

HIV/AIDS AMONG IDUs IN GREECE: REPORT OF A RECENT OUTBREAK AND INITIAL RESPONSE POLICIES

M. Malliori ⁽¹⁾, M. Terzidou ⁽²⁾, D. Paraskevis ⁽³⁾, A. Hatzakis ⁽³⁾

⁽¹⁾ Greek Organisation Against Drugs (OKANA)

⁽²⁾ Greek Reitox Focal Point, University Mental Health Research Institute

⁽³⁾ National Retrovirus Reference Center, Department of Hygiene, Epidemiology and Medical Statistics, Athens University Medical School

Acknowledgements:

We are grateful to Mrs Katerina Micha, Head of Research Department of OKANA and Mrs Anastasia Drimousi, Head of MABY Drug Addicts Care Facility of OKANA, for providing and processing routine data from the Low Threshold Services of OKANA, Mr Anastasios Fotiou, Head of the Epidemiology section of the Greek focal point for contributing his data from the routine monitoring, Ms Roula Andaraki, Head Statistician of the Greek focal point for analysing the epidemiological data and Ms Maria Katsimicha, NRRC Secretariat, for excellent assistance.

A. Brief background on drug treatment and drug use reduction situation in Greece

The number of heroin users in Greece in 2010 is estimated to be 22 515 (range 20 202–25 171). Approximately 70 % of them live in Athens Metropolitan Area. For the same reference year, the estimated number of injecting drug users (IDUs) in the general population, 15–64 years old, is estimated to be 9 439 (range 8 110–11 060). The majority of IDUs (52 %) belongs to the 25–34 age group, while 28.5 % are older (Greek Reitox focal point unpublished data).

According to data of high reliability, the prevalence of hepatitis C virus in IDUs is estimated to be 50.2 % (44.9–55.5), while the prevalence of anti-HBc is estimated to be 20.5 % (14.6–26.3) and HBsAg is estimated to be 2.5 % (2.3–2.7). The prevalence of anti-HIV was relatively low during the previous decade at 0.5 % (0.3–0.8) (1).

In 2010, 74 therapeutic programmes were existing in Greece, providing all treatment modalities. These include 25 opioid substitution units, 43 psychosocial interventions (drug-free) programmes and six treatment programmes implemented in the prison settings. A little more than 8 000 users were treated in these agencies in 2010 with approximately 70 % of them being IDUs (Greek Reitox focal point unpublished data).

Laboratory testing for HIV/AIDS is a prerequisite for admission to all drug treatment services in Greece. Laboratory tests are performed either by the specialised units within the drug treatment service or through a collaborating network of laboratories in public hospitals and other health services. The Greek Reitox focal point (hereafter referred to as FP) has been monitoring the prevalence of HIV/AIDS infection among injecting drug users in Greece since 2000.

B. Brief background of HIV in Greece, description of the outbreak

The Hellenic Center of Disease Control and Prevention (HCDCP) is responsible for general HIV/AIDS surveillance in Greece. Data coverage is high (estimated to be 80–90 %) because antiretroviral therapy is prescribed free of charge. Case reporting is mandatory, anonymous and confidential. Data from the routine collection and from the HCDCP are presented in the National report of the focal point submitted every year to the EMCDDA.

During 2011, the number of reported cases of HIV/AIDS among IDUs has sharply increased. By the end of July, 113 cases had been reported in the HCDCP surveillance system while, from 2001 to 2010, the number of reported cases ranged from 3 to 19 per year (Figure 1). This increase in the reported cases is consistent to a more than ten-fold increase in the incidence of diagnosed cases of HIV infection among IDUs. According to HCDCP, there have been no changes in testing policy that could explain this increase (1).

The total number of HIV/AIDS cases by year is also shown in Figure 1. By the end of July 2011, 559 cases were reported. Preliminary estimation suggests an increase of about 60 % in the total number of cases by the end of 2011, while only 50 % of the increase could be explained by IDUs. Early preliminary data suggest that 62 % of reported IDUs were of Greek origin, 15 % were immigrants and 23 % with unknown nationality.

Routine HIV/AIDS prevalence data are collected according to the EMCDDA 2006 DRID draft protocol. The network of data providers consists of inpatient and outpatient treatment services (both drug-free and substitution), low-threshold

(1) By the time of publication of this report — November 2011 — the number of cases exceeded 170.

services, public laboratories and hospitals. Data providers submit on a yearly basis their data to the FP, either through individual forms or through datasets of aggregated data. No checks for double counting can be conducted between individual and aggregated data. Results on individual data collected through the special forms are presented as 'FP network data' and the aggregated data (delivered from KETHEA and 18 ANO treatment agencies) are presented separately by the treatment agency.

HIV/AIDS prevalence has traditionally been low in Greece both in the general population and among the IDUs. Figure 2 shows the prevalence of HIV-positive individuals among those tested at admission in treatment from 2002 until July 2011. Based on FP data the anti-HIV prevalence ranged from 0.3–0.8 % during the years 2002–10. In the first seven months of 2011, a sharp increase is obvious in all three data sources.

As is shown in Figure 3, an increasing trend in the prevalence of anti-HCV (EIA) in injectors entering treatment with less than two years of injecting history was evident already since 2003 — and especially after 2008 — in the Data source A, which includes data from mostly OST and low-threshold programmes (Source: FP unpublished data; EMCDDA Statistical bulletin <http://www.emcdda.europa.eu/stats11/inftab113>). There is a gradual increase in the prevalence of anti-HCV during the years 2001–10 in contrast with the sharp increase of anti-HIV in 2011.

