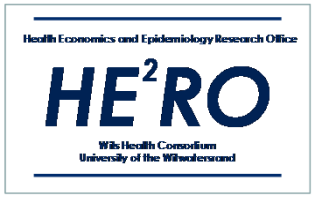
Modelling the cost of ART for prevention

Gesine Meyer-Rath[1,2], Mead Over[3], Lawrence Long[2]

[1] Center for Global Health and Development, Boston University, Boston, US.

[2] Health Economics and Epidemiology Research Office, University of Witwatersrand, Johannesburg, South Africa.

[3] Center for Global Development, Washington DC, US.



Prevention

Things are changing

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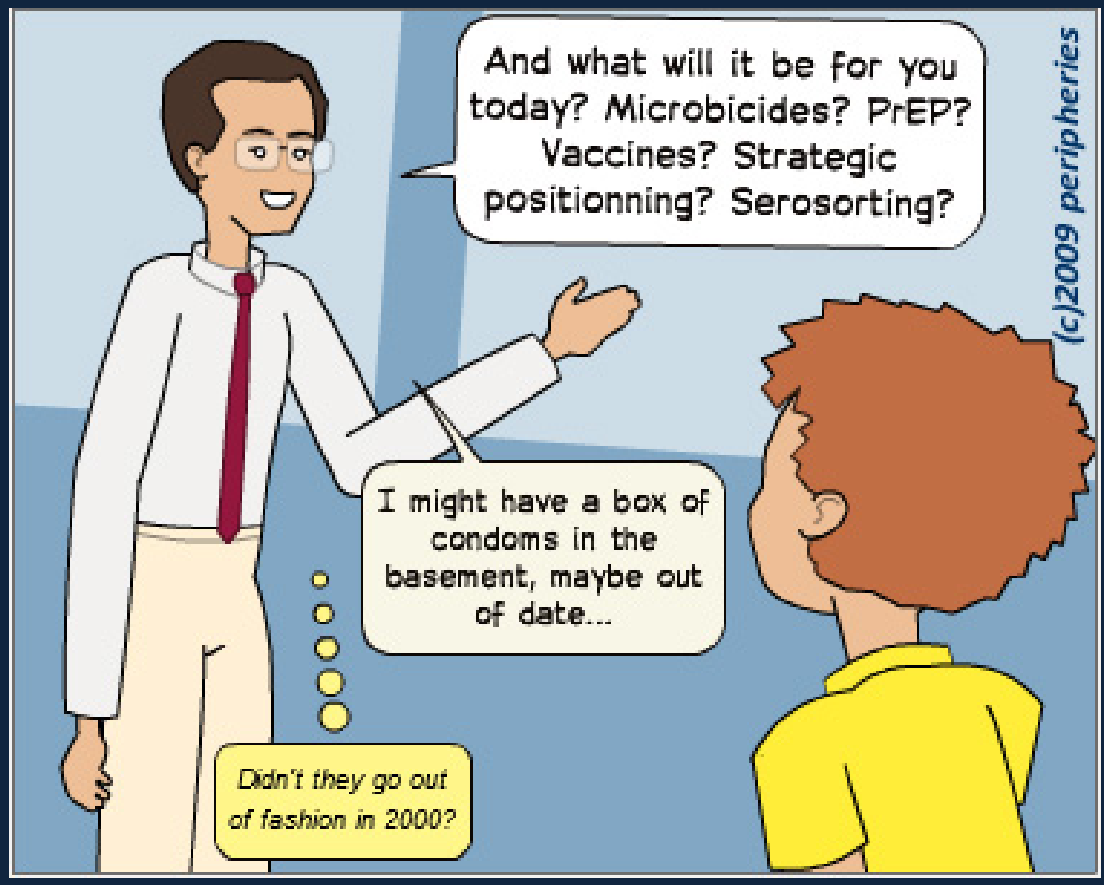
Prevention



What's in a projection model?

