Clinical Presentation and Risk Behaviors of Patients with Acquired Immunodeficiency Syndrome in Thailand, 1994–1998: Regional Variation and Temporal Trends

Suwat Chariyalertsak, Thira Sirisanthana, Orapan Saengwonloey, and Kenrad E. Nelson

From 1994 through 1998, the clinical and demographic features and risk behaviors of 101,945 adolescent and adult patients with acquired immunodeficiency syndrome (AIDS) were reported to the Ministry of Public Health in Thailand. The number of reported cases of AIDS infection increased from 12,005 in 1994 to 24,722 in 1997. Nearly 40% of the cases were reported from the northern provinces, which contained only ~20% of the adult population. About 80% of cases were among male patients, and 87% had been acquired via sexual contact. Tuberculosis was the most commonly reported opportunistic infection, occurring in 28.9% of patients; it was more commonly reported among injection drug abusers, especially in Bangkok. Pneumocystis carinii pneumonia and cryptococcal meningitis each occurred in nearly 20% of patients and were more frequently reported in patients with risk factors related to sex than in injection drug abusers. Penicillium marneffei infections were reported in 6.8% of patients from the northern provinces but less frequently elsewhere. These data suggest that AIDS is common in Thailand, and human immunodeficiency virus–infected persons should be given prophylaxis for tuberculosis, fungal infections, and P. carinii pneumonia.

Since it began approximately 12 years ago, the epidemic of HIV infection and AIDS in Thailand has exploded. Indigenous transmission of HIV was first recognized among injection drug abusers in Bangkok in early 1988 [1]. This was followed in 1988–1989 by a larger heterosexual epidemic that was nationwide but more extensive in the upper northern provinces of the country [2]. In 1989, the Thai Ministry of Public Health (MOPH) established semiannual sentinel surveillance of HIV infections in several groups of persons with high risk behavior to monitor the progress of the epidemic [3]. Included in this surveillance were female commercial sex workers, patients at sexually transmitted disease clinics, injection drug abusers, blood donors, and antenatal clinic patients. The sentinel surveys have found consistently higher rates of HIV prevalence in the upper northern part of Thailand in all populations except injection drug abusers [2, 4].

After a feasibility trial in 1 province, the MOPH established an HIV/AIDS prevention program, frequently called the “100% condom program” [5]. Its objectives were to decrease the likelihood of transmission of HIV during commercial or casual sex through promotion of condom use and to encourage safe sex practices generally through public education about the risks of HIV infection. To monitor the epidemic, the Division of Epidemiology of the MOPH established a reporting system for AIDS clinical illnesses. Patients were required to be reported to the Division of Epidemiology by physicians or other health care providers if they had a
clinical AIDS-defining illness that met the 1993 Centers for Disease Control (CDC) clinical AIDS criteria [6]. In addition, disseminated *Penicillium marneffei* infections in HIV-positive patients were added to the CDC AIDS definition for Thailand, because *P. marneffei* has emerged as an important AIDS-associated opportunistic pathogen in Thailand [7]. Case reports were confidential and were submitted and maintained without personal identifiers. Soundex codes that contained the patient’s name in the Thai language were used to prevent duplicate reporting of the same patient.

The number of patients with AIDS has increased in recent years as the epidemic of HIV/AIDS has matured, yet few data have been reported on the clinical manifestations of AIDS in Thailand, which is experiencing one of the largest epidemics in Asia. Clinical data from Thailand generally have been restricted to a description of cases from individual hospitals [8–10]. This report describes the nationwide distribution and regional variation of specific clinical illnesses and demographic and behavioral risk characteristics of >100,000 persons with AIDS who were reported to the Division of Epidemiology of the MOPH from January 1994 through December 1998. All cases of AIDS infection that occurred during this period that were reported as of 30 September 1999 were included. Although cases of AIDS infection occurred and were reported in Thailand before 1994, the official case definition, which includes the criteria for AIDS-defining illnesses, was standardized in 1994 and was modeled after the 1993 CDC clinical case definition, to which disseminated *P. marneffei* infection was added. Therefore, clinical cases that were reported after 1993 are more reliable than are reports of earlier cases.

