
New Injectors and HIV Risk

Most persons who inject drugs for the first time are likely to be uninfected with HIV unless they are men who have sex with men or residents of a country characterized by very high rates of heterosexual transmission. Indeed, there is a considerable literature showing that new drug injectors are less likely to be infected with HIV than longer-term injectors (De Rossi et al, 1988; Friedman et al, 1989; Lima et al, in press; van den Hoek et al, 1988; Vlahov et al, 1990; Zunzunegui, 1993). The seroconversion rates of new injectors may vary in accordance with the overall seroprevalence and seroconversion rates. In cities with high but stable seroprevalence new injectors have higher seroconversion rates than long term injectors (Ciaffi et al, 1992); in cities of medium to high but increasing seroprevalence new injectors have lower seroconversion rates; and new and longer term injectors have equally low seroconversion rates in cities with low seroprevalence (Friedman et al, 1994b). Male new injectors seem to lag behind women in becoming infected in New York and some but not all other American cities (Des Jarlais et al, 1994; Friedman et al, 1993; Friedman et al, 1994a; Neaigus et al, in press). Existing data indicate that new injectors may be less aware of HIV risks than longer-term ones, and they may also engage in higher levels of risk behaviour (Kleinman et al, 1990; Friedman et al, 1989).

Introduction

In this chapter, we examine the extent to which the subjects recruited in each city were new injectors; we examine their relative HIV seroprevalence, and how this varies by gender; and we present data on risk behaviours by years of injection.

Methods

The data for this chapter were taken from the same dataset as described in previous chapters. Thus, research participants included both out-of-treatment and in-treatment drug injectors. Years of injection are defined by subtracting age at first injection from current age. For the purposes of this chapter, unless otherwise specified, "new" injectors are defined as those who have been injecting for less than or equal to six years, as opposed to "old" injectors who are defined as those who have been injecting for more than six years. For analyses using a narrower time span to define newness, "very new" injectors, defined as those who have been injecting for less than or equal to three years, are contrasted with "other" injectors who are defined as those who have been injecting for more than three years.

For some analyses, cities were classified by seroprevalence as low (Athens, Glasgow, Sydney, and Toronto, where seroprevalence was 5% or less), medium (Berlin, London, and Rome, where seroprevalence was 13% to 20%), and high (Bangkok, Madrid, New York, Rio de Janeiro, and Santos, where seroprevalence was 34% to 63%).

Results

Prevalence of new injectors and very new injectors

Tables 1a and 1b give data on the distribution of subjects by years of injection. In the twelve cities taken as a whole, 38% of subjects had been injecting for six years or less, including 20% who had injected for three years or less. In nine cities, the proportion of very new injectors was in the 20% to 28% range; in New York, however, it was only 10% and in Rome 15%. In ten of the cities, the proportion of new injectors fell into the range from 37% to 50%; Glasgow had 56%, and New York had only 16%.

Table 1a.
New and old injectors, by site and by total sample*

Site	New injectors		Old injectors	
	N	%	N	%
Athens	180	46	208	54
Bangkok	227	43	296	57
Berlin	175	46	204	54
Glasgow	280	56	217	44
London	217	42	299	58
Madrid	194	42	269	58
New York	229	16	1228	84
Rio de Janeiro	223	47	256	53
Rome	176	37	306	63
Santos	107	50	108	50
Sydney	190	47	218	53
Toronto	160	37	277	63
Total	2358	38	3886	62

* New injectors have been injecting drugs for 6 years or less; old injectors for more than 6 years.

Table 1b
Very new and other injectors, by site and by total sample*

Site	Very new injectors		Other injectors	
	N	%	N	%
Athens	87	22	301	78
Bangkok	134	26	389	74
Berlin	101	27	278	73
Glasgow	126	25	371	75
London	99	19	417	81
Madrid	91	20	372	80
New York	142	10	1315	90
Rio de Janeiro	136	28	343	72
Rome	72	15	410	85
Santos	2	24	163	76
Sydney	92	23	316	77
Toronto	87	20	350	80
Total	1219	20	5025	80

* Very new injectors have been injecting drugs for 3 years or less; other injectors for more than 3 years.

Table 2a
Percent new injectors, by gender, site and total sample* % New Injectors

Site	Men	Women	p**
Athens	49	39	.113
Bangkok	43	43	.994
Berlin	43	50	.222
Glasgow	51	69	.000
London	39	49	.032
Madrid	43	39	.509
New York	12	25	.000
Rio de Janeiro	46	53	.25
Rome	35	41	.264
Santos	50	49	.935
Sydney	45	57	.049
Toronto	36	38	.810
Total	36	43	.000

* New injectors have been injecting drugs for 6 years or less; old injectors for more than 6 years. Probabilities are by χ^2 unless otherwise indicated.

** Probability by Fisher's Exact Test.

Table 2b.
Percent very new injectors, by gender, site and total sample

* % Very new injectors			
Site	Men	Women	p**
Athens	23	19	.368
Bangkok	25	30	.589
Berlin	27	26	.725
Glasgow	23	31	.071
London	17	23	.129
Madrid	21	15	.258
New York	8	15	.000
Rio de Janeiro	27	35	.184
Rome	12	26	.001
Santos	24	25	.878
Sydney	21	29	.134
Toronto	19	23	.411
Total	19	23	.001

* Very new injectors have been injecting drugs for 3 years or less; other injectors for more than 3 years. Probabilities are by ± 2 unless otherwise indicated.

** Probability by Fisher's Exact Test.

Women form a higher proportion of new injectors (see Tables 2a and 2b) than old injectors (43% versus 36%) and of very new injectors than other injectors (23% versus 19%). In Glasgow, fully 69% of the women are new injectors (as compared to 51% of the men), and in New York these proportions are 25% and 12%. Other cities where there are significant differences are London, Sydney, and (for very new injectors) Rome. Women form a higher proportion of new injectors (see Tables 2a and 2b) than old injectors (43% versus 36%) and of very new injectors than other injectors (23% versus 19%). In Glasgow, fully 69% of the women are new injectors (as compared to 51% of the men), and in New York these proportions are 25% and 12%. Other cities where there are significant differences are London, Sydney, and (for very new injectors) Rome.

HIV seroprevalence and years of injection

As Tables 3a and 3b show, new injectors are less likely to be infected with HIV than old injectors (14% versus 25%) and very new injectors are less likely to be infected than other injectors (15% versus 28%). Given that new and very new injectors have had less potential exposure time, and that they often inject with other new injectors, this is not surprising. The city data indicate that new injectors are significantly less likely to be infected than old injectors in seven of the cities. (In three of the others - Athens, Sydney and Toronto - seroprevalences among old and new injectors are equally low.) Comparing very new injectors to other injectors, very new injectors have higher seroprevalence in

four of the high prevalence cities and in Rome. In London and Santos, prevalence does not seem to differ by years of injection (whether comparing new injectors with old injectors or very new injectors with other injectors); further research comparing these cities with others might help illuminate the processes by which HIV spreads across different networks of drug injectors.

Table 3a.
Percent HIV seropositive for new injectors and older injectors,
by site and by total sample*

Cell entries present % HIV-seropositive, with number of subjects on which this is based (the denominator) on the line underneath.