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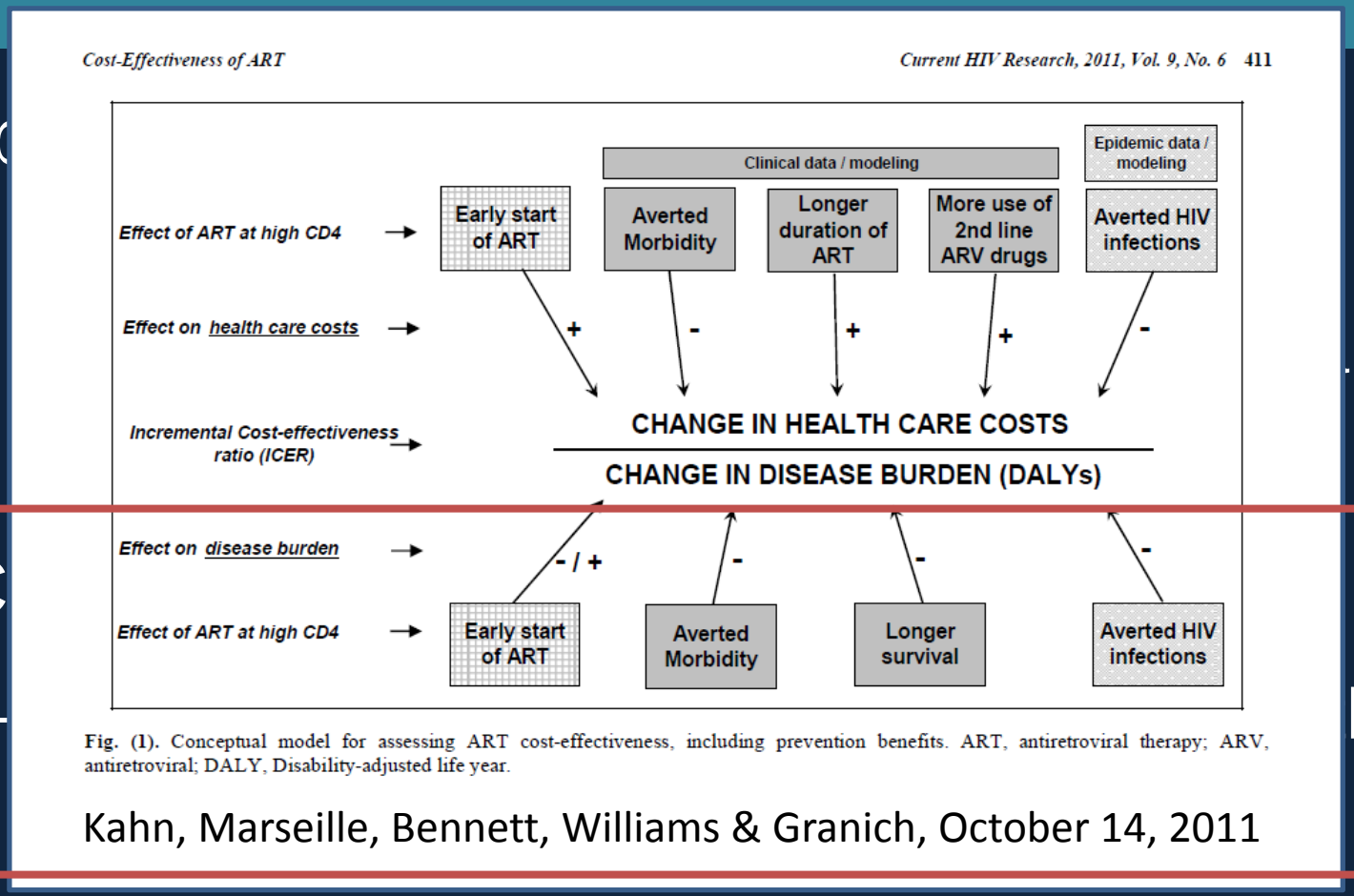


Cost-Effectiveness of ART *Current HIV Research, 2011, Vol. 9, No. 6* 411

Fig. (1). Conceptual model for assessing ART cost-effectiveness, including prevention benefits. ART, antiretroviral therapy; ARV, antiretroviral; DALY, Disability-adjusted life year.

