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National Institute of Justice & Office of National Drug Control Policy

R e s e a r c h R e p o r t

*Crack, Powder Cocaine, and
Heroin: Drug Purchase and Use
Patterns in Six U.S. Cities*

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The Price of Illicit
Drugs:
1981 through the
Second Quarter of
1998

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The Price of Illicit Drugs: 1981 through the Second Quarter of 1998

Abt Associates Inc., December 1998

Illicit drug prices vary over time and from place to place. This report provides tables and graphs of estimated drug prices in the United States across cities and for the entire country. It includes price and purity estimates for cocaine, heroin, methamphetamine, and price estimates for marijuana. The reporting period is the first quarter of 1981 through the second quarter of 1998. All prices are reported as second quarter 1998-dollar equivalents, based on the Consumer Price Index.

While borrowing from the work of others,¹ the methodology used to produce these estimates is more than a replication. Led by Patrick Johnston, Abt analysts have improved the statistical modeling, and those improvements are reflected here. Details of that methodology are provided in the appendix.

This report provides three figures, and corresponding tables, for each of cocaine, heroin and methamphetamine. The graphed price estimates are predictions based on an analysis of STRIDE data. In the interest of reducing the number of extreme spikes, quarters with fewer than four observations were excluded from the figures.

For each drug, the figures show estimated prices at several distribution levels. The term *distribution level* is not meant literally, because no precise delimiter exists between one distribution level and another. Nevertheless, treating different purchase amounts (0 to 1 pure gram, 1 to 10 pure grams, 10 to 100 pure grams, and so on, inclusive of the upper limit) as having come from successively higher distribution levels is convenient, provided readers understand this caveat.

¹ Rhodes, W., Hyatt, R. and Scheiman, P. "The Price of Cocaine, Heroin and Marijuana, 1981-1993," *The Journal of Drug Issues* 24 no. 3 (1994): 383-402. Caulkins, J. and Padman, R. "Quantity Discounts and Quality Premia for Illicit Drugs," *Journal of American Statistical Association* 88 no 423 (1994): 748-57. Caulkins, J. *Developing a Price Series for Cocaine*. Santa Monica, CA: Rand, MR-317-DPRC. Crane, B., Rivolo, A, and Comfort, G. *An Empirical Examination of Counterdrug Interdiction Program Effectiveness*. Alexandria, Virginia, Institute for Defense Analysis, 1997. Rhodes, W., Truitt, L., Kling, R and Nelson, A.

Furthermore, illicit drugs often are transacted at fixed *nominal* prices that are invariant over time – for example, a \$10 rock of crack cocaine and a \$20 bag of heroin. The size of the rock and the purity of the bag change over time, however, which means that the *standardized* price of illicit drugs changes. The figures reported here are intended to capture trends in real prices.

There are two figures, and corresponding tables, for marijuana prices, and these differ from their cocaine, heroin and methamphetamine counterparts. Marijuana's THC content – that is, its counterpart to purity – is unknown in the STRIDE data. Thus, marijuana price estimates are for bulk grams. Also, there are fewer data points for marijuana and methamphetamine than for cocaine and heroin, so the first two price series have considerably more sampling variation.

For all four drugs, prices for the highest distribution levels probably overstate drug prices at the border. Because imports are usually seized, not purchased, price information is seldom available for them. That is, prices at the border are almost certainly lower than the lowest prices shown in these figures.

Cocaine Prices

Figure 1 reports estimated² cocaine prices for purchases at each of five distribution levels:

- 0-1 pure grams
- 1-10 pure grams
- 10-100 pure grams
- 100-500 pure grams

The Domestic Monitor Program and the Heroin Signature Program: Recommendations for Changes.
Cambridge, MA. Abt Associates, June 30, 1998.

² After categorizing the data into the five distribution levels, we used a generalized linear model to estimate the mean price per pure gram as a function of amount and purity of the transacted drug. The city and date when the transaction occurred were also included in the regression. Based on residual analysis, the data were trimmed to eliminate outliers.

- 500 and more pure grams

The lowest level is almost certainly a retail-level purchase, the second lowest level is probably a mixture of retail-level and middle dealer-level purchases, and the rest of the purchases are almost certainly transactions between dealers. For each year, prices at the border are probably lower than the lowest figure reported here.

Prices at each distribution level have fallen markedly from 1981 to about 1988, after which price decreases have been gradual. For example, at the lowest distribution level reported here, a 350 milligram purchase of pure cocaine (that is, about one-half bulk grams at 67 percent purity) cost \$350 to \$400 per pure gram in 1981 and 1982, but cost \$150 to \$200 per pure gram in 1997 and 1998. Similarly, at the next higher distribution level, a 4.4 gram purchase of pure cocaine (that is, almost 7 bulk grams at 63 percent purity) cost roughly \$225 to \$275 in 1981 and 1982, but around \$75 per pure gram in 1997 and 1998.

Figure 2 reports the same information as figure 1, except that the scale of the price axis is logarithmic. Figure 1 and figure 2 show that some price increases at the highest distribution levels cascade through all the lower distribution levels, suggesting that events either outside the country or at the borders affected retail prices. The largest and longest lasting effect is associated with the end of 1989 and the beginning of 1990. Another sharp effect happened in the second quarter of 1992 and again in the first quarter of 1997. Prices may have spiked in the middle of 1995, but if they did, that spike only appears after a lag at the lowest distribution level.

Associating these price spikes with specific interdiction events is problematic. It seems likely that some interdiction events had measurable effects on cocaine prices, while others did not. Distinguishing the former from the latter is complicated by the absence of knowledge about the delay between when an event occurred and when prices changed.

Figure 2 also tells a story about the relationship between high-level prices and low-level prices. If low-level prices were a multiple of high-level prices, then the curves in figure 2 would be exactly parallel. If low-level prices were an additive markup of high-level prices, then the distance between the curves would diverge as prices fall. In fact, markups seem to be neither purely multiplicative nor purely additive, but rather, some combination of both. Typically, the markup between the 1 to 10 gram level and the 0 to 1 gram level is additive, while the markups between all other levels are multiplicative.³ However, short-term disturbances at the upper distribution levels seem to have amplified effects on retail level prices, which quickly disappear as equilibrium is reestablished at the upper distribution levels.⁴

These two figures reinforce conclusions reached by others.⁵ As noted, at any time, import prices must be less than the lowest price shown in figure 1. Evidently the high price of cocaine results mostly from costs incurred by domestic dealers who must contend with the inefficiencies of illicit markets and the threat of both other dealers and the police. Nevertheless, it would be mistaken to infer that routine source country and interdiction programs have little or no effect on street prices, because at least part of the price markup appears to be a multiple of the importation prices. Furthermore, episodic source country and interdiction programs have had demonstrable but transitory effects on the retail-level cocaine prices.

We estimated the size of the multiplier using a variety of statistical models. Some of these are described in section 6 of the appendix. Although the estimates are necessarily rough, the models indicate that from 10 to 20 percent of the current retail price is multiplicative and thus an interdiction event able to permanently increase border prices by 10% would permanently increase retail prices by one to two percent.

³ A plot of the differences in prices between consecutive distribution levels is constant between 0-1 grams and 1-10 grams, but decreases for all other differences. A plot of the ratio of prices between consecutive distribution levels increases between 0-1 grams and 1-10 grams, but is constant for all other ratios. These conclusions hold only for plots after 1988.

⁴ Explanations are speculative, but possibly dealers tend to honor contracted prices even when cocaine becomes temporarily scarce. In contrast, given limited supplies, retail-level dealers charge whatever the market will bear.

Figure 3 shows trends in cocaine purity when cocaine is transacted at different distribution levels. Because the lines blend together during recent years, patterns get muddled, but some conclusions are clear. At the highest distribution level, cocaine is routinely bought and sold at roughly 90 percent purity. The purity decreases at lower distribution levels, but even at those levels, cocaine is usually 70 to 80 percent pure. (This is only true after 1988, about the time when crack cocaine began to dominate the market.) However, cocaine is not necessarily more pure at higher distribution levels. This may result from crack cocaine being "cooked" from powder cocaine, resulting in a product of increased purity at the retail level.⁶

Another point is, while the purity of cocaine sold at the highest distribution levels remains relatively constant, cocaine shortages seem to have caused lower-level dealers to cut their product's purity periodically. Note that those transient decreases in purity correspond to temporary increases in prices, as shown in figures 1 and 2.

Heroin Prices

Figures 4 through 6 are the heroin counterparts to figures 1 through 3. They report prices for heroin distributed at five levels:

- 0 to 0.1 pure grams
- 0.1 to 1 pure grams
- 1 to 10 pure grams
- 10 to 100 pure grams
- 100 pure grams and more

Figure 4 shows that heroin prices have fallen at all distribution levels for nearly two decades. Looking at figures 4 and 5 together, the price decrease is least pronounced for low-level heroin sales, and it is most pronounced for high-level heroin sales. As reported

⁶ Caulkins, J. and Reuter, P. "What Price Data Tell Us about Drug Markets" *Journal of Drug Issues* 28(3): 593-612.

here, prices for the lowest-level sales are estimated for 40 pure milligrams purchases (that is, about 0.3 grams of bulk heroin at 13 percent purity). Such a quantity and purity seems most suitable for injection drug use, implying that injection drug users have experienced a relatively modest decrease in heroin prices. For them, heroin costs roughly \$3.00 to \$3.50 per pure milligram in the early 1980s and \$1.75 to \$2.25 per pure milligram in the late 1990s. Put another way, these numbers suggest that a \$20 bag of heroin contained about 6 pure milligrams in the early 1980s and about 10 pure milligrams in the later 1990s:

Price markups are neither purely additive nor purely multiplicative. However, figure 5 suggests that the price markup is primarily multiplicative at the upper distribution levels and mostly additive at the lowest distribution levels.⁷

Unlike cocaine, the heroin price curves show no apparent high-level disruptions that cascade through to low level sales. Before concluding that the heroin distribution system is inherently different from the cocaine distribution system, however, note that the heroin price series seems to suffer from greater quarter-to-quarter random variation than its cocaine counterpart. This partly results from a smaller number of heroin purchases than cocaine purchases in the STRIDE data.

Figure 6 shows the average purity of heroin transacted at five distribution levels. The purity of heroin has remained relatively constant when transacted in lots of 10 pure grams and more. For amounts less than 10 pure grams, dealers cut the drug before resale; however, over the last two decades heroin has been sold at increasing purity among lower level dealers, and between them and final customers. Most of the increase in the purity of heroin sold at retail seems to have happened before 1995, as the purity of heroin has remained fairly constant since then.⁸

⁸ Future models will distinguish between powder and crack cocaine.

⁷ A plot of the differences in prices between consecutive distribution levels is constant between 0-0.1 grams and 0.1-1 grams, but decreases for all other differences. A plot of the ratio of prices between consecutive distribution levels increase between 0-0.1 grams and 0.1-1 grams, but is constant for all other ratios.

Methamphetamine Prices

Figures 7 through 9 are the methamphetamine counterparts to figures 1-3 (cocaine) and figures 4-6 (heroin). They report prices for methamphetamine distributed at three levels:

- 0 to 10 pure grams
- 10 to 100 pure grams
- 100 pure grams and more

The STRIDE data provide fewer examples of methamphetamine purchases than they do for cocaine and heroin purchases. As a result, methamphetamine price series exhibit a greater sampling variation, and distinguishing trends is more difficult. However, some trends are apparent. Figures 7 and 8 show that methamphetamine prices have declined over the past two decades, and by roughly the same percentage for all distribution levels. In other words, price markups appear to be multiplicative for this drug. Prices for the lowest-level sales (estimated at 3 pure grams – about three quarters of a bulk gram at 40 percent purity) were roughly \$290 in the early 1980s and \$175 in the late 1990s. At the next highest level of distribution (estimated at 31 pure grams – about 78 bulk grams at 55 percent purity) prices were roughly \$110 in the early 1980s and \$60 in the late 1990s. As in the case of heroin, disruptions in high-level price curves do not appear to cascade through to low-level sales.

Figure 9 shows the average purity of methamphetamine transacted at three distribution levels. The relatively small number of data points results in considerable sampling variation from quarter to quarter, but patterns still emerge. As expected, the purity of methamphetamine was higher for higher levels of distribution. Purity appeared to decrease in 1990 but returned to previous levels within a few years. Beyond this, there was no discernable trend over the two decades.

⁸ Heroin may be increasingly transacted at higher purity at retail despite these figures. This could happen if customers increasingly buy heroin at the 0.1 to 1 pure gram level instead of at the 0 to 0.1 pure gram level.

Marijuana Prices

As in the case of methamphetamine, there are relatively few marijuana purchases in STRIDE, so distinguishing trends is relatively difficult. Another problem is that the DEA does not test marijuana for THC content, so there is no marijuana counterpart to the pure grams reported for cocaine and heroin. The difficulty this causes is that STRIDE data provide no basis for adjusting price changes for marijuana's quality.

Figure 10 is the counterpart to figures 1 (cocaine), 4 (heroin) and 7 (methamphetamine), and figure 11 provides the same information on a logarithmic scale. These two figures report price estimates for marijuana distributed at four levels:

- 0 to 10 bulk grams
- 10 to 100 bulk grams
- 100 to 1000 bulk grams
- 1000 bulk grams and more

The lowest level price is estimated for a 3.1 gram purchase of marijuana. A typical joint probably weighs somewhere around one-half gram, so this purchase might represent about six joints. Dividing the typical prices observed during the past few years by six suggests that a joint cost about \$2.50 during the later 1990s. The same joint (ignoring quality differences) probably cost about \$1.25 to \$1.50 in the early 1980s.

The second lowest price level is evaluated for a purchase of 35 grams, which is slightly more than an ounce. Many marijuana users buy the drug in ounce bundles, so prices estimated for this level probably represent retail level purchases, albeit relatively large ones and certainly many sales among dealers. A purchase at the ounce level probably cost about \$150 in the late 1990s. It probably cost more like \$80 in the early 1980s.

Appendix: Statistical Methods

1. STRIDE

The analysis reported here is based on the System To Retrieve Information from Drug Evidence (STRIDE) database, which contains data on illicit drug purchases from the first quarter 1981 through the second quarter 1998. Over this time period, the DEA recorded the price, weight, purity, location and date of 103,122 transactions of cocaine (66,745), heroin (26,046), methamphetamine (7,148) and marijuana (3,183).

2. Variables

To model the purchase price as a function of amount purchased, we standardized both price and amount. Except for marijuana, *amount* was expressed in pure grams and *price* was expressed in current (Q2 1998) dollars per pure gram. In the case of marijuana, the purity (THC content) was absent from the STRIDE database, so we expressed amount and price in terms of bulk grams and current dollars per bulk gram.

