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**TECHNICAL NOTE**

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# Efficiency Evaluation of a Police Operation to Fight the Drug Plague: Distribution Unit Weight as an Objective Index

**ABSTRACT:** Lod, a city near Tel-Aviv, is considered the main drug distribution center in Israel. A major police undercover operation in Lod, lasting close to a year, was terminated in May 2003. The success or failure of such an operation is frequently measured by the number of arrests made, the hierarchical level of the dealers arrested, the number of drug stations closed down, and the decrease in heroin seizures following the operation. In this work we suggest using an additional parameter, which has a scientific, objective basis, namely, comparing the changes in the average user weight unit ("dose") before and after the operation. We found that prior to the operation the average weight per unit was 1.1 g. Three months after the operation terminated the average weight per unit had decreased to 0.8 g and remained there for at least 4 months before rising again.

**KEYWORDS:** forensic science, heroin, drug, police operation, drug unit weight, dose, drug intelligence, drug monitoring, Israel

The legal jurisdiction area of the Lod police, which is in the Shfela subdistrict *c.* 20 km southeast of Tel-Aviv, is known to be area plagued with drugs. It attracts drug (mostly heroin) consumers from all over the country, because it is known nationwide as an area where one can buy relatively large heroin user units ("doses," the smallest heroin package that the user can get; it can vary in its weight in different areas) cheaply. From Israeli police intelligence sources it is known that a heroin user unit weighing *c.* 1 g, is sold in Lod for 100 Israeli shekels ($22) as opposed to elsewhere in the country where the weight of a heroin user unit is *c.* 0.1 g and costs 50 Israeli shekels ($11). This low price for a heroin user unit brings a flood of heroin consumers from all over the country to Lod to purchase drugs.

Most of the heroin drug transactions are carried out by the "automatic teller machine" method whereby the purchaser deposits a sum of money through a hole in a wall and receives in return the drug unit (Fig. 1). In this method, as there is no eye contact between the purchaser and the dealer, the dealer is protected from being identified. The heroin user units as sold by this method in Lod have a characteristic shape and are usually wrapped in heat-sealed plastic bags with the approximate dimensions of $1.5 \times 5$ cm (Fig. 2).

On May 31, 2003 a broad police operation to fight the drug plague in the city of Lod was terminated. The operation used an undercover agent and lasted for close to a year. As a result of this operation a large number of the "automatic teller machines" were destroyed and a number of high-level dealers were arrested. This action was considered one of the most successful drug actions in this area, which brought about a temporary setback of the infrastructure for drug dealing, mainly in heroin.

As a result of police activity or any other "shock" in the drug market that necessarily brings about a decrease in the amount of available drug at a given time, a number of possible scenarios may exist, combined or separately, which effect the increase in the price of the drug, directly or indirectly:

1. A decrease in the weight of the drug user unit sold to consumers.
2. A decrease in the concentration of the drug in the user unit, as a result of diluting the drug with additives in larger concentrations.
3. Increasing the price per gram of drug.

The above scenarios may be local and influence a limited geographical area or maybe broader and influence a larger geographical area. The influence may be short term or long term.

As part of the routine procedure in the Analytical Chemistry Laboratory at National Police Headquarters, the sole forensic laboratory in Israel responsible for the analysis of all drug seizures, different drug exhibits are weighed as required for the expert report to court. This data is stored in a computer database in addition to other information about the seizure such as date the exhibit was received in the laboratory, type of drug, and the police station handling the case (giving an idea about the geographical area of the seizure).

A possible method of perceiving the drug market in a given area is to note drug distribution and follow changes therein during a given time (1,2). A more specific approach to understand and evaluate changes in the illicit drug market is by monitoring the number of seizures, drug amounts (3) and purity (1,4,5) and studying the changes during a given time and place.

Prior to the termination of the undercover operation, the average concentration of heroin in a given unit weight was 18% with a standard deviation of ± 5% based on 139 determinations. After termination of the undercover operation the average concentration of heroin in a given unit weight was 18% with a standard deviation of ± 4% based on 8 determinations. Although 8 determinations is a relatively small sampling, it included a sampling from a very large seizure of 2143 U in November and thus reflects the results of over 70% of the total units seized in this time interval (see Table 3). This limited number of determinations was considered sufficient to

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FIG. 1—"*Automatic teller machine*"—*inside view: the dealer seat, the* "*working table*" *and the T-shirt to cover the hole used to exchange money for drug units.*

FIG. 2—*Typical heroin user units, approximate dimensions of 1.5 × 5 cm as can be bought in the* "*automatic teller machine*" *in the area of Lod.*

primarily confirm or negate if there was any correlation between the unit weight decrease and a possible increase in the heroin concentration. This obviously was not the case.

