

[Home](#) [News](#) [Journals](#) [Topics](#) [Careers](#)

Search



Advertisement

**COX**  
COMPARE  
NOW**THE CONTOUR  
VOICE REMOTE**

Log in



Rose Kough and her 6-week-old baby received antiretroviral drugs to prevent mother-to-child transmission of HIV. MISHA FRIEDMAN

**SHARE**

833



37

Nigeria has more HIV-infected babies than anywhere in the world. It's a distinction no country wants

News from Science has **introduced metered access**. Full access to all news content is included in **AAAS membership**.

**Got a tip?**How to contact  
the news team

in

By **Jon Cohen** | Jun. 12, 2018 , 1:00 PM**NIGERIA**—On a

January morning, 12-year-old Yusuf Adamu slumps in his father's lap, head pressed against his chest. Infected at birth with HIV, he is tiny for his age and has birdlike limbs. He has been feverish for 3 days, which is why his father, Ibrahim, brought him to the pediatric HIV/AIDS clinic at Asokoro District Hospital in Abuja, Nigeria's capital. "He's been losing weight, he is not eating well, he's still taking his drugs, and he's complaining of chest pains and coughing," Ibrahim tells the nurse. Yusuf's records show that at his last blood check 6 months ago,

**Special package:  
Far from over**

Three places where "ending AIDS" is a distant hope.

**Nigeria:  
Building  
TRUST  
in an  
LGBTQ-  
hostile  
country**



**Nigeria:  
Babies  
who  
dodge  
HIV may  
not be  
unscathed**



**Russia's  
HIV/AIDS  
epidemic  
is  
getting  
worse,  
not  
better**



[More content from this package](#)

Advertisement



Advertisement

Science | AAAS

[ SPECIAL EDITION ]

**CANCER**

Free Download »

HIV had already ravaged the boy's immune system, even though he was receiving antiretroviral (ARV) drugs. When the doctor, Oma Amadi, examines his mouth, it is filled with white sores from candidiasis, a fungal infection. "The boy has been sick for so long," she says. "I'm going to admit him." When Amadi removes Yusuf's shirt to listen to his chest, the boy winces at the touch of her stethoscope. Amadi suspects Yusuf has tuberculosis, and after x-raying his lungs, the doctors put him in an isolation room.

Yusuf's mother was never tested for HIV before he was born: She received no prenatal care and delivered at home. Yusuf was not tested for the virus until she died of AIDS 3 years later. Ibrahim then learned that he, too, is HIV-positive, as are his two other wives. One ended up transmitting the virus to a second child, now 4.

The entire family receives ARVs, but Yusuf has only had intermittent access to the drugs. Dosing is based on weight, and Yusuf's has fluctuated so much that he has required monthly hospital visits. Ibrahim, a security guard, earns the equivalent of only about \$20 a month. The Adamus live 20 kilometers and three bus rides from the hospital. The round trip bus fare costs \$2, and Ibrahim has to miss a day of work for each checkup, when he also picks up his son's ARVs.

## Related Jobs

### CBG Associate II

City of Hope  
California

### DEPARTMENT OF MICROBIOLOGY & IMMUNOLOGY AND CENTER FOR VACCINE DEVELOPMENT FACULTY POSITION

University of Maryland School of Medicine  
Baltimore, Maryland (US)

### Postdoctoral Fellow - H5N1 Influenza in Nonhuman Primates

The University of Pittsburgh Center for Vaccine Research  
University of Pittsburgh, Pittsburgh, PA

[MORE JOBS ►](#)

## ScienceInsider

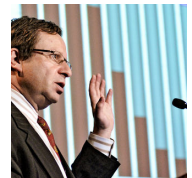
### Following charges of flawed statistics, major medical journal sets the record straight

BY JENNIFER COUZIN-FRANKEL | JUN. 13, 2018



### Obama official would have led EPA's climate science debate —if all agencies took part

BY ROBIN BRAVENDER, E&E NEWS | JUN. 13, 2018





Ibrahim simply can't afford regular treatment for his son. "There is no food at home," Ibrahim says.

#### SIGN UP FOR OUR DAILY NEWSLETTER

Get more great content like this delivered right to you!



**Sign Up**

Click to view the [privacy policy](#).

