Sexually Transmitted Infections
Epidemiology

Controlling Sexually Transmitted and Reproductive Tract Infections Team
Department of Reproductive Health & Research
World Health Organization

Training Course in Sexual and Reproductive Health Research
Geneva 2012

Overview of presentation

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- STI epidemiology: populations, transmission, determinants: 7 – 14
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- WHO STI Library: 75 – 80

... and, since BC, the STIs epidemic

Sexually Transmitted Infections, STIs

There are about **30 STIs** or disease syndromes that result from STIs

STIs

Bacteria

- Gonorrhea (*Neisseria gonorrhoeae*)
- Chlamydia (*Chlamydia trachomatis*)
- Syphilis (*Treponema pallidum*)
- Chancroid (*Haemophilus ducreyi*)

Viruses

- Genital warts and cervical—mainly-cancer (human papillomavirus)
- Genital herpes (herpes simplex virus)
- Hepatitis B (hepatitis B virus)

Parasites

- Trichomoniasis (*Trichomonas vaginalis*)
- Pubic lice (*Phthirus pubis*)

Since the 80's: HIV, the new, devastating, STI

Rate of spread of STIs*

Ro = β □x c x D

β - mean probability of transmission per exposure

C - mean rate of sexual partner change within the population

D - mean duration of infectiousness of the newly infected persons

If **Ro** < 1, the infection eventually disappears from the population!

* May RM, Anderson RM., Transmission dynamics of HIV infection, Nature. 1987 Mar 12-18;326(6109):137-42.

Average duration of infection for *Chlamydia* and *Neisseria gonorrhoeae**

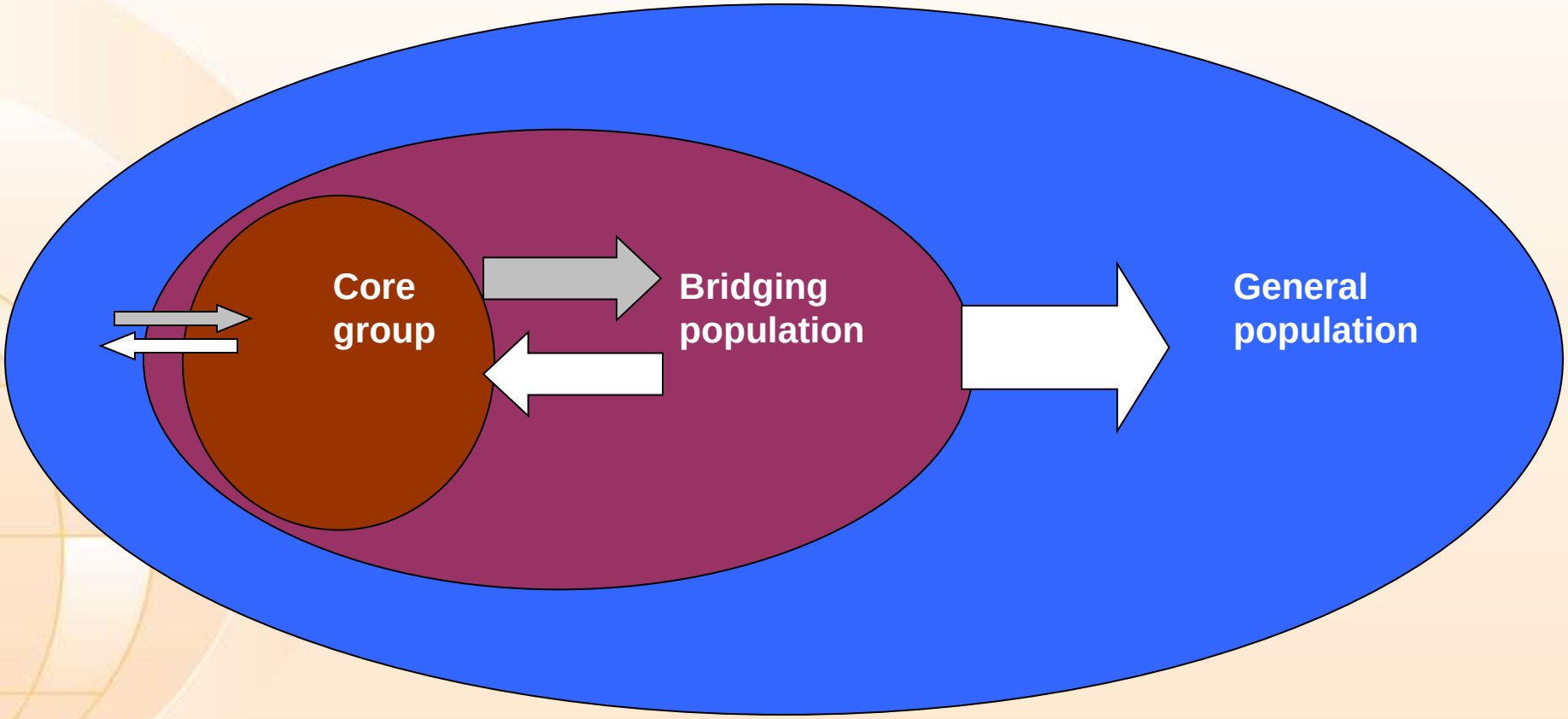
Infection	*Asymptomatic and not treated*		*Symptomatic and treated*	
	Male	***Female***	***Male***	***Female***
Chlamydia	1.25 years	1.25 years	4 weeks	8 weeks
Neisseria gonorrhoeae	5 months	6 months	2 weeks	4 weeks

Average duration of infection for individuals with Syphilis depending on stage in which they are treated*

Primary	1 month
Secondary	3 months
Latent	3 years
Tertiary	15 years

* World Health Organization. Prevalence and incidence of selected Sexually Transmitted Infections, *Chlamydia*, *Neisseria Gonorrhoeae*, Syphilis and *Trichomonas vaginalis:* Methods and Results used by WHO to generate 2005 estimates. WHO, Geneva 2010.

STI transmission dynamics at population level



Determinants of STIs epidemic*

Microenvironment	*Macroenvironment*
•Biological	•Cultural, Social and Economic
- gender	- poverty
- age	- gender inequality
- coexistance of other STIs	- health seeking behaviours
	- silent on sex issues
- pregnancy	- stigma and discrimination
•Immunological	•Epidemiological
	- STIs prevalence
•Behavioural	
- age at coital debut	•Demographic
- multiple sexual partners	- population age structure
- sexual practices:	- sex ratio
- anal sex	
- sex during menstruation	•Political and structural
- male circumcision	
- drug or alcohol use	

•**Chapter 4 : « Global Epidemiology of Sexually Transmitted Infections** »

! Some STIs increase the risk of HIV transmission

Studies on sexually transmitted infection as risk factor for HIV transmission*

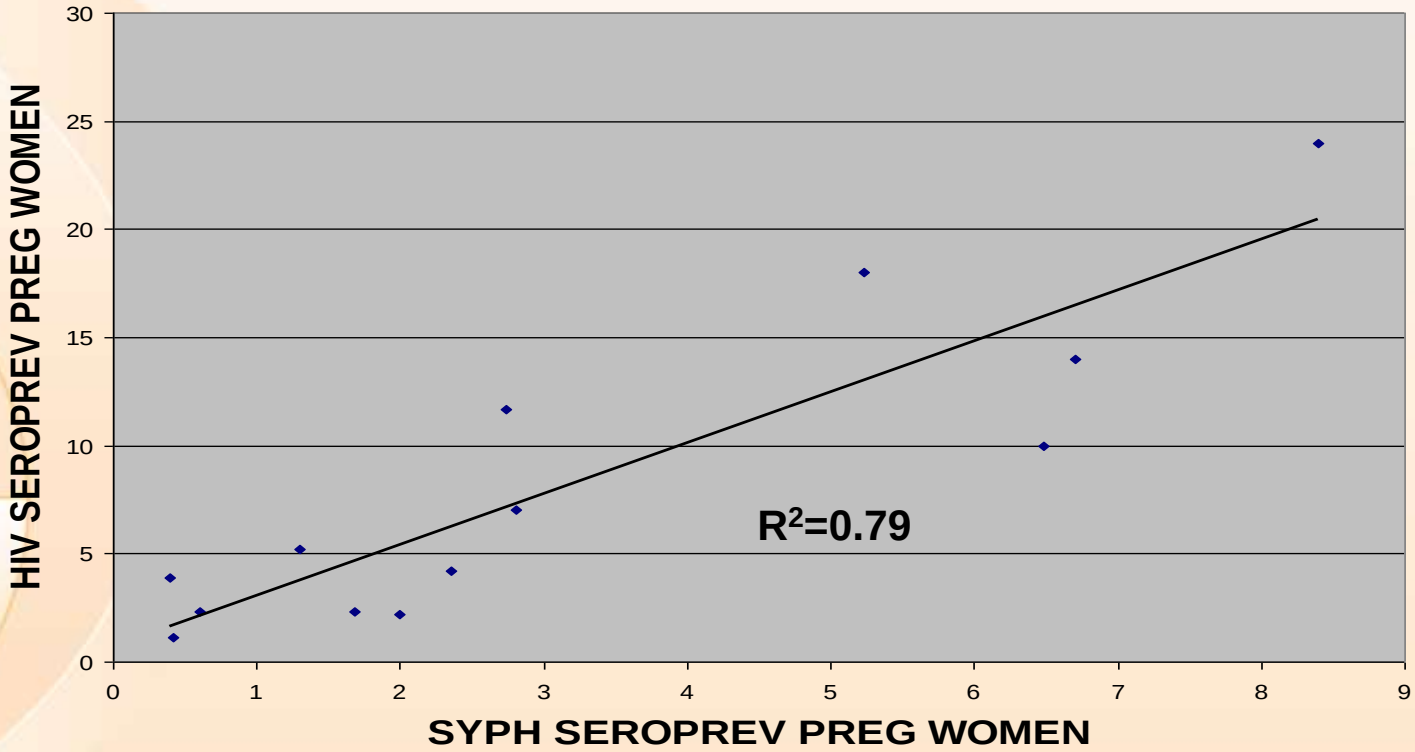
Reference	Study population	Sexually transmitted infection studied	Relative risk	Odds ratio
Plummer, 1991	Female sex workers, Kenya	Chlamydia		**3.6**
Laga, 1993	Female sex workers, Democratic Republic of the Congo	Chlamydia Gonorrhoea Trichomoniasis		**3.6** **4.8** **1.9**
Kassler, 1994	Heterosexual cohort, United States of America	Gonorrhoea		**2.5**
Craib, 1995	Cohort of MSM, Canada	Rectal gonorrhoea		**3.18**
Cameron, 1989	Heterosexual men, Kenya	Mainly chancroid	**4.7**	
Telzak, 1993	Heterosexual men, United States of America	GUD, chancroid	**3.0**	
Limpakarnjanarat, 1999	Female sex workers, Thailand	Syphilis GUD and herpes		**3.7** **2.0 – 2.4**
Mbizvo, 1996	Antenatal care women, Zimbabwe	GUD + PID		**5.8**
Bollinger, 1997	Sexually transmitted infection clinic attendees, India	GUD		**4.2**
Stamm, 1988	MCM, United States of America	Herpes, syphilis	**3.3 – 8.5**	
Holmberg, 1988	MCM, United States of America	Herpes	**4.4**	
Darrow, 1987	MCM, United States of America	Syphilis	**1.5 – 2.2**	

World Health Organization. Global Strategy for the prevention and control of sexually transmitted infections: 2006-2015. ISBN 9789241563475. Geneva 2007.

! Syphilis infection may increase the HIV viral load of co-infected patients, and may increase the risk of mother-to-child transmission of HIV*

* Victor Mwapasa et al, Maternal syphilis infection is associated with increased risk of mother-to-child transmission of HIV in Malawi, AIDS 2006, 20:1869-1877.

HIV–Syphilis seroconcordance in pregnant women* - African Region -



* Stoner BP, Schmid G, Guraiib M, Adam T, Broutet N, .Use of maternal syphilis seroprevalence data to estimate the global morbidity of congenital syphilis, oral presentation ISSTDR Congress 2005.

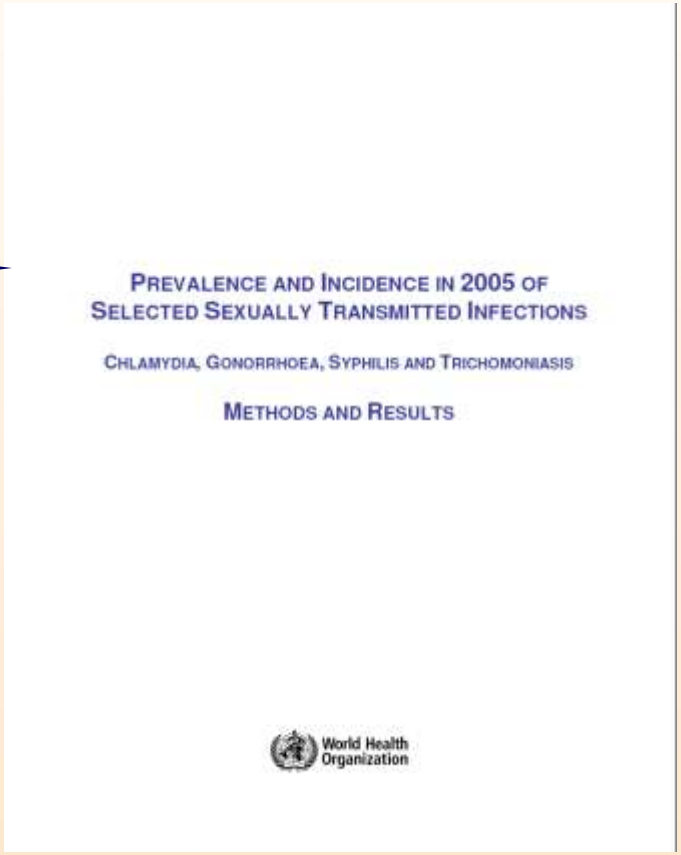
STI Global Burden

WHO approach to International STI "Surveillance"- Estimations

WHO did this in 1995, 1999 and 2005

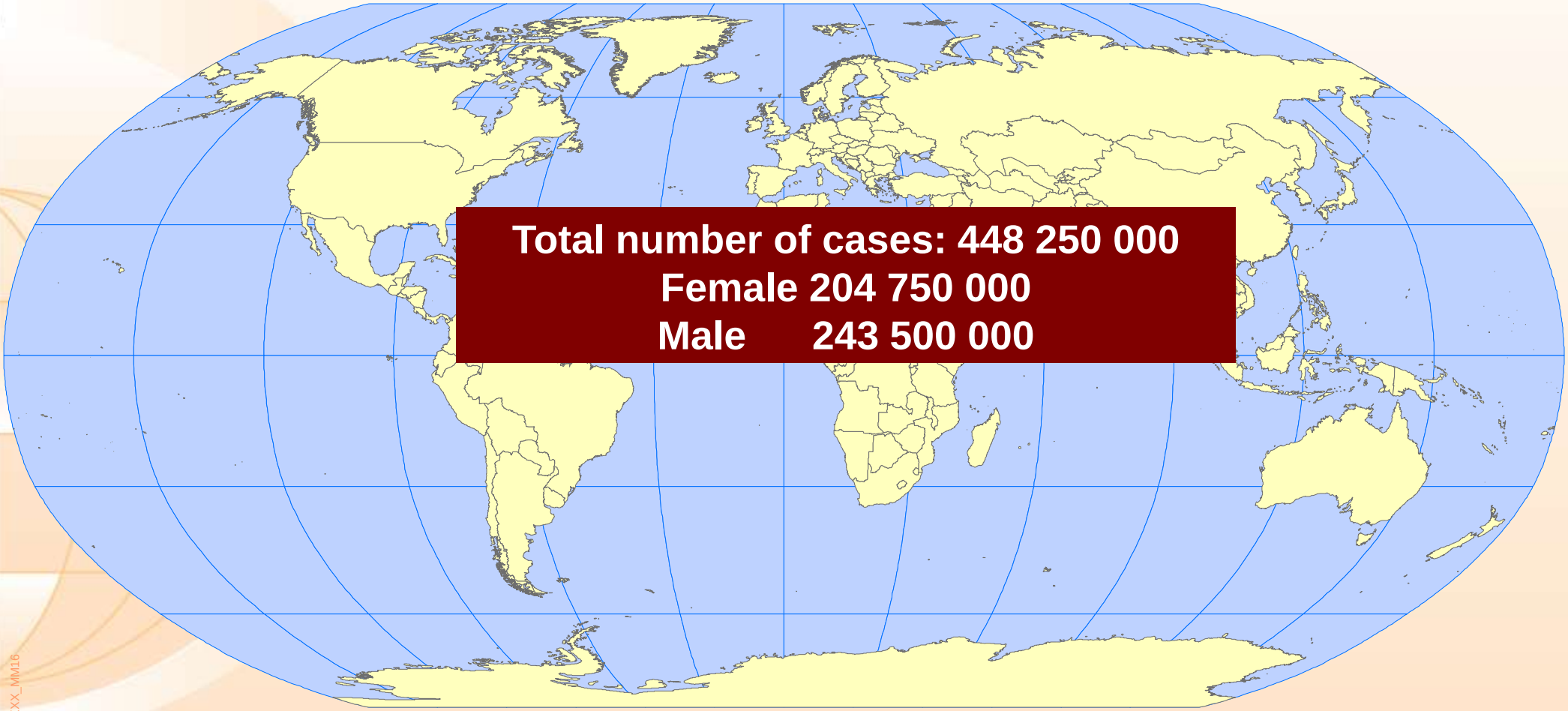
visit RHR at: http://www.who.int/reproductive-health/

visit WHO at: www.who.int



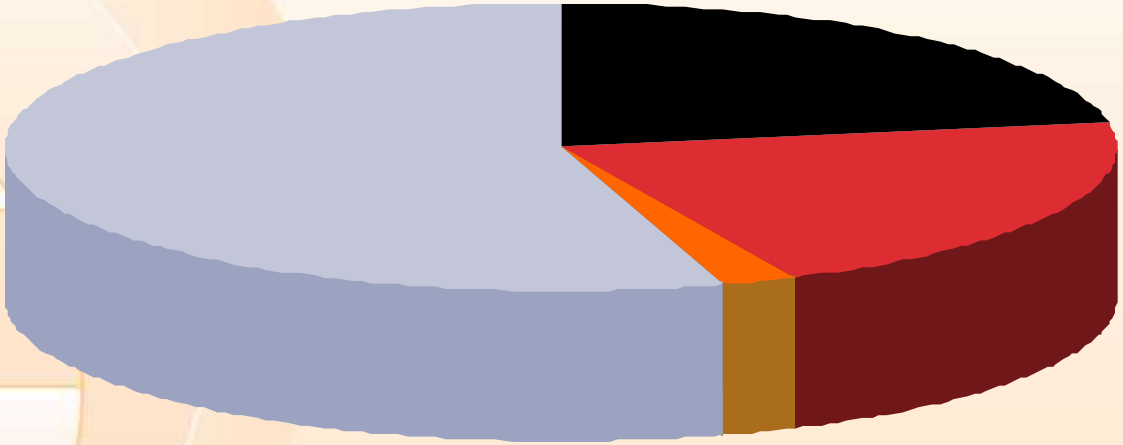
WHO is currently doing them for 2008!

