

Implementation of an Electronic Information System to Enhance Practice at an Opioid Treatment Program (R01 DA022030)

Lawrence S. Brown, Jr., MD, MPH, FASAM; Steven Kritz, MD; Melissa Lin, MS; Ben Louie, BA; Roberto Zavala, MD; Charles Madray, RPA-C, MBA;

START Treatment & Recovery Centers (formerly Addiction Research and Treatment Corporation), Brooklyn, NY 11201

Background

- Electronic information systems rarely utilized or evaluated in substance abuse treatment settings
- START serves a racially, ethnically and economically disenfranchised population
- START serves a population that experiences significant disparities in access and quality of healthcare

Study Design & Purpose

- Design:** Prospective, comparative, pre-post implementation study; 3-year timeline
- Purpose:** Evaluate the implementation of an electronic information system using the following domains:
 - Quality
 - Risks
 - Satisfaction
 - Productivity
 - Finance

Aims & Hypotheses

- Specific AIM 1: Quality**
Hypothesis - Improved capture or timeliness of:
 - .Medical Assessments
 - .Multidiscipline Assessments
 - .HCV Viral Load
- Specific AIM 2: Risks**
Hypothesis - Rates will decrease for:
 - .Patient Complaints
 - .Patient Incidents
 - .Medication Errors
- Specific AIM 3: Satisfaction**
Hypothesis - Overall satisfaction will increase for:
 - .Patients
 - .Clinicians
 - .Managers
- Specific AIM 4: Productivity**
Hypothesis - Visits will increase for:
 - .Counseling
 - .Primary Care
 - .HIV Case Management
- Specific AIM 5: Financial Performance**
Hypotheses -
 - .Revenue per capita staff will increase
 - .Cost per visit will decrease

Aims, Measures & Data Sources

Aim	Measure	Data Source (Pre)	Data Source (Post)
Quality	% Medical assessments performed on-time	Paper chart	Electronic record
	% Multidiscipline assessments performed on-time	Paper chart	Electronic record
	% HCV Viral Load obtained	Paper chart	Electronic record
Risks	# of Complaint / Incidents / Medication Error Reports	Reports to CQI Manager	Reports to CQI Manager
Satisfaction	Patient Satisfaction	Survey	Survey
	Clinician/Manager Satisfaction	Survey	Survey
Productivity	# Counseling visits	Clinician logs	Electronic logs
	# Primary care visits	Clinician logs	Electronic logs
	# HIV case management visits	Clinician logs	Electronic logs
Financial Performance	Revenue per capita	Finance/HR Depts	Finance/HR Depts
	Cost per visit	Finance Dept	Finance Dept

Quality: Annual Medical & Annual, 30 & 90-Day Multidiscipline Assessments

Hypotheses:
Implementation of the electronic health record will result in a higher percent of patients having annual medical assessments within 30 days of admission anniversary

Implementation of the electronic health record will result in a higher percent of patients having annual, 30-day, and 90-day multidiscipline assessments on or before the due date

Annual Medical & Multidiscipline Assessments:
Pre-implementation Eligibility: Admission date: 7/1/06 to 6/30/07
 Length of stay ≥365 days
 # of Eligible Patients: 420
Post-implementation Eligibility: Admission date: 11/1/08 to 10/31/09
 Length of stay ≥365 days
 # of Eligible Patients: 423

30-Day Multidiscipline Assessments:
Pre-implementation Eligibility: Admission date: 7/1/06 to 6/30/07
 Length of stay ≥30 days
 # of Eligible Patients: 613
Post-implementation Eligibility: Admission date: 10/1/09 to 9/30/10
 Length of stay ≥30 days
 # of Eligible Patients: 704

90-Day Multidiscipline Assessments:
Pre-implementation Eligibility: Admission date: 7/1/06 to 6/30/07
 Length of stay ≥90 days
 # of Eligible Patients: 576
Post-implementation Eligibility: Admission date: 10/1/09 to 9/30/10
 Length of stay ≥90 days
 # of Eligible Patients: 608

