

Performance Improvement Project (PIP) Name: Reduction of Seclusion and Restraints in Community-Based Residential Settings

Activity I: Select the Study Topic(s)

A. Step One: Choose the Selected Study Topic. Topics selected for study should reflect the Medicaid enrollment in terms of demographic characteristics, prevalence of disease, and the potential consequences (risks) of the disease. Topics could also address the need for a specific service. The goal of the project should be to improve processes and outcomes of health care. The topic may be specified by the State Medicaid agency or on the basis of Medicaid enrollee input.

Study Topic:

Purpose: The purpose of the present study was to examine whether a provider feedback intervention would decrease the sentinel event rates in general and seclusion and restraint rates in particular.

Based on a review of the occurrence of sentinel events in the provider network of the Hawaii Child and Adolescent Mental Health Division (CAMHD), the Safety and Risk Management (SARM) committee recommended to the Performance Improvement Steering Committee (PISC) that a special study be conducted investigating potential interventions to reduce the use of seclusions and restraints. PISC assembled a quality of care (QOC) study task force to review requests for special studies and to make recommendations for specific studies to implement. The Fiscal Year 2007 PISC quality of care study task force consisted of the following individuals:

Mary Brogan, M.Ed.	CAMHD Performance Manager-Chair of QOC Task Force
Rick Bunney, L.S.W.	CAMHD Resource Management Specialist
David Drews, Ph.D.	Catholic Charities - Provider Representative
Martin Hirsch, M.D.	Honolulu Oahu Family Guidance Center Clinical Director
Roger Perillo	Sentinel Events Specialist
John Viesselman, M.D.	CAMHD Medical Director

Upon review of various study proposals, the PISC QOC task force concluded that studies of interventions targeting use of seclusions and restraints should be a high priority for improving clinical care. The task force noted that seclusions and restraints were most common in hospital-based and community-based residential settings, affect both the CAMHD QUEST and non-QUEST populations, have a high risk of yielding negative effects and little evidence of positive effects for children (c.f., CAMHD, 2002), are generally inconsistent with CAMHD's value regarding providing least restrictive services, and are potentially changeable (c.f., CAMHD, 2002). The CAMHD Evidence-Based Service Committee (2002) in a consensus statement on seclusions and restraint wrote "the use of seclusion and restraint is indicated when dangerous behavior to self or others must be prevented and when measures promoting the child's self-control or less restrictive options have failed or are impracticable" but noted that seclusion and restraint should never "be considered a therapeutic modality" (p. 27). The QOC task force recommended that a study be conducted examining the use of a systematic feedback intervention to direct service provider agencies in the hospital-based residential (HBR) and community-based residential (CBR) settings. Consistent with the EBS consensus statement, the committee additionally recommended consideration of a training intervention in positive behavior support, noting that the intensity of this intervention might be more difficult to implement.

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PISC reviewed the recommendations from the QOC task force and forwarded the recommendations to the CAMHD Executive Management Team (EMT) for implementation. EMT approved the study proposal and assigned a work group to complete the task. The core work group consisted of Kimberly Allen, Mary Brogan, Eric Daleiden, Jennifer Lau, and Roger Perillo and reported to the PISC QOC task force. More detailed examination of population patterns found that both the CAMHD QUEST and non-QUEST populations were served in CBR and HBR settings. Primary study implementation and data collection was conducted by Mr. Perillo, who was the CAMHD Sentinel Event/Incident Specialist (Bachelors level Performance Management staff) and Ms. Allen, Program Monitor (Masters level Performance Management staff).

Specifically, 42% of youth served in CBR settings were QUEST involved youth and 20% of the QUEST population was served in a CBR setting during the fourth quarter of fiscal year 2003. Further, 36% of all youth served in HBR settings were QUEST involved and 3% of QUEST population was served in HBR. Therefore, if successful, the seclusion and restraint reduction interventions were expected to benefit the quality of care to both QUEST and Non-QUEST populations.

In designing the details of the investigation, two studies were defined due to substantive differences between the HBR and CBR settings. The HBR setting was served by a single provider agency so a reasonable comparison setting could not be identified. Further, the HBR setting included an internal reporting mechanism that provided staff regular feedback via a “Patient Care Scorecard” on seclusion and restraint rates in relation to staffing and direct service volume. Therefore, examination of a more intensive staff training, mentoring, and supervision debriefing intervention was conducted using a single subject time-series design.

The CBR study that is the focus of this report describes the second phase of a study that examined the effects of a monthly feedback intervention on the rate of seclusions and restraints. More specifically, during the first study phase, eight CBR facilities were randomly assigned to either receive a monthly feedback report (Group #1) and nine CBR facilities did not receive any feedback (Group #2). Despite initial randomization, these two study groups were not comparable in their baseline rates of sentinel events in general and seclusion and restraint events in particular. The initial feedback group (Group #1) displayed a low base rate of seclusion and restraint events (M = 37 seclusion and restraint events per 1,000 youth per month) relative to the no feedback group (Group #2, M = 278 seclusion and restraint events per 1,000 youth per month). Analysis of the first phase found no significant differences across time in Group #1, and therefore indicated that the feedback intervention alone was insufficient to produce meaningful change in the use of seclusion and restraints.

One hypothesis that was considered was that the low base rates in Group #1 were associated with a “floor effect” so that the study was insensitive to detecting change. To further address this hypothesis, a crossover design was implemented, wherein the feedback intervention was terminated for Group #1 and after an additional three month baseline, the feedback intervention was implemented with Group #2, which had higher base rate levels of seclusion and restraint. The current report presents the analysis of the second phase of this study with regard to the two primary dependent variables, namely average number of seclusion and restraint events per 1,000 youth per month and average number of sentinel events per 1,000 youth per month.

B. Step Two: The Study Question. Stating the question(s) helps maintain the focus of the PIP and sets the framework for data collection, analysis, and interpretation.