Site	New Injectors	Old Injectors	p
Athens	1 (180)	0 (208)	.127
Bangkok	29 (225)	37 (296)	.040
Berlin	11 (161)	20 (192)	.017
Glasgow	0 (253)	4 (198)	.024**
London	13 (205)	13 (271)	.721
Madrid	45 (73)	75 (71)	.000
New York	25 (130)	52 (702)	.000
Rio de Janeiro	21 (43)	41 (88)	.024
Rome	7 (61)	28 (123)	.001
Santos	66 (106)	59 (103)	.309
Sydney	2 (190)	2 (218)	.604
Toronto	6 (156)	4 (273)	.272
Total	15 (1783)	28 (2743)	.000

* New injectors have been injecting drugs for 6 years or less; old injectors for more than 6 years. Probabilities are by ± 2 unless otherwise indicated.

** Probability by Fisher's Exact Test.

Table 3b.
Percent HIV seropositive for very new injectors and other injectors,
by site and by total sample*

Cell entries present % HIV-seropositive, with number of subjects on which this is based (the denominator) on the line underneath.

Site	Very New Injectors	Other Injectors	p
Athens	0 (87)	0.66 (301)	.446
Bangkok	25 (132)	37 (389)	.014
Berlin	11 (91)	17 (262)	.161
Glasgow	0 (109)	2 (342)	.107
London	16 (93)	12 (383)	.321
Madrid	33 (36)	69 (108)	.000
New York	22 (78)	51 (754)	.000
Rio de Janeiro	10 (20)	39 (111)	.013
Rome	4 (27)	24 (157)	.019
Santos	63 (52)	62 (157)	.893
Sydney	1 (92)	2 (316)	.492
Toronto	4 (85)	5 (344)	.515
Total	14 (902)	25 (3624)	.000

* Very new injectors have been injecting drugs for 3 years or less; other injectors for more than 3 years. Probabilities are by ± 2 unless otherwise indicated.

**Probability by Fisher's Exact Test.

HIV seroprevalence and gender among new and very new injectors

Tables 4a and 4b present data on seroprevalence by gender among new and very new injectors. Men and women seem to have similar infection rates among the total samples of both new and very new injectors. Women, however, are more likely to be infected among new injectors in Athens, Berlin, and New York. Further research on why

women are more likely to be infected early in their injection careers in some cities, and why this is not true in others, may help us understand why, in some cities, men seem to be relatively protected and women seem to be at higher risk. In the meantime, it is clear that any obstacles to women making use of harm reduction programmes, drug treatment, and other prevention resources should be eliminated.

Table 4a.
Percent HIV seropositive by gender among new injectors,
by site and by total sample*

Cell entries present % HIV-seropositive, with number of subjects on which this is based (the denominator) on the line underneath.

Site	Men	Women	p
Athens	0 (147)	6 (33)	.033**
Bangkok	29 (215)	20 (10)	.728**
Berlin	5 (84)	17 (77)	.012**
Glasgow	1 (158)	0 (95)	1.00**
London	14 (123)	13 (82)	.934
Madrid	47 (64)	33 (9)	.445**
New York	18 (74)	34 (56)	.032
Rio de Janeiro	23 (31)	17 (12)	.669
Rome	4 (52)	22 (9)	.100**
Santos	65 (62)	68 (44)	.695
Sydney	2 (141)	0 (45)	1.00**
Toronto	8 (118)	0 (38)	.120**
Total	15 (1269)	16 (510)	.429

* New injectors have been injecting drugs for 6 years or less; old injectors for more than 7 years. Probabilities are by χ^2 unless otherwise indicated.

** Probability by Fisher's Exact Test.

Table 4b.
Percent HIV seropositive by gender among very new injectors,
by site and by total sample*

Cell entries present % HIV-seropositive, with number of subjects on which this is based (the denominator) on the line underneath.

Site	Men	Women	p
Athens	0 (71)	0 (16)	NA
Bangkok	25 (125)	29 (7)	1.00**
Berlin	8 (51)	15 (40)	.325**
Glasgow	0 (67)	0 (42)	NA
London	16 (55)	16 (38)	.941
Madrid	35 (34)	0 (2)	.543**
New York	15 (47)	32 (31)	.069
Rio de Janeiro	15 (13)	0 (7)	.521
Rome	0 (20)	1 (7)	.259**
Santos	63 (30)	64 (22)	.982
Sydney	1 (67)	0 (23)	1.00**
Toronto	3 (62)	0 (23)	.560**
Total	14 (127)	15 (773)	.583

* Very new injectors have been injecting drugs for 3 years or less; other injectors for more than 3 years. Probabilities are by $\div 2$ unless otherwise indicated.

** Probability by Fisher's Exact Test.

Risk and other behaviours

Tables 5a and 5b (see pages 118-121) present data on a number of behaviours for the total sample and for subsets of low, medium and high seroprevalence cities. This both allows for concise presentation of the results and also allows investigation of whether the

differences in behaviours between new and old injectors (and very new and other injectors) might be related to the extent to which HIV is present in the drug-injecting population.

Approximately 42% of drug injectors had injected with syringes that others had used in the prior six months, and an approximately equal proportion had passed used syringes on to others in this same time frame. There was considerable overlap between the two groups ($r=0.496$). Syringe sharing does not vary with years of injection, with one possible exception: in medium seroprevalence cities, old injectors may be slightly more likely to report having injected with a used syringe than new injectors.

Patterns of consistent condom use are more complicated, although rates of condom use are not high in any of the comparisons made. For the total sample, consistent condom use with primary partners is slightly more likely to be reported by other injectors than by very new injectors (and perhaps by old injectors than new injectors); and longer-term injectors are more likely to report consistent condom use with casual partners than more recent injectors in both comparisons. These relationships, however, seem to vary by city seroprevalence. Consistent condom use does not vary significantly by length of injection in medium seroprevalence cities. In low seroprevalence cities, very new injectors seem to be more likely to report consistent condom use than other injectors both with primary partners and with casual partners (though, even in their relationships with casual partners, only 31% of very new injectors are reporting consistent condom use). In high seroprevalence cities, on the other hand, consistent condom use with both primary and casual partners is more common among both old and other injectors than among more recent injectors.

Old injectors are slightly more likely to have a primary sex partner who injects drugs than is true for new injectors. The difference between old and new injectors is concentrated in the high seroprevalence cities.

Among men, new injectors and very new injectors are more likely to report having had sex with another man in the prior five years than are longer-term injectors.

For drug injectors, talking about AIDS is an important part of the process of learning about the disease and then of taking steps to reduce or avoid risk (Neaigus et al, 1993; Des Jarlais et al, 1993). Data were available for talking about AIDS with drug using friends, sex partners, and family. For the total sample, about five per cent more of old injectors than of new injectors reported that they talk about AIDS with each of these sets of other persons; and very new injectors were more likely than other injectors to report such talk with each group. The difference between longer-term and newer injectors in talking with these groups is strongest in high seroprevalence cities.

New injectors and very new injectors are more likely than old injectors and other injectors to know that a person who looks healthy can be infected with HIV.

