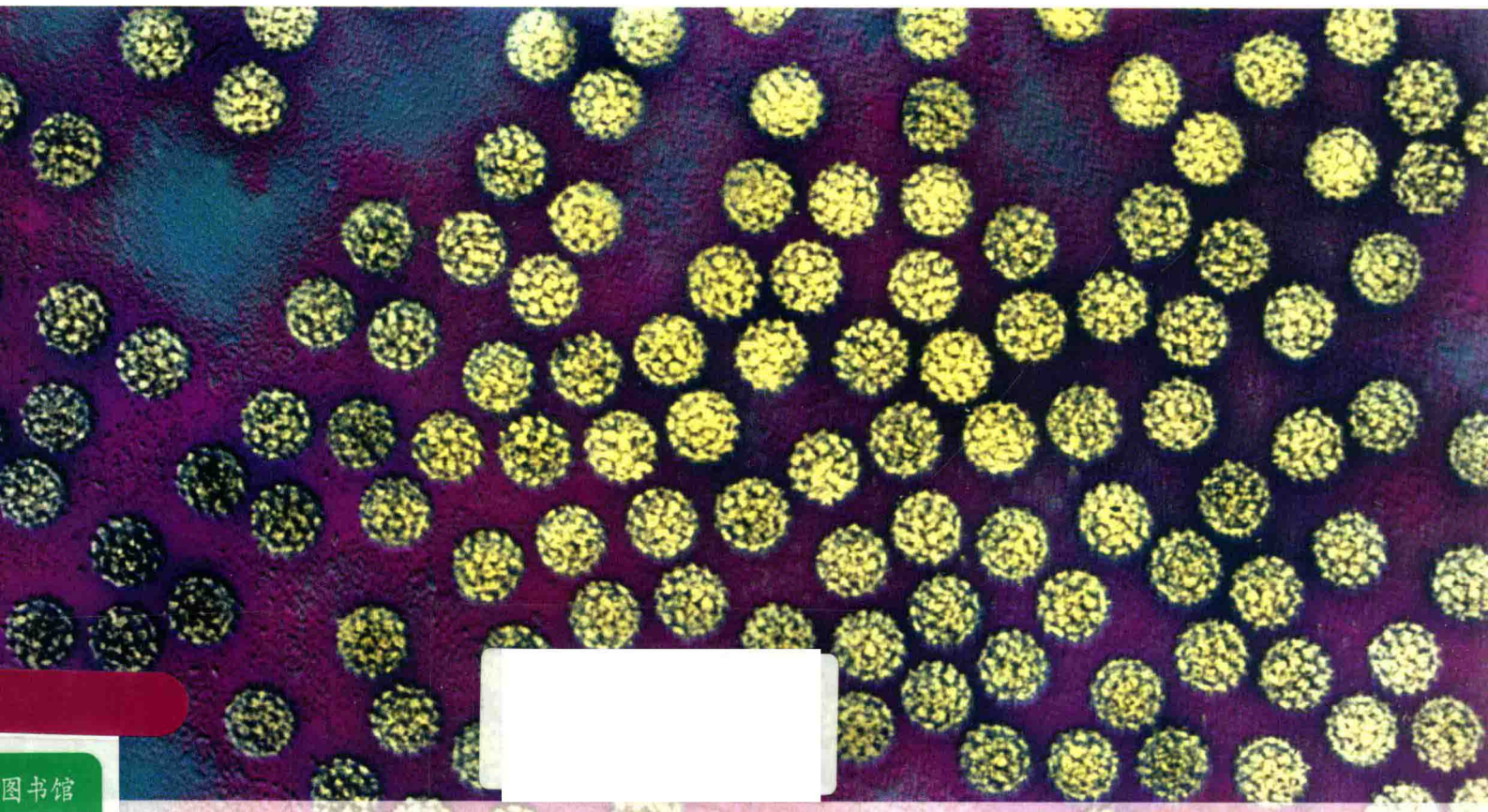
ABC of Sexually Transmitted Infections

SIXTH EDITION

Edited by Karen E Rogstad



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Sexually Transmitted Infections