Estimated new cases of curable STIs (WHO, 2005)



STI Global Burden, 2005

- Incidence per STI -



- Chlamydia **101 500 000**
- Gonorrhea **87 700 000**
- Syphilis **10 700 000**
- Trichomoniasis **250 500 000**

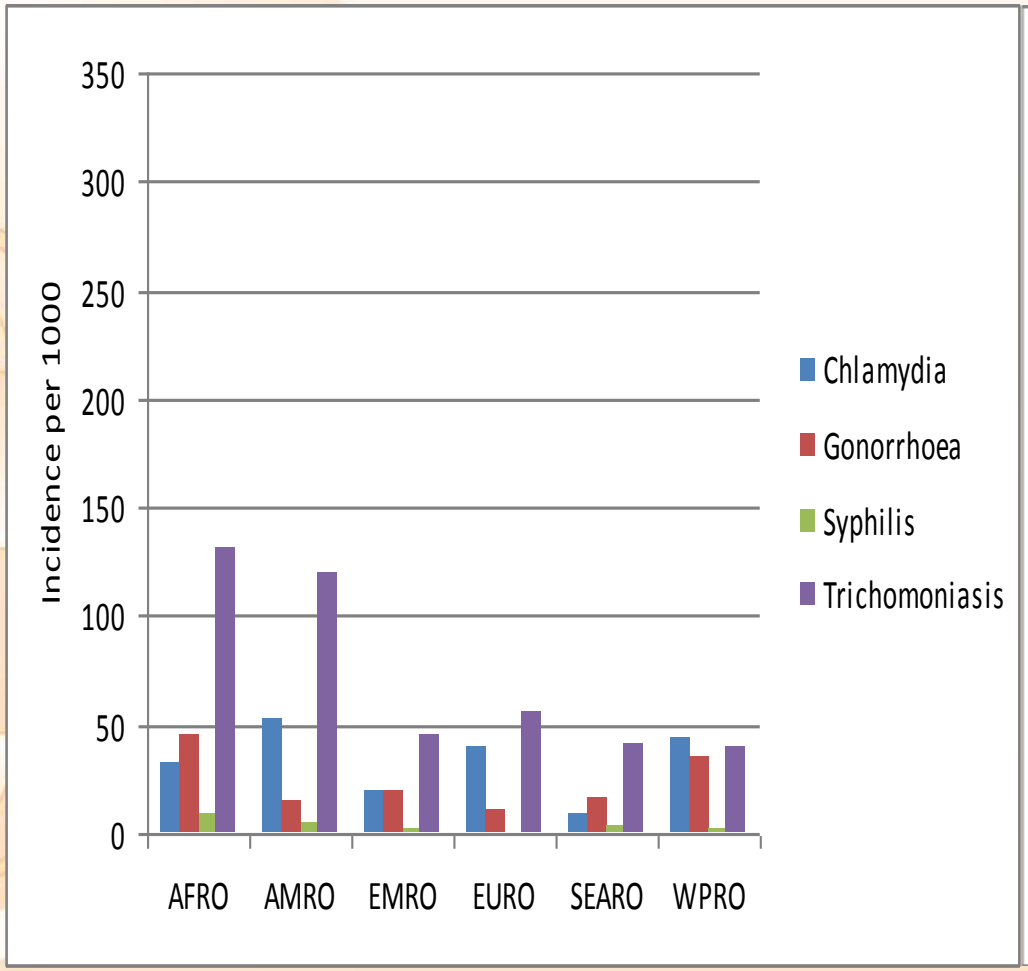
Estimated incidence of curable STIs by region, in million (WHO 2005)*

WHO Region	*Chlamydia*	*Neisseria gonorrhoeae*	*Syphilis*	*Trichomonas vaginalis*	*Total*
African Region	10.0	17.5	3.4	78.8	**109.70**
Region of the Americas	22.4	9.5	2.4	54.9	**89.20**
Eastern Mediterranean Region	5.7	6.5	0.6	12.60	**25.40**
European Region	15.2	4.6	0.3	24.50	**44.60**
South-East Asia Region	6.6	22.7	2.9	38.60	**70.80**
Western Pacific Region	41.6	26.9	1.1	39.10	**108.70**
TOTAL	**101.5**	**87.7**	**10.7**	**248.5**	**448.40**

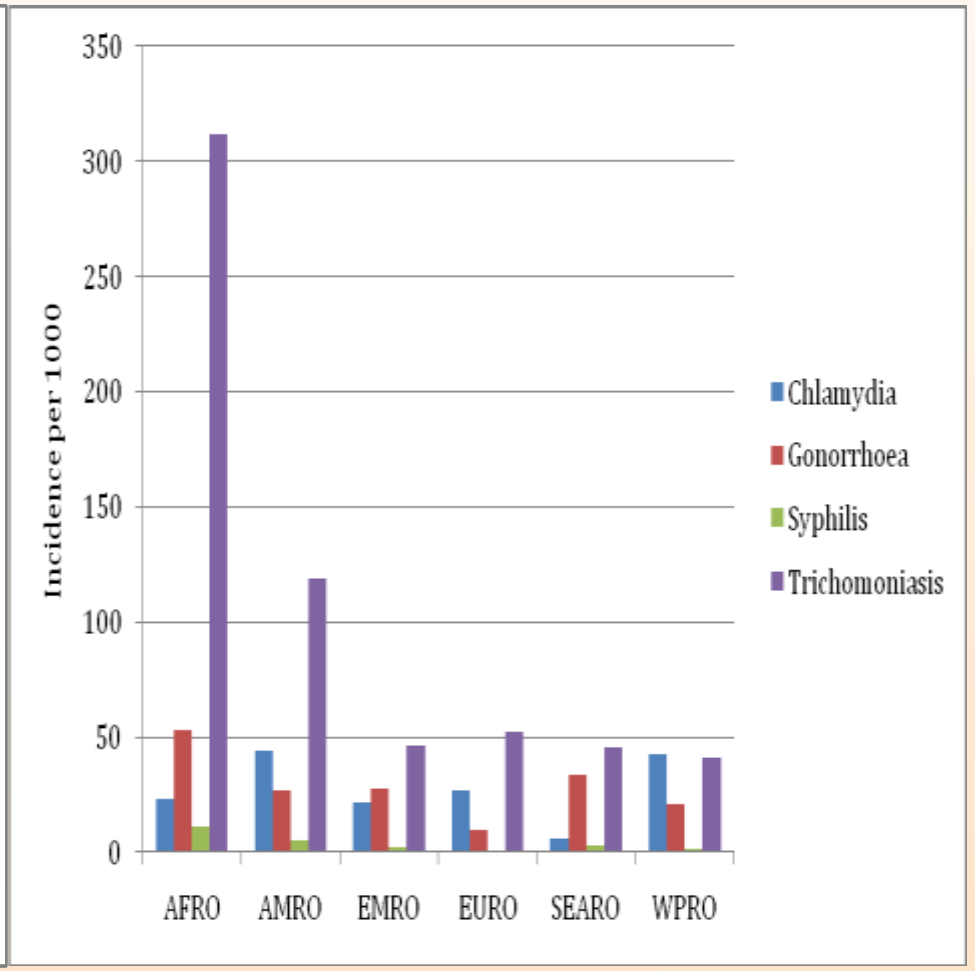
* World Health Organization. Prevalence and incidence of selected Sexually Transmitted Infections, *Chlamydia*, *Neisseria Gonorrhoeae*, Syphilis and *Trichomonas vaginalis:* Methods and Results used by WHO to generate 2005 estimates. WHO, Geneva 2010.

STI Global Burden, 2005
-Incidence per STI and region-

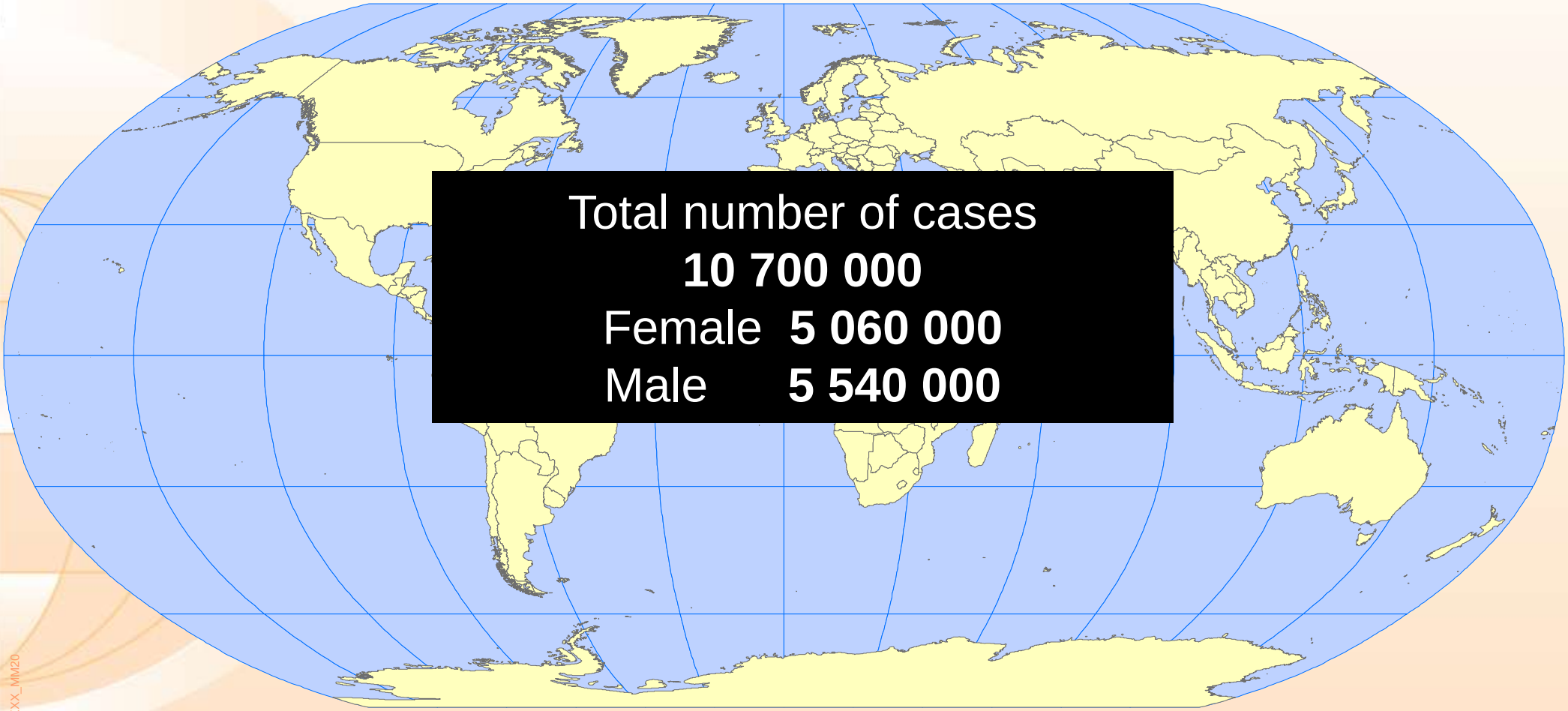
Females



Males



Estimated new cases of syphilis (WHO, 2005)



Estimated new cases of syphilis amongst adults

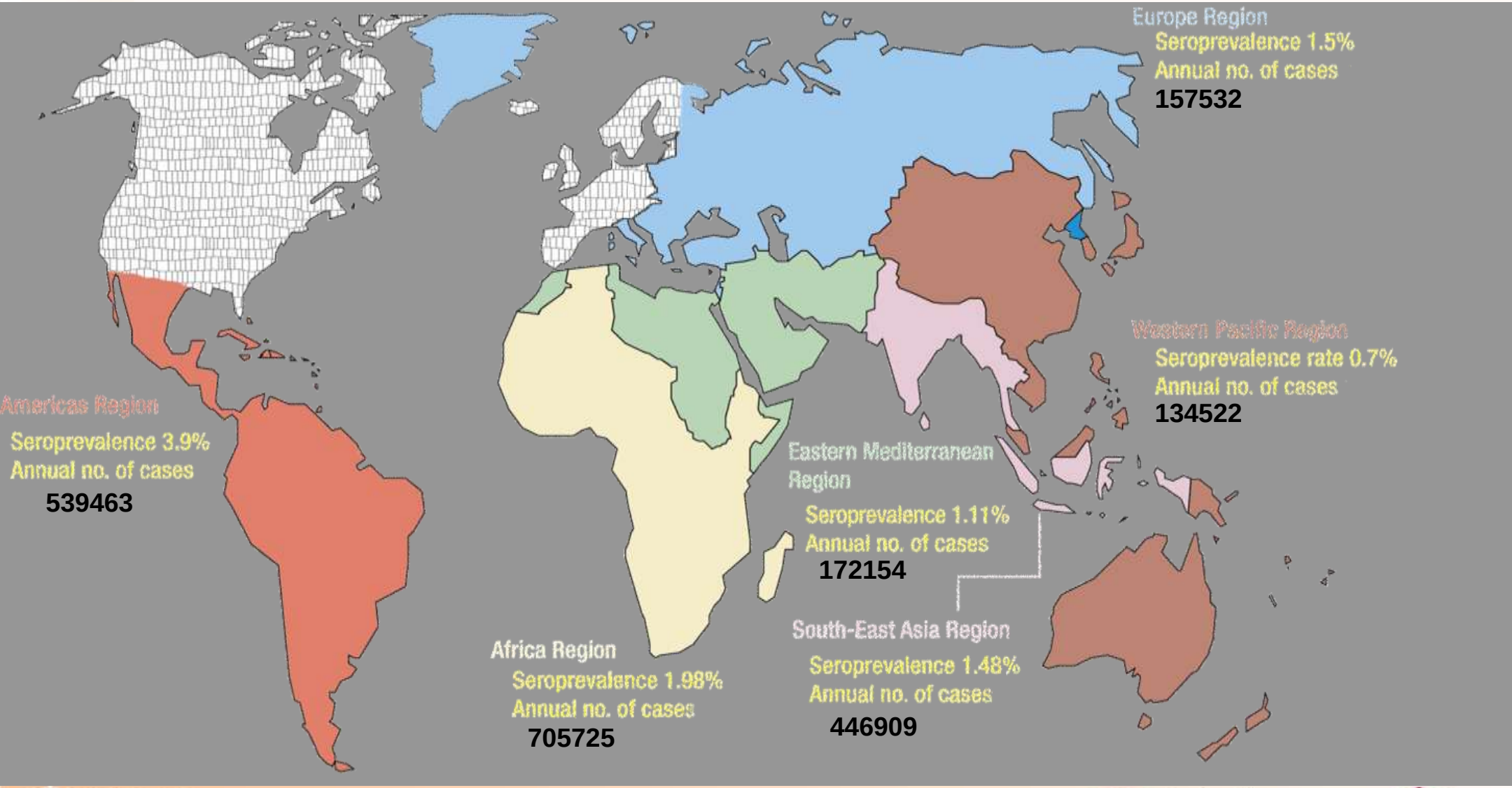
WHO Region	*Incidence per 1000*		*New cases (in millions)*		
	Females	*Males*	*Females*	*Males*	*Total*
African Region	8.34	10.82	1.49	1.92	**3.41**
Region of the Americas	5.06	5.33	1.16	1.23	**2.39**
Eastern Mediterranean Region	2.14	2.09	0.29	0.30	**0.59**
European Region	0.68	0.68	0.15	0.15	**0.30**
South-East Asia Region	3.33	3.02	1.45	1.40	**2.85**
Western Pacific Region	1.1	1.07	0.52	0.53	**1.05**
Global Total	**3.02**	**3.19**	**5.06**	**5.54**	**10.7**

* World Health Organization. Prevalence and incidence of selected Sexually Transmitted Infections, *Chlamydia*, *Neisseria Gonorrhoeae*, Syphilis and *Trichomonas vaginalis:* Methods and Results used by WHO to generate 2005 estimates. WHO, Geneva 2010.

! In pregnancy, untreated early syphilis will result in a stillbirth rate of 25% and be responsible for 14% of neonatal deaths – an overall perinatal mortality of about 40%.

World Health Organization. Global Strategy for the prevention and control of sexually transmitted infections: 2006-2015. ISBN 9789241563475. Geneva 2007.