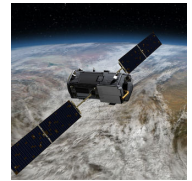
Required fields are indicated by an asterisk (\*)

Yet poverty alone does not explain the root of Yusuf's plight—which hundreds of thousands of other Nigerian children living with HIV now face. At a time when rates of mother-to-child transmission of HIV have plummeted, even in far poorer countries, Nigeria accounted for 37,000 of the world's 160,000 new cases of babies born with HIV in 2016. The most populous country in Africa, Nigeria does have an exceptionally large HIV-infected population of 3.2 million people. But South Africa—the hardest-hit country in the world, with 7.1 million people living with the virus—had only 12,000 newly infected children in 2016. The high infection rate, along with the lack of access to ARVs—coverage is just 30%—helps explain why 24,000 children here died of AIDS in 2016, nearly three times as many as in South Africa.

Mother-to-child transmission is only one part of Nigeria's HIV epidemic.

## NASA science and NSF do well in Senate spending bill

BY JEFFREY MERVIS, ERIC HAND | JUN. 13, 2018



## Undersecretary Paul Dabbar paints broad vision for Department of Energy science

BY ADRIAN CHO | JUN. 13, 2018



## An outspoken epidemiologist becomes U.S. science envoy

BY JON COHEN | JUN. 12, 2018



More *ScienceInsider*

## Sifter

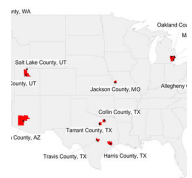
### Mammoth dust storm on Mars has left a NASA rover in the dark

JUN. 13, 2018



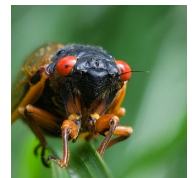
### These 12 U.S. states have record rates of unvaccinated kindergartners

JUN. 13, 2018



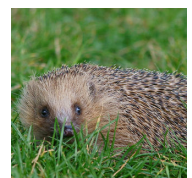
### A mutated killer fungus is keeping cicadas alive

JUN. 13, 2018



### One-fifth of the United Kingdom's wild mammals could be extinct within a decade

JUN. 13, 2018



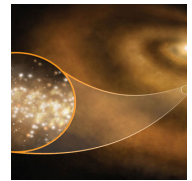
But that route of transmission epitomizes the country's faltering response to the crisis, highlighting major gaps in HIV testing that allow infections to go untreated and the virus to spread. "Nigeria contributes the largest burden of babies born with HIV in the world—it's close to one in every four babies [globally] being born with HIV—and that's really not acceptable," says Sani Aliyu, who heads the National Agency for the Control of AIDS (NACA) in Abuja. And it is a solvable problem—even here. The key is to find and treat the relatively small population of pregnant, HIV-infected women, because those who receive ARVs rarely transmit the virus to their babies. Like most countries, Nigeria has made mother-to-child transmission a priority for more than a decade, and it has seen a reduction in children born with HIV. Still, the country stands out for its slow progress. "What we've realized is that we need to think outside the box," Aliyu says.



Ibrahim Adamu sits with his son Yusuf in an isolation room at Asokoro District Hospital in Abuja. MISHA FRIEDMAN

## Clouds of diamonds found around newborn stars

JUN. 13, 2018



More Sifter

A pregnant woman living with HIV has a 15% to 30% chance of transmitting the virus to her baby in utero or at birth, and breastfeeding will infect up to 15% more. In 1994, a study showed that one ARV drug, azidothymidine, cut transmission rates by two-thirds if given to the mother before and after delivery and to the baby for 6 weeks. But few poor countries used that regimen because it was expensive and complex, requiring an intravenous drip of the drug during labor. Five years later, a study in Uganda showed a single dose of another ARV, nevirapine, given to a mother in labor and a baby at birth, could reduce transmission by 50%, which soon became a standard of care. Countries all over the world began aggressive prevention campaigns. Nigeria launched a program in 2002 when it had 54,000 newly infected children, and transmissions began to slowly decline.

Today, the standard of care is to treat all HIV-infected people, including pregnant women, with daily combinations of powerful ARVs. When treatment suppresses the virus in pregnant women and, as an additional safety measure, their newborn babies also receive ARVs for 6 weeks, transmission rates typically plummet to less than 1%. In the developed world and many developing countries, mother-to-child transmission is now rare. But the

regimen can't be given if pregnant women don't know whether they are infected.

