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Clinic-wide Intervention Lowers Financial Risk and Improves Revenue to HIV Clinics Through Fewer Missed Primary Care Visits

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Abstract

We calculated the financial impact in 6 HIV clinics of a low-effort retention in care intervention involving brief motivational messages from providers, patient brochures, and posters. We used a linear regression model to calculate absolute changes in kept primary care visits from the preintervention year (2008–2009) to the intervention year (2009–2010). Revenue from patients' insurance was also assessed by clinic. Kept visits improved significantly in the intervention year versus the preintervention year ($P < 0.0001$). We found a net-positive effect on clinic revenue of + $24,000/year for an average-size clinic (7400 scheduled visits/year). We encourage HIV clinic administrators to consider implementing this low-effort intervention.

Keywords

clinic-wide intervention; missed visits; insurance revenue

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INTRODUCTION

Adverse HIV patient outcomes from poor retention in care have been quantified,[1–5] but few reports have estimated the financial impacts to clinics of attempting an intervention to improve retention in care. In 2009, we initiated a 12-month clinic-wide intervention sponsored by the Centers for Disease Control and Prevention (CDC) and the Health Resources and Services Administration, with the aim to improve patients' attendance for HIV primary care (PC). Following a comparison preintervention year, we delivered a 12-month clinic-wide intervention of brief information to patients about the importance of staying in care, which significantly improved adherence to PC appointments.[6] In this report, we extend the analysis of the intervention by estimating the clinic visit revenue and financial benefits of having fewer missed PC visits in the intervention year compared with the preintervention year.

METHODS

The intervention was conducted at 6 HIV clinics located in Boston, MA, Brooklyn, NY, Baltimore, MD, Miami, FL, Birmingham, AL, and Houston, TX. All clinic staff were trained to provide print and verbal motivational messages to patients about the importance of staying in care. Details of the intervention (called "Stay Connected") have been previously published[6]; a description of the intervention process and training activities, as well as downloadable copies of the brochures, posters, and messages can be found at the link in reference 7. The preintervention year ran from May 1, 2008, to April 30, 2009; the intervention year ran from May 1, 2009, to April 30, 2010. The content of the posters, brochures, and messages was approved by Institutional Review Boards at each site.

Provider Surveys

During the intervention year, we conducted 3 quarterly waves of provider surveys that included physicians, nurse practitioners, and physician assistants. The surveys asked, "Compared to before the Stay Connected project started, how much attention is the clinic giving to the importance of patients keeping clinic appointments?" We report the percentages of providers (pooled across waves and provider type) who responded "Somewhat" or "Much more than before" the intervention started.

Visit and Financial Data

Primary care visit data from each clinic's attendance database were sent to CDC. Each scheduled visit had 3 possible outcomes: a kept visit, a missed (no-show) visit, and a cancelled visit. Kept and missed visits were counted; cancelled visits were excluded. The outcome variables were the number of kept PC visits in the 2 study years, and the clinic's revenue gained or lost due to the difference in kept PC visits between the 2 years.

Visit claims and capitation payments data were submitted separately to CDC after the end of the intervention year by the academic medical centers with which the clinics were affiliated. These centers supplied HIV primary care visit revenue (professional/technical payments and facility payments) for a 12-month period no more than 12 months after the intervention year. Clinics reported revenue by payer (commercial, Medicare, Medicaid, Ryan-White/self-pay)

and by Current Procedural Terminology level. The dollar value of 1 visit was calculated by clinic visit payments received divided by the number of kept visits for that year. Revenue gained or lost in the intervention year was calculated by multiplying the dollar value of 1 visit by the number of additional (or fewer) kept visits in the intervention year. Net revenue was the amount of revenue left after including costs to conduct the intervention.

We report actual paid amounts, rather than billed charges, as the payments received are typically lower than the billed charges. The payments, or revenue, are based on fee-for-service (FFS) visits and capitation contracts with third-party payers for professional services and facility fees. The breakdown between FFS visit payments versus capitated visit payments in US primary care settings was derived from published data from the Centers for Medicare and Medicaid Services for Medicaid and Medicare,[8,9] and published data using the Medical Expenditure Panel Survey for private insurance paid visits.[10] Site principal investigators supplied information to determine whether the Ryan White CARE Act funds were drawn down using a FFS formula or capitation-type formula. With these payer-specific estimates of capitated versus FFS proportions, we then applied the numbers of kept visits by payer type from our 6 clinics to derive a weighted average of capitated and FFS visit proportions for each site. The weighted average was 65% FFS visits and 35% capitated visits.