Sixth Edition

EDITED BY

Karen E Rogstad

Consultant Physician
Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, UK

WILEY-BLACKWELL
A John Wiley & Sons, Ltd., Publication

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Registered office: John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial offices: 9600 Garsington Road, Oxford, OX4 2DQ, UK
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK
111 River Street, Hoboken, NJ 07030-5774, USA

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Library of Congress Cataloging-in-Publication Data
ABC of sexually transmitted infections. – Sixth Edition / edited by Karen Rogstad, Department of Genitourinary Medicine, Royal Hallamshire Hospital, Sheffield, South Yorkshire, UK.
p. ; cm.
Includes bibliographical references and index.
ISBN 978-1-4051-9816-5 (pbk. : alk. paper) 1. Sexually transmitted diseases. 2. Communicable diseases. I. Rogstad, Karen, editor.
[DNLM: 1. Sexually Transmitted Diseases. WC 140]
RA644.V4A24 2011
614.5′47 – dc22

2010047401

A catalogue record for this book is available from the British Library.

Set in 9.25/12 Minion by Laserwords Private Limited, Chennai, India
Printed in Singapore by Ho Printing Singapore Pte Ltd

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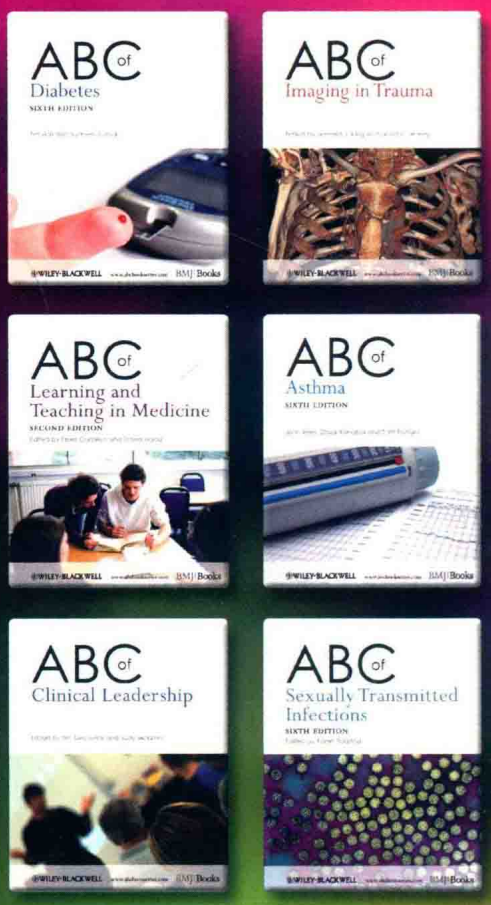

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Preface

It is over a quarter of a century since the first edition of *ABC of Sexually Transmitted Infections* was published. In that time there have been major changes in sexually transmitted infections. AIDS in 1984 was only just being recognised, but then subsequently became a major global epidemic. Initially there was no effective treatment and death was inevitable for most sufferers; now it is treatable, although the infection cannot be eliminated. While there is still no universal access to treatment, significant inroads have been made in treatment provision in resource-poor nations. Syphilis in the western world has shown a decline over the 25 years but there has been a recent resurgence. Lymphogranuloma venereum was a tropical STI but is now endemic in some communities of men who have sex with men. Gonorrhoea continues its relentless progress in developing resistance to antibiotics. STI diagnosis has changed from being labour intensive, requiring laboratory diagnosis by highly trained staff, to more sensitive tests that can be performed by a broader range of providers in the community, including the patient themselves.

The way sexual health care is provided has also shown a dramatic change, with much more community testing and treatment, and the integration of STI and contraceptive care. In addition, there has been an increased awareness of the need to address child protection issues for some sexually active adolescents. Finally, the internet has revolutionised how patients access information and services, and how professionals learn.