According to estimates from the Joint United Nations Programme on HIV/AIDS, 21.58% of HIV-infected, pregnant Nigerian women transmitted the virus to their children in 2016. Nigeria's central problem is that some 40% of women give birth at home or in makeshift clinics run by traditional birth attendants, where women are unlikely to get tested. The reasons women do not seek care at more formal health care facilities like Asokoro Hospital are many and overlapping: poverty, fear of stigma and discrimination for simply seeking an HIV test, lack of education, tradition, and husbands wary of health care.

Another barrier is the "formal" fee that the government levies for care at a clinic. Deborah Birx, director of the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) in Washington, D.C., which has invested more than \$5 billion in preventing and treating HIV in Nigeria, says the fee "opens the door" for others to tack on more insidious "informal" fees. "If you want to get your lab results back or you want to get your blood drawn, that nurse may charge you," Birx explains. Those fees, she says, "are very hard to police." When one Nigerian state eliminated the formal fee, the number

of women who came to clinics for antenatal care doubled, she says.

---

**“ Nigeria contributes the largest burden of babies born with HIV in the world ... and that’s really not acceptable. ”**

*Sani Aliyu, National  
Agency for the Control of  
AIDS*

---

Muktar Aliyu, an HIV/AIDS researcher at Vanderbilt University in Nashville who is Sani’s identical twin, says corruption is a major factor. “It’s a big elephant in the room,” says Muktar Aliyu, who still conducts studies in his home country. Scams such as informal fees are just part of the problem. The Global Fund to Fight AIDS, Tuberculosis and Malaria in 2016 suspended payment to the country after detecting what it called “systematic embezzlement” by Ministry of Health staff as well as improper auditing.

Conducting large-scale HIV testing is also hard because the virus is dispersed unevenly across the country, with some states having a much lower prevalence than others. In Niger, a state in the central part of the country, it is just 1.7%, according to 2015 estimates. “We’d test 1000, 2000



individuals and we'd get barely 20, 30 positive," Muktar Aliyu says. But Benue, an east-central state that has been hardest hit, has an estimated adult prevalence of 15.4%.

Several people at the front of Nigeria's HIV/AIDS response link the shortcomings to the government's lack of "ownership" of the epidemic. Foreign assistance—mainly from PEPFAR and The Global Fund—pays for nearly the entire HIV/AIDS response. Health Minister Isaac Adewole, an OB-GYN who worked in HIV/AIDS, says the "No. 1 challenge" is for Nigeria to move "from a donor-dependent program to a country-owned program." To give an example of the problem, Muktar Aliyu notes that foreign assistance often focuses on bolstering programs, including testing, at large treatment centers, not the 800 or so smaller clinics spread across the country. "In the next 5 years, at the most, country ownership will come through for HIV programs in Nigeria," Sani Aliyu promises. "It's my job to make sure that money is available."

Since taking over NACA in 2016, Sani Aliyu has made some progress. For the first time, the federal government has been taking steps to prevent mother-to-child transmission, and state governments have devoted up to 1% of their budgets to efforts against HIV/AIDS. President Muhammadu

Buhari, who appointed Sani Aliyu, authorized federal funds to pay for 60,000 new HIV-infected people to receive ARVs and vowed to add that same number to the treatment rolls each year. “The program, if successful, will serve as the exit gateway for PEPFAR as future programs acquire national ownership status,” Sani Aliyu says.

Perhaps most important, NACA—with \$120 million in funding from PEPFAR and The Global Fund—now is working on a massive epidemiologic survey that many hope will bolster the country’s efforts. Because HIV testing is so spotty, Birx explains, it’s possible that official estimates of Nigeria’s number of newly infected children are too high—or too low—and that HIV/AIDS workers target the wrong regions. “Our epidemic data from Nigeria is the weakest of all the countries,” Birx says. The nationwide survey of HIV now underway, the largest ever done in the world, should be completed by the end of the year. “I’ll be frank: I used to be upset with Nigeria,” she says. “Now, I’m just waiting for the data.”

Still, no one doubts that children are getting infected far too often. And some innovators are taking action.



In Aliade, Nigeria's St. Vincent de Paul Church, Reverend Emmanuel Dagi blesses pregnant parishioners and encourages them to attend the Baby Shower program.

