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OraSure Makes Final FDA Submission for Approval of Over-the-Counter Rapid HIV Test

BETHLEHEM, Pa., Jan 3, 2012 (GlobeNewswire via COMTEX) — OraSure Technologies, Inc. (Nasdaq:OSUR), a market leader in rapid point-of-care infectious disease diagnostics and biological sample collection, stabilization and preparation products, announced today that it has submitted the final of three modules in its application to the U. S. Food and Drug Administration (FDA) for the approval of the Company's OraQuick(R) Rapid HIV-1/2 test for sale in the U.S. consumer or over-the-counter (OTC) market.
The third module contains the findings from the final phase of clinical testing, which involved the use of the OraQuick(R) Rapid HIV-1/2 test with subjects in an unobserved setting. Approximately 5,800 subjects were enrolled and tested in this phase across 20 sites nationwide, resulting in the identification of more than 100 previously undiagnosed individuals with HIV.

According to the Centers for Disease Control and Prevention (CDC), there are approximately 1.2 million people in the U.S. that have HIV and approximately 240,000 of them are unaware of their status, despite current HIV testing options. Not only is their own health at risk, they are also unknowingly responsible for up to 70 percent of the approximately 50,000 new HIV infections occurring each year in the U.S. The CDC recommends routine HIV screening for all people ages 13 to 64, with more frequent testing for people at higher risk.

"The latest CDC figures demonstrate the status quo for testing is inadequate and additional options to capture undiagnosed individuals infected with HIV must be brought to the market. We’ve been working closely with the community and FDA on the development of a powerful new HIV testing option for individuals. This submission was a major undertaking for OraSure and the culmination of years of hard work and financial commitment. An easy-to-use, private, and accurate in-home HIV test will enable more people to learn their presumptive HIV status so that they can receive necessary care and support," said Douglas A. Michels, President and Chief Executive Officer of OraSure Technologies. "The completion of our submission to the FDA is a critical milestone in our efforts to secure approval and expand the tools available to combat the spread of HIV."

The final phase of clinical testing consisted of a multi-visit, blinded, unobserved user study in which individuals conducted unsupervised oral fluid self-testing using an investigational OTC version of the OraQuick ADVANCE(R) Rapid HIV-1/2 test. Once all subject tests were complete and study results unblinded, the performance of the OraQuick HIV test in the unobserved OTC setting was compared with FDA-approved laboratory HIV test results.

The Company intends to provide the necessary resources to ensure optimal support for individuals who, pending approval, would then be able to use the OraQuick HIV test in an OTC setting. In addition to a highly informative website, OraSure will offer "live" support and comprehensive referral services 24 hours a day, seven days a week, every day of the year, through a highly trained specialized toll-free call center, which was functional as part of the clinical trials. Detailed, easy-to-understand information on HIV and HIV testing was part of the clinical studies as well and will also be included in every test kit.

The first module for FDA review was submitted to the agency in the third quarter of 2011 and contained data from all studies performed prior to the final phase of testing. The second module was submitted to the FDA several weeks ago and included information about manufacturing and the customer care call center.

In the professional market, OraSure manufactures and sells the OraQuick ADVANCE(R) Rapid HIV 1/2 Test which is the first and only FDA-approved and CLIA-waived rapid point-of-care test that can detect antibodies to both HIV-1 and HIV-2 in 20 minutes, using oral fluid, finger-stick or venipuncture whole blood or plasma specimens. As the market leading rapid HIV test with over 20 million tests sold, OraQuick ADVANCE(R) is used extensively throughout the country in public health settings, hospitals, community-based organizations, and physician offices where HIV testing is conducted.

About OraSure Technologies

**Females may be more susceptible to infection during ovulation**

New research published in the Journal of Leukocyte Biology suggests that high levels of estradiol present prior to ovulation decreases immune system effectiveness resulting in growth and promotion of infection

Bethesda, MD—A new research report in the *Journal of Leukocyte Biology* ([http://www.jleukbio.org](http://www.jleukbio.org)) suggests that a woman’s ovarian cycle plays an important role in her susceptibility to infection. Specifically, researchers from Spain and Austria found that **women are most susceptible to infection, such as Candida albicans or other sexually transmitted diseases, during ovulation** than at any other time during the reproductive cycle. This natural "dip" in immunity may be to allow spermatozoa to survive the threat of an immune response so it may fertilize an egg successfully.

"This could be an explanation why during ovulation females have more risk of being infected with sexual transmitted diseases like HIV or HPV," said Miguel Relloso, Ph.D., a researcher involved in the work from the Laboratorio de Inmunobiología Molecular at the Hospital Gregorio Marañón and Complutense University in Madrid, Spain.
stayed, according to a report on a new quality of life measurement tool published online in an edition of the Journal of Virology.

Fears about transmitting HIV to others, worries about the future, self-esteem problems, difficulty sleeping and treatment issues are now important quality of life concerns for people living with HIV that are not measured by existing resources, according to a report on a new quality of life measurement tool published in the online edition of the Journal of Acquired Immune Deficiency Syndromes.

The tool — called PROQOL-HIV (Patient Report Outcomes Quality of Life – HIV) — was developed with the participation of 152 HIV-positive patients in nine countries on five continents.

Using mice, Relloso and colleagues found that the sex hormone, estradiol, increased susceptibility to systemic candidiasis (fungal infection). To monitor the effect of estradiol treatment on infection, researchers used in vivo and ex vivo fungal infection models. Ovariectomized mice were treated with estradiol and subsequently pulsed with C. albicans. Estradiol-treated mice were more susceptible to the fungal infection and had lower Th17 immune response. The researchers identified dendritic cells as a target cells of estradiol and showed that estradiol treated dendritic cells were inefficient at triggering the Th17 immune response to C. albicans antigens.

"The next time you hear a woman say that she's sick of men," said John Wherry, Ph.D., Deputy Editor of the Journal of Leukocyte Biology. "you can add this to her list as another reason. This adaption which allows male sperm to survive long enough to fertilize an egg, may also open the door for other types of infection."


### Novel Compound to Halt Virus Replication Identified

ScienceDaily (Jan. 3, 2012) — A team of scientists from Boston University School of Medicine (BUSM) have identified a novel compound that inhibits viruses from replicating. The findings, which are published online in the Journal of Virology, could lead to the development of highly targeted compounds to block the replication of poxviruses, such as the emerging infectious disease Monkeypox.

The basic research was led by Ken Dower, PhD, a postdoctoral fellow in the laboratory of John Connor, PhD, assistant professor of microbiology at BUSM who is corresponding author on the paper. They worked with Scott Schaus, PhD, associate professor of chemistry from the Boston University College of Arts & Sciences and co-principal investigator in the Center for Chemical Methodology and Library Development (CMLD). The researchers collaborated with the United States Army Medical Research Institute for Infectious Diseases (USAMRIID), who conducted the experiments involving Monkeypox at their laboratory in Maryland.

Poxviruses, such as smallpox, vaccinia virus and the Monkeypox virus, invade host cells and replicate, causing disease. Smallpox, a deadly poxvirus that killed hundreds of millions of people worldwide, was declared eradicated by the World Health Organization in 1979 after successful vaccination efforts. Recent data shows that the number of people being infected by Monkeypox is increasing globally.

Utilizing state of the art screening techniques, vaccinia and a library of chemicals from CMLD, Dower and his colleagues looked for compounds that could stop vaccinia from replicating inside human cells. They identified several. In studying how one of these compounds work, they discovered that the virus can enter the cell in its presence, but once the virus was inside, the compound inactivates an essential piece of virus machinery.

USAMRIID researchers then tested the efficacy of the chemical compound on the Monkeypox virus. Their experiments demonstrated similar results, showing that this chemical compound has the ability to inhibit different varieties of poxviruses.

"The compound we identified forces the catastrophic failure of the normal virus amplification cycle and illustrates a new drug-accessible restriction point for poxviruses in general," said Connor. "This can help us in developing new compounds that fight poxviruses infection."

Journal Reference:

### Study identifies issues affecting the quality of life of patients living with HIV

Michael Carter
Published: 04 January 2012

Fears about transmitting HIV to others, worries about the future, self-esteem problems, difficulty sleeping and treatment issues are now important quality of life concerns for people living with HIV that are not measured by existing resources, according to a report on a new quality of life measurement tool published in the online edition of the Journal of Acquired Immune Deficiency Syndromes.

The tool — called PROQOL-HIV (Patient Report Outcomes Quality of Life – HIV) — was developed with the participation of 152 HIV-positive patients in nine countries on five continents.
PROQOL-HIV is a novel multidimensional HIV-specific HRQL [health-related quality of life] instrument that strives to be sensitive to socio-cultural context, disease stage and treatment in the HAART [highly active antiretroviral therapy] era,” write the authors. “Important new HRQL issues were uncovered from the culturally diverse experiences of PLWHA [people living with HIV/AIDS] in previously under-represented populations.” Effective antiretroviral therapy has transformed the prognosis of many HIV-positive patients. However, people living with HIV still experience considerable changes in their health-related quality of life. Tools to measure such outcomes were developed in the era before potent HIV treatment became available. Moreover, they did not take account of the geographic, ethnic and cultural diversity of the epidemic. Therefore an international team of investigators set out to develop a new instrument that was sensitive to the impact of HIV therapy, different diseases stages and applicable across settings. It derived from in-depth interviews conducted with patients living with HIV in 2007 and 2008. The patients were recruited in high-, middle- and low-income countries. The interviews identified eleven broad areas of concern.

General health perceptions
In all countries, patients made spontaneous reference to the importance of their general health. Even slight improvements or declines were considered to have an important impact on quality of life.

Social relationships
The quality of relationships with partners, family and friends was identified as being very important to quality of life. This included receiving support from a main partner, feeling socially acceptable despite illness or side-effects, actual and perceived stigma, the fear of transmission of HIV to others, worries over rejection, loneliness and difficulties with disclosure.

Emotions
A wide range of negative self-perceptions and emotions were perceived to effect quality of life. These included feelings of shame, guilt, inferiority, inadequacy or embarrassment. Also common were sadness, anxiety, irritability and stress.

Energy/fatigue
Low physical and mental energy levels were commonly reported.

Sleep
Many patients described difficulties falling asleep and reduced sleep time. Pain was a frequent case, as was worry and thinking about the consequences of infection with HIV.

Cognitive function
Problems with memory, attentiveness and forgetfulness were reported by a number of individuals. These difficulties had emerged since infection with HIV or the initiation of antiretroviral therapy.

Physical and daily activities
Participants described having to rest more often and difficulty performing day-to-day tasks such as walking short distances or carrying light objects.

Coping
Individuals who were able to integrate HIV and its treatment into their daily routine generally described themselves as coping well. Religious or spiritual beliefs were also considered beneficial for coping.

The future
Fears about the future because of HIV were reported by large numbers of patients. Difficulties planning for the future were also common. There was a perception that HIV would lead to a deterioration in health and some patients believed that even minor infections such as flu would be fatal.

Symptoms
HIV symptoms and treatment-related side-effects emerged as key quality of life issues.

Treatment
Patients regarded treatment as life-saving. Nevertheless, there were concerns about adherence and some patients in low- and middle-income countries feared that supplies of medicines would dry up.

The investigators noted that a number of key quality of health concerns were not covered by existing questionnaires. These include fear of infecting others, concerns for the future, satisfaction with care, self-esteem problems, conception and raising a family, sleeping difficulties, and the impact of HIV on work.

“We identified 11 HRQL themes that broadly encapsulated the HIV experience. Subsumed within these themes were seven issues important to HIV patients yet absent from any single existing instrument,” comment the authors. “Incorporation of the newly identified issues into HRQL.
measurement via PROQOL is clearly a step forward in accounting for the long-term experience of living with HIV in the HAART era.”

They conclude: “PROQOL-HIV shows much promise as an HRQL instrument reflective of the themes that dominate the experience of HIV patients… and important issues which are not measured by existing instruments. It has been developed simultaneously across nine countries, following rigorous international standards.”

Reference

HIV/AIDS patients grapple with poor nutrition
January 3, 2012 Submitted by Mafabi D Filed under Health 0 Comments
Mr. Paul Nabende, 62, has been HIV positive since 2006. Although fit and strong between 2007-2009 and able to look for food and money for himself and his children, he has now weakened so much that he can’t work or afford to feed himself and his family.

Mr. Nabende who lies at Mbale regional hospital is on ARVs but can’t afford the medicine let alone enough nutritious food to boost his body strength to fight the disease.

Mr. Nabende is not alone, there are many HIV positive patients at Mbale TASO sub-region in rural areas who are on ARVs and can’t afford the medicine let alone the food that is required to keep the body strong before taking the ARVs.

“As TASO we can’t afford to feed the patients and buy ARVs and we are worried that many of the HIV positive patients are likely to die just because they can’t afford the treatment and nutritious food that the body requires to boost strength and immunity to fight the disease,” said Dr. Jonathan Wangisi, project director for operational research at TASO Eastern region.

Wangisi urged government to put in place a more sustainable plan to ensure food availability for people living with HIV/AIDS in hunger-stricken and drought prone parts of the country.

According to a study conducted this year by the National Community of Women Living with HIV/AIDS (NACWOLA), The impact of famine on administration of HIV/AIDS treatment, availability and access to adequate food and nutrition is one of the major impediments to HIV/AIDS therapy.

NACWOLA highlights that HIV/AIDS patients in Uganda take their ARV drugs on the understanding that there is food available but famine has destroyed HIV/AIDS treatment trends in the country.

“Nutrition is a key component of HIV/AIDS/TB treatment because it promotes immunity but once hit by food shortage and poverty, the administration of ARVs is likely to face a set back because patients can’t afford enough nutritious food to improve their quality of life in order to fight the disease,” said Ms. Florence Buluba, the Executive Director of NACWOLA Uganda.

Ms Buluba said the food shortage due to unpredictable climate in Uganda has forced many people on ARVs to abandon the drugs due to lack of sufficient nutrition and that many of them are likely to die in their communities.

“We are witnessing a bad scenario where HIV-positive patients in famine-hit areas in the country are abandoning their anti-retroviral regiments and we fear for their lives as poverty and current soaring inflation also hit,” said Ms Buluba.

Ms Buluba who was speaking to the Daily Monitor newspaper by phone on 24 December revealed that unless more food support becomes available to those infected by the HIV virus, the sick would soon be dealing with drug residence and death.

Dr Wangisi says while on ARVs, a patient is expected to eat enough nutritious food in order to boost his/her body strength in order to fight the disease but many patients lack the financial capacity to afford the required foods.

“On top of giving the infected people ARVs to fight the disease, patients need enough nutritious food in order to have the strength to fight on but it is unfortunate that due to climate change, prolonged droughts, poverty, soaring inflation many of the infected people can’t afford the desired food and this is likely to set back the administration of ARVs to some patients,” said Dr. Wangisi.

According to www.health24.com, people living with HIV need a well-balanced diet because it slows down the onset of HIV to Aids and improves the patient’s quality of life but most families can’t afford a balanced diet.
Reports in Eastern region of Uganda, the prolonged dry spell of July through October has withered the region’s traditional crops leaving hundreds of thousands of people hungry, many surviving on bought maize meal rather that a balanced diet which the HIV/Aids patients require.

Kenya HIV Families Torn Between Health or Food
Associated Press, (12.22.2011) Katharine Houreld
Many poor HIV/AIDS patients in Kenya are struggling with food security issues that threaten their health, experts say. Annual inflation in Kenya is about 20 percent, and wages have not kept pace. Staple food prices in 2011 were almost twice their 2009 levels, the UN Food and Agriculture Organization reported.

Kenyan patients say antiretroviral therapy can cause nausea, fatigue, and diarrhea at first, especially if the pills are taken without food, said Kate Greenaway, a nutritionist with Catholic Relief Services. At a CRS clinic in the Mathare slum, some patients are delaying treatment, and about a quarter of the 1,555 patients on therapy are skipping doses, said Valerian Kamito, a clinic nurse.

“They say they cannot take them on an empty stomach,” Kamito said. Before food prices rose, “it was very rare,” he said.

The clinic gives 400 of its patients food so they can continue treatment, but most take the meals home to share with their families, says Kamito. The program’s waiting list is long, and the financial crisis means there is no money to expand it. The Global Fund to Fight AIDS, TB and Malaria has no funding for new or expanded programs until 2014.

About 20 percent to 30 percent of HIV patients in developing countries will drop out in the first two years of treatment, said Nils Grede, deputy chief of the World Food Program’s nutrition and HIV/AIDS unit.

“Barriers to continue the treatment ... are often related to poverty,” Grede said. “You don’t have the money to pay for the bus, you don’t have enough food, so you spend your time on trying to make sure that your family eats.”

“People adhere much better to drug regimens when there is food,” Greenaway said. “But in poor families, that might mean mothers who want to stay strong have to decide whether to take something from their children’s plates.”

Reproductive Health Characteristics of Marijuana and Cocaine Users: Results from the 2002 National Survey of Family Growth
Perspectives on Sexual & Reproductive Health Vol. 43; No. 3, (09..2011) Marleen M.H.J. van Gelder; Jennita Reefhuis; Anne M. Herron; Mark L. Williams; Nel Roeleveld
Few studies have examined the associations of illicit drug use with risky sexual behaviors among people of reproductive ages, using a control group of non-users.

Data from the 2002 National Survey of Family Growth were used to assess associations between outcomes related to sexual behaviors and reproductive health, and marijuana and cocaine use. A total of 4,928 men and 7,643 women ages 15-44 were interviewed. “Chi-square tests, t tests and multivariable logistic regression analyses were used; in supplementary analyses, men and women were stratified by age group (25 or younger, and older than 25), to capture the understudied older adults who use drugs,” the team wrote.

Use of marijuana or cocaine in the previous year was reported by 27 percent of men and 16 percent of women. “Drug users were younger than non-users at first vaginal sex (mean, 15.2-16.1 vs. 17.3-17.5) and were more likely to have engaged in risky sexual behaviors during the last year, including having had sex with a non-monogamous partner (odds ratios, 3.3-5.2 for men and 2.9-6.5 for women), while high on alcohol or drugs (10.1-18.0 and 8.1-24.2), or in exchange for money or drugs (2.7-2.8 and 2.3-9.2),” the authors reported. Drug users also were more likely to have undergone STD testing or treatment. Drug use was associated with risky sexual behaviors in both age groups.

“Programs aimed at reducing sexual risks among drug users should address the behaviors of men and women of all reproductive ages,” the study concluded.

Life Expectancy for Babies Climbs to Record Level in City
The life expectancy for New York City babies reached 80.6 years in 2009, Mayor Michael R. Bloomberg announced on Dec. 27. Life expectancy at birth in the city has increased by almost three years since 2000 and now is more than two years higher than the national figure of 78.2 years. Life expectancy for 40-year-
olds also rose, from 79.5 years in 2000 to 82 years in 2009. Bloomberg has made public health a top priority, running campaigns against smoking, obesity, and high salt consumption. Officials, however, said the biggest factor in the improved outlook was expanded HIV testing and treatment, which has helped drive down the mortality rate from HIV infection by 51.9 percent since 2002, and by 11.3 percent from 2009 to 2010. New Yorkers trailed other Americans in life expectancy for most of the 20th century; the difference was most pronounced in 1990 when the AIDS epidemic drove the number downward, especially for men. The turnaround was noted around 2000, when the life expectancy of New Yorkers began surpassing the national rate. The city also saw a 32.5 percent drop in births to teenage girls since 2001; a 19.9 percent decline in smoking-related deaths of persons age 35 or older since 2002; and a 32 percent reduction in deaths from car accidents since 2001.

**Child Malnutrition Rates 'Alarming' In Somali Refugee Camps, AFP Reports**

"Aid workers say malnutrition rates among children under five at the Dolo Ado camp [in Ethiopia] are alarming," with "[o]ver 50 percent of children in Dolo Ado's Hilaweyn camp and nearly half of all children in Kobe camp ... suffering from malnutrition, according to a preliminary health survey from the United Nations refugee agency," [Agence France-Presse](http://afpnews.com) reports. "Severe drought, famine and conflict forced 300,000 people to flee Somalia" in 2011, according to U.N. estimates, and "[m]any have streamed into Ethiopia, which continues to receive hundreds of refugees every day," the news service writes.

Voitek Asztabski, an emergency coordinator for Doctors Without Borders (MSF) said, "The living conditions are appalling, there is not enough shelter, there is not enough food, there is not enough water," AFP writes (Vaughan, 12/25). An accompanying AFP video adds that while "[t]he aid the families receive contains all the nutrients they need ... some people are choosing to sell their handouts to buy other food, which isn't as nutritious" (Davies, 12/23).

**Increased Number Of Somali Women Reporting Being Raped, Sexually Abused**

In the wake of "decades of conflict" and famine, Somalia "face[s] yet another widespread terror: an alarming increase in rapes and sexual abuse of women and girls," the [New York Times](http://www.nytimes.com) reports. "The famine and mass displacement, which began over the summer, have made women and girls more vulnerable. Many Somali communities have been disbanded," leaving many women alone and vulnerable to al-Shabab militants, "rogue militiamen and even government soldiers [who] rape, rob and kill with impunity," the article states, adding, "Often, the women are left wounded or pregnant, forced to seek help" (Gettleman, 12/27).

NPR's "Tell Me More" host Michel Martin on Tuesday spoke with Jeffrey Gettleman, New York Times East Africa bureau chief and author of the article, about the victimization of Somali women and the "few small aid organizations that are helping women." One organization, Sister Somalia, is "providing some money to a partner organization in Mogadishu that is helping women with counseling, with medical services, and they're trying to set up a safe house where women can go and seek shelter and be safe," Gettleman said (Martin, 1/3).

**Promising results of novel combination HIV vaccine**

Preclinical study of HIV vaccine candidates provides strong rationale for clinical trials

(SILVER SPRING, MD)—Results from a recent study show that novel vaccine combinations can provide partial protection against infection by Simian Immunodeficiency Virus (SIV) in rhesus monkeys. In addition, in the animals that became infected, the optimal vaccine combinations also substantially reduced the amount of virus in the blood. Results from the studies were published online today in the journal *Nature*.

This proof-of-concept study, which tested MVA, Ad26, and Ad35 vector-based vaccines, is the first to show partial vaccine protection in the stringent animal model involving heterologous, neutralization-resistant SIVmac251 viral challenges in rhesus monkeys. Preclinical studies of vaccine candidates have typically shown post-infection virologic control, however protection against acquisition of infection has previously only been reported using less rigorous viral challenges. The new Ad26/MVA and Ad35/Ad26 vector-based vaccine regimens resulted in over 80% reduction in the per-exposure probability of acquisition of infection against repetitive challenges of SIV, a virus similar to HIV that infects monkeys. "This study allowed us to evaluate the protective efficacy of several prime-boost vaccine combinations, and these data will help guide the advancement of the most promising candidates into clinical trials,"
noted lead author Dr. Dan Barouch of Beth Israel Deaconess Medical Center at Harvard Medical School and the Ragon Institute of MGH, MIT, and Harvard.

Further analysis also provided insights into the immune responses that might have provided protection, called "immune correlates." The results show that antibodies to Env (the envelope protein that makes up the outer coat of the virus) correlated with protection against acquisition, whereas both T cell and antibody responses correlated with post-infection virologic control.

"These distinct immunologic correlates likely reflect fundamentally different requirements to block establishment of infection compared with controlling viral replication after infection," said Col. Nelson Michael, director of the U.S. Military HIV Research Program at the Walter Reed Army Institute of Research and senior author on the paper.

Barouch noted that "we have clearly shown that including Env in the vaccine is beneficial." The findings also suggest that a substantial degree of protection can be achieved against stringent virus challenges, even in the absence of high levels of tier 2 neutralizing antibodies.

These new preclinical studies provide support for advancing the Ad26/MVA prime-boost vaccine candidate into clinical development. Collaborators are planning clinical testing of this HIV vaccine regimen in healthy adults at research sites in the U.S., East Africa, South Africa, and Thailand.

How can Lyme Disease be Prevented and Controlled?
Lanham, MD; January 4, 2012—Lyme disease is the most commonly reported vector-borne disease in the United States, with the majority of cases occurring in the Northeast. It has been three decades since the agent of the disease, the spirochete Borrelia burgdorferi, and the ticks that vector it were identified. However, the number of Lyme disease cases have steadily increased.

In a new article appearing in the forthcoming issue of the Journal of Medical Entomology called "What Do We Need to Know About Disease Ecology to Prevent Lyme Disease in the Northeastern United States?" authors from Colorado State University and the Centers for Disease Control assess the potential reasons for the continued lack of success in prevention and control of Lyme disease in the northeastern United States, and they identify conceptual areas where additional knowledge could be used to improve Lyme disease prevention and control strategies.

Some of these areas include: 1) identifying critical host infestation rates required to maintain enzootic transmission of B. burgdorferi, 2) understanding how habitat diversity and forest fragmentation impacts acarological risk of exposure to B. burgdorferi and the ability of interventions to reduce risk, 3) quantifying the epidemiological outcomes of interventions focusing on ticks or vertebrate reservoirs, and 4) refining knowledge of how human behavior influences Lyme disease risk and identifying barriers to the adoption of personal protective measures and environmental tick management.

The article briefly summarizes existing prevention and control strategies and tools aimed at reducing human exposure to vector ticks and B. burgdorferi, and highlights conceptual areas where additional studies on the enzootic transmission cycle or the human-tick interface are needed to fill in the knowledge gaps preventing the development of novel, more effective Lyme disease prevention strategies and tools or the implementation of existing ones.

Because the likelihood of human exposure to the tick and the pathogen both can be influenced by human behavior, the authors focus not only on the density of infected ticks, which represents the fundamental (or acarological) risk of human exposure to B. burgdorferi, but they also provide an overview of studies that identify behavioral risk factors and explore areas where additional information in this field are needed.


Hepatitis C Virus Hijacks Liver microRNA
ScienceDaily (Jan. 2, 2012) — Viral diseases are still one of the biggest challenges to medical science. Thanks to thousands of years of co-evolution with humans, their ability to harness the biology of their human hosts to survive and thrive makes them very difficult to target with medical treatment.

Scientists at the University of North Carolina at Chapel Hill, working with colleagues from the University of Colorado, have shown for the first time how a small RNA molecule that regulates gene expression in human liver cells has been hijacked by the hepatitis C virus to ensure its own survival—helping medical scientists understand why a new antiviral drug appears to be effective against the virus.
MicroRNAs are involved in regulating the expression of genes in cells, usually by blocking the production of key proteins or by destabilizing the messenger RNAs that encode the cell's proteins as it grows and divides. Normally they act by downregulating gene expression. The research team found that the binding of a prominent microRNA in liver cells, called miR-122, to the viral RNA results in its stabilization, promoting efficient replication of the virus genome in the liver and supporting the virus' lifecycle.

"The hepatitis C virus has done two very interesting things with miR-122," says Stanley M. Lemon, MD, professor of medicine and microbiology and immunology and a member of UNC Lineberger Comprehensive Cancer Center and the Center for Translational Immunology.

"First, it has evolved a unique relationship with a key regulator, since miR-122 represents about half of all microRNAs present in the liver. Second, the virus has usurped a process that usually downregulates gene expression to upregulate the stability of its RNA and expression of viral proteins needed for its lifecycle. It's a classic example of how viruses subvert normally beneficial functions of the cell to their own nefarious purposes."

Work by Dr. Lemon and his colleagues in 2005 helped to demonstrate that miR-122 was required for hepatitis C to replicate itself, but the mechanism was not understood. Now the UNC research team has shown how it works, which helps to explain how a new experimental antiviral drug target the virus. The drug, called an "antagomer," binds to miR-122 and sequesters it in the liver and thus destabilizes the viral genome, accelerating its degradation in the liver. Results of the most recent study are published online this week in the journal Proceedings of the National Academy of Sciences.

Hepatitis C is a continuing public health problem, which is difficult to measure because symptoms occur months to years after infection. The Centers for Disease Control and Prevention estimates as many as 4 million people in the United States may be persistently infected with hepatitis C virus, and most do not know they are infected. More than a third of those who are long-term carriers may develop chronic liver disease or liver cancer, a deadly form of cancer that is becoming increasingly common due to the spread of this virus.

Journal Reference:

Europeans find high prevalence of lipodystrophy in HIV-positive children
Michael Carter
Published: 05 January 2012
A European study published in the online edition of the Journal of Acquired Immune Deficiency Syndromes has found a high prevalence of body fat changes and elevated lipids in HIV-positive children. Treatment with d4T (stavudine, Zerit) and a history of HIV-related illness were associated with fat loss, whereas body mass index predicted fat accumulation.

"More than half this cohort of HIV-infected children and adolescents presented with lipodystrophy syndrome (56%) and 42% with body fat abnormalities," note the authors. "Associated risk factors in this population are similar to those seen in adults, with both ART [antiretroviral therapy]-related and demographic/clinical factors identified."

Effective antiretroviral therapy means that the prognosis of many HIV-positive children is now excellent. However, this treatment can cause long-term side-effects. One of the most is a syndrome of body fat and metabolic disorders known as lipodystrophy.

This can involve fat loss, fat gain and abnormalities in cholesterol and triglycerides.

The prevalence and risk factors for lipodystrophy in adults are well established, but less is known about the syndrome in children.

This is an important gap in knowledge as HIV-positive children require life-long antiretroviral therapy and may therefore be especially vulnerable to lipodystrophy and its long-term consequences.

Moreover, body fat changes in children may be especially distressing as they occur at an important time in both physical and psychological development.

Therefore a team of investigators from Belgium, Italy and Poland conducted a cross-sectional study to determine the prevalence and risk factors for body fat changes and lipid abnormalities in HIV-positive children aged between two and 18 years.

A total of 426 individuals who received care between 2007 and 2008 were recruited to the study. Their median age was 12.2 years and 70% were white. Almost all (98%) were vertically infected with HIV.
The majority (90%) were taking antiretroviral treatment, the median duration of which was 5.2 years. Combinations based on ritonavir-boosted protease inhibitors were widely used (90%). Body fat changes were diagnosed by the treating physician. If present they were categorised as mild (only visible when specifically inspected); moderate (readily apparent to the child, carer and doctor); and severe (obvious to the casual observer).

Overall, 42% of children had some form of body fat abnormality. This included 27% who had fat loss and 28% with fat accumulation. Especially high prevalence was seen in those who treated with d4T (68%), individual taking efavirenz (53%) and children in receipt of triple-class antiretroviral therapy (69%).

Two-thirds of infants co-infected with hepatitis C also had body fat abnormalities as did 52% of those with an AIDS-diagnosis. The lowest prevalence was observed in children aged between two and six years (16%).

Median body mass index (BMI) was 18.6 m² and differed significantly (p < 0.001) according to the presence (19.4 m²) or absence (17.8 m²) of body fat abnormalities. Metabolic disturbances were seen in 28% of individuals. Elevated cholesterol was present in 14% of children and 17% had elevated triglycerides. Impaired glucose metabolism was seen in 3%.

Restricting analysis to individuals with body fat abnormalities showed that 53% had fat loss from the face, 50% in the limbs and 40% in the buttocks. The most common site for fat accumulation was the trunk (59%), followed by the breasts (29%) and neck (21%). Approximately three-quarters of children with fat loss and 46% of those with fat gain had the side-effect in two or more sites.

Body fat abnormalities were also seen in 29 children who were not yet taking HIV therapy. “Our finding that some ART-naive children developed fat abnormalities is consistent with a multifactorial process, including some direct action of HIV itself.”

The investigators calculated that overall 57% of children had lipodystrophy syndrome. Factors associated with lipodystrophy syndrome included white ethnicity, higher BMI, therapy with Kaletra and use of a drug from the non-nucleoside reverse transcriptase inhibitor (NNRTI) class (all p < 0.05).

Risk factors for fat loss included white ethnicity, an AIDS diagnosis and treatment with d4T. Increased risk of fat gain was associated with higher BMI and previous HIV-related disease (all p < 0.05).

The investigators were concerned about the possible consequences of the high prevalence of lipodystrophy observed in their patients. “Several studies have reported a negative impact of body fat changes on self-esteem and psychological profile in HIV-infected adults...little is known about the impact on children and adolescents, but this is likely to be an issue for adolescents, given that this is a time when self-image is important.

They conclude: “In our cohort of HIV-infected children, most will have accumulated at least a decade of exposure to multiple drugs by the time they become adults. This underscores how important it is to monitor and investigate the long-term implications of life-long HIV and ART use.”

Reference

US approval for paediatric use of raltegravir, new chewable tablet also gets the go-ahead
Michael Carter
Published: 05 January 2012
Drug regulatory authorities in the US have approved raltegravir (Isentress) for the treatment of HIV-positive children. In addition, chewable raltegravir tablets in 100mg scored and 250 mg formulations have been given the go-ahead for paediatric use.

Raltegravir belongs to a class of antiretrovirals known as integrase inhibitors. It has a potent anti-HIV effect and has a generally mild side-effect profile.

The drug is likely to provide an important treatment option for HIV-positive children, many of who have resistance to older antiretroviral drugs.

The new Food and Drug Administration dosing recommendations concern children aged between two and 18 years weighing at least 10kg.
General dosing recommendations state that both film-coated and chewable formulations of raltegravir can be taken with or without food. The maximum dose of the chewable tablets is 300 mg twice daily. The tablets can be swallowed whole or chewed.

The 300 mg twice-daily dose of the chewable tablet is lower than the 400 mg twice-daily dose for the film-coated tablets. This is because the chewable tablets are more readily converted into active drug in the bloodstream than the film-coated tablets, so a smaller dose of the drug in the chewable tablet is needed to achieve the same blood levels.

Because of this, the FDA guidance stresses that the chewable tablets must not be substituted for the 400 mg film-coated formulation.

Specific guidance for paediatric raltegravir dosing varies according to age and body weight.

For children aged twelve and over the recommended dose is one 400 mg film-coated tablet orally, twice daily. Children aged between six and twelve years and weighing over 25 kg can either take a 400 mg film-coated tablet twice-daily, or a weight-based dose of the chewable tablet to a maximum of 300 mg twice daily.

Children aged between two and six years should take the chewable tablet. Once again, the exact dose is weight-based and should not be greater than 300 mg twice daily.

The “Warning and Precautions” section of raltegravir’s product information has also been updated. It cautions that the chewable tablet contains phenylalanine, which can be harmful to patients with phenylketonuria (inability to break down phenylalanine).

Information about the side-effect profile of raltegravir has also been updated detailing the adverse events observed in children and adolescents enrolled in the IMPAACT P1066 study. Frequency, type and severity of side-effects were similar to those observed in adults treated with the drug.

One child developed drug-related Grade 3 hyperactivity, abnormal behaviour and insomnia. A Grade 2 serious drug-related rash developed in a separate patient, and one child experienced Grade 3-4 elevations in AST and ALT levels.

Studies exploring possible interactions between raltegravir and other drugs have all involved adults. Therefore the product label is unable to provide any information concerning this issue.

Navajo Nation confronts HIV and AIDS

Infections are rising within the tribe at a time when they are holding steady or declining in other groups across the country. Poor education is partly to blame, with some tribal members learning about HIV and AIDS only upon diagnosis.

Reporting from Gallup, N.M.—

Five years ago, the man Elsie Smith loved told her calmly from his hospital bed that it was time for him to go. He died with a hushed goodbye and a squeeze of her hand.

Smith herself had been feeling ill for a while. Her bones ached and she vomited often. She soon mourned him from her own hospital bed.

A doctor explained to the Navajo woman that her lover had died of AIDS. It was important that they check her blood, he said. She agreed.

Two days later, the doctor told her that she had HIV. Her tired mind became flustered with questions, but she asked only one.

"What is HIV?"

Smith learned of her diagnosis at the Indian Medical Center in Gallup, where Western medicine and traditional healing converge to treat members of the Navajo Nation and where a ceremonial hogan — or sacred structure — sits on hospital grounds.

It is where Jerry Archuleta and Emerson Scott, partners who are both HIV-positive, go for their monthly checkup and where Danny Morris nearly died from AIDS before receiving care from both doctors and medicine men.
The hospital has become a leading force in the effort to quell a rise of HIV transmission among Navajo, a troubling development at a time when HIV infections are holding steady or declining in other groups across the country.

Most of the infections are occurring in the Navajo Nation, a vast expanse in the Four Corners region where poverty, poor education, alcohol abuse and the hardships of reservation life cultivate an environment in which the virus can spread.

Like Smith, some Navajo learn of HIV and AIDS upon diagnosis. Others believe it's a white man's disease. Doctors, meanwhile, must explain the virus and disease in round-about ways because, in traditional Navajo culture, to speak of death is to bring it about.

Larry Foster, the Navajo Nation's sexually transmitted disease coordinator, said health professionals had encountered resistance when giving presentations on the disease.

"They didn't want to listen because they thought we were bringing a curse, bringing death into their communities," Foster said. "Nobody cares until they have seen an AIDS death in their family."

In sheer numbers, the amount of infections is small among the 173,600 people who live in the Navajo Nation. The Indian Medical Center and its clinics scattered across the reservation log about 35 new cases a year. But that's about three times the number recorded a decade ago.

Signs of trouble emerged in 2001, when about half a dozen patients trickled into the Indian Medical Center with severe fevers, rashes and headaches.

They appeared to have mononucleosis, but their symptoms did not completely match that diagnosis. Dr. Jonathan Iralu, the hospital's infectious disease specialist, called for HIV tests.

HIV was rare among Navajo then. The first documented case surfaced in 1987. Typically, Iralu said, the carriers were gay or bisexual men who contracted the virus in big cities and returned home for treatment or to die.

The results of the tests Iralu ordered were alarming. The patients' viral loads, the amount of HIV in their blood, were extremely high and their bodies had not yet produced antibodies to fight the virus. This indicated they had contracted the virus within a few weeks of being tested.

**Navajo were infecting Navajo**

Along with her two sons and three granddaughters, Elsie Smith lives in the tiny tribal community of Iyanbito. The name means "buffalo water," a place where herds of once-bountiful bison gathered to drink from a natural spring.

Only 17 miles from Gallup, it feels a world away, where Smith's small hogan sits at the foot of a brilliant red rock bluff.

Her infection was born of tragedy. In 1997, her late husband was killed during a gunfight with Navajo Tribal Police after he shot and killed an officer.

Her brother-in-law provided comfort, helping with the children and paying some bills. Eventually, they became a couple. They were together only a few months before he died.

They had never worried about sexually transmitted diseases. Smith, 47, with limited schooling, knew little of such things. After her blood test, the doctors explained everything.

"I felt like crying and I felt like I wanted to commit suicide," Smith said. "I was mad at myself."

Preparing meals for her granddaughters — Keyanna, 7, Keira, 3, and Kariann, 2 — is a daily torment.

"I'm scared of cutting myself and giving it to these kids," Smith said.

One morning Smith whipped dough swiftly between her palms, the white powder caking her fingertips and filling the wrinkled crevices on her hands. She gently placed the dough into a frying pan.

Smith served herself a bowl of deer and corn stew and added to a growing pile of fry bread on the table. Keira swooped in to grab a warm piece and mumbled a "thank you" between nibbles.

Smith's eight brothers and sisters rarely call. Sometimes they invite her to get-togethers, but she is not allowed around her nieces and nephews and is told not to handle food.

"They're afraid of me," she said.

But at home, there is family. Her oldest son, Julius, 28, drives her to appointments at the Indian Medical Center and the girls remind Smith to take her many pills.

In the living room, Keira and Kariann began bouncing and pirouetting to a Justin Bieber DVD. They collided mid-dance and tears flooded Kariann's hazel eyes and ran down her plump cheeks.

Keira, also crying, bolted for her grandmother sitting on the couch and Smith engulfed the little girl in her arms, the toddler's tears falling on her grandmother's face.

At 52, Danny Morris still has the boyish grin of the 19-year-old who escaped Gallup for Phoenix, where he attended Arizona State University and quickly discovered a bustling gay club scene.

Morris had been drinking since he was 8 and loved alcohol. At the clubs, he rarely had to buy his own.
"I was pretty wild. I thought I was invincible," Morris said, as his cellphone rang to the tune of Lady Gaga's "Born This Way."

He eventually returned to Gallup and found work. By 1990, he began feeling fatigued, would break into sweats and dropped weight. He had heard about AIDS on television but refused to be tested.

"I felt like I might have it, but I was just afraid to go in," Morris said. "I was still drinking, still partying, still having unprotected sex."

By 1995, he was back in the Navajo Nation, and doctors at the Indian Medical Center told him he had advanced AIDS. They gave him six months to live.

Morris chose to fuse modern medicine with traditional Navajo healing. It’s not only a frequent choice at the hospital, but one encouraged by the Indian Health Service out of respect for Navajo culture and to make patients feel more optimistic about their treatment.

Medicine men came to his hospital room, offering ancient prayers and blessings. He drank healing herbs.

In three months he was well enough to go home. There, medicine men conducted an Enemy Way Ceremony, a rite often performed for Navajo soldiers who have returned from war. It’s a days-long ritual of prayer, dance and offerings intended to rid a person of evil spirits and restore harmony.

Maintaining harmony is the driving force in Navajo life, a concept captured in hozho, a complicated word that can be translated as harmony, balance but also beauty.

"I was off-balance. I had to re-harmonize, reconnect with the creator and with Mother Earth," Morris said. "The holy people were there for me."

Today, Morris lives with his father in Naschitti, 51 miles from Gallup and many of the vices of his past. "I'm living in harmony here," he said.

Still, there are a few men on the reservation who call him every now and then for sex. Some have girlfriends or wives, some have children. "The only time they call is when they aren't with their wives," Morris said. "They still tell me that they aren't gay."

He uses protection, he said. He does not tell them that he has AIDS.

Emerson Scott sometimes stands outside the Gallup city library to hand out condoms and pamphlets to encourage people to get tested for the virus he's lived with for 13 years.

"People just don't want to change here. They are so stuck in their ways," said Jerry Archuleta, Scott's partner, who wore a shirt with an image of a horse that read: "If you're going to ride the pony, throw a blanket on it."

They are among the small number of Indians trying to warn Navajos about the dangers of AIDS, and as they make their way around Gallup together, their appearance sometimes draws puzzled looks.

Scott struts a bit when he walks, his lean arms often carrying a purse, his crown-shaped earrings gleaming in the sunlight. Archuleta is heavyset with salt-and-pepper hair often matted under a U.S. Navy veteran cap.

They're in love. They have been since they met 17 years ago outside a bar in Gallup.

Archuleta, who was separated from his wife, didn't know that Scott was a prostitute when they met. They shared a six-pack and their first night together was chaste.

"It was an instant connection," Archuleta said as he glanced at Scott, who smiled shyly. "We talked all night."

Scott, then 20, had fallen into prostitution after running away from the reservation community of Black Hat.

"I did it just to get the money, to drink and to have a place to stay," Scott said. Archuleta, a Pueblo Indian with a daughter, had decided to come out as a gay man as his marriage fell apart. The two moved in together.

After a routine physical in 1989, Scott tested positive for HIV. Soon after, another test showed Archuleta was infected.

"There was no blame. No pointing fingers at each other," Archuleta said. "We just went on from there."

They now avoid alcohol, try to watch what they eat and never miss an appointment at the Indian Medical Center. And should Archuleta forget to take his medication, he can expect a stern lecture from Scott.

Both volunteer with the Navajo AIDS Network and work with several support groups for HIV and AIDS patients and gays and lesbians.
They've recently befriended a young gay man who is HIV-positive. He struggles with thoughts of suicide and they spend hours and hours with him, on the phone or visiting his home.

They've done as much for many friends over the years; several have died of AIDS, others committed suicide.

On a recent morning, Archuleta and Scott did what might be called a breakfast waltz. They moved effortlessly about the kitchen, Scott gliding around Archuleta to tend to the scrambled eggs sizzling in the skillet.

Archuleta, wearing his favorite blue camouflaged pajama pants and blue slip-on shoes, dashed pepper on the hash browns. Scott, wearing the same ensemble in green, set the table.

Archuleta opened the oven door and they both bowed, as if to each other, to peek at the biscuits. Without a word, they agreed the biscuits needed a bit more time.

"We're not perfect, but we make it work," Archuleta said. "That to me is harmony."

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**Disclosure the common thread in pending SCOC cases**

By Thandi Fletcher, Postmedia News January 4, 2012

OTTAWA — From HIV status to erectile-dysfunction drug patents, the question of disclosure is the common thread in three high-profile cases scheduled to appear before Canada's top court early next month.

On Feb. 8, the Supreme Court of Canada will hear two back-to-back appeals involving people living with the human immunodeficiency virus, or HIV, who were convicted of sexual aggravated assault for engaging in unprotected sex without disclosing their status.

The first case involves Clato Lual Mabior, an HIV-positive man and Sudanese immigrant living in Winnipeg.

In 2008, Mabior was convicted of multiple accounts of aggravated sexual assault for engaging in unprotected sex with six women and not disclosing his status.

During the incidents, Mabior had an undetectable viral load and sometimes used condoms during intercourse. None of the women contracted HIV.

The second case involves a Quebec woman, referred to by the initials D.C., who had unprotected sex with her former spouse without informing him of her HIV status. D.C. was convicted of sexual assault and aggravated assault.

The Quebec appeals court later acquitted D.C. on the ground that her viral load had been undetectable during the period covered by the charges and the risk of transmission was low. The judge ruled that her non-disclosure did not expose her former spouse to "a significant risk of serious harm."

