

ORIGINAL RESEARCH ARTICLE

Increasing trends in HIV and TB rates in Odessa and the Ukraine

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Summary: Notification rates for HIV and tuberculosis (TB) have increased in the Ukraine and particularly in Odessa. In 1962, the incidence of TB in Odessa region was 178 cases per 100,000 cases, declining to 73.0, 42.0 and 41.6 cases per 100,000 in 1972, 1982 and 1992, respectively. In 2002, TB incidence and prevalence were 80.4 and 330.1/100,000 population, respectively. TB mortality in the port almost doubled from 10.2/100,000 to 21.6/100,000 between 1990 and 2001. In 2002, the HIV incidence and prevalence and AIDS incidence and prevalence were 46.4 and 241.0 cases/100,000 population and 14.5/100,000 and 26.9/100,000, respectively. There are increasing numbers of TB cases co-infected with HIV (200 in 2002), suggesting that the HIV and TB epidemics are converging. Significant effort is needed for the effective control of these two outbreaks to prevent high levels of morbidity and mortality from these diseases.

Keywords: HIV, tuberculosis, AIDS

Introduction

Infection with the HIV has continued to escalate across the world to an estimated 42 million cases currently.¹ In the last decade, countries of the Former Soviet Union (FSU) have seen an extraordinary increase from a few hundred cases in the mid-1990s for the whole of Central and Eastern Europe to a current estimate of over 1 million cases.¹ In the Ukraine, fewer than 50 cases were diagnosed annually before 1994.² By June 2002, 47,988 cases had been officially recorded, with 11,388 cases (or 24% of the total) occurring in the previous 18 months. It is estimated that there are 250,000 HIV-positive cases currently,³ but Odessa and southern Ukraine initially reported higher rates of HIV diseases.

Rates of tuberculosis (TB) have also increased in the same region in parallel with the HIV epidemic. Globally, TB accounts for one-third of all the deaths from HIV,⁴ but the degree to which the twin epidemics of HIV and TB is coalescing in the Ukraine is less clear. The first cases of dual TB and HIV infection were recorded in 1991, with estimated national rates of dual infection of approximately 178/100,000 in 1997.⁵ Accurate trend

assessments for both diseases are essential to inform local, regional and national health policy and planning.

Method

We retrospectively analysed the current and long-term trends of HIV and TB notification and prevalence from 1990 to 2002, using national TB and HIV surveillance data reported by the Ukraine Ministry of Health. This was compared with detailed TB and HIV patient notification data reported by the Odessa Oblast TB Dispensary, Odessa State Medical University TB Department and Odessa Regional AIDS Control Center. Rates of HIV infection in TB patients for 2001 and 2002 were also determined. The reference population for the Odessa Oblast TB Dispensary and Odessa Oblast AIDS Center is that of the region Odessa, which is approximately 2,470,000 currently. The data refer to the combined prison and civilian populations. Information on associated risk factors was as reported to the Odessa TB Dispensary and AIDS Center based on patient medical records. The HIV testing policy from 1987 until 1994 was that all hospital in-patients (including TB patients) were HIV tested, all officially registered drug addicts, blood donors and pregnant women. In 1994, HIV testing ceased to be compulsory for in-patients, but

continues for the other groups. Historical TB incidence data were available for the last four decades from the Odessa State Medical University TB Department.

Results

In 1962, the incidence of TB in the Odessa region was 178 cases per 100,000 cases, but this declined to 73.0, 42.0 and 41.6 cases per 100,000 in 1972, 1982 and 1992, respectively, rising to 80.4/100,000 in 2002. In the Ukraine as a whole, notification rates were lower at 34.8/100,000 and 58.9 cases/100,000 in 1992 and 2002, respectively.

Overall, Odessa has accounted for approximately the same proportion of TB cases nationally: in 1990, for 1091 cases (6.6%) of the 16,465 reported nationally and in 2001 for 1819 cases (5.4%) out of 33,634 cases. Mortality from TB in the port has nearly doubled in the same time from 10.2/100,000

to 21.6/100,000. Overall, TB incidence and TB prevalence in Odessa were 80.4 and 330.1 cases per 100,000 population, respectively, in 2002. The absolute numbers were 1985 and 8151 cases, respectively, in the region. The TB incidence, prevalence and mortality, in Odessa compared with Ukrainian national incidence figures, are given in Figure 1 and Table 1.

