

PRIORITY:

Reducing
HIV-Related
Disparities

Special Populations:

Racial and Ethnic Populations

Women and Girls

Research in International Settings

Training, Infrastructure, and Capacity Building

AREA OF EMPHASIS

Racial and Ethnic Populations

SCIENTIFIC OBJECTIVES AND STRATEGIES

OBJECTIVE—A: Environmental and Social Determinants of Health

Encourage high-risk, high-impact research that explores unique environmental and societal factors that affect: (1) HIV-risk behavior; (2) HIV acquisition, transmission, and disease progression (including development of resistance); and (3) access to, as well as adoption of, preventive and therapeutic interventions for those at highest risk for HIV infection within racial and ethnic minority communities.

STRATEGIES

- Explore the effects of poverty, residential segregation, educational opportunities, incarceration, and health literacy upon HIV transmission among racial and ethnic populations across the lifespan.
- Identify the synergistic effects of the provision of stable housing, treatment, and prevention interventions upon HIV-risk behavior, disease outcome, and treatment adherence in marginalized and high-risk racial and ethnic populations.
- Quantify the impact of insurance payor status on HIV care-seeking behavior, treatment, and treatment adherence, as well as on cost of care and years of life lost, among racial and ethnic populations.
- Investigate the effect of population migrations (e.g., migrant workers) upon HIV-risk behavior, comorbid sexually transmitted infections, and disease burden within racial and ethnic populations.
- Identify effective, efficient, and sustainable HIV prevention interventions for rural communities with significant numbers of undocumented immigrants and limited access to health care and health care information.
- Evaluate interventions that incorporate traditional and indigenous medicines and medical practices for prevention of high-risk behaviors.
- Determine the effect of stigma, racism, and racial/cultural stereotyping on access to HIV prevention, care, and treatment.
- Examine the influence of bias, racial and cultural prejudice, and homophobia upon health care providers, health care systems, and HIV-testing behaviors among the racial and ethnic populations they serve.
- Identify venues that can effectively deliver acceptable, efficient, and dependable HIV testing for racial and ethnic populations.
- Study the intersection between community and health organizations required for effective prevention message delivery, including the role of key informants, key community organizations, and the linkages necessary for community acceptance.
- Test, evaluate, and adapt private sector social marketing and health communication strategies to develop new effective HIV prevention interventions in racial and ethnic minority populations.
- Adapt, test, and evaluate private sector social marketing and health communication strategies to promote effective HIV prevention interventions.
- Develop, test, and evaluate new HIV prevention interventions in racial and ethnic minority populations modeled upon widely disseminated and effective social marketing campaigns.

OBJECTIVE—B: Family and Community Level

Conduct basic behavioral and intervention research that focuses on the familial, cultural, and community-level factors that enhance or decrease HIV risk in racial and ethnic populations.

STRATEGIES

- Identify practical and cost-effective HIV prevention interventions for racial and ethnic communities, including for those in a sexual minority within these communities.
- Examine the influence of race, ethnicity, language fluency, and gender, independently and collectively, upon the social and cultural contexts of HIV acquisition, transmission, and risk.
- Incorporate implementation science in the development of HIV prevention interventions for racial and ethnic populations to facilitate prompt scale-up and delivery of effective interventions.
- Conduct community-based and community-driven participatory studies of HIV interventions that incorporate community observations and experiences to: (1) create practical and community-appropriate interventions, and (2) facilitate bidirectional transfer of knowledge and observations of interest to both the community and the investigator(s).
- Explore processes of engagement of community leaders and organizations that make for effective community mobilization and receptivity to evidence-based prevention interventions.
- Identify the factors that reliably predict the level of community readiness to engage with HIV prevention or other research interventions.
- Explore the impact of the intersection of residential segregation, poverty, and community isolation upon HIV acquisition and transmission in racial and ethnic populations.
- Examine the impact of intergenerational trauma upon HIV-risk behavior and HIV resiliency in indigenous domestic populations, including Native Americans, Alaska Natives, Native Hawaiians, and Pacific Islanders.
- Assess the impact of acculturative stress and historical trauma upon HIV-risk behavior and HIV-health-seeking behavior among individuals in communities disproportionately affected by the HIV epidemic, including racial and ethnic populations.
- Develop, pilot, and test new models of HIV behavioral interventions that incorporate common stressors and experiences in racial and ethnic communities, including acculturation, racism, and stigma.
- Study the linkages between age of sexual partner, social networks, and race upon the HIV risk of racial and ethnic youth and those within their sexual networks.
- Study the impact of social and sexual networks upon HIV resiliency and risk in racial and ethnic populations.
- Conduct basic behavioral research on the determinants of HIV risk, including substance abuse and underlying health disparities, in racial and ethnic minority transgendered individuals and their social networks.
- Investigate the impact of adolescent and youth culture on HIV-risk behaviors and risk of HIV acquisition in adolescents, especially among racial and ethnic adolescents, and their social peer networks.
- Develop, pilot, and test models of HIV behavioral interventions that incorporate common resilience factors for racial and ethnic populations, such as cultural identity, spirituality, family ties and collectivism.

OBJECTIVE—C: Individual-Level Risk

Develop and conduct population-specific primary research that focuses on individual-level determinants of risk, including resiliency and cultural and social norms, in populations at highest risk for HIV acquisition.

STRATEGIES

- Develop, pilot, and test synergistic prevention interventions for high-risk HIV-uninfected individuals within health care systems.
- Study the biological (including genetic), physiological, and environmental factors that affect HIV acquisition, transmission, and disease progression among racial and ethnic individuals.
- Identify factors that increase HIV risk among racial and ethnic minority transgendered individuals, and develop, pilot, and test models of HIV prevention that reduce or eliminate those factors.
- Identify factors that affect an individual's perception of risk within racial and ethnic populations, and determine the effect of those factors upon HIV testing and testing frequency.
- Identify what constitutes sexual behavior "norms" in racial and ethnic populations.
- Identify the behavioral, biological, cultural, and social factors that affect HIV risk, acquisition, and transmission in racial and ethnic older women.
- Determine the impact of gender-based violence, intimate partner violence, and a history of childhood trauma, such as sexual abuse and violence, upon adoption of HIV prevention strategies in individuals within racial and ethnic populations, with particular emphasis on adolescents in sexual minority and transgenders.
- Explore the effects of hormonal replacement and its biological impact upon racial and ethnic minority transgendered individuals and risk of HIV acquisition and transmission.
- Develop, pilot, and test effective models for increasing the awareness of the benefits of HIV testing in racial and ethnic minority individuals.
- Determine the impact of increased education levels on health literacy, HIV awareness, and risk behavior in racial and ethnic minorities.
- Explore the relationship between employment type (e.g., day labor versus part-time) and HIV-risk behavior in communities heavily affected by HIV, including racial and ethnic communities.

OBJECTIVE–D: Methods

Develop and test innovative methods and measures to accurately assess the individual, interpersonal, organizational, cultural, and societal-level determinants of risk in racial and ethnic populations, with special emphasis on communities that are small in number and/or underrepresented in current clinical studies.

STRATEGIES

- Develop novel sampling methods to enhance the proportion of underrepresented populations that are disproportionately affected by HIV infection in clinical and prevention research (e.g., those in sexual minority, such as lesbian, gay, bisexual, transgender, and queer [LGBTQ] adolescents; homeless individuals; and those living with mental and/or physical disabilities).
- Develop and standardize assessment tools that are designed for the community in which they are to be used, including rural populations, populations with foreign-born individuals, and racial and ethnic populations at risk for HIV acquisition.
- Develop measures to assess the impact of evidence-based quality-of-care and best practices upon HIV disease outcome in racial and ethnic individuals.
- Develop models to incorporate community-initiated HIV prevention interventions and evaluation in community-academic partnerships, especially in communities disproportionately affected by HIV.
- Recruit and retain racial and ethnic minorities using existing and novel sampling methods to ensure numbers sufficient to provide adequate statistical power to detect racial and gender differences in NIH-sponsored studies, especially Phase III clinical trials.
- Utilize operational research to identify what determines what HIV prevention interventions are ready or necessary for efficient and rapid translation into the field.
- Develop, pilot, test, and evaluate new measures of HIV-risk behavior that are culturally and contextually appropriate for racial, ethnic, and sexual minority populations.
- Identify the components of effective outreach to racial and ethnic populations; develop models of successful outreach with quantification of that success.
- Evaluate interventions that incorporate traditional and indigenous medicines and/or medical practices that encourage adherence to prevention and/or treatment protocols.

OBJECTIVE—E: Treatment and Mental Health Comorbidities

Develop and conduct primary and intervention research to examine the individual and societal-level factors that influence adoption of HIV treatment and treatment adherence among racial and ethnic populations.

STRATEGIES

- Advance the study of the biology of HIV infection among racial and ethnic populations by:
 - ▶ Evaluating the effect of race/ethnicity and gender upon immune dysfunction and the development of opportunistic infection;
 - ▶ Determining the effect of race/ethnicity and gender upon p-glycoproteins and their role in the individual response to HIV therapy and the development of HIV drug resistance; and
 - ▶ Exploring the role of preexisting health conditions disproportionately found in racial and ethnic minorities, such as cardiovascular disease, diabetes, and hepatitis, upon HIV disease course and progression.
- Determine the impact of treatment interventions upon progression of HIV disease and HIV-associated coinfections and comorbidities, including hepatitis B and C infection, tuberculosis, and HIV-associated malignancies, in racial and ethnic individuals.
- Examine the impact of alcohol, drug use, and chronic medical and neuropsychiatric comorbidities on the success or failure of HIV clinical interventions and HIV disease progression in racial and ethnic minorities.
- Develop novel clinical research methodologies for prospective studies of the effect of racial, ethnic, gender, and sexual orientation differences on HIV transmission, disease pathophysiology, and treatment outcomes.
- Determine the impact of race-related factors on HIV risk in understudied indigenous populations, including Native Americans, Alaska Natives, Pacific Islanders, and Native Hawaiians.
- Identify successful interventions to increase access to and quality of care in racial and ethnic communities, and assess the impact of increased care upon HIV transmission in these communities.
- Evaluate models for HIV prevention, care, and treatment that utilize comprehensive, culturally and contextually appropriate interventions for HIV-infected individuals in disproportionately affected communities.