This new edition has also evolved over the years to reflect these changes, moving from the excellent 1984 edition written by Professor Michael Adler to a book with international authorship which brings together all the developments listed above to provide a resource for all those providing sexual health services, and those who wish to learn more about the subject. It is hoped that traditional and new sexual health care providers, as well as medical, nursing and pharmacy students, throughout the world will be able to utilise the information in this edition to enhance their own knowledge and thus improve patient care and STI prevention. I would like to acknowledge the expertise and work of the editors of the previous edition, which has formed the basis for this one – Michael Adler, Frances Cowan, Patrick French, Helen Mitchell, and John Richens.

Karen E Rogstad

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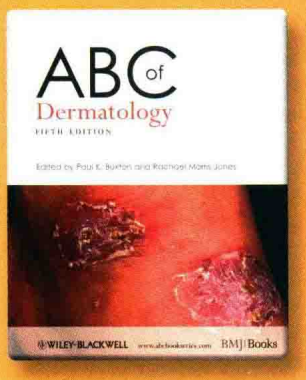

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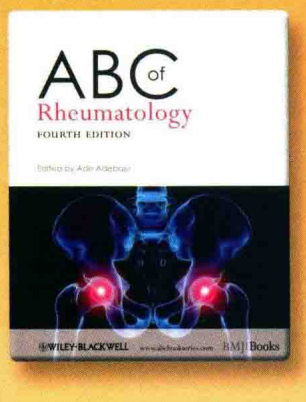

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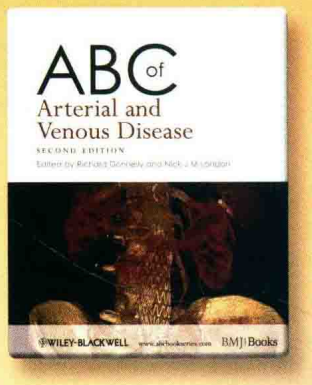

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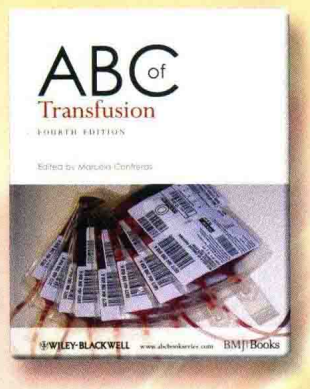

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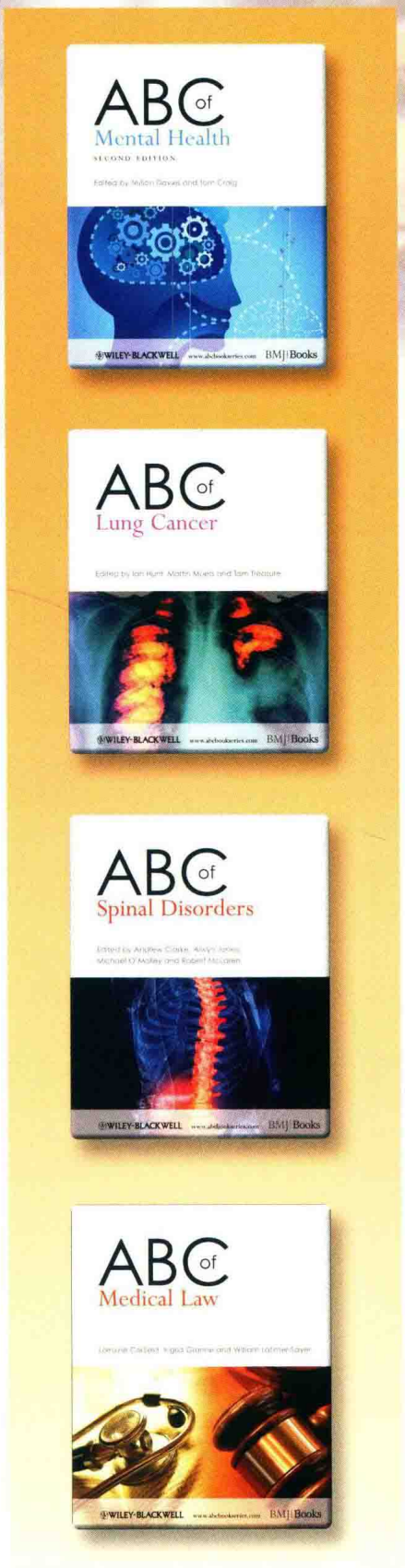

Contents

CHAPTER 1

Sexually Transmitted Infections: Why are they Important?

