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INSIDE

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Training Can Help Integrate LARC Options Into Contraceptive Care

Four-hour training session affects providers' attitudes, knowledge, and practices

New research from the Bixby Center for Global Reproductive Health at the University of California, San Francisco, and Planned Parenthood Federation of America indicates that a four-hour training intervention can significantly affect the likelihood that healthcare providers will integrate long-acting reversible contraceptives (LARC) into their clinical care.[1]

To conduct the study, providers and health educators in the intervention group at Planned Parenthood health centers in 15 states (California, Colorado, Connecticut, Florida, Hawaii, Idaho, Michigan, Minnesota, North Carolina, New Jersey, New Mexico, Ohio, Oregon, Pennsylvania, and Washington) were offered a four-hour accredited continuing education course with updated evidence on intrauterine devices (IUDs) and implants. The course also included hands-on training on IUD insertion and contraceptive counseling.

> "PATIENTS DESERVE EVIDENCE-BASED INFORMATION ABOUT ALL OPTIONS TO CHOOSE THE BIRTH CONTROL OPTION THAT'S BEST FOR THEM."

Results of the study indicate significant changes in providers' attitudes, knowledge, and practices in the group that received the training. A year following the training course, clinicians who participated in the training were more likely to have knowledge about which patients are eligible, to feel experienced enough to talk about long-acting reversible contraceptives, and to discuss such options routinely in contraceptive counseling sessions, results suggest.[1]

"Patients deserve evidence-based information about all options to

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choose the birth control method that's best for them," notes **Cynthia Harper**, PhD, professor of obstetrics, gynecology, and reproductive sciences at the University of California, San Francisco, and lead investigator for the study. "This efficient training offers a model that can help providers around the country offer high-quality, effective contraceptive care."

Training clinicians to inform women that different birth control methods have different levels of effectiveness proved key in reducing the number of unintended pregnancies among young women seeking family planning services, according to a 2015 study published by Bixby Center researchers.[2] By educating young women about the safety and effectiveness of long-acting reversible contraception, the researchers found that unintended pregnancy rates dropped by nearly half — from 15 to eight per 100 women — among women seeking family planning services.[2]

The Bixby Center/Planned Parenthood project stressed the same three issues often highlighted as reasons for the success of the CHOICE Project in St. Louis, says **Robert Hatcher**, MD, MPH, professor emeritus of gynecology and obstetrics at Emory University School of Medicine in Atlanta. The issues included:

- education about the effectiveness of LARC methods;
- emphasis on providing LARC methods on same-day visits or as soon as possible; and
- cost.

Although LARC methods were not provided free of charge in the Bixby Center/Planned Parenthood project, efforts were made to provide LARC as inexpensively as possible, Hatcher notes.

Check Your Knowledge Base

While obstetrician/gynecologists and women's health nurse practitioners are more familiar with IUDs and implants compared to other providers, it is not uncommon that even expert providers have some misinformation when it comes to LARC methods, the researchers note. For example, some providers believe IUD placement is inappropriate in nulliparous women, adolescents, and women immediately following abortion, while others think that IUDs and implants have the same contraindications as combined hormonal contraceptive methods.[3-5]

The *U.S. Medical Eligibility Criteria for Contraceptive Use, 2016* (*U.S. MEC*) classifies IUD use in nulliparous women and in adolescents (women 20 years of age or younger) as Category 2 (advantages outweigh the risks), and use of implants as Category 1 (no restrictions). Immediate insertion of the copper IUD or levonorgestrel IUD after a first-trimester induced or spontaneous abortion is classified as Category 1, and is Category 2 for second-trimester postabortion insertion. Contraceptive implant insertion immediately after an induced or spontaneous first-trimester abortion or second-trimester abortion (through medication, uterine aspiration, or dilation and evacuation) is classified as Category 1.[6]

The study also assessed providers about whether they would consider a copper IUD, levonorgestrel IUD, or an implant for a woman with obesity, diabetes, or hypertension, or a smoker. All methods can be used safely with these conditions, according to the *U.S. MEC*.[6]

EXECUTIVE SUMMARY

Research from the Bixby Center for Global Reproductive Health at the University of California, San Francisco, and Planned Parenthood Federation of America indicates that a four-hour training intervention can significantly affect the likelihood that healthcare providers will integrate long-acting reversible contraceptives into their clinical care.

- A year following the training course, clinicians who participated in the training were more likely to have knowledge about which patients are eligible, to feel experienced enough to talk about long-acting reversible contraceptives, and to discuss such options routinely in contraceptive counseling sessions.
- The American College of Obstetricians and Gynecologists' LARC Work Group recently has launched the ACOG LARC Program Help Desk, an online platform through which both ACOG members and nonmembers who provide contraceptive care can receive individualized, expert technical assistance.

Get On-site Training

The Bixby Center's "Beyond the Pill" program offers on-site training for improving women's access to LARC methods. The core curriculum of its on-site training includes a general session for all staff, followed by separate sessions for health educators and clinicians.

The all-staff session provides updated information on IUDs and implants, including the latest science and professional recommendations. Participants take part in a brainstorming session to identify barriers to provision and develop strategies to streamline access.

During the health educator practicum, participants receive training on education and counseling techniques, with a focus on patient-centered counseling and educating women on method effectiveness. A counseling skills and role-playing session for health educators provides an opportunity to refine counseling approaches and practice delivering patient education points specific to IUDs and implants. This session is designed specifically for health educators, counselors, clinicians, social workers, and administrative staff.

During the clinician practicum, a hands-on insertion technique session allows participants to gain or refine their skills placing different IUD models. This session is designed specifically for clinicians. Continuing medical education is available; clinicians can earn up to 7.5 credit hours toward continuing education requirements. (For more information, contact Abigail Smith at abigail.smith@ucsf.edu.)

Check the "Help Desk"

Do you have questions on LARC clinical issues, contraceptive counseling, resources, and assistance with reimbursement and payment issues? The American College of Obstetricians and Gynecologists' LARC Work Group recently launched the ACOG LARC Program Help Desk, an online platform through which both ACOG members and nonmembers who provide contraceptive care can receive individualized, expert technical assistance on LARC.

