

# Expanded HIV Screening in the US: What Will It Cost, and Who Will Pay? A Budget Impact Analysis

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# Poll 1: Why are you attending this cyber-seminar?

- I am interested in the methods (budget impact analysis)
- I am interested in the topic (HIV screening)
- I am interested in both the methods and topic
- At the time it seemed like a good idea to attend, but I'm not sure why I am here

# Poll 2: What is your comfort level with cost analysis?

- I take primary responsibility for conducting cost analyses
- I work on collaborative teams that conduct cost analysis, but I don't do the number crunching
- I understand the main concepts but I do not conduct this type of research
- I am a newbie!

# Research paper details

- Martin EG, Paltiel AD, Walensky RP, Schackman BR. Expanded HIV Screening in the US: What Will It Cost Government Discretionary and Entitlement Programs? A Budget Impact Analysis. *Value in Health* 2010; 13(8): 893-902
- Funding sources: NIDA (R01DA015612), NIAID (R37AI042006), AHRQ (T32HS017589), NIMH (R01MH65869, R01MH073445), Doris Duke Charitable Foundation (Clinical Scientist Development Award)

# Cyber-Seminar Objectives

- By the end of this session, you should be able to...
  - Articulate the major national policy initiative to expand HIV screening, and its rationale
  - Explain the difference between cost effectiveness and budget impact analysis
  - Identify how you could apply this tool to your own research area

# Are current HIV screening practices working?

- 1 in 5 HIV+ Americans unaware of serostatus
- 2 in 5 of newly identified HIV+ cases receive an AIDS diagnosis within a year of HIV detection

The majority of “late testers” receive an HIV test because of illness, not through routine care

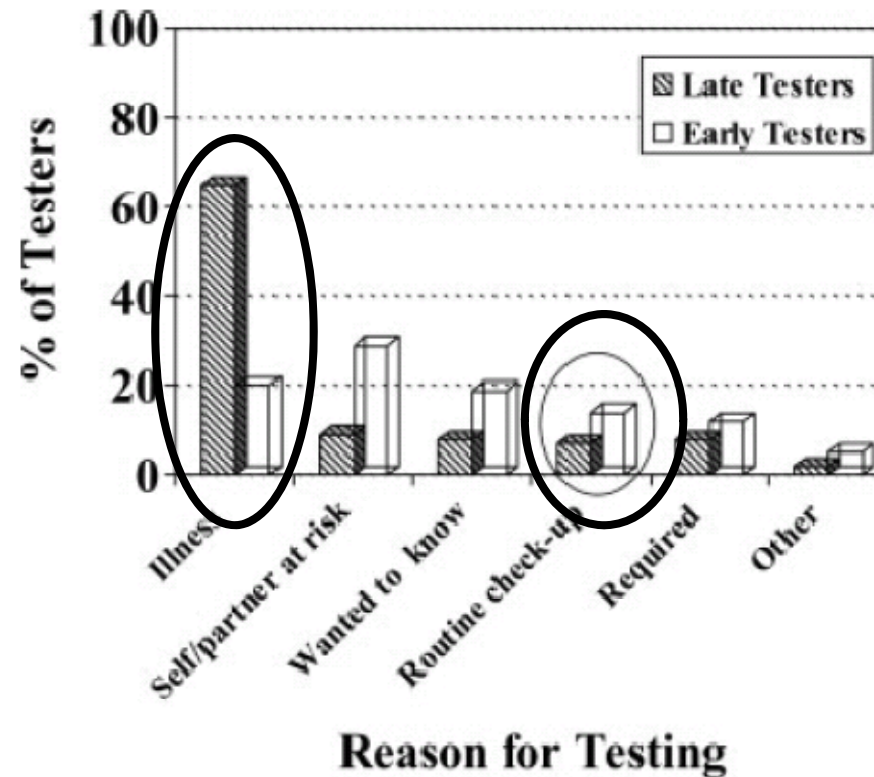


Fig. 1. Percentage of late and early testers, by reason for testing, United States, 2000–2003. Late Testers are persons who had their first positive HIV test <1 year of diagnosis of AIDS. Early Testers are persons who either had their first positive HIV test >5 years before the diagnosis of AIDS or had >5 years without a diagnosis of AIDS after their first positive HIV test.

# Revised CDC HIV screening guidelines (September 2006)

- Key revisions
  - Testing in general populations (previous: high-risk populations and high-prevalence areas)
  - Opt-out testing (previous: signed opt-in consent)
- Public health motivations
  - Earlier detection and referral to care saves lives
  - Cost effectiveness
  - Potential way to reduce secondary transmission



# Common misconceptions

- “Cost effective” = “cheap” = “saves money”
  - Cost effectiveness analysis compares relative value
- If a policy intervention is “cost effective,” then we should be willing to pay for it
  - Cost effectiveness analysis considers societal perspective; ignores issue of who pays and who benefits

# Affordability $\neq$ efficiency

- Under-funding HIV programs may yield large numbers of newly-identified cases who are unable to receive care
- Fragmented US healthcare system makes it difficult to apply societal perspective used in cost effectiveness analysis