On both cases, the court will clarify the law on disclosing HIV status to sexual partners when the risk of transmission is low, due to antiretroviral therapy or because the accused used condoms.

The Supreme Court last reviewed the law in 1998 in the case of Henry Gerard Cuerrier. Since then, there have been major medical advances in the treatment of HIV, including antiretroviral therapy drugs that can reduce the viral load of people living with HIV to undetectable levels, significantly reducing the risk of transmitting the disease.

If the Supreme Court agrees with the provincial appeal court’s decisions, the courts may choose to revisit previous similar aggravated assault convictions involving failures to disclose HIV status.

Meanwhile, on Feb. 7, the Supreme Court will hear a challenge from generic drug company Teva Canada to the patent on the drug Viagra.

Teva Canada, which wants to produce a generic version of the erectile-dysfunction drug developed and manufactured by Pfizer, is arguing that the Viagra patent is invalid.

The company says it does not sufficiently disclose the specific compound, among a lengthy list of chemical compounds named in the patent, the one that is effective in treating erectile dysfunction.

The Federal Court has already ruled in favour of Pfizer, whose patent on the drug expires in 2014.

The Supreme Court will clarify what specific information is necessary within a patent for it to be considered valid. If the court finds that the patent is invalid, Teva can sue Pfizer for damages for barring them from marketing the drug.

The cases are just three of a half-dozen attention-worthy appeals scheduled to appear before the Supreme Court in the coming months, the rest include:

- On Jan. 18, the Supreme Court will hear a Quebec alimony case to determine whether common-law partners should have the right to claim alimony after a breakup. The high-profile Eric v. Lola
case — the pseudonyms used to describe the Montreal businessman and his former common-law partner — could set a precedent on laws for division of assets during common-law splits. Unlike other provinces, Quebec civil law does not recognize division of assets to common-law spouses.

- On Jan. 19, a group representing Vancouver’s Downtown Eastside sex-trade workers will appear before the Supreme Court, which will determine whether they have a legal capacity to challenge federal prostitution laws. The court is not ruling on the constitutionality of the prostitution laws, but rather on whether the group has the ability to bring the lawsuit.

On Feb. 13, the Supreme Court will rule on whether a tree falling on a vehicle constitutes a car accident under Quebec’s Automobile Insurance Act. The ruling could affect car insurance plans across Canada. The case involves an incident in Westmount, Que., in which a tree collapsed on a car, killing Gabriel Anthony Rossy, who was inside.

**Atlanta man used HIV patients’ data to defraud Medicaid**

By Christopher Seward

The Atlanta Journal-Constitution

2:57 p.m. Wednesday, January 4, 2012

An Atlanta man who volunteered to help HIV patients and then used that access to obtain their personal information and defraud Georgia’s Medicaid program is headed to prison, state prosecutors said Wednesday.

George Boyd, who operated Northwest Ministry Inc., was sentenced to 15 years after pleading guilty to defrauding Medicaid of more than $300,000 and falsifying documents to hide his crime. He was sentenced Dec. 28.

According to the Secretary of State’s web site, Northwest Ministry was created in 2000 as a non-profit corporation to provide support services for homeless and economically disadvantaged individuals and families. Those services included child care, health care, temporary shelter and help for HIV sufferers.

Boyd claimed that between June 2005 and November 2009, he was providing case management services to HIV patients in DeKalb County, which included getting HIV sufferers to needed medical, social, nutritional and education services.

Prosecutors said Boyd didn’t provide any of those services. Instead, he used HIV patients’ Social Security numbers and personal information to bill Medicaid for services he did not provide.

Some of the personal information was gained by holding charity events, such as a toy giveaway, for HIV patients that required them to provide personal data before they could participate.

In some cases, prosecutors said, Boyd paid HIV patients directly for personal information. He also falsified patient charts as part of the scheme, prosecutors said.

DeKalb Superior Court Judge Daniel M. Coursey ordered Boyd to spend three years of his 15-year sentence in prison and to pay restitution of $284,000.

**FDA Cautions Against Using Secondhand Breast Milk**

*San Francisco Chronicle,*(12.22.2011) Stephanie Armour, Bloomberg News

Health experts are warning about the potential dangers of breast milk-sharing.

Nonprofit US breast milk banks reported $9 million in annual sales in 2010. Buyers include mothers who do not produce enough of their own milk to breastfeed, those with medical issues, and adoptive and gay parents. The milk banks screen donors and treat the donated milk. But about 3 percent of 1,019 potential donors screened positive for antibodies to diseases like HIV, syphilis, and hepatitis, according to a 2010 study in the Archives of Disease in Childhood Fetal and Neonatal Edition. Its authors concluded that casual sharing from unscreened donors may carry “significant risk.”

The Food and Drug Administration recommends against giving babies breast milk sold online or received directly from individuals or through the Internet, said spokesman Sandy Walsh. FDA lacks the authority to regulate breast milk sales and donations, she said.

Surgeon General Regina Benjamin has issued a call to action, saying online sales create “significant risks.” The safety of donor milk should be reviewed and clinical guidelines drafted for its use, she said.

“I can’t understand why anyone would want milk that way,” said Richard Schanler, chair of the breast-feeding unit at the American Academy of Pediatrics, which recommends infants be breast-fed exclusively for six months. “The women could be using illicit drugs, medications or have some diseases,” he said, confirming that breast milk acquired online may expose babies to bacteria and diseases including HIV and hepatitis.
Emma Kwasnica, a breast-feeding activist and founder of the Human Milk 4 Human Babies Global Network Facebook page, where mothers in communities worldwide post offers to share milk for free, said safety warnings about the practice come from a patriarchal system that devalues women.

**World’s first chimeric monkeys are born**
Researchers have produced the world’s first chimeric monkeys. The bodies of these monkeys, which are normal and healthy, are composed of a mixture of cells representing as many as six distinct genomes. The advance holds great potential for future research as chimeric animals had been largely restricted to mice, the researchers say. The report, published online ahead of the release of the January 20th issue of *Cell*, a Cell Press publication, also suggests there may be limits to the use of cultured embryonic stem cells.

The chimeric monkeys were born after the researchers essentially glued cells from separate rhesus monkey embryos together and successfully implanted these mixed embryos into mothers. The key was mixing cells from very early stage embryos when each individual embryonic cell is totipotent, capable of giving rise to a whole animal as well as the placenta and other life-sustaining tissues. (This is in contrast to pluripotent stem cells, which can differentiate into any tissue type in the body, but not extra-embryonic tissues or entire organisms.)

"The cells never fuse, but they stay together and work together to form tissues and organs," said Shoukhrat Mitalipov of the Oregon National Primate Research Center at Oregon Health & Science University. "The possibilities for science are enormous."

Initial efforts by Mitalipov’s team to produce living monkey chimeras by introducing cultured embryonic stem cells into monkey embryos—a well-established means to produce chimeric mice—failed. Chimeric mice have been extremely important to biomedical research by enabling the production of transgenic "knock-out" mice carrying deletions of targeted genes, Mitalipov explained.

Mitalipov says it appears that primate embryos prevent cultured embryonic stem cells from becoming integrated as they do in mice. Their study also suggests that cultured primate and human embryonic stem cells, some of which have been maintained in lab dishes for as long as two decades, may not be as potent as those found inside a living embryo.

"We need to go back to basics," Mitalipov said. "We need to study not just cultured embryonic stem cells but also stem cells in embryos. It’s too soon to close the chapter on these cells." For instance, he added, cultured embryonic stem cells are now considered the "gold standard" for comparisons to induced pluripotent stem (iPS) cells made by treating adult cells with relatively simple cocktails.

"We cannot model everything in the mouse," Mitalipov continued. "If we want to move stem cell therapies from the lab to clinics and from the mouse to humans, we need to understand what these primate cells can and can’t do. We need to study them in humans, including human embryos." He emphasized, however, that there is no practical use or intention for anyone to produce human chimeras.

**New Bandage Spurs, Guides Blood Vessel Growth**
ScienceDaily (Dec. 15, 2011) — Researchers have developed a bandage that stimulates and directs blood vessel growth on the surface of a wound. The bandage, called a "microvascular stamp," contains living cells that deliver growth factors to damaged tissues in a defined pattern. After a week, the pattern of the stamp "is written in blood vessels," the researchers report.

A paper describing the new approach will appear as the January 2012 cover article of the journal *Advanced Materials*.

"Any kind of tissue you want to rebuild, including bone, muscle or skin, is highly vascularized," said University of Illinois chemical and biomolecular engineering professor Hyunjoon Kong, a co-principal investigator on the study with electrical and computer engineering professor Rashid Bashir. "But one of the big challenges in recreating vascular networks is how we can control the growth and spacing of new blood vessels."
“The ability to pattern functional blood vessels at this scale in living tissue has not been demonstrated before,” Bashir said. “We can now write features in blood vessels.”

Other laboratories have embedded growth factors in materials applied to wounds in an effort to direct blood vessel growth. The new approach is the first to incorporate live cells in a stamp. These cells release growth factors in a more sustained, targeted manner than other methods, Kong said.

The stamp is nearly 1 centimeter across and is built of layers of a hydrogel made of polyethylene glycol (an FDA-approved polymer used in laxatives and pharmaceuticals) and methacrylic alginate (an edible, Jell-O-like material).

The stamp is porous, allowing small molecules to leak through, and contains channels of various sizes to direct the flow of larger molecules, such as growth factors.

The researchers tested the stamp on the surface of a chicken embryo. After a week the stamp was removed, revealing a network of new blood vessels that mirrored the pattern of the channels in the stamp.

“This is a first demonstration that the blood vessels are controlled by the biomaterials,” Kong said. The researchers see many potential applications for the new stamp, from directing the growth of blood vessels around a blocked artery, to increasing the vascularization of tissues with poor blood flow, to “normalizing” blood vessels that feed a tumor to improve the delivery of anti-cancer drugs. Enhancing the growth of new blood vessels in a coordinated pattern after surgery may also reduce recovery time and lessen the amount of scar tissue, the researchers said.

**Journal Reference:**

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**Fisting on trial**

Posted by David Allen Green — 05 January 2012 10:58

The obscenity case continues against Michael Peacock.

The trial continues today of Michael Peacock, who has been charged under the Obscene Publications Act 1959 for distributing DVDs featuring various sex acts including fisting, so-called "water sports", and BDSM.

Peacock’s defence is being conducted by law firm Hodge Jones & Allen whose lawyer Myles Jackman has blogged about the case here.

In essence, the prosecution have to prove beyond reasonable doubt that the DVDs distributed by Peacock are such that their effect would be "to tend to deprave and corrupt persons who are likely, having regard to all relevant circumstances, to read, see or hear the matter contained or embodied" in the DVDs. Whether the DVDs would tend to deprave and corrupt any such person is a question of fact for the jury, who presumably have had to watch the DVDs as part of their compulsory jury service and not be depraved or corrupted in the process.

Obscenity is a curious criminal offence, and many would say that it now has no place in a modern liberal society, especially when all that is being portrayed in any "obscene material" are the consensual (if unusual) sexual acts between adults. That said, the Crown Prosecution Service has decided it is in the public interest to prosecute Peacock over these products, and the judge and jury are (rightly) obliged to apply the law to the facts which are determined by trial. Accordingly Peacock may well be convicted and, if so, faces up to five years imprisonment.

Whatever the outcome, *R v Peacock* may well turn out to be an important test case on the boundaries of obscenity law. As Jackman says:

Perhaps illogically, of these sexual acts, fisting and urination are completely legal to perform in real life; and thus it is only the representation of these acts on film which may be considered obscene and therefore attract criminal liability.

Consequently many pornographic film producers operate a "four finger rule" to avoid the risk of criminal prosecution. This means that in such films only four fingers are inserted into the performers' vagina or anus, rather than the entire fist.

It could be argued that this is an entirely arbitrary distinction as the act of fisting itself is not illegal.

However, many pornographic film producers remain risk-averse and therefore the presumption that urination and fisting are obscene has endured as it seems that no previous defendant has been prepared to test the law in this area by electing jury trial.

It is expected today will be the last day of the trial, with expert defence evidence being provided by academics researching into sex and the media. Tweets from the trial can be followed at #ObscenityTrial.
The trial continues.

**Not guilty verdict in gay escort’s obscenity trial**

by **Staff Writer, PinkNews.co.uk**

**6 January 2012, 3:33pm**

A jury in London has returned a unanimous not guilty verdict for a man charged under the Obscene Publications Act 1959 for distributing DVDs containing scenes of extreme gay sex acts.

Michael Peacock was cleared of six charges earlier this afternoon at Southwark Crown Court, in what has been described as “the most significant obscenity trial of the decade”.

The legal test under the Act is whether any images would “tend to deprave and corrupt” those who saw them.

The acts contained within the DVDs in the case had included fisting between men, urination, and incidents of sado-masochism.

Myles Jackson, a lawyer specialising in the obscenity laws whose firm was representing Peacock, **had written:** “Perhaps illogically, of these sexual acts, fisting and urination are completely legal to perform in real life; and thus it is only the representation of these acts on film which may be considered obscene and therefore attract criminal liability.”

If the jury had found Peacock guilty of possessing material which would “deprave and corrupt”, he could have faced up to five years’ imprisonment.

In an interview in 2010, Peacock, now 53, said he came out as gay in 2004 and had begun work as an escort one month later.

Dr Brooke Magnanti, the author of the Belle du Jour blog, is personally acquainted with Peacock.

She wrote on her blog today that the “thought that he corrupts or defiles anyone who doesn’t want said treatment is frankly ridiculous”.

Magnanti added there was a need to clarify issues of consent in the depiction of such acts: “This failure to distinguish consensual and nonconsensual sex acts is something that must be addressed.

“Not only because is an important point as regards sex and kink, but also because making this point crystal clear in guidance on law would help to shape discussion of issues around sex in a way that is more reasonable and less anachronistic.”

The Crown Prosecution Service guidelines list images of “sadomasochistic material which goes beyond trifling and transient infliction of injury”, “torture with instruments”, “activities involving perversion or degradation” and “fisting” as possibly being suitable for prosecution along with non-consensual acts.

The jury determined the acts in question did not “tend to corrupt or deprave those who are likely, having regard to all relevant circumstances, to read, see or hear the matter contained or

**Some Girls Overestimate HPV Vaccine Protection**

**Reuters, (01.02.2012) Julie Steenhuysen**

Nearly a quarter of adolescent girls who were vaccinated against human papillomavirus were subsequently less concerned about practicing safer sex, a new study found. HPV vaccine cannot prevent other STDs, or treat active HPV infections.

In a survey of 339 females ages 13-21 who had received their first HPV shot, most endorsed the continuing importance of practicing safer sex. However, 23.6 percent thought they were at less risk for getting STDs after the shot. Factors associated with this perception included having less information about the HPV vaccine and HPV infections, being less concerned about contracting HPV, and not using a condom at last sexual intercourse with a male partner.

The findings from a single urban clinic serving low-income clients may not be applicable to a more general population, the authors said.

“Clinicians discussing HPV vaccination with girls and their mothers may need to emphasize the limitations of the vaccine and to specifically address that the vaccine does not prevent other sexually transmitted infections,” wrote study authors Dr. Tanya Kowalczyk Mullins, of Cincinnati Children’s Hospital Medical Center, and colleagues.

WHO Confirms Bird Flu Cases In Egypt, China
The WHO on Thursday "announced the deaths of two men from H5N1 avian influenza, one from Egypt and another from China whose death was reported earlier in the media," CIDRAP News reports. Both men are suspected to have contracted the virus from avian sources, although an investigation into the man from China’s exposure to the virus is ongoing, according to news service. "The two infections and deaths push the WHO global H5N1 count to 576 cases and 339 deaths. According to WHO records, the number of H5N1 cases and deaths reported in 2011 so far are modestly higher than 2010 (60 cases versus 48, and 33 deaths versus 24)," CIDRAP writes (Schnirring, 1/5).

Inflammatory Bowel Disease Emerges as a Global Disease
ScienceDaily (Jan. 4, 2012) — The incidence and prevalence of inflammatory bowel disease (IBD) are increasing with time and in different regions around the world, according to a new study in Gastroenterology, the official journal of the American Gastroenterological Association.

"Insight into the worldwide epidemiology of inflammatory bowel disease is important for the identification of geographic patterns and time trends," said Gilaad G. Kaplan, MD, MPH, of the University of Calgary and lead author of this study. "Our findings will help researchers estimate the global public health burden of inflammatory bowel disease so that appropriate health-care resources are allocated, and targeted research is conducted in specific geographic regions," added Dr. Kaplan, an Alberta Innovates—Health Solutions population health investigator.

Population-based epidemiologic data of IBD collected in a standardized fashion in developing nations are sparse. To properly interpret the incidence or prevalence data and evaluate time trends, researchers conducted a systematic review of all population-based studies that describe the incidence and/or prevalence of IBD. They found that the incidence of IBD is increasing or stable in virtually every region of the world that has been studied.

Researchers found that the highest prevalence of IBD worldwide was reported in Canada and Europe, whereas Asia had a lower prevalence of IBD. In developing nations, IBD was a rare occurrence; however, as these nations have become more industrialized, the incidence of IBD has increased. Gender differences were inconsistent, suggesting that the disease occurred equally among females and males.

Universally, incidence rates for both Crohn’s disease and ulcerative colitis were highest among individuals who were between 20 and 40 years old. Thus, IBD affects individuals in the most healthy and productive years of life, resulting in long-term cost to the patient, health-care system and society. Despite more than 200 publications in the literature on IBD, this study highlights the need for incidence and prevalence data in many regions of the world, particularly from developing countries. Future studies in these regions are required to provide important insights into the etiology of IBD.

The two major illnesses that are recognized most often as inflammatory bowel disease are ulcerative colitis and Crohn’s disease. The most common symptoms of ulcerative colitis, which occurs in the inner lining of the colon (large intestine) or rectum, are diarrhea, abdominal cramps and rectal bleeding. Patients suffering from Crohn’s disease, an inflammation and ulceration process that occurs in the deep layers of the intestinal wall, experience pain in the abdomen—often in the lower right side—diarrhea, weight loss and occasionally bleeding.

Journal Reference:

DNA Mismatch Repair Happens Only During a Brief Window of Opportunity
ScienceDaily (Dec. 22, 2011) — In eukaryotes—the group of organisms that include humans—a key to survival is the ability of certain proteins to quickly and accurately repair genetic errors that occur when DNA is replicated to make new cells.

In a paper published in the December 23, 2011 issue of the journal Science, researchers at the Ludwig Institute for Cancer Research and the University of California, San Diego School of Medicine have solved part of the mystery of how these proteins do their job, a process called DNA mismatch repair (MMR).

"One of the major questions in MMR is how MMR proteins figure out which base in a DNA mispair is the wrong one," said Ludwig Institute assistant investigator Christopher D. Putnam, PhD, an adjunct assistant professor of medicine at UC San Diego. "For example, if guanine (G) is inappropriately in a basepair with thymine (T), is the G or the T the error? Picking the wrong base results in mutations, not fixes."
Using *Saccharomyces cerevisiae*, or baker's yeast, as their model organism, the researchers, led by Richard D. Kolodner, PhD, Ludwig Institute investigator and UCSD professor of medicine and cellular and molecular medicine, discovered that newly replicated DNA produces a temporary signal for 10 to 15 minutes after replication which helps identify it as new—and thus a potential subject for MMR.

The actual signal was not identified, but Putnam said it might be tell-tale nicks in single-stranded DNA or certain proteins associated with replication. The scientists are working to pinpoint the precise signal.

The findings, combined with earlier, published work that visualized MMR in a living cell for the first time, more fully explains how eukaryotes eliminate DNA replication errors, which can result in defects and the development of cancers.

"How eukaryotes identify the newly synthesized strand of DNA is a mystery that has persisted for at least 30 years," said Putnam. "These findings really change our ideas of how MMR works," said Putnam. Co-authors include Hans Hombauer and Anjana Srivatsan of the Ludwig Institute for Cancer Research, UCSD Departments of Medicine and Cellular and Molecular Medicine, Institute of Genomic Medicine and UC San Diego Moores Cancer Center.

Funding for this research came from the National Institutes of Health.

**Journal Reference:**

**Scientists 'Hijack' Bacterial Immune System**

ScienceDaily (Jan. 5, 2012) — The knowledge that bacteria possess adaptable immune systems that protect them from individual viruses and other foreign invaders is relatively new to science, and researchers across the globe are working to learn how these systems function and to apply that knowledge in industry and medicine.

Now, a team of University of Georgia researchers has discovered how to harness this bacterial immune system to selectively target and silence genes. The finding, published in the early online edition of the journal *Molecular Cell*, reveals a powerful new tool that has far-reaching implications for biotechnology and biomedical research.

"Scientists study bacteria and other microorganisms to understand essential life processes as well as to improve their use in the safe production of foods, biofuels and pharmaceuticals, and to fight those that cause disease," said Michael Terns, a professor in the departments of biochemistry and molecular biology, and genetics in the UGA Franklin College of Arts and Sciences. "And now we have a new way to engineer bacteria to decrease or even eliminate the expression of the genes of our choosing."

The bacterial immune system consists of two components. The first is an RNA (a molecule that, like DNA, contains genetic information) that acts as a homing signal to target a virus or another cellular invader. The second component is a complex of proteins that cleaves the invader's genetic material. In a 2009 paper published in the journal Cell, Terns, co-principal investigator Becky Terns and their colleagues were the first to describe how this pathway, known as the Cmr branch of the CRISPR-Cas immune system, works.

In their latest study, the researchers further their understanding of the system and use that in-depth knowledge to essentially hijack the bacterial immune system to direct its homing system to a target of their choosing. Using customized CRISPR RNAs with a modified homing signal, the scientists were able to destroy the message for a protein that is responsible for resistance to the most commonly prescribed family of antibiotics, the beta-lactam antibiotics (that includes, for example, amoxicillin).

Becky Terns, co-leader of the UGA team, explained, "In this study we identified the key features of the RNAs that the system normally uses, and then showed that using this information we can program the system with engineered 'homing' RNAs to destroy new targets. New targets would go beyond viruses and other invaders to include essentially any gene present in the organism being studied. And because we have defined the components of this system, it is possible that we can introduce it into organisms that do not already possess it to further expand the potential industrial and biomedical applications."

She pointed out that most known CRISPR-Cas systems target and cleave DNA. The system that the UGA team studies is the only known example of a CRISPR-Cas system that targets RNA, the molecule that functions as an intermediary between DNA and the proteins that carry out various functions within cells. "Cleaving its own DNA would kill an organism. Silencing specific RNAs allows more sophisticated applications," Terns said.
Researchers could systematically shut down the function of individual genes, for example, to discern the role they play in essential cellular processes. Gene expression could be modified in bacteria that are used to break down plant materials for biofuels or that produce medications, such as insulin, to improve quality and production.

"This detailed biochemical study of a new branch of the CRISPR-Cas defense system-one that targets RNA molecules-has shed light on a powerful weapon in the bacterial arsenal against invading viruses and mobile elements," said Michael Bender, who oversees RNA processing and function grants at the National Institutes of Health’s National Institute of General Medical Sciences. "In addition, by defining the key components of the system, Drs. Terns and their colleagues have set the stage for the development of a new tool for targeting specific RNA molecules in diverse cell types, potentially providing biomedical researchers with a valuable new way to analyze gene functions."

Michael Terns added, "The possibility of exploiting the CRISPR-Cas system in biotechnology has been discussed since its discovery, and this work begins to realize some of that enormous potential."

Journal Reference:

Alarming Incidence of Hepatitis C Virus Re-infection After Treatment of Sexually Acquired Acute Hepatitis C Virus Infection in HIV-Infected MSM
AIDS Vol. 25; No. 17: P. F21-F27, (11.13.2011) Femke A.E. Lambers; and others

The seroprevalence of sexually transmitted HCV among men who have sex with men in Amsterdam is stabilizing, recent data show. Little is known, however, about the incidence of HCV re-infection in MSM who have cleared HCV. In the current study, the team assessed the incidence of HCV re-infection in HIV-positive MSM who were HCV RNA-negative following HCV treatment of acute primary infection.

The subjects of the Amsterdam-based study were HIV-infected MSM attending two large outpatient clinics; the men were previously diagnosed with a sexually transmitted acute HCV infection and tested HCV RNA-negative at the conclusion of treatment. "We defined HCV re-infection as detectable HCV RNA in individuals with an undetectable HCV RNA at the end of treatment accompanied by a switch in HCV genotype or clade," the authors wrote. Re-infection incidence was calculated using person-time methods.

Included in the analysis were 56 persons who became HCV RNA-negative during primary acute HCV treatment. Five of these cases relapsed and were not analyzed; 11 participants were re-infected. HCV re-infection incidence in this group was 15.2 per 100 person-years (95 percent confidence interval 8.0-26.5). Cumulative incidence within two years was 33 percent.

"An alarmingly high incidence of HCV re-infection was found in this group," the authors concluded. "This high re-infection rate indicates that current prevention measures should be discussed, frequent HCV RNA testing should be continued after successful treatment and, in case of possible relapse, clade typing should be performed to exclude re-infection."

HPV Vaccine Is Not Linked to Promiscuity
NPR.com, (12.27.2011) Nicholas Bakalar

Girls ages 15-19 who receive the human papillomavirus (HPV) vaccine are no more likely to be sexually active or to have more partners than their unvaccinated peers, a new study finds.

Furthermore, among sexually active girls, those who were vaccinated against the STD were more likely to report consistent condom use than those who had not had the shot. “This is all preliminary data, but it shows no association between HPV vaccination and sexual risk,” said lead author Nicole C. Liddon of CDC.

Liddon and colleagues studied a nationally representative sample of females ages 15-24. By the end of 2008, the investigators found 30 percent of girls ages 15-19 and 16 percent of women age 20-24 had received at least one dose in the three-shot series. About 25 percent of girls ages 14-19 and nearly 45 percent of women 20-24 have been infected with HPV.

No difference in vaccine rates were seen by race or ethnicity among girls ages 15-19, but 20- to 24-year-old non-Hispanic black women were less likely than their white peers to have been vaccinated.

Fallujah Doctors Say Chemicals From U.S. Weapons To Blame For High Levels Of Birth Defects

"While the U.S. military has formally withdrawn from Iraq, doctors and residents of Fallujah are blaming weapons like depleted uranium and white phosphorous used during two devastating U.S. attacks on Fallujah in 2004 for what are being described as 'catastrophic' levels of birth defects and abnormalities," Al Jazeera reports. Samira Alani, a pediatric specialist at Fallujah General Hospital, "told Al Jazeera she had personally logged 677 cases of birth defects since October 2009," the news service notes, adding, "Just eight days later when Al Jazeera visited the city on December 29, that number had already risen to 699."

The news service highlights a number of cases of babies born with abnormalities and notes that a study conducted by Alani, British scientist Christopher Busby, and other researchers, published in September 2011, found mercury, uranium, bizmuth and other trace elements in soil and water samples as well as in "hair samples from 25 parents of families with children who have birth defects." According to the news service, "The U.S. and U.K. militaries have sent mixed signals about the effects of depleted uranium, but Iraqi doctors like [Sharif al-Alwachi] and Alani, and along with researchers, blame the increasing cancer and birth defect rates on the weapon." However, "[e]ven with a vast amount of anecdotal evidence, the exact cause of the health crisis in Fallujah is currently inconclusive without an in-depth, comprehensive study, which has yet to be carried out," Al Jazeera writes (Jamail, 1/6).

Cases Of Totally Drug-Resistant TB Reported In India

"For the first time in India, 12 people have been detected with totally drug-resistant lung tuberculosis (TDR-TB), a condition in which patients do not respond to any TB medication" and for which the mortality rate is 100 percent, the Hindustan Times reports. "Doctors treating these patients say the absolute resistance is a result of the patients being prescribed wrong antibiotics," the newspaper reports (1/7). "While Iran first reported TDR-TB cases three years ago, India seems to be only the second country to report this deadly form of the disease," the Times of India notes (Iyer, 1/7).

Haiti Faces 'Largest' Cholera Epidemic In Modern History, PAHO Says

"Almost two years after the devastating 7.0 earthquake destroyed much of Port-au-Prince, full recovery appears to be years away," the Miami Herald reports, noting that "[t]housands of people continue to live in makeshift shelters and tents [and] rubble from dilapidated buildings still line some streets" (Lee, 1/7). In addition, "[t]he cholera outbreak in Haiti is 'one of the largest epidemics of the disease in modern history to affect a single country,' the U.N. World Health Organization's Pan-American Health Organization [PAHO] said in a news release," according to United Press International (1/7).

Jon Kim Andrus, deputy director of PAHO, said on Saturday that as of December, more than 7,000 people had died of the disease since the epidemic began in October 2010, more than 520,000 cases had been reported, and 200 new cases are reported daily, Agence France-Presse notes (1/7). "The disease has spread across the island of Hispaniola to Haiti's neighbor, the Dominican Republic, which has reported 21,000 cases and 363 deaths from cholera, he said," USA Today reports (Leger, 1/5).

Bacteria in the gut of autistic children different from non-autistic children

The underlying reason autism is often associated with gastrointestinal problems is an unknown, but new results to be published in the online journal mBio® on January 10 reveal that the guts of autistic children differ from other children in at least one important way: many children with autism harbor a type of bacteria in their guts that non-autistic children do not. The study was conducted by Brent Williams and colleagues at the Mailman School of Public Health at Columbia University.

Earlier work has revealed that autistic individuals with gastrointestinal symptoms often exhibit inflammation and other abnormalities in their upper and lower intestinal tracts. However, scientists do not know what causes the inflammation or how the condition relates to the developmental disorders that characterize autism. The research results appearing in mBio® indicate the communities of microorganisms that reside in the gut of autistic children with gastrointestinal problems are different than the communities of non-autistic children. Whether or not these differences are a cause or effect of autism remains to be seen.

"The relationship between different microorganisms and the host and the outcomes for disease and development is an exciting issue," says Christine A. Biron, the Brintzenhoff Professor of Medical Science
at Brown University and editor of the study. "This paper is important because it starts to advance the question of how the resident microbes interact with a disorder that is poorly understood."

Bacteria belonging to the group *Sutterella* represented a relatively large proportion of the microorganisms found in 12 of 23 tissue samples from the guts of autistic children, but these organisms were not detected in any samples from non-autistic children. Why this organism is present only in autistic kids with gastrointestinal problems and not in unaffected kids is unclear.

"*Sutterella* has been associated with gastrointestinal diseases below the diaphragm, and whether it’s a pathogen or not is still not clear," explains Jorge Benach, Chairman of the Department of Microbiology at Stony Brook University and a reviewer of the report. "It is not a very well-known bacterium."

In children with autism, digestive problems can be quite serious and can contribute to behavioral problems, making it difficult for doctors and therapists to help their patients. Autism, itself, is poorly understood, but the frequent linkage between this set of developmental disorders and problems in the gut is even less so.

Benach says the study was uniquely powerful because they used tissue samples from the guts of patients. "Most work that has been done linking the gut microbiome with autism has been done with stool samples," says Benach, but the microorganisms shed in stool don’t necessarily represent the microbes that line the intestinal wall. "What may show up in a stool sample may be different from what is directly attached to the tissue," he says.

Tissue biopsy samples require surgery to acquire and represent a difficult process for the patient, facts that underscore the seriousness of the gastrointestinal problems many autistic children and their families must cope with.

Benach emphasizes that the study is statistically powerful, but future work is needed to determine what role *Sutterella* plays, if any, in the problems in the gut. "It is an observation that needs to be followed through," says Benach.

**January 9, 2012**

**Study Finds Federal Amendments Increased Gun Sales Diverted to Criminals**

*Number of Guns Purchased at Milwaukee Dealer and Subsequently Diverted to Criminals Triples Following Adoption of Tiahrt Amendments*

A new study by researchers at the Johns Hopkins Center for Gun Policy and Research finds that the number of guns that were subsequently linked to crime sold by Badger Guns & Ammo, a Milwaukee-area gun shop, increased dramatically after Congress adopted measures likely to reduce the risks gun dealers face if they divert guns to criminals. The study is the first to examine the impact of these amendments on the diversion of guns to criminals and was recently published online in the peer-reviewed *Journal of Urban Health.*

The Tiahrt amendments are a series of amendments to appropriations bills and named for the sponsor, former U.S. Rep. Todd Tiahrt, R-KS. They became law in 2003 and prohibit the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) from releasing data from crime gun traces. Gun traces reveal when, where, and from whom a gun recovered from a crime was originally purchased. In 2004, the Tiahrt amendments further restricted crime gun-trace data by limiting access to government officials and prohibiting the use of these data in firearm dealer license revocations and civil law suits. In addition, the law prohibits ATF from requiring gun dealers to do a physical inventory of their firearms for compliance inspections and requires the FBI to destroy data from background checks of gun purchasers within 24 hours.

In 1999, ATF data showed that Badger Guns & Ammo led the nation’s gun dealers with the most gun sales later linked to crime gun traces. Shortly after the announcement, the gun shop’s owner announced that the store would no longer sell small, poorly made handguns (sometimes referred to as “junk guns”) that are commonly linked to crime.

Data from the new Johns Hopkins study indicate that the gun dealer apparently adhered to that policy for approximately 14 months, a period in which the number of guns sold by Badger Guns & Ammo and diverted to criminals declined by 66 percent. Reductions were observed for junk guns as well as other types of guns sold by Badger. After the Tiahrt amendments went into effect, guns diverted to criminals soon after being sold by Badger increased by 203 percent. The increase in the flow of guns from Badger to criminals following the adoption of the Tiahrt amendments, however, was not limited to junk guns. The study found no Tiahrt amendment-related increase in the number of guns sold by all other gun dealers that were diverted to criminals.
“Our findings suggest that changes to federal gun policy prompted a dramatic increase in the flow of guns to criminals from a gun dealer whose practices have frequently been of concern to law enforcement and public safety advocates,” said lead study author Daniel Webster, ScD, MPH, co-director of the Johns Hopkins Center for Gun Policy and Research and professor at the Johns Hopkins Bloomberg School of Public Health. Webster added, “The fact that the ATF took action which led the gun dealer to surrender his license in 2006 supports the idea that the large increase in Badger’s guns diverted to criminals was related to gun dealer practices.”

Study co-author and Center co-director Jon Vernick, JD, MPH, said, “our findings are consistent with other research that has shown that greater oversight and regulation of gun sellers is linked with fewer guns diverted to criminals shortly after retail sales.”

For the study, researchers examined data from firearms recovered by the Milwaukee Police Department and traced by the ATF from 1996 through 2006. Data for guns traced during 2003 to 2006 when the Tiahrt restrictions on ATF were in place were obtained from the Milwaukee Police Department. The number of firearms recovered by police less than a year following retail sale from someone other than the legal purchaser was used to track trends in illegal gun transfers.

Congress recently passed another appropriations bill with an amendment that makes permanent most of the protections for gun sellers that in prior Tiahrt amendments been limited to the fiscal year covered under appropriations bills. The study “Temporal Association Between Federal Gun Laws and the Diversion of Guns to Criminals in Milwaukee” is by Daniel W. Webster, Jon S. Vernick, Maria T. Bulzacchelli, and Katherine A. Vittes in the Journal of Urban Health. It was funded by a grant from The Joyce Foundation.

US Redefines Rape; Adds Men, Others as Victims

Associated Press, (01.06.2012) Pete Yost

The Obama administration has expanded the FBI’s definition of rape to include men as possible victims and dropped the requirement that a victim must have physically resisted the attack. Crime statistics affect the allocation of money and resources for prevention programs and assistance, and the revised definition will increase the number of rapes counted by the FBI. However, it will not affect federal or state laws, or charges and prosecutions.

For more than eight decades, the FBI has defined rape as carnal knowledge of a female, forcibly and against her will. The new FBI definition covers any gender of victim or attacker, and it applies to situations where the victim is incapable of giving consent, including due to drugs, alcohol or age. Physical resistance is not required. Rape is “the penetration, no matter how slight, of the vagina or anus with any body part or object” without the victim’s consent. The definition also covers “oral penetration by a sex organ of another person” without consent.

The issue received high-level White House attention after Vice President Joe Biden raised it during a July 2011 Cabinet meeting. The Department of Justice said the new definition mirrors the majority of rape statutes now on the books in individual states.

Of the $592 million Congress approved to address violence against women this year, $39 million is for rape prevention and education programming administered by CDC.

Double Sentence—AIDS in a Local Prison

Inter Press Service, (01.05.2012) Amanda Fortier

Though Senegal’s HIV rate of less than 1 percent is among the lowest in sub-Saharan Africa, vulnerabilities remain in this majority-Muslim country. Some 22 percent of Senegalese men who have sex with men (MSM) are HIV-positive. And the country’s prisons are a high-risk environment for HIV transmission due to the prevalence of drugs, violence, and sexual activity.

At the Camp Penal maximum-security prison in Dakar, harm-reduction strategies like needle exchange and condom distribution are non-existent. Alassane Balde, the prison’s chief of medical staff, said that is because they are not needed. “Our religion doesn’t permit this,” he said. “There is no tolerance for this type of behavior. It’s a taboo subject, and we don’t even talk about it.”

Amadou (not his real name), a prominent gay AIDS activist, served two months at Camp Penal. He was arrested in December 2008, along with eight others, for allegedly “engaging in homosexual acts.” Amadou was sentenced to eight years in prison, but the case was overturned when international aid groups intervened. “Everyone knows, whether we admit it or not, that there are sexual relations among men in prisons,” he said.
Amadou recently spoke with a group of 150 inmates at Camp Penal. “I know your realities,” he told the men. “Today I’m here to talk to you about AIDS. What it is, how we catch it, and how to prevent it.”

Amadou sees hope in a large-scale voluntary HIV testing program planned for Camp Penal in the coming months. “If MSM are promoting these types of prevention activities for the health of the whole community, they must be saluted and encouraged,” he said. “This work is not for ourselves, but for everyone. But how many people dare to send out that message? Because this is really what we need.”

**Prevention: Herpes Vaccine Falls Short in Clinical Trial**
*New York Times*, (01.10.2012) Nicholas Bakalar

Despite showing promise earlier, an experimental vaccine to prevent herpes simplex virus types 1 and 2 (HSV-1 and HSV-2) did not prevent HSV-2 in a double-blinded trial, a recent study shows. The investigational vaccine previously was thought to protect uninfected women who have HSV-infected partners.

In the most recent study, researchers randomly assigned 8,323 uninfected women ages 18-30 to receive either the herpes vaccine or a hepatitis A vaccine as a placebo. After 20 months, HSV-2 infection rates did not differ significantly between the groups, though the herpes vaccine showed a modest protective effect against HSV-1 genital infections. While most genital herpes infections are caused by HSV-2, HSV-1 can also cause genital herpes.

“The failure of the vaccine really suggests that we need to look at new approaches to HSV vaccine development,” said Dr. Peter A. Leone, a study co-author and professor of medicine at the University of North Carolina. An attenuated virus-based vaccine may prove more effective.


**Prevalence of Neisseria Gonorrhoeae Infections Among Men and Women Entering the National Job Training Program—United States, 2004-2009**
*Sexually Transmitted Diseases Vol. 39; No. 1: P. 49-54*, (01.2012) Heather Bradley; Catherine Lindsey Satterwhite

In 2009 there were 99 cases of gonorrhea for every 100,000 persons in the United States, according to national notifiable disease data—the lowest recorded rate in US history.

“However, the extent to which declining case reports signify a reduction in prevalence is unknown,” wrote the authors, who estimated prevalence of the STD among men and women, ages 16-24, entering the National Job Training Program (NJTP) between 2004 and 2009. The probability of testing positive for gonorrhea over time was assessed using multivariate logistic regression.

A total of 95,184 men and 91,697 women were screened for gonorrhea upon entering NJTP during the study period. Among women, gonorrhea prevalence increased from 2.6 percent in 2004 to 2.9 percent in 2006, then declined steadily to 1.8 percent through 2009. Among men, prevalence increased from 1.3 percent in 2004 to 1.6 percent in 2005, then decreased to 0.9 percent through 2009.

Among black women, gonorrhea prevalence decreased from 3.6 percent in 2004 to 2.5 percent in 2009; prevalence was two to four times higher than among white women. Among black men, prevalence decreased from 2.0 percent to 1.5 percent; prevalence was eight to 22 times higher than among white men.

“After adjusting for gonorrhea risk factors, the odds of women and men testing positive for gonorrhea decreased by 50 percent and 40 percent, respectively, from 2004 to 2009,” the authors wrote. “Declining trends in gonorrhea infection among NJTP entrants are similar to those observed in gonorrhea case report data, suggesting that the decrease in case reports is due to a decrease in prevalence. However, targeted interventions are needed to reduce gonorrhea infections in populations with disproportionate risk.”

**Aid Group Tracks Down Likely First Case In Haiti’s Cholera Outbreak**

"A mentally ill man who bathed in and drank from a contaminated river most likely was the first person to be infected" with cholera in the outbreak that began in Haiti in October 2010, researchers from Partners in Health said in a study published Monday in the American Journal of Tropical Medicine and Hygiene, the Associated Press/Washington Post reports (1/9). "This patient's case is the first in the community's collective memory to have had symptoms that are recognizable, in
retrospect, to be those of cholera,' according to the study," CNN's "The Chart" notes, adding, "There is no lab method to confirm that this was the first patient to start the epidemic, wrote the authors" (Park, 1/9).

"The man developed severe diarrhea on Oct. 12, 2010, and died in less than 24 hours," the New York Times writes, noting, "Two people who washed his body for a wake fell ill 48 hours later." The newspaper adds, "Although his family had clean drinking water, the man often walked naked through town to bathe and drink from the Latem River just downstream from the Meye River, into which raw sewage drained from an encampment of United Nations peacekeepers from Nepal," noting, "Haiti's outbreak was of a Nepali strain, and that encampment is considered the source" (McNeil, 1/9).

**India On Verge Of Recording Polio-Free Year**

If India does not record a new polio case through January 13, "produc[ing] 12 straight months of polio-free surveillance data, it will be removed from the list of countries where polio is considered endemic, leaving only the other three," Pakistan, Afghanistan, and Nigeria, Scientific American reports (Branswell, 1/9). "Asking other countries to draw inspiration from India in their polio eradication drive, Microsoft co-founder Bill Gates said the country not reporting a single polio case over the last year is a major milestone in the global health sector," the Economic Times writes (1/10).

In a statement on "The Gates Notes," Gates writes, "India's story is proof that major health problems can be solved in the toughest places in the world. But the fight against polio is not over and we are at a critical moment in time," saying funding must be sustained "to ensure a comprehensive immunization effort in India and other countries—until there are no more cases" (1/9).

**Restricting Publication Of H5N1 Research 'More Perilous' Than Threat Of Biological Warfare**

In this Reuters opinion piece, New York-based writer Peter Christian Hall responds to "the U.S. government's move to restrict publication of vital research into H5N1 avian flu," writing, "This unprecedented interference in the field of biology could hinder research and hamper responsiveness in distant lands plagued by H5N1," yet "no one seems to be challenging a key assumption— that H5N1 could make a useful weapon. It wouldn't."

He provides a brief history of biological warfare, including a link to a Nova slideshow on the topic, and writes that a flu strain has never been used as a weapon "for good reason"—"Influenza in general is an equal-opportunity menace" that would "put at great risk anyone trying to assemble a pandemic H5N1 to launch at 'target' populations." He concludes, "The public should certainly be concerned about unbridled transport of potentially pandemic flu strains. ... Letting the U.S. government suppress promising scientific work by controlling who can research it and who can assess the results strikes me as the more perilous development" (1/9).

**Blog Posts Respond To Legislation Enacted In Brazil Requiring Registration Of All Pregnancies**

The following summarizes two blog posts published in response to Provisionary Measure 557 (PM 557), legislation enacted by Brazilian President Dilma Rousseff on December 27 that will require all pregnancies to be registered with the government.

- **Beatriz Galli,** RH Reality Check: "Rousseff claims that PM 557 will address Brazil's high rates of maternal mortality by ensuring better access, coverage and quality of maternal health care, notably for high-risk pregnancies," Galli, policy and human rights adviser for Ipas Brazil, writes. However, "PM 557 does not guarantee access to health exams, timely diagnosis, providers trained in obstetric emergency care, or immediate transfers to better facilities," she notes, adding, "So while the legislation guarantees R$50.00 [roughly US$27] for transportation, it will not even ensure a pregnant woman will find a vacant bed when she is ready to give birth. And worse yet, it won't minimize her risk of death during the process." She concludes, "Last but certainly not least, MP 557 violates all women's right to privacy by creating compulsory registration to control and monitor her reproductive life" (1/6).

- **Gillian Kane,** Slate's "XX Factor": "At first glance, Provisional Measure 557 (PM 557) is not a bad law. It purports to address Brazil's high maternal mortality ratio by ensuring better access to quality maternal health care, notably for pregnant women at a high risk for health complications," Kane, a senior policy adviser for Ipas, writes, adding, "The problem is that it won't reduce maternal mortality. Notwithstanding the fact that many of its provisions are legally and constitutionally questionable, its requirements are not based on sound public health policy." Kane continues, "Passing such a controversial
law during the height of the holiday season without congressional review or approval suggests some backroom negotiations were at play," and concludes, "One thing we can be certain of is that maternal mortality rates will not be dropping any time soon, but the prosecution of women for harming a fetus or for getting an abortion could be on the rise" (1/6).