MISHA FRIEDMAN

On a Sunday morning in mid-January, about 1000 parishioners fill the pews at the St. Vincent de Paul Catholic Church in Aliade, a remote, agricultural area in Benue state. Today, Reverend Emmanuel Dagi is leading celebrations called Baby Shower and Baby Reception, programs tailor-made to steer around the obstacles that keep so many pregnant women here from seeking an HIV test and receiving care.

Near the end of the church service, Dagi asks women who are pregnant or who have recently given birth to come forward for a blessing with their husbands. More than 50 people cluster around the pulpit, some women with large pregnant bellies, others with swaddled babies in their arms. "Defend these mothers and these fathers and their children from every evil," Dagi says. He walks from one end of the pulpit to the other, sprinkling the faithful with holy water.

The priest then asks the expecting couples to attend Baby Shower, where they receive a gift bag and have blood drawn for tests for hepatitis B, sickle cell anemia, and HIV—casually lumped into the mix to sidestep stigma.

People with newborns attend a separate celebration, Baby Reception, where they, too, receive gift bags. At the same time, health workers discreetly check with all people who tested HIV positive at earlier services to make sure they've been following proper procedures: taking ARVs for themselves, administering them to their newborns, and bringing the babies in for a blood test at 6 weeks of age, the earliest the virus can reliably and efficiently be detected.

Those celebrations are part of the Healthy Beginning Initiative, funded by the U.S. National Institutes of Health and the Centers for Disease Control and Prevention. It has now expanded to more than 115 churches, some of which also test for malaria, syphilis, and anemia. Led by Echezona Ezeanolue, a pediatrician who works with the HealthySunrise Foundation based in Las Vegas, Nevada, the intervention takes advantage of the fact that some 90% of Nigerians regularly attend either church or mosque services. "That was a perfect place to test this," says Ezeanolue, a Nigerian who left the country 20 years ago. (Ezeanolue resigned from the University of Nevada in Las Vegas in

March after a prolonged dispute with the school about what it alleged were financial irregularities with the maternal HIV program he ran there. He insists he did nothing wrong.)

Sani Aliyu adds that Baby Shower has another advantage. "The religious leaders don't carry the burden of politicians," he says. "People believe in what they say, and people follow them."

In a study of the project in 40 churches, half of which received the intervention, Baby Shower increased HIV testing in pregnant women from 55% in the control churches to 92%, the researchers reported in the November 2015 issue of *The Lancet Global Health*. A study published in *AIDS and Behavior* last year shows that in women's male partners, testing jumped from 38% to 84%. "With Baby Shower, you don't have to go to the hospital for an HIV test—you go to the church and nobody suspects anything," says Amaka Ogidi, coordinator of the project here. A follow-up study is assessing the actual impact on HIV transmission rates to the babies.

Ogidi says she at first had reservations because the idea of a baby shower is a U.S. concept. "We're not used to celebrating pregnancy—we're used to celebrating childbirth," she says. But the intervention has steadily grown in popularity, especially

since the Baby Reception component was added. “The program is just like a sweet-smelling perfume,” Ogidi says. “You smell it and say, ‘Oooh, can I have some for myself?’ You see smiles on faces and it’s infectious.”



Mama Metta, a traditional birth attendant in Lagos, Nigeria, listens to a woman’s belly with a Pinard horn. MISHA FRIEDMAN

The Mama Metta Traditional Clinic and Maternity Home in the Iyana Ipaja neighborhood of Lagos also is introducing prevention of mother-to-child transmission into a familiar setting. The clinic, set on a street wide enough only for foot traffic, resembles a small house. Feyami Temilade, who runs the clinic, is a traditional birth attendant, and she is known as Mama Metta because she becomes something of a second mother to every woman in her care.

This Friday morning, 16 big-bellied women sit on wooden benches in the waiting room. The walls are cluttered with framed certificates from courses Temilade has completed over the past 35 years, awards, fading photos of herself in celebratory garb, calendars, and pregnancy infographics. A poster



above Temilade's desk says, "Know Your HIV Status" in English, Yoruba, and Nigerian Pidgin. A certificate next to it notes that she participated in a training workshop for traditional birth attendants run by the Society for Women and AIDS in Africa in—astonishingly—1991.

The women wait their turn for checkups and to fill bottles with two herb concoctions she has prepared. The cost of the visit, says Temilade, who will listen to babies through a metal fetoscope called a Pinard horn, is a mere 200 nairas—about \$0.55.

