

## BY THE USE OF A COMPUTERIZED DATA SYSTEM

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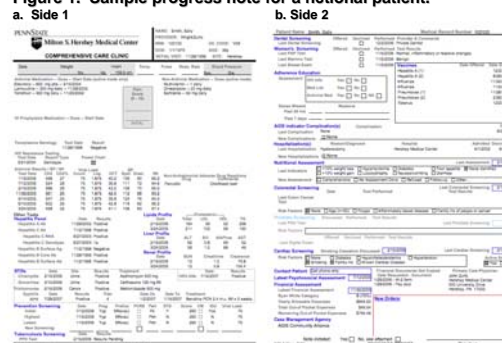
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### Abstract

### Methods

Figure 1. Sample progress note for a fictional patient.



### Results

In 2006, 667 active patients were followed in the Hershey Medical Center HIV program, 638 adults and 29 children. Basic demographics of the population are shown in Table 1.

Table 1. Demographics of active HIV population, 2006.

	n	Percent
<b>Gender</b>		
Male	451	67.6%
Female	216	32.4%
<b>Race/Ethnicity</b>		
Black/African American (Latino)	15	2.2%
Black/African American (non-Latino)	114	17.1%
White (Latino)	89	13.3%
White (non-Latino)	448	67.2%
Asian	1	0.1%
Other/Unknown	0	0.0%
<b>Age</b>		
<2	1	0.1%
2-12	14	2.1%
13-24	32	4.8%
25-44	303	45.4%
45-64	305	45.7%
>65	12	1.8%
<b>Exposure category</b>		
MWHSWM	285	42.7%
IDU	72	10.8%
MWHSWM & IDU	11	1.6%
Hemophilia	21	3.1%
Heterosexual contact	216	32.4%
Perinatal transmission	34	5.1%
Transfusion	6	0.9%
Other/Unknown	22	3.3%
<b>Diagnosis</b>		
HIV (non-AIDS)	295	44.2%
AIDS	372	55.8%

The Hershey Medical Center outpatient HIV practice has been active since the mid-1980s and has been funded by the Ryan White Care Act since 2000 (Title III, now Part C). A computerized, networked, database tool, **QuickData**, was introduced in 1998 as a clinical management tool that included fields related to HIV-specific data. It was built using a commercial database software, Filemaker Pro. A major expansion of **QuickData** took place in 2002 with the addition of fields to track all age-matched health maintenance elements for primary care. **QuickData** is fully integrated into patient care with real-time data entry at the point of care by means of summary data reports produced in the form of a Progress Note (2-sided) for each patient (Figure 1, fictional patient) and the availability of **QuickData** on computer work stations of key team members for daily access to and update of patient care data. Progress Notes are systematically amended during patient care visits based on a standardized care plan and the updated reports electronically entered. A CQI module was introduced in 2005 to accurately measure compliance with 10 CQI parameters and 1 outcome measure. A sample of 20% of active adult patients (seen at least once in the prior 12 months) is generated randomly by **QuickData** each calendar quarter. Each parameter and its denominator is detailed below. We report our results from 2006.

### CQI Parameters

- PCP prophylaxis for all selected active patients seen during the quarter with CD4 counts <200/mL (x2 consecutively).
- MAC prophylaxis for all selected active patients seen during the quarter with CD4 counts <50/mL (x2 consecutively).
- Influenza vaccine for all selected active patients seen during the most recent influenza vaccine period (9/1/0X to 3/31/0X+1) (Offered and/or Given).
- Pneumococcal vaccine for selected active patients, initially and repeated at 5 years (Offered and/or Given).
- Hepatitis B (HBsAg or HBsAb) & hepatitis C serologies for selected active patients checked once.
- Cholesterol for all selected active patients, checked at least once.
- PPD performed annually for all selected active patients seen during the quarter who were not previously PPD positive or treated for TB.
- RPR performed annually for all selected active patients.
- Pap smear performed annually for all selected active females seen during the quarter (Offered and/or Given).
- HAART discussed and/or prescribed for all selected active patients with CD4 counts <350 (x2 consecutively) seen during the quarter.

