

Is it feasible to provide monetary incentives for viral load suppression among a cohort of HIV-infected veterans in care?

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# Background

- Nonadherence with ARV important problem despite newer regimens with fewer side effects
- Across VA (Braithwaite RS et al, AIDS, 2007)
  - Doses taken as directed
    - 67% Efavirenz
    - 59% Boosted PI
    - 61% Single PI
  - Pts in highest adherence stratum
    - 33% Efavirenz
    - 23% Boosted PI
    - 21% Single PI

# Background

- Monetary incentives have been advocated as a means of improving adherence.
- However, adherence is
  - Difficult to verify
  - Easy to “game”
  - An elusive incentivization target

# Objective

- To investigate whether a monetary incentive for viral load suppression is feasible and/or leads to changes in virological suppression.

# Methods

- HIV-infected at the West Haven Infectious Disease clinic
  - Offered a monetary incentive (\$100) on a quarterly basis for
    - Achieving undetectable viral load (<50 copies/ml)
    - Having a substantial viral load improvement ( $\geq 1$  log unit) compared to their best result during the previous year.
- Eligibility
  - Attended clinic for  $\geq 1$  year
  - Prescribed ARV for  $\geq 1$  year.
  - Did not focus on poor adherers exclusively because of fairness concerns
- The size of the incentive based on estimated health care savings from preventing new HIV infections

# Methods

	Baseline transmission rate per person per year	Reduction in transmissions per year person by improving adherence*	Cost saved per year	Cost saved per quarter
↑ <b>Less</b> risk behavior and/or viral load	0.01	0.0006	\$218	\$54
	0.02	0.0012	\$435	\$109
	0.05	0.003	\$1088	\$272
↓ <b>More</b> risk behavior and/or viral load	0.10	0.006	\$2177	\$544
	0.20	0.012	\$4354	\$1088
	0.50	0.030	\$10,884	\$2721

\* Assuming viral load suppressed by partial adherence to 1 log viral load above detectability threshold of assay

# Methods

Viral Load	Grade
Undetectable	A
50-499	B
50 0– 4999	C
5000 or above	D

# Methods

If your best grade in the last year was	Grade needed for incentive
D	C
C	B
B	A
A	A

# Methods

- Although this was a feasibility study with low power, compared pre- versus post-incentive
  - Viral Load
    - Proportion of detectable viral load
    - Area under the curve (AUC)log viral load
      - “Undetectable” was assigned a log viral load of 48 copies/ml
  - Adherence
    - # ART regimens filled
  - Intent-to-treat vs On-treatment
- Pre-specified target patients
  - $\geq 1$  detectable viral load prior to the incentive
- Pre- versus post-incentive results were compared
  - Proportions: Exact binomial test
  - Means: Paired sample t-test

# Results

- 80 eligible patients
  - 77 consented to participate in the incentive program
  - 71 were available for 12 month follow-up
    - 3 relocations, 3 died, 1 was lost to follow-up
- Demographics
  - Median age 59
  - 100% male
  - 62% nonwhite

# Results

- Nonadherence risk factors
  - 54% history of alcohol abuse
  - 51% had history of injection drug use
  - 34% had history of depression
- 47% (N=37) had  $\geq 1$  detectable viral load in prior year

# Results - Feasibility

- No evident adverse effect on clinic workflow.
- Time 5 -10 minutes per pt per quarter
- No clinician expressed frustration about the impact of the study on workflow
- The clinic administrator was concerned at the beginning about workflow challenges
  - By the end of the study, she no longer had concerns.

# Results - Feasibility

- The incentive was acceptable to all patients except for one who
  - Expressed frustration after his first quarter because he did not qualify for the incentive.
  - His frustration was exhibited verbally, but without any threatening words or actions.
  - He chose to continue participating in the study,
  - During the subsequent quarter he qualified for the incentive, and became pleased with the intervention.

# Results - Feasibility

- Patients generally appeared to understand the incentive system, and could predict whether they qualified
- No complaints about unfairness or lack of transparency.
  - During 1st quarter, some confusion about timing/ eligibility
    - Some patients were disappointed that they were not able to receive at least a portion of the incentive.
    - Resolved by second quarter through education by research staff.
- No patients expressed concerns that the incentive targeted a clinical outcome rather than a behavior itself
- Acceptance of the premise that they could control the viral load by
  - Taking their medications with greater regularity
  - Working with clinician to find more effective drug regimen.

# Results - Effectiveness

- Among target population, pre- vs post-intervention
  - % undetectable viral loads
    - Intent to treat: Increased from 57% to 69%, ( $p = 0.03$ )
    - As treated: increased from 59% to 71% ( $p = 0.04$ )
  - AUC viral load
    - Intent to treat: 2.2 to 1.9 ( $p = 0.2$ )
    - As treated: 2.1 to 1.9 ( $p = 0.2$ )
  - Adherence
    - Intent to treat: # refills 18.8 to 20.4 ( $p = 0.02$ )
    - As treated: # refills 19.3 to 21.0 ( $p = 0.02$ )
- Among all patients
  - No evident changes

# Results – Posthoc analyses

- Substantial seasonal variation in viral load
  - Among those with detectable virus in the prior year, only 42% of viral loads were undetectable during the winter quarter, a lower proportion than during the other seasons (64%,  $p = 0.01$ ).
  - However in the intervention year the proportion of undetectable viral loads in winter, 64% , was more similar to the proportion seen in the rest of the year 69%(  $p = 0.4$ ).

# Results

- Parallel qualitative study
  - Taped interviews about attitudes and beliefs about incentives and HIV care
  - Cyndi Frank, expected PhD

# Limitations

- Small, single-site, observational study
- Many other possible explanations for viral load changes
  - Regression-to-the-mean.
- Large prevalence of patients with prior IDU
  - Would incentives would be generalizable to a population with fewer substance users?
- Potential inappropriateness of the incentive for patients with multiclass genotypic resistance.

# Conclusion

- It is feasible to
  - Use financial incentives with the aim of reducing viral load among HIV patients in care
  - Specify the incentive by requiring cost-neutrality, based on the avoided costs from downstream infections averted
  - Target clinical goal rather than behavior
- Raises the possibility that the incentive payments increased undetectable viral loads by 12%
- Future studies are needed to assess its effectiveness, scalability, and sustainability.

Questions ???