**Scripps Research scientists paint new picture of dance between protein and binding partners**

**New findings could influence design of future diabetes treatments**

Jupiter, FL—Using a blend of technologies, scientists from the Florida campus of The Scripps Research Institute have painted a new picture of how biochemical information can be transmitted through the modification of a protein. Previously, scientists believed that during the pairing of proteins and their binding partners ("ligands"), proteins modified their shape while ligands remained stable. The new study shows this one-size-fits-all solution is not entirely accurate.

Instead, the situation resembles a kind of complex but carefully organized dance routine, where the ligand samples a variety of binding modes while the protein also modifies its shape, a process that results in their pairing and changes in the protein critical for its function.

These new findings, published in the January 11, 2012 edition of the journal *Structure*, could affect future drug design.

"Using a multidisciplinary approach, we gleaned something from our data that no one else has," said Douglas Kojetin, an assistant professor on the Scripps Florida campus who led the study. "The conventional wisdom is that ligands bind in one orientation but our study shows that they can bind in multiple modes. That means if we can optimize a ligand to bind in mode B rather than mode A, we might be able to select the therapeutic results we want."

The new study—which used a number of complementary technologies including NMR spectroscopy and hydrogen/deuterium exchange (HDX) coupled to mass spectrometry, combined with previous x-ray crystallography analyses—provides detailed insights into the real-time actions of molecules that could never be determined with a single technology.

Specifically, the researchers revealed insights into ligand and receptor dynamics in the nuclear receptor known as PPARγ (peroxisome-proliferator-activated receptor). PPARγ has been implicated in metabolic diseases including obesity, diabetes, and atherosclerosis.

The study also found that various gradations in these ligands influence the dynamics of this exchange, adding another layer of complexity. "One of the compounds, MRL24, binds to the receptor and has anti-diabetic efficacy, but doesn't activate it very well," Kojetin said. "This is what you want because when the receptor is activated you get side effects such as weight gain and brittle bones."

"This study in particular highlights the importance of multidisciplinary collaborative efforts to truly understand the molecular details of drug-receptor interactions", says Kojetin. "This work is an excellent example of the strong campus collaborations we have with the laboratories of Patrick Griffin, Thomas Burris, and Theodore Kamenecka."

**Zimbabwe: what will it take to achieve virtual elimination of infant HIV infections?**

Carole Leach-Lemens

Published: 11 January 2012

Efforts to achieve "virtual elimination" of new HIV infections in infants by 2015 could prove highly challenging according to computer modelling of the situation in Zimbabwe, one of the most seriously HIV-affected countries in southern Africa.

Using a validated computer simulation model of a cohort of HIV-infected, pregnant/breastfeeding women in Zimbabwe researchers found that even with a 95% uptake of the World Health Organization’s (WHO) 2010 prevention of mother-to-child (PMTCT) guidelines (Option A or B treatment regimens) projected transmission risks (6.1%-7.7%) would still exceed WHO’s goal of “virtual elimination” of paediatric HIV (mother-to-child-transmission risk of less than 5%).

This analysis published in the January 10th edition of *PLoS Medicine* looked at the effectiveness of three PMTCT treatment regimens (single-dose nevirapine (sdNVP); Option A: zidovudine during pregnancy and sdNVP at delivery and infant nevirapine throughout breastfeeding in women with advanced illness; and Option B: triple ART during pregnancy and breastfeeding and lifelong ART for women with advanced illness) at four different levels of uptake of PMTCT services (36%, 56%, 80% and
95% corresponding to reported national 2008, 2009 rates and WHO target and optimal rates, respectively).

The authors found that increased uptake of PMTCT services played a significant role in reducing MTCT even in times of economic hyperinflation; uptake from 2008 to 2009 increased from 36% to 56% with a corresponding decrease in MTCT from 20.3% to 18%.

Replacing the 2009 national programme of sdNVP with Option A, (at the corresponding reported uptake of 56%) was projected to reduce the estimated transmission risk from 18% to 14.4% or 13.4% with Option B, they add. Both options are more effective than increasing sdNVP coverage to 80% (MTCT risk of 15.4%).

The planned implementation of Option A in Zimbabwe, like many other sub-Saharan African countries where prolonged breastfeeding is common, could significantly reduce infant HIV infection compared to the 2009 national programme of sdNVP.

In the United States and Europe the availability of antiretroviral therapy during pregnancy and avoidance of breastfeeding among HIV-infected women has led to the near elimination of paediatric HIV.

HIV can be passed from the mother to the child during pregnancy, labour and delivery or breastfeeding. Without treatment approximately 30% of infants will be infected during pregnancy or delivery, and an estimated 5-20% during breastfeeding.

In settings where breastfeeding is the norm and replacement feeding is not an option recent studies have shown that the provision of maternal ARV during breastfeeding can reduce MTCT to between 1% and 5%.

As a consequence WHO, among others, made “virtual elimination” of paediatric HIV a new target and accordingly released new guidelines in 2010 comprising options A and B.

Yet many women are lost to care at any point along what is known as the PMTCT ‘cascade’: getting antenatal care, having an HIV test and getting the results, being assessed for ART eligibility having a CD4 cell test and timely receipt of results, availability of ART, adherence and post-natal care.

Only an estimated 53% of pregnant women got any kind of treatment for PMTCT in 2009 resulting in around 400,000 infants newly infected with HIV; over 90% were in sub-Saharan Africa.

Given the difficulties of enrolling and keeping women in care at any step of the PMTCT cascade the effectiveness of Options A or B is unknown.

So the authors chose to expand a simulated model of MTCT to include all the steps, to project the level of PMTCT uptake, the drug regimens, and length of breastfeeding necessary to reach “virtual elimination” in Zimbabwe.

The model simulated a cohort of two populations of HIV-infected pregnant and breastfeeding women with a mean age of 24, a mean CD4 cell count of 451 cells/mm³ and breastfeeding period of 12 months. The cohort was followed from first ANC visit to two years after giving birth.

Cohort 1 included women already HIV-infected at their first ANC visit; cohort 2 included all women getting pregnant each year in Zimbabwe (392,460) with an HIV prevalence of 16% at the first ANC visit and HIV incidence of 1% during late pregnancy and breastfeeding. Cohort 1 was nested within Cohort 2. Cohort 1 was analysed to project MTCT rates and Cohort 2 to project the proportion and number of infants to become HIV-infected in an annual birth cohort.

The primary outcome was MTCT risk at weaning. The authors looked at improvements in two measures of PMTCT care: more effective regimens and improved uptake of the PMTCT “cascade”.

The authors note their findings are consistent with previous analyses (using different modelling methodologies) that suggest “virtual elimination” will require massive scale-up of PMTCT services.

The authors stress that regardless of whether sdNVP was replaced with Option A or B, it is the level of PMTCT uptake that has the greatest effect on MTCT rates.

They note once 56% uptake is reached with Option A increasing this to 80% results in MTCT risk of 10.5%, with better outcomes than if Option A were replaced with Option B at current levels of 56% (13.4%).

This analysis depends on the effectiveness of each ART regimen, note the authors, adding that Option B may not be better than Option A for MTCT; no randomised comparisons have been reported. Studies suggest that both options are equally efficacious in women with CD4 cell counts over 350 cells/mm³ in line with WHO’s strong recommendation of both.

They cite the anticipated results of the IMPAACT/PROMISE study, a multi-national clinical trial comparing these regimens in women with CD4 cell counts over 350 cells/mm³ which will, importantly, inform policy decisions around Options A and B.
As noted increased uptake of PMTCT services reduced projected MTCT risk. This happens, the authors add, by improving the proportion of ART-eligible women who get ART, including the greater availability of CD4 testing and timely receipt of results or with triple ART.

While shorter breastfeeding can contribute to reduced MTCT the absence of clean water and availability of infant formula make this impractical in many resource-poor settings.

The specific step in the cascade where uptake varied did not affect MTCT risk at 4–6 weeks. However, the proportion of mother-infant pairs linked to postnatal care had a considerable effect on 12-month MTCT risk.

The authors suggest promotion of high levels of access to postnatal care and adherence to ARV during breastfeeding is critical.

Limitations include computer model simplification of complex biological and operational processes; data from multiple sources was combined.

To meet this challenging and critical goal of “virtual elimination” in Zimbabwe, or in other resource-poor settings with a high HIV prevalence and prolonged breastfeeding, a national programme using either Option A or B must be implemented together with strategies to improve access to PMTCT services (to close to 100%), retain women in care, and to support medication adherence throughout pregnancy and breastfeeding, the authors conclude.

Reference

Workplace HIV story takes a twist
Lysol allegations were just the beginning
By Curt Guyette
Published: January 11, 2012

News Hits has seen its share of odd lawsuits over the years, but one filed in federal court in Detroit just before Christmas strikes us as particularly topsy-turvy.

The case involves a guy named James N. White, a Roseville resident with the extreme misfortune to have contracted HIV, the virus that causes AIDS. Adding to White’s woes, he claims, is the fact that he contracted HIV several months after getting an office job at Great Expressions, a chain of dental centers that has its headquarters in Bloomfield Hills.

According to published accounts, after White, 26, tested positive for HIV and began requesting time off for doctor visits, his office manager asked what was up.

"I told her I had tested positive for HIV; I thought it would be easier for me in the long run," White told reporter Todd Heywood for a story that appeared in POZ, a print and online publication focusing on issues facing people affected by HIV/AIDS. "I asked her not to tell anyone."

Heywood’s story appeared Dec. 8, and has been gaining traction ever since. Part of the reason the story has been getting attention is White’s claims of what happened after he disclosed his medical condition to his manager at Great Expressions’ Sterling Heights office.

Among other things, White claims that co-workers were informed of his condition, and that after finding out that he was HIV-positive, they began following him around with Lysol, using the disinfectant to clean doorknobs and other surfaces he’d touched.

Great Expressions denies all this, and says that White was eventually fired in April 2009 after seven months of employment because of a "chronic tardiness problem" and frequent missed days.

The decision to fire White, the company says, was based solely on his attendance problems and had absolutely nothing to do with his "disability."

"Great Expressions takes pride in being an equal opportunity employer — not just in adherence to the law, but because we believe it makes us a better company," Todd Gustke, vice president of human resources for Great Expressions, noted in a recent press release. "In order to provide equal employment and advancement opportunities to all individuals, employment decisions at Great Expressions Dental Centers are based on merit, qualifications and abilities."

The problem for Great Expressions is that its claim that White lost his job because of attendance problems has been deemed to be untrue by the federal Equal Opportunity Employment Commission (EEOC).

In 2009, White filed a complaint with the EEOC alleging that he was "disciplined, denied reasonable accommodation, and discharged" because he was infected with HIV, and, as a result, the company had violated the Americans With Disabilities Act.
In October 2011, the EEOC issued the results of its investigation, coming down squarely on the side of White, substantiating his claim that Great Expressions "subjected him to discriminatory discipline." The commission also determined that the company's claimed legitimate reason for firing White was "untruthful."

The commission recommended that Great Expressions pay White a total of $224,267, including $27,945 in back wages, $146,040 in compensatory damages, and $45,000 in punitive damages. The company, though, continued to deny any wrongdoing. Lawyers for White subsequently announced that they planned to take Great Expressions to court.

After Heywood broke the story in POZ in early December, the blogosphere picked up on the issue. Among those who began drawing attention to White's plight was James Harris, a student at the University of Oklahoma who launched an online petition drive aimed at Great Expressions.

Attorneys for White say that the online petition attracted the support of 41,000 people in just a few days. The company certainly took quick notice. On Dec. 21, lawyers for Great Expressions sent Harris a cease and desist letter, accusing him of libel and saying that he was making false and defamatory comments.

"You may conclude that this letter is an attempt to restrict legitimate free speech, but you would be mistaken," Troy attorney Jeffrey D. Wilson explained in his letter to Harris. "Our firm and our client both respect the cherished right of individuals to disseminate accurate and truthful information and make fair comment on the Internet and elsewhere. However, your actions unlawfully infringe on our client's rights to be free from defamatory attacks."

As far as we can tell, even though Harris was mostly repeating info gleaned from Heywood's article, neither the reporter nor POZ received a similar threatening letter accusing them of libel.

"They are just a bunch of bullies," says Joshua Moore, the head of Detroit Legal Services and one of the attorneys representing White.

Which brings us to the topsy-turvy part of all this.

On Dec. 20, the company filed a suit in federal court against White. It is seeking a judgment declaring that it did not discriminate against him or otherwise violate the Americans with Disabilities Act: "Despite the allegations [White] made to the EEOC, and the continued allegations he makes in media publications, [Great Expressions] did not discriminate against [White] because of his disability, and did not commit the scurrilous allegations appearing in such publications."

Moore, who specializes in handling HIV/AIDS-related cases, describes the company's lawsuit as a highly unusual preemptory move.

"To me, because of all the publicity around this case, they are trying to stop the bleeding, if you will," Moore tells News Hits. "We asked Moore if he could put us in contact with his client, but we're told that White, who previously said that he sought mental health care because of the stress caused by his firing, is going through a particularly difficult time right now and was declining interviews.

His attorney, however, is happy to speak for him. "We find the actions of Great Expressions Dental Care to be truly despicable," Moore says. "We will continue to pursue justice for Mr. White for the unconscionable trauma he has suffered."

Great Expressions' attorney, Wilson, did not return a call and e-mail seeking further comment.

Local Michigan county wants to force meds on HIV criminal suspect

By Todd Heywood

Tuesday, January 10, 2012 at 9:55 am

Sangeeta Ghosh, assistant corporate counsel for Kent County, Mich., says should the 51-year-old man charged in two cases of failing to disclose his HIV-positive status to sexual partners make bail, the county is prepared to ask a court to force him to take antiretroviral medications.

"The county is taking steps that if he gets out, we will file a civil matter to make sure he takes his medications," Ghosh told The American Independent.

Ghosh was speaking of the Comstock Park man who turned himself in to Grand Rapids police Dec. 22, alleging he attempted to infect hundreds of people with HIV through unprotected sex and sharing needles. He was placed in a psychiatric hold for two days, and on Dec. 24, he was arraigned on the first of two charges of failing to disclose his status to a sex partner. Several days later, prosecutors added a second charge of failing to disclose. He is currently in Ypsilanti undergoing a psychiatric evaluation to determine if he can stand trial. He is being held on a $100,000 bond.
TAI does not identify the names of those charged with HIV disclosure laws unless both the accused and the accuser are named in court documents, or one or both provide TAI permission to publish their names.

The case, media releases and subsequent reporting have resulted in what experts have told TAI were “sensationalist” reports in the wider media.

But this is the first time county officials have indicated plans on how to deal with the man if he is released on bond.

The announcement, however, has HIV advocates worried.

“Forcing anyone to take treatment is a slippery slope,” said Sean Strub, co-chair of the Global Network of People with AIDS, North America (GNP+), in an email. “This person’s most important health issue seems to be his mental health, not his viral status. Forcing anti-retroviral treatment on anyone is a slippery slope. Once the camel’s nose gets inside that tent, even in such a rare and bizarre circumstance as this peculiar case, it is not such a huge step to mandatory testing and treatment for an ever-expanding number of people with HIV.”

While the advent of antiretroviral medications in the mid-1990s resulted in a staggering revival of persons living with AIDS and a sharp decrease in AIDS-related deaths, the drugs themselves are quite toxic and cause a host of side effects. In addition, scientists are not in agreement as to when is the appropriate point in clinical progression to begin treatment, resulting in many mixed messages to patients.

Michigan does have a part of the state health code that allows health officials to declare a person a health threat to others (HTTO). HTTOs are a civil action and can amount to anything from counseling to forced civil confinement for as long as six months. TAI reported in December that many people thought the law was being abused when it was revealed that any HIV-positive person who was diagnosed with a sexually transmitted infection was immediately issued an HTTO. In other instances, women who became pregnant were issued HTTO orders and HIV-positive people who were named in partner services programs were also targeted for HTTO orders. The state, which oversees the HTTO list, denies pregnant women were targeted but said the STI and partner services programs were appropriate uses of the state’s name-based HIV list.

 “[The suspect] does not have an airborne disease spread through casual contact; he has a disease that, regardless of treatment, is not easily transmitted. Even without treatment, the primary routes of infection — unprotected anal or vaginal sex — result in HIV transmission roughly one percent or less of the time,” said Catherine Hanssens, executive director of the Center for HIV Law and Policy. “So the threat of mandatory treatment is not a reflection of any danger [the suspect] poses, but of Ms.Ghosh’s dangerous misapprehension of both HIV transmission and the law governing the very limited circumstances under which treatment of an individual can be mandated.”

**New Sex Education Standards Released**

Associated Press, (01.09.2012) Kimberly Hefling

Monday, a coalition of health and education groups released new, non-binding guidelines for sex education in the United States. The recommendations to states and school districts aim to foster age-appropriate discussions that build sequentially for young children until they grow into adults.

The organizations involved are Advocates for Youth; the American Association of Health Education; the American School Health Association; the National Education Association—Health Information Network; the Society of State Leaders of Health and Physical Education; and the Future of Sex Education Initiative.

The standards outlined include:

- By the end of second grade, students should be able to use proper names for body parts; explain that all living things reproduce; identify different types of family structures; explain that everyone has the right not to be touched; and explain why bullying and teasing are wrong.

- By the end of fifth grade, pupils should be able to describe the female and male reproductive systems; understand changes during puberty; define sexual orientation as “the romantic attraction of an individual to someone of the same gender or a different gender;” define HIV and ways to prevent it; describe healthy relationships; and define teasing, harassment, bullying and sexual abuse.

- By the end of eighth grade, students should be able to differentiate between gender identity, gender expression and sexual orientation; explain the range of gender roles; describe the signs of
pregnancy; compare and contrast behaviors including abstinence to determine potential disease transmission risk; define emergency contraception and its use; and explain why a person who has been raped or sexually assaulted is not at fault.

- By high school graduation, students should be able to analyze how brain development impacts changes in adolescence; define sexual consent and how it affects sexual decision-making; explain why using tricks, threats or coercion in relationships is wrong; and compare and contrast laws related to pregnancy adoption, abortion, and parenting.

For more information, visit http://www.ashaweb.org/files/public/Sexuality%20Education/JOSH-FeSE-Standards.pdf.

### Ongoing Sexually Transmitted Disease Acquisition and Risk-Taking Behavior Among US HIV-Infected Patients in Primary Care: Implications for Prevention Interventions

*Sexually Transmitted Diseases* Vol. 39; No. 1: P. 1-7, (01..2012)  Kenneth H. Mayer; and others

To gain a better understanding of factors associated with HIV- and STD-transmitting behavior among persons living with HIV, the team estimated STD prevalence and incidence, as well as associated risk factors, among a diverse sample of HIV-positive patients in primary care.

The researchers analyzed data from 557 participants in the SUN Study, a prospective observational cohort of HIV-infected adults in primary care in four US cities. At enrollment and six months later, participants completed an audio computer-assisted self-interview about their sexual behavior; in addition, they were screened for genitourinary, rectal and pharyngeal Neisseria gonorrhoeae and Chlamydia trachomatis infections by nucleic acid amplification testing, and for serologic evidence of syphilis. Women provided cervicovaginal samples, and men provided urine to screen for Trichomonas vaginalis by polymerase chain reaction.

At enrollment, 13 percent of participants had a prevalent STD; six months later, 7 percent had an incident STD. The most commonly diagnosed infections were rectal chlamydia, oropharyngeal gonorrhea, and chlamydial urethritis among the men, and trichomoniasis among the women. Excluding trichomoniasis, 94 percent of the incident STDs were diagnosed among men who have sex with men (MSM). Polysubstance abuse, other than marijuana, and having four or more sex partners in the six months prior to testing were associated with the diagnosis of an incident STD.

“STDs were commonly diagnosed among contemporary HIV-infected patients receiving routine outpatient care, particularly among sexually active [MSM] who used recreational drugs,” the authors concluded. “These findings underscore the need for frequent STD screening, prevention counseling, and substance abuse treatment for HIV-infected persons in care.”

### Trends In Compulsory Licensing Of Pharmaceuticals Since Doha Declaration

In this *PLoS Medicine* research article, Reed Beall and Randall Kuhn of the Josef Korbel School of International Studies at the University of Denver provide an analysis of trends in compulsory licensing (CL) of pharmaceuticals since the Doha Declaration. "Almost 10 years after the Doha Declaration, we examined the subsequent occurrence of CL episodes, an important direct indicator of treaty impact," they write. Given that "compulsory licensing activity has diminished greatly since 2006, ... the researchers conclude, health advocates who pushed for the Doha Declaration reforms have had little success in engaging trade as a positive, proactive force for addressing health gaps," according to the article's Editors' Summary (1/10).

### Big increase in repeat pregnancy rates in HIV-positive women in UK and Ireland

Michael Carter
Published: 12 January 2012
Rates of repeat pregnancies among HIV-positive women in the UK and Ireland have increased substantially since 1997, investigators report in the online edition of the *Journal of Acquired Immune Deficiency Syndromes*.

In 2009 over a third of all pregnancies involved women who had at least one other pregnancy. Younger age and geographic region of origin were associated with having a subsequent pregnancy. “A substantial and increasing proportion of pregnancies in diagnosed HIV-infected women are occurring in those who have already received HIV-related care in one or more previous pregnancy,” comment the authors. “The main demographic characteristics independently associated with repeat pregnancies were younger age…and being born in Middle or Western Africa.”
A large proportion of HIV-positive women are of childbearing age. However, mother-to-child transmission can be prevented in most cases with appropriate antiretroviral treatment and care. This low risk of transmission combined with the excellent prognosis provided by modern antiretroviral treatment means that HIV-positive women in resource-rich countries can realistically consider childbearing.

In the UK and Ireland the number of pregnancies in HIV-positive women has increased significantly over the last decade. A significant proportion of these women have experienced at least one other pregnancy while receiving HIV care. Given their often complex medical, obstetric and social needs, the care of this group of women can be complex.

Despite this, little is currently known about the demographics and health status of HIV-positive women who experience repeat pregnancies.

Therefore investigators from the National Study of HIV in Pregnancy and Childhood examined 20 years of data obtained from pregnant HIV-positive women in the UK and Ireland. Data from 1990 and 2009 were included in the study.

The investigators' aims were to characterise the pattern and rate of repeat pregnancies and to establish the demographic and clinical characteristics of HIV-positive women with two or more recorded pregnancies.

A total of 14096 pregnancies were recorded in HIV-positive women during the study period. Just over a quarter (2737; 26%) were repeat pregnancies. This figure included 2117 women who had two pregnancies, 475 with three pregnancies and 145 with four or more pregnancies.

Outcomes were recorded for 13,355 pregnancies. In all, 11,915 (89%) resulted in a live birth, 121 (1%) in a still birth and 10% in either miscarriage or termination.

Both the number and proportion of repeat pregnancies increased significantly. There were 158 recorded pregnancies in 1997, and 32 (20%) were repeat pregnancies. By 2009, the total number of pregnancies had increased to 1465, with 565 (37%) being repeat pregnancies.

Further analysis of the 2009 figures showed that 28% were second pregnancies, 7% were third and 3% were fourth or subsequent pregnancies.

“The increase in repeat pregnancies over the last two decades is likely to reflect a combination of factors including the accumulation of diagnosed HIV-infected women who have already had pregnancy,” suggest the investigators. “Major improvements in quality of life and AIDS-free survival of people living with HIV, and substantial reductions in the risk of mother-to-child-transmission are also likely to have had an impact.”

Overall, the rate of repeat pregnancies was 6.7 per 100 woman-years.

The median interval between first and second deliveries was 2.7 years, with an interval of 2.3 years between second and third deliveries, with the same interval between third and fourth deliveries.

Analysis of the factors associated with repeat pregnancy was restricted to women who received care after 2000. A total of 11,426 pregnancies in 8661 women were therefore included. Just over a quarter (26%) were repeat pregnancies.

The probability of a repeat pregnancy declined significantly with increasing age (p < 0.001).

Women born in central African countries and West Africa were more likely to experience sequential pregnancies than women born in other regions.

“This pattern is likely to reflect a complex range of cultural, behavioural and migratory factors such as fertility patterns in women’s countries of origin and the demographics of women who migrate from different regions,” write the researchers.

There was no robust evidence that either CD4 cell count or health were associated with repeat pregnancies.

“The number of diagnosed HIV-infected women in the UK and Ireland having more than one pregnancy has increased substantially and is likely to continue to grow,” conclude the authors.

They stress the importance of understanding the characteristics of these repeat pregnancies. “Variations in the probability of repeat pregnancies, according to demographic characteristics, are important considerations when planning the reproductive health services and HIV care for people living with HIV.”

Reference
How AIDS Was Branded: Looking Back at ACT UP Design
By Steven Heller
Jan 12 2012, 11:01 AM ET

A conversation with a member of Gran Fury, the "propaganda wing" of the early AIDS-awareness movement

In a 1987 speech, the public health advocate Larry Kramer urged that HIV-related illness be seen as a new kind of contagion. ACT UP (the AIDS Coalition to Unleash Power) was formed immediately afterward to bring needed awareness to a disease that was ravaging gay men. AIDS soon became politicized and ACT UP used civil disobedience and activism to attack the inertia and downright hostility from the mainstream to homosexuals accused of bringing on their own plague.

ACT UP held weekly "highly charged" meetings at The Center on West 13th Street in New York. It was a time of despair, and the ad-hoc members of ACT UP used every public means to increase understanding and compassion towards the disease's sufferers and ire towards the disease itself. Out of these meetings in 1988 came the graphic design and advertising arm, Gran Fury, a diverse group of designers and artists producing various public expressions using t-shirts, posters, stickers, banners, billboards, and video to get the message through. Pairing the slogan "Silence = Death" and the purple triangle (referring to gays in Nazi concentration camps) created in 1987 by the Silence = Death project, Gran Fury's iconic "Kissing Doesn't Kill: Greed and Indifference Do" poster put AIDS awareness on the map.

On January 31 through March 17 NYU's Steinhardt Department of Art and Arts Professions is hosting Gran Fury: Read My Lips, a retrospective exhibition curated by Gran Fury and Michael Cohen. I spoke to one of the members, Loring McAlpin, who was speaking on behalf of Gran Fury about its collective legacy

It seems like only yesterday that AIDS hit like a nuclear blast and Gran Fury's advertisements were blasted all over too. What, in fact, triggered the formation of the group?

The response was triggered by an awareness that our lives were in danger, that the political and medical institutions that we assumed would take the necessary steps to stem a nascent epidemic were in fact stalled. Friends and lovers, people we knew, were dying, and even the medical facts of HIV were not adequately understood. It’s worth noting that for many of the early organizers of ACT UP, not having full attention of the health and political establishment was something new—an awareness that the gains of gay liberation were limited. The irony is, of course, that nothing did more to bring the lesbian and gay community into the mainstream than the AIDS crisis. But that may be precisely because it demonstrated so clearly that stigma and discrimination served no one's interests, and that gays and lesbians were much more a part of society than had been acknowledged.

On a more literal level, Gran Fury formed after Bill Olander of the New Museum offered their window on Broadway to ACT UP in November 2007 for an installation. An ad hoc group formed to use this opportunity to get a message out. The group that created the installation, called "Let the Record Show" continued meeting to do more public projects, and this group became Gran Fury.

Gran Fury was the model of NYC police cars in the '80s. Where did you get the name?

We thought the name of the NYC squad car described nicely our anger and urgency, with humor, a slightly camp sensibility, and a nod to the ordinary—a mid-range Plymouth.

Gran Fury's method of using conventional advertising approaches was echoed by Guerilla Girls, Barbara Kruger, and others. How was the decision made to go in that direction?

We simply used the tools that were available to us, and of course the languages of advertising and appropriation were two of the first places we looked, even as we sought to insert unexpected messages in those vocabularies. There was not really a self-conscious "conceptual strategy". The press, government and the medical establishment were not delivering information or countering stigma; we wanted our activist voice to fill that void. Therefore, we tried to insert our message seamlessly into those spaces that were normally occupied by authority, and we used whatever we could to grab attention. It didn’t matter to us if that was a borrowed strategy or not.

Yours was a collective. How were creative decisions made?

Decisions were made collectively, in weekly meetings. Then production tasks were divided according to the skills and availability of individual members. It wasn’t always the most efficient process, but we managed to do a relatively effective boiling down of a message in this way.

You were the "propaganda" arm of ACT-UP and arguably the images you produced, some of which are iconic today, did as much for raising awareness as anything. What were your strategies and principles? Did you have a plan of attack?
At first, when we had limited funds, either our own money or from ACT UP, we sniped small flyers on the streets of lower Manhattan for the cost of offset printing and wheat paste. As the art world looked for ways to support ACT UP and the activist response to the pandemic, we were offered grants and opportunities. Simply, we sought to bring awareness about the pandemic that would lead others to join us in asking for the appropriate steps to be taken, whether that was streamlining the drug approval process, making funds available to allow for treatment and social services for HIV+ individuals, or countering social stigma that prevented those affected from getting appropriate care. Additionally, we recognized that our "propaganda" had a role in the group identity. Having graphics that made our demands not only visible but also to some extent pleasing gave ACT UP a stronger sense of itself. We chose not to sequester ourselves within the art world, removed from a broader public. Therefore we always demanded that our work to be visible in public space, and made that a condition for sponsors. We also decided not to make anything that could be sold, no unique objects that could be marketed, or to participate in the gallery economy. In retrospect, perhaps we could generate funds for bigger projects, but in not having to focus on that aspect, it forced us to concentrate on a message. None of us pursued this work as a full time career, and so there was a need to keep it simple.

**What were the roadblocks in getting the ACT UP message out?**

The Kissing Doesn't Kill campaign, one of our most widely seen projects, was an example of the extent to which even art world support had limits. The tagline to our image of racially mixed straight and gay couples kissing was "Government Inaction, Corporate Greed and Public Indifference Make AIDS a Political Crisis". The project, Art on the Road, had a funder, AMFAR, that the organizers didn't want to offend. So it ran without the tagline outside of New York City. Our hands were tied in this instance; we did not have the power to insist that the full message be run. We decided that the image itself had some value alone, and agreed to participate in spite of this. That alone proved provocative enough to generate press, which extended the reach of the project.

In general, we tried to remain aware of what was permitted in public space. If our message was too radical, we risked both access as well as a broader public reception.

**In the catalog to current Gran Fury exhibition photographs of the famous "Kissing Doesn't Kill: Greed and Indifference Do" with the inter-racial and male to male kissing scratched out (although female to female was not touched), what did this tell you about American tolerance?**

Although it would be tempting to conclude that it reveals a greater acceptance of lesbians than gay men, as that defacement occurred in San Francisco, it may simply demonstrate a strain of lesbian separatism more than anything else. The heterosexual interracial couple in the image was erased as well.

**So much of Gran Fury's work, which appeared radical then, has been co-opted or adopted by mainstream image-makers. Does this make you proud or not?**

At the very least, it suggests that our imagery became part of a vocabulary, so yes, that's nice to know.

**How would you describe Gran Fury's legacy?**

Perhaps we take our greatest satisfaction in the achievements of the broader movement—the ways in which the drug approval process was accelerated, the inclusion of patient groups in that process, the reduction of pricing for life saving drugs, the broader movement to make health care more affordable and increase access for all Americans. If we had a role in advancing the ways in which political and social dissent harnessed the power of media to communicate a more radical politics, then that also. But perhaps in that sense we were the product of many other broader forces that propelled these things. In many ways, we were just at the right place at the right time to have been allowed to operate as we did.

**America's Drinking Binge**

*New York Times*, (01.11.2012) Tara Parker-Pope

One in six Americans binge drink about four times a month, a new CDC report shows. CDC defines binge drinking as consuming four or more drinks per occasion for women, and five or more drinks per occasion for men. The one-in-six consumed an average of eight drinks per binge, said the report based on a 2010 survey of 457,677 Americans.

A large body of evidence shows binge drinking is associated with health risks such as STDs, injuries, violence, and car accidents, said report co-author Dr. Robert Brewer, head of CDC's alcohol program.

Younger people tend to consume more in a sitting, while the fewer older adults who binge did so more frequently. Of adults ages 18-24, 28 percent reported binge drinking, averaging four days per month. The young averaged 9.3 drinks per binge. About 13 percent of people ages 45-64 reported binging about five
times a month, with about seven drinks in a sitting. Of people age 65 and older, about 4 percent report regular binge drinking, averaging 5.5 times a month.

Of men, 23.2 percent reported a binge of about nine drinks in the past month, compared with 11.4 percent of women who averaged 5.9 drinks per binge. Binge drinking prevalence rose with household income: Binges were reported by about 20 percent of people earning $75,000+ annually. However, people earning less binged more frequently and consumed more per sitting. Binge drinking accounts for more than half of US alcohol consumed by adults, and 90 percent consumed by youths.

"It’s not just the usual suspects who are binge drinking," Brewer said. “This is not just a problem of high school kids and college students. It’s a problem across the lifespan.”


**Viral load a major factor affecting risk of sexually transmitting HIV**

**Study also confirms condom use significantly reduces risk of HIV infection**

The level of HIV-1 in the blood of an HIV-infected partner is the single most important factor influencing risk of sexual transmission to an uninfected partner, according to a multinational study of heterosexual couples in sub-Saharan Africa. The study, published in the *Journal of Infectious Diseases*, calculated the risk of HIV-1 transmission per act of sexual intercourse and found the average rate of infection to be about 1 per 900 coital acts. The findings also confirmed that condoms are highly protective and reduce HIV infectivity by 78 percent.

James P. Hughes, PhD, and colleagues at the University of Washington and the Fred Hutchinson Cancer Research Center, in Seattle; the University of Witwatersrand in South Africa; the University of Nairobi and Kenyatta National Hospital, in Kenya; and the Rwanda-Zambia HIV Research Group conducted a study that included 3,297 HIV-discordant couples (where one person is HIV-infected, and the other is not) in eastern and southern Africa who were enrolled in a randomized trial of acyclovir suppressive therapy. The couples had frequent follow-up to measure plasma HIV-1 RNA in the infected partner and genetic testing to link the transmitted virus to the index HIV-infected partner, to prevent inclusion of infections acquired from other possible partners. HIV acquisition was not affected by the acyclovir therapy.

The study confirmed that condoms are highly protective, reducing the risk of HIV transmission by 78 percent when subjects reported using a condom. Most important, the authors noted, was the level of HIV-1 RNA in the blood of the infected partner. The higher the viral load in the index infected partner, the higher the risk of transmission, emphasizing the importance of lowering viral load to help prevent the spread of HIV-1 through sex. Older age was associated with reduced transmission per sex act, and male circumcision reduced female-to-male transmission by approximately 47 percent. Genital herpes infections and the presence of genital ulcers were associated with increased rates of transmission.

"Our results underscore the importance of antiretroviral therapy, and, possibly, treatment of co-infections, to reduce plasma HIV-1 viral load in HIV-1 infected partners, and condom promotion, male circumcision, and treatment of symptomatic sexually-transmitted infections for HIV-1 uninfected partners as potential interventions to reduce HIV-1 transmission," the authors wrote.

The findings also showed that the risk of an HIV-infected man transmitting an infection to a woman not infected with HIV was about twice the risk of an HIV-infected woman transmitting to an HIV-uninfected man. However, this difference can be attributed to the difference in viral loads between men and women, the authors noted. On average, HIV-infected men have higher HIV-1 loads. Difference in age and having genital herpes in the HIV-uninfected partners also help account for the disparity—the HIV-uninfected female partners were, on average, younger and had higher rates of genital herpes than their male counterparts.

Previous studies examining HIV-1 per-act infectivity have been significantly smaller and not as comprehensive in terms of measuring plasma HIV-1 RNA and the use of genetic linkage of transmissions. In an editorial commentary, Ronald H. Gray, MD, and Maria J. Wawer, MD, both of Johns Hopkins University in Baltimore, noted that Dr. Hughes and his colleagues have possibly recorded the most precise estimates of HIV-1 transmission per sexual act during latent HIV disease, providing a valuable addition to knowledge in this area, where much remains to be learned.

Additional research using the genetic data collected from this study, in addition to new data from another recently completed clinical trial, is planned to help explain the variation in transmission risk among couples, the authors noted.
Fast Facts:
1. In HIV-discordant couples—where one partner is infected with HIV, and the other is not—viral load of the infected partner was a major factor affecting the HIV transmission rate.
2. Condom use among HIV-discordant couples was 78 percent effective in preventing transmission to the uninfected partner.
3. Factors such as age, male circumcision status, and sexually transmitted infections also affected transmission probability.

Newly identified type of immune cell may be important protector against sepsis
Investigators in the Massachusetts General Hospital (MGH) Center for Systems Biology have discovered a previously unknown type of immune cell, a B cell that can produce the important growth factor GM-CSF, which stimulates many other immune cells. They also found that these novel cells may help protect against the overwhelming, life-threatening immune reaction known as sepsis.

"B cells are a family of white blood cells that secrete antibodies, and GM-CSF induces the production or activation of granulocytes and macrophages, other white blood cells that have specific roles in the immune system," says Filip Swirski, PhD, of the MGH Center for Systems Biology, senior author of the report that is to be published in the journal Science and is receiving advance release on the Science Express website. "Our findings are surprising not only because B cells were not previously known to produce GM-CSF in vivo but also because they indicate these novel cells initiate an important immune response."

As part of a separate investigation, Swirski and his team analyzed production of GM-CSF (granulocyte macrophage colony-stimulating factor) in tissue from several important organs. They were surprised to find that application of a bacterial molecule known to produce a powerful immune response induced GM-CSF production by what turned out to be a previously unknown family of B cells in the spleen. Because GM-CSF is known to activate white blood cells as part of the innate immune response—the body's first line defence against pathogens—the novel cells were named innate response activator (IRA) B cells.

The researchers went on to identify distinguishing characteristics of IRA-B cells, including gene expression patterns not seen in other B cells. They also determined that IRA-B cells derive from B cells known as B1a B cells. These IRA-B cell precursors originally reside in the peritoneal cavity but, after detecting the presence of invading bacteria, travel to the spleen or bone marrow where they differentiate into IRA-B cells that can either produce antibodies or release GM-CSF.

"While the IRA-B cell shares many attributes with other B cells, it is unique in its involvement with GM-CSF production," explains Clinton Robbins, PhD, co-lead author of the Science article. "Instead of the classic way that B cells recognize antigens, B1a B cells produce IRA-B cells after recognizing bacteria via a type of receptor known to be involved in the first steps of inflammation. The IRA-B cell, therefore, appears to be an early orchestrator of the immune system."

To test the potential role of IRA-B cells in sepsis, the researchers developed a mouse model in which B cells were totally unable to produce GM-CSF, preventing the generation of IRA-B cells. Those mice were unable to mount a defense against induced sepsis and died much earlier and in greater numbers than did control animals. Inflammatory markers in the infected mice lacking IRA-B cells suggested a defect in the ability to clear bacteria.

"We think that IRA-B cells sound a distress call when they deliver GM-CSF to the spleen, an organ where cells known to be important to the recognition and clearance of bacteria reside," explains Swirski, an immunologist who is an assistant professor of Radiology at Harvard Medical School. "Sepsis is an immunological conundrum. On the one hand it results from failure of the immune system to control infection. On the other hand, immune cells that do respond inflict damage and contribute to complications such as leakage of blood vessel walls and septic shock. Striking a balance between controlling infection and controlling inflammation is a major therapeutic goal, and we believe the IRA-B cell is a critical, previously unrecognized component in that balance."
Discovery in Africa gives insight for Australian Hendra virus outbreaks
Researchers find that African bats have antibodies that neutralize deadly virus

A new study on African bats provides a vital clue for unravelling the mysteries in Australia's battle with the deadly Hendra virus.

The study focused on an isolated colony of straw-coloured fruit bats on islands off the west coast of central Africa. By capturing the bats and collecting blood samples, scientists discovered these animals have antibodies that can neutralise deadly viruses known in Australia and Asia.

The paper is published today, 12 January, in the journal PLoS ONE, and is a collaboration of the Department of Veterinary Medicine at the University of Cambridge, the Zoological Society of London and the CSIRO Australian Animal Health Laboratory.

Hendra virus in Australia and Nipah virus in Asia are carried by fruit bats and sporadically "spill over" into people with tragic consequences. The findings of the new study are significant as they yield valuable insights for our understanding of how these viruses persist in bat populations.

Cambridge PhD student Alison Peel explains, "Hendra and Nipah viruses cause fatal infections in humans, but we currently understand very little about how the viruses are transmitted from bats to other animals or people. To understand what the risk factors for these 'spill-overs' are, it is crucial to understand how viruses are maintained in bat populations. The ability to study these viruses within an isolated bat colony has given us new insight into these processes."

It was previously believed that these viruses were maintained in large interconnected populations of bats, so that if the virus dies out in one colony, it would be reintroduced when bats from different colonies interact. The new study indicates that a closely related virus is able to persist in a very small and isolated population of bats. This is the first time this has been documented in a natural wild population, casting doubt on current theories.

Peel added, "Although Hendra and Nipah viruses are relatively new to science, it appears that bats have lived and evolved with them over a very long time. We hope that by gaining a better understanding of this relationship, we may then be able to understand why it is only within the last 20 years that spill-over to humans has occurred."

The Microbiome and Disease: Gut Bacteria Influence the Severity of Heart Attacks in Rats
ScienceDaily (Jan. 12, 2012) — New research published online in the FASEB Journal suggests that the types and levels of bacteria in the intestines may be used to predict a person's likelihood of having a heart attack, and that manipulating these organisms may help reduce heart attack risk. This discovery may lead to new diagnostic tests and therapies that physicians use to prevent and treat heart attacks. In addition, this research suggests that probiotics may be able to protect the heart in patients undergoing heart surgery and angioplasty.

"Our discovery is a revolutionary milestone in the prevention and treatment of heart attacks," said John E. Baker, Ph.D., study author from the Division of Cardiothoracic Surgery at the Medical College of Wisconsin in Milwaukee. "The biochemical link between intestinal bacteria, their metabolites, and injury to the heart will reduce the risk of death from a heart attack and, coupled with the use of probiotics, will ultimately be able to improve the overall cardiovascular health of the human population."

To make this discovery, Baker and colleagues conducted experiments involving three groups of rats. The first group was fed a standard diet. The second group was treated orally with the antibiotic vancomycin in the drinking water. The third group was fed a probiotic supplement that contains Lactobacillus plantarum, a bacterium that suppresses the production of leptin.

The group treated with the antibiotic had decreased levels of leptin (a protein hormone that plays a key role in appetite and metabolism), which resulted in smaller heart attacks, and improved recovery of mechanical function as compared to the group fed a standard diet. The antibiotic reduced total bacterial numbers in the intestines and altered the abundance of specific types of bacteria and fungi that live in the gut. Treating these rats with leptin was shown to offset the protection produced by the antibiotic treatment. The third group was fed a probiotic that also altered the numbers and types of bacteria and fungi living in the gut. Like those fed the antibiotic, these rats also had decreased leptin levels, resulting in smaller heart attacks and greater recovery of mechanical function as compared to the first group. Treating these rats with leptin also was shown to offset the protection produced by the probiotic.

"We may not be ready to prescribe yogurt to prevent heart attacks, but this research does give us a much better understanding of how the microbiome affects our response to injury," said Gerald
Weissmann, M.D., Editor-in-Chief of the *FASEB Journal*. "Just as physicians use cholesterol levels, blood pressure, and overall body composition as measures of heart disease risk, we may soon evaluate our body's susceptibility to disease by looking at the microbes that inhabit the gut."

**Journal Reference:**

**Is a viral load just below 50 copies/ml low enough to ensure the long-term success of HIV therapy?**
Michael Carter
Published: 16 January 2012
Suppressing viral load to below 50 copies/ml may not be enough to ensure the long-term success of antiretroviral therapy, according to a UK study published in the March edition of *Clinical Infectious Diseases*.

Using ultra-sensitive viral load assays, investigators at the Royal Free Hospital, London, found that patients with a viral load between 40-49 copies/ml were significantly more likely to experience a rebound in viral load above 50 copies/ml and 400 copies/ml when compared to individuals with viral load between 39 and 3 to 10 copies/ml and patients with a truly undetectable viral load.

The investigators recommend “treatment efficacy should be reviewed” for patients whose viral load is above the very lowest levels.

However, the authors of an editorial accompanying the study are less convinced about the significance of its findings.

The goal of modern HIV therapy is a viral load below 50 copies/ml. Studies have shown that a sustained increase above this level is associated with the virological failure of therapy and the emergence of drug-resistant strains of HIV.

Assays capable of accurately measuring viral load to 40 copies/ml have been developed. In approximately two-thirds of cases, the assays can also detect viral load to a threshold of 10 copies/ml.

Viral load at an ultra-low level – between 3 to 10 copies/ml – is often labelled “residual viraemia” and cannot be eradicated with treatment intensification.

In 2006, the Royal Free Hospital started to use the Roche Real Time viral load assay with a lower detection limit of 40 copies/ml in routine HIV care.

Investigators wished to see if a low but detectable viral load was associated with an increased risk of subsequent rebound in viral load above 50 copies/ml and 400 copies/ml, when compared to individual whose viral load was completely undetectable.

The retrospective study involved 1247 patients all of whom were taking suppressive HIV therapy.

