

among MSM. Oropharynx to oropharynx transmission through kissing is estimated to account for nearly three quarters of all incident cases (71.6% [64.4–80.5%]) of gonorrhoea in MSM. Substantially increasing annual oropharynx screening for gonorrhoea from the current 40% to 100% may only halve the prevalence of gonorrhoea in MSM. In contrast, the use of mouthwash with moderate efficacy (additional 1% clearance per daily use) would further reduce the corresponding prevalence rates to 3.1% (2.2%–4.4%), 3.8% (2.3%–4.9%) and 0.10% (0.06%–0.11%), and a high efficacy mouthwash (additional 1.5% clearance per daily use) may further halve the gonorrhoea prevalence. Without oropharynx to oropharynx transmission, we could not replicate current prevalence data.

**Conclusion** Our model suggests that kissing may play a key role in NG transmission among MSM. Focusing on STI screening alone is not sufficient to control the rising epidemic. Promotion of regular mouthwash may achieve near elimination of gonorrhoea in MSM.

#### 014.5 CONTINUOUS DECLINE OF HIV PREVALENCE AND INCIDENCE AMONG FEMALE SEX WORKERS IN BENIN OVER 22 YEARS OF TARGETED INTERVENTION, BUT RESURGENCE OF GONORRHOEA IN THE CONTEXT OF INADEQUATE TREATMENT POLICIES

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**Background** An HIV preventive intervention aimed at female sex workers (FSW) and involving structural interventions, condom promotion and care for sexually transmitted infections (STI) is ongoing in Benin since 1993 [antiretroviral treatment (ART) available since 2005]. No routine surveillance of *Neisseria gonorrhoeae* (NG) resistance is carried out in Benin and, despite evidence of emerging ciprofloxacin resistance in surrounding countries, this antibiotic remained the recommended treatment till 2015. We estimated time trends in HIV/STI prevalence among FSW from 1993 to 2015.

**Methods** 8 integrated biological and behavioural surveys were conducted among FSW using cluster sampling procedures. HIV antibodies were detected on serum or dried blood spots using standard assays. Cervical (1993–99) or self-administered vaginal swabs (2002–15) were tested for NG and *Chlamydia trachomatis* (CT) using nucleic acid amplification tests. Time trend analysis controlled for potential socio-demographic confounders using log-binomial regression. HIV incidence data were available from 4 FSW cohort studies (1997–2000, 2005–07, 2009–12 and 2014–16).

**Results** HIV prevalence declined from 53.3% in 1993 to 49.4% in 1996, 40.7% in 1999, 46.5% in 2002, 30.1% in 2005, 26.8% in 2008, 20.5% in 2012 and 15.8% in 2015 ( $p < 0.0001$ ). During the same period, condom use with all clients in the last month increased from 13.9% in 1993 to 77.1% ( $p < 0.0001$ ) in 2015 (93% at last sex with a client in 2015). HIV incidence declined steadily, from 9.6 per 100

person-years in the 1997–2000 period to 5.9 in the 2005–07 period, 1.4 in the 2009–12 period and 0.9 per 100 person-years in the 2014–16 period. Following a sharp decline during the 1993–2005 period, from 43.2% in 1993 to 30.7% in 1996, 23.7% in 1999, 20.4% in 2002 and 3.4% in 2005 ( $p < 0.0001$ ), NG increased progressively to 6.2% in 2008, 6.8% in 2012 and 8.4% in 2015 ( $p < 0.0001$ ). CT also declined from 9.4% to 5.4% (1993–2005), but then stabilised at 4%–6%.

**Conclusion** Our results suggest a significant impact of this intervention aimed at FSW in Benin, where HIV prevalence in the general population is stable at 1.1% since 2006, despite increased survival due to ART scale-up (current ART coverage >50%). However, NG has steadily increased in the last decade likely due to inadequate treatment policies. Setting up NG resistance surveillance is of paramount importance in African countries, most of them not currently having such programs on a regular basis.

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#### 014.6 SEXUAL TRANSMISSION OF FLAVIVIRUSES – A LIVING SYSTEMATIC REVIEW

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**Introduction** Flaviviruses, such as Zika virus (ZIKV), are primarily transmitted by infected arthropods. Evidence indicates that some of these viruses can be transmitted between persons through sexual intercourse. Sexual transmission of ZIKV is of special interest because of the risk of congenital abnormalities such as microcephaly. Several health agencies have produced guidelines on the prevention of sexual transmission of ZIKV, but there are many uncertainties. A systematic approach to assessment of the risk and epidemic potential of sexual transmission of flaviviruses is therefore crucial.

**Methods** We conducted a systematic review with questions derived from a conceptual framework of the key parameters that drive infection transmission. We searched multiple databases and websites for studies of any design and in any language. Because of the rapid increase in publications, we have developed the review as a living systematic review, allowing continual updating of the findings.

**Results** By January 10th 2017, we identified 28 unique reported cases of likely sexual transmission of ZIKV in 9 countries; 20 male to female, three female to male, one male to male, four unknown. In the US, 1% (36/4,310) of reported travel-associated ZIKV cases likely resulted from sexual contact. ZIKV has been detected by PCR for up to 188 days in semen and 14 days in vaginal secretions. Two of three included modelling studies quantified the contribution of the sexual transmission route, two studies estimated the