Clinicians may receive answers to their questions by submitting a ticket on the help desk home page at www.acog.org/LARChelpdesk. Through the help desk, providers will receive status updates and responses to questions at their provided email address. By creating an ACOG LARC Program Help Desk account, providers can view their current ticket and can review answers to past tickets at any time. Use of the help desk is free and open to the public. While ACOG member questions will receive priority, ACOG membership and login information are not required for help desk access.

The ACOG LARC Program Help Desk also contains a knowledge base of resources that can be accessed and downloaded free of charge, with items such as ACOG LARC Program materials, ACOG clinical guidance on LARC, patient education materials, and billing and reimbursement resources.

"The ACOG LARC Program remains committed to supporting ACOG members and the broader women's health community," said **Eve Espey**, MD, MPH, Chair of the LARC Work Group, in a statement. "We hope the new ACOG LARC Program Help Desk will support [clinicians'] work to provide the full range of contraceptive methods to patients so they can achieve their reproductive health goals." ■

REFERENCES

1. Thompson KMJ, Rocca CH, Stern L, et al. Training contraceptive providers to offer intrauterine devices and implants in contraceptive care: A cluster randomized trial. *Am J Obstet Gynecol* 2018; doi:10.1016/j.ajog.2018.03.016. [Epub ahead of print].
2. Harper CC, Rocca CH, Thompson KM, et al. Reductions in pregnancy rates in the USA with long-acting reversible contraception: A cluster randomised

trial. *Lancet* 2015;386:562-568.
3. Harper CC, Henderson JT, Raine TR, et al. Evidence-based IUD practice: Family physicians and obstretrician-gynecologists. *Fam Med* 2012;44: 637-645.
4. Tyler CP, Whiteman MK, Zapata LB, et al. Health care provider attitudes and practices related to intrauterine devices for nulliparous women. *Obstet Gynecol* 2012;119:762-771.
5. Harper CC, Stratton L, Raine TR, et al. Counseling and provision of long-acting reversible contraception in the US: National survey of nurse practitioners. *Prev Med* 2013;57: 883-888.
6. Curtis KM, Tepper NK, Jatlaoui TC, et al. U.S. medical eligibility criteria for contraceptive use, 2016. *MMWR Recomm Rep* 2016;65:1-103.

Check Access to Prescription-Only, OTC Emergency Contraception

According to a new national survey, less than 10% of pharmacies have the ability to fill a prescription immediately for ulipristal acetate, the prescription-only form of emergency contraception (EC).[1]

Ulipristal acetate (ella) was approved for use as an emergency contraceptive by the Food and Drug Administration (FDA) in August 2010. It follows the copper-T intrauterine device (IUD) as the most effective option for EC; less than one in 1,000 women who have unprotected sex and use the copper-T IUD for EC become pregnant, compared to five in 1,000 women who choose ulipristal acetate. About 10 women out of 1,000 who choose levonorgestrel-only EC are estimated to become pregnant.[2]

To conduct the current study, researchers at the University of Hawaii at Manoa used a telephone-based secret shopper survey of 533 retail pharmacies from 10 large cities in five U.S. geographic regions. During the 2016 survey, callers identified themselves as uninsured 18-year-old women attempting to fill prescriptions for ulipristal acetate, with inquiries regarding availability and use of the drug.

Thirty-three of the 344 pharmacies indicated the ability to fill a ulipristal acetate prescription immediately. About 70% (224/311) of pharmacies without immediate availability said they could order the drug, with a median predicted wait time of 24 hours.[1] Less than 65% of pharmacies could indicate correctly a difference between ulipristal acetate and levonorgestrel forms of EC; just half of the pharmacies surveyed could identify that ulipristal acetate can be taken up to 120 hours after unprotected sex.[1]

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Ulipristal acetate is available in many European countries without a prescription, notes **Andrew Kaunitz**, MD, University of Florida Term Professor and Associate Chairman of the Department of Obstetrics and Gynecology at the University of Florida College of Medicine-Jacksonville. For women who may benefit from EC, particularly those using short-acting or less effective contraceptives, clinicians may wish to prescribe ulipristal acetate in advance of need, he suggests.

How About Levonorgestrel EC?

Although levonorgestrel emergency contraception (sold as Plan B One-Step and in some generic forms as Aftera and My Way) is approved for over-the-counter (OTC) sale, true OTC access is not a reality for many women, according to a new survey conducted by the American Society for Emergency Contraception, a Princeton, NJ-based nonprofit advocacy group.

In conducting its third survey since 2014, Society members visited retail pharmacies across the United States to determine whether levonorgestrel EC was stocked on store shelves as allowed by FDA regulations, how much it cost,

and whether pharmacy staff were imposing age restrictions, which were removed by the FDA in 2013.

The survey findings indicate that in 40% of stores, levonorgestrel EC is not stocked on the shelf. Independent pharmacies were far more likely than chain stores (91% vs. 24%) to keep levonorgestrel EC behind the counter, rather than to stock it on the shelf. About one-third (30%) of stores continue to call for age restriction and identification requirement on the sale of levonorgestrel EC, even though such barriers were removed in 2013. Data show the average price for the branded product, Plan B One-Step, was about $49, with generic products priced around $39.[3]

Emergency contraception is more effective the sooner it is taken, so any barriers represent a greater risk of pregnancy, notes **Kelly Cleland**, MPA, MPH, executive director of the American Society for Emergency Contraception.

"People who need EC may be intimidated or embarrassed to discuss their purchase with pharmacy staff," said Cleland in a press statement. "There's no medical reason for EC to sit behind the counter — where it remains out of reach of many who need it."

Although the Affordable Care Act has increased the number of women who can access prescription contraception without cost sharing, most insurance plans require a prescription to cover over-the-counter EC. About 12.8 million women (13%) ages 19-64 years were uninsured in 2014, including low-income women in states where Medicaid has not been expanded.[4]

"The high price of EC puts it out of reach for many women, for whom $40 or $50 is a significant expense," said Cleland. "Women who are young, poor, or living in rural areas are among the hardest hit."