### Outcome Measure

- HIV viral load for all patients on HAART (mean of last two measurements).

### Statistical Methods

We did statistical comparisons using chi-square, SAS 9.1, for the 4 CQI parameters for which we had adequate data from the multi-institutional EQUIV Study\* (Effects of a Quality Improvement Collaborative on the Outcome of Care of Patients with HIV Infection).

\*Ann Intern Med 2004;140:887-896.

Table 2 shows the cumulative data for CQI parameters and outcome (viral load) for 2006 comparing our results with the EQUIV data. For 10 CQI parameters (offered or given), our lowest percent adherence was 88.1% for completed PPDs. For the same parameters (given, rather than offered or given), our lowest percentage adherence was 70.4% (Pap smear). In comparison with the EQUIV Intervention Clinic group, we achieved significantly better results for influenza vaccination, PPD performed, and hepatitis C serology testing while results for completed Pap smears were not statistically different. Our results for appropriate use of antiretroviral therapy (94.1% vs. 80.5%) and viral load <400 (76.7% vs. 51.7%) could not be compared statistically due to the lack of specific EQUIV data.

Table 2. Cumulative CQI and outcome data compared with EQUIV data.

	PENN STATE HERSEY		EQUIV		OR	95% CI	p value
	n	# Applicable Percent	n	# Applicable Percent			
PCP Prophylaxis	36	36 100.0%	5	5 100.0%			
MAC Prophylaxis	353	436 89.4%	1,913	3,216 99.5%	2.89	2.26-3.7	<0.0001
Influenza Vaccine Offered or Given	300	436 89.4%	2,894	3,216 90.0%	7.74	3.82-15.71	<0.0001
Pneumococcal Vaccine Offered or Given	513	565 90.8%	511	565 90.4%			
Given	491	565 86.9%	565	565 99.1%			
Hepatitis B serology	557	565 88.6%	2,894	3,216 90.0%	6.7	4.7-9.55	<0.0001
Hepatitis C serology	511	565 90.4%	511	565 90.4%			
PPD performed	273	310 88.1%	1,682	3,216 80.5%	1.28	0.82-2.01	0.28
RPR performed	308	324 95.1%					
Annual Pap smear Offered or Given	94	98 95.9%	702	1,080 65.0%			
Given	69	98 70.4%					
HAART (for CD4 <350)	84	85 98.8%	2,589	3,216 80.5%			
Discussed or On treatment	82	85 94.1%					
On Treatment							
<b>Viral Load</b>							
<45	260	464 56.0%					
<400	356	464 76.7%	1,662	3,216 51.7%			

### Summary and Conclusions

- Our computerized data management tool (**QuickData**) has been fully integrated into the care of our large outpatient HIV practice.
- Key patient data items are available and updated at the point of care using a summary report (progress note) and with daily access to the database by key team members.
- A CQI module randomly selects 20% of the adult population per quarter and accurately reports the results for 10 CQI parameters and 1 outcome measure.
- Our compliance with standard CQI measures (using a standardized care plan) is high for all parameters and compares favorably with nationally published data.
- We believe our patient care model using our computerized data management tool and a well-defined standardized care plan can serve as a model for the management of HIV infection and is applicable to other primary care populations.

### Acknowledgements

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With the advent of combination antiretroviral therapy that has resulted in improved survival for HIV-infected individuals, it has become ever more important to address the full spectrum of healthcare with these individuals and to demonstrate adherence to a strict plan of care. Yet difficulties with the existing infrastructure of information flow at many medical facilities and the inherent psychosocial challenges of this population that often lead to inconsistent and fragmented medical care have resulted in poor performance in quality measures for many medical practices both large and small. We have created a computerized database tool, **QuickData**, that is a comprehensive medical management tool for HIV-infected patients which, combined with a strict care plan, real time data entry, and built-in tools to measure quality, has resulted in demonstrably excellent performance for 10 quality measures and one key outcome measure.

### Introduction