**PATIENTS AND METHODS**

We analyzed the data from 101,945 patients with AIDS from January 1994 through December 1998. Only patients who were ≥10 years of age were included in the analysis, because the diagnosis and clinical features of AIDS in infants and young children differ from those in older children and adults. Data included the sex, age, primary HIV risk behavior, and the specific AIDS indicator illness (opportunistic infection, wasting syndrome, or neoplasm) at the time of the report, together with the geographic region of the country and year of the report. The regions of Thailand were as follows: Bangkok and central, north, northeast, and south Thailand (figure 1). (These regions are generally used in studies that evaluate the regional distribution of morbidity and mortality and other health and economic indices in Thailand.) Cases are reported by use of Soundex codes of the names to maintain confidentiality. Because of the complex given and family names in Thailand, it is rare for different persons to share names. In addition, other demographic variables of the reported patient are used, such as age, sex, and address, to avoid duplicate reporting. Only the initial AIDS-defining illness is recorded. The list of AIDS-defining illnesses in Thailand includes 25 conditions and is identical to the list in the 1993 CDC clinical definition of AIDS, with the addition of disseminated *P. marneffei* infection [7]. Diagnostic capabilities in Thailand are quite good and are available to clinicians throughout the country. All provinces have access to modern radiographic and microbiological facilities. Laboratory confirmation was required for some diagnoses, such as extrapulmonary cryptococcosis, *P. marneffei* infection, salmonellosis, and tuberculosis. Report of *Pneumocystis carinii* pneumonia (PCP) was made on the basis of laboratory confirmation or a typical clinical presentation that responded to therapy with trimethoprim-sulfamethoxazole.

**RESULTS**

The number of reported AIDS patients increased progressively from 1994 (12,005 cases) through 1996 (22,542 cases) before levelling off at ~24,000 cases per year in 1997 and 1998 (table 1). Overall, 81,740 (80.2%) of the cases were in male patients. The slightly lower percentage of cases in male patients from the northern region (76.9%) may reflect more frequent male-to-female transmission in this area (table 2). Most patients

![Figure 1](image-url)
(83.1%) were 20–39 years of age. A total of 88,967 AIDS infections (87.3%) were acquired by means of sexual contact; the percentage who had acquired their HIV infection by sexual means varied from ~75%, in Bangkok and the south, to ~92%, in the north and northeast (table 2). Most of the patients with sexual risks reported only heterosexual contact; male homosexuals or bisexuals accounted for only 1.32% of those with sexual risks. Proportionally more patients with AIDS acquired their HIV infection by means of injection drug use in Bangkok and the southern area of Thailand. Throughout Thailand, 5.3% of AIDS infections were reported to have occurred via injection drug use (table 2). The percentage of AIDS infections reported from the northern area of Thailand during the study period (38.6%) was larger than the percentage of the national population ≥10 years of age that lived in this area in 1995 (20.5%; P < .001; table 3; figure 1). Conversely, the percentage of AIDS infections that were reported from the northeast and south (15.9% and 8.5%, respectively) was smaller than the percentages of the adult population that live in these areas (33.8% and 12.4%, respectively; table 3).

Overall, 25 AIDS indicator illnesses were included by the MOPH as AIDS-defining conditions in HIV-positive patients (table 1). At least 1 patient was reported for each of the conditions listed, with the exception of coccidioidomycosis, for which no cases were reported. Some patients had multiple AIDS indicator illnesses at their first diagnosis (table 1). The most commonly reported conditions were wasting syndrome, tuberculosis, PCP, cryptococcosis, and esophageal candidiasis. Each of these conditions occurred in at least 5% of reported patients infected with AIDS. Of note was the rarity of Kaposi’s sarcoma, which was reported in only 182 patients, or 0.2% of the total. Several AIDS-related illnesses showed significant regional variation. For example, esophageal candidiasis occurred in 8.9% of patients with AIDS in Bangkok, but only in 4.3% of patients with AIDS in the northeast (P ≤ .001; table 3), and prevalence of extrapulmonary cryptococcosis infection varied