# HIV treatment is financed through a fragmented system of care

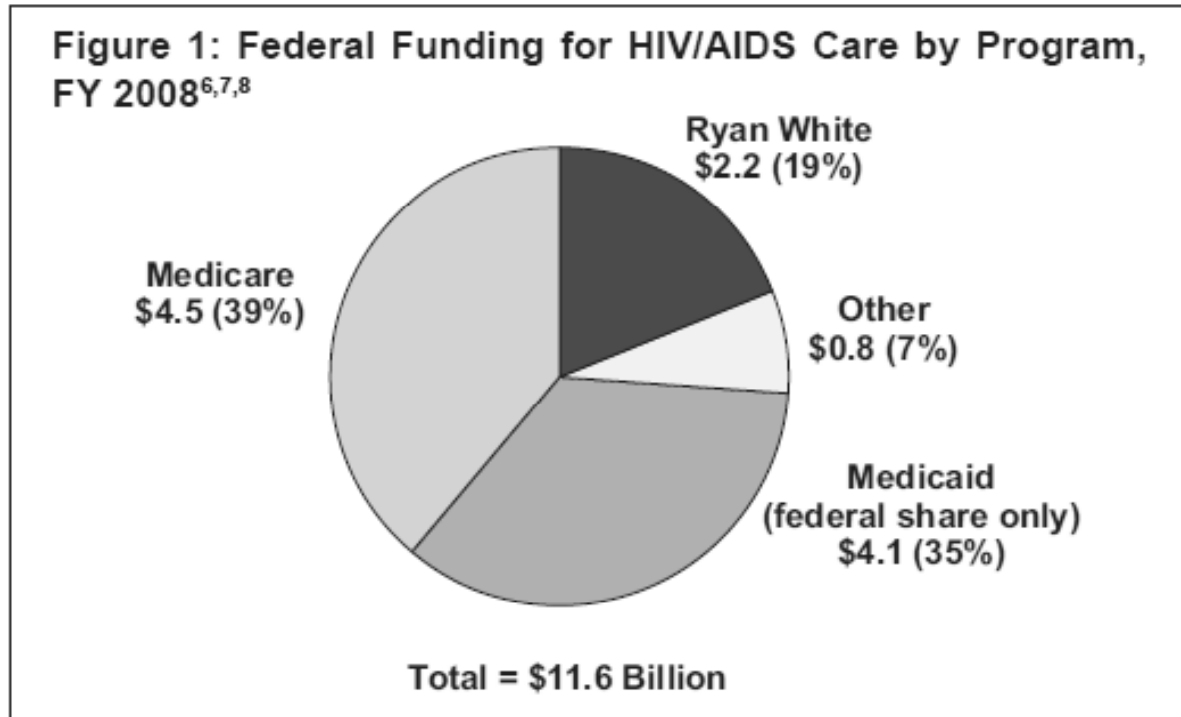
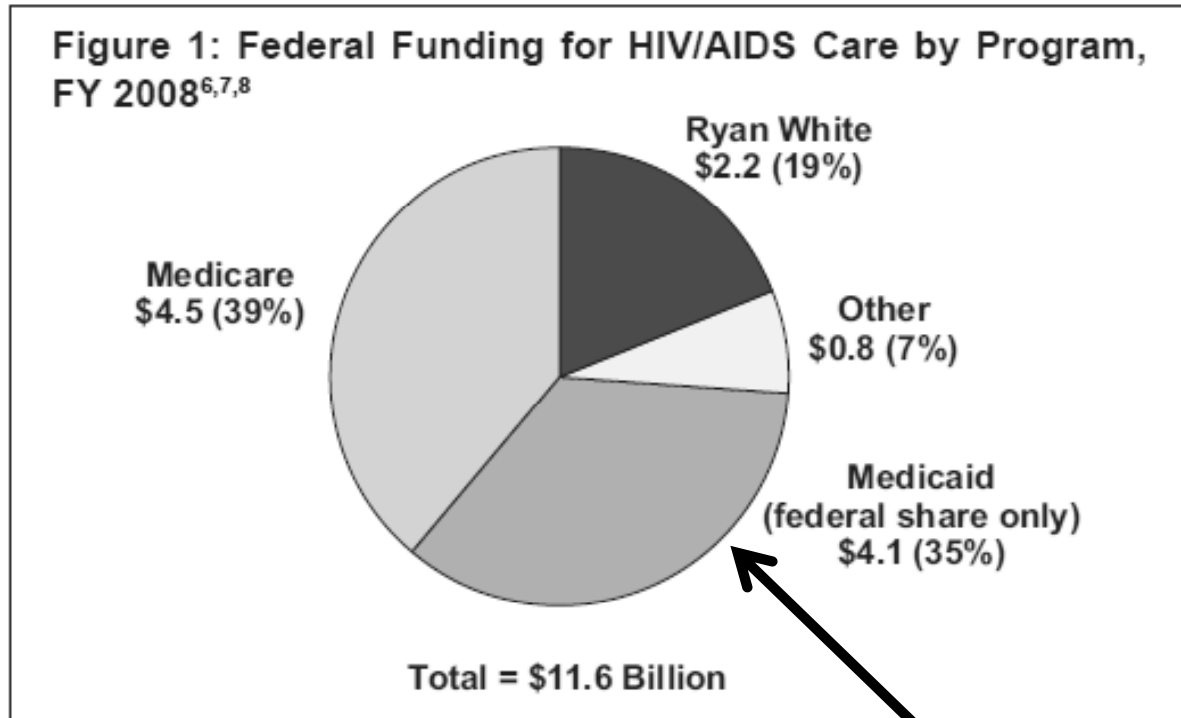


Figure reproduced from Kaiser Family Foundation, The Ryan White Program Factsheet, 2009