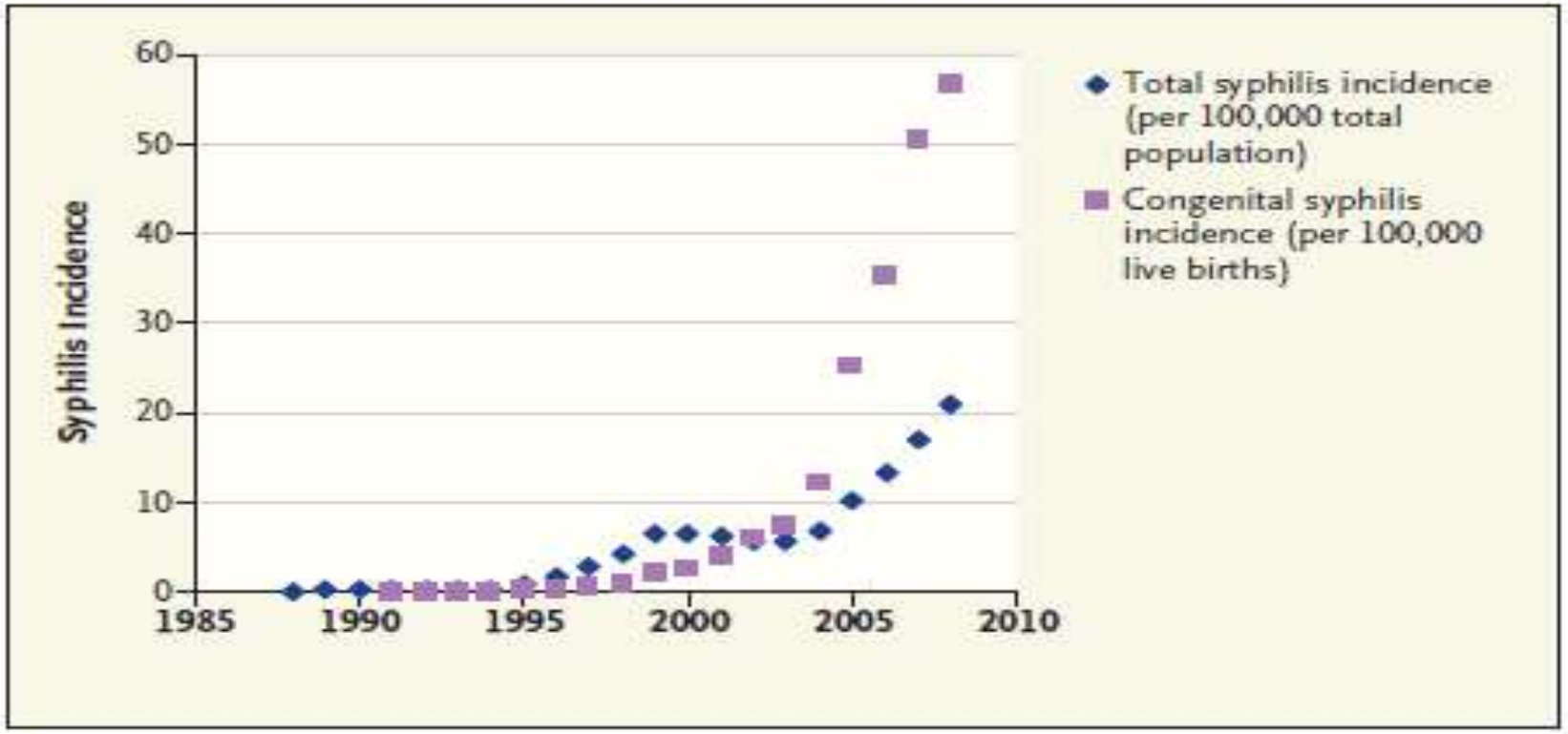
Regional Estimates of Maternal Syphilis Seroprevalence



Syphilis prevalence rates amongst pregnant women in Africa

Country	*Prevalence*	*Studied population*	*Reference*
Botswana	4,8	pregnant women attending ANC clinic	Romoren M, et al., 2007
Democratic Republic of Congo	0	pregnant women attending ANC clinic	Kinoshita-Moleka R, et al., 2008
Mozambique	4,7	pregnant women attending ANC clinic	Lujan et al, 2008
Nigeria	1,87	pregnant women attending ANC clinic for first visit	Federal Ministry of Health, Nigeria: 2005 National HIV/Syphillis seroprvalence sentinel survey among pregnant women attending ANC clinics. April 2006
Tanzania	1,6	women attending one of 6 ANC clinics, 15-49 y.o.	Yahya-Malima et al, 2008
Uganda	1,6	pregnant women attending booking visit at Entebbe district hospital, 15-40 y.o.	Tann CJ et al, 2006
Zambia	6,8	pregnant women attending ANC clinic, 14-44 y.o.	Zambia antenatal clinic sentinal surveillance report: 1994-2004. (2005)

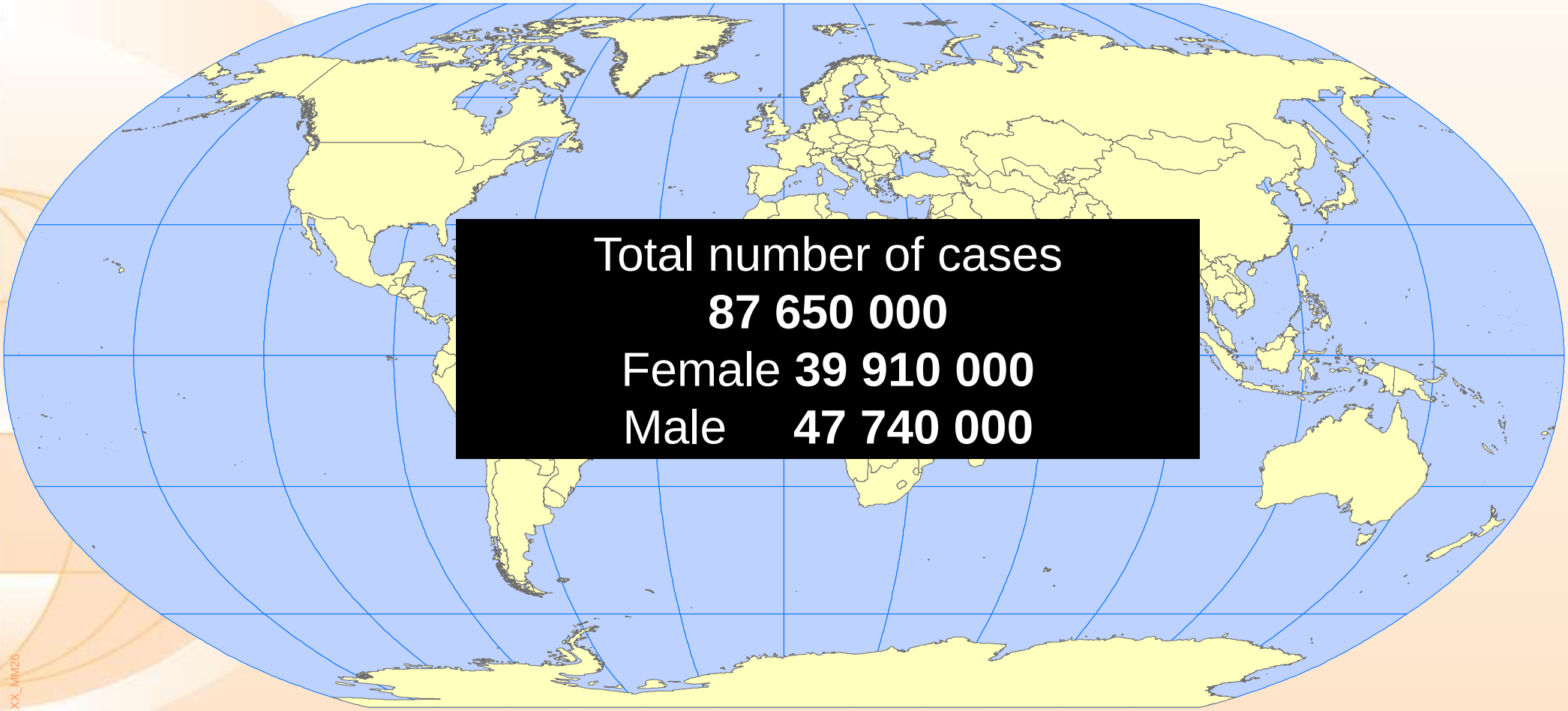
Reported Overall Incidence of Syphilis per 100,000 Population and Incidence of Congenital Syphilis per 100,000 Live Births in China*



Data are from the National Center for STD Control in Nanjing, China.

*Joseph D., et al, Syphilis and Social Upheaval in China, N Engl J Med 2010; 362:1658-1661

Estimated new cases of genital gonorrhoea (WHO, 2005)



Estimated new cases of gonorrhoea infections in adults, 2005*

WHO Region	*Incidence per 1000*		*New cases (in millions)*		
	Females	*Males*	*Females*	*Males*	*Total*
African Region	45.61	52.68	8.16	9.36	**17.52**
Region of the Americas	13.89	27.17	3.18	6.29	**9.47**
Eastern Mediterranean Region	19.14	27.32	2.57	3.91	**6.48**
European Region	10.71	9.72	2.42	2.22	**4.64**
South-East Asia Region	16.32	33.61	7.11	15.55	**22.66**
Western Pacific Region	35	20.94	16.47	10.41	**26.88**
Global Total	**23.8**	**27.47**	**39.91**	**47.74**	**87.65**

* World Health Organization. Prevalence and incidence of selected Sexually Transmitted Infections, *Chlamydia*, *Neisseria Gonorrhoeae*, Syphilis and *Trichomonas vaginalis:* Methods and Results used by WHO to generate 2005 estimates. WHO, Geneva 2010.

! Worldwide, up to 4 000 newborn babies

become blind every year because of eye infections attributable to untreated maternal gonococcal and chlamydial infections.

World Health Organization. Global Strategy for the prevention and control of sexually transmitted infections: 2006-2015. ISBN 9789241563475. Geneva 2007.

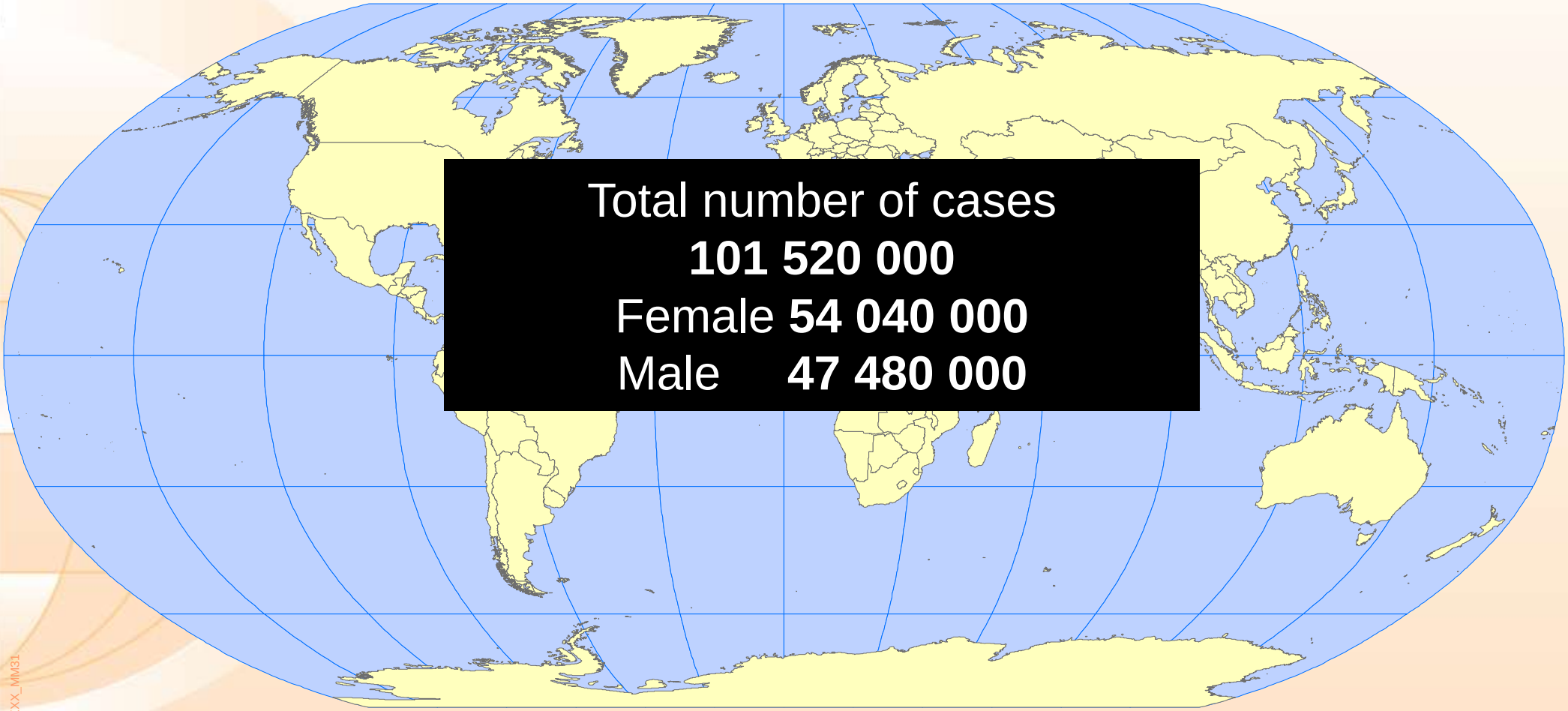
Neisseria gonorrhoeae prevalence studies among pregnant women

Country	*Prevalence*	*Studied population*	*Reference*
Botswana	3	pregnant women attending one of 13 ANC clinics	Romoren M, et al., 2007
China	0,8	pregnant women; 1st ANC visit	Chen XS et al, 2006
Democratic Republic of Congo	0,4	pregnant women attending ANC clinic	Kinoshita-Moleka R, et al., 2008
Fiji	1,7	ANC clinic attendees in Suva	Cliffe SJ et al, 2008
Ghana	0,6	pregnant women attending ANC at Korle Bu teaching hospital	Apea-Kubi et al, 2004
Kenya	1,2	pregnant women attending ANC clinic	Moses S et al, 2003
Lao	0,8	pregnant women (<20 weeks) at first visit to Sethiathirath or MCH hospital	Thammalangsy S et al, 2006
Mongolia	6,1	10 randomly selected ANC clinicals	Report from MOH Mongolia, 2007
Mozambique	2,5	pregnant women attending ANC clinic	Lujan et al, 2008
Nepal	2,3	Women who are 6 week postpartum with live birth residing in rural southeastern Nepal	Christian P et al, 2005
South Africa	8	pregnant women attending ANC clinic	Sturm PDJ et al, 2004
Tonga	2,5	ANC clinic attendees attending central hospital	Cliffe SJ et al, 2008
Zimbabwe	1,1	pregnant women attending ANC clinic	Mbizvo EM et al, 2001

Chlamydia prevalence studies among pregnant women

Country	*Prevalence*	*Population*	*Reference*
Botswana	8	13 ANC clinics	Romoren M, et al., 2007
Brazil	9,4	ANC clinic - diverse emo and socio economic backgrounds, 11-47 y.o.	Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Programa Nacional de DST e Aids. 2008
China	10,1	pregnant women; 1st ANC visit	Chen XS et al, 2006
Fiji	29	ANC clinic attendees in Suva	Cliffe SJ et al, 2008
Ghana	3	pregnant women attending ANC at Korle Bu teaching hospital	Apea-Kubi et al, 2004
Ireland	3,7	pregnant women - asymptomatic, 15 – 50 y.o.	McMillan et al, 2006
Japan	3,7	pregnant women, 14-46 y.o.	Shimano S et al, 2004
Lao	9,6	pregnant women (<20 weeks) at first visit to Sethiathirath or MCH hospital	Thammalangsy S et al, 2006
Mozambique	4,1	Pregnant women attending antenatal clinic	Lujan et al, 2008

Estimated new cases of genital *Chlamydia* infections (WHO, 2005)



Estimated new cases of genital *Chlamydia* infections (in million) among adults, 2005*

WHO Region	*Incidence per 1000*		*New cases (in millions)*		
	Females	*Males*	*Females*	*Males*	*Total*
African Region	32.79	23.39	5.86	4.16	**10.02**
Region of the Americas	53.04	44.32	12.15	10.26	**22.41**
Eastern Mediterranean Region	19.35	21.4	2.6	3.06	**5.66**
European Region	39.89	27.06	9.03	6.17	**15.20**
South-East Asia Region	9.2	5.63	4.01	2.6	**6.61**
Western Pacific Region	43.31	42.7	20.38	21.22	**41.60**
Global Total	**32.22**	**27.32**	**54.04**	**47.48**	**101.52**

* World Health Organization. Prevalence and incidence of selected Sexually Transmitted Infections, *Chlamydia*, *Neisseria Gonorrhoeae*, Syphilis and *Trichomonas vaginalis:* Methods and Results used by WHO to generate 2005 estimates. WHO, Geneva 2010.

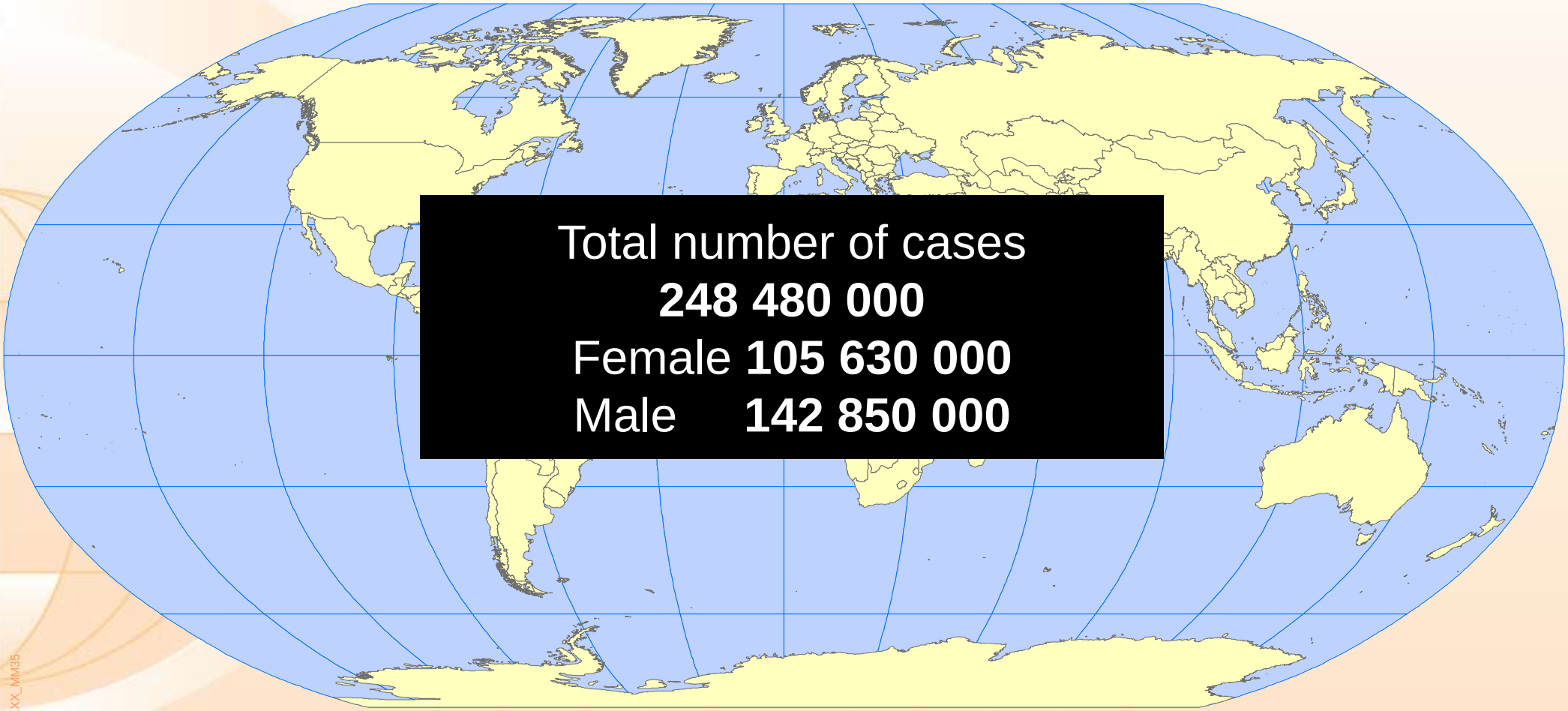
! Untreated gonococcal and chlamydial infections in women will result in pelvic inflammatory disease in up to 40% of cases. One in four of these will result in infertility.

World Health Organization. Global Strategy for the prevention and control of sexually transmitted infections: 2006-2015. ISBN 9789241563475. Geneva 2007.