Figure 1: Number of newly reported HIV/AIDS cases by year in Greece (total and IDUs) during 2000–31 July 2011

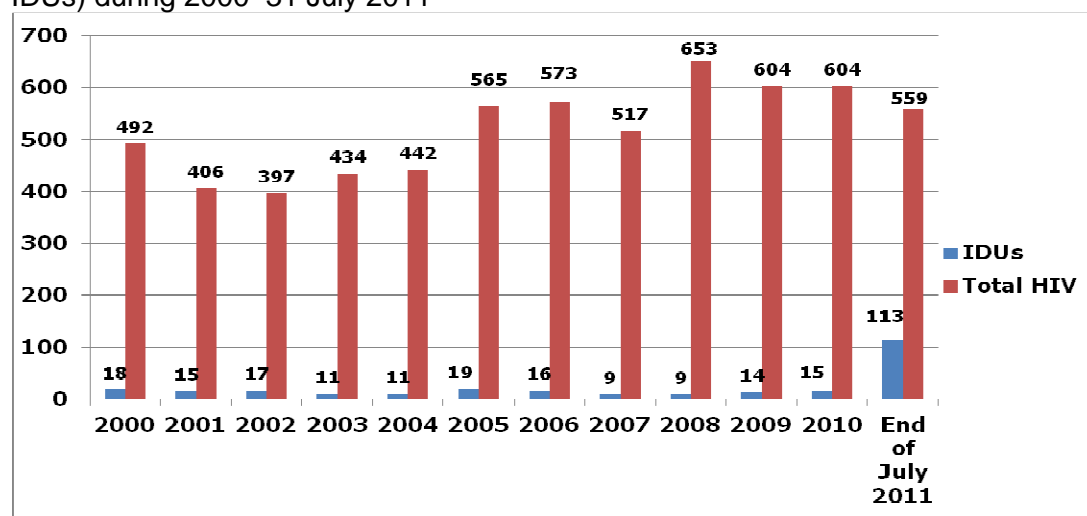


Figure 2. Trends in the prevalence of HIV/AIDS among those IDUs examined in 2002–10. Data presented separately for the three different data sources

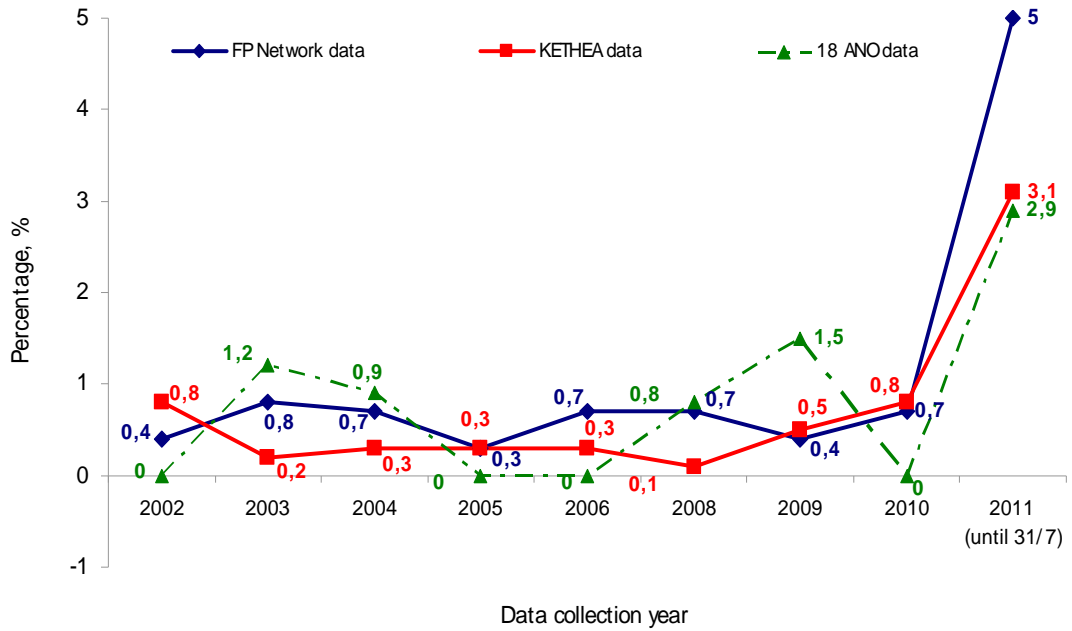
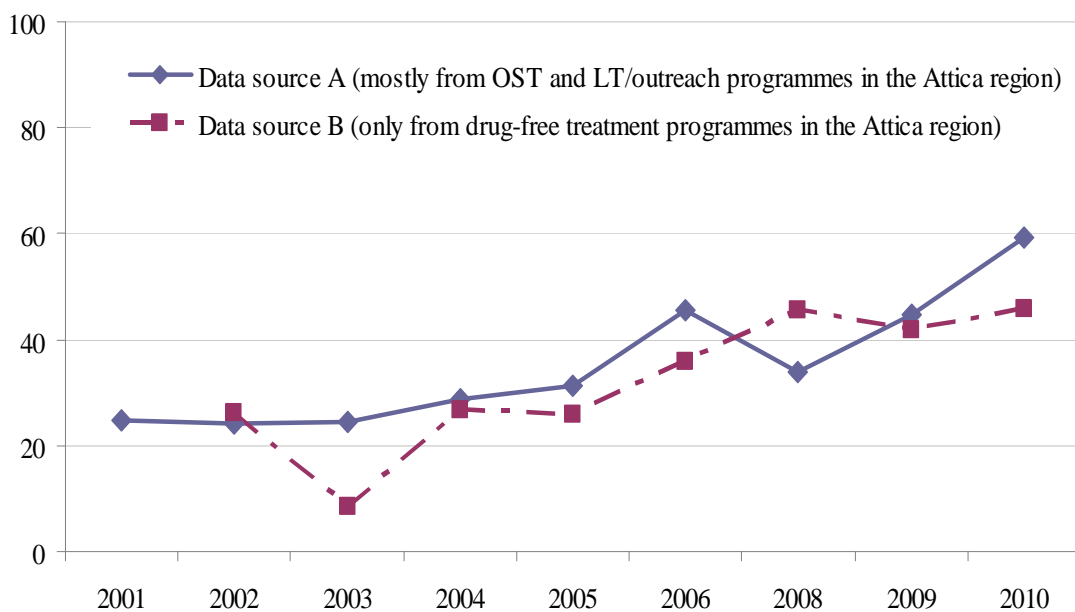


