Kirby Institute

STIs: getting worse or better?

Basil Donovan

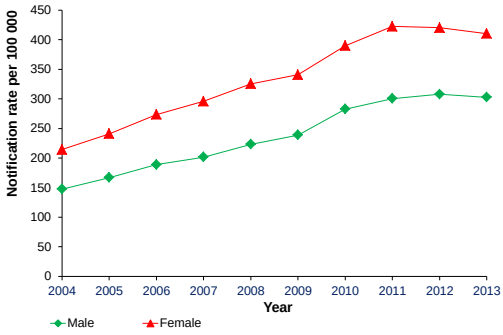
Today

- 1,000,000 new curable STIs every day
- Is the story all gloomy?
- Briefly discuss recent trends in STIs and their implications (though ~90% are in low- and middle-income countries)
- Disclosures: bioCSL and Australian Department of Health (research funding), Merck (speaker honoraria), NHMRC Fellowship.

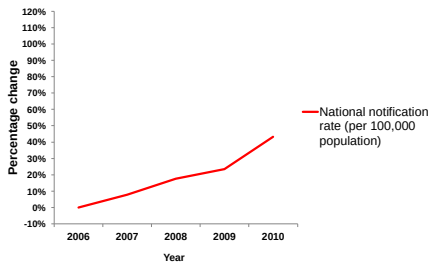
Curable (non-viral) STIs

- *Chlamydia trachomatis* (inc. LGV)
- *Neisseria gonorrhoeae*
- *Treponema pallidum* subsp. *pallidum* (syphilis)
- *Haemophilus ducreyi*
- *Calymmatobacterium (Klebsiella) granulomatis* (donovanosis)
- *Trichomonas vaginalis*
- *Phthirus pubis* (pubic lice)

Chlamydia notifications, Australia 2004 – 2013, by year and sex



Percentage change in notification rate, positivity rate in ACCESS, and Medicare testing rate in young people, 2006-2010



Ali H, et al. *Sex Transm Infect* 2012

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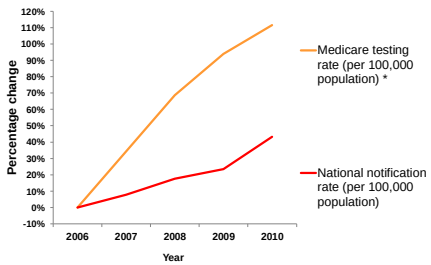

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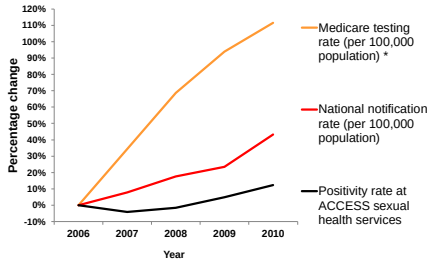
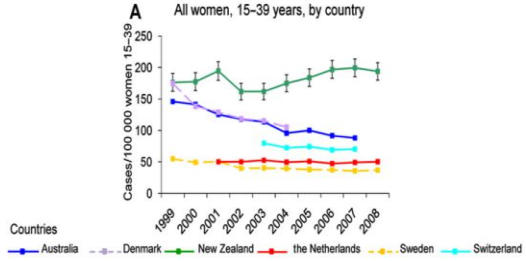


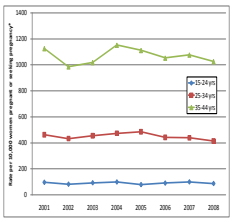
Ali H, et al. *Sex Transm Infect* 2012

Hospitalisations for PID: 6 countries, 1999-2008

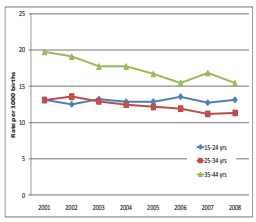


Bender N, et al. *Sex Transm Infect* 2011; 87: 601

Hospitalisations for PID-related sequelae by age group, NSW 2001-2008



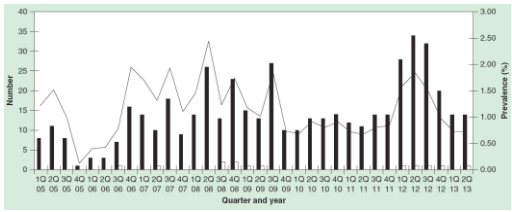
Infertility (female origin)