Training and materials for the intervention were included as costs in the analysis. We assumed that no-cost training would not be universally available, so training was estimated at approximately $2400 for a 2-hour session per clinic. Materials for the intervention (posters, brochures, and provider pocket guides) are available,[7] and can be printed locally for approximately $250 to $500.

Statistical Analysis

In Table 1, we used a linear regression model to calculate absolute and relative improvement in kept visits between the 2 years. Table 2 extended this model, taking into account the cost of the intervention, and producing revenue change based on change in the number of kept visits. We used regression models to calculate the difference in proportion of kept visits between the 2 years, adjusting for variables that differed between the study years, and Generalized Estimating Equations with an unstructured correlation matrix to adjust for repeated measures per patient. Adjusting for scheduled visits was necessary because the net revenue calculations were based on differences in proportions where year-specific denominators of scheduled visits may differ. Analyses were performed with SAS 9.2 (SAS Institute, Inc., Cary, NC).

RESULTS

There were significantly fewer missed visits in the intervention year relative to the preintervention year (Table 1). The intervention year saw significant increases in the proportions of kept visits for Ryan White/charity, Medicare, and Medicaid-insured patients, but not for privately insured patients, effectively narrowing the gap on this measure for publicly insured patients.

Table 2 presents the estimated clinic revenue gained or lost in the intervention year based on increases (or decreases) in kept visits. The 6 clinics experienced a total of 986 more kept PC visits in the intervention year compared with the preintervention year and realized net additional patient-visit revenue of $185,662. The differences in the dollar value of a visit among the clinics mainly reflected differences in reimbursement rates for Ryan White patients and Medicaid patients, which varied by clinic; because these are safety net clinics, Ryan White funds and Medicaid funds contributed the largest proportion of visit revenue. At the Birmingham clinic, there were no facility fee payments. In addition, this site routinely expended all Ryan White funds before the end of the year, which increased the proportion of charity visits at this site relative to the other sites. The sites varied in kept visits gained or lost due to differences in intervention effect by site. Table 2 also presents the results for a hypothetical clinic that experienced our 6-clinic mean of 7466 scheduled visits per year; such a clinic could expect to gain 164 additional kept visits, and $24,000 in additional visit revenue relative to a preintervention year.

From the provider survey, 73.9% (207/280) of providers responding indicated the clinic was giving “somewhat” or “much more” attention to the importance of patients keeping clinic appointments compared with the year before the intervention started.

DISCUSSION

We found that from the perspective of the institutions operating these HIV clinics, the small difference in missed visits (2.2%) due to the intervention yielded $24,000 in net revenue for an average-sized HIV clinic. We used this perspective because decisions for allocating resources to academic HIV clinics are often based on revenue that the clinic generates. It is important for clinic administrators to know whether particular intervention strategies have a positive or negative effect on clinic finances. That information can be used by HIV clinics to help estimate changes in financial risk they could anticipate by using the intervention. Beyond the perspective of revenue impacts from lowering the number of missed visits, the intervention can benefit the health of patients who attend clinic regularly. In a large multicenter study, as missed HIV care visits increased, all-cause mortality was found to increase.[11] Our intervention also reduced disparities in appointment keeping between public payer patients and private payer patients (insurance results, Table 1), a major health equity goal for safety-net health care systems.[12]

Five of the 6 clinics increased the number of kept visits and visit revenue in the intervention year. At the Miami site, however, the intervention was not revenue generating. Unlike the institutional stability at the other 5 sites, at Miami, there were structural and institutional changes that occurred in the intervention year; these included restricted use of transportation programs, disruption of appointment reminder services, requirements to more frequently establish eligibility for clinic services, and suspension of waivers for insurance co-pays. These policy changes may have been responsible for the reduction in the percentage of kept visits in the intervention year compared with the preintervention year at the Miami clinic.

Beginning in the 1990s, states began shifting Medicaid reimbursement away from FFS plans, and by 2011, over 60% of Medicaid recipients were in Medicaid managed care plans

that use some form of capitated reimbursement, including shared risk and monitoring of performance.[13,14] This trend away from FFS is less true for Medicare and private insurance payers.[9,10] We stated our net results using all insurance revenue due to the additional kept visits. On average, about 35% of the visits and payments were under a capitation payment system; 65% were FFS.