There are no age or point-of-sale restrictions on the purchase of levonorgestrel EC. Any woman or man of any age can purchase such products without needing to show identification, and there is no limit on the number of packages that a person can purchase. ■

REFERENCES

1. Shigesato M, Elia J, Tschann M, et al. Pharmacy access to ulipristal acetate in major cities throughout the United States. *Contraception* 2018;97: 264-269.
2. Paling J. Strategies to help patients understand risks. *BMJ* 2003;327: 745-748.
3. American Society for Emergency Contraception. Not There Yet: ASEC's 2017 EC Access Study. Available at: https://bit.ly/2qqH6Gw. Accessed April 17, 2018.
4. Committee on Health Care for Underserved Women. Committee Opinion No 707: Access to Emergency Contraception. *Obstet Gynecol* 2017;130:e48-e52.

Report: Abortion Safe, but Access to the Procedure May Be Limited

A new report from a National Academies of Sciences, Engineering, and Medicine-convened committee has determined that although abortion in the United States is safe, the quality of abortion care depends on where a woman lives. In many states, regulations have created barriers to safe, effective, and timely services.[1]

According to data from the Centers for Disease Control and Prevention (CDC), most abortions in the United States are performed early in pregnancy. In 2014, 90% of abortions occurred by 12 weeks of gestation.[2]

To compile the report, the committee examined the scientific evidence on the safety and quality of medication, aspiration, dilation and evacuation (D&E), and induction abortions, which are the four methods used in the United States. Members also looked at data assessing the quality of care according to well-established standards.

In reviewing the medical literature, the report concludes that having an abortion does not increase a woman's risk of secondary infertility, pregnancy-related hypertensive disorders, abnormal placentation (after a D&E abortion), preterm birth (defined as less than 37 weeks), or breast cancer. Having an abortion also does not increase a woman's risk of depression, anxiety, and/or posttraumatic stress disorder, the data indicate.[1]

The analysis indicates that in 2014, there were 17% fewer abortion clinics than in 2011; 39% of all women of reproductive age resided in a county without an abortion provider. A total of 25 states in 2017 had five or fewer abortion clinics, and five states had only one abortion clinic. Data indicate that 17% of women travel more than 50 miles to obtain an abortion.[1]

State Regulations

Abortion-specific regulations in many states create barriers to safe and

EXECUTIVE SUMMARY

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- In 2014, there were 17% fewer abortion clinics than in 2011; 39% of all women of reproductive age resided in a county without an abortion provider. A total of 25 states in 2017 had five or fewer abortion clinics, and five states had only one abortion clinic. Data indicate that 17% of women travel more than 50 miles to obtain an abortion.
- Abortion-specific regulations in many states create barriers to safe and effective care. Such regulations may stop qualified providers from performing abortions, misinform women of the risks of the procedures they are considering, or call for medically unnecessary services.

effective care, the committee found. Such regulations may stop qualified providers from performing abortions, misinform women of the risks of the procedures they are considering, or call for medically unnecessary services. Such actions include mandatory waiting periods, pre-abortion ultrasound, and a separate in-person counseling visit. Some states require abortion providers to provide women with written or verbal information suggesting that abortion increases a woman's risk of breast cancer (Alaska, Kansas, Mississippi, Oklahoma, Texas) or stressing negative emotional responses (Kansas, Louisiana, Michigan, Nebraska, North Carolina, South Dakota, Texas, West Virginia), despite the lack of valid scientific evidence of increased risk.[3]

The new report confirms decades of research that abortion is safe, says **Debra Hauser**, MPH, president of Advocates for Youth, a Washington, DC-based nonprofit adolescent reproductive health advocacy group. With efforts to further hinder care, the advances in abortion access are being chipped away, she states.

"Every year, hundreds of thousands of women need abortion care," said Hauser in a press statement. "Medically unnecessary regulations not only threaten their autonomy and ability to plan their futures, but endanger their health. We need to ensure that everyone has access to safe and affordable abortion care, regardless of their age, income, or where they live."

In November 2018, voters will have an opportunity to elect House and Senate representatives who may be more inclined to protect a woman's right to terminate a pregnancy, says **Robert Hatcher**, MD, MPH, professor emeritus of gynecology and obstetrics at Emory University School of Medicine in Atlanta.

New Report Affirms Drug Safety

The federal Government Accountability Office has issued a report reaffirming the steps taken by the Food and Drug Administration (FDA) in its March 2016 relabeling of the medication abortion drug mifepristone.[4] The updated labeling was issued to reflect the most current clinical practices and safety and efficacy data. For the new label, the size of the initial dose was reduced to 200 mg and the window for taking it extended to 70 days since the first day of a woman's last menstrual period. The updated labeling also calls for the second drug in the medication abortion regimen, misoprostol, to be taken "at a location appropriate for the patient." (Contraceptive Technology Update *reported on the label change; see the June 2016 article, "FDA Updates Mifepristone Labeling, Easing Access to Abortion Pill," at http://bit.ly/2qL2WGP.*)

Medication abortions accounted for 31% of all nonhospital abortions in 2014, and for 45% of abortions before nine weeks' gestation.[5] The federal report is another affirmation that medication abortion is a safe and effective option for ending an early pregnancy, says **Gillian Dean**, MD, MPH, senior director of medical services at Planned Parenthood Federation of America.

"Studies show medication abortion has a 99% safety record, and that medication abortion is up to 98% effective in ending an early pregnancy," noted Dean in a press statement. "The results underscore that the 2016 label change was rooted in evidence-based medicine." ■

REFERENCES

1. Committee on Reproductive Health Services: Assessing the Safety and Quality of Abortion Care in the United States. National Academies of Sciences, Engineering, and Medicine. The Safety and Quality of Abortion Care in the United States. Accessed at https://bit.ly/2GDUWM2.
2. Jatlaoui TC, Shah J, Mandel MG, et al. Abortion surveillance — United States, 2014. *MMWR Surveill Summ* 2017;66(SS-24):1-48.
3. Guttmacher Institute. Counseling and waiting periods for abortion. Fact sheet. Accessed at https://bit.ly/2gb34cV.
4. United States Government Accountability Office. Report to Congressional Requesters. Food and Drug Administration. Information

on Mifeprex Labeling Changes and Ongoing Monitoring Efforts. Available at: https://bit.ly/2HdK3np. Accessed April 19, 2018.
5. Jones RK, Jerman J. Abortion incidence and service availability in the United States, 2014. *Perspect Sex Reprod Health* 2017; doi:10.1363/psrh.12015.

