



UNITED NATIONS
Office on Drugs and Crime



UNIVERSITY
of
GLASGOW

International Consultant on Estimation of the Prevalence of Problem Drug Use in Lithuania

**Report to
United Nations Office on Drugs and Crime
Project “HIV/AIDS prevention and care among injecting drug users
and in prison settings in Estonia, Latvia and Lithuania”**

Dr Gordon Hay

**Centre for Drug Misuse Research
University of Glasgow
United Kingdom**

December 2007

Executive Summary

This report outlines the findings from an assignment, carried out by myself for the United Nations Office on Drugs and Crime as part of their Project "HIV/AIDS prevention and care among injecting drug users and in prison settings in Estonia, Latvia and Lithuania". The main objectives of the assignment were to estimate the size of the injecting drug use and problem drug use populations in Lithuania and also to increase the capacity of national experts in estimation of problem drug use prevalence. The fieldwork for the assignment was carried out over 5 days in September 2007. During that time, meetings were held with about 10 different Governmental and non-Governmental Organisations. A follow-up meeting was held with the main data provider in November 2007, as was a meeting where the results of the assignment were presented to an audience of relevant professionals and discussed. A two-day training workshop was also held, with 16 participants.

The main result from the assignment was the analysis of data from the Vilnius Centre for Addictive Disorders from which an estimate of the number of problem opiate users in the capital city could be derived. It was estimated that there are 2,167 problem opiate users (95% CI 1,663 – 2,934) in Vilnius in 2006. This analysis was only possible due to the work of Egle Pincevicius from the Vilnius Centre for Addictive Disorders who had carried out much of the analysis herself.

It was also estimated that there were 1,622 injecting drug users in Vilnius and 750 injecting drug users in Klaipeda in 2006. Both of these estimates should be treated as provisional as they were derived from a method that has many associated assumptions which cannot be tested. In terms of national information, it was estimated that there were 3,200 injecting drug users and 4,300 problem opiate users in Lithuania in 2006. Again these national estimates should be seen as provisional.

The figure of 4,300 problem opiate users is lower than the number of drug users in the treatment registry held by the State Mental Health Centre. This may be due to the nature of the treatment registry where people remain on the register for a fixed time period or until it is established that they are not using drugs, or it may be due to the different definition within this assignment that only include opiate users.

During the fieldwork, there was a general agreement from organisations that hold the relevant data on drug users in Lithuania that they could supply their data to a prevalence estimation study if it was agreed with the State Data Protection Inspectorate that this was allowable. A meeting was held with the State Data Protection Inspectorate, but as yet, permission to collect these data has not been secured.

Study Objectives

The main objective of the study was to estimate the size of the problem drug use and injecting drug use population in Lithuania. Due to the size of the study (carried out over 20 working days, with five workdays in Lithuania) any estimates derived at this stage should be considered as provisional. A secondary objective was therefore to explore data sources and the barriers to the collation of such data that could be used within prevalence estimate in the medium term. The third objective was to build capacity in the use of prevalence estimation methods in Lithuania.

Fieldwork

Fieldwork was carried out between the 3rd and the 7th of September 2007. The fieldwork consisted of a series of meetings with data providers and relevant stakeholders in Vilnius and Klaipeda and a two-day seminar in prevalence estimation methods in Vilnius (with my colleague Maria Gannon assisting). During both of these elements of the fieldwork, I was fully supported by Mantas Gurevičius and Vytautas Gasperas of the Drug Control Department. During the fieldwork, data from the needle exchanges of Klaipeda (in paper format) were provided to me; a similar set of data from the needle exchanges of Vilnius were supplied in computerised format direct to the consultant on his return to the UK. Information on a capture-recapture analysis for Vilnius, being carried out by Egle Pincevicius, was also provided to the consultant. While in Lithuania, the consultant had an opportunity to complete that capture-recapture analysis and consider it with colleagues at the Drug Control Department. On my return to the UK, I entered the paper copies of the needle exchange data from Klaipeda and analysis both those data and the previously computerised data for Vilnius. The results from the assignment were presented to an audience of relevant professionals in November 2007 and before that presentation I had an opportunity to discuss the findings from the capture-recapture analysis with Ms Pincevicius and her colleagues and seek clarification, particularly about the case definition employed in her data collection. Appendix 1 lists the meetings held during the fieldwork and Appendix 2 lists the participants of the prevalence estimation workshop. The supporting documents used in the workshop can be made available to the UNODC.

