2007-2012

DRUG AND ALCOHOL-ASSOCIATED INTOXICATION DEATHS

BALTIMORE CITY

Lead Authors:
Aruna Chandran, Chief of Epidemiologic Services, Baltimore City Health Department
Elizabeth Salisbury-Afshar, Medical Director, Behavioral Health Systems Baltimore
Maria Yolanda Giraldo Jimenez, Intern, Baltimore City Health Department

Contributing Authors:
Oxiris Barbot, Health Commissioner, Baltimore City Health Department
Bernard J. McBride, President and CEO, Behavioral Health Systems Baltimore
Christina Trenton, Vice President of Program Operations, Behavioral Health System Baltimore
Jose J. Arbelaez, Director of Epidemiology, Behavioral Health Systems Baltimore
Emily Heinlein, Director of Public Health Initiatives, Behavioral Health System Baltimore

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INTRODUCTION

The State of Maryland has experienced a recent increase in the number of drug and/or alcohol (D&A)-associated deaths; in 2012 there was a 15% increase (from 633 to 761) in D&A-associated deaths as compared to 2011. Of note, there was a marked 54% increase (from 245 to 378) in deaths attributable to heroin (DHMH Report, 2013).

D&A intoxication also contributes significantly to the number of preventable deaths in Baltimore City. In 2011, the Baltimore City Health Department published a report showing D&A intoxication deaths in the 2000 to 2009 time period (BCHD Report, 2009). The report highlighted a 19% increase in the number of D&A associated deaths among Baltimore City residents from 2008 to 2009 (from 152 to 181). Between those two years, alcohol associated deaths increased most significantly (26%), followed by cocaine (24%).

GOAL

This report of D&A intoxication deaths in Baltimore City from 2007 to 2012 shows updated data with changes over time, with the ultimate goal of providing information that can be used for targeted intervention and prevention efforts that can minimize these preventable deaths.

KEY FINDINGS

- In Baltimore City, there were 213 D&A intoxication deaths in 2012, compared with 165 in 2011. While this 29% increase is concerning, it is not statistically significant. The number of D&A intoxication deaths has fluctuated over the 2007 to 2012 time period, but the general trend in both the number and rate of deaths is a small decrease.
- During the period of 2007 to 2012, heroin-associated deaths account for the majority of D&A intoxication deaths in Baltimore city. In 2012, 126 (59%) of D&A deaths were attributable to heroin.
- In 2012 in Baltimore City, the largest proportions of D&A intoxication deaths occurred in:
  - The 45-54 year age group (86; 40%);
  - Males (140; 66%); and
  - African-Americans (121; 57%)

METHODS

Information and data for D&A intoxication deaths occurring in Baltimore City between 2007 and 2012 were obtained from the following sources:

- The *Drug and Alcohol Intoxication Deaths in Maryland, 2007-2012*, published by the Maryland Department of Health and Mental Hygiene (DHMH) in July 2013.
- The Maryland DHMH Alcohol and Drug Abuse Administration (ADAA).

The Office of the Chief Medical Examiner (OCME) is responsible for providing information on all D&A intoxication deaths in the State of Maryland to DHMH. The OCME investigates all deaths occurring in Maryland that result from injury/violence or take place in a suspicious, unexpected or unusual manner. OCME investigations involve the compilation of several sources of data; when deaths are suspected to be associated with D&A intoxication, a toxicological analysis is routinely performed. From that and corroborating physical examination findings, the determination is made as to whether the primary cause of death is ingestion/exposure to alcohol or another drug (heroin, cocaine, phencyclidine [PCP], prescription opioids, benzodiazepines, methamphetamines, and other prescribed and non-prescribed drugs). The Virtual Data Unit, housed within the Vital Statistics Administration (VSA) in DHMH, validates the data obtained from the OCME. Deaths that are attributable to more than one substance are listed under each substance; no differentiation is made between multi-substance and single-substance deaths. Of note, deaths determined to be due to suicide are not included in this dataset; those deaths assigned by the OCME with an underlying cause as “undetermined” or “accidental” are included.

The Baltimore City Health Department received from DHMH a de-identified line list of all D&A intoxication deaths occurring in Baltimore City, regardless of the county of residence, as well as all D&A intoxication deaths occurring in Baltimore City residents, regardless of where the death occurred (as long as it occurred within Maryland) between 2007 and 2012, along with basic demographic information such as gender, age and race. Therefore, deaths reported in this report were coded in the same manner as those reported in the DHMH *Drug and Alcohol Intoxication Deaths in Maryland, 2007-2012*; further details about coding and determination of cause of death can be found in that report ([http://adaa.dhmh.maryland.gov/Documents/content_documents/OverdosePrevention/2007-2012%20intox%20report_final.pdf](http://adaa.dhmh.maryland.gov/Documents/content_documents/OverdosePrevention/2007-2012%20intox%20report_final.pdf)).

All data were analyzed using Stata Version 13.0. Statistical significance of changes over time was calculated using a test of equality of proportions. Graphs were made in Microsoft Excel 2010.
RESULTS

From 2007 to 2012, there have been fluctuations in the number of D&A intoxication deaths occurring in Baltimore City, regardless of county of residence (Figure 1); however, the overall trend suggests a decrease during that time period. While the overall trend from 2007 to 2012 represents a decrease in the number of deaths, it remains to be seen if that decrease is sustained over time.