### Table 1. Acquired immunodeficiency syndrome (AIDS)–defining illnesses among AIDS patients who are ≥10 years of age, as reported to Ministry of Public Health, Thailand, by year, 1994–1998.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasting syndrome</td>
<td></td>
<td>3627 (30.2)</td>
<td>5429 (30.1)</td>
<td>6527 (29.0)</td>
<td>6719 (27.2)</td>
<td>6427 (26.1)</td>
<td>28,729 (28.2)</td>
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<td>Tuberculosis</td>
<td></td>
<td>3346 (27.9)</td>
<td>4891 (27.1)</td>
<td>6181 (27.4)</td>
<td>7353 (29.7)</td>
<td>7666 (31.1)</td>
<td>29,437 (28.9)</td>
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<tr>
<td>Pneumocystis carinii pneumonia</td>
<td></td>
<td>2192 (18.3)</td>
<td>3388 (18.8)</td>
<td>4220 (18.7)</td>
<td>4965 (20.1)</td>
<td>5380 (21.8)</td>
<td>20,145 (19.8)</td>
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<td>Cryptococcosis</td>
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<td>2148 (17.9)</td>
<td>3302 (18.3)</td>
<td>4316 (19.1)</td>
<td>4707 (19.0)</td>
<td>4348 (17.6)</td>
<td>18,821 (18.5)</td>
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<tr>
<td>Esophageal candidiasis</td>
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<td>961 (8.0)</td>
<td>1371 (7.6)</td>
<td>1571 (7.0)</td>
<td>1001 (4.0)</td>
<td>1085 (4.4)</td>
<td>5989 (5.9)</td>
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<td>Pneumonia, bacterial</td>
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<td>512 (4.3)</td>
<td>787 (4.4)</td>
<td>840 (3.7)</td>
<td>811 (3.3)</td>
<td>741 (3.0)</td>
<td>3691 (3.6)</td>
</tr>
<tr>
<td>Penicillium marneffei infection</td>
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<td>510 (4.2)</td>
<td>557 (3.1)</td>
<td>700 (3.1)</td>
<td>692 (2.8)</td>
<td>595 (2.4)</td>
<td>3054 (3.0)</td>
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<td>Cerebral toxoplasmosis</td>
<td></td>
<td>446 (3.7)</td>
<td>520 (2.9)</td>
<td>721 (3.2)</td>
<td>727 (2.9)</td>
<td>719 (2.9)</td>
<td>3133 (3.1)</td>
</tr>
<tr>
<td>HIV encephalopathy</td>
<td></td>
<td>307 (2.6)</td>
<td>444 (2.5)</td>
<td>372 (1.7)</td>
<td>462 (1.9)</td>
<td>402 (1.6)</td>
<td>1987 (1.9)</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td></td>
<td>150 (1.2)</td>
<td>197 (1.1)</td>
<td>154 (0.7)</td>
<td>219 (0.9)</td>
<td>175 (0.7)</td>
<td>895 (0.9)</td>
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<tr>
<td>Herpes simplex</td>
<td></td>
<td>101 (0.8)</td>
<td>130 (0.7)</td>
<td>165 (0.7)</td>
<td>156 (0.6)</td>
<td>175 (0.7)</td>
<td>727 (0.7)</td>
</tr>
<tr>
<td>Mycobacterium infection (other)</td>
<td></td>
<td>120 (1.0)</td>
<td>128 (0.7)</td>
<td>125 (0.6)</td>
<td>185 (0.7)</td>
<td>272 (1.1)</td>
<td>830 (0.8)</td>
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<tr>
<td>Isosporiasis</td>
<td></td>
<td>75 (0.6)</td>
<td>145 (0.8)</td>
<td>106 (0.5)</td>
<td>143 (0.6)</td>
<td>131 (0.5)</td>
<td>600 (0.6)</td>
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<tr>
<td>Cytomegalovirus retinitis</td>
<td></td>
<td>74 (0.6)</td>
<td>105 (0.6)</td>
<td>149 (0.7)</td>
<td>144 (0.6)</td>
<td>100 (0.4)</td>
<td>572 (0.6)</td>
</tr>
<tr>
<td>Salmonella septicemia</td>
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<td>106 (0.9)</td>
<td>88 (0.5)</td>
<td>120 (0.5)</td>
<td>104 (0.4)</td>
<td>117 (0.5)</td>
<td>535 (0.5)</td>
</tr>
<tr>
<td>Histoplasmosis</td>
<td></td>
<td>39 (0.3)</td>
<td>56 (0.3)</td>
<td>60 (0.3)</td>
<td>66 (0.3)</td>
<td>49 (0.2)</td>
<td>270 (0.3)</td>
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<tr>
<td>Kaposi’s sarcoma</td>
<td></td>
<td>20 (0.2)</td>
<td>32 (0.2)</td>
<td>48 (0.2)</td>
<td>44 (0.2)</td>
<td>38 (0.2)</td>
<td>182 (0.2)</td>
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<tr>
<td>Lymphoma, immunoblastic</td>
<td></td>
<td>24 (0.2)</td>
<td>34 (0.2)</td>
<td>39 (0.2)</td>
<td>48 (0.2)</td>
<td>32 (0.1)</td>
<td>177 (0.2)</td>
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<tr>
<td>Cytomegalovirus infection</td>
<td></td>
<td>27 (0.2)</td>
<td>34 (0.2)</td>
<td>45 (0.2)</td>
<td>74 (0.3)</td>
<td>54 (0.2)</td>
<td>234 (0.2)</td>
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<td>Burkitt’s lymphoma</td>
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<td>20 (0.2)</td>
<td>22 (0.1)</td>
<td>28 (0.1)</td>
<td>61 (0.1)</td>
<td>98 (0.1)</td>
<td>108 (0.1)</td>
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<td>Lymphoma primarily in brain</td>
<td></td>
<td>20 (0.2)</td>
<td>21 (0.1)</td>
<td>12 (0.1)</td>
<td>21 (0.1)</td>
<td>24 (0.1)</td>
<td>98 (0.1)</td>
</tr>
<tr>
<td>Mycobacterium avium infection</td>
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<td>13 (0.1)</td>
<td>18 (0.1)</td>
<td>40 (0.2)</td>
<td>57 (0.2)</td>
<td>84 (0.3)</td>
<td>212 (0.2)</td>
</tr>
<tr>
<td>Progressive multifocal leukoencephalopathy</td>
<td></td>
<td>11 (0.1)</td>
<td>12 (0.1)</td>
<td>12 (0.1)</td>
<td>21 (0.1)</td>
<td>7 (~0.0)</td>
<td>63 (0.1)</td>
</tr>
<tr>
<td>Invasive carcinoma, cervix</td>
<td></td>
<td>18 (0.1)</td>
<td>6 (~0.0)</td>
<td>11 (~0.0)</td>
<td>6 (~0.0)</td>
<td>8 (~0.0)</td>
<td>49 (~0.0)</td>
</tr>
<tr>
<td>Coccidioidomycosis</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>12,005</td>
<td>18,022</td>
<td>22,542</td>
<td>24,722</td>
<td>24,654</td>
<td>101,945</td>
</tr>
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</table>