Methods

The methods that can be used to estimate the prevalence of injecting drug use or problem drug use depends heavily on the nature of the available data on individuals who either use or inject drugs. Although there should be flexibility in the choice of methods, there is perhaps a hierarchy of methods, with more statistical methods such as capture-recapture (CRC) or the multiple indicator method (MIM) providing more robust estimates than other, perhaps simpler methods, such as the truncated Poisson (tP) method or mortality or treatment multiplier methods. It is my opinion that the capture-recapture method is the best for providing prevalence estimates at the city or county level, whereas the multiple indicator method is the best approach to combining local estimates to obtain a national estimate. When the capture-recapture method cannot be used (for example because of problems in obtaining data) the truncated Poisson or multiplier methods may be more appropriate. It can also be argued that prevalence estimates derived from a range of methods should be obtained and the different estimates compared and contrasted to help in selecting the 'best estimate'. Although the main methods used so far in Lithuania are the three-sample capture-recapture method and the truncated Poisson method, I will outline the main aspects of a range of different methodologies. Further details of all these methods can be found in methodological guidelines and supporting documents produced by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)¹.

¹ <http://www.emcdda.europa.eu> (see Drug Situation Pages)

Multiplier Methods

The mortality multiplier is an example of a multiplier method. To estimate the prevalence of problem drug use with this method, information on the number of drug-related deaths and the mortality rate of problem drug users is required. Both the number of deaths and the mortality rate need to have a common case definition, for example deaths amongst people who use heroin and the mortality rate experienced by a cohort of heroin users. It is preferred that the mortality rate is derived from a specific study carried out within the population of interest (i.e. heroin users in Lithuania) however the mortality rate is often assumed from studies carried out elsewhere. A study by Bargagli et al² calculated a mortality rate (specifically the crude death rate) in eight locations across Europe (Amsterdam, Barcelona, Denmark, Dublin, Lisbon, London, Rome and Vienna). The annual mortality rate varied from 1.1% (in Dublin) to 3.8% (in Barcelona). The largest study (covering Denmark) estimated the mortality rate as 1.7%. If the mortality rate found in Denmark was relevant to Lithuania, then an estimate of the number of problem drug users in the country can be estimated as 58.8 times the number of drug related deaths in any given year. Unfortunately, establishing the number of drug related deaths within a country is not straightforward, and is dependent on systems for identifying deaths by drug users (as opposed to deaths where any substance was involved).

Capture-recapture methods

The capture-recapture method was originally developed over a century ago to estimate the size of animal populations. It was adapted in the 1940s by demographers to count human populations and then further extended by epidemiologists in the 1970s to study the prevalence of disease. Since the 1980s the methodology has been applied to estimating hidden populations such as drug users, the homeless or prostitutes. It is now the standard method used to correct for under-ascertainment in diabetes registers and to examine the precision of the US census and is increasingly recognised as the best method to estimate the prevalence of problem drug misuse.

Within the drug misuse field, the first researchers to apply the capture-recapture method were Hartnoll et al (1985)³ who were undertaking research to estimate the prevalence of opiate use in an area of London. The research team collected data concerning opiate users who had attended a drug clinic and those who had been admitted to a hospital for infectious diseases as a result of their drug use. By comparing these sources of data they found that 20%, or a fifth, of the hospital sample had also attended the drug clinic. The researchers realised that the total number of opiate users could be estimated as being five times the number who attended the drug clinic. Thus in that study the size of the hidden population of drug users was estimated by merging two existing sources of data and examining the overlap between them.

That simple example masks some of the problems of the two-sample capture-recapture methodology. If those who were attending the clinic were more likely to have been admitted to the hospital then the resultant figure would be an underestimate. In other words, if there had been some kind of relationship between data sources the estimate would almost certainly have been biased. Unfortunately it is often unclear if such relationships, or interactions, are present and therefore the validity of estimates obtained when examining two data sources is often questionable. More recent applications of the capture-recapture methodology however have compensated for this problem by employing three or more sources. The extra information present in the additional samples can be used within a statistical model (known as a log-linear

² Bargagli, A, et al (2005) Drug-related mortality and its impact on adult mortality in eight European countries. *European Journal of Public Health*, 16(2), 198-202.

³ Hartnoll, R et al (1985) Estimating the prevalence of opiod dependence, *Lancet* 1(8422), 203-205

model) to examine whether or not interactions are present between data sources. If any interactions are found then the estimate of the total population size can be adjusted accordingly.

Multiple Indicator Method

The multiple indicator method can be used to generalise from areas for which local prevalence estimates have been established (for example by applying the capture-recapture method), to obtain estimates for areas without directly derived estimates. The areas that already have local prevalence estimates are known as 'anchor points'. The use of this method assumes that the prevalence of drug use is correlated with readily available data such as the published number of drug users in treatment, crime statistics or other statistics that may be related to levels of drug use. This correlation or relationship can take the form of a regression model and standard regression methods can be used to identify the relationship and provide estimates for the areas that are not anchor points. The method also assumes that the relationship between prevalence estimates and indicators within the anchor point areas is the same as the relationship between the indicators and the areas that are not anchor points.