AREA OF EMPHASIS

Women and Girls

SCIENTIFIC OBJECTIVES AND STRATEGIES

OBJECTIVE—A: Determinants of HIV Transmission

Elucidate the biologic determinants of HIV transmission; and define the mechanisms by which innate and adaptive viral and host immune factors influence HIV transmission, acquisition, and resistance to infection in nonpregnant and pregnant women and girls across the life cycle.

STRATEGIES

- Evaluate the role of viral and host immune function on HIV transmission, acquisition, and resistance to infection.
- Study mucosal immune activity and response in the upper and lower genital tract, anus/rectum, and oral cavity.
- Identify and study cellular mechanisms responsible for HIV acquisition and propagation at mucosal surfaces in the upper and lower genital tract, anus/rectum, and oral cavity.
- Investigate the relationship of age and endogenous and exogenous hormone status on HIV transmission, acquisition, and resistance to infection.
- Evaluate the role of oral, anal/rectum, and genital tract physiology, microbiology, and concomitant infections on HIV transmission and acquisition.
- Study host and viral genetic factors that influence HIV transmission, acquisition, and resistance to infection.
- Elucidate mechanisms of innate and adaptive immunity and other cellular factors that affect HIV transmission, acquisition, and resistance to infection.
- Determine the impact of host factors, including anatomic/physiologic changes, nonhormonal contraception use, and vaginal practices, on HIV transmission, acquisition, and resistance to infection.
- Study the impact of other sexually transmitted infections (STIs) and syndromic or disease-specific STI treatment on HIV susceptibility, transmission, acquisition, and resistance to infection.
- Study the impact of antiretroviral therapies (ARTs) on genital tract and anal/rectum viral dynamics and vertical and sexual HIV transmission, acquisition, and resistance to infection.
- Identify and study appropriate animal models to explain host-viral-immune interactions.
- Develop standardized assays to investigate host, viral, and immune factors that impact HIV acquisition, transmission, and resistance to infection.
- Develop techniques for sampling upper and lower genital tract, anus/rectum, and oral mucosa that are minimally invasive or noninvasive and do not promote HIV acquisition.

OBJECTIVE–B: Biomedical and Behavioral Prevention Interventions

Conduct and support basic, translational, preclinical, and clinical biomedical and behavioral intervention research to prevent HIV and other STI transmission, acquisition, and resistance to treatment in pregnant and nonpregnant, HIV-infected and -uninfected women and girls across the life cycle.

STRATEGIES

Joint Biomedical and Behavioral Strategies

- Support an integrated approach to HIV and STI prevention research that includes linked behavioral and biomedical studies that consider the social context of the population in which the interventions will be applied.
- Support research to understand how the organization, financing, management, access, delivery, cost-effectiveness, and cost-utility of health care, reproductive health, family planning, and social services affect HIV-risk behaviors, HIV transmission, acquisition, and resistance to infection.
- Analyze the impact of community-level sociologic and behavioral norms on the acceptability and efficacy of and adherence to biomedical and behavioral HIV/STI prevention interventions.
- Analyze the impact of prevention interventions conducted in males on HIV and STI acquisition and transmission in females.
- Develop and evaluate methods to access, recruit, and retain women and girls who are demographically representative of the populations at risk for HIV infection into separate and integrated biomedical and behavioral prevention intervention studies.
- Develop and assess the effectiveness of utilizing multiple prevention approaches, including biological, behavioral, and community-level strategies both individually and in combination, as a potential means for preventing HIV and other STI transmission and acquisition.
- Support research to identify effective methods to improve the translation, dissemination, and increased adoption of effective HIV prevention technologies by communities, health care providers, and prevention services providers who serve women and girls.
- Support research to understand the impact of policy and policy change on HIV-risk behavior and transmission.
- Develop and evaluate innovative ways to obtain culturally and age-appropriate fully informed consent for participation in HIV prevention trials, and document the critical components of informed consent.
- Support research to identify and develop methods to overcome barriers to enrolling girls under the age of 18; racial and ethnic populations; and hard-to-reach populations including girls living outside of family care, involved in the juvenile justice system, and substance users into HIV biomedical and behavioral prevention intervention trials.
- Support research to evaluate the differences between trial participants and their in-trial behaviors compared with the general population in which HIV prevention interventions will be used.
- Develop and evaluate biomedical and behavioral interventions that target HIV-serodiscordant couples to prevent transmission.
- Investigate the interaction of HIV-risk perception and sexual behaviors and sexual activity, age of sexual debut, and the impact of the interactions on the use of HIV prevention methods.
- Develop, implement, and evaluate biomedical and behavioral HIV/STI prevention interventions that identify and decrease the role of relationship and sexual violence, relationship power discordance, intimate partner drug and alcohol use, and economic survival sex on HIV/STI risk.

- Support research to improve the translation and dissemination and increase the adoption of effective HIV prevention technologies and interventions, including treatment and care by communities and health care and prevention service providers who serve women and girls.
- Support the discovery, development, and preclinical and clinical evaluation of new and current biomedical and behavioral prevention interventions to reduce the transmission and acquisition of HIV and STIs during pregnancy.
- Support research to understand the impact of fertility intentions on the use of HIV prevention technologies and behaviors.
- Develop, implement, and evaluate culturally focused HIV behavioral prevention, treatment, and care interventions targeting populations at risk due to vulnerable and/or isolating circumstances such as being orphaned, incarcerated, a refugee, a runaway, a gang member, or a victim of sexual exploitation, trauma, violence, war, homelessness, and drug and alcohol abuse.
- Evaluate the impact of hormonal and nonhormonal intrauterine contraception and other nonhormonal contraception on upper and lower genital tract physiology, microbiology, mucosal integrity, and subsequent risk for the transmission or acquisition of HIV and other STIs.
- Support the development of contraceptive and noncontraceptive biomedical interventions to prevent HIV and other STIs.
- Support the evaluation of the contraceptive efficacy of current and future biomedical prevention interventions.
- Support the discovery and development of HIV/STI biomedical prevention interventions with varied rheologic properties, modes of delivery, and contraceptive and noncontraceptive properties designed to improve acceptability and adherence.
- Support studies that determine how mode of delivery, rheologic properties, and contraceptive efficacy of biomedical HIV/STI prevention interventions affect acceptability and adherence.

Biomedical Strategies

- Support the discovery, development, and preclinical and clinical evaluation of new and current biomedical prevention interventions to reduce the transmission and acquisition of HIV superinfection and other STIs among HIV-positive women and girls.
- Evaluate the impact of biomedical prevention interventions on upper and lower genital tract and anal/rectal physiology, microbiology, mucosal integrity, and the risk for the transmission or acquisition of HIV and other STIs.
- Evaluate the impact of endogenous and exogenous hormones on upper and lower genital tract and anal/rectal physiology, microbiology, mucosal integrity, and the risk for the transmission or acquisition of HIV and other STIs.
- Analyze the interaction between HIV and other STIs and how the presence of STIs and syndromic management or specific treatment of STIs impact upper and lower genital tract and anal/rectal physiology, microbiology, mucosal integrity, and risk for HIV acquisition and transmission.
- Study the impact of biomedical interventions to prevent mother-to-child transmission, including antiretrovirals (ARVs), cesarean section, and breastfeeding interventions, on maternal morbidity and mortality.
- Evaluate the impact of ARV treatment on HIV transmission.
- Develop treatment and technological interventions to prevent mother-to-child HIV transmission.
- Develop HIV prevention interventions for HIV-serodiscordant couples that do not prevent pregnancy.

Behavioral/Sociological Prevention Strategies

- Conduct and support behavioral intervention research to address the female-specific, psychological, social, environmental, economic, and cultural dynamics that impact HIV risk, acquisition, and transmission.
- Identify and study the impact of population-level and community-level social, economic, educational, and behavioral interventions on HIV acquisition and prevention.
- Investigate changes in HIV-related risk and prevention behaviors as a function of developmental and life-course events, such as adolescence, child-bearing, sexual partnership choice and change, HIV treatment, menopause, and the presence or absence of family, social, and economic support.
- Develop innovative prevention strategies targeting male partners whose behaviors confer risk for HIV transmission to female partners, particularly in populations/areas with elevated HIV prevalence.
- Develop, implement, and evaluate culturally focused behavioral prevention interventions for populations traditionally perceived to be at low risk for HIV infection, such as middle-aged and older women, college students, persons with physical and mental disabilities, women who have sex with women, residents of rural areas, Asian/Pacific Islanders, Native Americans, and Alaskan Natives.
- Study the impact of macro events and social unrest such as (but not limited to) natural disasters, trauma, war, and refugee status on HIV risk for women and girls globally.
- Conduct basic research to understand the dynamics of gender-specific stigma/discrimination associated with HIV/AIDS and to inform the development of structural interventions to reduce HIV/AIDS-associated stigma.
- Develop and evaluate interventions to reduce or prevent adverse psychological, social, and economic consequences for women and girls infected with or affected by HIV/AIDS.