HIV/AIDS • CID 2001:32 (15 March) • 957
Table 2. Demographic and behavioral characteristics of reported patients with AIDS >10 years of age, according to region, Thailand, 1994–1998.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Bangkok</th>
<th>Central</th>
<th>North</th>
<th>Northeast</th>
<th>South</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>9874</td>
<td>27,766</td>
<td>39,318</td>
<td>16,233</td>
<td>8754</td>
<td>101,945</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8434 (85.4)</td>
<td>22,887 (82.4)</td>
<td>30,222 (76.9)</td>
<td>13,115 (80.8)</td>
<td>7082 (80.9)</td>
<td>81,740 (80.2)</td>
</tr>
<tr>
<td>Female</td>
<td>1440 (14.6)</td>
<td>4879 (17.6)</td>
<td>9096 (23.1)</td>
<td>3118 (19.2)</td>
<td>1672 (19.1)</td>
<td>20,205 (19.8)</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10–19</td>
<td>111 (1.1)</td>
<td>311 (1.1)</td>
<td>431 (1.1)</td>
<td>168 (1.0)</td>
<td>96 (1.1)</td>
<td>1117 (1.1)</td>
</tr>
<tr>
<td>20–29</td>
<td>3171 (32.1)</td>
<td>11,565 (41.7)</td>
<td>16,862 (42.9)</td>
<td>8533 (52.6)</td>
<td>3673 (42.0)</td>
<td>43,804 (43.0)</td>
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<tr>
<td>30–39</td>
<td>4223 (42.8)</td>
<td>10,989 (39.6)</td>
<td>16,124 (41.0)</td>
<td>5878 (36.2)</td>
<td>3624 (41.4)</td>
<td>40,838 (40.1)</td>
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<tr>
<td>40–49</td>
<td>1661 (16.8)</td>
<td>3471 (12.5)</td>
<td>4255 (10.8)</td>
<td>1326 (8.2)</td>
<td>1023 (11.7)</td>
<td>11,736 (11.5)</td>
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<td>50–59</td>
<td>478 (4.8)</td>
<td>983 (3.5)</td>
<td>1074 (2.7)</td>
<td>244 (1.5)</td>
<td>238 (2.7)</td>
<td>3017 (3.0)</td>
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<td>&gt;60</td>
<td>230 (2.4)</td>
<td>447 (1.6)</td>
<td>572 (1.5)</td>
<td>84 (0.5)</td>
<td>100 (1.1)</td>
<td>1433 (1.3)</td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injection drug abuse</td>
<td>1188 (12.0)</td>
<td>1751 (6.3)</td>
<td>772 (2.0)</td>
<td>496 (3.0)</td>
<td>1177 (13.4)</td>
<td>5383 (5.3)</td>
</tr>
<tr>
<td>Sexual contact</td>
<td>7771 (78.7)</td>
<td>23,527 (84.7)</td>
<td>36,308 (92.3)</td>
<td>14,823 (91.3)</td>
<td>6538 (74.7)</td>
<td>88,967 (87.3)</td>
</tr>
<tr>
<td>Blood transfusion</td>
<td>3 (~0.0)</td>
<td>4 (~0.0)</td>
<td>11 (~0.0)</td>
<td>4 (~0.0)</td>
<td>1 (~0.0)</td>
<td>23 (~0.0)</td>
</tr>
<tr>
<td>Unknown</td>
<td>912 (9.3)</td>
<td>2484 (9.0)</td>
<td>2227 (5.7)</td>
<td>911 (5.7)</td>
<td>1038 (11.9)</td>
<td>7572 (7.4)</td>
</tr>
</tbody>
</table>

