



Taking the antibiotic doxycycline after condomless sex can reduce the risk of contracting three different sexually transmitted infections (STIs). PHOTO: Myself (Shorelander), CC BY-SA 3.0/ Wikimedia Commons

AIDS 2022: What does an important STI prevention finding mean for SA?

News & Features

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Taking a widely available antibiotic after condomless sex can reduce the risk of contracting three different sexually transmitted infections (STIs), according to a study presented last week at the AIDS 2022 conference in Montreal, Canada.

The antibiotic, doxycycline, was found to significantly reduce the risk of men who have sex with men (MSM) and transgender women developing chlamydia, gonorrhoea, and syphilis in a study conducted in San Francisco and Seattle in the United States. (Spotlight previously reported on the state of [gonorrhoea](#) and [syphilis](#) in South Africa.)

Dr Annie Luetkemeyer, Professor of Medicine in the Division of Infectious Diseases, HIV, and Global Medicine at the Zuckerberg San Francisco General Hospital explained that the study sought to better understand how doxycycline might work as PEP in people living with HIV and people not living with HIV who are taking antiretrovirals to prevent HIV infection. Previous studies showed that doxycycline had some efficacy in preventing STIs when taken prior to sex – this study tested its use after sex.

Study stopped early

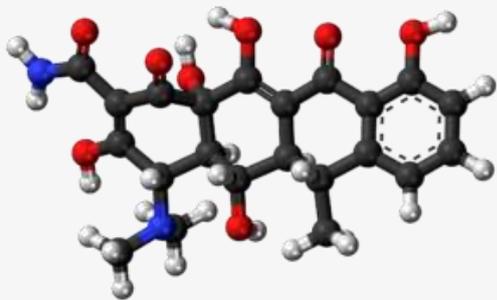
At the conference, Luetkemeyer presented interim study results based on 501 study participants – 174 living with HIV and 327 not (those in this latter group were all taking antiretrovirals to prevent HIV infection). Participants in the study were randomised two to one, with the larger group receiving doxycycline and the smaller group not. Those in the doxycycline group were asked to take one dose (200mg) of doxycycline within 72 hours of having condomless sex. With the maximum dose being 200mg every 24 hours.

Study participants were followed for 12 months with visits every three months or when symptomatic to test for syphilis, gonorrhoea, and chlamydia.

According to Luetkemeyer, due to significant effectiveness, it was recommended in May this year that the study stop enrolment, and continue with doxycycline being offered to all study participants. The study was originally set to run until May 2023, according to the [ClinicalTrials.gov Database](#).

Doxycycline taken as PEP (commonly referred to as DoxyPEP) was found to reduce the incidence of the three bacterial STIs by 66% in study participants not living with HIV and 62% in study participants living with HIV. More precisely, in those not living with HIV, STIs were detected in 29.5% of people in the control group compared to 9.6% in the doxycycline group. In study participants living with HIV, STIs were detected in 27.8% of those in the control group compared to 11.7% in the doxycycline group. No serious adverse events were attributed to doxycycline. (You can read the study abstract [here](#).)

“Based on this data, we think that DoxyPEP has potential as an effective prevention strategy in populations with high STI incidents,” Luetkemeyer told the conference.



Ball and stick model of the doxycycline molecule, a tetracycline antibiotic. PHOTO: Jynto, CC0, via Wikimedia Commons

In terms of individual STIs, DoxyPEP was most effective in preventing chlamydia, with an 88% reduction in those not living with HIV and a 74% reduction in those living with HIV, according to Luetkemeyer. There was only a small number of syphilis cases in the study, according to Luetkemeyer, but there was nevertheless a statistically significant reduction in syphilis in those not living with HIV and a “trend towards reduction” in syphilis in those living with HIV. Luetkemeyer said there was a 57% reduction in gonorrhoea in those living with HIV and a 55% reduction in those not living with HIV.

More research needed

While the findings are exciting, three experts interviewed by Spotlight agreed that further studies, particularly in the South African context, are needed before implementing a rollout. In a [statement](#), the United States Centers for Disease Control and Prevention (CDC) also stressed the need for further research.

“Further review of the data presented and potentially additional analyses will be needed to develop clinical guidance on the safe and effective use of this strategy for bacterial STI prevention among gay and bisexual men and transgender women,” the CDC statement reads. It also said it will collaborate with the trial investigators and other partners to review the data to develop interim clinical guidance and outline additional key research questions.

