>Malignant neoplasms (cancers)</td>
<td>44</td>
<td></td>
<td>0.9</td>
</tr>
</tbody>
</table>

† P<0.001
What are the Causes of Morbidity and Mortality in People with Serious Mental Illness?

- While suicide and injury account for about 30-40% of excess mortality, about 60% of premature deaths in persons with schizophrenia are due to “natural causes”
  - Cardiovascular disease
  - Diabetes
  - Respiratory diseases
  - Infectious diseases
Need slide (see next) from CDC paper indicating CVD as leading cause of death…this should be simple and direct
Figure 1. Leading causes of death in general populations (All) and public mental health clients (MH) nationwide and statewide in Missouri, 1997 to 2000.

Figure 2. Leading causes of death in general mental health clients (MH) nationwide and 1998.
Schizophrenia: Natural Causes of Death

- Higher standardized mortality rates than the general population from:
  - Diabetes 2.7x
  - Cardiovascular disease 2.3x
  - Respiratory disease 3.2x
  - Infectious diseases 3.4x

- Cardiovascular disease associated with the largest number of deaths
  - 2.3 X the largest cause of death in the general population

Cardiovascular risk factors – overview

BMI = body mass index; TC = total cholesterol; DM = diabetes mellitus; HTN = hypertension.

## Cardiovascular Disease (CVD) Risk Factors

<table>
<thead>
<tr>
<th>Modifiable Risk Factors</th>
<th>Estimated Prevalence and Relative Risk (RR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Schizophrenia</td>
</tr>
<tr>
<td>Obesity</td>
<td>45–55%, 1.5-2X RR&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Smoking</td>
<td>50–80%, 2-3X RR&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>Diabetes</td>
<td>10–14%, 2X RR&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hypertension</td>
<td>=18%&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Up to 5X RR&lt;sup&gt;8&lt;/sup&gt;</td>
</tr>
</tbody>
</table>


Mental Disorders and Smoking

• Higher prevalence (56-88% for patients with schizophrenia) of cigarette smoking (overall U.S. prevalence 25%)

• More toxic exposure for patients who smoke (more cigarettes, larger portion consumed)

• Smoking is associated with increased insulin resistance

• Similar prevalence in bipolar disorder

Prevalence of Diagnosed Diabetes in General Population Versus Schizophrenic Population

Hypothesized Reasons Why There May Be More Type 2 Diabetes in People With Schizophrenia

- Genetic link between schizophrenia and diabetes
- Impact of lifestyle
- Medication effect increasing insulin resistance by impacting insulin receptor or postreceptor function
- Drug effect on caloric intake or expenditure (obesity, activity)
How Does This Relate to What is Happening in the General Population?

- There is an “epidemic” of obesity and diabetes, increasing risk of multiple medical conditions and cardiovascular disease.
  - Obesity
  - Diabetes
  - Metabolic Syndrome
  - Cardiovascular Disease
Diabetes and Obesity: The Continuing Epidemic

Obesity Trends* Among US Adults
(*BMI ≥30, or about 30 lbs overweight for 5’4” person)
Diabetes and Gestational Diabetes Trends: US Adults, BRFSS 1990

Diabetes and Gestational Diabetes Trends: US Adults, BRFSS 1995

Diabetes and Gestational Diabetes Trends: US Adults, BRFSS 1999

No Data           Less than 4%           4% to 6%        Above 6%

Diabetes and Gestational Diabetes Trends: US Adults, BRFSS 2000

Mokdad et al. JAMA. 2001;286(10).
US Diabetes Prevalence by Ethnic Group

Men and Women, Age 45-74 Years

% with diabetes

European American, Cuban American, Japanese American, African American, Mexican American, Puerto Rican, Pima

IGT = impaired glucose tolerance.