OBJECTIVE—C: Biology of HIV Disease

Study the biology of HIV infection in pregnant and nonpregnant women and girls across the life cycle, including the viral life cycle, disease progression, clinical manifestations, coinfections, sexual dimorphism, and other conditions.

STRATEGIES

- Develop and evaluate innovative and rapid testing strategies in diverse settings to identify acute and chronic HIV infection in women and girls.
- Identify the mechanisms that mediate virus/host interactions and impact disease progression.
 - ▶ Determine HIV viral dynamics, tissue distribution, and replication in blood and in all viral reservoirs in varied racial and ethnic populations across the human life cycle.
 - ▶ Identify normative laboratory values and the impact of HIV infection on those normative values in varied racial and ethnic populations across the life cycle.
 - ▶ Investigate the role of cofactors and mediators of disease progression in both early- and late-stage disease, including:
 - Endogenous and exogenous hormones, pregnancy, autoimmune diseases, and other concomitant diseases;
 - Opportunistic infections (OIs), other coinfections, HIV superinfection, HIV treatment, intermittent highly active antiretroviral therapy (HAART) and monotherapy for perinatal transmission, and genetic factors; and
 - Nutrition, biological indicators of stress, substance use, HIV-related and unrelated medication use, and complementary and alternative treatments.
- Develop approaches for identifying, recruiting, enrolling, and retaining recently exposed and newly HIV-infected women and girls for studies on the biology of HIV infection and prevention.
- Elucidate the sex-specific etiologies and pathogenic mechanisms of HIV disease manifestations in women and girls.
 - ▶ Investigate HIV-specific and therapy-associated metabolic and body composition changes at varied stages of HIV infection and at varied ages.
 - ▶ Study HIV-specific alterations of puberty, the menstrual cycle, fertility, menopause, and sexual function.
 - ▶ Conduct studies on the gynecologic (Gyn) manifestations of HIV disease and the impact of HIV on the efficacy of Gyn disease treatment.
 - ▶ Investigate the pathogenesis of OIs, coinfections, and autoimmune diseases unique to HIV-infected women and girls.
 - ▶ Investigate the characteristics, pathogenesis, treatments, and outcomes of HIV-related preneoplastic and neoplastic conditions that occur in women and girls.
 - ▶ Identify environmental changes that impact HIV disease and associated cancers in women and girls.
 - ▶ Elucidate the characteristics of neurological and neuropsychological manifestations of HIV disease and underlying cofactors specific to women and girls that impact these manifestations.
 - ▶ Investigate the impact of menopause and perimenopause on HIV disease manifestations and progression.
 - ▶ Investigate clinical manifestations and morbidity related to HIV and HIV-related therapies in pregnant, peripartum, and postpartum women.

- ▶ Investigate the impact of HIV, coinfections, and related therapy on fetal, infant, and childhood development.
- ▶ Evaluate the impact of HIV and HIV-related therapies on breast milk quantity and quality, and on the development of breast-fed infants.
- Explore the role of pharmacogenetics on variations in the course of HIV disease.
- Study the impact of HIV infection and disease progression on women's and girls' sexual development, reproductive health, and reproductive decisionmaking.
- Examine the association between sex-specific physical and psychosocial consequences of HIV disease and the initiation and maintenance of HIV-related care.

OBJECTIVE–D: Treatment and Care of HIV Disease

Conduct basic, translational, preclinical, and clinical research to inform the diagnosis, care, and treatment of HIV-infected women and girls across the life cycle, including puberty, pregnancy, and menopause. Emphasis should be on the inclusion of vulnerable and marginalized populations like adolescents and racial and ethnic minorities.

STRATEGIES

- Assess novel case-finding approaches, including social- and risk-network-based strategies to identify undiagnosed HIV infection in women and girls at risk.
- Develop and evaluate innovative strategies in diverse settings to identify and link HIV-infected women and girls to care and treatment services.
- Study the impact of receiving HIV-positive test results on HIV-risk behaviors, seeking access to and participating in treatment and care, and reproductive decisionmaking.
- Study the effectiveness and reasons for the success and failure of new and existing therapeutics in treatment-naïve and treatment-experienced women and girls.
- Evaluate the short- and long-term effects of anti-HIV therapy on morbidity and mortality among women and girls across the life cycle.
- Evaluate the impact of therapy and other strategies for reducing mother-to-child HIV transmission on women’s health and on reproductive decisionmaking.
- Study interventions and other factors that impact adherence to HIV therapeutic regimens and to medical care.
- Evaluate the impact of HIV-unrelated therapies and comorbidities, including substance use and mental health disorders, on access to health care and the enrollment of women and girls in clinical trials.
- Develop and evaluate strategies to increase the participation of women and girls in clinical trials.
- Support multidisciplinary research to identify unmet needs and elucidate barriers for women and girls to achieving optimal HIV/AIDS care, support, treatment, and prevention services.
- Conduct research to optimize the diagnosis and treatment of opportunistic infections and other HIV-related comorbidities and coinfections in women and girls.
- Explore the role of pharmacokinetics, pharmacodynamics, antiretroviral activity, and the toxicity of therapeutic agents on general health and on HIV disease progression in women and girls across the life cycle.
- Investigate the medication interactions of ARTs, and of ARTs with other HIV-related and -unrelated therapies in women and girls.
- Measure the quantity, frequency, and impact of alcohol and other substance use in HIV-related therapeutics trials.
- Study the effects of ART on human papillomavirus (HPV)-associated disease.
- Study the effect of the HPV vaccine on HIV disease.
- Study the impact of HPV vaccines in females and males on the reduction of HPV-associated lesions in HIV-infected women and girls.
- Study viral-specific and HIV therapy-associated changes in the menstrual cycle, fertility, and sexual function.
- Study the role of pharmacogenetics, pharmacodynamics, and pharmacokinetics on HIV disease course in women and girls as compared with males across the life cycle.

- Study the effect of ARTs and other HIV-related therapies on HIV viral dynamics, tissue distribution, and replication in blood and in all other viral reservoirs in women of varied race and ethnicity across the life cycle.
- Study how treatment interventions in acute compared with chronic HIV infection, including treatment during pregnancy, affect HIV disease progression.
- Design and evaluate effective models for service delivery that improve access and adherence to care.
- Identify appropriate female-specific HIV quality-of-care indicators and study the impact of implementing community-level and country-level quality-of-care guidelines on the health status of women and girls.
- Study the impact of stigma on access to health services and HIV treatment.
- Study the impact of access to care for women on family health.
- Support research to understand how the organization, financing, management, access to, delivery, and cost-effectiveness of general and reproductive health, family planning, and social services affect access to HIV/AIDS care, support, and treatment services.
- Support research to understand the impact of policy and policy change on the delivery and utilization of HIV/AIDS-related services, HIV-risk behavior and transmission, and HIV/AIDS disease outcomes in women and girls.
- Develop and evaluate accessible assisted reproductive technologies designed to assist in meeting fertility desire without vertical or horizontal HIV transmission.
- Study the impact of maternal treatment during pregnancy on fetal and infant outcome.

OBJECTIVE—E: Ethical Issues

Conduct and support research, training, and education on ethical issues that affect the access to and participation of women and girls in HIV/AIDS-related research.

STRATEGIES

- Develop and evaluate methods to facilitate obtaining fully informed consent from potential trial participants.
- Conduct research to examine and determine the factors that influence when the consent process is fully voluntary and informed.
- Investigate the unintended social and community consequences of policies and practices (including research practices) that provide special benefits to HIV-infected individuals.
- Investigate unintended harmful and beneficial consequences for women and girls, their families, and their communities as a result of participation in research studies.
- Examine the ethical risks and benefits of studies that involve treatment versus observation of women and girls.
- Investigate the ethical impact within a community of studies in which clinical trials provide the only access to therapeutics for women and girls.
- Investigate the ethics of conducting HIV treatment and biomedical intervention research in communities that are unable to afford the treatment or prevention intervention.
- Assess the potential risks and benefits for women and girls living where community-level epidemiological research is being conducted.
- Study the ethical issues related to HIV-specific diagnostic and therapeutic strategies implemented during pregnancy and lactation.
- Study the ethical issues related to providing family planning services and breastfeeding alternatives in communities where these interventions may not be acceptable.
- Study the ethical issues related to the participation of women and girls in clinical trials.

AREA OF EMPHASIS

Research in International Settings

SCIENTIFIC OBJECTIVES AND STRATEGIES

OBJECTIVE–A: Capacity Building

Develop a sustainable, collaborative research environment by utilizing and enhancing in-country capacity.

(The scientific objectives of A and B are of equal weight and serve as a prerequisite foundation for objectives C through I.)