Other variables thought to affect purchase price were *purity* (0 to 1), *time* (70 quarters from Q1 1981 to Q2 1998), *city* (29 large U.S. cities and the Rest of U.S.), and *distribution level* (several levels defined in terms of standardized amount). The precise definition of the levels of distribution depends on the drug, but the intention was to distinguish purchases that were predominantly retail (Level 1) from those involving dealers (Level 2 and above). The levels, inclusive of the upper limit, were as follows: cocaine (0 to 1, 1 to 10, 10 to 100, 100 to 500, and >500 pure grams); heroin (0 to 0.1, 0.1 to 1, 1 to 10, 10 to 100, and >100 pure grams); methamphetamine (0 to 10, 10 to 100, and >100 pure grams); marijuana (0 to 10, 10 to 100, 100 to 1,000, and >1,000 bulk grams).

3. The Model for Price

For each drug and each level of distribution, we regressed standardized price against standardized amount, purity, time and city. For the reason just outlined, purity was not included in the model for marijuana. Because price changes over short periods of time are of interest, both time and city were treated as factors (with 70 and 30 levels respectively). Had time been treated continuously, means estimated by the model would not have exhibited short-term fluctuations in price.

The regression model took the form of a generalized linear model with log link function, logarithmic predictors, and constant coefficient of variation (McCullagh and Nelder, 1989, ch. 8). This model implies the following mean and variance specifications:

$$E(\text{price}_{ij}) = \exp(\alpha + \text{city}_i + \text{time}_t + \beta \log(\text{amount}_{ij}) + \gamma \log(\text{purity}_{ij})) \quad (1)$$

$$V(\text{price}_{ij}) = \phi E^2(\text{price}_{ij}) \quad (2)$$

In these expressions, price_{ij} represents the j th observation from the i th city at the t th time period, with covariate values amount_{ij} and purity_{ij} . $E(\text{price}_{ij})$ is the mean value of price_{ij} , and $V(\text{price}_{ij})$ is its variance. ϕ is a dispersion parameter analogous to σ^2 in a linear model based on least squares.

Estimation and inference for the above model was carried out via the method of quasi-maximum likelihood. Under distributional assumptions involving only the first two moments (those embodied in (1) and (2)), quasi-maximum likelihood estimates are consistent and asymptotically normal, and they are also optimal among a large class of estimators (McCullagh and Nelder, 1989, ch. 9). Residual analysis supported the adequacy of the specifications given by (1) and (2), although consistency and asymptotic normality hold even when the variance function is incorrectly specified (Fahrmeir and Tutz, 1994, pp.52-55).

Incidentally, several of the distributions commonly used to fit multiplicative models like (1) do in fact have variance functions like (2). These include the gamma, lognormal,

loglogistic and Weibull distributions (Lawless, 1982, ch.1). Estimation and inference for these models is usually carried out via the method of maximum likelihood. In contrast to quasi-maximum likelihood, maximum likelihood yields consistent estimates only when the assumed distribution coincides with the true distribution. In this setting, the only exception applies when a gamma distribution is assumed, because in this case maximum likelihood estimates and quasi-maximum likelihood estimates are identical. This coincidence occurs because the gamma distribution is the unique exponential family member with variance function (2), the constant ϕ now being the exponential family dispersion parameter.

Tables 1 through 4 list the average purchase price and parameter estimates associated with $\log(\text{amount})$, β , and $\log(\text{purity})$, γ , for each level of distribution. The figures in parentheses are standard errors. As expected, the price per pure gram (price per gram for marijuana) falls with distribution level. Also, the magnitude of β tends to decrease, and the magnitude of γ tends to increase, with an increase in distribution level.

Table 1. Mean Price and Parameter Estimates for Cocaine

Level of Distribution	N	Average Price per Pure Gram	β	γ
Less than 1 pg	15028	318.978	-0.274(0.005)	-0.814(0.008)
1 to 10 pg	18388	188.793	-0.280(0.004)	-0.655(0.008)
10 to 100 pg	25658	90.459	-0.152(0.003)	-0.803(0.005)
100 to 500 pg	2478	49.478	-0.178(0.009)	-0.848(0.020)
More than 500 pg	853	38.838	-0.006(0.015)	-1.203(0.055)

Table 2. Mean Price and Parameter Estimates for Heroin

Level of Distribution	N	Average Price per Pure Gram	β	γ
Less than .1 pg	6680	3893.828	-0.411(0.008)	-0.351(0.008)
.1 to 1 pg	8162	1448.595	-0.270(0.009)	-0.291(0.007)
1 to 10 pg	4771	983.410	-0.253(0.011)	-0.304(0.010)
10 to 100 pg	2890	433.774	-0.154(0.011)	-0.578(0.015)
More than 100 pg	311	249.539	-0.114(0.037)	-0.607(0.078)

Table 3. Mean Price and Parameter Estimates for Methamphetamine

Level of Distribution	N	Average Price per Pure Gram	β	γ
Less than 10 pg	3492	321.058	-0.278(0.005)	-0.817(0.011)
10 to 100 pg	1975	103.471	-0.288(0.015)	-0.783(0.017)
More than 100 pg	488	40.177	-0.101(0.026)	-0.833(0.044)

Table 4. Mean Price and Parameter Estimates for Marijuana

Level of Distribution	N	Average Price per Gram	β
Less than 10 g	1321	13.528	-0.878(0.019)
10 to 100 g	647	8.811	-0.121(0.027)
100 to 1000 g	778	3.417	-0.284(0.025)
More than 1000 g	195	1.998	-0.134(0.032)

4. The Model for Purity

Given sufficient data, we could have estimated the mean purity for each city in each quarter by its sample mean. For a given quarter, a weighted average of these 30 city sample means would have provided a sensible quarterly estimate for the mean purity in the U.S. for that quarter. However, given 30 cities and 70 quarters, this would require

2,100 sample means for each level of distribution for each drug, and this requirement goes well beyond the resources of the STRIDE database. This section describes a feasible alternative.

In order to estimate 2,100 cell means from a database containing less than 2,100 cells of data, some form of modeling is necessary. The linear model provides a straightforward possibility:

$$E(\text{purity}_{it}) = \alpha + \text{city}_i + \text{time}_t \quad (3)$$

$$V(\text{purity}_{it}) = \sigma^2 \quad (4)$$

However, both of these specifications are implausible for the purity data. First, the mean purity must lie in the unit interval, but (3) does not impose this restriction. Second, the variance of purity depends on its mean (it is higher around 0.5 than 0.9), but this is not embodied in (4). The first problem was particularly important for our data, as the linear model gave impossible estimates for purity for several cities in several quarters. We avoided both problems by working with a quasi-binomial model and regarding a purity measurement as a realization from a quasi-binomial experiment.

A purity measurement for a given purchase was obtained in a laboratory by analyzing a small sample of the purchase. To construe this measurement as an outcome of a binomial experiment (even though the actual measurement process may have proceeded along different lines), let the small sample constitute a three dimensional grid of m cells, and let y be the number of pure cells. Then y follows a binomial(m, p) distribution, and $p = y/m$ is the observed proportion of pure cells, that is, the purity. The analysis of purity can now be carried out via a binomial model because each purity observation corresponds to a binomial observation. For example, if a purchase had an observed purity of 0.8 then, if m was 1,000, we have effectively observed 800 events in 1,000 trials.

The problem is that the value of m is unknown. While a purity measurement of 0.8 is consistent with obtaining 800 events in 1,000 trials, it is also consistent with obtaining 8

events in 10 trials, but these two binomial observations convey different information. However, if we assume the value of m is the same for all purchases (i.e. that the size of the small sample used in the laboratory analysis was the same size for all purchases), any choice of m will suffice provided the variance function incorporates a dispersion parameter. That is, estimation and inference based on an *overdispersed* binomial model is invariant to the choice of m . Thus, our mean and variance functions for purity were:

$$E(\text{purity}_{ij}) = \exp(\alpha + \text{city}_i + \text{time}_r) / (1 + \exp(\alpha + \text{city}_i + \text{time}_r)) \quad (5)$$

$$V(\text{purity}_{ij}) = \phi \{ E(\text{purity}_{ij})(1 - E(\text{purity}_{ij})) \} / m \quad (6)$$

Here, purity_{ij} represents the j th observation from the i th city at the r th time period, and ϕ is the dispersion parameter. Equation (5) specifies a logistic model, because the inverse of the mean function is the logit function. In contrast to the linear model (3), the logistic model restricts the mean purity to the unit interval.

5. City Weights

The price and purity models described above provided 101 and 99 parameter estimates respectively, and based on these, we derived mean estimates for price and purity for each city in each quarter. For a given quarter, the 30 city means were multiplied by their respective weights, and the sum of these terms provided weighted estimates for the mean price and mean purity in the U.S. for that quarter.

Weighting was necessary because the STRIDE database was not designed to be representative of drug purchases across the U.S. For example, STRIDE over-represented cocaine purchases in Washington D.C. and under-represented those in Los Angeles.

Weighting seeks to remedy this situation. The required weight for a given city in a given quarter is the proportion of U.S purchases made in that city in that quarter.

Unfortunately, these weights are unavailable, and it was necessary to estimate weights via a surrogate variable. We used Drug Abuse Warning Network (DAWN) emergency-event

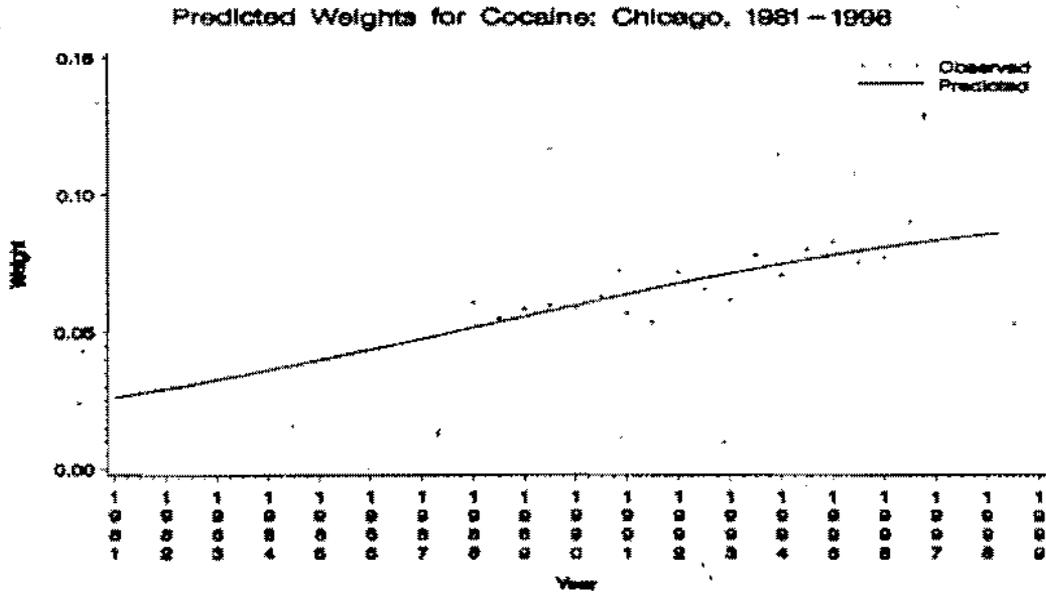
counts as a surrogate variable. These counts were compiled by the Substance Abuse and Mental Health Services Administration (SAMHSA) on a semi-annual basis over the period 1988-1996 for 21 of our 29 cities and for a Rest of U.S. category. We paired eight DAWN cities with the eight cities that were excluded from DAWN and imputed counts for the latter cities in proportion to their population. For example, Dallas, a DAWN city, was paired with Houston, a non-DAWN city. In the first half of 1988, Dallas had a population of 2,566,124 and a cocaine emergency-event count of 823. At that time, Houston had a population of 3,274,963, so its imputed cocaine emergency-event count was 1,050.

We fit a Poisson regression model to this 'extended' DAWN database (18 semi-annual emergency-event counts from 1988 through 1996 for 29 cities plus the Rest of U.S.) to obtain modeled counts for the 70 quarters from Q1 1981 through Q2 1998 for each city. The modeled weights were then calculated from the modeled counts in such a way that the weights in a given quarter summed to one. Note that had a model been applied directly to the observed weights (i.e. observed counts for a city divided by the total observed counts), the resulting modeled weights would not have generally summed to one. The mean and variance expressions for the Poisson regression model for a given city were:

$$E(\text{Price}_t) = \exp(\alpha + \beta \text{Time}_t) \quad (7)$$

$$V(\text{Price}_t) = \phi E(\text{Price}_t) \quad (8)$$

Modeling the weights achieved two objectives. Firstly, it smoothed over the random fluctuations in quarters where data existed, and secondly, it provided estimates (extrapolations and interpolations) in quarters where data was unavailable. The graph below shows the modeled and observed weights for Chicago. The modeled weights appeared reasonable overall, particularly given that the length of the required extrapolation was as long as the range of observable data.



6. Retail Price as a function of Border Price

It is of interest to know how cocaine prices at the retail level (distribution level 1) vary with cocaine prices at the border level (distribution level 5). We experimented with a variety of models having additive and multiplicative components and two of these are described below. All models gave broadly similar conclusions: we estimate that from 10 to 20 percent of the current retail price is multiplicative and thus an interdiction event able to permanently increase border prices by 10% would permanently increase retail prices by one to two percent.

The simplest model having an additive and multiplicative components is:

$$E(\text{retail}_t) = \alpha + \beta \text{border}_t \quad (9)$$

$$V(\text{retail}_t) = \sigma^2 \quad (10)$$

where retail_t is the estimated mean retail price at the t th time period and border_t is the estimated mean border price at that time period. The parameter α could be interpreted as the additive component and the parameter β could be interpreted as the multiplicative component. Time periods are measured in quarters beginning at the second quarter of

1983 (i.e. $t = 0, 1, \dots, 60$ for Q2 1983, Q3 1983, ..., Q2 1998). We chose the second quarter of 1983 (rather than the first quarter of 1981) as the starting period because both retail and border price series had complete data from this time period onward. The estimated means are those obtained from the price model and presented in Table 1.

