

tion. Small-scale behavioral studies based on observations can help determine whether self-reported data are reliable. Actual behavioral change is frequently difficult to monitor, though some behavioral change is subject to measurement (for example, through tracking of condom sales). In-depth interviewing may be necessary to find out about other types of behavioral change. These studies can be costly to conduct and often can be used for evaluation purposes as well as monitoring.

Results from monitoring can be a powerful tool to attract public attention, foster public support, and influence decision-makers. The news media are generally eager to report new information about AIDS and progress towards AIDS prevention. Results of a health promotion campaign that demonstrate

changes in public knowledge, attitudes, and behavior are important news stories. A particular health promotion piece—such as a song or television ad—can become a news item itself if monitoring shows that it was heard or viewed by millions.

A second important by-product of monitoring is its value for the health promoter's professional development. Analysis of monitoring results not only reveals specific program weaknesses or strengths, but also teaches valuable lessons about behavioral change in the society which are applicable to other aspects of the AIDS problem.

Finally, monitoring can have a powerful impact outside the field of health promotion by providing insights into human behavior that can influence overall AIDS policy.



Report of the Consultation on the Neuropsychiatric Aspects of HIV Infection

Cases of acquired immunodeficiency syndrome are often accompanied by neurologic and psychiatric disorders: 70% of persons who die of AIDS exhibit significant mental and neurologic impairment, and pathologic changes in the central and peripheral nervous system have been reported in the autopsy of up to 90% of AIDS cases (1, 2). Recent reports have also suggested that neuropsychiatric disorders may occur earlier in the course of

HIV-1 infection, and possibly even in persons who lack physical symptoms, that is, those classified as Groups II or III according to the U.S. Centers for Disease Control (CDC) classification (see Annex, p. 205). These reports have raised apprehensions concerning possible public health and safety hazards that could result from neurologic, cognitive, or behavioral abnormalities in otherwise asymptomatic infected individuals, particularly those involved in occupations in which mishaps endanger many lives, such as civil aviation or operation of nuclear reactors.

To examine currently available data and formulate appropriate policy responses

Source: World Health Organization, Global Program on AIDS. Report of the Consultation on the Neuropsychiatric Aspects of HIV Infection, Geneva, 14-17 March 1988. Document WHO/GPA/DIR/88.1. Geneva, 1988.

in this complex area, a four-day consultation was convened in Geneva from 14 to 17 March 1988 by the World Health Organization's Global Program on AIDS and the WHO Division of Mental Health. The consultation was attended by 48 experts from 17 countries, representing the disciplines of neurology, psychiatry, psychology, neurobiology, epidemiology, social work, occupational health, ethics, clinical research, and health policy.

The first two days of the meeting were devoted to reviewing the available evidence on the neuropsychiatric effects of human immunodeficiency virus type 1 (HIV-1) infection, with particular focus on persons in CDC Groups II and III. The following questions were considered:

- What neuropsychiatric conditions are associated with HIV-1 infection in Groups II and III?
- What is known about the incidence, prevalence, course, and functional impact of such neuropsychiatric effects in these groups?
- How do the incidence and prevalence of such problems among Groups II and III individuals compare with those of neuropsychiatric conditions unrelated to HIV-1 in the general population?

In the second part of the meeting, the policy implications resulting from examination of these questions were identified and discussed.

NEUROPSYCHIATRIC DISEASES AND DISORDERS ASSOCIATED WITH HIV-1 INFECTION

HIV-1 dementia. Individuals with HIV-1 dementia (also known as AIDS dementia complex, HIV encephalopathy, or subacute encephalitis) typically experience forgetfulness, slowed thought processes,

poor concentration, and difficulties with problem-solving and reading. They may exhibit apathy, reduced spontaneity, and social withdrawal. In a small percentage of affected individuals, the illness begins atypically as an affective disorder, psychosis, or seizures.

