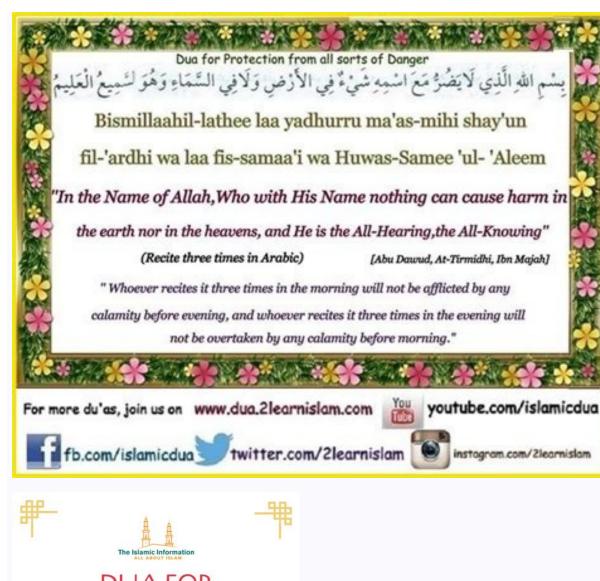
Dua for protection against diseases

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DUAFOR CORONAVIRUS اللَّهُمَّ إِنِّي أَعُوذُ بِكَ مِنَ الْبَرَصِ، وَالْجُنُون، وَالْجُذَامِ، وَمِنْ سَيِّئ الأسْقَامِ. OH ALLAH I SEEK YOUR REFUGE FROM LEPROSY, INSANITY MUTILATION AND FROM ALL SERIOUS ILLNESS.

Dua for Protection from Evil **Diseases or Any Harm**

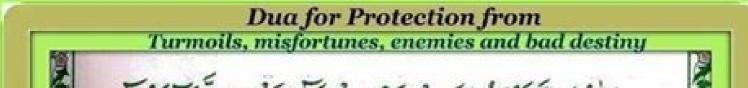
مبغ المقلم وَلاَفِيالسَّمَاءِوَهُوَالسَّمِيعُالُ

Bismillahil-ladhi la yadurru ma'as-mihi shai'un fil-ardi wa la fis-sama'i, wa Huwas-Sami'ul-'Alim

Islam the Infinite Light

In the name of Allah with Whose Name nothing on earth or in heaven harms and He is the All-Hearing the All-Knowing

DUA FOR PROTECTION FROM EVIL (To be recited thrice in the morning and eve بسُمِ الله الآنِي لاَ يَضُرُّ مَعَ اسْمِهِ شَى عَنِي الأَرْضِ وَلاَ فِي السَّمَاءِ وَهُوَ الشَّمِيعُ الْعَلِيمُ seek protection) in the name of Allah, the name with in the heavens and earth can be harmed and He is the All-hearin the All-knowing ISLAAM MY ISLAAM WEEKLY DUA



Reveloped and الهوإنا تعوديك من جهد البلاء ودر No. No. الْقَضَاء وشَمَاتَة الْأَعُدَاء «المارين الشاملين المتامن المردة) Allaahummaa inna na'oothubika min jahdil-balaa, wa darkish-shakaa, wa soo'il-qadha, wa shamatatil-'adaa "O Allah, Surely we seek refuge in You against the hardship of turmoils and attacks of misfortunes and evil destiny and from 5 the mockery of (triumphant) enemies" تد ابشک م تجرب پناه مانگ ، می ابر ، بلا (اور مصيبت) کي شخي ساور برخي Reference: Muslim, مركيف ، اور بر مي تقدير سے اور دشمنوں كے رہم بر) نوش بونے سے . Al-Bukhari youtube.com/islamicdua For more du'as, join us on www.dua.2learnislam.com fb.com/islamicdua twitter.com/2learnislam instagram.com/2learnislam

This article is updated as of 20 July 2022. Praise be to Allah. Singapore reported 10,197 new local COVID-19 infections as of noon on 19 July. With 3 deaths, Singapore's total death toll is now 1,460. As Muslims, it is important to remind ourselves that everything happens by the will and divine wisdom of Allah s.w.t. through constant invocations with the language of love and servanthood. We can find many prophetic traditions that teach us what to pray and some guidelines on how to pray. Some of these prayers are encouraged to be done routinely in the morning and afternoon, emphasising the significance and benefits of such discipline. Accordingly, we have been advised by our religious leaders to strengthen our faith in these difficult times and to increase our prayers and supplications to Allah s.w.t, on top of taking preventive measures to help contain this situation including getting vaccinated. Read: Fatwa on precautionary measures in dealing with COVID-19 Alhamdulillah, the Muslim community has been lauded for making sacrifices and adjustments to protect one another since the start of the COVID-19 pandemic. Let's increase our Dua for those who are sick as the increase of the provision of the stand answers the prayers of those who are truly sincere in seeking His refuge. Read: What Does Tawakkul Mean? Let us continue to adhere to the recommended measures by the Multi-Ministry Taskforce (MTF) here. Access the latest religious guidance from the Office of The Mufti on dealing with COVID-19 here. May we remain united as Singaporeans in protecting one another by being socially responsible. and May Allah s.w.t. protect our loved ones and us from harmful diseases. And Allah knows best. Sexually transmitted infections (STIs) impose major health and economic burdens globally. More than 35 bacterial, viral, and parasitic pathogens have been identified as sexually transmissible. An estimated 498.9 million new cases of four of the curable STIs occurred among adults ages 15-49 years in 2008, an increase of 11.3 percent from the estimated 448.3 million new cases in 2005 (WHO 2012a). In 2008, these cases included 105.7 million new cases of trichomoniasis (WHO 2012a). Males accounted for 266.1 million new cases of trichomoniasis (WHO 2012a). Males accounted for 266.1 million new cases of trichomoniasis (WHO 2012a). In 2008, an estimated 100.4 million new cases of trichomoniasis (WHO 2012a). Males accounted for 266.1 million new cases of trichomoniasis (WHO 2012a). gonorrhea, 36.4 million with syphilis, and 187.0 million with trichomoniasis (WHO 2012a). The incidence and prevalence of these curable STIs varies remarkably across World Health Organization (WHO) regions, as shown in map 10.1, figure 10.1, and table 10.1. In general, low- and middle-income countries (LMICs) (WHO 2012a). However, comparing income and STI burden by region can be challenging because income can vary substantially across countries within a given region. The highest estimated prevalence of these four curable STIs is higher in this than in any other region. For example, the Americas include two relatively wealthy countries within a given region. The highest estimated prevalence of these four curable STIs is higher in this than in any other region.