Financial pressures on HIV clinics will continue, regardless of the main source of revenue. Increasing the share of revenue from capitated payments over FFS will not be a panacea for financing routine HIV care, particularly given how low Medicaid (the single largest payer for HIV) capitation rates are. A clinic will be exposed to financial risk if capitation rates are set low and patients' routine care costs are not sufficiently covered; managed care payments for Medicaid are usually tied to FFS rates, and states have cut reimbursement rates during fiscal downturns.[15] It has been adequately established that health outcomes for patients with HIV cycling in and out of care are worse,[1,2] and that caring for patients with worse relative to better clinical profiles is expensive.[16] Thus, when HIV clinics share the risk with insurers to cover the cost of capitated patients, higher missed visit rates would result in higher costs to the clinic.

Regardless of the mix of FFS and capitated payment plans, the intervention year missed visit rate was lower across these clinics, which translates to less financial risk or increased payments for the clinic for both types of payment plans. Individual clinic's results would vary according to their response to the intervention and the value of per-visit revenue. Not considered were walk-in visits, which would take up some of the slack of no-show visits; however, not all of our clinics offered slots for walk-ins, thus, we did not include them. We also did not estimate the workload costs saved (such as for rescheduling) by clinics on missed visits that were averted; this workload reduction would benefit the clinic.

We addressed some limitations of our pre–post study design by adjusting for the study variables that differed between the preintervention and intervention years. The intervention's effects will not last indefinitely; it would require a longer study to know how much longer than a year the effects might last. Since the study involved only 6 HIV clinics (that were not randomly sampled), we cannot claim the results are representative of most HIV clinics. The results were stronger for publicly compared with privately insured patients, which might make the results more relevant to safety-net clinics.

In summary, we found a low-cost, low-effort clinic-wide intervention using posters, brochures, and brief motivational messages from providers to patients reduced the number of missed HIV primary care visits, benefitting both the patient and the clinic. The small reduction in missed visits improved FFS revenue and reduced a clinic's exposure to financial risk when patients were enrolled in managed care capitation plans. Given the small effort involved, we would encourage HIV clinic administrators to consider implementing such an intervention.

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TABLE 1

Adjusted* Mean Proportion of All Primary Care Visits Kept Among Patients During the Preintervention and Intervention Periods, Retention in Care Study, 2008–2010

	Mean Proportion of Kept Visits (No. Patients)			
Variable	**Preintervention Year, 2008–2009**	**Intervention Year, 2009–2010**	**% Relative Improvement†**	***P***
Overall (no adj)	0.700 (9407)	0.724 (10,344)	3.4	<0.0001
Overall	0.679 (9407)	0.699 (10,344)	3.0	<0.0001
Patient type				
New + re-engaging	0.649 (1310)	0.699 (1371)	7.6	<0.0001
Active	0.678 (8097)	0.694 (8973)	2.4	<0.0001
Viral load‡				
Undetectable§	0.723 (6142)	0.738 (7131)	2.0	0.0004
Detectable	0.622 (3265)	0.656 (3213)	5.5	<0.0001
CD4 cell count/mm3‡				
<350	0.663 (3719)	0.697 (3922)	5.1	<0.0001
≥350	0.688 (5558)	0.702 (6115)	1.9	<0.0020
No. scheduled visits for care				
1–3	0.647 (4142)	0.676 (5215)	4.5	<0.0001
4–6	0.705 (3589)	0.720 (3600)	2.1	0.003
7 or more	0.668 (1676)	0.678 (1529)	1.5	0.131
Gender				
Males	0.677 (6124)	0.697 (6708)	3.0	<0.0001
Females	0.680 (3249)	0.702 (3598)	3.3	0.0001
Age group, yrs				
16–29	0.604 (526)	0.662 (638)	9.6	0.0002
30–39	0.666 (1667)	0.684 (1749)	2.7	0.060
40–49	0.688 (3554)	0.708 (3739)	2.8	0.0010
50–85	0.742 (3660)	0.761 (4218)	2.5	0.0003
Race/ethnicity				
Black	0.668 (5985)	0.689 (6641)	3.3	<0.0001
White	0.693 (1593)	0.712 (1697)	2.7	0.022
Other race	0.715 (123)	0.757 (142)	5.9	0.184
Hispanic	0.686 (1706)	0.705 (1864)	2.7	0.033
HIV risk				
MSM	0.698 (2629)	0.712 (2888)	2.1	0.03
MSM + IDU	0.640 (225)	0.645 (226)	0.9	0.790
Other‖	0.638 (710)	0.690 (819)	8.1	<0.0001
Heterosexual	0.689 (4597)	0.706 (5120)	2.4	0.0010
IDU	0.615 (1246)	0.645 (1291)	4.9	0.0020
Insurance				
Private	0.709 (1589)	0.722 (1709)	1.8	0.11