Physical examination often reveals tremor, rapid repetitive movements, imbalance, ataxia, hypertonia, and generalized hyperreflexia, among other signs. Formal neuropsychological testing shows abnormalities on a variety of tests that measure performance under time constraints, problem-solving, visual scanning, perceptual and visual motor integration, and learning and memory.

Although the characteristic symptoms described above strongly suggest a diagnosis of HIV-1 dementia in HIV-1 seropositive individuals or patients with clinical AIDS, other etiologies must be excluded before such a diagnosis can be made. Laboratory and radiographic studies are useful for excluding other causes of dementia in HIV-1-infected individuals.

No data are currently available on the incidence of this disorder. In some studies of AIDS patients, the point prevalence of HIV-1 dementia ranged between 8% and 16% (3, 4, 5, 6). However, in a series of autopsies of cases referred to neurologists, the figure was as high as 66% (2).

It is not currently known what factors may predispose a person infected with HIV-1 to develop dementia, nor whether individuals in CDC Groups II and III who exhibit more subtle neurobehavioral abnormalities (described below) are at any increased risk of developing HIV-1 dementia. Studies are under way to determine whether differences in the manifestations or the course of the disorder exist among different risk groups.

HIV-1 dementia usually progresses quickly to severe deterioration and

death. The course and outcome of the disorder in patients without opportunistic infections and neoplasms is not presently known due to lack of data. Also insufficient is evidence regarding the efficacy of antiviral agents in treatment of this disorder. The sole and optimum management strategy at present consists of psychological and social support for patients and their care-givers in order to help sustain quality of life, attenuate the rate of deterioration, and minimize the impact of behavioral disturbance.

Neurobehavioral abnormalities other than dementia. These abnormalities are not specific and can only be related to HIV-1 infection if they cannot be ascribed reliably to any other disorder or etiology after thorough evaluation. Disorders such as adjustment reaction and depression or organic brain dysfunction must be ruled out.

Neurologic, cognitive, and behavioral problems may occur singly or in combination, and include difficulty with concentration, memory, or spoken or written language; persistent headaches; incoordination; weakness; diplopia; vertigo; apathy; anxiety; or depression. The abnormalities can be detected by history, physical examination, and neuropsychological testing. They are usually mild and are insufficient to establish a diagnosis of dementia by the WHO International Classification of Diseases (10th revision, in press) clinical criteria. Patients report that the problems rarely interfere with job performance in the absence of other AIDS-related illnesses.

The reported prevalence of abnormalities as measured by neuropsychological testing is 9% to 18% for HIV-1 seronegative controls; 20% (2) to 54% (7) for AIDS-related complex (ARC) patients; and 35% (2) to 87% (7) for AIDS patients. There is disagreement about whether the abnormalities measured by such testing occur

with increased frequency in CDC Groups II and III individuals. Data from three studies (unpublished data from the ongoing multi-center AIDS cooperative study, unpublished results of the ongoing CDC/San Francisco cohort study, and a study reported by Marshall—4) that involved over 800 men showed no increase in neurologic and neuropsychological abnormalities in otherwise healthy HIV-1 seropositive persons compared to HIV-1 seronegative controls. Data from a fourth study are based on a small sample, but show a higher rate of neuropsychological abnormalities in seropositive persons (7). The weight of current evidence suggests that CDC Groups II and III individuals do not have an increased frequency of neuropsychological abnormalities; however, the existence of divergent findings means that a final conclusion is not possible at present, and further studies are being conducted.

Factors that may increase the risk or predict the onset of neurobehavioral abnormalities in persons infected with HIV-1 are presently unknown. It is also not known whether these abnormalities are transient and reversible, persistent, or progressive, and whether they are predictive of subsequent neurologic or mental deterioration.

Therapy consists of supportive care and referral to psychological specialists when appropriate. Psychogenic factors may account for some of the mild cognitive defects observed, and as such are amenable to psychological interventions. It should be noted that it was the opinion of several participants in the consultation that psychoactive medication such as antidepressants might cause more frequent and severe side effects in HIV-1-infected persons compared with uninfected individuals.

