Empirical Evidence on The Role of Public Warnings on Physicians Drug Prescriptions Behavior

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  - interpretation of the ‘boundaries’ of the ‘specific’ population
- News on some drugs can underline ‘lack’ of news on others and generate ‘spillovers’
- Example: new results on the increase of suicidal thinking in children reported in 2004 for selective serotonin reuptake inhibitors (SSRI)
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- First Generation: Tricyclic Antidepressants (TCAs)

- Second Generation: Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs), Other (Mianserine, Mirtazapine, Tianeptine)
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Public health authority ANSM is in charge of drug authorization and regulation the use of prescription drugs gives usage conditions and recommendations to physicians.
Information Release and Warnings

Figure 1: Timeline of Events on Antidepressants
Data and Outcome of Interest

- Proprietary data of CEGEDIM, a global technology and services company specializing in health care
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- Large panel data on exhaustive prescriptions of 386 general practitioners in France between 2000 and 2008

Outcome of interest:
- Physician-specific probability to prescribe an antidepressant
- Choice probability of antidepressants with a Random Coefficient Logit Model (allow heterogeneity of decision makers)
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# Antidepressant Prescriptions - Means

## Table 1: Antidepressant Prescriptions Probabilities at Diagnosis

<table>
<thead>
<tr>
<th>Antidep. Group</th>
<th>All Ages</th>
<th>Kids and Ado. (2-18)</th>
<th>Young Adults (19-25)</th>
<th>Adults (26-65)</th>
<th>Elderly (65+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSRI</td>
<td>29.4%</td>
<td>10.1%</td>
<td>23.8%</td>
<td>31.9%</td>
<td>29.1%</td>
</tr>
<tr>
<td>SNRI</td>
<td>5.5%</td>
<td>1.0%</td>
<td>4.1%</td>
<td>6.3%</td>
<td>4.6%</td>
</tr>
<tr>
<td>TCA</td>
<td>2.4%</td>
<td>1.1%</td>
<td>0.9%</td>
<td>2.4%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Other</td>
<td>5.6%</td>
<td>1.7%</td>
<td>3.3%</td>
<td>5.4%</td>
<td>10.2%</td>
</tr>
<tr>
<td>None</td>
<td><strong>57.1%</strong></td>
<td><strong>86.1%</strong></td>
<td><strong>67.9%</strong></td>
<td><strong>54%</strong></td>
<td><strong>51.4%</strong></td>
</tr>
<tr>
<td>Patients</td>
<td>173,207</td>
<td>9,815</td>
<td>19,949</td>
<td>122,178</td>
<td>21,174</td>
</tr>
</tbody>
</table>
Antidepressant Prescriptions Changes

- Prescription probability for kids and adolescents decreases after warning for almost all physicians with initial prescription probability above 10%. Much less changes for other age categories.
SSRI Prescriptions Changes

- Probabilities of SSRI prescriptions are lower for kids and adolescents than for other age groups. It decreases after warning, with heterogeneity.
## Mixed Logit Results - Means of Marginal Effects

<table>
<thead>
<tr>
<th>Prescription</th>
<th>Depression</th>
<th>Mild</th>
<th>Severe</th>
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<tbody>
<tr>
<td></td>
<td>Age group</td>
<td>Prob. (%)</td>
<td>Change</td>
</tr>
<tr>
<td>No Antidepressant</td>
<td>Kids (2-18)</td>
<td>70.6</td>
<td>72.8</td>
</tr>
<tr>
<td></td>
<td>Young Adults</td>
<td>17.0</td>
<td>14.6</td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>17.9</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>15.9</td>
<td>11.1</td>
</tr>
<tr>
<td>SSRI</td>
<td>Kids (2-18)</td>
<td>16.7</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>Young Adults</td>
<td>18.4</td>
<td>19.7</td>
</tr>
<tr>
<td></td>
<td>Adults</td>
<td>20.1</td>
<td>18.4</td>
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Change in c.d.f. of Predicted Probabilities

No Drug

No Antidepressant - Mild Depression

Kids

Young Adults

Adults

Elderly

Choice Probability

0 0.2 0.4 0.6 0.8 1

0 0.2 0.4 0.6 0.8 1

0 0.2 0.4 0.6 0.8 1

0 0.2 0.4 0.6 0.8 1

c.d.f. without news — c.d.f. with news

Dubois - Tunçel (TSE)
Mixed Logit Results

Change in c.d.f. of Predicted Probabilities

No Drug

No Antidepressant - Severe Depression

- Kids
- Young Adults
- Adults
- Elderly

Dubois - Tunçel (TSE)
Change in c.d.f. of Predicted Probabilities

SSRI

SSRI - Mild Depression

Kids

Young Adults

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SSRI

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- Kids
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Choice Probability
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Change in c.d.f. of Predicted Probabilities

SNRI - Severe Depression

- Kids
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Main Results

- Targeted population by the warning (kids and adolescents):

  - Reduction of SSRI prescription (-2.5% to -4.3%) without drug substitution for mild depression but partial switch to SNRI, TCA for severe depression
  - For older age categories: heterogeneous responses with some increase and some decrease, spreading prescription probabilities.
  - Potential explanations: some physicians interpret warning on SSRI for kids and adolescents (which is clearly a 'bad' news for SSRIs for kids and adolescents) as 'bad news' for other age groups too and others as 'good news' for SSRIs in other age groups (they may think if there was bad news for other age groups they would be informed).
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- Effect may depend on whether physicians are Bayesian updating (like in Rheinberger and Hammitt)