

Caribbean connections



Harry W. Haverkos, MD

Dr. Haverkos is Associate Professor, Preventive Medicine and Biostatistics, Uniformed Services University, Bethesda, MD; and Captain, United States Public Health Service (retired).

During the final weeks of March 1982, the pace quickened in the labyrinthine corridors of the red brick Building 6 of the CDC in Atlanta....The latest crisis had started with sporadic reports to the CDC's parasitic disease division of toxoplasmosis in Haitians, first in Miami and then in New York City. At first parasitologists thought this was some problem unique to the malnourished refugees who had come from the most impoverished nation in the Western Hemisphere. Others remembered reports of strange cases of toxoplasmosis among gay men in the early cases.

—Randy Shilts, *And the Band Played On*¹

In July 1981, I entered the Epidemic Intelligence Service (EIS) of the Centers for Disease Control (CDC) as a medical officer in Parasitic Diseases. Dr. James Curran (AQA, University of Michigan, 2002, Alumnus) of the Venereal Diseases Division recruited me to work on outbreaks of Kaposi sarcoma and opportunistic infections (KSOI) among homosexual men. After setting up surveillance for those diseases among previously healthy men, we conducted a case-control study among men in Atlanta, Los Angeles, New York City (NYC), and San Francisco.² I evaluated several patients with opportunistic infections among gay men in the Midwest and prisoners in upstate New York.

In April 1982, I returned to Atlanta to present a paper at the annual EIS conference describing our case definition and active surveillance system for the new diseases. Curran asked me to withdraw my paper and go to Miami where a pathologist had reported two male Haitian immigrants with central nervous system (CNS) toxoplasmosis

and others with CNS lesions of undetermined diagnoses. He sent samples to experts around the country, including pathologists at Stanford University, who confirmed the diagnosis of CNS toxoplasmosis in five of the Miami patients, and reported two other Haitian refugees with toxoplasmosis, one each from NYC and Montreal, to the CDC parasitology division.

In Miami, I reviewed the records of eight males and one female, six with CNS toxoplasmosis, and one each with *Pneumocystis carinii* pneumonia (PCP), Kaposi Sarcoma (KS), and disseminated cryptococcosis. I was convinced that those patients met our case definition.³ I talked with two Haitian-born physicians who confirmed that their patients were not homosexual, or injecting drugs users.

As more and more cases of KSOI were reported in persons other than gay men, the moniker GRID (gay-related immune deficiency) became inappropriate. Some started calling the new disease AIDS—Acquired Immune Deficiency Syndrome.

The Haitian connection

Next, Curran asked me to accompany a group of National Institutes of Health (NIH) scientists to Haiti. The team was headed by Dr. Richard Krause (AQA, Case Western Reserve University, 1984, Alumnus), director, National Institute of Allergy and Infectious Diseases, and included three other physician-scientists. On entry into Haiti, we were met by an American-born diplomat and served coffee as our bags cleared customs. We were driven to our hotel and told we could have anything we wanted, including women!

We made several presentations to groups of doctors at the university hospital and were allowed to examine patients. House doctors presented seven patients to us on an

**Red ribbon courtesy of T_Kimura/E+/Getty Images*



Illustration by Jim M'Guinness

open ward in a poorly lit wing of the hospital. One was a 50-year-old white male government employee with esophageal candidiasis and oral thrush. He was married with five children, and initially denied any homosexual behavior. A medical resident had elicited a history of homosexual behavior the night before our visit. He told the patient that doctors from America were visiting the hospital, and that he could not see us if he denied homosexual behavior. When we arrived at his bedside, the patient was listless and non-communicative; we could not confirm his sexual history. On physical exam, his skin and mucous membranes were dry. We could lift his skin between our fingers and it would form a tent—a sign of severe dehydration. When I asked the resident why they were not treating the patient with intravenous fluids, he told us that IV fluids were not routine care at the hospital. If a family wanted such treatment, it was their responsibility to go to the local pharmacy to procure the materials. The man died the next day.