Study Question:

Does giving monthly feedback to direct providers of community based residential services regarding sentinel event rates in general and seclusion and restraint rates in particular decrease the reported rate of these events?

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C. Step Three: Selected Study Indicators. A study indicator is a quantitative or qualitative characteristic or variable that reflects a discrete event (e.g., an older adult has not received a flu shot in the last twelve months), or a status (e.g., a member's blood pressure is/is not below a specified level) that is to be measured. The selected indicators should track performance or improvement over time. The indicators should be objective, clearly and unambiguously defined, and based on current clinical knowledge or health services research.

Study Indicator #1:	Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #1
Numerator:	Number of Seclusion and Restraint Events Reported to CAMHD (scaled to 1,000's)
Denominator:	Number of Youth Served in Community-Based Residential Program
First Measurement Period Dates:	July 1, 2003 to January 31, 2004
Baseline Benchmark:	37
Source of Benchmark:	Observed Average
Baseline Goal:	Not Specified
Study Indicator #2:	Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #2
Numerator:	Number of Seclusion and Restraint Events Reported to CAMHD (scaled to 1,000's)
Denominator:	Number of Youth Served in Community-Based Residential Program
First Measurement Period Dates:	July 1, 2003 to October 30, 2004
Benchmark:	216
Source of Benchmark:	Observed Average
Baseline Goal:	Not Specified
Study Indicator #3:	Monthly Rate of Sentinel Events Per 1,000 youth – Group #1
Numerator:	Number of Sentinel Events Reported to CAMHD (scaled to 1,000's)
Denominator:	Number of Youth Served in Community-Based Residential Program
First Measurement Period Dates:	July 1, 2003 to January 31, 2004
Benchmark:	864
Source of Benchmark:	Observed Average
Baseline Goal:	Not Specified

Study Indicator #4:	Monthly Rate of Sentinel Events Per 1,000 youth – Group #2
Numerator:	Number of Sentinel Events Reported to CAMHD (scaled to 1,000's)
Denominator:	Number of Youth Served in Community-Based Residential Program
First Measurement Period Dates:	July 1, 2003 to October 30, 2004
Benchmark:	1,453
Source of Benchmark:	Observed Average
Baseline Goal:	Not Specified

D. Step 4: Identified Study Population. The selected topic should represent the entire Medicaid enrolled population with system-wide measurement and improvement efforts to which the PIP study indicators apply. Once the population is identified, a decision must be made whether to review data for the entire population or a sample of that population.

Identified Study Population:

Provider participants for the present study were all facilities providing community-based residential services under contract with CAMHD (n = 17). Facilities were recruited by telephone calls to Chief Executive Officers of the provider agencies by the CAMHD Performance Manager. These phone calls were followed-up with a mailing to describe the study. All of the agencies contacted agreed to participate in the study. Following agency recruitment, CBR facilities were randomly assigned to a feedback (n = 8) or no feedback (n = 9) condition.

Six hundred fifty-two (N = 652) youth registered with CAMHD received one or more days of service in a participating community-based residential (CBR) program during the study period from July 1, 2003 to June 30, 2006. The requirement to be in the study sample was eligibility for CAMHD services for one or more days. This sample accounted for a total of 856 CBR service episodes during the study period. The average total number of days of CBR service during the period was 217 (SD = 172) for those who completed episodes. Approximately one-half (58.9%, N = 384) of the sample was a QUEST member for one or more days and 41.1% (N = 268) were non-QUEST.

During the study period, four facilities ceased operations. On average, the facilities that closed had higher baseline rates of sentinel events on the indicators of interest. Therefore, in subsequent analyses, data from the closed facilities was excluded from all measurement periods, so that observed changes over time reflected improvement within facilities rather than population change due to closure of more problematic facilities.

E. Step 5: Sampling Methods. If sampling is to be used to select members of the study, proper sampling techniques are necessary to provide valid and reliable information on the quality of care provided. The true prevalence or incidence rate for the event in the population may not be known for the first time a topic is studied.

Measure	Sample Size	Population	Method for Determining Size (<i>describe</i>)	Sampling Method (<i>describe</i>)
Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #1	197	197	Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used
Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #2	511	511	Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used
Monthly Rate of Sentinel Events Per 1,000 youth – Group #1	197	197	Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used

Monthly Rate of Sentinel Events Per 1,000 youth – Group #2	511	511	Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used
Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #3			Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used
Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #4			Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used
Monthly Rate of Sentinel Events Per 1,000 youth – Group #3			Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used
Monthly Rate of Sentinel Events Per 1,000 youth – Group #4			Census of all CAMHD clients served by the participating CBR's that remained open throughout the study period	No Sampling Method – A census was used

Note: Youth may have received multiple service at different providers participating in the Group #1 and Group #2 conditions, therefore the sample size across indicators is higher than the total number of youth in the sample. Because not all youth service episodes crossed the study conditions the sample size across indicators is also lower than the total number of service episodes.

F. Step 6: Data Collection Procedures. Data collection must ensure that the data collected on the PIP indicators are valid and reliable. Validity is an indication of the accuracy of the information obtained. Reliability is an indication of the repeatability or reproducibility of a measurement.

- Clear identification of the data to be collected
- Identification of the data sources and how and when the baseline and repeat indicator data will be collected
- Specification of who will collect the data
- Identification of instruments used to collect the data
 - Medical/treatment records
- Administrative data: Sentinel Events Reports
 - Claims/encounter data Complaints Appeals Telephone service data Appointment/access data
 - Hybrid (medical/treatment records and administrative)
 - Pharmacy data
 - Survey data (attach the survey tool and the complete survey protocol)
 - Other (list and describe):

If medical/treatment records, check below:

- Medical/treatment record abstraction

If survey, check all that apply:

- Personal interview
- Mail
- Phone with CATI script
- Phone with IVR
- Internet
- Incentive provided
- Other (list and describe):

If administrative, check all that apply:

- Programmed pull from claims/encounter files of all eligible members
- Programmed pull from claims/encounter files of a sample of members
- Complaint/appeal data by reason codes
- Pharmacy data
- Delegated entity data
- Vendor file
- Automated response time file from call center
- Appointment/access data
- Other (list and describe):

Sentinel event reports are submitted in a timely fashion following the occurrence of events as described by the relevant policy and procedure. Submission of these reports is one of the items reviewed during annual provider monitoring.