Adapted from: International Diabetes Center (IDC). Available at:
Prevalence of Diabetic Tissue Damage at Diagnosis of Type 2 Diabetes

- Urine Albumin: 4%
- Absent Reflexes: 8%
- Absent Foot Pulses: 12%
- Cardiovascular: 17%
- Retinopathy: 18%

Diabetes is a CVD Risk Equivalent to Previous Myocardial Infarction

Equivalent MI Risk Levels

- **Nondiabetic Subjects (n = 1373)**
  - No Prior MI: 3.5%
  - Prior MI: 18.6%

- **Type 2 Diabetic Subjects (n = 1059)**
  - No Prior MI: 20.2%
  - Prior MI: 45.0%

ADA Cardiometabolic Risk Initiative

The Cardiometabolic Risk Initiative

- Genetics
- Age
- Insulin Resistance

Overweight/Obesity

Insulin Resistance Syndrome

- Lipids
- BP
- Glucose

Abnormal Lipid Metabolism

- LDL ↑
- ApoB ↑
- HDL ↓
- Triglycerides ↑

Cardiometabolic Risk

Global Diabetes/CVD Risk

- Age, Race, Sex, Family History
- Smoking
- Hypertension

Inflammation Hypercoagulation

diabetes.org/cmr
Identification of the Metabolic Syndrome

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Defining Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal obesity</td>
<td>Waist circumference</td>
</tr>
<tr>
<td>Men</td>
<td>&gt;40 in (&gt;102 cm)</td>
</tr>
<tr>
<td>Women</td>
<td>&gt;35 in (&gt;88 cm)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>≥150 mg/dL</td>
</tr>
<tr>
<td></td>
<td>(1.69mmol/L)</td>
</tr>
<tr>
<td>HDL cholesterol</td>
<td>&lt;40 mg/dL</td>
</tr>
<tr>
<td>Men</td>
<td>(1.03mmol/L)</td>
</tr>
<tr>
<td>Women</td>
<td>&lt;50 mg/dL (1.29mmol/L)</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>≥130/85 mm Hg</td>
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<tr>
<td>Fasting blood glucose</td>
<td>≥110 mg/dL</td>
</tr>
<tr>
<td></td>
<td>(6.1mmol/L)</td>
</tr>
</tbody>
</table>

HDL = high-density lipoprotein.
CHD Risk Increases with Increasing Number of Metabolic Syndrome Risk Factors

Whyte et al, American Diabetes Association, 2001
Adapted from Ridker, Circulation 2003;107:393-397
## Comparison of Metabolic Syndrome and Individual Criterion Prevalence in Fasting CATIE Subjects and Matched NHANES III Subjects

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
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<tbody>
<tr>
<td></td>
<td>CATIE N=509</td>
<td>NHANES N=509</td>
</tr>
<tr>
<td>Metabolic Syndrome</td>
<td>36.0%</td>
<td>19.7%</td>
</tr>
<tr>
<td>Prevalence</td>
<td></td>
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<tr>
<td>Waist Circumference Criterion</td>
<td>35.5%</td>
<td>24.8%</td>
</tr>
<tr>
<td>Triglyceride Criterion</td>
<td>50.7%</td>
<td>32.1%</td>
</tr>
<tr>
<td>HDL Criterion</td>
<td>48.9%</td>
<td>31.9%</td>
</tr>
<tr>
<td>BP Criterion</td>
<td>47.2%</td>
<td>31.1%</td>
</tr>
<tr>
<td>Glucose Criterion</td>
<td>14.1%</td>
<td>14.2%</td>
</tr>
</tbody>
</table>

Prevalence of Metabolic Syndrome According to BMI in the Adult General Population

N=12,363

“Overweight” = BMI 25-29.9
“Obese” = BMI ≥30
(National Heart, Lung, and Blood Institute, Obesity Guidelines)

Modifiable Risk Factors Affected by Psychotropics

- Overweight / Obesity
- Insulin resistance
- Diabetes/hyperglycaemia
- Dyslipidemia

1-Year Weight Gain: Mean Change From Baseline Weight

- Olanzapine (12.5–17.5 mg)
- Olanzapine (all doses)
- Quetiapine
- Risperidone
- Ziprasidone
- Aripiprazole

CATIE Trial Results: Weight Gain Per Month Treatment

Weight gain (lb) per month

OLZ  QUET  RIS  PER  ZIP

NEJM 2005 353:1209-1223
Change in Weight From Baseline 58 Weeks After Switch to Low Weight Gain Agent

Switched to Ziprasidone from
- Conventionals (MMRM)
- Risperidone (MMRM)
- Olanzapine (MMRM)
- Conventionals (OC)
- Risperidone (OC)
- Olanzapine (OC)

