Supplementary Online Content


eTable 1. Trends in Annual Amount of Opioids Prescribed in Morphine Milligram Equivalents (MME) per Person in All Ages, by State, United States, 2006-2017

eTable 2. Trends in Mean Annual Duration per Prescription, by State, United States, 2006-2017

eTable 3. Trends in Rate (per 100 Population) of Opioids Prescribed for Duration ≤3 Days, by State, United States, 2006-2017

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This supplementary material has been provided by the authors to give readers additional information about their work.
### eTable 1. Trends in Annual Amount of Opioids Prescribed in Morphine Milligram Equivalents (MME) per Person in All Ages, by State, United States, 2006-2017

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<tr>
<th>State</th>
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Source: IQVIA Xponent database.

Abbreviation: AAPC, average annual percent change; APC, annual percent change; MME, morphine milligram equivalents; 95% CI, 95% confidence interval.

*a Year category presented in each trend represented year groupings as determined by joinpoint regression.

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b Indicates that the Annual Percent Change (APC) or average APC was significantly different from zero at the alpha = 0.05 level.
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Source: IQVIA Xponent database.

Abbreviation: AAPC, average annual percent change; 95% CI, 95% confidence interval; Rx, prescription; 95% CI, 95% confidence interval.

^ Year category presented in each trend represented year groupings as determined by joinpoint regression.

b Indicates that the Annual Percent Change (APC) or average APC was significantly different from zero at the alpha = 0.05 level.
eTable 3. Trends in Rate (per 100 Population) of Opioids Prescribed for Duration ≤3 Days, by State, United States, 2006-2017

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<td>(-8.9 to -6.5)</td>
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<td>(-4.9 to -3.4)</td>
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Source: IQVIA Xponent database.
Abbreviation: AAPC, average annual percent change; Rx, prescription; 95% CI, 95% confidence interval.

Year category presented in each trend represented year groupings as determined by joinpoint regression.

Indicates that the Annual Percent Change (APC) or average APC was significantly different from zero at the alpha = 0.05 level.
eTable 4. Trends in Rate (per 100 Persons) of Opioids Prescribed for Duration ≥30 Days, by State, United States, 2006-2017

<table>
<thead>
<tr>
<th>State</th>
<th>Rx for duration ≥30 days, rate</th>
<th>Change, %</th>
<th>AAPC (95% CI)</th>
<th>Trend 1</th>
<th>Trend 2</th>
<th>Trend 3</th>
</tr>
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<tbody>
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<td>2015-2017</td>
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<td>2006-2009</td>
<td>13.3 (8 to 18.9)</td>
<td>2013-2017</td>
</tr>
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<td>35.7</td>
<td>3.0 (2.1 to 3.9)</td>
<td>2006-2008</td>
<td>11.7 (6.6 to 17.1)</td>
<td>2015-2017</td>
</tr>
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<td>51.1</td>
<td>3.8 (3.0 to 4.6)</td>
<td>2006-2011</td>
<td>9.7 (8.6 to 10.8)</td>
<td>2015-2017</td>
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<td>6.4 (3.7 to 9.2)</td>
<td>2006-2008</td>
<td>17.5 (1.0 to 36.8)</td>
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<td>3.1 (1.9 to 4.3)</td>
<td>2006-2009</td>
<td>11.7 (7.5 to 16.0)</td>
<td>2014-2017</td>
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<td>2006-2011</td>
<td>9.2 (7.6 to 10.8)</td>
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<td>8.6 (3.1 to 14.3)</td>
<td>2015-2017</td>
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<td>9.0 (7.6 to 10.5)</td>
<td>2015-2017</td>
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<th>Change, %</th>
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<th>Trend 3</th>
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</table>

Source: IQVIA Xponent database.

Abbreviation: AAPC, average annual percent change; Rx, prescription; 95% CI, 95% confidence interval.