F. Step 6a: Data Collection Cycle.	Data Analysis Cycle.
<p> <input type="checkbox"/> Once a year <input type="checkbox"/> Twice a year <input type="checkbox"/> Once a season <input type="checkbox"/> Once a quarter <input checked="" type="checkbox"/> Once a month <input type="checkbox"/> Once a week <input type="checkbox"/> Once a day <input checked="" type="checkbox"/> Continuous – Sentinel Event Reports collected continuously <input type="checkbox"/> Other (list and describe): <hr/> <hr/> <hr/> </p>	<p> <input type="checkbox"/> Once a year <input type="checkbox"/> Once a season <input checked="" type="checkbox"/> Once a quarter <input type="checkbox"/> Once a month <input type="checkbox"/> Continuous <input type="checkbox"/> Other (list and describe): Data are analyzed and reviewed on at least a quarterly basis and more frequently as needed to address high rates of sentinel events. <hr/> <hr/> <hr/> </p>

F. Step 6b. Other Pertinent Methodological Features. Complete only if needed.

Detailed description of the methodology, measures, and quality review procedures are described in the relevant policies and procedures for sentinel events and provider monitoring.

G. Step 7. Improvement Strategies. Real, sustained improvements in care result from a continuous cycle of measuring and analyzing performance, and developing and implementing system-wide improvements in care. Describe interventions designed to change behavior at an institutional, practitioner, or beneficiary level.

During the feedback conditions, programs in the group targeted for feedback were sent copies of the monthly status report (MSR) for review within their program. The MSR was constructed for the present study to provide standardized feedback to direct service providers about their rate of total sentinel events and seclusion and restraints events in relation to the state average for their peer group. The MSR was a single sheet, double-sided report with the total sentinel event rate on one side of the sheet and the seclusion and restraint rate on the other side of the sheet. The dominant visual element of the report was a line graph plotting the state average and the program-specific rate of sentinel events per youth per month for the most recent annual period. This graph included a prominent text description of whether the agency's rate was above or below the state average. The MSR also included a brief description of the rationale for the measure, the specific formula used to define the measure, the data sources for the measure, the reporting period, etc. as supporting information to clarify common questions regarding the validity and interpretation of the report.

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H. Step 8. Data analysis and interpretation of study results: Describe the data analysis process on the selected clinical or non-clinical study indicators. Include the statistical analysis techniques utilized.

The present project was analyzed as two separate studies and used a variety of data analytic strategies to statistically describe the pattern of results using a 95% confidence level.

The first study involved the follow-up analysis from the original randomization into two groups (Group #1 and Group #2). The intervention phases for the first study were as follows:

Phase	Measurement Periods	Group #1	Group #2
1	1 – 7	Baseline	Baseline
2	8 – 13	Feedback Intervention	Baseline
3	14 – 16	Follow-up	Baseline
4	17 – 23	Follow-up	Feedback Intervention
5	24 – 27	Follow-up	Follow-up
6	28 – 36	CERC Intervention	CERC Intervention

The first analysis tested the basic question of whether there was a statistically significant pattern of linear decline across time (i.e., Did the rate of seclusion and restraints decrease over the period of the study?). This analysis included all six phases to determine whether any quality improvement was evident, regardless of the factor driving such improvement. These results are reported for each indicator under the subheading “Linear Regression Analysis of Trend” in section I below.

The second set of analyses aimed to evaluate whether specific interventions were associated with quality improvements by examining the mean differences in the indicators across study phases using the Analysis of Variance (ANOVA) model.

Question	Group #1 Test	Group #2 Test
1. Was the feedback intervention associated with a rate on the study indicators that was lower than the baseline rate?	Phase 2 vs. Phase 1	Phase 4 vs. Phases 1, 2, & 3
2. Were quality improvements sustained during a non-intervention period following the feedback intervention?	Phases 3, 4, & 5 vs. Phase 2	Phase 5 vs. Phase 4
3. Was the event rate on study indicators during a non-intervention period following feedback lower than the baseline rate?	Phases 3, 4, & 5 vs. Phase 1	Phase 5 vs. Phases 1, 2, & 3

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The third set of analyses aimed to evaluate whether the CERC intervention was associated with additional quality improvement beyond the preceding periods. This analysis collapsed across Group #1 and Group #2 and examined the mean differences in the indicators by comparing Phase 6 to all prior phases using the Analysis of Variance (ANOVA) model.

Results from the second and third set of analyses are reported for each indicator under the subheading “Mean Differences ANOVA” in section I below.

Due to the closure of multiple programs, the second study involved a new randomization of the existing programs to create two new groups (Group #3 and Group #4). The intervention phases for the second study were as follows:

Phase	Measurement Periods	Group #1	Group #2
1	1 – 4	Baseline	Baseline
2	5 – 14	CERC Intervention	CERC Intervention
3	15 – 19	CERC Intervention plus Feedback	CERC Intervention

As in the first study, the first analysis tested the basic question of whether there was a statistically significant pattern of linear decline across time (i.e., Did the rate of seclusion and restraints decrease over the period of the study?). This analysis included all three phases to determine whether any quality improvement was evident, regardless of the factor driving such improvement. These results are reported for each indicator under the subheading “Linear Regression Analysis of Trend” in section I below.