HIV-1-related meningitis. An acute "aseptic" meningitis occurring shortly

after infection appears to represent a primary response of the nervous system to HIV-1 infection. The symptoms are compatible with acute meningeal inflammation and include headache, retro-orbital pain, meningismus, fever, photophobia, cranial neuropathies, and, rarely, transient encephalopathy (but not progressive dementia). Typically, the acute symptoms are self-limited, require no special treatment, and disappear in one to four weeks.

A milder variant of HIV-1-related meningitis, with only headache and persistent low-grade cerebrospinal fluid pleocytosis, has also been recognized. This type of meningitis can be attributed to HIV-1 infection only after the exclusion of other possible causes.

The incidence of clinically apparent meningitis seems to be low, but no systematic studies have been carried out. It is uncertain whether either acute symptomatic meningitis or "silent" central nervous system involvement (manifested by cerebrospinal fluid lymphocytic pleocytosis, intrathecal synthesis of anti-HIV-1-specific antibodies, and/or HIV-1 isolation) is associated with the later development of progressive dementia.

Vacuolar myelopathy. The clinical manifestations typically include a slowly progressive spastic paraparesis, sensory ataxia, sphincter disturbance, and impaired distal sensation. The myelopathy may be subtle and masked by other neurologic disorders. While this condition is generally associated with HIV-1 dementia, the pathologic changes observed in the two disorders are very different, suggesting different pathogenic mechanisms. It has not been established whether the vacuolar changes result directly from spinal cord infection with HIV-1.

The prevalence of vacuolar myelopathy exceeds 20% among autopsied AIDS

cases in New York and New Jersey (8). The lower prevalence rates observed in clinical and autopsy series from other places may be related to case selection or autopsy technique.

Only anecdotal reports have appeared of vacuolar myelopathy in otherwise asymptomatic HIV-1 seropositive persons, suggesting that the incidence of the condition is quite low. More studies are needed to assess the incidence, the course, and the outcome of this condition in CDC Groups II and III persons, the risk factors for its development after HIV-1 infection, and the effectiveness of zidovudine (also called azidothymidine or AZT) or other antiviral agents in the treatment of vacuolar myelopathy.

Demyelinating peripheral nerve disease. This disease is typically either an acute demyelinating motor neuropathy similar to Guillain-Barré syndrome or a more chronic syndrome characterized by motor weakness (9). It may be immune-mediated, representing immune dysregulation rather than direct nerve damage from HIV-1. Other viruses, such as herpes group viruses, may also be involved in its pathogenesis.

The disorder is uncommon. Most cases are seen in the early stages of HIV-1 infection (10), and in CDC Groups II and III individuals it may be the first manifestation of HIV-1 infection (11). Risk factors for its development are unknown, and it is unclear whether the syndrome appears in all risk groups. Most patients recover spontaneously.

Mononeuritis multiplex. Several reports have described multiple mononeuropathies in HIV-1-infected individuals, sometimes with accompanying cranial neuropathies and in other cases with central nervous system signs. Several patients have developed a more widespread peripheral neuropathy with

features of chronic inflammatory demyelinating neuropathy. The etiology of mononeuritis multiplex in HIV-1-infected persons is unknown and could be related to concurrent infection (for example, with hepatitis B virus).

This disorder is rare in all persons with HIV-1 infection, regardless of group classification. Some cases progress to generalized neuropathy, but too few patients have been studied to generalize about the course of the illness. There is no proven therapy.

Predominantly sensory neuropathy (PSN). This disorder normally involves symmetrical acral paresthesia and dysesthesia, primarily affecting the balls of the feet and the toes. In some patients with PSN, a selective degeneration of the gracile tract in the spinal cord is discovered at autopsy, and it has been proposed that the syndrome represents HIV-1 infection of and damage to the spinal ganglia.

Approximately 20% of patients with AIDS and fewer patients with ARC develop PSN. Since distal symmetrical peripheral neuropathies may be common in the general population, particularly among the elderly, PSN may not be sufficiently characteristic to be considered pathognomonic of HIV-1 infection. PSN only rarely occurs in persons in CDC Groups II and III.