Ectopic pregnancy

Liu B, et al. *Sex Health* 2012; 9: 355

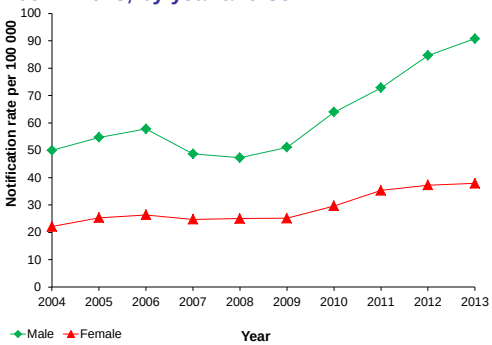
Lymphogranuloma venereum (LGV) cases at the Amsterdam STI clinic, 2005-2013



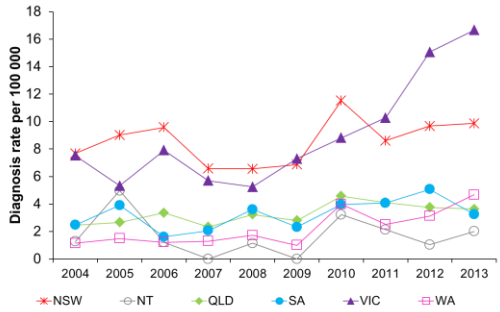
All *C trachomatis* L2b subtype
Strongly associated with HIV and HCV
Anorectal >> inguinal disease

Hesselina N, et al. *Expert Rev Anti Infect Ther* 2014; 12: 697

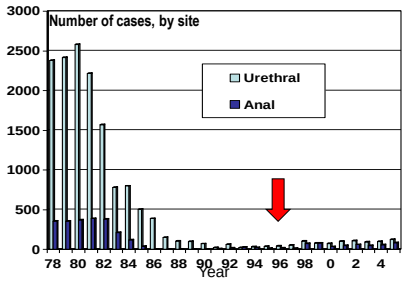
Gonorrhoea notifications, Australia 2004 – 2013, by year and sex



Gonococcal rectal infection among men, 2004 – 2013, by State/Territory and year

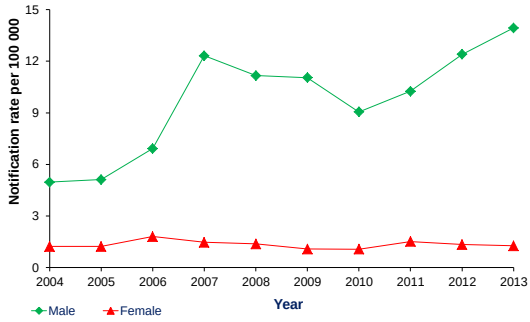


Gonorrhoea in men, Sydney Sexual Health Centre, 1978-2005

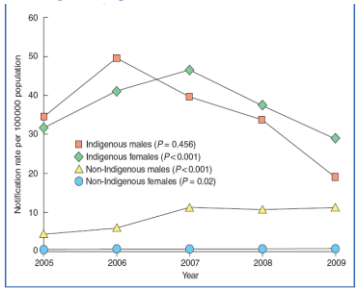


Unpublished

Infectious syphilis notifications, 2004 – 2013, by year and sex



Infectious syphilis notifications, Australia 2005-2009, by Indigenous status and sex



Ward JS, et al. *MJA* 2011

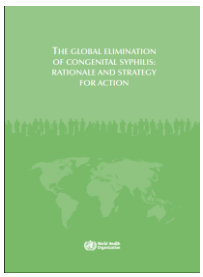
Pregnancy outcomes among women with untreated syphilis

Outcome	Proportion	Global burden (WHO 2008)
Stillbirth and foetal loss	25.6%	215,000
Neonatal death (first month)	12.3%	90,000
Clinical congenital syphilis	15.5%	150,000
Prematurity or low birth-rate	12.1%	65,000

Gomez GB, et al. *Bull WHO* 2013; 91:217

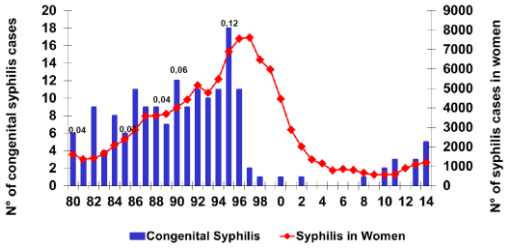
Global elimination of congenital syphilis

- Political commitment
- Increase access to antenatal care
- Screen and treat (ASAP)
- Surveillance and evaluation



WHO 2012

Congenital syphilis and syphilis in women, Cuba 1980-2014



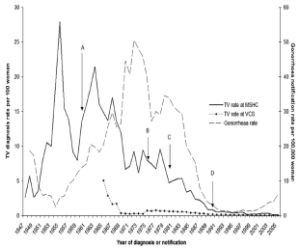
EDO Information System and Birth Information System 2015

Haemophilus ducreyi – a disappearing pathogen?