Variable	Mean Proportion of Kept Visits (No. Patients)		% Relative Improvement[†]	*P*
	Preintervention Year, 2008–2009	Intervention Year, 2009–2010		
Medicare	0.682 (2087)	0.702 (2186)	3.0	0.004
Medicaid	0.638 (3047)	0.656 (3275)	2.9	0.002
Other/RW/none[¶]	0.656 (2684)	0.683 (3174)	4.2	0.0002

[*] Model adjusted for age, viral load, number of scheduled appointments, insurance, and clinic site. Missing data on age, viral load, and insurance excluded from the table.

[†] Change in the retention measure from the preintervention period to the intervention period expressed as a percentage of the preintervention period's measure.

[‡] Based on clinical records, no more than 699 days from the anchor visit in the preintervention and intervention periods.

[§] HIV RNA ≤400 copies/mL.

[‖] Includes other, unknown, undetermined, no risk identified, and missing.

[¶] For insurance, RW = Ryan white coverage; other and none include university or local charity programs.

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TABLE 2

Clinic Visits and Revenue Gained or Lost in the Intervention Year Compared With the Preintervention Year, Retention in Care Study, 2008–2010

Site	Unadjusted Kept/ Scheduled Visits, Preintervention Year	Unadjusted Kept/ Scheduled Visits, Intervention Year	GEE Model-Adjusted Year–Year Difference in Proportion of Kept Visits*	Kept Visits Gained or Lost†	Dollar Value of Visits‡	Total Revenue Gained or Lost (Col. 5 × Col. 6)	Cost of Intervention§	Net Revenue Less Costs
Baltimore	5888/8810	6625/9682	0.0212	+205	$267.3	$54,796.5	($2650)	$52,147
Birmingham	2843/3571	2907/3614	0.0101	+37	$86.0	$3182.0	($2650)	$532
Boston	4197/5338	4324/5355	0.0308	+165	$240.6	$39,699.0	($2650)	$37,049
Brooklyn	3689/5767	3956/5971	0.0095	+57	$146.0	$8322.0	($2650)	$5672
Houston	8504/12,672	8237/11,456	0.0506	+580	$179.3	$103,994.0	($2650)	$101,344
Miami	4930/6560	6249/8717	−0.0071	−62	$136.0	($8432.0)	($2650)	($11,082)
Total or average for 6 clinics	30,344/43,403	32,298/44,795	0.0220	+986	$190.1	$201,562	($15,900)	$185,662
Hypothetical clinic‖	5057/7234 (6 clinic average)	5383/7466 (6 clinic average)	0.0220	+164 (6 clinic average)	$163 (6 clinic median)	$26,732	($2650)	$24,082

*GEEs linear model of the absolute increase or decrease in proportion of visits kept, intervention minus preintervention year, adjusting as reported in Table 1, including numbers of scheduled visits in each year.

†Gained or lost in the intervention year. Calculated as the product of the number of scheduled visits in the intervention year × the adjusted difference in year–year proportion of kept visits.

‡For the individual sites, the dollar values of visits are calculated from revenue received from third-party payments for a 12-month period. Revenue was a mixture of FFS revenue and capitation payment revenue.

§Includes training costs at $2400 [includes 2 trainers, preparation time, and delivery of training ($100 per hour, and travel costs)] and $250 to print 25 posters, 2000 brochures, and 50 pocket guide message reminders.

‖A hypothetical clinic that experiences 7466 scheduled visits in the intervention year (average of the 6 clinics), an average number of kept visits gained based on the 6 clinics, the median per-visit revenue across these clinics, and the average response to the intervention.

GEE, generalized estimating equation.