To accommodate an increasingly competitive cocaine market over the period 1983 to 1998, we permitted the additive component to change over time. In addition, we allow for the fact that some of the means were more precisely estimated than others because they were based on larger numbers of individual retail purchases. Thus, instead of (9) and (10), the mean and variance specifications actually used were:

$$E(\text{retail}_t) = \alpha + \gamma \text{time}_t + \beta \text{border}_t \quad (11)$$

$$V(\text{retail}_t) = \sigma^2/n_t \quad (12)$$

The fitted version of (11) was:

$$E(\text{retail}_t) = 209.04 - 1.43 \text{time}_t + 1.33 \text{border}_t \quad (13)$$

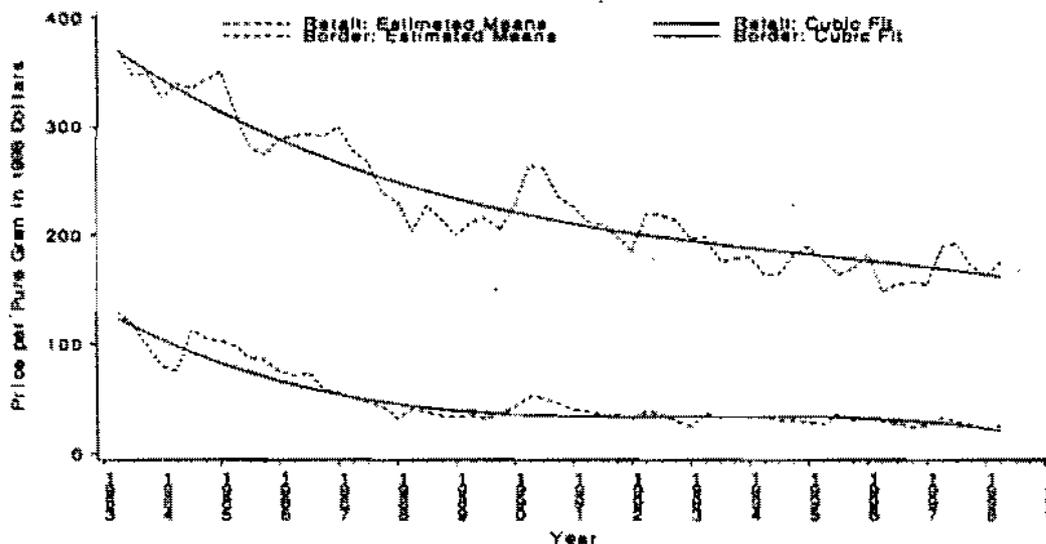
so the predicted retail price in Q2 1983 is $209.04 + 1.33$ times the border price in Q2 1983, and the predicted retail price in Q2 1998 is $294.84 + 1.33$ times the border price in Q2 1998. The average border price in 1998 was about \$24 per pure gram, so the equation implies that the retail price should have been about \$155.1, and this compares with the observed average retail price of about \$169 (Table 1). According to this model, 79% of the current retail price is additive and the remaining 21% depends on the border price in a multiplicative way. It follows that a 10% increase in the border price would result in a 2.1% increase in the retail price.

Caution is required when interpreting these results because interdiction not only increases producer/dealer costs but also causes short-term shortages in cocaine's availability. It is possible that these shortages appear to cause spikes in retail prices, not just because high-

level dealers are passing costs on to lower-level dealers, but also because lower-level dealers are extracting short-term monopoly profits from retail-level customers.

To reduce the possible bias that short-term shortages have on the estimate of the multiplier, we smoothed the data by applying a cubic model to the retail mean prices and border mean prices, and then estimated the regression model based on these cubic fits rather than the means themselves. The means and cubic fits are shown in the figure below.

Cubic Fit of Estimated Retail and Border Prices for Cocaine



When applied to the cubic fits, the estimated regression model was:

$$E(\text{retail}_t) = 222.63 - 1.64\text{time}_t + 1.22\text{border}_t \quad (14)$$

Equation 14 gives a similar conclusion to equation 13. We now estimate that 19% of the current retail price is multiplicative and thus an interdiction event able to permanently increase border prices by 10% would permanently increase retail prices by 1.9%.

7. Outliers

The STRIDE database contained many purchases that a researcher familiar with the illicit drug market would deem incorrect. These were removed under the guidance of Dr. Dana Hunt, an expert at Abt Associates. Table 5 lists the criteria for deletion. Purchases with extremely low purities were deleted because it seemed likely that the buyer was deceived; low purities imply a low ratio of price per gram to price per *pure* gram. In other cases, purchases were disregarded because an inordinately high price per bulk gram indicated a recording error.

Table 5. Criteria for Deleting Data Point by Drug

Drug	Dollars per pure gram	Purity	Nominal price (\$)	Bulk grams
Cocaine	> 3,000	< 0.1	< 3	< 0.1
Heroin	>10,000	< 0.02	< 3	< 0.1
Methamphetamine	> 3,000	< 0.1	< 3	< 0.1
Marijuana	> 100	-	< 0.1	< 0.2

In addition to the above gross discrepancies, many prices were reasonable at *some* transaction size and purity, but were unreasonable given the actual amount and purity of the purchase at hand. For example, \$100 per pure gram of heroin is not an unreasonable price for a purchase of one pure kilo, but it is extremely low for a purchase of one tenth of a pure gram. A purchase was deleted if the residual price - the difference between the observed price and predicted price (given the amount, purity, city and quarter) - was sufficiently large.

In order to gauge the degree of discrepancy, it is necessary to know the distribution of residual prices. For normal linear models, the standardized residuals (residuals divided by their standard errors) follow a standard normal distribution and the probability of a large residual is easily calculated. For generalized linear models, the deviance residuals can be used in a similar way (McCullagh and Nelder, 1989, pp. 37-40).

We set the probability of deleting good data to 0.002 and deleted purchases with prices outside this threshold. Experiments with simulated data indicate that further iteration improves our ability to detect outliers. This occurs because the distribution of deviance residuals in the first iteration is artificially dispersed because of the presence of inordinately extreme residuals which will be absent from the second iteration. We iterated until no further outliers could be detected, typically performing five to ten iterations.

Table 6 summarizes the effect of our successive approaches to outlier deletion. The first row gives the initial STRIDE sample, the second row shows the effect of removing gross outliers by the criteria listed in Table 5, and the third row shows the effect of further outlier removal by model-based methods. The second row has 2 to 11 percent less data than the first row, and the third row has 4 to 7 percent less data than the second row.

The effect of removing gross outliers and extreme residuals depended on the drug and distribution level, but some general patterns emerged. The removal of gross outliers dramatically reduced (by orders of magnitude) the mean price per pure gram and mean price per gram. The effect of the subsequent removal of extreme residuals was to decrease mean prices by a further 6% on average, although the effect was occasionally in the opposite direction (mean prices for Level 4 cocaine and Level 5 heroin increased by 2% and 11% respectively).

The effect of the removal of extreme residuals on parameter estimates associated with $\log(\text{amount})$, $\log(\text{purity})$, and the ratio of Q2 1998 prices to Q1 1981 prices (denoted here by β , γ and τ) was varied. For some drugs and distribution levels, the magnitude of the parameter estimates increased and for others they decreased. In no case was a statistically significant change in sign observed; except for τ in the case of marijuana, all parameters were negative with or without the inclusion of extreme residuals. Also, there was a tendency for β and γ to offset each other in the sense that β increased when γ decreased, and conversely.

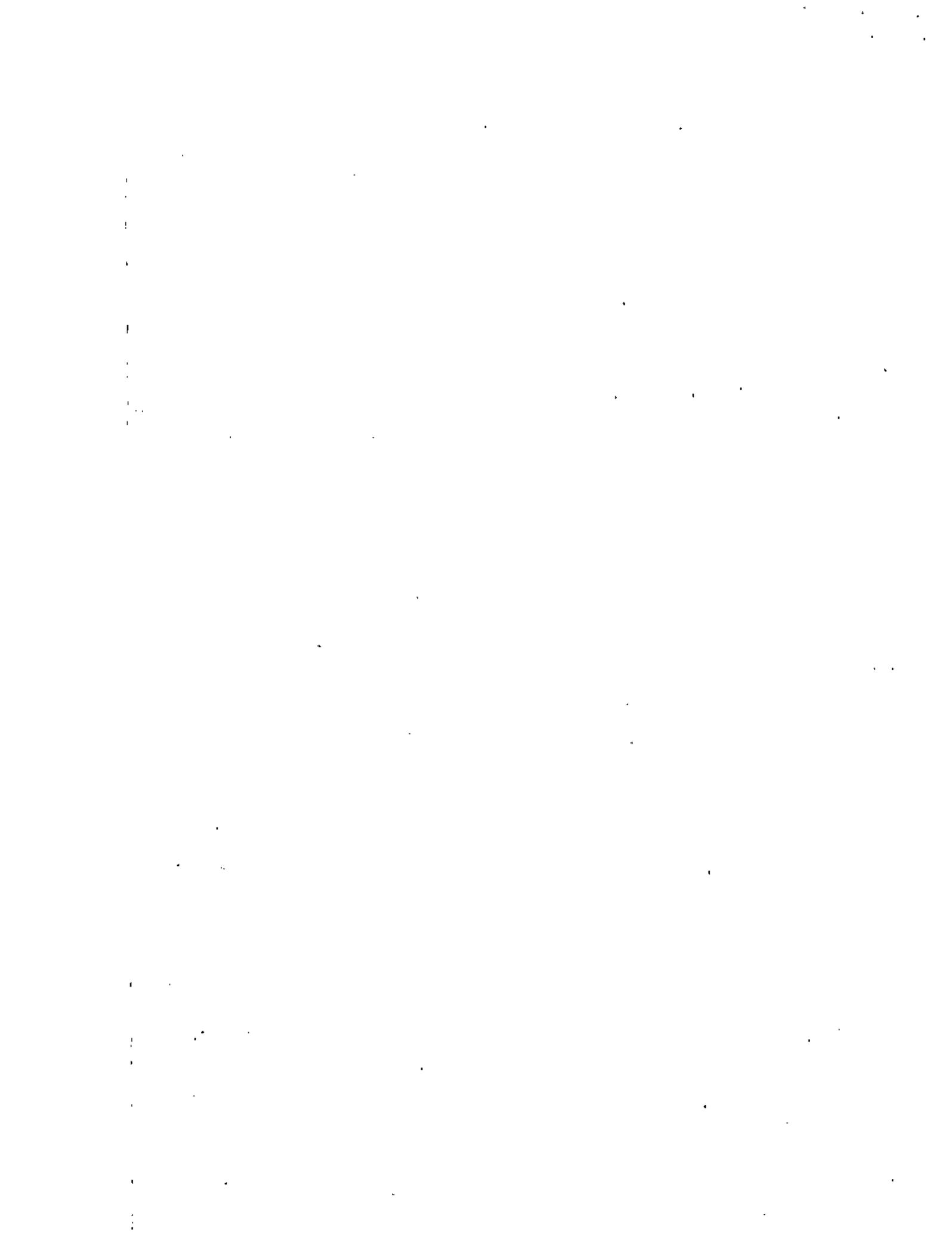


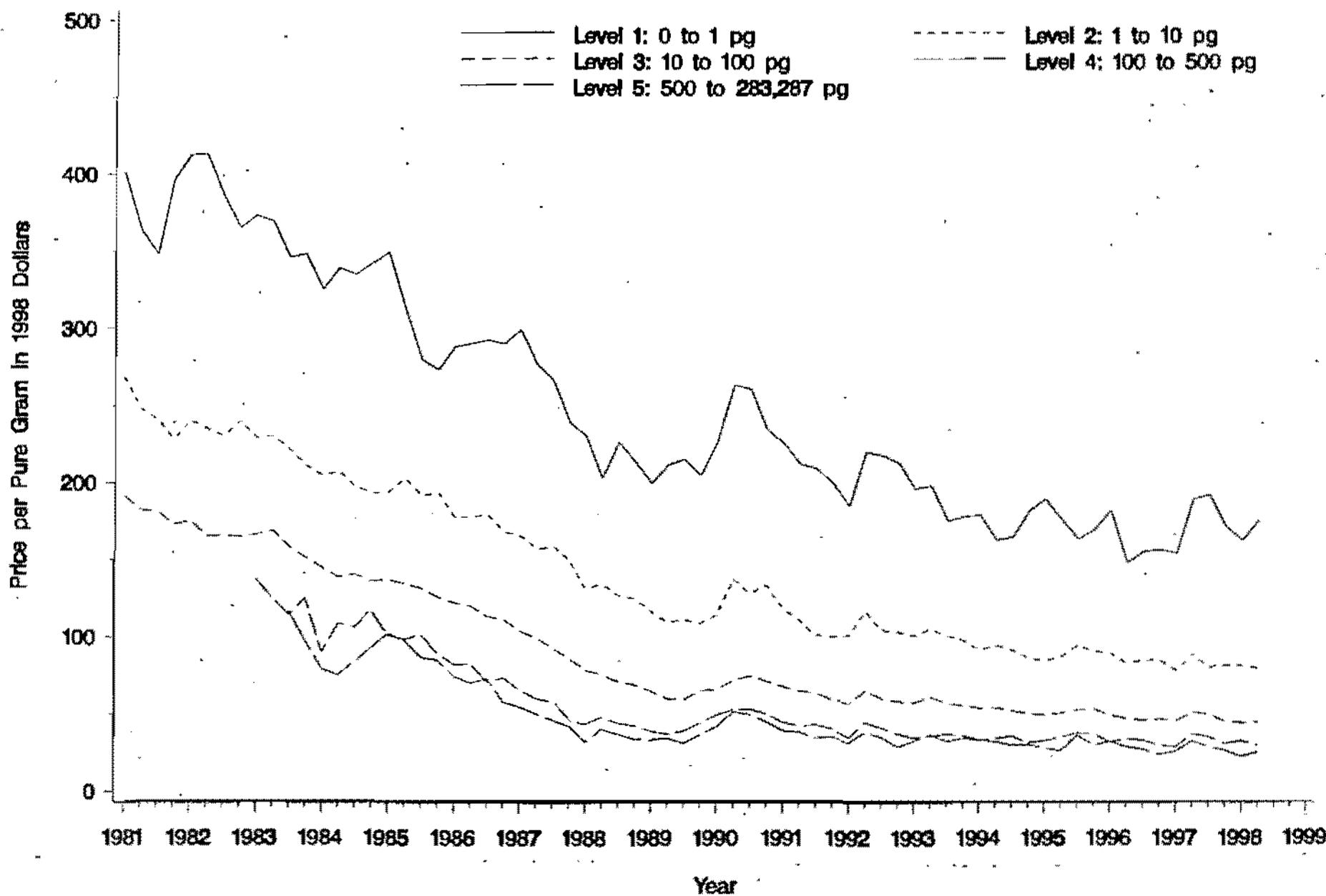
Table 6. The Effect of Outlier Deletion on Sample Size

	Cocaine	Heroin	Meth.	Marijuana
Initial STRIDE sample	68,745	26,046	7,148	3,183
Sample after removing gross outliers	65,125	23,965	6,369	3,109
Sample after removing extreme residuals	62,383	22,814	5,953	2,939