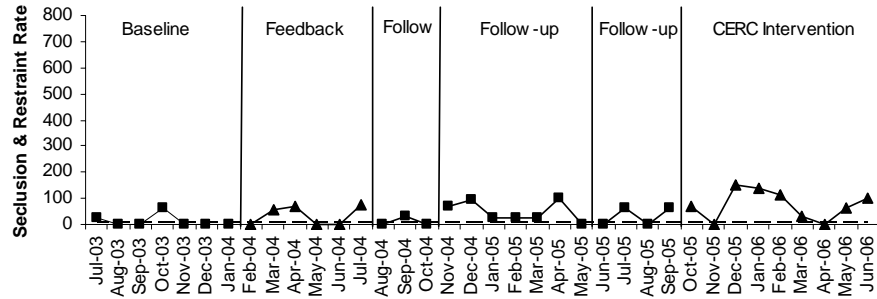
The second set of analyses aimed to evaluate whether specific interventions were associated with quality improvements by examining the mean differences in the indicators across study phases using the Analysis of Variance (ANOVA) model. These results are reported for each indicator under the subheading “Mean Differences ANOVA” in section I below.

Question	Group #1 Test	Group #2 Test
1. Was the CERC intervention associated with a rate on the study indicators that was lower than the baseline rate?	Phase 2 vs. Phase 1	Phase 2 & 3 vs. Phase 1
2. Did the addition of a feedback intervention to the CERC intervention yield additional quality improvements?	Phase 3 vs. Phase 2	-

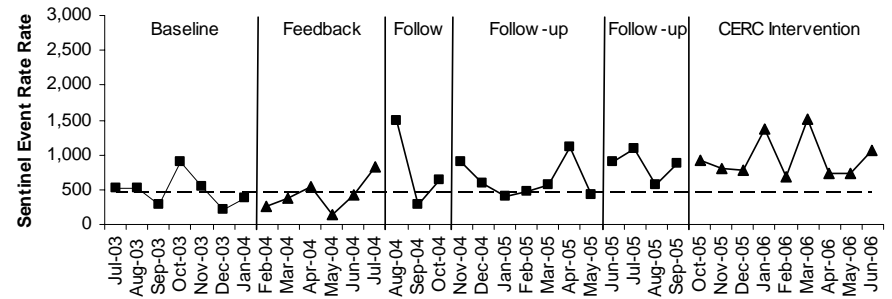
The current tests comparing changes across time within groups do not control for history effects that may be controlled by comparison across groups and time. These tests are not reported in detail here, but yield similar findings.

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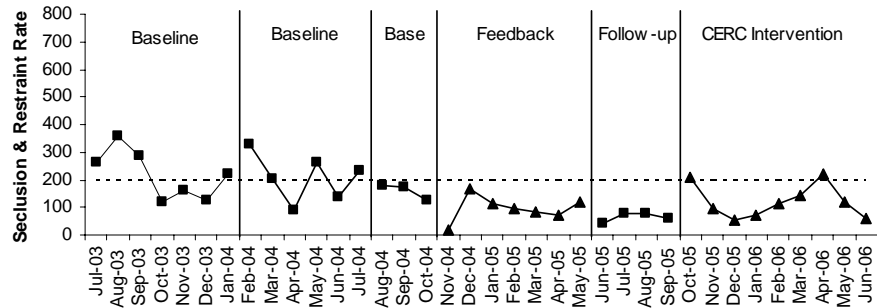
Group 1 Completers: Monthly Rates of Seclusion & Restraints per 1,000 Youth



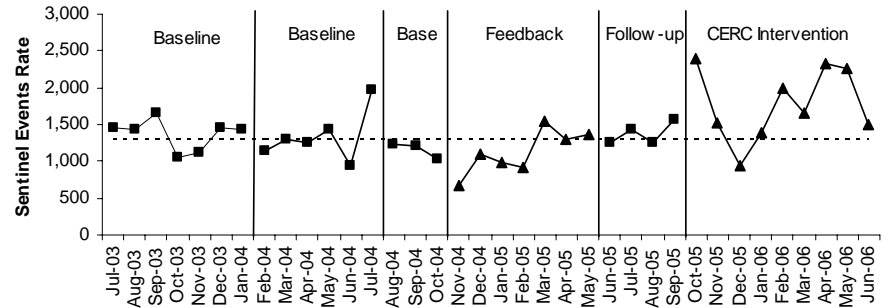
Group 1 Completers: Monthly Rates of Sentinel Events per 1,000 Youth