Figure 3: HCV (HCVab) prevalence among new injectors (injecting less than two years) in IDUs entering treatment in the Attica region, by source of data (%)



Molecular epidemiology: In order to identify whether the HIV-1 epidemic spreads among IDUs through local IDUs networks, phylogenetic analyses were performed on HIV-1 sequences sampled from IDUs (n=111) collected during 1999 up to 30 April 2011. These sequences have been submitted for routine testing of antiretroviral resistance before documentation of the outbreak. We included in the analysis sequences from a large number of HIV-1 infected individuals in Greece (approximately n=2327) sampled over the same time period and HIV-1 isolates sampled globally (n=2715 sequences). Phylogenetic analysis was performed using the Neighbour-Joining (NJ) method. A preliminary molecular epidemiology analysis of this outbreak was recently published (2).

Analysis including reference strains from different sub-types (3, 4) revealed that the prevalence of HIV-1 sub-types in IDUs between 1999 and 2011 was as follows: Sub-type B: 52/111 (47 %), sub-type A: 42/111 (38 %), sub-type G: 4/111 (4 %), others 13/111 (12 %).

Detailed phylogenetic and phylogeographic analyses of the HIV-1 epidemic among IDUs showed:

— Sub-type B sequences from 43 out of 52 IDUs (83 %) did not form clusters with sequences from other IDUs from Greece. Nine sequences (17 %) fell within three separate small IDU networks (two clusters of two sequences and one cluster consisting of five IDUs). The sequences of the largest cluster originated from Greece (Figure 4B), while for the other two small ones, the exact origin couldn't be identified due to the complex nature of sub-type B dispersal in the western world (Paraskevis et al., 2009).

— Sub-type A sequences from 25 out of 42 IDUs (60 %) did not form clusters with sequences from other IDUs from Greece, while sequences from 17 (40 %) IDUs belonged to three networks: a single cluster of 12 sequences and two other consisting of two and three sequences (Figure 4). The largest network was infected with a strain that originated from Asia; the single cluster of three sequences had a strain that originated from the former Soviet Union (FSU) countries and the other one a strain from Greece.

- Until 2009, 4 out of 72 IDUs (6 %) belonged to IDU clusters. The specific origin of the virus couldn't be identified; however, it was from outside Greece (Table 1).
- In 2010, 6 out of 11 IDUs (55 %) fell within IDU clusters (3 from FSU, 1 from Europe (Portugal and Spain) and for 2 the specific origin couldn't be identified) (Table 1).
- In 2011, 22 out of 23 sequences (96 %) were found to belong to IDU networks. The origin of the virus was from Asia (12 cases), Greece (7 cases) and from Europe (Portugal and Spain) (3 cases) (Table 1).

In conclusion:

1. Up to 2009, clustered IDU transmission of HIV-1 was uncommon among the reported IDUs cases suggesting that sexual transmission may have prevailed up to 2009.
2. During 2011, clustered IDU transmission was dominant as suggested by the analysis of HIV sequences.
3. Despite that the majority of IDU cases occurred among people of Greek origin the proportion of immigrants among the new cases is high, while HIV strains

that originated in Asia, former Soviet Union and Africa (mostly sub-type A) currently dominate.

Figure 4. Part of phylogenetic trees showing **A.** HIV-1 sequences from IDUs in Greece originating from Asia (sub-type A) and **B.** HIV-1 sequences from IDUs in Greece originating from a local transmission network (sub-type B).