A random viral load measurement for each patient was extracted from his or her records. This showed that 19% of patients had a viral load between 40 and 49 copies/ml; 41% had a viral load between 39 copies/ml and residual levels; and 40% had a truly undetectable viral load.

There were significant differences between these categories of patient.

Most notably, individuals with a viral load between 40 and 49 copies/ml had been taking HIV therapy for a median of 0.2 years. This compared to a median of 1.9 years for patients with viral load between 39 copies/ml and residual levels and a median of 3.2 years for patients with undetectable viral load (p < 0.001).

In addition, patients with a viral load between 40 and 49 copies/ml had significantly poorer adherence than those with lower viral loads.

A total of 211 out of the 1247 patients experienced a rebound in viral load above 50 copies/ml, with viral load increasing above 400 copies/ml for 40 patients.

The risk of rebound differed significantly according to viral load at the time of random measurement.

Just over a third (34%) of patients with a viral load between 40 and 49 copies/ml experienced a rebound in their viral load above 50 copies/ml. This compared to 11% of those with a viral load between 39 copies/ml and residual levels, and 4% of patients with an undetectable viral load (p < 0.001 for all comparisons).

An increase in viral load above 400 copies/ml occurred in 13% of patients with viral load above 40 copies/ml, compared to 4% of individuals with a viral load between 39 copies/ml and residual levels and 1% of those with an undetectable viral load.

Analysis confirmed an association between detectable viral load and an increased risk of rebound.
Compared to patients with only residual viraemia, individuals with a viral load between 40 and 49 copies had a more than four-fold increase in their risk of viral load rebounding above 50 copies/ml (HR = 4.68; 95% CI, 2.40-9.12). For patients with a viral load between 39 copies/ml and residual levels the risk was increased two-fold (HR = 2.33; 95% CI, 1.26-4.31).

Length of viral suppression was also an important determinant of rebound above the 50 copies/ml threshold (p = 0.005).

A detectable viral load was also associated with an increased risk of viral rebound above 400 copies/ml.

Once again, the risk was highest for those with a viral load in the 40 to 49 copies/ml range (HR = 10.71; 95% CI, 3.30-34.81) when compared to individuals with an undetectable viral load. However, the risk was also increased for patients with a viral load between 39 copies/ml and residual levels (HR = 3.78; 95% CI, 1.23-11.59).

Time since starting effective HIV therapy was associated with a lower risk of rebound above 400 copies/ml (p = 0.03).

However, the risk of resistance did not differ according to viral load before rebound above 400 copies/ml.

Adherence was not associated with a risk of rebound in multivariate analysis and there was no significant difference in efavirenz levels according to viral load level in a subset of 186 patients taking efavirenz who were equally divided between those with viral loads above the residual level and those with completely undetectable viral load.

“The goal of HAART [highly active antiretroviral therapy] may need to be revised to a lower cutoff than 50 copies/ml,” conclude the investigators.

However, the authors of the accompanying believe “there are reasons to pause before adopting this recommendation.”

In particular, they note that viral load had been suppressed for a significantly shorter duration in patients with a viral load between 40 to 49 copies/ml compared to those with a truly undetectable viral load. This suggested that these individuals had not yet achieved the full viral suppression that can be accomplished with longer-term HIV therapy.

US treatment guidelines now recommend that 200 copies/ml should be considered the threshold for suppressive HIV therapy.

“The findings of the current study suggest that this threshold may be too high for a patient who has quantifiable and persistently detectable viremia, but confirmatory studies are needed,” suggest the authors.

“Until such studies are available, a careful assessment of adherence should be the first response to low levels of viremia. Whether treatment for such individuals should be modified or intensified is currently unknown.”

**Reference**


**What do we know about AIDS deaths in South Africa?**

By Nathan Geffen

Published: Jan. 16, 2012, 9:10 a.m., Last updated: Jan. 16, 2012, 10:36 a.m.

The obscure Italian Journal of Anatomy and Embryology has published an article by AIDS denialist Peter Duesberg packed with errors. It claims that data from Uganda and South Africa shows that there is no evidence of an HIV epidemic. This journal, whose title indicates no expertise in HIV, has a [track record of publishing peer-reviewed AIDS denialist nonsense](#).
It is very unlikely that any genuine expert in AIDS statistics would have given their paper the go-ahead.

The article will have no influence on medical science. Nor is it likely to influence the South African government; the days of state-supported AIDS denialism are gone. Nevertheless its publication and the subsequent unnecessary publicity it received in the world's leading science journal, Nature, provide a good opportunity to explain how we do know there is a massive HIV epidemic in South Africa.

The two main arguments Duesberg et al. offer are that (1) the population has increased by 20 million in the past three decades and (2) mortality reports released by Statistics South Africa (Stats SA) show relatively few AIDS deaths.

The first argument, that the population has increased, can be swiftly dealt with. The annual number of births in South Africa over the last two decades has been between 1 and 1.2 million. By the best estimate the number of deaths rose between 1997 and 2006 from about 400,000 to about 650,000 annually. This rise in deaths, as I explain below is entirely consistent with our large HIV epidemic, but it is still far below the number of births: hence South Africa’s population has risen. Source: ASSA2008 Provincial Outputs

The second argument is one that has been raised repeatedly by denialists, despite the fact that a little bit of analysis shows it is wrong.

Stats SA regularly publishes a mortality report which tabulates death statistics based on death notification forms. Every time someone dies in South Africa, a death certificate is supposed to be filled in and eventually finds its way into national statistics. A doctor is supposed to indicate the underlying cause of death and Stats SA always publishes the top 10 such causes for natural deaths. It is true that HIV as the underlying cause of death features near the bottom of the top 10 and is quite low. For example in 1997 there were just over 6,600 recorded HIV deaths and this rose to just under 18,000 in 2009.

The reason for this massive underestimate of HIV deaths is explained in an article published in 2005 by Medical Research Council researchers:

In a country such as South Africa, where the HIV status of the deceased is often unknown or the medical certifier does not have access to a full medical history, mis-classification to the immediate cause of death rather than the underlying cause often takes place. Furthermore, since 1992 it has been possible for traditional headmen to complete an abbreviated death notification form, often resulting in misclassification of the cause of death to a generalized ill-defined rubric ... in some rural areas.

In addition, some doctors are reluctant to write HIV as the underlying cause because, even though the cause of death is noted on a confidential form, they remain worried that insurance companies will access the forms and thereby deny funeral and life-insurance payouts to the families of the dead.

But the evidence for a massive increase in deaths due to AIDS is nevertheless abundant from the death data.
1. The number of recorded deaths in SA in 1997 was 316,505. This rose to 613,040 in 2006 and has since declined to 572,673 in 2009. Improved registration and population growth only explains this partially. I am not using false accuracy here; these are the actual counts of recorded death certificates. According to Stats SA, about 80% of deaths are recorded. Sources: Stats SA P0309.3 reports 2005 and 2011.

2. The number of recorded deaths from opportunistic infections associated with HIV has risen dramatically. For example, Tuberculosis deaths rose from 22,071 in 1997 to 77,009 in 2006. This is by far the biggest cause of recorded deaths. Influenza and Pneumonia deaths rose from 11,518 in 1997 to 52,791 in 2006 to become the second-largest cause of death after TB. Deaths due to Intestinal Infectious Diseases was not in the top 10 in 1997. In 1998 it was 9th at 8,808. In 2006 it was 3rd at 39,239. Most of the increases in these causes of death were almost definitely due to HIV.

3. By contrast death from Ischaemic Heart Disease rose marginally from 9,797 in 1997 to 13,025 in 2006. Diabetes deaths rose a bit more significantly, from 10,828 to 19,549 (and South Africa is indeed experiencing a diabetes epidemic). While these causes of death are not commonly associated with HIV, it's quite conceivable that their relatively small increases are at least in part explained by HIV since we know that HIV also increases the risk of death from non-AIDS causes. For example, the SMART trial found that untreated HIV causes increased risk of dying from heart disease.

4. With the introduction of antiretroviral treatment (ART) in the public sector in 2004, the number of people on treatment has risen to approximately 1.5 million. This correlates with a decline in recorded deaths in recent years, which is what would be predicted by an increase in the number of people taking ART. This decrease in deaths is the one silver lining of the South African epidemic.

5. Andrew Warlick and I prepared the graph below for the Treatment Action Campaign some years ago. It shows the changing age pattern of deaths in South Africa. It is perhaps the most compelling proof of the massive HIV epidemic in SA. It destroys AIDS denialism in one pretty picture. It shows how in 2004 the women who died in South Africa were mainly young adults, not old people. This was in contrast to 1997 as well as the situation in Brazil in 2004, a country with a comparatively tiny HIV epidemic. Only the presence of the large HIV epidemic in South Africa can explain this.

6. In 2002, Stats SA closely analysed a 12% sample of death certificates. The death certificates often contained synonyms for deaths caused by HIV and, in contrast to the standard mortality reports that Stats SA publishes, these were counted as AIDS. It offers clear evidence of the growing epidemic. In 1997 TB and HIV were responsible for 6.5% and 4.6% of underlying causes of death respectively. This steadily rose to 9.7% and 8.7% in 2001. The only larger causes were Unspecified unnatural causes (15.3% and 8.2% in 1997 and 2001 respectively) and ill-defined causes of mortality (8.6% in 1997 and 2001). Influenza and Pneumonia deaths rose dramatically too. But deaths due to diseases not usually related to AIDS didn’t show similar increases. For example, heart disease deaths declined.

8. The Actuarial Society of South Africa uses multiple sources to calibrate its models in order to
come up with the best estimate of the number of annual AIDS deaths in South Africa. Their latest
published model, ASSA2008, calculates that between 1997 and 2008, 2.1 million people died of AIDS in
South Africa. That’s an average of nearly 500 people per day. It’s difficult to fathom such a catastrophe. By
comparison it’s almost the equivalent of the 2004 Tsunami happening in just one country every year, year
after year. In 2006, the worst year of the epidemic so far, over 700 people died daily.

All of the above is of course ignored by Duesberg et al. But it is well known to experts on the South
African epidemic. This raises a perplexing question: who were the peer reviewers of the Duesberg et al.
article? It is very unlikely that any genuine expert in AIDS statistics would have given their paper the go-
ahead.

A genetic accelerator hits the gas on autoimmune diseases

Italian researchers found a DNA sequence that cause the most severe cases of lupus

A “genetic accelerator” is responsible for the most severe cases of Lupus (systemic lupus erythematosus),

an autoimmune disease: the accelerator, called enhancer HS1.2, speeds up the activity of some critical
genomes of the immune system involved in the disease.

A team of Italian researchers at the Catholic University of Sacred Heart in Rome found that the
enhancer HS1.2 is like the accelerator of the car and boosts the pathological immune response typical of
the disease by enhancing the production of the pathological antibodies that attack the patient's body
instead of defending it (autoantibodies).

Professor Gianfranco Ferraccioli, Head of the Rheumatology Unit of Rheumatology and Internal
Medicine of the Catholic University led the research in collaboration with Professor Domenico Frezza at
Tor Vergata University of Rome and Professor Raffaella Scorza at University of Milan and they published
their results in the Annals of the Rheumatic Diseases.

The discovery could lead to more targeted and effective therapies against this complex disease, in
particular against the most severe cases, Professor Ferraccioli explained.

Systemic lupus erythematosus is an autoimmune disease, that is a condition in which the patient’s
immune system goes haywire and begins to attack the body rather than defend it. Lupus affects about
60,000 people in Italy, with a major prevalence among females. Lupus affects so several different organs
and tissues and causes a variety of symptoms, including joint pain, fever, skin rashes, hair loss, Raynaud’s
disease, anemia, nephritis.

The therapies currently used are based on cortisone, anti-malarial drugs and immunosuppressants
(azathioprine, mycophenolate, cyclophosphamide) and biologic drugs (rituximab, Belimumab).

But in many cases Lupus is more aggressive and so far the origin of this particular severity was quite
unclear.

Italian researchers discovered that the cause of the most severe cases is the accelerator HS1.2
enhancer. Enhancers are DNA sequences that accelerate the activation of neighboring genes and enhance
their functioning, hence the name.

HS1.2 leads to enhanced activation of the "transcription factor NF-KB" (a transcription factor is a
molecule that "reads" the genes to make them work), which in turn dramatically increases the
aggressiveness of the inflammatory processes underlying the disease.

Italian researchers have discovered that over 30 per cent of the patients has the enhancer HS1.2 in
their Dna and that it causes a more severe form of Lupus.

The researchers reached this finding after demonstrating that the enhancer HS1.2 promotes also
other autoimmune diseases such as rheumatoid arthritis and identified how the enhancer causes
increased susceptibility to autoimmune diseases.

"Our results suggest that new drugs that turn off the enhancer HS1.2, or inhibit its effect on NF-KB,
can stop the disease without the need for immunosuppressive drugs or other therapies with many side
effects," Ferraccioli said. "Moreover the discovery of the role of this enhancer allows us to better classify
patients and formulate a precise prognosis for each one moving toward more personalized care."

Does the La Niña weather pattern lead to flu pandemics?

new study examining weather patterns around the time of these pandemics finds that each of them was
preceeded by La Niña conditions in the equatorial Pacific. The study's authors—Jeffrey Shaman of
Columbia University’s Mailman School of Public Health and Marc Lipsitch of the Harvard School of
Public Health—note that the La Niña pattern is known to alter the migratory patterns of birds, which are thought to be a primary reservoir of human influenza. The scientists theorize that altered migration patterns promote the development of dangerous new strains of influenza.

The study findings are currently published online in PNAS.

To examine the relationship between weather patterns and influenza pandemics, the researchers studied records of ocean temperatures in the equatorial Pacific in the fall and winter before the four most recent flu pandemics emerged. They found that all four pandemics were preceded by below-normal sea surface temperatures—consistent with the La Niña phase of the El Niño-Southern Oscillation. This La Niña pattern develops in the tropical Pacific Ocean every two and seven years approximately.

The authors cite other research showing that the La Niña pattern alters the migration, stopover time, fitness and interspecies mixing of migratory birds. These conditions could favor the kind of gene swapping—or genetic reassortment—that creates novel and therefore potentially more variations of the influenza virus.

“We know that pandemics arise from dramatic changes in the influenza genome. Our hypothesis is that La Niña sets the stage for these changes by reshuffling the mixing patterns of migratory birds, which are a major reservoir for influenza,” says Jeffrey Shaman, PhD, Mailman School assistant professor of Environmental Health Sciences and co-author of the study.

Changes in migration not only alter the pattern of contact among bird species, they could also change the ways that birds come into contact with domestic animals like pigs. Gene-swapping between avian and pig influenza viruses was a factor in the 2009 swine flu pandemic.

**Pfizer tests a concept that could modernize drug studies**

**Published: Sunday, January 15, 2012, 7:49 AM**

By Susan Todd/The Star-Ledger

For the pharmaceutical industry, it’s another part of the business that cries out for change: the complex and costly human studies involved in developing new medicines.

Pfizer, the world’s largest drug maker, is preparing to test a “virtual” clinical trial which would allow patients to participate from their homes, eliminating the time and expense of traveling to medical schools or other study sites.

For now, it’s just an experiment, according to Craig Lipset, head of Pfizer’s clinical innovation efforts. “It’s about trying to reinvent the way we’re capturing data,” Lipset said, ”and the way we’re conducting clinical trials.”

The idea of tinkering with the clinical trial process isn’t hard to understand given the current trends in healthcare — the proliferation of electronic record-keeping, the availability of apps for managing medication and the emergence of e-patients who willingly share details of their health online.

The ability for patients to log into a website and report data electronically creates the possibility of reducing expenses and eliminating some of the inconvenience and demanding requirements, according to people familiar with the clinical trial process. Still, some experts think drug studies require patients and the data they generate for researchers to be more closely monitored than the “virtual” trials allow.

Clinical trials are critical to drug development, but they are also onerous. On average, they can take eight years to complete, require thousands of people and millions of dollars. They can also involve testing sites scattered across the country or around the world.

Heavily regulated and complicated by science as well as statistics, the studies are required by federal regulators to prove that a prospective drug works effectively and safely.

Pfizer isn’t the only company interested in finding new ways to make the trials less cumbersome while still meeting the standards set by federal regulators. Merck and Johnson & Johnson are also exploring ways to improve and modernize the clinical trial process.

"The way clinical trials are right now, they are definitely cumbersome," said Sunanda Gaur, director of the Pediatric Clinical Research Center at Robert Wood Johnson Medical School. "It's very difficult, time-consuming experience for (study volunteers), but it's necessary."

Pfizer, which has its headquarters in New York City and operations in several locations in New Jersey, is currently recruiting individuals to participate in an experiment that will involve an approved medicine for overactive bladder. "They're testing on an approved drug because it's the process that they're really testing,” Lipset said.
Pfizer’s experiment will allow patients to remain at home rather than requiring them to travel to a medical school or some other clinical trial site. The patients will be supplied with cellphones and provided with Internet access so they can access a special website where data — in this case, urine frequency, urgency and side effects — will be collected and managed by Pfizer’s internal team.

Lipset said the patients will have to submit some data at the start of the trial, make about four "virtual" visits by providing data to Pfizer via the web site. During the 16-week "virtual" clinical trial, patients will also be able to speak with a member of the study staff at any time.

Even the recruitment phase is testing new ground. Lipsky said Pfizer is tapping social media outlets and bloggers to recruit volunteer patients. The goal is to gather 600 women with overactive bladders who are willing to participate in the remote trials.

Jeff Sherman, a managing partner at BioEndpoint Consulting in Lawrenceville, is doubtful that the virtual model will become widely used in the industry.

Clinical trials, he said, are not taken lightly by the Food and Drug Administration. Regulators would have to be closely involved in designing and setting up an actual virtual drug study and still, some drug makers would likely consider it to be too risky to rely on self-reported data, he said.

"If you ask researchers, the term clinical trial has a very significant meaning, they're carefully designed, they're blinded so the results can’t be skewed," he said. "It’s a profession in and of itself.”

Lipset isn’t surprised by Sherman’s reaction.

"Many people pointed to the Food and Drug Administration and said that would be the biggest hurdle,” Lipset said. But it wasn’t. The agency, he said, has supported the industry’s efforts to explore possible changes.

It’s no wonder why. The late stage of a clinical trial — in industry jargon, it is known as Phase 3 — is generally considered the largest and most expensive part of a study. The Phase 3 stage of a drug study can cost as much as $70 million to complete, according to Sherman.

Gaur, who runs pediatric clinical research center at Robert Wood Johnson Medical School, said she also doesn’t see the self-reporting process being tested by Pfizer as a complete replacement to conventional studies. "It could be an element," she added, "depending on the type of drug being studied.”

But even Lipset doesn’t view "virtual” studies as a panacea.

Digitalizing clinical trials isn’t likely to make recruitment for drug studies suddenly so much easier. Much of the public still doesn’t know a lot about drug studies and how they work.

Even for its virtual trial experiment, Lipset said, Pfizer is looking for a diverse group of women with overactive bladder — all of whom have to feel comfortable using gadgets and sharing information over the Internet. It’s not an easy task.

"It’s still not for every patient," he said. "They're out there. It's just a matter of getting them to understand what we're doing.”

Poland’s Condom Market Shrinks for First Time: Data

Agence France Presse, (01.17.2012)

In the first such drop on record, condom and contraceptive sales in Poland fell by 10 percent and 3.2 percent, respectively, during one year as of October 2011, new data show. Additional analyses of the figures compiled by Nielsen and IMS Health are expected to show the cause of the decline, but some experts already are weighing in. “Youngsters choose condoms more often, and there are fewer and fewer of these youngsters, so [condom] producers are feeling it,” said Professor Zbigniew Izdebski. He added that the government has not launched any high-profile HIV/AIDS prevention campaigns in recent years, and this could contribute to falling condom sales. “Poles are choosing other forms of sex more and more often, and perhaps this is the reason behind the decline of its traditional form,” said fellow sexologist Professor Zbigniew Lew-Starowicz. Professor Aleksandra Jodlko, however, blamed declining sales on depression and stress linked to the tough economy. Although Poland is a devoutly Roman Catholic nation, the sexologists did not cite the church’s prohibition on contraception as being a factor.

WHO To Take Lead Role In Addressing Controversial Bird Flu Research, Official Says

"The World Health Organization says it will take a role in helping sort through an international scientific controversy over two bird flu studies that the U.S. government deemed too dangerous to publish in full," the Canadian Press/Winnipeg Free Press reports. Keiji Fukuda, the WHO's assistant director-general for health security and environment, on Sunday in an interview with the Canadian Press "said the agency will pull together international talks aimed at fleshing out the issues that need to be addressed and
then work to resolve them." On the advice of the National Science Advisory Board on Biosecurity (NSABB), the journals Science and Nature "have grudgingly agreed to abbreviate the papers, leaving out the details of how the work was done," according to the news service.

"When the journals agreed not to publish the papers in full, they did so on the proviso that a system be set up that allows the technical details of the work to be shared with other scientists and perhaps public health authorities on a need-to-know basis," but when "[a]sked if the WHO would be taking on the responsibility for running such a system, which would involve vetting applications to see the work, Fukuda suggested that would be outside the agency's scope," the news service writes. While the journals are expected to publish the papers later this month, "putting together the system to decide who can see the full works and how the details can be safely shared may take several months," the Canadian Press reports (Branswell, 1/15).

**Afghan President Karzai Urges Taliban To Allow Polio Vaccination Teams Into Insurgent-Controlled Areas**

Afghanistan President Hamid Karzai on Tuesday "urg[ed] the Taliban to allow teams conducting a polio vaccination campaign access to areas under their control" and "said that whoever hampers the medical workers 'is the enemy of our children's future,'" the Associated Press/Washington Post reports (1/17). "A total of 80 cases of the crippling disease were reported in Afghanistan last year—a three-fold increase over 2010, the health ministry said on Tuesday, marking a major setback in the drive to eradicate polio worldwide," Agence France-Presse writes, adding that "Karzai appealed to religious and community leaders to persuade the insurgents to allow the immunization teams to vaccinate children" (1/17).

**Counterfeit, Substandard Drugs Threaten Progress In Controlling Malaria In Africa, Researchers Report**

"Hopes of controlling malaria in Africa could be wrecked by criminals who are circulating counterfeit and substandard drugs, threatening millions of lives, scientists" said in a study published in the Malaria Journal last month, the Guardian reports. "They are calling for public health authorities to take urgent action to preserve the efficacy of the antimalarials now being used in the worst-hit areas of the continent," the newspaper adds (Boseley, 1/16). "The counterfeit medicines could harm patients and promote drug resistance among malaria parasites, warns the study, funded by the Wellcome Trust," BBC News writes (1/16).

In the study, Paul Newton from the Wellcome Trust-Mahosot Hospital-Oxford University Tropical Medicine Research Collaboration in Laos, and colleagues report on the make-up of samples of suspect drugs collected from 11 countries in Africa between 2002 and 2010, noting that "some counterfeits contained a mixture of wrong active pharmaceutical ingredients, some of which may initially alleviate malaria symptoms but would not cure malaria," the Guardian writes (1/16). "Failure to take action will put at risk the lives of millions of people, particularly children and pregnant women,' [Newton] said," according to BBC (1/16).

**Short, Sharp Shock Treatment for E. Coli**

ScienceDaily (Jan. 11, 2012) — A short burst of low voltage alternating current can effectively eradicate *E. coli* bacteria growing on the surface of even heavily contaminated beef, according to a study published in the International Journal of Food Safety, Nutrition and Public Health. The technique offers an inexpensive and easy to implement approach to reducing the risk of food poisoning, which can occur despite handlers complying with hygiene standards.

Food poisoning is a serious public-health issue, especially with the emergence of lethal and highly virulent strains of *Escherichia coli* (*E. coli* O157:H7, for example). Infection with this bacterium causes serious diarrhea, dehydration, kidney problems and can lead to serious long-term problems or even be fatal in children, the elderly and people with pre-existing health problems. Tens of thousands of people are affected by *E. coli* infection each year through eating contaminated beef and other food products. The US Centers for Disease Control and Prevention (CDC) estimates that about 2500 people are hospitalized and there are several dozen deaths each year.

Now, Ajit Mahapatra and colleagues at Fort Valley State University, in Georgia and Virginia Tech have demonstrated that applying a low-voltage alternating current to beef samples inoculated with large numbers of the potentially lethal *E. coli* O157:H7 can almost completely deactivate the bacterium, which is usually present on the surface of contaminated meat. The team points out that the level of contamination...
used in their tests far exceeded the contamination that would be seen in commercial carcasses after slaughter.

Previous researchers had demonstrated that electricity can kill bacteria effectively. The study by Mahapatra and colleagues proves efficacy against *E. coli* O157:H7 at low voltage and low alternating current. It offers a quick and easy way to decontaminate at-risk, but otherwise safe beef without recourse to microbicidal chemicals or other more complicated treatment processes.

**Journal Reference:**

**Condoms are slowing HIV spread in South Africa**
18 January 2012

CONDOMS are to thank for falling HIV infection rates in South Africa. So say Leigh Johnson at the University of Cape Town and colleagues. They fed data from 2000 to 2008 on the country's HIV rates, condom use and the number of people taking antiretroviral therapy (ARTs)—which reduce the chances of passing on the virus—into two computer models of viral transmission and prevalence.

Condom use accounted for the vast majority of the decline in HIV, with only up to 17 per cent due to the natural dynamics of the disease, and up to 10 per cent down to the use of ARTs (*Journal of the Royal Society Interface*, DOI: 10.1098/rsif.2011.0826).

David Wilson at the University of New South Wales in Sydney, Australia, says the results highlight that condoms are "the most effective" way to protect against HIV epidemics. Johnson emphasises that all prevention and treatment programmes should be intensified.

**Austria: Man accused of criminal HIV transmission fights "unconstitutional" forced blood test**
18 January 2012

A man in Austria is taking a case to the Constitutional Court that challenges the forcible testing of blood for HIV (as well as for use in phylogenetic analysis) that was legalised on 1 January 2012 through an amendment of the Criminal Procedure Code by the Prevention of Terrorism Act 2011. He is being supported by Rechtskomitee LAMBDA, whose president, Dr. Helmut Graupner, is also his defence counsel.

Full details of the case, and the problematic application of this law, from the Rechtskomitee LAMBDA press release issued today are included in full below (English version is slightly modified from the original release; German is the original.)

From 1 January 2012: Forced Hiv-Testing: Rechtskomitee LAMBDA supports case in the Constitutional Court

The Prevention of Terrorism Act 2011 also amended the Criminal Procedure Code. It makes forcible HIV-testing legal as of 1 January 2012, despite the fact that the Constitution prohibits taking blood by force. A case has already been brought to the Constitutional Court.

The Prevention of Terrorism Act 2011, passed by federal parliament in October 2011, legalizes taking blood by force in order to prove the misdemeanor of *Endangering Human Beings by Transmittable Diseases* (§ 178 Criminal Code). Up to now forcible blood taking (in the case of not intoxicated defendants) had been restricted to sexual felonies or other felonies incurring a maximum penalty of five years.

Since 1 January 2012 this changed, despite the fact that the Constitutional Court prohibits forcible blood withdrawals, as no one may be forced to supply his body as evidence against him. The first case challenging this new power of the criminal police has already been taken to the Constitutional Court.

The applicant, who has no criminal record, is HIV-positive and asks the Constitutional Court to strike down the amendment. The state prosecutor has started proceedings against him under § 178 CC after another HIV-positive man had accused him of infecting him with HIV. Indeed the two men had sex with each other years ago, but in accordance with the safer sex rules propagated by the Ministry of Health and the AIDS Service organisations (oral sex without ejaculation into the mouth).

Blackmailed and reported to the police
The accuser, who has a massive criminal record of violent, drug and property offences, reported the defendant to the police years after the sexual contact and only after the man refused to fulfil his
considerable financial demands. In addition the accuser admitted during his interrogation that he had unprotected sex with others, and he had searched for casual sex ("sexdates") in the internet displaying in his profile the information "Safer Sex: Never". Even more so the man, according to his own depositions, is addicted to heroin and thus had been exposed also to other ways of transmission than the sexual one.

The case against the accuser (for aggravated blackmail) has been dropped immediately after the interrogation of both men due to "conflicting depositions". Not so the case against the defendant for endangering by transmittable diseases (which offence is fulfilled just by engaging in unsafe sex without the necessity of causing infection). Also in regard to this offence there were "conflicting depositions" but the prosecutor wanted a blood test (for phylogenetic analysis).

**Potential for conviction of innocents**

A phylogenetic analysis however cannot prove an infection. And phylogenetic analyses bear the risk of false results and misinterpretation at the expense of a defendant. There are no standards (guidelines) so far for such analyses in forensic context and its results unfortunately again and again are misunderstood and misinterpreted by the courts. UNAIDS and the EU-Fundamental Rights Agency for years have been highlighting this.

So the man did not agree to blood withdrawal from him as he fears, because he is innocent, to be wrongfully convicted on the basis of such a blood test. Since 1 January he now is facing the danger of forced blood taking at any time. Therefore he has addressed the Constitutional Court.

"It is incredible that the governing coalition passed this unconstitutional law," says president of Rechtsskomitee LAMBDA (RKL) and defence counsel of the man, Dr. Helmut Graupner, "As too often we again have to hope for the Constitutional Court".

**GREECE / Minister of Health blames undocumented women for HIV infections and calls for their deportation**

"The infection goes from the illegal migrant women to the Greek client, into the Greek family” announced Greek Health Minister Andreas Loverdos on 15 December 2011 at a public health conference, “HIV infected migrant women should be deported”. While at a UN General Assembly High-Level meeting on AIDS in June 2011, Mr Loverdos recognised human trafficking of Sub-Saharan women brought to Greece and forced to work as prostitutes as a cause of infections, his comments made at national level are remarkably more reactionary. He has been quoted elsewhere as calling undocumented pregnant women as a huge burden on the Greek National Healthcare service (ESY- Ethniko Systima Ygeias) and makes frequent comments to the ‘public health risks’ caused by the ‘influx’ of African and Asian migrants arriving in Greece since 2010. Critics note that the Greek National Health System has been in a state of continued crisis since its establishment in 1983 and accuse Mr Loverdos of scapegoating the most vulnerable and disempowered members of Greek society.

**Virus Related to HIV Found in One Quarter of Ape Hunters in Gabon**

Author: Mark Mascolini
09 January 2012

Nearly one quarter of humans bitten or scratched while hunting nonhuman primates in Gabon had evidence of simian foamy retrovirus (SFV), a virus closely related to HIV. The finding underlines the continuing risk of cross-species transmission of retroviruses.

SFV is a spumavirus closely related to HIV. From 70% to 90% of nonhuman primates born in captivity have SFV, which does not appear to cause symptomatic disease in these animals. Rates of SFV infection in wild primates and transmission risk to humans are not well defined.

An earlier study of people in southern Cameroon found that 7 of 29 (24%) who had contact with apes (gorillas or chimpanzees) tested positive for SFV, compared with 2 of 56 (4%) who did not have contact with apes (Calattini S, et al. Emerg Infect Dis. September 2007, click on link below).

In the new study, researchers collected 286 blood samples and 211 bush meat samples from 497 wild-born nonhuman primates in Gabon. They detected anti-SFV antibodies in 31 plasma samples (11%). The integrase gene sequence could be detected in 38 of 497 samples (8%). Novel SFV sequences were found in several Cercopithecus guenon monkeys.

Of the 78 humans tested, most were hunters. All had been bitten or scratched by nonhuman primates. Nineteen of these people (24%) tested positive for SFV, and 15 (19%) had PCR-confirmed SFV. All but one of these people were infected with ape SFV. Cross-species transmission appeared to result mainly from gorilla bites.
Southerners Have Higher Risk of HIV/AIDS

A new report by the Southern HIV/AIDS Strategy Initiative (SASI) highlights the disproportionate impact the epidemic is having on the South.

Using CDC data, mostly from 2009, Duke University researchers found states in the Deep South—Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and eastern Texas—had the highest rates of new HIV infections compared to other US regions. The Deep South sees 35 percent of all new US infections, though it makes up just 22 percent of the country’s population.

Furthermore, Deep South states lead the nation in new AIDS diagnoses. Eight of the 10 states with the highest death rates from HIV are in the region. “Delayed entry into medical care may be particularly problematic in the South due to barriers such as shortages of health care professionals and high levels of uninsured individuals,” said the report.

Possible reasons for the South’s high numbers include race—blacks are disproportionately affected by the epidemic—lack of sex education, higher incarceration rates, higher rates of other STDs, and worse health indicators overall. Stigma and ignorance about the disease also contribute, said Kathie Hiers, CEO of AIDS Alabama and a SASI steering committee member.

Michael Saag, director of the Center for AIDS Research at the University of Alabama-Birmingham, said the main reasons are poverty and lack of access to medical care.

Despite the disease’s impact on the South, the region has a lower rate of funding for HIV/AIDS programs than the rest of the country, the report said. “You combine those two things, as well as the poverty rates and the lack of education you sometimes get down here, and it’s just a disaster,” said Hiers.

To access the report, visit http://southernaidsstrategy.org/.

India Doctor's Claim of 'Totally' Drug Resistant TB Disputed

Reuters, (01.17.2012) Tan Ee Lyn
Indian government officials are disputing the report of a dozen TB cases in Mumbai that researchers are calling “totally drug resistant.” In December, doctors reported in Clinical Infectious Diseases that the first four such TB cases were diagnosed at the Hinduja National Hospital in Mumbai.

Indian government officials on Tuesday questioned the use of the term “totally drug resistant” and said the laboratory at the hospital was not accredited for some of the tests the researchers conducted. “The term ... is neither recognized by the [World Health Organization] nor by the Revised National Tuberculosis Control Program,” said the Ministry of Health and Family Welfare.

Such cases can be managed by national treatment guidelines for extensively drug-resistant TB (XDR TB), according to WHO.

But the TB cases diagnosed at Hinduja differ from WHO classifications for multidrug-resistant TB (MDR TB) and XDR TB, maintains Zarir Udwadia, a TB doctor at the hospital and the report’s co-author.

“It is an untreatable form of TB in the sense that there are no available first- and second-line drugs for it in the world,” Udwadia said. “XDR is easier to treat ... there are three to four second-line drugs still available which you can treat these patients with, but [for] our patients there is none.”

Udwadia and colleagues cultured bacteria from the patients and found that all first- and second-line treatments were powerless against the TB. The team also performed genetic tests on the samples.

“We confirmed that whether we used traditional culture or genetic [tests], we came up with the same resistance pattern,” Udwadia said. “These patients were already exposed to these drugs and ... they did not work in them.”

Untreatable TB cases have been described previously in medical literature, with cases reported in Europe in 2007 and Iran in 2009.
Positive Youth, Healthy Adults: Does Positive Well-Being in Adolescence Predict Better Perceived Health and Fewer Risky Health Behaviors in Young Adulthood?  
*Journal of Adolescent Health* Vol. 50; No. 1: P. 66–73, (01.2012)  
Lindsay T. Hoyt, MA; P. Lindsay Chase-Lansdale, PhD; Thomas W. McDade, PhD; Emma K. Adam, PhD

The study’s aim was to examine the prospective, longitudinal associations between positive well-being during adolescence and young adults’ health outcomes.

Using data from the first three waves of the National Longitudinal Study of Adolescent Health, the researchers examined positive well-being during adolescence (averaged across Waves I-II) as a predictor of perceived young adult general health and risky health behaviors (Wave III). A full set of health and demographic baseline covariates were included for each model. Missing values were assigned using multiple imputation methods (n=10,147).

The results showed positive well-being during adolescence was significantly associated with reporting better perceived general health during young adulthood, independent of depressive symptoms. In addition, positive well-being was significantly associated with fewer risky health behaviors in Wave III, after adding all covariates, including depressive symptoms and baseline risky health behaviors.

“Few studies of adolescent health have examined positive psychological characteristics, tending instead to focus on the effect of negative mood states and cognitions on health,” the researchers concluded. “This study demonstrates that positive well-being during adolescence predicts better perceived general health and fewer risky health behaviors during young adulthood. Aligned with the goals of the positive youth development perspective, promoting and nurturing positive well-being during the transition from childhood to adolescence may present a promising way to improve long-term health.”

Local TB Case Unusually Virulent  
*Journal Gazette (Fort Wayne)*, (01.13.2012)  
Vivian Sade

A case of active TB diagnosed in December prompted the screening of 150 students at Fort Wayne Community Schools (FWCS). The Fort Wayne-Allen County Department of Health recently learned the initial patient has the county’s first known case of multidrug-resistant TB (MDR TB), meaning it is a strain not responsive to first-line treatment, said spokesperson John Silcox.

The student now is in isolation and undergoing treatment, said Silcox. No one else has been identified as having active TB, although testing is ongoing, he said.

County Health Commissioner Dr. Deborah McMahan said MDR TB spreads the same way as regular TB, but treatment is different. Treating regular TB typically involves four drugs over the course of six months; a person with MDR TB must be given six drugs for two years, McMahan said. “When the [medications] don’t work, they almost always resort to surgery as treatment,” she noted.

The student was in an all-day program at Anthis Career Center and the exposure risk was minimal, said FWCS spokesperson Krista Stockman. The parents of those determined to be at risk were notified by telephone and letter. A second round of TB skin testing is needed to rule out infection, so it will likely be a few months before health officials learn whether any others are infected and need treatment.

“Because we know that some of the individuals being tested are high risk for having prior TB exposure, we anticipate having some positive skin tests during the first round of testing,” said McMahan. “We will need to be careful in how we interpret these results, and it will likely be some time before we know if any of these positive cases are linked to this index case.”

The health department has set up a hotline for people with questions or concerns; telephone 260-449-8739.

Intestinal Worms May Help Promote Healing  
ScienceDaily (Jan. 10, 2012) — Intestinal worm infections may not be all bad, according to a new study. In research on mice immune reaction to the presence of intestinal worms was found to promote wound healing in the lungs. The researchers have found cytokines that help oust intestinal worm infections in mice also soothe the associated lung injury and inflammation. Cytokines are proteins released by cells that in turn play a role in communications among various cells in the body.

The new study has been published online in advance of print in *Nature Medicine*.

Many intestinal worms take a detour through the lungs en route to the gut. One such worm is *Nippostrongylus brasiliensis*, the equivalent in rodents to human hookworm, which currently infects over 700 million people worldwide. As this worm passes through the lungs, it induces tissue damage and inflammation.
To counter this assault, the body mobilizes a specific type of immune response called a Th2 response, which promotes expulsion of the worms. But the benefits of Th2 don’t end there, according to the new research. Specific cell populations and immune proteins induced during a Th2 response to these parasites, including macrophages and interleukin (IL)-4 and -13, help to repair the worm-induced damage to the lungs. The parasite-induced Th2 response appears to activate multiple factors that are important in acute wound healing and control of inflammation, which together orchestrate an enhanced wound healing response. In mice unable to respond to these proteins, the researchers found that lung damage went unchecked.

Thus it is possible that promoting Th2 responses, triggered by parasites, may be beneficial in the treatment of wounds as well as acute lung injury caused by respiratory infections such as pneumonia.

**Journal Reference:**
Fei Chen, Zhugong Liu, Wenhui Wu, Cristina Rozo, Scott Bowdridge, Ariel Millman, Nico Van Rooijen, Joseph F Urban, Thomas A Wynn, William C Gause. *An essential role for TH2-type responses in limiting acute tissue damage during experimental helminth infection.* Nature Medicine, 2012; DOI: 10.1038/nm.2628

**New Analysis: Failure to Address Pandemic Among Gay Men and Other Men who have Sex with Men (MSM) Imperils Goal of “AIDS-Free Generation”**

New report calls for urgent reforms by donors, multilateral institutions, and national governments

**NEW YORK, January 18, 2012**—Funding to prevent and treat HIV/AIDS consistently fails to reach programs designed to control the disease among gay men and other men who have sex with men (MSM), according to a new analysis released Wednesday by amfAR, The Foundation for AIDS Research and the Center for Public Health and Human Rights (CPHHR) at Johns Hopkins University. The report finds that resources dedicated to addressing the epidemic among MSM are grossly insufficient, and that funding intended for this population is often diverted away from MSM-related services.

Despite Obama Administration leadership in setting bold new targets to tackle global AIDS and highlight the human rights of MSM and other sexual minorities, U.S. government aid intended to prevent and treat HIV infection among MSM continues to encounter obstacles throughout the world.

The new report, “Achieving an AIDS-Free Generation for Gay Men and Other MSM,” provides the most comprehensive analysis to date of HIV-related funding and programming for this population. Focusing on eight countries, the report finds that national governments have failed to adequately tackle the epidemic among MSM. The findings are especially dire in countries that criminalize MSM. In those settings, governments spend fewer resources on HIV-related health services for MSM, do less to track and understand the epidemic, and are more likely to repurpose donor funds intended to fight the epidemic among MSM.

International efforts such as the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria have made great strides against the global epidemic, including more recent efforts to reach MSM. Yet these and other donors typically fail to collect and analyze basic information about the epidemic among MSM. In settings where MSM are persecuted, this lack of data is often used to justify under-funding and marginalization.

“These data show an astonishing lack of support for MSM populations around the world, but most especially in countries where MSM are criminalized and persecuted,” said amfAR CEO Kevin Robert Frost. “Gay men and other MSM pioneered the global response to HIV in developed countries and have contributed significantly to the development of programs globally. However, they have been mostly excluded from these very services and programs in the developing world. This report lays out concrete steps that donors and national governments should take without delay to address the pandemic among MSM.”

The report examines the progress and shortcomings of PEPFAR, the Global Fund, and the UNGASS reporting system, managed by UNAIDS, and draws on data collected from on-the-ground researchers in eight countries: China, Ethiopia, Guyana, India, Mozambique, Nigeria, Ukraine, and Viet Nam. Using a standardized evaluation tool, civil society consultants studied the funding and implementation of MSM-related programming. Each consultant uncovered a range of issues related to funding allocations and service delivery, providing an in-depth view of the challenges facing MSM and their access to HIV treatment, care, and prevention services.

Among their findings:
With few exceptions, MSM are deprioritized and marginalized by HIV programs regardless of epidemic type or disease burden. For example, this analysis found that in Guyana, funding for MSM programs dropped 96% between initial proposal and final budget.

Epidemiological surveillance of MSM in many countries is woefully inadequate to determine the true burden of HIV among MSM. This makes it much more difficult for international monitors, including UNGASS, to assess the needs of MSM in each country, and further complicates allocation and monitoring by donors.

In countries where homosexuality is criminalized, such as Nigeria and Ethiopia, many MSM forgo seeking medical care out of fear of government-sanctioned punishment. Despite billions of dollars in funding for HIV programs, both countries continue to make international headlines for persecution and violence against MSM.

Efforts to streamline donor bureaucracy are being undertaken without consideration of their impact on vulnerable populations. Consolidated funding streams, broad health systems investments, and reduced reporting requirements may ultimately undercut efforts to direct money to more effective interventions.

In addition to the eight country reports, the overall report also includes recommendations for national governments, PEPFAR, the Global Fund, and UNGASS.

“For the first time, we have specific data to help us understand why MSM are omitted from national HIV/AIDS surveillance systems and are subsequently excluded from HIV/AIDS services in countries that rely on foreign assistance from international donors,” said Stefan Baral, associate director of the CPHHR at Johns Hopkins Bloomberg School of Public Health. “As an international community, we must take these data and work with donors and governments to better address the needs of gay men and other MSM throughout the world. We will never create an ‘AIDS-free generation’ if we don’t get the epidemic under control among MSM.”

AFRICA: Snake oil salesmen and dodgy HIV “cures”
NAIROBI/JOHANNESBURG, 19 January 2012 (PlusNews)—Uganda’s National Drug Authority recently arrested sales representatives of a company selling a drug that purports to cure HIV; the firm’s owners are not licensed to sell medicine and are being sought by the police.

The drug, known as Virol ZAPPER, was being sold in 37ml liquid doses, each costing about US$210; patients were advised to take 10 drops daily. It was being advertised on local radio and TV stations as a miracle cure for HIV.

The sale of such “cures” is a profitable racket for charlatans willing to take advantage of desperate HIV-positive people; here is a collection of some dodgy treatments that have made the news in Africa over the years:

Tanzania—In 2011, tens of thousands of people from all over East Africa flocked to the tiny village of Loliondo in Tanzania seeking a cure for several diseases, including diabetes, tuberculosis and HIV. Ambilikile Mwasapile, a former Lutheran pastor, was charging 500 Tanzanian shillings—about $0.33—for a cup for his concoction.

Several sick people died in the queues, which at their peak numbered 15,000 people. Studies are being conducted to determine the properties of Mwasapile’s treatment.

South Africa—A 2008 Cape High Court judgment ruled that clinical trials of multivitamins in the treatment of HIV/AIDS by controversial vitamin salesman Matthias Rath were unlawful, and stopped them. The court also prohibited Rath from publishing any more advertisements claiming that his product, VitaCell, cured AIDS, pending further review by the Medicines Control Council.

Rath, who had been operating in South Africa since about 2004, claimed his multivitamins treated AIDS, heart disease, cancer, diabetes, bird flu and numerous other illnesses. Rath ran numerous advertisements aimed at convincing HIV-positive people to take his high-dose multivitamins rather than ARVs, available free-of-charge through the public health system, which he claimed were "toxic".

Kenya—In 2008, the government warned HIV-positive people in the country’s eastern Coast Province to reject herbal “cures” peddled by fake herbalists who claimed their concoctions contained unique ingredients that could boost the immune system and even cure HIV.