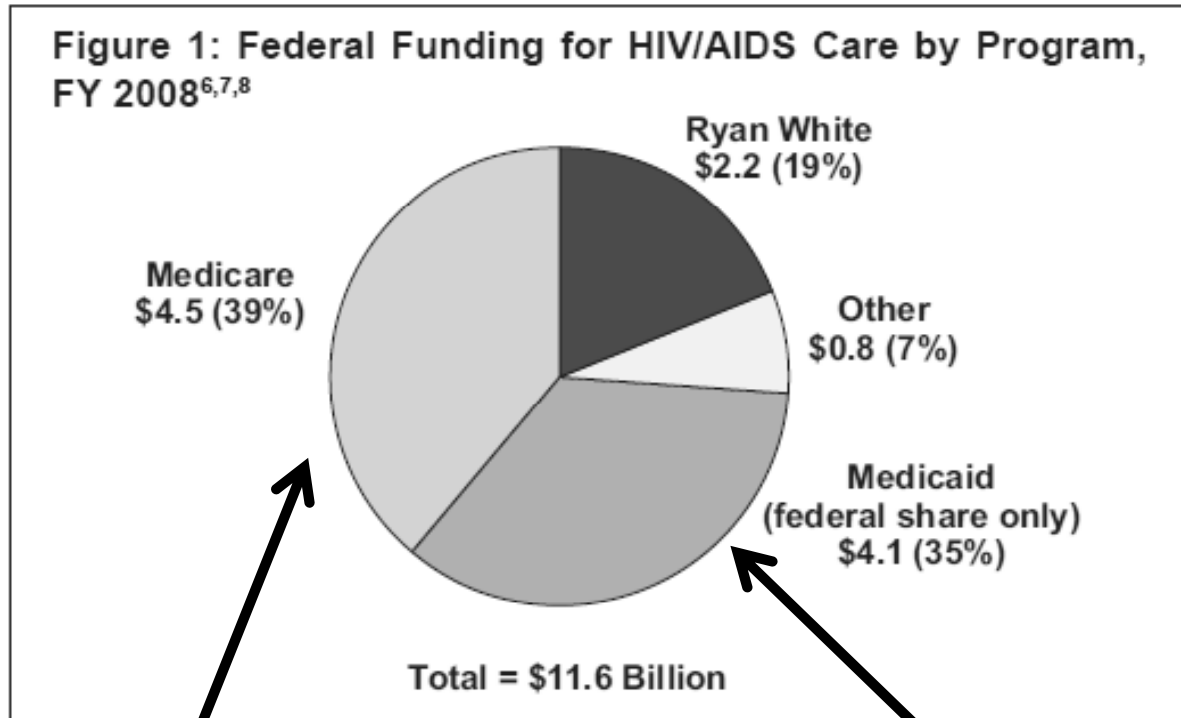
# HIV treatment is financed through a fragmented system of care



- Low-income and disabled
- Entitlement program

Figure reproduced from Kaiser Family Foundation, The Ryan White Program Factsheet, 2009

# HIV treatment is financed through a fragmented system of care

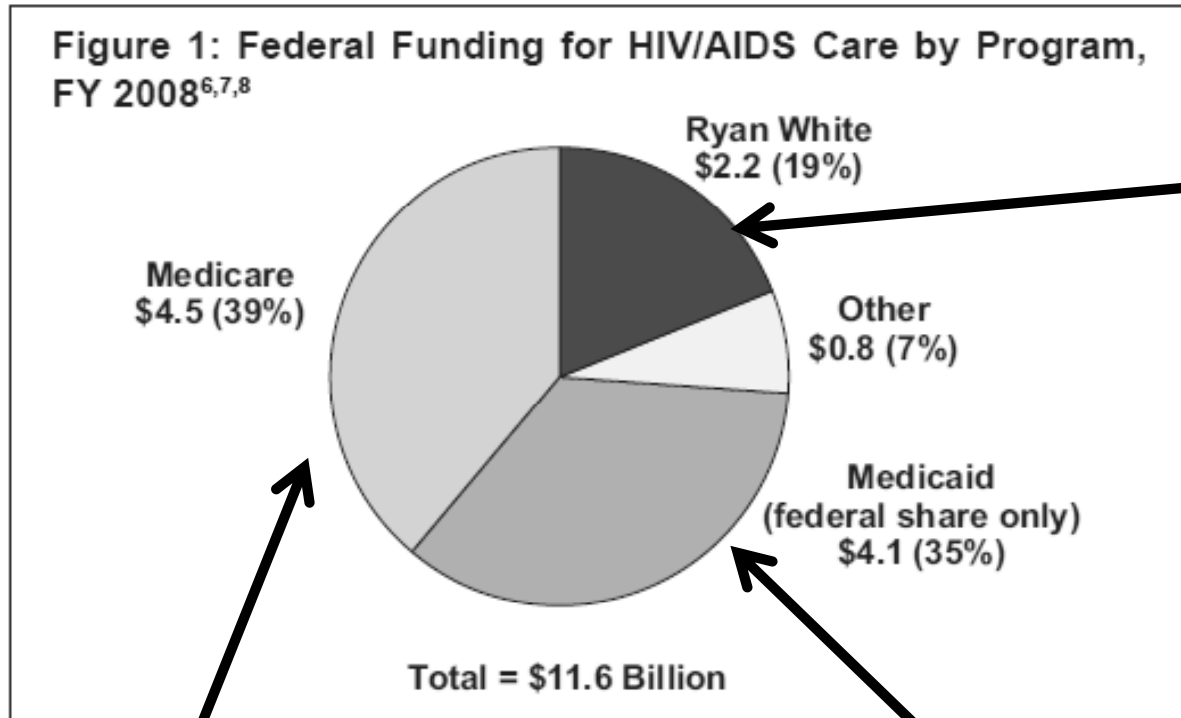


- Permanent disability
- Age 65+
- Entitlement program

- Low-income and disabled
- Entitlement program

Figure reproduced from Kaiser Family Foundation, The Ryan White Program Factsheet, 2009

# HIV treatment is financed through a fragmented system of care



- “Payer of last resort” for un(der)insured, especially those who have not progressed to AIDS
- Includes AIDS Drug Assistance Program (ADAP)
- Discretionary program, with state flexibility
- Flat-funded since 2000

- Permanent disability
- Age 65+
- Entitlement program

- Low-income and disabled
- Entitlement program

Figure reproduced from Kaiser Family Foundation, The Ryan White Program Factsheet, 2009

# Budget impact analysis

- Payer perspective
- Budget outlays of policy/technology uptake
- Assesses affordability (not efficiency)
- Tailor analyses to interests and needs of decision-maker:
  - Time horizon
  - Data
  - Costs (undiscounted)
  - Assumptions
  - Scenarios

For additional details see Mauskopf et al. 2007, Principles of Good Practice for Budget Impact Analysis: Report of the ISPOR Task Force of Good Research Practices – Budget Impact Analysis, *Value in Health* 10(5): 336-347.