Even though longer-term injectors have had more time to take action to reduce their risks of getting infected than newer injectors, there are no significant differences by years of injection on this variable, with approximately 80% of subjects reporting that they have tried to reduce their risk.

On the other hand, 18% fewer very new injectors than other injectors have been tested for HIV (and 10% fewer of new injectors than old injectors). These differences are significant within low, medium, and high seroprevalence cities. Similarly, longer-term injectors are more likely to report having previously tested seropositive for HIV than

Table Sa. Percent Who Engaged in Risk Behaviours in Prior Six Months for New Injectors and Older Injectors, by City Seroprevalence*
Cell entries present % HIV-seropositive, with number of subjects on which this is based (the denominator) on the line underneath.

City Seroprevalence: Site	All Cities		Low@		Medium@		High@							
	new injectors	old injectors	new injectors	old injectors	new injectors	old injectors	new injectors	old injectors						
Injected with Used Syringe	41 (2338)	43 (3824)	.17 6	.38 0	43 (809)	45 (917)	.38 0	.05 7	31 (561)	36 (786)	.05 7	45 (968)	44 (2121)	.70 0
Passed Used Syringe on to others	44 (2318)	43 (3799)	.31 9	.22 5	45 (807)	42 (917)	.22 5	.18 0	38 (549)	34 (769)	.18 0	47 (962)	46 (2113)	.75 1
Always Used Condoms with Primary Partners	11 (1167)	16 (1884)	.00 0	.41 5	9 (398)	8 (366)	.41 5	.37 3	13 (301)	15 (442)	.37 3	11 (468)	19 (1076)	.00 0
Always Used Condoms with Casual Partners	24 (721)	29 (1192)	.00 9	.42 3	28 (250)	25 (292)	.42 3	.78 6	28 (159)	30 (247)	.78 6	18 (312)	31 (653)	.00 0
Has Primary Partner Who Is an IDU	25 (2306)	27 (3799)	.04 5	.60 9	32 (791)	33 (891)	.60 9	.08 6	31 (555)	36 (785)	.08 6	15 (960)	21 (2123)	.00 0
Men: Any Male/Male Sex in Prior 5 Years	13 (1519)	8 (2767)	.00 0	.00 6	10 (520)	6 (635)	.00 6	.82 5	5 (264)	5 (417)	.82 5	17 (735)	9 (1715)	.00 0
Talks about AIDS with drug-using friends	77 (2334)	81 (3868)	.00 0	.22 7	75 (809)	78 (917)	.22 7	.04 7	79 (559)	84 (801)	.04 7	77 (966)	82 (2150)	.00 0
Talks about AIDS with sexual partners	63 (2254)	68 (3688)	.00 0	.32 2	66 (746)	68 (805)	.32 2	.26 0	70 (552)	73 (791)	.26 0	57 (956)	66 (2092)	.00 0
Talks about AIDS with family	45 (2322)	50 (3831)	.00 0	.29 0	38 (796)	41 (886)	.29 0	.22 6	40 (561)	36 (798)	.22 6	54 (965)	59 (2147)	.00 7

Table 5a. Continued

City Seroprevalence: Site	All Cities			Low@			Medium@			High@		
	new injectors	old injectors	p	new injectors	old injectors	p	new injectors	old injectors	p	new injectors	old injectors	p
Subject knows that an HIV-infected person can look healthy	79 (2300)	84 (3822)	.0 00	86 (808)	86 (919)	.9 14	73 (528)	80 (764)	.0 01	77 (964)	84 (2139)	.0 00
Has changed behaviour to protect self from AIDS	79 (2117)	80 (3483)	.7 30	87 (802)	85 (911)	.2 92	79 (389)	84 (497)	.0 70	73 (926)	77 (2075)	.0 52
Has previously been tested for HIV	54 (2312)	64 (3827)	.0 00	56 (794)	74 (911)	.0 00	69 (561)	81 (791)	.0 00	44 (957)	54 (2125)	.0 00
Has previously tested positive for HIV	12 (1096)	26 (2068)	.0 00	4 (397)	3 (624)	.7 27	7 (370)	27 (616)	.0 00	28 (329)	42 (828)	.0 00

* New injectors have been injecting drugs for 6 years or less; old injectors for more than 7 years. Probabilities are by χ^2 unless otherwise indicated.

** Probability by Fisher's Exact Test

@ Low seroprevalence cities are Athens, Glasgow, Sydney, and Toronto; Medium are Berlin, London, and Rome; High are Bangkok, Madrid, New York, Rio de Janeiro, and Santos

**Table 5b. Percent Who Engaged in Risk Behaviours in Past Six Months for Very New Injectors and Other Injectors, by City Seroprevalence*
Cell entries present % HIV-seropositive, with number of subjects on which this is based (the denominator) on the line underneath.**

City Seroprevalence: Site	All Cities			Low@			Medium@			High@		
	very new injectors	p	other injectors	very new injectors	other injectors	p	very new injectors	other injectors	p	very new injectors	other injectors	p
Injected with Used Syringe	41 (1211)	.40 5	42 (4951)	44 (1335)	44 (1332)	.95 1	31 (270)	34 (1077)	.41 9	43 (550)	44 (2539)	.556
Passed Used Syringe on to others	42 (1203)	.41 3	43 (4914)	44 (1332)	44 (1332)	.36 8	39 (266)	35 (1052)	.20 9	44 (545)	47 (2530)	.27 6
Always Used Condoms with Primary Partners	11 (615)	.01 7	15 (2436)	7 (584)	7 (584)	.01 9	9 (159)	15 (584)	.06 1	11 (276)	18 (1268)	.00 3
Always Used Condoms with Casual Partners	23 (375)	.02 5	28 (1538)	26 (415)	26 (415)	.25 0	24 (70)	30 (336)	.33 3	16 (178)	29 (787)	.00 0
Has Primary Partner Who Is an IDU	24 (1188)	.10 9	27 (4917)	33 (1300)	33 (1300)	.31 3	34 (261)	34 (1079)	.79 7	15 (545)	20 (2538)	.00 7
Men: Any Male/Male Sex in Prior 5 Years	15 (792)	.00 0	8 (3494)	7 (912)	7 (912)	.10 2	7 (128)	4 (553)	.16 6	20 (421)	10 (2029)	.00 0
Talks about AIDS with drug using friends	75 (1203)	.00 0	81 (4999)	78 (1335)	78 (1335)	.00 7	76 (267)	83 (1093)	.00 3	78 (545)	81 (2571)	.08 1
Talks about AIDS with sexual partners	64 (1163)	.04 2	67 (4779)	68 (1189)	68 (1189)	.73 3	72 (260)	71 (1083)	.83 8	57 (541)	64 (2507)	.00 3
Talks about AIDS with family	45 (1195)	.00 9	49 (4958)	40 (1299)	40 (1299)	.45 2	38 (268)	38 (1091)	.99 6	53 (544)	59 (2568)	.02 4