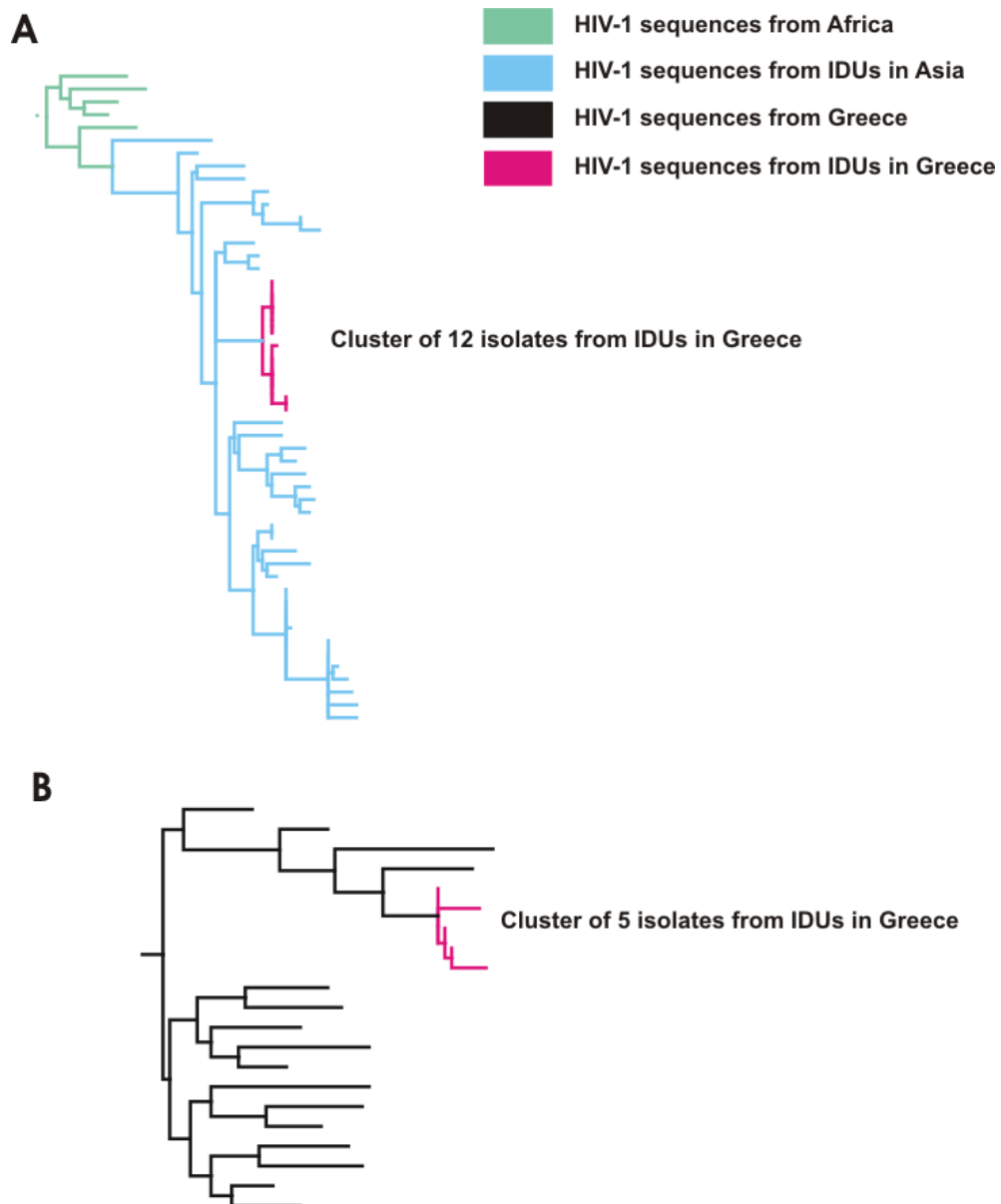


Table 1. Clustered HIV-1 infections among IDUs over time. In total 111 sequences were analysed belonging to A, B and other sub-types. Among them, isolation dates were available for 106 sequences.

Sub-types Time period	Sub-type B	Sub-type A	Non-A/non-B sub-types	Total sequences analysed
Until 2009	3	0	1	72
2010	1	3	2	11
2011	5	14	3	23
Total	9	17	6	106

C. Possible hypothesis of the outbreak circumstances and risks of further spread

The possible causes for the increase may have different origin in connection with the following:

- (a) Social, economic, institutional, legal or other factors which may have prevented or limited the implementation of interventions designed to provide needles and syringes or opioid substitution programmes and to screen, inform and treat IDUs;
- (b) Factors which may have changed the patterns of use including increase of needle sharing;
- (c) Factors which may have changed the patterns of illicit drug trafficking;
- (d) Factors which may have shifted the IDUs' sexual practices towards riskier ones including increased sex work;
- (e) The role of the country's economic crisis in this development.

According to experts, anecdotal reports suggest the increase in HIV/AIDS cases started already in the last quarter of 2010 and continued with more intensity in 2011. The overwhelming majority of cases have been detected in Athens. Most of them have been notified by the Direct Aid and Support Unit (MABY), which performs tests for the OKANA substitution treatment programmes in Athens and for KETHEA programmes.

In order to respond to the observed increase in HIV/AIDS cases, the OKANA Direct Aid and Support Unit (MABY) increased, as of May 2011, the number of syringes allowed for exchange (from 25 to 40 per patient weekly) and the number of condoms distributed to active users (from 7 weekly to 25 or even 40 for injecting sex workers).

Due to public annoyance in the city centre of Athens, where there is the highest concentration of drug users, a stronger police presence and 'sweep operations' occurred to disperse drug users, albeit only temporarily, thereby making it harder for them to reach the street-work professionals.

Furthermore, the Greek Reitox focal point highlighted in its *2010 Annual Report on the State of Drugs and Alcohol in Greece* that, compared to the estimated number of problematic drug users, the number of low-threshold programmes is very small in

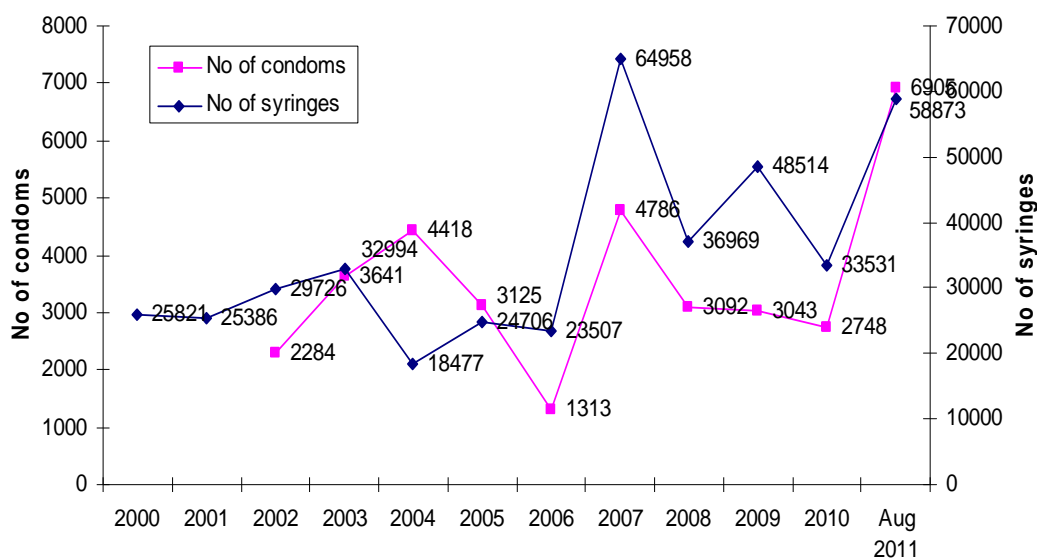
Greece, i.e. a total of four, three of them in Athens: MABY Drug Addicts' Care Facility (OKANA), EXELIXIS (KETHEA) and 'Streets of Athens' (Medecins du Monde NGO) and one in Thessaloniki — the Outreach programme of the Self-Help promotion programme, which operates as a collaboration between OKANA and Aristotle University of Thessaloniki. The programme 'Streets of Athens' was not in operation in the last four months of 2009, while the Thessaloniki programme had suspended its street-work services for two years (2009–10), and has resumed action in 2011.