from 24.1% of patients with AIDS in the northeast to 6.9% in the south ($P<.001$). The prevalence of tuberculosis infection varied from 43.0% of patients with AIDS in Bangkok to 21.6% from the north ($P<.001$). However, the most striking regional variation was seen for $P$. marneffei infections, which infected 6.8% of all AIDS patients in the north, but only 0.4%–1.0% of AIDS patients from other regions of the country ($P<.001$). Also, cerebral toxoplasmosis was more common in the north (5.3%) than in other regions of the country.

Reported patients with AIDS who had acquired HIV via sexual contact differed from those with a history of injection drug abuse with regard to the ratio of male to female patients and with regard to some of their AIDS-defining illnesses (table 4). Male patients accounted for 78.7% of those who were infected via sexual contact and 98.0% of those with a history of injection drug abuse. Stratification of the 11 most common AIDS-related opportunistic conditions, according to transmission category (sexual or injection drug abuse) and region, revealed tuberculosis to be a more common infection in injection drug abusers in all areas of Thailand (table 5). However, the percentage of injection drug abusers with AIDS-associated tuberculosis (75.7%) was approximately double that reported in patients with risk factors related to sex practices (38.3%) in Bangkok, whereas the difference in tuberculosis, according to risk group, was not as marked elsewhere in Thailand. PCP and cryptococcosis were more commonly reported among AIDS patients with sexual risks than among those with drug injection risks (tables 4 and 5). There was no trend for any particular opportunistic infection to emerge as a more frequent AIDS indicator illness during the 5 years of this study (table 1).

**DISCUSSION**

Despite the extensive spread of AIDS in the past decade, few reports have been published that describe the clinical manifestations of AIDS in Thailand [8–11]. Most reports include a limited number of AIDS patients from a single hospital. Although, in all likelihood, cases of AIDS infection may not have been comprehensively reported in Thailand, the ratio of reported patients with AIDS (101,945) to the number of people estimated to be living with HIV infection (estimated at 700,000–800,000) is greater than that of other Asian countries with epidemics of relatively recent onset [12]. Furthermore, the recognition of the importance of the AIDS epidemic by the medical and public health community and the general public, along with the availability of modern diagnostic facilities and drugs to treat and prevent some AIDS-associated infections in Thailand, has facilitated the diagnosis and reporting of AIDS. Also, the implementation of confidential means of reporting data that do not use personal identifiers has removed many concerns about stigmatization. We believe the data are generally reliable with respect to the distribution and temporal trends of AIDS indicator illnesses and risk behaviors, even if all AIDS cases may not have been reported.