In fact, until now, to evaluate the failure or success of an operation, the Israeli police used the information about the number of "automatic teller machines" that decreased or changed places and the number of key criminals who were arrested, thus terminating their activities.

This preliminary work offers an additional objective measurement to operators and commanders of the operation with which to evaluate success or failure of the operation, by monitoring changes in the weight of a heroin user unit sold in the area before and after the operation. This work monitored the weight of heroin user units in Lod in the year 2003, where the average weight of the units was determined in the period prior to and after the operation.

## Methods

All suspected drug units seized in the Shfela subdistrict jurisdiction that were sent to the analytical chemistry laboratory during 2003 were weighed, tested, and identified as heroin. A comparison was carried out between the weights of all heroin user units, which were received in the laboratory in the first 3 months January–March, prior to the operation, and the weight of all heroin user units received in the laboratory in the 3 months (September–November), after the end of the operation. The weight data were stored in a computer database, based on the MAGIC program. Analysis of results was performed using EXCEL, *t*-test was carried out using the SAS program. The concentrations of heroin were determined using HPLC (6).

## Results and Discussion

Division of the seizures into weight groups per distribution unit was based on data from the total heroin seizures sent to the laboratory in 2001. The following seven weight groups were defined: 0.001–0.650, 0.651–1.500, 1.501–8.00, 8.01–31.00, 31.01–80.00, 80.01–150.00, and >150.00 g.

Analysis of weight distribution results of the first two groups of heroin user units that were received in the laboratory in the years 2001 and 2002 supports the information that in the Shfela subdistrict in general and in the city of Lod in particular, heroin user units sold there are larger than in the rest of the country (Table 1). The data in Table 1 shows that in 2001 and 2002 most units (95.5% in 2001 and 93.9% in 2002) seized in the Shfela subdistrict were in the weight range 0.651–1.500 g, while in the rest of the country most units (63.1% in 2001 and 65.2% in 2002) seized were in the weight range of 0.001–0.650 g. The average weight of heroin user units seized in the Shfela subdistrict in the weight group 0.651–1.500 g in 2001 and 2002 were 1.06 g and 1.11 g, respectively (the median weights in 2001 and 2002 were 1.06 and 1.14 g, respectively). As a result it was decided to examine in detail the most common weight group in the Shfela subdistrict, namely the second weight group (0.651–1.500 g).

The number of heroin seizures in the second weight group, the number of heroin units, the average weight, and the median weight of all heroin units that were seized in the Shfela subdistrict jurisdiction in 2003 is presented in Table 2. Two months, December 2002 and January 2004, were added to give a more complete picture. It is clear from this table that starting at the end of July, in addition to the decrease in the total number of seizures in this weight range, the average (and median) unit weight decreased. Figure 3 illustrates the average weight of units in this weight range for each month, starting with the average weight in December 2002 till January 2004. There is a gradual decrease in average weight of the units, starting in July, which continues sharply in August, starting *c.* 3 months after the end of the operation. The average unit weight stabilized at *c.* 0.74 g 4 months after the end of the operation and

TABLE 1—*Distribution of seized heroin units by weight groups in the years 2001 and 2002 in the Shfela subdistrict and the rest of the country.*

| | Shfela subdistrict [no. units (%)] | | Rest of the country [no. units (%)] | |
|---|---|---|---|---|
| Weight group (g) | 2001 | 2002 | 2001 | 2002 |
| 0.001–0.650 | 268 (3.5) | 279 (3.8) | 9109 **(63.1)** | 7909 **(65.2)** |
| 0.651–1.500 | 7263 **(95.5)** | 6852 **(93.9)** | 4272 (29.6) | 3322 (27.4) |
| 1.501–8.00 | 30 (0.4) | 89 (1.2) | 724 (5.0) | 635 (5.2) |
| 8.01–31.00 | 27 (0.3) | 20 (0.3) | 157 (1.1) | 153 (1.3) |
| 31.01–80.00 | 9 (0.1) | 15 (0.2) | 56 (0.4) | 31 (0.3) |
| 80.01–150.00 | 6 (0.1) | 19 (0.3) | 30 (0.2) | 14 (0.1) |
| Over 150.00 | 5 (0.1) | 19 (0.3) | 83 (0.6) | 73 (0.6) |
| Total | 7608 | 7293 | 14,431 | 12,137 |