Birth attendants are unregulated in much of Nigeria. But Lagos state, which includes Nigeria's largest city, has a Traditional Medicine Board that accredits and monitors practitioners. Since 2012, the board has offered regular HIV/AIDS training, which includes an internship at a hospital, for Temilade and some 2000 other birth attendants.

Temilade has been in business here so long that two of the women here today were born in the facility, which has a birthing room with two beds. "If you're pregnant, you're eating for two people," Temilade tells the group. She also warns them to avoid high heels and not to sit in the same position for too long. "Come here for HIV tests," she says, explaining that she'll link anyone who tests positive to a hospital.

That's a start, Sani Aliyu says. But, ultimately, he believes, getting women to antenatal clinics in established health facilities will be key to stopping mother-to-child transmission here. "In most cases, at least 80% of them will get tested and commence treatment," he says. One state has experimented with paying incentives to traditional birth attendants to bring pregnant women to formal health care settings.

Pregnant women make up only a fraction of Nigeria's huge HIV-infected population, and Sani Aliyu well recognizes that halting the epidemic here, as in other countries, depends on treating nearly everyone who is living with the virus—not just mothers and babies. "It's going to be a lot of work to put everybody with HIV on treatment," he says. But protecting babies from infection, he says, "should be a low-hanging fruit that can be reached."

Science *produced these stories in collaboration with the PBS NewsHour, **which is airing a companion five-part series.** Reporting for this project was supported by the Pulitzer Center.*

#### RELATED STORIES

### Building TRUST in an LGBTQ-hostile country

By [Jon Cohen](#)



Davida Anderson poses for friends behind a clinic that doubles as a hangout. MISHA FRIEDMAN

Five years ago, David Anderson, then 18, knew that he was at high risk of HIV infection. But he had never had a test for the virus because he feared that people at any clinic he visited would make assumptions about his sexuality and status. "I'm a bit feminine," says Anderson, who now openly identifies as both a gay man and a transgender woman (Davida). But then a friend told him about an unusual community center in Abuja, where he lives. "It was nice and safe for people of my kind to come," he says. Anderson tested negative and remains uninfected.

The clinic, opened by the Institute of Human Virology, Nigeria, in 2012, was the first in the country to cater to men who have sex with men (MSM) and transgender people, communities so heavily stigmatized that treating them is technically illegal. The clinic nevertheless provides state-of-the-art HIV services and conducts some of the most authoritative

research on those communities in Nigeria. "We offer one-stop shopping," says Man Charurat, an epidemiologist heading a multifaceted research project at the clinic with virologist William Blattner, both of whom are based at the institute's main facility in Baltimore, Maryland.

The study is known as Trusted Community Center to Reduce HIV Infections by Engaging Networks of Friends and Partners to Support Safe Sex, or TRUST—the nickname of the clinic. The study looks at, among other things, the prevalence of HIV, the rate of new infections, and how the virus spreads in networks of sexual partners. Each person who enrolls is given a small incentive to bring five friends. TRUST—which has a second clinic in Lagos run by the U.S. Military HIV Research Program—now has more than 2000 participants, a startling 45% of whom tested positive for HIV.

TRUST also is looking at how antigay laws and other stigmatizing social factors impede care and treatment. In 2014, a new Nigerian law called the Same-Sex Marriage (Prohibition) Act made providing services to MSM a punishable offense. (To avoid legal complications, the TRUST clinic is

located out of the way, in a residential neighborhood, and bills itself simply as “MSM friendly.”) Stigma and discrimination against that community were already pervasive the year the law was enacted: According to a survey of 3500 undergraduates in Lagos, nearly 40% thought health care workers should not provide services to MSM, as reported in the August 2017 issue of *LGBT Health*. Researchers and affected communities alike contend that the law has made things worse.

Charurat, Blattner, and colleagues assessed their clients' attitudes toward seeking health care before and after enactment of the law. Fear of seeking health care jumped from 25% to 38%. Today, only 25% of TRUST participants infected with HIV know their status when they first come in. Of those, fewer than half are on treatment. TRUST encourages all HIV-infected clients to start antiretrovirals, and a new program is offering the drugs to uninfected participants—a proven prevention strategy called pre-exposure prophylaxis.

The TRUST clinic has evolved into a place to hang out as well. Anderson sometimes lets Davida shine, donning a wig, high heels, and an elegant gown. “That’s the

reason we set this up," says Charurat as Davida struts around the TRUST clinic grounds, "voguing" with friends. "It's not just a clinic. It's a community."