Study Examines Disparity of Trichomoniasis

Check the data from the Centers for Disease Control and Prevention (CDC) — trichomoniasis is the most common curable sexually transmitted infection. An estimated 3.7 million people in the United States have the infection, which is caused by a protozoan parasite called *Trichomonas vaginalis* (TV).[1] Although symptoms of the disease vary, most people who have the parasite cannot tell they are infected.

Results of a new analysis indicate that trichomoniasis disproportionately affects the black community.[2] To examine the prevalence of the infection, researchers from Johns Hopkins University and the National Institute of Allergy and Infectious Diseases looked at data from the 2013-2014 National Health and Nutrition Examination Survey, a collection of health information from the United States' noninstitutionalized, civilian population. Data were gathered from urine sample analysis from men and women 18 to 59 years of age.

The 4,057 total participants in the analysis included 1,942 males and 2,115 females; 822 participants identified as non-Hispanic black and 3,235 identified as other races/ethnicities. The study indicates that although the prevalence of TV infection was 0.03% and 0.8% among males and females of other races/ethnicities, the prevalence of the infection was significantly higher among black males and females at 4.2% and 8.9%, respectively.[2]

The study found that a higher prevalence of infection with *T. vaginalis* was associated with patients who were female, black, and older, and with those who had less than a high school education and were living below the poverty level. These factors were independent of having multiple sexual partners. The prevalence of infection also was linked with socioeconomic status. Those living below the poverty level had a prevalence of 3.9%, compared to 0.6% for those living at or above the poverty level. People without a high school education had a prevalence of 2.9%, compared to 0.8% for those who had at least a high school education.

"These findings are likely reflective of real social and structural disparities, such as lower access to health care, that result in high infection rates in the black community," says **Aaron Tobian**, MD, PhD, associate professor of pathology at the Johns Hopkins University School of Medicine and the study's senior author. "Targeted public health education about Trichomonas will be critical."

Many Are Asymptomatic

It is estimated that 70% of people infected with *Trichomonas vaginalis* do not have any signs or symptoms. When symptoms are present, they can range from mild irritation to severe inflammation. Some patients may present with symptoms within five to 28 days after being infected, while others do not develop symptoms until much later, according to the CDC.[1]

Men with trichomoniasis may present with symptoms such as:

- Itching or irritation inside the penis;
- Burning after urination or ejaculation; or
- Discharge from the penis.

Women with trichomoniasis may have symptoms such as:

- Itching, burning, redness, or soreness of the genitals;
- Discomfort with urination; or
- A change in vaginal discharge, such as a thin discharge or increased volume, that can be clear, white, yellowish, or greenish, with an unusual fishy smell.[1]

How can trichomoniasis can be treated? Clinicians may prescribe either oral metronidazole or tinidazole,

EXECUTIVE SUMMARY

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- Trichomoniasis is the most common curable sexually transmitted infection. An estimated 3.7 million people in the United States have the infection.
- Trichomoniasis is a facilitator of HIV transmission and acquisition. If infection is left untreated in women, it can lead to pelvic inflammatory disease and infertility.

reminding patients not to drink alcohol within 24 hours after taking such medication.

One challenge with trichomoniasis is reinfection. It is estimated that about one in five people become infected again within three months after receiving treatment.[3] To help patients avoid reinfection, providers should emphasize the importance of treating all sex partners. Clinicians also should counsel patients to wait seven to 10 days after both partners have been treated before having sex again.

Strides to Be Made

Trichomoniasis is a facilitator of HIV transmission and acquisition.[4] If infection is left untreated in women, it can lead to pelvic inflammatory disease and infertility.

Screening for *T. vaginalis* infection currently is recommended only for people who are HIV-positive. Findings from the current study should encourage broader screening initiatives, educational programming, and policy changes to ensure access to sexual health care, says **Eshan Patel**, MPH, a research data analyst at Johns Hopkins University and lead author of the study.

"It's unfortunate that TV infection hasn't received a stronger public health response, especially since it is easy to diagnose and treat," said Patel in a press statement. "TV infection can be detected using the same diagnostic platform as the one used for chlamydia and can be cured with just one pill (metronidazole)."

The current study underscores the importance of providing a large number of condoms to women and men in various healthcare settings, says **Robert Hatcher**, MD, MPH, professor emeritus of gynecology and obstetrics at Emory University School of Medicine in Atlanta. It also points to the importance of providing treatment for both partners when just one partner is found to have a *T. vaginalis* infection, he states. ■

REFERENCES

1. Centers for Disease Control and Prevention. Trichomoniasis. Fact sheet. Available at: https://bit.ly/2qmbG54. Accessed April 18, 2018.
2. Patel EU, Gaydos CA, Packman ZR, et al. Prevalence and correlates of *Trichomonas vaginalis* infection among men and women in the United States. *Clin Infect Dis* 2018; doi: 10.1093/cid/ciy079.
3. Menezes CB, Frasson AP, Tasca T. Trichomoniasis — are we giving the deserved attention to the most common non-viral sexually transmitted disease worldwide? *Microb Cell* 2016;3:404-419.
4. Kissinger P. *Trichomonas vaginalis*: A review of epidemiologic, clinical and treatment issues. *BMC Infect Dis* 2015;15:307.

Research Examines Male Contraception Option

Researchers at the University of Washington and Harbor-University of California, Los Angeles Medical Center are evaluating the use of a daily contraceptive pill containing dimethandrolone undecanoate pill for men. Results presented at the 2018 Endocrine Society Annual Meeting in Chicago indicated that the experimental male birth control pill was safe when given for 28 days.[1]

The current study, which included 83 men between the ages of 18-50 years, showed that the study drug lowered hormones to a degree that should prove effective as a contraceptive. Scientists now plan to conduct studies to demonstrate sperm suppression. The researchers will be testing dimethandrolone undecanoate on 100 men over a three-month period.

Dimethandrolone undecanoate represents an advance in the development of a once-daily "male pill," says senior investigator **Stephanie Page**, MD, PhD, professor of medicine at the University of Washington.

"Many men say they would prefer a daily pill as a reversible contraceptive, rather than long-acting injections or topical gels, which are also in development," noted Page in a press statement.