STRATEGIES

Site Development

- Encourage the integration of research programs being conducted in resource-limited countries by U.S. researchers with established in-country programs, including collaboration with local investigators on strategic planning for research.
- Assess existing sites and, as needed, further develop sustainable, existing in-country sites, or establish new international research sites as rapidly as possible to address urgent and emerging scientific opportunities.
- Enhance capacity for the conduct of basic and applied prevention and treatment research, with emphasis on maintaining and developing both Good Laboratory Practice (GLP) and Good Clinical Practice (GCP) requirements for large-scale clinical trials, through:
 - ▶ strengthening laboratory capacity through the provision of required equipment and human resource development, with appropriate quality assurance and training;
 - ▶ developing clinical capabilities through research training and “hands-on” research experiences;
 - ▶ developing affordable alternatives to viral load and CD4+ cell counts and expensive laboratory monitoring for treatment efficacy and toxicity;
 - ▶ supporting the analysis of scientific and research-based international databases and developing common laboratory information management systems;
 - ▶ enhancing data management and analysis capabilities;
 - ▶ addressing barriers in maintaining, optimizing the use of, and ensuring human subject protections related to repositories of biological samples in resource-constrained countries;
 - ▶ developing community entry, engagement, and involvement strategies that support the development of testing various strategies for recruitment and retention of participants in prevention, treatment, and care studies;
 - ▶ optimizing epidemiological assessment of at-risk populations, including refining respondent-driven sampling, venue-time sampling, and Internet-based sampling, among other approaches to population-based recruitment of hard-to-reach populations;

- ▶ enhancing the ability to ensure protection for human subjects involved in research and the ethical conduct of research, including informed consent and issues specific to women, children, adolescents, and the elderly, as well as vulnerable populations, including injection drug users (IDUs), men who have sex with men (MSM), prisoners, and sex workers;
- ▶ enhancing mechanisms for information exchange among investigators, including enhanced electronic communication;
- ▶ conducting research on rapid and sustainable scale-up from pilot projects and/or early Phase I and II trials to large research studies, including Phase III trials, and on how to apply and implement research findings to the general population;
- ▶ strengthening community advisory boards to participate in the development and design of clinical trials and other research, as well as in the translation of research results into programs and policies;
- ▶ strengthening financial management, accounting, and business office practices;
- ▶ strengthening library services and access to scientific resources; and
- ▶ strengthening the capacity of institutional review boards (IRBs), including information-sharing between IRBs, updates on recent development, and building capacity for IRBs for review and monitoring of approved protocols.
- Build global capacity to conduct operational research, including outcome and cost-effectiveness studies and modeling, to rapidly address emerging priorities in prevention, treatment, and care.
- Conduct studies on incidence and feasibility, using appropriate incidence measures (e.g., population-specific assays), in order to identify sites suitable for the conduct of efficacy trials of HIV prevention, treatment, and care interventions.
- Develop and provide training at international sites conducting vaccine studies on the role and responsibilities of an institutional biosafety committee (IBC).

- Develop regional approaches to research (e.g., through regional meetings and training) to enhance communication and to address common issues and needs among countries in a region.

Collaboration and Coordination

- Ensure that foreign investigators are full and equal partners with U.S. scientists in the design, conduct, analyses, reporting, and publication of clinical studies.
- Enhance coordination of NIH international AIDS research, particularly when multiple projects are active in the same country and/or region.
- Encourage the continued development of research collaborations between international and U.S. investigators, ensuring project relevance to strategic planning at the local level, to maximize the research effort in resource-limited settings; and encourage U.S. researchers to participate at the developing country research site to better understand the challenges of conducting research and providing care and services in such settings.
- Provide assistance to foreign collaborators in addressing regulatory issues and special oversight mechanisms.
- Coordinate with other U.S. Government agencies, including the Centers for Disease Control and Prevention (CDC), the U.S. Agency for International Development (USAID), the Department of Defense (DoD), the Health Resources and Services Administration (HRSA), and the State Department (e.g., the Office of the U.S. Global AIDS Coordinator [OGAC] and the President's Emergency Plan for AIDS Relief [PEPFAR]).
- Work with foreign governments, international organizations (e.g., the World Health Organization [WHO]), the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), nongovernmental organizations (NGOs), private industry, foundations, and alliances (e.g., the Global HIV Vaccine Enterprise) to help identify priorities; increase funding of basic infrastructure for prevention, treatment, and care of HIV/AIDS in developing countries and thereby help support NIH-funded

clinical research in the growing economically challenged global environment; gain efficiencies; and reduce overlap in the development and testing of vaccines, microbicides, drugs, and other prevention, care, and treatment strategies, including behavioral interventions.

- Explore and assess the efficacy of collaborations with nonphysician health professionals and community members (e.g., nurses, pharmacists, health aides) to facilitate their involvement as partners in global AIDS research, prevention, treatment, and care, including the optimization of antiretroviral (ARV) rollout in settings with limited numbers of physicians.
- Explore and assess the efficacy of collaborations with reputable indigenous health providers to better understand their role in AIDS care, prevention, and research, and to identify practices that may add value in treating and preventing diseases in diverse geographical settings.

Ethical Issues

- Ensure that research projects are designed to benefit the communities in which the research is being conducted (e.g., addressing locally relevant scientific questions).
- Enhance the capability of institutions in resource-limited settings to conduct independent scientific and ethical reviews, while ensuring timeliness of the review process.
- Ensure education/cross-fertilization between resource-limited countries' ethical review committees and U.S. IRBs, and educate U.S. IRBs about cultural issues in developing countries.
- Ensure the participation of local researchers/scientists, communities, NGOs, governments, indigenous leadership of vulnerable populations, and other stakeholders in the development of research protocols.
- Ensure that ethical challenges in both research and the implementation of research results in resource-limited settings are clearly described and addressed in grant proposals.

- Ensure confidentiality of information about HIV-infected individuals, including information on individuals in treatment for substance abuse.
- Ensure that ethical review mechanisms, such as informed consent forms, are relevant and appropriate to the country where the research is conducted and are placed in an appropriate cultural context (including low literacy, local languages, etc.).
- Conduct training for all stakeholders on ethical principles and their implementation in research, encouraging countries to develop their own set of ethical guidelines and procedures, to include the principles of respect for persons, beneficence, and justice, and the application of informed consent, assessment of risks and benefits, and selection of subjects.
- Encourage in-country scientists and leaders to work closely with local journalists to foster understanding of science, the role of research, and relevant ethical issues.
- Conduct research designed to identify ways to improve the application of ethical principles in the conduct of research in varied cultural settings, including a focus on informed consent.

Technology Transfer and Translation of Research Results

- Ensure results are provided to and understood by participants and the community in which the study is conducted, as well as to the community's health professionals and relevant Ministry of Health personnel.
- Develop distance learning approaches to enhance communication of research results and translation into prevention, treatment, and care programs.
- Provide improved access to information concerning treatment and prevention guidelines and the results of research through enhanced information technology.

- Facilitate development of locally appropriate and acceptable HIV prevention and treatment guidelines, by including behavioral, basic, epidemiological, and clinical research findings.
- Transfer clinical, laboratory, and public health technologies that may be sustained and used for implementation of prevention, symptom management, clinical training, and patient care programs once research studies are completed.
- Support operational research based on implementation science and innovative research designs not limited to randomized clinical trials (RCTs).

OBJECTIVE–B: Mentoring and Training Investigators

Develop an in-country community of investigators committed to a culture of leadership in research through providing sustainable mentoring for junior investigators and career development opportunities for new, mid-career, and senior investigators.

(The scientific objectives of A and B are of equal weight and serve as a prerequisite foundation for objectives C through I.)

STRATEGIES

- Collaborate with in-country investigators and stakeholders in resource-limited settings to assist them in prioritizing their research needs by considering gaps in epidemic control strategies and the kinds of data and knowledge necessary to influence policy (i.e., research should be country-driven).
- Ensure the leadership role of in-country investigators and influential individuals in countries where studies take place by involving them in all stages of the research, including conceptualization of the research question, study design, development of protocols, study implementation and collection of data, data analysis, publication, and presentation of research results to government and other relevant stakeholders and audiences.
- Provide sustainable career development opportunities for new, junior, mid-career, and senior investigators (e.g., similar to long-term career awards and institutional grants offered domestically) in resource-limited international settings.
- Provide opportunities for new, junior, mid-career, and senior investigators from developed countries to spend significant amounts of time working with investigators in developing countries (i.e., create career milestones in the United States that recognize collaborations on par with first authorship or principal investigator [PI] status).
- Develop in-country training partnerships, and support “south-to-south” training to enable investigators to obtain training appropriate for the areas in which they will work by (1) developing a cadre of in-country scientific professionals, and (2) providing opportunities to enable trained investigators returning to their home countries to serve as training resources for others.
- Continue to support research training, both in-country and in the United States, of clinicians (physicians and nonphysician professionals, e.g., nurses, midwives, pharmacists), public health professionals and community health workers, and scientists from developing nations to enhance the conduct of research on HIV, AIDS, sexually transmitted infections (STIs), and other HIV-related coinfections, malignancies, and comorbidities, including research training related to: (1) biomedical, social, and behavioral prevention research, (2) prevention of mother-to-child transmission (MTCT), (3) treatment and care, (4) clinical trials of therapeutic strategies, (5) development and testing of vaccine candidates, (6) prevention and treatment of substance abuse/dependence in the context of HIV transmission, ARV treatment, and disease outcome, (7) reproductive health, including microbicides, and (8) disease progression.
- Provide training in data collection, management, and analysis for in-country research personnel.
- Provide training to enable in-country researchers to meet the requirements of GCP and GLP, including training and maintenance of medical records.
- Provide training in the ethical conduct of research, including informed consent, establishment of community advisory boards, and other topics related to the protection of human subjects.
- Provide training in all aspects of grantsmanship, including preparation of grant proposals, registration for electronic submission, grants management, reporting requirements, research administration, and fiscal accounting.

- Provide training to ensure that clinicians and other health care workers are knowledgeable about infection control principles and can implement proper procedures in resource-constrained countries.
- Enhance training in translational, operational, and health services research, including training in cost-effectiveness.