References

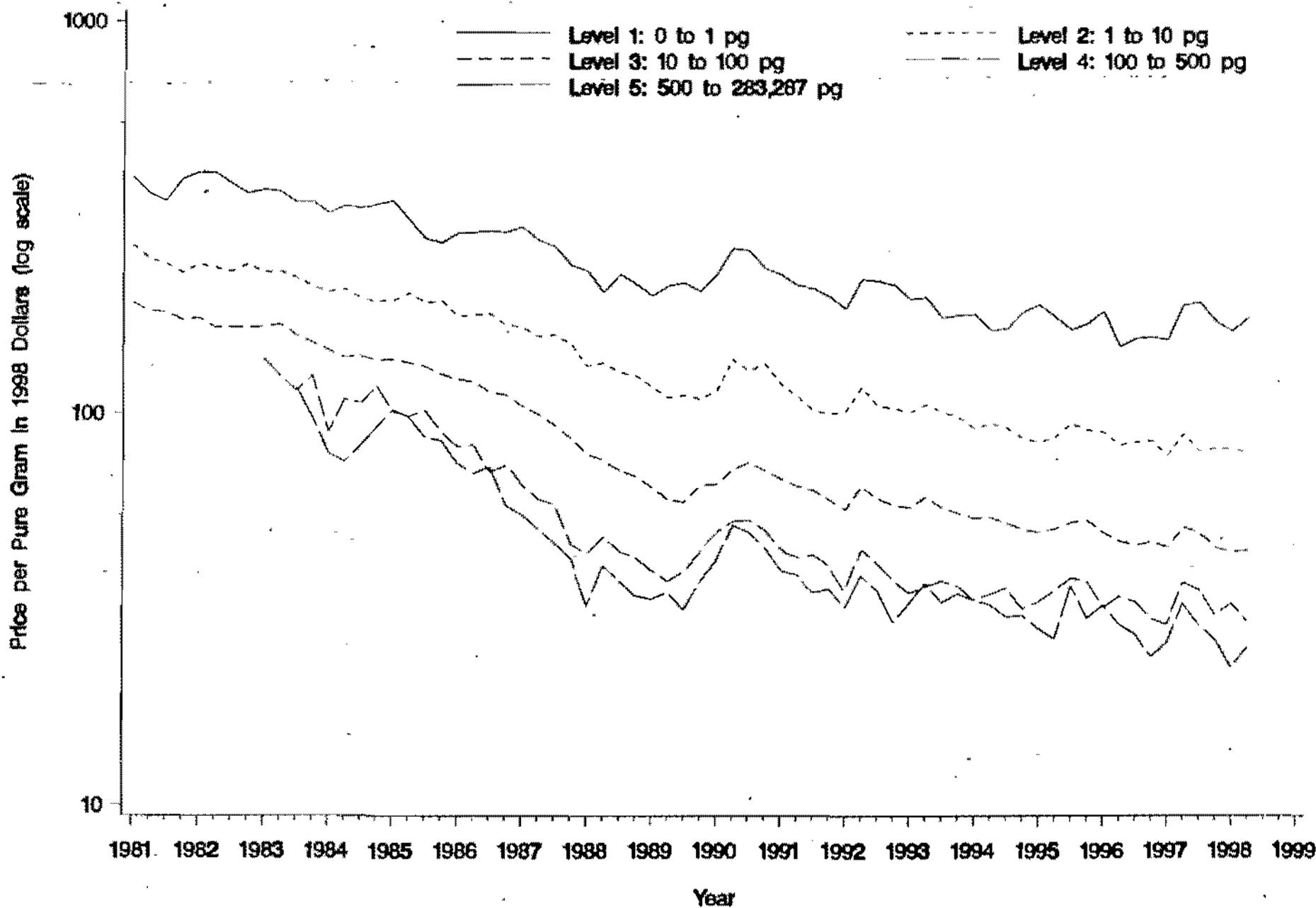
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Figure 1. Estimated Price per Pure Gram of Cocaine at Five Levels of Distribution



Note: Prices are based at mean sizes (0.35pg, 4.4pg, 30pg, 198pg, 1,696pg) and purities (67%, 63%, 72%, 81%, 87%)

Figure 2. Estimated Price per Pure Gram of Cocaine at Five Levels of Distribution (log scale)



Note: Prices are based at mean sizes (0.36pg, 4.4pg, 30pg, 198pg, 1,696pg) and purities (67%, 63%, 72%, 81%, 87%)

Figure 3. Estimated Purity for Cocaine at Five Levels of Distribution

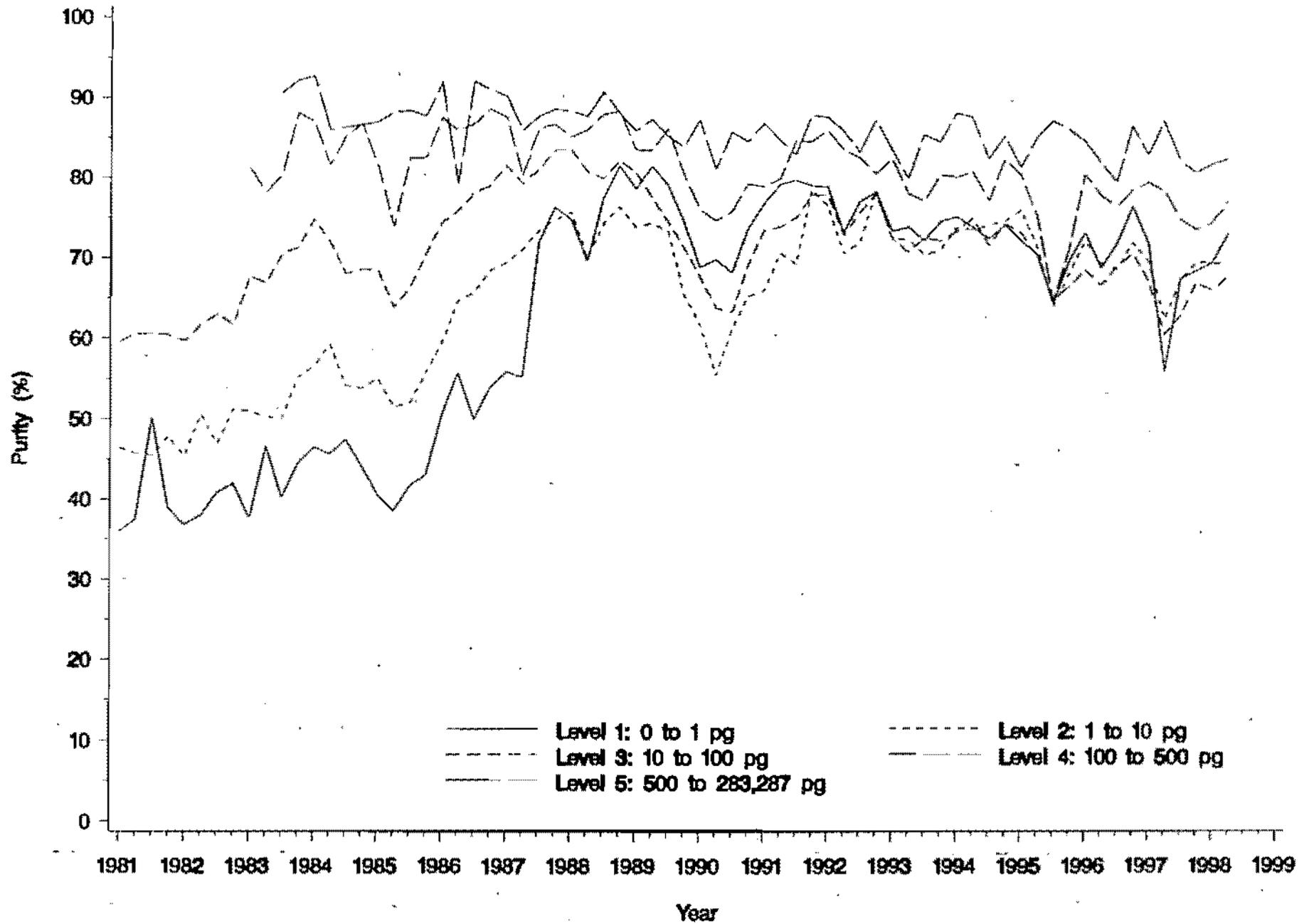
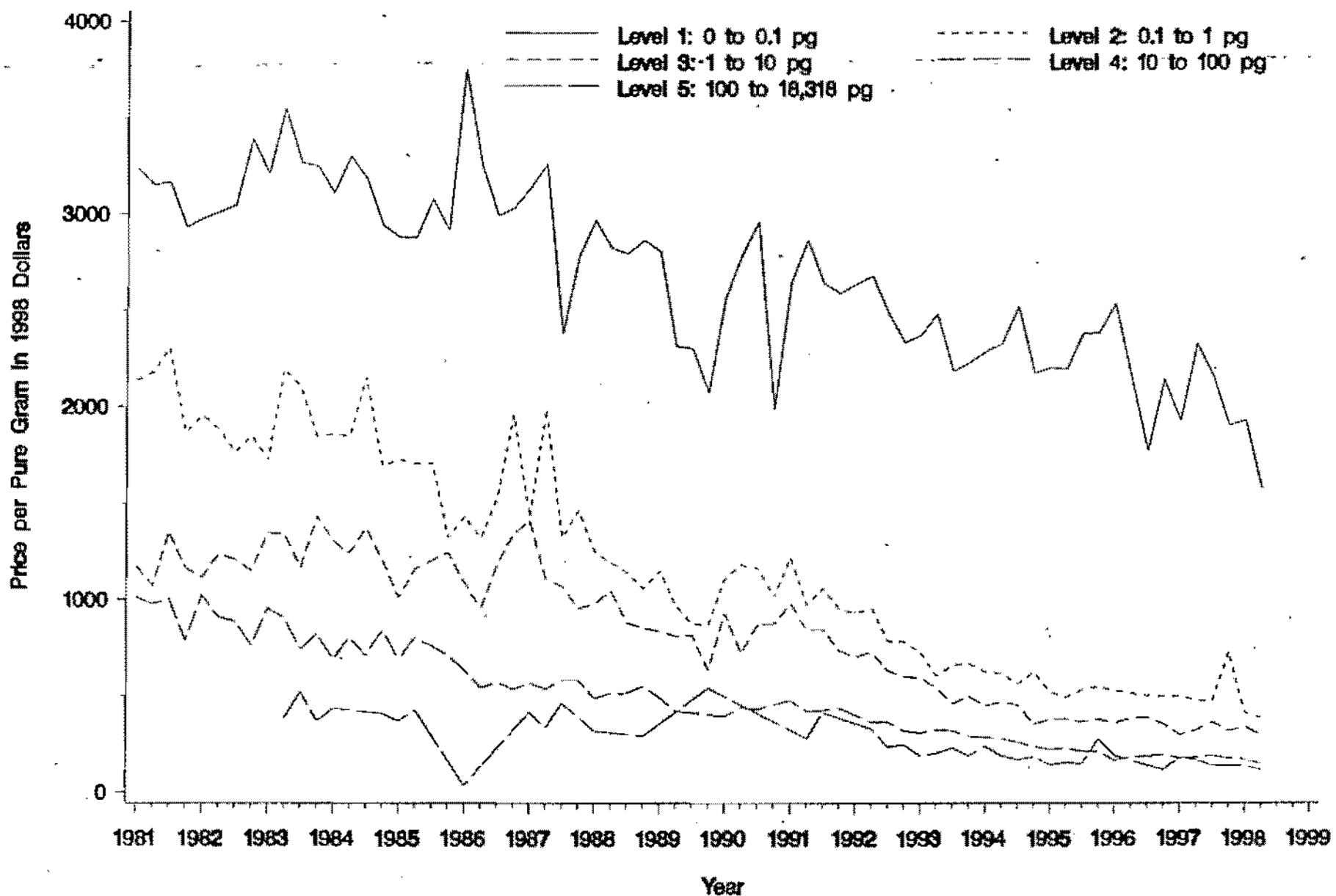
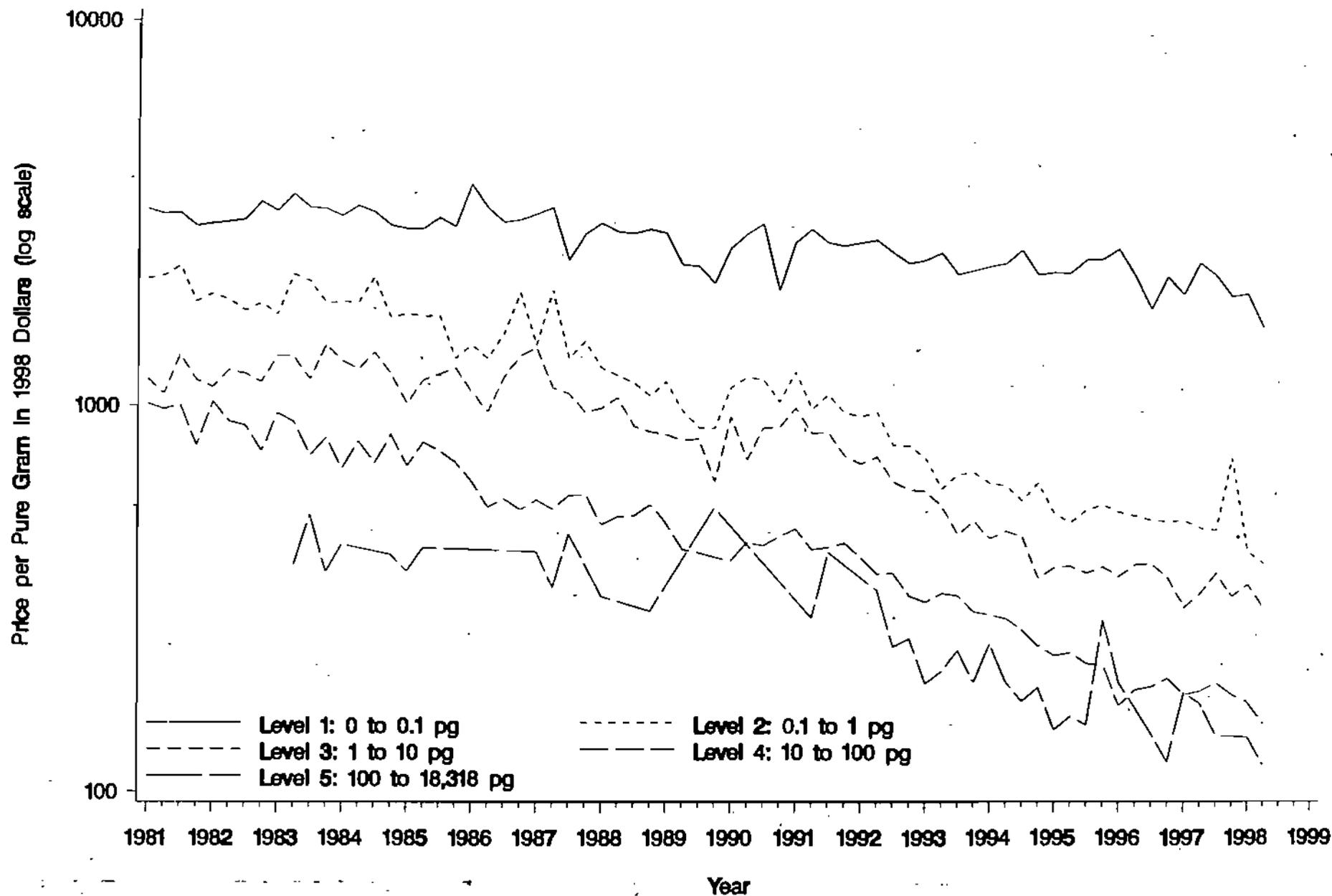