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OVERVIEW

- There are more than 30 different sexually transmissible bacteria, viruses and parasites
- A million people acquire HIV or another STI every day
- There are 33.4 million people with HIV worldwide, with 2.7 million new HIV infections and 2 million HIV-related deaths annually (1998 data)
- STIs (excluding HIV) are the second most common cause of healthy life lost in 15- to 44-year-old women
- STIs cost $16 billion annually to the health care system
- Preventing a single HIV transmission would save £0.5–1 million in health benefits and costs

What are sexually transmitted infections?

Sexually transmitted infections (STIs) are infections that are spread primarily through person-to-person sexual contact. There are more than 30 different sexually transmissible bacteria, viruses, and parasites (Table 1.1). Several, in particular HIV and syphilis, can also be transmitted from mother to child during pregnancy and childbirth, and through blood products and tissue transfer.

In general, the viral STIs (including sexually transmitted HIV and hepatitis A, B, and C) are more prevalent, often causing lifelong infections, frequently asymptomatic in their early phases, and may result in serious long-term sequelae including chronic morbidity or even mortality. In contrast, the bacterial and protozoal STIs are generally curable, and often asymptomatic. The causative organisms may cause a spectrum of genitourinary symptoms, including urethral discharge, genital ulceration, and vaginal discharge with or without vulval irritation.

STIs are among the most commonly diagnosed infectious diseases in many parts of the world. More than a million people acquire HIV or another STI every day, and there are 450 million new cases of curable STIs occurring in adults each year. There is marked variation in the prevalence and incidence of infections throughout the world, and even within countries (Figure 1.1 and Table 1.2).

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Why are STIs important?

Being diagnosed with an STI can have a tremendous physical, emotional, and psychological toll on individuals. Symptoms are unpleasant and may cause considerable pain, and have systemic complications. HIV and hepatitis B and C may have an aggressive course leading to lifelong morbidity and death. Some human papillomavirus (HPV) types are a cause of cervical, penile, anal, and oropharyngeal cancer (Table 1.3). Chlamydia and gonorrhoea are both the most serious, and also most preventable, threats to women's fertility worldwide. The World Bank estimated that STIs (excluding HIV) were the second most common cause of healthy life lost after maternal morbidity in 15- to 44-year-old women (Figure 1.2).

Effects on pregnancy, neonates, and children

STIs can lead to miscarriage, intrauterine growth retardation, and *in utero* death. They can also cause neonatal illness and death, and long-term sequelae. The consequences of congenital herpes and HIV are well recognised in developed nations. However, the magnitude of the congenital syphilis burden, globally, rivals that of HIV infection in neonates yet receives little attention. Congenital syphilis results in serious adverse outcomes in up to 80% of cases and is estimated to affect over 1 million pregnancies annually.

Effects on partners

STIs are also important to sexual partners, who may have asymptomatic infection. Partner notification is a key strategy for identifying and treating sexual partners for most STIs (see Chapter 2). The diagnosis of an acute STI may indicate that a partnership is non-monogamous, with negative impacts on relationships. For some couples who are discordant for infections such as HIV or herpes, there are long-term implications such as whether to have unprotected sex and psychological issues.

Stigma

The stigma and fear of STIs cannot be over-emphasised. There is significant psychological morbidity associated with being diagnosed with an STI which ranges from mild distress to severe anxiety and depression. Stigma can result in people living with HIV and other STIs being rejected, shunned, and discriminated against by partners,

Table 1.1 Main sexually transmitted pathogens and the diseases they cause.