A possible key factor in relation to the above seems to be the economic crisis, resulting in limited opportunities to make money from e.g. occasional employment, hand-outs, pocket money from parents etc., while leading to an increasing number of (mostly) problematic users prostituting themselves to make money to support their habit. However, the molecular epidemiology data suggest that HIV transmission through needle sharing is currently the most important route of transmission. This seems to be further aggravated by the significant increase in the number of (mostly illegal) immigrants, who tend to concentrate in downtown Athens.

All the above-mentioned factors are indicative for two main hypotheses. First, behavioural risk factors, such as an increase in needle-sharing and unsafe sex practices have deteriorated recently, facilitating a change from sexual to needles/syringes sharing HIV transmission patterns. Second, more HIV-seropositive immigrant IDUs have likely arrived in the Athens Metropolitan Area population. Contact of local and immigrant IDUs and increased risk behaviours facilitated an explosion of HIV transmission. The economic crisis and the concomitant social and behavioural disruption facilitated and catalysed HIV transmission.

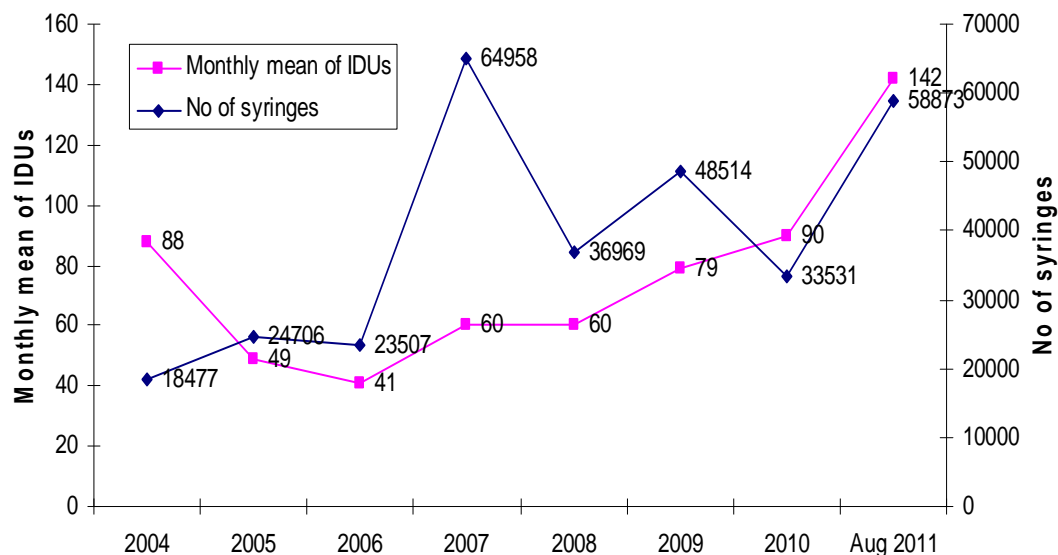
A possible third hypothesis might be a disruption to preventive programmes such as street-work programmes and provision of needles and syringes in the centre of Athens. It is clear that the distribution of condoms and needles during the period 2008–10 was significantly lower in comparison with the year 2007. From the beginning of 2011, there is a big change in the number of condoms as well as for needles distribution (Figure 5a and 5b).

Figure 5a: Number of condoms and needles distributed by the Needle exchange programme of OKANA in the years 2000–11



Source: Greek Organisation Against Drugs (OKANA)

Figure 5b: Monthly mean of IDUs attending and no of syringes distributed by the Needle exchange programme of OKANA during the years 2004–11



Source: Greek Organisation Against Drugs (OKANA)

D. Steps taken until now and possible steps that should be taken to avoid further spread

A wealth of international experience suggests that without a major and successful preventive effort, a 10 % or higher anti-HIV prevalence can be reached within 2–4 years (5–10). In the case of a 10 % increase, this would imply that some 1 200–1 300 new HIV infected IDUs plus 1 200–1 300 new HIV-infected people from other risk groups could present to services, which would not be manageable by the National Health System, especially under the current circumstances of economic crisis. To face this threat, the following measures are proposed:

- (a) evaluation of the proposals of international organisations (11–13) and the Greek ability to implement such proposals;
- (b) concrete prevention measures to be taken immediately.

Table 2. Nine interventions outlined in the WHO, the UNODC, UNAIDS technical guide for the prevention and treatment of HIV among drug injectors

Source: WHO, UNODC, UNAIDS (2009,) *Technical guide for countries to set targets for universal access to HIV prevention, treatment and care for injecting drug users*, WHO, Geneva (11).

1. needle and syringe exchange programmes;
2. drug dependence treatment and in particular opioid substitution therapy for people who use opioids;
3. antiretroviral therapy for HIV-positive people (and their sexual partners);
4. HIV testing and counselling;
5. prevention and treatment of sexually transmitted infections;

6. condom programmes for people who inject drugs and their sexual partners;
7. targeted information, education and communication for people who inject drugs and their sexual partners;
8. vaccination, diagnosis and treatment of viral hepatitis;
9. prevention, diagnosis and treatment of tuberculosis.

Table 3. The proposal of the Independent Reference Group to the United Nations

Source: *Independent Reference Group to the United Nations calls for Member States to scale up evidence-based interventions to address HIV among people who inject drugs ahead of the High Level Meeting on AIDS (12).*

1. Improve engagement with people who inject drugs in shaping responses to HIV/AIDS.
2. Support a public health, rights-based approach to HIV programming that recognises that access to life-saving, proven interventions for the prevention and treatment of HIV is a human right for all people, including people who inject drugs.
3. Urgently implement and/or scale up the comprehensive package of nine interventions outlined in the WHO, the UNODC and UNAIDS technical guide for the prevention and treatment of HIV among people who inject drugs.
4. Remove legislation and policies that prevent the introduction or inhibit the delivery of these nine interventions.
5. Commit to ending punitive law-enforcement approaches to injecting drug use.
6. Improve integration of HIV services with treatment for drug dependence.
7. Commit to treating health conditions that co-occur alongside HIV among people who inject drugs.
8. Gather data to enhance the response to HIV among people who inject drugs.