Figure 4. Estimated Price per Pure Gram of Heroin at Five Levels of Distribution



Note: Prices are based at mean sizes (0.04pg, 0.34pg, 4.1pg, 27pg, 368pg) and purities (13%, 33%, 39%, 59%, 73%)

Figure 5. Estimated Price per Pure Gram of Heroin at Five Levels of Distribution (log scale)



Notes: Prices are based at mean sizes (0.04pg, 0.34pg, 4.1pg, 27pg, 358pg) and purities (13%, 39%, 39%, 59%, 73%)

Note: The value for Level 5, first quarter 1986, was excluded to enhance the general visual effect

Figure 6. Estimated Purity for Heroin at Five Levels of Distribution

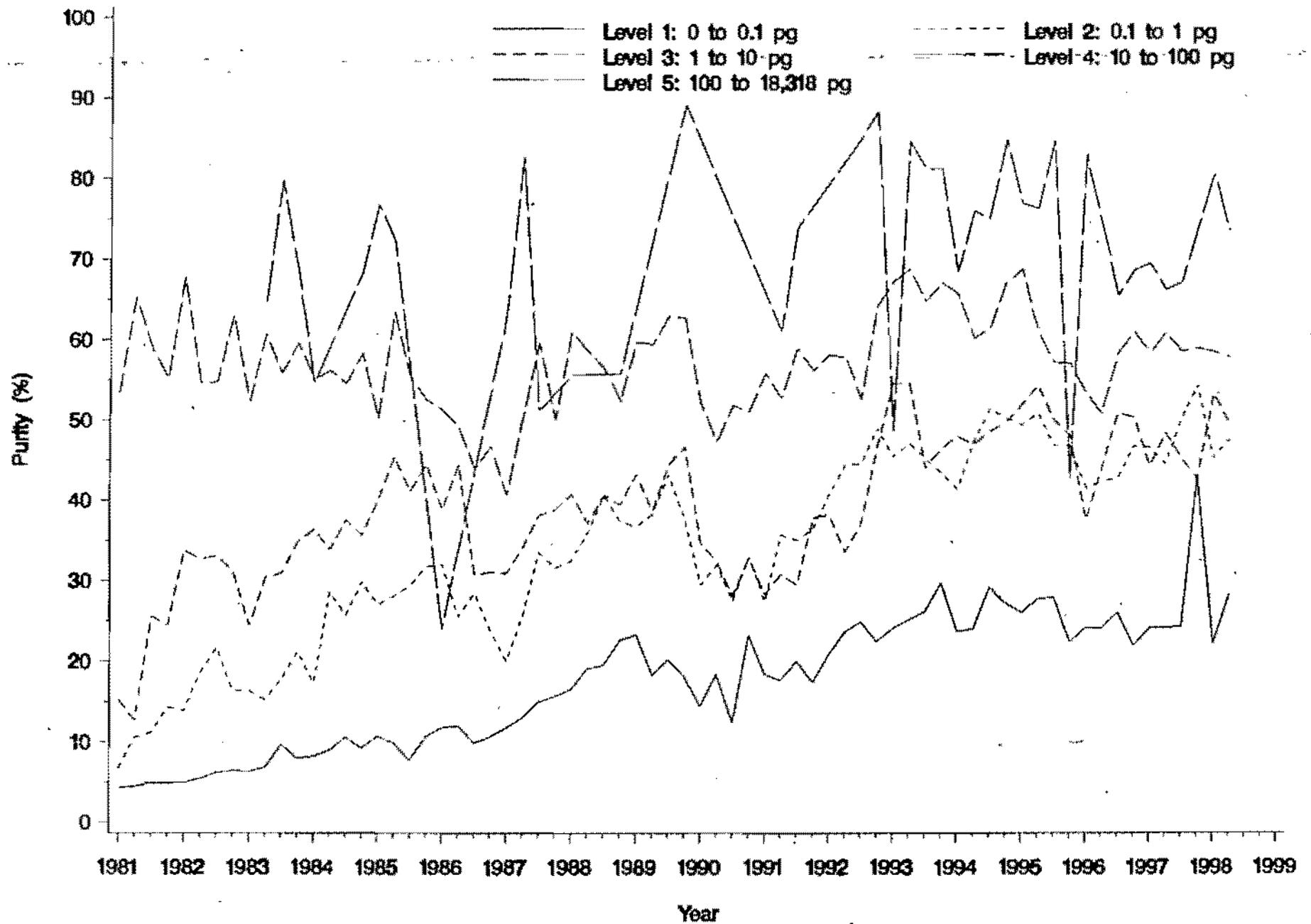
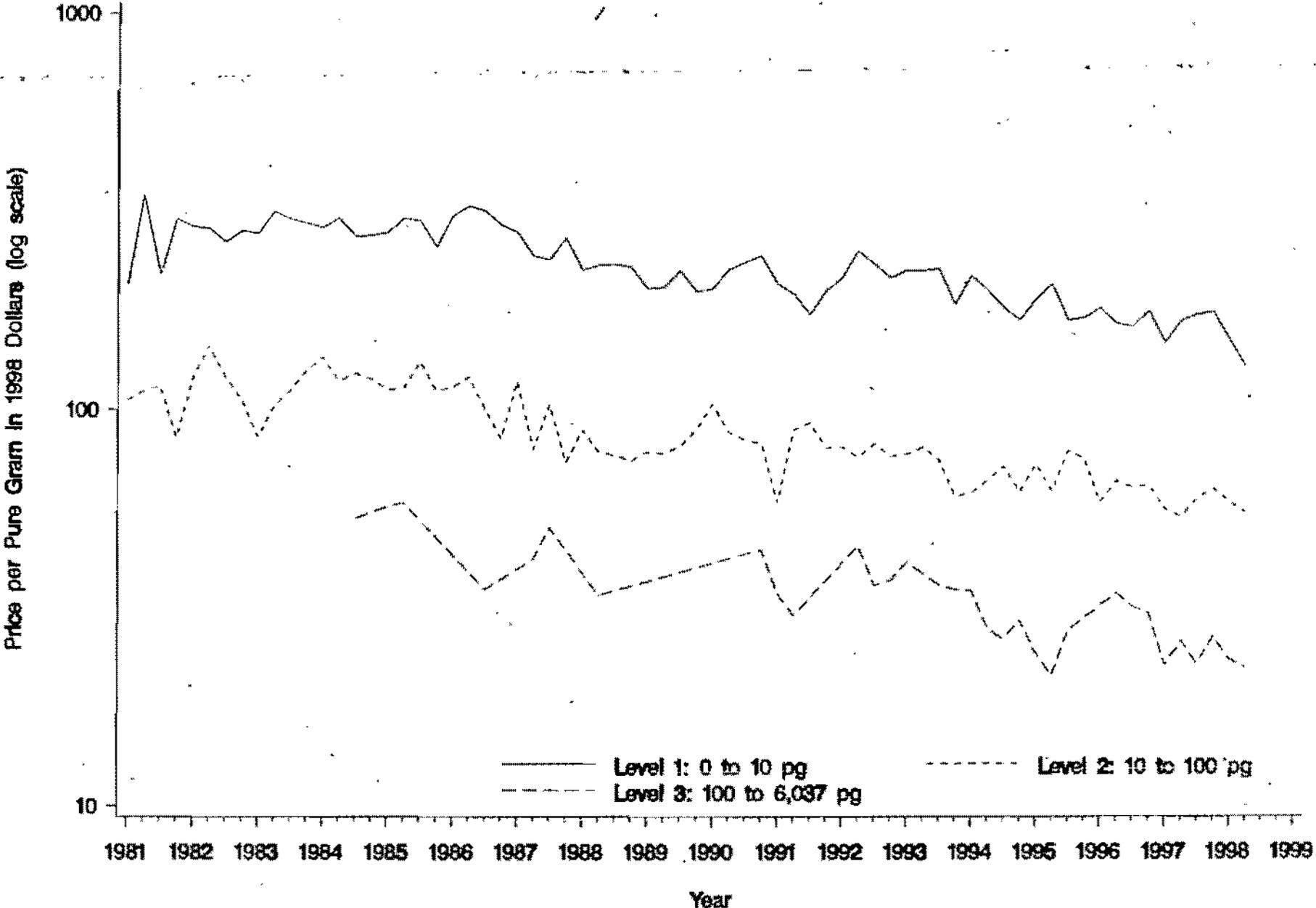


Figure 7. Estimated Price per Pure Gram of Methamphetamine at Three Levels of Distribution



Note: Prices are based at mean sizes (2.94pg, 31pg, 321pg) and purities (41%, 55%, 71%)

Figure 8. Estimated Price per Pure Gram of Methamphetamine at Three Levels of Distribution (log scale)



Note: Prices are based at mean sizes (2.94pg, 31pg, 321pg) and purities (41%, 55%, 71%)