Pathogen	Clinical manifestations and other associated diseases
	Bacterial infections
Neisseria gonorrhoea	GONORRHOEA *Men:* urethral discharge (urethritis), epididymitis, orchitis, infertility. *Women:* cervicitis, endometritis, salpingitis, pelvic inflammatory disease, infertility, preterm rupture of membranes, peri-hepatitis. *Both sexes:* proctitis, pharyngitis, disseminated gonococcal infection. *Neonates:* conjunctivitis, corneal scarring and blindness
Chlamydia trachomatis	CHLAMYDIAL INFECTION *Men:* urethral discharge (urethritis), epididymitis, orchitis, infertility. *Women:* cervicitis, endometritis, salpingitis, pelvic inflammatory disease, infertility, preterm rupture of membranes, peri-hepatitis; commonly asymptomatic. *Both sexes:* proctitis, pharyngitis, Reiter's syndrome. *Neonates:* conjunctivitis, pneumonia
Chlamydia trachomatis (strains L1–L3)	LYMPHOGRANULOMA VENEREUM *Both sexes:* ulcer, inguinal swelling (bubo), proctitis
Treponema pallidum	SYPHILIS *Both sexes:* primary ulcer (chancre) with local adenopathy, skin rashes, condylomata lata; bone, cardiovascular, and neurological damage. *Women:* pregnancy wastage (abortion, stillbirth), premature delivery. *Neonates:* stillbirth, congenital syphilis
Haemophilus ducreyi	CHANCROID *Both sexes:* painful genital ulcers; may be accompanied by bubo
Klebsiella (Calymmatobacterium) granulomatis	GRANULOMA INGUINALE (DONOVANOSIS) *Both sexes:* nodular swellings and ulcerative lesions of the inguinal and anogenital areas
Mycoplasma genitalium	*Men:* urethral discharge (nongonococcal urethritis). *Women:* bacterial vaginosis, probably pelvic inflammatory disease
Ureaplasma urealyticum	*Men:* urethral discharge (nongonococcal urethritis). *Women:* bacterial vaginosis, probably pelvic inflammatory disease
	Viral infections
Human immunodeficiency virus	ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) *Both sexes:* HIV-related disease, AIDS
Herpes simplex virus type 2 Herpes simplex virus type 1 (less commonly)	GENITAL HERPES *Both sexes:* anogenital vesicular lesions and ulcerations. *Neonates:* neonatal herpes (often fatal)
Human papillomavirus	GENITAL WARTS *Men:* penile and anal warts; carcinoma of the penis. *Women:* vulval, anal and cervical warts, cervical carcinoma, vulval carcinoma, anal carcinoma. *Neonates:* laryngeal papilloma
Hepatitis B virus	VIRAL HEPATITIS *Both sexes:* acute hepatitis, liver cirrhosis, liver cancer
Cytomegalovirus	CYTOMEGALOVIRUS INFECTION *Both sexes:* subclinical or nonspecific fever, diffuse lymph node swelling, liver disease, etc.
Molluscum contagiosum virus	MOLLUSCUM CONTAGIOSUM *Both sexes:* genital or generalized umbilicated, firm skin nodules
Kaposi's sarcoma associated herpes virus (human herpes virus type 8)	KAPOSI'S SARCOMA *Both sexes:* aggressive type of cancer in immunosuppressed persons
	Protozoal infections
Trichomonas vaginalis	TRICHOMONIASIS *Men:* urethral discharge (nongonococcal urethritis); often asymptomatic. *Women:* vaginosis with profuse, frothy vaginal discharge; preterm birth, low birth weight babies. *Neonates:* low birth weight
	Fungal infections
Candida albicans	CANDIDIASIS *Men:* superficial infection of the glans penis. *Women:* vulvo-vaginitis with thick curd-like vaginal discharge, vulval itching or burning
	Parasitic infections
Phthirus pubis	PUBIC LICE INFESTATION
Sarcoptes scabiei	SCABIES

Source: World Health Organization, 2007.

family, and community, and being victims of physical violence. Stigma not only makes it more difficult for people trying to come to terms with and manage their illness, but it also interferes with attempts to fight the disease more generally. On a national level, stigma can deter governments from taking fast, effective action against STI epidemics.