Figure 1: Number of Alcohol/Drug Intoxication Deaths in Baltimore City, 2007-2012

Between 2011 and 2012, there was a 29% increase, although not statistically significant, in the number of D&A intoxication deaths (Figure 2). It will be important to monitor annual changes in the number of D&A-associated deaths in order to recognize and respond to trends.

Figure 2: Percent Change in Number of D&A Intoxication Deaths over Two-Year Time Frames

*Represents a statistically significant (p value < 0.05) change from the previous year
When looking at the numbers for Baltimore City residents regardless of where in Maryland the death occurred, there were a total of 178 deaths in 2012 compared with 142 in 2011, representing a statistically significant 25% increase.

The rate of total D&A intoxication deaths per 100,000 population in Baltimore City has generally declined over the past 6 years (Figure 3), with the exception of spikes in 2009 and 2012. A similar trend is seen in rates of death due to the major substance types. Heroin has been the predominant substance each year, associated with nearly 60% of deaths in 2012. Alcohol was the next most prevalent substance, accounting for 31% of deaths in 2012. Interestingly, in spite of methadone being tightly regulated by Drug Enforcement Agency, a significant proportion of D&A intoxication deaths are due to methadone; methadone accounted for 22% of deaths in 2012, similar to the 21% of deaths due to methadone at the state level in the same year. Other substances accounting for a smaller proportion of deaths include oxycodone, benzodiazepines, fentanyl and tramadol.

**Figure 3: Rate of Alcohol/Drug Deaths by Substance Type per 100,000 Population in Baltimore City, 2007-2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total A&amp;D Deaths</th>
<th>Alcohol</th>
<th>Cocaine</th>
<th>Heroin</th>
<th>Methadone</th>
<th>Prescription Opioids</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>44.2</td>
<td>9.0</td>
<td>16.4</td>
<td>31.0</td>
<td>11.9</td>
<td>14.2</td>
</tr>
<tr>
<td>2008</td>
<td>28.4</td>
<td>6.3</td>
<td>9.0</td>
<td>16.8</td>
<td>6.9</td>
<td>8.7</td>
</tr>
<tr>
<td>2009</td>
<td>37.4</td>
<td>8.4</td>
<td>11.1</td>
<td>23.5</td>
<td>8.1</td>
<td>10.2</td>
</tr>
<tr>
<td>2010</td>
<td>27.7</td>
<td>6.3</td>
<td>7.2</td>
<td>15.0</td>
<td>8.5</td>
<td>9.8</td>
</tr>
<tr>
<td>2011</td>
<td>26.6</td>
<td>7.1</td>
<td>7.6</td>
<td>12.3</td>
<td>10.2</td>
<td>12.9</td>
</tr>
<tr>
<td>2012</td>
<td>34.3</td>
<td>10.8</td>
<td>8.5</td>
<td>20.3</td>
<td>7.6</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Not unexpectedly, the rate of deaths due to D&A intoxication has consistently been higher in males than females (Figure 4). However, there is an overall downward trend in males while the rate in females has remained stable over the past 6 years.
Comparing the proportion of total D&A deaths by age group over time shows that the 45-54 year age group has made up the largest proportion of total deaths in each year for the past 6 years, followed by the 35-44 year age group (Figure 5). Heroin is the substance responsible for the highest number of deaths in each of the age groups. From 2011 to 2012, there was a 2.6% reduction (not statistically significant) in the proportion of intoxication deaths occurring in the <25 year old age group.

**Figure 4: Rate of D&A Intoxication Deaths by Gender in Baltimore City, 2007-2012**

![Figure 4](image)

**Figure 5: Proportion of Total D&A Intoxication Deaths by Age Group in Baltimore City, 2007-2012**

![Figure 5](image)
Looking at the number of deaths by race, the majority of D&A intoxication deaths occurred in non-Hispanic African American individuals, with the exception of 2011 (Figure 6).

**Figure 6: Number of D&A Intoxication Deaths by Race in Baltimore City, 2007-2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>African American</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>180</td>
<td>100</td>
</tr>
<tr>
<td>2008</td>
<td>160</td>
<td>90</td>
</tr>
<tr>
<td>2009</td>
<td>140</td>
<td>80</td>
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<tr>
<td>2010</td>
<td>120</td>
<td>70</td>
</tr>
<tr>
<td>2011</td>
<td>100</td>
<td>60</td>
</tr>
<tr>
<td>2012</td>
<td>80</td>
<td>50</td>
</tr>
</tbody>
</table>

**CONCLUSION**

There were a total of 213 D&A intoxication deaths that occurred in Baltimore City in 2012, with 168 of those being in Baltimore City residents. Heroin is the substance associated with the largest proportion of deaths, with the highest risk sub-populations being males, non-Hispanic African Americans, and those in the 45-54 year age range.

This analysis shows some important and perhaps unexpected opportunities for targeted intervention and prevention efforts. First, the highest-risk age groups are in the 35 to 54 year age range; this may be an older age group than people might have assumed, and therefore programs should be targeted accordingly. Second, although heroin has been the predominant substance associated with D&A intoxication deaths, methadone and prescription opioids are also associated with a significant proportion of overall D&A intoxication deaths. This represents an opportunity to work with healthcare providers and the healthcare system to ensure that individuals are aware of the risks associated with prescribed medications and that recommendations for the use of all medications are clear and accurate.

While the number of D&A intoxication deaths from 2007 to 2012 in Baltimore City trended downward, these deaths still represent a significant and preventable public health problem.
REFERENCES