OBJECTIVE–C: Structural Interventions

Conduct studies to identify effective structural and policy interventions to address the AIDS epidemic.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Determine barriers and facilitators to acceptance of voluntary counseling and testing (VCT), and develop more comprehensive and integrated health system-level approaches to the provision of VCT, including:
 - ▶ assess new VCT approaches for effectiveness and cost-effectiveness with regard to reducing risk from sexual behavior and substance use in settings with varying levels of HIV seroprevalence;
 - ▶ integrate VCT into other existing health services, including family planning, maternal and child health care, and child immunization services; and
 - ▶ change community norms for seeking VCT that encourage knowledge of one's status, help mitigate social harm, and reduce HIV stigma.
- Identify the most effective and sustainable ways for schools, leisure locations, and worksites to support behavior change interventions.
- Investigate the effectiveness of community-based and community-level HIV prevention programs, including prevention education and strategies to evaluate, replicate, and extend effective behavioral interventions.
- Investigate the processes through which various governments implement structural interventions and how these processes might be systematically facilitated.
- Investigate the structural and policy-related human rights limitations that affect HIV prevention and access to treatment and care for vulnerable populations (e.g., MSM, IDUs, and sex workers), including laws and policies related to discrimination against minorities and criminalization of same-sex behavior between consenting adults, and evaluate the effectiveness of rights-based interventions to improve HIV disease outcomes in these groups.
- Investigate the effectiveness of structural interventions for HIV, STI, and tuberculosis (TB) prevention, treatment, and care among incarcerated populations, including in prisons, jails, mandatory drug remand centers, juvenile detention centers, and therapeutic communities.
- Ensure that all research is conducted in culturally appropriate content, form, and format and in accordance with local IRBs.
- Ensure that all research is conducted in accordance with international standards of human rights principles and in accord with the dignity of persons.
- Evaluate the effectiveness of interventions targeted to drug users, including testing and counseling outreach, access to resources for treatment of identified HIV-positive drug users, drug dependence treatment programs, availability of sterile injection equipment and needle syringe exchange programs, and the policy-level changes necessary to implement such expanded interventions.
- Develop and test strategies for encouraging voluntary partner notification within the context of families and couples counseling.
- Evaluate the effectiveness of expanded access to male circumcision programs and the policy-level changes necessary to implement such expanded interventions.
- Assess and determine optimal methodologies for evaluation of various structural interventions and ensure that research funding mechanisms recognize the need for innovative study designs not limited to RCTs.

OBJECTIVE–D: Interventions to Alleviate Stigma and Discrimination

Support AIDS research to develop interventions that address the issues of sex/gender, age, power relationships, stigma, and discrimination.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Conduct research on sex/gender and age differences and/or inequities in access to and use of resources, information, and prevention and care services, as well as adherence issues.
- Evaluate the relationship between new technologies and structural interventions (e.g., male circumcision) and gender and power relationships.
- Encourage analysis of sex/gender and age differences in all relevant HIV-related research.
- Study gender-related social and behavioral factors affecting acquisition of HIV infection, including intimate partner violence and the conflicting demands of childbearing and avoidance of disease.
- Study gender-related biological factors affecting susceptibility to HIV infection, including the use of contraception and the presence of sex-specific conditions, such as human papillomavirus (HPV) infection and cervical cancer.
- Study age-related social, behavioral, and biological factors (including the use of medications) affecting susceptibility to HIV infection and its transmission.
- Study how HIV infection psychologically affects women, including their role as heads of households and/or caregivers, their reproductive health requirements, and family support.
- Evaluate strategies to reduce stigma related to choice of infant-feeding modality by HIV-infected women.
- Develop interventions to mitigate the negative social consequences of HIV infection related to AIDS stigma and discrimination, with particular emphasis on children infected with or affected by HIV (e.g., AIDS orphans).
- Evaluate laws, legal policies, and health programs at the local, State, and national levels that operate to possibly increase, perpetuate, sustain, or alleviate stigma.
- Design and evaluate strategies to reduce stigma and discrimination and increase willingness of individuals to enter into voluntary counseling and testing; identify, accept, and implement alternative infant-feeding practices; receive and adhere to antiretroviral therapy (ART) and anti-tuberculosis drug regimens; and participate in HIV/AIDS trials.
- Develop epidemic control strategies for prevention as well as care and treatment that are mainstreamed into communities, so that participation does not signify risk for infection.
- Support training of community and public health leaders to become role models in the implementation of such strategies and interventions (i.e., to lead by example, such as public displays of getting tested or revealing infection status).

OBJECTIVE–E: Prevention of Risk Behaviors in Social Settings and Networks

Study the significance of interactions among individuals in groups engaging in various risk behaviors, and develop and evaluate interventions and strategies to prevent HIV-risk behaviors in social settings and high-risk networks.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Develop sustainable interventions at multiple levels (e.g., individual, couple, group, and society) that address multiple risk factors and reflect regional aspects of the epidemic.
- Develop and test prevention strategies that integrate the multiple, diverse components of sexuality, substance use, mental health, and sexual transmission into HIV prevention programs.
- Define sexual and substance use behaviors and their predictors in HIV-infected populations, and design and test interventions to reduce the risk of HIV transmission.
- Develop and test prevention strategies that address relationships between substance use and sexual transmission.
- Develop interventions targeted to both HIV-infected and HIV-uninfected individuals that are designed to appeal to specific populations such as women, men, adolescents, and the military.
- Develop and test prevention interventions to be used in the family context to prevent risky behavior and HIV acquisition and transmission by its members.
- Study the role of migration in the spread of the HIV epidemic in diverse geographical regions.
- Support cross-border studies to evaluate HIV transmission, as well as the effect of various policies and structural interventions related to migration and immigration.
- Identify the most effective means to reach and prevent HIV transmission among mobile or most at-risk populations, including sex workers, discordant couples, migrants (e.g., fishermen), refugees, and internally displaced persons (IDPs) displaced by national conflict or natural disaster.
- Conduct studies to develop interventions at multiple levels (e.g., individual, couple, group, and society) that reflect and address regional aspects of the epidemic.
- Investigate the role of mental health conditions (e.g., depression) and use of psychoactive substances in promoting or facilitating high-risk sexual behaviors that reduce the efficacy of prevention strategies.
- Determine the factors involved in high-risk social networks, especially in high-income groups (e.g., injection and noninjection drug users and heavy drinkers and/or alcohol-dependent individuals), that influence the rates and patterns of HIV infection, and design prevention programs based on these results.
- Encourage molecular epidemiology studies of viral diversity in the context of social networks.
- Study how alcohol use, including systems of payment using alcohol, affects increases in HIV risk in seasonal and nonseasonal migrant populations.
- Conduct studies to identify sustainable interventions at the levels of the individual, social network, community, and society to prevent HIV and hepatitis C virus (HCV) transmission at the population level as a result of high-risk sexual activity and/or practices related to substance use.
- Investigate the processes through which some social network interventions become self-sustaining forces for risk reduction and the frequency of this occurrence.

- Devise strategies to prevent initiation of substance use and dependence, and transition to riskier drug practices, such as initiating drug injection and sharing of injection equipment.
- Conduct research to determine the optimal way to provide HIV prevention in antenatal care (ANC) clinics for pregnant women who are found to be uninfected in VCT.

OBJECTIVE—F: Biomedical Prevention Interventions

Develop and evaluate biomedical prevention interventions and strategies.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Evaluate techniques for detection of acute HIV infection, and study the effects of early identification of potential HIV transmitters on HIV infection spread in different settings.
- Utilize population-based studies to examine basic scientific questions about HIV infection, mechanisms of transmission, and host responses, including viral evolution, viral diversity, human immunology, and mucosal factors in transmission.
- Study the risk of transmission of drug-resistant strains of HIV.
- Develop and evaluate methods for increasing access to, acceptability of, and adherence to biomedical interventions.
- Study and integrate the behavioral aspects of biomedical interventions and strategies.
- Conduct research on how best to deliver prevention education in the care and treatment setting, targeting interventions to both HIV-uninfected and -infected individuals.
- Determine the factors affecting male circumcision use and acceptance.
- Study the sociocultural aspects that may inhibit or encourage the use of male circumcision.
- Study the technical training and implementation requirements for widespread uptake of male circumcision interventions.
- Determine the cost-effectiveness of male circumcision in limiting transmission and curtailing the expansion of the epidemic.

Antiretroviral Use

- Determine the effectiveness of pre- and postexposure ARV prophylaxis in prevention of sexual and blood-borne HIV transmission.
- Determine the most effective ARV agents or combinations of agents to reduce transmission risk.
- If proven effective, determine the social, cultural, and practical factors affecting ARV use and/or providing barriers to implementation of exposure prophylaxis.

Male Circumcision

- Determine the durability of effectiveness of circumcision in reducing HIV transmission risk in men.
- Study the effectiveness of male circumcision for reducing HIV transmission from men to women and from men to men.
- Develop and evaluate innovative strategies for the safe and effective delivery of male circumcision and other male-oriented prevention services to prevent or reduce HIV transmission.