Figure 9. Estimated Purity for Methamphetamine at Three Levels of Distribution

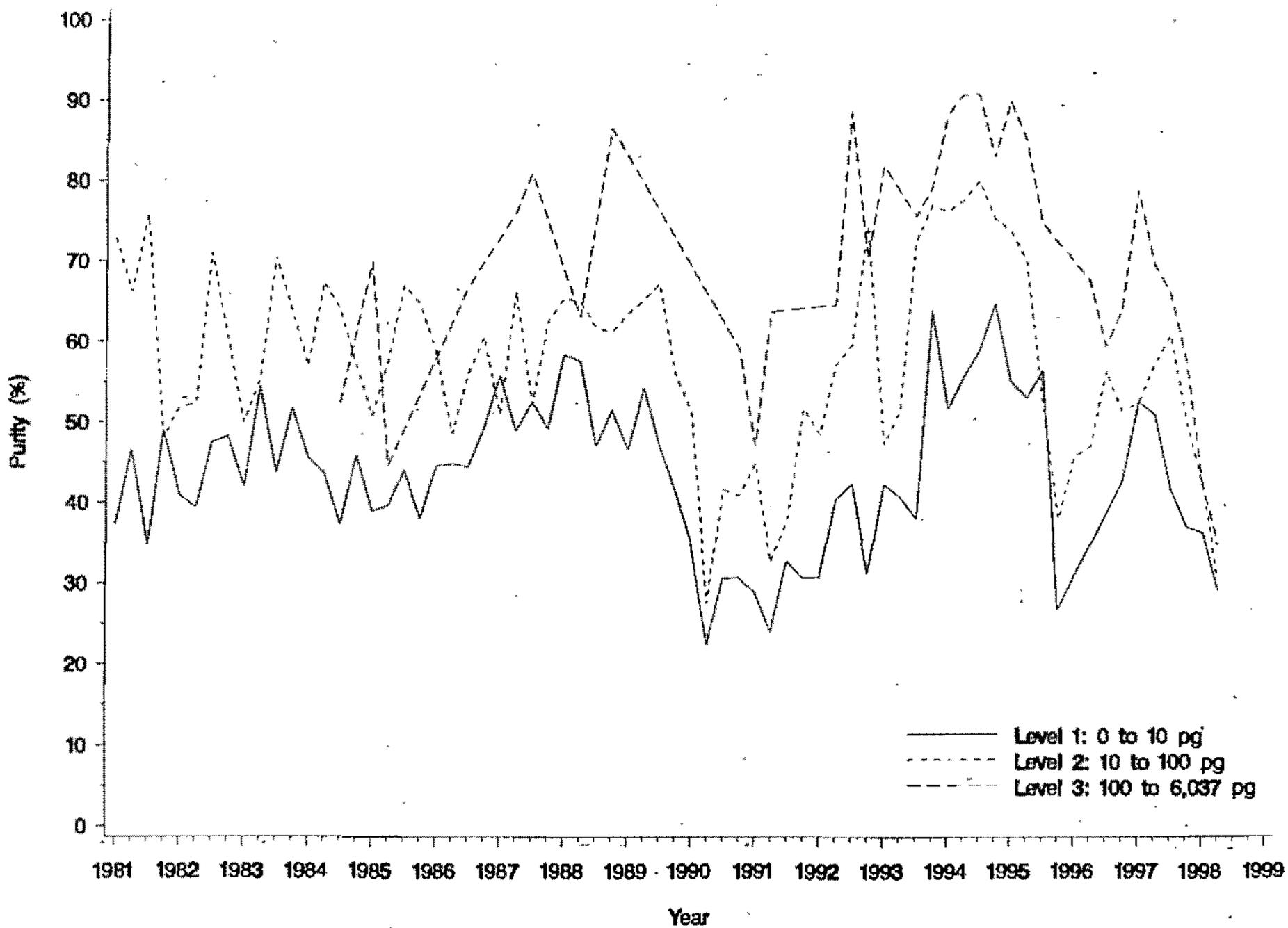
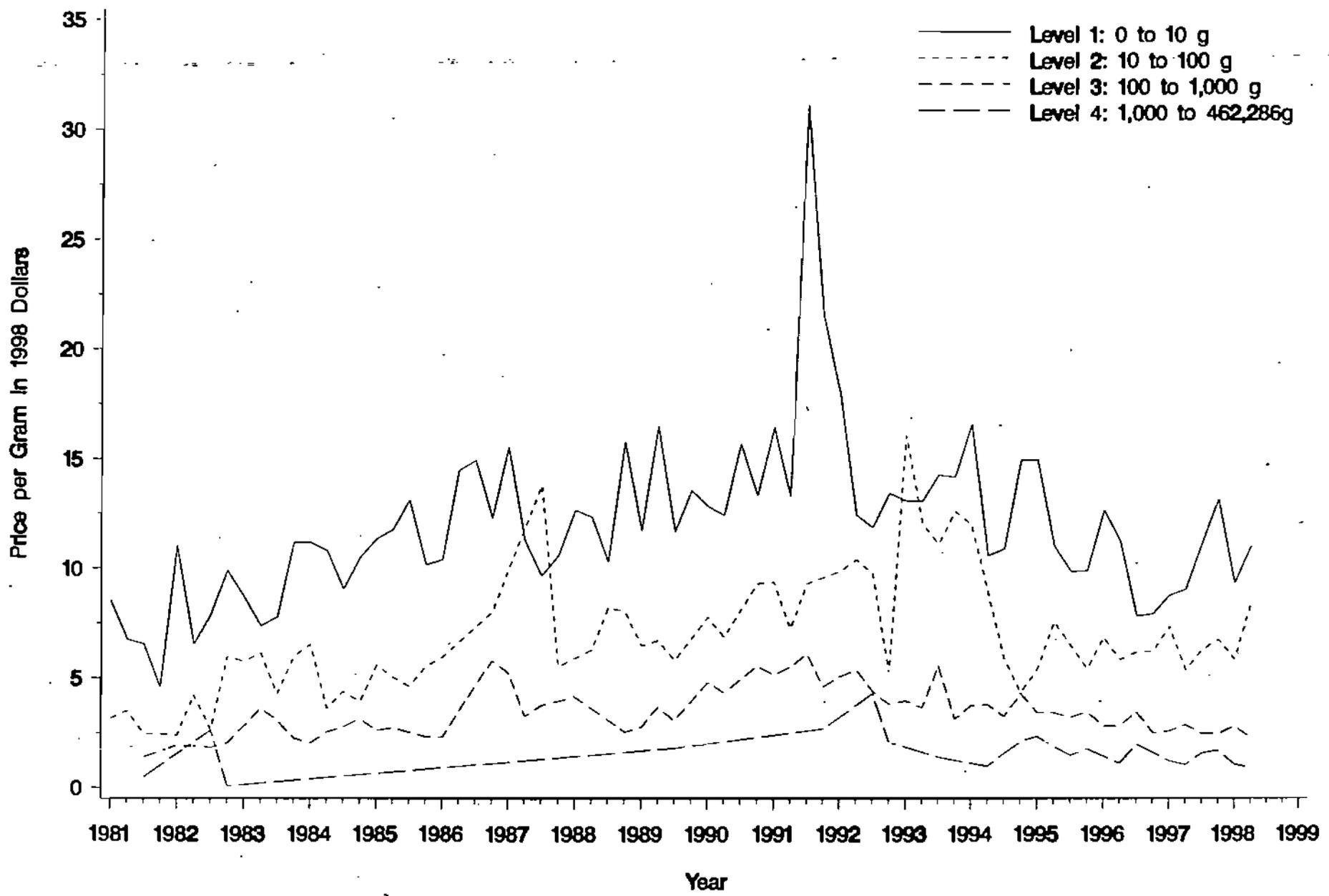
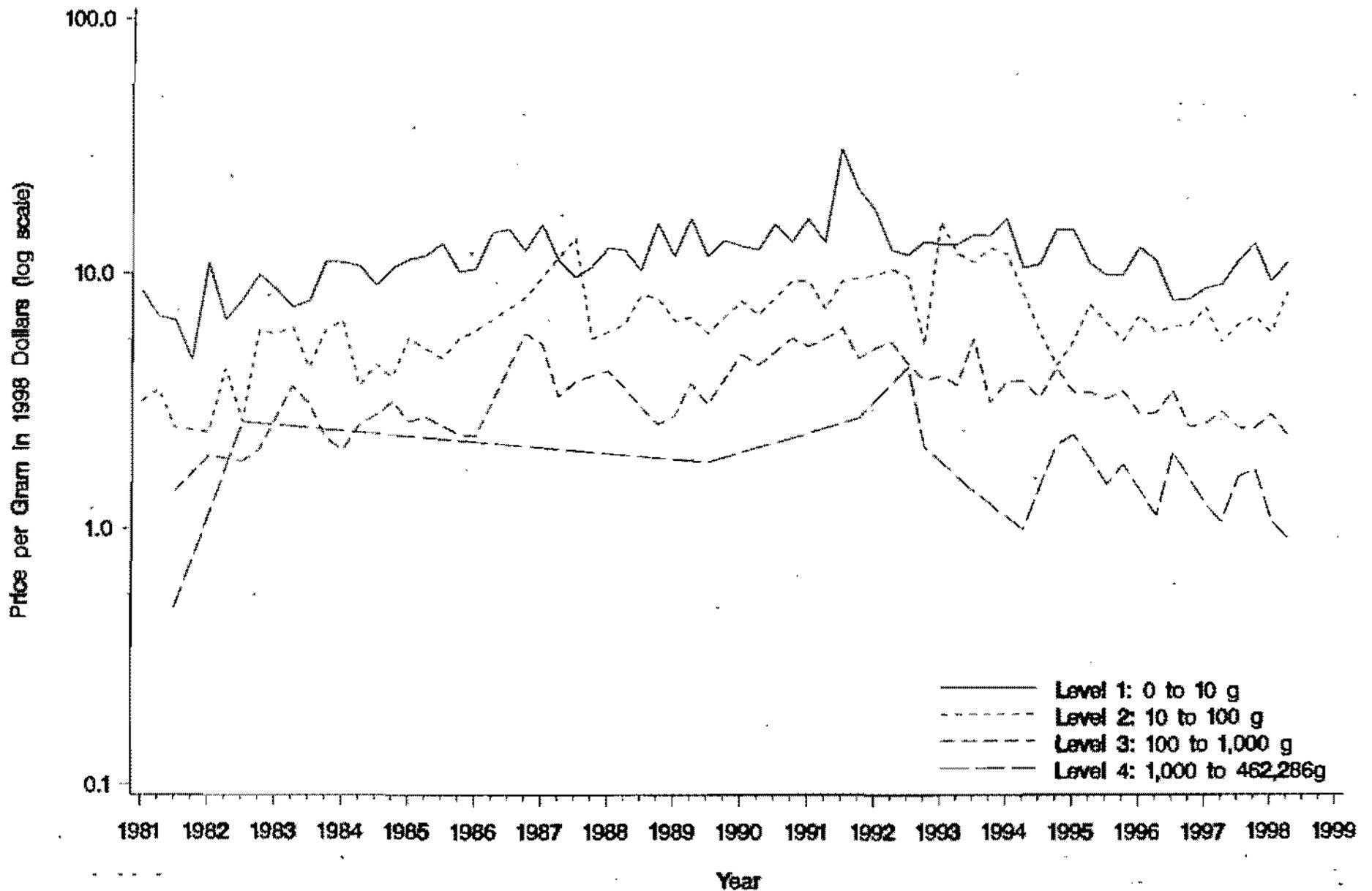


Figure 10. Estimated Price per Gram of Marijuana at Four Levels of Distribution



Note: Prices are based at mean sizes (3.1g, 35g, 389g, 18166g)

Figure 11. Estimated Price per Gram of Marijuana at Four Levels of Distribution (log scale)



Note: Prices are based at mean sizes (3.1g, 35g, 389g, 1,8166g)

Note: The value for Level 4, fourth quarter 1982, was excluded to enhance the general visual effect

TABLE 1. Estimated Price per Pure Gram and Purity of Cocaine at Five Levels of Distribution, 1981-1998

	1981				1982				1993			
	01	02	03	04	01	02	03	04	01	02	03	04
Purchases of 1 pg or less												
Price per pure gram	401.30	384.32	348.87	396.66	413.17	413.75	387.37	366.04	374.31	370.31	347.05	349.11
Purity	35.97	37.47	50.23	38.97	36.83	37.98	40.61	42.00	37.61	48.85	40.22	44.60
Number of cases	69	72	51	55	106	71	112	111	134	65	67	143
Purchases of 1 to 10 pg												
Price per pure gram	268.45	246.12	241.38	228.57	240.85	235.70	230.93	240.55	230.15	230.89	222.52	211.71
Purity	46.44	45.73	45.49	47.80	45.36	50.60	46.92	51.21	51.02	50.33	50.07	55.21
Number of cases	162	109	116	75	165	152	206	134	165	213	153	222
Purchases of 10 to 100 pg												
Price per pure gram	191.35	182.71	181.51	173.31	175.58	185.89	166.34	185.27	186.91	189.34	158.81	151.69
Purity	59.59	60.59	60.60	60.48	59.72	61.72	63.05	61.74	67.82	68.96	70.57	71.38
Number of cases	81	75	84	39	87	55	75	74	112	122	145	196
Purchases of 100 to 500 pg												
Price per pure gram	-	-	-	-	-	-	-	-	138.24	125.49	114.66	125.38
Purity	-	-	-	-	-	-	-	-	81.29	78.22	80.44	88.20
Number of cases	2	1	0	0	0	2	3	1	5	11	14	13
Purchases of 500 pg or more												
Price per pure gram	-	-	-	-	-	-	-	-	-	-	117.08	97.64
Purity	-	-	-	-	-	-	-	-	-	-	90.75	92.26
Number of cases	0	0	0	0	2	2	0	0	0	2	5	9

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.
11/24/96

TABLE 1. Estimated Price per Pure Gram and Purity of Cocaine at Five Levels of Distribution, 1981-1998
(Continued)

	1984				1985				1986			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 1 pg or less												
Price per pure gram	326.19	339.95	335.69	343.09	350.46	313.89	280.86	273.99	289.05	290.96	293.16	290.83
Purity	46.55	45.69	47.50	44.14	40.83	38.58	41.73	43.07	50.51	55.75	49.99	53.90
Number of cases	176	127	128	140	194	237	243	210	196	225	227	172
Purchases of 1 to 10 pg												
Price per pure gram	205.07	207.83	197.54	194.36	194.49	203.35	192.23	194.20	178.00	178.52	179.99	188.62
Purity	56.80	59.30	54.19	53.64	55.09	51.51	52.02	55.70	59.49	64.67	65.75	68.53
Number of cases	209	200	198	235	305	298	311	246	262	307	252	198
Purchases of 10 to 100 pg												
Price per pure gram	145.51	139.09	140.87	137.05	137.80	134.99	132.29	126.34	122.73	120.73	113.87	111.64
Purity	74.88	72.03	68.11	66.64	66.52	63.89	66.41	70.58	74.48	75.93	78.13	79.02
Number of cases	212	236	232	249	245	295	364	377	426	392	359	367
Purchases of 100 to 500 pg												
Price per pure gram	89.97	109.17	106.64	117.92	101.34	98.85	101.94	90.16	82.48	83.30	70.93	73.77
Purity	87.10	81.88	85.29	86.82	81.60	73.90	82.54	82.60	87.56	85.98	86.83	86.65
Number of cases	11	14	13	13	18	14	23	20	27	22	21	23
Purchases of 500 pg or more												
Price per pure gram	78.54	75.48	-	-	102.69	98.18	87.18	85.51	74.69	70.50	73.24	58.24
Purity	92.83	88.06	-	-	87.02	86.23	88.43	87.61	92.02	79.24	92.14	91.11
Number of cases	6	5	2	3	4	7	7	15	9	10	7	12

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 1. Estimated Price per Pure Gram and Purity of Cocaine at Five Levels of Distribution, 1981-1998
(Continued)

	1987				1988				1989			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 1 pg or less												
Price per pure gram	299.97	277.69	267.17	239.56	231.28	203.44	227.01	214.27	200.02	212.06	215.97	205.28
Purity	55.87	55.19	71.90	76.32	74.84	89.51	77.39	81.51	78.80	81.44	79.07	74.48
Number of cases	176	185	217	233	241	318	344	337	363	475	388	292
Purchases of 1 to 10 pg												
Price per pure gram	166.04	157.54	158.91	150.29	132.01	134.75	127.45	125.32	116.98	109.89	111.55	109.19
Purity	69.41	71.09	73.43	74.71	75.71	69.98	74.25	76.35	73.88	74.34	73.30	65.37
Number of cases	150	224	286	204	231	220	263	226	251	242	270	205
Purchases of 10 to 100 pg												
Price per pure gram	104.85	99.66	93.85	88.80	78.84	78.04	71.81	69.22	84.89	60.20	59.44	65.51
Purity	81.57	79.29	81.05	83.48	83.53	80.84	78.88	82.18	80.61	77.55	74.52	71.25
Number of cases	362	531	568	494	498	471	538	488	580	535	508	356
Purchases of 100 to 500 pg												
Price per pure gram	66.65	60.47	58.49	46.22	43.83	48.34	44.28	42.88	39.71	37.28	39.45	44.41
Purity	87.83	80.19	88.24	88.71	85.14	85.97	87.94	88.33	83.53	83.49	88.14	80.31
Number of cases	35	57	53	52	46	57	75	62	72	87	78	46
Purchases of 500 pg or more												
Price per pure gram	55.11	50.62	46.54	42.51	32.18	40.80	37.34	34.25	33.59	34.95	31.47	37.08
Purity	90.25	85.95	87.75	88.82	88.38	87.88	90.78	88.08	85.88	87.28	85.20	83.87
Number of cases	10	15	21	21	22	25	54	53	33	27	22	23

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 1. Estimated Price per Pure Gram and Purity of Cocaine at Five Levels of Distribution, 1981-1998
(Continued)

	1990				1991				1992			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 1 pg or less												
Price per pure gram	228.75	264.02	281.25	234.91	226.12	212.81	209.61	199.89	185.45	220.55	218.29	213.40
Purity	88.82	89.81	88.15	73.88	76.78	79.17	79.70	79.01	78.84	73.21	77.03	76.22
Number of cases	415	273	431	312	488	406	359	311	289	247	271	216
Purchases of 1 to 10 pg												
Price per pure gram	114.60	137.74	128.42	133.93	118.72	111.04	101.82	100.26	101.55	116.97	104.90	103.60
Purity	81.75	55.42	61.16	85.28	85.94	70.80	89.23	78.49	76.49	70.51	71.98	78.36
Number of cases	263	218	244	247	351	284	255	250	326	245	335	233
Purchases of 10 to 100 pg												
Price per pure gram	88.05	71.90	75.05	71.57	88.08	85.28	83.87	59.90	56.93	65.35	60.63	58.44
Purity	67.68	63.79	63.22	69.15	73.42	73.86	75.03	77.83	77.87	72.88	75.68	78.01
Number of cases	378	277	368	368	589	631	614	505	578	392	509	354
Purchases of 100 to 500 pg												
Price per pure gram	49.55	53.03	53.44	50.30	44.70	42.67	43.43	40.75	35.30	44.83	41.48	37.54
Purity	76.09	74.66	75.81	79.28	78.93	79.88	84.58	84.53	85.97	83.53	82.57	80.51
Number of cases	41	31	32	40	47	85	82	74	68	32	71	43
Purchases of 500 pg or more												
Price per pure gram	42.04	51.79	49.77	45.31	39.54	38.88	34.88	35.55	31.87	38.54	35.41	29.21
Purity	87.28	81.09	85.76	84.55	86.88	84.72	82.98	87.82	87.60	85.88	83.21	87.21
Number of cases	7	8	20	14	21	38	35	30	23	7	15	5