Table 5b. Continued

City Seroprevalence: Site	All Cities		Low@		Medium@		High@					
	very new injectors	other injector s	p	very new injectors	other injectors	p	very new injectors	other injectors	p	very new injectors	other injectors	
Subject knows that an HIV-infected person can look healthy	78 (1194)	83 (4928)	.00 0	84 (391)	87 (1336)	.12 7	71 (258)	79 (1034)	.00 6	77 (545)	83 (2558)	.00 1
Has changed behaviour to protect self from AIDS	79 (1110)	80 (4490)	.40 3	85 (388)	86 (1325)	.73 6	79 (198)	83 (688)	.20 8	74 (524)	76 (2477)	.35 9
Has previously been tested for HIV	46 (1195)	64 (4944)	.00 0	48 (384)	71 (1321)	.00 0	60 (269)	80 (1083)	.00 0	37 (542)	54 (2540)	.00 0
Has previously tested positive for HIV	9 (469)	23 (2695)	.00 0	3 (156)	4 (865)	.47 9	3 (155)	22 (831)	.00 0	22 (158)	40 (999)	.00 0

* Very new injectors have been injecting drugs for 3 years or less; other injectors for more than 3 years. Probabilities are by χ^2 unless otherwise indicated.
** Probability by Fisher's Exact Test

@ Low seroprevalence cities are Athens, Glasgow, Sydney, and Toronto; Medium are Berlin, London, and Rome; High are Bangkok, Madrid, New York, Rio de Janeiro, and Santos

newer injectors in the total sample and in the medium and high seroprevalence cities. These results are consistent with the idea that longer-term injectors have had more opportunity to decide to be tested.

The measured variation in the proportion of injectors who are new injectors among cities needs to be interpreted cautiously. The meaning of such data is by no means obvious. Several factors can affect the proportion of new injectors in this study:

Conclusion and Discussion

- The initiation rate of new injectors as a proportion of the total city population – which is a measure of the extent to which the population is generating potential new recruits for parenteral exposure to HIV and other blood-borne viruses.
- The prior "stock" of old injectors. For example, New York City has a much higher proportion of injectors who started in the 1960s and 1970s than other study cities in this study because there was a big influx into injection then (WHO Collaborative Study Group 1993).
- Recruitment procedures may have differed in different cities. For example, if one city's recruiters of the street sample are old-line heroin users, but most new injectors are cocaine users, this would tend to decrease its measured proportion of new injectors. Similar results might be produced if the treatment sample was recruited at a methadone programme and most new injectors have eschewed opiates.
- Geographical factors. If the project has mainly recruited subjects from areas with long-term IDUs, but there are other neighbourhoods with large proportions of new IDUs, this will tend to underestimate the true proportion new IDUs.
- Differing proportions of truly hidden new users. In a New York study that attempted to recruit large numbers of new injectors in New York, it appeared that a number of persons begin to inject but avoid having much if any presence in drug dealing scenes for several years. If they remain drug injectors, there is a very high chance that eventually they get drawn into the main centres of drug injecting life. However an unknown proportion stay apart from drug injecting groups either because they quit injecting drugs or, perhaps, because they maintain controlled levels of use over many years. If police enforcement, differing degrees of stigmatization of drug use, or different occupational or industrial distributions mean that different proportions of IDUs remain truly hidden, this may affect the measured proportion of new injectors.

Preventing initiation

In spite of these caveats, however, it is clear that large numbers of persons have begun to inject drugs in many of these cities since the beginning of the AIDS era. Furthermore, although in cities with mature HIV epidemics several years seem to elapse between the time of initiation into injection and the time when seroprevalence levels reach those of longer-term injectors, new injectors are at high risk for HIV infection and other blood-borne infections. Thus, it is clearly urgent that effective ways be developed to reduce the extent to which new persons begin to inject drugs. Such methods might

take any of several forms. First, they might involve personal interventions with persons likely to become drug injectors. One experimental project used intensive group work with heroin sniffers and significantly reduced the proportion who went on to injection during the follow-up period (Casriel et al, 1990; Des Jarlais et al, 1992). Programmes to work with school-age youth – both in school and out – should also be developed and implemented in all countries where drug injection exists or is likely to spread. One question that needs to be considered and to have research done is the extent to which such programmes should also provide "harm reduction" education so that those youths who go on to use drugs in spite of the intervention will be more able to protect themselves against HIV.

Programmes that focus on drug injectors who are likely to be initiators of others into drug injecting should also be developed and tested. Such programmes should attempt to enlist their aid in refusing to initiate others. (Anecdotal evidence from drug injectors in our studies about their own attempts to get initiated indicate that many drug injectors already try to protect others by refusing to initiate them even when asked.) Another (and arguably secondary) aim of such programmes should be to encourage potential initiators to teach anyone who approaches them (or whom they approach) about initiation in the practical application of harm reduction techniques. Finally, such programmes should try to discourage participants from ever sharing syringes with anyone they should initiate. Further studies of the social network environments of drug injectors at the time of initiation may help in identifying potential subjects for such programmes and in devising appropriate programme materials.

Another approach to preventing the onset of drug injection is drug treatment. Specifically, it should be made easy and appealing for persons at high risk because of their non-injecting use of injectable substances, or because of their use of other (late) precursor drugs such as inhalants, to enter drug treatment programmes. The failure of many nations to have provided a massive increase in drug treatment availability probably allows preventable initiations into drug injection as well as preventable HIV infections among those who have already begun to inject.

Finally, we need to consider a range of programmes that affect possible policy, macro-social and macro-economic causes of initiation into drug use and drug injection. Research is clearly needed to help ascertain such causes. If racial or gender inequality contribute to initiation; if economic hopelessness and despair contribute to initiation; if sexual abuse contributes to initiation; if policing and control measures contribute to initiation - then it should be considered how these can be eliminated or at least reduced.

Preventing HIV infection among new injectors

In spite of efforts to prevent initiation of additional persons into drug injecting, large numbers of persons in both developed and developing countries are likely to start injecting. The data presented in this chapter clearly indicate that they are at considerable behavioural risk. Two-fifths of them report that in the prior six months they had injected with syringes or needles that others had used. Condom use is low, and approximately a third of them have primary partners who inject drugs and about one out of seven male new injectors have engaged in sex with other men. About three-quarters of the new and very new injectors talk about AIDS with their drug-using friends, almost two-thirds do so with sex partners, and almost half do so with their family. This is encouraging, and may help

explain the high proportions of new injectors and very new injectors who know that a healthy looking person can be infected and the high proportion who report having made behavioural changes to protect themselves against HIV. Nonetheless, since such AIDS talk seems to be an important part of the process of risk reduction (Neaigus et al, 1993; Des Jarlais et al, 1993), further programmes to increase the extent to which new drug injectors discuss AIDS with their social networks seem likely to be useful.

Although almost half of the very new injectors had previously been tested for HIV, it should be useful to increase the extent to which these services are made available to new injectors. It may well be that there is correlated recruitment bias operating here, such that those new injectors who are most likely to be recruited for this study may also be those most likely to seek or to be recruited for HIV counselling and testing.

Finally, in regard to testing as well as in regard to other harm reduction efforts aimed at new injectors, efforts should be made to develop new ways to determine if there are "hidden" new injectors in each locality, and, where they exist, to find ways to make preventive services available to them in spite of their perceived need (and ability) to remain undetected as drug injectors.