Another was a Black woman in her twenties, reportedly a prostitute, who had an extensive genital infection with herpes simplex virus (HSV). When we uncovered her at the bedside, we saw vesicles and pustules affecting her genital area. I could not believe that she was in an open ward. In the United States, she would have been placed under wound and skin precautions in a private room with a closed door.

Wound and skin precautions are used to protect the wound from contamination with bacteria and fungi from hands and clothes of visiting health care workers. Precautions also protect health care workers from exposure to HSV and other agents in the wound. Standard protocol calls for washing hands and donning a mask, gown, and gloves before entering such a room and approaching the patient. After examining the patient, the gown, mask, and gloves are removed and placed in a closed container, and hands are washed before proceeding to the next patient.

With the Haitian medical residents, we talked about antiviral treatments for HSV infection. I told them about my work with interferon but would not recommend it for this patient. I didn't think that a virostatic agent would have much impact on such an extensive HSV infection.

The last patient was a homosexual male with multiple infections including pulmonary tuberculosis. He had been started on anti-tuberculosis (TB) medications just three days before. In the U.S., he would have been placed in a private pressurized room, where the air pressure could be adjusted to protect the staff from TB exposure. Those facilities were not available in Haiti.

We met Dr. Jean Pape, an infectious diseases clinical researcher. Pape was born in Haiti, graduated with a degree

in biology from Columbia University in 1971, and a medical degree from Cornell University Medical College in 1975. He was funded by the Rockefeller Foundation to conduct research on infants with diarrheal disease, a major cause of mortality in Haiti and the developing world. He told us of excellent results with the introduction of oral rehydration therapy and careful monitoring of patients. He escorted us through a large room with 24 beds and a cement roof, and onto an open air patio where overflow infants were lying on individual cots.

While we were seeing patients, Krause was with hospital administrators. Haitian doctors requested funds to study the growing number of patients with AIDS. They requested expensive laboratory equipment such as lymphocyte cell sorters to measure T cell functions, and drugs for treatment of viral infections. More importantly, the Haitian physicians wanted Krause to remove Haitians from the CDC list of AIDS risk groups. Why list the whole nation of Haiti as a risk group? Krause told them he could not change the designation, and that I was the representative from the CDC.

When I was asked about the listing, I explained that there could be something new or different among Haitians that might help determine the cause of the new disease and lead to strategies to prevent these diseases among all three groups: gay men, injecting drug abusers, and Haitians. I asked them to explore possible risk factors for their patients. They told me repeatedly of the hardships that our designation was having on them. I promised to relay their concerns to my superiors.

When we left the hospital, the clinical staff refused for a few days to take care of patients without the use of the protective devices I had suggested. After 10 days in Haiti, we were driven to the airport, our bags were flung out of the taxi, and we were told to fend for ourselves. It was clear that we had not met their expectations.

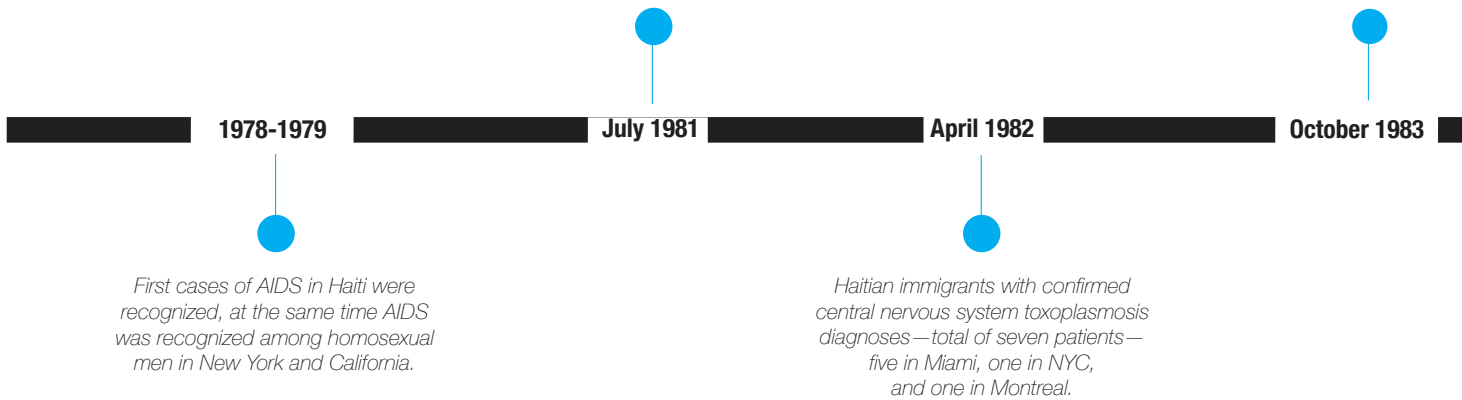
When I returned to Atlanta, I reviewed the case report forms from national surveillance and travel histories of gay men in our national case-control study. I found a handful of gay men with AIDS who reported vacationing in Haiti, some of whom reported buying sexual favors from men and/or boys.⁴