Vaccine Development

- Continue the accelerated efforts toward development of vaccine candidates suitable for use around the world, and foster the development of vaccines to optimize characteristics appropriate for broad international use, including candidates exhibiting low cost with ease of production and administration, as well as stability.
- Define immune approaches that will provide specific and sustained protection against HIV transmission; develop the products necessary to achieve these goals; and develop the capacity to evaluate their safety in human subjects.
- Provide a scientific knowledge base (incidence, viral subtypes, major histocompatibility complex [MHC] types, and natural history) to guide decisionmaking regarding the need for clinical trials in international sites and to conduct trials in these sites and communities according to the highest clinical and ethical standards.
- Identify suitable populations of adults and children to enroll in clinical trials of candidate vaccines, while ensuring equitable and appropriately representative gender balance in enrollment.
- Conduct Phase I, Phase II, and Phase III clinical trials for safety, immunogenicity, and efficacy, with appropriate surrogate markers and measures of correlates of protection with suitable candidate vaccines in domestic and international settings.
- Enlist the participation of local community representatives in the development of appropriate trial protocols, as well as responsive mechanisms to inform and educate the participating individuals; establish networks within the community that will effectively address the social and medical concerns of the participants; and establish mechanisms to provide ongoing information and open discussions concerning the scientific rationale of the study.
- Examine relevant behavioral issues related to the conduct of vaccine research and its acceptability in diverse populations.
- Conduct research on the potential social and economic effect of vaccines and their cost-effectiveness.

Microbicides and Barrier Methods

- Discover and develop candidate microbicides and other physical/chemical barrier methods to prevent sexual HIV transmission.
- Conduct Phase I, Phase II, and Phase III clinical trials for safety and efficacy with suitable candidate microbicides in domestic and international settings.
- Develop appropriate biological and surrogate markers of safety or protection.
- Determine the efficacy and use of prevention interventions, including microbicides and other physical/chemical barrier methods, and determine the factors affecting their use and acceptance.
- Study the sociocultural aspects that may inhibit or encourage microbicide use and barriers to adherence.
- Study the sociocultural and behavioral concerns related to partner involvement and acceptance of microbicide use or covert use in the absence of partner willingness or acceptance.
- If found to be effective in preventing HIV transmission/acquisition, determine the cost-effectiveness of microbicides and other physical/chemical barrier methods in limiting transmission and curtailing the expansion of the epidemic.

STIs and Other Diseases

- Determine the efficacy and cost-effectiveness of syndromic management of STIs among HIV-infected individuals to prevent HIV transmission.
- Improve clinical management of viral STIs in HIV-infected individuals, emphasizing coinfections with herpes simplex virus (HSV)-2 and HPV.
- Identify gender-related biological factors affecting susceptibility to HIV infection, including the use of hormonal contraceptives and the presence of gender-specific conditions such as HPV infection, cervical cancer, and genital ulcer disease.

- Examine how coinfection with other endemic diseases affects HIV transmission and acquisition and HIV disease progression.
- Determine the role of sexual transmission of HCV in coinfection with HIV.

Substance Abuse

- Develop and evaluate innovative, culturally relevant, contextually appropriate alcohol and drug abuse treatment programs for their utility as HIV and HCV prevention approaches in different international settings.
- Develop and evaluate approaches for drug and alcohol abuse programs among HIV- and HCV-coinfected patients to improve adherence with drug/alcohol treatment strategies.
- Develop and evaluate approaches to integrate risk-reduction prevention strategies for drug and alcohol use into HIV treatment and primary care settings.
- Develop and evaluate innovative strategies for identifying “hidden populations” of young, older, and out-of-treatment drug users, and those in the “high income” strata (e.g., visitors of night clubs and rave parties).

MTCT: Considerations for the Mother, Child, and Family

- Develop and evaluate strategies:
 - ▶ for primary prevention, i.e., prevention of HIV acquisition by adolescent girls and women;
 - ▶ to improve reproductive health in serodiscordant couples, including HIV-risk reduction in *in vitro* fertilization; and
 - ▶ for prevention of unwanted pregnancy by HIV-infected adolescent girls and women, and study factors associated with unwanted pregnancy.

- Investigate the mechanisms of and risk factors for *in utero*, intrapartum, and postnatal MTCT of HIV.
- Further evaluate and adapt known efficacious interventions in infants, mothers, or both to prevent MTCT (antiretroviral prophylaxis, cesarean section before labor and before ruptured membranes, complete avoidance of breastfeeding, exclusive breastfeeding, antiretroviral prophylaxis to breastfeeding infants).
- Evaluate acquisition of HIV infection during pregnancy:
 - ▶ quantify more precisely risk of MTCT when maternal HIV infection is acquired during pregnancy; and
 - ▶ develop strategies for detecting or reducing maternal incident infection during pregnancy.
- Develop new effective, safe, and feasible strategies to further decrease MTCT, especially postnatal (breast milk) transmission of HIV, or provide alternatives to currently identified effective strategies.
- Investigate the unique immune status of pregnant women and their infants and develop passive and active immunization interventions to interrupt HIV transmission.
- Evaluate risk factors for and strategies to reduce the morbidity and mortality associated with HIV infection in pregnant and postpartum women and their HIV-exposed infants, including:
 - ▶ maternal and infant nutrition during the peripartum and postpartum periods; and
 - ▶ the association of maternal HIV disease stage and mortality of both HIV-infected and HIV-uninfected children.
- Investigate the effect of ARV regimens used for prevention of MTCT (including repeated interventions) on subsequent response to ARV used for treatment in mothers and infants, if infected despite prophylaxis.
- Evaluate and develop strategies to reduce morbidity associated with interventions to reduce the risk of MTCT of HIV, including the facts that:

- ▶ antiretroviral prophylaxis may involve risks related to short- and long-term toxicity and ARV resistance;
 - ▶ mode of delivery will determine outcome, i.e., cesarean section for prevention of MTCT of HIV is related to increased postpartum morbidity in the mother, while iatrogenic preterm birth and associated respiratory morbidity are risks for the newborn; and
 - ▶ replacement feeding issues need to be considered.
- Evaluate strategies for scaling up successful interventions for prevention of MTCT of HIV.
 - Evaluate strategies to ensure linkage of sites (and information from sites) conducting prevention of MTCT with sites providing ART treatment for mothers and with infant/child health clinics (e.g., immunization clinics) for infants to ensure maternal HIV status is known so that infant receives cotrimoxazole (CTX) provision and HIV diagnosis.

OBJECTIVE–G: Treatment Research

Develop and evaluate the most effective, setting-specific strategies for care and treatment of HIV and HIV-related conditions and their sequelae among HIV-infected and HIV-affected children, adolescents, and adults at all stages of the life course.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Characterize the clinical course of HIV infection in diverse geographic settings.
- Conduct research on biological, behavioral, and psychosocial effects related to the natural history and care of HIV disease among children and adolescents.
- Develop and evaluate suitable and sustainable approaches to the diagnosis of HIV infection, especially for children under the age of 18 months.
- Collaborate with clinicians from resource-limited countries to identify (by testing high-risk groups for HIV every 3 months), recruit, and retain acute and early HIV infection cases in treatment research programs.
- Identify affordable, safe, and effective ARV regimens, including timing of initiation and durability of initial treatment, and study cost-effectiveness of starting early treatment.
- Determine the role of pharmacogenetics/pharmacokinetics and identify appropriate ARVs that can be used in specific populations (e.g., children, adolescents, and adults at all life stages) in resource-constrained countries.
- Determine the efficacy of ARV regimens on various clades prevalent around the world.
- Conduct studies, including clinical trials and operational research, on the quality of treatment, its effectiveness, and its efficacy.
- Develop and evaluate suitable and sustainable approaches to monitoring the effectiveness and safety of HIV treatment, especially with regard to affordable technologies to measure CD4+ cell counts and viral load (for appropriate alternatives) and validate low-cost monitoring technology.
- Assess the cost-effectiveness of ARVs in resource-limited settings and determine the minimal level and methods of targeted drug resistance monitoring necessary in those failing therapy and pregnant women.
- Evaluate and monitor treatment effectiveness, adherence, drug-drug interactions, and toxicity of ARVs and prophylaxis medications against major coinfections in pediatric, adolescent, and adult populations (including over age 50 and pregnant women) in resource-constrained settings.
- Examine the effectiveness of a variety of approaches to the administration of therapy (e.g., directly observed therapy, directly delivered therapy, or directly administered antiretroviral therapy).
- Develop and test strategies, including promotion of treatment literacy for health care workers, people living with HIV/AIDS, and family and community members, to support adherence in adults, adolescents, and children to medication regimens to enhance therapeutic outcomes and limit the development of drug resistance.
- Conduct community-based studies that assess the effect of community mobilization on VCT and treatment success.
- Investigate the effect of substance abuse and other associated comorbid conditions (and their integrated treatment) on HIV disease progression, adherence to treatment regimes, and clinical outcomes.
- Investigate interactions of ARVs with alcohol, drugs of abuse, or medications used for the treatment of substance abuse.

- Assess the effect of nutritional status and nutritional interventions on patient survival and the efficacy and tolerability of ART, including measuring the rate of immune system deterioration.
- Develop culturally appropriate mechanisms to identify persons for whom treatment is indicated and to overcome factors such as stigma and discrimination, which can forestall testing and limit the provision of treatment and care.
- Develop, evaluate, and implement programs to prevent discrimination in the provision of ARV treatment.
- Support the long-term followup of children exposed to ART *in utero* and/or postpartum to evaluate possible late effects of ARV exposure.
- Identify and study conditions that emerge as a consequence of ART and longer survival, such as malignancies, neurological and neuropsychological conditions, and metabolic and nutritional dysfunctions.
- Develop and evaluate strategies to initiate and provide care to targeted groups of individuals such as health care workers, security forces, and teachers.
- Develop and evaluate public health models, such as family and community models of care for infants to older adults that integrate HIV/AIDS care and other existing health services in a single setting to maximize outcomes and avoid duplication of effort.
- Enhance interdependent programs such as programs for TB control and management of other comorbid conditions, alcohol and other substance abuse/dependence treatment programs, maternal and child health services, and support services for the elderly.
- Develop and initiate strategies to link HIV treatment and care centers with programs for diagnosis, evaluation, and management of HIV-associated malignancies to allow a continuum of care.