# Research questions

- How much will expanded HIV screening cost public payers over 5 years?
- What will be the budget impact to:
  - Discretionary programs (e.g., Ryan White HIV/AIDS Program, \$2.2 billion, “flat-funded”)
  - Entitlement programs (e.g., Medicaid/Medicare, \$8.6 billion federal share)
  - Prevention programs (CDC, local health departments)



# Budget impact analysis methods

- Computer simulation model of HIV screening and clinical HIV disease (CEPAC model)
- Extrapolate costs to public programs based on national data on program enrollment and eligibility pathways
- Forecast costs to different programs and compare to current budgets

# Cost-effectiveness of Preventing AIDS Complications (CEPAC)

- Simulation model of HIV disease that captures immune status (CD4 cell count), HIV viral load, HIV treatment, opportunistic infections
- HIV testing module simulates screening program
- Data sources: public use datasets, published observational cohorts, clinical trials
- Model outcomes: life expectancy, quality-adjusted life expectancy, cost, cost-effectiveness
- Recent analyses using the CEPAC model:
  - Lifetime costs of HIV care: Schackman et al, *Med Care*, 2006
  - HIV testing: Paltiel et al, *N Eng J Med*, 2005
  - Pre-exposure prophylaxis: Paltiel et al., *CID*, 2009
  - Test and treat in DC: Walensky et al., *CID* 2010

# CEPAC Investigators: US

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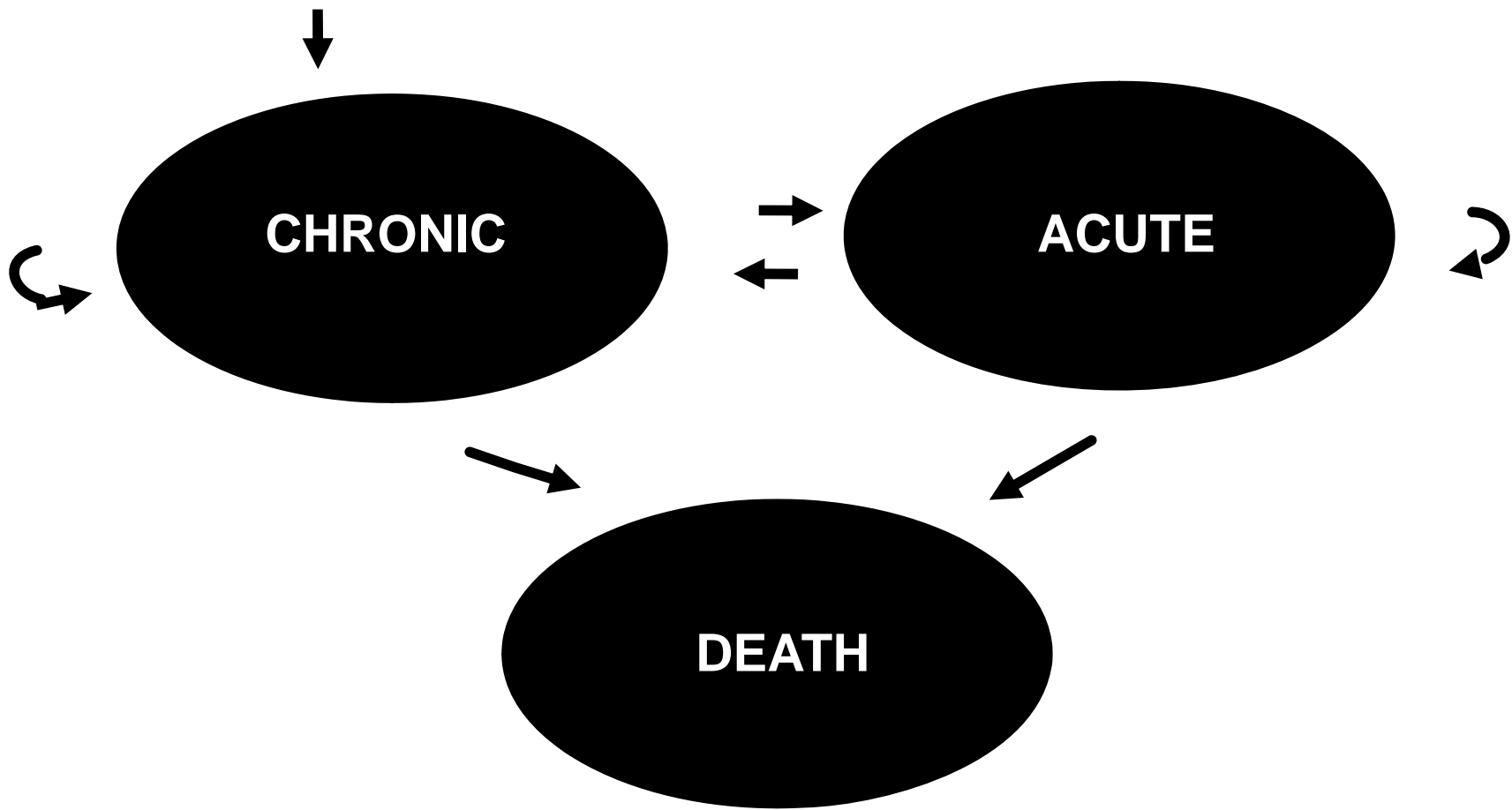
## **Lille and Bordeaux, France**

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Yazdan Yazdanpanah, MD, PhD  
Delphine Gabillard  
Sylvie Deuffic-Burban