Kahn, Marseille, Bennett, Williams & Granich, October 14, 2011

Identities vs. functions

- Cost accounting identity
  - Too rigid to model large scale changes over periods of more than a few years
  - Not appropriate to model ART as prevention
- Cost function
  - More plausible characterisation and projection of cost

Use of cost functions in the literature

- Reviewed 8 literature databases from1988-2011 + References + Grey literature for ART costing
- Included all with a modelled cost
- Compared by: economic evaluation method, type of model, time horizon, outcome metric, input cost

Results: Literature Review

- 45 published articles, 1 conference abstract and 4 reports
  - 38 for single countries
  - 4 for wider regions
  - 8 were global
- 5, all for single countries, considered the impact of ART on transmission

Results: Literature Review - including transmission

Paper, year (country)	Analysis
Over 2004 (India)	HIV/AIDS treatment and prevention in India: Modelling the costs and consequences
Granich 2009 (South Africa)	Impact of universal voluntary testing and immediate treatment (UTT) on HIV incidence and prevalence and annual cost
Long EF 2010 (United States)	The cost effectiveness and population outcomes of expanded HIV screening and ART in the US
Hontelez 2011 (South Africa)	Incremental cost benefit of ART initiation at CD4 cell count threshold < 200 vs. <350
Schwartländer 2011 (Int.)	Incremental cost effectiveness of "investment approach" to achieving universal access to HIV prevention, treatment, care and support by 2015

Factors influencing cost

Paper	Factors influencing input cost (Including in sensitivity analysis, SA)
Over (2004)	Time on treatment (first 3 years vs. year before death); health state (symptomatic, non-AIDS | AIDS); unstructured vs. structured treatment provision; SA: Cost not included
Granich (2009)	Drug cost by FL/ SL, otherwise constant unit cost; No SA
Long EF (2010)	One regimen cost only; health state (untreated symptomatic | untreated symptomatic | treated symptomatic | untreated AIDS | treated AIDS); SA: Cost not included
Hontelez (2011)	On ART cost by *baseline* CD4 cell count (100|200|350) for first 3 years, then uniform; drug cost by FL/ SL; SA: Cost varied by +/- 33%
Schwartländer (2011)	"Average cost per patient of antiretroviral therapy is assumed to decline by about 65% between 2011 and 2020, with a large proportion of the cost savings after 2015 coming from an increasing shift to primary care and community-based approaches and cheaper point-of-care diagnostics"; No SA
Granich (2012)	Drug cost by FL/SL; Laboratory cost by first year on regimen or > 1 year; Inpatient / outpatient cost based on treatment status; SA: Varied ART, monitoring, inpatient costs based on data available for South Africa.