The prevalence estimates that are used as anchor points in a multiple indicator analysis will have an impact on the prevalence figures derived for other areas. These anchor points must be available for at least two of the areas (preferably far more than two areas) and must be valid and reliable as they determine the parameters of the regression model. If there are only a small number of anchor point areas, then a technique known as principal components analysis can be used to combine the available indicator data into one or more factors; these factors will be correlated with the indicator data and thus hopefully correlated with the prevalence estimates.

Truncated Poisson Method

Truncated Poisson estimators have been used previously to estimate the size of a drug using population from a drug misuse monitoring system in California⁴ and have been used to estimate the size of other human populations. The premise underpinning the use of these estimators is that summary statistics on the number of attendances by individual drug users, which can be extracted from drug treatment agencies' recording systems, follow a recognised statistical distribution and that distribution can be used to obtain an estimate of the size of a hidden drug using population which is not in contact with that agency.

A truncated Poisson estimator, proposed by Zelterman⁵ can be applied on data generated by counts of individuals who have been seen once, twice and so on. Those who are never seen fall into the zero frequency class and are missing from the observed series of frequencies. Therefore, the frequencies of the visits are incomplete and are called 'truncated below one'. Naturally, the total population size equals the number of persons ever seen plus the number of persons never seen. The estimation problem, then, becomes to estimate the number of persons never seen from the truncated series of persons ever seen. Zelterman's estimator is based on this idea and it assumes that the observed series of frequencies follows a distribution, similar to the Poisson distribution, which is truncated below one. As an estimate can be readily obtained without using statistical packages we give the equation.

⁴ Hser, Y.-I. (1993) Population estimation of illicit drug users in Los Angeles County. *The Journal of Drug Issues*, **23**, 323-334.

⁵ Zelterman, D. (1988) Robust estimation in truncated discrete distributions with application to capture-recapture experiments. *Journal of Statistical Planning and Inference*, **18**, 225-237.

Zelterman's estimator of the unknown population size, $est(n)$, is given by

$$est(n) = S / [1 - \exp(-2f_2 / f_1)]$$

where f_1 represents the number of persons falling in the first frequency class, f_2 represents the number of persons falling in the second frequency class and S represents the sum of all frequencies. We refer the interested reader to the cited literature for the calculation of the 95% confidence intervals.

It should be noted that the estimator is primarily based on the lower frequencies (f_1 and f_2). This emphasis on the lower frequency classes makes sense. People seen rarely (only once or twice) are likely to bear a greater resemblance with persons never seen, than what would have been the case with persons seen very often. In addition, the emphasis on the lower frequency classes makes the estimators robust in the presence of 'heterogeneity', e.g. persons seen very often may form a different subgroup as compared to persons rarely seen. The influence of the persons often seen is weighted down in this estimator and therefore heterogeneity, if present, is likely to exercise a relatively small influence. Finally, emphasis on the lower frequency classes results in another bonus as well; the estimator is known to perform rather well even when we have few data.

Mortality Multiplier analysis - Lithuania

The statistics that the Lithuanian Focal Point to the EMCDDA submit to the EMCDDA suggest that there are, on average 40 drug related deaths per year (45 in 2000, 35 in 2001, 33 in 2002, 40 in 2003, 38 in 2004 and 31 in 2005). This would suggest that there would be approximately 2,350 problem drug users in Lithuania. However, there is an argument that most drug-related deaths are of drug injectors, not problem drug users. Indeed, a study I am involved with in Scotland suggests that around 80% of drug related deaths refer to injectors; therefore it could be argued that the estimate of approximately 2,350 problem drug users would refer to drug injectors. However, data on treatment demands from Lithuania suggest that approximately 80% of problem drug users are injectors, which would then suggest that there would be approximately 2,940 problem drug users in Lithuania. This estimate is likely to be an underestimate if there are difficulties in identifying drug related deaths.

Using the mortality multiplier method, it can be estimated that there are approximately 2,940 problem drug users and 2,350 drug injectors in Lithuania

Capture-recapture analysis – Vilnius

The Vilnius Addictive Behaviours Centre is the primary drug treatment service in Vilnius. It provides various services for the city's problem drug users. It collates information within three distinct databases. The first includes information on clients who are on a detoxification programme with Subutex. The second database includes information on clients who are receiving outpatient treatment. The final database is constructed from people who have been brought to the service following contact with the police. The data were extracted for this study by Egle Pincevicius and she carried out the first stage of the analysis, which was to construct the following overlap pattern. The following data only refers to opiate users, and therefore the resultant estimates are of opiate use. Other types of problem drug users (such as stimulant or cannabis users) are in contact with the Vilnius Addictive Behaviours Centre however the data on such individuals was not included in the study.