- 95% reduction in the incidence of chancroid in Thailand between 1987 and 1994
- Virtually disappeared in Nairobi by the late 1990s
- Now involved in <1% of genital ulcers in South Africa and Uganda, and none in Namibia and Paris.
- >99% decline in cases in the USA between 1990 and 2010 (n=24)

Lewis DA. *Expert Rev Anti Infect Ther* 2014; 12: 687

Trichomoniasis: Victoria 1947-2005 and SSHC 1992-2006



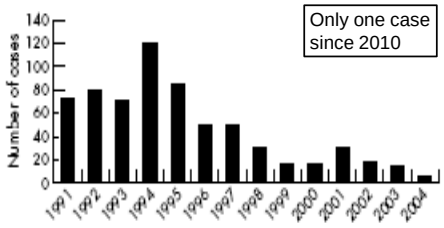
Marrone J, et al. *Sex Transm Dis* 2008

SSHC prevalence 0.4%

Risk factor	aOR
Vaginitis	6.47
No prior Pap	7.22
Other STI	3.65
Foreign partner	2.33
Sex work	0.45
IDU	7.27

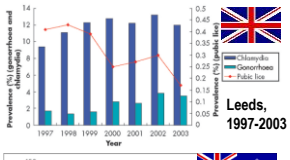
Uddin R, et al. *Sexual Health* 2011

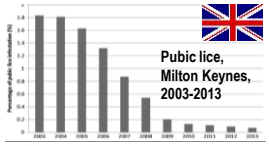
Donovanosis in Australia, 1991-2004

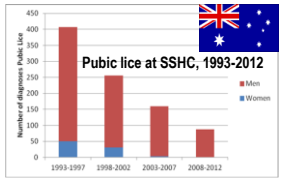


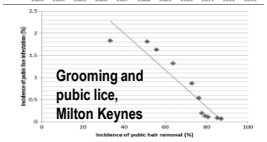
Bowden F. *Sex Transm Infect* 2005;81:365

Pubic lice and habitat loss







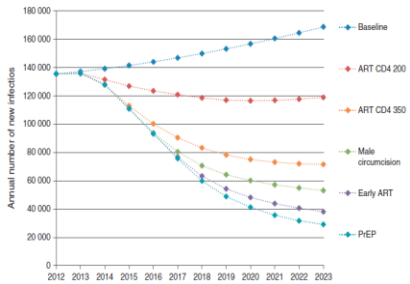


Armstrong NR, et al. *Sex Transm Infect* 2006
Dholakia S, et al. *Sex Transm Dis* 2014
Foster R et al, unpublished

Viral STIs

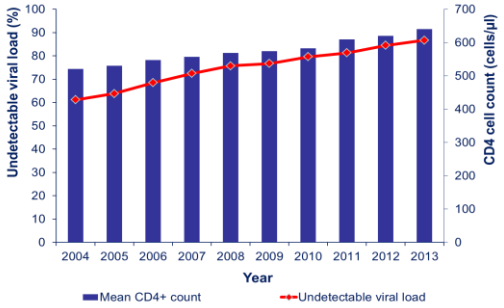
- Human immunodeficiency virus
- Hepatitis B virus
- Hepatitis A virus (gay men)
- Human papillomaviruses
- Herpes simplex viruses

The impact of combination prevention on the annual number of new HIV infections



Cremin I et al. *AIDS* 2013; 27: 447

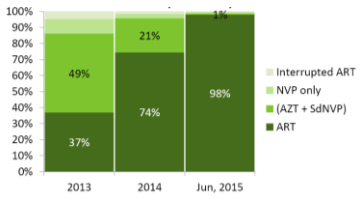
HIV viral load and CD4+ cell count among people enrolled on the Australian HIV Observational Database, 2004 – 2013, by year



1. Undetectable viral load equals 50 copies/ml or less

Kirby Annual Surveillance Report 2014

ART use in pregnant women with HIV, Kenya 2013-2015



Viral Load Suppression Rate (Nov 2013-June 2015)

Patient Category	<1000 cps/ml	Total	Viral Suppression Rate*
Adults	108,706	128,220	85%
Pregnant women	306	362	84%

MoH Kenya 2015

Prevention of mother-to-child transmission of HIV in Cuba, 2012-2014

- HIV serology testing in all three trimesters of pregnancy
- Screening of sexual partners
- Combined anti-retroviral therapy
- Cesarean delivery
- Preventive treatment to newborns

Impact indicator	2012	2013	2014
Mother-to-child transmission rate	1.85	1.74	2.0

The rate of mother- to -child HIV transmission has been equal to or lower than 2% in the last three years.