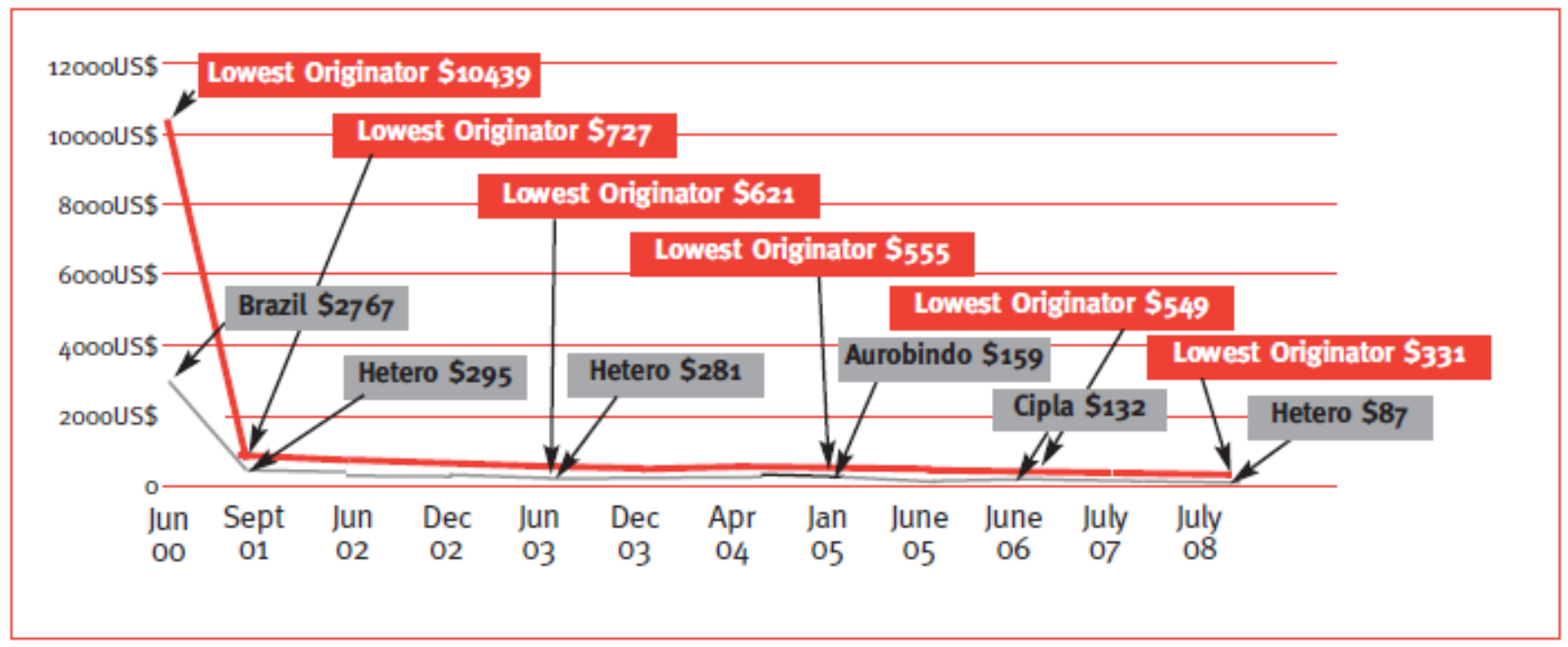
Potential determinants of a cost function

- Most modelled estimates of ART to date use cost accounting identities, with minimal use of cost functions
- If a more flexible cost function where to be used, which variables should be included?

Treatment characteristics

- Regimens, health states and time on treatment
- More complex = higher treatment costs
- Distribution into first and second line
- Distribution across CD4 count strata
- Time on treatment dictating likelihood of an event

Factor prices



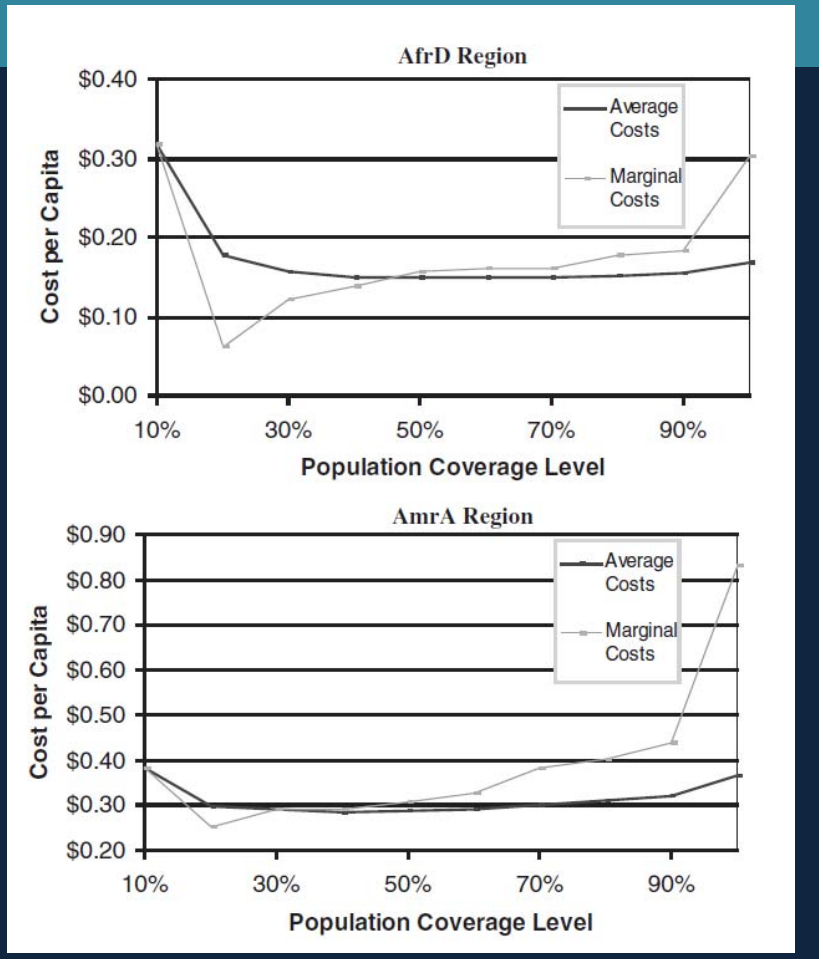
The development of the price of d4T+3TC+NVP 2000 - 2008