Chlamydia prevalence studies in different populations

Country	*Prevalence*	*Studied population*	*Reference*
France	1,6 female 1,4 male	General population, 18 – 44 y.o.	ANRS. INED. INSERM. Quoted in ECDC Technical Report: Review of Clamydia Control Activities in EU Countries. May 2008
Japan	6,8 female	students from nine schools (5 universities and 4 professional schools) located in the suburbs of Miyazaki City included students sexually active and not, 18-35 y.o.	Imai H et al, 2004
Korea	5 male	sexually and not sexually active university students, 18-25 y.o.	Lee SJ et al. 2005
Luxembourg	2,3 female 0,9 male	High school students, under 25 y.o.	ECDC. 2008. Techincal Review of Chlamydia Activities in EU Countries
Netherlands	2,5 female 1,5 male	General population, 15 – 29 y.o.	Van Bergen J et al, 2005
New Zealand	2,7 female	university students, 18-25 y.o.	Baker M et al, 2005
Norway	6,7 female 5,8 male	General population, 18 – 25 y.o.	Steen et al, 2008 Referenced in ECDC
Sweden	4,6 female 6 male	General population, 15 - 35 + y.o.	Novak DP & Karlsson RB, 2006
Thailand	7,5 female 6 male	students at 2 vocational colleges, 15- 21 y.o.	Whitehead et al, 2008

Estimated new cases of trichomoniasis (WHO, 2005)



Estimated new cases of trichomoniasis among adults in 2005*

WHO Region	*Incidence per 1000*		*New cases (in millions)*		
	Females	*Males*	*Females*	*Males*	*Total*
African Region	130.74	311.83	23.38	55.43	**78.81**
Region of the Americas	119.55	118.83	27.4	27.51	**54.91**
Eastern Mediterranean Region	44.76	46.23	6.01	6.62	**12.63**
European Region	55.6	52.01	12.59	11.87	**24.46**
South-East Asia Region	40.3	45.53	17.56	21.06	**38.62**
Western Pacific Region	39.73	41	18.7	20.37	**39.07**
Global Total	**62.98**	**82.21**	**105.63**	**142.85**	**248.48**

* World Health Organization. Prevalence and incidence of selected Sexually Transmitted Infections, *Chlamydia*, *Neisseria Gonorrhoeae*, Syphilis and *Trichomonas vaginalis:* Methods and Results used by WHO to generate 2005 estimates. WHO, Geneva 2010.

! Trichomoniasis in the era of new generation diagnostics (LCR and PCR).

Are we underestimating the risk?

World Health Organization. Global Strategy for the prevention and control of sexually transmitted infections: 2006-2015. ISBN 9789241563475. Geneva 2007.

Trichomoniasis prevalence studies amongst pregnant women

Country	*Prevalence*	*Studied population*	*Reference*
Australia	7,2	cohort of women attending aboriginal and islander health services in Townsville (provincial urban centre)	Panaretto KS et al, 2006
China	3,2	pregnant women; 1st ANC visit	Chen XS et al, 2006
Lao	1,8	pregnant women (<20 weeks) at first visit to Sethiathirath or MCH hospital, Population	Thammalangsy S et al, 2006
Mongolia	6,7	10 randomly selected ANC clinics	Report from MOH Mongolia, 2007
Samoa	20,8	pregnant women; out of the women living in villages outside of Apia on the main island of Upolu (28, 68.2%), with the remainder living in Apia (132, 31.4%).	Sullivan EA et al, 2004

! Herpes Simplex Virus Type II is responsible for over two-thirds of all episodes of genital herpes and more than 5% of recurrent cases.

Corey L, et al. Genital herpes simplex virus infections: current concepts in diagnosis, therapy, and prevention. Ann Intern Med 1983; 98: 958-972.

Regional estimates of the prevalence of the herpes simplex virus type 2 infection among males and females, in 2003*

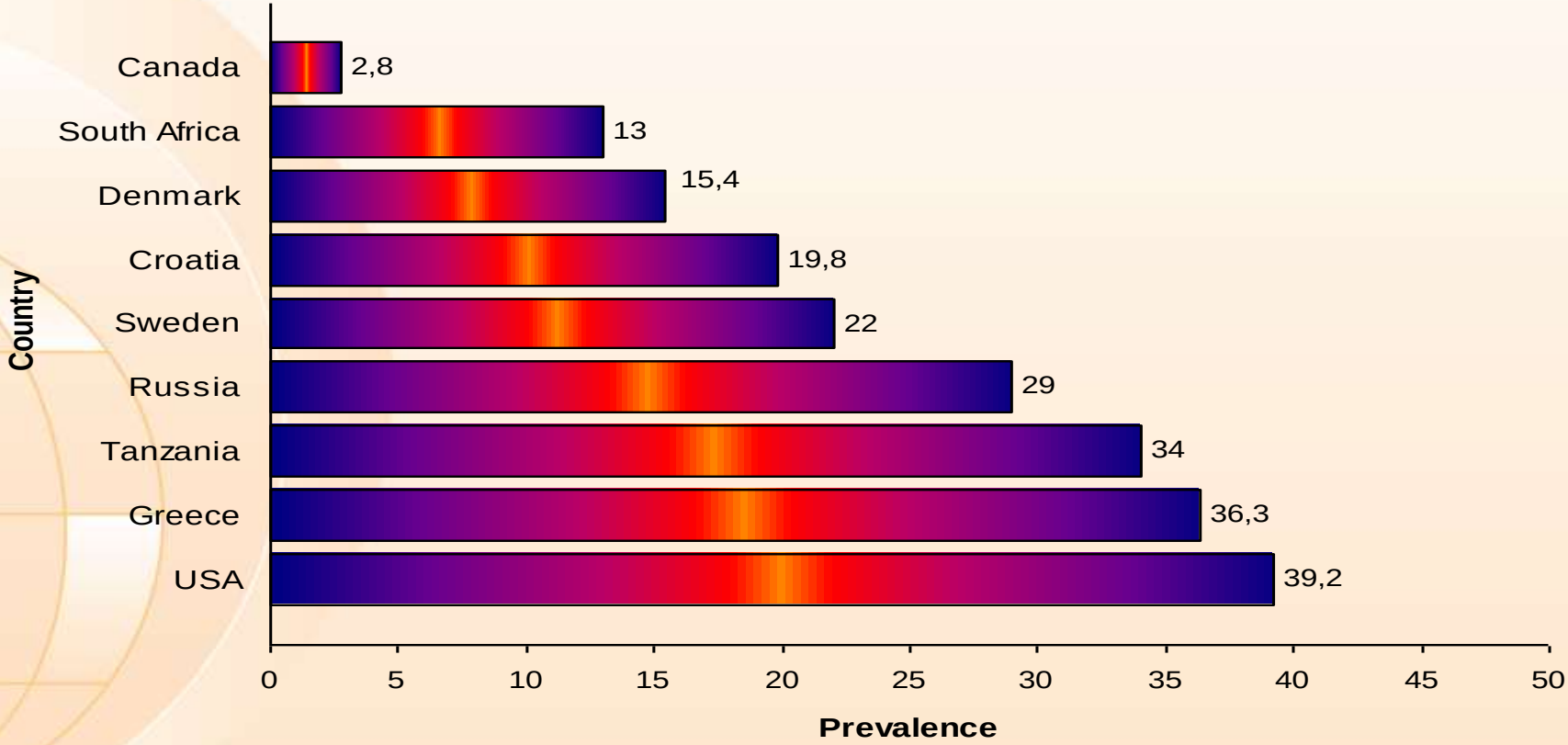
Region	Regional prevalence in millions, by age															
	Female								Male							
	15-19 y.o	20-24 y.o	25-29 y.o	30-34 y.o	35-39 y.o	40-44 y.o	45-49 y.o	Total	15-19 y.o	20-24 y.o	25-29 y.o	30-34 y.o	35-39 y.o	40-44 y.o	45-49 y.o	Total
North America	0.9	1.5	2.0	2.6	3.2	3.8	3.9	**17.9**	0.6	1.0	1.4	1.7	2.2	2.5	2.6	**11.9**
Latin America and the Caribbean	2.6	4.5	5.8	6.4	6.7	6.6	6.0	**38.6**	0.9	1.6	2.1	2.4	2.7	2.8	2.7	**15.1**
North Africa and the Middle East	1.0	1.5	1.6	1.5	1.4	1.3	1.1	**9.6**	1.4	1.6	1.5	1.3	1.1	0.9	0.8	**8.6**
Sub-Saharan Africa	9.0	13.1	13.6	12.5	11.2	10.0	8.8	**78.2**	4.1	6.5	7.5	7.5	7.1	6.7	6.2	**45.5**
Western Europe	0.7	1.3	1.8	2.2	2.6	2.6	2.5	**13.7**	0.2	0.5	0.7	1.1	1.4	1.6	1.7	**7.2**
Eastern Europe and central Asia	2.7	3.9	4.3	4.3	4.3	4.7	4.7	**28.9**	0.6	1.1	1.5	1.8	2.1	2.6	2.8	**12.3**
Eastern Asia	2.6	4.4	7.1	11.1	12.8	11.9	12.0	**61.8**	2.0	3.4	5.4	8.4	9.8	9.3	9.5	**47.8**
Japan	0.4	0.6	0.7	0.7	0.6	0.6	0.6	**4.1**	0.02	0.05	0.08	0.1	0.1	0.1	0.2	**0.7**
Pacific	0.03	0.04	0.05	0.06	0.06	0.06	0.05	**0.3**	0.05	0.08	0.09	0.09	0.09	0.08	0.06	**0.5**
South Asia	4.1	5.4	5.5	5.4	4.9	4.3	3.7	**33.2**	1.8	3.1	4.0	4.8	5.2	5.4	5.2	**29.4**
South-east Asia	1.7	3.1	4.0	4.6	4.9	4.8	4.4	**27.6**	3.1	5.2	6..3	6..9	7.0	6.6	6.0	**41.2**
Australia and New Zealand	0.03	0.06	0.09	0.1	0.2	0.2	0.2	**0.9**	0.02	0.03	0.05	0.06	0.08	0.1	0.1	**0.4**
Total	**25.8**	**39.4**	**46.5**	**51.5**	**52.9**	**50.8**	**47.9**	**314.8**	**14.6**	**24.1**	**30.5**	**36.1**	**38.8**	**38.8**	**37.8**	**220.7**

*Looker KJ, et al. An estimate of the global prevalence and incidence of herpes simplex virus type 2 infection. Bull World Health Organ. 2008 Oct;86(10):805-12, A.

! New vaccines against human papilloma virus infection could stop the untimely death of approximately 240 000 women from cervical cancer every year in resource-poor settings.

World Health Organization. Global Strategy for the prevention and control of sexually transmitted infections: 2006-2015. ISBN 9789241563475. Geneva 2007.

Human papilloma virus, prevalence studies among female population, 1995-2001*



*** Sexually Transmitted Infections**. Ivonne Camaroni, Antonio Gerbase. **Chapter 4 « Global Epidemiology of Sexually Transmitted Infections** », PP 27-43.

! Risk of contracting gonorrhoea, syphilis and HPV is higher among uncircumcised men than among circumcised ones.

Circumcision reduces the prevalence and incidence of Multiple High-Risk Papillomavirus infections in HIV-positive Men (Uganda, 2007)

Incidence of Single and Multiple HR-HPV infections over 24 Months, by Study Arm*

New HR-HPV Infections	No.(%) of samples with infection, by study arm		IRR, intervention vs control (95% CI)
	Intervantion (n=81)	Control (n=93)	
≥1 HR-HPV genotype infection	34 (42.0)	53 (57.0)	0.74 (0.54 – 1.01)
Single HR-HPV genotype infection	26 (32.1)	30 (32.2)	1.00 (0.65 – 1.53)
Multiple HR-HPV genotype infections	8 (9.9)	23 (24.7)	0.40 (0.19 - 0.84)

Note. – Samples are those that had amplifiable cellular or viral DNA at both enrolment and follow-up CI, confidence interval; IRR incidence risk ratio.

*David Serwadda et al. Circumcision of HIV-Infected Men: Effects on High-Risk Human Papillomavirus Infections in Randomized Trial in Rakai, Uganda. The Journal of Infectious Diseases 2010; 201(10):000-000.

Antimicrobial Resistance

Status quo or new challenges!?

The clinical implications of persistent gonococcal infections

In adults

- Pelvic inflammatory disease (PID)
- Chronic pelvic pain
- Ectopic pregnancy
- Spontaneous abortions
- Post-partum infections
- Infertility (male & female)
- Increased HIV transmission
- Epididymitis
- Orchitis
- Urethral strictures

In children

- Stillbirths
- Prematurity
- Low birth weight
- Conjunctivitis
- Blindness

Antimicrobial resistance in *Neisseria gonorrhoeae*

- **Sulphonamides**
- **Penicillins**
- **Tetracyclines**
- **Aminoglycocides (gentamicin, kanamycin)**
- **Quinolones (norfloxacin, ciprofloxacin)**
- **Macrolides (azithromycin)**
- **Cephalosporins (ceftriaxone, cefixime)**

Penicillin resistance in 9048 strains of *N. gonorrhoeae* in 22 Asian countries in 2008

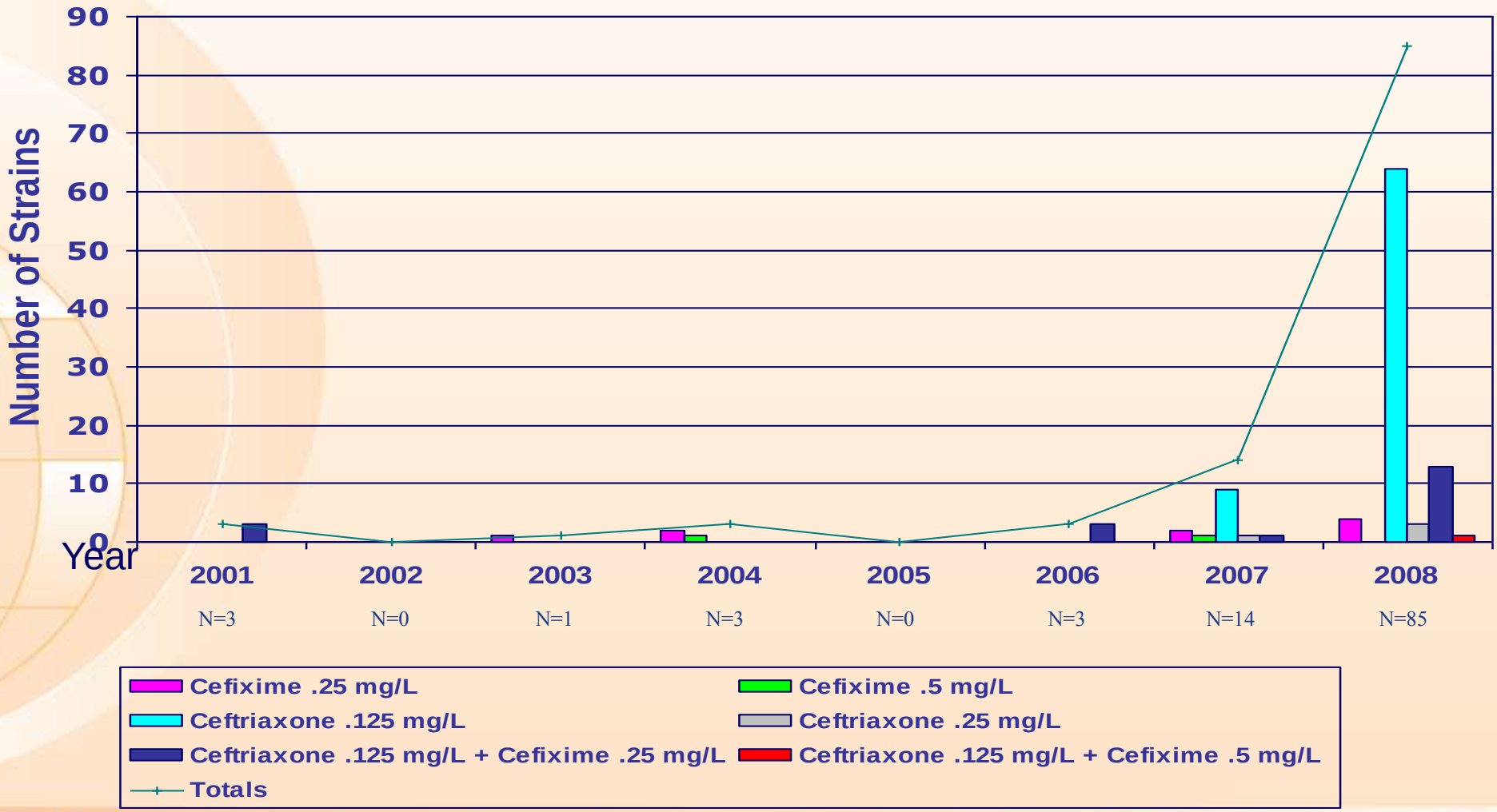
Country	n	PPNG		CMRP		All Pen R	
		No.	%	No.	%	No.	%
Australia	3110	373	12%	994	32	1367	44%
*#Bhutan	161					161	**100%**
Brunei	351	201	70.5%	44	12.5%	245	69.8%
China	1403	543	38.7%	ND^			
Fiji	320	20	6.3%	11	3.4%	31	9.7%
Hong Kong SAR	1393	434	31.2%	169	12.1%	603	43.3%
*India	60	20	33.3%	5	8.3%	25	41.7%
Japan	328	2	0.6%	88	26.8%	90	27.4%
Korea	141	18	12.8%	77	54.6%	95	67.4%
#Lao PDR	9					7#	**78%**
Malaysia	43	23	53.5%	0	0.0%	23	53.5%
Mongolia	91			3	3.3%	3	3.3%
*Myanmar	12	2	16.7%	8	66.7%	10	**83.3%**
New Caledonia	152	0	0.0%	2	1.3%	2	1.3%
New Zealand	258	6	2.3%	57	22.1%	63	24.4%
Papua New Guinea	32	20	62.5%	2	6.3%	22	68.8%
Philippines	84	76	90.5%	0	0.0%	76	**90.5%**
*Sri Lanka	34	18	52.9%	1	2.9%	19	55.9%
Singapore	160	90	56.3%	12	7.5%	102	63.8%
*@Thailand	733	592	80.8%	45/53	84.9%		
Tonga	14	1	7.1%	0	0.0%	1	7.1%
Vietnam	153	40	26.1%	9	5.9%	49	32%

Quinolone resistance in 8731 strains of *Neisseria gonorrhoeae* in 20 Asian countries in 2008

Country	n	Less susceptible		Resistant		All QRNG	
		No.	%	No.	%	No.	%
Australia	3110	34	1.1%	1651	53.1%	1685	54.2%
*Bhutan	161					153	95%
Brunei	353	92	26.1%	168	47.6%	260	73.7%
China	1403	53	3.8%	1348	96.1%	1401	99.9%
Hong Kong SAR	1393	12	0.9%	1362	97.80%	1374	98.6%
*India	60	10	16.7%	50	83.3%	60	100.0%
Japan	328	14	4.3%	240	73.2%	254	77.4%
Korea	141	29	20.6%	106	75.2%	135	95.7%
Lao PDR	9			1	11%	1	11%
Malaysia	43	6	14%	29	67.4%	35	81.4%
Mongolia	91	35	38.5%	34	37.4%	69	75.8%
*Myanmar	12	4	33.3%	6	50.0%	10	83.3%
New Caledonia	152	2	1.3%	3	2.0%	5	3.3%
New Zealand	258	2	0.8%	53	20.5%	55	21.3%
Papua New Guinea	32	0	0.0%	0	0.0%	0	0.0%
Philippines	84	4	4.8%	68	81.0%	72	85.7%
*Sri Lanka	34	0	0.0%	26	76.5%	26	76.5%
Singapore	160	10	6.3%	119	74.4%	129	80.6%
*Thailand	754	162	21.5%	570	75.6%	732	97.1%
Vietnam	153	5	3.3%	147	96.0%	152	99.3%