Search Continues for Effective Option

The road to developing a male oral contraceptive has been hindered by the fact that available oral forms of testosterone may cause liver inflammation, noted Page.[2] Oral forms of testosterone also clear the body too quickly for once-daily dosing, she explained. The chemical structure of dimethandrolone undecanoate contains a long-chain fatty acid, which slows such clearance, said Page. The drug is being developed for possible contraceptive use by the National Institutes of Health's Eunice Kennedy Shriver National Institute of Child Health and Human Development, which funded the current study.

To conduct the study, researchers enrolled 100 healthy men at the University of Washington Medical Center and at Harbor-UCLA Medical Center. Scientists used three different doses of dimethandrolone undecanoate (100 mg, 200 mg,

EXECUTIVE SUMMARY

Researchers at the University of Washington and Harbor-University of California, Los Angeles Medical Center are evaluating the use of a daily contraceptive pill containing dimethandrolone undecanoate for men.

- In a small study, the drug lowered hormones to a degree that should prove effective as a contraceptive, researchers say.
- Men currently have two options available when it comes to contraception — the male condom or vasectomy. Survey data on men across different countries, ethnicities, and socioeconomic groups show that men and couples are very interested in men taking responsibility for birth control.

and 400 mg) and two different formulations (castor oil and powder) inside the capsules. The study design called for each dose group to include five subjects, who were assigned randomly to receive an inactive placebo, and another 12-15 men who received the study drug. Subjects took the drug or placebo for 28 days once daily with food, since dimethandrolone undecanoate must be taken with food to be effective.

Eighty-three men completed the study; researchers obtained blood samples for hormone and cholesterol testing on the first and last days of the trial. Results indicate that those who used 400 mg pills (the highest dose of study drug tested) exhibited marked suppression of testosterone levels and of two hormones required for sperm production. Such levels are consistent with effective male contraception shown in longer-term studies, researchers state.

All men who used the study drug exhibited mild weight gain and decreases in HDL cholesterol. All study participants passed safety tests, including markers of liver and kidney function.[1]

Moving Forward in Research

Providing men with a practical and reversible contraceptive option is "long overdue," says co-investigator **Christina Wang**, MD, professor of medicine and assistant dean in clinical and translational sciences at the David Geffen School of Medicine at UCLA. Wang also serves as the associate director of the UCLA Clinical and Translational Science Institute, and as a faculty member of the Division of Endocrinology, Department of Medicine, Harbor-UCLA Medical Center and Los Angeles Biomedical Research Institute.

"Sixty years after the pill was developed for women, men will now have options — that neither require surgery nor long-acting injections — to participate in family planning as equal partners," noted Wang in a press statement.

Men currently have two options available when it comes to contraception — the male condom or vasectomy. Survey data on men across different countries, ethnicities, and socioeconomic groups show that men and couples are very interested in men taking responsibility for birth control.[3]

"It is unfair to discredit a whole gender as not being trustworthy enough to take that responsibility, when they are specifically telling us otherwise," says **Arthi Thirumalai**, MD, co-investigator and acting assistant professor in Metabolism, Endocrinology and Nutrition at the University of Washington. "When men have more options, we will have real world data as to their interest and engagement." ■

REFERENCES

1. Thirumalai A, Ceponis J, Amory JK, et al. Pharmacokinetic and pharmacodynamic effects of 28 days of oral dimethandrolone undecanoate in healthy men: A prototype male pill. Presented at ENDO 2018: The Endocrine Society Annual Meeting. Chicago; March 2018.
2. Bassil N, Alkaade S, Morley JE. The benefits and risks of testosterone replacement therapy: A review. *Ther Clin Risk Manag* 2009;5:427-448.
3. Wang C, Festin MP, Swerdloff RS. Male hormonal contraception: Where are we now? *Curr Obstet Gynecol Rep* 2016;5:38-47.

Beyond Efficacy: Applying a Reproductive Justice Framework to Contraceptive Counseling for Young People

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In recent years, widespread excitement over long-acting reversible contraception (LARC) to reduce unintended pregnancy in the United States has intensified among the public health community, policy makers, and legislators. In addition, medical organizations such as the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists have adopted practice recommendations listing LARC as a "first-line" contraception for adolescents.[1]

LARCs, consisting of intrauterine devices (IUDs) and implants, are highly effective, reversible, and cost-effective. Many practitioners praise the control over reproduction that LARCs provide young women, allowing them to avoid unintended pregnancy throughout their education. However, for some young women, control may mean the ability to choose a method that can be started and discontinued without provider involvement. For this and many other reasons, young women still may not choose LARC even with complete knowledge and without access barriers.

Review Reproductive Justice History

While the benefits of LARC use are compelling, these contraceptive methods also are part of a shameful history concerning reproductive injustices and abuses in the United States.[2] Forced sterilization, financial incentives to encourage LARC use, and reduced prison sentences in exchange for LARC insertion or sterilization are well-documented coercive measures targeting women of color, low-income and uninsured women, indigenous and immigrant women, young women, and those with disabilities as recently as 2010.[3]

Although one population-level goal may be to increase LARC use, a narrow focus on LARC does not consider young women's attitudes about their contraceptive counseling experiences. In a 2016 study, researchers collected qualitative data from 50 Wisconsin women, ages 18-29, to understand their perceptions as contraceptive users related to provider bias and influence, mostly with LARC methods. Women across all racial groups expected that providers would be more likely to recommend LARC methods to marginalized communities, and women of color were more likely to link historical injustices of reproductive coercion to their own experiences of racialized LARC promotion. Findings also presented evidence of provider resistance to LARC removal.[4]

More recently, researchers conducted a qualitative study to explore patient experiences with contraceptive coercion by health providers at the time of abortion using the Integrated Behavioral Model and the Reproductive Autonomy Scale to inform their interview guide. They interviewed 31 women who were predominantly young, black, and Medicaid-insured. Nearly half of participants perceived a form of coercion during their contraceptive counseling; 42% reported feeling "pressured" into choosing some type of method, while 26% voiced that providers "pushed" a specific method or appeared to prefer LARC methods. Participants who were offered a range of methods and given appropriate time for deliberation displayed greater reproductive autonomy and reported less feelings of coercion.[5]

Reproductive coercion is not about the provider's intent, even when well meaning, but it is about the individual's perception. Another qualitative study of 38 Latina and black women ages 18-24 assessed ways in which patients experience pressure from health providers during contraceptive care, and what affect that has on their decision-making and reproductive autonomy. The analysis showed that those who accepted a

form of contraception based on what they perceived as their provider's biased suggestion, discontinued the method sooner than those who did not.[6]

One of the tenets of reproductive justice is recognizing that the main reproductive challenge facing young and poor women of color is not unintended pregnancy by itself, but rather socio-economic and cultural inequalities that provide some people with easier access to self-determination and bodily autonomy than others.[7] SisterSong Women of Color Reproductive Justice Collective and the National Women's Health Network developed the LARC Statement of Principles.