An estimated 80 percent of Kenyans use traditional healers either exclusively or in conjunction with western medicine; the government is drafting regulations to stop fraudulent herbalists from practising.
Gambia—In 2007, President Yahya Jammeh was roundly denounced by AIDS activists when he said he had found a cure for HIV/AIDS and began treating citizens. Shortly after his announcement, Jammeh expelled the most senior UN official in the country for questioning his "cure".

The programme is still running, but more Gambians are choosing ARVs over Jammeh's treatment.

Ethiopia—In 2007, thousands of HIV-positive patients flocked to Entoto, an ancient mountain north of the capital, Addis Ababa, seeking a "holy water" cure for AIDS after local priests said they could cure HIV.

The Archbishop of the Ethiopian Orthodox Church, Abune Paulos, later advised patients to continue with their ARVs even as they sought healing at Entoto.

São Tome and Principe—In 2007, questions were raised about Dorviro-Sida, or "Put AIDS to sleep" in Portuguese, an anti-AIDS herbal remedy produced by Amancio Valentim, president of the Association of Traditional Medicine of São Tome and Principe. Valentim claimed three tablespoons of the brownish syrup, taken every day before meals, could reduce the viral load and make patients feel better; he said four patients who had taken the drug for four years had tested negative for HIV.

AIDS activists were concerned the drug could make HIV-positive people complacent about taking their ARVs, and the health ministry said it did not support Valentim's treatment.

South Africa—In 2006, a clinic in South Africa's east coast city of Durban began to sell "ubhejane"—a herbal mixture believed to treat HIV/AIDS.

The controversial traditional medicine received vast media coverage, mainly due to the backing it received from influential political figures such as the former health minister, Dr Manto Tshabalala-Msimang, and provincial health officials. Ubhejane, a dark brown liquid sold in old plastic milk bottles, had not undergone any clinical trials to test its efficacy. All that the tests confirmed was that it was not toxic.

But HIV-positive patients were far more willing to accept the traditional medicine as an effective remedy, flocking to the clinic to buy a full course of the herbal remedy that retailed at R374 ($40).

Uganda—In 2006, the Ugandan government banned the use of a popular anti-AIDS herb remedy known as "Khomeini", after tests found it provided no cure. Iranian Sheikh Allagholi Elahi claimed the drug—which contained olive oil and honey and cost $1,650 per dose—could cure HIV/AIDS and TB in three weeks.

Studies by experts in Uganda and Kenya found that while patients had gained weight due to the nutritional content of the drug, it was incapable of curing HIV.

Police Oppose Safe Injection Sites

*Toronto Star*, (01.12.2012)

In interviews and focus groups, police in Toronto and Ottawa voiced strong opposition to supervised drug consumption sites (SCSs), according to a new study. The first analysis of regional law enforcement perceptions of SCSs found police do not believe the intervention is a way to reduce harm from illegal drug use. Those interviewed, 18 officers of various ranks, also said SCSs do not address addiction.

In the study, Toronto Police Chief Bill Blair expressed concern over “the ambiguous messaging that comes out from a society that says you can’t use these drugs, they’re against the law, but if you do, we’ll provide a place to do it in.” “It’s a little problematic when you’re trying to explain to young people about the consequences of illegal drug use,” he said. “And we are interested in trying to discourage them from that.”

The police officers generally distrusted previous studies showing public health benefits of SCSs, where drug users inject under medical supervision as a means to prevent overdoses and infections, including HIV and hepatitis. Research has shown that SCSs have been associated with a drop in fatal overdoses and public drug use, and with health care savings, among other findings. The officers polled, however, put greater stock in colleagues’ anecdotes and their own police work with drug-related activities.

A report on whether Toronto and Ottawa could benefit from SCSs is expected this year. Such an intervention in Toronto “likely represents good value for money,” initial data indicate.

While small, the new study represents a good starting point for addressing police concerns, said Dr. Chris Beyrer, director of the Johns Hopkins Center for Public Health & Human Rights.

Sexual Risk Behavior Among HIV-Positive Patients at an Urban Clinic in Santiago, Dominican Republic

AIDS Care Vol. 23; No. 12: P. 1637-1643, (12..2011)  David Sears; Claudia Cabrera; Francisco Ortiz; Bradley Anderson; Michael Stein

In the Dominican Republic, more than 1 percent of adults are HIV-infected; most transmissions of the virus occur sexually. The current study examines risk behaviors in a group of HIV-positive individuals receiving treatment in Santiago.

The researchers interviewed 129 patients seen in May 2006 in one of the nation's largest public hospital HIV clinics. The interviews collected information including demographics, sexual history, and condom use, and they focused on the patients’ last sexual encounter.

The majority of patients (72.4 percent) reported they had been sexually active since being diagnosed with HIV. After their diagnosis, 72.8 percent of patients who were sexually active used condoms more frequently; 21.7 percent used condoms with the same frequency; and 5.4 percent used condoms less often.

The most common reason for not using condoms after being diagnosed with HIV differed by gender: Men cited decreased sexual pleasure (70 percent), while women reported their partner had refused to wear a condom (71.8 percent). Patients who were sexually active and believed their partner was HIV-negative were much more likely to report condom use during last sex than patients who did not know their partner’s HIV status (odds ratio=16.9).

―HIV-positive patients reported using condoms more frequently following their HIV diagnosis and were more likely to use a condom if they believed their partner did not have HIV,‖ the authors concluded. "Increased HIV testing may lead to reduced sexual risk behavior in the Dominican Republic.‖

Los Angeles Council Requires Condoms in Porn Films

Associated Press , (01.17.2012)  John Rogers

On Tuesday, the Los Angeles City Council voted 9-1 to approve a measure requiring actors in adult films produced in the city to wear condoms. The legislation next goes to the mayor for his signature. Before the ordinance takes effect, the council ordered police officials, city attorneys, and others to hold meetings about its enforcement.

Several adult-film representatives criticized the ordinance as politically correct and unenforceable. Many consumers refuse to buy films in which condoms are used, they said.

"The only thing that the city could potentially achieve is losing some film permit money and driving some productions away, but you can’t actually compel an industry to create a product that the market doesn’t want," said Christian Mann, general manager for Evil Angel Productions.

The industry years ago voluntarily adopted STD testing of actors every 30 days, a policy that is working well, according to former adult-film actress Tabitha Stevens and others. AIDS advocates, however, say STD testing is insufficient, and requiring condoms adds another level of safety.

"We are not opposed to testing, but testing is not prevention in the same way that a barrier protection is," said Ged Kenslea, spokesperson for the Los Angeles-based AIDS Healthcare Foundation, which for years has campaigned to enact a condom requirement. Kenslea also claimed the adult-film industry does not report all STD diagnoses.

With 90 percent of the industry based in the city’s San Fernando Valley, Kenslea dismissed claims that the measure would drive productions to other locations.

New Research Could Lead To Cheaper, Easier Production Of Malaria Drug Artemisinin

"Artemisinin, a crucial drug in the global fight against malaria, could soon become cheaper and easier to make, thanks to researchers who have found a better way to synthesize the compound," Science NOW reports, providing an overview of the research published in Angewandte Chemie on Monday. "'The impact of this is hard to overestimate,' says Jack Newman, an industrial chemist at Amyris Biotechnologies in Emeryville, California, who was not involved in the work,” the news service writes. Newman added that “the supply chain to make artemisinin has been a huge problem,” the news service notes.

"Since 2001, WHO has recommended that so-called artemisinin-based combination therapies (ACTs)—in which artemisinin is combined with another drug—replace older, ineffective drugs worldwide,” Science NOW notes, adding, "These combinations have become a cornerstone of malaria control and are believed to have saved many lives." The news service writes, "Artemisinin is naturally produced by a plant called sweet wormwood,” but "[s]ynthesizing artemisinin from scratch has been too
costly and cumbersome so far, however, and the plant holds only a tiny fraction of artemisinin
(Kupferschmidt, 1/18).

**UCI team discovers how protein in teardrops annihilates harmful bacteria**

Finding that lysozymes have jaws could aid in early diagnosis of cancer

Irvine, Calif. – A disease-fighting protein in our teardrops has been tethered to a tiny transistor, enabling UC Irvine scientists to discover exactly how it destroys dangerous bacteria. The research could prove critical to long-term work aimed at diagnosing cancers and other illnesses in their very early stages.

Ever since Nobel laureate Alexander Fleming found that human tears contain antiseptic proteins called lysozymes about a century ago, scientists have tried to solve the mystery of how they could relentlessly wipe out far larger bacteria. It turns out that lysozymes **have jaws that latch on and chomp through rows of cell walls** like someone hungrily devouring an ear of corn, according to findings that will be published Jan. 20 in the journal Science.

"Those jaws chew apart the walls of the bacteria that are trying to get into your eyes and infect them," said molecular biologist and chemistry professor Gregory Weiss, who co-led the project with associate professor of physics & astronomy Philip Collins.

The researchers decoded the protein's behavior by building one of the world's smallest transistors – 25 times smaller than similar circuitry in laptop computers or smartphones. Individual lysozymes were glued to the live wire, and its eating activities were monitored.

"Our circuits are molecule-sized microphones," Collins said. "It's just like a stethoscope listening to your heart, except we're listening to a single molecule of protein."

It took years for the UCI scientists to assemble the transistor and attach single-molecule teardrop proteins. The scientists hope the same novel technology can be used to detect cancerous molecules. It could take a decade to figure out, but would be well worth it, said Weiss, who lost his father to lung cancer.

"If we can detect single molecules associated with cancer, then that means we'd be able to detect it very, very early," Weiss said. "That would be very exciting, because we know that if we treat cancer early, it will be much more successful, patients will be cured much faster, and costs will be much less."

**Bryan Fischer Of American Family Association: God Will Cure AIDS If Gays Stop Having Sex, Doing Drugs**

Bryan Fischer is at it again.

The right-wing Christian extremist, who has previously endorsed the notion that the HIV virus is not the true cause of AIDS, is now suggesting that the disease can be cured—if the victim stops doing drugs and having sex.

"You know, we really don't know what kind of recuperative powers God may have built into the human body," Fischer, who serves as Director of Issues Analysis for the American Family Association (AFA), said on his "Focal Point" radio show. "In other words, if you stop shooting up, if you stop inhaling these nitrates, if you stop having random sex promiscuously with total strangers, your body may begin to heal."

Fischer has been particular vocal about HIV/AIDS victims as of late, even suggesting that basketball legend Magic Johnson being alive for 20 years after his initial diagnosis is "confirmation" that AIDS is not caused by the virus.

**More Americans practicing safe sex, CDC reports**

By Steven Reinberg, HealthDay

The number of Americans who practice behaviors that put them at risk for HIV infection has declined significantly, federal health officials reported Thursday.

The decline seems to be due to a drop in risky behaviors such as having unprotected sex and having sex with multiple partners, Chandra said.

The ranks of those engaging in a risky sexual or drug-related behavior dropped from 13 percent of men and 11 percent of women in 2002 to 10 percent and 8 percent, respectively, in 2010, according to the U.S. Centers for Disease Control and Prevention.
"Generally, these are behaviors that are studied in higher risk populations, but by looking in the household population we can get a better sense of the level of risk that may exist in the general population that you don't normally think about," said report author Anjani Chandra, a health scientist at the CDC's National Center for Health Statistics.

Some of the risk factors the researchers looked at were gay and bisexual sex, illicit drug use and having several sexual partners or a partner who injects illegal drugs, she said.

"For women, we don't really see that the decline is due to any variation in sexual risk behaviors, whereas for men we see substantial difference by race," she said.

The reasons for the decline in risk behaviors is not clear, Chandra said. Some of the public health messages might be getting through. It also could be that people are reluctant to disclose that they engage in risky behaviors, she said.

"But, it could be real and reflect actual changes in behavior," she said.

The data in the report was collected on almost 23,000 men and women aged 15 to 44 in households throughout the country and represents 6.5 million men and 4.9 million women.

The decline seems to be due to a drop in risky behaviors such as having unprotected sex and having sex with multiple partners, Chandra said.

There were, however, differences in behaviors in different groups. For example, men who had recently been in prison were more likely to report engaging in one or more HIV risk behaviors, compared with other men, the researchers found.

There were also significant variations based on race and income level, they reported.

Sixteen percent of young black men ages 15 to 24 reported at least one HIV risk-related sexual behavior, compared with 8.7 percent of Hispanic men and 6.5 percent of young white men. Poorer men were also more likely to engage in risky behaviors.

The HIV risk in households is not something one usually thinks about when one thinks about HIV risk, Chandra said.

"In household populations, where you may think these behaviors are nonexistent or very rare, they are occurring and they may be placing people at risk of HIV and other sexually transmitted diseases," Chandra said. "Just focusing on high-risk populations may not take care of the concerns that we have."

Dr. Sten Vermund, director of the Institute of Global Health at Vanderbilt University School of Medicine in Nashville, said that the data used was "a highly valid sample of the American population."

Both sexual and drug-related risk behaviors declined in the study period, and that is a positive trend, he said.

"Risk behaviors remain high and the likelihood of encountering an HIV-infected person has never been higher," Vermund noted. "Nonetheless, there is a strong indication that prevention programs are working or cultural norms are shifting, or both."

Philip Alcabes, an associate professor in the School of Health Sciences at Hunter College/City University of New York, is critical of the report as another example of how the government still avoids the real problem of HIV.

"What a waste of time and taxpayer dollars," he said. "Having failed to advocate for structural changes that would actually reduce risk of HIV acquisition and having failed to implement widespread, easily accessible syringe exchange programs, federal agencies instead spend their time studying personal behavior. It's a shame."

"Even though our officials don't have a clear concept of what really happened 30 years ago, they are still looking at AIDS through the same moralizing lens that was common in 1981. That's sad, and disturbing," he said.

**Why Didn’t Teen Moms Use Birth Control?**


A CDC survey found that among teen moms ages 15-19 who got pregnant unintentionally, 50.1 percent had not been using any form of birth control. Conducted by mail and telephone, the survey polled 9,844 teen moms in 19 states during 2004-08. Data on contraceptive methods came from five of the states.

Of teen moms who had not used any method of birth control, 31.4 percent said they did not think they could get pregnant at the time. Nearly a quarter (23.6 percent) said their partner did not want to use birth control. In addition, 22.2 percent said that while the pregnancy was unintentional, they had not minded getting pregnant. Some struggled with birth control, with 13.1 percent reporting trouble getting it and 9.4 percent reporting contraception-related side effects. Eight percent thought they or a partner was sterile.
Nonetheless, 21 percent of the teen moms surveyed reported using a highly effective contraceptive method, such as sterilization, IUD, birth control pill, and hormonal injection, patch or ring. Use of condoms, considered moderately effective contraception, was reported by 24.2 percent. And 5.1 percent used the least effective methods, such as rhythm and withdrawal, diaphragm, sponge, and cervical cap.

The survey did not analyze the details of birth control use, so it is hard to know why these teens still got pregnant. It is possible that birth control was self-reported by teens but misused, inconsistently used, or not used.

Contraceptive use among sexually active teens could be improved by “providing appropriate access to contraception” and “encouraging consistent use of more effective contraceptives,” said the editorial note in the report. Moreover, “health care providers, parents, and educators could encourage delaying the onset of sexual activity and abstinence, provide factual information about the conditions under which pregnancy can occur, increase teens’ motivation to avoid pregnancy, and strengthen their negotiation skills for pregnancy prevention,” the note said.


**CDC Warns Against Sharing Insulin Pens**


CDC has issued a new clinical reminder that using insulin pens on more than one person puts patients at risk for blood-borne infections such as hepatitis and HIV. Pens containing multiple doses of insulin are meant for use on a single patient only, and they should never be used on more than one person. Infection can occur even when a pen’s needle is changed, CDC said.

The guidance applies in any setting where insulin pens are used, including health care facilities, assisted living or residential care centers, health fairs, shelters, detention centers, senior centers, schools, and camps, according to the agency. Insulin pens should be clearly labeled with the patient’s name or other identifying information to ensure the right pen is used only on the right patient.

If re-use of an insulin pen occurs, exposed patients should be immediately notified and offered blood-borne pathogen testing as part of appropriate follow-up. Hospitals and other facilities should review their policies with staff and provide education regarding safe use of insulin pens and similar devices.

In 2009, the Food and Drug Administration issued a similar alert to health care professionals following reports of improper insulin pen use in hospitals. Despite that warning, reports of patients being placed at risk due to inappropriate re-use and sharing of pens have continued. An incident last year required notification of more than 2,000 potentially exposed patients, CDC said.

For more information, visit http://www.cdc.gov/injectionsafety/clinical-reminders/insulin-pens.html.

**Cutting Military Medical Research Funding Would Jeopardize Health Of U.S. Troops, World’s Poorest**

"In recent months, many politicians and presidential hopefuls have called for budget reductions, and many have specifically targeted military spending for cutbacks," Peter Hotez and James Kazura, past president and president, respectively, of the American Society of Tropical Medicine and Hygiene, write in this Atlantic opinion piece. "[P]rograms such as the Walter Reed Army Institute of Research (WRAIR) often find themselves low on the priority list despite their crucial role in saving the lives of our troops on the battlefield and here at home," they write, adding, "Today, American troops in Iraq and Afghanistan still face formidable tropical disease threats. ... For over 100 years, WRAIR has been the U.S. military’s premier institution for preventing these types of tropical infections."

"We need a strong and active military medical presence in global conflict hotspots such as the Middle East, Central Asia, and Africa," Hotez and Kazura write. "Cutting WRAIR will deprive our troops and also the world’s poorest people of one of America’s greatest global health treasures. ... Both our national and our global security depend on a strengthened and robust WRAIR," they conclude (1/19).

**Anti-infective drug shortages pose threat to public health and patient care**

[EMBARGOED FOR JAN. 20, 2012] Shortages of key drugs used to fight infections represent a public health emergency and can put patients at risk, according to a review published in Clinical Infectious Diseases and available online. Frequent anti-infective shortages can substantially alter clinical care and may lead to worse outcomes for patients, particularly as the development of new anti-infectives has slowed and the prevalence of multidrug-resistant pathogens is increasing.
Of the 193 medications unavailable in the U.S. at the time of the analysis, 13 percent were anti-infective drugs, the authors found, led by Marc Scheetz, PharmD, and Milena Griffith, PharmD, from Midwestern University Chicago College of Pharmacy and Northwestern Memorial Hospital in Chicago. "Anti-infectives often represent irreplaceable life-saving treatments," the authors noted, and hospitalized patients are particularly vulnerable in an era when such shortages often last months and are occurring more frequently.

First-line treatments for herpes encephalitis, neurosyphilis, tuberculosis, and enterococcal infections, among others, have been hit by shortages, forcing physicians to use other drugs that may not work as well, the authors found. For example, the current shortage of the intravenous form of sulfamethoxazole/trimethoprim, a first-line treatment for Pneumocystis jiroveci pneumonia since the 1980s, may result in adverse outcomes for patients with severe disease.

Although the root cause of drug shortages can be hard to determine—current U.S. law does not require manufacturers to disclose such details—the authors point to several supply-side issues that play a role: procuring raw materials, processing, distributing, regulatory compliance, market shortages due to epidemics, new therapeutic indications, and perceived shortages.

Multidisciplinary stewardship programs that support the appropriate "selection, dosing, route of administration, and duration of antimicrobial therapy" can help front-line clinicians when a first-line anti-infective drug is in short supply, Scheetz said. Hospitals should also develop strategies that anticipate the impact and extent of drug shortages, as well as identify therapeutic alternatives that mitigate potential adverse outcomes.

Enhancing oversight by the Food and Drug Administration through congressional legislation may also be needed to identify and correct shortages of life-saving anti-infective drugs, conclude the authors, who describe recently introduced legislation on this topic. "Let your members of Congress know that addressing this issue is important for the proper care of patients," Scheetz said.

University of Iowa News Release
Jan. 20, 2012

**UI study: High levels of MRSA bacteria in retail meat products**

Retail pork products in the United States have a higher prevalence of methicillin-resistant Staphylococcus aureus bacteria (MRSA) than previously identified, according to new research by the University of Iowa College of Public Health and the Institute for Agriculture and Trade Policy.

MRSA can occur in the environment and in raw meat products, and is estimated to cause around 185,000 cases of food poisoning each year. The bacteria can also cause serious, life-threatening infections of the bloodstream, skin, lungs, and other organs. MRSA is resistant to a number of antibiotics.

The study, published Jan. 19 in the online science journal PLoS ONE, represents the largest sampling of raw meat products for MRSA contamination to date in the U.S. The researchers collected 395 raw pork samples from 36 stores in Iowa, Minnesota, and New Jersey. Of these samples, 26—or about 7 percent—carried MRSA.

"This study shows that the meat we buy in our grocery stores has a higher prevalence of staph than we originally thought," says lead study author Tara Smith, Ph.D., interim director of the UI Center for Emerging and Infectious Diseases and assistant professor of epidemiology. "With this knowledge, we can start to recommend safer ways to handle raw meat products to make it safer for the consumer."

The study also found no significant difference in MRSA contamination between conventional pork products and those raised without antibiotics or antibiotic growth promotants.

"We were surprised to see no significant difference in antibiotic-free and conventionally produced pork," Smith says. "Though it’s possible that this finding has more to do with the handling of the raw meat at the plant than the way the animals were raised, it’s certainly worth exploring further."

To read the full findings from the study, visit: [http://dx.plos.org/10.1371/journal.pone.0030092](http://dx.plos.org/10.1371/journal.pone.0030092). Additional information about the Center for Emerging Infectious Disease can be found at [http://www.public-health.uiowa.edu/CEID/index.html](http://www.public-health.uiowa.edu/CEID/index.html), and more on Institute for Agriculture and Trade Policy at [http://www.iatp.org](http://www.iatp.org).
'Bubblegram' Imaging: Novel Approach to View Inner Workings of Viruses

ScienceDaily (Jan. 12, 2012) — Since the discovery of the microscope, scientists have tried to visualize smaller and smaller structures to provide insights into the inner workings of human cells, bacteria and viruses. Now, researchers at the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), part of the National Institutes of Health, have developed a new way to see structures within viruses that were not clearly seen before.

Their findings are reported in the Jan. 13 issue of Science.

A technique that allows scientists to image very small particles, like structures on the surface of viruses. This method has been useful in helping researchers understand how vaccines work. But, despite the success of cryo-EM, scientists have been unable to clearly visualize structures inside of viruses, because radiation is used to image them. "With lower doses of radiation, it is not possible to see inside the organism," said lead author Dr. Alasdair Steven of the NIAMS Laboratory of Structural Biology Research. "However, higher doses of radiation damage the virus, destroying the very structures that we would like to view."

Working in collaboration with the group of Dr. Lindsay Black at the University of Maryland Medical School, Baltimore, Steven and his team were able to turn the problem of radiation damage into an asset. Viruses, one of the simplest life forms, are made up of nucleic acids (DNA or RNA) and the proteins encoded by the nucleic acid instruction manual. The researchers realized that proteins inside the virus are more sensitive to damage than DNA.

"We first used low doses of radiation and recorded images in which the inner structure of the virus was invisible," said Steven. "Next, we used high doses of radiation, and found that the inner structure could be seen as a cylinder of bubbles." While the inner structure was damaged, the team was able to superimpose the images, using three-dimensional computer reconstruction. As a result, they were able to clearly visualize the viral structure. The investigators call this technique bubblegram imaging.

Moving forward, the team members anticipate many uses of bubblegram imaging. Ideally, this technique will allow a better understanding of the inner workings of viruses, providing more opportunities for developing novel therapies. Beyond studying viral structure, cryo-EM could be used to visualize interactions of proteins with DNA in human cells. One exciting prospect lies in using this approach to visualize differences in cancer vs. non-cancer cells. "This new cryo-EM procedure renders previously invisible proteins visible and, thus, will provide new understanding of cell biology," said Steven.

Journal Reference:

How Immune Cells Move Against Invaders

ScienceDaily (Jan. 19, 2012) — UCSF scientists have discovered the unexpected way in which a key cell of the immune system prepares for battle. The finding, they said, offers insight into the processes that take place within these cells and could lead to strategies for treating conditions from spinal cord injury to cancer.

The research focused on the neutrophil, the most common type of white blood cell. Like other cells in the immune system, its job is to seek out and destroy bacteria, viruses or other foreign entities that enter the bloodstream or organs. Scientists have known that, to do this, each cell changes its otherwise amorphous shape to form a single front, or leading edge, that approaches the invader and leads the cell into attack.
The leading edge is thought to send out some type of signal to the rest of the cell to prevent the formation of secondary fronts. Until now, scientists thought the signal was transmitted by the movement of molecules from one part of the cell to another.

Now, however, a team of researchers at the University of California, San Francisco, has shown that the neutrophil triggers this long-range inhibition by transmitting mechanical force.

The process relies on the assembly of a protein known as actin, which accumulates in the part of the cell that pushes out in the direction of its bacterial target.

In their paper, recently published in the journal Cell (January 20, 2012), the team showed that the cell’s protrusion stretches its membrane, taking it from lax to tight, like the rope in a game of tug-of-war. The tension is transmitted along the cell membrane, moving from front to back. It is this tension that restricts activity to the leading edge.

"This critical ability of cells to restrict activity to specific regions of their surface is essential for many processes, ranging from the regulation of cell division to the formation of multicellular organisms and the wiring of the nervous system," said lead author Orion Weiner, PhD, an assistant professor in residence at UCSF’s Cardiovascular Research Institute.

The finding may help researchers identify new therapies that can promote or block the process of cell mobilization as a way of intervening in conditions, he said. After a spinal cord injury, for example, neurons don’t readily cross the site of the injury, impairing motor function or leading to paralysis. There may be drugs that can help the neurons form a leading edge and enable them to jump the gap, Weiner said. Other drugs might impede cells from migrating inappropriately as they do in cancer.

To reach their conclusion, Weiner and his colleagues conducted a series of experiments in which they applied or removed tension from neutrophils and tracked the accumulation of actin and the movement of the cell. Andrew Houk, a graduate student in Weiner’s lab, conducted many of the experiments. They showed that tension is necessary and sufficient to constrain the spread of an existing front and keep a cell from forming a second one.

"Our study establishes tension as a central regulator of this process of leading-edge formation," Weiner said. "The challenge now is to figure out which molecules respond to that tension and how." UCSF is a leading university dedicated to promoting health worldwide through advanced biomedical research, graduate-level education in the life sciences and health professions, and excellence in patient care.

Journal Reference:

US Confirms Contraception Without Co-Pay Rule

Agence France Presse, (01.20.2012)

Under a federal rule announced Friday, most health insurance plans will be required by Aug. 1 to cover preventive services for women, including contraception, without a co-pay, co-insurance or deductible. Services include Food and Drug Administration-approved contraception methods and contraceptive counseling, annual check-ups, STD counseling, HIV screening and counseling, human papillomavirus testing for women age 30 and older, and testing for gestational diabetes.

An exemption on contraceptive coverage for directly religious institutions such as churches was maintained in the final rule announced by the Department of Health and Human Services (HHS). Certain religious-affiliated nonprofit institutions—such as colleges and hospitals—were not exempted but were given an additional year, until Aug. 1, 2013, to comply.

"This additional year will allow these organizations more time and flexibility to adapt to this new rule," said HHS Secretary Kathleen Sebelius. "This decision was made after very careful consideration, including the important concerns some have raised about religious liberty. I believe this proposal strikes the appropriate balance between respecting religious freedom and increasing access to important preventive services."

The president of the US Conference of Catholic Bishops criticized the decision, saying it forces some people to act against their beliefs. The Obama administration “ordered almost every employer and insurer in the country to provide sterilization and contraceptives, including some abortion-inducing drugs, in their health plans,” said Cardinal-designate Timothy Dolan. “Never before has the federal government
forced individuals and organizations to go out into the marketplace and buy a product that violates their conscience.”

**CDC Expands Testing of Confiscated 'Bush Meat' for Viruses**

*Washington Post*, (01.15.2012) Brian Vastag

A CDC project that screens wild “bush meat” confiscated at US airports for infectious diseases has found retroviruses and herpesviruses in nonhuman primate and rodent species.

Bush meat is considered an edible treat from home by some African residents of the United States, but the nation’s disease detectives worry about its potential to harbor exotic viruses that could cause a deadly outbreak. Infectious-disease experts are convinced that HIV and severe acute respiratory syndrome (SARS) jumped to humans through the butchering, handling, and eating of infected meat.

The project launched as a pilot in 2008 at Dulles International Airport in Chantilly, Va., John F. Kennedy International Airport in New York, and airports in Houston and Atlanta. Scientists netted heads, arms, and other pieces of two chimpanzees, seven monkeys, and 35 rodents, mostly giant cane rats—all of it illegally imported.

The program found three exotic viruses, though they do not appear dangerous to humans. Two are in the family of viruses that cause herpes in humans, while simian foamy virus, found in the monkeys and one of the chimps, is a retrovirus. There is no sign SFV makes people sick, said CDC’s Brian Switzer. However, the agency has been keeping close tabs on 130 people infected with SFV, mostly laboratory or zoo workers who handled monkeys, apes, or blood and tissue from the primates.

“We’re looking at whether these viruses are transmissible to close contacts, spouses, children, and so on,” Switzer said.

With $59,740 in additional funding, CDC is expanding bush meat testing efforts to 18 of CDC’s 20 quarantine stations, which are usually located at airports. However, funding is uncertain beyond this year, said Nina Marano, who heads the program.


**Rates of Condom and Non-Condom-Based Anal Intercourse Practices Among Homosexually Active Men in Australia: Deliberate HIV Risk Reduction?**

*Sexually Transmitted Infections* Vol. 87; No. 6: P. 489-493, (10.2011) Limin Mao; Susan C. Kippax; Martin Holt; Garrett P. Prestage; Iryna B. Zablotska; John B.F. de Wit

“Three decades into the HIV epidemic and with the advancement of HIV treatments, condom and non-condom-based anal intercourse among gay men in resource-rich countries needs to be re-assessed,” the authors wrote to introduce the current study.

The team used data from the ongoing cross-sectional Gay Community Periodic Surveys, in six Australian states from 2007 to 2009, to estimate the proportions of men engaging in a range of anal intercourse practices. Comparisons were made between men who were HIV-negative, HIV-positive men with an undetectable viral load, and those with a detectable viral load.

“Condoms play a key role in gay men’s anal intercourse practices,” the authors found. Consistent condom use with all male partners in the six months prior to the survey was reported by 33.8 percent of HIV-negative men, 25.1 percent of HIV-positive men with an undetectable viral load, and 22.5 percent of those with a detectable viral load.

Among HIV-negative men, the second-largest group comprised men who had unprotected anal intercourse (UAI) only within the context of HIV-negative seroconcordant regular relationships. Among the HIV-positive men, the second-largest group comprised those who had UAI in casual encounters preceded by HIV status disclosure to some, but not to all, casual partners.

“A minority, yet sizable proportion, of men consistently engaged in a number of UAI practices in specific contexts, suggesting they have adopted deliberate risk-reduction strategies,” the researchers concluded. “While it is important that HIV behavioral prevention continues to reinforce condom use, it needs to address both the challenges and opportunities of the substantial uptake of non-condom-based risk-reduction strategies.”

**Scientists Halt Bird Flu Research For 60 Days Amid Safety Concerns**

The head of the NIH National Institute of Allergy and Infectious Diseases (NIAID), which funded “two projects that created a highly pathogenic [H5N1] flu virus mutation, has welcomed a two-month
moratorium on further research while defending the value and safety of the experiments," the Financial Times reports. NIAID Director Anthony Fauci "told the FT it was 'right to get off the unnecessary fast track' of a debate 'played out in sound bites,' and instead hold a serious international debate to determine future publication and practice in the field," according to the newspaper (Jack, 1/22). "In a letter published in the journals Nature and Science on Friday, 39 scientists defended the research as crucial to public health efforts, including surveillance programs to detect when the H5N1 influenza virus might mutate and spark a pandemic," Reuters writes, adding, "But they are bowing to fear that has become widespread since media reports discussed the studies in December that the engineered viruses 'may escape from the laboratories' ... or possibly be used to create a bioterror weapon" (Begley, 1/20).

"Scientists at the University of Wisconsin in the United States and at Erasmus University Medical Center in the Netherlands say they are voluntarily halting their work for 60 days," stating "the two months will give governments, international organizations and the scientific community time to determine whether the research can be conducted safely," VOA News writes (1/21). The WHO is expected to organize a forum in the coming weeks to discuss the issue, Agence France-Presse reports (Sheridan, 1/21). "Suspensions of biomedical research are almost unheard of; the only other one in the United States was a moratorium from 1974 to 1976 on some types of recombinant DNA research, because of safety concerns," the New York Times notes (Grady, 1/20).

**How cells dispose of their waste**

Defective proteins that are not disposed of by the body can cause diseases such as Alzheimer's or Parkinson's. Scientists at the Max Planck Institute (MPI) of Biochemistry recently succeeded in revealing the structure of the cellular protein degradation machinery (26S proteasome) by combining different methods of structural biology. The results of collaboration with colleagues from the University of California, San Francisco and the Swiss Federal Institute of Technology Zurich (ETH Zürich) represent an important step forward in the investigation of the 26S proteasome. The findings have now been published in Proceedings of the National Academy of Sciences.

At any given point in time, cells may contain only the proteins that are needed at exactly this moment. Otherwise, undesirable reactions can occur which could cause cancer or other diseases. Furthermore, the proteins have to be folded correctly to fulfill their tasks. Misfolded proteins can clump into aggregates, and neurodegenerative diseases such as Alzheimer's or Parkinson's may be the consequence. In order to prevent this, several mechanisms in the body regulate the number of proteins in the cell and degrade proteins if necessary.

"Cellular waste disposal" – the 26S proteasome – plays an important role in protein degradation. First, misfolded and potentially dangerous proteins are tagged with molecules called ubiquitin. The 26S proteasome detects the tagged proteins and breaks them down into small fragments, which are then recycled. Scientists in the team of Wolfgang Baumeister, head of the research department "Molecular Structural Biology" at the MPI of Biochemistry, have now been able to reveal its structure.

**Many puzzle pieces lead to one structure**

"The structure of the 26S proteasome changes continuously," explained Friedrich Förster, head of the research group "Modeling of Protein Complexes" at the MPI of Biochemistry. "That is why until now it could not be explained by means of traditional approaches, such as only using X-ray crystallography. We had to combine different methods to be successful." Electron microscopy and mass spectrometry helped to reveal the general structure of the 26S proteasome. X-ray crystallography provided detailed insights into specific areas of the molecule. The researchers then used computer software to integrate the different data and generate an overall picture.

Based on these results, the researchers next want to find out how the different mechanisms of protein degradation work in detail. "We have already developed a hypothesis of how exactly the 26S proteasome detects tagged proteins and processes them," said Stefan Bohn, scientist at the MPI of Biochemistry. The
complete elucidation of the 26S proteasome and its underlying mechanisms could also be of medical importance: "Cellular waste disposal" is a therapeutic target for cancer and neurodegenerative diseases.

**Vaccines to Boost Immunity Where It Counts, Not Just Near Shot Site**

ScienceDaily (Jan. 22, 2012) — Researchers at Duke University Medical Center have created synthetic nanoparticles that target lymph nodes and greatly boost vaccine responses, said lead author Ashley St. John, PhD, a researcher at Duke-NUS Graduate Medical School.

The paper was published online in the journal *Nature Materials* on Jan. 22.

Currently all other adjuvants (substances added to vaccines to help to boost the immune response) are thought to enhance immunity at the skin site where the vaccine is injected rather than going to the lymph nodes, where the most effective immune reactions occur.

The current study used mice to show it is possible to shift the delivery path directly to the lymph nodes.

The researchers based their strategy on their observation that mast cells, which are cells that are found in the skin that fight infections, also communicate directly to the lymph nodes by releasing nanoparticles called granules.

"Our strategy is unique because we have based our bioengineered particles on those naturally produced by mast cells, which effectively solve the same problem we are trying to solve of combating infection," said St. John, who is in the Duke-NUS Program in Emerging Infectious Diseases.

The synthetic granules consist of a carbohydrate backbone that holds tiny, encapsulated inflammatory mediators such as tumor necrosis factor (TNF). These particles, when injected, mimic the attributes of the granules found in natural cells, and the synthetic particles also target the draining lymph nodes and provide for the timed release of the encapsulated material.

Traditional vaccine adjuvants may help antigens (the small part of a pathogen that is injected during vaccination that the body reacts to) to persist so the body can have an immune reaction and build antibodies so that when a real pathogen, such as the flu virus arrives, it will be conquered. Alternatively, adjuvants may activate cells called dendritic cells, which pick up pathogen parts and must travel from the skin to lymph nodes where immune reactions are initiated.

The Duke team, however, has created a vaccine adjuvant of nanoparticles that are capable of traveling from the point of injection to the lymph nodes where they act on many cell types of the immune system to spur the right reaction for a greatly increased immune response.

The researchers found that they could use this adjuvant in vaccinations of mice with the influenza A virus.

In levels of flu virus exposure that would be lethal in typical mice, the vaccinated mice were able to fight off the disease and had an increased survival rate, thanks to the effective immune response the particles stimulated.

The researchers also showed they could load the same type of particles with a different immune factor, IL-12, that directed a response toward a different set of lymphocytes. This is an important finding since certain types of infections require specialized responses to be overpowered by the body.

St. John said the flexibility of the synthetic particles and their ability to target certain lymph nodes represented a new avenue of personalized medical treatment—personalized vaccines.

Senior author Soman Abraham, PhD, professor of pathology, immunology and molecular genetics and microbiology at Duke in Durham, NC, and emerging infectious diseases at Duke-NUS, is cautiously optimistic that the mast-cell-inspired synthetic particles could make their way into human use soon.

"It should not be long because all the individual cytokines (immune system factors) and additional materials loaded into these particles are already FDA approved for use in humans," Abraham said. "There is a lot of interest in nanoparticle-based therapy, but we are basing our materials on our observation of mast cells in nature. This is an informed application to deliver the right material to the right place in the body to get the most effective immune reaction."

**Journal Reference:**
Ashley L. St. John, Cheryl Y. Chan, Herman F. Staats, Kam W. Leong, Soman N. Abraham. *Synthetic mast-cell granules as adjuvants to promote and polarize immunity in lymph nodes.* Nature Materials, 2012; DOI: [10.1038/nmat3222](http://dx.doi.org/10.1038/nmat3222)

**SA loses 4.4m people to HIV/AIDS: Survey**

If it was not for HIV/AIDS, the population of South Africa would be over 4.4 million more than it is today, according to the South African Institute of Race Relations' latest South Africa Survey.
The survey, published this week, says there are 50.6 million people in the country and in the absence of AIDS, this would have been 55.0 million.
By 2040 the population would have been 77.5 million without AIDS – 24.1 million more people than is projected.
   The data shows that 31% of all deaths in 2011 were AIDS-related. By 2015, this proportion will have risen to 33% and by 2025, there will be 121% more AIDS deaths than there were in 2000.
   Also, the total number of people living with HIV/AIDS in 2015 (6 million) will be double the number recorded in 2000 (3 million).
   The Institute's analysis is based on data sourced from the Actuarial Society of South Africa and the Institute for Futures Research (IFR).
   According to the IFR, the HIV prevalence rate is higher among young African adults, resulting in fewer people in this group reaching old age compared to other races.
   Thuthukani Ndebele, a researcher at the institute, said that HIV/AIDS has resulted in a significantly slower population growth rate, among other things.
   "Not only does HIV/AIDS reduce life expectancy and increase mortality, but it is largely responsible for wider social ills such as orphanhood and child-headed households," Ndebele said.

Ohio wrestler gets 32 years in HIV assault case
Published January 23, 2012
CINCINNATI – A former professional wrestler was sentenced Monday to 32 years in prison for having sex with women without telling them he had tested positive for the virus that causes AIDS.
  Andre Davis, 29, was sentenced in a Hamilton County court on 14 counts of felonious assault. Davis, who wrestled using stage names including Gangsta of Love and Sweet Sexy Sensation, was convicted in November.
   Prosecutors had said Davis violated state law by not telling a dozen sex partners about his HIV status or lying to them.
   Davis told the judge Monday that he was a "sex addict" and that his addiction grew worse when he lost his dream of becoming a professional wrestler after getting the HIV test results.
   He said sex addiction is probably the worst addiction anyone could have.
   "Drugs and alcohol are terrible, but sex is something everybody wants," he said.
   Davis, who said he didn't disclose his HIV test results because he didn't want his family to know, said he never intended to hurt anyone.
   "I am not a monster," he said.
   Assistant prosecutor Amy Tranter had argued during trial that Davis should go to prison for a long time, saying the case was about his responsibility to tell the women his test results.
   "He's a manipulative man and a liar," Tranter said Monday.
   Davis' attorney, Greg Cohen, had argued that the state law regarding HIV and felonious assault is poorly written because it doesn't require proof that there has been harm or an attempt to commit harm.
   Cohen told the judge that his client was sorry for what he had done and that the women Davis slept with also had some responsibility for choosing to have unprotected sex.
   The judge, citing medical privacy laws, had prohibited attorneys from bringing up whether any of the women was infected with the virus, which can be transmitted through unprotected sex.
   The Cincinnati Enquirer has reported that World Wrestling Entertainment told Davis in July 2009 that it wouldn't hire him because he failed his physical and tested positive for HIV.
   Cohen had noted during the trial that a company, not a doctor, told Davis that he was HIV-positive and that he did not think prosecutors could prove that Davis has HIV. But the state law requires those who test positive for HIV to inform their sex partners of that status and it was not necessary to prove that Davis is HIV-positive, Tranter said.
   Cohen told The Associated Press that an appeal will be filed.
   He said the constitutionality of the law "is probably going to be raised, and there are some legal issues regarding the admission of certain types of evidence."
   Davis, who could have received over 100 years in prison, faces similar charges in Warren County, north of Cincinnati.
Generation X: How young adults deal with influenza

ANN ARBOR, Mich.—Only about one in five young adults in their late 30s received a flu shot during the 2009-2010 swine flu epidemic, according to a University of Michigan report that details the behavior and attitudes of Generation X.

But about 65 percent were at least moderately concerned about the flu, and nearly 60 percent said they were following the issue very or moderately closely.

Using survey data collected from approximately 3,000 young adults during the 2009-2010 H1N1 influenza epidemic—the first serious infectious disease this group had ever experienced—The Generation X Report explores how Americans ages 36-39 kept abreast of the issue and what actions they eventually took to protect themselves and their families.

"These results suggest that young adults in Generation X did reasonably well in their first encounter with a major epidemic," said Jon D. Miller, author of The Generation X Report. "Those with minor children at home were at the greatest risk, and they responded accordingly, with higher levels of awareness and concern."

According to Miller, understanding Gen X reactions to this recent threat may help public health officials deal more effectively with future epidemics.

The results show that a majority of Generation X young adults felt that they were "well informed" or "very well informed" about the issue. However, they scored only moderately well, overall, on an Index of Influenza Knowledge, a series of five items designed to test the level of knowledge about viral infections generally and about the swine flu epidemic specifically.

Miller directs the Longitudinal Study of American Youth at the U-M Institute for Social Research. The study, funded by the National Science Foundation since 1986, now includes responses from approximately 4,000 Gen Xers—those born between 1961 and 1981.

Among the other findings:

- Young adults with minor children at home were most likely to follow the news about influenza closely and were most concerned about the swine flu epidemic.
- Young adults were most likely to report getting information about the epidemic from friends, co-workers and family members. In the month before the survey, they reported having about nine such conversations, compared to getting news about the flu less than three times via print or broadcast media, and about five times from searching the Internet.
- The most trusted sources of information about the influenza epidemic were physicians, followed by the National Institutes of Health, pharmacists at local drug stores and nurses from county health departments. The least trusted sources were YouTube videos, drug company commercials and Wikipedia articles.

"In the decades ahead, the young adults in Generation X will encounter numerous other crises—some biomedical, some environmental, and others yet to be imagined," Miller said. "They will have to acquire, organize and make sense of emerging scientific and technical information, and the experience of coping with the swine flu epidemic suggests how they will meet that challenge."

Study examines link between vaccinations and exposure to compound widely used in food packaging

CHICAGO—Elevated exposures in children to perfluorinated compounds, which are widely used in manufacturing and food packaging, were associated with lower antibody responses to routine childhood immunizations, according to a study in the January 25 issue of JAMA.

"Fluorine-substituted organic compounds have thousands of important industrial and manufacturing applications and occur widely in surfactants and repellants in food packaging and textile impregnation. The perfluorinated compounds (PFCs) are highly persistent and cause contamination of drinking water, food, and food chains," according to background information in the article. The most common PFCs, perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorohexane sulfonic acid (PFHxS), are commonly detected in human serum. The immune system in mice has recently been shown to be highly sensitive to PFOS, with adverse effects on humoral (pertaining to elements in the blood or other body fluids) immunity detected at blood concentrations similar to those occurring in the U.S. population, but adverse health effects of PFC exposure are poorly understood.

Philippe Grandjean, M.D., D.M.Sc., of the Harvard School of Public Health, Boston, and colleagues conducted an investigation of antibody responses to diphtheria and tetanus toxoids as indicators of immunotoxicity in children, choosing the fishing community of the Faroe Islands, where frequent intake
of marine food is associated with increased exposures to PFCs. The Faroe Islands are a country in the Norwegian Sea located between Scotland and Iceland. The study included 656 children born at the National Hospital in the Faroe Islands during 1999-2001. Follow-up was through 2008, with 587 participants. The researchers measured serum antibody concentrations against tetanus and diphtheria toxoids at ages 5 and 7 years of the children.