Results

Measure	Study Period	# (%) On Time	# (%) Late + Not Completed	P-value
Annual Medical Assessments*	Pre-implementation	350 (83%)	70 (17%)	<0.001
	Post-implementation	411 (97%)	12 (3%)	
Annual Multidiscipline Assessments**	Pre-implementation	294 (70%)	126 (30%)	<0.0001
	Post-implementation	407 (96%)	16 (4%)	

* ± 30 days of 1-year anniversary ** ≤ 365 days after admission

Measure	Study Period	# (%) On Time	# (%) Late + Not Completed	P-value
30-Day Multidiscipline Assessments*	Pre-implementation	441 (72%)	172 (28%)	<0.001
	Post-implementation	614 (87%)	90 (13%)	
90-Day Multidiscipline Assessments**	Pre-implementation	242 (42%)	334 (58%)	<0.001
	Post-implementation	423 (70%)	185 (30%)	

* ≤ 30 days after admission ** ≤ 90 days after admission

SUMMARY: Highly statistically significant improvement in timely completion of Annual Medical and Annual, 30-Day & 90-Day Multidiscipline assessments

Quality: Hepatitis C Viral Load

Hypothesis:
Implementation of the electronic health record will result in a higher percent of Hepatitis C antibody positive patients tested for hepatitis C viral load

Pre-implementation Eligibility:
 ♦ Admission date: 7/1/06 to 6/30/07
 ♦ Length of stay: ≥60 days
 ♦ # of Eligible Patients: 670

Post-Implementation Eligibility:
 ♦ Admission date: 10/1/09 to 9/30/10
 ♦ Length of stay: ≥60 days
 ♦ # of Eligible Patients: 653

Results

Study Period	HCV Antibody Positive (%) / Negative (%)	Appropriately Referred + Refused	HCV VL Done / HCV VL Done + Not Done (%)*	P-value
Pre-implementation	342 (51%) / 328 (49%)	160 + 4 = 164	151/178 (85%)	NS
Post-implementation	296 (45%) / 357 (55%)	212 + 5 = 217	64/79 (81%)	

* HCV VL Not Done: 27 (pre); 15 (post)

SUMMARY: No statistically significant change in obtaining HCV Viral Load for patients positive for HCV Antibody

Risk: Medication Errors, Patient Complaints & Patient Incidents

Hypothesis: Implementation of the electronic information system will result in a lower number of Medication Errors, Patient Complaints & Patient Incidents