MSF Campaign for Access to Essential Medicines: Untangling the Web of Antiretroviral Price Reductions. 11th edition, July 2008

Scale

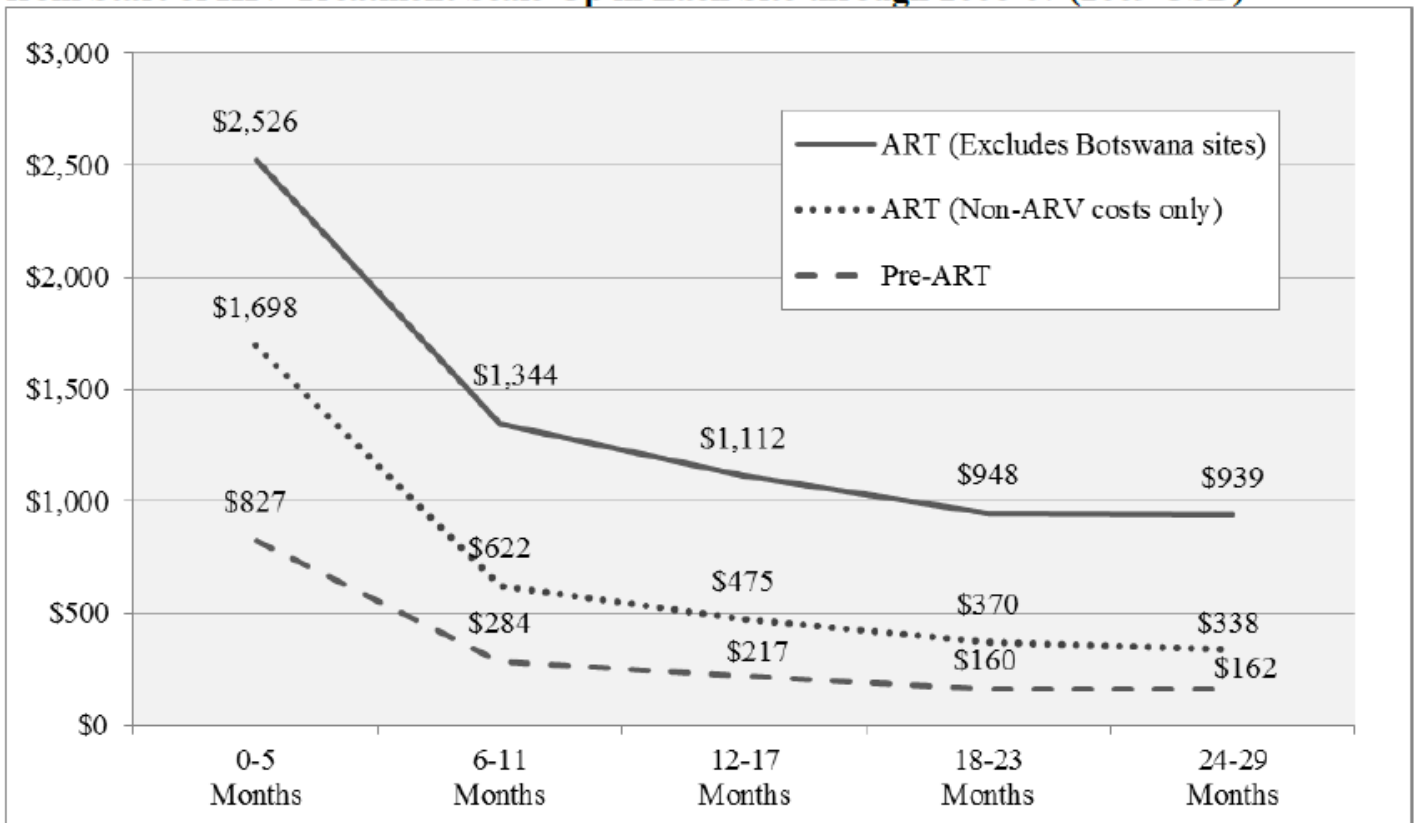
- Marginal and average cost for hygiene outreach in 2000 Int'l $
- Adjustment for scale used in WHO-CHOICE generalized CEA
- Modelled on world-wide GPS data (clinic and population density)
- Calculated transport cost of goods, fixed and supervision costs; health centre cost excluded