In the October 20, 1983 issue of the *NEJM*, Pape and colleagues summarized clinical aspects of 61 previously healthy Haitians diagnosed with either KS (15), opportunistic infections (45) or both (1) in Haiti between June 1979 and October 1982. Fifty-two were men, and 54 died (89 percent). Bisexual behavior was reported by nine of the men (17 percent), and a few reported sex with American

Outbreaks of Kaposi sarcoma and Opportunistic Infections (KSOI) among homosexual men reported in the U.S.

NEJM publishes study of previously healthy Haitians with Kaposi sarcoma and opportunistic infections between 1979-1982.

Original CDC definition of AIDS established.



homosexuals in Miami and NYC. Three men and two women reported a previous blood transfusion, but none reported illegal drug use. One third of the men were from Carrefour, a popular vacation spot and center of prostitution, and 71 percent of patients reported a previous sexually transmitted infection. Pape postulated that there was a strong bias against homosexuality in Haiti, and that the connections between American gay men and Haitian bisexual men may be underestimated.⁵

Meanwhile, clinicians reported 10 Haitian-American heterosexual men residing in Brooklyn, NY, with opportunistic infections and immunologic defects similar to gay men with AIDS. The men ranged in age from 24 years old to 39 years old, and six were dead by the time of publication. All denied homosexual behavior and injection drug use.⁶

Curran asked me to investigate a Haitian-American with PCP diagnosed in 1959. I went to Kings County Hospital in Brooklyn and met a co-author of the case history reported in 1961. Could AIDS have been going on unnoticed for more than 20 years?

A 49-year-old black man was admitted on June 8, 1959, complaining of a three-month cough. Diffuse haziness was observed on his chest X-ray (consistent with, but not unique for, PCP). His white blood cell counts ranged from 10,800 to 62,000 cells per cubic millimeter. Tests for common bacteria, TB, and common fungi were negative. He was treated with isoniazid, streptomycin, tetracycline, and corticosteroids, and expired on the 20th hospital day. At autopsy, PCP was found. The man was born in Haiti and came to NYC as a teenager in 1927. He worked as a shipping clerk in an apparel factory.⁷

I could not confirm the diagnosis of AIDS. The use of steroids prior to the diagnosis of PCP was a disqualifier,

and the elevated white cell blood count would be most unusual for an AIDS patient.

Missed clues

My focus changed to evaluate hemophiliacs and blood transfusion recipients, and I missed clues about Haitians and heterosexual transmission. In late 1982, Bronx investigators at Albert Einstein College of Medicine, and colleagues reported four cases:

- 17-month-old Black/Hispanic male with disseminated *M. avium*-intracellular infection, whose mother, an injecting drug user, died of PCP.
- Five-month-old Caucasian female with PCP, whose mother, a prostitute and injecting drug user, had oral candidiasis and lymphopenia. The mother also had another daughter who had died of PCP.
- Five-month-old Haitian male with PCP, cryptococcus and cytomegalovirus (CMV) infections, health status of parents not known.
- Five-month-old Haitian male with PCP; health status of parents not known.⁸

I took the reports as a challenge to my case definition, and did not immediately see its Haitian connection. I questioned how one could rule out congenital or hereditary immunodeficiencies.