Group 2 Completers: Monthly Rates of Seclusion & Restraints per 1,000 Youth

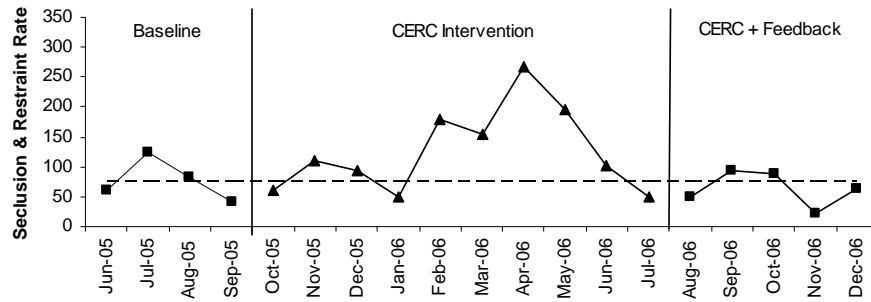


Group 2 Completers: Monthly Rates of Sentinel Events per 1,000 Youth

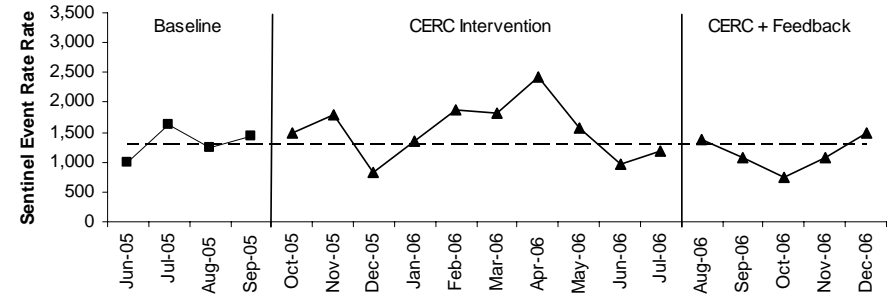


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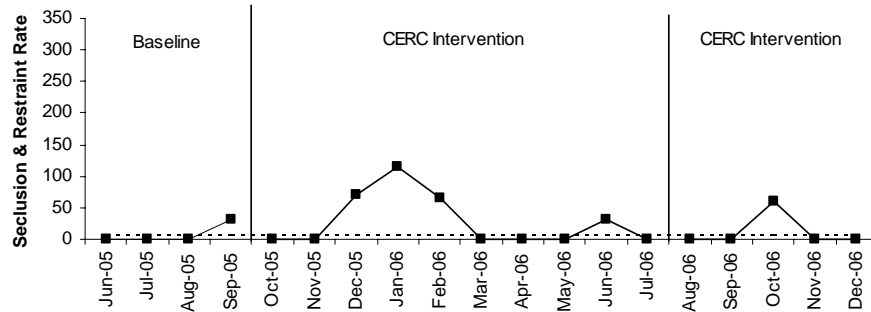
Group 3 Completers: Monthly Rates of Seclusion & Restraints per 1,000 Youth



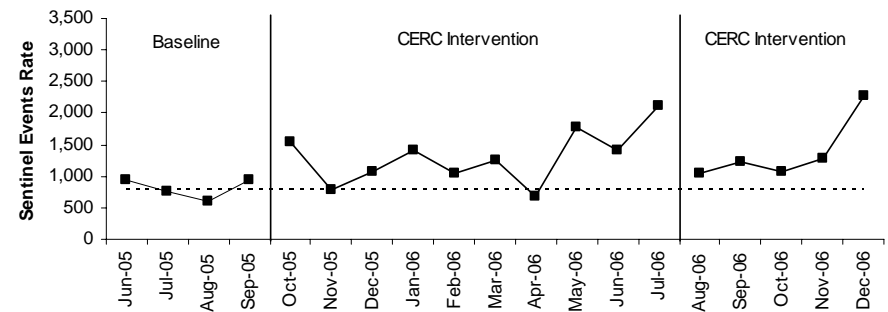
Group 3 Completers: Monthly Rates of Sentinel Events per 1,000 Youth



Group 4 Completers: Monthly Rates of Seclusion & Restraints per 1,000 Youth



Group 4 Completers: Monthly Rates of Sentinel Events per 1,000 Youth



Test of CERC intervention vs. all earlier phases across groups 1 & 2 for Seclusion & Restraint events: eta-square = .001, $F(1,70) = 0.45$, $p = .832$
 Test of CERC intervention vs. all earlier phases across groups 1 & 2 for Sentinel Events: eta-square = .097, $F(1,70) = 7.55$, $p = .008$

I. Step 9. Reported Improvement: Describe any meaningful change in performance observed during baseline measurement that was demonstrated.

#1 Quantifiable Measure: Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #1

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
July, 2003	Baseline 1:	1	36	28	N/A	Linear Regression Analysis of Trend: Overall = 1.886 * Mo + 7.7 R-square = .198, F(1,34) = 8.42, p = .006
August, 2003	Baseline 2:	0	33	0	N/A	
September, 2003	Baseline 3:	0	33	0	N/A	
October 2003	Baseline 4:	2	33	62	N/A	
November 2003	Baseline 5:	0	35	0	N/A	
December 2003	Baseline 6:	0	36	0	N/A	
January 2004	Baseline 7:	0	32	0	N/A	
February 2004	Feedback 1:	0	37	0	N/A	
March 2004	Feedback 2:	2	36	56	N/A	
April 2004	Feedback 3:	3	42	71	N/A	
May 2004	Feedback 4:	0	40	0	N/A	
June 2004	Feedback 5:	0	40	0	N/A	Mean Differences ANOVA: Feedback (Phase 2) vs. Baseline (Phase 1): eta-square = .120, F(1,11) = 1.50, p = .246
July, 2004	Feedback 6:	3	41	74	N/A	
August, 2004	Follow-Up 1:	0	35	0	N/A	Follow-up (Phases 2, 4, & 5) vs. Feedback (Phase 2): eta-square = .001, F(1,18) = 0.02, p = .898
September, 2004	Follow-Up 2:	1	34	30	N/A	
October 2004	Follow-Up 3:	0	35	0	N/A	
November 2004	Follow-Up 4:	2	29	69	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .108, F(1,19) = 2.31, p = .145
December 2004	Follow-Up 5:	3	32	94	N/A	
January 2005	Follow-Up 6:	1	38	26	N/A	
February 2005	Follow-Up 7:	1	39	26	N/A	
March 2005	Follow-Up 8:	1	36	28	N/A	
April 2005	Follow-Up 9:	4	39	104	N/A	
May 2005	Follow-Up 10:	0	38	0	N/A	
June 2005	Follow-Up 11:	0	31	0	N/A	

July, 2005	Follow-Up 12:	2	33	62	N/A
August, 2005	Follow-Up 13:	0	28	0	N/A
September, 2005	Follow-Up 14:	2	31	66	N/A
October 2005	CERC 1:	2	29	69	N/A
November 2005	CERC 2:	0	27	0	N/A
December 2005	CERC 3:	4	26	157	N/A
January 2006	CERC 4:	3	22	136	N/A
February 2006	CERC 5:	3	26	118	N/A
March 2006	CERC 6:	1	29	34	N/A
April 2006	CERC 7:	0	29	0	N/A
May 2006	CERC 8:	2	31	65	N/A
June 2006	CERC 9:	3	29	103	N/A