* Year category presented in each trend represented year groupings as determined by joinpoint regression.

b Indicates that the Annual Percent Change (APC) or average APC was significantly different from zero at the alpha = 0.05 level.
eTable 5. Trends in Rate (per 100 Population) of Opioids Prescribed in High Dosages (≥90 MME per Day), by State, United States, 2006-2017

<table>
<thead>
<tr>
<th>State</th>
<th>High-dosage Rx, rate</th>
<th>Change, %</th>
<th>AAPC (95% CI)</th>
<th>Trend 1</th>
<th>Trend 2</th>
<th>Trend 3</th>
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© 2019 Schieber LZ et al. JAMA Network Open.
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Source: IQVIA Xponent database

Abbreviation: AAPC, average annual percent change; MME, morphine milligram equivalents; Rx, prescriptions; 95% CI, 95% confidence interval.

* Year category presented in each trend represented year groupings as determined by jointpoint regression.

<sup>b</sup> Indicates that the Annual Percent Change (APC) or average APC was significantly different from zero at the alpha = 0.05 level.

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<td>8.7</td>
<td>0.8 (-1.3 to 2.9)</td>
<td>4.1 (2.4 to 6.0)b</td>
<td>-7.7 (-14.7 to 0.0)b</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>1.8</td>
<td>1.9</td>
<td>6.0</td>
<td>-0.9 (-4.6 to 3)</td>
<td>4.4 (1.3 to 7.7)b</td>
<td>-13.7 (-25.6 to 0.2)</td>
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<tr>
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<td>6.3</td>
<td>-13.5</td>
<td>-1.0 (-2.1 to 0.1)</td>
<td>4.8 (1.8 to 8.0)b</td>
<td>-4.2 (-5.5 to -2.9)b</td>
</tr>
<tr>
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<td>6.0</td>
<td>5.3</td>
<td>-10.9</td>
<td>-1.1 (-2.1 to -0.1)b</td>
<td>6.7 (1.1 to 12.7)b</td>
<td>-1.6 (-2.7 to -0.4)b</td>
</tr>
<tr>
<td>Hawaii</td>
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<td>4.1</td>
<td>-15.2</td>
<td>-1.5 (-2.2 to -0.9)b</td>
<td>7.0 (5.8 to 8.2)b</td>
<td>-4.0 (-5.5 to -2.4)b</td>
</tr>
<tr>
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<td>7.0</td>
<td>7.6</td>
<td>8.9</td>
<td>0.6 (-0.5 to 1.6)</td>
<td>5.6 (4.2 to 6.9)b</td>
<td>0.0 (-2.4 to 2.5)b</td>
</tr>
<tr>
<td>Illinois</td>
<td>3.7</td>
<td>3.5</td>
<td>-6.7</td>
<td>-0.6 (-2.9 to 1.8)</td>
<td>6.4 (-5.5 to 19.8)</td>
<td>0.0 (-1.9 to 1.8)</td>
</tr>
<tr>
<td>Indiana</td>
<td>8.0</td>
<td>6.0</td>
<td>-24.8</td>
<td>-2.5 (-3.5 to -1.5)b</td>
<td>3.5 (2.1 to 4.9)b</td>
<td>-9.3 (-11.2 to -7.3)b</td>
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<td>-9.4</td>
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<td>0.8 (-0.3 to 1.9)</td>
<td>-10.9 (-21.8 to 1.5)</td>
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<table>
<thead>
<tr>
<th>State</th>
<th>ER/LA Rx, rate</th>
<th>Change, %</th>
<th>AAPC (95% CI)</th>
<th>Trend 1</th>
<th>Trend 2</th>
<th>Trend 3</th>
</tr>
</thead>
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<td></td>
<td>2006</td>
<td>2017</td>
<td>2006-2017</td>
<td>2006-2017</td>
<td>Years</td>
<td>APC (95% CI)</td>
</tr>
</tbody>
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| Kansas         | 6.9   | 6.6   | -3.1      | -0.5      | (-1.4 to 0.5) | 2006-2008 | 4.4   | (-0.6 to 9.7) | 2008-2015 | 0.7   | (-0.1 to 1.5) | 2015-2017 | -9.0  | (-13.5 to -4.3)
