

ACE-PREVENTION PAMPHLETS

GENERAL POPULATION RESULTS PAMPHLET 8 COST-EFFECTIVENESS OF HIV INTERVENTIONS

1. MAIN MESSAGES

- Needle syringe programs should continue and could be increased.
- Continuation of funding of non-occupational post-exposure prophylaxis could be considered if targeted to men having sex with men (MSM) after receptive anal sex, rather than all potential exposures.
- Circumcision of MSM is recommended but could lead to large upfront costs if all eligible men are circumcised and there may be significant cultural and social barriers to overcome.
- Pre-exposure prophylaxis taken intermittently is recommended for implementation subject to evidence from studies.
- Early use of antiretrovirals (ARVs) would not be recommended at current prices and uncertainty exists surrounding their effect on infectiousness.
- Anal cytology screening is cost-ineffective compared to annual digital rectal screening for anal cancers.

2. BACKGROUND

Huge improvements in the outlook for people living with HIV have taken place since the introduction of highly active antiretroviral medications with most people expected to live a near-normal lifespan. Previous estimates have suggested that HIV prevention was cost-saving and treatment of HIV, cost-effective. But rising rates of HIV infection have brought into question the effectiveness and cost-effectiveness of current prevention programs and new biomedical approaches for prevention have been studied.

3. INTERVENTIONS

We reviewed the literature on prevention and treatment. An expert panel of stakeholders including community, government, medical, and academic representatives chose six interventions for evaluation from the 17 options presented on the basis that they were on the policy agenda; represented a mix of classic and new prevention technologies and healthcare; had data to inform the modelling; and could be brought together into a doctoral research program. Unless otherwise stated, the interventions were targeted at MSM in Australia.

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ACE-PREVENTION

DESCRIPTION OF INTERVENTIONS

- a) **Needle Syringe Programs:** sterile needles and syringes are provided through needle syringe programs (NSP) at no or low cost as well as advice on injection behaviour, safe sex and referral to other services. Injection drug users were the target population.
- b) **Adult male circumcision:** would be a program to circumcise men having sex with men (MSM) to prevent HIV acquisition. Four target groups were compared: young MSM; MSM aged 35-44 years (highest incidence of HIV acquisition); insertive MSM; and all MSM.
- c) **Non-occupational post-exposure prophylaxis:** provision of one month supply of 2-3 antiretroviral medicines to MSM with a recent potential high-risk sexual exposure to HIV.
- d) **Pre-exposure prophylaxis:** two antiretrovirals taken by HIV negative MSM with high sexual risk behaviour as well as prevention counselling and medical monitoring. Pre-exposure prophylaxis could be taken continuously or intermittently.
- e) **Early use of antiretrovirals for treatment and/or prevention:** initiation of ARVs in all patients with HIV regardless of CD4 T-cell count.
- f) **Anal cytology screening for anal intraepithelial neoplasia:** annual anal cytology in HIV+ MSM using liquid based cytology and follow-up of high grade cytology by high resolution anoscopy with biopsy and treatment of lesions with topical therapies. We also considered a program of annual digital rectal examination (DRE) to detect early anal cancers.

4. COMPARATOR

The status-quo was the comparator for all interventions except the NSP where a hypothetical situation where no program was in place applied.

5. RESULTS

Needle-syringe programs were cost saving at current levels (Table 1) and there would be increased healthcare cost-savings if the funding and provision of sterile injection equipment were increased by 50-75% compared to current levels of funding. Decreased funding would be associated with greater decreases in health care cost-offsets than would be saved in program costs.

Adult male circumcision would be cost-saving if targeted to men who predominantly are the insertive partner in anal sex; it is likely to be cost-effective if implemented for all men but there would be high program costs, especially initially; programs for young men would have a significant likelihood of not being cost-effective.

Pre-exposure prophylaxis could have a big impact on incidence and prevalence of HIV in men having sex with men but at high budget costs at current antiretroviral prices and uncertain cost-effectiveness.

Post-exposure prophylaxis, as currently provided in Australia, is not cost-effective, with a very limited impact on HIV incidence. If targeted to HIV negative men having unprotected receptive anal sex only, the incremental cost-effectiveness ratio is below \$50,000/DALY.

Early use of antiretrovirals as treatment alone would not be cost-effective but the inclusion of the benefits of prevention would have an impact on the incremental cost-effectiveness ratio, mainly by additional healthcare cost-offsets related to fewer HIV infections.

Anal cytology screening may be cost-effective compared to no program but has very significant uncertainty surrounding the incremental cost-effectiveness ratio. However digital rectal examination is cost-saving and/or cost-effective compared to no program.



