Executive Summary

This report extends, improves, and augments previous estimates of trends in the price and purity of five major illicit drugs—powder cocaine, crack cocaine, heroin, d-methamphetamine, and marijuana—using data from the 1981–2003 Drug Enforcement Administration's (DEA's) System to Retrieve Information from Drug Evidence (STRIDE) database. Series are extended in this study through the second quarter of 2003, so data for 2003 reflect only one-half year. Estimates are provided for three or four quantity levels for each substance and, where sufficient data exist, for five specific cities. All prices are adjusted for inflation and reported in 2002 dollars. Our primary national estimates for price and purity are based on formal econometric models used to analyze "purchase" transactions from STRIDE. Further analyses developing purity estimates are based on both "purchase" and "seizure" transactions from STRIDE.

Since drugs are provided through markets, albeit illegal markets, it is natural to want to track data series pertaining to prices as well as more traditional indicators of demand, use, and quantities consumed. Suppliers do not, of course, report prices, but samples of market prices are obtained in the course of drug enforcement, particularly through undercover buys. Drug acquisitions sent to a DEA laboratory for analysis are registered in STRIDE. These data are used by policymakers and researchers to estimate the price and purity of specific drugs in various jurisdictions, including cities, states, and the nation. Small and irregular sample sizes for particular locations, together with the fact that drugs are not sold in standard package sizes with consistent purity, considerably complicates analysis, but these issues can be addressed by using appropriate statistical techniques. A more fundamental limitation is that the data are obtained through a nonrandom process. It is not possible to assess definitively what possible biases arise from nonrandom sampling, but the series generated here and in earlier studies using STRIDE correlate with external indicators such as emergency-room mentions and drug consumption, suggesting that price and purity series derived from STRIDE can reliably capture broad trends. Further exploration of such correlations would be valuable.

Before describing trends in average price and purity observed in the STRIDE data, it is important to note that at any given place and time, a wide range of prices and purities can be observed for a particular drug. This report seeks to convey some sense of the magnitude of this dispersion by reporting estimates of the 25th and 75th percentiles of the distributions of prices and purities predicted by the model. These ranges do not reflect variability stemming from uncertainty concerning the model itself or the precision of the model estimates, so the true ranges may be even broader.

Furthermore, there can be great variation in prices across cities. Therefore, "national" price estimates are simply weighted averages of price estimates obtained for particular cities and regions. Price levels and even trends in locations throughout the country do not necessarily match the "national" prices. The same is true for "national" estimates of purity. Thus it may be more appropriate to think of these "national" price and purity series as indices of prices and purity that behave in a manner similar to the S&P 500 for stock prices.

Cocaine price and purity trends reported here mirror those reported in the past: very sharp (roughly 70 percent) price declines during the 1980s through 1989 at all quantity levels, a pronounced (22 to 35 percent) one-year increase from 1989 to 1990, and gradual declines during the 1990s, interrupted briefly in 1995. Hence, prices at the end of the 1990s were 30 to 40

percent below those in 1989. There was an apparent price jump between 1999 and 2000 that was sustained until 2001, at least at the lowest quantity level. Prices then declined uniformly from 2001 to 2003, reaching all-time lows that are roughly 12 to 21 percent below prices in 1999. Cumulatively, powder cocaine prices have declined by roughly 80 percent since 1981. These broad trends are apparent at each quantity level and in each of the five cities for which city-specific series are described.

The average purity of powder cocaine in 2003 was high and was similar across quantity levels (60 to 80 percent) but was still well below the peak levels of the late 1980s. Through the late 1980s, there were pronounced differences in average purity between the two lower quantity levels and the two higher quantity levels. Now those differences are quite small, suggesting that "cutting" or diluting powder cocaine as it moves from the higher (~100 gram) to the lower (~1 gram) quantity levels is not as common as it used to be.

The crack cocaine series display many of the same features as the powder cocaine series: sharp price declines through 1989, an even more pronounced (30 to 45 percent) one-year increase from 1989 to 1990, and gradual, modest declines at higher quantity levels during the 1990s. There are some differences, however. Crack prices rose from 1998 to 1999 and from 1999 to 2000, whereas powder cocaine prices did not begin to increase until 2000, and, notably, crack prices at the lowest quantity level did not decrease during the 1990s. As a result, while crack prices at higher quantity levels reached all-time lows in 2003, crack prices at the lowest quantity level did not. In addition, there are some unique city-specific price and purity trends for crack cocaine that do not closely mimic the national pattern, at least not in the short run.