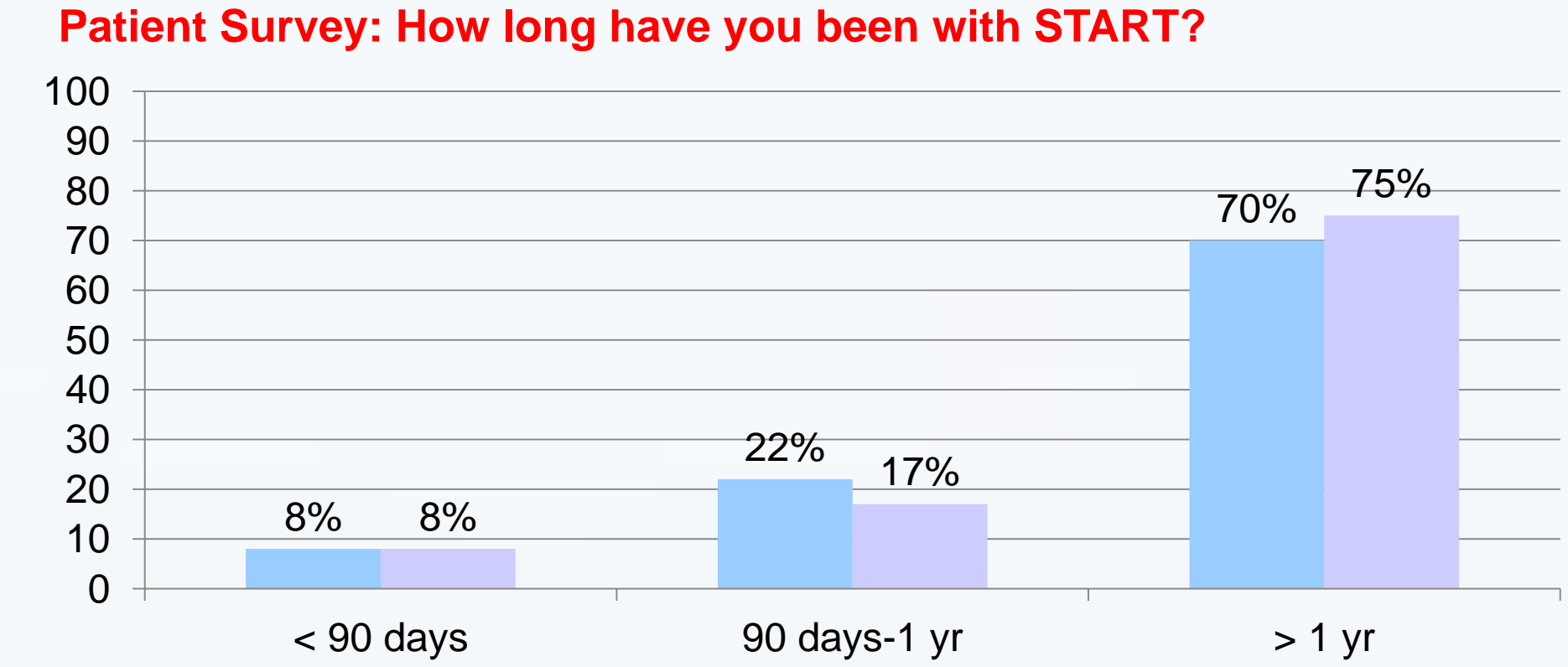
Pre-implementation Period: 7/1/06 to 6/30/07
 - # of Medication Errors: 8
 - # of Patient Complaints: 15
 - # of Patient Incidents: 64

SUMMARY: This domain was not included in the post-implementation data collection due to:
 - N relatively small
 - Processes did not change post-implementation

Satisfaction: Patient Survey

Hypothesis:
Implementation of the electronic health record will result in increased patient satisfaction