OBJECTIVE–H: Endemic Diseases and HIV

Study the interactions between HIV infection, comorbidities, and endemic diseases, with a particular focus on endemic diseases that affect HIV care and are a part of the spectrum of HIV comorbidities, and develop strategies to optimize their integrated prevention, diagnosis, treatment, and care.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Define the spectrum, incidence, and risk factors for HIV-related sequelae (e.g., coinfections such as TB, HCV, and HPV, malignancies, and organ system-specific manifestations such as renal, eye, and urologic diseases, and neurological and neuropsychiatric conditions) in adult, adolescent, and pediatric populations specific to individual regions in diverse geographic settings.
- Investigate sustainable strategies for preventing, treating, and monitoring response to treatment of endemic diseases in HIV-infected adults, adolescents, children, and infants in resource-constrained settings.
- Develop simple clinical algorithms for guiding initiation of prevention or treatment of HIV-related opportunistic infections (OIs) and comorbidities.
- Identify affordable strategies to target high-risk patients for initiation of prophylaxis for HIV-related OIs and comorbidities.
- Develop, study, and widely and uniformly deploy new, low-cost, and rapid diagnostic and drug susceptibility tests for comorbid and endemic diseases (including TB).
- Examine the role of coinfection and other endemic diseases and their treatment in modulating HIV infection or disease, including risk of acquiring and/or transmitting HIV infection, disease progression, and the use of ART.
- Determine the effect of ART on susceptibility to infection with endemic diseases, and on their natural history.
- Determine the effect of ART on the efficacy of treatment and prophylaxis for other endemic diseases.
- Investigate drug-drug interactions of ARVs and drugs used to prevent and treat endemic infections and/or other manifestations of such endemic infections.
- Assess the burden of TB and the relative importance of reactivation versus *de novo* infection in HIV-coinfected individuals in various settings.
- Develop and study strategies for primary and secondary TB prevention, including prophylactic regimens.
- Develop and study feasible and effective strategies for prevention of transmission of drug-susceptible and -resistant TB in community and health care settings.
- Determine optimal ways of integrating treatment for HIV disease with prevention of and treatment for OIs, endemic diseases, and comorbidities, especially TB, including clinical research to assess clinical outcome and operational research to determine cost-effectiveness.
- Determine the safest and most efficient treatment modalities for endemic diseases (e.g., TB, HCV, HIV-associated cancers, and malaria) in the adult, pediatric, and adolescent populations infected with HIV, including pregnant women.
- Assess the impact of available antibiotic treatment and prophylaxis regimens to optimize therapeutic approaches for TB and other endemic coinfections in the context of ART, including new therapies for TB and new approaches to administering drugs.

- Develop new agents and therapeutic strategies to treat drug-sensitive and drug-resistant TB (including multi-drug-resistant [MDR]-TB and extensively drug-resistant [XDR]-TB).
- Investigate behavioral and cultural factors related to endemic coinfections, within the context of HIV, and develop strategies to enhance and monitor adherence to therapy and prophylaxis for endemic coinfections in HIV-infected individuals.
- Develop methods to monitor development of anti-microbial resistance by HIV-related and endemic pathogens infecting both study participants and the general population.
- Determine the safety and effectiveness of available immunizations for endemic pathogens in diverse HIV-infected populations.
- Conduct studies to better understand the role and mechanism of reinfection and/or superinfection with HCV in coinfecting individuals.
- Develop and test the feasibility of low-cost assays for early diagnosis of viral cancers, particularly cervical cancer, non-Hodgkin's lymphoma, and Kaposi's sarcoma, and utilize these in a loco-regional setting to develop adequate clinical approaches to the management of such cancers.

OBJECTIVE—I: Integrated Prevention and Treatment

Evaluate the impact of prevention and treatment programs on the HIV epidemic, including the integration of comprehensive prevention and clinical care in existing health service delivery programs related to HIV/AIDS.

(The scientific objectives of C through I are of equal weight.)

STRATEGIES

- Assess the social, psychological, societal, and economic impact of ART on risk behaviors, HIV transmission, and prevalence, including associated behavior change, in individuals (including children), families, and various communities.
- Determine how availability of ART affects utilization of VCT in various communities.
- Determine how availability of ART affects the entry into care and treatment.
- Determine how availability of ARV prophylaxis for prevention of MTCT affects entry into ANC and utilization of VCT within ANC.
- Determine whether expanded ART care and treatment leads to a decrease in HIV-associated stigma and discrimination.
- Determine effective strategies for integrating the delivery of HIV care with drug treatment, alcohol treatment, TB treatment, maternal and child health services, and other medical and social services commonly needed by HIV-infected individuals.
- Evaluate how ART, alcohol, psychoactive drugs, or medications used for the treatment of substance abuse interact and potentially affect adherence to anti-addiction therapy and MTCT.
- Determine how ART affects breastfeeding behaviors.
- Identify morbidities in HIV-exposed, uninfected infants and young children, using appropriate control populations, in resource-constrained settings.
- Study the direct effects of ART on HIV transmission, e.g., by evaluating the effectiveness of specific ART strategies in curtailing HIV transmission in HIV-serodiscordant couples.
- Consider the implications of ART use for prevention in settings where ART is not available for all those infected individuals who meet WHO eligibility criteria.
- Determine the public health impact of ART, specifically the likelihood of transmission of drug-resistant virus and the natural history of disease in people infected with a drug-resistant HIV strain.
- Examine the potential use of HIV therapeutic vaccines.
- Determine the impact of ART on the development of drug-resistant strains of HIV in diverse geographical settings, and develop strategies to limit its development. Develop biomarkers that can serve as surrogates for measurement of HIV-risk behavior and can be used to predict and monitor rapid escalation of HIV subepidemics.
- Integrate operational and health services research with clinical research to facilitate the translation of research findings to clinical practice and public health programs and to provide information to inform the scale-up of HIV prevention, care, and treatment programs.
- Develop strategies to ensure that prevention efforts in resource-limited countries are simultaneously preserved and enhanced when treatment clinical trials and, later, ART treatment programs are established, and when prevention trials are completed.

- Develop demonstration programs that simultaneously address prevention, care, and treatment.
- Examine risk-reduction among community health care workers involved in aspects of care or adherence.
- Develop links with other agencies and organizations to integrate research with service programs and to develop multidisciplinary prevention research in multiple settings, including medical treatment and community support and care organizations.
- Develop strategies to control the HIV epidemic that address multiple health outcomes simultaneously without compromising existing public health infrastructure, while at the same time strengthening infrastructure to improve health outcomes.
- Evaluate the impact of scale-up of HIV prevention, care, and treatment programs on the health system as a whole and its ability to deliver other public health services, particularly in resource-limited settings, and consider strategies for general health care strengthening that also effectively address HIV/AIDS.

AREA OF EMPHASIS

Training, Infrastructure, and Capacity Building

SCIENTIFIC OBJECTIVES AND STRATEGIES

OBJECTIVE–A: Research Training

Provide training domestically and internationally in biomedical, social, and behavioral research on HIV, with an emphasis on multidisciplinary research in racially and culturally diverse settings domestically, and with attention to the needs of marginalized communities domestically and in developing countries with high incidence and/or high prevalence of HIV infection.

STRATEGIES

- Increase opportunities for predoctoral, doctoral, postdoctoral, and advanced research training across a broad range of AIDS-related disciplines.
- Expand the NIH AIDS Loan Repayment Program to increase the number of U.S. scientists and physicians from disadvantaged backgrounds, including racial and ethnic minorities, to come to the NIH to boost the cadre of trained HIV/AIDS researchers.
- Develop and implement programs at domestic institutions, with attention to institutions serving women and individuals from disadvantaged backgrounds, including racial and ethnic minorities, to provide precollege training to attract students interested in behavioral and biomedical sciences related to HIV/AIDS research.
- Expand programs for HIV/AIDS research to develop culturally appropriate and relevant training and mentoring models to be applied to HIV-affected minority communities.
- Create procedures to improve the supply of trained mentors by establishing a national mentoring network for the development and retention of new investigators in HIV/AIDS research.
- Support research that develops an evidence-based approach to effective mentoring so that future mentoring programs can build on the knowledge base of educational and social science research.
- Enhance opportunities through all Institutes and Centers (ICs) and programs to improve mechanisms for recruiting, training, mentoring, and retaining of intramural and extramural HIV investigators, especially those from diverse backgrounds, including biomedical, behavioral, and social scientists in the conduct of interdisciplinary sex and gender analyses in HIV/AIDS research.
- Support programs to implement active recruiting and retention strategies for mentorship that target key transition periods along the career path in view of data that a large proportion of potential scientists from underrepresented racial/ethnic groups and other populations are lost at key transition points in their developmental trajectories.
- Support multidisciplinary training and mentoring programs to strengthen HIV/AIDS intervention research including behavioral interventions, vaccines, microbicides, therapeutics, coinfections such as tuberculosis (TB), sexually transmitted diseases, interventions to interrupt mother-to-child transmission (MTCT), nutritional interventions,

substance abuse prevention and treatment, and precancerous and cancer detection, all in the context of HIV infection.