Johns B, Baltussen R: Accounting for the cost of scaling-up health interventions.
Health Econ. 13: 1117–1124 (2004)



Experience of facility and program

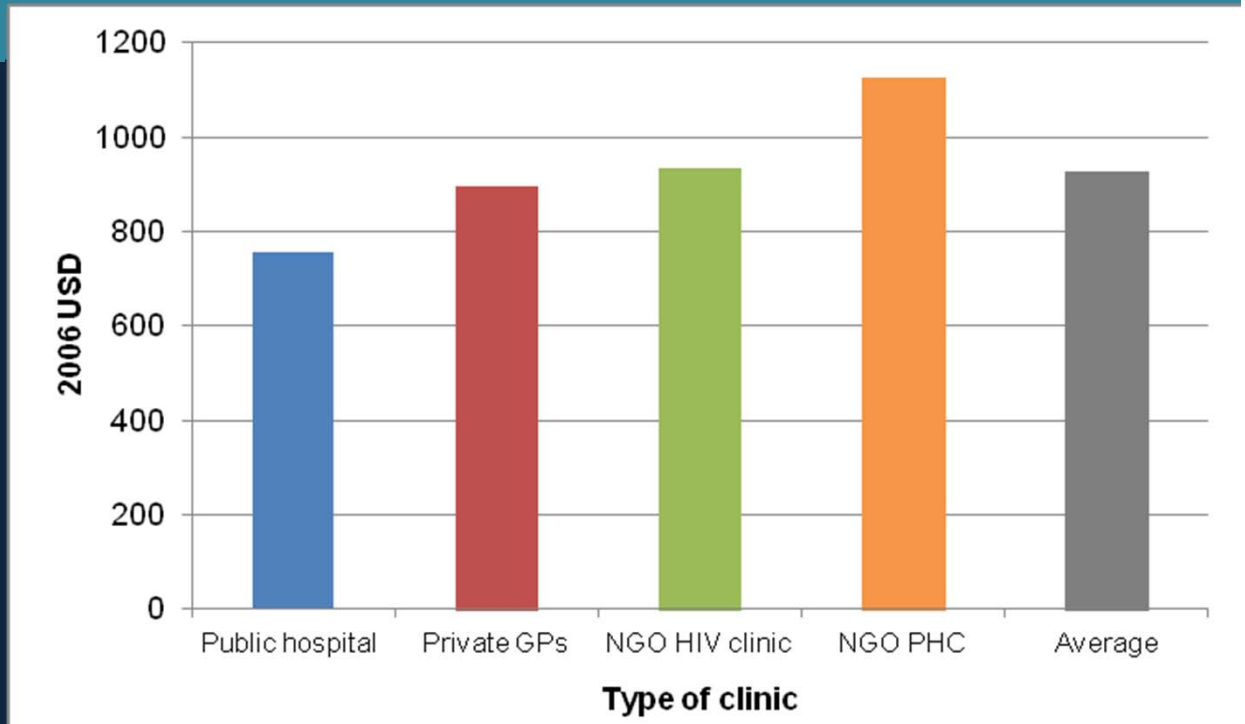
Figure Two: Change in Median Per-Patient Financial Costs in Successive 6-Month Periods, from Start of HIV Treatment Scale-Up in Each Site through 2006-07 (2009 USD)



Menzies et al, 2011, PEPFAR data.