Reliable information on the clinical manifestations of AIDS in a country that is experiencing an epidemic of HIV infection
is important for several reasons. First, if clinicians are aware of the common clinical manifestations of AIDS, it may lead them to suspect, diagnose, report, and counsel persons seen with compatible symptoms and, therefore, to interrupt transmission of HIV. Second, more complete and accurate reporting could assist in planning for diagnostic and health care facilities. Third, a knowledge of the common clinical features of AIDS in a local setting could be used to guide decision-making with regard to appropriate prophylactic or therapeutic trials for the prevention of frequent AIDS complications. Finally, geographic differences in the frequency of opportunistic infections among AIDS patients may provide important epidemiological information about the environmental reservoirs or important exposures associated with specific opportunistic infections in immunosuppressed patients.

The reported AIDS cases from Thailand indicate that Mycobacterium tuberculosis is the most common opportunistic pathogen; overall, 28.9% of AIDS diagnoses were made when a patient developed tuberculosis. Among patients in Bangkok who have had AIDS diagnosed, the percentage who had tuberculosis (43.0%) was higher than that of patients with AIDS from other regions of the country. This was because of a larger proportion of reported AIDS infections from Bangkok among injection drug abusers and a greater frequency of tuberculosis among the general population of injection drug abusers in Bangkok. There might be different reasons for this high number of infections: different policies regarding routine screening of tuberculosis patients for HIV infection; differing access to health care; or, possibly, latent tuberculosis may be more com-

Table 3. Common AIDS-de®ning illnesses among patients with AIDS ≥10 years of age reported to the Ministry of Public Health, Thailand, according to region, 1994–1998.

<table>
<thead>
<tr>
<th>AIDS indicator illness</th>
<th>No. (%) of patients, by region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bangkok</td>
</tr>
<tr>
<td>Wasting syndrome</td>
<td>1874 (19.0)</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>4250 (43.0)</td>
</tr>
<tr>
<td><em>Pneumocystis carinii</em> pneumonia</td>
<td>1578 (16.0)</td>
</tr>
<tr>
<td>Cryptococcosis</td>
<td>1571 (15.9)</td>
</tr>
<tr>
<td>Esophageal candidiasis</td>
<td>881 (8.9)</td>
</tr>
<tr>
<td>Pneumonia, bacteria</td>
<td>444 (4.5)</td>
</tr>
<tr>
<td><em>Penicillium marneffei</em> infection</td>
<td>44 (0.4)</td>
</tr>
<tr>
<td>Cerebral toxoplasmosis</td>
<td>185 (1.9)</td>
</tr>
<tr>
<td>HIV encephalopathy</td>
<td>162 (1.6)</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>115 (1.2)</td>
</tr>
<tr>
<td>Herpes simplex</td>
<td>98 (1.0)</td>
</tr>
<tr>
<td>Mycobacterium infection (other)</td>
<td>83 (0.8)</td>
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<td>Isosporiasis</td>
<td>57 (0.6)</td>
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<td>Cytomegalovirus retinitis</td>
<td>71 (0.7)</td>
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<tr>
<td><em>Salmonella septica</em></td>
<td>93 (0.9)</td>
</tr>
<tr>
<td>Histoplasmosis</td>
<td>40 (0.4)</td>
</tr>
<tr>
<td>Kaposi’s sarcoma</td>
<td>23 (0.2)</td>
</tr>
<tr>
<td>Total</td>
<td>9874 27,766 39,318 16,233 8754</td>
</tr>
</tbody>
</table>
Table 5. Common opportunistic infections among patients with AIDS ≥10 years of age reported to Ministry of Public Health, Thailand, according to mode of transmission and regions, 1994–1998.

