



## The Impact of Prior Service Costs on Change in Externalizing Problems

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## Purpose

- The current study examines whether children who had prior contacts with various child-serving sectors differed in terms of changes in their clinical outcomes over time
- In addition, the study examines possible predictors of variation in individual rates of change in costs over time



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## Research Questions

- First, do the costs of services change over time?
- If so, do costs vary as a function of whether the child receives services in a system of care vs. a comparison system?
- And are changes in costs over time systematically related to specific characteristics of the children being served (e.g., demographic characteristics, prior services, etc.)?



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## Research Questions continued

- Second, do the externalizing problems of children with serious emotional disturbance change over time?
- If so, do outcomes vary as a function of where the child receives services (through a CMHS-funded system of care or a non-funded comparison system)?
- And, are changes in child symptomatology over time systematically related to whether the child had prior contacts with varying child-serving sectors?



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## CMHS Initiative and National Evaluation

- The Center for Mental Health Services (CMHS) has funded 92 communities in 4 phases since 1993 to build systems of care (SOC) to serve children with serious emotional disturbance
- National evaluation of 22 communities funded in Phase 1 included a comparison study of 3 pairs of communities



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## Design of Phase I Longitudinal Comparison Study

- Each pair matched two mental health care systems
  - Community funded to develop SOC
  - Matched comparison community with a more traditional mental health service delivery system
- Longitudinal follow-up
  - Recruited children and youths with serious emotional disturbance
  - Interviewed child and caregiver at baseline and every 6 months for 2 years

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### CMHS Phase I Comparison Study

- Stark County, OH (SOC) and Mahoning County, OH
- East Baltimore (SOC) and West Baltimore
- Santa Cruz County, CA (SOC) and Travis County, TX (Austin)
- Focus on Stark (Canton) and Mahoning (Youngstown) Counties because:
  - more children enrolled into study
  - better retention rates
  - only pair to include an extensive community-wide service utilization study component

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### Child Demographics for Sample

	Mahoning Non-SOC (N=209)	Stark SOC (N=217)
Age (mean)	11.5	11.2
Gender		
Male	69.4%	65.9%
Female	30.6%	34.1%
Race***		
Non-White	61.7%	29.0%
White	38.3%	71.0%
Poverty***		
<\$15,000	68.9%	54.4%
\$15,000 or more	31.1%	45.6%

Note: \*\*\*p<.005.

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### Costs Components

- ∪ Total costs consist of mental health costs and other sector costs
- ∪ Mental health costs include costs for services derived from primary mental health center MIS in each community
- ∪ Other sector costs include costs associated with services provided by
  - Juvenile justice
  - Child protective services
  - Special education

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### Prior Costs for Sample

	Mahoning Non-SOC (N=209)	Stark SOC (N=217)
Prior Other Sector*		
Yes	29.2%	20.3%
No	70.8%	79.7%
Mental Health Only**		
Yes	26.8%	39.6%
No	73.2%	60.4%

Note: \*p<.05  
\*\*p<.01

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### Instrumentation Child Behavior Checklist (CBCL)

- ∪ Assesses behavioral and emotional problems
- ∪ 8 syndrome scores
  - Internalizing
    - Withdrawn
    - Somatic complaints
    - Anxious/depressed
    - Thought problems
  - Externalizing
    - Social problems
    - Attention problems
    - Aggressive problems
    - Delinquent problems
- ∪ 17 social competence items and 113 behavior problem items
- ∪ Internal consistency (alpha) = .96
- ∪ Test-retest reliability (after 7 days) r = .93

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### Procedures

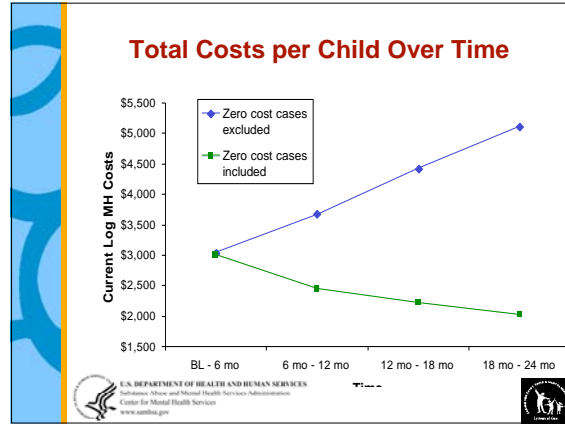
- ∪ 217 children served by SOC and 209 children served by non-funded comparison system
- ∪ CBCL administered 1 - 4 occasions within a 24 month timeframe