Clinicians in Newark, NJ, reported eight children, median age 12 months, with PCP or severe immunodeficiency. The children had recurrent fevers, failure to thrive, interstitial pneumonitis, and hepatosplenomegaly. The immune defect was similar to adults with AIDS. Parents of six of the children reported injecting drugs, one child had parents born in Haiti, another a mother born in the Dominican Republic.⁹

Investigation begins 45 miles west of West Palm, Florida where an unusually high rate of AIDS cases are reported with no identified risks, although thousands of migrant workers from Haiti, British West Indies flock annually for harvest.

January 1984

1985

1988

NEJM reports that pediatricians in Miami reported 14 infants with AIDS, 12 with Haitian-born parents, and two of non-Haitian, but injecting drug using parents.

The Haitian connection could not be denied.

136 countries reported 84,526 cases of AIDS. Haiti reported 912 cases, ranked first among nations in the Caribbean area, and one of the top 15 countries worldwide.

In July 1981, I established the original CDC definition of AIDS as:

1. Biopsy-proven KS and/or culture or biopsy-confirmed life-threatening opportunistic infections at least moderately predictive of immunosuppression.
2. Persons between the ages of 15 years and 60 years.
3. No prior evidence of underlying immunosuppression, i.e., cancer diagnosis, organ transplant, or use of steroids or other immunosuppressants.

Several pediatricians challenged the age restriction on our case definition, and wondered why the CDC was so slow in recognizing AIDS among infants and children. Curran assigned two CDC pediatricians to develop a case definition and set up a separate surveillance system for pediatric patients.¹⁰

In the January 4, 1984 issue of the *NEJM*, pediatricians in Miami reported 14 infants with AIDS, 12 with Haitian-born parents, and two of non-Haitian, but injecting drug using parents.¹¹ The Haitian connection could not be denied.

Case-control studies

The CDC developed and implemented a case-control study among Haitian-Americans in Miami and NYC. They defined a case as a patient diagnosed with AIDS, born in Haiti, and ever having been hospitalized at Jackson Memorial Hospital, Miami, or Downstate Medical Center in NYC. Controls were Haitian-born men and women recruited on hospital wards, in outpatient clinics, and in private physician offices associated with the two hospitals. Controls were matched to cases by sex, age, and city of residence. Controls with underlying cancers, immune suppression, any chronic medical condition, or HIV-positive status were excluded.

Interviews were conducted confidentially by five trained interviewers fluent in Creole and English. Interviews covered time spent in the U.S. and the last five years in Haiti. Laboratory studies evaluated immune function, sexually transmitted, and mosquito-borne infections. A standardized questionnaire was developed and translated into Creole. The instrument explored several areas related to transmission of infectious agents including living conditions, occupation, medical history, sexual history, use of folk healers, history of tattoos, voodoo practices, and date of arrival into the U.S. It was designed to obtain detailed information about homosexuality and blood transfusions through questions about specific sex acts, including prostitution with tourists.

From March through December of 1984, 45 men and 10 women with AIDS, and 242 controls were interviewed—37 patients and 164 controls in Miami, and 18 patients and 78 controls in NYC. Forty-nine of 51 (96 percent) cases were HIV positive; 10 of 218 (five percent) controls tested for HIV were positive, and were excluded from further analysis.