HIV-1-associated myopathy. This syndrome is characterized by a subacute, predominantly proximal muscle weakness with myalgias, excessive fatigue, and an increased serum creatine kinase level. Muscle biopsies may reveal myofiber degeneration and regeneration and perivascular and interstitial inflammation. A self-limited myopathy may also occur at the time of seroconversion.

The incidence of this disorder in people infected with HIV-1 is unknown, but the clinical syndrome is rare. It is the first

manifestation of HIV-1 infection (12) in an unknown percentage of cases. Also unknown are the risk factors for its development and its course and outcome.

Opportunistic infections and neoplasms. A number of opportunistic infections or neoplasms of the central nervous system can affect the patient with HIV-1 infection and immunosuppression. By definition, the presence of these illnesses will result in a diagnosis of AIDS. Thus, while they may arise in CDC Groups II and III patients, once the illnesses have developed the patients are categorized as having AIDS (included in Group IV).

Progressive multifocal leukoencephalopathy (PML) is an unusual infectious central nervous system disease caused by the papovavirus John Cunningham (JC). It causes dementia, blindness, dysphasia, hemiparesis, and ataxia that slowly progress until death. Incidence in AIDS patients has been reported at 0.6% (University of California, San Francisco) and 3.8% (University of Miami). PML may be the initial clinical manifestation of HIV-1 infection in a small number of cases. There are no known factors that increase the risk of developing PML following HIV-1 infection, and there are no known effective therapies. The prognosis is grave; mean survival time after the onset of symptoms is less than two months.

Cerebral toxoplasmosis in AIDS patients results from the reactivation of latent brain infection with the opportunistic intracellular parasite *Toxoplasma gondii*. By October 1987, 838 cases had been reported to the CDC. In a substantial proportion of AIDS patients with cerebral toxoplasmosis, this disease was the first clinical manifestation of illness; overall, however, the percentage of AIDS patients first presenting with cerebral toxoplasmosis is small. Geographic differ-

ences in risk for the development of cerebral toxoplasmosis that have been found among AIDS patients in the United States may reflect local endemicity levels of toxoplasmosis, since the illness is a recrudescence of latent infection. Therapy with pyrimethamine and sulfadiazine is effective, but lifelong treatment is necessary in most patients. Survival of up to 18 months has been reported.

Cryptococcal meningitis, caused by infection with the common soil fungus *Cryptococcus neoformans*, is a well-known clinical entity. Symptoms are those of meningitis, including headache, stiff neck, fever, and photophobia. By October 1987, 2,473 cases of AIDS-related cryptococcal meningitis had been reported to the CDC, whose data indicate that 6.1% of AIDS patients have cryptococcal meningitis as their first AIDS-defining illness. Treatment with amphotericin B can alleviate clinical symptoms and control the disease. Use of ketoconazole derivatives for maintenance therapy is under investigation. Lifelong suppressive treatment may be required in most patients.

Primary malignant lymphomas of the brain are rare but well-characterized tumors. CDC data suggest that 1.5% of AIDS patients in the United States first present with central nervous system lymphoma. Epidemiological studies have not revealed risk factors for development of this disease. Although early reports suggested that it was untreatable, one recent study found that tumors of patients in otherwise good general health appear to respond to early aggressive radiation therapy, which may increase the length and quality of life. Without this therapy, mean survival time is about two months.

Severe depressive episode/major depression. Depression is a common mental disorder in most populations and can be

reliably diagnosed on the basis of present mental state, personal history, and family history. Depression can occur at any point in the course of an HIV-1 infection, but clinical reports indicate that it is most prevalent in the period following identification of HIV-1 seropositivity and in the initial stage of HIV-1 dementia.

Data on the incidence and prevalence of depressive illnesses among CDC Groups II and III persons are currently lacking. The reported frequency (13, 14) among HIV-1 seropositive persons referred to a psychiatric consultation was 15% to 17%. Analysis of the large number of existing observations on HIV-1 seropositive individuals with psychiatric symptoms should permit further estimates of the prevalence of major depression in HIV-1 seropositive populations.