# CEPAC disease model

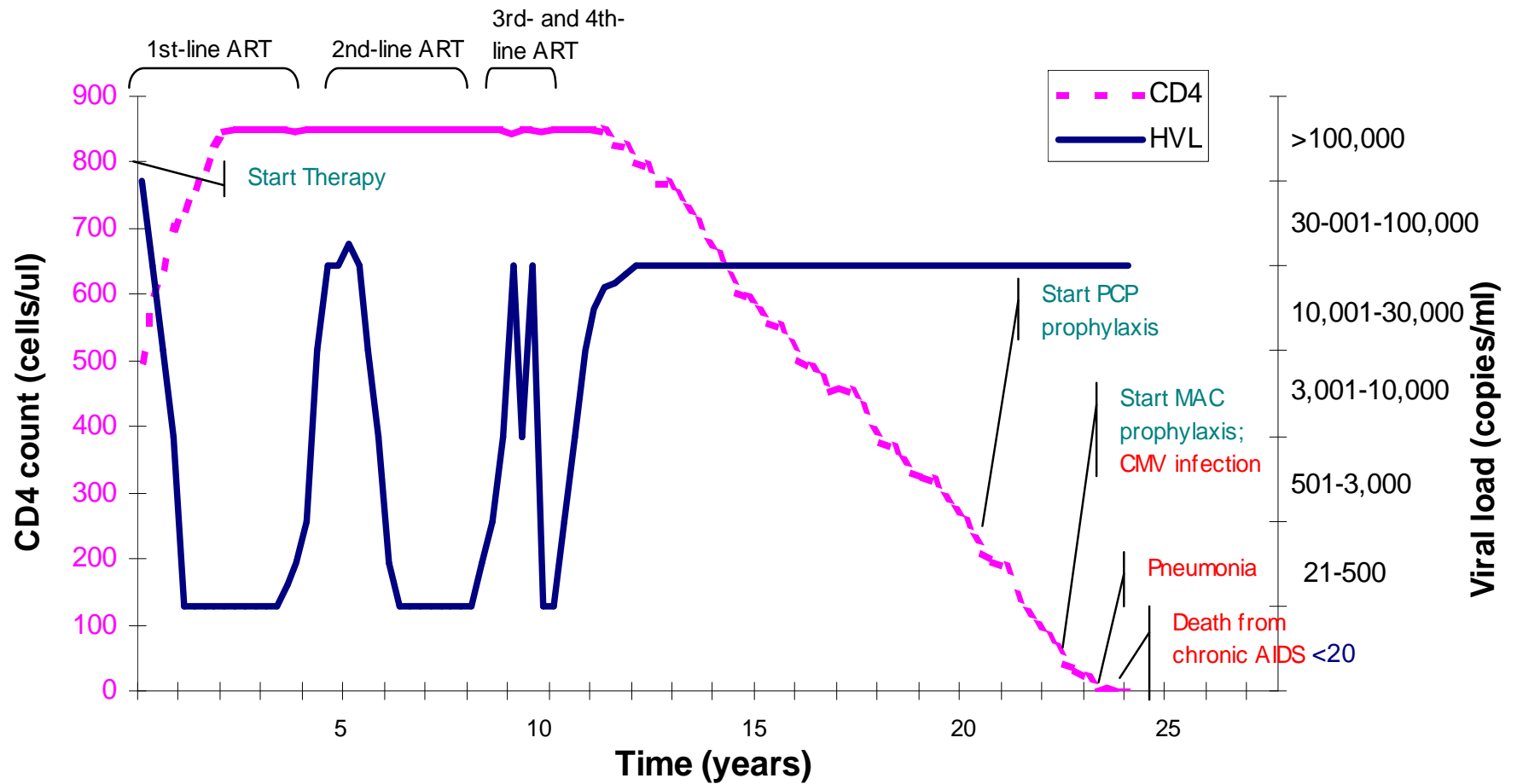
Enter:  
Age, Sex, CD4, RNA



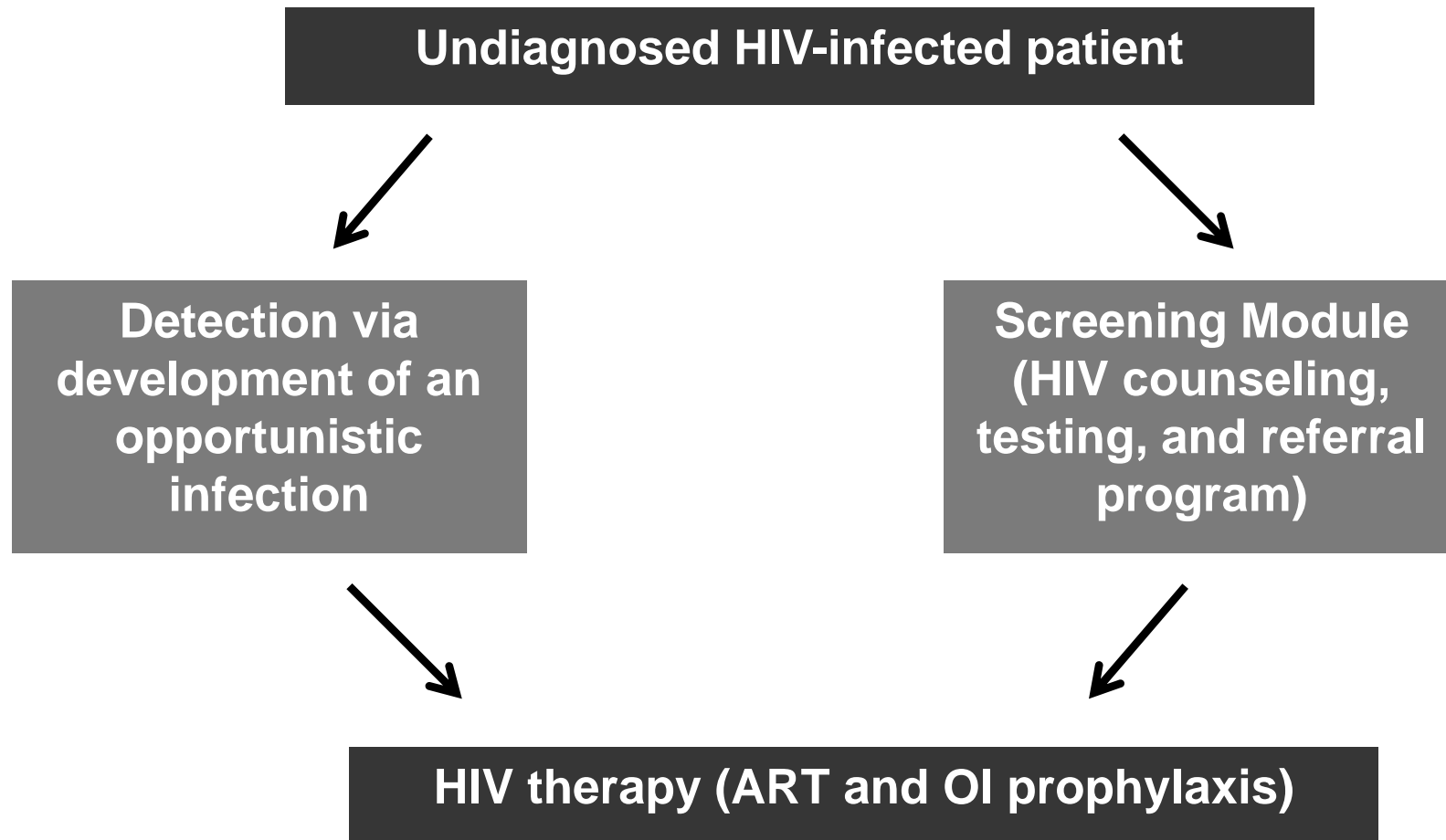
# State space

- stage of disease  
chronic / acute / death
- HIV-1 RNA (current / “set point”)  
>100,000 / 30,001-100,000 / 10,001 - 30,000 / 3,001-10,000 /  
500-3,000 / <500
- CD4 (current / nadir)  
>500 / 301-500 / 201-300 / 101-200 / 51-100 / 0-50
- acute infections  
PCP / toxoplasmosis / *Mycobacterium avium* Complex / CMV  
/ fungal / “other”
- history of each acute event type
- time on therapy / time to treatment failure
- cause of death  
acute OI / chronic AIDS / non-AIDS

# Patient trace



# Mechanisms of HIV detection



# Three cohorts

- “Prevalent aware” cases