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The Structure of Stable Seroprevalence Epidemics among Injecting Drug Users

In many areas, the introduction of HIV into the local population of injecting drug users (IDUs) was followed by extremely rapid transmission within this group. Rapid HIV spread has occurred both in industrialized and developing countries, and in very large cities such as New York (Des Jarlais et al, 1989), moderate sized cities such as Edinburgh (Robertson et al, 1986) and in semi-rural areas such as the state of Manipur, India (Naik et al, 1991) (also see: Des Jarlais et al, 1992; Friedman & Des Jarlais, 1991; Stimson, 1994 submitted).

Background

Fortunately, there have also been examples of localities in which HIV was introduced into a local population of IDUs, but where HIV seroprevalence has subsequently remained low and stable, such as Glasgow (Scotland), Lund (Sweden), Tacoma (Washington, USA), Toronto (Canada), and Sydney (Australia) (Des Jarlais et al, submitted [a]). Understanding the factors which account for the differences between localities where HIV spreads very rapidly among IDUs and localities in which HIV has basically remained under control among IDUs is one of the most important questions of HIV epidemiology. The WHO Multi-City Study has provided a unique opportunity to address this question.

We have identified "low", "medium" and "high" seroprevalence cities. Here cities are grouped according to the following levels of seroprevalence:- low: less than 5%; medium: over 5%, but under 20% and anything above this figure is high. In this chapter, we will examine what is currently known about the structure of high, medium and low HIV seroprevalence epidemics among IDUs, using the WHO dataset as a whole, and with additional data on two high seroprevalence cities (New York and Bangkok), one medium seroprevalence city (London) and three low seroprevalence cities (Glasgow, Toronto and Sydney). Additional longitudinal data are available from these six cities.

Introduction of HIV into the local IDU population

HIV can be introduced into local IDU populations in several ways. In some cities, such as New York (Des Jarlais et al, 1989), Sydney (Ross et al, 1992) and Rio de Janeiro (Lima et al, 1994), HIV was probably introduced into a local area by men-who-have-sex-with-men (MSM), and then spread to IDUs who were also MSM, and then to other IDUs. In this sense, MSM IDUs can be considered a "bridge population" between non-injecting MSM and the IDU population as a whole. (HIV infection among female IDUs-who-have-sex-with-women is also an important topic for additional research, but the role of such persons within the larger spread of HIV has not yet been determined [Jose et al, 1993; Reardon et al, 1992].)

Moreover, contrary to the popular stereotype, a substantial proportion of IDUs do travel. Indeed, substantial proportions of subjects in each of the 13 cities in the WHO study reported having injected outside of their home city within the previous two years

(WHO Collaborative Study Group, 1993). Some of this travel can be considered "drug tourism" — ie, drug users going to a different locality where drugs are substantially less expensive (Simons, 1994) — while some of the travel may simply be a part of the drug distribution business, with the drug users carrying drugs from one city to another. Other travel is associated with employment and/or the search for work. When drug injectors do travel from one city to another, they are unlikely to carry much (if any) injection equipment with them because of the possibility of difficulties with customs and other officials. Drug users who travel may also have considerable difficulties in obtaining their own sterile injection equipment while in unfamiliar cities. Travelling drug injectors may thus be particularly likely to inject with equipment which has been previously used by others and will be subsequently used by other injectors.

Potential rapid spread of HIV among IDUs

Among the WHO study cities, well-documented very rapid transmission of HIV occurred among IDUs in New York City and in Bangkok. In New York, HIV seroprevalence among IDUs increased from under 10% in 1978 to approximately 50% by 1983 (Des Jarlais et al, 1989), with an estimated rate of 13 new HIV infections per 100 person-years at risk. In Bangkok, HIV seroprevalence among IDUs increased from approximately 2% in the spring of 1988 to over 40% in the fall of 1988, with an estimated rate of four new HIV infections per 100 person-months at risk (Vanichseni & Sakuntanaga, 1990). Although it has not been determined how HIV was first introduced into Bangkok, it is likely that it was brought in by travelling HIV-infected IDUs. Because Bangkok is located on a heroin distribution route from the Golden Triangle, the street prices of heroin in Bangkok are generally quite low.

In both New York and Bangkok, the rapid spread of HIV was associated with multiperson use of injection equipment ("sharing") that occurred through mechanisms for rapid and efficient mixing of the IDUs who were "sharing" the needles and syringes. During the period of rapid transmission in New York, many drug injectors used "shooting galleries"; ie, locations where a drug injector could rent a needle and syringe, inject with it, and then return it to the operator of the shooting gallery. There was usually no (or at most, minimal) cleaning of the injection equipment between uses by different IDUs. Such cleaning as did occur was merely to prevent the needle and syringe from becoming so clogged so that it could no longer be used.

In Bangkok, rapid transmission was associated with "sharing" among large numbers of IDUs, using needles and syringes kept by drug dealers, and with being incarcerated (Choopanya et al, 1991). Whether the incarceration risk factor was a result of actually "sharing" equipment while injecting in prison (Wright et al, 1994) or whether incarceration led IDUs to form new social networks with other IDUs (with whom they only subsequently "shared" injection equipment—after being released from prison) has not yet been determined.

Very rapid transmission of HIV among IDUs should not be seen simply as a function of any multiperson use of injection equipment, but rather as arising when IDUs "share" with large numbers of other IDUs (a) within short time periods and (b) outside of naturally occurring friendship networks.

Behaviour change and risk reduction among IDUs

Contrary to the popular stereotype that IDUs are not at all concerned about their health, and therefore will not change their injection behaviour to avoid HIV/AIDS, the great majority have shown that they have changed their behaviour in response to concerns about AIDS. In this regard also, the WHO study has provided an excellent opportunity to study cross-national aspects of AIDS risk reduction among IDUs, including the validity of the self-reports of behaviour change and risk reduction. The WHO data actually contain some of the strongest evidence to date for the validity of self-reported HIV/AIDS behaviour change and risk reduction among IDUs (Des Jarlais et al, 1994a). Moreover, there is now strong biological evidence for the validity of the self-report data from Bangkok in particular (Chitwood, 1994; Des Jarlais et al, 1994b).

Table 1 presents the percentage of subjects who, when asked: "Since you first heard of AIDS, have you done anything to avoid getting AIDS?", reported that they had changed their behaviour. The cities are grouped by current HIV seroprevalence. There is no direct linkage between seroprevalence and the percentage of IDUs who have changed their behaviour. Large majorities of IDUs have changed their behaviour in almost all of the cities.

Table 1

Number and percent of persons reporting behaviour change when asked "Since you first heard of AIDS, have you done anything to avoid catching the virus yourself?".

Reported behaviour change

Low seroprevalence cities:	Athens	347 (88%)
	Glasgow	412 (83%)
	Sydney	357 (86%)
	Toronto	395 (86%)
Medium seroprevalence cities:	Berlin	326 (86%)
	London	411 (78%)
	Rome	Not available
High seroprevalence cities:	Bangkok	542 (92%)
	Madrid	300 (72%)
	New York	1,133 (79%)
	Rio de Janeiro	276 (59%)
	Santos	103 (50%)

Seroprevalence: Low: under 5%; Medium: 5-20%; High: over 20%.