Economic burden

STIs can have significant economic impacts on the individual and community. Even where treatment for STIs is free or low cost, individuals may pay for care in the private sector, or access traditional healers, because of stigma. Aditionally, there are opportunity costs incurred through missing work, travelling to the clinic, or purchasing treatment and returning for follow-up.

The global economic impact of STIs is staggering. However, treatment costs for STIs vary tremendously between countries and are influenced a range of factors. Reproductive ill-health (death and disability related to pregnancy, childbirth, STIs, HIV, and reproductive cancers) is thought to account for 5–15% of global disease burden. In developing countries they account for 17%

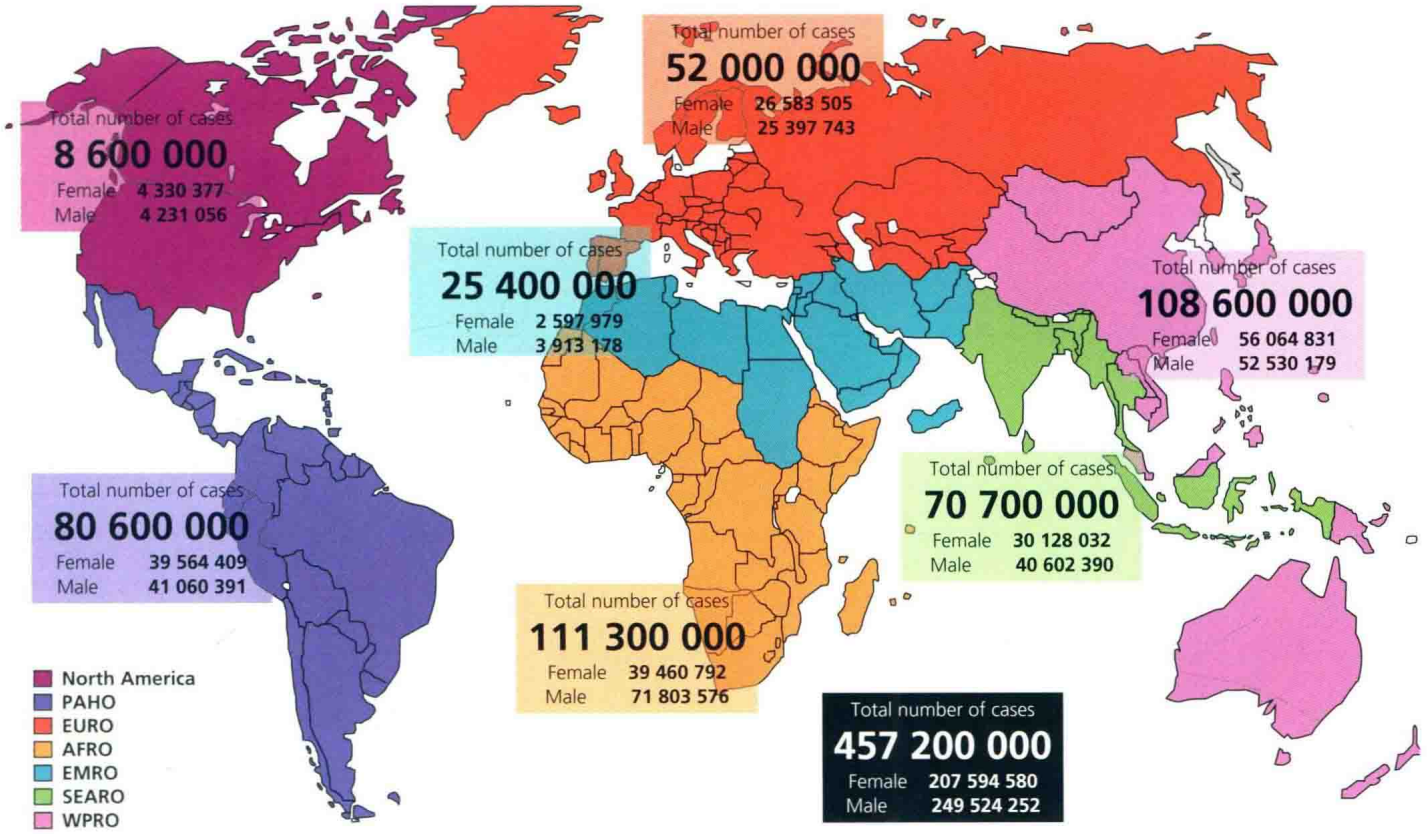

Figure 1.1 Global incidence of selected STIs, 2005. *Source*: World Health Organization, 2009.

of economic losses caused by ill-health and rank among the top 10 reasons for health care visits. In the United States, STIs cost $16 billion annually to the health care system (Tables 1.4 and 1.5). Care for the complications of STIs accounts for a large proportion of tertiary health care in terms of screening and treatment of cervical cancer, management of liver disease, investigation of infertility, care for perinatal morbidity, childhood blindness, and chronic pelvic pain. Preventing a single HIV transmission would save £0.5–1 million in health benefits and costs.

The economic impact in resource poor settings is even greater where the majority of curable STIs and HIV occur, particularly South and South-East Asia and sub-Saharan Africa (Box 1.1). Delays in the diagnosis and treatment increase complications and mortality with a substantial economic impact. In countries with high HIV prevalence, morbidity and mortality from HIV has led to important changes in average household composition and population structure.

Table 1.2 Estimated prevalence and annual incidence of curable STI by region.