- Expand the pool of domestic HIV/AIDS diversity supplement awards to ensure the research capacity of underrepresented minority investigators to make them more competitive for independent funding.
- Support programs to address the leaks in the pipeline and remediate attrition by understanding the multiple paths that people can follow to a research career, from one career stage to the next and the optimal time of entry to a research project.
- Support HIV/AIDS research planning and organizational grants targeting domestic minority institutions and minority-serving communities. Emphasis should be placed upon grants that develop academy-community partnerships.
- Provide new opportunities and programs to attract newly trained investigators and established researchers from other fields to pursue HIV/AIDS research.
- Develop funding mechanisms to foster better linkages across AIDS-related scientific disciplines, including basic, clinical, epidemiologic, statistical, social, and behavioral science.
- Expand opportunities for institutions serving specific diverse populations at risk for HIV/AIDS to develop equal and productive partnerships with U.S. majority institutions.
- Facilitate the establishment of research partnerships between minority institutions and the communities they serve by enhancing and expanding initiatives that support research in diverse communities.
- Expand training to strengthen local capacity to conduct multidisciplinary AIDS-related prevention, vaccine, and therapeutic research in resource-limited countries by scientists from these countries.
- Strengthen cultural competency training and ethical training for the conduct of HIV/AIDS prevention, vaccine, and therapeutic clinical trials in vulnerable populations, in both domestic and international settings.
- Support training programs for the diagnosis, prevention, and treatment of HIV infection and/or disease in resource-limited countries.
- Support training programs for the diagnosis, prevention, and treatment of nosocomial infections control, including TB, in resource-limited countries.
- Support training programs that increase the capacity for research in HIV-associated malignancies in resource-limited countries.
- Provide support for all HIV/AIDS training materials such as CD-ROM- and Web-based training and training sessions; all training materials must be adapted for local languages.
- Provide training in Good Laboratory Practices (GLP)/Good Clinical Practices (GCP) for translational processes and in product development in both domestic and international settings conducting HIV/AIDS clinical trials or research.
- Implement new funding mechanisms to provide research training to nonphysician professionals (e.g., physician assistants and nurse practitioners) in resource-limited settings and to increase the pool of HIV/AIDS minority researchers at domestic sites.
- Develop collaborative evaluation research efforts to assess the efficacy of strategies to shift HIV care tasks in resource-limited settings to nonphysician-professional trained individuals.
- Support the training of biomedical and behavioral scientists in both developed and developing countries in the use of advanced computer and information technologies for HIV-related research, including distance learning, and ensure access to appropriate tools and equipment at the end of training.
- Support veterinary residency training programs in primate medicine at National Primate Research Centers (NPRCs) or other primate facilities to help to increase the number of highly trained veterinarians who can manage the increasing needs for HIV/AIDS nonhuman primate (NHP)-dedicated colonies.

- Support the training of veterinarian scientists who contribute to the growing need for interdisciplinary-trained researchers who help to understand both the microbial/infectious disease aspects as well as the animal model side of HIV/AIDS research in NHPs.
- Develop new models of integrated training that focus on the protection of human and animal subjects enrolled in HIV/AIDS clinical trials and on ethical issues of clinical trial design and implementation of vaccine and other prevention modalities in at-risk populations, in both domestic and international settings.
- Support training programs for personnel in institutions in resource-limited settings to strengthen the administrative and financial management capacity needed to conduct HIV/AIDS-related research.
- Expand programs to increase opportunities for scientists from developing and resource-limited countries trained through the NIH to conduct AIDS research in their home countries (e.g., reentry grants).
- Develop new funding mechanisms and expand existing ones to sustain human capacity and to link U.S. AIDS research scientists, industry partners, and relevant institutions with each other and with investigators and institutions in both developed and developing countries.
- Take advantage of existing AIDS clinical trial infrastructures to develop specific training programs in clinical trials methodology, including issues related to the design, recruitment, retention, target population dynamics, and analysis of data, domestically and internationally.
- Expand training programs on the effective use of HIV/AIDS antiretroviral drugs and prophylactic and therapeutic interventions for coinfections/opportunistic infections as well as adequate monitoring for patient safety.
- Develop training to prevent transmission of HIV and hepatitis C virus (HCV) in resource-limited health care facilities, including recruitment and retention of appropriate blood donors, predonation counseling of all blood donors, improvement of blood screening strategies and technologies, and appropriate use of transfusion.
- Support training opportunities for HIV prevention researchers interested in adding specific methodological skills to their research expertise (e.g., methods to conduct cost-effectiveness analyses, measurement of biologic outcomes in behavioral intervention studies, appropriate use of behavioral and social science measures in clinical trials, ethnographic and other qualitative methods, and network analysis).
- Support the training of HIV/AIDS-affected communities, to strengthen their ability to be informed partners in biomedical and behavioral science research.

OBJECTIVE–B: Infrastructure Development

Establish and maintain the appropriate infrastructure needed to conduct HIV research domestically and internationally with emphasis on populations of high prevalence.

STRATEGIES

- Increase research infrastructure at U.S. minority-serving institutions to improve capacity to support HIV/AIDS research.
- Enhance, improve, and maintain research capacity and infrastructure in resource-limited settings with high HIV incidence, with particular emphasis on construction and operation of facilities for research on HIV prevention, including the development of vaccines and microbicides, as well as clinical trials for therapies and behavioral interventions.
- Enhance and improve the clinical trial research infrastructure for the conduct of prevention, vaccine, and therapeutics trials in domestic and foreign sites, including laboratory capacity, trained scientists and other personnel, appropriate participant cohorts, and mechanisms to address ethical issues such as the implementation of ethical committees and translated human rights documents.
- Enhance and improve research capacity and infrastructure to advance research on AIDS-associated coinfections (HCV, herpes simplex virus type 2, Kaposi's sarcoma-associated herpesvirus or human herpesvirus type 8, human papillomavirus, Epstein-Barr virus, TB, and malaria) and associated malignancies.
- Support an adequate infrastructure for producing HIV/AIDS vaccine candidates, for preventive and therapeutic vaccine trials, under Good Manufacturing Practices (GMP).
- Support and expand adequate facilities and resources, including BSL-2/3 (Bio Safety Level 2/3) facilities for studies in NHP, as well as appropriate ethical and procedural training to house, breed, and conduct HIV-related research in various NHP models.
- Expand the production of genetically defined specific pathogen-free (SPF) NHP, with emphasis on Indian-origin rhesus macaques.
- Develop and characterize appropriate reagents for use in HIV-related research conducted in different species of macaques and also other NHPs.
- Maintain programs that enhance the current research infrastructure, particularly the trans-NIH infrastructure, such as the Centers for AIDS Research (CFARs), the Research Facilities Improvement Program, the NPRCs, and the Clinical and Translational Science Awards.
- Provide support for, and awareness of, the Biomedical Technology Resources Program for structural studies of HIV proteins and host proteins in the context of HIV infection.
- Provide for the long-term support of advanced in-country research in resource-limited settings participating in priority AIDS-related intervention research, such as methods to interrupt mother-to-child, sexual, or parenteral transmission, or trials of candidate HIV vaccines.
- Increase collaboration between community-based organizations (CBOs) and other Government-supported service providers (such as those funded through the Health Resources and Services Administration [HRSA], the U.S. Department of Veterans Affairs, and the Centers for Disease Control and Prevention [CDC]) and academic researchers, to improve the quality and capacity of HIV/AIDS research endeavors in service settings.
- Establish and support quality-controlled repositories for, and ensure access by, qualified scientists to human samples (e.g., serum, peripheral blood mononuclear cell, plasma, patient-derived cell lines, cerebrospinal fluid, semen, breast milk, lymphoid tissues, and other key patient samples) and HIV strains from clinical trials and natural history and epidemiological studies, especially in complex study settings (e.g., MTCT studies).

- Develop, maintain, and effectively utilize domestic and international cohorts, repositories, and nested studies among populations experiencing emerging and ongoing HIV epidemics to maintain updated existing databases, allowing a broader and efficient use by the scientific community, when appropriate.
- Maintain the present AIDS-related tumor registries, and ensure linkages between AIDS and cancer registries, for both domestic and international studies.
- Improve and adequately disseminate the process of requesting, prioritizing, and receiving HIV/AIDS laboratory samples, so that access is as timely and equitable as possible.
- Promote Internet connections, cell-phone-based communication for training, infrastructure, and treatment, and online social networks including those with virtual worlds. Ensure availability of pertinent information technology at health science centers, hospitals, outpatient clinics, CBOs, and other access points, both domestically and internationally, for HIV-related research and patient care.
- Develop statistical sampling methodologies, data collection protocols, and statistical analysis tools that are easy to use and adaptable to different settings; facilitate efficient statistical analysis and report generation and enhance standardization, when appropriate, in the context of HIV/AIDS research.
- Promote research in, and application of, medical informatics (e.g., high-performance computing) for HIV/AIDS research and clinical practice in resource-limited settings, both domestically and internationally.
- Enhance coordination and collaboration among NIH-supported investigators, other U.S. Government agencies, and other international agencies conducting HIV/AIDS research in the same developing countries.
- Develop efficient and effective systems for collecting and managing HIV/SIV (simian immunodeficiency virus)/SHIV (chimeric simian/human immunodeficiency virus) multiple-center and single-site clinical and animal model trial data; ensure timely and accurate dissemination of clinical and animal model trial information.
- Develop and improve conventional and electronic systems for longitudinal documentation of medical care/tracking of HIV/AIDS in low-resource settings to improve longitudinal clinical care and facilitate health systems, care quality, and epidemiologic research.
- Encourage the development of stable and sustainable locally generated “green” power supply (e.g., wind, solar) for clinical care and research sites in low-resource settings.