More detailed analyses of the specific types of behaviour change have been conducted for Bangkok, Glasgow, New York and Rio de Janeiro (Des Jarlais et al, 1994 submitted). In all four of these cities, changes in drug-injection behaviour occurred in a significantly larger percentage of subjects than did changes in sexual behaviour. The most frequent

change in injection behaviour was to "stop or reduce sharing" of injection equipment, while the most frequent sexual behaviour changes were increased use of condoms, fewer sexual partners and greater selectivity in choosing sexual partners.

While a majority of subjects reported that they had changed their behaviour in response to concerns about AIDS, there is also substantial variation across the different cities with a low of 50% in Santos and a high of 92% in Bangkok reporting some behaviour change. Determinants of the differences in the percentages of IDUs who have changed their behaviour because of concerns about AIDS have yet to be established, but are likely to be related to (a) the types and intensity of the HIV prevention efforts for IDUs in the different cities, and (b) the amount of time that had elapsed in each city between initiation of local prevention efforts and the moment when the WHO study data were collected.

Stabilization of HIV seroprevalence

In the great majority of the WHO study cities, additional data has shown stabilization of HIV seroprevalence among IDUs. (Although the amount of data varies across the different cities, it is possible that stabilization of HIV seroprevalence has by now occurred in all of the WHO study cities.) The data on stabilization of HIV seroprevalence is particularly strong for Bangkok, Glasgow, London, New York, Sydney, and Toronto:

In Bangkok, seroprevalence surveys have been conducted at least annually among IDUs at the Bangkok Metropolitan Administration drug abuse treatment programmes. At the end of 1988, seroprevalence was approximately 40%, and this had not changed by the end of 1993 (Choopanya, unpublished data).

In Glasgow, seven serial cross-sectional studies conducted among 2,300 of Glasgow's estimated 8500 IDUs found HIV seroprevalence rates ranging from 1% to, at most, 5%, but with no increasing trend over time from 1986 to 1992 (Frischer et al, 1992).

In London, four annual cross-sectional studies using the WHO multi-centre study design show an initial prevalence of 12.8% in 1990 declining to and then stabilizing at approximately, for 1991, 1992 and 1993, 8% (Donoghoe and Hunter, 1994).

In New York, studies of IDUs entering drug treatment show stabilization at approximately 50% from 1984 through 1992 (Des Jarlais et al, 1989, 1994c). Data since 1992 and data from IDUs recruited at out-of-treatment sites also show stabilization of HIV seroprevalence among IDUs (Des Jarlais, unpublished data).

In Sydney, seven serial cross-sectional studies conducted among 2,700 of an estimated 7,800 IDUs found HIV seroprevalence rates ranging from 0.5% to at most 5%, with significantly higher rates among MSM IDUs (from 13% to 44%), but with no discernible trend towards an increase in overall seroprevalence rates from 1984 to 1991 (Kaldor et al, 1993).

In Toronto, seven serial cross-sectional studies conducted among 1,300 of an estimated 8,000 IDUs found HIV seroprevalence rates ranging from 0.8% to 3.3%—but again, with no increasing trend from 1988 to the end of 1992 (Millson et al, 1993).

It is important to note that stabilization of HIV seroprevalence among a population of IDUs does not imply an absence of new HIV infections (Des Jarlais et al, 1994c). Populations of IDUs are dynamic groups, with some IDUs leaving the population (due to death or ceasing to inject) and an influx of new persons beginning to inject drugs. Since HIV-infected IDUs are particularly likely to die from HIV-related illnesses, and

since almost all persons will probably not be HIV-infected as of the time they start to inject drugs, an absence of new HIV infections would lead to a declining HIV seroprevalence in the IDU population over time.

Continuing risk behaviour

While behaviour change and risk reduction has probably been a very important factor in the stabilization of HIV seroprevalence among IDUs in WHO study cities, this stabilization has not occurred through an elimination of all risk behaviour. Table 2 shows the percentage of IDUs in each city who report any injecting with equipment that had been previously used by someone else (ie, any "sharing") in the six months prior to the interview. While the determinants of the variation across cities in Table 2 have yet to be identified, it is clear that nothing close to complete risk elimination has occurred among IDUs in the WHO study cities and that there is no direct relationship between any risky injections and current seroprevalence.

Table 2

Number and percent of injecting drug users who reported injecting with equipment previously used by someone else ("sharing") during the six months prior to the interview.

Reported any sharing

Low seroprevalence cities:	Athens	197 (49%)
	Glasgow	215 (43%)
	Sydney	175 (42%)
	Toronto	198 (44%)
Medium seroprevalence cities:	Berlin	189 (50%)
	London	181 (34%)
	Rome	89 (19%)
High seroprevalence cities:	Bangkok	325 (54%)
	Madrid	208 (45%)
	New York	622 (44%)
	Rio de Janeiro	144 (30%)
	Santos	119 (55%)

Seroprevalence: Low: under 5%; Medium: 5-20%; High over 20%.

Estimated seroconversions

What happens after HIV seroprevalence reaches certain levels in an IDU population is another critical question for which the WHO multi-centre study has provided important leads. Although the WHO study was conducted as a cross-sectional behaviour and serostatus survey, it is possible to develop an estimate of HIV seroconversion among the IDUs who participated in the study in the different cities. One of the questions in the survey asked whether the subject had previously been tested for HIV, and a follow-up question asked about the results of the most recent HIV test.

Since blood or saliva samples were collected and tested as part of the WHO multi-centre study, subjects who had previously been tested HIV-negative—and who were HIV-positive on the blood/saliva sample collected as part of the study itself—can be considered as possible HIV seroconverters. For Bangkok, we were able to check the records of the drug abuse treatment programmes, and found documentation of a previous seronegative test for all of the 17 persons who had both reported a previous negative test and who also had tested positive at the time of the WHO multi-centre study (Des Jarlais et al, 1994a). For New York City, we have compared the estimated seroconversion rate by using the outcomes of this "report of previous negative test" as measured against other estimates of HIV seroconversion derived from two large cohort studies of IDUs in New York City, and found that our method produces somewhat high, but still reasonably compatible estimates for HIV seroconversion (Des Jarlais, unpublished data).

Using this "report of a previous negative test" method when comparing estimated seroconversions across different cities, however, clearly requires great caution, particularly in regard to the following: (a) the characteristics of previously tested IDUs may vary across cities; (b) the duration of time since the most recent negative test may vary; and (c) there may be differential accuracy in the reports of previous tests. Table 3 presents the number and percentage of previously tested subjects, number and percentage of subjects with reported previous negative tests, as well as the number and percentage of possible seroconverters (as a percentage of all persons with a reported previous negative test) in the various cities.