Table 1 **Overlap between three sources of data on problem drug users in Vilnius**

		Police			
		Yes		No	
		Outpatient Treatment			
		Yes	No	Yes	No
Detox with Subutex	Yes	4	7	52	144
	No	24	131	226	-

From Table 1, there were 4 people who were in all three data sources. There were 7 people who were in both the Detox data and the Police data, but not in the Outpatient Treatment data. The largest cell in Table 1 gives the number of people who were in the outpatient treatment (226) but not in the Detox or Police data. The capture-recapture analysis can be used to estimate the size of the hidden population, and fitting different statistical (log-linear) models to this overlap pattern gives Table 2.

Table 2 **The results from the log-linear analysis of the data in Table 1**

Model	Deviance	Df	Estimate	Total	P	AIC	SIC
Independence	17.72	3	970	1,558	0.00	11.72	-1.41
S1xS2	3.51	2	1,579	2,167	0.17	-0.49	-9.24
S2xS3	16.35	2	871	1,459	0.00	12.35	3.60
S1xS3	7.57	2	797	1,385	0.02	3.57	-5.18
S1xS2+S2xS3	0.35	1	2,695	3,283	0.55	-1.65	-6.03
S1xS2+S1xS3	0.48	1	1,234	1,822	0.49	-1.52	-5.90
S1xS3+S2xS3	2.62	1	626	1,214	0.11	0.62	-3.76
S1xS2+S1xS3+S2xS3	0.00	0	1,952	2,540	1.00	0.00	0.00

In Table 2, S1 denotes the Detox with Subutex data, S2 denotes the Outpatient Treatment data and S3 denotes the Police data. Thus the model S1xS2 (which has a deviance value of 3.51) is the model that accounts for a relationship between the Detox data and the Outpatient Treatment data. We can gauge how well each of these models fits the data by either comparing the deviance values or looking at the last two columns which provide the Akaike Information Criterion (AIC) or an alternative information criteria as proposed by Schwarz (SIC). In short, the best model is usually the one with the lowest AIC value or the one with the lowest SIC value.

The model with the lowest AIC value is the one that has an interaction between the Detox and Outpatient data sources and an interaction between the Outpatient data and the Police data. This model would give an estimate of 3,283. That estimate has quite a wide confidence interval of 1,897 to 6,948.

However, I would opt for the simpler model that only has an interaction between the Detox and Outpatient data sources. This model is the one with the lowest SIC value and gives an estimate of 2,167 (95% CI 1,663 – 2,934). The interactions present within this model appear to be quite sensible.

Using the capture-recapture method, it can be estimated that there are 2,167 problem opiate users (95% CI 1,663 – 2,934) in Vilnius.

Truncated Poisson analysis – Vilnius

During the fieldwork in Vilnius and Klaipeda, data were collated from the needle exchanges from both cities. The data for Vilnius were supplied to me in a computerised format. From these data, it was possible to identify how many clients had attended once in any given month, twice in any month and so on (including how many people in total had attended during the month). Each individual had an identifying code, from which it should be possible to carry out a truncated Poisson analysis.

However, there are various different types of truncated Poisson analysis that can be carried out on the needle exchange data from Vilnius. An analysis can be carried out covering the whole of 2006, i.e. one that estimates the number of drug injectors in Vilnius from the number of people who have attended once in that year and the number that attended twice in that year, along with the number who have attended any number of times that year. To carry out that analysis, it would be necessary for me to combine the month by month data supplied to me and assume that each individual injector has a unique identifying code. In total there were 1,439 unique individuals identified within that analysis, however only 24 individuals were identified as attending only once throughout the year and 513 people were identified as attending twice. Using these figures within the formula proposed by Zelterman would suggest that the total estimate of the size of the drug injecting population of Vilnius would be 1,439, or in other words, there are no 'hidden' drug injectors in Vilnius. This appears unlikely and it may be concluded that this particular truncated Poisson analysis was inappropriate. This is probably due to the identifying code used to identify unique individuals within the databases (particularly when aggregated up to one years data by myself) such that more than one unique individual may have the same code therefore the numbers identified only once would be deflated.

A second approach would be to take the data that had been already been aggregated by staff at the needle exchanges in Vilnius and examine the number of people who had attended (at any point) during only one month and the number of people who had attended (at any point) during two months). From the aggregated data, there were 344 people who had attended in only one month and 380 people who had attended in only two months (out of a total of 1,444 people who had attended at any point during the year). Using these figures, the estimated number of drug injectors in Vilnius in 2006 would be 1,622.