Men and women were analyzed separately. One male patient was homosexual, and one female had received a blood transfusion. None admitted to injecting drugs, hemophilia, or sexual contact with AIDS patients. Male patients were more likely to admit sexual contact with prostitutes and to have had gonorrhea and/or syphilis. Female patients were more likely to have been offered money for sex, and have friends who were voodoo priests. The CDC concluded that these cases resulted from heterosexual transmission.¹²

Pape and colleagues also conducted a case-control study in Haiti, interviewing 93 men and 35 women with AIDS, and 112 age- and sex-matched controls, identified

as siblings or friends of patients. They identified known risk factors for 43 percent of patients, included 33 bisexual men, one intravenous drug abuser, and five men who received blood transfusions. Among female patients, 14 reported previous blood transfusions, and two were spouses of men with AIDS.

Significant differences were apparent for two variables: the number of heterosexual contacts and receipt of intramuscular injections.¹³

A new risk factor

The Haitian study confirmed the CDC's link to heterosexual transmission, but raised a new risk factor, receipts of intramuscular injections with reusable needles. During the five-year period before onset of symptoms, 89 percent of patients had received intramuscular injections compared to 66 percent of controls. The patients received a larger number of injections per year and were more likely to receive them from nonmedical sources. At that time, it was a common practice in Haiti for persons to receive intramuscular injections of antibiotics or vitamins when they were not feeling well.¹³

By May 1985, the CDC removed Haitians as a major risk group.¹⁴ Subsequently, the surveillance team at the CDC found five men with AIDS born in Barbados, Jamaica, St. Vincent's, and Trinidad with no known risk factors, along with case reports of AIDS directly from other Caribbean Islands. The CDC removed the term "Haitian" from the CDC reports, and replaced it with "born in the Caribbean."

In 1985, Curran asked an EIS officer to investigate an agricultural community on Lake Okeechobee, 45 miles west of West Palm, FL, because of an unusually high rate of AIDS reported with no identified risks.

Each year, thousands of migrant farm workers, American Blacks, British West Indians, Haitians, and Hispanics entered Belle Glade during sugarcane and vegetable harvesting season.¹⁵

First, they interviewed surviving AIDS patients, asking about known risk factors for HIV transmission, including a history of contact with other AIDS patients or other persons at risk for HIV infection. If patients were deceased, family members or known sexual contacts were interviewed.

They identified risk factors for 66 of 73 male patients, and 19 of 20 female patients. Nine of the patients were born in Haiti.¹⁶ Forty-two patients, 35 men and 7 women, were linked by heterosexual contact with a person with AIDS or at increased risk for AIDS. Twenty-one patients were injecting drug users, and 17 men were homosexual/bisexual.¹⁷

Next, they conducted three seroepidemiologic studies

between February and October 1986. A standardized questionnaire was developed in English, Spanish, and Haitian Creole exploring a wide range of topics as in previous AIDS studies. However, this study included questions on exposure to insects, availability of door and window screens, open foundations, and other specific living conditions likely to result in greater exposure to insects. They recruited three populations: a randomly selected group of 877 participants going door-to-door; 115 participants who were not selected randomly, but who requested HIV testing; and 28 clinic attendees being evaluated for the possibility of HIV infection. Participants were also asked to volunteer for a variety of tests including those for HIV, sexually transmitted diseases, and insect-borne infections.¹⁶

HIV-seropositives were more likely to be from Haiti, have a lower income, more sexual partners, and more syphilis and hepatitis B infections. Seropositive men were more likely to report sex with men, sex with prostitutes, injection drug use, and gonorrhea. Seropositive women were more likely to have given birth to children of different fathers, been paid for sex, have sex with injection drug users, have gonorrhea, have had blood transfusions, and have tattoos. There was no evidence to suggest transmission by insects.

The CDC concluded that the high cumulative rate of AIDS in Belle Glade was due to heterosexual contact and intravenous drug use.¹⁶

In August 1986, the CDC transferred patients born in the Caribbean with no known risk factors from the undetermined category to heterosexual contact cases. The CDC and World Health Organization (WHO) would issue subsequent reports designating three categories of AIDS transmission worldwide. Pattern I countries, such as those of North America and Europe, were those in which male homosexuality and injection drug use predominate. Pattern II countries, such as those in the Caribbean and sub-Saharan Africa, were those in which heterosexual transmission was believed to play a major risk, and transmission from mother to child was common. Pattern III countries, such as Eastern Europe, the Middle East, Asia, and most of the Pacific, were those in which cases occurred among persons who had traveled to endemic areas and had sex with prostitutes or gay men.