Similar to results of prior studies in the United States, the PFCs with the highest serum concentrations were PFOS and PFOA. Multiple analyses showed that prenatal exposures to both PFOS and PFOA, as indicated by the maternal serum concentrations, were negatively associated with antidiphtheria antibody concentrations, with a 2-fold increase in PFOS exposure associated with a difference in antibody concentration of -39 percent at age 5 years before the booster. All but 1 of the PFC concentrations measured in the child's serum at age 5 years showed negative associations with the antibody concentrations measured in serum both before and after the booster. For antibody concentrations at age 7 years, all PFC exposures measured at age 5 years showed negative associations, most strongly for PFOA and PFOS, with a 2-fold increase in PFOA exposure associated with differences of -36 percent and -25 percent for tetanus and diphtheria, respectively.

At a doubled postnatal PFC exposure, the overall antibody concentration at age 7 years was approximately halved. This significant difference remained after adjustment for prenatal PFC exposure. A 2-fold increase in PFOS and PFOA concentrations at age 5 years was associated with an approximately 2.4 and 4.2 higher odds of falling below a clinically protective level of 0.1 IU/ml for tetanus and diphtheria antibodies, respectively, at age 7 years.

"If the associations are causal, the clinical importance of our findings is therefore that PFC exposure may increase a child's risk for not being protected against diphtheria and tetanus, despite a full schedule of vaccinations. Adequate formation of specific antibodies relies on several important immune functions, and serum antibody concentrations triggered by standardized antigen stimulations may therefore reflect the more general efficacy of the immune system in relation to infection. For this reason, PFC-associated decreases in antibody concentrations may indicate the potential existence of immune system deficits beyond the protection against the 2 specific bacteria examined in this study," the authors write.

"These findings suggest a decreased effect of childhood vaccines and may reflect a more general immune system deficit. Assessment of risk related to exposure to these contaminants therefore needs to consider the immunotoxic potential of the PFCs."

**Saliva HIV test passes the grade**

**RI-MUHC-led study compares saliva self-test to blood test**

Montreal January 24, 2012 – A saliva test used to diagnose the human immunodeficiency virus (HIV), is comparable in accuracy to the traditional blood test, according to a new study led by the Research Institute of the McGill University Health Centre (RI-MUHC) and McGill University. The meta-analysis, which compared studies worldwide, showed that the saliva HIV test, OraQuick HIV1/2, had the same accuracy as the blood test for high-risk populations. The test sensitivity was slightly reduced for low risk populations. The study, published in this week's issue of The Lancet Infectious Diseases, has major implications for countries that wish to adopt self-testing strategies for HIV.

"Testing is the cornerstone of prevention, treatment and care strategies," says the study's lead author, Dr. Nitika Pant Pai, a medical scientist at the RI-MUHC and assistant professor of Medicine at McGill University. "Although previous studies have shown that the oral fluid-based OraQuick HIV1/2 test has great promise, ours is the first to evaluate its potential at a global level."

Dr. Pant Pai and her colleagues analyzed and synthesized real-life field research data from five worldwide databases. Their findings showed that the saliva test is 99 percent accurate for HIV in high risk populations, and about 97 percent in low risk populations.

The oral HIV test has become one of the most popular tests because of its acceptability and ease of use. It is non-invasive, pain-free, and convenient and produces results in 20 minutes. "Getting people to show up for HIV testing at public clinics has been difficult because of visibility, stigma, lack of privacy and discrimination. A confidential testing option such as self-testing could bring an end to the stigmatization associated with HIV testing," says Dr. Pant Pai, whose work is supported by a Grand Challenges Canada's Rising Star in Global Health Award. "There is a huge global momentum for alternate HIV self-testing strategies that can inform people know of their status."

High risk populations fuel the expansion of HIV epidemics but they face widespread discrimination, violence and social marginalization from healthcare services. UNAIDS estimates that globally, 90% of
men who have sex with men lack access to the most basic sexual health services. "Oral HIV tests can be a powerful tool for high risk populations, but self-testing must be accompanied by linkage to care to achieve good health outcomes," says the study's co-author Dr. Rosanna Peeling, Professor and Chair of Diagnostics Research at the London School of Hygiene & Tropical Medicine.

**Entry point for hepatitis C infection identified**

A molecule embedded in the membrane of human liver cells that aids in cholesterol absorption also allows the entry of hepatitis C virus, the first step in hepatitis C infection, according to research at the University of Illinois at Chicago College of Medicine.

The cholesterol receptor offers a promising new target for anti-viral therapy, for which an approved drug may already exist, say the researchers, whose findings were reported online in advance of publication in *Nature Medicine*.

An estimated 4.1 million Americans are infected with hepatitis C virus, or HCV, which attacks the liver and leads to inflammation, according to the National Institutes of Health. Most people have no symptoms initially and may not know they have the infection until liver damage shows up decades later during routine medical tests.

Previous studies showed that cholesterol was somehow involved in HCV infection. The UIC researchers suspected that a receptor called NPC1L1, known to help maintain cholesterol balance might also be transporting the virus into the cell.

The receptor is common in the gut of many species—but is found on liver cells only in humans and chimpanzees, says Susan Uprichard, assistant professor in medicine and microbiology and immunology and principal investigator in the study. These primates, she said, are the only animals that can be infected by HCV.

Uprichard and her coworkers showed that knocking down or blocking access to the NPC1L1 receptor prevented the virus from entering and infecting cells.

Bruno Sainz, Jr., UIC postdoctoral research associate in medicine and first author of the paper, said because the receptor is involved in cholesterol metabolism it was already well-studied. A drug that "specifically and uniquely targets NPC1L1" already exists and is approved for use to lower cholesterol levels, he said.

The FDA-approved drug ezetimibe (sold under the trade-name Zetia) is readily available and perfectly targeted to the receptor, Sainz said, so the researchers had an ideal method for testing NPC1L1's involvement in HCV infection.

They used the drug to block the receptor before, during and after inoculation with the virus, in cell culture and in a small-animal model, to evaluate the receptor's role in infection and the drug's potential as an anti-hepatitis agent.

The researchers showed that **ezetimibe inhibited HCV infection in cell culture and in mice transplanted with human liver cells.** And, unlike any currently available drugs, ezetimibe was able to inhibit infection by all six types of HCV.

The study, Uprichard said, opens up a number of possibilities for therapeutics.

Hepatitis C is the leading cause for liver transplantation in the U.S., but infected patients have problems after transplant because the virus attacks the new liver, Uprichard said.

While current drugs are highly toxic and often cannot be tolerated by transplant patients taking immunosuppressant drugs, **ezetimibe is quite safe and has been used long-term without harm by people to control their cholesterol**, Uprichard said. Because it prevents entry of the virus into cells, ezetimibe may help protect the new liver from infection.

For patients with chronic hepatitis C, ezetimibe may be able to be used in combination with current drugs.

"We foresee future HCV therapy as a drug-cocktail approach, like that used against AIDS," Uprichard said. "Based on cell culture and mouse model data, we expect ezetimibe, an entry inhibitor, may have tremendous synergy with current anti-HCV drugs resulting in an improvement in the effectiveness of treatment."

**Is Short Stature Associated With a 'Shortage' of Genes?**

ScienceDaily (Nov. 23, 2011) — New research sifts through the entire genome of thousands of human subjects to look for genetic variation associated with height. The results of the study, published by Cell
Press in the December issue of the American Journal of Human Genetics, suggest that uncommon genetic deletions are associated with short stature.

Height is a highly heritable trait that is associated with variation in many different genes. "Despite tremendous recent progress in finding common genetic variants associated with height, thus far these variants only explain about 10% of the variation in adult height," explains senior study author, Dr. Joel N Hirschhorn, from Children's Hospital Boston and the Broad Institute. "It has been estimated that about half of height variation could eventually be accounted for by the sorts of variants we've been looking at, so it is possible that other types of genetic variants, such as copy number variants (CNVs), may also contribute to the genetic variation in stature."

Dr. Hirschhorn, co-authors Dr. Yiping Shen and Dr. Andrew Dauber, and their colleagues were interested in looking for associations of human stature with CNVs, something that has not been done before. A CNV is an excess (gain) in genetic material or an absence (deletion) of parts of the genome. Some CNVs are common, meaning that they are observed often in the human genome. Other CNVs are rare or occur with low frequency in the human population.

"To investigate whether CNVs play a role in short or tall stature, we conducted a genome-wide association study of copy number in a cohort of children who had comparative genomic hybridization microarray screening for clinical reasons and we observed an excess of rare deletions in children with short stature," says Dr. Shen. "We extended our findings to a large population-based cohort, and again observed an excess of low frequency deletions in shorter individuals." The findings were not due to known gene deletion syndromes and no significant associations were observed between CNV and tall stature.

Taken together, the results demonstrate that there is a correlation between low frequency genetic deletions and decreasing height. "Our findings strongly support the hypothesis that increasing burden of lower frequency deletions can lead to shorter stature, and suggest that this phenomenon extends to the general population," concludes Dr. Dauber.

Journal Reference:

New Culprit in Atherosclerosis

ScienceDaily (Jan. 9, 2012) — A new study by NYU Langone Medical Center researchers identified a new culprit that leads to atherosclerosis, the accumulation of fat and cholesterol that hardens into plaque and narrows arteries. The research, published online by Nature Immunology on January 8, 2012, explains why cholesterol-laden, coronary artery disease-causing cells called macrophages, accumulate in artery plaques.

"We have discovered that macrophages that accumulate in plaques secrete a molecule called netrin-1," said Kathryn J. Moore, PhD, senior author of the study and associate professor in the Departments of Medicine and Cell Biology at NYU Langone Medical Center. "Our study shows that netrin-1 blocks the normal migration of macrophages out of arteries, causing these immune cells to accumulate and promote the progression of atherosclerosis."

Artery plaques that break off causing vessel blockages, or potentially fatal heart attacks and strokes are known to have high macrophage cell content. Atherosclerosis is fueled by the presence of these cholesterol-laden macrophages in the artery wall. Typically, the immune system sends macrophages to clean up cholesterol deposits in arteries, but once they fill up with the unhealthy form of cholesterol they get stuck in the arteries, triggering the body’s inflammatory response. The bloated macrophages then become major components of plaque lining artery walls. Until now, the mechanism by which macrophages become trapped has remained unknown.
In this new study, researchers show why macrophages remain in artery plaques leading to atherosclerosis. Netrin-1 promotes atherosclerosis by retaining macrophages in the artery wall. In fact, netrin-1 signals macrophages to stop migrating and as a result these cells accumulate within the plaque. In addition, study experiments show, genetically deleting netrin-1 can minimize atherosclerosis, reduce the level of macrophages in plaque and promote the migration of macrophages from plaques.

In the study researchers used a fluorescent tracking technique to label and monitor the movement of macrophage cells in and out of plaques. This experiment showed how macrophages were immobilized and retained in plaque by netrin-1 expression and also demonstrated macrophage emigration from plaque after the deletion of netrin-1.

"Our study identifies netrin-1 as a novel target for future therapeutic intervention for the treatment of atherosclerosis and cardiovascular disease," said Janine M. van Gils, PhD, lead author of the study and a post-doctoral researcher in the Marc and Ruti Bell Vascular Biology and Disease Program, Leon H. Charney Division of Cardiology, Department of Medicine at NYU Langone Medical Center. "This discovery provides new clues to help reduce the amount of plaque in arteries and the threat of atherosclerosis, a major cause of mortality in Western countries. The development of a new strategy to diminish macrophage accumulation in plaque offers great promise to reducing the occurrence of fatal cardiac events."

Journal Reference:

Posted on Tue, Jan. 24, 2012

Judges weigh HIV-infected man's fight to get job
By GREG BLUESTEIN
Associated Press
A panel of federal judges appeared skeptical Wednesday of the Atlanta police department's decision to reject a job application from an HIV-infected man.

The 40-year-old man sued the city in 2010, claiming he was denied a police officer job solely because he has the virus. Atlanta attorneys argued there are other officers on the force with HIV, and said the police department does not have a blanket policy disqualifying candidates with the virus. Gay rights groups and police agencies are closely following the case.

One of the three judges signaled the lawsuit would likely be sent back to a lower judge to reconsider.

"I don't see how we can avoid a remand in this case," Circuit Judge R. Lanier Anderson said.

The judges will issue a ruling later.

The man sued under the pseudonym Richard Roe and has requested anonymity because he believes his medical condition could prevent him from other job opportunities. He said in an interview he was a former criminal investigator with the city of Los Angeles who discovered he had HIV in 1997, but that it didn't hinder his ability to perform his duties.

Roe moved to Atlanta to find a better job and joined the city's taxicab enforcement unit. In January 2006, he decided he wanted to join the police force. He passed a series of tests, but hit a snag when a blood test revealed he had the virus that causes AIDS.

The doctor didn't do any more tests, according to records, and recommended to the city that he have "no physical contact or involvement with individuals."

Atlanta attorneys said the city follows the recommendation of the physicians who examine candidates, and in this case, the doctor advised the department to limit Roe's interaction with the public.

"We're told that he can't do the job," said Robert Godfrey, a city attorney. "We have to assume when a doctor tells us this, he can't perform the essential duties."

Roe's attorney, Scott Schoettes of gay rights group Lambda Legal, said there was no evidence that Roe posed a threat to the health and safety of others. The city violated the federal Americans with Disabilities Act by not fully vetting his client, Schoettes said.

Roe's advocates said the city's position perpetuates myths about HIV that have persisted for three decades. Modern medical advances have made the disease a manageable condition that in many cases won't affect job performance even in the most demanding fields, they said.
"I really see an opportunity for the city of Atlanta to make some drastic changes and move forward," Roe said. "I think that's what this whole case is about."

**Brazil’s Emerging Market: Crack**  

In the United States, studies linked crack use with increases in HIV infections and violent crime in cities such as Washington and New York during the 1980s. Now mayors in Brazil, from Rio de Janeiro to outposts in the Amazon, are lamenting the growth of "cracklands," as cocaine producers expand into emerging markets to offset declines in US consumption.

In São Paulo, hundreds of zombielike and rail-thin users wander at night in a downtown no-man’s land known as Cracolândia. Though the area was already a skid row, crack use there is exploding. A clearance campaign launched Jan. 3 resulted in the arrests of dozens, seizures of large quantities of crack, and the demolition or bricking-up of crack dens.

Traffic is increasingly turning to Brazil, Argentina, and Uruguay, where cocaine use has grown. Though profits are smaller, so are dealers’ risks of prosecution and jail. Producers also are expanding markets in Western and Central Europe, where estimated use grew from 63 metric tons in 1998 to 126 in 2008. The most recent trend is moving cocaine to users in South Africa, and from Bolivia through to Chile and on to Australia and New Zealand, said Bo Mathiasen, a senior UN drug official based in Brasilia.

While São Paulo’s Cracolândia has become a key issue in this year’s mayoral election, critics say the clampdown only moves users to society’s margins. Most treatment centers are full, and new ones promised by officials have yet to be built. In the United States, crack use sharply declined in the 1990s; the question remains as to whether law enforcement drove down usage or the drug’s brutal toll on users led the epidemic to burn itself out.

**Is Injection Serosorting Occurring Among HIV-Positive Injection Drug Users? Comparison by Injection Partner’s HIV Status**  
*Journal of Urban Health Vol. 88; No. 6: P. 1031-1043*, (12.2011)  Yuko Mizuno; David W. Purcell; Lisa R. Metsch; Cynthia A. Gomez; Amy R. Knowlton; and others

“Research needs to build evidence for the roles that HIV status of injection partners may or may not play in injection risk behaviors of injection drug users (IDUs),” the authors wrote in introducing the current study. Using baseline data from a randomized controlled study (INSPIRE) in Baltimore, Miami, New York, and San Francisco, 2001-2005, the team categorized 759 primarily heterosexual HIV-positive IDUs into four groups based on the HIV serostatus of injection partners.

Of the sample, 32 percent injected exclusively with HIV-positive partners in the previous three months, and more than 60 percent had risky injection practices with these partners. Among the rest, 49 percent injected with any partners of unknown serostatus; 11 percent reported both HIV-positive and –negative partners but no partners of unknown serostatus; and 8 percent injected exclusively with HIV-negative partners.

The group with mixed status partners reported riskier injection behavior. Risk among those with partners of unknown serostatus appeared driven by the greater number of injecting partners. No major group differences were noted for sociodemographic and psychosocial factors.

“Our analysis suggests that serosorting appeared to be occurring among some, but not an overwhelming majority of HIV-positive IDUs, and knowledge of HIV status of all injection partners per se did not appear to be as important as knowledge of sexual partner’s HIV status in its association with risk behavior.”

**More Than 40% Of World’s Population At Risk Of Dengue, WHO Fact Sheet States**

"The incidence of dengue has grown dramatically around the world in recent decades," the WHO writes in an updated fact sheet about dengue and severe dengue published on the organization’s website. According to the fact sheet, "Over 2.5 billion people—over 40 percent of the world’s population—are now at risk from dengue," and "WHO currently estimates there may be 50-100 million dengue infections worldwide every year" (January 2012).

**Prevalence of oral HPV infection higher among men than women**

CHICAGO – The overall prevalence of oral human papillomavirus (HPV) infection is approximately 7 percent among men and women ages 14 to 69 years in the United States, while the prevalence among men...
is higher than among women, according to a study appearing in JAMA. The study is being released early online to coincide with its presentation at the Multidisciplinary Head and Neck Cancer Symposium.

"Oral HPV infection is the cause of a subset of oropharyngeal [relating to the mouth and pharynx] squamous cell carcinomas (OSCC). Human papillomavirus—positive OSCC are associated with sexual behavior in contrast to HPV-negative OSCC that are associated with chronic tobacco and alcohol use. At least 90 percent of HPV-positive OSCC are caused by high-risk (or oncogenic) HPV type 16 (HPV-16), and oral infection confers an approximate 50-fold increase in risk for HPV-positive OSCC. The incidence of OSCC has significantly increased over the last 3 decades in several countries, and HPV has been directly implicated as the underlying cause," according to background information in the article. "Although oral HPV infection is the cause of a cancer that is increasing in incidence in the United States, little is known regarding the epidemiology of infection."

Radical Theory Explains the Origin, Evolution, and Nature of Life, Challenges Conventional Wisdom

Case Western Reserve Theorist Develops Incomparable Model that Unifies Physics, Chemistry, and Biology

News Release: Thursday, January 26, 2012
CLEVELAND—The earth is alive, asserts a revolutionary scientific theory of life emerging from Case Western Reserve University School of Medicine. The trans-disciplinary theory demonstrates that purportedly inanimate, non-living objects—for example, planets, water, proteins, and DNA—are animate, that is, alive. With its broad explanatory power, applicable to all areas of science and medicine, this novel paradigm aims to catalyze a veritable renaissance.

Erik Andrulis, PhD, assistant professor of molecular biology and microbiology, advanced his controversial framework in his manuscript “Theory of the Origin, Evolution, and Nature of Life,” published in the peer-reviewed journal, Life. His theory explains not only the evolutionary emergence of life on earth and in the universe but also the structure and function of existing cells and biospheres.

In addition to resolving long-standing paradoxes and puzzles in chemistry and biology, Dr. Andrulis’ theory unifies quantum and celestial mechanics. His unorthodox solution to this quintessential problem in physics differs from mainstream approaches, like string theory, as it is simple, non-mathematical, and experimentally and experientially verifiable. As such, the new portrait of quantum gravity is radical.

The basic idea of Dr. Andrulis’ framework is that all physical reality can be modeled by a single geometric entity with life-like characteristics: the gyre. The so-called “gyromodel” depicts objects—particles, atoms, chemicals, molecules, and cells—as quantized packets of energy and matter that cycle between excited and ground states around a singularity, the gyromodel’s center. A singularity is itself modeled as a gyre, wholly compatible with the thermodynamic and fractal nature of life. An example of this nested, self-similar organization is the Russian Matryoshka doll.

By fitting the gyromodel to facts accumulated over scientific history, Dr. Andrulis confirms the proposed existence of eight laws of nature. One of these, the natural law of unity, decrees that the living cell and any part of the visible universe are irreducible. This law formally establishes that there is one physical reality.

Another natural law dictates that the atomic and cosmic realms abide by identical organizational constraints. Simply put, atoms in the human body and solar systems in the universe move and behave in the exact same manner.

“Modern science lacks a unifying, interdisciplinary theory of life. In other words, current theories are unable to explain why life is the way it is and not any other way,” Dr. Andrulis says. “This general paradigm furnishes a fresh perspective on the character and meaning of life, offers solutions to protracted problems, and strives to end divisive debates.”

One debate swirls around the scientific merit of James Lovelock’s popular Gaia hypothesis. By showing that the earth is theoretically synonymous with life, Dr. Andrulis’ paradigm substantiates the Gaian premise that all organisms and their surroundings on earth are closely integrated to form a single self-regulating complex system.

Another legendary quarrel is that between biblical creationists and neo-Darwinian evolutionists. In demonstrating that the origin and evolution of life is a consequence of natural laws and physical forces, this theory synthesizes arguments and dispels assumptions from both sides of the creation-evolution debate.
To test his paradigm, Dr. Andrulis designed bidirectional flow diagrams that both depict and predict the dynamics of energy and matter. While such diagrams may be foreign to some scientists, they are standard reaction notation to chemists, biochemists, and biologists.

Dr. Andrulis has used his theory to successfully predict and identify a hidden signature of RNA biogenesis in his laboratory at Case Western Reserve University School of Medicine. He is now applying the gyromodel to unify and explain the evolution and development of human beings.


Berkeley Lab Researchers Discover a Rotational Motion of Cells that Plays a Critical Role in Their Normal Development
January 26, 2012
Lynn Yarris (510) 486-5375 lcyarris@lbl.gov
Berkeley Lab researchers have discovered a rotational motion in human breast cells that continues through mitosis and enables the cells and their progeny to form sphere-shaped acini.

In a study that holds major implications for breast cancer research as well as basic cell biology, scientists with the U.S. Department of Energy (DOE)’s Lawrence Berkeley National Laboratory (Berkeley Lab) have discovered a rotational motion that plays a critical role in the ability of breast cells to form the spherical structures in the mammary gland known as acini. This rotation, which the researchers call “CAMo,” for coherent angular motion, is necessary for the cells to form spheres. Without CAMo, the cells do not form spheres, which can lead to random motion, loss of structure and malignancy.

“What is most exciting to me about this stunning discovery is that it may finally give us a handle by which to discover the physical laws of cellular motion as they apply to biology,” says Mina Bissell, a leading authority on breast cancer and Distinguished Scientist with Berkeley Lab’s Life Sciences Division.

Bissell is a corresponding author of a paper describing this work in the Proceedings of the National Academy of Sciences (PNAS), along with Kandice Tanner, a post-doctoral physicist in Bissell’s research group. The PNAS paper is titled “Coherent angular motion in the establishment of multicellular architecture of glandular tissues.” Other authors were Hidetoshi Mori, Rana Mroue and Alexandre Brun-Cardoso, also members of Bissell’s research group.

Healthy human epithelial cells in breast and other glandular tissue form either sphere-shaped acini or tube-shaped ducts. The cell and tissue polarity (function-enabling spatial orientations of cellular and tissue structures) that comes with the formation of acini is essential for the health and well-being of the breast. Loss of this polarity as a result of cells not forming spheres is one of the earliest signs of malignancy. However, despite all that is known about cell morphogenesis, the fundamental question as to how epithelial cells are able to assemble into spheres that are similar in size and shape to organs in vivo has until now been a mystery.

“We’ve discovered a novel type of cell motility where single cells undergo multiple rotations and cohesively maintain that rotational motion as they divide and assemble into acini,” says Tanner. “We’ve also demonstrated that this CAMo is a critical function for the establishment of spherical architecture and not simply a consequence of multicellular aggregates. If CAMo is disrupted, the final geometry is not a sphere.”

Working with both immortalized and primary human epithelial cells, cultured in a unique 3D gel that serves as a surrogate for the basement membrane (an assay developed by Bissell and colleagues two decades ago), and using 4D live-imaging (3D plus time) confocal microscopy, Tanner, Bissell and their colleagues found that CAMo arises from a centripetal force generated by the flexing of crescent-shaped muscle-like molecules called actomyosin in the cell’s cytoskeleton. This centripetal force sets the cell to rotating about an axis. The rotation is slow, barely once an hour, it may run clockwise or counterclockwise, and its axis might shift, but this rotational motion is cohesive. It continues as the cell divides and the subsequent progeny form into acini, bestowing on cells and acini the polarity and the cavity needed for proper form and function.

“Without CAMo, the cells lose their way and do not form structures that allow mammary cells to make and secrete milk,” says Tanner. “In order to form a polarized sphere, the cells have to be properly oriented so that certain components are up and certain components are down. The CAMo rotation provides the cells with this orientation.”

Bissell is renowned for her pioneering work that elucidated the critical role in breast cancer development played by the extracellular matrix (ECM), a network of fibrous and globular proteins in the microenvironment that surrounds a breast cell. Her experiments have shown that when the nucleus of a
breast cell fails to receive the proper biochemical cues and signals from the ECM and other components of the microenvironment, cells and tissue lose structure, which opens the door to malignancy. The discovery of CAMo now provides an important missing mechanism that facilitates the reception and response of a breast cell to the cues and signals from the ECM.

“In addition to wanting to know how a single cell and its progeny assemble into polar tissue, we also wanted to know whether cellular dynamics are corrupted by malignant transformation,” Bissell says. “In this study, we found that malignant cells do not display CAMo but instead become randomly motile and do not form spheres.”

In recent research, Bissell and her group demonstrated that through manipulation of the ECM, malignant cells cultured in an ECM enriched with laminin – a protein that they had shown induces cell quiescence – can undergo a reversion in which their normal phenotype is restored despite their malignant genome. In this new study, Tanner, Bissell and their colleagues found that when malignant cells cultured in the 3D ECM surrogate gel underwent phenotypic reversion in response to signaling inhibitors, CAMo was restored. When CAMo was restored, the reverted cancer cells formed polarized spheres.

“These results complement our early hypothesis that signaling and support by the ECM when cells are in proper context informs both form and function in cells,” Bissell says. “The results also suggest that in response to microenvironmental cues from the ECM, cells execute a program of cytoskeletal movements that dictate different kinds of motilities. We hypothesize that these motilities direct the formation of a given type of tissue and preclude other multicellular geometries. We believe this is a crucial evolutionary phenomena for multicellular organisms.”

In this new study, Tanner and Bissell and their colleagues were surprised to observe a significant delay between the second and third round of breast cell divisions in the 3D ECM surrogate gel. This mitotic delay is similar to the mitotic delay that’s been observed during human blastocyst formation and is critical for normal embryogenesis. Tanner says the delay is probably necessary for the progeny to acquire sufficient adhesion so that the CAMo can be maintained for the adhere cells. This finding may provide a possible explanation for how the mammary gland reorganizes after each pregnancy and involution.

“Once the cells are sufficiently adhered to one another, they can continue CAMo as a cohesive unit,” Tanner says. “We postulate that this cohesive CAMo motility is the mechanism by which the original structure of the breast tissue is restored following lactation and breast feeding.”

The next step for the research team will be to study the effects of CAMo from the perspective of the ECM. “We would like to look at the interaction of the ECM with a single cell as it undergoes CAMo and show the in vivo relevance,” Tanner says.

Avastin, Sutent Increase Breast Cancer Stem Cells, Study Suggests
ScienceDaily (Jan. 25, 2012) — Cancer treatments designed to block the growth of blood vessels were found to increase the number of cancer stem cells in breast tumors in mice, suggesting a possible explanation for why these drugs don’t lead to longer survival, according to a new study by researchers at the University of Michigan Comprehensive Cancer Center.

The drugs Avastin and Sutent have been looked at as potential breast cancer treatments. But while they do shrink tumors and slow the time till the cancer progresses, the effect does not last, and the cancer eventually regrows and spreads.

"This study provides an explanation for the clinical trial results demonstrating that in women with breast cancer antiangiogenic agents such as Avastin delay the time to tumor recurrence but do not affect patient survival. If our results apply to the clinic, it suggests that in order to be effective, these agents will need to be combined with cancer stem cell inhibitors, an approach now being explored in the laboratory," says study author Max S. Wicha, M.D., director of the U-M Comprehensive Cancer Center.

The researchers treated mice with breast cancer using Avastin (bevacizumab) and Sutent (sunitinib), both of which work by stopping the growth and formation of blood vessels, a process called angiogenesis.
The researchers found that tumors treated with these drugs developed more cancer stem cells, the small number of cells within a tumor that fuel a cancer’s growth and spread and that are often resistant to standard treatment. Both the number of cancer stem cells and the percentage of cancer stem cells that make up the tumor increased after being treated with each of these therapies. The researchers found that the cancer stem cells increased because of a cellular response to low oxygen, a condition called hypoxia. And they were able to determine the specific pathways involved in hypoxia that activate the cancer stem cells.

Results of the study appear online in the Proceedings of the National Academy of Sciences Early Edition.

The U.S. Food and Drug Administration recently revoked approval of Avastin for treating breast cancer, although the drug is approved for use in other types of cancer. The reversal was in response to clinical trials showing that the drug’s benefit was short-lived, with breast cancer patients quickly relapsing and the cancer becoming more invasive and spreading further throughout the body. Overall, the drug did not help patients live any longer.

The current study suggests the possibility of combining anti-angiogenesis drugs with a cancer stem cell inhibitor to enhance the benefit of this treatment. The researchers are testing this approach in mice and preliminary data looks promising.

Breast cancer statistics: 209,060 Americans will be diagnosed with breast cancer this year and 40,230 will die from the disease, according to the American Cancer Society.

Journal Reference:

Morgellons: Unexplained Skin Condition Is Non-Infectious, Not Linked to Environmental Cause: CDC Report
ScienceDaily (Jan. 25, 2012) — The US Centers for Disease Control and Prevention has completed a comprehensive study of an unexplained skin condition commonly referred to as Morgellons and found no infectious agent and no evidence to suggest an environmental link.

The full results are reported in the Jan. 25 issue of the online journal PLoS ONE. In this study, investigators took an in-depth look at a skin condition characterized by unexplained lesions that contain fibers, threads, or other foreign material, accompanied by sensations of crawling, biting, or stinging. The condition is not currently recognized as a distinct clinical disorder with established diagnostic criteria. However, increasing inquiries to the CDC in 2006-2009 regarding the condition prompted the study in Northern California, where many of the persons who reported these symptoms lived.

The researchers found and enrolled 109 persons with symptoms of this condition by searching through the electronic medical record database of a large HMO. They conducted extensive testing to rule out infectious causes, and found no indication that the condition was attributed an infection. The researchers also determined that the fibers associated with the lesions were apparently fragments of cloth or other debris. The investigators showed that the condition is uncommon, estimating that it results in fewer than four out of 100,000 people seeking medical attention. About half of the study participants had evidence of other medical, most commonly psychiatric, illnesses.

The CDC suggests that people suffering with symptoms similar to those reported in the study should see their health care provider for a complete physical to ensure proper diagnosis of all illnesses, including psychiatric, and follow the recommended treatments.

"We found no evidence that this condition is contagious, or that suggests the need for additional testing for an infectious disease as a potential cause," says Dr. Mark Eberhard, Director of CDC’s Division of Parasitic Diseases and Malaria and a lead study investigator. "This alleviates concerns about the condition being contagious between family members and others."

Journal Reference:
**Access To, Use Of Sanitation Systems Cuts Odds Of Worm Infection In Half, Study Review Shows**

When sanitation systems are available and used, the odds of contracting one of a group of diseases, known as soil-transmitted helminths (STH), is cut in half, according to a systemic review and meta-analysis published this week in *PLoS Medicine*, * Examiner.com* reports (Herriman, 1/25). "One billion of the world’s people experience a diminished ability to work, learn, and thrive as a result of infection by these parasites—roundworm, whipworm, and hookworm. The resulting losses in quality of life and productivity can trap people in a cycle of poverty and stigma and diminish their ability to care for themselves and their families," the *PLoS "Speaking of Medicine"* blog writes.

The authors note the limitations of addressing STH infections with drug treatment, and urge the use of "integrated control," which includes drug treatment, "preventive measures ..., surveillance and research, strong health care systems, vector control, safe water supplies, good hygiene practices, and adequate sanitation systems," the blog notes. The authors also state, "Implementation of sanitation facilities and integrated control approaches go far beyond the prevention and control of intestinal helminths; they impact other neglected tropical diseases, such as schistosomiasis, trachoma, and diarrhea ... and can even help promote social and educational advances for women and girls," according to the blog (Brown, 1/27).

**Global Health Frontline News Examines Clean Cookstove Efforts In Tanzania**

*Global Health Frontline News* (GHFN) reports on efforts to produce and provide clean cookstoves to people in Tanzania. The WHO estimates that indoor air pollution caused by smoke from cooking fires contributes to two million premature deaths annually, more than are caused by tuberculosis or malaria, according to GHFN. The piece includes comments from Radha Muthiah, executive director of the Global Alliance for Clean Cookstoves, and Everline Kihulla, who works for the Tanzanian clean cookstove manufacturer TaTedo (Striker, January 2012).

**Global Hunger Estimates 'Are Not Infallible'**

"While the Food and Agriculture Organization's (FAO) estimated figures on global hunger often grab headlines, the uncertainty surrounding the numbers receives relatively little media attention," Guardian reporter Claire Provost writes in the newspaper's "Poverty Matters Blog." In 2009, the FAO responded to a demand for global hunger figures with the projections that "by the end of the year ... world hunger was likely to reach a 'historic high,' with 1.02 billion people going hungry every day," Provost writes, adding, "Almost immediately, these figures seemed to take on a life of their own. References to the global hunger crisis affecting 'one billion people' or 'one-sixth of humanity' began appearing in speeches, media reports, and advocacy campaigns around the world."

She asks "where did these numbers come from?" and notes, "Now that data is finally becoming available for that period, it is ‘contradicting’ the projections made in 2009, according to FAO statistician Carlo Cafiero." Provost concludes, "With famine in Somalia, severe food shortages in the Sahel, and seemingly endless anxiety about high and volatile food prices, the demand for up-to-date estimates of global hunger is set to continue. While new figures are unlikely to come out of the FAO before October, there is at least one immediate lesson: perhaps it is time to stop expecting so much of a single set of numbers. And more broadly, the story of global hunger estimates—among the development sector's best-known and most-quoted numbers—is a study in how figures are not infallible, and should never be taken at face value" (1/26).

**Scientists reveal how cholera bacterium gains a foothold in the gut**

Posted on 27 January 2012

A team of biologists at the University of York has made an important advance in our understanding of the way cholera attacks the body. The discovery could help scientists target treatments for the globally significant intestinal disease which kills more than 100,000 people every year.

The disease is caused by the bacterium *Vibrio cholerae*, which is able to colonise the intestine usually after consumption of contaminated water or food. Once infection is established, the bacterium secretes a toxin that causes watery diarrhoea and ultimately death if not treated rapidly. Colonisation of the intestine is difficult for incoming bacteria as they have to be highly competitive to gain a foothold among the trillions of other bacteria already in *situ*.
This work continues our discoveries of how bacteria that grow in our body exploit sialic acid for their survival.

Scientists at York, led by Dr Gavin Thomas in the University's Department of Biology, have investigated one of the important routes that V. cholera uses to gain this foothold. To be able to grow in the intestine the bacterium harvests and then eats a sugar, called sialic acid, that is present on the surface of our gut cells.

Collaborators of the York group at the University of Delaware, USA, led by Professor Fidelma Boyd, had shown previously that eating sialic acid was important for the survival of V. cholerae in animal models, but the mechanism by which the bacteria recognise and take up the sialic was unknown.

The York research, funded by the Biotechnology and Biological Sciences Research Council (BBSRC), demonstrates that the pathogen uses a particular kind of transporter called a TRAP transporter to recognise sialic acid and take it up into the cell. The transporter has particular properties that are suited to scavenging the small amount of available sialic acid. The research also provided some important basic information about how TRAP transporters work in general.

The leader of the research in York, Dr Gavin Thomas, said: “This work continues our discoveries of how bacteria that grow in our body exploit sialic acid for their survival and help us to take forward our efforts to design chemicals to inhibit these processes in different bacterial pathogens.”

The research is published in the latest issue of the Journal of Biological Chemistry and was primarily the work of Dr Christopher Mulligan, a postdoctoral fellow in Dr Thomas’s laboratory.

How Viruses Evolve, and in Some Cases, Become Deadly
ScienceDaily (Jan. 26, 2012) — Researchers at Michigan State University (MSU) have demonstrated how a new virus evolves, shedding light on how easy it can be for diseases to gain dangerous mutations. The findings appear in the current issue of the journal Science.

The scientists showed for the first time how the virus called "Lambda" evolved to find a new way to attack host cells, an innovation that took four mutations to accomplish. This virus infects bacteria, in particular the common E. coli bacterium. Lambda isn't dangerous to humans, but this research demonstrated how viruses evolve complex and potentially deadly new traits, noted Justin Meyer, MSU graduate student, who co-authored the paper with Richard Lenski, MSU Hannah Distinguished Professor of Microbiology and Molecular Genetics.

"We were surprised at first to see Lambda evolve this new function, this ability to attack and enter the cell through a new receptor – and it happened so fast," Meyer said. "But when we re-ran the evolution experiment, we saw the same thing happen over and over."

This paper follows recent news that scientists in the United States and the Netherlands produced a deadly version of bird flu. Even though bird flu is a mere five mutations away from becoming transmissible between humans, it's highly unlikely the virus could naturally obtain all of the beneficial mutations at once. However, it might evolve sequentially, gaining benefits one-by-one, if conditions are favorable at each step, Meyer added.

Through research conducted at BEACON, MSU’s National Science Foundation Center for the Study of Evolution in Action, Meyer and his colleagues’ ability to duplicate the results implied that adaptation by natural selection, or survival of the fittest, had an important role in the virus’ evolution.

Journal Reference:
Scientists Link Evolved, Mutated Gene Module to Syndromic Autism

ScienceDaily (Jan. 26, 2012) — A team led by researchers at the University of California, San Diego School of Medicine reports that newly discovered mutations in an evolved assembly of genes cause Joubert syndrome, a form of syndromic autism.

The findings are published in the January 26 online issue of Science Express.

Joubert syndrome is a rare, recessive brain condition characterized by malformation or underdevelopment of the cerebellum and brainstem. The disease is due specifically to alterations in cellular primary cilia—antenna-like structures found on most cells. The consequence is a range of distinct physical and cognitive disabilities, including poor muscle control, and mental retardation. Up to 40 percent of Joubert syndrome patients meet clinical criteria for autism, as well as other neurocognitive disorders, so it is considered a syndromic form of autism.

The cause or causes of Joubert syndrome are not well-understood. Researchers looked at mutations in the TMEM216 gene, which had previously been linked to the syndrome. However, only half of the expected Joubert syndrome patients exhibit TMEM216 gene mutations; the other half did not. Using genomic sequencing, the research team, led by Joseph G. Gleeson, MD, professor of neurosciences and pediatrics at UC San Diego, broadened their inquiry and discovered a second culprit: mutations in a neighboring gene called TMEM138.

"It is extraordinarily rare for two adjacent genes to cause the same human disease," said Gleeson. "The mystery that emerged from this was whether these two adjacent, non-duplicated genes causing indistinguishable disease have functional connections at the gene or protein level.

Through evolutionary analysis, the scientists concluded that the two TMEM genes became joined end-to-end approximately 260 million years ago, about the time some amphibians began transitioning into land-based reptiles. The connected genes evolved in tandem, becoming regulated by the same transcription factors.

"Prior to this transition, the two genes had wildly different expression levels," said Jeong Ho Lee, MD, PhD, and first author of the study. "Following this transition, they became tightly co-regulated. Moreover, we found that the two encoded proteins coordinate delivery of factors key for cilia assembly."

Gleeson said the findings suggest the human genome has evolved to take advantage of fortuitous ancestral events like gene translocations to better coordinate gene expression by assembling into specific modules. When these modules are disrupted, however, neurodevelopmental diseases may result.

Journal Reference:

No More Free Rides for 'Piggy-Backing' Viruses

ScienceDaily (Jan. 4, 2012) — Scientists have determined the structure of the enzyme endomannosidase, significantly advancing our understanding of how a group of devastating human viruses including HIV and Hepatitis C hijack human enzymes to reproduce and cause disease.

The findings open the door to the development of new drugs to combat these deadly viruses that infect more than 180 million people worldwide.

The team of international scientists led by and Professor Gideon Davies from the University of York and Associate Professor Spencer Williams from the University of Melbourne, studied bacterial endomannosidase as a model for the same human enzyme and successfully determined the three dimensional structure of the enzyme using state of the art synchrotron technology.
Professor Davies, of the Department of Chemistry at York, said that knowing the structure of the enzyme revealed details on how viruses play biological "piggy-back," borrowing our cellular machinery to replicate and cause disease.

"If we understand how the viruses use our enzymes, we can develop inhibitors that block the pathway they require, opening the door to drug developments," he said.

In the past the problem has been that this group of viruses including HIV, Hepatitis C, Dengue Fever and West Nile virus, are able to bypass the main pathway if inhibited and replicate via a second pathway using this enzyme. Thus for a treatment to be effective, both pathways need to be blocked.

"It was already known how to block the main pathway for these viruses but until now, this endomannosidase bypass pathway has proved a considerable challenge to study," Professor Davies said.

Dr Williams said: "Combining international resources and expertise, we were able to determine the endomannosidase structure and this has revealed how we can block the bypass route, stopping the viruses from hijacking human enzymes."

Professor Davies added: "We hope that the work will lead beyond viruses and will point the way towards similar treatments for other diseases including cancer."

Journal Reference:
Andrew J. Thompson et al. Structural and mechanistic insight into N-glycan processing by endo-α-mannosidase. Proceedings of the National Academy of Sciences, 2012 DOI: 10.1073/pnas.1114824109

Scientists Map One of Life's Molecular Mysteries: Visualisation of the Molecular Gateway Across and Into Cellular Membranes

ScienceDaily (Jan. 26, 2012) — All living organisms are made up of cells, behind these intricate life forms lie complex cellular processes that allow our bodies to function. Researchers working on protein secretion—a fundamental process in biology—have revealed how protein channels in the membrane are activated by special signals contained in proteins destined for secretion. The results help explain the underlying mechanism responsible for the release of proteins such as hormones and antibodies into the blood stream.

The findings, published Jan. 25 in the inaugural issue of Cell Reports, represent a major step forward in cell biology. Until now, scientists have been frustrated by not knowing the architecture of the protein transport machinery when engaged by cargo. However, the team led by researchers from the University of Bristol as part of an international collaboration, has successfully produced and visualised such a complex.

All cells are surrounded by membranes, made up from a double layer of fatty molecules called phospholipids. These act as an ideal 'skin', keeping the cell's insides in. In the absence of other components these fatty molecules act as barriers, preventing the necessary rapid exchange of nutrients and waste products, and of larger molecules like proteins, between the environment and the cell interior. However, such movement is required for many proteins to perform their biological functions either within the membrane or the outside.

To overcome this problem, biological membranes contain a number of translocation systems that enable proteins and other useful substances to pass across the phospholipid barrier. In the case of proteins, those destined for transport are recognised by translocation systems via signals embedded in the sequence of amino acids from which they are constructed. Correct passage through or across the membrane is critical in ensuring that cells complete their lifecycle and fulfill their function.

Using electron microscopy and results from X-ray crystallography, Ian Collinson, Professor of Biochemistry at the University, and his team have described the structure of the ubiquitous Sec-complex associated with a bona fide mimic of a pre-secretory protein in the native environment of the membrane.
These results reveal how the binding of the signal sequence unlocks the Sec-complex prior to channel opening and pre-protein transport.

Professor Collinson from the University’s School of Biochemistry, said: “These findings are important as they address outstanding questions in one of the central pillars of biology, a process essential in every cell in every organism. The results may suggest ways in which the process can be corrupted in order to manage specific disease states or bacteria infections.”

**Journal Reference:**

### Oral Human Papillomavirus Infection
#### Hazard of Intimacy

**Hans P. Schlecht**, MD, MMSc

Over the past 40 years, human papillomavirus (HPV) has been identified as an important pathogen. Upward of 100 types of HPV have been documented and broadly categorized into high-risk and low-risk subtypes on the basis of their association with high-grade dysplasia vs condylomata and mostly low-grade dysplasia, respectively. Infection with HPV, the most common sexually transmitted disease, begins with direct skin/mucosal contact and inoculation of immortalized basal lamina cells through the microabrasions that accompany sexual behaviors. As infected basal cells ascend the epidermal strata, HPV stimulates cell proliferation into condylomata or dysplasia, completes its life cycle, and sheds further virions. Although most people are able to clear the potential pathogen, others develop persistent infection, which if caused by a high-risk subtype, in particular HPV type 16 (HPV-16), may progress from low-grade dysplasia to a high-grade form and become malignant with local invasion across the basement membrane. Although HPV was initially seen as simply the cause of the common skin wart or anogenital wart and the rare skin cancer, the more widespread effect of the damaging potential of HPV was first recognized by zur Hausen et al in the late 1970s and early 1980s with studies linking cervical cancer to HPV infection; this work was recognized with the Nobel Prize in Medicine awarded in 2008. These discoveries spurred further investigation into the oncologic effects of HPV. Subsequent research has linked HPV to most squamous cell cancers of the vagina and anus; many cancers of the vulva and penis; and, more recently, oropharyngeal cancers. Human papillomavirus–positive oropharyngeal tumors are increasing in incidence and exceed the number of oropharyngeal tumors caused by the more traditional risk factors of tobacco and alcohol abuse. Following confirmation of the oncologic potential of HPV at each of these sites, surveys assessed the prevalence among the general population and high-risk groups, leading to longitudinal studies and targeted screening efforts.