Levels of Evidence

- Case reports, case series, uncontrolled observational studies - *hypothesis-generation only*
- Retrospective database analyses - *could be hypothesis-testing, but methodological issues might limit these to hypothesis-generation*
- Controlled analytic studies, including randomized clinical trials - *hypothesis-testing*

Modifiable Risk Factors Affected by Psychotropics

- Overweight / Obesity
- Insulin resistance
- Diabetes/hyperglycaemia
- Dyslipidemia

Randomized Clinical Trials

Growing number of studies measure drug effects on the following:

- Insulin resistance
- Fasting lipids
- Fasting or post-load glucose and insulin
- Metabolic syndrome
CATIE Results:
Metabolic Changes From Baseline

- Cholesterol (mg/dL)
- Triglycerides (mg/dL)

NEJM 2005 353:1209-1223
CATIE Results: Metabolic Changes From Baseline

Glucose (mg/dL) & Glycosylated HB (%)

<table>
<thead>
<tr>
<th>Glucose</th>
<th>Glycosylated HB</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.7</td>
<td>0.4</td>
</tr>
<tr>
<td>7.5</td>
<td>0.07</td>
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<tr>
<td>6.6</td>
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<tr>
<td>5.4</td>
<td>2.9</td>
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<tr>
<td>0.11</td>
<td>0.07</td>
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OLZ  ZIP PER QUET RIS
Consensus Conference on Antipsychotic Drugs and Risk of Obesity and Diabetes

<table>
<thead>
<tr>
<th>Drug</th>
<th>Weight Gain</th>
<th>Diabetes Risk</th>
<th>Dyslipidemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>clozapine</td>
<td>+ + +</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>olanzapine</td>
<td>+ + +</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>risperidone</td>
<td>+ +</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>quetiapine</td>
<td>+ +</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>aripiprazole</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ziprasidone</td>
<td>+/-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

+ = increased effect; - = no effect; D = discrepant results.

Diabetes Care 27:596-601, 2004
**ADA/APA/AACE/NAASO Consensus on Antipsychotic Drugs and Obesity and Diabetes: Monitoring Protocol**

*More frequent assessments may be warranted based on clinical status*

<table>
<thead>
<tr>
<th></th>
<th>Start</th>
<th>4 wks</th>
<th>8 wks</th>
<th>12 wk</th>
<th>qtrly</th>
<th>12 mos.</th>
<th>5 yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal/family Hx</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Weight (BMI)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Waist circumference</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasting glucose</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fasting lipid profile</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

*Diabetes Care. 27:596-601, 2004*
# Metabolic Screening and Monitoring Form

**NAME:**

*There is a growing awareness that some psychiatric illnesses and atypical antipsychotics can increase metabolic risks. Frequency of monitoring for modifiable risk factors depends on level of risk present at baseline screening.*

**Obesity Screening:***

<table>
<thead>
<tr>
<th>Date</th>
<th>Height</th>
<th>Baseline</th>
<th>Dates/Values from Subsequent Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI: Normal (18.5-24.9); Overweight (25-29.9); Obese (≥30)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Lipid Screening — Cholesterol, Triglycerides (TG):**

<table>
<thead>
<tr>
<th>Optimal/Desirable (mg/dL)</th>
<th>Near/Above Optimal (mg/dL)</th>
<th>Borderline High (mg/dL)</th>
<th>High/Undesirable (mg/dL)</th>
<th>Very High (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200</td>
<td>200-239</td>
<td>≥240</td>
<td>≥190</td>
<td>500*</td>
</tr>
<tr>
<td>LDL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100</td>
<td>100-129</td>
<td>130-159</td>
<td>160-189</td>
<td></td>
</tr>
<tr>
<td>HDL</td>
<td>≥80</td>
<td>&lt;40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TG</td>
<td>≤150</td>
<td>150-199</td>
<td>200-499</td>
<td>500*</td>
</tr>
</tbody>
</table>

*Enter values as indicated in the Metabolic Syndrome (MS) screening section of the form below.

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## Metabolic Syndrome (MS) Screening

**Risk Criteria:**

Abdominal obesity measured in waist circumference (men >40 inches, women >35 inches)

Triglycerides (mg/dL) (<150; or drug treatment)

HDL Cholesterol (mg/dL) (men >40, women <50; or drug treatment)

Fasting plasma glucose (≥100 mg/dL; or drug treatment)

Total Criteria for each visit (≥3 = MS Diagnosis)*

*Risk for cardiovascular disease increases with each criterion present, motivating intervention for any single criterion.