## Babies who dodge HIV may not be unscathed

By **Jon Cohen**



Researchers measure head circumference to compare growth in children born to HIV-positive and negative mothers. MISHA FRIEDMAN

Up to half of babies born to HIV-infected mothers become infected themselves either in utero, during labor, or through breastfeeding, unless the mothers and babies are treated with antiretroviral (ARV) drugs. But several studies suggest an additional burden for the many children in Nigeria who dodge transmission from their mothers, whether by luck or treatment: They may still suffer from growth retardation, immune abnormalities, and even an increased risk of mortality. "Exposed, uninfected children are



a growing population, and they're neglected," says virologist Nicaise Ndembu of the Institute of Human Virology, Nigeria (IHVN) in Abuja.

At the University of Benin Teaching Hospital in Benin City, Ndembu is a co-principal investigator (co-PI) of a study exploring what happens to those exposed, uninfected children and why. "There's a growing body of data that suggests they're very different from normal infants," says another co-PI, epidemiologist Man Charurat of IHVN.

Theoretically, the harm could come from the mother's poor health, or from exposure to viral proteins or to the ARV drugs given to treat the mother and the baby to prevent transmission. "It's a really complicated picture," says Claire Thorne, an epidemiologist at University College London who is trying to separate the effects of HIV exposure from exposure to ARV drugs.

The IHVN team is exploring whether an HIV-caused condition called "leaky gut" may transfer from mother to uninfected child. HIV preferentially destroys immune cells in the gut shortly after infection, leading to an overstimulated immune system, inflammation, and a permeable gut. That could alter the mother's

microbiome, and she might pass the altered bacteria to her child during birth or breastfeeding. The Benin researchers suspect the child's altered microbiome then increases diarrhea, impedes proper absorption of nutrients, and slows growth.

The IHVN study, which began in 2014 and will run through next year, compares 300 uninfected children, half of whom were exposed to HIV during their first 2 years of life. The researchers are analyzing stool samples from mothers and their children to see whether HIV alters the genera of bacteria that live in their guts. Researchers also are giving the children a dose of two sugars and then testing their urine to see whether their intestines have compromised permeability. "If we can identify problems, we can begin to look at interventions," Ndembu says.

*Science produced these stories in collaboration with the PBS NewsHour, **which is airing a companion five-part series.** Reporting for this project was supported by the Pulitzer Center.*

Posted in: [Africa](#), [Health](#), [Far from over](#)

doi:10.1126/science.aau4435



**Jon Cohen**

Jon is a staff writer  
for *Science*.

- Email Jon
- Twitter

**More from News**



**'We're in a mess.' Why Florida is struggling with an unusually severe HIV/AIDS problem**



**Russia's HIV/AIDS epidemic is getting worse, not better**



**In the face of a misguided response to HIV/AIDS in Russia, these bright stars are taking charge**

Science

8 June 2018

ECOLOGY  
Beavers, rebooted

Vol 360,  
Issue 6393



POPO  
eks first  
h  
nent New

PLANETARY SCIENCE  
NASA Curiosity rover hits organic pay dirt on Mars

ASTRONOMY  
Middleweight black holes found at last

SCIENTIFIC COMMUNITY  
No bias found in NIH reviews?

ASIA/PACIFIC NEWS  
China takes new steps to lure science talent from abroad

Subscribe Today

Receive a year subscription to Science plus access to exclusive AAAS member resources, opportunities, and benefits.

First Name

Last Name

Email Address

Get Our Newsletters

Enter your email address below to receive email announcements from Science. [See full list](#)

☒ Science Table of Contents

☒ Science Daily News

☒ Science News This Week

☒ Science Editor's Choice

☒ First Release Notification

☒ Science Careers Job Seeker

Country \*

Email address \*

☐ I agree to receive emails from AAAS/Science and Science advertisers, including information on products, services, and special offers which may include but are not limited to news, career information, & upcoming events.

Click to view the [Privacy Policy](#).

Required fields are indicated by an asterisk (\*)

Table of Contents

Subscribe Today

Sign up today

© 2018 American Association for the Advancement of Science. All rights Reserved. AAAS is a partner of HINARI, AGORA, OARE, CHORUS, CLOCKSS, CrossRef and COUNTER.

[Terms of Service](#) | [Privacy Policy](#) | [Contact Us](#)