N. gonorrhoeae strains with decreased susceptibility to Cephalosporins*

Cefixime (0.25 mg/l and 0.5 mg/L) and Ceftriaxone (0.125 mg/L and 0.25 mg/L) MICs



*Source: Public Health Agency of Canada

Modal ceftriaxone MICs – Europe data

	2004	2006	2007	2008	Fold increase (1st to last year)
Austria	0.004	<0.002	0.016	0.016	4
Belgium	<0.002	<0.002	<0.002	0.008	4
Denmark	<0.002	0.016	0.016	0.016	8
England/Wales	<0.002	<0.002	<0.002	0.004	2
Netherlands	<0.002	0.016	0.008	0.004	2
Portugal	<0.002	0.004	0.004	0.004	2
Scotland	0.004	0.004	0.004	0.008	2
Slovenia		0.004	0.004	0.016	4
Spain	<0.002	0.008	0.004	0.004	2
Sweden	0.004	0.008	0.008	0.008	2
France	<0.002		0.016	0.004	2
Germany			0.016	0.008	Decrease
Greece	<0.002		0.004	0.004	2
Italy	<0.002		0.008		4
Malta			0.016	0.032	2

MICs rounded up to full dilution
<0.002 = 0.002 for fold calculation

Courtesy: Cathy Ison

Ceftriaxone reduced-susceptibility strains of *Neisseria gonorrhoeae* – WHO/WPR/SEAR, 2006

Data Source: National Ministry of Health/WHO
Map Production: Public Health Mapping and GIS
World Health Organization

World Health Organization

The STI Epidemic, Eastern Europe and Central Asia

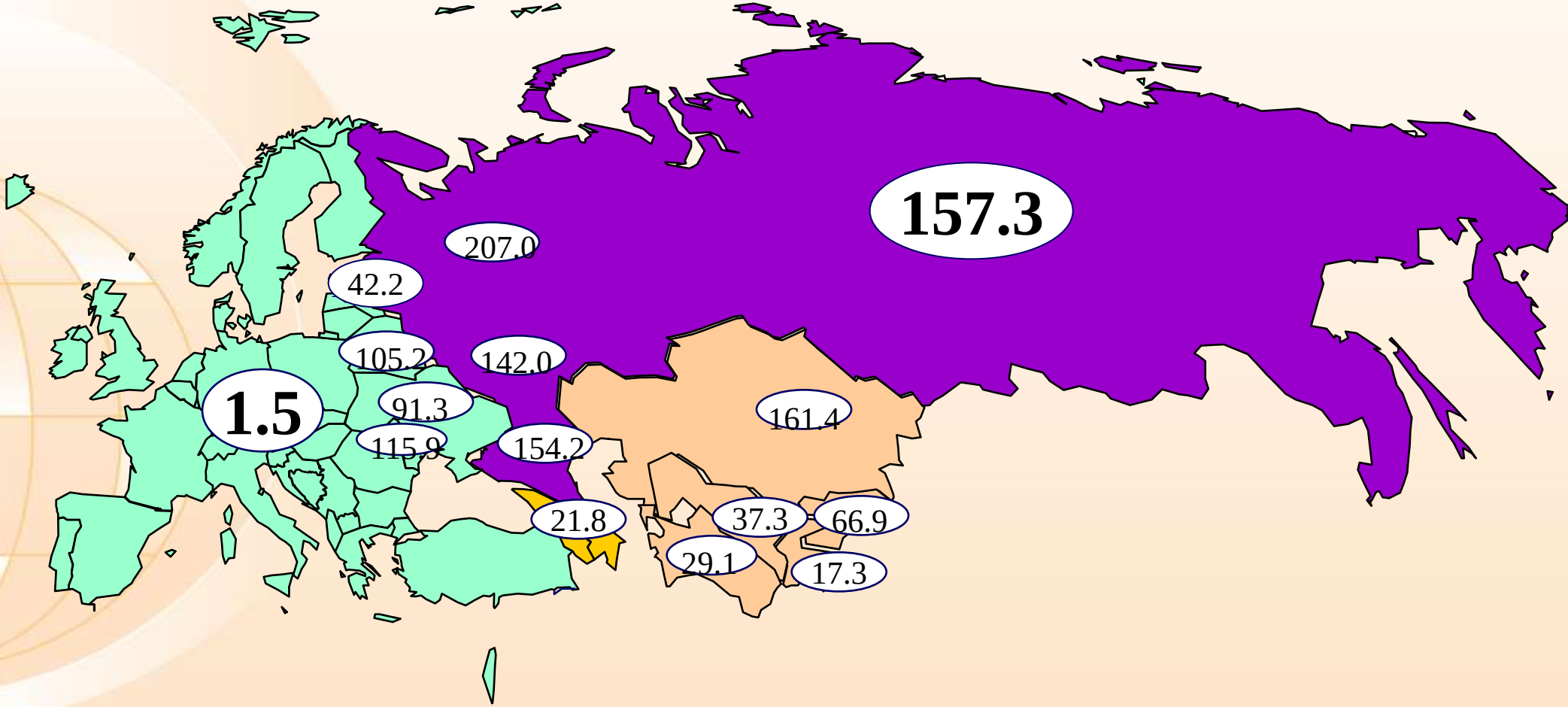
Late 1990s

Things are not the same anymore!

BUT....

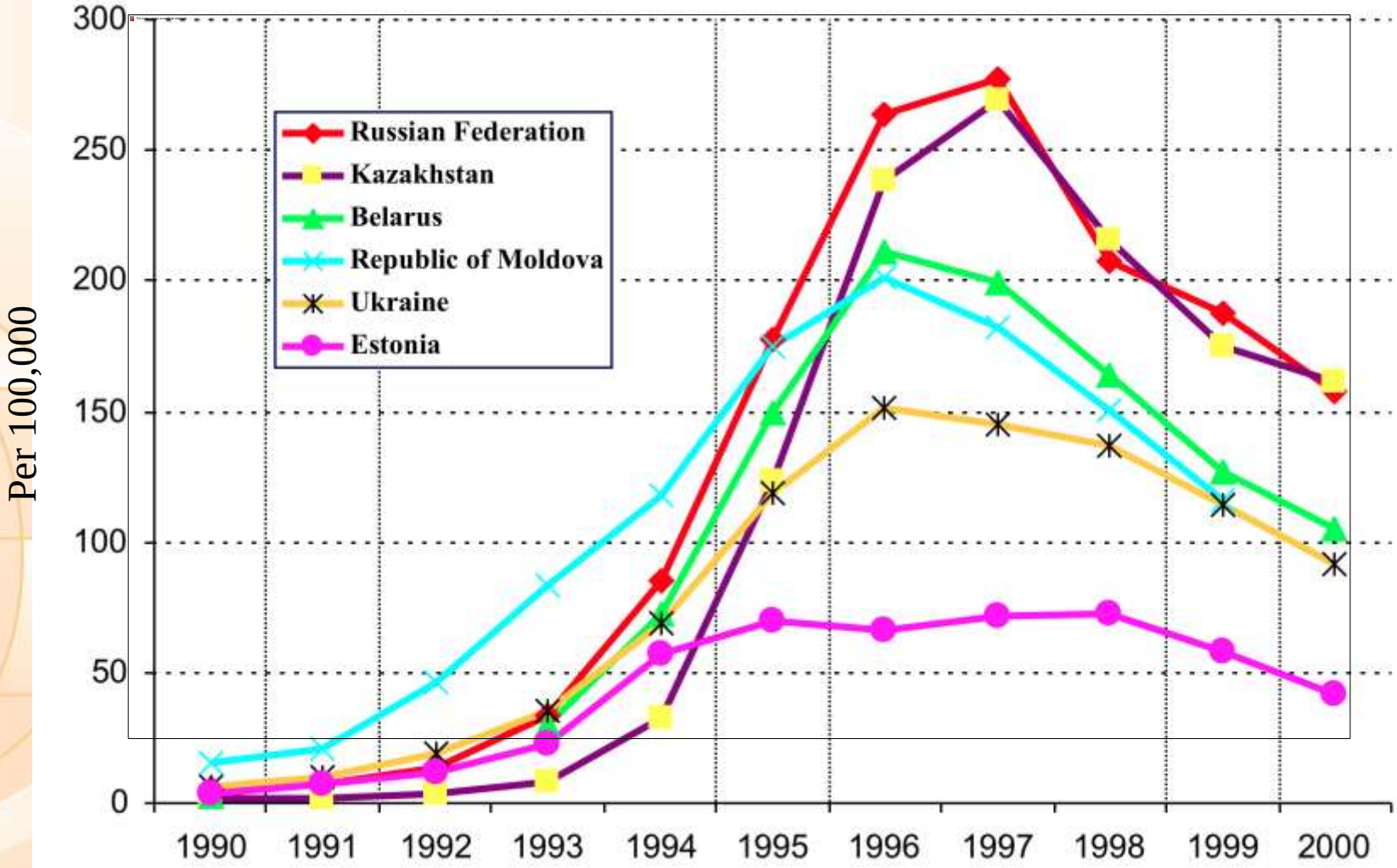
Incidence of syphilis in the WHO EURO Region 1999/2000

- rate per 100,000 population -



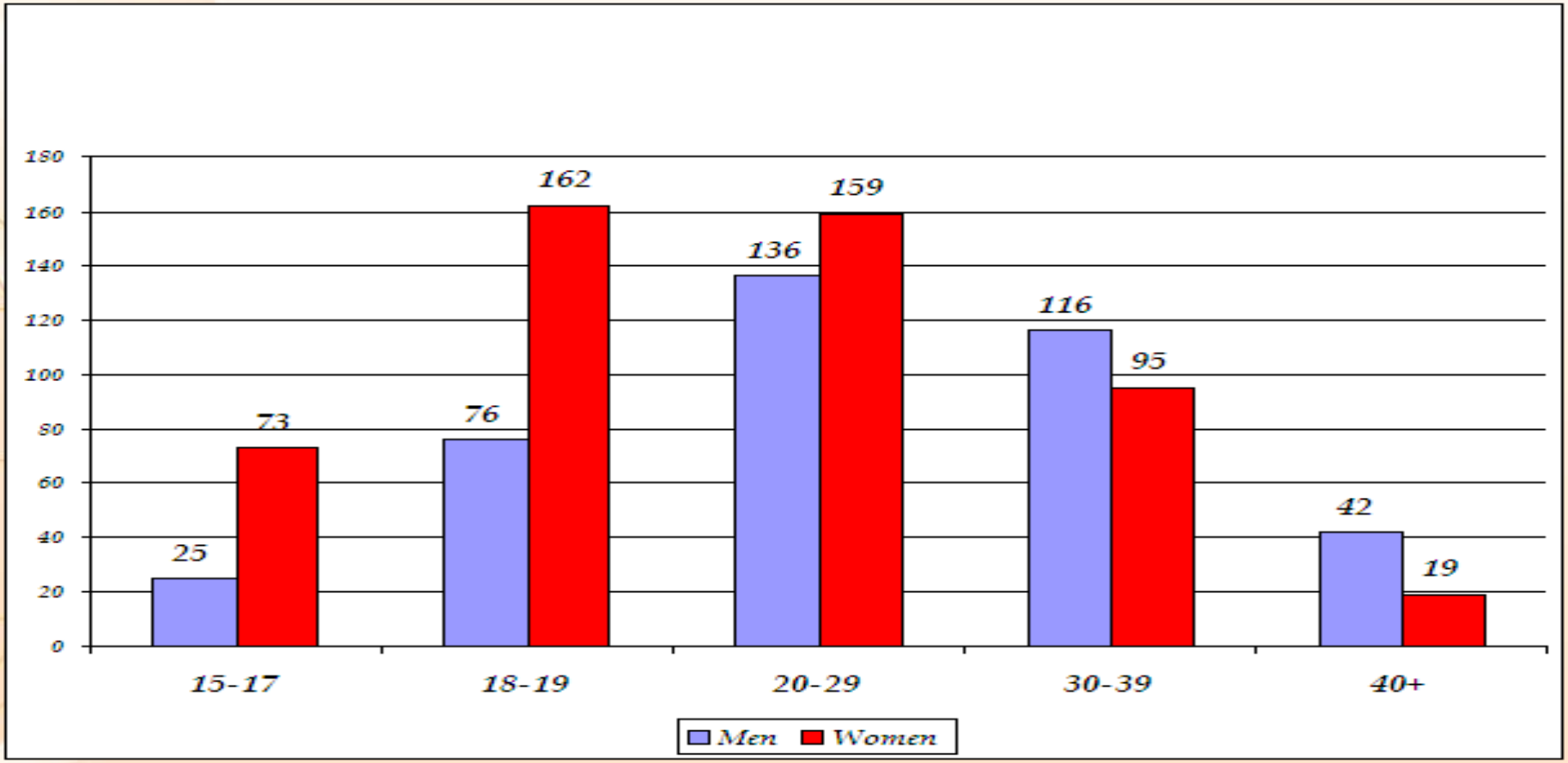
Incidence of syphilis in Belarus, Estonia, Kazakhstan, Moldova, Russia, Ukraine, 1990-2000

- rate per 100 000 -



Incidence rate of syphilis by age groups and sex in the Russian Federation (2009)*

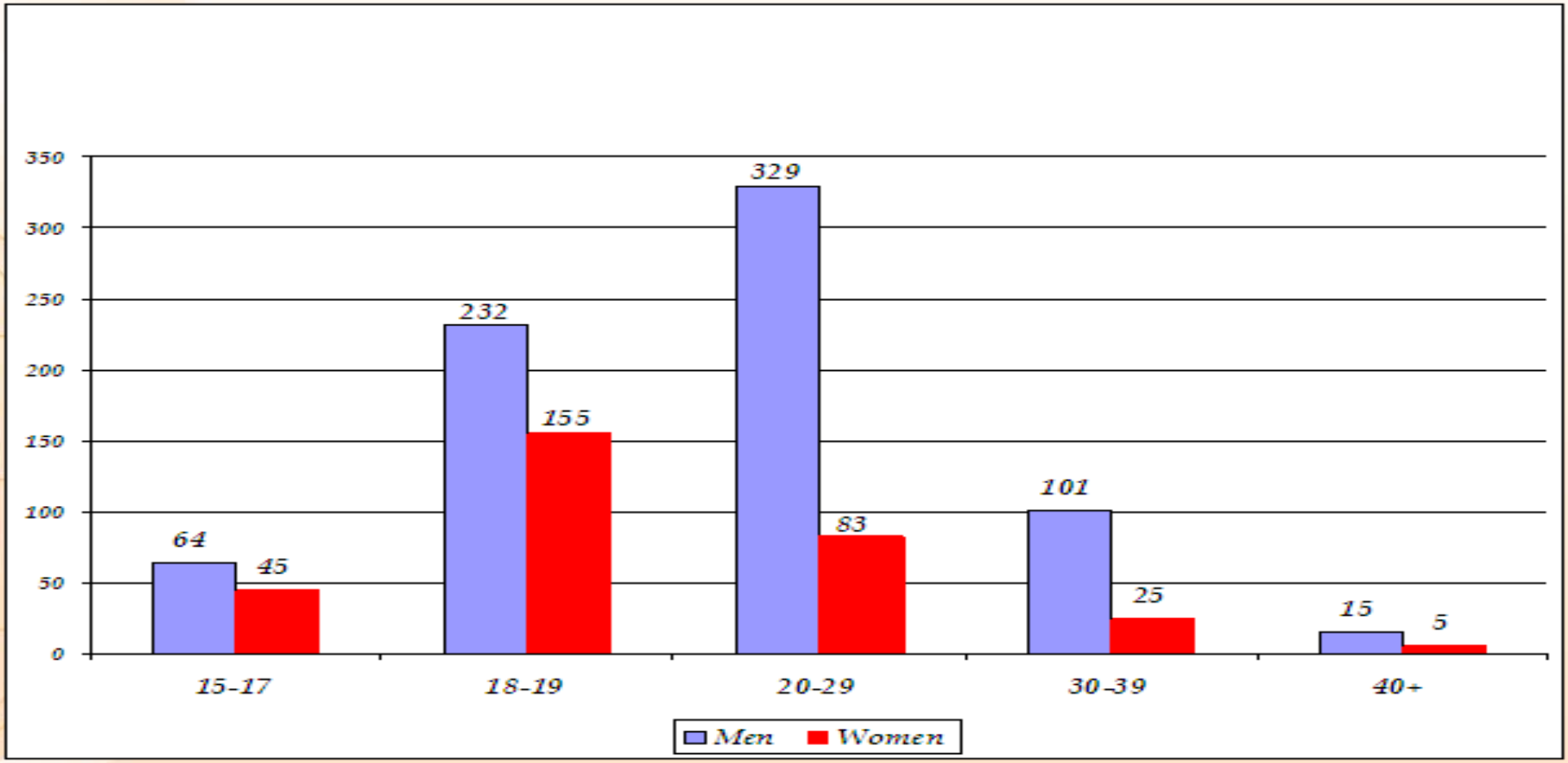
(per. 100 000 population)



* Source: Здравоохранение в России. 2009: Стат.сб./Росстат. - М., 2009. - 365 с.

Incidence rate of gonorrhea by age groups and sex in the Russian Federation (2009)*

(per. 100 000 population)

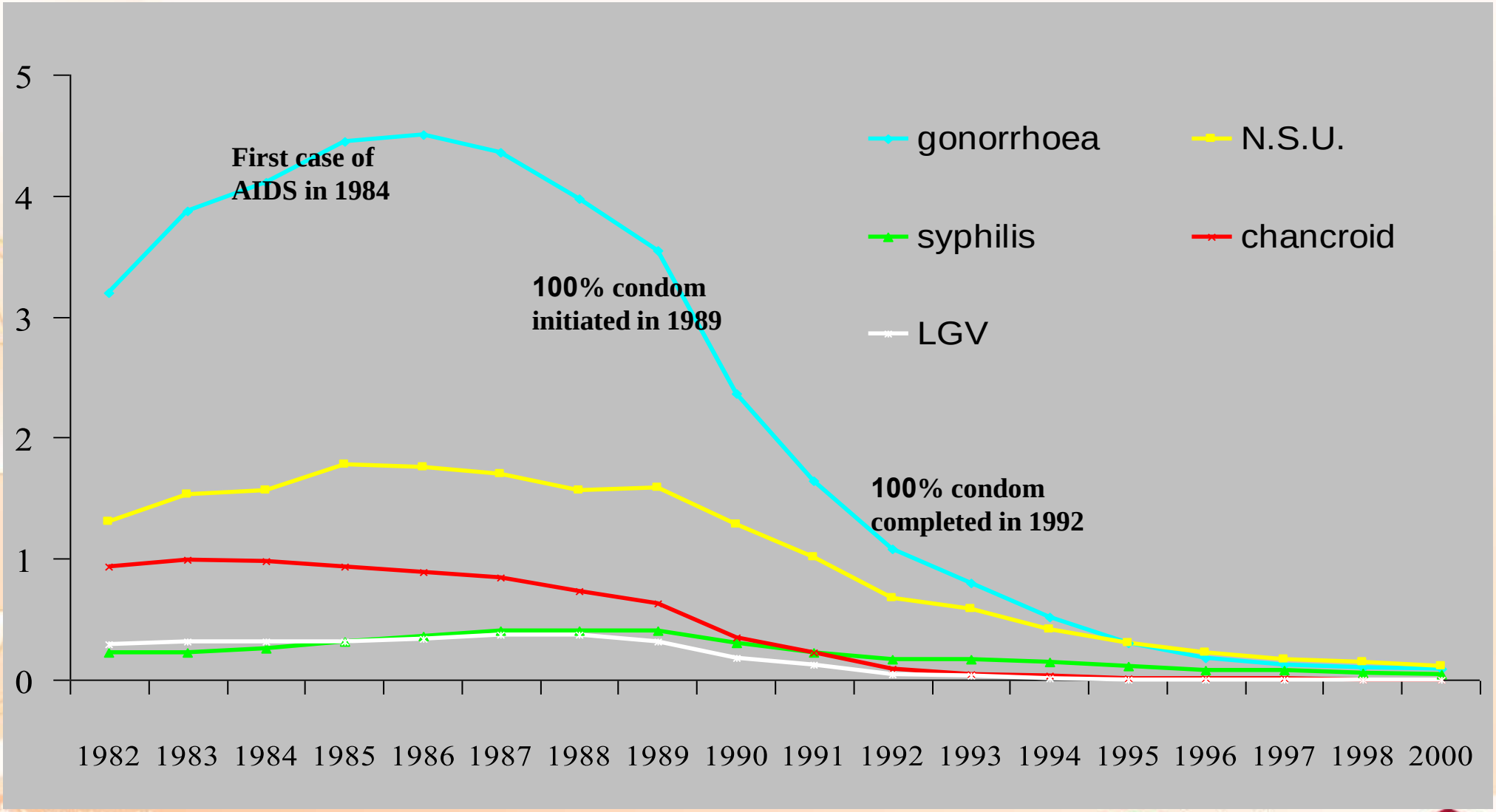


* Source: Здравоохранение в России. 2009: Стат.сб./Росстат. - М., 2009. - 365 с.

