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## Comparative Cost Analysis of Clinical Reminder for HIV Testing at the Veterans Affairs Healthcare System



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### ABSTRACT

**Objective:** To estimate the cost and health outcomes associated with a new HIV testing strategy that utilizes routine-based clinical reminders. **Methods:** We conducted an economic analysis of 1) traditional pretest/post-test counseling; 2) counseling and a new clinical reminders system; and 3) only clinical reminder in the veterans' health care system. A payer-perspective decision model was conducted to calculate the 1-year budget impact of three HIV testing strategies. Parameter values were obtained from the literature, including patients' probability of accepting test, and costs associated with HIV testing procedures. Deidentified patient data, including total population screened and number of new HIV cases, were collected from one clinic in Los Angeles, California, from August 2004 to December 2011. Annual total costs and costs per new case were calculated on the basis of parameter values and patient data. Sensitivity analyses were conducted to evaluate the robustness of the critical variable on costs. **Results:** The

total cost of the clinical reminder system with pretest counseling was \$81,726 over 1 year compared with \$109,208 for traditional HIV testing. Under a clinical reminder system with no pretest counseling, the number of HIV tests performed and the number of new diagnoses increased for that year. In addition, cost per new diagnoses was the lowest. **Conclusions:** The clinical reminder system can reduce the cost per cases identified and promote better performance of HIV testing compared with traditional HIV testing. The fundamental decision model can be used for hospital facilities outside the Veteran Affairs adopting a similar program for improving the HIV testing rate.

**Keywords:** AIDS, cost analysis, Veterans Affairs Healthcare System.

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### Introduction

Early identification of HIV infection provides clinical benefit to the infected individuals and reduces the risk of disease transmission. The Centers for Disease Control and Prevention estimates that approximately 19% of the US population is unaware of its HIV status. This gap has led the Centers for Disease Control and Prevention, the American College of Physicians, and US Preventive Services Task Force to recommend that routine, voluntary HIV testing be offered to adults [1–3]. In response, as the single largest health care system in the United States, the Veteran Health Administration (VHA) has implemented a series of programs to increase early identification by promoting HIV testing [4].

Over time, in responses to changes in the regulatory environment (i.e., removal of requirements for written informed consent) and modifications of recommendations as to who should be offered HIV testing (i.e., transition from risk-based to routine testing), different interventions have been undertaken in VHA to

improve HIV testing rates. Although these programs have been successful as indicated in our previous study, the total costs of these programs and the cost per identified case are incompletely described [5].

This study performed the cost analysis for three alternative strategies for HIV testing: 1) physician-based traditional HIV testing and counseling in the absence of clinical reminders; 2) clinical reminders and nurse-based streamlined counseling with telephone notifications for negative results; and 3) clinical reminders without pretest counseling and with telephone notifications for negative results. To assist programs that may be interested in adopting a similar strategy but are uncertain of the cost implication, we have evaluated the cost per test and the cost for identifying a previously undiagnosed case of HIV infection. Because this article focused on evaluating the immediate cost implication of these new strategies, we did not include the long-term cost-effectiveness of HIV testing. These analyses will consider the effects of diagnosis and treatment on quality-adjusted life-year, which is beyond the scope of this study.