In 2002, the HIV notification and HIV prevalence rates were 46.4 and 241.0 cases per 100,000 population, respectively, with corresponding AIDS incidence and prevalence rates in 14.5/100,000 and 26.9/100,000 of the population. The absolute numbers for the same groups were 1141 and 5930 cases, respectively, in the region. The incidence of AIDS cases in the Odessa region compared with Ukraine is given in Figure 2.

The first few HIV seropositive cases were reported at the beginning of the 1990s, with escalating numbers associated with outbreaks in IVDU in the mid-1990s. The notification and

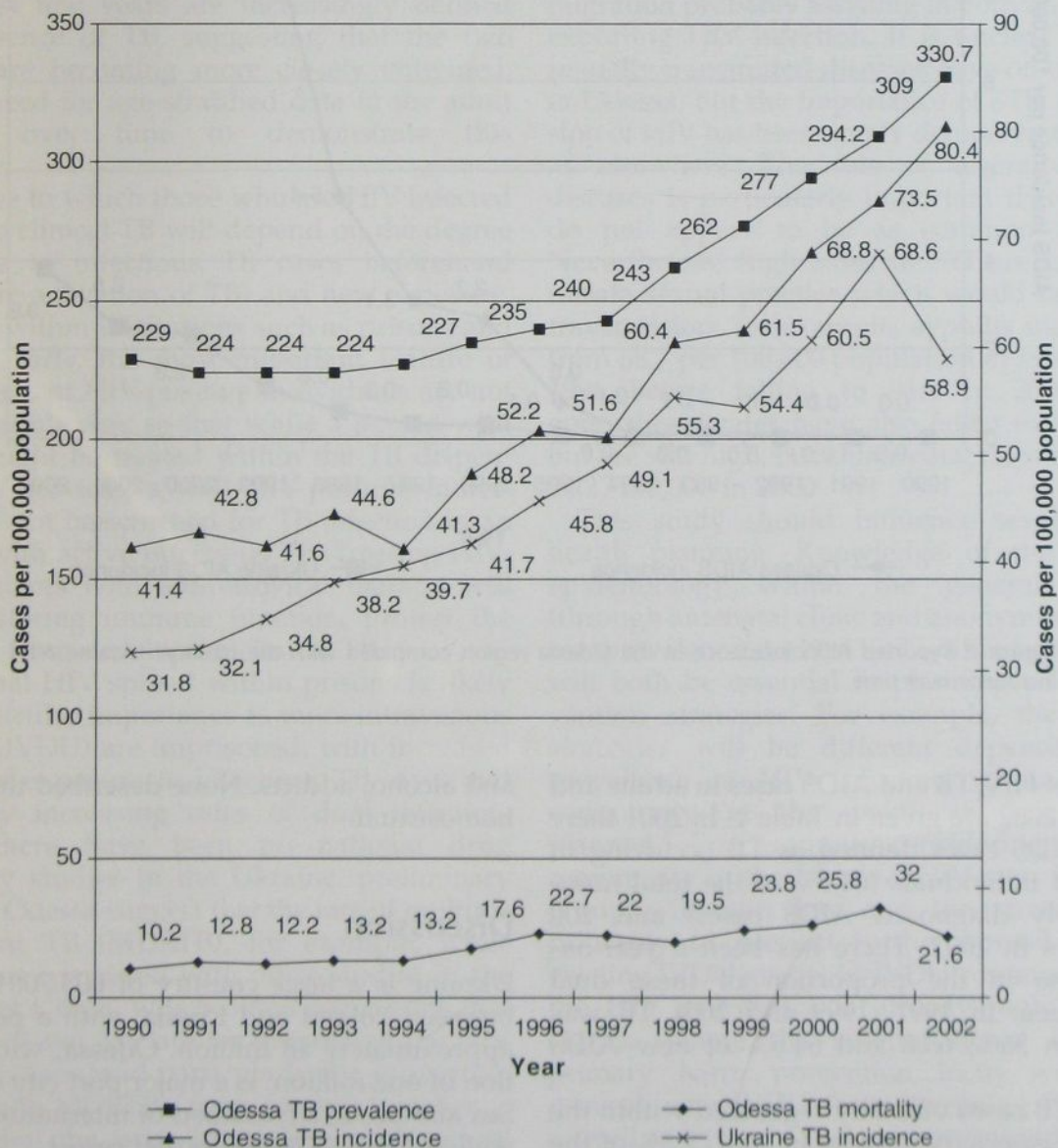
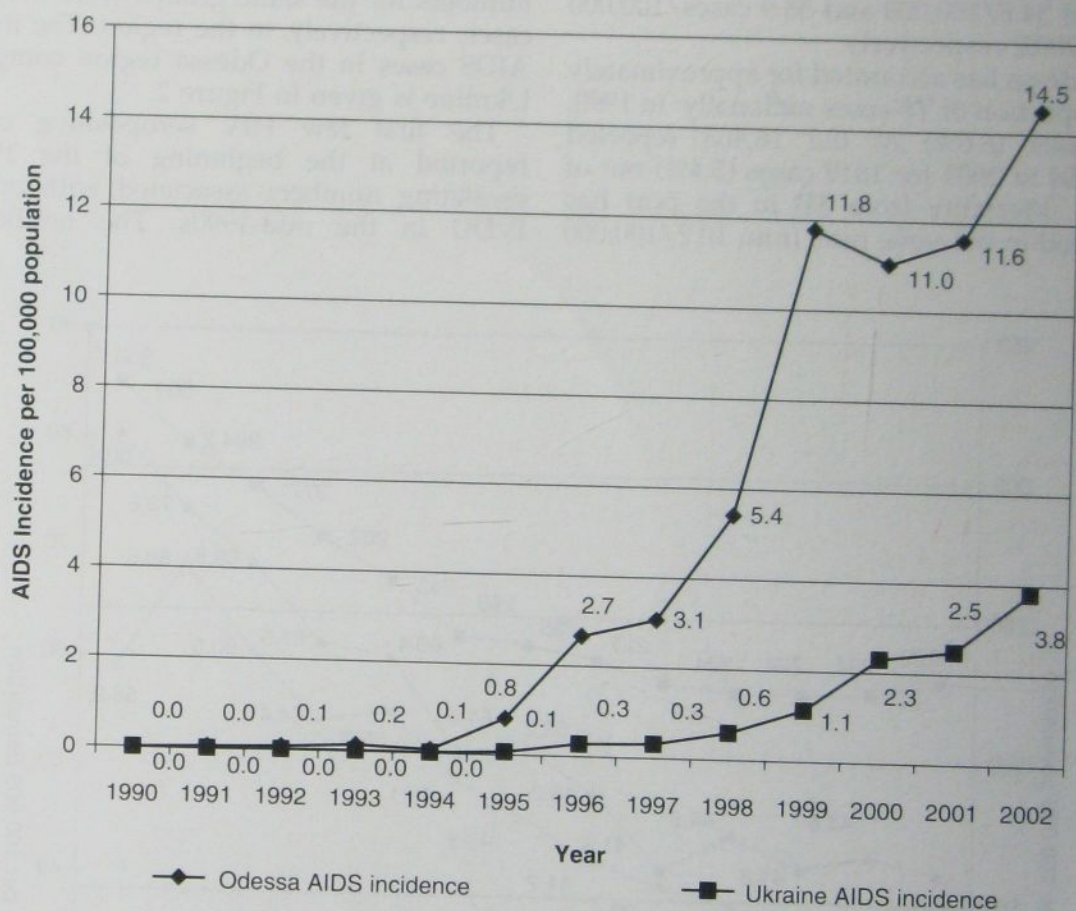


Figure 1 Tuberculosis (TB) incidence, prevalence and mortality in Odessa Region compared with the Ukrainian national incidence over time

Table 1 Tuberculosis (TB) incidence, TB prevalence, HIV notification and prevalence, AIDS incidence and prevalence in 2002 in children and adults in the Odessa region