Table 4. The Joint ECDC and EMCDDA Guidance

Source: ECDC and EMCDDA guidance (2011), 'Prevention and control of infectious diseases among people who inject drugs', EMCDDA/ECDC, Stockholm, October 2011 (13).

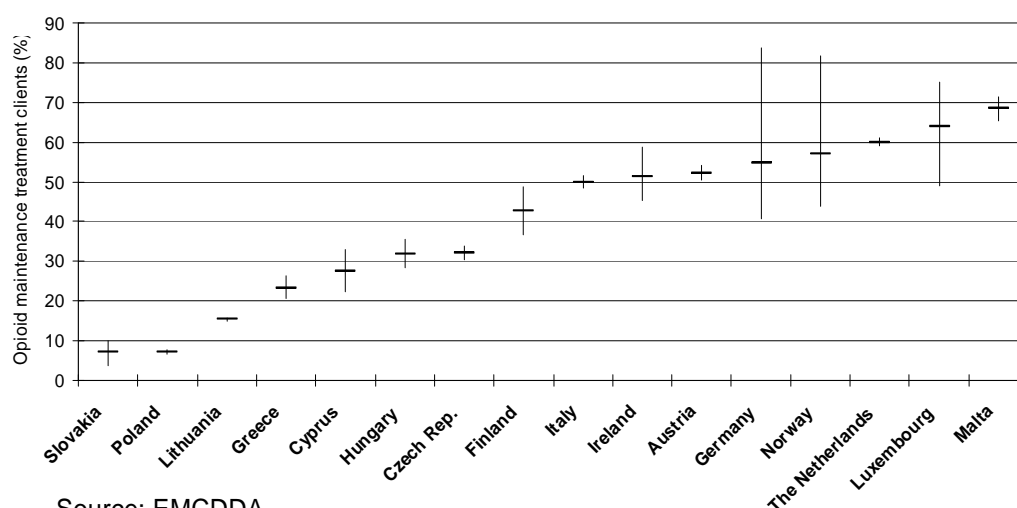
1. Injection equipment: Provision of, and legal access to, clean drug injection equipment, including sufficient supply of sterile needles and syringes free of

charge, as part of a combined multi-component approach, implemented through harm-reduction, counselling and treatment programmes.
2. Vaccination: Hepatitis A and B, tetanus, influenza vaccines, and, in particular for HIV-positive individuals, pneumococcal vaccine.
3. Drug dependence treatment: Opioid substitution treatment and other effective forms of drug dependence treatment.
4. Testing: Voluntary and confidential testing with informed consent for HIV, HCV (HBV for unvaccinated) and other infections including TB should be routinely offered and linked to referral to treatment.
5. Infectious disease treatment: Antiviral treatment based on clinical indications for those who are HIV, HBV or HCV infected. Anti-tuberculosis treatment for active TB cases. TB prophylactic therapy should be considered for latent TB cases. Treatment for other infectious diseases should be offered as clinically indicated.
6. Health promotion: Health promotion focused on safer injecting behaviour; sexual health, including condom use; and disease prevention, testing and treatment.
7. Targeted delivery of services: Services should be combined and organised and delivered according to user needs and local conditions; this includes the provision of services through outreach and fixed site settings, offering drug treatment, harm reduction, counselling and testing, and referrals to general primary health and specialist medical services.

With regard to the interventions outlined in the WHO, UNODC and UNAIDS technical guide (11), the proposal of the Independent Reference Group to the United Nations (12), and the ECDC–EMCDDA Joint Guidance (13), it is true that although all of them have been developed in Greece, several of them are not adequate. More specifically, in Greece:

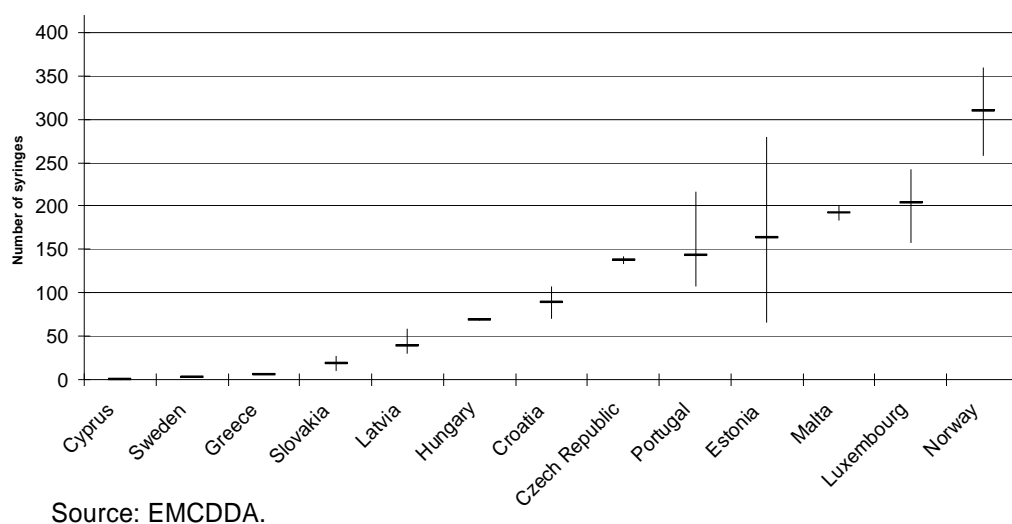
1. HIV/AIDS anonymous screening and counselling, as well as antiretroviral therapy for HIV-positive people and their sexual partners are provided for by law and are widely available. This also holds true for prevention interventions targeting AIDS or other infectious diseases, i.e. hepatitis B and C and tuberculosis.
2. All treatment modalities are available to drug-dependent individuals. Psychosocial interventions (drug-free programmes) can admit users who seek treatment immediately, i.e. they have no waiting list. On the other hand, the Substitution Programme and, in particular, the units based in Athens, where the focus of the problem of increasing HIV/AIDS cases is located, have a long waiting list. By the end of June 2011, all over Greece, 5 573 drug users were actively enrolled in opioid substitution programmes (approximately 23 % of the estimated number of heroin users), while the pending active applications were 7 428 (3 500 in Athens with a mean waiting time of more than seven years). As a consequence, Greece has had relatively low coverage of opioid substitution treatment in comparison with other EU countries (Figure 6).