#2 Quantifiable Measure: Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #2

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
July, 2003	Baseline 1:	17	64	268	N/A	Linear Regression Analysis of Trend: Overall = -4.594 * Mo + 227.0 R-square = .333, F(1,34) = 16.99, p = .000
August, 2003	Baseline 2:	23	64	362	N/A	
September, 2003	Baseline 3:	19	66	290	N/A	
October 2003	Baseline 4:	8	67	120	N/A	
November 2003	Baseline 5:	11	67	164	N/A	
December 2003	Baseline 6:	9	72	125	N/A	
January 2004	Baseline 7:	14	63	222	N/A	
February 2004	Baseline 8:	24	73	329	N/A	
March 2004	Baseline 9:	15	73	207	N/A	
April 2004	Baseline 10:	7	78	90	N/A	
May 2004	Baseline 11:	18	68	265	N/A	Mean Differences ANOVA: Feedback (Phase 4) vs. Baseline (Phases 1, 2, & 3): eta-square = .350, F(1,21) = 11.33, p = .003
June 2004	Baseline 12:	8	58	138	N/A	
July, 2004	Baseline 13:	14	60	235	N/A	Follow-up (Phase 5) vs. Feedback (Phase 4): eta-square = .145, F(1,9) = 1.53, p = .248
August, 2004	Baseline 14:	11	62	177	N/A	
September, 2004	Baseline 15:	11	63	176	N/A	Follow-up (Phases 5) vs. Baseline (Phases 1, 2, & 3): eta-square =
October 2004	Baseline 16:	8	65	124	N/A	
November 2004	Feedback 1:	1	63	16	N/A	

December 2004	Feedback 2:	11	66	167	N/A	.395, F(1,18) = 11.76, p = .003
January 2005	Feedback 3:	7	63	111	N/A	
February 2005	Feedback 4:	6	61	98	N/A	
March 2005	Feedback 5:	5	62	81	N/A	
April 2005	Feedback 6:	5	71	71	N/A	
May 2005	Feedback 7:	9	74	122	N/A	
June 2005	Follow-Up 1:	3	71	43	N/A	
July, 2005	Follow-Up 2:	5	64	79	N/A	
August, 2005	Follow-Up 3:	5	64	78	N/A	
September, 2005	Follow-Up 4:	4	68	59	N/A	
October 2005	CERC 1:	13	63	206	N/A	
November 2005	CERC 2:	6	61	99	N/A	
December 2005	CERC 3:	3	57	53	N/A	
January 2006	CERC 4:	4	58	69	N/A	
February 2006	CERC 5:	7	63	112	N/A	
March 2006	CERC 6:	9	63	143	N/A	
April 2006	CERC 7:	14	64	220	N/A	
May 2006	CERC 8:	7	59	119	N/A	
June 2006	CERC 9:	3	52	58	N/A	

#3 Quantifiable Measure: Monthly Rate of Sentinel Events Per 1,000 youth – Group #1

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
July, 2003	Baseline 1:	19	36	535	N/A	Linear Regression Analysis of Trend:
August, 2003	Baseline 2:	17	33	523	N/A	
September, 2003	Baseline 3:	9	33	277	N/A	Overall = 17.621* Mo + 382.5 R-square = .291, F(1,34) = 13.929, p = .001
October 2003	Baseline 4:	30	33	923	N/A	
November 2003	Baseline 5:	19	35	543	N/A	
December 2003	Baseline 6:	8	36	222	N/A	Mean Differences ANOVA:
January 2004	Baseline 7:	12	32	375	N/A	
February 2004	Feedback 1:	10	37	270	N/A	Feedback (Phase 2) vs. Baseline (Phase 1): eta-square = .011, F(1,11) = 0.13, p = .731
March 2004	Feedback 2:	14	36	394	N/A	
April 2004	Feedback 3:	23	42	548	N/A	
May 2004	Feedback 4:	6	40	150	N/A	Follow-up (Phases 2, 4, & 5) vs. Feedback (Phase 2): eta-square = .176, F(1,18) = 3.85, p = .066
June 2004	Feedback 5:	17	40	425	N/A	
July, 2004	Feedback 6:	34	41	840	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
August, 2004	Follow-Up 1:	52	35	1486	N/A	
September, 2004	Follow-Up 2:	10	34	299	N/A	
October 2004	Follow-Up 3:	22	35	638	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
November 2004	Follow-Up 4:	26	29	897	N/A	
December 2004	Follow-Up 5:	19	32	594	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
January 2005	Follow-Up 6:	15	38	395	N/A	
February 2005	Follow-Up 7:	18	39	462	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
March 2005	Follow-Up 8:	20	36	563	N/A	
April 2005	Follow-Up 9:	43	39	1117	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
May 2005	Follow-Up 10:	16	38	421	N/A	
June 2005	Follow-Up 11:	28	31	918	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
July, 2005	Follow-Up 12:	36	33	1108	N/A	
August, 2005	Follow-Up 13:	16	28	571	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
September, 2005	Follow-Up 14:	27	31	885	N/A	
October 2005	CERC 1:	27	29	931	N/A	Follow-up (Phases 3, 4, & 5) vs. Baseline (Phase 1): eta-square = .143, F(1,19) = 3.18, p = .091
November 2005	CERC 2:	22	27	830	N/A	

December 2005	CERC 3:	20	26	784	N/A	
January 2006	CERC 4:	30	22	1364	N/A	
February 2006	CERC 5:	18	26	706	N/A	
March 2006	CERC 6:	44	29	1517	N/A	
April 2006	CERC 7:	21	29	737	N/A	
May 2006	CERC 8:	23	31	742	N/A	
June 2006	CERC 9:	31	29	1069	N/A	