Age groups Years	TB incidence*		TB prevalence*		HIV notification*		HIV prevalence*		AIDS incidence*		AIDS prevalence*	
	Rate	<i>n</i>	Rate	<i>n</i>	Rate	<i>n</i>	Rate	<i>n</i>	Rate	<i>n</i>	Rate	<i>n</i>
0-14	7.2	30	26.5	110	56.3	234	129.8	540	3.4	14	3.4	14
15-17	48.5	56	93.5	108	5.2	6	12.2	14	0	0	0	0
18+	98.4	1899	411.2	7933	46.7	901	278.7	5376	17.8	343	33.5	647
Total	80.4	1985	330.1	8151	46.4	1141	241	5930	14.5	357	26.9	661

*Officially registered

n=cases, rate is per 100,000 population**Figure 2** Reported AIDS incidence in the Odessa region compared with the national Ukraine AIDS incidence over time

prevalence of HIV, TB and AIDS cases in adults and children for 2002 are given in Table 1. In 2001 there were 185 AIDS cases defined as TB occurring in HIV-infected individuals (64.5% of the total number of newly diagnosed AIDS cases) and 200 civilian cases in 2002. There has been a year-on-year increase in the proportion of these dual infections seen: in 1997, 1999 and 2001 TB was diagnosed in 36%, 63.8 and 64.5% of new AIDS patients.

Of those TB cases officially registered within the Odessa TB dispensary system, in 2001, 7.5% of the total were HIV-positive. Of these HIV-positive individuals, 43.1% used drugs intravenously, 7.5% were alcohol abusers and 12.1% were both drug

and alcohol addicts. None described themselves as homosexual.

Discussion

Ukraine is a large country of 603,700 km² located between Poland and Russia, with a population of approximately 48 million. Odessa, with a population of one million, is a major port city on the Black Sea and lies at a crossroad of international trade, as well as being a major tourist resort.

Odessa saw a decline in TB notification rates over most of the second half of the 20th century as in the rest of Europe, but witnessed a steep

increase in the 1990s with a significant increase in mortality. Rates are higher than the national average in Ukraine, but the proportion of national TB cases accounted for by Odessa has remained approximately constant. Similarly, the AIDS incidence (which includes TB in HIV-positive individuals) has risen and is greater than the national average. The proportion of AIDS defined by TB cases occurring in HIV-positive individuals has risen from one-third to two-thirds between 1997 and 2001.

The limitations of this study are that these figures, like those of neighbouring Russia and Belarus, are likely to be an underestimate, as not all those with risk factors for HIV will have presented for HIV testing. In 1994 HIV testing ceased to be compulsory for in-patients, but continued for the other groups. It is unlikely that this change affected the conclusions reached as the case rates would be even higher than reported. For TB, case rates would have been artificially lower pre-perestroika in 1991, but the annual trend since then indicates that the upward trajectory is reliable. AIDS cases over the last few years are increasingly defined by the presence of TB, suggesting that the two epidemics are becoming more closely entwined. There is a need for age-stratified data in the adult population over time to demonstrate this conclusively.

The degree to which those who are HIV infected will develop clinical TB will depend on the degree of exposure to infectious TB cases beforehand (leading to re-activation of TB) and new exposure, particularly within institutions such as prisons and hospitals. Clearly, the most important feature of any policy is that HIV-positive individuals are not placed in harm's way so that while a person with active TB might be treated within the TB dispensary or HIV services, a well HIV-positive individual should not be screened for TB infection in an institution with active infectious TB. Treating HIV-positive patients with antiretroviral therapy will also, by restoring immune function, protect the HIV patient from developing clinical TB.

Institutional HIV spread within prisons is likely to be of particular importance as more intravenous drug users (IVDU) are imprisoned, with increased likelihood of exposure to infectious TB cases and consequently increasing rates of dual infection. Although there have been no national drug susceptibility studies in the Ukraine, preliminary local data in Odessa suggest that the rate of multiple drug-resistant TB (MDRTB), for example, while high, is lower compared with other studies in the former Soviet Union, which offers some hope that intervention is not too late for preventing the HIV and TB epidemics (and particularly the proportion associated with MDRTB), from coming together.