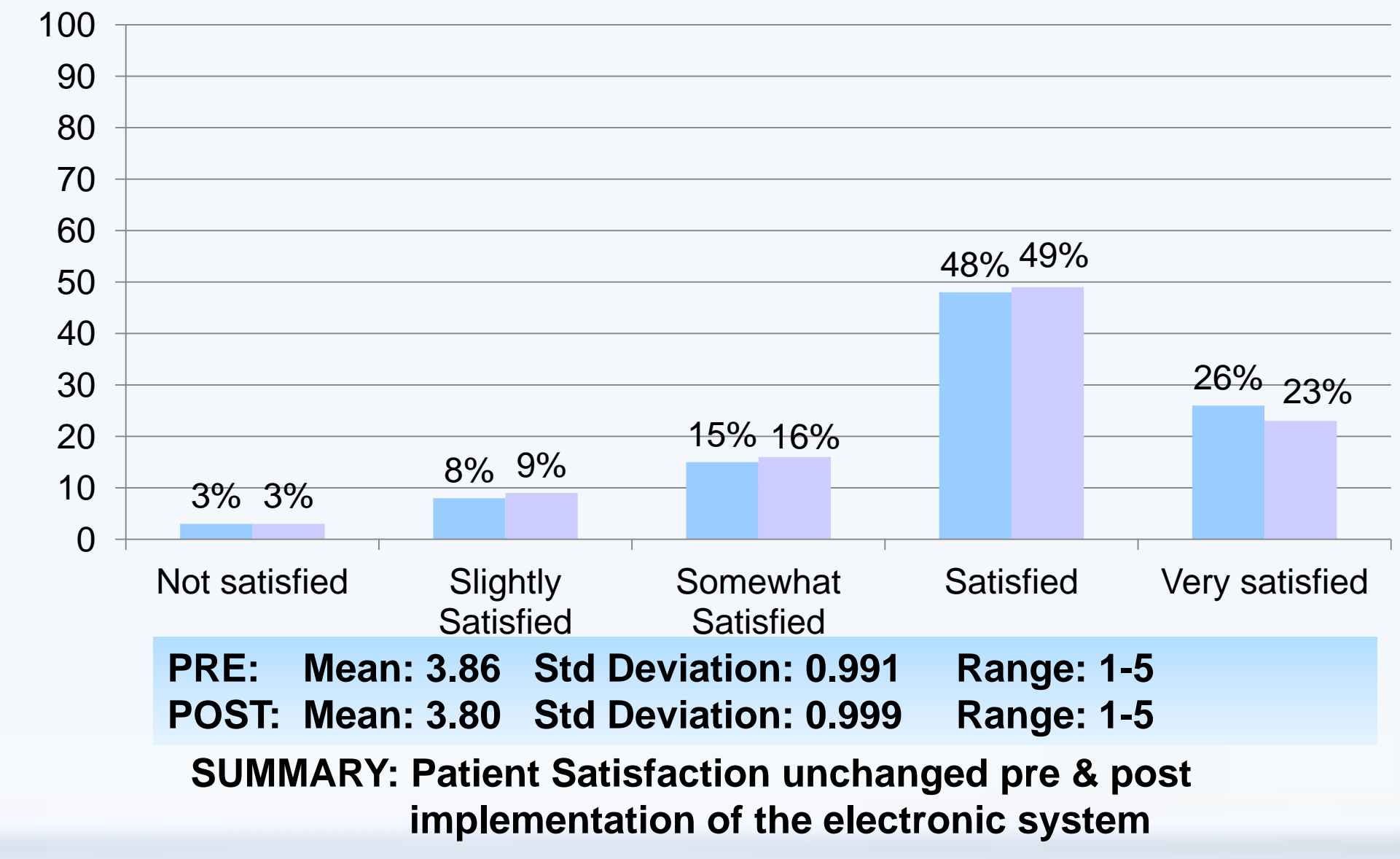
of Surveys Administered (Pre & Post): 1,000
 - Apportioned by Clinic Census
 - Process: First come/first served with 2-ride MetroCard
 - 6 Questions



Results

• Length of time with START not different pre-post
 • 35% completed pre & post-implementation surveys
 • Mean Score & Standard Deviation: Q1-6
 - Pre: Mean Score: 3.78* Std Deviation: 0.750
 - Post: Mean Score: 3.74* Std Deviation: 0.775
 *P=NS for each question & overall

Patient Survey Q6: How satisfied are you with the overall quality of care you receive?



Satisfaction: Staff Survey

Hypothesis:
Implementation of the electronic health record will result in increased staff satisfaction

Eligible employees: Clinicians and Managers

	Pre	Post
# of eligible employees:	148	155
# of surveys returned:	99 (67%)	92 (59%)