| Kentucky       | 7.9   | 5.5   | -29.9     | -2.7      | (-5.3 to -0.1) | 2006-2008 | 7.8   | (-4.1 to 21.1) | 2008-2011 | -0.1  | (-10.0 to 10.9) | 2015-2017 | -7.3  | (-9.4 to -5.1)
| Louisiana      | 6.6   | 5.0   | -24.0     | -2.5      | (-3.4 to -1.5) | 2006-2017 | -2.5  | (-3.4 to -1.5) | 2009-2015 | -1.0  | (-3.0 to 1.1) | 2015-2017 | -14.5 | (-24.6 to -3.1)
| Maine          | 10.1  | 7.7   | -23.2     | -2.1      | (-4.1 to -0.1) | 2006-2009 | 4.5   | (-0.6 to 9.9) | 2009-2015 | -1.0  | (-3.0 to 1.1) | 2015-2017 | -7.1  | (-14.1 to 0.3)
| Maryland       | 7.0   | 6.8   | -2.2      | -0.3      | (-1.6 to 1.1) | 2006-2010 | 4.4   | (2.0 to 6.9) | 2009-2015 | -0.3  | (-3.2 to 1.0) | 2015-2017 | -7.1  | (-14.1 to 0.3)
| Massachusetts  | 6.6   | 4.4   | -33.5     | -3.6      | (-4.2 to -3.0) | 2006-2014 | -0.9  | (-1.3 to -0.5) | 2014-2017 | -10.5 | (-12.6 to -8.3) | 2015-2017 | -9.6  | (-19.8 to 2.0)
| Michigan       | 6.6   | 6.6   | 1.2       | -0.1      | (-2.2 to 1.9) | 2006-2010 | 7.4   | (3.6 to 11.3) | 2010-2015 | -2.0  | (-5 to 1.1) | 2015-2017 | -9.6  | (-19.8 to 2.0)
| Minnesota      | 5.4   | 4.0   | -25.0     | -2.7      | (-4.2 to -1.3) | 2006-2010 | 5.2   | (3.0 to 7.5) | 2010-2015 | -4.4  | (-6.4 to -2.3) | 2015-2017 | -13.3 | (-21 to -4.9)
| Mississippi    | 6.2   | 5.9   | -5.3      | -0.4      | (-2.3 to 1.5) | 2006-2008 | 7.1   | (-2.8 to 18.1) | 2008-2015 | -0.3  | (-1.8 to 1.2) | 2015-2017 | -7.7  | (-16.6 to 2.2)
| Missouri       | 6.9   | 6.1   | -11.0     | -1.1      | (-2.8 to 0.7) | 2006-2008 | 6.3   | (-2.7 to 16.1) | 2008-2015 | 1.3   | (-2.7 to 0.1) | 2015-2017 | -7.1  | (-15.8 to 2.6)
| Montana        | 9.7   | 6.5   | -33.0     | -3.5      | (-4.2 to -2.7) | 2006-2008 | 9.5   | (6 to 13.2) | 2008-2015 | -3.2  | (-3.7 to -2.6) | 2015-2017 | -15.9 | (-19.7 to -11.8)
| Nebraska       | 5.6   | 5.4   | -4.3      | -0.7      | (-1.7 to 0.2) | 2006-2014 | 1.0   | (0.2 to 1.8) | 2014-2017 | -5.2  | (-8.8 to -1.6) | 2015-2017 | 9.7   | (-14.9 to -4.1)
| Nevada         | 9.2   | 7.4   | -18.8     | -1.8      | (-2.8 to -0.7) | 2006-2008 | 6.9   | (1.7 to 12.4) | 2008-2015 | -1.8  | (-2.6 to -1.0) | 2015-2017 | -9.7  | (-14.9 to -4.1)
| New Hampshire  | 10.2  | 8.2   | -19.1     | -1.9      | (-3.8 to 0.0) | 2006-2008 | 12.2  | (2.3 to 23) | 2008-2015 | -2.2  | (-3.6 to -0.9) | 2015-2017 | -13.2 | (-22.4 to -2.8)
| New Jersey     | 6.8   | 5.3   | -22.2     | -2.2      | (-3.8 to -0.5) | 2006-2008 | 2.8   | (-4.7 to 11.0) | 2008-2015 | 1.5   | (-2.8 to -0.2) | 2015-2017 | -9.1  | (-17.3 to -0.1)
| New Mexico     | 5.7   | 4.4   | -21.3     | -2.6      | (-5.9 to 0.8) | 2006-2010 | 7.8   | (2.5 to 13.4) | 2010-2015 | 5.2   | (-9.5 to 0.6) | 2015-2017 | -14.9 | (-31.6 to 6.0)
| New York       | 4.2   | 4.2   | -2.0      | -0.1      | (-1.3 to 1.1) | 2006-2009 | 7.8   | (4.3 to 11.5) | 2009-2015 | 1.5   | (-2.8 to -0.2) | 2015-2017 | -7.3  | (-13.5 to -0.7)
| North Carolina | 7.7   | 7.1   | -8.4      | -0.8      | (-1.9 to 0.4) | 2006-2008 | 5.6   | (-0.3 to 11.9) | 2006-2015 | 0.6   | (-0.2 to 1.5) | 2015-2017 | -11.2 | (-16.4 to -5.6)
| North Dakota   | 7.6   | 4.7   | -38.2     | -4.5      | (-6.3 to -2.6) | 2006-2008 | 4.6   | (-3.0 to 12.8) | 2008-2015 | -4.0  | (-5.3 to -2.7) | 2015-2017 | -14.2 | (-23.8 to -3.3)