Dr Nigel Garrett, the head of the HIV pathogenesis and vaccine research programme at the Centre for the AIDS Programme of Research in South Africa (CAPRISA) says DoxyPEP is a “simple intervention with a potentially high impact”. But he also points out that only the study abstract

and interim results were presented at AIDS 2022 and the full study findings will have to be examined to compare how the study's population may differ from a similar target population in South Africa. He suggests possibly conducting a few local pilot projects or implementation studies where effectiveness and implementation concerns, as well as potential antibiotic resistance, can be monitored. He also suggests that studies may be required to test DoxyPEP in heterosexual populations.

"Put it into the toolbox as something to definitely do more research on and try to bring across, I mean, it's crucial that we [South Africa] are part of this," he says. "Because doxycycline is relatively cheap and already widely available."

Rene Sparks, a Public Health Professional whose expertise include HIV/AIDS and STIs agrees that further studies would be needed before implementing DoxyPEP in South Africa, particularly since the country has a unique resistance profile and health-seeking behaviour. She says the study focused on men, while in South Africa data points to health services being accessed by women more than by men.



Bottle of Doxycycline pills. PHOTO: NIAID, CC BY 2.0 via Wikimedia Commons

Together with other services

Dr Tendesayi Kufa-Chakezha, an epidemiologist at the Centre for HIV and STIs at the National Institute for Communicable Diseases (NICD), tells Spotlight that the country could theoretically benefit from DoxyPEP. But points out that South Africa's STI services are very different from the services available to the study participants in the United States.

She says that within the study setting, participants received DoxyPEP as an "intervention that is additional to existing sexual reproductive healthcare" like routine STI screening and testing. This differs from South Africa in the sense that here STIs are treated with "syndromic management", meaning that people are treated for STIs when symptoms are present instead of being tested routinely and then treated if an STI is present.

Kufa-Chakezha says that DoxyPEP would be just one more tool in the arsenal against STIs and existing STI prevention measures like condom use, HPV vaccination, partner notification, seeking care if an STI is suspected, and voluntary medical male circumcision do work. She adds that programmes and organisations that provide sexual health services to MSM would more easily implement DoxyPEP than programmes that look after the general population and where the bulk of the STIs are managed, like primary health clinics and GP practices.

"For me, that's the concern. Do we spend time trying to get DoxyPEP or do we spend time trying to build capacity to provide this kind of sexual reproductive healthcare for our people?" she asks, "We have a lot of work that we need to do in building affordable, accessible, appropriate, [and] acceptable sexual reproductive health services in the country."



PHOTO: Samantha Reinders/MSF

That said, Kufa-Chakezha suggests having discussions with researchers, policymakers, and clinicians about DoxyPEP and what would be possible given the country's current circumstances, which populations could benefit, and which populations might already be receiving the kind of sexual and reproductive health services that the study participants were receiving.

She adds that studies will also have to determine whether DoxyPEP could be used effectively without routine STI testing or to determine the minimum level of testing that is needed when using DoxyPEP. Taking DoxyPEP at doses recommended for PEP is not sufficient to treat certain STIs when someone already has an active infection.

Antibiotic resistance

One concern highlighted in the study itself was that of antibiotic resistance.

"Larger studies and ongoing surveillance are needed in DoxyPEP users to understand the impact of tetracycline (the class of antibiotic doxycycline belongs to) resistance development in gonorrhoea and evaluation is underway to look at the impact of DoxyPEP on sexual behaviour and antibiotic resistance, including in *s. aureus*, commensal *Neisseria*, and the gut microbiome," says Luetkemeyer.

For Kufa-Chakezha, there is also the concern that in addition to the three STIs developing resistance to doxycycline, other bacteria present in the body might also develop resistance.

"The doxycycline is not going to end in the urinal-genital tract where gonorrhoea, chlamydia, and syphilis are. It's going to go everywhere in the body... you worry about the development of resistance by the three targeted organisms, but also other organisms that are sitting in the body being exposed to antibiotic levels intermittently," she says.

Sparks is also concerned about antibiotic resistance, saying communities are already receiving too many antibiotics due to healthcare workers treating STIs based on symptoms and not always verifying the STI is present. Before any kind of implementation, she advises gaining an understanding of South Africa's levels of antibiotic resistance and ensuring healthcare workers are able to provide a "quality service without adding the resistance".

Using the same drug to treat three different bacterial infections is a bit of a concern, according to Garrett. To combat this, he suggests monitoring antibiotic resistance better by having surveillance studies include antibiotic resistance monitoring. As well as having better testing and monitoring to ensure someone doesn't, for example, have chlamydia before using doxycycline

as a PEP option, as the single 200mg dose may prevent chlamydia but it is not a strong enough dose to effectively treat an existing infection.

He adds that South Africa, before implementing the use of DoxyPEP, would need a more tailored and nuanced approach to treating STIs, starting with conducting more tests for STIs and treating those based on results instead of simply treating people who have symptoms of STIs with antibiotics without testing them first.