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### Analysis

- v Random effects Tobit analysis for costs
  - Appropriate when dependent variable is censored at some lower bound like the zero values associated with costs data
- v Two level hierarchical linear model for CBCL
  - Calculated individual growth curves for each child in sample
  - Examined group differences based on individual level characteristics of sample

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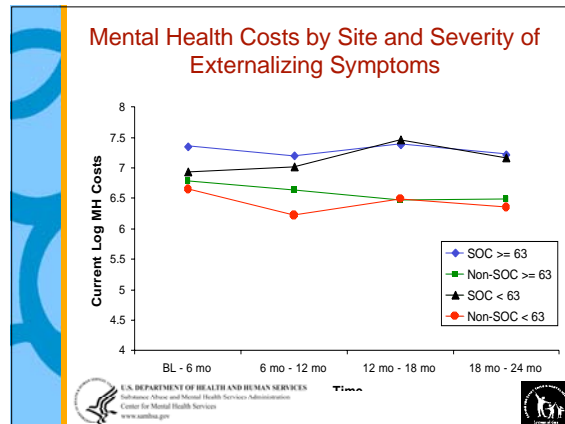


### Cost Analysis

Dependent Variable: Mental Health Costs Only

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Time	-2.17 ( <b>&lt;-0.01</b> )	-2.17 ( <b>&lt;-0.01</b> )	-2.17 ( <b>&lt;-0.01</b> )	-2.17 ( <b>&lt;-0.01</b> )	-2.17 ( <b>&lt;-0.01</b> )	-2.16 ( <b>&lt;-0.01</b> )
SOC	0.54 (0.14)	0.53 (0.14)	0.57 (0.12)	0.59 (0.10)	0.55 (0.13)	0.50 (0.16)
CBCL Ext. > 63	0.92 ( <b>&lt;-0.01</b> )	0.93 ( <b>&lt;-0.01</b> )	0.91 ( <b>&lt;-0.01</b> )	0.91 ( <b>&lt;-0.01</b> )	0.92 ( <b>&lt;-0.01</b> )	0.96 ( <b>&lt;-0.01</b> )
Time*SOC*CBCL	0.41 (0.03)	0.43 (0.02)	0.41 (0.03)	0.43 (0.02)	0.41 (0.03)	0.43 (0.03)
Prior costs: mental health	0.11 (0.77)	-0.04 (0.92)				
Prior costs: other sectors			0.11 (0.78)	0.80 (0.06)		
Prior costs: any					0.18 (0.61)	0.52 (0.15)
Income < \$15,000		0.48 (0.19)		0.49 (0.18)		0.47 (0.19)
Age		-0.26 ( <b>&lt;-0.01</b> )		-0.29 ( <b>&lt;-0.01</b> )		-0.27 ( <b>&lt;-0.01</b> )

Note: P-values in parentheses n = 426, t = 4



### Cost Analysis

Dependent Variable: Other Sector Costs Only

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Time	-0.20 (0.35)	-0.15 (0.47)	-0.15 (0.49)	-0.12 (0.57)	-0.14 (0.50)	-0.16 (0.46)
SOC	0.18 (0.84)	0.78 (0.39)	0.012 (0.99)	0.85 (0.36)	-1.32 (0.11)	-0.91 (0.35)
CBCL Ext. > 63	1.04 (0.10)	1.74 (0.01)	1.19 (0.06)	1.41 (0.05)	1.76 (0.01)	2.01 ( <b>&lt;-0.01</b> )
Time*SOC*CBCL	0.27 (0.55)	0.10 (0.83)	0.23 (0.60)	0.03 (0.95)	0.17 (0.70)	-0.27 (0.56)
Prior costs: mental health	-7.71 ( <b>&lt;-0.01</b> )	-4.17 ( <b>&lt;-0.01</b> )				
Prior costs: other sectors			16.61 ( <b>&lt;-0.01</b> )	12.49 ( <b>&lt;-0.01</b> )		
Prior costs: any					7.91 ( <b>&lt;-0.01</b> )	4.89 ( <b>&lt;-0.01</b> )
Income < \$15,000		2.02 (0.03)		2.36 (0.02)		1.47 (0.11)
Age		1.31 ( <b>&lt;-0.01</b> )		0.93 ( <b>&lt;-0.01</b> )		1.17 ( <b>&lt;-0.01</b> )