Figure 6: OST coverage among estimated problematic opioid users in the EU, 2009 or most recent year available



- As already mentioned, syringe and injecting equipment exchange or distribution programmes are available, but they are few and with a limited coverage. As a consequence, Greece has had very low coverage of needle and syringe provision in comparison with other EU countries (Figure 7).

Figure 7: Syringes distributed through specialised programmes per estimated IDU per year (2004–09, EU, Croatia and Norway)



- Low-threshold programmes for active users also include condom distribution, though with the aforementioned limitations in terms of number and coverage.
- As already mentioned, awareness-raising and information interventions addressed to problem users and their injecting and sex partners concerning the risks and high-risk practices are insufficient, and the specific needs or characteristics of such groups have not been taken into consideration while designing or implementing the interventions.

According to the above points, the following measures should be taken or scaled up under the circumstances:

1. Cooperation of all competent bodies — including NGOs — in preparing a national action plan on the management of infectious diseases, with a special focus on IDUs. A standing committee should be set up, under the auspices of HCDCP, to study the proper ways of tackling the problem.
2. Consolidation and improvement of the mechanism for the documentation and monitoring of (new) HIV/AIDS cases and other infectious diseases among drug users, through stepping up cooperation between the Greek Reitox focal point and HCDCP.
3. Health alerts for health professionals in case of a sudden change in the number and/or rate of new HIV/AIDS cases among IDUs and prompt utilisation of the Early warning system of the Greek Reitox focal point, a mechanism enabling us to rapidly respond to and inform all the agencies involved about drug-related emerging trends (new drugs, new patterns of use, new cases, etc.) which may be a risk for public health (See <http://www.ektepn.gr/Activities/SEP/>).
4. A public information campaign with the involvement of the media, with a special focus on groups at risk. Leaflets translated in the various languages spoken by the immigrants.
5. Expansion and staffing of low-threshold services and provision of the funds needed to increase the number of street-work teams, as well as the number of syringe exchange and distribution and condom distribution programmes.
6. Expansion of harm reduction interventions to cover special population groups, prisoners in particular.
7. Increased drug users' access to therapy. Expansion of the Substitution programme. Elimination of waiting lists. Continued funding to drug-free programmes.
8. Access to immigrants' groups through their organisations, to ensure their engagement in infectious disease information and prevention as well as generally in the response to the outbreak.
9. Illegal immigrants' access to HAART, opioid substitution, needle-syringe exchanges and medical care in general.
10. Specialised education/training in prevention for the staff of health services, so as for them to relay information to high-risk groups they come in contact with.
11. It was agreed that the Greek Reitox focal point would receive the questionnaires with the results of medical examinations every two months.
12. The aforementioned prevention measures entail a burden for the budgets of the competent bodies, but they should be looked at in the light of the cost of treatment of AIDS.

The following steps were immediately taken:

1. Intensification of needle-syringes and condom provision programmes in downtown Athens (middle of 2010).
2. A switch from high to low dead-space syringes is under way (14–16), (September 2011).
3. Systematic HIV screening of IDUs in treatment programmes was initiated (September 2011).

4. Awareness campaign directed to IDUs was implemented in the center of Athens (March 2011).
5. All HIV positive IDUs, including illegal immigrants, were offered prioritised opioid substitution and antiretroviral therapy (active before detection of the outbreak).
6. A molecular epidemiology surveillance programme was initiated to describe the transmission networks, the origin of HIV strains and to identify index cases (May 2011).
7. A major restructuring of opioid substitution programmes is under way which is anticipated to eliminate the waiting list by the end of 2011. During September 2011, OKANA has launched 17 new substitution units, in collaboration with hospitals in Athens and Thessalonica, whereas by the end of the year, 20 new units are also planned to be established. Moreover, in order to increase access of treatment at the local level, substitution units are to be established in 13 other cities as a part of the effort to cover all Greek prefectures.
8. A major intervention study is planned by OKANA, HCDCP and Athens University Medical School.

E. Broader discussion of implications for harm reduction, drug treatment policies

The increase in HIV/AIDS cases among IDUs is a serious and recent problem. The most probable causes may be, among others, lack of information, increased needle-sharing, and recent influx of immigrants, resulting in higher pressure on the already limited services. In relation to the latter, the economic crisis and the concentration of a large number of immigrants in downtown Athens may have played an important role. Interestingly, a neighbouring country, Bulgaria, experienced a steady increase in HIV reporting rates, from zero per million population in 2003 to almost 10 per million in 2009 (17–19).

Among IDUs and problematic drug users, there is a lack of information concerning the routes of HIV transmission and the precautions, as well as poor access to infectious disease control and management services.

The measures to be taken immediately in order to respond to this situation include an information/awareness campaign to raise public and IDUs' awareness, increased precautions, improved access to specialised substitution therapy programs and infectious disease control services of IDUs, expansion of low-threshold services, and specialised training for health professionals. The major and most urgent change is the restructuring of opioid substitution programs which is anticipated to eliminate the waiting lists and reduce substantially the residual risks within the IDUs community in Greece.