Alternatively, we can treat each month's worth of data as a separate truncated Poisson analysis and derive the following table for Vilnius.

Table 3 Attendance pattern at the Vilnius Needle Exchange Provision

Month	Attended Once	Attended Twice	Total	Estimated number of Injectors
January	161	106	359	490
February	200	91	364	609
March	200	95	391	638
April	176	109	441	621
May	180	136	539	692
June	180	127	486	643
July	145	103	464	612
August	168	113	513	694
September	177	118	519	705
October	148	103	442	588
November	131	79	375	535
December	80	74	254	301

Table 3 therefore suggests that over the summer months, there are around 600 to 700 drug injectors active in Vilnius (average of approximately 600 when considered across the complete year). There does appear to be a seasonal pattern, with lower numbers of injectors attending needle exchange in the winter.

Using the truncated Poisson method, it can be estimated that there are approximately 1,622 injectors in Vilnius in 2006, with an average of 600 active drug injectors each month.

Truncated Poisson analysis – Klaipeda

In Klaipeda, I was given access to the daily log books from both needle exchange sites. Each client of the needle exchange is given an identifying code, constructed from their initials, their mother's initial and their year of birth (and gender). It should therefore be possible to identify how many people attended once or twice in any given month, along with the total number of people who had attended in the month. A table, similar to that for Vilnius in Table 3, can be produced for each of the two needle exchange sites that provided data for me. These are shown in Table 4 and Table 5.

Table 4 Attendance pattern at a Klaipeda Needle Exchange

Month	Attended Once	Attended Twice	Total	Estimated number of Injectors
January	62	24	150	278
February	62	12	122	380
March	65	13	142	431
April	69	22	123	261
May	80	21	151	370
June	51	16	98	210
July	61	27	116	197
August	59	35	185	266
September	55	22	146	265
October	57	27	154	252
November	61	36	153	221
December	-	-	-	-

Table 5 Attendance pattern at a Klaipeda Needle Exchange

Month	Attended Once	Attended Twice	Total	Estimated number of Injectors
January	54	8	86	335
February	72	18	111	282
March	42	11	80	196
April	43	15	80	159
May	47	16	78	158
June	47	10	68	196
July	34	8	49	131
August	46	12	76	187
September	41	13	74	158
October	33	12	59	114
November	-	-	-	-
December	-	-	-	-

For the first needle exchange, there were insufficient data to provide an estimate for December. For the second needle exchange, the data for November and December were too sparse to provide a valid estimate. It was not possible to combine the raw data from the two needle exchanges to carry out combined analysis for the whole of Klaipeda. The data for the first needle exchange are larger and more consistent throughout the year. There also did not seem to be any reason why drug injectors from any part of Klaipeda would exchange needles from the first needle exchange (which I think is in the centre of Klaipeda) therefore I feel it is possible to use the data for the first needle exchange to estimate that there are, on average approximately 280 drug injectors active in Klaipeda in any month. The Vilnius estimates suggest that the total number of injectors across 2006 is 2.7 times the average number of active injectors per month. If this ratio for Vilnius is applied to the analysis for Klaipeda, then the total number of injectors in Klaipeda will be approximately 750.

Using the truncated Poisson method (and comparing the Klaipeda data with corresponding data for Vilnius), it can be estimated that there are approximately 750 injectors in Klaipeda in 2006, with an average of 280 active drug injectors each month.

National Prevalence Estimate

It was not possible to collate enough information to use the multiple indicator method to provide a national estimate of the prevalence of either problem drug use or drug injecting for Lithuania. However, published statistics from the Ministry of the Interior suggest that drug offences in the Vilnius municipality account for approximately half of the offences for the whole country. Data supplied to the EMCDDA suggest that half the new demands for treatment in Lithuania are from the Vilnius municipality. If it is valid to assume that half of the country's problem opiate users (and drug injectors) live in the Vilnius municipality, then there would be approximately 3,200 drug injectors and 4,300 problem opiate users in the whole country.

Using the best available estimates for Vilnius, and extrapolating to the whole country using Ministry of Information data on drug offences, there will be 3,200 drug injectors and 4,300 problem opiate users in Lithuania in 2006.