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<th>Trend 2</th>
<th>Trend 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio</td>
<td>8.2</td>
<td>5.0</td>
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<td>Oklahoma</td>
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<td>9.0</td>
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<tr>
<td>Oregon</td>
<td>10.6</td>
<td>6.8</td>
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<td>-3.7</td>
<td>(-4.9 to -2.4)(^b)</td>
<td>2006-2008</td>
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<tr>
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<td>7.6</td>
<td>6.6</td>
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<td>(-2.1 to -0.5)(^b)</td>
<td>2006-2009</td>
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<td>6.9</td>
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<td>-3.1</td>
<td>(-3.8 to -2.4)(^b)</td>
<td>2006-2017</td>
</tr>
<tr>
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<td>7.7</td>
<td>8.3</td>
<td>8.1</td>
<td>1.3</td>
<td>(0.0 to 2.6)(^b)</td>
<td>2006-2017</td>
</tr>
<tr>
<td>Virginia</td>
<td>5.2</td>
<td>4.9</td>
<td>-6.7</td>
<td>-0.8</td>
<td>(-2.2 to 0.6)</td>
<td>2006-2010</td>
</tr>
<tr>
<td>Washington</td>
<td>9.1</td>
<td>5.9</td>
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<td>(-5.1 to -2.8)(^b)</td>
<td>2006-2009</td>
</tr>
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<td>6.2</td>
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<td>-3.0</td>
<td>(-5.0 to -1.0)(^b)</td>
<td>2006-2009</td>
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<td>5.9</td>
<td>-22.7</td>
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<td>(-4.5 to -0.3)(^b)</td>
<td>2006-2010</td>
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<td>-8.9</td>
<td>-0.9</td>
<td>(-2.2 to 0.4)</td>
<td>2006-2014</td>
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</tbody>
</table>

Source: IQVIA Xponent database.

Abbreviation: AAPC, average annual percent change; ER/LA, extended-release/long-acting; MME, morphine milligram equivalents; Rx, prescriptions; 95% CI, 95% confidence interval.

\(^a\) Year category presented in each trend represented year groupings as determined by joinpoint regression.

\(^b\) Indicates that the Annual Percent Change (APC) or average APC was significantly different from zero at the alpha = 0.05 level.
eFigure. (A) Mean Dosage in Morphine Milligram Equivalent (MME) per Day per Prescription and (B) Mean Duration per Prescription by Formulation in All Ages, by State, United States, 2017.

Data were calculated from IQVIA Xponent database in 2017. Figure 1A: Data markers represent the mean daily dosage (morphine milligram equivalent, MME) per prescription stratified by formulation of prescribed opioids in the United States, 50 states, and the District of Columbia. Figure 1B: Data markers represent the mean duration (days) per prescription stratified by the formulation of prescribed opioids in the United States, 50 states, and the District of Columbia. Blue diamond represents extended release and long acting (ER/LA) formulations; black triangle represents immediate release (IR) formulations, and red square represents all opioids.