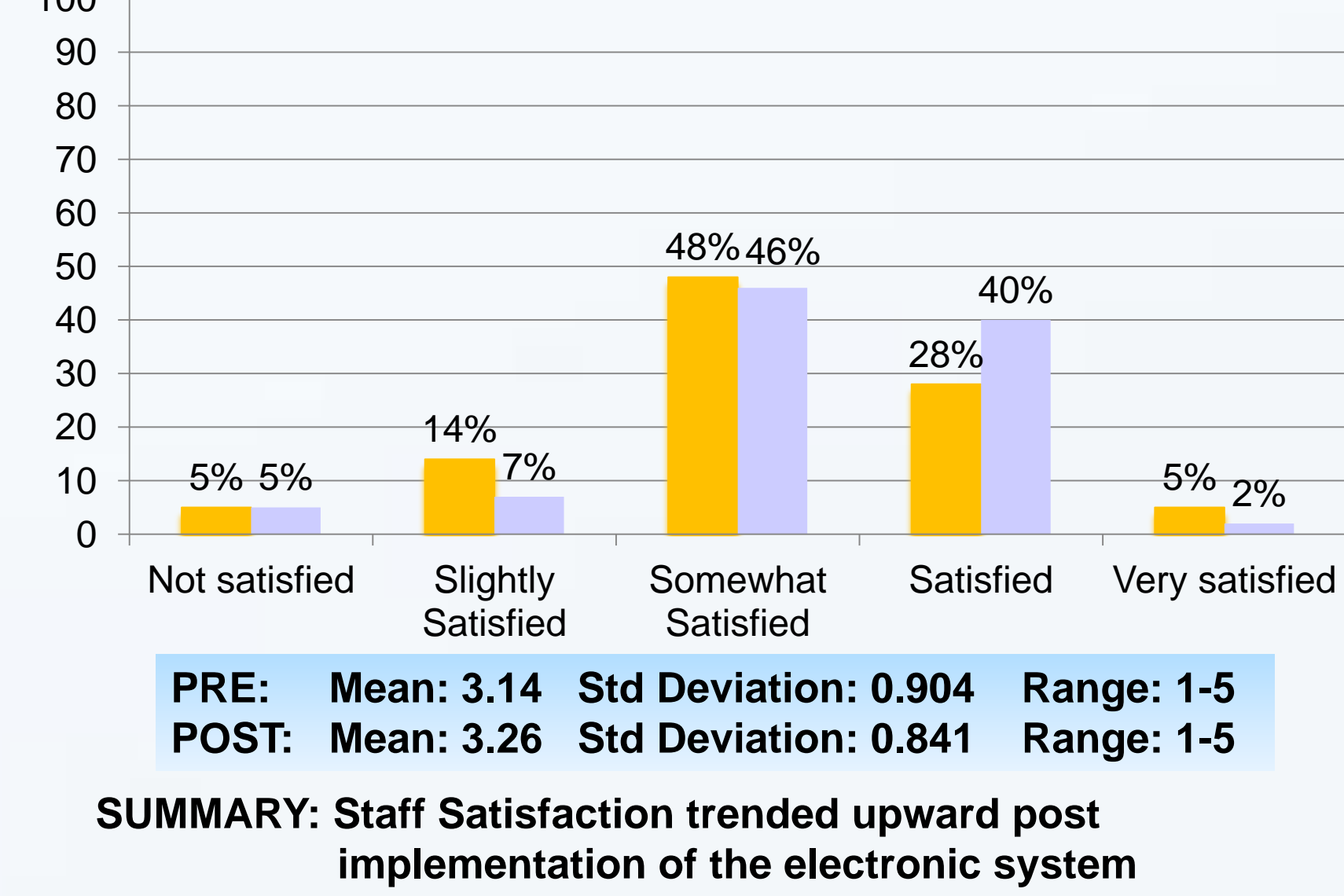
Results

• 54% completed pre & post-implementation surveys
 • Mean Score & Standard Deviation: Q1-17
 - Pre: Mean Score: 3.11 Std Deviation: 0.819
 - Post: Mean Score: 3.32 Std Deviation: 0.728

*P=NS overall; P≤0.03 for Q1, 7, 8, 11, 13
 Pre Mean Score > Post Mean Score for Q2 & 16 only (P=NS)

- Questions with significant post-survey satisfaction:**
- Q1:** How satisfied are you with the ability to access needed reports or obtain information for needed reports? (P=0.008)
- Q7:** How satisfied are you with the ability of the system to track your productivity and/or your staff? (P=0.005)
- Q8:** How satisfied are you with the organization of the patient records and/or reports? (P=0.03)
- Q11:** How satisfied are you that the patient record and/or management report format helps to prevent you from overlooking information? (P=0.03)
- Q13:** How satisfied are you that you can communicate patient and/or administrative information to and from administrative staff? (P=0.03)

Staff Survey Q6: How satisfied are you with the system overall?