Hundreds of organizations, including the Society for Adolescent Health and Medicine, Advocates for Youth, and Physicians for Reproductive Health, endorse the principles that "commit to ensuring that people are provided comprehensive, scientifically accurate information about the full range of contraceptive options in a medically ethical and culturally competent manner to ensure that each person is supported in identifying the method that best meets their needs."[8]

Consider Your Recommendations

Negative healthcare experiences during adolescence and young adulthood can reinforce health inequities and mistrust of providers, and can affect future health-seeking behavior, especially among young people of color.[6] Once we acknowledge the history of reproductive coercion and abuse, we can begin to address the social and health disparities that exist and truly provide patient-centered contraceptive counseling. Health professionals may do this by saying, "I want you to know that I recommend these methods to all of my patients, regardless of their race, social class, or number of children; however, these methods might not be right for everyone, and I want to make sure we find the one that works best for you."[4] It also is critical for healthcare professionals to self-evaluate how their personal biases may affect their contraceptive counseling methods with young people.[9]

Adolescent medicine providers and reproductive justice advocates have suggested the following questions to help clinicians support the young person's agency while reinforcing shared decision-making:

- What matters most to you in a contraceptive method?
- What are your preferences?[9]

In shifting the counseling approach from a tiered efficacy model, which may not be relevant to patients, to one that supports bodily autonomy, dignity, and agency of persons, particularly those whose fertility has been historically oppressed, we work toward ensuring reproductive justice for all. ■

REFERENCES

1. Foster DG, Barar R, Gould H, et al. Projections and opinions from 100 experts in long-acting reversible contraception. *Contraception* 2015:92;543-552.
2. Gomez AM, Fuentes L, Allina A. Women or LARC first? Reproductive autonomy and the promotion of long-acting reversible contraceptive methods. *Perspect Sex Reprod Health* 2014;46:171-175.
3. Gold RB. Guarding against coercion while ensuring access: A delicate balance. *Guttmacher Policy Rev* 2014;17:8-14.
4. Higgins JA, Kramer RD, Ryder KM. Provider bias in long-acting reversible contraception (LARC) promotion and removal: Perceptions of young adult women. *Am J Public Health* 2016;106:1932-1937.
5. Brandi K, Woodhams E, White KO, Mehta PK. An exploration of perceived contraceptive coercion at the time of abortion. *Contraception* 2018;97:329-334.
6. Gomez AM, Wapman M. Under (implicit) pressure: Young Black and Latina women's perceptions of contraceptive care. *Contraception* 2017;96:221-226.
7. Higgins JA. Celebration meets caution: LARC's boons, potential busts, and the benefits of a reproductive justice approach. *Contraception* 2014;89:237-241.
8. LARC Statement of Principles. Available at: www.tinyurl.com/LARCprinciples. Accessed April 19, 2018.
9. Shah B, Akers A. Collaboration or coercion: Challenges in prioritizing vulnerable youths' agency and autonomy in contraceptive counseling interactions with health care providers. Presented at the Society for Adolescent Health and Medicine Annual Meeting. Seattle; March 2018.

COMING IN FUTURE MONTHS

- Examining previous gonorrhea treatment options
- Focus on permanent birth control options
- Research weighs EC cost effectiveness
- Review postpartum contraception choices

CONTRACEPTIVE TECHNOLOGY UPDATE®

Contraceptive Technology Update is endorsed by the **National Association of Nurse Practitioners in Women's Health** and the **Association of Reproductive Health Professionals** as a vital information source for healthcare professionals.

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CME/CE QUESTIONS

1. **What is the *U.S. Medical Eligibility Criteria for Contraceptive Use, 2016* (*US MEC*) rating for intrauterine device use in adolescents (20 years of age or younger)?**

   a. Category 1
   b. Category 2
   c. Category 3
   d. Category 4

2. **What is the most effective form of emergency contraception?**

   a. levonorgestrel-only pill
   b. ulipristal acetate
   c. copper-T intrauterine device
   d. Yuzpe regimen

3. **According to 2016 updated labeling, what is the recommended dosage of mifepristone for day one of medication abortion?**

   a. 200 mg
   b. 300 mg
   c. 325 mg
   d. 450 mg

4. **What drugs are preferred for use in treatment of trichomoniasis?**

   a. cefotetan or doxycycline
   b. clindamycin or gentamicin
   c. ceftriaxone or cefoxitin
   d. metronidazole or tinidazole

CME/CE OBJECTIVES

After reading *Contraceptive Technology Update*, the participant will be able to:

1. identify clinical, legal, or scientific issues related to development and provisions of contraceptive technology or other reproductive services;
2. describe how those issues affect services and patient care;
3. integrate practical solutions to problems and information into daily practices, according to advice from nationally recognized family planning experts;
4. provide practical information that is evidence-based to help clinicians deliver contraceptives sensitively and effectively.

STI QUARTERLY™

A SUPPLEMENT TO CONTRACEPTIVE TECHNOLOGY UPDATE

Clinical Challenge: PrEP Is Not Reaching Most of the People Who Are at Risk

CDC leads efforts to build PrEP awareness and expand availability

An analysis of national data indicates that only a small percentage of Americans who could benefit from pre-exposure prophylaxis (PrEP) have received a prescription for it.[1] Although two-thirds of people who potentially could benefit from PrEP are African-American or Latino, they account for the smallest percentage of prescriptions, the data suggest.