#4 Quantifiable Measure: Monthly Rate of Sentinel Events Per 1,000 youth – Group #2

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
July, 2003	Baseline 1:	93	64	1465	N/A	Linear Regression Analysis of Trend: Overall = 45.293 * Mo + 1993.8 R-square = .253, F(1,34) = 11.54, p = .002 Mean Differences ANOVA: Feedback (Phase 4) vs. Baseline (Phases 1, 2, & 3): eta-square = .113, F(1,21) = 2.68, p = .117 Follow-up (Phase 5) vs. Feedback (Phase 4): eta-square = .503, F(1,9) = 9.11, p = .015 Follow-up (Phases 5) vs. Baseline (Phases 1, 2, & 3): eta-square = .212, F(1,18) = 4.86, p = .041
August, 2003	Baseline 2:	92	64	1449	N/A	
September, 2003	Baseline 3:	110	66	1679	N/A	
October 2003	Baseline 4:	71	67	1068	N/A	
November 2003	Baseline 5:	75	67	1119	N/A	
December 2003	Baseline 6:	104	72	1444	N/A	
January 2004	Baseline 7:	90	63	1429	N/A	
February 2004	Baseline 8:	84	73	1151	N/A	
March 2004	Baseline 9:	95	73	1310	N/A	
April 2004	Baseline 10:	97	78	1244	N/A	
May 2004	Baseline 11:	98	68	1441	N/A	
June 2004	Baseline 12:	54	58	931	N/A	
July, 2004	Baseline 13:	118	60	1983	N/A	
August, 2004	Baseline 14:	77	62	1242	N/A	
September, 2004	Baseline 15:	76	63	1216	N/A	
October 2004	Baseline 16:	67	65	1039	N/A	
November 2004	Feedback 1:	42	63	667	N/A	
December 2004	Feedback 2:	73	66	1106	N/A	
January 2005	Feedback 3:	62	63	984	N/A	
February 2005	Feedback 4:	56	61	918	N/A	
March 2005	Feedback 5:	96	62	1561	N/A	
April 2005	Feedback 6:	92	71	1305	N/A	
May 2005	Feedback 7:	101	74	1365	N/A	
June 2005	Follow-Up 1:	89	71	1262	N/A	
July, 2005	Follow-Up 2:	91	64	1433	N/A	
August, 2005	Follow-Up 3:	80	64	1250	N/A	
September, 2005	Follow-Up 4:	107	68	1585	N/A	
October 2005	CERC 1:	151	63	2397	N/A	
November 2005	CERC 2:	93	61	1537	N/A	

December 2005	CERC 3:	54	57	956	N/A	
January 2006	CERC 4:	80	58	1379	N/A	
February 2006	CERC 5:	126	63	2016	N/A	
March 2006	CERC 6:	104	63	1651	N/A	
April 2006	CERC 7:	149	64	2346	N/A	
May 2006	CERC 8:	134	59	2271	N/A	
June 2006	CERC 9:	78	52	1500	N/A	

#5 Quantifiable Measure: Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #3

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
June 2005	Baseline 1:	3	49	61	N/A	Linear Regression Analysis of Trend: Overall = $-0.612 * Mo + 104.8$ R-square = .003, $F(1,17) = 0.05$, $p = .821$ Mean Differences ANOVA: CERC (Phase 2) vs. Baseline (Phase 1): eta-square = .145, $F(1,13) = 2.21$, $p = .161$ CERC + Feedback (Phase 3) vs. CERC (Phase 2): eta-square = .164, $F(1,12) = 2.36$, $p = .151$
July, 2005	Baseline 2:	6	48	125	N/A	
August, 2005	Baseline 3:	4	48	83	N/A	
September, 2005	Baseline 4:	2	50	40	N/A	
October 2005	CERC 1:	3	50	60	N/A	
November 2005	CERC 2:	5	45	111	N/A	
December 2005	CERC 3:	4	43	93	N/A	
January 2006	CERC 4:	2	40	50	N/A	
February 2006	CERC 5:	8	45	178	N/A	
March 2006	CERC 6:	7	45	156	N/A	
April 2006	CERC 7:	12	45	267	N/A	
May 2006	CERC 8:	8	41	195	N/A	
June 2006	CERC 9:	4	39	103	N/A	
July, 2006	CERC 10:	2	40	50	N/A	
August, 2006	CERC + Feedback 1:	2	40	50	N/A	
September, 2006	CERC + Feedback 2:	4	43	93	N/A	
October 2006	CERC + Feedback 3:	4	46	87	N/A	
November 2006	CERC + Feedback 4:	1	47	21	N/A	
December 2006	CERC + Feedback 5:	3	47	64	N/A	

#6 Quantifiable Measure: Monthly Rate of Seclusion and Restraint Events Per 1,000 youth – Group #4

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
June 2005	Baseline 1:	0	33	0	N/A	Linear Regression Analysis of Trend: Overall = -0.336 * Mo + 22.6 R-square = .003, F(1,17) = 0.05, p = .820 Mean Differences ANOVA: CERC (Phase 2 & 3) vs. Baseline (Phase 1): eta-square = .059, F(1,17) = 1.06, p = .318
July, 2005	Baseline 2:	0	32	0	N/A	
August, 2005	Baseline 3:	0	28	0	N/A	
September, 2005	Baseline 4:	1	32	31	N/A	
October 2005	CERC 1:	0	30	0	N/A	
November 2005	CERC 2:	0	31	0	N/A	
December 2005	CERC 3:	2	28	71	N/A	
January 2006	CERC 4:	3	26	115	N/A	
February 2006	CERC 5:	2	31	65	N/A	
March 2006	CERC 6:	0	35	0	N/A	
April 2006	CERC 7:	0	33	0	N/A	
May 2006	CERC 8:	0	35	0	N/A	
June 2006	CERC 9:	1	32	31	N/A	
July, 2006	CERC 10:	0	27	0	N/A	
August, 2006	CERC 11:	0	26	0	N/A	
September, 2006	CERC 12:	0	31	0	N/A	
October 2006	CERC 13:	2	34	59	N/A	
November 2006	CERC 14:	0	37	0	N/A	
December 2006	CERC 15:	0	33	0	N/A	