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## Type 2 Diabetes Mellitus (T2DM) Screening

**Risk Factors:**

- Age (≥45)
- Family history
- Fast weight loss or weight regain
- Hypertension (≥140/90 mmHg in adults)
- History of vascular disease

**Diagnostic Criteria for Prediabetes and T2DM:**

Fasting plasma glucose (FPG)§

- Normal: <100 mg/dL; Prediabetes: 100-125 mg/dL; T2DM: ≥126 mg/dL

Two-hour post-load glucose (OGTT)§

- Normal: <140 mg/dL; Prediabetes: 140-199 mg/dL; T2DM: ≥200 mg/dL

Symptoms of T2DM (Yes + casual/random PG ≥200 mg/dL)

Random plasma glucose

(≥100 mg/dL requires formal screening with FPG or OGTT)

* Includes African Americans, Hispanic Americans, Native Americans, Asian Americans, Pacific Islanders

† May not be correct for all ethnic groups

§ Screen at 3-year intervals beginning at age 45, particularly for those with BMI ≥25; test at <45 or more frequently when overweight and have 1+ other risk factors.

§ FPG and OGTT are the only measures currently approved by the ADA for diabetes screening/diagnosis; ADA recommends preferential use of FPG due to ease of use/acceptance.

‡ Diagnosis must be confirmed on a subsequent day with FPG, 2-h PG, or casual/random PG ≥200 mg/dL in symptoms (e.g., polyuria, polydipsia) are present, unless unequivocal hyperglycemia with acute metabolic decompensation is present.

**ATP-III recommends therapeutic lifestyle changes (TLC) for those with prediabetes, hypertension, 0-1 CHD risk factor and LDL ≥160 mg/dL; 2+ CHD risk factors and LDL ≥130 mg/dL; and perhaps subclinical MS.**

Follow-up monitoring of 6- to 12-week intervals to monitor TLC response is recommended and pharmaceutical intervention if TLC fails after 3 months—unless lipid, blood pressure, or glucose values demand immediate drug treatment.

**ADA/APA Consensus Statement recommends considering antipsychotic medication switch for those who gain ≥5% of baseline body weight.**

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Produced by Compact Clinicals Kansas City, MO

Author: John W. Newcomer, MD and Dan W. Haupt, MD. Compiled primarily from ADA and ATP-III guidelines.
Problem: SMI and Reduced Use of Medical Services

- Fewer routine preventive services (Druss 2002)
- Worse diabetes care (Desai 2002, Frayne 2006)
- Lower rates of cardiovascular procedures (Druss 2000)
Access and Quality of Care

- SMI may be a health risk factor because of:

  - **Patient factors**, e.g.: amotivation, fearfulness, homelessness, victimization/trauma, resources, advocacy, unemployment, incarceration, social instability, IV drug use, etc
  - **Provider factors**: Comfort level and attitude of healthcare providers, coordination between mental health and general health care, stigma,
  - **System factors**: Funding, fragmentation
<table>
<thead>
<tr>
<th>Goal</th>
<th>Percentage Reduction</th>
<th>Decrease in CHD</th>
<th>Decrease in Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood cholesterol</td>
<td>10% ↓</td>
<td>30% ↓</td>
<td></td>
</tr>
<tr>
<td>High blood pressure (&gt; 140 SBP or 90 DBP)</td>
<td>4-6 mm Hg ↓</td>
<td>16% ↓</td>
<td>42% ↓</td>
</tr>
<tr>
<td>Cigarette smoking cessation</td>
<td>50% - 70% ↓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of ideal body weight (BMI = 25)</td>
<td>35% - 55% ↓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of active lifestyle (20-min walk daily)</td>
<td>35% - 55% ↓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Survival Following Myocardial Infarction

- 88,241 Medicare patients, 65 years of age and older, hospitalized for MI
- Mortality increased by
  - 19%: any mental disorder
  - 34%: schizophrenia
- Increased mortality explained by measures of quality of care

Druss BG et al. *Arch Gen Psychiatry*. 2001;58:565-572.
Disparities in care: impact of mental illness on diabetes management

313,586 Veteran Health Authority patients with diabetes
76,799 (25%) had mental health conditions (1999)

Why Should we be Concerned About Morbidity and Mortality?