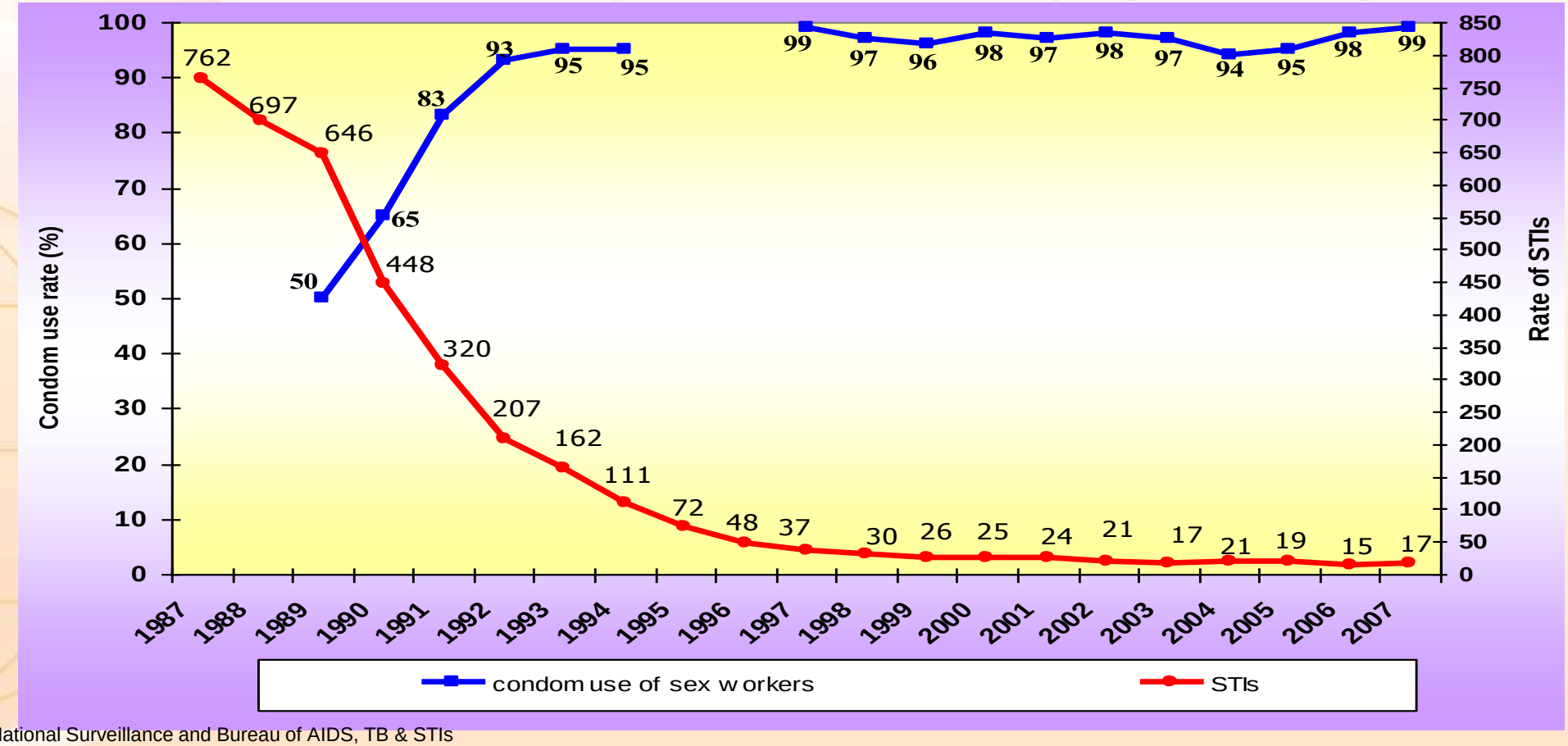
Thailand 100% Condom Use Programme

Dr Chavalit Mangkalaviraj, Bangrak Hospital, Bangkok Thailand. " The HIV Epidemic – how Thailand cut back its STI rates in the light of the HIV epidemic" 16th International Against Sexually Infection, Bali, Indonesia May 4-6, 2010.

Incidence of STIs in Thailand (1982-2000)



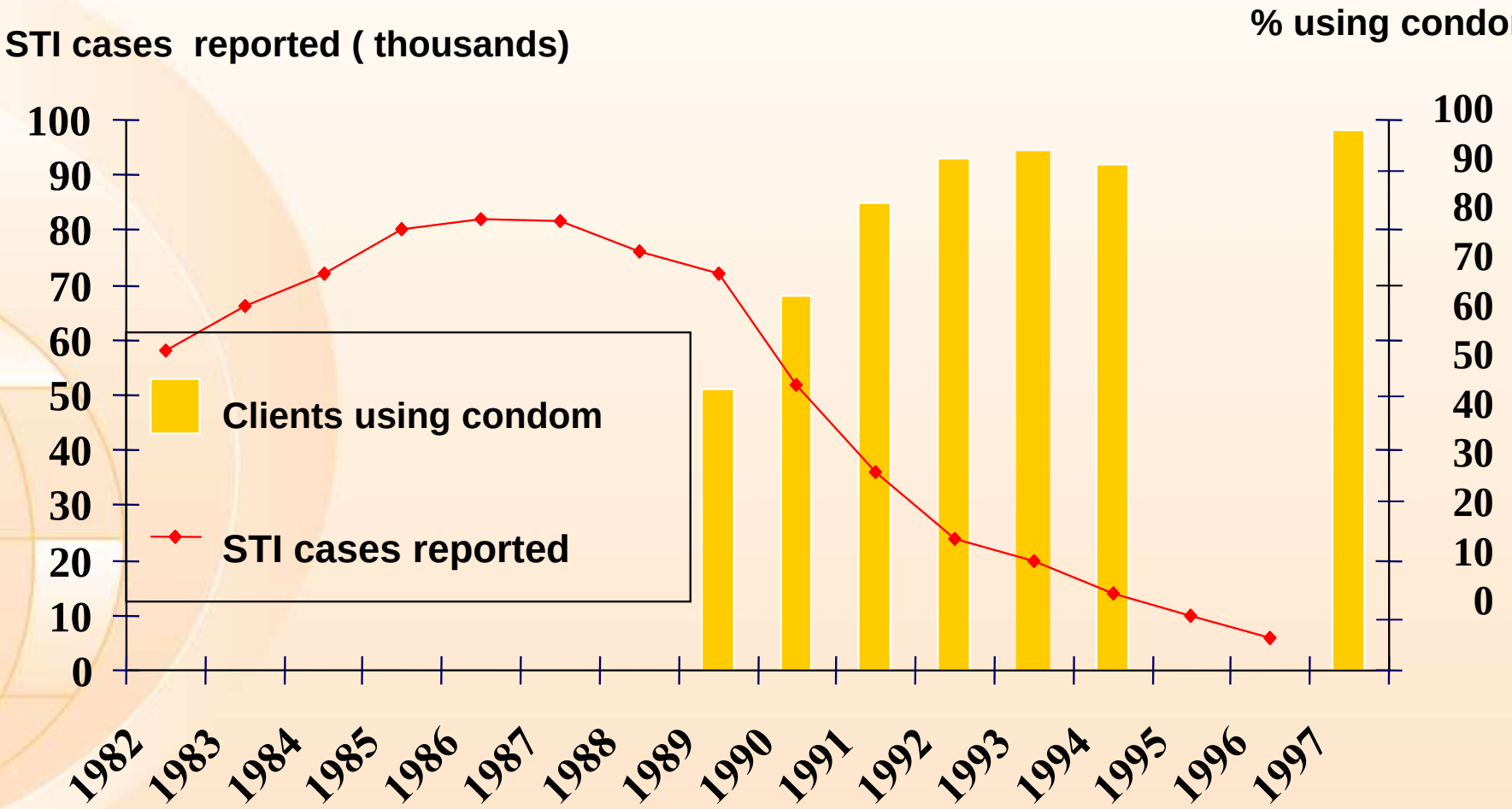
Number of reported STIs cases and Condom use Rate Among sex workers in Thailand : 1987- 2007(Rate : 100 000 population)



Source : National Surveillance and Bureau of AIDS, TB & STIs
Department of Disease Control, Ministry of Public Health

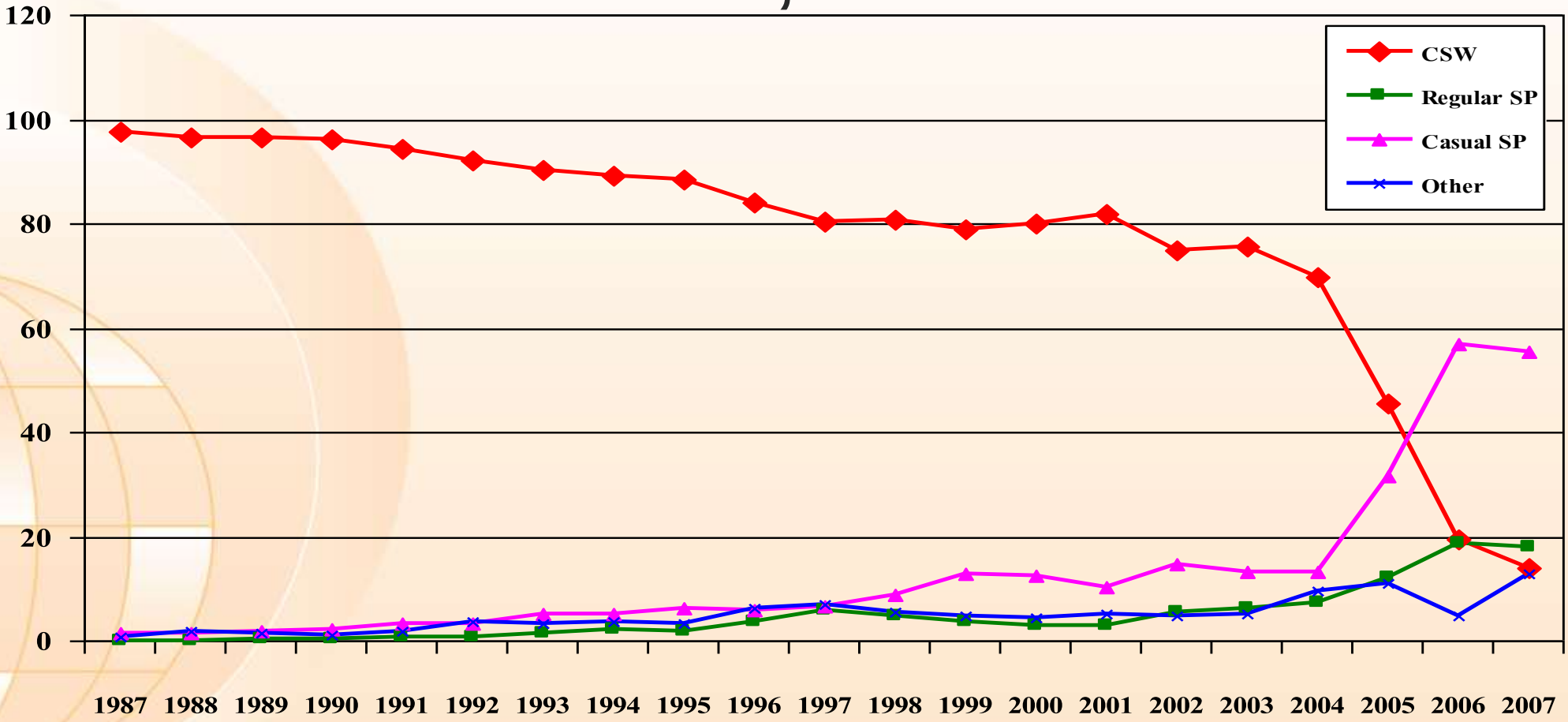
Dr Chavalit Mangkalaviraj, Bangrak Hospital, Bangkok Thailand. " The HIV Epidemic – how Thailand cut back its STI rates in the light of the HIV epidemic" 16th International Against Sexually Infection, Bali, Indonesia May 4-6, 2010.

Clients Using Condoms and STI Cases Reported - Thailand



Source: Sentinel Serosurveillance, Division of Epidemiology, Ministry of Public Health.

Sources of infection in Male STIs patients Thailand, 1987-2007*

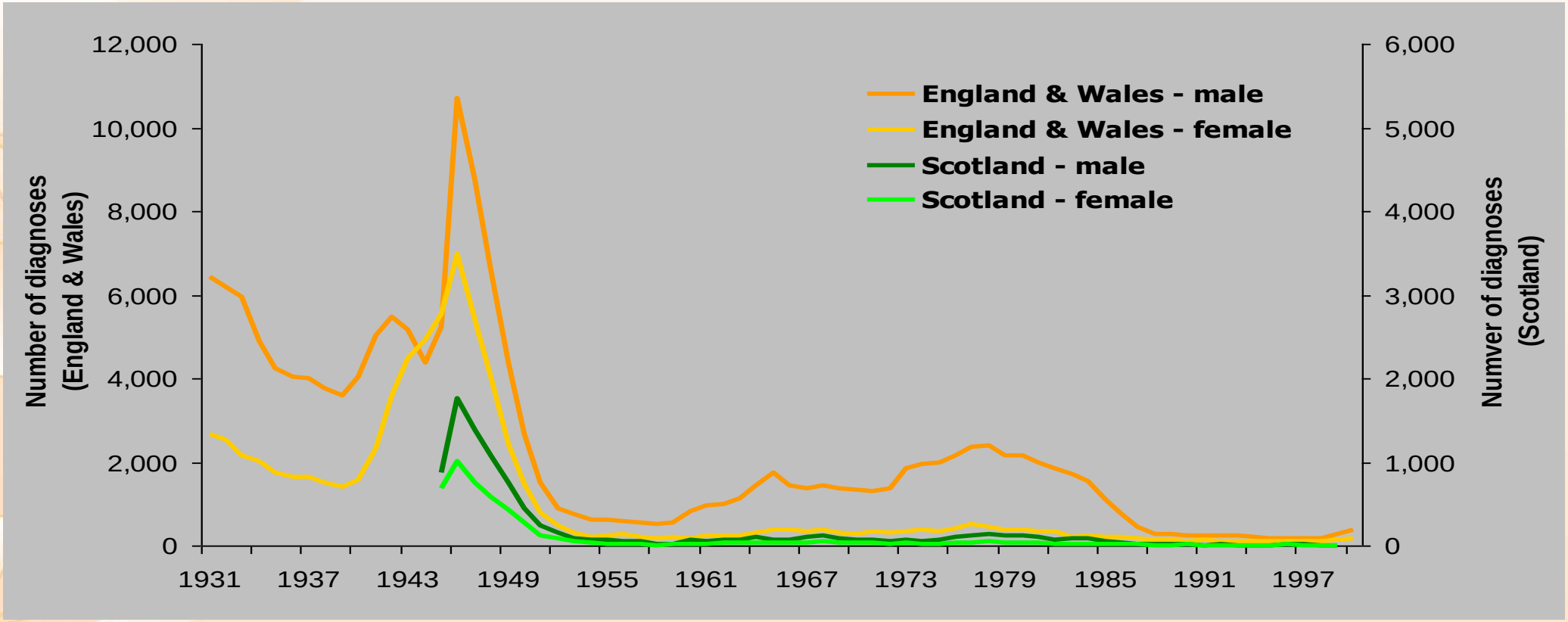


*Dr Chavalit Mangkalaviraj, Bangrak Hospital, Bangkok Thailand. " The HIV Epidemic – how Thailand cut back its STI rates in the light of the HIV epidemic" 16th International Against Sexually Infection, Bali, Indonesia May 4-6, 2010.

The STI Epidemic, Western Europe, North America and Australia

Are we missing something!?