By March 1988, 136 countries reported 84,526 cases of AIDS. Haiti reported 912 cases, ranked first among nations in the Caribbean area, and one of the top 15 countries worldwide.¹⁷

Haitian-Americans and AIDS

In retrospect, Haitian-Americans accounted for the first clusters of AIDS patients clearly linked to heterosexual transmission, and fueled by three risk factors: social discord, prostitution, and drug abuse.

Discord occurs when men and women are separated from each other by social conditions, i.e., immigration, seasonal farm or mine work, cross country trucking; and/or military deployment.

Haiti is a mountainous country in the West Indies. It covers the western third of the island of Hispaniola, which lies between Cuba and Puerto Rico in the Caribbean Sea. Haiti is the oldest Black republic in the world, and poorest country in the Western Hemisphere.

Francois Duvalier, a country doctor known as Papa Doc, was elected president of Haiti in 1957. He declared himself president for life and ruled as a dictator. Duvalier chose his son, Jean-Claude Duvalier to succeed him. When the senior Duvalier died in 1971, Jean-Claude, aka Baby Doc, was 19-years-old. The son also ruled as a dictator, controlling the armed forces and a secret police, know as

the *Tontons Macoutes* (after a bogeyman of lore who stole children in the night).

In the early 1970s, many people left Haiti because of poor economic conditions and severe treatment by the secret police. Economic and political conditions deteriorated even more over the next decade leading to a mass migration of Haitians into NYC and South Florida at the same time that HIV was introduced in North America.

The Haitian HIV connection involves immigration of people who settle in a new place, in which the man generally goes first to the new land and establishes himself, and then returns to retrieve his spouse. The Haitian connection brought heterosexual transmission of HIV infection into focus.

According to the WHO, more than 35 million lives have been lost due to HIV/AIDS worldwide since 1981, and 36.7 million people are currently living with HIV infection. Men who have sex with men, female sex workers, users of injection drugs, truck drivers, fishermen, and military personnel are disproportionately affected around the world.¹⁸ Those sentinel patients among Haitians living in Haiti and



Illustration of the number of HIV positive individuals in 2011. The virus icon illustrates the number of people who are HIV positive and the arrows, the increase or decrease (in percentage of new cases). BSIP/UIG/Universal Image Group/Getty Images

the U.S. provided recognition of international HIV transmissions that are due to heterosexual behaviors.

Spreading worldwide

The first cases of AIDS in Haiti were recognized in 1978–1979, at the same time that AIDS was recognized among homosexual men in New York and California. Pape suggested that HIV was introduced into Haiti either by gay tourists or by bisexual Haitians returning from the U.S. and then spread to heterosexuals in Haiti. I would suggest that we can further link heterosexual Haitian-Americans in Miami to Black and Hispanic heterosexual/drug users in Belle Glade. From there, HIV spread through south Florida, and on and on throughout the U.S.¹⁹ The Haitian connections are similar to, but probably not unique among, thousands of other HIV networks worldwide.

Most historians favor the hypothesis that AIDS originated in Africa. Pape reported no direct link of the earliest AIDS cases in Haiti to Africa.²⁰ While he acknowledged that about 100 Haitian professionals, mostly teachers, went to Africa primarily Zaire in the late 1960s to escape the dictatorship of Duvalier, very few of them returned to Haiti, and none were among the earliest cases of AIDS.

How HIV was introduced into the Americas remains an open question.

Acknowledgment

Thanks to Jean William “Bill” Pape, MD, for providing his perspective on AIDS among Haitians, and for his lifelong compassionate service to the Haitian people.