Region	Adult population (millions)	Infected adults (millions)	Infected adults per 1000 population	New infections in 1999 (millions)
North America	156	3	19	14
Western Europe	203	4	20	17
North Africa & Middle East	165	3.5	21	10
Eastern Europe & Central Europe	205	6	29	22
Sub-Saharan Africa	269	32	119	69
South & Southeast Asia	955	48	50	151
East Asia & Pacific	815	6	7	18
Australia & New Zealand	11	0.3	27	1
Latin America & Caribbean	260	18.5	71	38
Total	3040	116.5	–	340

Source: World Health Organization, 2001.

Box 1.1 **Factors influencing costs and cost effectiveness of STI treatment and care**

- Health system characteristics, service delivery by public or private sector
- Economies of scale, economies of scope
- Prevalence and incidence, epidemic phase
- Transmission efficiency
- Population composition and concentration
- Resource combinations and input prices
- Incentives to providers for high quality and quantity of service delivery
- Willingness to pay for treatment as a function of price, income, and distance
- Stigmatization
- Disutility of condom use

Source: adapted from Bertozzi & Opuni (2008).

Table 1.3 Major sequelae of STIs.

	Women	Men	Infants
Cancers	Cervical cancer Vulval cancer Vaginal cancer Anal cancer Liver cancer T cell leukaemia Kaposi's sarcoma	Penile cancer Anal cancer Liver cancer T cell leukaemia Kaposi's sarcoma	
Reproductive health problems	Pelvic inflammatory disease Infertility Ectopic pregnancy Spontaneous abortion	Epididymitis Prostatitis Infertility	
Pregnancy related problems	Preterm delivery Premature rupture of membranes Puerperal sepsis Postpartum infection		Stillbirth Low birth weight Pneumonia Neonatal sepsis Acute hepatitis Congenital abnormalities
Neurological problems	Neurosyphilis	Neurosyphilis	Cytomegalovirus Herpes simplex virus Syphilis associated neurological problems
Other common health consequences	Chronic liver disease Cirrhosis	Chronic liver disease Cirrhosis	Chronic liver disease Cirrhosis