Note: P-values in parentheses n = 426, t = 4

### Cost Analysis

Dependent Variable: Total Costs

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Time	-3.61 ( <b>&lt;-0.01</b> )	-3.62 ( <b>&lt;-0.01</b> )	-3.60 ( <b>&lt;-0.01</b> )	-3.61 ( <b>&lt;-0.01</b> )	-3.59 ( <b>&lt;-0.01</b> )	-3.59 ( <b>&lt;-0.01</b> )
SOC	0.50 (0.16)	0.58 (0.10)	0.65 (0.05)	0.72 (0.03)	0.37 (0.28)	0.43 (0.22)
CBCL Ext. > 63	1.05 ( <b>&lt;-0.01</b> )	1.05 ( <b>&lt;-0.01</b> )	1.03 ( <b>&lt;-0.01</b> )	1.02 ( <b>&lt;-0.01</b> )	1.14 ( <b>&lt;-0.01</b> )	1.15 ( <b>&lt;-0.01</b> )
Time*SOC*CBCL	0.62 (0.09)	0.64 (0.08)	0.64 (0.07)	0.68 (0.06)	0.61 (0.09)	0.63 (0.08)
Prior costs: mental health	-0.66 (0.08)	-0.71 (0.06)				
Prior costs: other sectors			2.34 ( <b>&lt;-0.01</b> )	2.74 ( <b>&lt;-0.01</b> )		
Prior costs: any					1.20 (0.01)	1.32 ( <b>&lt;-0.01</b> )
Income < \$15,000		0.58 (0.11)		0.63 (0.06)		0.58 (0.11)
Age		-0.05 (0.34)		-0.16 ( <b>&lt;-0.01</b> )		-0.08 (0.13)

Note: P-values in parentheses n = 426, t = 4

### Child Behavior Checklist Externalizing Problems T-Scores

Final Estimation of Fixed Effects  
Unconditional Model

Fixed Effects	Coefficient	Standard Error	T-Ratio	Approximate d. f.	P-Value
Average CBCL Ext score at entry	69.90	0.53	131.26	425	<0.01
Average rate of change	-6.35	0.77	-8.24	425	<0.01
Average rate of acceleration	1.22	0.38	3.26	425	<0.01
Random Effects	Variance Component		d. f.	P-Value	
Average CBCL Ext score at entry	89.01		389		<0.01
Average linear change	42.71		389		0.01
Average quadratic change	6.62		389		0.13
Level 1 error	35.32				

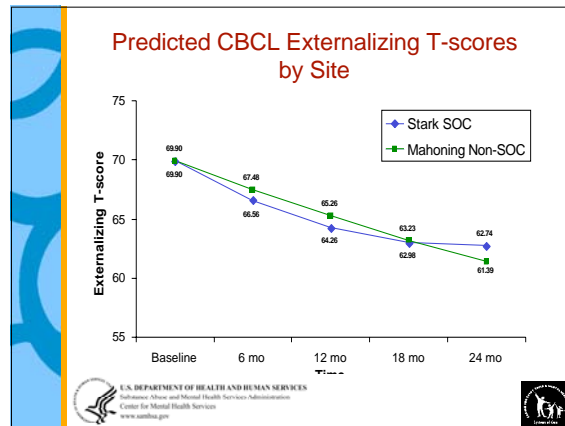
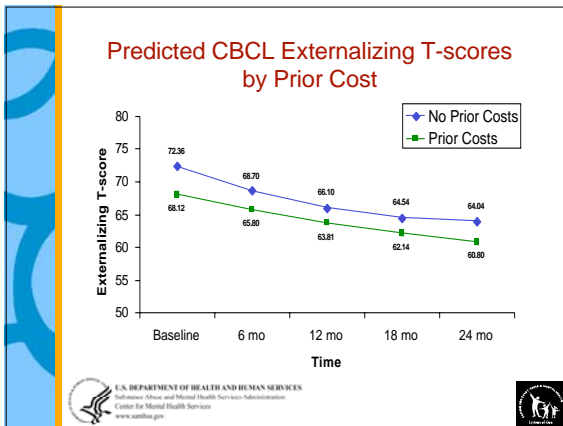
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### Child Behavior Checklist Externalizing Problems T-Scores