Table 1: Health impact, costs and incremental cost-effectiveness ratios for six HIV interventions

Interventions	Health impact (95% CI or interquartile range-IQR)	Annual budget	ICER	ICER (95% CI)
Needle Syringe Programs	75,000 HIV infections (IQR 41,000-84,000) 190,000 HCV infections (IQR 185,000-206,000) prevented 365,703 DALYs	\$24m	Cost-saving \$2.3bn (IQR \$1.7-\$4.0bn)	
Circumcision				
Circumcision insertive	240 to 650 HIV infections prevented	Initial \$5m to \$140m	cost-saving	cost-saving
Circumcision All MSM	1.4%-3.7% of expected incidence	Ongoing \$3m to \$5m	\$8,900/DALY	cost-saving to \$45,000
Circumcision 35-44 year olds	1,800 to 4,900 DALYs		\$9,100/DALY	cost-saving to \$22,000
Circumcision Young			\$35,000/DALY	\$700 to \$110,000
Pre-exposure prophylaxis				
Pre-exposure prophylaxis Continuous	HIV prevalence could fall to 6.8% over 20 years vs rise to 14% with no program. 95,000 DALYs (55,000 to 160,000)	\$420m	\$46,000/DALY	\$24,000 to \$69,000
Pre-exposure prophylaxis Intermittent		\$210m	\$5,600/DALY	cost-saving to \$18,000
Post-exposure prophylaxis				
Post-exposure prophylaxis	3 HIV infections prevented per year 540 DALYs (430 to 660)	\$3m-\$5m	\$190,000/DALY	\$170,000 to \$210,000
Early Rx alone				
Early Rx alone	11,000 DALYs (3,600 to 20,000)	\$40m	\$140,000/DALY	\$65,000 to \$350,000
Early Rx with prevention effect				
Early Rx with prevention effect	12,000 DALYs (5400-14,000) including Rx and prevention	\$40m	\$59,000/DALY	cost-saving to \$143,000
DRE				
		DRE \$450,000	DRE cost-saving	Cost-saving to \$37,000
Anal cytology				
Anal cytology	2000 (0 to 14,000)	Cytology \$5m	Cytology \$33,000/DALY vs nil	cost-saving to \$330,000
		Cytology \$5m	\$53,000/DALY vs DRE	cost-saving to \$700,000

In addition to the technical economic evaluation (cost-effectiveness analysis) the steering committee discussed and evaluated other considerations that effect implementation of options for change. These are presented in Tables 2 and 3 demonstrating the reasons often provided for changes to decisions when setting priorities in health. Acceptability to stakeholders is often paramount in these discussions.

Table 2: The stakeholders ranked the interventions after the economic analyses.

Decision	Intervention	Main reason
Should fund	Needle Syringe Programs Pre-exposure prophylaxis	Cost-saving Impact on epidemic
Could fund	Circumcision Early use of treatment as prevention	Potentially cost-saving May be cost-effective if prevention effect within plausible limits
Don't fund	Early use of treatment Non-occupational post-exposure prophylaxis Anal cytology	Not likely to be cost-effective Not good value for money Lack of evidence

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Table 3: Stakeholder ranking following second stage filter discussion

Stakeholder decision	Intervention	Summary of second stage filters
Should fund	Needle Syringe Programs	Generally acceptable now
	Pre-exposure prophylaxis	Moral imperative to use available technology Intermittent use may make more cost-effective
	Non-occupational post-exposure prophylaxis	Indemnity risks if person denied service acquired HIV.
Could fund	Early use of treatment and/or as prevention	Easy to implement
Doubtful	Circumcision	Feasibility and acceptability
	Anal cytology	Feasibility and acceptability

6. ABOUT ACE-PREVENTION

To aid priority setting in prevention, the Assessing Cost-Effectiveness in Prevention Project (ACE-Prevention) applies standardised evaluation methods to assess the cost-effectiveness of 100 to 150 preventive interventions, taking a health sector perspective. This information is intended to help decision makers move resources from less efficient current practices to more efficient preventive action resulting in greater health gain for the same outlay.

For more information on this topic area, please visit website www.sph.uq.edu.au/bodce-ace-prevention

PAMPHLETS IN THIS SERIES

Methods:

- A. The ACE-Prevention project
- B. ACE approach to priority setting
- C. Key assumptions underlying the economic analysis
- D. Interpretation of ACE-Prevention cost-effectiveness results
- E. Indigenous Health Service Delivery

Overall results

1. League table
2. Combined effects

Indigenous population results

1. Cardiovascular disease prevention
2. Diabetes prevention
3. Screening and early treatment of chronic kidney disease

General population results

1. Adult depression
2. Alcohol
3. Blood pressure and cholesterol lowering
4. Cannabis
5. Cervical cancer screening, Sunsmart and PSA screening
6. Childhood mental disorders
7. Fruit and vegetables
8. HIV
9. Obesity
10. Osteoporosis
11. Physical activity
12. Pre diabetes screening
13. Psychosis
14. Renal replacement therapy, screening and early treatment of chronic kidney disease
15. Salt
16. Suicide prevention
17. Tobacco