In this issue of *JAMA*, Gillison and colleagues report the first major prevalence study of oral HPV infection for the US population through analysis of National Health and Nutrition Examination Survey (NHANES) 2009-2010 data. The investigators studied 5579 participants aged 14 to 69 years who provided a 30-second oral rinse for HPV DNA polymerase chain reaction and type-specific hybridization. Study participants also provided interviewer-derived sociodemographic data and computer-assisted, self-interview–derived data about substance use and sexual history. The investigators found an overall prevalence of oral HPV infection of 6.9%. Prevalence peaked for ages 30 to 34 years and 60 to 64 years; with stratification by sex, this bimodal distribution was present only for men. Men had a higher overall HPV prevalence than women (10.1% vs 3.6%, respectively), and behaviors associated with higher oral prevalence were similar to those for HPV infection at other bodily sites: a history of sexual activity vs none, smoking, and a higher number of lifetime sexual partners. The study reports an overall HPV-16 oral prevalence of 1.0%, which is important because 85% of HPV-related oropharyngeal cancers are positive for this subtype.

These results are remarkable for a number of reasons. Along with a recent study of HIV-positive and at-risk HIV-negative adults, the results allow estimation of oral HPV prevalence based on sexual experience, smoking status, and immune suppression. The general adult population has an oral HPV prevalence of 6.9% (men 10.1%, women 3.6%); at-risk HIV-negative adults, 25% (men 28%, women 18%); and HIV-positive adults, 40% (men 45%, women 35%). The corresponding oral HPV-16 prevalence rates are 1.0%, 5.3%, and 6.1%, respectively.

The authors also report that the rate of HPV infection of the mouth was much lower than that at other sites in HIV-negative individuals. The prevalence of cervicovaginal HPV was 42% in women aged 14 to 59 years; penile/scrotal HPV prevalences ranged from 14% to 51%; anal HPV prevalence rates ranged
from 42% to 57% in homosexual men, were 25% in heterosexual men, and were 27% in women. Lower rates combined with a peak prevalence at 30 to 34 years, which was much later than the average age of sexual debut; initiation of oral sex behaviors; and the age of HPV acquisition at anogenital sites prompt questions about whether the oral cavity is relatively resistant to infection, is afforded cross-protection by other HPV types unavailable at anogenital sites, or is potentially better able to clear infection and prevent persistence of HPV. The bimodal distribution in men also matches data from other studies in women: a second, lower peak of cervical HPV infection occurs in women older than 55 years and may reflect reinfection or reactivation of unknown significance in these groups. Longitudinal studies will hopefully clarify the dynamics of oral HPV infection and persistence across sexual debut into sexually active adolescents and adults, particularly between HPV vaccine recipients and abstainers.

Although HPV-related anogenital cancer pathogenesis is well described, this model is challenging to apply to HPV-related oropharyngeal cancer because these cancers arise predominantly from tonsillar crypts, and the precursor lesions remain largely uncharacterized. Future research will need to identify the natural history of HPV-related oropharyngeal dysplastic lesions and evaluate potential screening methods to detect oropharyngeal dysplasia prior to invasion. Successful screening measures such as a Papanicolaou test, HPV polymerase chain reaction testing, or both may be daunting to achieve, but there is meaningful hope that prevention efforts will ameliorate the effects of HPV-related oropharyngeal cancer.

The available HPV vaccines have demonstrated significant ability to prevent infection and dysplasia at anogenital sites, although data regarding oral HPV infection are lacking. Considering that both available HPV vaccines target HPV-16, that oral HPV prevalence is less than 2% for 12- to 17-year-olds, and that vaccination was able to completely prevent oral infection in a beagle model of canine oral papillomavirus, protection before exposure may be possible. Future NHANES data and cancer databases may bear witness to gradual reductions in oral HPV infection and related cancer as vaccine uptake increases in children and adolescents before their sexual debut. However, it will be decades before any potential benefit of HPV vaccination in reducing the rates of HPV-related cancers, such as oropharyngeal cancer, is seen.

While researchers continue to address the numerous outstanding questions surrounding oral HPV infection and oropharyngeal carcinogenesis, clinicians should encourage their patients who engage in oral sex to use barrier protection. Physicians should also be vigilant for the signs and symptoms of oropharyngeal cancer, such as persistent odynophagia, dysphagia, dysphonia, otalgia, a feeling of globus, a neck mass, or unexplained weight loss, and perform a thorough head and neck evaluation if present.

**Summary of Notifiable Diseases—United States, 2009**

_Weekly_ May 13, 2011 / 58(53):1-100


**Infectious Diseases Designated as Notifiable at the National Level during 2009***

- Anthrax
- Arboviral diseases, neuroinvasive and nonneuroinvasive
- California serogroup virus
- Eastern equine encephalitis virus
- Powassan virus
- St. Louis encephalitis virus
- West Nile virus
- Western equine encephalitis virus
- Botulism
- foodborne
- infant
- other (wound and unspecified)
- Brucellosis
- Chancroid
- Chlamydia trachomatis infections
- Cholera
- Coccidioidomycosis

- Cryptosporidiosis†
- Cyclosporiasis
- Diphtheria
- Ehrlichiosis/Anaplasmosis
- Ehrlichia chaffeensis
- Ehrlichia ewingii
- Anaplasma phagocytophilum
- Undetermined
- Giardiasis
- Gonorrhea
- Haemophilus influenzae, invasive disease
- Hansen disease (Leprosy)
- Hantavirus pulmonary syndrome
- Hemolytic uremic syndrome, post-diarrheal
- Hepatitis, viral, acute
- Hepatitis A, acute
- Hepatitis B, acute
- Hepatitis B virus, perinatal infection
Hepatitis C, acute
Hepatitis, viral, chronic
Chronic Hepatitis B
Hepatitis C virus infection (past or present)
Human Immunodeficiency Virus (HIV)
diagnosis§
Influenza-associated pediatric mortality
Legionellosis
Lyme disease
Malaria
Measles†
Meningococcal disease
Mumps
Novel influenza A virus infections
Pertussis
Plague
Polio, paralytic
Poliovirus infection, nonparalytic
Psittacosis
Q fever†
Acute
Chronic
Rabies
Animal
Human
Rocky Mountain spotted fever
Rubella†
Rubella, congenital syndrome
Salmonellosis
Severe acute respiratory syndrome-associated coronavirus (SARS-CoV) disease
Shiga toxin-producing *Escherichia coli* (STEC)
Shigellosis
Smallpox
Streptococcal disease, invasive, Group A
Streptococcal toxic-shock syndrome
*Streptococcus pneumoniae*, drug resistant, all ages, invasive disease
*Streptococcus pneumoniae*, invasive disease
non-drug resistant, in children aged <5 years
Syphilis
Syphilis, congenital
Tetanus
Toxic-shock syndrome (other than streptococcal)
Trichinellosis
Tuberculosis†
Tularemia
Typhoid fever
Vancomycin-intermediate *Staphylococcus aureus* (VISA) infection
Vancomycin-resistant *Staphylococcus aureus* (VRSA) infection
Varicella (morbidity)
Varicella (mortality)
Vibriosis
Yellow fever

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**Commentary**

**1918 Influenza, a Puzzle with Missing Pieces** (long)

David M. Morens and Jeffery K. Taubenberger

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Shanks and Brundage offer thought-provoking hypotheses about influenza pathogenesis during the catastrophic 1918–1919 pandemic (*J*). Although we neither agree nor disagree with their views, its central hypothesis of T-cell–mediated immunopathogenesis begs examination of past events in light of modern immunologic and virologic understanding. We also emphasize that effects of the pandemic virus should not be measured only by illness and death in 1918–1919, but should also take into account disease caused by its descendent seasonal and pandemic influenza viruses up to the present (*J*). Thus, for human influenza history to be better understood, it must be continually reevaluated.
Specifically, Shanks and Brundage hypothesize that high mortality rates in 1918 resulted from immunopathogenic effects of cell-mediated immune responses elicited by previously circulating influenza viruses. They also suggest that clues to immunopathogenic mechanisms are found in the unique, well-documented, W-shaped age-specific mortality curve of the 1918 pandemic (Figure) in which the typical (U-shaped) curve of pandemic influenza, featuring mortality rate peaks in young and old persons, was augmented by an unprecedented third mortality rate peak in persons 20–40 years of age.
A complicating fact about 1918–1919 mortality patterns and pathogenesis hypotheses is that for ≈98% of infected persons, influenza was clinically unremarkable in its traditional signs and symptoms (fever, cough, myalgia) and severity (4). Clinical and epidemiologic differences were confined to 2 aspects: higher frequency of its long-recognized post-illness complication—bacterial pneumonia (5)—and an unusual peak in fatal or nonfatal pneumonia cases in persons 20–40 years of age. In 1918, a higher percentage of persons of all ages, and especially those 20–40 years old, experienced influenza that led to cases of secondary bacterial pneumonia, which were caused by highly prevalent pneumopathogenic bacteria (especially pneumococci, streptococci, and staphylococci). These bacteria had been continuously causing primary pneumonia and pneumonia after influenza and other respiratory illnesses, and had long been exacting a substantial death toll.

These 1918 postinfluenza cases of pneumonia produced case-fatality rates similar to those of noninfluenza pneumonia caused by the same organisms. Moreover, antibacterial vaccines administered in 1918–1919 seem to have prevented postinfluenza deaths (6). Influenza mortality rates in 1918–1919 were most strongly associated with increased case incidence of, not increased severity of, common complicating bacterial pneumonia, and this finding was seen especially in persons 20–40 years of age. The epidemiology of 1918 influenza mortality is predominantly, almost entirely, the epidemiology of a single postonset complication: secondary bacterial pneumonia. Therefore, pathogenesis theories of severe or fatal 1918 influenza must account for why the 1918 virus predisposed more persons to secondary bacterial pneumonia, and also look beyond the virus to address bacterial cofactors. The hypotheses of Shanks and Brundage should be considered with these observations in mind.

An interesting aspect of the epidemiology of fatal 1918 influenza is demonstrated by epidemics in US military training camps, in which increased mortality rates were strongly associated with carriage epidemics of pneumopathogenic bacteria (5). An eerily analogous phenomenon had happened a year earlier (winter of 1917–1918) in deadly epidemics of measles/postmeasles bacterial pneumonia (3). Therefore, bacterial carrier status at the time of influenza virus introduction should be considered in interpreting mortality rate differences in soldiers and examined with respect to epidemiologic variables that could affect carriage (e.g., length of service, rural or urban differences, and health care worker status). Such simple exposure variables might explain at least some of the mortality rate differences pointed out by Shanks and Brundage.

With regard to possible immunoprotection afforded by earlier circulating influenza viruses, in our view, the picture is not fully interpretable. Epidemiologic information about the 1889 global pandemic suggests that the unidentified causative virus was novel in persons born after ≈1830 (4), if not before 1830. However, what the 1889 virus was, how long it may have circulated after 1889, in what form it may have drifted, and what level of population immunity in what age groups may have resulted are all speculative. Making various assumptions about post-1889 viral circulation patterns in an attempt to find epidemiologic evidence of protective or amplifying effects on incidence or mortality rates of 1918 influenza has not, to our knowledge, shown anything suggestive, let alone definitive.

Given that no age group in 1918 seems to have been protected by influenza exposures in 1889, some 1918 data are consistent with partial protection in persons >60 years of age (i.e., alive during and after the influenza pandemics of the 1830s and 1840s), even though the viruses involved in these pandemics had no discernible effect on 1889 influenza incidence (4). To further complicate the picture, major antigenic changes in the 1889 pandemic virus around 1900 have been postulated on the basis of epidemiologic/serologic evidence, and data from the 1957 (H2N2) and 1968 (H3N2) pandemics are each consistent with partial protection in persons alive during 1889–1918. Taken together, this information produces more questions than it answers, which suggests that only further virologic or serologic evidence based on examination of specimens from an earlier era can clarify the situation.

A related issue addressed by Shanks and Brundage concerns interpreting data on protection during the fatal October–November 1918 fall wave by influenza viruses circulating earlier in 1918 (we avoid the term spring wave on the grounds described below). In the 9 months before the 1918 fall wave, from which influenza (H1N1) viruses have been sequenced, 2 seemingly different types of influenza phenomena were observed. The first phenomenon was in January–May 1918 when scattered, explosive local outbreaks and epidemics of influenza-like illness occurred in various locations in Europe, and epidemic outbreaks occurred in several other countries, which in virtually all cases showed lower than expected mortality rates for influenza. (Shanks and Brundage classify this spring activity, along with summer activity, as a spring wave.) If this wave was influenza, it was not a wave as the term had been used since 1889 to indicate global pandemic mortality.
The second phenomenon was a wave of moderate mortality rates that occurred not in the spring of 1918, but in the summer (July–August), mostly in a few countries in northern Europe. This summer wave seems consistent with a first major occurrence of the 1918 virus (H1N1), which may have found a tenuous foothold in the normally unfavorable summer months, predominantly in northern climes where temperature and humidity might be less restrictive of virus circulation. If this wave was the 1918 pandemic virus, simple arithmetic dictates that to have reached moderate explosiveness by July it must have been circulating for at least many weeks beforehand (7). Prepandemic circulation of virus (H1N1) in early 1918 could have caused at least some circumscribed outbreaks that elicited protection. However, if all winter–spring prepandemic 1918 activity had been caused by the pandemic virus, we are left with the conundrum of why it did not become pandemic then, when environmental circumstances were seemingly more favorable, and when it was being locally transmitted within the war zone in Europe at more explosive levels than the fall wave pandemic virus would later be. We must also explain the frustratingly contradictory protection data from spring or summer influenza-like illness during the fall occurrence of influenza.

Astute observers of the time considered the 1918 protection data uninterpretable (8). Because influenza viruses of different subtypes are now understood to protect against each other for prolonged periods (e.g., H1N1 against H2N2 and H2N2 against H3N2), interpreting 1918 protection data has become even more problematic. One or more viruses unrelated to the fall wave virus (H1N1) (e.g., an 1889 viral descendant) may have caused at least some of the observed protection and nonprotection phenomena in 1918. Less plausibly, the pandemic virus could have lost transmissibility while gaining pathogenicity after early 1918. However, in the absence of virologic evidence, the identity of early 1918 viruses that may have caused or failed to cause protection remains speculative.

Finally, despite whatever degree of immunopathogenesis or immunoprotection may have occurred in 1918, we see no particular reason to focus hypotheses on T-cell immunity over immunity conferred by antibody to viral antigens. The extremely high 1918 influenza infant mortality rate cannot easily be linked to cell-mediated immunity because infant T cells would presumably have never been exposed to influenza viruses. It is also noteworthy that mortality rates across the entire 1918 age spectrum were higher than in any other year between 1889 and the present time. In looking at the W-shaped mortality curve, we believe that the findings are striking for persons ≈5–14 years of age, the age range of persons with the lowest mortality rates in virtually all influenza pandemics and epidemics studied to date. In 1918, this age group appears to have had an ≈4-fold higher mortality rate than in 1889, conceivably indicating inherent viral virulence or, more correctly, viral–bacterial copathogenicity because most of the relatively few deaths in this age group seem also attributable to secondary bacterial pneumonia.

Although it is intriguing to speculate about the role of severe and fatal primary viral pneumonia, we are unaware of data suggesting that primary viral or viral immunopathogenic mechanisms accounted for high mortality rates in any 1918 age group; results of reported experimental animal studies are of uncertain relevance for humans. Almost all of the tens of thousands of autopsies reported in 1918 indicated classic bacterial pneumonia as the most prominent feature, which was different in frequency, but not in kind, from the familiar cases of pneumonia seen year in and year out, before and after 1918 (5,7). The data appear most consistent with some unidentified property of the 1918 virus (e.g., respiratory cell cytopathicity) that potentiated pneumonia with common bacteria carried in the upper respiratory tract (5). The cause of the middle peak of the W-shaped mortality curve remains a fascinating mystery that so far seems inexplicable by any hypothesis.

In summary, Shanks and Brundage have addressed 3 major mysteries of the 1918 influenza pandemic: high mortality rates/unexplained pathogenesis, unexplained age-specific mortality rate patterns, and evidence for wave-to-wave protection, with a unifying hypothesis. In our view, they justifiably point out that highly inconsistent wave-to-wave protection data from different 1918 observers represent essential clues to what happened 94 years ago. However, these clues have not yet led to satisfactory answers. They also draw attention to the W-shaped age-specific mortality curve, still unexplained we would argue, and hypothesize that it, as well as disease pathogenesis and protection, results from cell-mediated immune responses. Although we are not fully persuaded by all aspects of this hypothesis, it does suggest avenues for experimental and perhaps serologic and immunologic research. It should also stimulate us to rethink old mysteries in light of modern and evolving understanding of influenza. Questions about 1918 persist, and critical pieces of the puzzle, in our view, are still missing.

Dr Morens is senior advisor to the director at the National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Maryland. His research interests are viral disease epidemiology, disease pathogenesis, and medical history.
Rapid Oral HIV Test Has Disadvantages

Lara C. Pullen, PhD

January 25, 2012 — The oral HIV test has a 2% lower sensitivity but similar specificity compared with blood-based tests, according to pooled data from a new review and meta-analysis performed by Nitika Pant Pai, MD, from the Department of Medicine, McGill University, and the Division of Clinical Epidemiology and Infectious Diseases, McGill University Health Center, Montreal, Canada, and colleagues, published online January 24 in *Lancet Infectious Diseases*.

Similarly, the oral test (OraQuick, OraSure) has a high positive predictive value (PPV) in high-prevalence settings (98.65%; 95% credible interval, 85.71%–99.94%) that is comparable with the PPV of blood tests in the same setting (98.50%; 95% credible interval, 93.10%–99.79%). However, the PPV in low-prevalence settings was lower for oral (88.55%; 95% credible interval, 77.31%–95.87%) compared with blood (97.65%; 95% credible interval, 95.48%–99.09%) specimens. The differences found in these head-to-head comparisons should be considered when planning worldwide use of the popular oral test.

The authors of the study note that although the specificity estimates were similar to the manufacturer’s claims, the sensitivity estimates of the oral test fell short.

In an accompanying comment, Chi Chiu Leung, MD, and Shui Shan Lee, MD, from the Chinese University of Hong Kong describe the clinical application of the study: "Oral fluid-based OraQuick offers the attraction of being more convenient and non-invasive. However, although its better acceptability might promote access to HIV screening, this seems to be at the cost of a substantial false-positive rate, even though the estimated specificity of 99.74% might have dwarfed that of most other diagnostic tests in use. This factor must be considered for test interpretation, especially when the availability of such a rapid test allows penetration of screening programme into lower-risk groups."

The editorialists explain that the lower PPV for oral specimens was more noteworthy in low-prevalence settings (HIV < 1%). They also emphasize the PPV values in their commentary because they feel that it may be most relevant to clinicians. The PPV provides the actual probability that the patient being tested is HIV-positive.

Thus, although the oral test is highly specific, the subtle difference between the false-positive rates in that test vs those in the blood-based tests becomes substantial when the HIV prevalence is less than 1%. Although Dr. Leung and Dr. Lee appear to discourage rapid adoption of the oral HIV test because of its lower PPV, they do note that confirmatory testing (both positive and negative) is generally considered important for such a major disease as HIV. Repeat testing would decrease the concern about the lower PPV of the oral test.
Study Estimates HIV Is Transmitted During 1 in 900 Acts of Unprotected Heterosexual Sex

By Warren Tong
January 24, 2012

A person living with HIV will transmit the virus, on average, once out of every 900 acts of unprotected heterosexual sex. At least, this is the estimate based on a study of mixed-status couples in Africa, published on Jan. 11 in the Journal of Infectious Diseases.

The exact risk of HIV transmission during a specific activity has always been a difficult number to pin down, and some experts were quick to note that the "1 in 900" figure should not be regarded as carved in stone. "The study provides a number that people may quote as to the risk of infection per episode of intercourse, but this ranged considerably," said David Wohl, M.D., one of the experts in TheBody.com's Safe Sex and HIV Prevention Forum. He noted that the risk "was influenced by the viral load of the infected person, the circumcision status, and the presence of STIs [sexually transmitted infections] in the uninfected partner."

Researchers from the University of Washington reached their "1 in 900" conclusion after analyzing data from 3,297 mixed-status couples enrolled in the study, which followed them for a maximum of 2 years. At enrollment, the participants were tested for STIs; men were examined to determine circumcision status; and the negative partners were tested for genital herpes (HSV-2). They were also given HIV prevention counseling and free condoms.

Each month, the positive participants self-reported the number of times they had sex with their partners and whether or not they used a condom. In addition, their HIV viral loads were measured at 0, 3, 6, 12 and 24 months.

The negative partners were tested for HIV every three months. If positive, the researchers used genetic testing to confirm whether or not the negative partners contracted HIV from their study partner.

Viral load played a key role in predicting HIV transmission. The higher the viral load, the higher the chances of transmission. The researchers estimated that with every log10 increase of viral load (e.g. going from 1,000 copies/ml to 10,000 copies/ml, or from 10,000 copies/ml to 100,000 copies/ml), the per-act risk of transmission increased by 2.9 times. This reaffirmed previous studies, which found lower viral loads decreased transmission.

In the study, men were found to be about twice as likely to transmit HIV to women, but the researchers stated this may mostly be due to higher viral loads in the male participants.

The study found that male circumcision reduced transmission by 47 percent, while condoms reduced transmission by 78 percent, also reaffirming previous studies.

"This study helps to confirm the role that several key, modifiable factors play in HIV transmission, especially viral load and condom use," lead researcher James P. Hughes, Ph.D., told TheBody.com. "None of the factors we identified are really new—others have raised their role in HIV transmission before—but this study offers greater precision in determining the effects."

When asked if the study suggested lower effectiveness for condoms than we're generally used to, Hughes stated, "Unfortunately, the data by itself can't answer that question, so I can only speculate. However, my very strong bias is that the true effectiveness of condoms is much higher than 78%, and the apparent reduced effectiveness we are seeing is largely due to self-reporting discrepancies."

The findings that an HIV-positive person's viral load affects his or her HIV transmission risk appear to support the now-famous "treatment as prevention" study findings released last year, but Dr. Hughes urged caution when interpreting the results. "While these results, along with the recently published HPTN 052 results, do suggest that transmission of HIV can be significantly reduced by lowering viral load with antiretroviral treatment, that isn't the only consideration in starting treatment early," he noted. "The START study will consider the effect of starting treatment early on the HIV-infected person's health."

Similarly, the results don't suggest that an undetectable viral load makes unprotected sex OK. "I hope that this study does not lead people with a low or undetectable viral load to stop using condoms," Dr. Hughes said. "Even if an individual's viral load is undetectable at the time of measurement, it is possible to have transient increases in viral load, and this could lead to transmission if a condom is not used."

Dr. Wohl added a warning against applying these study results to same-sex couples or people who have anal sex. "This study looked at heterosexual couples in Africa. It is a leap to think about this in terms of the risk with anal sex, which was likely uncommon in this study cohort," he said. "Overall, these results
will be most useful for us to talk more about the need to reduce people's viral load in case they do not use condoms, which worked great to prevent infection, but are hardly loved."

Lisa Hightow-Weidman, M.D., another expert in TheBody.com's forum on safe sex and HIV prevention, concurred. "I encourage all my patients to use condoms, but I also talk with them about this research," she said. "If they decide, within the context of a mutually monogamous, serodiscordant relationship in which the pos partner is on meds and has been undetectable for a while (I encourage at least 6 months), to not use condoms, I give them the facts. Risk is low—not zero, but low."

The Making of a Trait
Populations of organisms acquire beneficial traits repeatedly and rapidly through co-evolution with other species and through gene interaction.
By Megan Scudellari | January 26, 2012

How many genes does it take to get to the center of a new trait? A pair of papers published today (January 26) in Science looks at just that, probing the molecular basis of how organisms evolve new physical characteristics. In the first study, a virus finds a novel way to infect E. coli under the pressure of co-evolution. In the second study, E. coli adapts to a hot environment using two different survival strategies.

Together, the papers demonstrate that the evolution of beneficial new traits—also called key innovations—is repeatable, rapid, and often spurred by co-evolution and the interaction of genes.

“It’s always been one of the big problems of evolution—how do you get beyond fine tuning of what you’re already doing and come up with something radically new, a fundamentally new trait?” said John Thompson, an evolutionary biologist at the University of California, Santa Cruz, who was not involved in either study. “Both studies tell us there is ongoing and rapid appearance of beneficial mutations.” Similar evidence has appeared in phenotypic studies, he noted, “but to see it at the molecular level in well-controlled experiments like this is very encouraging and interesting... They’re both really first class studies.”

Bacteriophage λ, a tiny DNA virus, infects E. coli through a single receptor, LamB, on the bacterium’s outer membrane. Evolutionary biologist Richard Lenski, along with PhD student Justin Meyer and colleagues at Michigan State University, designed an experiment to see if the virus could evolve to infect the host via a different pathway. The team grew 96 populations of E. coli and λ together under conditions that stop the E. coli from expressing LamB. The team waited to see whether the virus would adapt to infect the bacteria through an alternate receptor in the absence of its sole receptor.

And it did. About 25 percent of the populations evolved the ability to enter the E. coli through a second receptor, OmpF, within about 12 days. The adapted viruses remained capable of binding LamB, but had gained this new function. By sequencing the viral DNA, the team identified four mutations in the J protein, a specialized protein on the virus’s tail that normally binds LamB, that were required for the protein to bind the OmpF receptor.

But not all the λ populations evolved. The team looked at the E. coli’s DNA to determine why, and found that the bacteria were co-evolving to impede the virus. In those cases, the E. coli had a mutated transmembrane channel in its inner membrane, so the virus’s DNA could no longer penetrate the cell, regardless of which receptor it bound. In this case, there was no benefit for the viruses that could use OmpF. So while these populations gained some of the J protein mutations, which appeared to improve attachment to LamB, they never acquired the fourth and final mutation necessary for OmpF binding because the selection pressure to do so was lost.

“There’s this really delicate co-evolutionary dance,” said Meyer. “The bacteria take one step, which creates the environment, so then the phage takes several steps, and if it gets to the fourth one, then it can enter through a new receptor... But if the bacteria take a second step before the phage gets there, then they shut down the process and we don’t have that interesting outcome.”
“Co-evolution can predispose this shift to happen in the phage, but it can also constrain it,” said Thompson, who wrote an accompanying perspective in Science. “[Co-evolution] is one of the great engines of biodiversity. It’s an adaption generator.”

In the second paper, Brandon Gaut of the University of California, Irvine, and Olivier Tenaillon of the French National Institute of Health and Medical Research in Paris describe a year-long experiment in which they grew 115 populations of E. coli at high temperatures (42.2°C). “Temperature is a complex challenge for an organism to respond to because it can affect so many parts of the cellular process,” said Gaut.

Of the populations that survived, the team identified 1,331 mutations affecting more than 600 sites in the bacterial DNA. Few of the mutations were shared from population to population, suggesting little overlap between their evolutionary paths. But when the scientists stepped back and analyzed the mutations at the level of functional gene groups, they were surprised to find a strong pattern: E. coli populations adapted to the heat by mutating one of two pathways—either the RNA polymerase complex or the termination factor rho, but rarely both. Additionally, each of these pathways had a set of associated genes that were also mutated in parallel, suggesting that epistasis, or the interaction of associated genes, plays a role in adaptive evolution.

“You tend to have RNA polymerase and its associated genes as one set of solutions to this adaptive problem, or you get mutations in rho and another set of associated genes,” said Gaut. Unfortunately, he added, the team does not yet know how either solution physically helped the cells to survive the high temperature, or what role the associated genes play. They plan to begin teasing out those answers by comparing the phenotypes of E. coli strains with some of the mutations that were recorded.


Metabolites Involved in Chronic Pain
Untargeted metabolic profiling implicates a new suite of metabolites that may be involved in nerve damage-induced pain.

By Jeffrey M. Perkel | January 22, 2012

An analysis of the metabolic profile of a rat model of chronic pain has identified novel dysregulated metabolites that may underlie the condition, according to a study published today (January 22) in Nature Chemical Biology. If the results hold up in humans, one of these metabolites, which has not previously been associated with neuropathic pain, could potentially serve as both a molecular indicator of and therapeutic target for the condition, for which few treatment options exist.

The findings are “a great example of how metabolomics is leading to novel insights into, in this case pain, and how that’s mediated,” said Lloyd Sumner, a metabolomics researcher at the Samuel Roberts Noble Foundation who was not involved in the research.

In the United States, more than 30 percent of adults suffer from chronic pain of one form or another. Neuropathic pain is a form of chronic pain induced by previous nerve damage, like the phantom pain felt by those who have lost limbs. “Neuropathic pain is the worst,” because it’s the hardest to treat, said Gary Patti, an assistant professor at Washington University in St. Louis and lead author of the study. “It is a disease with an unmet medical need.”

While a research associate at the Scripps Research Institute in La Jolla, California, Patti and his then-research advisor, Gary Siuzdak, senior director of the Center for Metabolomics and Mass Spectrometry and professor of Chemistry and Molecular Biology at Scripps, used an animal model of the condition, in which rats are subjected to tibial nerve transection (TNT)—that is, the tibial nerve in one leg is severed and allowed to heal. Three weeks later, these animals apparently continue to experience pain, though the wound itself has healed.
Rather than studying the genes involved, or the proteins they encode, the researchers identified instead potential metabolic players in this response. Metabolites, after all, are the ultimate molecular arbiters of biological function, the molecules upon which proteins often act.

The team used an approach called untargeted metabolomics to profile the metabolites at the site of injury, the neural cell body of the damaged nerve, the dorsal horn (where the damaged nerve connects to the spinal cord), and in the blood. It was essentially a molecular fishing expedition—collecting boatloads of data that can point to molecules that may be involved.

“We are seeing many more metabolites than can be accounted for by the canonical pathways in biochemistry textbooks,” Patti said. “The untargeted approach allows us to explore that space.”

In total, the team observed some 733 mass spectrometric peaks whose levels varied at least 2-fold between control and TNT animals. The vast majority of them were localized not at the site of injury, but at the dorsal horn of the spinal cord. In particular, the researchers noticed differential expression of several members of the sphingomyelin-ceramide pathway, a lipid metabolic pathway linked to, among other things, myelin formation and programmed cell death. “That screamed at us that this pathway was important,” Siuzdak said.

The team then tested these different molecules directly to see whether they could induce a pain response on their own. Indeed, one such metabolite, called N,N-dimethylsphingosine (DMS), induced symptoms akin to neuropathic pain when injected directly into the animals at comparable concentrations to those found in TNT rats a few weeks after injury. The authors also determined that DMS may function by activating astrocytes, inducing them to release cytokines such as IL-1beta and MCP-1, both of which are associated with inflammation and pain.

If validated in humans, DMS could potentially serve as a biomarker of for neuropathic pain, Sumner said. Furthermore, “by defining specific molecules involved in the pain response, [the finding] also provides a pathway for mediating the pain management,” he added. “If they can mediate how these molecules are made and modify that with inhibitors or other medications, then the opportunity for pain management is substantial.”

Indeed, Siuzdak calls his approach “therapeutic metabolomics.” “You survey the pathways, find molecules that are dysregulated, and then find enzymes that produce those molecules. We are currently trying to figure out explicitly what enzyme produces DMS, because that’s a much more specific target.” (See this month’s feature article on other efforts to manage chronic pain.)


Can DNA Self-replicate?
Using DNA subunits to create DNA-like superstructures, scientists think they’ve discovered how to turn DNA into enzymes.
By Sabrina Richards | January 19, 2012

Biological systems are complicated. Though DNA may carry a simple sequence of base pairs, once this information is transcribed into RNA and translated into proteins, this simple sequence can give rise to numerous, often unpredictable convolutions. Contending with this unpredictability of RNA and protein structure, synthetic biologists can struggle to design precise biological systems with specific goals. But what if the system was constructed entirely of DNA?

In a study in Journal of Royal Society Interface published online last week, Harish Chandran of Duke University and colleagues use DNA’s simplicity and predictability to propose possible DNA nanostructures that mimic polymerases or restriction enzymes to carry out a variety of biological processes.

“It’s a theoretically neat demonstration that some important reactions could be possible using DNA’s structure,” said Chris Dwyer, a computer engineer at Duke University who designs DNA nanostructures and was not involved with the research.

While DNA “origami”—the construction of precisely folded DNA nanostructures—has already been used to facilitate enzymatic reactions through precise placement of components, Chandran’s work is the first attempt to use DNA as the enzyme in such systems. The models take advantage of the double helix, and DNA’s “desire” to keep twisting. Chandran and his team created computer models of meta-DNA structures using pieces of DNA as the building blocks, or bricks, to build something much bigger that still acts a lot like a strand of DNA. Just as a real base is the primary unit of DNA, the meta-bases (DNA bricks) are the primary units of meta-DNA.
Meta-bases are designed from three strands of normal double-stranded DNA. The ends of each strand complement the other two, and all three will match up in what Chandran describes as a “three-prong star.” These stars can be linked, again through complementary end sequences, with other stars, to form meta-DNA strands.

Creating meta-DNA structures that can act like enzymes, the researchers added, simply involves the combining of two meta-strands of differing length, providing an opening for other single-stranded bit of meta-DNA to bind. Under the right conditions, new meta-bases could start binding to the longer meta-strand, allowing for possible “enzymatic” reactions, like DNA replication (much like PCR reactions, in which shorter primer pieces of DNA extend under the right conditions). Meta-DNA could also be designed to mimic restriction enzyme activity if a strand within one of its meta-bases recognizes a sequence in the meta-DNA strand to be cleaved.

The researchers have yet to build such DNA-based enzyme reactions, but they have begun to build actual meta-DNA structures, and Chandran is confident that with some careful planning, they should be able to put these principles into practice, he said. He imagines someday being able to create entire meta-cells, capable of interacting with living tissue, possibly carrying therapeutic components inside.

A system built entirely of DNA should theoretically eliminate unnecessary unpredictability of RNA and proteins, and should make it easier, in the long run, for synthetic biologists to design unique systems, Chandran said. “We have a strong belief in our group that we can probably create primitive life using just DNA strands.”

Dwyer agreed that enzyme design is a problem “not yet solved,” but pointed to a critical drawback of the DNA-only system. At this point, “it’s only really applicable to other meta-DNA constructs,” Dwyer explained. To become truly useful, meta-DNA will need to be able to interact with proteins. Meta-DNA is also likely to perform reactions (like replication) much more slowly than normal protein enzymes, a point which Chandran acknowledged.

And not everyone sees the need for DNA-only systems in the first place. Though he calls the research “neat,” systems chemist Douglas Philp of the University of St Andrews in Scotland doesn’t feel that enzymes and RNA need replacing. “Proteins do enzymatic work. RNA can carry both information and catalyze reactions, and DNA carries information,” said Philp. “DNA is great for carrying information because it’s so stable,” but it’s the extraordinary complexity of protein structure that helps enzymes work so well. DNA’s monotonous propensity for the double helix could actually limit its applicability, he noted.

### Bioterrorist Battles

A Swiss-based firm may have a back-door way to thwart a bioterrorist attack—by fighting the flu.

**By Fran Hawthorne | January 1, 2012**

In 2001, the Center for Strategic and International Studies (CSIS) and the Johns Hopkins Center for Civilian Biodefense Studies coordinated a 2-day terrorist attack simulation using the smallpox virus, called “Dark Winter.” The predicted result: up to one million people would die within weeks. Similarly, an analysis by the National Security Council in November 2009 estimated that a biological attack could leave “hundreds of thousands of people” at risk of death. Of course, all these estimates are iffy, and the CSIS-Johns Hopkins prediction in particular was based on a relatively high transmission rate of 10 new infections by each victim—a figure that depends on unpredictable factors such as the weather, time of year, social interactions, and each victim’s genetic makeup and health. Nevertheless, there is little dispute that the use of biologic agents, like smallpox or the Ebola virus, as weapons is among the biggest threats haunting military planners.

To prepare for such potential attacks, the US Department of Defense started a special program in 2006, called the Transformational Medical Technologies Initiative, to seek broad-based “medical countermeasures” to such weapons. But there’s a catch: the Pentagon has no way to determine whether these countermeasures actually work.

Obviously, if you’re going to do efficacy studies, you’re not going to do those on Ebola in humans, because it’s too lethal. -Neil Goldsmith, Evolva cofounder and CEO

As with all medications, antibioterror drugs can be tested for safety on healthy human volunteers—after thorough preliminary experiments and animal trials, of course. They can also be tested for effectiveness on animals that are deliberately infected with the disease, under a special rule of the US Food and Drug Administration, issued in 2002. However, as the FDA rule acknowledges, “Adequate and well-controlled efficacy studies in humans cannot be ethically conducted because the studies would
involve administering a potentially lethal or permanently disabling toxic substance or organism to healthy human volunteers."

"Obviously, if you’re going to do efficacy studies, you’re not going to do those on Ebola in humans, because it’s too lethal," says Neil Goldsmith, cofounder and CEO of the Swiss-based biotech Evolva.

So Goldsmith and his colleagues have devised a back-door solution: an influenza drug that, in theory, also ought to work against Ebola, and perhaps other fatal viruses, because it targets the mechanism of the body’s immune response to viral attack, rather than focusing on any specific virus. With authorization from the FDA and a $27 million, 5-year grant from the Pentagon’s Defense Threat Reduction Agency (DTRA), Evolva is almost ready to begin clinical trials with influenza patients.

"We are using the influenza trials to gain information, and we can use that to build the Ebola case," explains Evolva president and cofounder Alexandra Sorensen.

**A catch-all drug**

Founded in 2004 near Basel, Switzerland, Evolva has about 100 employees and 10 widely varying projects under way in crop protection, flavorings, and other food-related areas, as well as drugs. All of the research uses the same scientific platform: ordinary baker’s yeast that is injected with artificial chromosomes—created by Evolva using plants, animals, and fungi—in one billion different combinations. Of those billion "souped-up" yeasts, as Goldsmith dubs them, no more than 10,000 will show enough promise to move on to the next stage of research, where they will be subjected to a new set of trial-and-error experiments until one yeast happens to produce a substance that hits the desired target. At that point, Goldsmith says, "we identify what new molecule these yeasts are making. We can also find the genes the yeast has used to make it."

The first product to hit the market, possibly as early as 2014, is expected to be a vanilla flavoring molecule, which the company has created by concocting a chromosome combination that mimics the mix of ingredients that occur naturally in the vanilla orchid. But the one that has drawn the Pentagon’s interest as a bioterror antidote is a drug called EV-077.

EV-077 blocks the thromboxane (TP) receptor, a G protein–coupled receptor found on the cell surfaces of many different human tissues that performs a variety of functions. In patients with type 2 diabetes, for instance, an excess of metabolites called prostanooids, including thromboxane, causes the receptor to signal the extreme aggregation of platelets in the bloodstream, increasing the risk of heart attack and inflammation. Indeed, EV-077 is now being tested in diabetics, with Phase I safety trials on healthy individuals successfully completed this summer in Germany. A small scale study of participant blood samples also indicated that the drug may enhance the ability of aspirin to inhibit platelet aggregation. The company hopes to start Phase II trials on diabetes patients in Germany this year.

The potential for fighting viruses such as influenza and Ebola comes into the picture because of the TP receptor’s secondary role in immunity. When the body’s immune system is working properly, antigen-presenting cells and T cells interact to fight off a viral attack. Scientists believe that some viruses and other pathogens can interfere with this immune response by inducing increased synthesis of thromboxane A2 (TXA2), which in turn stimulates TP receptors expressed in immune cells, somehow inhibiting the interaction of the two cell types. In animal tests published last February, EV-077 reduced the effects of TXA2 on the TP receptor, and animals receiving EV-077 after exposure to the flu virus had fewer symptoms than those given the standard medication, Roche’s Tamiflu. The FDA has approved safety trials on about 20 healthy individuals, which Evolva will eventually follow up with efficacy studies in influenza patients.

But even if the compound proves effective against the flu, there is one big question remaining: will it also work against other viruses—in particular, Ebola? Although Ebola and influenza attack different aspects of human physiology, Evolva scientists say that part of the innate human immune response to both is to increase expression of TXA2. Thus, it may be possible that the drug will be effective against both pathogens, and that maybe—just maybe—the flu results can be transposed lock, stock, and petri dish to Ebola.

**Other Ebola efforts**

Evolva is hardly the only company working to fight Ebola—and some of them are further along than Evolva. A Canadian biotech called Tekmira Pharmaceuticals Corp., for example, has a $34.7 million, 3-year Department of Defense contract for research into attaching small interfering RNAs to three crucial Ebola genes—one that copies the virus and two that interfere with the host’s immune response. In 2010, working with scientists from Boston University, Tekmira successfully tested two different dosings of the treatment on rhesus monkeys infected with Ebola. Two of the three monkeys that received a four-dose
regimen, and all four monkeys receiving seven doses, survived infection with Ebola virus, whereas all untreated animals died.

Independently, Washington State-based AVI BioPharma has an up-to $291 million, 6-year Pentagon contract for its trials of antisense-based treatments targeting viral RNA for Ebola and another usually fatal viral disease, Marburg fever. In trials last year, the company reported a 75 percent survival rate 15 days post-infection for monkeys infected with Ebola and 100 percent for Marburg, and Phase I trials on 10 healthy people started last spring.

In addition, researchers at Thomas Jefferson University Hospital in Philadelphia say they've developed a vaccine against both rabies and Ebola that worked in mice, building on an already-available rabies vaccine. And Arizona State University researchers just last month published a report that they had developed a vaccine that protects mice against lethal Ebola infection.

The long road ahead

However, all of these compounds take the traditional approach of attacking a particular virus, rather than viruses in general, and thus they cannot be ethically tested on humans for efficacy against lethal pathogens. That's the big advantage to Evolva's strategy—there's no shortage of flu patients on whom to test EV-077's effectiveness.

Moreover, testing the effectiveness of EV-077 for ailments such as diabetes could smooth the path to FDA approval, says Alan Rudolph, director of the chemical and biological technologies in the Pentagon's DTRA. “We can get the FDA comfortable with a new technology for a first indication that has broad applications, then follow up with an indication that has a more specific use against threat agents.”

Finally, the prospective market for EV-077 as a flu medication—which Goldsmith estimates in the “high hundreds of millions of dollars” annually—would give Evolva a business incentive to proceed. After all, even Goldsmith admits there isn’t much money to be made selling an anti-Ebola drug for the Pentagon to stockpile.

But there’s still a long road ahead for EV-077. Despite the promising beginning, it will likely take another 6 years and dozens of trials before EV-077 is approved as a bioterror antidote—and that’s if all goes well.

First, the drug may not work, either against flu in humans or Ebola in animals. The industry well knows that only about 10 percent of the compounds that optimistically start down the path of clinical trials ever make it to market. And even if all the human-flu and animal-Ebola results are great, there is still the lingering question about the basic tenet of Evolva’s approach: whether those results will translate into a preventive for Ebola in humans. “Animals have a very different set of susceptibilities to different infections,” points out Jonathan Kimmelman, an associate professor of biomedical ethics at McGill University in Montreal. “All the time, drugs work miracles in animals, and they flunk their test in humans.”

Yet the traditional alternatives aren’t any better. Testing an Ebola treatment on cell cultures or via computer modeling would be even more removed from human reality than animal trials. Scientists could wait for an outbreak to occur naturally, but those are—fortunately—rare, and usually occur in remote locations where it’s not easy to organize a randomized clinical trial on short notice. Plus, the living conditions in these locales are a far cry from those of New York City subway riders, which could render any trial as unreliable as animal tests. “They may have a different diet that interacts with the drug. They may have different kinds of illnesses that change the way the drug works,” Kimmelman points out.

Thus, for all the hurdles, Evolva may hold out the best hope for a testable Ebola treatment. Though “you probably wouldn’t be able to say [EV-077] works on all viruses,” the approach Evolva is taking may be the closest science can come to securing a successful treatment in case of a bioterror attack, says Nancy M.P. King, a professor of social sciences and health policy at the Wake Forest University School of Medicine.

And the US government has acknowledged the need to do something. In a report released last year, the presidential Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism gave the government an “F” on its efforts to “enhance the nation’s capabilities for rapid response to prevent biological attacks from inflicting mass casualties” and a “C” on its work so far to “strengthen domestic and global disease surveillance networks.”

“We can no longer afford to develop products for specific agents,” Rudolph says. “There are too many threats, the threats are too dynamic, and we don’t have the time or money to develop specific products.”
A Call to Stop H5N1 Research

Three dozen researchers have signed a letter promising to halt dangerous bird flu research for 2 months to initiate safety discussions.