  - Aware of infection at start of simulation
  - Immediately eligible for linkage to care
  - Modeled in disease module only
- “Prevalent unaware” cases
  - Unaware of infection at start of simulation
  - Only eligible for linkage to care upon diagnosis
  - Modeled in screening module and disease module
- Incident cases
  - Only eligible for linkage to care upon diagnosis
  - Modeled in screening module and disease module



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# Pathway of care

## **Discretionary**

Ryan White

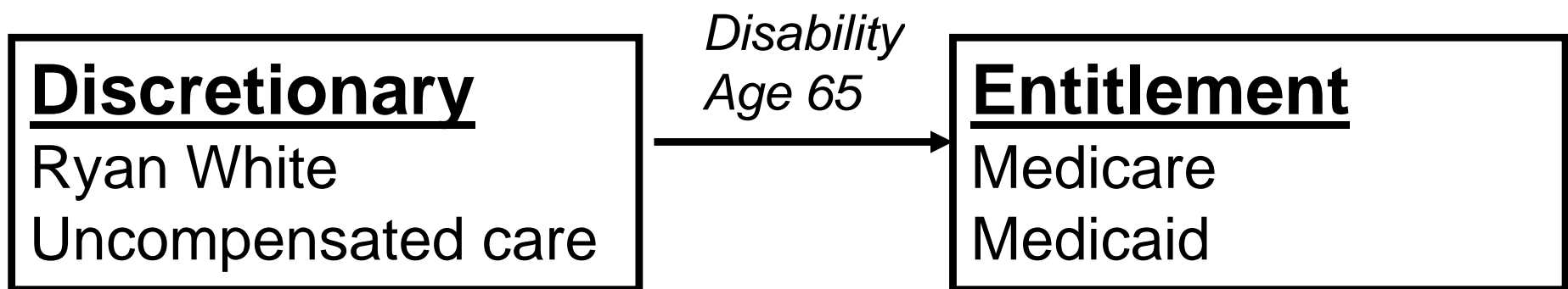
Uncompensated care

## **Entitlement**

Medicare

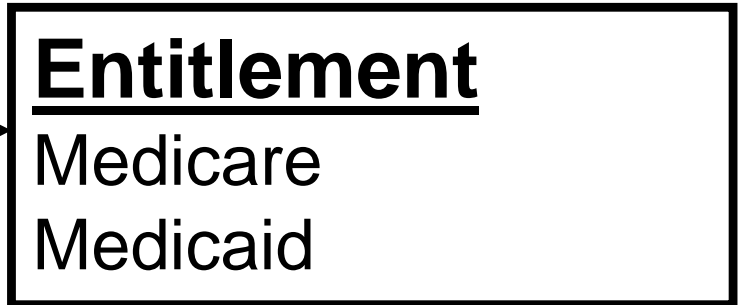
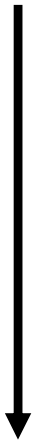
Medicaid