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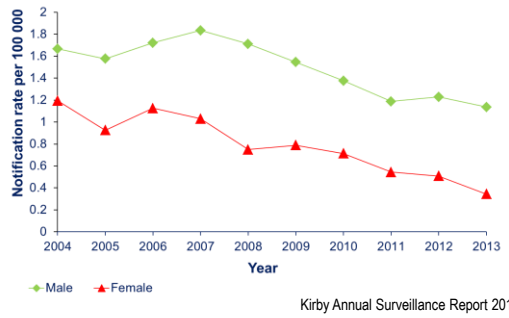
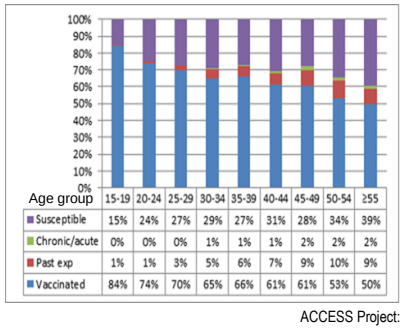
Newly acquired hepatitis B notifications, Australia 2004 – 2013, by year and sex



Kirby Annual Surveillance Report 2014

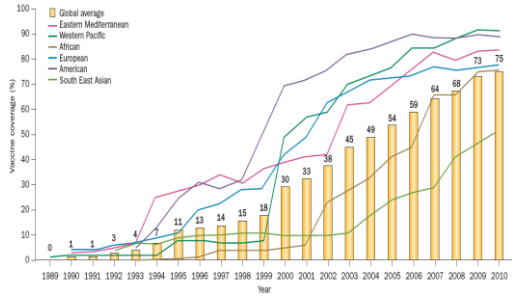
HBV status of Australian MSM at first visit to sexual health clinics by age group, 2014



Age group	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	≥55
Susceptible	15%	24%	27%	29%	27%	31%	28%	34%	39%
Chronic/acute	0%	0%	0%	1%	1%	1%	2%	2%	2%
Past exp	1%	1%	3%	5%	6%	7%	9%	10%	9%
Vaccinated	84%	74%	70%	65%	66%	61%	61%	53%	50%

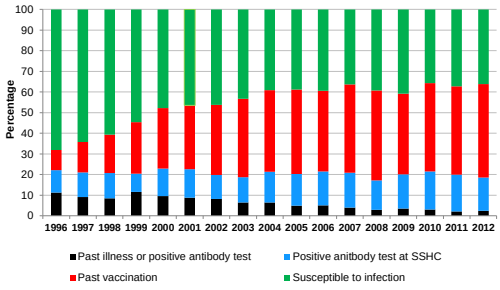
ACCESS Project: unpublished

Global and regional HBV vaccine coverage



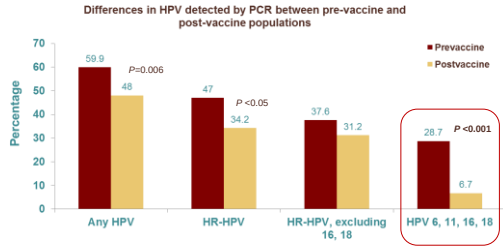
Thursz M, et al. *Nat Rev Gastroenterol Hepatol* 2012; 9: 492

HAV status of MSM at first visit to the Sydney Sexual Health Centre, 1996-2012



Ali H, et al. *Vaccine* 2015 (in press)

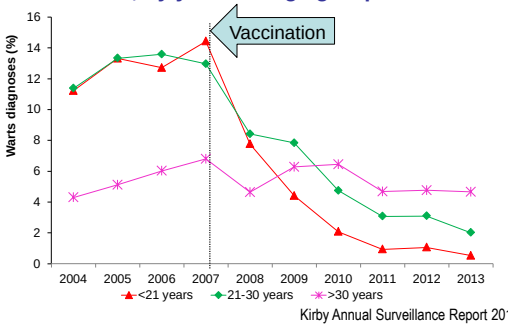
HPV prevalence in Australian females following a National Vaccination Program



High risk genotypes included HPV 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, or 68.