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 1. Estimated Price per Pure Gram and Purity of Cocaine at Five Levels of Distribution, 1981-1998
(Continued)

	1993				1994				1995			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 1 pg or less												
Price per pure gram	196.53	198.48	175.68	178.46	179.44	163.25	185.09	182.30	189.94	178.81	163.80	189.91
Purity	73.36	73.85	72.18	74.54	75.14	73.79	72.36	74.04	72.09	70.33	64.27	89.59
Number of cases	195	175	167	169	167	162	203	124	141	159	249	159
Purchases of 1 to 10 pg												
Price per pure gram	101.00	105.63	101.30	98.23	91.93	94.87	91.99	86.69	84.76	87.27	94.67	91.03
Purity	72.40	72.30	70.29	71.04	73.81	73.48	74.05	74.59	75.66	71.34	63.82	67.99
Number of cases	203	290	254	254	261	304	395	353	435	290	277	259
Purchases of 10 to 100 pg												
Price per pure gram	57.54	61.38	57.40	55.89	54.08	54.34	52.47	50.55	49.79	50.79	52.76	53.40
Purity	72.46	70.73	72.48	72.16	73.32	74.80	71.50	74.22	73.04	70.09	64.83	68.42
Number of cases	256	299	329	257	365	375	490	447	488	352	318	318
Purchases of 100 to 500 pg												
Price per pure gram	34.78	36.07	37.29	36.27	33.45	34.51	35.86	31.72	33.05	35.33	37.93	37.53
Purity	82.41	78.04	77.05	80.39	80.96	80.70	77.03	82.24	80.32	75.20	64.48	71.05
Number of cases	27	18	37	29	36	35	52	38	40	33	25	33
Purchases of 500 pg or more												
Price per pure gram	-	36.89	32.87	34.87	33.40	32.49	30.25	30.56	28.23	26.53	36.42	29.97
Purity	-	79.91	85.42	84.47	88.10	87.57	82.32	85.14	81.26	64.92	87.04	85.99
Number of cases	3	7	6	6	13	5	11	10	6	12	5	8

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 1. Estimated Price per Pure Gram and Purity of Cocaine at Five Levels of Distribution, 1981-1998
(Continued)

	1996				1997				1998	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Purchases of 1 pg or less										
Price per pure gram	162.58	148.20	155.63	156.67	154.40	189.60	192.32	171.77	162.43	175.40
Purity	73.10	68.66	71.66	76.34	71.70	55.77	67.36	68.30	69.33	72.95
Number of cases	147	212	180	228	216	301	241	148	153	170
Purchases of 1 to 10 pg										
Price per pure gram	89.66	83.24	85.00	85.34	78.44	88.86	80.43	81.75	81.31	79.78
Purity	72.02	69.28	68.52	71.81	69.46	62.35	67.13	69.37	69.26	69.21
Number of cases	340	357	373	396	445	391	436	336	413	369
Purchases of 10 to 100 pg										
Price per pure gram	49.45	47.12	46.13	48.94	45.58	51.28	49.57	45.33	44.30	44.72
Purity	68.44	68.52	68.63	70.47	67.05	60.36	62.80	66.79	65.92	67.64
Number of cases	425	506	531	452	507	346	582	510	580	594
Purchases of 100 to 500 pg										
Price per pure gram	31.94	34.08	33.10	29.94	28.83	37.08	35.46	30.58	32.72	29.48
Purity	60.38	77.72	76.31	76.29	79.35	78.23	74.71	73.48	74.24	77.00
Number of cases	35	59	60	54	35	24	42	49	40	60
Purchases of 500 pg or more										
Price per pure gram	32.40	28.98	27.27	23.92	25.96	32.71	28.77	26.47	22.43	25.25
Purity	64.54	81.81	79.38	86.38	82.75	87.00	81.97	80.55	81.62	82.25
Number of cases	7	15	13	10	11	7	17	8	6	12

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/96

TABLE 2. Estimated Price per Pure Gram and Purity of Heroin at Five Levels of Distribution, 1981-1998

	1981				1982				1983			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of .1 pg or less												
Price per pure gram	3239.41	3153.25	3169.24	2934.93	2981.44	3014.40	3050.45	3397.17	3212.99	3555.01	3273.71	3254.84
Purity	4.30	4.51	4.91	4.96	5.01	5.47	6.20	6.47	6.34	8.88	9.70	8.00
Number of cases	142	139	155	175	186	143	198	136	148	128	126	123
Purchases of .1 to 1 pg												
Price per pure gram	2136.88	2177.80	2306.00	1868.50	1957.07	1886.76	1787.02	1851.99	1727.89	2187.69	2106.52	1848.80
Purity	8.76	10.58	11.17	14.31	13.86	18.80	21.67	16.39	16.38	15.20	17.80	21.20
Number of cases	121	101	128	66	151	89	97	82	110	107	120	66
Purchases of 1 to 10 pg												
Price per pure gram	1173.35	1071.19	1351.10	1165.35	1117.84	1236.42	1212.21	1151.54	1348.83	1343.87	1169.47	1437.41
Purity	15.27	12.66	25.62	24.41	33.74	32.89	33.08	31.18	24.40	30.45	30.98	34.78
Number of cases	58	75	74	42	76	87	83	45	55	81	68	49
Purchases of 10 to 100 pg												
Price per pure gram	1012.16	978.73	1003.44	787.01	1024.31	911.22	889.37	783.20	958.15	909.31	743.88	828.01
Purity	53.25	65.27	59.11	55.15	67.77	54.60	54.82	63.07	52.35	60.76	55.90	59.67
Number of cases	10	23	22	20	16	30	21	18	11	15	27	27
Purchases of 100 pg or more												
Price per pure gram	-	-	-	-	-	-	-	-	-	385.02	522.72	370.36
Purity	-	-	-	-	-	-	-	-	-	64.67	79.89	68.27
Number of cases	1	1	0	2	1	1	2	1	1	9	7	4

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 2. Estimated Price per Pure Gram and Purity of Heroin at Five Levels of Distribution, 1981-1998
(Continued)

	1984				1985				1986			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of .1 pg or less												
Price per pure gram	3114.57	3306.47	3188.91	2946.05	2885.76	2881.87	3082.48	2918.63	3760.02	3281.74	2997.67	3036.64
Purity	8.24	8.98	10.63	9.25	10.72	9.90	7.74	10.70	11.60	12.04	9.89	10.65
Number of cases	123	110	120	119	172	132	103	112	94	119	109	77
Purchases of .1 to 1 pg												
Price per pure gram	1882.21	1851.51	2158.62	1894.57	1731.74	1709.11	1713.21	1325.97	1438.56	1323.21	1532.56	1960.82
Purity	17.26	28.65	25.75	29.90	27.05	28.11	29.42	31.80	32.01	25.58	28.48	23.78
Number of cases	73	57	85	58	94	65	67	67	75	79	63	49
Purchases of 1 to 10 pg												
Price per pure gram	1308.85	1241.30	1375.99	1208.98	1011.69	1164.19	1208.60	1249.08	1087.85	980.06	1184.81	1344.17
Purity	36.44	33.84	37.63	35.66	40.09	45.44	41.24	44.52	38.90	44.44	30.69	31.11
Number of cases	48	53	60	43	55	77	82	48	78	54	60	45
Purchases of 10 to 100 pg												
Price per pure gram	689.23	809.49	710.23	843.14	698.20	802.68	764.79	712.90	637.01	545.43	573.54	537.61
Purity	55.15	56.25	54.62	58.44	50.22	63.53	55.35	52.62	51.34	49.32	43.90	46.80
Number of cases	25	22	31	28	23	37	52	38	31	33	18	20
Purchases of 100 pg or more												
Price per pure gram	437.48	-	-	411.25	372.43	428.54	-	-	35.28	-	-	-
Purity	54.73	-	-	66.53	76.87	72.43	-	-	24.00	-	-	-
Number of cases	4	2	2	4	14	4	3	2	4	0	3	1

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 2. Estimated Price per Pure Gram and Purity of Heroin at Five Levels of Distribution, 1981-1998
(Continued)

	1987				1988				1989			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of .1 pg or less												
Price per pure gram	3140.73	3265.14	2379.48	2785.63	2972.88	2827.88	2799.55	2889.55	2808.84	2318.87	2305.90	2073.84
Purity	11.77	13.00	14.99	15.84	16.54	19.13	19.58	22.82	23.34	18.30	20.22	18.07
Number of cases	72	70	54	108	96	97	82	72	53	72	71	61
Purchases of .1 to 1 pg												
Price per pure gram	1432.33	1967.90	1323.87	1468.14	1250.02	1196.20	1144.13	1058.84	1152.38	971.07	875.92	871.97
Purity	29.01	25.80	39.52	31.81	32.48	35.95	40.57	37.44	36.78	38.29	43.24	37.75
Number of cases	54	76	83	89	81	94	109	71	70	56	83	52
Purchases of 1 to 10 pg												
Price per pure gram	1412.64	1109.37	1072.33	958.82	982.88	1047.70	882.83	854.84	840.42	813.14	819.10	634.55
Purity	30.91	34.10	38.21	38.87	40.81	37.14	40.72	39.49	43.31	38.87	44.53	46.72
Number of cases	48	54	52	87	59	83	56	52	44	57	68	42
Purchases of 10 to 100 pg												
Price per pure gram	569.69	539.42	584.58	588.43	492.01	515.19	517.89	553.48	494.28	424.28	415.38	404.81
Purity	40.61	50.34	59.89	50.04	61.05	58.83	58.57	52.42	59.85	59.50	63.04	82.76
Number of cases	20	25	37	29	44	40	47	30	38	48	73	60
Purchases of 100 pg or more												
Price per pure gram	418.30	337.40	464.55	-	319.97	-	-	293.47	-	-	-	542.22
Purity	63.22	82.71	51.24	-	55.67	-	-	55.89	-	-	-	89.22
Number of cases	4	5	7	3	4	2	2	5	3	2	3	4

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 2. Estimated Price per Pure Gram and Purity of Heroin at Five Levels of Distribution, 1981-1998
(Continued)

	1990				1991				1992			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of .1 pg or less												
Price per pure gram	2563.78	2789.02	2963.88	1986.69	2647.19	2869.70	2645.74	2593.60	2639.02	2883.07	2489.76	2936.52
Purity	14.46	18.41	12.37	23.25	18.40	17.64	20.02	17.41	20.76	23.69	24.92	22.48
Number of cases	94	107	87	70	140	127	114	58	79	73	59	76
Purchases of .1 to 1 pg												
Price per pure gram	1112.50	1182.08	1167.82	1019.14	1219.36	974.56	1063.40	954.13	934.02	955.84	788.91	784.97
Purity	29.50	31.98	27.50	33.03	27.41	35.73	35.04	36.50	40.68	44.47	44.60	49.04
Number of cases	83	85	64	85	118	137	109	72	108	92	100	87
Purchases of 1 to 10 pg												
Price per pure gram	933.45	724.00	873.98	876.17	982.70	845.68	849.12	736.78	704.13	733.74	632.73	603.38
Purity	34.74	32.40	28.12	32.81	26.28	30.83	29.51	37.64	38.22	33.81	37.07	46.87
Number of cases	57	102	89	85	62	75	86	31	73	80	70	27
Purchases of 10 to 100 pg												
Price per pure gram	395.92	441.68	433.24	457.67	478.57	423.12	428.12	439.53	403.02	365.51	367.03	320.67
Purity	52.15	47.37	51.93	51.05	55.95	52.74	59.03	56.21	58.19	57.87	52.83	64.27
Number of cases	41	41	28	23	24	36	33	28	42	46	45	36
Purchases of 100 pg or more												
Price per pure gram	-	-	-	-	-	261.14	415.84	-	-	331.23	236.25	249.31
Purity	-	-	-	-	-	61.09	73.99	-	-	82.32	85.26	69.50
Number of cases	3	1	1	3	2	5	7	1	2	4	10	9

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 2. Estimated Price per Pure Gram and Purity of Heroin at Five Levels of Distribution, 1981-1998
(Continued)

	1993				1994				1995			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of .1 pg or less												
Price per pure gram	2376.22	2467.10	2187.41	2233.98	2291.45	2333.30	2524.37	2179.65	2207.85	2200.32	2382.66	2389.37
Purity	24.09	25.20	26.23	29.76	23.71	24.04	29.25	27.25	26.11	27.79	27.98	22.43
Number of cases	95	108	62	56	84	65	82	56	72	70	62	54
Purchases of .1 to 1 pg												
Price per pure gram	727.40	607.12	660.97	669.47	627.07	616.75	584.64	628.17	524.09	495.88	535.43	550.94
Purity	45.51	47.16	45.27	43.46	41.42	47.41	51.45	50.32	49.49	50.91	46.90	46.83
Number of cases	136	125	169	121	163	175	184	172	177	201	212	182
Purchases of 1 to 10 pg												
Price per pure gram	596.25	548.55	461.57	501.26	451.75	471.28	456.77	355.84	379.59	382.27	367.35	380.67
Purity	54.70	54.64	44.01	46.59	47.99	47.07	46.88	49.74	52.00	54.39	50.08	48.11
Number of cases	42	56	71	81	85	88	85	75	80	79	91	72
Purchases of 10 to 100 pg												
Price per pure gram	309.11	325.52	321.11	291.90	286.88	279.98	261.83	237.85	224.19	226.86	213.52	211.03
Purity	67.34	68.91	64.81	67.20	65.86	60.26	81.58	67.08	68.95	60.96	57.31	57.17
Number of cases	46	42	79	32	44	51	58	45	76	59	94	46
Purchases of 100 pg or more												
Price per pure gram	189.49	203.89	230.50	190.37	240.15	191.00	170.38	184.81	143.51	155.67	147.83	276.93
Purity	48.62	84.72	81.26	81.39	68.44	76.09	75.08	84.98	77.03	76.41	84.79	42.80
Number of cases	5	5	8	4	7	11	16	4	6	10	11	4

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 2. Estimated Price per Pure Gram and Purity of Heroin at Five Levels of Distribution, 1981-1998
(Continued)