Diagnoses of syphilis (primary, secondary and latent in the first 2 years of infection) seen in GUM clinics, England, Scotland and Wales, 1931 to 2000*

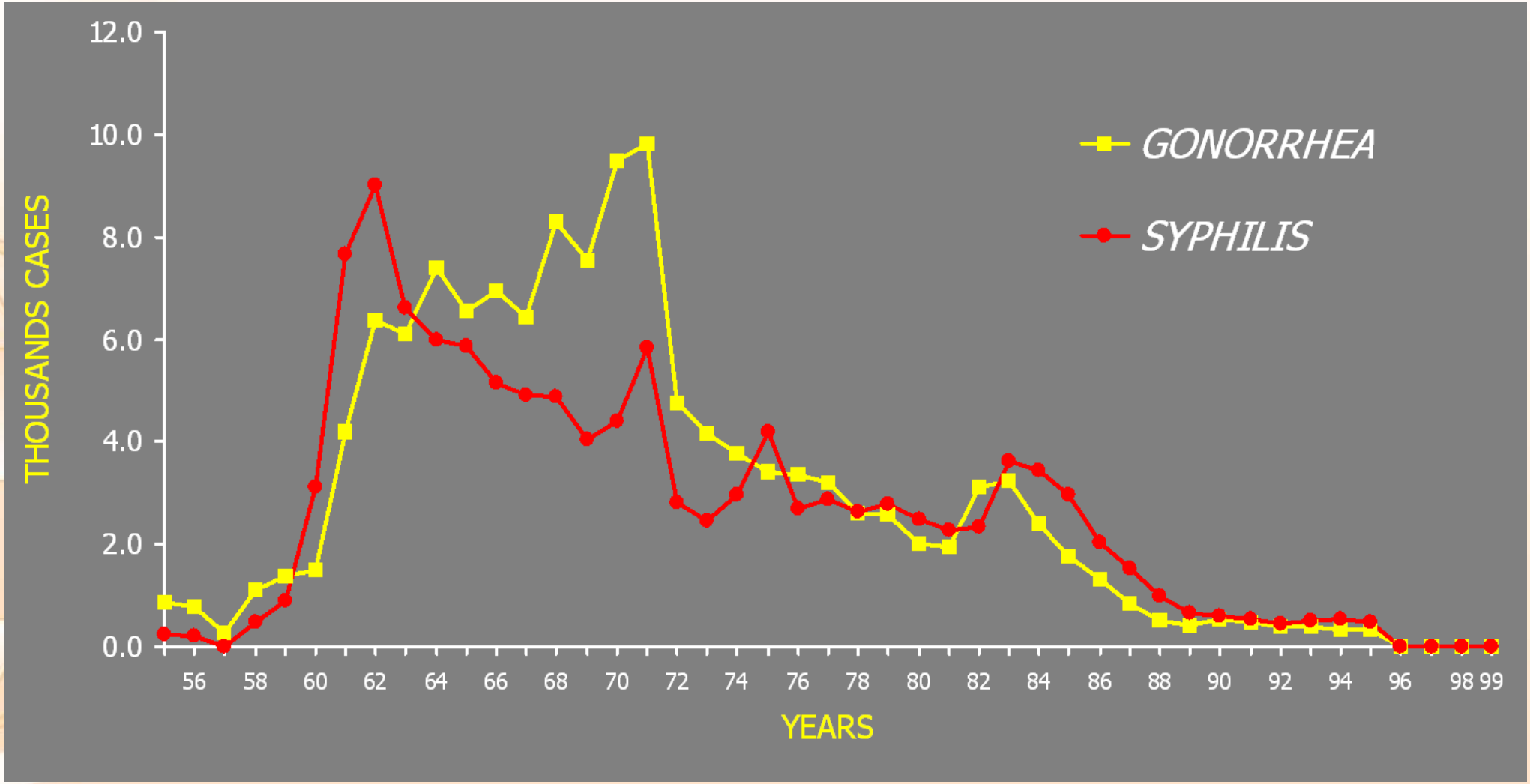


Source: PHLS, UK

Equivalent Scottish data are not available prior to 1945 and for 2000

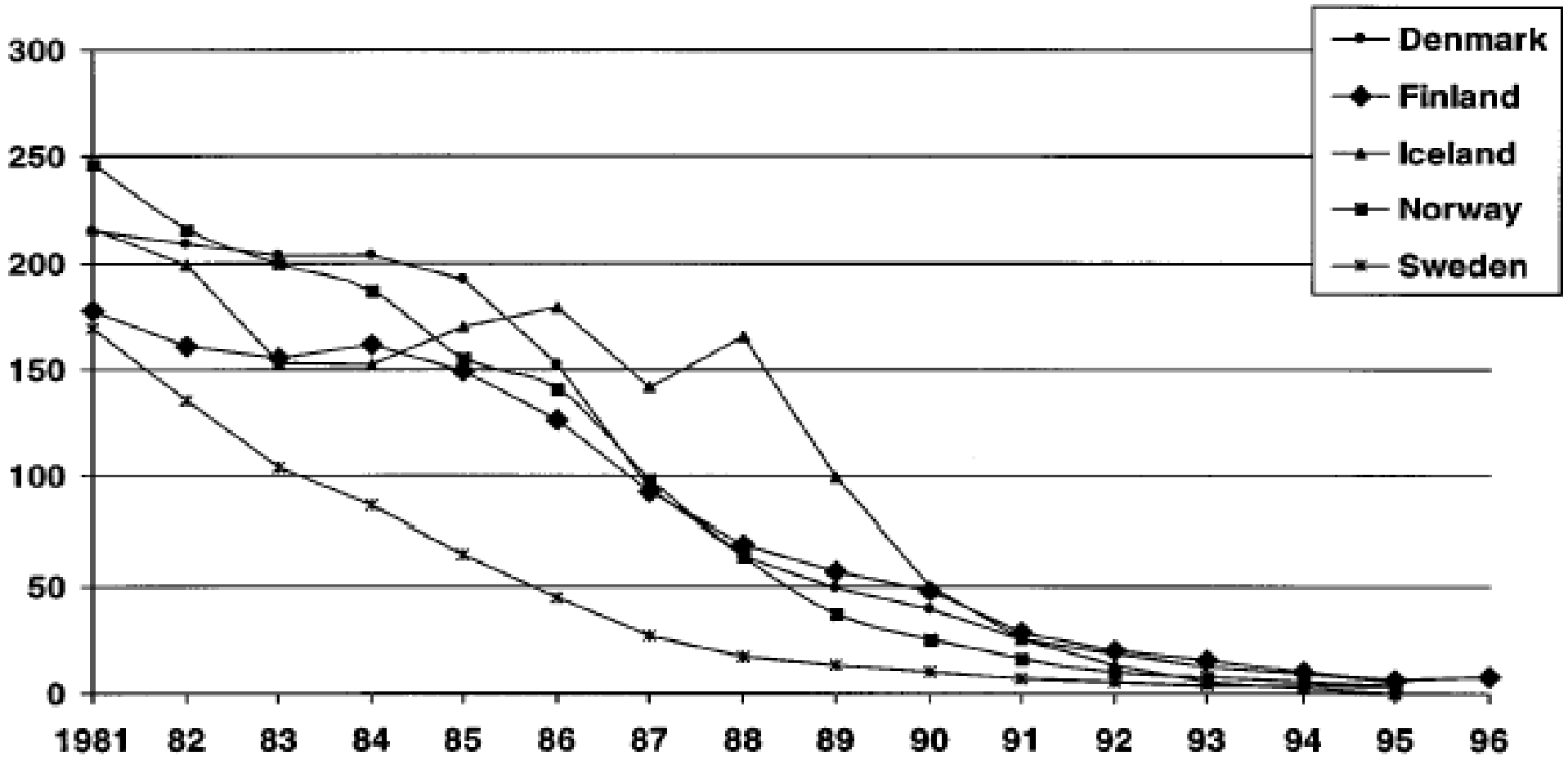
*As Northern Ireland data from the time period 1931 to 2000 are incomplete they have been excluded from this figure

Gonorrhea and syphilis in Italy
Mandatory notifications, *1955-1999*



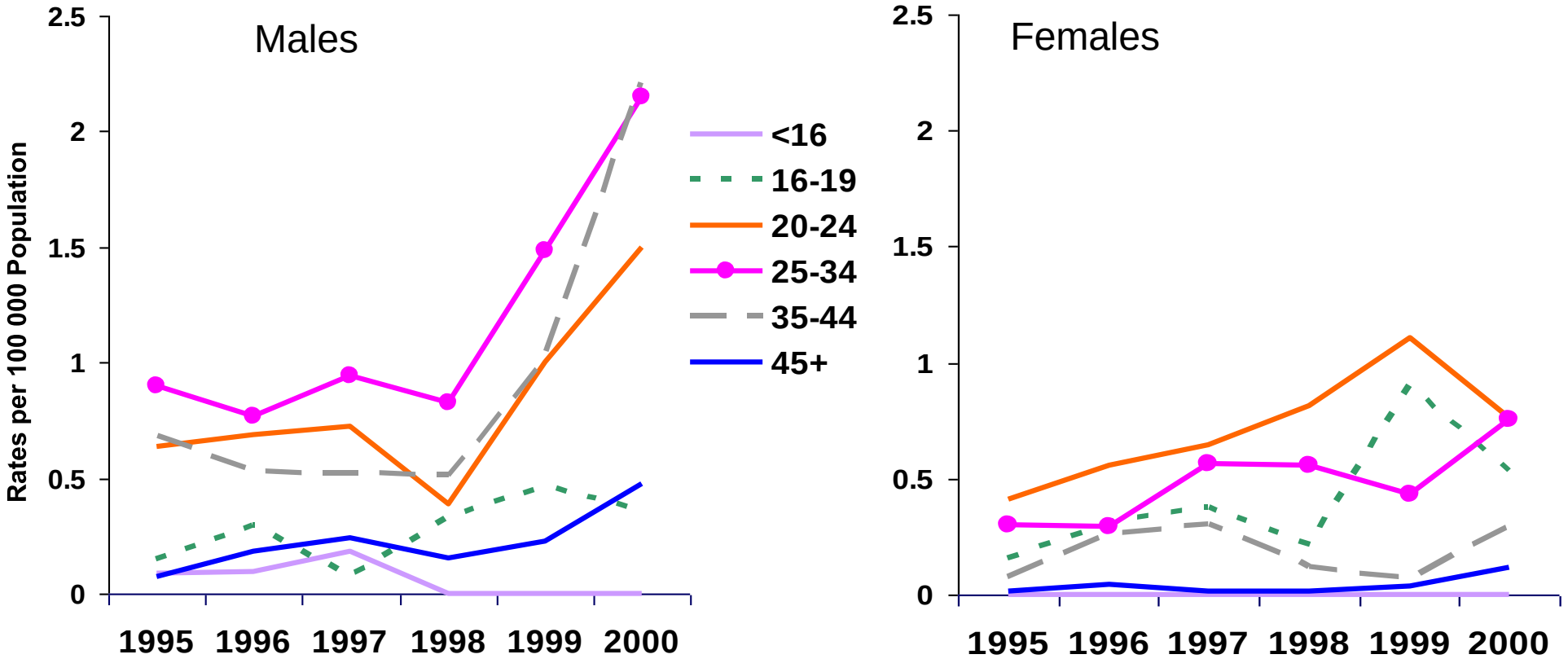
Source: Suligo et al.

Annual incidence of gonorrhoea per 100 000 population in Nordic countries (1981 – 1996)



Source: Adler, Meheus, *JEADV* 2000;14:370 - 377

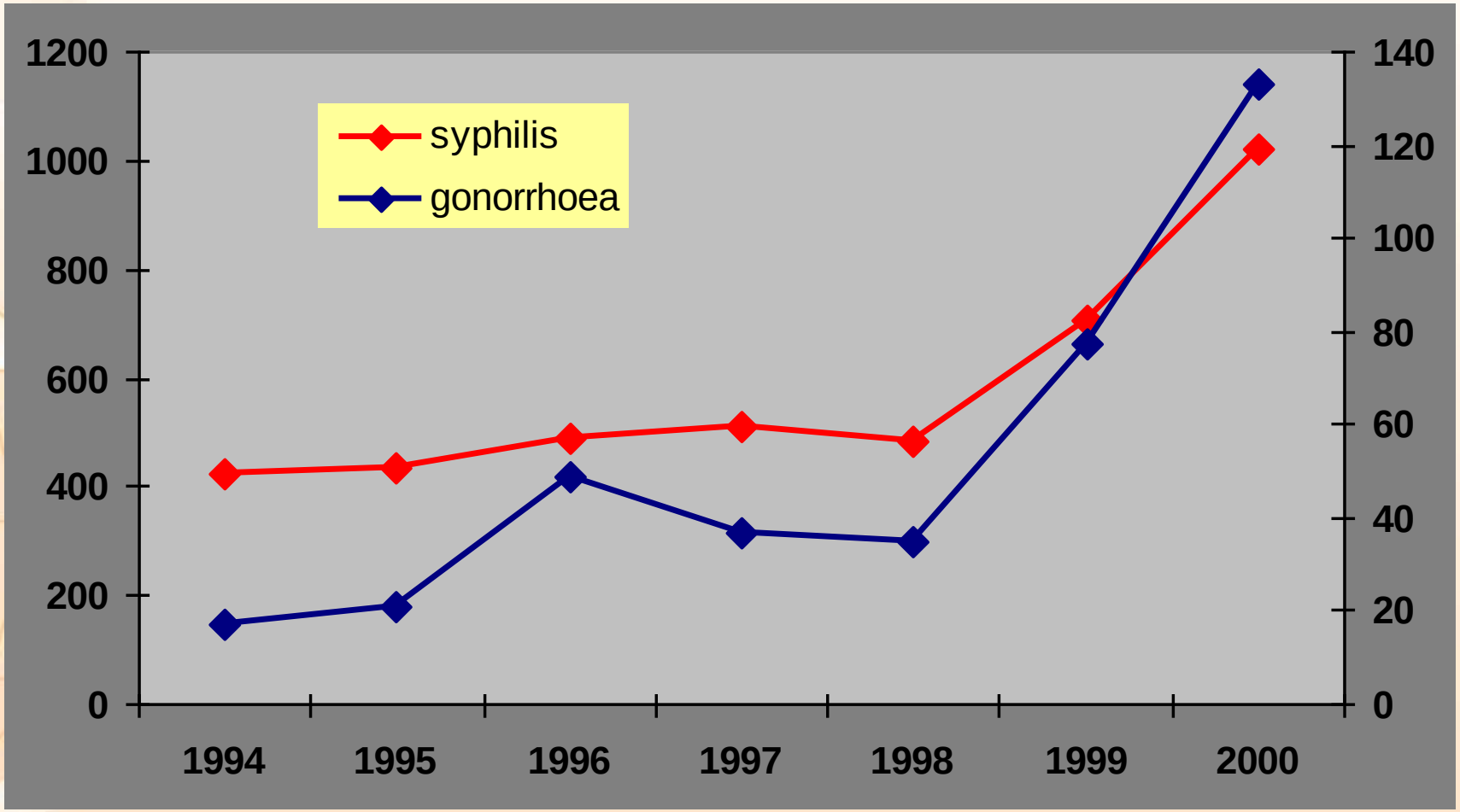
Diagnoses of infectious syphilis (primary and secondary) in GUM clinics by sex and age group, UK: 1995-2000*



*Data are unavailable from Scotland for 2000 and from N.Ireland for 1996 & 1997

Source: ESSTI/PHLS, UK

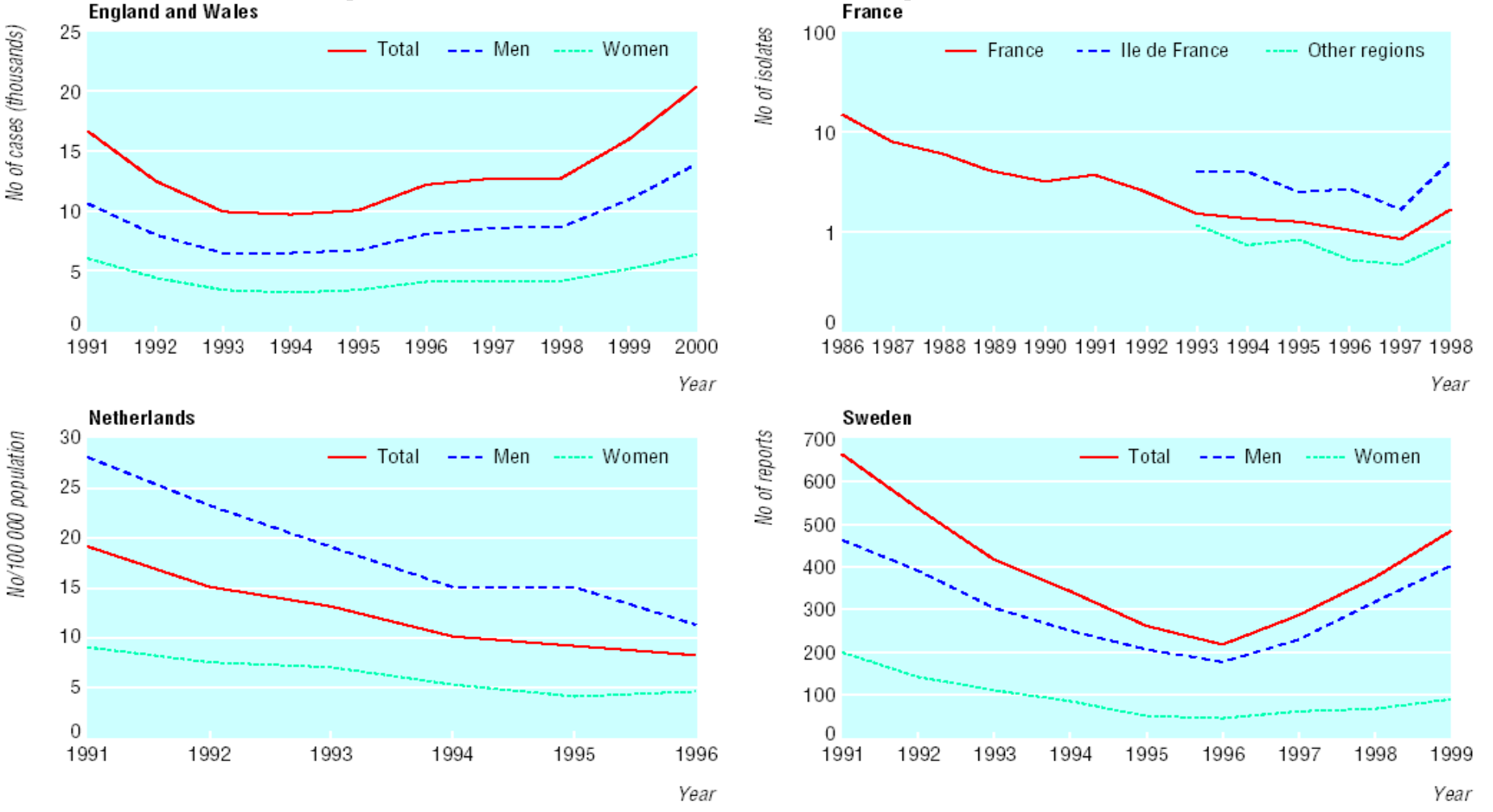
Netherlands: Gonorrhoea and syphilis, STD clinic (annual reports, GG&GD, Amsterdam).