Even if the incidence of depression in persons in CDC Groups II and III is higher than in the general population, the difference (unless excessive) will be difficult to demonstrate in view of the high baseline rate of occurrence of depressive disorders, which may be 5% of the adult population over a six-month period (15). Another potential difficulty in attributing mood disorders to HIV-1 infection is the possibility that groups at risk of becoming infected might consist of persons who are more likely to suffer from depression than members of the general population. Additionally, the differential diagnosis of depression in an HIV-1 seropositive individual is difficult because its symptoms may mimic features of ARC (weight loss, sleep disturbance, loss of libido) or dementia (slowing of mental processes, impaired concentration, subjective complaints of memory deterioration). Nevertheless, such differentiation should be attempted because of its important implications for prognosis, treatment, and management.

The risk of depression may be augmented by psychosocial factors, such as

lack of social support. Very little is known at present about the course and outcome of depression in CDC Groups II and III persons.

Other affective disorders. There are anecdotal reports of manic episodes in HIV-1 seropositive individuals, but it is not known whether these are causally linked to HIV-1 infection of the nervous system or are the expression of a bipolar affective illness in a person who happens to be seropositive.

Schizophreniform and paranoid disorders. Several case reports (16, 17, 18) mention acute psychotic illnesses with hallucination, paranoid or grandiose delusions, and thought disorders in individuals classified as CDC Groups II and III. On the basis of these reports, the etiology of these illnesses cannot be clearly attributed to HIV-1 infection, and further research is needed to establish whether acute schizophreniform and paranoid psychosis could be a neurobehavioral manifestation of HIV-1 infection.

Delirium. This well-defined clinical entity may develop in conjunction with a variety of physical illnesses, infectious and parasitic diseases, and intoxications, and as a complication of head injury. In HIV-1 infection, cases of benign and short-lived delirium have been described in association with the aseptic meningitis that may develop upon seroconversion (19). Such cases are probably quite rare in early Groups II and III individuals. Delirium is apparently much more common in HIV-1 dementia (20), but estimates of incidence are not available at present. It is not known whether the development of a delirium worsens the overall course of HIV-1 dementia, but this possibility cannot be excluded. Delirium should be regarded, therefore, as a serious complication in the course of HIV-1 dementia.

Other mental disorders. There have been a number of individual case reports of acute illnesses of mixed symptomatology in HIV-1-infected persons (e.g., combinations of delusions and hallucination, affective symptoms, and impaired sensorium). Although such illnesses cannot be classified unequivocally, the etiology is likely to be related to HIV-1. More epidemiological data are required before incidence can be assessed.

An observation of potential significance from Tanzania (21) concerns the apparent occurrence of acute psychotic disorders in HIV-1 seropositive individuals. These disorders apparently were the first manifestation of HIV-1 infection, and resulted in rapid deterioration and death within weeks or months, without development of ARC or AIDS. The clinical picture in these cases was not dementia but an acute hallucinatory psychosis with generalized excitement. The nature of these illnesses needs further investigation; no autopsies of affected individuals have been performed thus far.

Adjustment reactions. These reactions are common in persons recently diagnosed with HIV-1 infection. They involve expressions of despair, grief, guilt, anxiety, protest, depression, and hypochondriasis. In type, severity, and duration they are similar to reactions to other major life events or diseases and do not usually lead to chronic functional impairment. Factors such as perceived stigma and the extent of social and familial support have a significant bearing on the severity and duration of such reactions.

Adjustment reactions may occur in up to 90% of persons recently diagnosed with HIV-1 infection. The impact of adjustment problems can be reduced by counseling before and after testing.

Adjustment disorders. Many reports have not differentiated between adjust-

ment reactions and disorders. Adjustment disorders feature chronic functional distress or impairment and involve a morbid (excessive in length and/or intensity) response to the stress of HIV-1 infection identification or diagnosis.

