

# Are HIV-Related Diagnostics Excessively Ordered? A Pilot Intervention Study to Improve Test Use in the Inpatient Setting.

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Poster # 1270

## BACKGROUND

- Total yearly healthcare expenditure in the United States is projected to hit \$4.4 trillion in 2018.
- Efforts are underway across healthcare settings to reduce costs, with unnecessary diagnostics representing a significant opportunity to reduce overall expenditure.
- The significance of reducing unnecessary testing is realized through more than the actual cost per test; hidden costs include discomfort and anxiety to the patient, laboratory burden, labor costs for members of the healthcare team in obtaining the test and interpreting results, and/or even additional workup that may not be indicated due to misinterpretation.
- HIV patients in routine care typically have existing HIV test results, and linkage to these data may forego unnecessary lab testing in the inpatient setting.
- With specific regard to CD4 counts, a mounting body of evidence in the outpatient setting indicates frequent monitoring of CD4 counts seldom affects treatment decisions, spares patients undue anxiety, and represents millions in potential savings; however, there is limited guidance with regards to the proper use of these tests inpatient.

## OBJECTIVES

- This prospective study, with pre- and post-intervention arms, will evaluate if education and implementation of a pharmacist driven protocol for ordering CD4 counts, HIV viral loads, and HIV genotypes can improve the ordering of these tests and optimize associated costs.
- Primary outcome** in this study is the number of unnecessary CD4 count, HIV viral load, and HIV genotype tests intervened on during the post-intervention time compared to the pre-intervention time. Cost savings pre-versus post-intervention and the reduction in inappropriate tests ordered between study arms will also be evaluated.

## METHODS

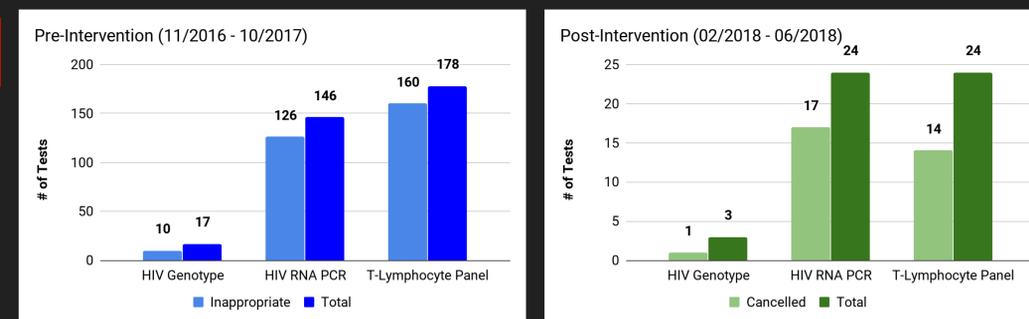
- Single-center, pre-post-interventional study
- Retrospective chart review 1 year prior followed by 5-month intervention period
- Pharmacist to discontinue tests deemed unnecessary per pre-specified algorithms based on Centers for Disease Control and Prevention (CDC)/Department of Health and Human Services (DHHS) guidelines and provide education to providers
- Inclusion Criteria**
  - Documented or suspected HIV infection
  - Order for:
    - T-Cell Lymphocyte Panel
    - HIV RNA PCR
    - HIV Genotype
- Exclusion Criteria**
  - Inpatients <18 years old

## Criteria for Appropriateness

- HIV PCR RNA**
  - Suspected acute seroconverting illness
  - Confirmatory test for HIV diagnosis (after positive HIV ag/ab test)
  - 2-4 weeks post inpatient initiation of antiretroviral treatment
- T-Cell Lymphocyte Panel**
  - New HIV diagnosis made in-house
  - Confirmed or HIGH clinical suspicion of HIV-associated opportunistic infection and no recent outpatient testing available
  - HIV-infected person who is not on antiretrovirals and has no recent CD4 count (> 1 year) available in inpatient/outpatient records in order to assess need for opportunistic infection prophylaxis
- HIV Genotype**
  - New diagnosis made in-house AND antiretroviral treatment to be initiated inpatient
  - Documented antiretroviral treatment failure with intention to modify inpatient treatment regimen inpatient

## RESULTS

Figure 1: Primary Outcome



- Pre-intervention** period, **87%** (296/341) of tests deemed **inappropriate** and should not have been performed
- Post-intervention** period, **63%** (32/51) of tests deemed **inappropriate** and cancelled by the pharmacist

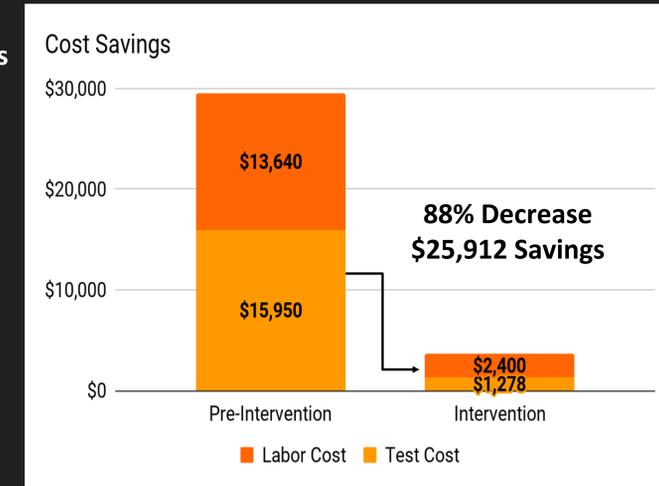
Table 2: Additional Outcomes: Well-Controlled Patients Tested

Well-Controlled HIV Patients	Pre-Intervention (N=178) Number [%]	Intervention (N=24) Number [%]
CD4 > 200 cells/ $\mu$ L	77 [43]	1 [4]
HIV Viral Load Undetectable	54 [37]	1 [4]
HIV Viral Load < 100 copies/mL	74 [51]	1 [4]

Well-controlled patients defined as those with stable CD4 > 200 cells/ $\mu$ L who are fully virally suppressed

Figure 2: Additional Outcomes: Cost Savings

Projected annualized cost savings based on % decrease in tests run post intervention and monthly thereafter



## CONCLUSIONS

### Primary Outcome

- Pharmacist-driven intervention reduced the number of HIV diagnostic tests performed by 63% compared to pre-intervention arm (P<0.001)
- Pharmacist-driven intervention projected to reduce cost by \$25,900 (88%) annually

### Additional Outcomes

- Pharmacist-driven intervention associated with reduction in stable patients unnecessarily tested

## FUTURE DIRECTIONS

- Continued education to incoming housestaff and physician groups on appropriate ordering.
- Computerized provider order entry decision support is currently being designed for upcoming implementation when ordering HIV-associated tests.
- Additional pharmacy staff are being trained on intervening when these orders are inappropriately placed.

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