GO: 1999: + 46%;MSM 59% heter 16% fem 66%; 2000: + 45%; 33% 56% 72%
Lues: 1999: + 120%; MSM 333% heter 54% fem 40%; 2000: + 63% (MSM 136%)

Source: ESSTI/PHLS, UK

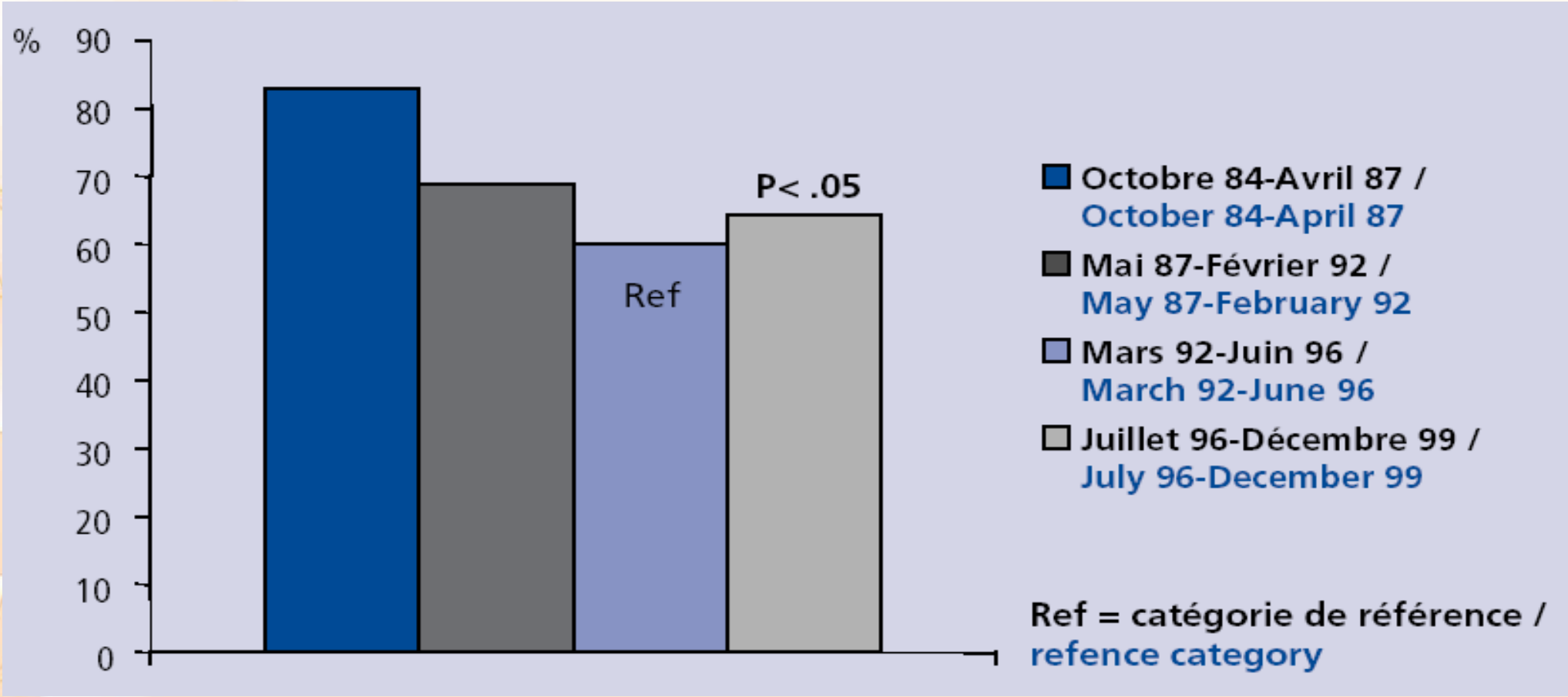
Trends in gonorrhoea in England and Wales, France, the Netherlands, and Sweden



SOURCES:
England and Wales: cases of gonorrhoea seen in GUM clinics, 19912000; France: trends in gonococcal infections in RENAGO laboratories, 19919
Netherlands: notified cases of gonorrhoea per 100 000 inhabitants, 1976; Sweden: number of clinically reported *Neisseria gonorrhoeae* cases, 199199 (adapted from Smittskyddsinstitutet (Swedish Institute for Infectious Disease Control). *Smittsamma Sjukdomar 1999*. Stockholm: Smittskyddsinstitutet, 2000)

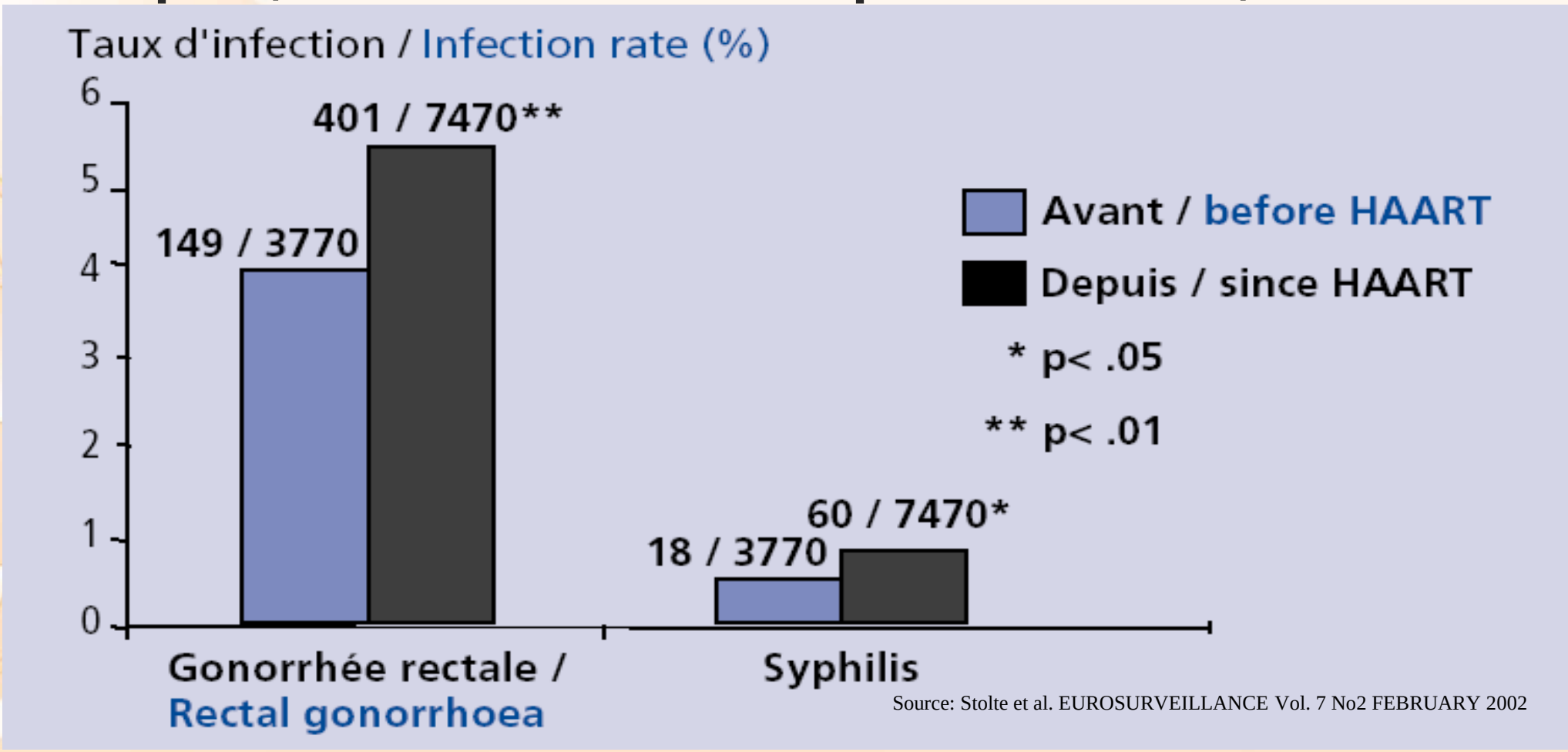
Source: Nicoll & Hamers, *BMJ* 2002;324:1324–7

Percentage of unprotected anal intercourse among HIV-negative young (< 35 years) homosexual men (n=877), Amsterdam, 1984-1999



Source: Stolte et al. EUROSURVEILLANCE Vol. 7 No2 FEBRUARY 2002

Relative numbers (infection rate) of rectal gonorrhoea and early syphilis diagnosed among homo- and bisexual men before and after the introduction of anti HIV therapies, Amsterdam STD outpatients clinic, 1994-1999

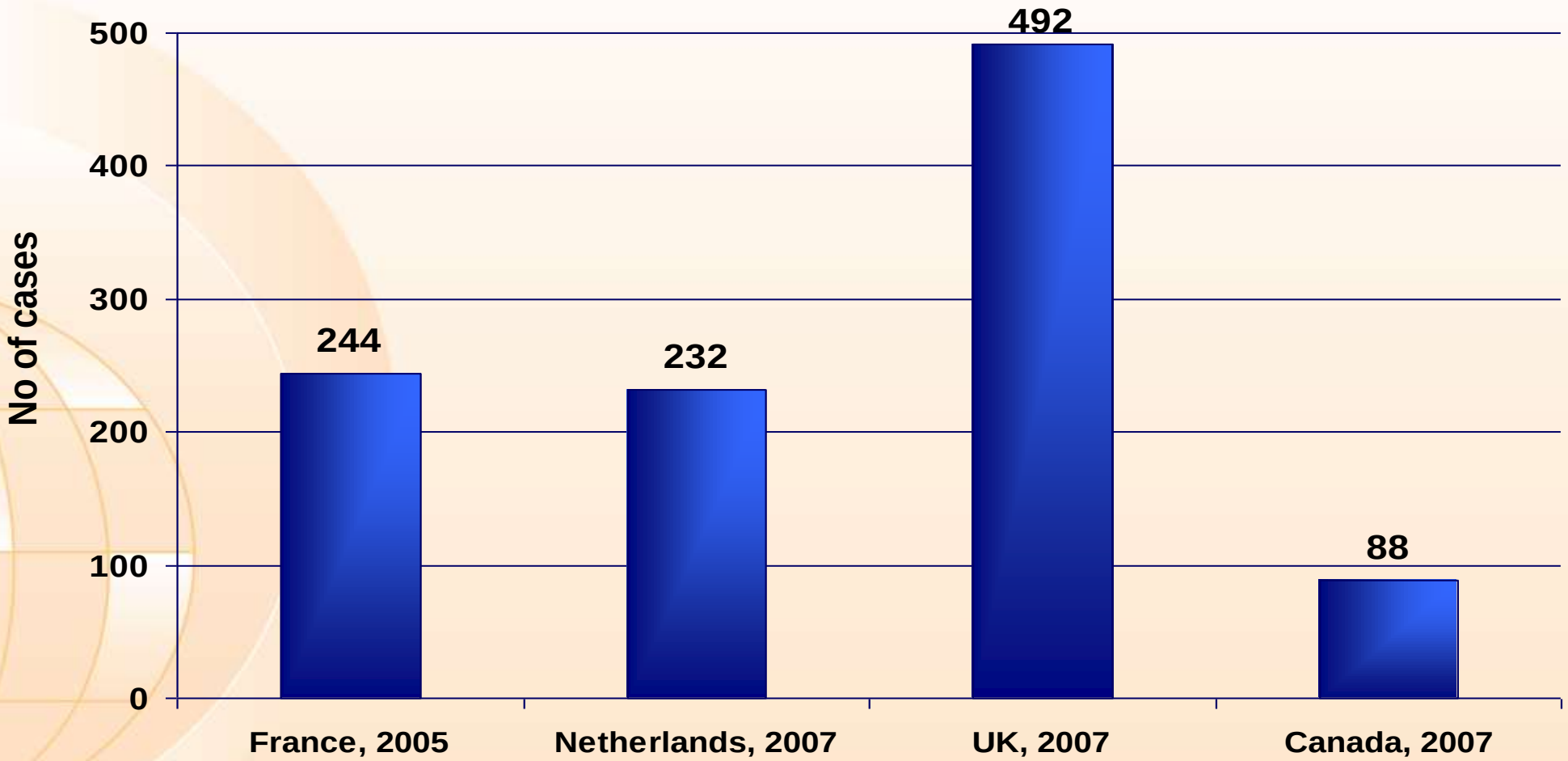


Source: Stolte et al. EUROSURVEILLANCE Vol. 7 No2 FEBRUARY 2002

! Recent outbreaks of proctitis due to

Lymphogranuloma Venereum among men who have sex with men in Western Europe, North America and Australia.

Number of LGV proctitis reported in Europe, North America, 2005-2007*



Martin-Iguacel R, et al. Lymphogranuloma venereum proctocolitis: a silent endemic disease in men who have sex with men in industrialised countries. Eur J Clin Microbiol Infect Dis. 2010 Aug;29(8):917-25

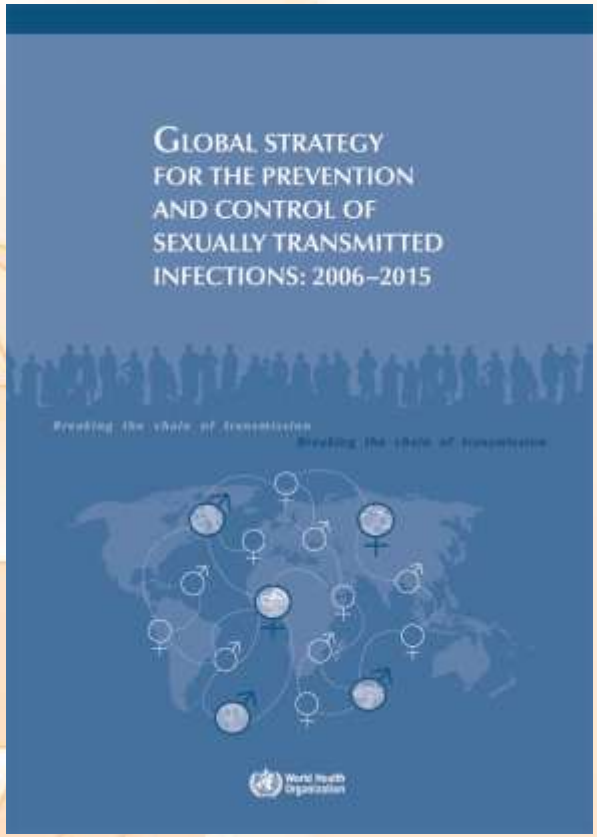
Never ending story?

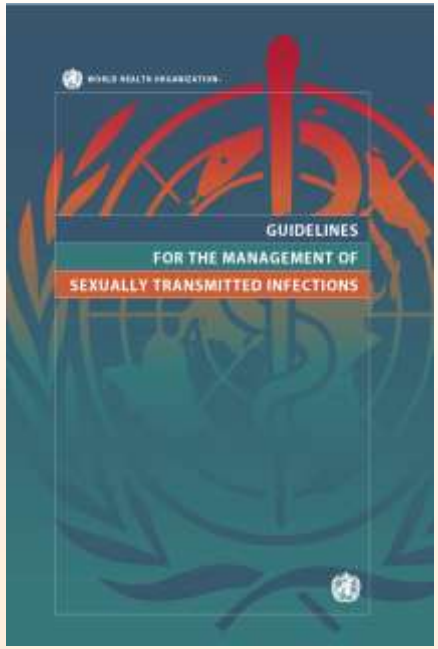
The past started

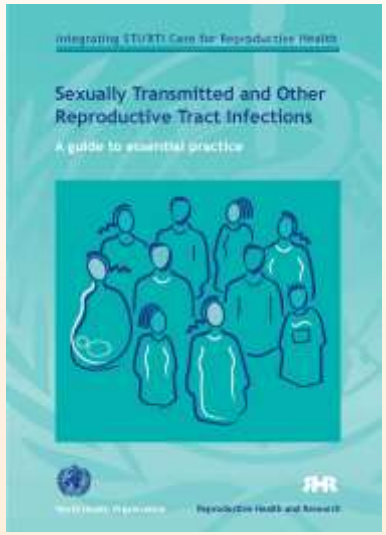
The present is working

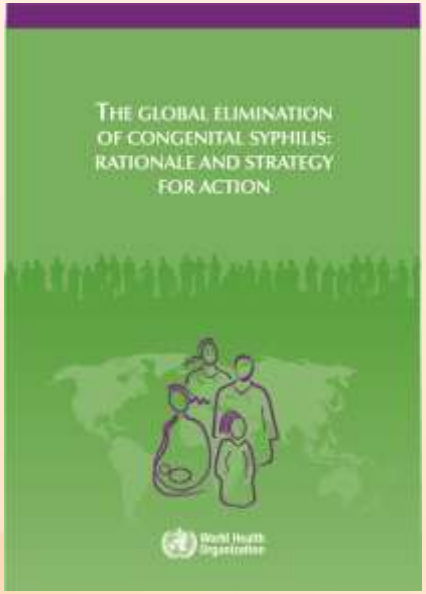
Tradition exits

Progress is made







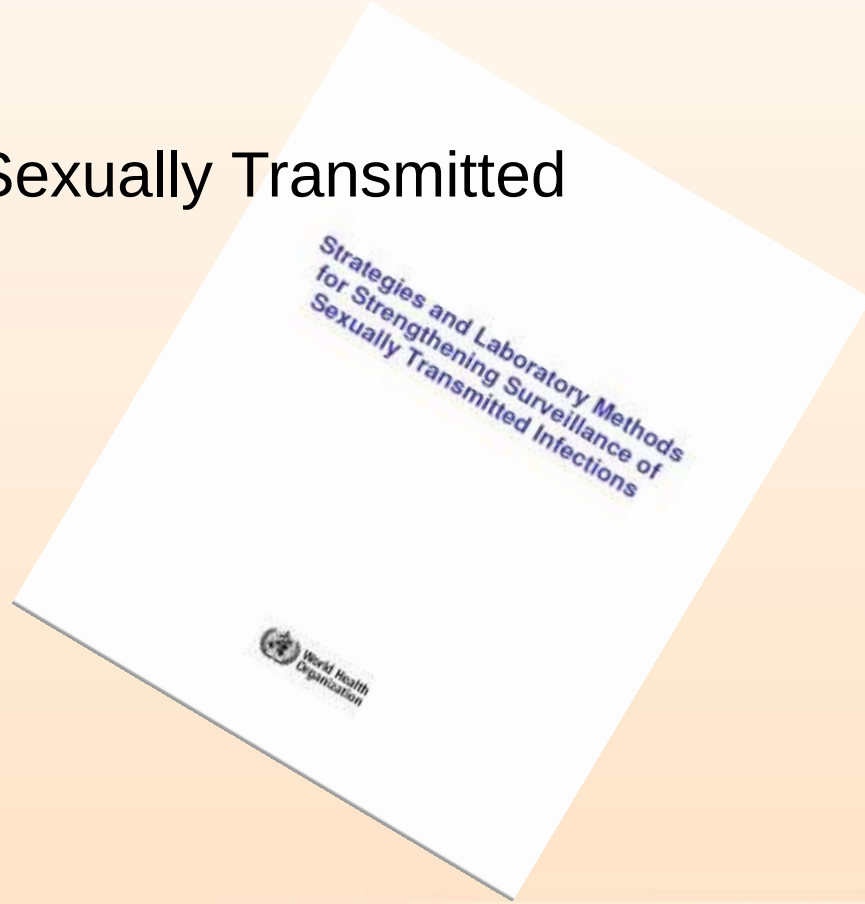


Coming…

- Updated version of the Guidelines for the management of Sexually Transmitted Infections

- Updated version of the Guidelines for Sexually Transmitted Infections Surveillance

visit RHR at: http://www.who.int/reproductive-health/
visit WHO at: www.who.int



Acknowledgements

Drs Nathalie Broutet, Francis Ndowa and Igor Toskin, *Controlling Sexually Transmitted and Reproductive Tract Infections (STI) Team, Department of Reproductive Health & Research (RHR), World Health Organization*

Dr Antonio Carlos Gerbase, Department of HIV/AIDS, *Prevention in the Health Sector, World Health Organization*

For further information:

1. http://www.who.int/reproductive-health/
http:// www.who.int

2. Dr. Igor Toskin
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World Health Organization
Geneva, Switzerland