- Recent data from several states have found that people with serious mental illness served by our public mental health systems die, on average, at least 25 years earlier than the general population.
Overview - PROPOSED SOLUTIONS

- Prioritize the Public Health Problem
- Target Providers, Families and Clients
- Focus on Prevention and Wellness
- Track Morbidity and Mortality in Public Mental Health Populations
- Implement Established Standards of Care
- Prevention, Screening and Treatment
- Improve Access to and Integration of Physical Health and Mental Health Care
Recommendations

**NATIONAL LEVEL**

- Seek federal designation of people with SMI as a distinct at-risk health disparities population. Establish co-ordinated mental health and general health care as a national healthcare priority.

- Establish a committee at the federal level to recommend changes to national surveillance activities that will incorporate information about health status in the population with SMI.

  - Consider representation from SAMHSA, Medicaid, the Centers for Disease Control and Prevention, state MH authorities / NASMHPD, and experts
  - This may include the IOM project and other national surveys.
Recommendations

**NATIONAL LEVEL**

- Share information widely about physical health risks in persons with SMI to encourage awareness and advocacy. Educate the health care community. Encourage consumers and family members to advocate for wellness approaches as part of recovery.
Recommendations

**STATE LEVEL**

- Seek state designation of people with SMI as BOTH an at-risk and a health disparities population.

- Establish co-ordinated mental health and general health care as a state healthcare priority.

- Education and advocacy
  - policy makers
  - funders
  - providers
  - individuals, family, community
Recommendations

**STATE LEVEL**

1. Require, regulate and lead Behavioral Health provider systems to screen, assess and treat both mental health and general health care issues. Provide for
   - staffing
   - time
   - record keeping
   - reimbursement
   - linkage with physical healthcare providers

- **Funding**

- Promote co-ordinated and integrated mental health and physical health care for persons with SMI.
  See 11th NASMHPD Technical Paper: *Integrating Mental Health and Primary Care.*
Recommendations

STATE LEVEL

1. Develop a quality improvement (QI) process that supports increased access to physical healthcare and ensures appropriate prevention, screening and treatment services.

- Target common causes of increased mortality and chronic medical illness in the SMI population

- Include all key stakeholders: state agencies, practitioners, individuals and their families, academic and training institutions in QI planning and review

- A key component: training and technical assistance for practitioners in both mental health and primary health fields
Recommendations

**LOCAL AGENCY / CLINICIAN**

1. BH providers shall provide quality medical care and mental health care

2. Screen for general health with priority for high risk conditions

3. Offer prevention and intervention especially for modifiable risk factors (obesity, abnormal glucose and lipid levels, high blood pressure, smoking, alcohol, etc.)

4. Prescribers will screen, monitor and intervene for medication risk, especially if second generation anti-psychotics are being used.

5. Prescribers will monitor for treatment related to risk of metabolic syndrome with use of second generation anti-psychotics

6. Treatment per practice guidelines e.g. heart disease, diabetes, smoking cessation, use of novel anti-psychotics.

7. BH providers shall provide quality medical care and mental health care
LOCAL AGENCY / CLINICIAN
Recommendations

2. Care coordination Models

- Assure that there is a specific practitioner in the MH system who is identified as the responsible party for each person’s medical health care needs being addressed and who assures coordination all services.

- Routine sharing of clinical information with other providers (primary and specialty healthcare providers as well as mental health providers)

- Care integration where services are co-located
3. Support consumer wellness and empowerment to improve personal mental and physical well-being

- educate / share information to make healthy choices regarding nutrition, tobacco use, exercise, implications of psychotropic drugs
- teach / support wellness self-management skills
- teach / support decision making skills
- motivational interviewing techniques
- Implement a physical health Wellness approach that is consistent with Recovery principles, including supports for smoking cessation, good nutrition, physical activity and healthy weight.
- attend to cultural and language needs
Overview - PROPOSED SOLUTIONS

- Prioritize the Public Health Problem
  - Target Providers, Families and Clients
  - Focus on Prevention and Wellness
- Track Morbidity and Mortality in Public Mental Health Populations
- Implement Established Standards of Care
  - Prevention, Screening and Treatment
- Improve Access to and Integration of Physical Health and Mental Health Care