

## SUPPLEMENTARY DATA 3

### The effects of free condom distribution on HIV and other sexually transmitted infections in men who have sex with men

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#### Burden of disease

DALYs of the various STIs were calculated using uniform age weights, and without discounting, using the following formula [1,2]:

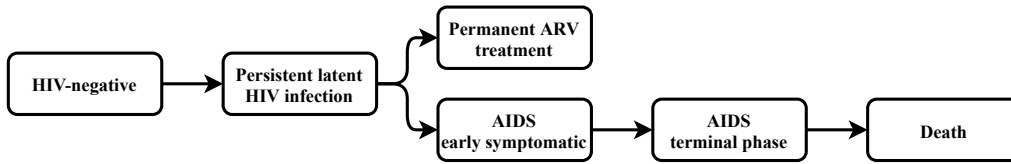
$$\begin{aligned} DALY &= YLD + YLL \\ &= IcTpDwLd + IcTpLl \end{aligned}$$

Where  $YLD$  is years lived with disability,  $YLL$  is years of life lost,  $Ic$  is the annual number of incident cases,  $Tp$  is the transition probability of entering a disease stage,  $Dw$  is the disability weight of the disease stage,  $Ld$  is the duration of the disease stage in years, and  $Ll$  are the years lost due to premature death caused by infection. The life expectancy of healthy males in the Netherlands was 79.5 years in 2011 [3]. Generalised courses of infection of HIV, hepatitis C, chlamydia, gonorrhoea, and syphilis in Dutch MSM in presence of treatment were constructed and included in the models. Parameter estimates of these generalised courses of infection were taken from *Cassini et al* [4] and are shown in *Table 1*.

For HIV, the course of infection start with a persistent HIV infection that can lead to permanent antiretroviral (ARV) treatment, or to early symptomatic AIDS, terminal phase AIDS, and premature death. We assumed that HIV was acquired at age 37.9 years [5]. The course of infection with hepatitis C was assumed as follows: the infection starts with an acute stage, followed by a chronic stage, which leads first to compensated liver cirrhosis, then to decompensated liver cirrhosis, hepatocellular carcinoma, and ultimately to premature death. Sexually transmitted hepatitis C is only found

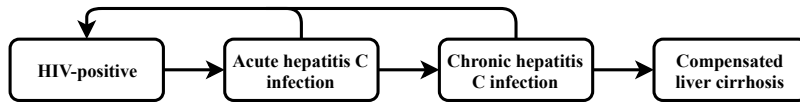
among HIV-infected MSM and we assumed that the infection was acquired at age 42.6 years [6]. Acute and chronic infections could be cleared or progress towards compensated liver cirrhosis. No further stages of the disease (de-compensated liver cirrhosis, hepatocellular carcinoma and premature death) will be entered as this would exceed the life expectancy of 79.5 years. For chlamydia and gonorrhoea, complications can occur after infection, but all cases recovered due to either spontaneous clearance or treatment. Syphilis' course of infection is composed of three stages (primary, secondary and tertiary syphilis) and recovery can occur in every stage and is seen for all cases. DALYs per STI were estimated as follows:

### HIV:



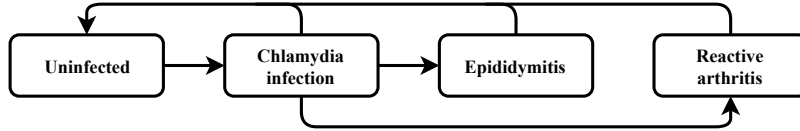
$$\begin{aligned}
 DALY_{hiv} = & I_{c_{hiv}} D w_{phi} L d_{phi} \\
 & + I_{c_{hiv}} T p_{pat} D w_{pat} L d_{pat} \\
 & + I_{c_{hiv}} T p_{aes} D w_{aes} L d_{aes} \\
 & + I_{c_{hiv}} T p_{atp} D w_{atp} L d_{atp} \\
 & + I_{c_{hiv}} T p_d L l_d
 \end{aligned}$$

### Hepatitis C:



$$\begin{aligned}
 DALY_{hepc} = & I_{c_{hepc}} D w_{ahci} L d_{ahci} \\
 & + I_{c_{hepc}} T p_{chci} D w_{chci} L d_{chci} \\
 & + I_{c_{hepc}} T p_{cc} D w_{cc} L d_{cc}
 \end{aligned}$$