Americas, while the highest rates of gonorrhea and syphilis are in Sub-Saharan Africa (figures 10.2 and 10.3) In general, trichomoniasis is the most prevalent STI across regions, with the exception of Europe and the Western Pacific, where chlamydia is more prevalent STI across regions, with the exception of Europe and the Western Pacific, where chlamydia is more prevalent STI across regions, with the exception of Europe and the Western Pacific, where chlamydia is more prevalent STI across regions, with the exception of Europe and the Western Pacific, where chlamydia is more prevalent STI across regions, with the exception of Europe and the Western Pacific (Strenge and Strenge and Streng the population in each region, the Americas has the highest annual incidence rate of these four curable STIs (0.264), followed by Africa (0.241), Western Pacific (0.130), Europe (0.104), Eastern Mediterranean (0.085), and South-East Asia (0.083). However, given heterogeneity in the quality of STI surveillance across regions, it is difficult to make cross-regions, it is difficult to make cross-regional comparisons. The incidence of STIs can vary substantially within, astern Mediterranean (0.085), and South-East Asia (0.083). cording to the WHO's Global Health Observatory Data Repository. In 2010, the proportion of antenatal care attendees who were positive for syphilis was 1.5 percent in Honduras and 17.5 percent in El Salvador; and the proportion with active syphilis and can successfully reduce the burden of STIs in a cost-effective manner in all settings. If left untreated, common STIs may cause complications, including pelvic inflammatory disease, ectopic pregnancy, postpartum endometriosis, infertility, and chronic abdominal pain in women; adverse pregnancy outcomes, including pelvic inflammatory disease, ectopic pregnancy outcomes, including abortion, intrauterine death, and premature delivery; neonatal and infant infections and blindness; urethral bididymitis in men; genital malignancies; proctitis, colitis, and enteritis in MSM; arthritis secondary to gonorrhea and chlamydia; liver failure and lymphotropic virus (HBV); myelopathy and lymphotropic virus (H others 2006; Holmes and Aral 1991; van Dam, Dallabetta, and Piot 1999).STI sequelae disproportionately affect women and children. STIs are one of the leading causes of morbidity and mortality, as measured by disability-adjusted life years (DALYs) for reproductive-age women (Kamb and others 2007) in LMICs. Moreover, the health burden of STIs is often greatly underestimated. Although most cervical cancers are caused by the willions of DALYs caused by cervical cancer are not included in estimates of mortality and morbidity due to STIs; they are typically listed in estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of cancer of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of cancer of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, where 88 percent of the estimated 610,000 HPV-attributable cancer cases worldwide in 2008, 490,000 occurred in LMICs, 490,000 occurred in LMICs cervical cancer deaths also occurred (Forman and others 2012). Similarly, HBV-related chronic hepatitis, liver failure, and liver cancer attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of complications. To a large extent, inadequacies in health service provision are seldom included in estimates of morbidity attributable to STIs. Delayed or inadequacies in health service provision are seldom included in estimates of morbidity attributable to STIs. Delayed or inadequacies in health service provision are seldom included in estimates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs. Delayed or inadequate diagnosis and treatment of STIs in LMICs result in high rates of morbidity attributable to STIs in LMICs result in high rates of morbidity attributable to STIs in LMICs result in high rates of morbidity attributable to STIs in LMICs result in high rates of morbidity attributable to STIs in LMICs result in high rates of mor and health care seeking are responsible for the high levels of STIs and the high rates of complications and sequelae in LMICs (Aral, Hogben, and Wasserheit 2008). STI care is provided by a variety of health care provided by a variety of health care provided by a variety of care is often inadequate, particularly and inadequate, particularly of care is provided by a variety of health care provided by a variety of health care provided by a variety of health care as a result of the asymptomatic nature of many STIs; low levels of awareness of sexual health; stigma associated with genital symptoms; and tendency to seek care through traditional healers, home remedies (Mayaud and Mabey 2004; Moses and others 1994; van Dam 1995), and pharmacies where drugs are dispensed by workers not trained in STI treatment. In resource-poor settings, variables that affect the ess include adequacy of health worker training, attitudes of health workers toward marginalized groups, patient loads at health centers, availability of drugs and clinic supplies, and decrease the incidence of STIs (Aral 2002). However, in many LMICs vorsening economic conditions; increasing burden of human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS); and occasional health crises, such as natural disasters, refugee situations, or epidemics like the recent Ebola outbreak in West Africa, can adversely affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect sexual behaviors that contribute to a situation of human immunodeficiency syndrome (HIV/AIDS); and occasional health crises, such as natural disasters, refugee situations, or epidemics like the recent Ebola outbreak in West Africa, can adversely affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect sexual behaviors that contribute to a situation of human immunodeficiency syndrome (HIV/AIDS); and occasional health crises, such as natural disasters, refugee situations, or epidemics like the recent Ebola outbreak in West Africa, can adversely affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect sexual behaviors that contribute to a situation of human immunodeficiency syndrome (HIV/AIDS); and occasional health crises, such as natural disasters, refugee situations, or epidemics like the recent Ebola outbreak in West Africa, can adversely affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and political contexts also affect these variables (Nam and Blanchet 2014). Sociocultural, economic, and economic, and economi the STI burden in LMICs. Changes have included rising inequality in income and other factors within countries, growing inequality among countries, increased globalization, higher proportions of persons living outside of their cultures, increased globalization, higher proportions of persons living inequality among countries, growing inequality among cou nultipartner sexual activity. Furthermore, changes in technology, including the widespread use of cell phones and the Internet, can facilitate the formation of short-term sexual partnerships (Bull and McFarlane 2000). These technological changes, concurrent with changes in norms and attitudes, have led to the expansion of transactional and commercial sex that increases sexual exposure (Aral and Ward 2014). Direct medical ve been estimated at US\$16.7 billion in the United States (Owusu-Edusei, Chesson, Gift, and others 2013). This estimate includes costs in the United States in 2008 for gonorrhea, chlamydia, syphilis, trichomoniasis, hepatitis B, diseases associated with sexually transmitted HPV, genital HSV-2 infections, and HIV infections. The total direct medical cost for each of these STIs in 2008 was computed as the united States in 2008 for gonorrhea, chlamydia, syphilis, trichomoniasis, hepatitis B, diseases associated with sexually transmitted HPV, genital HSV-2 infections, and HIV infections. nber of new cases in 2008 multiplied by the estimated discounted lifetime cost per case, adjusted to 2012 U.S. dollars. The estimated costs totaled US\$16.7 billion (range of US\$11.8 billion) when including HIV. Total costs excluding HIV infections were US\$3.2 billion. Although few estimates exist for LMICs, the direct medical costs of STIs are undoubtedly substantial given the high ese and other STIs in these settings. STIs also impose extensive productivity costs that can often exceed the direct medical costs (Owusu-Edusei, Chesson, Gift, and others 2013). Productivity costs are particularly burdensome in LMICs at both the individual and the community levels, especially for populations in which most people are under age 40 years (World Bank 2007). The youthful ac ountries contributes to the high prevalence and the direct costs of STIs. The economic burden of STIs in LMICs is so high that the treatment of curable financial burden on those infected. For example, the cost of drugs is equivalent to several days' wages in most LMICs (Terris-Prestholt and sociated with medical treatment of STI sequelae in LMICs have not