Discussion

The fieldwork element of the project was comparatively short and within that time, it was only possible to use the capture-recapture method to estimate the number of problem opiate users in Vilnius and to make some attempts to use the truncated Poisson method to estimate the number of drug injectors in Vilnius and Klaipeda. While the capture-recapture analysis for Vilnius was the most successful of these analyses (due mainly to the high quality work undertaken by Egle Pincevicius using databases that she has access to within the Vilnius Centre for Addictive Disorders). Within a capture-recapture analysis, the hardest part is gaining access to the data, cleaning the data and producing the overlap pattern (as shown in Table 1). The actual statistical analysis (the log-linear analysis) is relatively straightforward to carry out. Although I would often be cautious about analysing data that someone else has collected and cleaned, I am confident that this has been done well by Ms Pincevicius and that the results of the analysis are valid. There may be an issue that all three data sources are from the single treatment agency (the Vilnius Centre for Addictive Disorders). I would usually prefer to use data from more than one agency in a capture-recapture analysis, but I do not see any obvious reason why this particular analysis would not give a valid estimate, particularly since the Vilnius Centre for Addictive Disorders appears to cover the whole of the Vilnius Municipality and the capture-recapture analysis included two different types of treatment data and a Police data source.

There was, however, the suggestion that the opiate users who were attending the Vilnius Centre for Addictive Disorders were likely to be more problematic in terms of the opiate use than other opiate users not in contact with the service. In particular, it was suggested that those in contact with the centre were more likely to be injecting opiate and less likely to be younger, less problematic opiate users who were only smoking the drug. There was also the suggestion that the police data may be biased towards areas of Vilnius where it is perceived that opiates

are easier to buy. Such areas were described as being associated with the gypsy communities within Vilnius. Thus it could be argued that none of the three data sources were totally representative of Vilnius's opiate users. However, this is the case in most studies that use capture-recapture methods to estimate the prevalence of problem drug use where it can often be reasonably assumed that the drug users in contact with treatment services are more likely to be more problematic. The capture-recapture method is relative robust to this issue, however since it is probably unlikely that those that have just tried opiates once or twice would be included in the analyses, I have used the term 'problem opiate use' in this report rather than opiate use.

In terms of the scientific quality of that analysis, I would say that it is as good as the analyses I have been involved with in Copenhagen (Denmark), Tallin (Estonia) and the Ida-Virumaa County (Estonia) and is as good, if not better, than many prevalence estimation studies in other parts of Europe.

The truncated Poisson method was used on needle exchange data from Vilnius and Klaipeda to try to estimate the prevalence of drug injecting in those cities. The data for Vilnius were computerised and paper copies were supplied to me for Klaipeda, however there were problems trying to use truncated Poisson to provide estimates. It should be stressed that these problems were not due to the quality of the data collected by the needle exchanges (which I feel is very good) rather because of the assumptions related to the application of the method. Particularly for Vilnius, there appeared to be very few injectors who had only attended the needle exchange once within a 12 month period. If this was true, it would suggest that there are very few injectors in the city who were not known to the needle exchange. However, it is probably more likely that it has not been possible for me to identify the true number of people who have attended only once or twice due to the nature of identifying codes given to each client (based on the client's initials and year of birth). I could however carry out two variations of the truncated Poisson analysis which did not rely on me identifying duplicate cases (or cases that only attended once). One approach was to treat each month separately, and from those analyses it was possible to obtain estimates for the number of 'active' injectors each month, i.e. the number that would be likely to be resident in the city and injecting drugs but not necessarily in touch with the needle exchange. For Vilnius I could also treat attendance at the needle exchange at any point during a calendar month as the 'event' and thus use that data to estimate the number of injectors in that city who have attended in zero months (i.e. the hidden population). That analysis did suggest that there were 1,622 drug injectors in the capital city. In comparison with the capture-recapture analysis (which was for problem drug users, not necessarily drug injectors), then the injecting proportion amongst problem drug users would be $1,622 / 2,167$ or approximately 75%. This injecting proportion was not so different to the injecting proportions found in the treatment demand data supplied to the EMCDDA.

The analyses for Klaipeda were not as successful as those for Vilnius. Again, this was not due to the quality of the data collected by the needle exchanges in that city; rather it was the possible violation of the assumptions associated with the truncated Poisson analysis. Furthermore there would be additional problems introduced by me converting the paper copies of needle exchange log books into a computerised format (particularly with my lack of experience of the Lithuanian alphabet). Thus the truncated Poisson estimate for Klaipeda should be treated with caution. It was only possible to get a month-by-month estimate of the number of active injectors in Klaipeda over the year 2006. To get a total injecting prevalence estimate for Klaipeda, I needed to extrapolate the results of the Vilnius truncated Poisson analysis. This suggested that there would be approximately 750 injectors in Klaipeda, however

this estimate should be treated with caution. It does, however, appear that Klaipeda has a slightly higher prevalence of drug injecting (per capita) than Vilnius.