**Chlamydia:**



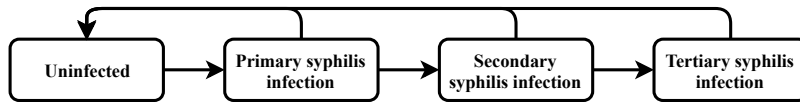
$$\begin{aligned}
 DALY_{chlam} = & I_{c_{chlam}} D w_{ci} L d_{ci} \\
 & + I_{c_{chlam}} T p_e D w_e L d_e \\
 & + I_{c_{chlam}} T p_{ra} D w_{ra} L d_{ra}
 \end{aligned}$$

**Gonorrhoea:**



$$\begin{aligned}
 DALY_{gono} = & I_{c_{gono}} D w_{gi} L d_{gi} \\
 & + I_{c_{gono}} T p_e D w_e L d_e
 \end{aligned}$$

**Syphilis:**



$$\begin{aligned}
 DALY_{syph} = & I_{c_{syph}} D w_{psi} L d_{psi} \\
 & + I_{c_{syph}} T p_{ssi} D w_{ssi} L d_{ssi} \\
 & + I_{c_{syph}} T p_{tsi} D w_{tsi} L d_{tsi}
 \end{aligned}$$

Table 1. Parameters used in the DALY calculations.

Infection	Disease stage	Transition probability	Disability weight	Duration
<b>HIV</b>	Persistent HIV infection		$Dw_{phi}$ 0.108	$Ld_{phi}$ 9.27
	Permanent ARV treatment	$Tp_{pat}$ 94.25%	$Dw_{pat}$ 0.108	$Ld_{pat}$ 32.33
	AIDS early symptomatic	$Tp_{aes}$ 5.75%	$Dw_{aes}$ 0.351	$Ld_{aes}$ 5.36
	AIDS terminal phase	$Tp_{atp}$ 1.85%	$Dw_{atp}$ 0.574	$Ld_{atp}$ 0.08
	Death	$Tp_d$ 1.85%		$Ll_d$ 26.89
<b>Hepatitis C</b>	Acute hepatitis C infection		$Dw_{ahci}$ 0.013	$Ld_{ahci}$ 0.13
	Chronic hepatitis C infection	$Tp_{chci}$ 75.60%	$Dw_{chci}$ 0.070	$Ld_{chci}$ 36.50
	Compensated cirrhosis	$Tp_{cc}$ 44.96%	$Dw_{cc}$ 0.070	$Ld_{cc}$ 0.27
	Chlamydia infection		$Dw_{ci}$ 0.002	$Ld_{ci}$ 0.02
<b>Chlamydia</b>	Epididymitis	$Tp_e$ 15.56%	$Dw_e$ 0.176	$Ld_e$ 0.04
	Reactive arthritis	$Tp_{ra}$ 0.31%	$Dw_{ra}$ 0.402	$Ld_{ra}$ 0.27
	Gonorrhoea infection		$Dw_{gi}$ 0.051	$Ld_{gi}$ 0.02
<b>Gonorrhoea</b>	Epididymitis	$Tp_e$ 2.91%	$Dw_e$ 0.176	$Ld_e$ 0.08
	Primary syphilis infection		$Dw_{psi}$ 0.004	$Ld_{psi}$ 0.31
<b>Syphilis</b>	Secondary syphilis infection	$Tp_{ssi}$ 23.00%	$Dw_{ssi}$ 0.125	$Ld_{ssi}$ 0.10
	Tertiary syphilis infection	$Tp_{tisi}$ 0.30%	$Dw_{tisi}$ 0.407	$Ld_{tisi}$ 0.03

*DALY = disability adjusted life year, ARV = antiretroviral.*

## References

- [1] Murray CJ, Ezzati M, Flaxman AD, Lim S, Lozano R, Michaud C, Naghavi M, Salomon JA, Shibuya K, Vos T, Wikler D, Lopez AD: **GBD 2010: design, definitions, and metrics.** *Lancet* 2012, **380**:2063-6.
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