#7 Quantifiable Measure: Monthly Rate of Sentinel Events Per 1,000 youth – Group #3

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
June 2005	Baseline 1:	48	49	980	N/A	<p>Linear Regression Analysis of Trend:</p> <p>Overall = $-12.590 * Mo + 1,496.2$ R-square = .029, $F(1,17) = 0.51$, $p = .485$</p> <p>Mean Differences ANOVA:</p> <p>CERC (Phase 2) vs. Baseline (Phase 1): η-square = .035, $F(1,13) = 0.48$, $p = .503$</p> <p>CERC + Feedback (Phase 3) vs. CERC (Phase 2): η-square = .179, $F(1,12) = 2.62$, $p = .131$</p>
July, 2005	Baseline 2:	78	48	1625	N/A	
August, 2005	Baseline 3:	60	48	1250	N/A	
September, 2005	Baseline 4:	72	50	1440	N/A	
October 2005	CERC 1:	74	50	1480	N/A	
November 2005	CERC 2:	80	45	1778	N/A	
December 2005	CERC 3:	35	43	814	N/A	
January 2006	CERC 4:	54	40	1350	N/A	
February 2006	CERC 5:	84	45	1867	N/A	
March 2006	CERC 6:	82	45	1822	N/A	
April 2006	CERC 7:	109	45	2422	N/A	
May 2006	CERC 8:	64	41	1561	N/A	
June 2006	CERC 9:	38	39	974	N/A	
July, 2006	CERC 10:	47	40	1175	N/A	
August, 2006	CERC + Feedback 1:	55	40	1375	N/A	
September, 2006	CERC + Feedback 2:	46	43	1070	N/A	
October 2006	CERC + Feedback 3:	34	46	739	N/A	
November 2006	CERC + Feedback 4:	50	47	1064	N/A	
December 2006	CERC + Feedback 5:	70	47	1489	N/A	

#8 Quantifiable Measure: Monthly Rate of Sentinel Events Per 1,000 youth – Group #4

Time Period Measurement Covers	Baseline Project Indicator Measurement	Numerator (x 1,000)	Denominator	Rate or Results	Industry Benchmark	Statistical Test and Significance*
June 2005	Baseline 1:	31	33	939	N/A	Linear Regression Analysis of Trend: Overall = 38.650 * Mo + 513.7 R-square = .378, F(1,17) = 10.34, p = .005 Mean Differences ANOVA: CERC (Phase 2 & 3) vs. Baseline (Phase 1): eta-square = .204, F(1,17) = 4.35, p = .052
July, 2005	Baseline 2:	24	32	750	N/A	
August, 2005	Baseline 3:	17	28	607	N/A	
September, 2005	Baseline 4:	30	32	938	N/A	
October 2005	CERC 1:	46	30	1533	N/A	
November 2005	CERC 2:	24	31	774	N/A	
December 2005	CERC 3:	30	28	1071	N/A	
January 2006	CERC 4:	37	26	1423	N/A	
February 2006	CERC 5:	32	31	1032	N/A	
March 2006	CERC 6:	44	35	1257	N/A	
April 2006	CERC 7:	22	33	667	N/A	
May 2006	CERC 8:	62	35	1771	N/A	
June 2006	CERC 9:	45	32	1406	N/A	
July, 2006	CERC 10:	57	27	2111	N/A	
August, 2006	CERC 11:	27	26	1038	N/A	
September, 2006	CERC 12:	38	31	1226	N/A	
October 2006	CERC 13:	36	34	1059	N/A	
November 2006	CERC 14:	47	37	1270	N/A	
December 2006	CERC 15:	75	33	2273	N/A	

* If used, specify the test, p value, and specific measurements (e.g., baseline to remeasurement #1, remeasurement #1 to remeasurement #2, etc., or baseline to final remeasurement) included in the calculations.

Performance Improvement Project (PIP) Name:

J. Step 10. Sustained improvement: Describe any demonstrated improvement through repeated measurements over comparable time periods. Discuss any random year-to-year variation, population changes, and sampling error that may have occurred during the remeasurement process.

Taken together, results from the present series of analyses found evidence that the feedback intervention was specifically associated with a lower rate of seclusion and restraint for Group #2 and that this effect was maintained throughout the follow-up period. However, this effect did not generalize across groups nor did it generalize from the seclusion and restraint rate to the general sentinel event rate. Therefore, evidence for sustained quality improvement was isolated.

A number of analyses found evidence for a quality decrement across time in the overall sentinel event rate. Moreover, the CERC intervention had little effect in these CBR facilities or tended to have a deleterious effect. Several considerations are important to keep in mind when interpreting these effects. First, with the broader tendency to use less restrictive levels of care, the average client acuity has consistently increased within the CBR level of care during the study period (see Daleiden & Tolman, 2006). The closure of facilities during the study period may have further concentrated the population of youth at high risk for experiencing sentinel events. Second, through the statewide training and the best practices in residential care network meetings, the CERC intervention may have raised awareness of sentinel event issues that resulted in greater detection and reporting of such events. Alternatively, the CERC intervention may be introducing new practices that are disrupting current practices. Finally, the baseline levels of seclusion and restraint were very low in Groups #1 and #4, which practically eliminates the possibility of achieving quality improvement in these groups.

Given the lack of evidence that the feedback interventions can impact improvements significantly, and the low incidence of restraints, the recommendation will be to end this study. CERC interventions will be continued, however full evaluations will be conducted through the SAMHSA grant mechanisms.