been well defined, and the indirect costs associated with lost productivity due to STIs or STI sequelae are not known. Significant changes have occurred in many HICs, and natural and nealth crises all have had important effects. Most of the data on sexual behaviors and practices come from HICs. However, the increased volume of travel, sex tourism, transactional and commercial sex, and role of technology in establishing these connections have expanded sexual networks beyond national boundaries (Aral and Ward 2014; Ward and Aral 2006). ple, by allowing or forcing sexual mixing among groups that did not mix before the displacement (Hankins and others 2002). Where available, systematically collected data on representative samples of the general population reflect increases in a number of risky behaviors, including the following: large numbers of sex partners, including the following: la initiation of sexual activity, short time spent during the sexual encounter, lack or short duration of social links between sex partners, short duration of gaps between sex partners, short duration of gaps between sex partners, short duration of gaps between consecutive sex partners and sexual encounters, and a tendency for both partners to recruit each other for sex. (Aral and Ward 2014; Mercer and others 2013). Sexual practices have also been changing. Recent data from the United Kingdom and the United States suggest trends toward initiation of sex at a younger age, greater frequency of oral and anal sex (Aral and Ward 2014). Although increases in oral sex began with the generation born between 1946 and 1964, increases in anal sex began with the generations born between 1965 and 2000 (Aral and Ward 2014). These changes may result from temporal trends in demographic and social patterns. Marriage rates have risen in the Organisation for Economic Co-operation and Uverla 2014; International Futures Program 2011; Stevensor 2014; International Futures Program 2014; International Futures Prog and Wolfers 2007). Globally, people who marry are doing so at older ages than before (Aral and Ward 2014). Because of their adult lives outside of marriage (Aral and Ward 2014), which probably increases the number of sex partners. Data collected in LMICs over the past two decades have revealed the importance of sex work to the spread of STIs (Baral and others 2012) usiderable prevalence) of MSM among sex workers (Baral and others 2007). These key populations have high prevalence of STIs, including HIV/AIDS, and play an important role in spreading STIs to the general population. The understanding of STI epidemiology in LMICs has been shaped by the reemergence and escalation of gonorrhea and congenital syphilis; recognition of sexual transmission as a ke factor in the and globalization. Although these issues can be difficult problems globalization, emergence and impact of HIV/AIDS mortality; and patterns of STI spread, such as clustering and globalization. Although these issues can be difficult problems globalization. Although these issues can be difficult problems globalization. Although these issues can be difficult problems globalization. Asia, and the Western Pacific (Bala and others 2013; Lahra, Lo, and Whiley 2013; Ndowa and others 2013). In addition to resistance to penicillin, tetracycline, and quinolones, decreased susceptibility to third-generation cephalosporins has been reported. Decreased susceptibility to treatment has been associated with increased susceptibility to third-generation cephalosporins has been associated with increased susceptibility to the United States (Chesson and others 2013). In addition to resistance to penicillin, tetracycline, and quinolones, decreased susceptibility to the United States (Chesson and others 2014). trends highlight the importance of sustaining and enhancing surveillance to monitor the spread and threat of antimicrobial resistance (Lahra, Lo, and Whiley 2013). Syphilis in pregnancy can lead to a wide range of adverse outcomes, including stillbirth, fetal loss, neonatal death, premature and low-birthweight infants, and infection or disease in newborns (John-Stewart and others 2017; Kahn and others 2014; Newman and others 2013; WHO 2012b). Even though these adverse outcomes could be prevented through antenatal screening programs, syphilis in pregnancy imposes a substantial global burden of disease due to syphilis during pregnancy is comparable to that of mother-to-child transmission of HIV (Kahn and others 2014; Kamb and others 2010; WHO 2012b).LMICs bear a disproportionate share of the global health and economic burden of syphilis in pregnancy (Kamb and others 2010). In the Mwanza Region of Tanzania, from 1998 to 2000, maternal syphilis accounted for more than 50 percent of all adverse pregnancy outcomes among unscreened women (Watson-Jones and others AIDS mortality, before the advent of effective antiretroviral therapy (ART), on the declining incidence of bacterial STIs was substantial. Empirical and model-based studies in HICs suggest that AIDS mortality, before the advent of effective antiretroviral therapy (ART), on the declining incidence of bacterial STIs was substantial. affected by HIV/AIDS. Syphilis outbreaks among MSM have been observed in metropolitan areas worldwide since the late 1990s, in large part because of decreased fear of HIV/AIDS and increased survival of persons with HIV/AIDS (Chesson and Gift 2008; 5.25 million people in these settings were receiving ART, compared with million at the end of 2008 (WHO 2010). Peterman and Furness (2015) report notable declines in syphilis in some parts of Africa and attribute these declines in part to syndromic treatment of genital ulcers and possibly the impact of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in part to syndromic treatment of genital ulcers and possible in LMICs as a result of these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute these declines in synhilis in some parts of Africa and attribute th increased availability of ART, particularly in areas with high coverage (Kenyon, Osbak, and Chico 2014; Kenyon and others 2012). In particular, MSM are understudied and underserved in these countries. Patterns of sexual networks linking MSM and the general population warrant future research so that appropriate responses can be developed. Three additional patterns have influenced and enhanced understanding of STI epidemiology in LMICs: Geographic clustering and concentration of risk behaviors and infections. Nonuniform distribution and clustering of risk behaviors and infections. The end of the epidemiologies of both HIV and other STIs (Chesson 2010a, 2010b; Leichliter and others 2010). More recent attention has been drawn to geographic concentration (Tanser and others 2009) and to the critical role of local context in the epidemiology of STIs. The Priorities for Local AIDS Control Efforts method can identify sites where people with high rates of partner change can receive STI prevention services (Weir and others 2003). Similarly, the Situational Analysis of Sexual Health method can identify specific locations where vulnerable and at-risk people can receive STI prevention and control, including targeting of interventions and allocation of resources (Aral and Cates 2013). In the past two decades, the importance of inants of sexual health and structural drivers for STI epidemiology have received increasing recognition. Examples of social determinants include low socioeconomic status and poor access to quality health care (Hogben and Leichliter 2008). Underlying social, economic, legal, and political structures have a notable influence on sexual behaviors (Hogben and Leichliter 2008). Underlying social, economic, legal, and political structures have a notable influence on sexual behaviors (Hogben and Leichliter 2008). factors affect the formation, evolution, and persistence of STIs in key populations. Finally, globalization shapes and connects sexual behaviors, practices, and networks around the world (Aral, Bernstein, and Torrone 2015; Aral and Ward 2005, 2014; Ward and Aral 2006). Current developments in methodological approaches promise to have an impact on the study and understanding of STI epidemiology in all settings. Two developments are particularly remarkable: (1) the increasing use of sophisticated geographic mapping methodologies (Tanser and others 2009) and (2) phylogenetic analyses. When combined, these approaches provide powerful explanations of transmission dynamics within and between groups; if used in conjunction with enhance the understanding of aspects of STI prevention science, such as subgroup targeting. Important changes in the approach to STI prevention have been influenced by the HIV world and gained prominence in the STI domain. However, since the turn of the century, there has been increasing recognition that behavioral rought sustainable decreases in incidence (Aral 2011; Kippax and Stephenson 2012). Concurrently, remarkable progress has