The problem opiate use estimate for Vilnius was used to derive prevalence estimates for the whole country. It can perhaps be estimated that there are 3,200 drug injectors and 4,300 problem opiate users in Lithuania. These estimates are higher than the ones derived using the mortality multiplier, where it was estimated that there were 2,350 injectors and 2,940 problem drug users. I would favour the higher estimates, particularly as mortality multiplier estimates may be under-estimates if there is any under-reporting in the number of drug related deaths.

Although only an approximate estimate, it is worthwhile comparing the estimate of 4,300 problem opiate users with the available data on treatment. From the EMCDDA's website, it is suggested that there are 5,011 clients in treatment (2004 data). From my understanding of the way those data are collated, I feel that this figure could be quite a large over-estimate of the true number of problem drug users in treatment. I think there is an issue that, once someone is placed on the treatment register, they remain on that register for a fixed number of years or until it can be established that they are drug free.

During the fieldwork, there was a general agreement from organisations that hold the relevant data on drug users in Lithuania that they could supply their data to a prevalence estimation study if it was agreed with the State Data Protection Inspectorate that this was allowable. A meeting was held with the State Data Protection Inspectorate and at this meeting various approaches to data collection that would be consistent with the Data Protection legislation were considered, including using unique encrypted identifier codes that would be the same for each contributing data source but which the study team could not un-encrypt. As yet, permission to collect these data has not been secured. It should, however, be noted that similar studies that use the capture-recapture methodology and collect information from a range of data sources including treatment services and police have met the requirements of Data Protection legislation in other European Union countries.

Conclusions and Recommendations

Estimates of the number of problem drug users in Vilnius and for Lithuania have been obtained, as have estimates of the number of drug injectors in Klaipeda and Vilnius, as well as national estimates for Lithuania. Apart from the problem drug use estimate for Vilnius, all these estimates should be seen as provisional and approximate. During the fieldwork, there did appear to be willingness from a range of organisations that hold data on problem drug users. However, until permission has been given by the State Data Protection Inspectorate for a study to use the identifier data needed in a capture-recapture study, it would not be possible for the agencies to supply data to a prevalence estimation study.

I would recommend that there should be further discussion with the State Data Protection Inspectorate about how further capture-recapture studies can be carried out in Lithuania.

If permission is granted from the State Data Protection Inspectorate to collect data from relevant data sources for use within a capture-recapture analysis, I would recommend that a capture-recapture study is repeated for Vilnius and a capture-recapture study is also carried out in Klaipeda. From the fieldwork, it does appear that capture-recapture studies in those two cities

would be feasible. I would also recommend that the possibility of carrying out two additional capture-recapture studies be examined; one in Kaunas and one in another town or city.

Capture-recapture analysis, using 2007 data, should be repeated for Vilnius and carried out in Klaipeda, Kaunas and one other site.

Egle Pincevicius, from the Vilnius Centre for Addictive Disorders has experience in carrying out the data collection, data cleaning and matching necessary for a capture-recapture analysis. With the material from the workshop or with further (low level) input from myself, she would be able to carry out the statistical analysis to provide prevalence estimates. Following on from the prevalence estimation workshop, it may be possible for one of the participants to carry out the necessary data collection, data cleaning and matching (possibly with support from Egle Pincevicius) and again, with low level input from myself, would be able to carry out the capture-recapture analysis. It would be particularly useful if one or more of the participants from Klaipeda could be supported in this. The EMCDDA suggests that each member state should have a prevalence estimation expert group; I feel it would be useful for such an expert group to be established to take forward plans for future prevalence estimation.

Experts within Lithuania who have experience in using prevalence estimation techniques, including those attending the prevalence estimation workshops, should be supported in order that they can carry out further prevalence estimations.

The truncated Poisson analysis (using needle exchange data) for Vilnius and Klaipeda was of limited success. This was not the fault of either needle exchange, rather it would be due to the assumptions related to the method. In particular, it was difficult for me to assess if it was possible to identify unique individuals using the identifying codes they use in the needle exchanges (partly due to my lack of experience of the Lithuanian alphabet). It would, however, be useful if the needle exchanges in Klaipeda received support in converting their data into a computerised format (similar to the format in Vilnius). I would only recommend this if it did not detract from the main purpose of the needle exchange provision in Klaipeda, i.e. to distribute clean needles to prevent the spread of HIV / AIDS and hepatitis. I would recommend that their data should be computerised for their own purposes (of assisting in the monitoring of their service) however there may be merit in having a trained data collector going over the paper copies of monitoring data, entering them into a database in order to feed into a future truncated Poisson analysis. There may be merit in a joint meeting between those involved in collecting the monitoring data in the Vilnius needle exchange and the Klaipeda needle exchanges to examine how feasible it would be to begin to computerise the Klaipeda data.