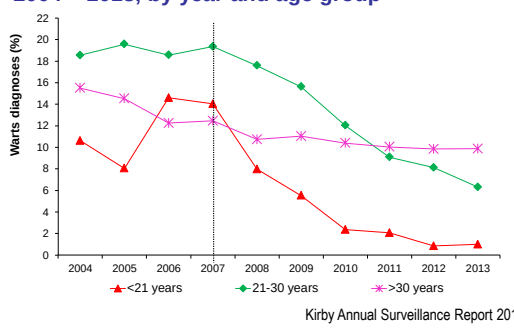
Tabrizi SN, et al. *J Infect Dis* 2012; 206: 1645

Proportion of Australian born women diagnosed with genital warts at first visit, 2004 – 2013, by year and age group



Kirby Annual Surveillance Report 2014

Proportion of Australian born heterosexual men diagnosed with genital warts at first visit, 2004 – 2013, by year and age group

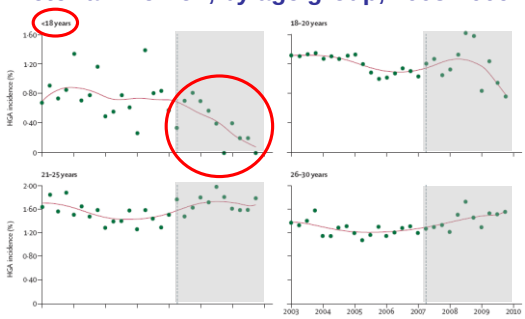


Kirby Annual Surveillance Report 2014

Early qHPV vaccine population impact on warts

	Australia	New Zealand	Denmark	Sweden	USA	Germany
Type of Program (start year)	School- and clinic-based (2007)	School- and clinic-bosed (2008)	Clinic-based (2008-2009)	Clinic-based (2006-2007)	Clinic-based (2006)	Clinic-based (2007)
Coverage (youngest females)	83%	52%	85%	32%	32%	40%
Decline in GW in youngest females	93%	63%	90%	41%	35%	47%
Decline in high-grade abnorm.	Y	-	Y	-	-	-
Decline in target HPV prevalence	67%	-	49%	-	56%	-
Herd protection for males	+++	++	Too early	±	+	-

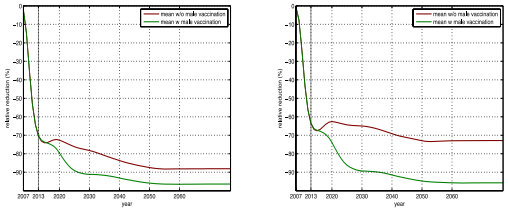
High grade cervical abnormalities in Victorian women, by age group, 2003-2009



Red lines = Lowess smoothing

Brotherton JML et al. *Lancet* 2011

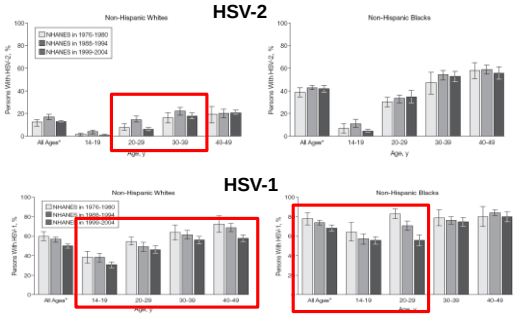
The predicted impact of giving boys the qHPV vaccine on genital warts in Australian heterosexuals



Females **Males**

Korostil I, et al. *Sex Transm Dis* 2013

Seroprevalence of HSV-2 and HSV-1 in USA, by ethnic and age group, 1976-2004



Xu F, et al. *JAMA* 2006; 296: 964

Summary

- The STI story is not entirely gloomy
- Large in-roads are possible with once common STIs, sometimes approaching elimination
- Ongoing problems in some marginalised problems in high-income countries
- Limited surveillance of aetiological diagnoses in low- and middle-income countries

When do we do well against STIs?

- Vaccines – HBV, HAV, and HPV
- Limited sub-clinical pool – chancroid, donovanosis, LGV (± gonorrhoea)
- Whole of population screening – trichomoniasis, mother-to-child transmission of syphilis and HIV
- Health services that are acceptable and affordable
- Political will, resources, and good program science