Table 3
Seroconversion analysis based on self-reported first HIV test
and Elisa/Western Blot for second HIV test

		Previously tested	Previously tested neg*	% Apparent seroconversion
Low seroprevalence cities:	Athens	220 (55%)	193 (98%)	0 (0.0%)
	Glasgow	270 (54%)	243 (98%)	0 (0.0%)
	Sydney	331 (81%)	296 (95%)	1 (0.3%)
	Toronto	327 (74%)	278 (95%)	5 (1.8%)
Medium seroprevalence cities:	Berlin	340 (90%)	284 (87%)	12 (4.4%)
	London	242 (47%)	194 (90%)	11 (6.0%)
	Rome	453 (94%)	323 (71%)	6 (4.8%)
High seroprevalence cities:	Bangkok	265 (44%)	174 (66%)	17 (9.8%)
	Madrid	331 (77%)	145 (49%)	16 (39.0%)
	New York	752 (51%)	288 (71%)	50 (29.8%)
	Rio	128 (27%)	94 (78%)	5 (9.4%)
	Santos	148 (68%)	50 (41%)	22 (45.8%)

* Denominator for percentages is the number of people who were previously tested and who *knew* their HIV test result.

Seroprevalence: Low: under 5%; Medium: 5-20%; High: over 20%.

Despite the uncertainties in using this method of identifying possible HIV seroconverters, there is a striking pattern in the findings. The cities for which data are available clearly fall into three clusters, associated with the current HIV seroprevalence in the cities.

Those centres with low seroprevalence rates (Athens, Glasgow, Sydney and Toronto) had low apparent seroconversion rates (none exceeding 2%). The medium seroprevalence cities (Berlin, London and Rome) had higher apparent seroconversion rates, in the region of 4% to 6%. The highest seroprevalence cities (Bangkok, Madrid, New York, Rio de Janeiro and Santos) had the highest apparent seroconversion rates of between 10% and 46%. Bearing in mind the caution required, given the way in which the "apparent seroconversion rate" was calculated, there is however a striking consistency between city seroprevalence and levels of seroconversion.

A strong relationship between background HIV seroprevalence among IDUs and current HIV seroconversion was also observed in a study of 15 US cities from 1988 to 1992. In that study, seroconversion rates in cities with seroprevalence below 10% ranged from 0 to 3.8 per 100 person-years at risk, while seroconversion rates in cities with seroprevalence above 20% ranged from 3.7 to 8.1 per 100 person-years at risk (Friedman et al, in press).

Conclusions

The WHO multi-centre study offers the first opportunity systematically to compare HIV epidemics among IDUs in different areas, including comparison of epidemics in industrialized and developing countries. The WHO data show that a large percentage of IDUs in all cities will change their behaviour in response to concerns about HIV and AIDS. This large-scale behaviour change has been followed by stabilization of HIV seroprevalence in all cities for which data are available. The behaviour change, however, does not involve elimination of all risk behaviour. There appears to be a substantial residual level of risky injections among IDUs in all cities. New HIV infections are a product not only of the frequency of risk behaviour of individual IDUs, but also of the likelihood that the risk behaviour will occur among IDUs with different HIV status. Thus, in low HIV-seroprevalence cities, the residual risk behaviour appears to lead to very low numbers of new HIV infections, while in moderate to high HIV seroprevalence cities, the residual risk behaviour appears to lead to moderate to high numbers of new HIV infections. The critical factor in control of HIV epidemics among injecting drug users, therefore, would seem to be initiating large-scale behaviour change and risk reduction while HIV seroprevalence is still at very low levels.

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Conclusions and Recommendations

In 1989 the World Health Organization initiated this comparative study on drug injecting behaviour and HIV infection which involved 13 cities (Athens, Bangkok, Berlin, Glasgow, London, Madrid, Naples, New York, Rome, Rio de Janeiro, Santos, Sydney and Toronto). Recruitment of 6390 drug injectors took place between October 1989 and March 1992, with most being recruited from outside of drug treatment settings.

Background

The study was originally planned in 1986-7, before there was much awareness of the problem of HIV infection among IDUs in developing countries. In the light of this discovery the original WHO plans were revised relatively quickly to include cities from developing countries.

This study represents the largest international project of its kind, using a standardized methodology and instrument for the collection of data and central data management and analysis. Apart from the wealth of data collected in each of the participating cities, the study has contributed much to the development of research methods, informing national policies, establishing international collaborative networks and placing drug injecting, HIV and related health and policy issues on the international agenda.

Methodological issues

Using a core questionnaire developed by an international working group, each participating centre modified the instrument to meet local conditions. Data sets were submitted from each centre to Glasgow for central merging and analysis. The number of variables in those data sets ranged from 120 for Rio de Janeiro to 454 for Glasgow. Due to local alteration of some questions and variability in naming conventions and coding, difficulties were encountered in the merging process. Furthermore, as a result of limited time and resources, it was only possible to merge and make comparative analyses using 57 selected variables from 12 cities. Data from Naples could not be included at this stage but some data have been reported elsewhere (WHO Collaborative Study Group, 1993). Although the common dataset did not contain all information collected from the different centres it provides a valuable data base upon which further analyses may be undertaken. Each centre has completed extensive analyses on its own dataset and an extensive list of publications has eventuated See Appendix 1 for the list of publications.

The difficulties experienced illustrate the importance of ensuring standardization across centres of the wording of core questionnaire items and coding conventions prior to data collection. It also supports the argument for a shorter and simpler core questionnaire when undertaking a multi-centre study, with the possibility that individual or groups of centres can include additional items. The value of such additional items is demonstrated in the publications from the various centres.

The time from first data collection to the dissemination of the final report has taken over four years. Difficulties were encountered in the central coordination of the project and the management of so many centres and such a large data base. However, most participating cities undertook local data analysis and published results from their centres within a short period from data collection. It appears that the delays in preparing this report did not significantly impede the rapid dissemination of the research findings. The long duration of the project has nonetheless provided an opportunity for the refinement of methods and a greater depth of analysis of the data.

For some centres the data represented the first systematic collection of information on drug injecting behaviour and HIV seroprevalence for that country. In particular, data have been collected from drug users who are not in treatment, presenting a more typical sample of drug injectors.

Since the first round of data collection, some centres have undertaken a number of subsequent data sweeps in order to identify trends and to investigate specific issues. A refined and standardized instrument and methodology will facilitate the further collection of comparable data across a wide range of centres.

International collaboration

The study has resulted in the establishment of an international network of researchers and research institutions. The network has provided a forum for better informed debate on prevention and research on drug injecting and HIV infection.

Various centres negotiated twinning arrangements allowing for them to make more detailed comparative analyses between centres and to develop additional questions for later sweeps. These arrangements have facilitated the transfer of technology and expertise, the direct comparison of data from different centres and enabled the publication of collaborative papers. Twinning arrangements will provide a useful strategy for future research.

The cultural context of HIV epidemics

Whereas the demographic characteristics of the study samples were similar across different centres, HIV seroprevalence varied greatly, from 0% in Athens to 59% in Santos. The extent of spread of HIV among and from drug injectors depends to a considerable extent on the social, political and cultural characteristics of a community. In order to determine these characteristics, investigators from each of the participating cities completed an Environmental Questionnaire covering such items as existing drug and HIV/AIDS policies, prevention and treatment services, the legal environment and public attitudes. This information was collected retrospectively, making it difficult for some centres to provide reliable data. The difficulties in designing this qualitative questionnaire reflect the complexities of understanding drug use in different settings. However the questionnaire did provide useful background information on the cultural and political context of drug injection and risk behaviour.