References

1. Shilts R. *And the Band Played On*. New York: St. Martin's Press. 1987.
2. Haverkos HW. A recruit enters the Epidemic Intelligence Service. *Pharos Alpha Omega Alpha Medical Honor Society* 2016 Winter; 79 (1): 36–43.
3. Moskowitz LB, Kory P, Chan JC, Haverkos HW. Unusual causes of death in Haitians residing in Miami: High prevalence of opportunistic infections. *JAMA*. 1983; 250: 1187–91.
4. Memorandum from Harry Haverkos to Task Force Core Group, 2 August 1982, “re: Anecdotes of sexual encounters in Haiti.”
5. Pape JW, Liautaud B, Thomas F, Mathurin J-R, et al. Characteristics of Acquired Immunodeficiency Syndrome (AIDS) in Haiti. *N Engl J Med*. 1983; 309: 945–50.
6. Vierra J, Frank E, Spira TJ, Landesman SH. Acquired Immuno-deficiency Syndrome in Haitians: opportunistic Infections in previously healthy Haitian immigrants. *N Engl J Med*. 1983; 308: 125–9.
7. Hennigar GR, Vinijchaikul K, Roque AL, Lyons HA. *Pneumocystis carinii* pneumonia in an adult: Report of a case. *Am J Clin Pathol*. 1961; 35: 353–64.
8. Centers for Disease Control and Prevention (CDC). Unexplained Immuno-deficiency and Opportunistic Infections in Infants—New York, New Jersey, California. *MMWR*. December 17, 1982; 31(49): 665–7.
9. Oleske J, Minnefor A, Cooper R Jr, Thomas K, et al. Immunodeficiency Syndrome in Children. *JAMA*. 1983 May 6; 249(17): 2345–9.
10. Centers for Disease Control and Prevention (CDC). Current Trends Update: Acquired Immunodeficiency Syndrome (AIDS)—United States. *MMWR*. January 6, 1984; 32(52): 688–91.
11. Scott GB, Buck BE, Leterman JG, Bloom F, et al. AIDS in infants. *N Engl J Med*. 1984; 310: 76–81.
12. The Collaborative Study Group of AIDS in Haitian-Americans. Risk Factors for AIDS Among Haitians Residing in the United States. Evidence of Heterosexual Transmission. *JAMA*. 1987; 257(5): 635–9.
13. Pape JW, Liautaud B, Thomas F, Mathurin J-R, et al. AIDS in Haiti. *Ann Intern Med*. 1985; 103: 674–8.
14. Centers for Disease Control and Prevention (CDC). Current Trends Update: Acquired Immunodeficiency Syndrome (AIDS)—United States. *MMWR*. May 10, 1985; 34(18): 245–8.
15. Nordheimer J. Poverty Scarred Town Now Stricken by AIDS. *The New York Times*. May 2, 1985.
16. Castro KG, Lieb S, Jaffe HW, Narkunas JP, et al. Transmission of HIV in Belle Glade, Florida: Lessons for Other Communities in the United States. *Science*. 1988; 239(436): 193–7.
17. Centers for Disease Control and Prevention (CDC) Update: Acquired Immunodeficiency Syndrome (AIDS)—Worldwide. *MMWR*. May 13, 1988; 37(18): 286–8, 293–5.
18. Piot P, Quinn TC. Response to the AIDS pandemic—A Global Health Model. *N Engl J Med*. 2013; 368: 2210–8.
19. Haverkos HW, Turner JF, Jr., Moolchan ET, Cadet J-L. Relative Rates of AIDS Among Racial/Ethnic Groups by Exposure Categories. *J Natl Med Assoc*. 1999; 91: 17–24.
20. Pape JW, Johnson WD, Jr. HIV-I Infection and AIDS in Haiti. In: Kaslow RA, Francis DP, editors. *The Epidemiology of AIDS: Expression, Occurrence, and Control of Human Immunodeficiency Virus Type 1 Infection*. Chapter 12, New York: Oxford University Press. 198: 221–30.

The author's e-mail address is haverkosh@comcast.net, or harry.haverkos@usuhs.edu.