been made in biomedical approaches to preventing HIV/AIDS, including male circumcision, preexposure prophylaxis (PrEP), and ART (Baeten and others 2010; Thigpen and others 2010; Thigpen and others 2010; Thigpen and others 2010; Thigpen and others 2010; Concurrently, remarkable progress has been made in biomedical approaches to preventing HIV/AIDS, including male circumcision, preexposure prophylaxis (PrEP), and ART (Baeten and others 2010; Thigpen and others 2010; Thigpe others 2012). Given the success of biomedical approaches to the prevention of HIV/AIDS, the field of STI prevention is drawing increasingly on biomedical interventions, reinforced by development of effective biomedical interventions, reinforced by development of the success of biomedical interventions for syphilis and HIV, and an understanding of the success of biomedical interventions for syphilis and HIV, and an understanding of the success of biomedical interventions for syphilis and HIV. preventive effects of circumcision for certain STIs are beginning to show promise in preventing specific STIs other than HIV.STI prevention has also been influenced by other insights. Prevention activities have increasingly sought to achieve impact at the population level. In addition to protecting individuals, the focus has turned to decreasing population incidence. This shift has brought several other changes given that i equires system-level thinking, planning, and evaluation. It is important to take into account how interventions may have additive, synergistic, or antagonistic effects (Aral 2011: Aral and Douglas 2007: Parkhurst 2014). The social and epidemiological context and interactions between interventions and context have additive. elements of complex systems (mixing patterns, networks, clustering, and hot spots) and to social, economic, legal, and sexual structures (Blanchard 2012; Blanchard and Aral 2011; Parkhurst 2014). With the reality of limited and declining resources, emphasis has been placed on accountability, resource allocation, efficiency, prioritization, and return on investment (Over and Aral 2006). These developments are changing the STI prevention field in important ways. The hope is that the next decade will bring significantly greater prevention for the money in LMICs, where health systems are often weak (Mills 2014). Reforming and strengthening of health care infrastructure may be needed before the money in LMICs, where health systems are often weak (Mills 2014). recent advances in STI prevention science can be successfully implemented in these contexts. Over the past 20 years, many STI prevention interventions have been rigorously evaluated by randomized controlled trials (RCTs) in HICs and LMICs, Wetmore, Manhart, and Wasserheit (2010) found that 44 of 75 interventions (59 percent) significantly reduce ing at least one STI. Interventions were organized according to modality, including behavior change, vaginal microbicides, male circumcision, partner services, treatment, and vaccines. The percentage of trials in which a statistically significant reduction in the risk of a laboratory-confirmed STI was observed in the intervention arm (compared with the control arm) was highest for treatment, vaccines, and male wed by behavioral interventions, partner services, and vaginal microbicides. These findings are consistent with those of Manhart and Holmes (2005), in which 54 percent of the trials led to a significant reduction in STI acquisition, transmission, or complications. For this section, a literature search was conducted to identify studies of the impact of STI prevention interventions in LMICs. The search was conducted from January 2014 to April 2014, and the following databases were used: Cochrane Library, Database of Abstracts of Reviews of Effects, MEDLINE, and these search terms used to identify the relevant literature are listed in annexes 10A and 10B, and these search terms were amended as necessary to search terms used to identify the relevant literature are listed in annexes 10A and 10B, and these search terms used to identify the relevant literature are listed in annexes 10A and 10B. bibliographies of articles obtained in the search and previous reviews of the impact of STI prevention interventions (Manhart, and Wasserheit (2010) overlap, there are four key differences. First, this review was not systematic—no specific inclusion or exclusion criteria were applied nstead, studies were selected to highlight key aspects of the evidence, focusing on studies that use biological outcomes rather than changes in attitudes or behaviors. Second, the search was not limited to RCTs, but also considered cohort and cross-sectional studies. Third, this review focused on interventions that were evaluated in LMICs. Finally, it included more recent articles, published from January 2000 to July 2014, that the earlier review, which included articles published through December 2009. In this summary of the literature, interventions were organized as primary prevention, male circumcision, vaccines, and microbicides), STI case management, partner notification and management, targeted interventions and periodic presumptive treatment (PPT), mass treatment, and community-level and structural interventions, male circumcision, vaccines, and microbicides. Promotion of condom use, STI and HIV education, and knowledge and skill building are commo behavior change interventions. Interventions to increase condom use are generally effective in reducing STI incidence in high-risk populations (Celentano and others 2005; Patterson and others 2007). However, Fontanet and others (1998) found that female sex workers in Thailand who had the option of using female condoms in situations where male condoms only. An HSV-2 glycoprotein-D-adjuvant vaccine administered to persons with no serological evidence of previous HSV-1 infection partially protected women, but not men, from acquiring genitations where male condoms only. An HSV-2 glycoprotein-D-adjuvant vaccine administered to persons with no serological evidence of previous HSV-1 infection partially protected women, but not men, from acquiring genitations where male condoms only. herpes disease, with efficacy of about 75 percent across two trials (Stanberry and others 2002). In contrast, the bivalent and quadrivalent vaccines may also offer some cross-protection against other types of HPV (Malagon and others 2012). These safe and effective vaccines could reduce the burden of cervical cancer and potentially other cancers, such as vulvar, vaginal, penile, anal, and oropharyngeal cancers (Markowitz and others 2014). In HICs with routine HPV vaccination programs, reductions in the prevalence of HPV-associated health outcomes, such as genital warts and cervical precancers, have been observed at the population level (Drolet and others 2015; Fairley and others 2015; Fairley and others 2019; Fairley and others 2014). In HICs with routine HPV vaccination programs, reductions in the prevalence of HPV-associated health outcomes, such as genital warts and cervical precancers, have been observed at the population level (Drolet and others 2015; Fairley and others 2019; Fairley and other Flagg, Schwartz, and Weinstock 2013; Hariri and others 2014; Hariri and others 2014 vaccine, For example, in an Internet survey conducted in the United States in 2010, 42.4 percent of HIV-negative MSM older than age 31 years reported never having received the HBV vaccine (Matthews, Stephenson, and Sullivan 2012). A cross-sectional survey of MSM in Beijing, China, in 2012 found that only 38.9 percent had received the HBV vaccine (Matthews, Stephenson, and Sullivan 2012). A cross-sectional survey of MSM in Beijing, China, in 2012 found that only 38.9 percent had received the HBV vaccine (Matthews, Stephenson, and Sullivan 2012). antiretrovirals can reduce HIV acquisition among heterosexual men and women in serodiscordant couples (Baeten and others 2012) and in MSM (Grant and others 2012; Thigpen and others 2012) and in MSV-2 to the seronegative therapy reduced transmission of HSV-2 to the seronegative therapy reduced transmission of HSV-2 to the seronegative therapy reduced transmission of HSV-2 in Australia, Canada, Europe, Latin America, and the United States found that once-daily valacyclovir for suppressive therapy reduced transmission of HSV-2 to the seronegative therapy reduced transmission of HSV-2 in Australia, Canada, Europe, Latin America, and the United States found that once-daily valacyclovir for suppressive therapy reduced transmission of HSV-2 to the seronegative therap partner by about 75 percent (Corey and others 2004). However, an RCT in HIV-discordant couples in which the partner with HIV was also infected with HSV-2 found that daily acyclovir did not reduce the risk of HIV transmission to the HIV-negative partner (2013) report that a 1 percent vaginal gel formulation of tenofovir reduced the risk of HIV transmission to the HIV-negative partner (2013) report