Bibliography

1. Nelson, P.K., Mathers, B., Cowie, B., Hagan, H., Don Des Jarlais, Horyniak, D., Degenhardt, L., (2011), 'Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: a systematic review', *The Lancet*, p. 378–571.
2. Paraskevis, D., Nikolopoulos, G., Tsiara, C., Paraskeva, D., Antoniadou, A., Lazanas, M., Gargalianos, P., Psychogiou, M., Malliori, M., Kremastinou, J., Hatzakis, A. (2011), 'Hiv-1 outbreak among injecting drug users in Greece, 2011: a preliminary report', *Eurosurveillance* 2011, September 08 16 (36).
3. Paraskevis, D., Magiorkinis, E., Magiorkinis, G., Sypsa, V., Papanizos, V., Lazanas, M., Gargalianos, P., Antoniadou, A., Panos, G., Chrysos, G., Sambatakou, H., Karafoulidou, A., Skoutelis, A., Kordosis, T., Koratzanis, G., Theodoridou, M., Daikos, G.L., Nikolopoulos, G., Pybus, O.G., Hatzakis, A. (2007), 'Increasing prevalence of HIV-1 sub-type A in Greece: estimating epidemic history and origin', *Journal of Infectious Diseases* 2007,15 October;196(8), pp. 1167–76.
4. Paraskevis, D., Pybus, O., Magiorkinis, G., Hatzakis, A., Wensing, A.M., van de Vijver, D.A., Albert, J., Angarano, G., Asjö, B., Balotta, C., Boeri, E., Camacho, R., Chaix, M.L., Coughlan, S., Costagliola, D., De Luca, A., de Mendoza, C., Derdelinckx, I., Grossman, Z., Hamouda, O., Hoepelman, I., Horban, A., Korn, K., Kücherer, C., Leitner, T., Loveday, C., Macrae, E., Maljkovic-Berry, I., Meyer, L., Nielsen, C., Op de Coul, E.L., Ormaasen, V., Perrin, L., Puchhammer-Stöckl, E., Ruiz, L., Salminen, M.O., Schmit, J.C., Schuurman, R., Soriano, V., Stanczak, J., Stanojevic, M., Struck, D., Van Laethem, K., Violin, M., Yerly, S., Zazzi, M., Boucher, C.A., Vandamme, A.M. (2009), 'Spread programme. Tracing the HIV-1 sub-type B mobility in Europe: a phylogeographic approach', *Retrovirology*, 20 May 2009, 6:49.
5. Mathers, B.M., Degenhardt, L., Phillips, B., Wiessing, L., Hickman, M., Strathdee, S.A., Wodak, A., Panda, S., Tyndall, M., Toufik, A., Mattick, R.P. (2008), 'Global epidemiology of injecting drug use and HIV among people who inject drugs: a systematic review', *Lancet* 372, pp. 1733–1745.
6. Mathers, B.M., Degenhardt, L., Ali, H., Wiessing, L., Hickman, M., Mattick, R.P., Myers, B., Ambekar, A., Strathdee, S.A. (2010), 'HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage', *Lancet* 375, pp. 1014–1028.
7. Friedman, S.R., Rossi, D., Braine, N. (2009), 'Theorising "Big Events" as a potential risk environment for drug use, drug-related harm and HIV epidemic outbreaks', *International Journal of Drug Policy*, 20, pp. 283–291.
8. Strathdee, S.A., Hallett, T.B., Bobrova, N., Rhodes, T., Booth, R., Abdool, R., Hankins, C.A. (2010), 'HIV and risk environment for injecting drug users: the past, present, and future', *Lancet* 376, pp. 268–284.
9. Rhodes, T., Stimson, G.V., Fitch, C., Ball, A., Renton, A. (1999), 'Rapid assessment, injecting drug use, and public health', *Lancet* 354, pp. 65–68.
10. Des Jarlais, D.C., Semaan, S. (2008), 'HIV prevention for injecting drug users: the first 25 years and counting', *Psychosomatic Medicine*, 70, pp. 606–611.
11. WHO, UNODC, UNAIDS (2009), 'Technical guide for countries to set targets for universal access to HIV prevention, treatment and care for injecting drug users', WHO, Geneva.

12. Independent Reference Group to the United Nations Calls for Member State to Scale up Evidence-Based Interventions to Address HIV among People who Inject Drugs ahead of the High-Level Meeting on AIDS 2010:
http://www.unodc.org/documents/hiv aids/HLM_statement1.pdf
13. ECDC and EMCDDA guidance (2011), 'Prevention and control of infectious diseases among people who inject drugs', EMCDDA/ECDC, Stockholm, October 2011. <http://www.emcdda.europa.eu/publications/ecdc-emcdda-guidance>
14. Zule, W.A., Bodashev, G. (2009), 'High dead-space syringes and the risk of HIV and HCV infection among injecting drug users', *Drug Alcohol Dependence* 2009; 100, pp. 204–13.
15. Abdala, N., Stephens, P.C., Griffin, B.P., Heimer, R. (1999), 'Survival of HIV-1 in syringes', *Journal of Acquired Immune Deficiency Syndrome and Human Retrovirology* 1999;20, pp. 73–80.
16. Painsil, E., He, H., Peters, C., Lindenbach, B.D., Heimer, R. (2010), 'Survival of hepatitis C virus in syringes: implications for transmission among injection drug users', *Journal of Infectious Diseases* 2010; 202, pp. 984–90.
17. Wiessing, L., Likatavicius, G., Klempova, D., Hendrich, D., Nardone, A., Griffiths, P. (2009), 'Associations between availability and coverage of HIV-prevention measures and subsequent incidence of diagnosed HIV infection among injection drug users', *American Journal of Public Health* 99;6, pp. 1049–52.
18. EMCDDA (2010), *Annual report on the state of the drugs problem in Europe*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, November 2010. Available from:
http://www.emcdda.europa.eu/attachements.cfm/att_120104_EN_EMCD DA_AR_2010_EN.pdf
19. EMCDDA (2011), *Statistical bulletin*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, July 2011. Available from:
<http://www.emcdda.europa.eu/stats11>