To conduct the analysis, researchers at the Centers for Disease Control and Prevention (CDC) looked at available data on PrEP prescriptions from a national database of prescriptions filled by commercial U.S. pharmacies. The analysis indicates that although about 500,000 African-Americans and nearly 300,000 Latinos potentially could have benefited from PrEP, prescriptions were filled at retail pharmacies or mail order services for only 7,000 African-Americans and 7,600 for Latinos during a similar time period (September 2015-August 2016).[1]

When looking at the same time period for white U.S. residents, the analysis indicates that of the 300,000 whites who potentially could have benefited from PrEP, just 42,000 prescriptions were filled at retail pharmacies or mail order services.[1] The data were presented at the 2018 Conference on Retroviruses and Opportunistic Infections in Boston.

"One of our most powerful tools for HIV prevention remains largely on pharmacy shelves," says **Jonathan Mermin**, MD, MPH, director of the CDC's National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention. "PrEP can be a potent prescription that strengthens prevention options for people who are at high risk for HIV infection."

ONLY A SMALL PERCENTAGE OF AMERICANS WHO COULD BENEFIT FROM PRE-EXPOSURE PROPHYLAXIS HAVE RECEIVED A PRESCRIPTION FOR IT.

Help Patients at Risk

In 2012, the Food and Drug Administration approved the use of 300 mg tenofovir disoproxil fumarate and 200 mg emtricitabine as PrEP in combination with safer sex practices. In 2014, the CDC issued clinical guidance for using these anti-HIV drugs in uninfected patients who are at substantial risk of infection.[2] Research indicates that PrEP can reduce HIV infection rates; when taken daily as directed, PrEP can reduce the risk of HIV infection by more than 90%.[3]

To help focus provider and public education efforts, CDC researchers have developed a new method for estimating where PrEP need is greatest. Their approach combines data on risk behavior with the latest information on HIV diagnoses nationally and in states.

About 1.1 million Americans are at substantial risk for HIV and should be offered PrEP, the analysis indicates.[1] The figures show that only 90,000 PrEP prescriptions were filled

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EXECUTIVE SUMMARY

An analysis of national data indicates that only a small percentage of Americans who could benefit from pre-exposure prophylaxis (PrEP) have received a prescription for it.

- Although two-thirds of people who potentially could benefit from PrEP are African-American or Latino, they account for the smallest percentage of prescriptions, the data suggest.
- Data indicate that although about 500,000 African-Americans and nearly 300,000 Latinos potentially could have benefited from PrEP, prescriptions were filled at retail pharmacies or mail order services for only 7,000 African-Americans and 7,600 for Latinos during a similar time period.

in commercial pharmacies in the year examined.[1] Analysts say that actual PrEP use may be somewhat higher than estimates because some patients receive their PrEP medication through avenues such as demonstration projects, non-commercial pharmacies, or managed care plans that operate private prescription drug programs. The CDC says commercial pharmacies account for about 85-90% of all PrEP prescriptions.

Delve Into the Numbers

A second presentation at the 2018 conference from a research team led by **Patrick Sullivan**, PhD, professor of epidemiology at Emory University's Rollins School of Public Health, compared the distribution of PrEP users to the need for PrEP based on where new HIV cases are occurring.[4] Using data from the U.S. census and CDC HIV case surveillance, the scientists developed a "PrEP-to-need" ratio, dividing the number of PrEP prescriptions by the number of new HIV diagnoses. A higher ratio indicates areas with better coverage of PrEP for those who need it, the researchers explain.

The analysis indicates that 61,300 people nationwide had active PrEP prescriptions in the second quarter of 2017, or 23.0 per 100,000 people. With 15.0 new diagnoses of HIV per 100,000 people nationwide, the analysis yields a PrEP-to-need ratio of 1.5.

Regarding geographic regions, the analysis shows that the Northeast (with the highest PrEP use rate at 38.5, and 13.3 new diagnoses of HIV per 100,000) displayed the highest PrEP-to-need ratio at 2.9. The South registered a low rate of PrEP use at 18.8 and a high rate of diagnosis at 20.9 per 100,000, yielding the lowest PrEP-to-need ratio at 0.9. The Midwest and West yielded PrEP-to-need ratios of 2.1 and 1.8, respectively.[4]

Researchers also calculated the PrEP use and PrEP-to-need ratios for different demographic groups. The PrEP usage rate among women was 2.0 and the new diagnosis rate was 5.5 per 100,000, equaling a PrEP-to-need ratio of 0.4. On the other hand, the PrEP usage rate among men was 45.0 and the diagnosis rate was 24.9 per 100,000, resulting in a PrEP-to-need ratio of 1.8. People 24 years of age and younger, or 55 years of age and older, exhibited lower PrEP-to-need ratios than people between these age groups.[4] Lower rates of PrEP use and lower PrEP-to-need ratios were found in states that have a higher proportion of people who are living in poverty and who don't have health insurance, as well as in states that did not implement Medicaid expansion under the Affordable Care Act, data suggest.

AIDSVu, a project presented by Emory University's Rollins School of Public Health in partnership with Gilead Sciences, Inc., and the Center for AIDS Research at Emory University, provides a visualization of the HIV epidemic across the United States. Its interactive maps illustrate geographic variations in the HIV epidemic, and reveal how the disease affects different communities. In March 2018, AIDSVu issued its first-ever interactive state-level maps showing a 73% increase year over year in persons using PrEP across the United States from 2012 to 2016, with 77,120 PrEP users in 2016.

Men and patients 25-44 years of age were more likely to be PrEP users, the mapping program shows. More than 90% of all PrEP users in 2016 were male, and men accounted for 81% of all new HIV diagnoses in 2016. In the same year, 64% of all PrEP users were 25-44 years of age. This age group represented 54% of all new HIV diagnoses during the same period. The South accounted for just 30% (23,091 persons) of all PrEP users in 2016. However, the region represented 52% of all new HIV diagnoses in that year. Regarding the rate of PrEP use, the five states with the highest rates in 2016 were New York, Massachusetts, Rhode Island, Washington, and Illinois.