Approaching the issue from the perspective of the emerging HIV epidemic, whether HIV develops into a larger-scale epidemic will depend on the interaction of key factors including the proportion

of IVDU that are HIV positive, the extent of needle sharing within the group and so transmission within the IVDU community, the degree to which those engaged in commercial sexual practice are HIV-positive and the degree of concurrent HIV infection with sexually transmitted diseases. There are estimated to be 650,000 IVDU in the Ukraine.⁶ Nevertheless, the proportion of HIV infection acquired through IVDU in the Ukraine has fallen (72.7% in 1997 to 54.2% in 2000),⁷ and this may represent an increasing role for heterosexual transmission spreading from both the IVDU and within the heterosexual non-IVDU group. There was little evidence supporting male homosexual transmission as a significant transmission route.⁷ By comparison, in a recent study, the HIV prevalence for the Ukrainian population in 1999 as a percentage of all cases tested was 0.46% (general), 0.16% (pregnant women), 0.75% (test for patients with a clinical illness), 0.8% (sexually transmitted infection [STI] patients), 4.2 (prisoners) and 8.6% for IVDU.

Odessa is a major port city with travel and migration probably assisting in both importing and exporting HIV infection. It is unclear what effect sexually transmitted diseases have on transmission in Odessa, but the importance of STIs in transmission of HIV has been amply demonstrated in Africa as elsewhere. The role of ulcerative venereal diseases is particularly important there, but these do not appear to be as common in Ukraine. Nevertheless, high rates of STI are indicative of unsafe sexual practice which would facilitate HIV transmission: for example, syphilis incidence rose from 68.7 per 100,000 population in 1994 to 150.9 in 1996 before falling to 91.5 in 2000; reported gonorrhoeal rates have also fallen to 52.7/100,000 but are still high, but chlamydial rates have risen to 54.2/100,000 in 2000.

This study should influence several areas of health planning. Knowledge of the exact HIV epidemiology within the general population (through antenatal clinic and anonymized unlinked seroprevalence studies) and within key risk groups will both be essential in planning effective intervention strategies. For example, the preventive strategies will be different depending on the prevalence of HIV infection within the IVDU community at the point an intervention is planned.⁸ For example, considering a relatively remote city in the Ukraine, HIV rates in the IVDU group will start low and the strategy will be primarily to prevent further spread within the existing IVDU group. In IVDU communities where the HIV prevalence is already high (as it is in Odessa where the seroprevalence is 65%),⁹ the primary harm prevention focus would be to prevent new IVDU from becoming HIV positive as well as trying to prevent transmission within the existing pool of IVDU individuals. In practice, the harm reduction measures are likely to be similar (see below).

Behaviour modification through education and knowledge transfer is essential. Individuals need to have a clear understanding of how HIV is transmitted and the role of IVDU and concurrent STI in facilitating this, and that similar measures are valuable in curbing both STI and HIV. Programmes including outreach harm reduction, school-oriented sexual and HIV education programmes, AIDS awareness campaigns have all been successful elsewhere, particularly where they have involved popular media figures and socially influential persons.

As part of an effective strategy to prevent the two outbreaks coalescing further, there is a need for (1) more detailed epidemiology on both HIV and TB, including a detailed understanding of HIV rates among TB cases regionally as well as nationally, and trends among different adults; (2) antenatal clinic and anonymized unlinked HIV seroprevalence studies in the general population and risk groups and drug resistance surveys among TB patients; (3) behaviour modification campaigns with appropriate education delivered by professionals and peer groups; (4) harm intervention strategies including condom provision, interruption of mother-to-child transmission and needle exchange; (4) improved TB diagnosis and case management and institution of effective mechanisms to limit TB transmission within institutions such as hospitals and prisons, particularly to HIV-positive patients. Effective TB control programmes will be essential to adequately and effectively treat TB and limit the emergence (or transmission) of drug-resistant TB. Where there are both high TB and HIV rates, an antiretroviral treatment programme will be necessary.

High rates of TB and HIV infection and disease have been seen in Ukraine and in Odessa in particular. Significant effort is needed for the effective control of these two outbreaks to prevent high levels of morbidity and mortality from these two diseases.

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