Implications for future research

A major limitation of the network of cities and researchers, has been the under-representation of developing countries. Bangkok, Rio de Janeiro and Santos were the only centres participating from developing countries. Considering the dynamic changes

in injecting behaviour and the rapid spread of HIV infection among drug injectors in many developing countries, and the emergence of new routes for drug transit and consequent drug problems, sites in Africa, Eastern Europe, Latin and South America, the Caribbean and parts of Asia should be included in any future studies.

Particular attention should also be given to the transition from non-injecting to injecting drug use, as the ability to understand the reasons why and the context in which users move to injecting, should lead to the development of more effectively targeted interventions. Similarly specific research should be undertaken to determine why certain communities experience high prevalence of drug injecting behaviour, whereas other similar and geographically close communities do not.

The rapid spread of HIV among injecting drug users in many developing countries, particularly in East and South East Asia and Latin America, calls for an evaluation of the appropriateness of using this research methodology in those countries. The limited resources and expertise available in some developing countries often precludes the use of quantitative methods requiring large representative samples. Particular consideration should be given to the development and implementation of simple rapid assessment methods which can inform cost-effective and culturally appropriate interventions.

Future research should incorporate means of exploring varying socio-political and cultural contexts in the original research design. This information should be collected at the same time as data collection.

Impact of the Study on HIV/AIDS and IDU Policy

Results of the study have informed local and national drug and HIV/AIDS policies and have helped to direct further research in this field. For example, reports on London prevalence were submitted to the UK government's Chief Medical Officer, and the Advisory Council on the Misuse of Drugs subsequently reconvened its AIDS and Drug Misuse Working Group; the Santos and Rio de Janeiro results were quoted in the World Bank/Ministry of Health report on HIV prevention strategies aimed at IDUs (World Bank 1993); results of the Toronto study have encouraged similar research efforts among IDUs elsewhere in Canada, and have been used in support of HIV prevention efforts for IDUs, both in and out of prisons.

Examining the context of drug injecting has helped to inform our understanding of factors which influence the spread of HIV infection among this population. In work associated with this study, it has been reported that the HIV epidemic among injecting drug users has been contained in communities which responded quickly to the threat. Specifically, prevention efforts in these cities included the widespread legal availability of sterile needles and syringes and the provision of outreach services to drug injectors which disseminated information and which built trust between injecting drug users and health workers. Such outreach often incorporates the efforts of informal and formal drug user organizations. Other strategies found to be associated with low seroprevalence rates among injecting drug users in some cities included the distribution of bleach and the expansion of drug treatments such as increasing access to methadone programmes, counselling and in-patient detoxification and rehabilitation services.

There is now substantial evidence from this and other studies that injecting drug users do change their behaviour in response to information about HIV/AIDS (and with access to means for behaviour change). Recent papers based on the data from New

York, Bangkok, Rio de Janeiro, London and Glasgow address this point (Des Jarlais et al 1994a, Des Jarlais et al 1994b, Lima et al 1994; Stimson forthcoming; Bloor et al forthcoming). However, many policy makers may still believe the stereotype that IDUs do not change their behaviour, and then use this as a rationale for not implementing AIDS prevention programmes.

This report shows that injecting drug users will change their risk behaviour, but that it is important to begin HIV/AIDS prevention efforts early, before HIV spreads rapidly within a local population of IDUs. Prevention efforts are much more likely to be effective if they are begun early.

As the epidemic unfolds, it is evident that HIV transmission among and from injecting drug users plays a critical role. Transmission occurs through both drug injecting and sexual practices. This study has contributed much to current knowledge on this subject. It is also apparent that some current local and international policies and practices are doing little to halt this epidemic and may actually be contributing to it, particularly in the developing world. Heightened control measures in certain regions have resulted in the establishment of new areas of drug crop cultivation and new centres for drug processing and new trafficking routes. This then exposes new populations to injectable drugs and drug injecting practices. The study has raised a wide range of questions which calls for a further programme of research. The existing network of researchers established through this study is well positioned to build on the experience and knowledge already gained and to help in directing further research activities and priorities.

Recommendations

The following recommendations relate to the results of this study and evidence from other associated studies.

1. Project Management
 - 1.1 Adequate resources should be provided for the central coordination and management of data for multi-centre studies.
 - 1.2 There needs to be a continuity of commitment and support from within and between sponsoring international agencies for future activities in this field.
 - 1.3 Existing participating sites should be encouraged to undertake further data collection sweeps to look at trend data.
 - 1.4 New sites should be encouraged to build upon the standardized methodology and instruments when researching drug injecting and HIV infection.
2. Research Design
 - 2.1 Recognizing the poor level of understanding of the context of drug use, future studies should employ and integrate both qualitative and quantitative methodologies to describe better the contexts within which drug use occurs.

- 2.2 Given the nature of the unfolding epidemic, there is need for greater involvement of researchers in developing countries and resources for appropriate training.
- 2.3 Methodologies for research in drug using and injecting populations require improvement to ensure that they are better able to inform the development and evaluation of interventions.
- 2.4 Future research needs to include a focus on populations who are not in treatment and who have never been in treatment.
- 2.5 Future research needs to extend beyond HIV infection to include other blood-borne viral infections and other health consequences associated with drug injecting.
- 2.6 Future research developments need to include simple, affordable, repeatable and reliable methods for the monitoring and surveillance of blood-borne viral infections and risk behaviours.

Recommendations of particular importance for local, national and international organizations:

3. Policies and Interventions

- 3.1 Policies targeting drug injecting and HIV infection need to be more extensive and more effective. There is a need to raise levels of national and international awareness about drug injecting and associated HIV infection and to simplify organizational responses because of the rapidly worsening global crisis of drug injecting and HIV infection.
- 3.2 There is a need to reduce the number of people globally exposed to the risk of blood-borne viral infections. Programmes should be developed in order to decrease the rate at which people initiate and maintain drug injecting behaviour.
- 3.3 In responding to the problem of drug injecting there needs to be a shift in commitment from law enforcement to strategies which focus on public health and social conditions.
- 3.4 Campaigns to increase general and targeted AIDS awareness should be implemented in order to create environments which enable behavioural change to occur. Such campaigns should involve the target audience in their design, implementation and evaluation.
- 3.5 Evidence from this study, in conjunction with other research, shows that HIV epidemics among drug injectors can be prevented. It is important to ensure that drug injectors have adequate and easy access to resources for behaviour change, such as sterile injecting equipment and the provision of outreach services which disseminate information and which build trust between injecting drug users and health workers. Early interventions are critical for prevention.

- 3.6 There is a need to develop and maintain preventive interventions in areas of high HIV prevalence and HIV risk.
- 3.7 Programmes to encourage risk reduction by new injectors need to be developed and established.
- 3.8 Interventions should include a focus on high levels of sexual risk behaviour among IDUs and their partners.
- 3.9 HIV testing programmes need to be established and extended so that IDUs may avail themselves of regular and repeated testing.
- 3.10 Specific attention should be afforded to the problem of HIV transmission risk within prisons, among street children and out-of-school youth, and in other high risk settings.
- 3.11 This report should be widely disseminated and utilised by WHO and UNDCP in encouraging Member States to undertake appropriate local research, implement effective interventions and develop national drug and HIV policies.

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