Final Estimation of Fixed Effects  
Level Two

Fixed Effect	Coefficient	Standard Error	T-Ratio	Approximate d. f.	P-Value
<b>For Intercept (B0)</b>					
Intercept	69.90	0.52	134.70	422	<0.01
White	-2.38	0.97	-2.46	422	0.01
Prior Other Costs	4.81	1.49	3.23	422	<0.01
No Prior Costs	4.25	1.19	3.57	422	0.01
<b>For Linear Time Slope (B1)</b>					
Intercept	-6.39	0.76	-8.40	422	<0.01
SOC vs. Non-SOC	-2.68	1.50	-1.79	422	0.07
Prior Other Costs	-0.31	2.02	-0.16	422	0.88
No Prior Costs	-3.42	1.70	-2.01	422	0.04
<b>For Quadratic Time Slope (B2)</b>					
Intercept	1.26	0.37	3.38	422	<0.01
SOC vs. Non-SOC	1.67	0.75	2.24	422	0.03
Prior Other Costs	0.31	1.01	0.31	422	0.76
No Prior Costs	1.46	0.84	1.74	422	0.08

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### Variance Explained at Level 1

Model	Variance
Unconditional	54.40
Conditional	35.32
Proportion of Variance Explained	35.08%

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### Variance Explained at Level 2

Model	Initial Status (Intercept)	Change Rate (Linear)	Change Rate (Quadratic)
Unconditional	89.01	42.71	6.62
Conditional	83.80	40.60	6.09
Proportion of Variance Explained	5.85%	4.95%	7.92%


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### Conclusions

- Do costs change over time?
  - Avg. rate of change in log MH costs =  $-2.17$  per year
  - Avg. rate of change in log total costs =  $-3.60$  per year
  - Log other sector costs did not change significantly over time
- Do costs vary as a function of where the child received services?
  - Sites differ in MH spending over time for children with clinical levels of externalizing problems




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### Conclusions

- Are changes in total costs over time systematically related to specific characteristics of the children being served?
  - Costs for children with clinical levels of symptoms in SOC were higher than for similar children in the non-SOC during first 6 months of service




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### Conclusions

- Do externalizing problems change over time?
  - On average CBCL Externalizing Problems T-scores decreased by 6.36 points per year over the 24 month period ( $p < 0.01$ )
- Do outcomes vary as a function of where children received services?
  - marginally significant linear time effect and significant quadratic time effect indicated initially more rapid rate of improvement but greater slowing of improvement for children served in the SOC than for those served in non-SOC




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### Conclusions

- Are differences in outcomes related to whether child had prior contact with the varying child-serving agencies?
  - Children who had no prior costs had initially higher Externalizing Problems T-scores than those who had any prior costs.
  - Children who had no prior costs also had a greater rate of improvement, but more rapid slowing of the rate of improvement.




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### Implications

- The Stark County SOC spent current MH dollars in a more targeted manner than the Mahoning County non-SOC during the first 6 months of service.
- This targeted spending occurred in conjunction with a slightly more rapid decrease in symptoms in the first 6 months of services that was statistically significant but not clinically meaningful.




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### Implications

- Children who enter a system of care with prior costs in other sectors are likely to have higher current costs in other sectors
- Children with prior MH costs likely to have lower current costs in other sectors



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