	1996				1997				1998	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Purchases of .1 pg or less										
Price per pure gram	2540.12	2156.54	1771.16	2149.06	1929.64	2332.44	2163.67	1907.53	1934.09	1578.97
Purity	24.18	24.10	26.09	21.95	24.20	24.22	24.35	43.28	22.11	28.35
Number of cases	75	92	58	77	96	81	59	13	78	48
Purchases of .1 to 1 pg										
Price per pure gram	528.40	515.51	502.55	499.01	501.09	478.99	473.39	726.64	416.13	387.56
Purity	41.64	42.47	42.84	46.90	46.69	44.60	50.35	54.40	45.32	47.64
Number of cases	209	198	188	172	233	216	220	43	323	213
Purchases of 1 to 10 pg										
Price per pure gram	359.77	385.59	387.70	356.51	298.39	323.61	365.41	318.51	341.82	297.31
Purity	37.56	44.17	50.96	50.45	44.34	48.49	45.32	42.72	53.32	49.61
Number of cases	102	126	84	82	77	95	91	79	110	127
Purchases of 10 to 100 pg										
Price per pure gram	165.80	182.56	185.74	195.20	177.22	180.69	190.03	178.76	189.03	148.55
Purity	53.52	50.83	58.44	61.04	58.52	60.89	58.65	59.08	58.59	57.93
Number of cases	45	67	66	57	62	76	80	68	83	107
Purchases of 100 pg or more										
Price per pure gram	190.48	-	140.17	118.48	179.09	167.80	138.76	-	137.52	116.28
Purity	83.14	-	65.58	68.75	69.63	66.36	67.25	-	80.60	73.81
Number of cases	5	1	5	5	6	8	8	3	7	7

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.
11/24/98

TABLE 3. Estimated Price per Pure Gram and Purity of Methamphetamine at Four Levels of Distribution, 1981-1998

	1981				1982				1983			
	01	02	03	04	01	02	03	04	01	02	03	04
Purchases of 10 pg or less												
Price per pure gram	206.39	348.84	218.25	303.13	290.06	266.93	265.10	283.07	278.49	316.58	303.55	296.32
Purity	37.29	46.56	34.71	49.11	40.96	39.42	47.54	48.34	42.03	54.57	43.68	51.92
Number of cases	36	22	20	15	53	31	38	37	40	48	37	36
Purchases of 10 to 100 pg												
Price per pure gram	105.54	111.66	114.84	85.07	120.29	144.76	121.17	106.33	85.39	102.10	112.30	125.78
Purity	72.85	66.20	75.69	48.12	52.03	52.34	71.12	60.86	50.00	55.43	70.81	63.95
Number of cases	5	5	4	4	17	13	12	12	9	10	12	12
Purchases of 100 pg or more												
Price per pure gram	-	-	-	-	-	-	-	-	-	-	-	-
Purity	-	-	-	-	-	-	-	-	-	-	-	-
Number of cases	0	1	1	0	1	0	1	0	2	1	1	2

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 3. Estimated Price per Pure Gram and Purity of Methamphetamine at Four Levels of Distribution, 1981-1998
(Continued)

	1984				1985				1986			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 pg or less												
Price per pure gram	288.85	304.84	273.67	275.95	280.25	304.80	300.31	257.57	308.30	326.97	318.05	293.18
Purity	45.64	43.78	37.25	45.95	38.98	39.63	44.01	37.91	44.53	44.91	44.52	49.36
Number of cases	67	63	40	73	75	33	43	55	74	59	58	37
Purchases of 10 to 100 pg												
Price per pure gram	136.11	118.48	123.86	120.14	112.59	113.60	132.44	111.91	114.18	121.27	100.76	84.66
Purity	57.03	67.47	64.11	57.18	50.88	57.70	87.06	64.86	58.93	48.60	56.04	60.65
Number of cases	15	37	14	23	32	20	16	21	15	15	14	11
Purchases of 100 pg or more												
Price per pure gram	-	-	53.32	-	57.16	58.45	-	-	-	-	35.18	-
Purity	-	-	52.35	-	70.07	44.70	-	-	-	-	66.86	-
Number of cases	2	2	4	2	4	4	1	3	1	1	4	1

TABLE 3. Estimated Price per Pure Gram and Purity of Methamphetamine at Four Levels of Distribution, 1981-1998
(Continued)

	1987				1988				1989			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 pg or less												
Price per pure gram	280.52	244.00	239.33	271.34	225.14	231.69	232.63	228.91	201.66	203.36	223.90	198.37
Purity	55.88	48.93	52.61	49.18	58.44	57.63	46.99	51.58	46.51	54.34	47.09	41.31
Number of cases	40	47	28	64	84	74	47	35	57	37	39	44
Purchases of 10 to 100 pg												
Price per pure gram	117.89	79.62	103.22	73.75	88.96	78.32	77.02	74.50	78.44	77.72	80.94	89.40
Purity	51.08	66.29	52.27	62.59	65.41	65.07	61.77	61.22	63.46	65.29	67.25	55.93
Number of cases	17	15	14	9	30	24	25	29	26	16	14	10
Purchases of 100 pg or more												
Price per pure gram	-	42.01	50.47	-	-	34.05	-	35.91	-	-	-	-
Purity	-	76.12	81.02	-	-	63.05	-	86.62	-	-	-	-
Number of cases	1	4	5	3	2	6	2	5	2	3	0	3

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 3: Estimated Price per Pure Gram and Purity of Methamphetamine at Four Levels of Distribution, 1981-1998
(Continued)

	1990				1991				1992			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 pg or less												
Price per pure gram	201.45	225.63	235.46	244.51	207.75	196.15	173.69	198.99	214.82	252.07	233.18	215.09
Purity	34.81	22.24	30.65	30.74	28.93	24.00	32.81	30.83	30.78	40.52	42.41	31.14
Number of cases	46	41	38	24	33	24	21	21	34	39	35	36
Purchases of 10 to 100 pg												
Price per pure gram	103.36	68.02	84.22	82.53	58.42	89.25	92.94	80.30	80.80	76.12	82.27	76.43
Purity	51.29	27.47	41.63	40.87	44.84	32.62	37.99	51.73	48.45	57.25	59.70	74.48
Number of cases	8	12	11	10	10	14	8	12	16	18	22	19
Purchases of 100 pg or more												
Price per pure gram	-	-	-	44.39	34.26	30.23	-	-	-	45.34	36.08	37.09
Purity	-	-	-	59.17	47.07	63.76	-	-	-	64.67	88.73	70.31
Number of cases	2	1	1	4	6	4	1	3	3	10	10	6

TABLE 3. Estimated Price per Pure Gram and Purity of Methamphetamine at Four Levels of Distribution, 1981-1998
 (Continued)

	1993				1994				1995			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 pg or less												
Price per pure gram	224.52	224.69	226.67	183.99	217.78	200.61	180.76	168.43	190.13	207.24	168.44	170.37
Purity	42.32	40.72	38.00	63.94	51.63	55.71	59.03	64.72	55.09	53.09	56.48	26.69
Number of cases	43	31	35	37	39	44	48	45	75	61	78	39
Purchases of 10 to 100 pg												
Price per pure gram	77.46	80.67	74.58	60.62	81.87	66.47	72.01	62.05	72.98	62.34	78.89	75.66
Purity	47.26	51.52	72.50	77.04	76.26	77.68	80.08	75.42	73.89	70.08	52.68	37.85
Number of cases	15	16	27	25	27	47	47	42	54	98	42	19
Purchases of 100 pg or more												
Price per pure gram	41.28	-	36.18	35.15	34.95	28.04	26.28	28.44	24.23	21.27	27.60	-
Purity	81.95	-	75.66	79.23	88.26	90.88	90.94	82.96	90.03	85.25	74.89	-
Number of cases	5	3	6	9	21	20	15	20	21	28	12	1

TABLE 3. Estimated Price per Pure Gram and Purity of Methamphetamine at Four Levels of Distribution, 1981-1998
(Continued)

	1996				1997				1998	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Purchases of 10 pg or less										
Price per pure gram	180.43	165.37	161.96	177.56	147.37	167.84	173.88	176.66	150.29	129.21
Purity	30.75	34.61	38.64	42.67	52.55	50.94	41.63	38.93	36.21	29.00
Number of cases	43	64	37	65	71	87	98	125	143	104
Purchases of 10 to 100 pg										
Price per pure gram	58.44	66.14	63.90	64.68	56.25	53.69	59.84	63.27	56.65	54.93
Purity	45.78	46.99	56.33	51.25	52.51	57.13	60.77	50.08	41.99	30.64
Number of cases	27	52	41	73	104	99	104	109	113	55
Purchases of 100 pg or more										
Price per pure gram	-	34.47	31.86	30.65	22.54	26.03	22.77	26.69	23.43	22.27
Purity	-	67.60	59.34	64.03	78.78	69.65	66.12	57.50	42.12	34.68
Number of cases	1	11	24	28	20	27	29	26	29	4

TABLE 4. Estimated Price per Gram of Marijuana at Four Levels of Distribution, 1981-1998

	1981				1982				1983			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<u>Purchases of 10 g or less</u>												
Price per gram	8.57	6.77	6.58	4.56	11.06	6.54	7.89	9.93	8.72	7.40	7.81	11.21
Number of cases	22	41	49	38	15	19	13	17	12	28	17	11
<u>Purchases of 10 to 100 g</u>												
Price per gram	3.15	3.51	2.48	2.46	2.39	4.23	2.64	5.98	5.77	6.16	4.27	5.99
Number of cases	24	7	12	11	14	13	7	4	10	12	8	18
<u>Purchases of 100 to 1000 g</u>												
Price per gram	-	-	1.40	-	1.03	-	1.83	2.04	-	3.62	3.08	2.26
Number of cases	3	2	9	1	5	3	7	9	2	5	8	15
<u>Purchases of 1000 g or more</u>												
Price per gram	-	-	0.49	-	-	-	2.62	0.09	-	-	-	-
Number of cases	1	0	4	1	2	0	4	11	1	0	0	3

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.
11/24/88

TABLE 4: Estimated Price per Gram of Marijuana at Four Levels of Distribution, 1981-1998
(Continued)

	1984				1985				1986			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 g or less												
Price per gram	11.20	10.83	9.08	10.53	11.39	11.80	13.15	10.19	10.43	14.51	14.97	12.31
Number of cases	19	41	22	19	27	26	18	11	9	11	13	15
Purchases of 10 to 100 g												
Price per gram	6.54	3.62	4.40	3.93	5.61	5.06	4.65	5.55	5.96	-	-	8.03
Number of cases	9	10	9	13	13	9	4	6	4	2	2	4
Purchases of 100 to 1000 g												
Price per gram	2.04	2.55	2.78	3.16	2.63	2.74	-	2.33	2.31	-	-	5.82
Number of cases	4	4	5	5	10	17	3	8	6	2	3	4
Purchases of 1000 g or more												
Price per gram	-	-	-	-	-	-	-	-	-	-	-	-
Number of cases	1	3	2	2	3	1	3	1	0	1	0	1

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

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TABLE 4. Estimated Price per Gram of Marijuana at Four Levels of Distribution, 1981-1998
(Continued)

	1987				1988				1989			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 g or less												
Price per gram	15.58	11.29	9.69	10.62	12.69	12.36	10.32	15.81	11.73	16.54	11.69	13.59
Number of cases	30	21	9	4	17	12	10	6	14	9	10	12
Purchases of 10 to 100 g												
Price per gram	-	-	13.82	5.54	-	6.32	8.23	6.07	6.50	6.74	5.82	-
Number of cases	3	3	7	5	3	14	12	16	6	6	4	2
Purchases of 100 to 1000 g												
Price per gram	5.26	3.28	3.78	-	4.16	-	-	2.57	2.78	3.70	3.08	-
Number of cases	10	25	7	3	8	1	2	7	15	5	4	1
Purchases of 1000 g or more												
Price per gram	-	-	-	-	-	-	-	-	-	-	1.83	-
Number of cases	1	1	2	0	2	1	0	1	3	1	4	1

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98

TABLE 4. Estimated Price per Gram of Marijuana at Four Levels of Distribution, 1981-1998
(Continued)

	1990				1991				1992			
	01	02	03	04	01	02	03	04	01	02	03	04
Purchases of 10 g or less												
Price per gram	12.87	12.46	15.73	13.34	16.47	13.27	31.18	21.60	16.07	12.46	11.89	13.45
Number of cases	8	10	9	14	14	16	5	5	12	18	25	14
Purchases of 10 to 100 g												
Price per gram	7.60	6.89	-	9.34	9.40	7.27	9.34	-	9.89	10.42	9.80	5.24
Number of cases	9	4	1	12	26	7	5	1	7	12	6	7
Purchases of 100 to 1000 g												
Price per gram	4.63	4.36	-	5.57	5.18	5.53	6.13	4.63	5.09	5.39	4.44	3.82
Number of cases	13	10	3	19	25	9	5	20	21	21	25	20
Purchases of 1000 g or more												
Price per gram	-	-	-	-	-	-	-	2.71	-	-	4.31	2.10
Number of cases	3	1	0	3	2	1	0	10	0	1	8	5

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

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TABLE 4. Estimated Price per Gram of Marijuana at Four Levels of Distribution, 1981-1998
(Continued)

	1993				1994				1995			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Purchases of 10 g or less												
Price per gram	13.11	13.10	14.30	14.20	16.62	10.61	10.92	14.98	14.98	11.05	9.89	9.92
Number of cases	25	27	43	29	14	22	9	15	15	9	13	43
Purchases of 10 to 100 g												
Price per gram	16.08	12.05	11.13	12.83	12.01	-	5.92	4.36	5.43	7.58	-	5.44
Number of cases	5	8	11	9	6	2	6	19	15	8	1	17
Purchases of 100 to 1000 g												
Price per gram	3.98	3.67	5.56	3.13	3.76	3.61	3.26	4.29	3.44	3.43	3.23	3.47
Number of cases	13	11	10	10	17	22	10	8	8	23	13	14
Purchases of 1000 g or more												
Price per gram	-	-	1.41	-	-	0.99	-	2.14	2.35	1.89	1.49	1.79
Number of cases	1	2	4	3	1	4	3	5	11	12	8	4

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.
11/24/98

TABLE 4. Estimated Price per Gram of Marijuana at Four Levels of Distribution, 1981-1998
(Continued)

	1996				1997				1998	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
<hr/> Purchases of 10 g or less <hr/>										
Price per gram	12.69	11.27	7.85	7.95	8.80	9.06	11.19	13.17	9.33	11.04
Number of cases	24	22	16	13	45	40	26	19	13	22
<hr/> Purchases of 10 to 100 g <hr/>										
Price per gram	6.67	5.86	6.20	6.23	7.36	5.38	6.31	6.77	5.85	8.42
Number of cases	17	10	13	6	17	26	15	6	13	12
<hr/> Purchases of 100 to 1000 g <hr/>										
Price per gram	2.81	2.85	3.47	2.51	2.59	2.88	2.49	2.48	2.61	2.33
Number of cases	23	19	19	11	23	28	28	11	19	16
<hr/> Purchases of 1000 g or more <hr/>										
Price per gram	-	1.12	1.99	-	1.24	1.06	1.60	1.72	1.08	0.91
Number of cases	0	4	5	3	5	5	5	5	4	5

Source: System to Retrieve Information from Drug Evidence, 1981-1998.

Prepared by Abt Associates Inc.

11/24/98