# Pathway of care



# Pathway of care

Some prevalent cases currently aware of infection



Some prevalent cases currently aware of infection



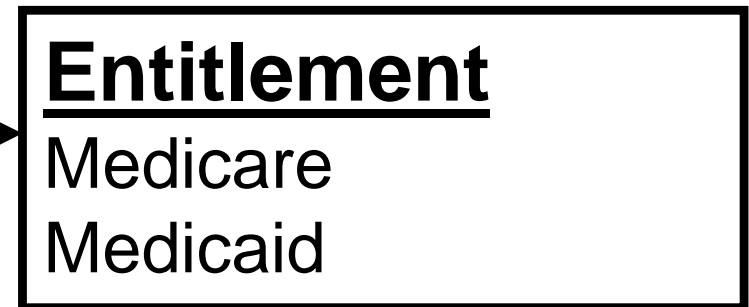
# Pathway of care

Some prevalent cases  
currently aware of infection  
+  
All newly diagnosed cases

Some prevalent  
cases currently aware  
of infection



*Disability*  
*Age 65*



# Key input parameters

- Number eligible for discretionary and entitlement programs
  - National HIV epidemiology data; ages 19+
  - National data on health insurance coverage
- Demographic and clinical characteristics of cases
  - HIV Research Network (HIVRN), MACS cohort, published studies of individuals with primary infection

# Key input parameters

- Costs
  - Undiscounted \$2009
  - Pharmaceuticals: Average wholesale prices, adjusted for average state Medicaid discount
  - Laboratory monitoring: CMS Clinical Laboratory Fee Schedule
  - HIV test costs: Adapted from Farnham et al. 2008
- HIV test characteristics
  - Sensitivity pre-seroconversion 0.1%
  - Specificity pre-seroconversion 99.6%
  - Specificity post-seroconversion 99.9%
  - Rapid test return rate: HIV+ 97%; HIV- 97%
  - ELISA test return rate: HIV+ 75%; HIV- 67%

# Key input parameters

- Screening strategies
  - Current practice: every 10 years
  - Expanded screening: every 5 years
  - Sensitivity analysis: no screening – annual screening
- Base case
  - Rapid test, 80% linkage to care, % return for results based on national data, no pre-test counseling
- High cost scenario
  - Rapid test, 100% linkage to care, 100% return for results, pre-test counseling included
- Low cost scenario
  - Laboratory test (ELISA), 50% linkage to care, 50% return for results, no pre-test counseling



# Overview of main findings

- \$2.7 billion five-year costs to government testing, discretionary, and entitlement programs
- Testing costs a small fraction of budget increase
- Important budget concerns:
  - Downstream care costs (esp. to discretionary budgets)
  - Cost shifting between discretionary and entitlement programs

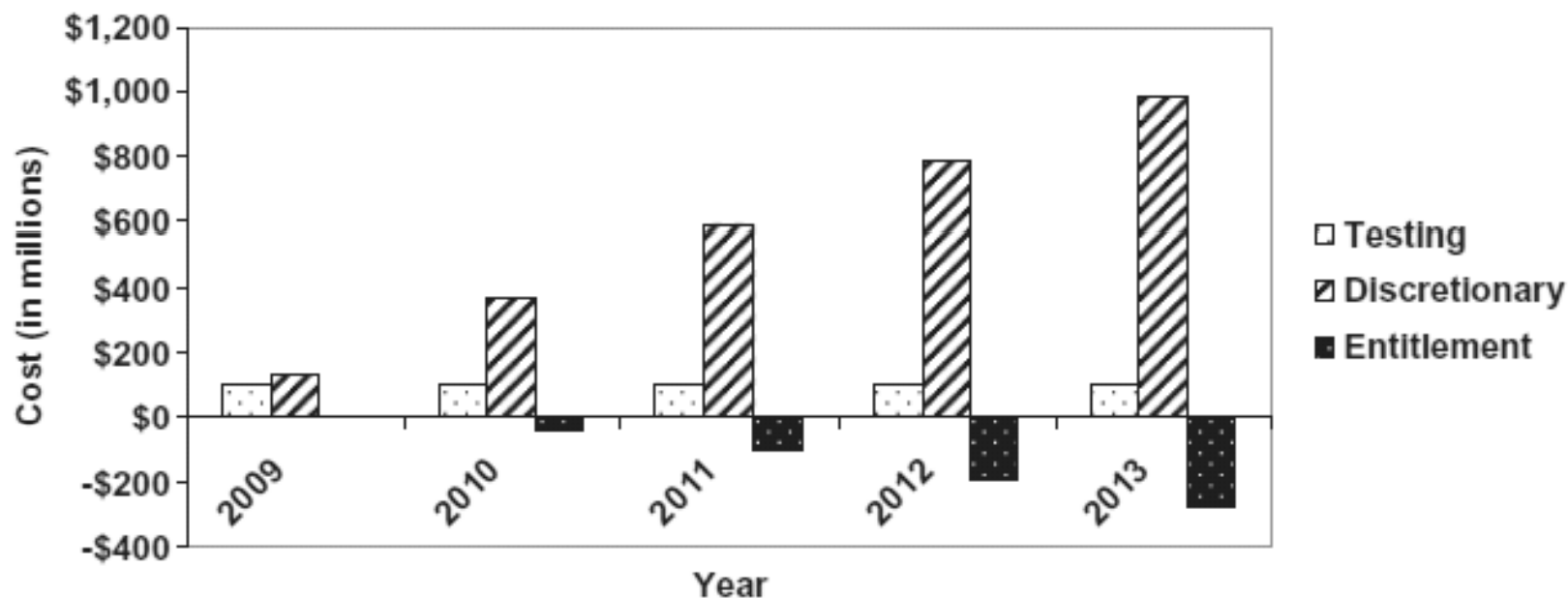
# Expanded screening identifies individuals earlier in their infections

- Better immune status (higher mean CD4 cell count) at detection under expanded screening
  - Prevalent cases: 122 (current practice); 140 (expanded)
  - Incident cases: 251 (current practice); 312 (expanded)
- Fewer cases detected due to opportunistic infection
  - Prevalent cases: 68.3% (current practice); 57.8% (expanded)
  - Incident cases: 49.0% (current practice); 32.3% (expanded)
- Fewer cases undetected over lifetime
  - Prevalent cases: 12.0% (current practice); 9.1% (expanded)
  - Incident cases: 11.7% (current practice); 7.5% (expanded)
- Improved quality-adjusted survival
  - Prevalent cases: 2.0 QALYs
  - Incident cases: 3.2 QALYs