<table>
<thead>
<tr>
<th>AIDS indicator illness</th>
<th>Bangkok</th>
<th>Central</th>
<th>North</th>
<th>Northeast</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sexual IDA</td>
<td>Sexual IDA</td>
<td>Sexual IDA</td>
<td>Sexual IDA</td>
<td>Sexual IDA</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>2979 (38.3)</td>
<td>899 (75.7)</td>
<td>7308 (31.1)</td>
<td>749 (42.8)</td>
<td>7734 (21.3)</td>
</tr>
<tr>
<td>Pneumocystis carinii pneumonia</td>
<td>1301 (16.7)</td>
<td>61 (5.1)</td>
<td>5175 (22.0)</td>
<td>281 (16.0)</td>
<td>8248 (22.7)</td>
</tr>
<tr>
<td>Cryptococcosis</td>
<td>1419 (18.3)</td>
<td>52 (4.4)</td>
<td>4249 (18.1)</td>
<td>142 (8.1)</td>
<td>7392 (20.4)</td>
</tr>
<tr>
<td>Esophageal candidiasis</td>
<td>694 (8.9)</td>
<td>78 (6.6)</td>
<td>1476 (6.3)</td>
<td>142 (8.1)</td>
<td>1786 (4.9)</td>
</tr>
<tr>
<td>Pneumonia, bacterial</td>
<td>369 (4.7)</td>
<td>34 (2.9)</td>
<td>990 (4.2)</td>
<td>149 (8.5)</td>
<td>834 (2.3)</td>
</tr>
<tr>
<td>Penicillium marneffei infection</td>
<td>39 (0.5)</td>
<td>2 (0.2)</td>
<td>98 (0.4)</td>
<td>6 (0.3)</td>
<td>2377 (6.5)</td>
</tr>
<tr>
<td>Cerebral toxoplasmosis</td>
<td>163 (2.1)</td>
<td>9 (0.8)</td>
<td>355 (1.5)</td>
<td>18 (1.0)</td>
<td>1908 (5.3)</td>
</tr>
<tr>
<td>HIV encephalopathy</td>
<td>136 (1.8)</td>
<td>6 (0.5)</td>
<td>408 (1.7)</td>
<td>31 (1.8)</td>
<td>658 (1.8)</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>104 (1.3)</td>
<td>7 (0.6)</td>
<td>188 (0.8)</td>
<td>11 (0.6)</td>
<td>273 (0.8)</td>
</tr>
<tr>
<td>Herpes simplex</td>
<td>92 (1.2)</td>
<td>2 (0.2)</td>
<td>145 (0.6)</td>
<td>13 (0.7)</td>
<td>189 (0.5)</td>
</tr>
<tr>
<td>Mycobacterium infection (other)</td>
<td>70 (0.9)</td>
<td>8 (0.7)</td>
<td>208 (0.9)</td>
<td>20 (1.1)</td>
<td>274 (0.8)</td>
</tr>
<tr>
<td>Total</td>
<td>7771</td>
<td>1188</td>
<td>23,527</td>
<td>1751</td>
<td>36,308</td>
</tr>
</tbody>
</table>

NOTE. IDA, injection drug abuse.
mon or opportunities for transmission of tuberculosis may be greater among injection drug abusers in Bangkok. Tuberculosis is the most common AIDS-defining opportunistic infection in several developing countries in Africa and Asia [12, 13]. In one report from India, 76% of people with AIDS had tuberculosis [14]. Also, in smaller clinical series from Papua New Guinea [15] and Sri Lanka [16], ~70% of patients with AIDS had tuberculosis. In contrast, in Australia, where the annual incidence of tuberculosis is quite low (~6 cases/100,000 persons), only 2% of people with AIDS have developed tuberculosis [17]. The rates of tuberculosis among AIDS patients in the United States [18] and France [19] fall between those reported from Thailand and Australia; the rates of infection were 4.8% and 11%, respectively.

In most developed countries, PCP has been the most common AIDS-defining infection since the beginning of the epidemic, accounting for nearly 67% of all initial AIDS diagnoses [20]. Moreover, this rate has decreased with the routine use of antibiotic prophylaxis to prevent PCP among patients with CD4 cell counts of <200 cells/μL [21, 22]. Further reductions in the frequency of all AIDS-defining illnesses, including PCP, have been reported in HIV-infected patients who are receiving combination antiretroviral therapy that includes protease inhibitors [23–25]. In contrast, clinicians in some developing countries in Africa report that PCP infection is rare among patients with AIDS in their countries [26, 27]. Although lack of adequate diagnostic services could account in part for the rarity of PCP infection in some developing countries, evidence of PCP was found in only 4% of patients in an autopsy series of patients with AIDS who died in Abidjan, Ivory Coast [27]. This suggests that there may be significant geographic variation with regard to environmental exposure to this organism or that early AIDS-related mortality due to other causes may reduce the rates of PCP infection among African patients.