Scope and distribution

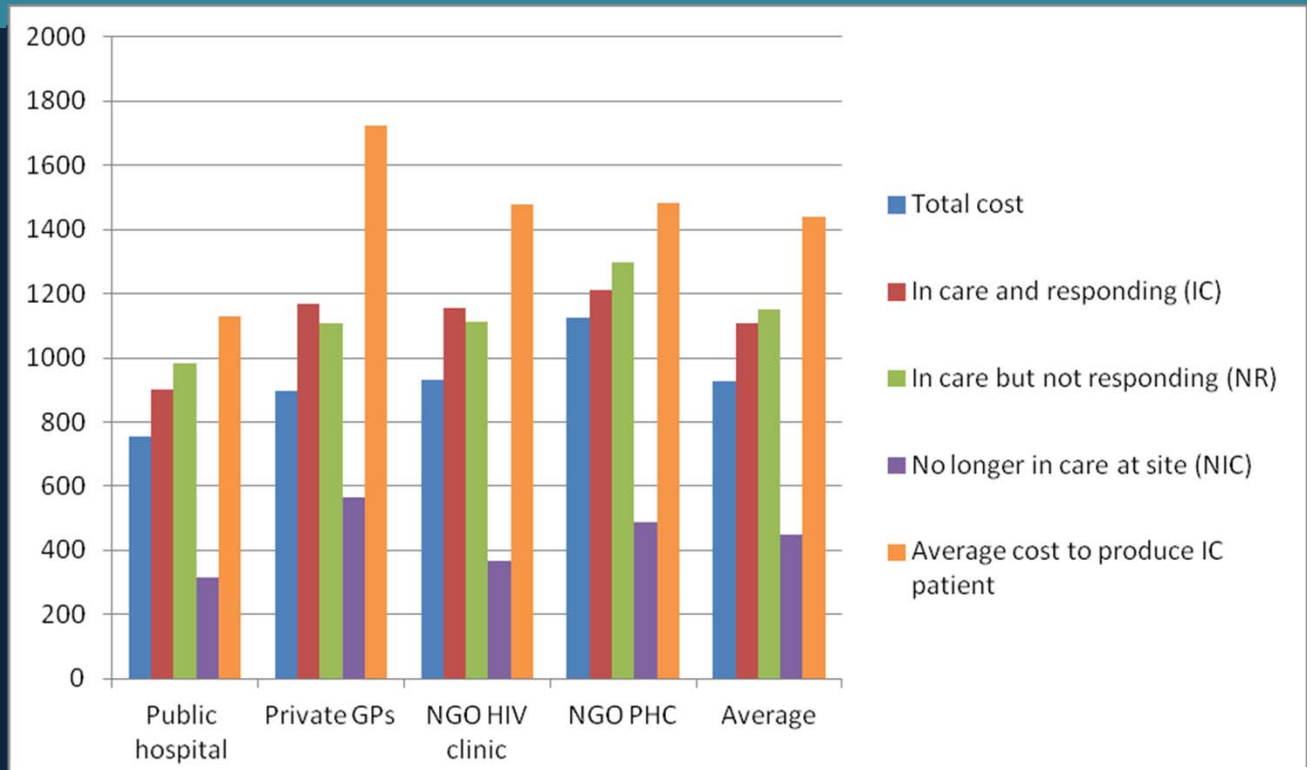
- Analysis of cost of ART provision amongst different models of care
- 4 settings in South Africa (GP/ MP/ EC)
- Annual per patient cost in each setting



Rosen et al: The outcomes and outpatient costs of different models of antiretroviral treatment
delivery in South Africa. Trop Med Intern Health 13(8):1005-15 (2008)

Quality of care

- "In care and (not) responding" defined by VL, CD4 and new WHO stage 3/ 4 conditions
- "No longer in care" pt died or was lost to follow-up in the first 12 months



Rosen et al: The outcomes and outpatient costs of different models of antiretroviral treatment
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Technical efficiency

- Production of good/service without waste
- Incentives: Salaries (private vs. public)
- Non financial incentives: Encouragement and supervision
- Technical changes: take into account things not currently used / invented