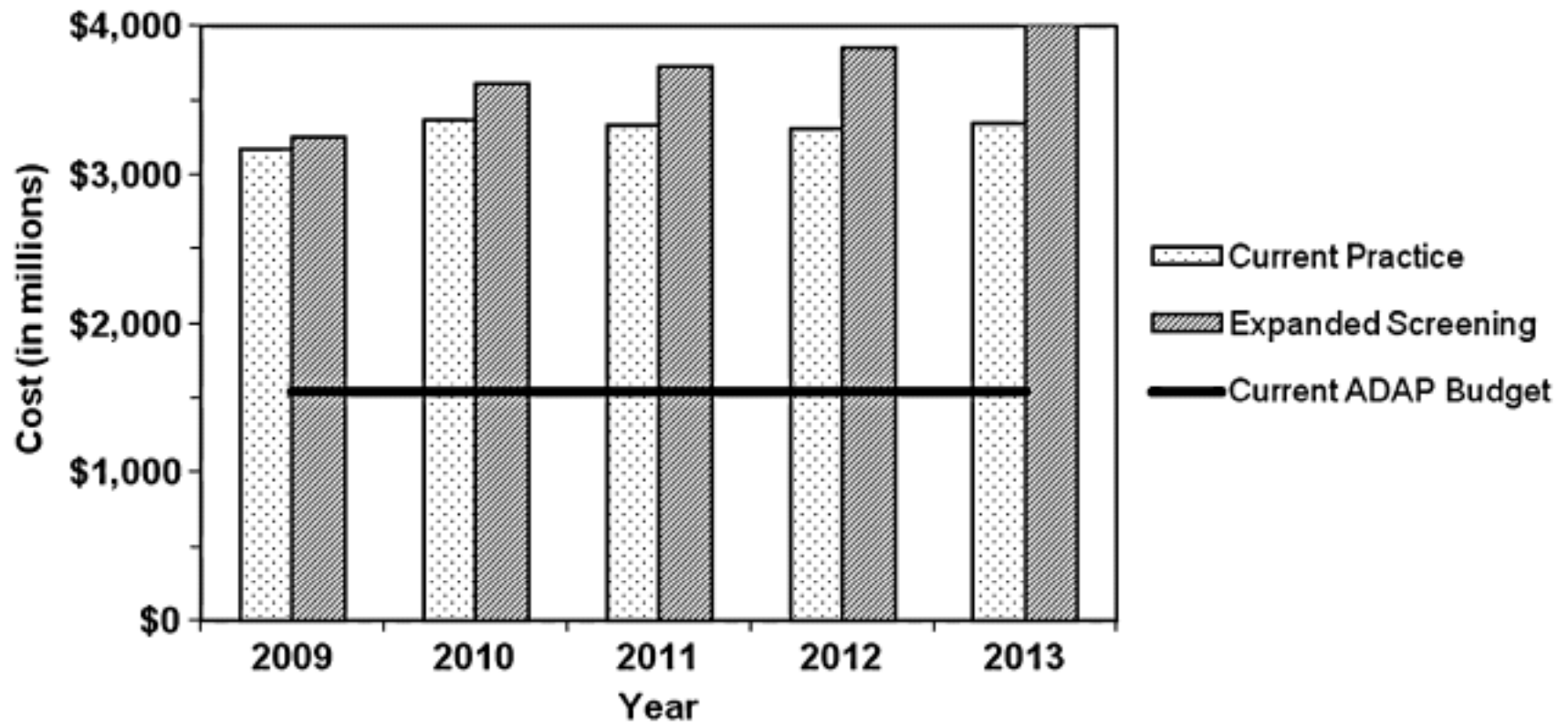
# Total five-year budget impact of \$2.7 billion, with most costs due to downstream care

- Total incremental costs \$2.7 billion
  - Sensitivity analysis: \$1.9 – \$3.4 billion
- Testing costs (\$503 million) less than one-fifth of total cost
  - Sensitivity analysis: \$383 – \$697 million
- Largest budget impact (\$2.9 billion) to discretionary programs
  - Sensitivity analysis: \$1.9 – \$3.4 billion
- Slight short-term cost savings (\$624 million) to entitlement programs
  - Sensitivity analysis: \$421 – \$742 million

# Incremental cost of expanded screening versus current practice: Discretionary programs will be disproportionately affected by expanded screening



**Pharmaceutical costs of expanded screening versus current practice:** Pharmaceutical costs, particularly those financed by discretionary programs, will be the main driver of budget increases



# Limitations

- Assumptions
  - No new drugs or technologies
  - Constant % of individuals with private or VA health insurance coverage
  - No dropping out of care/treatment discontinuation
  - No financial benefits of preventing secondary infections
- Data limitations: number with VA insurance estimated, HIVRN not nationally representative
- National aggregation ignores interstate variation
- Does not incorporate Medicaid expansion as part of health reform

# Budget challenges

- Largest impact to discretionary programs, which have less capacity to expand
- President Obama's pledged \$53 million increase to CDC for HIV prevention and surveillance unable to cover testing costs
- Although health reform expands Medicaid services to <133% FPL, many HIV-infected individuals will still need additional services
- Important to consider downstream care costs

# Current HIV policy questions that could benefit from budget impact analysis

- Health reform and shift in payers for HIV care
  - Medicaid expansion
  - Insurance exchange; high-risk pools
- Recent clinical findings on “treatment as prevention” (HPTN 052)



Whiteboard: Are there research questions (from your area) that could be addressed using budget impact analysis techniques?

# Questions?

If you have any follow-up questions about the methods or the topic, feel free to email me at [emartin@albany.edu](mailto:emartin@albany.edu)