"We hope that the newly available data on AIDSVu will allow health departments, elected officials, medical professionals, and community leaders to better understand and visualize the realities of who has access to this important prevention tool so they can develop programs and policies to decrease barriers," says Sullivan, who serves as principal scientist for AIDSVu. ■

REFERENCES

1. Smith DK, Van Handel M, Grey JA. By race/ethnicity, blacks have highest number needing PrEP in the United States, 2015. Presented at the 2018 Conference on Retroviruses and Opportunistic Infections. Boston; March 2018.
2. Centers for Disease Control and Prevention. Preexposure Prophylaxis for the Prevention of HIV Infection in the United States — 2014: A Clinical Practice Guideline. Available at: http://1.usa.gov/1n3lJzr. Accessed April 20, 2018.
3. Baeten JM, Donnell D, Ndase P, et al. Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *N Engl J Med* 2012;367:399-410.
4. Siegler AJ, Mouhanna F, Giler RM, et al. Distribution of active PrEP prescriptions and the PrEP-to-need ratio, US, Q2 2017. Presented at the 2018 Conference on Retroviruses and Opportunistic Infections. Boston; March 2018.

Researchers Examine Possible Capsule Option for HIV Drugs

Early research by scientists at MIT and Brigham and Women's Hospital is focusing on a capsule capable of delivering a week's worth of HIV drugs in one dose.[1] If confirmed in advanced research, such an option could allow patients to stay compliant with the dosing regimen required to fight the virus successfully.

The team has developed a drug delivery capsule consisting of a star-shaped structure including six arms that can be loaded with drugs, folded inward, and encased in a smooth coating. The arms unfold and release the drugs after the capsule is swallowed. In data published in 2016, researchers reported that such capsules containing the malaria drug ivermectin could stay in the stomach for up to two weeks, gradually releasing the target medication.[2] The scientific team then worked to adapt the capsule for delivery of HIV drugs.

"One of the main barriers to treating and preventing HIV is adherence," says **Giovanni Traverso**, MB, BChir, PhD, a research affiliate at MIT's Koch Institute for Integrative Cancer Research and a gastroenterologist and biomedical engineer at Brigham and Women's Hospital. "The ability to make doses less frequent stands to improve adherence and make a significant impact at the patient level."

EXECUTIVE SUMMARY

Early research is focusing on a capsule that can deliver a week's worth of HIV drugs in a single dose. If confirmed in advanced research, such an option could allow patients to stay compliant with the dosing regimen required to fight the virus successfully.

- The drug delivery capsule has a star-shaped structure consisting of six arms that can be loaded with drugs. The arms fold inward so that the structure can be encased in a smooth coating. After the capsule is swallowed, the arms unfold and release the drugs.
- While antiretroviral therapy has improved treatment and prolonged the life expectancy of patients infected with HIV, several challenges limit its optimal performance. Such drug therapy often requires life-long use and complex dosing regimens, resulting in low patient adherence and periods of lapsed treatment.

Although antiretroviral (ARV) therapy has affected the medical landscape with improved treatment and prolonged life expectancy of patients infected with HIV, several challenges limit the optimal performance of such drugs.[3] First, ARVs often require life-long use and complex dosing regimens, resulting in low patient adherence and periods of lapsed treatment. These behaviors can lead to drug resistance.

"We are all very excited about how this new drug-delivery system can potentially help patients with HIV/AIDS, as well as many other diseases," states **Robert Langer**, ScD, the David H. Koch Institute Professor at MIT and a member of MIT's Koch Institute for Integrative Cancer Research.

Focus on New Delivery System

In the current study, the scientific team at MIT and Brigham and Women's Hospital designed a capsule that, once inside the stomach, opens into a star-shaped structure that is too large to pass through the pylorus. In this location, centered between the stomach and the small intestine, the star-shaped system could allow food to continue to pass through the

digestive system while the study drugs diffuse slowly over time.

Since the capsule can hold multiple drugs at one time, the team looked at delivering the HIV antiretrovirals dolutegravir, rilpivirine, and cabotegravir. Such drugs are used for HIV prevention among non-infected patients and for viral suppression among HIV patients. To examine the efficacy of such delivery, scientists tested the concentration profiles for each of the doses over time in a pig model, and measured the presence of each drug in the bloodstream in the week following ingestion. They also used mathematical modeling in conjunction with the Institute for Disease Modeling in Bellevue, WA, to predict what happens when a patient misses a dose, and developed steps to improve prevention strategy.

Using simulations of viral dynamics and patient adherence patterns, the research suggests the new capsule system not only may lower the incidence therapeutic failures, but also may prevent thousands of new HIV cases.[1] By converting from a daily to weekly dose, the calculations indicate that the efficacy of pre-exposure HIV prevention strategies could increase by up to 20%. When using models of populations in South Africa, where HIV incidence is high, the data suggest that using the new dosage form has the potential to prevent 200,000 to 800,000 new HIV infections over the next 20-year period.[1]

What Is the Next Step?

The scientific team now is working to scale up and validate results from preclinical models to move forward in delivering the potential therapy in advanced trials. One focus is to adapt the capsule to other diseases for which weekly drug dosing would be helpful. The polymer arms of the capsule will allow researchers to swap different drugs for ease of delivery. Scientists also are working to develop capsules that could remain in the body for longer periods of time.

> "A LONGER-ACTING, LESS INVASIVE ORAL FORMULATION COULD BE ONE IMPORTANT PART OF OUR FUTURE ARSENAL."

"A longer-acting, less invasive oral formulation could be one important part of our future arsenal to stop the HIV/AIDS pandemic," says **Anthony Fauci**, MD, director of the National Institute of Allergy and Infectious Diseases, which partly funded the research.

Although progress has been made with antiretroviral therapies, a key challenge remains the lack of compliance with once-daily medications for infected individuals and pre-exposure prophylaxis (PrEP) for uninfected people who are at risk, notes Fauci.

"New and improved tools for HIV treatment and prevention, along with wider implementation of novel and existing approaches, are needed to end the HIV pandemic as we know it," Fauci said in a press statement. "Studies such as this help us move closer to achieving this goal." ■

REFERENCES

1. Kirtane AR, Abouzid O, Minahan D, et al. Development of an oral once-weekly drug delivery system for HIV antiretroviral therapy. *Nat Commun* 2018;9:2.
2. Bellinger AM, Jafari M, Grant TM, et al. Oral, ultra-long-lasting drug delivery: Application toward malaria elimination goals. *Sci Transl Med* 2016;8:365ra157.
3. Kirtane AR, Langer R, Traverso G. Past, present, and future drug delivery systems for antiretrovirals. *J Pharm Sci* 2016;105:3471-3482.