TABLE 2—*Average and median weight of heroin units in the weight group 0.651–1.500 g, seized in the Shfela subdistrict from December 2002 through January 2004.*

| Month | No. seizures | No. units (*n*) | Average weight (g) | Median weight (g) |
|---|---|---|---|---|
| December 2002 | 52 | 483 | 1.14 | 1.15 |
| January | 30 | 328 | 1.12 | 1.12 |
| February | 52 | 482 | 1.11 | 1.14 |
| March | 46 | 466 | 1.06 | 1.05 |
| April | 40 | 687 | 1.10 | 1.11 |
| May | 29 | 625 | 0.99 | 0.95 |
| June | 37 | 533 | 1.02 | 1.04 |
| July | 32 | 1682 | 0.97 | 0.90 |
| August | 15 | 56 | 0.87 | 0.79 |
| September | 17 | 495 | 0.80 | 0.77 |
| October | 14 | 384 | 0.80 | 0.80 |
| November | 15 | 2331 | 0.71 | 0.67 |
| December | 22 | 528 | 0.79 | 0.74 |
| January 2004 | 38 | 1115 | 0.89 | 0.88 |

Two cases with many heroin user units seized in July (900 U) and November (2143 U) are the reason for the relatively large number of units.

TABLE 3—*The two groups: (a) January–March: prior to the operation. (b) September–November: after the operation. ($p < 0.0001$).*

| Months | No. units (*n*) | Average weight (g) | Standard deviation |
|---|---|---|---|
| January–March | 1276 | 1.09 | 0.135 |
| September–November | 3210 | 0.74 | 0.132 |

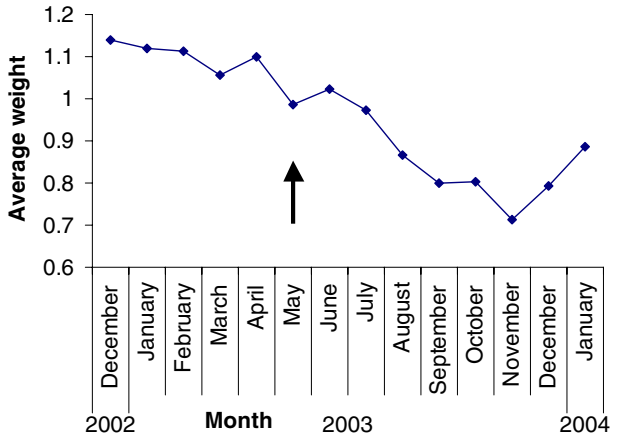


FIG. 3—*Average weight of heroin user units in the weight range 0.651–1.500 g. The arrow shows the time when the operation was terminated.*

remained there for roughly 4 months, September–December (Table 2).

For testing the significance of the average unit weight results, *t*-test was applied. The data was divided into two groups (Table 3): (i) prior to the operation—January through March. (ii) after the operation—September through November. The consideration in choosing these comparison periods was finding a stable interval in the market as expressed in the average weight of the heroin units. January–March was chosen as representative months of the weight of heroin user units in the period prior to the operation. September–November was chosen as representative months of the weight of heroin user units characteristic of the period after the operation, because in these 3 months stability was observed in the average weight of the units as illustrated in Fig. 3. The results of the *t*-test show a very high significance level with the probability that the difference in the average unit weight before and after the police operation is because of the chance being very small ($p < 0.0001$). This difference is *c.* 30%. No significance differences in the average weight of the heroin user units were observed in the parallel periods (January–March and September–November) in the years 2001 and 2002. The average weights of heroin user units in the year 2001 were 1.00 and 1.10 g and in the year 2002 were 1.20 and 1.10 g respectively, in the aforementioned two periods.

The heroin unit weight distribution divided into the two test groups is presented in Figs. 4 and 5. As a result to the decrease in the unit weight during the test period, the original division into the weight group 0.651–1.500 g, which faithfully represented the market condition on the eve of the operation, created a distortion of the data presentation in relation to the units, which were seized during September through November. Therefore, we were forced to expand the range and also include the unit weight range from 0.001 to 0.650 g. Figure 4 describes the weight distribution of all units that were seized in the Shfela subdistrict jurisdiction during January–March whose weight ranged between 0.001 and 1.500 g. Figure 5 describes the weight distribution of all units seized in the Shfela subdistrict jurisdiction during September–November in the same weight range.