By Sabrina Richards | January 23, 2012

*Science* and *Nature* jointly published a letter on Friday (January 20) declaring a voluntary 2-month suspension of research into transmission of H5N1 highly pathogenic avian influenza. The letter, signed by 39 influenza researchers around the world, acknowledges that before research continues, there should be informed, global discussions regarding its regulation and publication.

The move came after the news that H5N1, which so far has not evolved transmissibility between humans, had been transformed in lab experiments into a virus that is aerosolized and easily transmitted between ferrets, the animal model that best mimics human influenza infection. Last month (December 20), the National Science Advisory Board for Biosecurity (NSABB) recommended that details of the mutations which evolved this new transmissibility be redacted before publication, sparking a heated debate among the scientific community regarding how to share the results of such potentially dangerous research, and whether or not to do it in the first place.

The call for bird flu scientists to cease dangerous research activities for 60 days is similarly met with mixed reactions. Some welcome the opportunity to explore proper precautions, but others consider it an empty gesture, arguing that 2 months is too short to bring consensus on how avian influenza research should proceed.

“It’s a welcome statement right now, although it will be a challenge to come up with a global plan in 60 days,” said Michael Osterholm, director of the Center for Infectious Diseases Research and Policy at the University of Minnesota and a member of the NSABB panel that advised against full publication of the results.

“It’s a useful gesture,” agreed John Steinbruner, director of the Center for International and Security Studies at the University of Maryland, but 2 months is not enough time, even if the pause “implicitly acknowledges a problem with the research.”

But whether those researchers who signed the letter intend to begin drawing up a global plan to re-imagine how H5N1 research is accomplished is unclear. The letter—co-authored by researchers of the two recent studies, which have been submitted to *Science* and *Nature*—describes the “need to clearly explain the benefits of this important research and the measures taken to minimize its possible risks.” The goal of the 60-day moratorium, the letter says, is to “provide time for these discussions” regarding the “best solutions for opportunities and challenges that stem from the work.”

Daniel Perez, a virologist at the University of Maryland and one of the letter’s co-signers, feels that the pause should be a “time out, when we discuss what to do.” Perez believes that the benefits of the research, which he hopes can aid developing countries in pandemic preparedness, outweigh the risks, and that the suspension in research should be used to “put out the message that [the research] is useful.”

Some observers hoping for more action are not impressed with these sentiments. Richard Ebright, a chemistry professor and bioweapons expert at Rutgers University, sees the letter as a “PR gesture,” with 2 months being insufficient time to address the biosafety and security of the influenza virus.

Among the changes needed, “we should have in place a system of prior review,” Ebright said, such as a group of disinterested parties tasked with weighing the risk of such studies. He also calls for the new highly transmissible avian influenza to be placed in the Tier 1 risk group of select agents, so that the US government would regulate which labs handled and researched it. If influenza became a Tier 1 agent, it would join Ebola, anthrax, and the plague bacteria *Yersinia pestis*. Furthermore, to help prevent accidental release, many are arguing that H5N1 research should be restricted to Biosafety Level-4 (BSL4) labs, which require researchers to wear positive pressure suits, and add extra decontamination steps, like UV irradiation and showering before exiting. (The two recent H5N1 transmission studies under debate were both conducted in BSL3 or BSL3+ labs, in accordance with the current edition of the NIH’s *Biosafety in Microbiology and Biomedical Laboratories.*)

While researchers applaud the effort to initiate such discussions, decisions regarding the regulation of H5N1 research are unlikely to conclude in the 60 day window outlined in the letter. For starters, researchers and regulators must first decide who to include in such discussions. While Laura Kahn of Princeton University’s Program on Science and Global Security thinks that biosecurity experts should be required participants, others envision scientific experts convening to weigh the risks. Lynn Klotz, a senior science fellow at the Center for Arms Control and Non-Proliferation in Washington, DC, would like to see
a global group of independent virologists and microbiologists deciding which experiments need doing at all.

Steinbruner argues for keeping “professional regulators” out of the picture for now in order to come to a conclusion more quickly. “Scientists must take the initiative to find an arrangement [of regulations] they can live with” before disaster strikes, he said. Though the name may not inspire the same nightmares as Ebola or anthrax, influenza may be the perfect agent for a pandemic, with H5N1 showing greater than 50 percent mortality in the five hundred people who have contracted the virus directly from infected poultry—well above the 2.5 percent mortality rate of the 1918 flu, which killed over 50 million people. “There’s nothing else in its league,” Steinbruner said.

**Infection-Control Training Mandated at Assisted Living Centers**

*News and Observer (Raleigh NC)*, (01.24.2012)  Thomas Goldsmith

This month, a new law requiring infection-control training for staff at North Carolina assisted living centers takes effect.

Duke University's Dr. Thomas Bender, formerly a CDC investigator, said the training compares favorably to efforts in other states to deal with a growing number of hepatitis outbreaks caused by improper diabetes care. “I certainly look at this legislation as a model to hold up for other states,” he said. “These rules are a lot more of a response to a very significant problem than you see elsewhere.”

This year, some 30,000 medical technicians and their supervisors at assisted living centers will take part in a training course developed by the state divisions of Health Service Regulation and Public Health. By the end of next year, medical techs will need five hours of infection-control training before they ever touch a patient, then another 10 hours after starting work. In addition to training, the law mandates monitoring for infections and reporting outbreaks at these facilities.

Dr. Zack Moore, medical epidemiologist with the Division of Public Health, said the law brings infection-control protocols at assisted living centers more in line with those at health care institutions. “It’s a real patchwork as far as what kinds of regulations and oversights occur in different settings—hospitals, nursing homes, assisted living,” he said. “Adult care homes didn’t have very much in the way of training before this bill, which is why it was thought to be important.”

A 2009 hepatitis B outbreak at the Glen Care Mount Olive assisted living facility in Wayne County that killed six residents was found to be due to improper reuse of fingerstick devices and other instruments used to monitor diabetes. GCMO initially denied it had any role in the deaths but eventually paid $16,000 in state fines for the violations. Reusable fingerstick devices should not even be present in a group setting where assisted monitoring is occurring, Bender noted.

**Doctors Without Borders: 15,000 Congo AIDS Victims Likely Will Die**

*Associated Press*, (01.25.2012)  Saleh Mwanamilongo

Just 15 percent of people with AIDS in the Democratic Republic of Congo have access to antiretroviral therapy (ARVs), according to a new DWB report. DWB said donor nations reneging on pledges to the Global Fund to Fight AIDS, TB and Malaria—the country’s leading supplier of ARVs—has led the fund to sharply reduce support. In addition, DRC’s government has not made free ARVs a priority, the report said.

DWB was the first organization to provide free ARVs in Congo, in 2003, and today treats more than 10 percent of DRC patients on ARVs, including 20 percent of those on therapy in Kinshasa. However, only 44,000 of the estimated 350,000 people in DRC with AIDS who need ARVs receive them. Some 15,000 people waiting for ARVs likely will die in the next three years, DWB said.

The pullback of donor support for the Global Fund “is directly threatening the lives of thousands of people in DRC,” DWB said. Only 1 percent of HIV-positive pregnant women have access to ARVs to protect their babies from the virus; as a result, about one-third of those infants exposed to HIV will be infected, the report said.

“What I’m seeing in DRC has not existed elsewhere for years,” said Anja De Wegheleire, the DWB medical coordinator for the nation. “The situation here reminds me of the time before any antiretroviral treatment was available.”
Hepatitis A Vaccination Coverage Among Adolescents in the United States

*Pediatrics doi:10.1542/peds.2011-2197*, (01.23.2012) Christina G. Dorell, MD, MPH; David Yankey, CPH, MS; Kathy K. Byrd, MD, MPH; Trudy V. Murphy, MD

“Hepatitis A infection causes severe disease in adolescents and adults,” the authors wrote in their introduction. CDC’s Advisory Committee on Immunization Practices instituted incremental recommendations for hepatitis A vaccination (HepA) at two years of age based on risk in 1996; in selected states in 1999; and universally at one year of age, with vaccination through age 18 based on risk or desire for protection, in 2006. In the current study, the team assessed adolescent HepA coverage in the United States and factors independently associated with receiving the vaccine.

To determine 1- and 2-dose HepA coverage among youths ages 13-17, data from the 2009 National Immunization Survey-Teen (n=20,066) were analyzed. The researchers used bivariate and multivariable analyses to test associations between HepA initiation and sociodemographic characteristics stratified by state groups: group 1, universal child vaccination since 1999; group 2, consideration for child vaccination since 1999; and group 3, universal child vaccination at one year of age since 2006.

The results showed that national 1-dose HepA coverage among adolescents was 42 percent in 2009, with 70 percent of vaccinees completing the 2-dose series. One-dose coverage was 74.3 percent among states in group 1; 54 percent among states in group 2; and 27.8 percent among states in group 3.

“The adjusted prevalence ratios of vaccination initiation were highest for states with a vaccination requirement and for adolescents whose providers recommended HepA,” the authors found. “HepA coverage was low among most adolescents in the United States in 2009, leaving a large population susceptible to hepatitis A infection maturing into adulthood.”

Drug-Users' Needles Endanger Public, Study Shows

*Miami Herald*, (01.13.2012) Fred Tasker

A new study comparing needle disposal practices in Miami and San Francisco illustrates how legislative support for harm-reduction strategies like needle exchange can impact transmission rates of diseases like HIV and hepatitis.

Hansel Tookes and colleagues at the University of Miami interviewed 448 injection drug users in the city’s downtown area who admitted throwing away a total of 9,845 syringes during a one-month period. The IDUs either shared or sold some 700 needles. In all, 95 percent of the used needles were disposed of improperly—in public trash cans, on sidewalks, in parks, into sewers and down toilets. By contrast, just 13 percent of used needles in San Francisco were improperly disposed of.

In 2009, IDUs accounted for 9 percent of new HIV infections in the United States, 15 percent of new hepatitis B cases and 44 percent of new hepatitis C infections. “Many [IDUs] contract these viral infections through the sharing of contaminated syringes,” Tookes wrote. Non-IDUs are at risk of infection “through accidental needle-sticks from unsafely disposed contaminated syringes,” though such transmissions are rare.

San Francisco has had needle-exchange programs since 1988. Florida law bans NEPs, so it is not among the 32 states in which 220 such programs are distributing 30 million clean needles, according to the North American Syringe Exchange Network.

A 2009 study in the Journal of Urban Health reported that 12 percent of San Francisco IDUs were HIV-positive, compared to 23 percent of IDUs in Miami-Dade.

Tom Liberti, chief of the Florida Department of Health HIV/AIDS Bureau, said he would support NEPs on the grounds they reduce disease; however, no legislation is in process to repeal the ban, which has been on the books for more than a decade.


Virulent TB Case Rings Up Steep Bill

*Journal Gazette (Fort Wayne)*, (01.25.2012) Vivian Sade

A multidrug-resistant TB case discovered last month in Allen County will cost the state and county an estimated $250,000 in medication alone, the Fort Wayne-Allen County Board of Health was told on Monday. The MDR TB infection was found in a Fort Wayne Community Schools student, who is now in isolation and receiving treatment. Nearly 150 students potentially exposed have been screened for TB, and no other active case has been identified.
“The health department is in the process of evaluating the results of the first round of testing and will repeat the process in eight weeks,” said Dr. Deborah McMahan, health commissioner.

The treatment cost estimate is on the high side, noted John Silcox, the Department of Health’s spokesperson. It includes $200,000 from the state for one year of treatment for the six main medications. The county will pick up $50,000 for two years’ worth of additional medications.

“We attempt to tap into any available insurance or resources, but with this case, neither is available,” said Silcox. “It’s unfortunate because this happens to be a case where the treatment is more expensive because of the nature of the TB.”

Other costs are difficult to estimate, Silcox said. “Depending on whether the patient becomes eligible for Medicaid and whether any surgery is necessary, it will likely be a minimum of $40,000 to $50,000 and a maximum of $50,000 to $115,000,” he said.

“It’s frustrating, because in some way, shape or form the taxpayer bears a substantial burden in this case,” said Joseph Steensma, the board’s chair. “If we had three such cases instead of one, it would be our entire budget for the year.”

Making Memories Last: Prion-Like Protein Plays Key Role in Storing Long-Term Memories

ScienceDaily (Jan. 27, 2012) — Memories in our brains are maintained by connections between neurons called "synapses." But how do these synapses stay strong and keep memories alive for decades? Neuroscientists at the Stowers Institute for Medical Research have discovered a major clue from a study in fruit flies: Hardy, self-copying clusters or oligomers of a synapse protein are an essential ingredient for the formation of long-term memory.

The finding supports a surprising new theory about memory, and may have a profound impact on explaining other oligomer-linked functions and diseases in the brain, including Alzheimer’s disease and prion diseases.

"Self-sustaining populations of oligomers located at synapses may be the key to the long-term synaptic changes that underlie memory; in fact, our finding hints that oligomers play a wider role in the brain than has been thought," says Kausik Si, Ph.D., an associate investigator at the Stowers Institute, and senior author of the new study, which is published in the January 27, 2012 online issue of the journal Cell.

Si's investigations in this area began nearly a decade ago during his doctoral research in the Columbia University laboratory of Nobel-winning neuroscientist Eric Kandel. He found that in the sea slug Aplysia californica, which has long been favored by neuroscientists for memory experiments because of its large, easily-studied neurons, a synapse-maintenance protein known as CPEB (Cytoplasmic Polyadenylation Element Binding protein) has an unexpected property.

A portion of the structure is self-complementary and—much like empty egg cartons—can easily stack up with other copies of itself. CPEB thus exists in neurons partly in the form of oligomers, which increase in number when neuronal synapses strengthen. These oligomers have a hardy resistance to ordinary solvents, and within neurons may be much more stable than single-copy "monomers" of CPEB. They also...
seem to actively sustain their population by serving as templates for the formation of new oligomers from free monomers in the vicinity.

CPEB-like proteins exist in all animals, and in brain cells they play a key role in maintaining the production of other synapse-strengthening proteins. Studies by Si and others in the past few years have hinted that CPEB's tendency to oligomerize is not merely incidental, but is indeed essential to its ability to stabilize longer-term memory. "What we've lacked till now are experiments showing this conclusively," Si says.

In the new study, Si and his colleagues examined a Drosophila fruit fly CPEB protein known as Orb2. Like its counterpart in Aplysia, it forms oligomers within neurons. "We found that these Orb2 oligomers become more numerous in neurons whose synapses are stimulated, and that this increase in oligomers happens near synapses," says lead author Amitabha Majumdar, Ph.D., a postdoctoral researcher in Si's lab.

The key was to show that the disruption of Orb2 oligomerization on its own impairs Orb2's function in stabilizing memory. Majumdar was able to do this by generating an Orb2 mutant that lacks the normal ability to oligomerize yet maintains a near-normal concentration in neurons. Fruit flies carrying this mutant form of Orb2 lost their ability to form long-term memories. "For the first 24 hours after a memory-forming stimulus, the memory was there, but by 48 hours it was gone, whereas in flies with normal Orb2 the memory persisted," Majumdar says.

Si and his team are now following up with experiments to determine for how long Orb2 oligomers are needed to keep a memory alive. "We suspect that they need to be continuously present, because they are self-sustaining in a way that Orb2 monomers are not," says Si.

The team's research also suggests some intriguing possibilities for other areas of neuroscience. This study revealed that Orb2 proteins in the Drosophila nervous system come in a rare, highly oligomerization-prone form (Orb2A) and a much more common, much less oligomerization-prone form (Orb2B). "The rare form seems to be the one that is regulated, and it seems to act like a seed for the initial oligomerization, which pulls in copies of the more abundant form," Si says. "This may turn out to be a basic pattern for functional oligomers."

The findings may help scientists understand disease-causing oligomers too. Alzheimer's, Parkinson's and Huntington's disease, as well as prion diseases such as Creutzfeldt-Jakob disease, all involve the spread in the brain of apparently toxic oligomers of various proteins. One such protein, strongly implicated in Alzheimer's disease, is amyloid beta; like Orb2 it comes in two forms, the highly oligomerizing amyloid-beta-42 and the relatively inert amyloid-beta-40. Si's work hints at the possibility that oligomer-linked diseases are relatively common in the brain because the brain evolved to be relatively hospitable to CPEB proteins and other functional oligomers, and thus has fewer mechanisms for keeping rogue oligomers under control.

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**New Information for Flu Fight: Researchers Study RNA Interference to Determine Host Genes Used by Influenza for Virus Replication**
ScienceDaily (Jan. 27, 2012) — Influenza virus can rapidly evolve from one form to another, complicating the effectiveness of vaccines and anti-viral drugs used to treat it. By first understanding the complex host cell pathways that the flu uses for replication, University of Georgia researchers are finding new strategies for therapies and vaccines, according to a study published in the January issue of the Journal of the Federation of American Societies for Experimental Biology.

The researchers studied RNA interference to determine the host genes influenza uses for virus replication.

All viruses act as parasites by latching onto healthy cells and hijacking the cells' components, essentially turning the cell into a factory that produces copies of the virus. This process begins when influenza binds to sugars found on the surface of host cells in the lung and respiratory tract. Once attached, the virus downloads its genetic information into the nucleus of the cell, and virus replication begins.

"Viruses contain very minimal genetic information and have evolved to parasitize host cell machinery to package and replicate virus cells. Because virus replication is dependent on host cell components, determining the genes needed for this process allows for the development of novel disease intervention
strategies that include anti-virals and vaccines," said study co-author Ralph Tripp, a Georgia Research Alliance Eminent Scholar and Chair of Animal Health Vaccine Development in the UGA College of Veterinary Medicine.

"We have the technology today that allows us to target specific genes in human cells and silence those genes to inhibit the production of virus in the cells," he said.

RNA interference, which was first discovered as the mechanism that effects color change in petunia breeding, is now being applied to medical advancements. Using RNAi silencing technologies, Tripp's lab was able to identify key host cell pathways needed by influenza virus for replication.

"We have a very limited toolbox for treating influenza," Tripp said. "There are two medications currently used to treat flu infections, but virus resistance has developed to these drugs. Our studies have identified several novel host genes and associated cell pathways that can be targeted with existing drugs to silence virus replication."

Understanding which genes can be silenced to inhibit growth of viruses opens the medicine cabinet for the repurposing of existing drugs.

Existing anti-viral drugs slow influenza virus replication by preventing the virus from releasing itself from its host cell. These treatments target the virus, which is able to rapidly mutate to avoid drug sensitivity. In contrast, drugs that target host genes work more effectively because host genes rarely change or mutate.

"If we target a host gene, the virus can't adapt," Tripp said. The influenza virus "may look for other host genes in the same pathway to use, which may be many, but we have identified the majority of preferred genes and can target these genes for silencing."

The influenza A virus has eight single RNA strands that code for 11 proteins. Recent studies suggest it may need several dozen host genes to reproduce. Turning off the apex, or signaling, gene can cause the reproduction sequence to stall.

"Through this research we can repurpose previously approved drugs and apply those to influenza treatments, drastically reducing the time from the laboratory to human medicine," said Victoria Meliopoulos, a UGA graduate student and co-author of the study. "We can manipulate the cellular microenvironment to increase the viral yield during vaccine manufacturing."

Meliopoulos said these discoveries can be used to create new anti-viral drugs and develop better vaccines that can be used to treat patients with influenza. This technology also can be used to improve medications for other viruses like hepatitis and polio.

The technology allows the researchers "to establish a comprehensive roadmap of human genes modulated during influenza virus infection to better understand these disease mechanisms and to identify novel targets for anti-influenza therapy," said Lauren Andersen, a UGA graduate student and co-author of the study.

Influenza is the world's leading cause of morbidity and mortality; seasonal viruses affect up to 15 percent of the human population and cause severe illness in 5 million people a year, according to the Centers for Disease Control and Prevention. In the U.S., financial losses caused by seasonal influenza are estimated to exceed $87 billion annually.

**Journal Reference:**

**House Passes Repeal of HPV Vaccine Mandate**
*Roanoke Times*, (01.27.2012) Michael Sluss
In a 62-34 vote Friday, Virginia’s House of Delegates passed HB 1112, which would eliminate the state mandate that girls be vaccinated against human papillomavirus before entering sixth grade. The General Assembly in 2007 approved adding HPV vaccination to the state’s list of required immunizations for children. Under the law’s liberal opt-out clause, parents can refuse their consent for vaccination after receiving information about the link between HPV and cervical cancer.

A similar bill to eliminate the mandate passed the Republican-controlled House last year, but it failed to advance in the Democratic-controlled Senate Education and Health Committee. Republicans now hold a majority on that committee after taking control of the Senate this year. The sponsor of HB 1112, Del. Kathy Byron (R-Campbell County), said parents and doctors should decide whether to vaccinate girls against the STD.
Del. Jeion Ward (D-Hampton) said she is concerned that the children of low-income families would have more difficulty accessing the vaccine without a state mandate. She also expressed dismay that more female House members were not involved in the brief floor debate.

Would Gay Men Change Their Sexual Behavior to Reduce Syphilis Rates?

Sexually Transmitted Diseases Vol. 38; No. 12: P. 1145-1150. (12..2011) Pol Dominic McCann; Richard T. Gray; Alexander Hoare; Jack Bradley; Ian Down; Basil Donovan; David P. Wilson; Garrett Prestage

“The community at which public health strategies for reducing syphilis epidemics are potentially targeted may have different considerations with regards to their sexual and health priorities,” noted the study authors, whose research sought information on the acceptability of behavior change interventions to reduce syphilis among gay men in Australia.

An online survey of 2,306 participants and focus groups were conducted to determine whether further sexual behavior change to reduce syphilis is likely to be acceptable to gay men.

Twenty-six percent of survey respondents indicated they would be highly likely to reduce partner acquisition rates in order to reduce their chances of infection with syphilis. However, among the 475 men (21 percent) who reported more than 10 partners in the last six months, just 11 percent said it was “highly likely” they would reduce partner numbers to avoid the STD. Among 606 respondents (26 percent) who reported not always using condoms in the previous six months, 34 percent indicated being highly likely to always use condoms with casual partners to avoid syphilis. Men in the focus groups indicated little commitment to sexual behavior change but some willingness to consider short-term changes to reduce syphilis at the community level.

“Interventions promoting partner reduction or increased condom use are unlikely to be adopted on a long-term basis by men at greatest risk. Behavioral interventions alone are unlikely to materially contribute to syphilis prevention among gay men,” the study authors concluded.

Much-Debated Issue of Condoms in Schools OK’d

Rochester Democrat and Chronicle , (01.27.2012)  Tiffany Lankes

Rochester schools soon will make condoms available to high school students, following a 4-3 vote Thursday in favor of the policy.

Nearly a year ago, local health experts recommended a condom distribution program to the district school board as a way to help teens avoid STDs and unplanned pregnancies. Officials with the Metro Council for Teen Potential and the Monroe County Department of Public Health cited a recent youth behavior survey indicating that 58 percent of Rochester ninth- through 12th-graders reported being sexually active, of which 21 percent said they had had at least four partners. In a typical year, 8 percent of girls ages 15-19 give birth. In 2005, 19 percent of babies born in the city were born to mothers ages 10-19.

The proposal sparked controversy, with hundreds of people for and against it attending school board meetings. Many of those same people were on hand for Thursday’s board vote.

“We’re not going to appease everyone,” said board member José Cruz, who voted in favor of the program along with Mary Adams, Malik Evans, and Willa Powell. “Our job is to make the best decision we can with what we hear.” Melisza Campos, Cynthia Elliott, and Van White voted against the proposal.

Under the program, condoms will be made available at health clinics in city high schools. Health professionals will provide information about proper usage and sexual risks.

School officials are reworking lessons on reproductive and sexual health; these may incorporate community-based resources and more of a focus on contraceptive usage. Parents will be able to opt their children out of the lessons and block their access to condoms.

Fears Of Cholera Outbreak Arise In Zimbabwe After More Than 800 Cases Of Typhoid Reported

"Doctors in Zimbabwe said more than 800 cases of typhoid have been reported in Harare, the capital, in an outbreak of the bacterial disease," GlobalPost reports (Conway-Smith, 1/29). "Health services director Dr. Prosper Chonzi raised fears of a cholera outbreak given the health conditions that gave birth to typhoid," Xinhua writes (1/28). Chonzi "said ... a clean-up and awareness campaign is underway," according to GlobalPost (1/29).
Reflecting On Africa’s Successes, Challenges In Fight Against Malaria
Ellen Johnson Sirleaf, president of Liberia and the new chair of the African Leaders Malaria Alliance (ALMA), writes in a Huffington Post opinion piece about Africa's efforts in the fight against malaria. "Supported by the lessons learned from the decade to 'roll back malaria,' which produced a 33 percent decline in malaria deaths in Africa between 2000 and 2010, 41 African presidents have now signed on to end deaths from the disease in their home countries as part of [ALMA]," she writes. But "[d]espite this encouraging progress, much work remains to be done," she continues.

Citing ways malaria affects health and education outcomes, Sirleaf says that "to understand malaria's true impact, consider that the disease can rob individual families in poorer communities of as much as 25 percent of their disposable income. By controlling malaria we eliminate a major obstacle to sustainable economic development and stability in Africa." She adds, "...[W]ith sound policies, genuine leadership, and reliable partnership from the world, I believe Africa can be free of the need for development assistance in a generation" (1/29).

How Bacteria Behind Serious Childhood Disease Evolve to Evade Vaccines
ScienceDaily (Jan. 29, 2012) — Genetics has provided surprising insights into why vaccines used in both the UK and US to combat serious childhood infections can eventually fail. The study, recently published in Nature Genetics, which investigates how bacteria change their disguise to evade the vaccines, has implications for how future vaccines can be made more effective.

Pneumococcus (Streptococcus pneumoniae) causes potentially life-threatening diseases including pneumonia and meningitis. Pneumococcal infections are thought to kill around a million young children worldwide each year, though the success of vaccination programmes has led to a dramatic fall in the number of cases in countries such as the UK and US. These vaccines recognise the bacteria by its polysaccharide, the material found on the outside of the bacterial cell. There are over ninety different kinds—or 'serotypes'—of the bacteria, each with a different polysaccharide coating.

In 2000, the US introduced a pneumococcal vaccine which targeted seven of the ninety serotypes. This '7-valent' vaccine was extremely effective and had a dramatic effect on reducing disease amongst the age groups targeted. Remarkably, the vaccine has also prevented transmission from young children to adults, resulting in tens of thousands fewer cases of pneumococcal disease each year. The same vaccine was introduced in the UK in 2006 and was similarly successful.

In spite of the success of the vaccine programmes, some pneumococcal strains managed to continue to cause disease by camouflaging themselves from the vaccine. In research funded by the Wellcome Trust, scientists at the University of Oxford and at the Centers for Disease Control and Prevention in Atlanta studied what happened after the introduction of this vaccine in the US. They used the latest genomic techniques combined with epidemiology to understand how different serotypes of the pneumococcus bacteria evolve to replace those targeted by the initial vaccine.

The researchers found bacteria that had evaded the vaccine by swapping the region of the genome responsible for making the polysaccharide coating with the same region from a different serotype, not targeted by the vaccine. This effectively disguised the bacteria, making it invisible to the vaccine. This exchange of genome regions occurred during a process known as recombination, whereby one of the bacteria replaces a piece of its own DNA with a piece from another bacterial type.

Dr Rory Bowden, from the University of Oxford, explains: "Imagine that each strain of the pneumococcus bacteria is a class of schoolchildren, all wearing the school uniform. If a boy steals from his corner shop, a policeman—in this case the vaccine—can easily identify which school he belongs to by looking at his uniform. But if the boy swaps his sweater with a friend from another school, the policemen will no longer be able to recognise him and he can escape. This is how the pneumococcus bacteria evade detection by the vaccine."
Dr Bowden and colleagues identified a number of recombined serotypes that had managed to evade the vaccine. One in particular grew in frequency and spread across the US from east to west over several years. They also showed that during recombination, the bacteria also traded a number of other parts of the genome at the same time, a phenomenon never before observed in natural populations of pneumococcus. This is of particular concern as recombination involving multiple fragments of DNA allows rapid simultaneous exchange of key regions of the genome within the bug, potentially allowing it to quickly develop antibiotic resistance.

The original 7-valent vaccine in the US has now been replaced by a 13-valent vaccine, which targets thirteen different serotypes, including the particular type which had escaped the original vaccine. In the UK, the 7-valent vaccine resulted in a substantial drop in disease overall. This overall effect was a mixture of a large drop in frequency of the serotypes targeted by the vaccine with some growth in serotypes not targeted by the vaccine. The 13-valent vaccine was introduced in the UK in 2010.

Derrick Crook, Professor of Microbiology at the University of Oxford and Infection Control Doctor at the Oxford University Hospitals NHS Trust, adds: "Childhood vaccines are very effective at reducing disease and death at a stage in our lives when we are susceptible to serious infections. Understanding what makes a vaccine successful and what can cause it to fail is important. We should now be able to understand better what happens when a pneumococcal vaccine is introduced into a new population. Our work suggests that current strategies for developing new vaccines are largely effective but may not have long term effects that are as successful as hoped."

Dr Bernard Beall, a scientist at the Centers for Disease Control and Prevention commented: "The current vaccine strategy of targeting predominant pneumococcal serotypes is extremely effective, however our observations indicate that the organism will continue to adapt to this strategy with some measurable success."

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Quarter of men resume sex before wounds from circumcision fully healed in Zambian study
Michael Carter
Published: 31 January 2012
Approximately a quarter of men undergoing circumcision resume sexual activity before their wounds have fully healed, Zambian research published in the online edition of AIDS shows.

Most of the men reporting the early resumption of sexual activity engaged in unprotected sex, often with multiple partners.

The investigators calculated that early resumption of sexual activity at this level could undermine the protective effect of circumcision against HIV at a population level. Indeed, if the proportion of men engaging in sex during wound healing increased to 30%, then circumcision would lead to more new HIV infections in women than it would avert.

“The prevalence of sexual activity and, in particular, risky sex during the wound healing period in the Zambian context is not trivial,” comment the investigators. “Even relatively small increases in early sex can have a deleterious impact on women to a point where new infections exceed averted infections in that year.”

A number of randomised controlled trials have shown that circumcision can reduce a man’s risk of infection with HIV by approximately 66%. It has been calculated that universal male circumcision in sub-Saharan Africa could avert 2 million new HIV infections in the first ten years. Male circumcision programmes are therefore being implemented in a number of countries in the region with generalised HIV epidemics.

Zambia embarked on a national circumcision programme in 2007. HIV-negative men aged between 13 and 39 years are targeted in this programme and in 2010, some 61,000 men underwent circumcision.

However, the protective effects of circumcision suggested by randomised trials can be undermined by a number of factors. One of the most important is early resumption of sexual intercourse before the wounds from surgery have healed.

Men undergoing circumcision are therefore counselled not to resume sexual activity until six weeks have passed.
Investigators wished to establish how many men were having sex within this six-week period. They also wanted to see if any factors were associated with the early resumption of sexual activity, and if sex in the post-operative period would have wider implications for the impact of circumcision programmes on the prevention of new HIV infections.

A total of 225 men were interviewed about their sexual behaviour before circumcision and again six weeks later.

The men had a mean age of 21 years. At baseline they reported a mean of three lifetime sexual partners and 44% had a regular partner. Unprotected sex in the four weeks before circumcision was reported by 22% and 10% had been diagnosed with a sexually transmitted infection within the past twelve months.

Just under a quarter (24%) of men reported resuming sex within the six-week healing period. Almost half (46%) of these men had sex within the first three weeks after surgery.

Moreover, 81% of men resuming sex during the healing period reported unprotected sex, and 32% said they had had unprotected intercourse with two or more partners.

Early resumption of sexual activity was associated with a higher number of lifetime sexual partners and unprotected sex in the period immediately before circumcision (p < 0.05).

“Identifying men who already engage in risky sexual behaviour when they present for circumcision and targeting their counselling according might be effective,” suggest the authors.

The investigators calculated that a 24% prevalence of sex during the six-week healing period among the 61,000 men circumcised in Zambia in 2010 would result in 69 more HIV infections compared to sexual abstinence for the duration of healing. Some 32 of these extra infections would be in men and 37 in women.

However, even with this level of early sexual activity, approximately 230 HIV infections would be averted.

Nevertheless, the investigators caution that resumption of sex during healing could put women at risk of HIV. If 30% of men undergoing circumcision had sex within the healing period, then more new HIV infections in women would be generated than averted.

“These study findings suggest that the prevalence of risky sexual behaviour during the wound healing period is high,” write the investigators. “Programmes need to continue to emphasise to clients the risks associated with early resumption of sex.”

Reference

Paper denying HIV–AIDS link sparks resignation
Member of editorial board quits as editor defends publication.
Zoë Corbyn, 30 January 2012
The publication of a paper denying the link between HIV and AIDS in an Italian anatomy journal has prompted a member of its editorial board to resign in protest.

Klaudia Brix, a cell biologist at Jacobs University in Bremen, Germany, says that she tendered her resignation from the board of the Italian Journal of Anatomy and Embryology (IJAE) because she felt that it was important for a journal to function within its scientific “scope”.

Others on the 13-member board have also raised concerns. Hanne Mikkelsen, associate professor of molecular medicine at the University of Copenhagen, Denmark, says that she too is considering resigning her position.

Another board member, Laurentiu Popescu, a professor of cellular and molecular medicine at the Carol Davila University of Medicine and Pharmacy in Bucharest, Romania, says that he would have handled the paper differently, but that he will not be resigning.

The IJAE — the official publication of the Italian Society of Anatomy and Histology — published the controversial paper in December after examination by just two peer reviewers, one of them the journal’s editor-in-chief, Paolo Romagnoli, an expert in cell anatomy at the University of Florence, Italy. Popescu says he personally would have used more reviewers. “Only one [external] reviewer in my mind is not enough for manuscripts of a sensitive nature,” he says.

The president, Eugenio Gaudio, and secretary, Gigliola Sica, of the Italian Society of Anatomy and Histology say that the responsibility for selecting manuscripts, referees and deciding what to publish belonged to the journal’s editor.
Points of contention
The paper’s lead author, Peter Duesberg of the University of California, Berkeley, is well known for denying the link between HIV and AIDS, and six of the paper’s nine authors, including Duesberg, are on the board of Rethinking AIDS, a voluntary group campaigning for “scientific reappraisal of the HIV–AIDS hypothesis”.

The paper is a reworked version of one published in the journal Medical Hypotheses in 2009, which at that time did not use peer review. Following a storm of protest, publisher Elsevier sent the paper to five external reviewers, and it was unanimously rejected. Elsevier permanently withdrew the paper on grounds of quality and concern for public health.

This version, like the original, attempts to challenge estimates of HIV–AIDS death-tolls in South Africa put forward in a study led by AIDS epidemiologist Max Essex of the Harvard School of Public Health in Boston, Massachusetts, and questions the effectiveness of antiretroviral (ARV) drugs. “There is no evidence for a new fatal HIV–AIDS epidemic in Africa,” write the authors. “We deduce...that HIV is not a new killer virus,” they add, and propose a “reevaluation of the HIV–AIDS hypothesis”.

But AIDS researchers consulted by Nature say that the new paper uses the same arguments and data as the original version. Both papers, in their view, use flawed methods and selective evidence, they say. Given the body of available evidence, it is “ridiculous” to deny the link between HIV and AIDS, says Essex.

The previous referee reports — obtained by Nature — apply to the new paper “in almost their entirety”, at least as far as the demographic analysis is concerned says Ian Timaeus, a professor of demography at the London School of Hygiene and Tropical Medicine, who studies the impact of the HIV–AIDS epidemic in South Africa.

One problem that remains unaddressed in the new paper, says Timaeus, is the use of estimates of AIDS deaths in South Africa based on cause-of-death data, which are notoriously unreliable. Another is the claim that South Africa’s population is increasing, so large numbers of people cannot be dying of HIV–AIDS, an argument a previous reviewer described as “completely fatuous”. There is no reason why South Africa’s population can’t grow in the presence of AIDS, for example, its moderately high birth rate and fairly low infant and child mortality from other causes, Timaeus says.

The paper’s authors also completely ignore a raft of data demonstrating the effectiveness of ARVs, says Luis Montaner, an expert in immune-system dysfunction associated with HIV at the Wistar Institute in Philadelphia, Pennsylvania. Duesberg maintains the paper is based on evidence and facts.

Montaner says that he was “surprised” to see the paper in an anatomy and embryology journal, as it contains no direct data such as figures or tables relating to the toxicity of ARVs that might bear on development, anatomy or embryology. “In my opinion, [this paper] is speaking to epidemiologists,” he says.

The IJAE has previously published two other papers questioning or denying accepted features of HIV–AIDS, also authored by members of the Rethinking AIDS group, including one, Marco Ruggiero, a molecular biologist at the University of Florence, who is a co-author on the latest paper.

Romagnoli defends the journal’s decision to publish the paper, saying that two reviewers are considered sufficient unless they give contradictory indications. He insists that the paper is inside the journal’s remit because it deals with “issues related to the biology of pregnancy and prenatal development and with the tissues of the immune system”.

Reviewers were chosen on the basis of “scientific competence” and “impartiality of judgement”, Romagnoli says, adding that he avoided picking anyone who would reflexively reject a paper because it challenged conventional thinking.

Montaner, himself the editor-in-chief of the Journal of Leukocyte Biology, says that a journal’s editors are free to make their own judgements, but given the history of the paper and the nature of its claims, he would have expected more scrutiny. He adds that the episode highlights how the scientific community needs to develop common criteria for what counts as acceptable peer review. “All peer review is not equal,” he says. “This case illustrates why we need a better definition of what peer review is.”


References
**Most with HIV Skip Treatment**

*Clarion Ledger (Jackson)*, (01.28.2012) Jerry Mitchell

New estimates from the state Department of Health (DOH) show more than two-thirds of Mississippians who test HIV-positive are not on treatment, placing their health in jeopardy and increasing the risk of infecting others.

Stigma, cost, and lack of access to care are among reasons why some people with HIV avoid treatment, say health officials. Many patients “don’t want others to know they’re HIV-infected,” said Dr. Leandro Mena, associate professor of medicine for the infectious-disease division at the University of Mississippi Medical Center.

“All people in the Delta drive here to Jackson because they don’t want the stigma,” said Valencia Robinson, an AIDS advocate and executive director for Mississippi in Action.

Access to care is a problem. “Where there is not reliable public transportation, patients have to rely on other people to take them to appointments, which means they have to tell them about their HIV infection,” said Mena.

Another issue is HIV’s link to poverty. Some 312 of the 572 HIV patients who see case managers at DOH clinics are living well below the poverty line, said Dr. Nicholas Mosca, DOH’s HIV director. Patients who qualify for Medicaid are covered for up to five medications, but brand-name drugs are limited, he said.

Across the state, more than 9,500 residents are known to have HIV; almost one-quarter of them live in Hinds County. Mississippi has an HIV mortality rate of 5.9 per 100,000 population, compared to the national rate of 3.7.

DOH officials are hoping to get $6 million in state matching funds to complement $13 million in Ryan White federal funds this legislative session. The money goes toward providing HIV care for low-income residents, said State Health Officer Dr. Mary Currier.

**Oral Cancer Virus Affects 7 Percent of Americans**


The overall prevalence of oral human papillomavirus was 6.9 percent among American men and women ages 14-69, according to an analysis of data from the National Health and Nutrition Examination Survey 2009-10. Although more commonly linked with cervical cancer, HPV also is increasingly recognized as a major cause of oral cancers. Smoking and heavy drinking are other key causes of oral cancers.

People in the survey provided a 30-second oral rinse and gargle with mouthwash, which was tested for HPV. Only about 1 percent of the 5,579 people tested had HPV-16, the type most robustly linked to oral cancer and also a cause of cervical cancer. The study’s overall oral HPV prevalence of 6.9 percent would translate to about 16 million Americans infected, with about 2 million having HPV-16.

The study “provides us some reassurance” that most people with HPV will not get oral cancer, said Dr. Maura Gillison, lead author and researcher with Ohio State University. Fewer than 15,000 Americans get HPV-linked oral cancer each year. Further study is needed to determine whether HPV vaccines can protect against oral HPV, said Gillison, who has consulted for HPV vaccine makers Merck & Co. and GlaxoSmithKline. OSU, Merck, and the National Cancer Institute helped pay for the study.

Oral HPV was more common in men than women (10 percent vs. 4 percent), smokers and people who had many sexual partners. People ages 55-59 were most at risk. Sexual activity, including oral sex, was a strong risk factor.

The lower prevalence for oral HPV compared with genital HPV suggests the mouth might somehow be more resistant to infection, Dr. Hans Schlecht, infectious-disease specialist at Drexel University in Philadelphia, wrote in an accompanying editorial. The study could further research on how some infections lead to cancer and on detecting and treating HPV-related oral lesions before they turn to cancer, he said.

Faster, Less Expensive Methods Of Circumcision Being Tested, Reviewed, New York Times Reports

The New York Times examines developments in circumcision technology, after "three studies have shown that circumcising adult heterosexual men is one of the most effective 'vaccines' against [HIV]—reducing the chances of infection by 60 percent or more." The newspaper writes, "Public health experts are struggling to find ways to make the process faster, cheaper, and safer" and "donors are pinning their hopes on several devices now being tested to speed things up." The New York Times reports on several circumcision methods currently being tested, including PrePex, which received FDA approval three weeks ago and "is clearly faster, less painful and more bloodless than any of its current rivals" (McNeil, 1/30).

Researchers identify key peptides that could lead to a universal vaccine for influenza

Researchers at the University of Southampton, University of Oxford and Retroscreen Virology Ltd have discovered a series of peptides, found on the internal structures of influenza viruses that could lead to the development of a universal vaccine for influenza, one that gives people immunity against all strains of the disease, including seasonal, avian, and swine flu.

Influenza, an acute viral infection, affects hundreds of thousands of people a year and puts an enormous strain on healthcare providers globally. The last pandemic flu outbreak in the UK — swine flu — was in 2009 when it claimed 457 lives. While previous pandemics have been more serious, there is a heightened risk of more severe pandemics in the future.

The scientific collaboration used a research method known as "Human Viral Challenge Studies", where healthy volunteers are infected with influenza virus, and their immune responses closely monitored in an isolation unit.

These were important to the research, published online in Nature Medicine, as they allowed the healthy volunteers to be held in "sterile" isolation conditions and ensured they had no existing infections. The volunteers were then "challenged" with influenza virus, with blood samples being taken at regular intervals to observe how their immune systems responded to the viral infection.

Researchers discovered that the immune systems produced various types of T-cells (part of the immune system that kills both viral particles, and cells infected with viral particles). Notably, the T-cells responded to peptides associated with the internal structures of the influenza viruses.

Unlike the external structures of influenza virus, that mutates very rapidly and creates a new strain of virus most years, the internal structures change very slowly over a long period of time. These internal structures are found in all strains of influenza virus—thus, a vaccine that targets such peptides may provide immunity against all strains of influenza, including seasonal (yearly), avian (bird), and swine flu, for many years.

A vaccine against these peptides would activate the T-cell immune response — which is able to respond much more rapidly than vaccines that activate an antibody response.

Dr Tom Wilkinson, Senior Lecturer in Respiratory Medicine at the University of Southampton, who led the study, says: "Influenza is a virus that we know has a global impact, and the threat of further pandemics is a real one. Most influenza vaccines only protect us against known influenza strains by creating antibodies in the blood but the influenza virus has the ability to rapidly change itself and new strains can emerge which rapidly spread across the globe by escaping this immunity.

"We have found that there is an important role for T-cells that recognise the flu virus, which if harnessed could protect against most or even all strains of seasonal and pandemic flu. Through this discovery we hope to improve vaccines for future strains of influenza; and potentially protect against the next pandemic. However there is more to do to translate these findings into new approaches to treatment."

"Current flu vaccines are very good at producing antibodies against flu, but not so good at generating a lasting immunity involving T-cells,’ says Professor Sir Andrew McMichael, Director of the Medical Research Council (MRC) Weatherall Institute of Molecular Medicine at Oxford University. "The big question is: if we had a pandemic involving a much more severe virus than the swine flu we saw, what would we do in the six months it takes to develop an effective vaccine? This study suggests that vaccines stimulating a T-cell response might be an option, but there remains a lot to do to be certain of this approach."

Dr Rob Lambkin Williams, Chief Scientific Officer of Retroscreen, adds, "It is great to see the quality of data produced using the challenge study technique. Knowing that the volunteers were only infected..."
with the viral strains that the research team had introduced, takes the guess work out of such research. The immune response observed in these volunteers was as a direct result of the virus to which they had been exposed. This quality of data will have the potential to rapidly speed up the rate that we are able to create a universal vaccine for influenza."

Retroscreen's Chief Executive Officer, Kym Denny said: "Retroscreen is delighted that our scientists and doctors have been able to work so closely with two leading universities. This work significantly expands our understanding of the immune response to influenza infection; this could be key in the fight against a future pandemic."

Finally, Professor John Oxford, President, Scientific Director and founder of Retroscreen and Professor of Virology at St Bartholomew's and the Royal London Hospital, Queen Mary's School of Medicine and Dentistry said: "Dedicated volunteers in our isolation unit have helped us to open a window into why some people get flu and others do not and even better to formulate a new vaccine."

To view the paper published in Nature Medicine visit http://www.nature.com/nm/journal/vaop/ncurrent/full/nm.2612.html