that a 1 percent vaginal gel formulation of tenofovir reduced the risk of HIV transmission to the HIV-negative partner (2013) report that a 1 percent vaginal gel formulation of tenofovir reduced the risk of HIV transmission to the HIV-negative partner (2010) and Karim and others 2010). Karim and others (2010) and Karim and (2010) 2 acquisition in a randomized trial involving women in KwaZulu-Natal, South Africa. Specifically, it reduced HIV-1 acquisition by 39 percent (54 percent among those with high adherence) and HSV-2 acquisition by 39 percent (54 percent among those with high adherence) and HSV-2 acquisition by 39 percent (54 percent among those with high adherence) and HSV-2 acquisition by 51 percent. Arror of the intent-to-treat analysis (Marrazzo and others 2015). In both the VOICE and the FACTS 001 studies, low rates of adherence to the drug regimen were considered a primary reason for this result. An RCT of the VOICE and the FACTS 001 studies, low rates of adherence to the drug regimen were considered a primary reason for this result. An RCT of the VOICE and the FACTS 001 studies, low rates of adherence to the drug regimen were considered a primary reason for this result. An RCT of the VOICE and the FACTS 001 studies, low rates of adherence to the drug regimen were considered a primary reason for this result. An RCT of the VOICE and the FACTS 001 studies, low rates of adherence to the drug regimen were considered a primary reason for this result. nvolving sexually active women in southern Africa at risk for STIs found that providing condoms alone (control) was as effective as providing a diaphragm could be protective given that the incidence of gonorrhea (Ramjee and others 2008). However, consistent use of a diaphragm could be protective given that the incidence of gonorrhea among women in the intervention arm was nose who reported always using a diaphragm. Pettifor and others (2000) review the literature on the effectiveness of syndromic management of STIs. Their review includes 5 studies of WHO algorithms for urethral discharge, 5 for genital ulcers, and 13 for vaginal discharge. Overall, the literature suggests that algorithms for urethral discharge, and genital ulcers, and 13 for vaginal discharge. disease can be effective. For example, La Ruche, Lorougnon, and Digbeu (1995) reported therapeutic success rates of 92 percent for wall allocer disease. The studies reviewed in Pettifor and others (2000) also show that the algorithms to detect cervical infection can be improved by incorporating risk scores based on factors such as sexual history. Other disease. ere effective for STI control (McCormick and others 2013). A randomized trial involving men in Malawi with urethritis found that the addition of metronidazole to the syndromic management of male urethritis found that the addition for STIs in vhich the treating clinician discussed partner referral (Moyo and others 2002). A randomized trial in Kampala, Uganda, involving men and women with a syndromically diagnosed STI found that a significantly higher percentage of partner referral (Nuwaha and others 2001). Although no published evaluations are available of the syndromically higher percentage of partner referral (Nuwaha and others 2001). Although no published evaluations are available of the syndromically higher percentage of partner medication compared with patient-based partner referral (Nuwaha and others 2001). A randomized trial in Kampala, Uganda, involving men and women with a syndromically higher percentage of partner medication compared with patient-based partner medication compared with patient-based partner medication compared with a syndromically higher percentage of partner medication compared with patient-based partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromically higher percentage of partner medication compared with a syndromical higher percentage of partner medication compared with a syndromical higher percentage of partner medication compared with a syndromical higher percentage of partner medication compared with a syndromical higher percentage of partner medication compared with a s mpact of partner services on STI incidence in LMICs, evidence is available from trials conducted in HICs. Studies from the United States, for example, have shown that the administration of suppressive therapy to partners (Corey and others 2004) and that expedited partner (including patient elivered therapy to a partner) can reduce the risk of persistence or reoccurrence of gonococcal or chlamydial infection in the index patient (Golden and others 2005). Golden and others 2005). Golden and others 2005). Golden and others 2005) conducted a community-level stepped-wedge RCT of a public health intervention in the index patient (because the uptake of expedited partner therapy). of state-financed uptake of parts of the intervention was associated with reductions of about 10 percent in chlamydia positivity and gonorrhea incidence, although these reductions were not statistically significant, perhaps as a result of inadequate statistical power and of state-financed uptake of parts of the intervention in control communities. Further trials are needed to assess the impact on STI and cost-effectiveness of partner notification interventions in LMICs (Alam and others 2010; Ferreira and others 2013). The potential benefits of partner notification strategies for STIs in LMICs are supported by encouraging results for HIV in Cameroon. Similarly, are RCT in Malawi found that 51 percent of partners returned for counseling and testing in the provider referral group in which health care providers notifying their partners, compared with 24 percent in the passive referral group in which health impact and cost-effectiveness of partner notifying their partners, compared with 24 percent in the passive referral group in which health impact and cost-effectiveness of partner notifying their partners, compared with 24 percent in the passive referral group in which health impact and cost-effectiveness of partners (Brown and others 2011). The health impact and cost-effectiveness of partner notifying their partners, compared with 24 percent in the passive referral group in which health impact and cost-effectiveness of partners (Brown and others 2011). testing into STI clinics and providing HIV testing to partners of STI clinic patients. Furthermore, this integration could improve the diagnostics part of the HIV treatment continuum. Interventions can include the provision of PPT, which is the systematic treatment of people at high risk with a combination of drugs targeting the prevalent of the HIV treatment continuum. Interventions can include the provision of PPT, which is the systematic treatment of people at high risk with a combination of drugs targeting the prevalent continue to the prevalent of the HIV treatment of people at high risk with a combination of drugs targeting the prevalent continuum. Interventions commonly target groups at high risk of STI acquisition and transmission. curable STIs. As shown by four rigorous evaluations, PPT interventions can be highly effective in reducing the STI burden within targeted groups. In an RCT among female sex workers in Kenya, the provision of monthly prophylaxis substantially reduced the incidence of genorrhea, chlamydia, and trichomoniasis, but not of HIV (Kaul and others 2004). Reductions of about 45 percent in the prevalence of cervical infection with gonorrhea and chlamydia were observed among commercial sex workers in the Lao People's Democratic Republic after monthly PPT over a three-month period (O'Farrell and others 2006). Substantial reductions in STIs were also observed among hotel-based sex workers in Bangladesh following the provision of monthly PPT over a three-month period (McCormick and others 2013). PPT with vaginal suppositories containing miconazole among HIV-negative women with one or more vaginal infections in Kenya and in Birmingham, Alabama, significantly reduced the prevalence of bacterial vaginosis among women during 12 months of follow-up, compared with women receiving a placebo (McClelland and others 2015). Steen, Chersich, and de Vlas (2012) noted that reductions in gonorrhea and chlamydia on the order of 50 percent across the 15 studies included in their review of PPT of curable STIs among sex workers. The WHO (2008) reviewed the effectiveness of presumptive treatment, finding that PPT can lead to rapid, short-term reductions in STI prevalence among high-risk groups and the impactive treatment, finding that PPT can lead to rapid, short-term reductions in STI prevalence among high-risk groups and the impactive treatment, finding that PPT can lead to rapid, short-term reductions in STI prevalence among high-risk groups and the impactive treatment. of PPT on the emergence of antimicrobial resistance in sexually transmitted and other pathogens. Reducing STI prevalence among core groups (for example, sex workers), although the evidence is