The incidence and prevalence of adjustment disorders in CDC Groups II and III individuals are not known. They may be more frequent in persons with a history of psychiatric problems (18, 22). Adjustment disorders may last many months. They are frequently amenable to psychological therapy or medication.

CONCLUSIONS AND RECOMMENDATIONS

HIV-1 Serologic Status and Job Performance

Persons with AIDS and some of those with AIDS-related complex (ARC) are susceptible to damage or dysfunction of all areas of the nervous system due to HIV-1 or to opportunistic infections or meningitis. However, review of currently available scientific and medical data brought to light no evidence of an increase in clinically significant neuropsychological abnormalities in CDC Groups II and III HIV-1 seropositive persons compared to HIV-1 seronegative controls. The consultation therefore concluded that there is no justification at the present time for HIV-1 serologic screening as a strategy for detecting functional impairment in asymptomatic persons in the interest of public safety. It also recommended that this policy statement be reviewed frequently to take account of the findings of studies currently in progress or planned.

It was recognized that public concern has been aroused regarding issues related to AIDS and HIV infection, and that the public may be excessively influenced

by anecdotal or single case reports. Therefore, it was emphasized that single instances and anecdotes cannot and should never replace meticulous analysis of all the available evidence as the basis for conclusions regarding cause and effect and for policy formulation.

On the weight of the data reviewed, it was concluded that asymptomatic HIV-1-infected individuals pose no special problems in occupations with potentially high impact on public safety. The most effective strategy to detect meaningful dysfunction due to any cause (since a wide range of conditions may impair performance, including stress, fatigue, aging, and substance abuse) was felt to be the application of currently recommended performance and functional standards in both industry (e.g., for airline pilots, crane operators, etc.) and the assessment of individual capacity to perform daily activities (e.g., drive a car). Therefore, the effectiveness of performance testing must be reviewed and the correlation between tests of neuropsychological function and actual job performance must be determined precisely.

Given the evidence, denial of access to employment or the freedom to engage in everyday activities for otherwise healthy persons solely on the basis of HIV-1 serologic status would represent a violation of human rights and have broad and detrimental social implications. The consultation pointed out that HIV-1 screening of prospective or current employees might be implemented by employers for reasons other than public safety and unrelated to neuropsychological function, for example, to boost an industry's public relations image by publicizing its concern for public safety, or to exclude HIV-1-infected employees from training programs on the basis of a belief that they have a reduced life expectancy.

In summary, while the continued refinement of functional tests to detect

early neuropsychiatric impairment in occupation groups is to be encouraged, there is no justification at this time for the addition of HIV-1 serologic screening to these tests in the name of public safety.

Research

The review of current findings presented to the consultation pointed to the need to define or create a standard neuropsychological test battery for assessing functional impairment in HIV-1 seropositive persons. Such tests should attempt to measure a broad range of functions, since HIV-1 infection may result in variable nervous system pathology with diverse neuropsychological consequences.

Another problem recognized was the great variation in experimental design of previous studies, which has made analysis and comparison of results difficult. Therefore, the standardization of methodology is of prime importance. In this regard, it was recommended that study populations should be representative of all risk behavior groups, geographic areas, and socioeconomic and cultural groups. The results of studies on patients with differing clinical status should not be lumped together, and it is critical that patients with concomitant psychiatric or neurologic disease be studied separately.

The selection of appropriate control groups is of paramount importance. The lifestyle of many HIV-1-infected persons and the stress associated with a recent diagnosis of HIV-1 infection make comparisons with the general population or any group of uninfected individuals (who do not have the stress associated with the knowledge of HIV-1 infection) problematic. Future studies could use as control groups: (1) HIV-1 seronegative individuals with the same risk factors; (2) HIV-1 seronegative individuals with a recent diagnosis of life-threatening illness;

(3) HIV-1 seronegative individuals outside usual risk behavior groups but closely matched in sociodemographic and educational characteristics; (4) HIV-1 seronegative individuals with similar rates of alcohol and drug use; and (5) HIV-1 seronegative patients with other causes of immunosuppression.