Productivity

Hypothesis:
Implementation of the electronic health record will result in increased visits per clinician for addiction counseling, primary medical care, and HIV-related case management

Eligible staff:
 • Human Services Counselors
 • Medical Staff
 • Case Managers

Pre Evaluation Period: 7/1/06 to 6/30/07
Post Evaluation Period: 11/1/09 to 10/31/10

- ♦ **Human Services Staff**
Addiction related counseling services (Pre): 64,345
Addiction related counseling services (Post): 52,652
- ♦ **Medical Services Staff**
Primary medical care services (Pre): 5,221
Primary medical care services (Post): 4,028
- ♦ **Case Managers**
HIV counseling services (Pre): 2,680
HIV counseling services (Post): 3,058

Results

- ♦ Productivity significantly declined for Human Services staff
- ♦ Non-significant productivity decline for Medical Services staff
- ♦ Non-significant productivity increase for Case Manager staff

Productivity Confounders

- ♦ Staff capability to utilize the electronic system varied considerably
- ♦ Increased turnover of staff due to inability to adapt to new system
- ♦ Electronic system upgrades required frequent retraining of staff
- ♦ Preparation for new billing process required major re-training

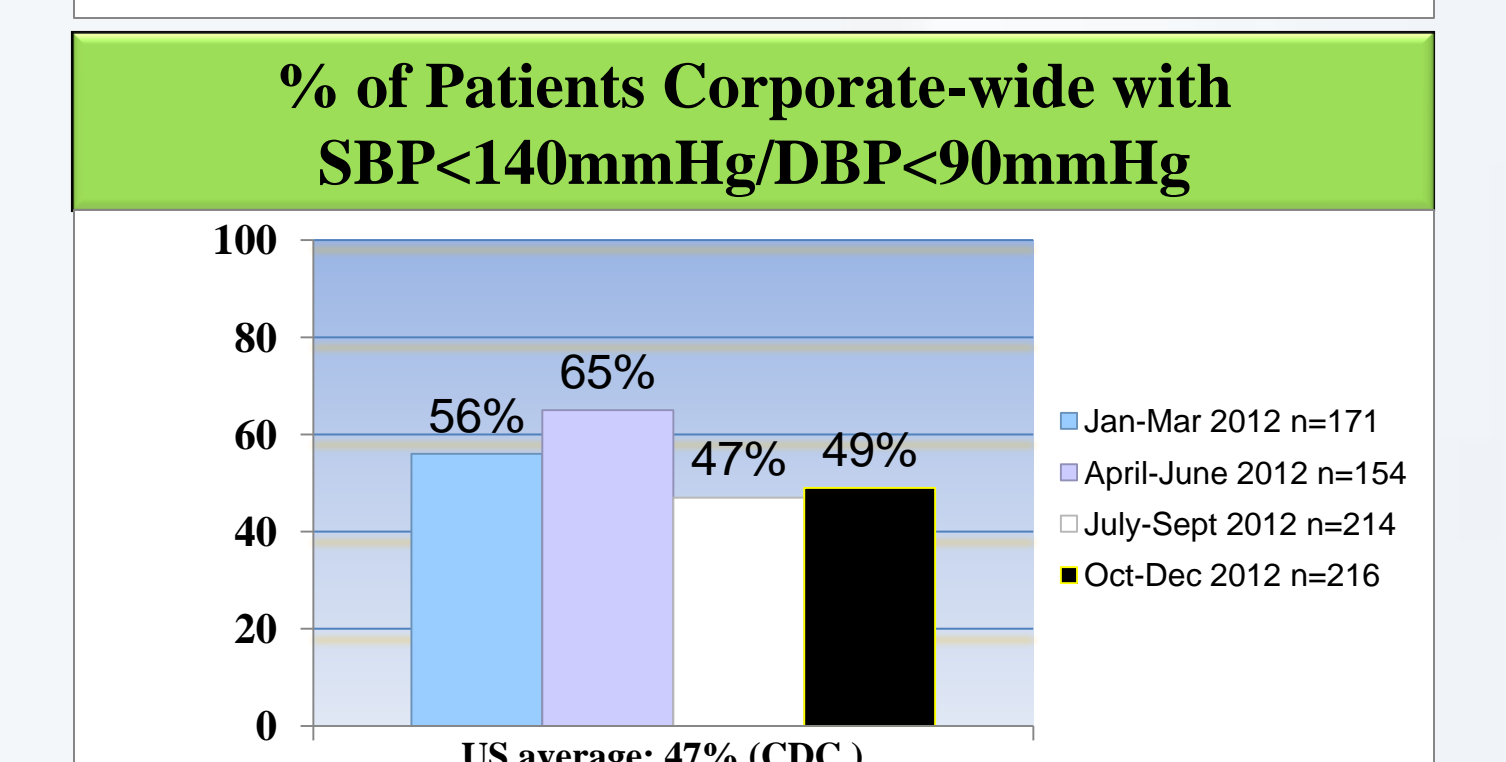
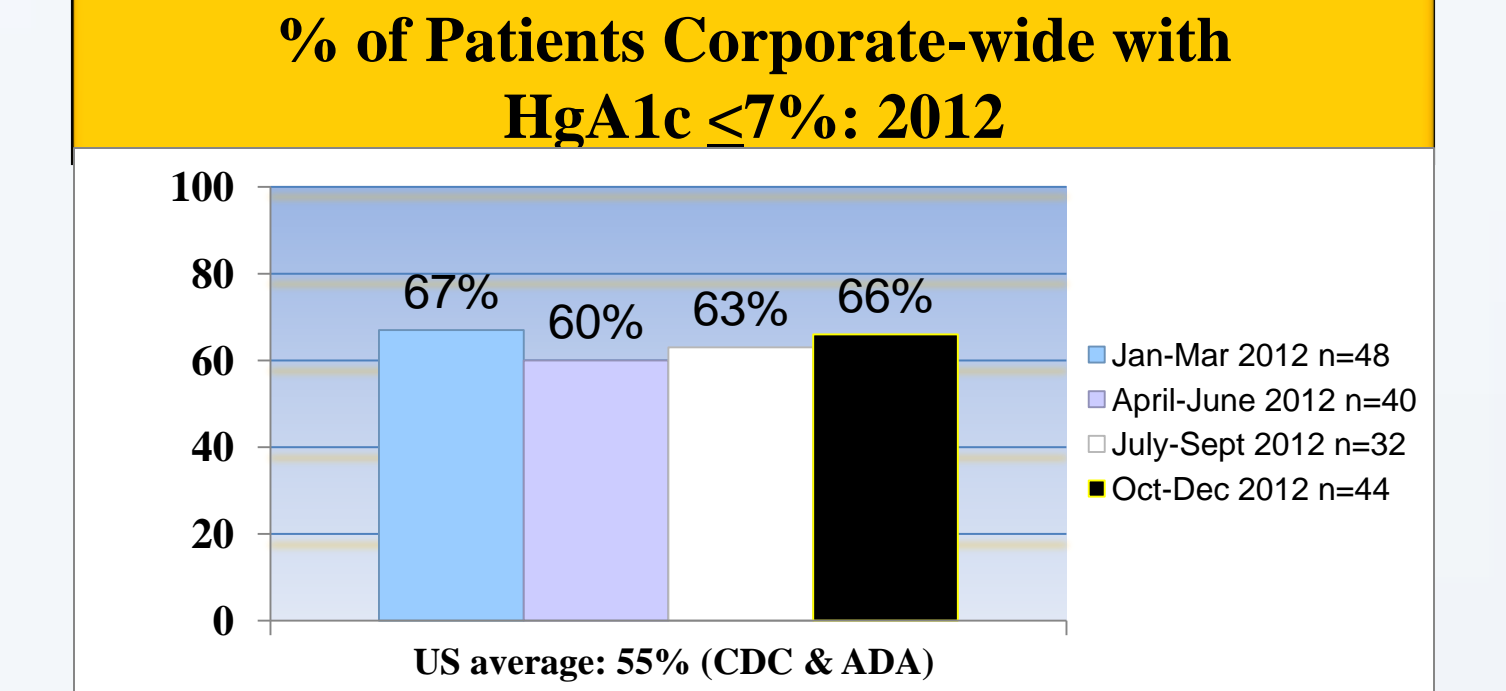
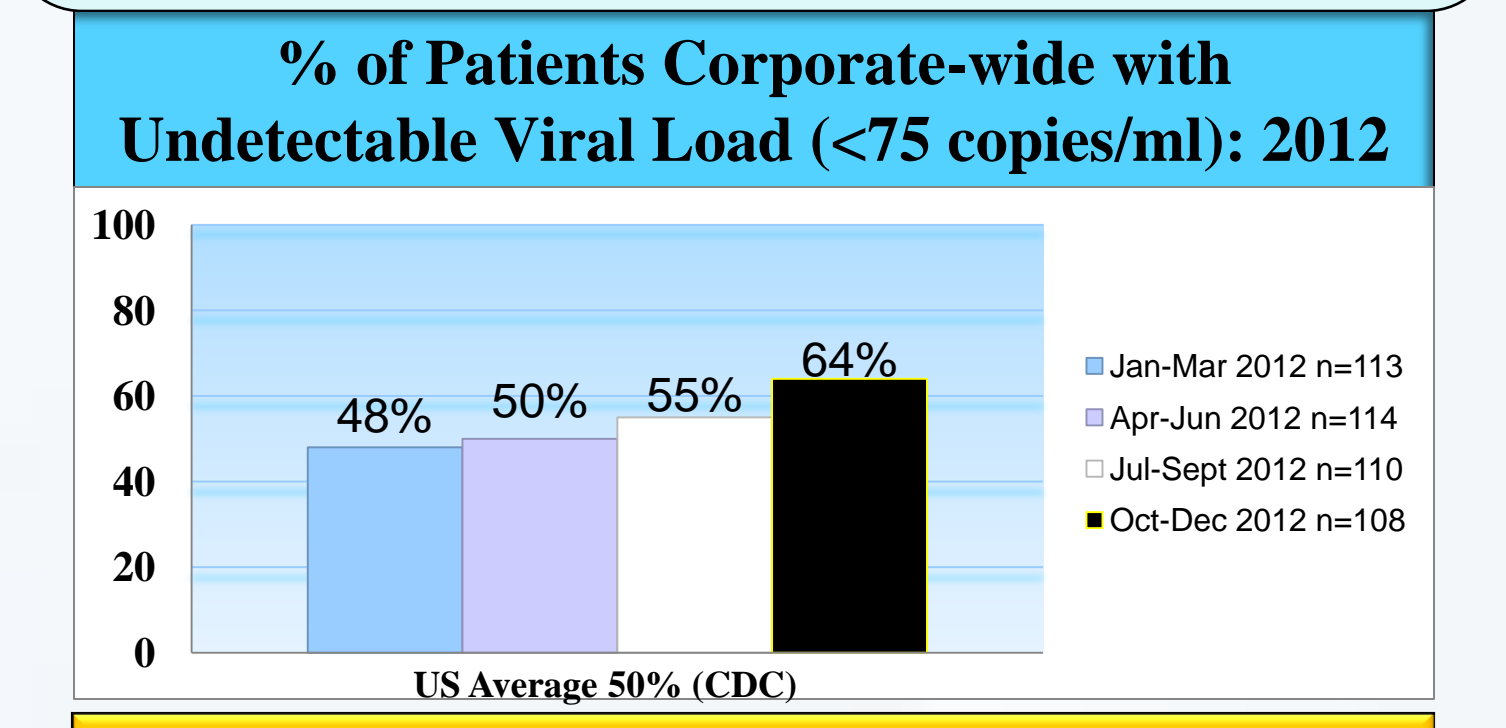
Financial Performance

Hypotheses:
Implementation of the electronic health record will result in:
 ♦ Increased revenue per capita staff
 ♦ Decreased cost per patient visit

Measures	PRE (2007)	POST (2010)
Revenue per capita staff:	\$66,900	\$67,280
Cost per patient visit:	\$28.09	\$29.68

SUMMARY: Revenue per capita staff increased by 0.6%
 Cost per patient visit increased by 5.7%

Performance Measurement



Analysis

Despite serving a racially, ethnically, and economically disenfranchised population that experiences significant disparities in access and quality of healthcare, given the right tools, national performance standards can be met or exceeded for even the most challenging patients.

In Conclusion ...

Overall results were somewhat less robust than expected in some of the domains examined in the research study. However, our ability to measure outcomes has been extremely beneficial for our patients; and the recent changes in documentation and reimbursement for services would have paralyzed our agency had we not had the electronic system in place.

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