limited. An intervention of PPT plus STI prevalence among core groups (for example, sex workers), although the evidence is limited. was found to reduce the prevalence of gonorrhea and chlamydia not only in the women in the intervention but also in the miner population (Steen and others 2000). In contrast, a cluster randomized trial of PPT conducted among female sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers in Benin and Ghana found substantial reductions in gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers in Benin and Ghana found substantial reductions in gonorrhea but not in chlamydia among sex workers themselves after nine months, and no impact on the prevalence of gonorrhea but not in chlamydia among sex workers in Benin and Ghana found substantial reductions in gonorrhea but not in chlamydia among sex workers in Benin among se sex workers in Maharashtra, India, Avahan led to significant declines in the prevalence of syphilis, chlamydia, and gonorrhea (Mainkar and others 2013). Peer-mediated interventions have also shown promise among female sex workers in Mombasa, Kenya, where peer-based STI and om promotion among female sex workers increased consistent condom use with clients, but these interventions did not have a statistically significant impact on STI. The prevalence of syphilis seropositivity and trichomoniasis infection in women was significantly lower i exercises suggest that mass treatment combined with sustained syndromic management could be an effective STI control strategy and substantially reduce STI-attributable HIV incidence (Korenromp and others 2000). This model suggests that the impact of a single round of mass treatment on STI incidence would be temporary without continued rounds of mass treatment or a sustained syndromic management could be an effective STI-attributable HIV incidence (Korenromp and others 2000). n of resistance, and other factors (Mayaud and Mabey 2004). For example, a targeted mass treatment program to provide azithromycin to more than 4,000 at-risk persons in British Columbia resulted in a temporary decre not studied. For these and other reasons, researchers have cautioned that mass treatment interventions should not be undertaken routinely (Pourbohloul, Rekart, and Brunham 2003; Rekart and others 2003).STI prevention interventions can be implemented at the individual, risk group, or community level. Although this literature review is stratified by intervention modality and not by level of implementation, most of the nterventions reviewed thus far were targeted to individuals or high-risk groups. The MEMA kwa Vijana ("good things for young people") intervention, a random community intervention, and community activities Although the intervention increased knowledge and decreased reported risk behaviors, it had no apparent effect on HIV or HSV-2 seroincidence, incidence of other STIs, or pregnancy outcomes at the end of the trial (Hayes and others 2005), and no effect on HIV after about 10 years (Doyle and others 2010). Con nition and man ent of STI syndromes by pharmacy workers (Garcia and others 2003). The intervention was found to improve STI recognition and management, as well as STI and HIV risk-reduction counseling. A sub ent trial that chose 20 cities throughout Peru to receive or not receive this intervention resulted in substantial and signification improvements in STI syndromic management at pharmacies in the intervention cities. The community trial in Peru (Peru PREVEN Study) combined four intervention modalities: Provision of training, workshops, and educational materials to pharmacy workers and cliniciansSTI screening and treatment for female sex workers by mobile outreach teamsProvision of training. workers with bacterial vaginosisCondom promotion among female sex workers by mobile outreach teams and among the general population by social marketing of low-cost condoms (Garcia and others 2012). Adjusted for baseline prevalence, among 12,930 young adults ages 18-29 years there was a nonsignificant reduction in chlamydia, trichomoniasis, and gonorrhea infection and in syphilis seroreactivity. However, significant reductions were noted in certain subgroups, specifically young adult women and female sex workers in intervention cities. Randomized trials at the clinic level offer comparable findings in Pakistan (Shah and others 2007) and South Africa (Harrison and others 2007). A cluster randomized trial in rural Vietnam showed that educational programs with interactive training can increase STI-related knowledge and practices of health care providers such as pharmacists, doctors, and nurses (Lan and others 2014). Structural (or environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs, including HIV, seek to change the physical and social environmental) interventions to prevent STIs (and a social environmental) intervental (and a social env interventions. A government policy in Puerto Plata, the Dominican Republic, requiring condom use between sex workers and clients (with penalties for violations incurred by owners of sex establishments), combined with a 50 percent reduction in STI prevalence among female sex workers (Kerrigan and others 2006). This reduction was more substantial than that observed in Santo Domingo, the Dominican Republic, which received the community-solidarity intervention alone. Although an RCT or comparative effectiveness design, the Thai government's response to prevention of HIV in the late 1980s and early 1990s provides compelling evidence of the potential impact of structural interventions. The response to prevention of HIV in the late 1980s and early 1990s provides compelling evidence of the potential impact of structural interventions. condoms to commercial sex venues, the imposition of sanctions on commercial sex venues not adhering to the 100 percent, with notable reductions advertising campaign advising men to use condoms with commercial sex venues, the imposition of sanctions on commercial sex venues and others 1994). Within four years, condom use in commercial sex workers (Hanenberg and others 1994). Within four years, condom use in commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to use condoms with commercial sex venues at a mass advertising campaign advising men to usex venues at a ma in HIV incidence as well (Hanenberg and others 1994; Punpanich, Ungchusak, and Detels 2004). Charania and others (2011) concluded that structural interventions to increase the availability of condoms do increase the availability of condoms do increase the availability of condoms do increase that these interventions reduced HIV or STIs (Moreno and others (2014), the review by Charania and others (2014), the review by Moreno and others (2014), the review by Charania and others (2014), the review by Charania and others (2014), the review by Charania and others (2014). incidence). A cash transfer program was tested in a trial of never-married women ages 13-22 years in Zomba District of Malawi (Baird and others 2012). The provision of cash was intended to increase household income and sustain school enrollment in an attempt to offset two possible risk factors for HIV and HSV-2 incidence AIV and HSV-2 incidence AIV and HSV-2 incidence AIV and STIs: powerty and lack of education. The cash transfer program was shown to reduce HIV and HSV-2 incidence AIV and HSV-2 incidence indicating high effectiveness in a low-income setting (Baird and others 2012). Alcohol control policies (alcohol consumption to risky sexual behaviors. In HICs, alcohol control policies have been associated with substantial declines in alcohol-related health outcomes, such as motor vehicle fatalities and homicides (Cook and Durrance 2013). They have also been shown to reduce risky sexual behaviors and STI incidence and to improve sexual behaviors and increase in the state excise taxes on beer was associated with lower gonorrhea rates among males ages 15-24 years in the United States. Dee (2001) estimated that establishing a minimum legal drinking age of 21 years in the United States. Dee (2001) estimated that establishing a minimum legal drinking age of 21 years in the United States reduced childbearing by about 6 percent among black teenagers. The cost-effectiveness of STI prevention interventions depends in STIs other than establishing a minimum legal drinking age of 21 years in the United States reduced childbearing by about 6 percent among black teenagers. The cost-effectiveness of STI prevention interventions depends in STIs other than establishing a minimum legal drinking age of 21 years in the United States. HIV might influence the HIV epidemic. In general, the estimated cost-effectiveness of STI prevention interventions is much higher if the potential benefits of preventing STI-attributable HIV transmission or acquisition are included. Modeling exercises have suggested that syndromic management of STIs can have a substantial influence on HIV incidence in LMICs and be cost saving in