Since studies of neuropsychiatric aspects of HIV-1 infection have major public policy implications, it is essential that the data be subjected to the rigorous scrutiny of peer review before they are disclosed. Results should therefore be published in recognized scientific journals. All data collection and analysis must be done in a manner that ensures the confidentiality of information and anonymity of study participants.

Many important aspects regarding HIV-1 dementia and the milder neurobehavioral abnormalities associated with HIV-1 infection remain to be clarified, including their natural history, pathogenesis, and predictors or possible markers of disease. The value of different types of psychological support in the management of HIV-1 dementia needs to be evaluated, as do the value and potential risks of treatment of concomitant psychiatric disorders with antidepressants, neuroleptics, or other pharmacological agents, and the use of anti-HIV-1 agents in its treatment. It is critically important to determine whether the neurobehavioral abnormalities represent distinct disorders or are early symptoms of a progression to HIV-1 dementia, and whether these conditions are permanent or reversible. Potential treatments should be investigated.

Health Care

As the incidence of AIDS increases, an enormous burden of neuropsychiatric illness will face the health care system in many countries. By 1991, the number of

neurologically symptomatic AIDS patients in the United States is expected to be nearly half the number of all epilepsy patients and will far exceed the number of persons with Parkinson's disease. Since that projection relates only to patients with manifest AIDS, it is an underestimation of the impact of HIV-1 infection on neurology services.

Appropriate support and treatment services must be available and accessible not only to individuals with clinical illness but also to asymptomatic individuals as soon as they become aware that they are infected. Health services must be able to respond to those persons experiencing acute adjustment and stress reactions as the result of learning of their seropositive status. Trained psychiatrists, neurologists, psychologists, counselors, and social workers will be required, as will strengthened community services and self-help groups for patients and their families.

Because of the large increase that will occur in the number of affected individuals, it is inevitable that most, if not all, neurologists, psychiatrists, and psychologists will become involved in managing HIV-1-infected persons. Therefore, there is an urgent need for training programs for key categories of health workers. It is essential that all health care workers be aware of the possible range of neuropsychiatric disorders that may be the initial manifestation of illness or that may develop later, so that they will be able to recognize these problems at the earliest possible stage; to respond with appropriate attitudes, understanding, and therapy; and to refer patients for care as required.

In summary, health workers should be made aware of both the wide range of neuropsychiatric conditions associated with HIV-1 infection and the fact that the weight of existing information indicates that functional impairment is not signifi-

cantly increased over levels found among persons not infected by HIV-1 until or unless patients become clinically ill with ARC or AIDS. Health services need to prepare to deal with a large burden of neuropsychiatric illness, much of it severe, in patients with ARC and AIDS, and planning should commence immediately.

It was recommended that the report of the consultation be disseminated widely to health workers to help ensure that informed advice is provided to HIV-1-infected persons.

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¹ A more extensive bibliography may be found in the source document.

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ANNEX

Summary of CDC classification system for HIV infection.

GROUP I	Acute infection
GROUP II	Asymptomatic infection ^a
GROUP III	Persistent generalized lymphadenopathy ^a
GROUP IV	Other disease
Subgroup A	Constitutional disease
Subgroup B	Neurological disease
Subgroup C	Secondary infectious diseases
Category C-1	Specific secondary infectious diseases listed in the CDC surveillance definition for AIDS ^b
Category C-2	Other specified secondary infectious diseases ^b
Subgroup D	Secondary cancers
Subgroup E	Other conditions

Source: Centers for Disease Control. Revision of the CDC surveillance case definition for acquired immunodeficiency syndrome, *MMWR* 36 (suppl 1S), 1987.

^aPatients in Groups II and III may be subclassified on the basis of a laboratory evaluation.

^bIncludes those patients whose clinical presentation fulfills the definition of the acquired immunodeficiency syndrome used by Centers for Disease Control for national reporting.