From Fig. 4, during January–March, the size of most heroin units (*c.* 90% of the total) were in the weight range 0.90–1.40 g

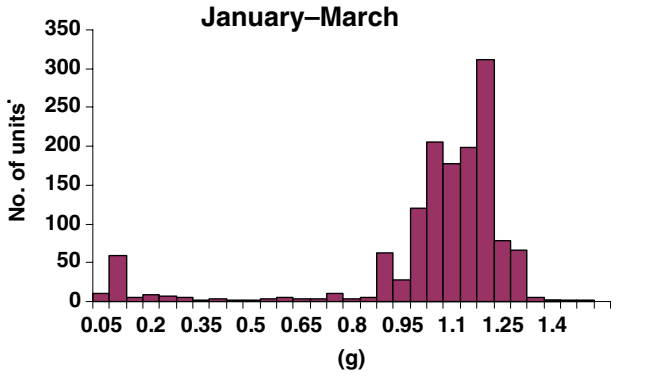


FIG. 4—*Distribution weight of all units in the weight range 0.001–1.500 g for the time period January–March 2003.*

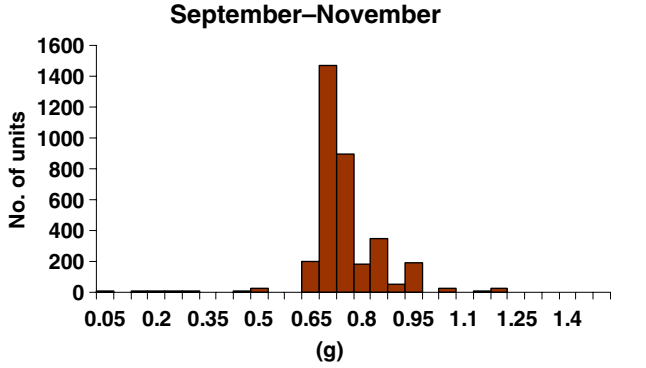


FIG. 5—*Distribution weight of all units in the weight range 0.001–1.500 g for the time period September–November 2003.*

with a normal weight distribution function. The occurrence of heroin seizures in January–March in the low weight range (<0.90 g) is marginal (10% of the total seizures in the weight range 0.001–1.500 g) and may arise from purchases not performed by the automatic teller machine method. From Fig. 5, during September–November, the size of most heroin units (*c.* 95% of the total units) was in the range 0.70–1.00 g with a slight asymmetric distribution in the direction of the heavier weights. This was probably due to actual supply problems and/or dealers fearful of supply problems in the future and as a result decreasing the size of the average unit weight. The unit weight was decreased down to a weight of *c.* 0.70–0.80 g without changing the price and purity per unit. The asymmetry as shown in Fig. 5 can be explained as the result of decreasing the unit weight to 0.70–0.80 g, while in the market there were still many units that were in the higher weight range (*c.* 1 g). This decision would not exist in a stable market condition, in which changes are not demanded on the part of the distributor, and thus this asymmetry does not exist in seizures from the first 3 months.

Regarding the variable of traffic shifting, according to intelligence reports Lod remained the main center of drug dealing even after the undercover operation. However, the "automatic teller system" ceased and was replaced by telephone coordination of a meeting at a given time and place with the dealers sending relatively young children as the distributors arriving by bicycle. Initially it was suspected that the Jaffa area south of Tel Aviv and barely 20 km from Lod would show a significant increase in drug dealing after the undercover operation and this area was monitored by police intelligence. However, no significant change was observed.

To operate the unit weight measurement tool in a way that will result in significant data, the test area must be defined, such as the jurisdiction area of a station, subdistrict, district or the nationwide area, and coordination with the level and nature of the police activity that is carried out. An additional important parameter is defining the duration of the test. It is important to define the origin of the data at an appropriate time before the operation (time "zero") and compare it with the data after the conclusion of the operation and this after consideration of "market stabilization" for a defined time interval and in coordination with the level and character of the market.

One should act with extreme caution when analyzing data not based on facts in the field but which are influenced by other activities and considerations. For example, the decrease in the number of drug seizures could be caused by a decrease in work activity of police units working in the field after completion of a broad scale, successful operation. However, it could also be a true reflection of the drug situation in the area, expressed by decrease in level of activity of offenders in the area. In contrast to this, a decrease in weight of a heroin unit is data not readily influenced by police work and represents a truer picture of the drug market.

## Conclusion

This work described monitoring the weight of heroin user units, which were seized and sent for testing to the analytical chemistry laboratory. From the data that was collected and presented in this work, it was found that as a result of the operation, there was a significant decrease of *c.* 30% in the weight of the heroin user units after the police operation as opposed to before it.

The drug market is not a wild market but one that follows rules of supply, demand, and a certain loyalty and obligation to the client that determine a minimum unit size sold at a given price.

Systematic monitoring of the units weight distribution in general and the user units for immediate use in particular could be an objective, scientific measurement tool in evaluating market conditions, by giving a credible, transparent picture of fluctuations in the drug market without being dependent on regular police activity. This method gives an additional, solid, factual basis and confirms in a scientific manner, independently, that the above police operation to fight the drug plague was a successful operation. In the future, in cooperation with field units, it will be possible to assess the success of other operations and compare them to the present operation. Continuity of work and results of this type will anchor this method as a compulsory tool for the police to measure success or failure in the war on drugs.

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