The heroin series also share many features with the powder cocaine series, including very sharp (roughly 55 percent) price declines during the 1980s through 1989, a pronounced (30 to 50 percent) increase from 1989 to 1990 at the larger quantities, and further declines during the 1990s. Purity-adjusted prices were at or near all-time lows in 2003. Again, however, there are some important differences. For example, there was no spike in 1995 in the heroin price series, and there was at most perhaps a slight leveling but no increase in prices in 2000. As a result, heroin prices at the end of the 1990s were 55 to 65 percent lower than they were in 1989, a much larger decline than was observed for powder cocaine during the same period. Heroin prices have declined another 10 to 20 percent since the late 1990s. Variation in trends in average prices across cities is substantial, more akin to what is observed for crack cocaine than for powder cocaine.

Heroin purity has been relatively stable since the early 1990s. For purchases, purity averages roughly 30 to 40 percent at the two lower quantity levels (<1 gram and 1 to 10 grams). For seizures and purchases combined, the average purity is about 60 percent for quantities of 10 to 200 grams and 75 percent for quantities over 200 grams. The incrementally higher purity levels at higher quantity levels suggest that heroin is often cut when it is passed between quantity levels.

Unlike the cocaine and heroin series, the d-methamphetamine series in this report differ substantially from those in previous reports. The preceding report described a more-or-less steady decline in methamphetamine prices from the mid-1980s onward (through 2000, the last year in that series). The series in this report show comparable declines overall, but with three

very large and noteworthy spikes in the year or years following three precursor control regulations in 1989, 1995, and 1997. Purity trends for d-methamphetamine have been the opposite, with troughs in purity occurring alongside spikes in prices, consistent with a hypothesis that these transients reflect some sort of market disruption.

There are far fewer price observations for d-methamphetamine than for powder cocaine, crack, or heroin, and they are disproportionately concentrated in one city (San Diego). Furthermore, d-methamphetamine prices and purity have varied in more complicated ways over time, perhaps reflecting a relatively immature market that is still evolving. Hence, observations with regard to d-methamphetamine market trends are more tentative than those for the other substances, but they are intriguing and merit further analysis.

In the case of marijuana, this report summarizes trends in the average price of a gram (rather than a pure gram) because STRIDE does not record information on the potency of this substance. Marijuana price trends are not correlated with trends in prices of the other drugs. While prices of the other drugs were falling in the 1980s, in some cases very dramatically, the average price of marijuana was rising, reaching a peak in 1991 for two of the three quantity levels. Prices then declined through 2000 but have since rebounded somewhat. At the two lower quantity levels (<10 grams and 10 to 100 grams), marijuana prices in 2003 were about one-third above their 2000 troughs. This recent price increase leaves current marijuana prices near their 20-year averages.

In summary, prices for powder cocaine, crack, and heroin declined sharply in the 1980s and have declined more gradually since then, with periodic interruptions by modest price spikes that have usually persisted for a year or less. For d-methamphetamine, the pattern is broadly similar, but the price spikes appear to be larger and longer-lasting, particularly for 1989–1991. Marijuana prices have followed a very different pattern, increasing from 1981 to 1991, then declining through 2000 and increasing over the past three years.

The average purities of these drugs have varied substantially by drug, occasionally with divergent trends. Trends over time suggest that cutting, or diluting, across quantity levels occurs today primarily in the case of heroin. The data also show that the average purity of drugs obtained through seizures is generally higher than that of drugs observed through purchases, particularly at higher quantity levels.

This report reflects several methodological changes from our previous reports. First, we have taken steps to avoid aggregating price data from distinct substances. Specifically, separate series are now produced for powder cocaine and crack cocaine; heroin series are based only on “heroin base” and “heroin hydrochloride” observations; and the methamphetamine series is specifically for d-Methamphetamine, not other forms. Second, this report uses a random coefficient regression model. This allows for the possibility that the extent of quantity discounts (or equivalently, the extent of price markups as one moves down the distribution chain) might vary from city to city. Third, estimates of the ranges of price and purity across cities are provided in the form of estimates of the 25th and 75th percentiles (interquartile range) of distributions. Fourth, several adjustments are made to account for the fact that buyers often do not discover the actual purity of what they purchase until after the price is agreed upon and the deal consummated. Specifically, quantity levels are defined in terms of the total or “raw” quantity, not pure quantity, and prices are standardized based on an estimate of the purity the buyer could

have expected to receive, not the assayed purity. Fifth, the city-specific weights used when computing national estimates as a weighted average of city-specific series are simply the cities' population. Previous reports used a proxy for quantities consumed in various cities estimated from emergency-room data, but those estimates are not available for all cities, they have limitations, and they are less transparent. Finally, more information is provided on the variation of purity across quantity levels.

Given these methodological changes, it is not appropriate to compare price levels in this report to those developed in previous reports. Comparisons in this report between cities and particularly over time are, however, valid and instructive.