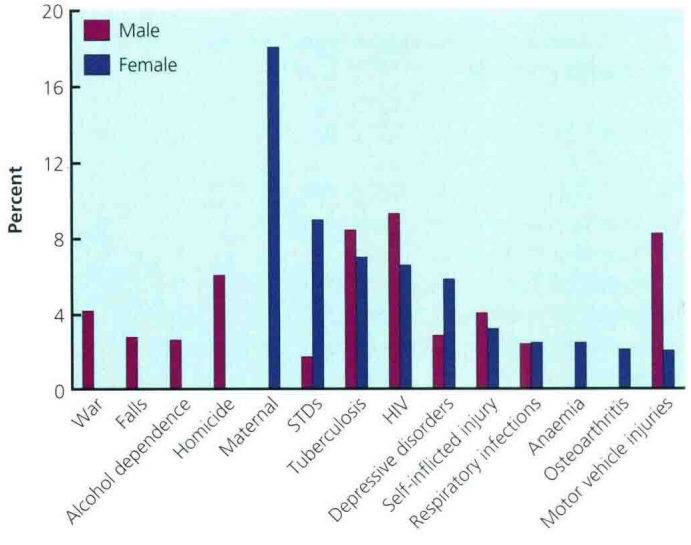

Figure 1.2 Top 10 causes of healthy life lost in young adults aged 15–44 years.

Table 1.4 Average (standard deviation) of estimated cost per unit output, by disease or syndrome and by type of output, 2001 US$.

Disease or syndrome	Treatment	Cure	Total
Syphilis	36.04 (5.91)	Not applicable	36.04 (5.91)
Urethral discharge	14.29 (20.68)	89.07 (0)	29.25 (37.94)
Genital ulcer	23.16 (21.73)	100.6 (83.74)	48.97 (59.56)
Venereal disease	25.47 (18.56)	82.65 (111.55)	31.83 (37.12)
Pelvic inflammatory disease	7.12 (3.09)	Not applicable	7.12 (3.09)
Vaginal discharge	48.23 (0)	102.92 (89.63)	81.04 (70.1)
Total	24.05 (19.04)	96.1 (73.44)	39.49 (47.23)

Source: Aral *et al.* (2005).

Table 1.5 Estimated annual burden and cost of STI in the United States.

STI	Estimated annual cases	Estimated annual direct cost (millions) US dollars
Chlamydia	2.8 million	$624
Gonorrhoea	718,000	$173
Syphilis	70,000	$22
Hepatitis B	82,000	$42
Genital herpes	1.6 million	$985
Trichomoniasis	7.4 million	$179
HPV	6.2 million	$5,200
HIV	56,300	$81,000
Total	18.9 million	$15.3 billion

Source: Centers for Disease Control and Prevention.

Size of the problem

In 2008 there were an estimated 33.4 million people living with HIV worldwide, 2.7 million new HIV infections, and 2 million HIV-related deaths (Figures 1.3 and 1.4; Table 1.6). Sub-Saharan Africa remains the region most heavily affected by HIV, accounting for 67% of all people living with HIV and for 70% of AIDS deaths in 2008. However, some of the most worrying increases in new infections are now occurring in populous countries in other regions, such as Indonesia, the Russian Federation, and various high-income countries. The rate of new HIV infections has fallen in several countries, including 14 of 17 African countries, where the percentage of young pregnant women (15–24 years) living with HIV has declined since 2000. As treatment access has increased over the last 10 years, the annual number of AIDS deaths has fallen. Globally, the percentage of women among people living with HIV has remained stable (at 50%) for several years, although women's share of infections is increasing in several countries.

Table 1.6 Prevalence of STIs among 14- to 19-year-old US females, NHANES, 2003–2004.

	All		Sexually experienced	
	Number	Prevalence (%)	Number	Prevalence (%)
HPV (HR6,11)	652	18.3	357	29.5
Chlamydia	793	3.9	396	7.1
Trichomonas	695	2.5	371	3.6
HSV-2	729	1.9	370	3.4
'Any STI'	612	25.7	347	39.5

Source: adapted from Forhan SE, Gottlieb SL, Sternberg MR, Xu F, Datta SD, McQuillan GM, *et al.* Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in the United States. *Pediatrics* 2009;**124**(6):1505–12.