many scenarios (White and others 2008). However, given the scientific debate regarding the effects on HIV of STI treatment and prevention, some experts have advised assessing the cost-effectiveness of STI prevention in its own right, without regard to the potential effects on HIV. A literature search was conducted to identify studies of the cost-effectiveness of STI prevention interventions. Search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases as those listed for the literature search was conducted through July 2014 using the same databases a bibliographies of articles obtained in the search. Costs and cost-effectiveness ratios have been updated to 2012 U.S. dollars. The cost-effectiveness of provention bibliographies of this volume (John-Stewart and others 2017). Table 10.3 summarizes selected studies of the cost-effectiveness of prevention interventions. Although several studies have examined the cost-effectiveness of behavioral interventions to prevent HIV in LMICs (McCoy, Kangwende, and Padian 2010; Townsend, Mathews, and Zembe 2013), the literature search yielded only one study of the cost-effectiveness of behavioral interventions to prevent attending to a contract of the cost-effectiveness of behavioral interventions to prevent attending to a contract of the cost-effectiveness of behavioral interventions to prevent attending to a contract of the cost-effectiveness of behavioral interventions to prevent attending to a contract of the cost-effectiveness of behavioral interventions to prevent attending to a contract of the cost-effectiveness of public schools in Colombia (Chong and others 2013). The intervention addressed topics such as sexual rights, contraception, condom use and STIs and HIV, empowerment, and violence prevention. The findings suggested a cost per STI averted of US\$95-US\$824, depending on assumptions about the duration of the intervention's effect (table 10.3). Adult male circumcision is a cost-effective and potentially cost-saving intervention for preventing heterosexual acquisition of HIV in men, according to a review of published studies (Uthman and others 2010). The cost-effectiveness of male circumcision. Although HPV vaccination is a relatively new intervention, a substantial body of research examines its cost-effectiveness in LMICs. Levin and others (2013) and Nature and others (2013) reviewed the cost-effectiveness of HPV vaccination in 72 countries eligible for support from Gavi, the Vaccine Alliance. Two key themes emerge from this literature. First, HPV vaccination of females (either alone or in combination with cervical cancer screening) can be highly cost-effective even in the poorest countries. Second, despite favorable cost-effectiveness, HPV vaccine available at less than US\$5 per dose to Gavi-eligible countries. Second, despite favorable cost-effective even in the poorest countries. Second, despite favorable cost-effectiveness, HPV vaccine available at less than US\$5 per dose to Gavi-eligible countries. Second, despite favorable cost-effectiveness, HPV vaccine available at less than US\$5 per dose to Gavi-eligible countries. modeling study suggested that a hypothetical microbicide with 55 percent efficacy in preventing male-to-female HIV transmission would be less cost-effective in LMICs with generalized epidemics, but it likely would be less cost-effective in LMICs with generalized epidemics. percent vaginal gel formulation of tenofovir, as reported in the CAPRISA trial (Karim and others 2010). Results indicate that the gel reduces HIV/AIDS acquisition. The literature search yielded no cost-effectiveness analyses of using microbicides strictly to prevent STIs other than HIV/AIDS. Sahin-Hodoglugil and others (2003) used a decision tree model to examine the cost-effectiveness of three protocols for diagnosing and treating gonorrhea and chlamydia in women in Sub-Saharan Africa: gold-standard care (use of the best available yet expensive diagnostic tests), syndromic management, and mass treatment. They found that the cost-effectiveness of each strategy varied by locale, depending on STI prevalence, program coverage, and health-seeking behavior. Syndromic management had two key advantages—low program costs and relative ease of implementation—which likely explains why it is often used in resource-poor settings. This finding is consistent with a systematic review of the costs of treating curable STIs in LMICs (Terris-Prestholt and others 2006), which found that syndromic management had lower costs than other management strategies. However, syndromic management had a lower estimated impact on the percentage of chlamydia and gonorrhea cases cured than the gold-standard or mass treategies to improve the quality of syndromic management of urethral discharge and genital ulcer disease in males and vaginal discharge and pelvic inflammatory disease in females was found to be cost saving from the societal perspective (Adams and others 2003). An intervention in Durban, South Africa, that provided syndromic management packets (including an information leaflet and appropriate antibiotics) to primary care clinics was found to cost US\$2.39 per additional patient appropriately managed for urethral discharge and lower abdominal pain in females (Colvin and others 2006). Vickerman, Ndowa, and Mayaud (2008) examined the cost-effectiveness of a modification in the 2003 WHO guidelines for syndromic management of genital ulcer disease that incorporated antiviral treatment for HSV-2 in certain situations, such as in populations with HSV-2 prevalence of 30 percent or more. Although the incorporation of HSV-2 treatment could increase program costs, it could potentially increase the proportion of herpetic ulcers treated while reducing the cost of HSV-2 therapy. Perhaps more important, the implementation of syndromic management for genital ulcers that includes treatment for chancroid, in accordance with the WHO guidelines (WHO 2003), has been credited with major reductions in or even elimination of chancroid is an important risk factor for HIV transmission, syndromic management to reduce its incidence may be exceptionally cost-effective (Makasa, Buve, and Sandøy 2012). The literature search vielded no cost-effectiveness analyses of partner management strategies for STIs. For example, Rutstein and others (2014) found that, in Sub-Saharan Africa, the incremental cost per HIV transmission averted was US\$3,014.93 for "contract" notification, in which there is an agreement that the provider will attempt to notify partners. Furthermore, partner notification, is regarded as an efficient approach to identifying HIV-positive individuals in need of therapy and also identifies HIV-negative partners who may benefit from PrEP.Borghi and others (2005) examined the cost-effectiveness of a voucher scheme implemented in Managua, Nicaragua, to increase STI services from a range of providers. The analysis focused on the cost of treating four STIs, and the incremental cost per STI cured by the voucher intervention was US\$140.17.Carrara and others (2005) examined the cost-effectiveness of providing STI clinical services and outreach to female sex workers and their male clients in Cambodia through nongovernmental organizations. The analysis focused on the management of genital discharge syndrome cured or improved was about US\$84.35 to US\$154.34 for men and US\$89.73 to US\$154.34 for men and US\$89.73 to US\$154.34 for women. Marseille and others (2001) examined the cost-effectiveness of an intervention to distribute female condoms was expected to avert 6 HIV infections, 33 gonorrhea infections, and 38 syphilis infections and to pay for itself in averted HIV and STI treatment costs. Increasing access to STI prevention services by establishing a dedicated clinic specifically for high-risk populations (female sex workers and long-distance truck drivers) found a cost per clinic visit of about US\$4.76, based on a monthly clinic cost of US\$2,233.02 and treatment of 475 clients per month (Lafort and others 2010). Expanding the hours of operation, widening the geographic coverage of the clinic, and targeting additional risk groups could reduce the cost per client served. Only one cost-effectiveness analysis of mass treatment offered relative advantages over gold-standard care and syndromic management in number and percentage of cases cured, but relative disadvantages in overall program costs and costs associated with overtreatment. The decision trees used in the analysis did not account for the potential for mass treatment to promote antimicrobial resistance or for the potential adverse effects on persons treated unnecessarily. Sweat and others (2006) examined the cost-effectiveness of environmental and structural intervention consisted of activities such as community mobilization, peer education, and distribution of educational intervention consisted of activities such as community mobilization, peer education of educational intervention consisted