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**Methods**

**Background**

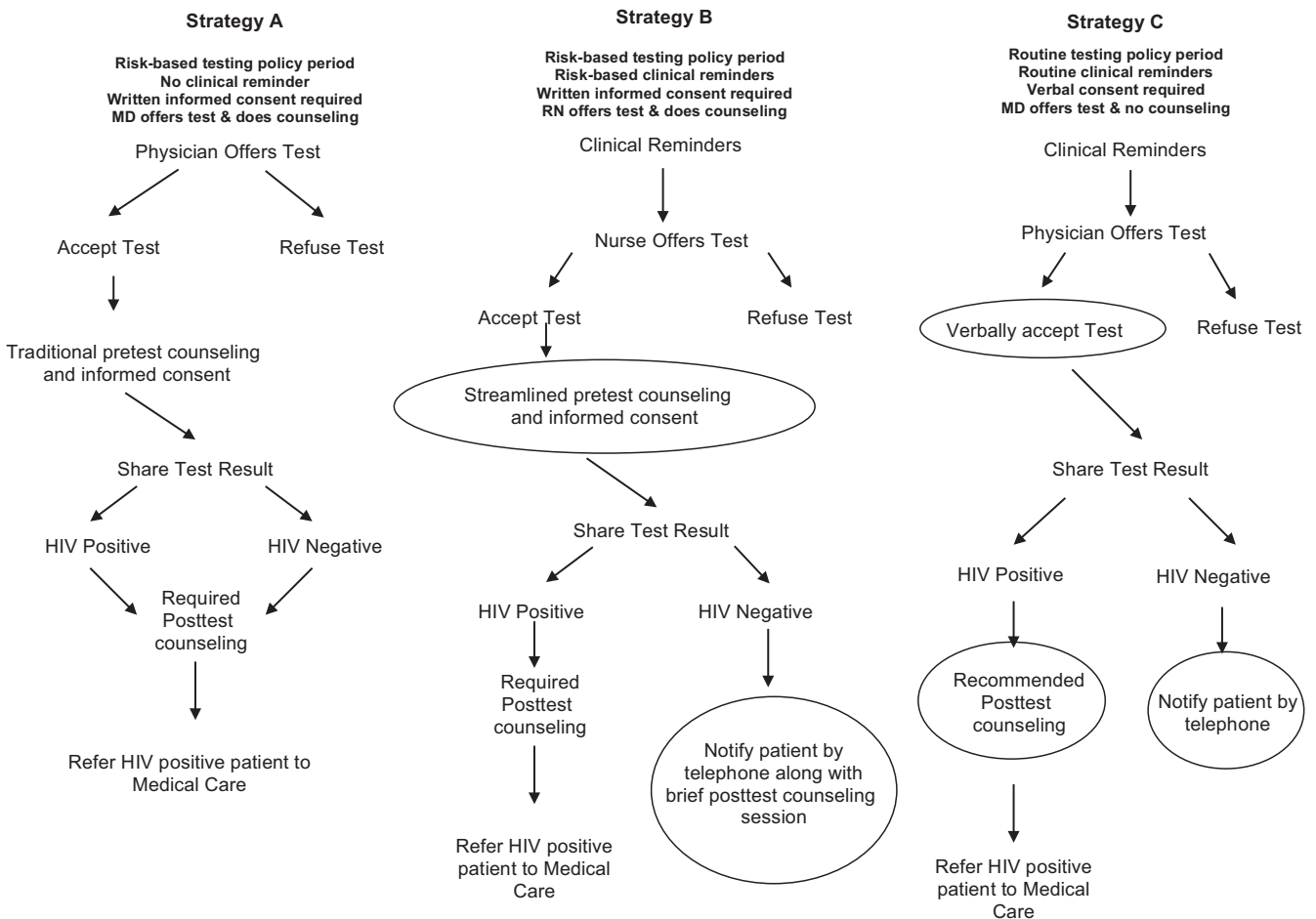
When written informed consent was required for HIV testing, nurse-initiated, streamlined counseling was found to be cost-effective in increasing HIV testing rates in primary care settings [6]. In August 2005, Goetz et al. [5] used this strategy as part of a multimodal intervention that included a real-time clinical reminder to prompt providers to offer risk-based HIV testing, provider education, and an audit-feedback program to increase HIV testing rates in VHA medical care facilities in Southern California. The clinical reminder was triggered by any previous evidence of hepatitis B or C infection, illicit drug use, a sexually transmitted disease, homelessness, and certain behavioral risk factors in the patient’s medical record. Implementation of this program tripled the screening rate and led to more HIV diagnoses [5]. In August 2009, the VHA policy for HIV testing was changed. The revised policy removed requirements for formal pretest and post-test counseling. Meanwhile, verbal consent was substituted for written consent for testing and testing was recommended for all persons regardless of known risk of HIV infection [4]. Following this change, many Veterans Affairs (VA) facilities changed their policies to be consistent with new VA requirements and implemented a non-risk-based clinical reminder to promote HIV testing. Both the original risk-based interventions and the subsequent modification to offer HIV testing to all

previously untested patients have been shown to improve HIV testing rates [5,7].

**Hypothesis and Study Design**

This study intended to test the hypothesis that the implementation of a non-risk-based clinical reminder system for promoting HIV testing is more cost-effective than traditional risk-based counseling. The study tested this hypothesis by estimating the comparative costs of HIV testing strategies in three different scenarios (Fig. 1):

1. Strategy A: Risk-based testing with reliance on physician’s recognition of at-risk patients and physician’s responsibility for test ordering, and requirements for written informed consent and in-person pretest and post-test counseling.
2. Strategy B: Risk-based testing with reliance on clinical reminders to identify at-risk patients, physician’s responsibility for test ordering, nurse-based streamlined in-person pretest counseling, requirements for written informed consent, and telephone notifications for negative results.
3. Strategy C: Routine HIV testing with reliance on clinical reminders to identify previously untested patients, elimination of pretest counseling, substitution of verbal for written informed consent, physician’s responsibility for test ordering, and telephone notification for negative results.



**Fig. 1 – Key procedural steps in the three strategies are evaluated. The key difference between the strategies are circled. MD, doctor of medicine; RN, registered nurse.**

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