In Thailand, PCP infection was reported in 19.8% of patients with AIDS from 1994 through 1998. Because many of these diagnoses were made on clinical grounds alone, these data may not accurately reflect the true incidence of PCP infection. Because of the frequency of PCP infection in patients with AIDS in Thailand (although it is lower than that reported from the United States and Europe), routine prophylaxis with trimethoprim-sulfamethoxazole is recommended as the standard of care for immunocompromised patients with AIDS. Nevertheless, many patients with AIDS in Thailand do not receive this prophylaxis at the present time.

Systemic fungal infections are common among patients with AIDS in Thailand. Esophageal candidiasis was reported in 5.9% of patients with AIDS, with some significant regional variation; higher rates were reported from Bangkok than from the north or northeast. In contrast to the regional variation of candidal esophagitis, invasive cryptococcosis was reported in 18.5% of patients with AIDS and was more commonly reported among persons who acquired HIV via sexual contact and among those in the north and northeast than among those in Bangkok or south Thailand. The frequency of cryptococcosis among AIDS patients in Thailand is significantly higher than that in similar populations in Australia or the United States. In one recent series from Australia, 4.5% of patients had cryptococcosis as an initial AIDS-related illness and, overall, 10.9% had cryptococcosis as an initial or subsequent AIDS-related illness [17]. Although cryptococcosis has been reported in patients with AIDS throughout the world, the opportunities for exposure may be greater in some tropical regions, such as Thailand. Also, intermittent or continuous treatment or prophylaxis of oral thrush with antifungal agents in patients in the United States or Europe may decrease the risk of infection with cryptococcal meningitis.

Another fungal infection that has exhibited marked geographic variation is disseminated P. marneffei infection. Cases have been reported from Thailand, other countries in Southeast Asia, southern China, and Hong Kong [28]. The organism is not endemic in other areas of the world; however, infections have been reported among residents of the United States, Europe, and Australia who have visited countries in which it is endemic [28–30]. Within Thailand, P. marneffei infections are much more common in the northern area of the country than they are elsewhere. In fact, they are rarely seen outside of the northern provinces. Among the reported patients with AIDS from the northern region, 6.8% had P. marneffei, whereas this infection was reported in <1% of patients with AIDS from elsewhere in the country. Data reported from Chiang Mai University Hospital indicate that P. marneffei infections in patients with AIDS are seasonal and that they occur more frequently during the rainy season. This stands in contrast with Cryptococcus neoformans infections, which are not seasonal [31]. Apparently the environmental reservoir of P. marneffei expands or human exposure to the reservoir may increase during the rainy season.

One of the most common manifestations of AIDS in Thailand is the wasting syndrome, which was reported in ~30% of patients. Wasting was often accompanied by other infectious manifestations, such as tuberculosis or chronic diarrhea.

One common AIDS condition in the United States and Europe that is very uncommon in Thailand is Kaposi’s sarcoma; only 0.2% of Thai patients with AIDS were reported to have Kaposi’s sarcoma. Whether this reflects the smaller proportion of men who have sex with men among patients with AIDS in Thailand or a lower infection rate with human herpesvirus type 8 among patients with AIDS in Thailand is unknown.

The epidemic of HIV infection in Thailand has been spread primarily via heterosexual sexual contact [2]; injection drug abuse has been associated with a minority (5.3%) of the total reported AIDS cases in adults. The proportion of cases in injection drug abusers is highest in Bangkok and the south, where...
injection drug abusers constitute ~15% of reported patients with AIDS. More than 80% of reported AIDS infections have occurred among young, sexually active male persons. However, recent seroprevalence data suggest that an increasing proportion of HIV infections are among women as the virus is transmitted to women in regular partnerships [4]. The AIDS prevention program of the MOPH has been directed at decreasing the rate of sexual transmission of HIV, especially during commercial sex. This program has been quite successful in reducing the HIV infection rates in young adult men [32]. Recent data suggest that the HIV prevalence may be leveling off or decreasing in women as well [33]. The numbers of reported AIDS cases did not increase from 1996 through 1998. This may reflect the decreasing incidence of HIV infection as a result of concerted national prevention efforts, which began around 1991. However, it is still not clear whether the AIDS epidemic in Thailand has reached its peak.

The distribution of AIDS-related opportunistic illnesses in Thailand suggests that substantial clinical benefits might result from efforts to prevent or treat tuberculosis and local or systemic opportunistic fungal infections. Although public health efforts to prevent HIV infection should be paramount, prevention and treatment of AIDS-related opportunistic infections in Thailand are likely to increase in importance in the coming years.

References