If it does not detract from the work of the needle exchanges in Klaipeda, they should be supported in computerising their data.

The national prevalence estimates for Lithuania were constructed by extrapolating the results of prevalence estimation in Vilnius to the whole country (assuming that half of the country's

problem drug user or injecting drug users live in the Vilnius Municipality). If prevalence estimates were available for 3 (or preferably 4) sites in Lithuania, it may be possible to use the multiple indicator method to provide a more reliable estimate of the national prevalence and also possibly to provide approximate estimates for other municipalities / regions. There does appear to be sources of indicator data (particularly from the Ministry of the Interior) that can be broken down to the municipality / region level that could be used in a multiple indicator analysis.

Once local estimates have been found for 3 or more locations in Lithuania, the use of the multiple indicator method to provide further information on the national prevalence estimates should be examined.

Finally, the estimates obtained during the brief period of fieldwork in September should be seen as a starting point. They are provisional and should be subject to review and criticism from a range of experts within Lithuania. I feel the estimate of the prevalence of problem drug use for Vilnius is of sufficient quality to be submitted to the EMCDDA by the Lithuania Focal Point, however it should still be made subject to comment by relevant experts and professionals. Although the injecting estimates for Vilnius and Klaipeda should be seen as provisional (as should the national estimates for Lithuania) I feel they do seem sensible. It is only by consideration, review and criticism of these estimates that further, more reliable estimates can be produced in the future.

The prevalence estimates derived in this assignment should be viewed as provisional and shared with experts and professionals for review, comment and criticism in order to improve prevalence estimation in the future.

Appendix 1 List of Meetings

Monday 3rd September 2007

Ms. **Audrone Astrauskiene**, Director Drug Control Department (DCD) under the Government of the Republic of Lithuania

Mr. **Saulius Caplinskas**, Director of Lithuanian AIDS centre

Mr. **Vytautas Kriauza**, Deputy Director of State Patient Fund under the Ministry of Health

Ms. **Ana Dalinkeviciene**, Head of Statistical Data Division, Ministry of Interior, IT and Communications Department

Ms. **Ona Davidoniene**, Director of State Mental Health Centre

Ms. **Signe Rotberga**, Regional Project Coordinator, UNODC Project Office for the Baltic States

Tuesday 4th September

Mr. **Aleksandras Slatvickis**, Director of Klaipeda Mental Health Centre

Ms. **Svetlana Zamkovaja**, Deputy Director of Klaipeda Centre for Addictive Disorders

Ms. **Snieguole Gelzinyte**, Supervisor, Anonymous Drug User Counselling Service in Klaipeda.

Wednesday 5th September

Mr. **Emilis Subata**, Director of Vilnius Centre for Addictive Disorders

Ms. **Egle Pincevicius**, Vilnius Centre for Addictive Disorders

Friday 7th September

Ms. **Rima Vaitkiene**, Secretary of the Ministry, Ministry of Health under the Government of the Republic of Lithuania

Ms. **Daiva Paulikiene**, Head of Law division, State Data Protection Inspectorate

Ms. **Jolita Supranaviciute**, Chief Specialist of Law division, State Data Protection Inspectorate

Mantas Gurevičius from the Drug Control Department attended all meetings. Vytautas Gasperas from the Drug Control Department attended all meetings apart from the meetings with Ms. Audrone Astrauskiene and Ms. Rima Vaitkiene. Ms Maria Gannon (from the Centre for Drug Misuse Research at the University of Glasgow) also attended the meetings at the Vilnius Centre for Addictive Disorders and the State Data Protection Inspectorate.

Appendix 2 Participants at Prevalence Estimation Workshop

Jolanta Ašembergienė	Hygiene Institute
Irma Čaplinskienė	Lithuanian AIDS Centre
Motiejus Dulksnys	Vilnius University, Faculty of Medicine
Vytautas Gasperas	Drug Control Department
Algirdas Griskevičius	Lithuanian AIDS Centre
Mantas Gurevičius	Drug Control Department
Romualdas Gurevičius	Hygiene Institute
Larisa Jakovuk	State Mental Health Centre
Vytautas Jurkuvėnas	Hygiene Institute
Brigita Kairienė	Klaipėda's Public Health centre
Virginija Kanapeckienė	Hygiene Institute
Asta Palekauskaitė	Hygiene Institute
Rožė Perminienė	Klaipėda's Municipality, Health care division
Jelena Stanislavovienė	State Mental Health Centre
Marija Veniūtė	Vilnius University, Faculty of Medicine
Kęstutis Žagminas	Vilnius University, Public Health institute

A translator (Vida Augustauskienė) was present throughout the workshop.