of activities such as community mobilization. follow government policies requiring condom use during sex work. Accordingly, the structural intervention alone. When the structural intervention alone. was included along with the environmental intervention, the estimated number of HIV infections averted more than doubled and the cost effectiveness ratios were sensitive to various assumptions, the inclusion of the structural intervention consistently resulted in more favorable cost-effectiveness ratios were sensitive to various assumptions, the inclusion of the structural intervention consistently resulted in more favorable cost-effectiveness ratios were sensitive to various assumptions, the inclusion of the cost-effectiveness ratio of the cost-effectiveness ratio of the structural intervention. of structural interventions to prevent STIs in LMICs are rare, but structural interventions could yield substantial and lasting impacts at relatively low cost. For example, in a review of HIV preventions to control and prevent STIs other than HIV in LMICs. The review focused primarily on studies of the cost-effectiveness of prevention programs (Chesson and Pinkerton 2000), particularly those targeted to high-risk populations. To the extent that prevention or control of STIs reduces the incidence of HIV, any effective STI intervention itself is not excessively costly and that its effect on HIV is not too small. Furthermore, STI-related intervention itself is not excessively costly and that the intervention itself is not excessively costly and that the intervention itself is not excessively costly and that its effect on HIV is not too small. HIV in people infected with both HIV and another STI. For example, Vickerman and others (2011) found that suppressive therapy for HSV-2 in women with HSV-2 and HIV could be a cost-effective public health intervention based on the benefits of reducing the progression of HIV and improving the retention of women in care, a potential benefit of HSV-2 in women with HSV-2 and HIV could be a cost-effective public health intervention based on the benefits of reducing the progression of HIV and improving the retention of women in care, a potential benefit of HSV-2 in women with HSV-2 in w variety of interventions targeting curable STIs might also reduce the risk of potentially fatal, incurable, and chronic STIs other than HIV such as sexually transmitted HPV, HBV, and HSV, the cost-effectiveness is generally not as sensitive to the inclusion of other STI-related benefits as the reverse. For example, circumcision is a highly cost-saving) intervention of HIV acquisition in men (Uthman and others 2010). Because it is cost-effective (and potentially cost-saving) intervention of HIV acquisition in men (Uthman and others 2010). Because it is cost-effective when considering HIV-related benefits alone, there is little need to include the potential benefits of prevention of HIV acquisition in men (Uthman and others 2010). other STIs is not the primary goal of circumcision. Given the scarcity of published studies on the cost-effectiveness has been analyzed extensively, as reviewed by Naturen and others (2013) and Levin and others (2015). Similar data exist for HBV vaccine in poorer settings because of the high cost of the vaccine and others 2012; Kane 2010). Nonetheless, Gavi's support for HPV vaccine is expected to increase access in LMICs and eventually reduce the disproportionate burden of HPV-associated cancers in these settings. Aral and others (2006) examined the association between two economic measured using gross national income inequality and STI burden—at the country level. For each country setting, income was measured using the Gini coefficient, which can range from 0 (complete equality) to 1 (inequality). The burden of STIs was negatively associated with income and positively associated with income inequality. Their analysis suggested that these two economic measures could explain almost half of the variation across countries in STI prevalence among low-risk groups). These findings are consistent with other analysis suggested that these two economic measures could explain almost half of the variation across countries in STI prevalence among low-risk groups). These findings are consistent with other analysis suggested that these two economic measures could explain almost half of the variation across countries in STI prevalence among low-risk groups). Gini coefficient to examine income inequality and gonorrhea incidence rates across 11 countries. Their analysis showed significant positive associated with racial disparities in structures in structures. Their analysis showed significant positive associated with racial disparities in STI burden. One possible explanation is that racial income disparity contributes to residential segregation by race, which has been identified as a social determinant of STI risk (Hogben and Leichliter, 2008; Owusu-Edusei, Chesson, Leichliter 2008; Owusu-Edusei, Chesson, STI prevention and control interventions, including therapeutic interventions such as drug treatment and therapeutic vaccines, and primary prevention interventions, and behavioral interventions, and behavioral interventions such as drug treatment and therapeutic vaccines, and primary prevention interventions such as prophylactic vaccines, and primary prevention interventions, and behavioral interventions, and behavioral interventions such as drug treatment and therapeutic vaccines, and primary prevention interventions such as prophylactic vaccines, and primary prevention interventions such as drug treatment and therapeutic vaccines, and primary preventions such as drug treatment and therapeutic vaccines, and primary preventions are constrained with the spread of drug-resistant strains of government and therapeutic vaccines, and primary preventions are constrained with the spread of drug-resistant strains of government and the spread sequelae and for allocating STI prevention resources efficiently to reduce this burdenDevelopment and evaluation of strategies to identify persons at highest risk for STIs, particularly inexpensive and practical rapid diagnostic tests for gonorrhea and chlamydiaDevelopment and evaluation of strategies to identify persons at highest risk for STIs, particularly inexpensive and practical rapid diagnostic tests for gonorrhea and chlamydiaDevelopment and evaluation of strategies to identify persons at highest risk for STIs, particularly inexpensive and practical rapid diagnostic tests for gonorrhea and chlamydiaDevelopment and evaluation of strategies to identify persons at highest risk for STIs and to offer prevention services to reduce their risk of acquisition and transmission, especially to highly stigmatized populations (MSM, transgender persons, and sex workers)Promotion of practical and cost-effective prevention strategies or systems into the public health infrastructureImplementation of studies in support of global elimination programs, such as for syphilis and possibly cervical cancerContinued research on the importance of social determinants of STIs, with the goal of reducing racial and geographic disparities in sexual health.STIs impose a considerable health and economic burden globally. Primary prevention and control of STIs in LMICs can be an efficient use of resources, although the impact and cost-effectiveness of interventions can vary substantially across settings. Furthermore, estimates of the cost-effectiveness of STI control in LMICs can be an efficient use of resources, although the impact and cost-effectiveness of settings. can be subject to considerable uncertainty and might not be generalizable across settings. The findings of this literature review should be considered in light of the limitations inherent in cost-effectiveness studies of STI control in LMICs, such as incomplete cost data and imprecise estimates of program impact. Behavioral interventions can often lead to reductions in the risk of acquiring STIs, at least in the short term. In contrast, interventions with long-lasting effects—such as adult male circumcision and HPV and HBV vaccination—can have a more pronounced impact on disease burden at the individual and population levels. Given the challenges of providing STI prevention and treatment services in LMICs, structural interventions are needed to make it easier and more realistic for people to choose safer behaviors. Unfortunately, establishing that a given intervention is effective and cost-effective and cost-effective is not enough to ensure its delivery. Screening for syphilis in pregnancy remains vastly underutilization of effective and cost-effective interventions highlights the need for more health services research and stronger health systems—not only to improve the delivery of STI prevention interventions in LMICs, but also to expand access to STI prevention services, especially among the most vulnerable populations

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