Systems for Action

National Coordinating Center

Systems and Services Research to Build a Culture of Health

Strategies to Achieve Alignment, Collaboration, and Synergy across Delivery and Financing Systems

Linking Education and Health Data to Improve Adolescent Health in Los Angeles

Research In Progress Webinar
Wednesday, June 6, 2018
12:00-1:00 pm ET/ 9:00 am-10:00 am PT

Funded by the Robert Wood Johnson Foundation

UK College of Public Health

Center for Public Health Systems and Services Research

Agenda

S4A
Systems for Action

Welcome:

C.B. Mamaril, PhD
Research Scientist, RWJF Systems for Action National Coordinating Center
Research Faculty, University of Kentucky College of Public Health
cbmamaril@uky.edu

Presenters:

Sheryl Kataoka, MD, MS
Professor, Psychiatry
UCLA Semel Institute
SKataoka@mednet.ucla.edu

Rebecca Dudovitz, MD, MS
Assistant Professor, Pediatrics
UCLA
RDudovitz@mednet.ucla.edu

Commentary:

Maryjane Puffer, MPA
Executive Director
L.A. Trust for Children's Health
maryjane@thelatrust.org

Joshua Kaufman, LCSW
Coordinator, School Mental Health/SpEd Program
Los Angeles Unified School District
joshua.kaufman@lausd.net

Q & A: Moderated by Dr. C.B. Mamaril

Presenter

Sheryl Kataoka, MD, MS
Professor, Psychiatry
UCLA Semel Institute
SKataoka@mednet.ucla.edu

Presenter

S4A
Systems for Action

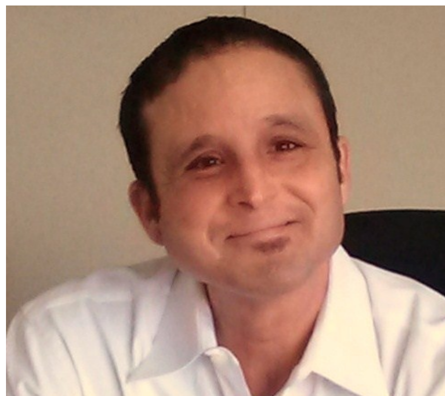
Rebecca Dudovitz, MD, MS
Assistant Professor, Pediatrics
University of California, Los Angeles
rdudovitz@mednet.ucla.net

Commentary Speaker

Maryjane Puffer, MPA
Executive Director
L.A. Trust for Children's Health
maryjane@thelatrust.org

Commentary Speaker

S4A
Systems for Action



Joshua Kaufman, LCSW
Coordinator
School Mental Health/SpEd Program
L.A. Unified School District
joshua.kaufman@lausd.net

Linking Education and Health Data to Improve Adolescent Health in Los Angeles

Rebecca Dudovitz, MD, MS
Sheryl Kataoka, MD, MS
June 6, 2018

David Geffen
School of Medicine

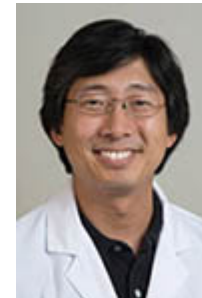
Study Team

Rebecca Dudovitz, MD, MS
Pediatrics

Sheryl Kataoka, MD, MS
Child Psychiatry

Eryn Block, MPP
Health Policy and Management

Lingqi Tang, PhD
Biostatistics



Paul Chung, MD, MS
Pediatrics

School performance and behavioral health

- Poor academic performance is associated with behavioral health disorders.
  - Grades, test scores, high school completion, grade retention, and educational attainment are all associated with substance use.
  - Association is incredibly robust– noted nearly 100% of the time

Odds of Engaging in Substance Use for Students with B- or Above vs C+ or Below

Substance use	Stage 0 (Unadjusted)	Stage 1 (Demographics)	Stage 2 (School)	Stage 3 (Parenting)
Cigarette use in past 30 days	0.42 (0.27–0.65)†	0.47 (0.30–0.75)†	0.52 (0.33–0.83)†	0.52 (0.32–0.85)†
Alcohol use in past 30 days	0.65 (0.48–0.86)†	0.65 (0.48–0.88)†	0.68 (0.50–0.92)†	0.70 (0.51–0.96)†
Marijuana use in past 30 days	0.39 (0.28–0.54)†	0.42 (0.30–0.60)†	0.44 (0.31–0.62)†	0.43 (0.30–0.62)†
Binge drinking in past 30 days	0.47 (0.29–0.76)†	0.49 (0.30–0.80)†	0.49 (0.30–0.81)†	0.52 (0.31–0.86)†
Substance use at school in past 30 days	0.47 (0.29–0.74)†	0.52 (0.32–0.84)†	0.54 (0.33–0.88)†	0.55 (0.34–0.91)†

Bryant et al. *Journal of Research on Adolescence.* 2003;13(3):361-397; Bradley et al. *Journal of Adolescent Health.* 2013;52(5):523-532; Wong et al. *Academic Pediatrics. 2017; 17:633-641.*

David Geffen School of Medicine

Mattel Children's Hospital UCLA

School performance and behavioral health

% of students who engaged in behavior

Behavior	Mostly A's	Mostly B's	Mostly C's	Mostly D's/F's
Carried a weapon*	12	16	21	37
Current cigarette use	10	19	27	45
Current alcohol use	32	43	51	62
Currently sexually active	24	34	43	54
Watched television 3 or more hours per day	24	32	39	49
Physically active at least 60 minutes per day on fewer than 5 days	56	63	68	76

US 2009 YRBS results, CDC

David Geffen
School of Medicine

Mattel Children's Hospital UCLA

School performance and depression

Table 2

Intercorrelations Between Measured Variables and Means and Standard Deviations of Measured Variables (N = 178)

Variable	1	2	3	4	5	6	7
1. Perceptions of victimization	—						
2. Harassment incidents	.60***	—					
3. Self-worth	−.35***	−.36***	—				
4. Depression	.31***	.42***	−.69***	—			
5. Loneliness	.38***	.35***	−.42***	.47***	—		
6. GPA	−.26***	−.23**	.23***	−.36***	−.08	—	
7. Absenteeism	.16*	.18**	−.14	.20*	.14	−.53***	—
M	2.13	6.40	3.14	9.62	1.77	2.59	19.28
SD	0.86	4.90	0.74	7.37	0.54	0.86	20.64

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Juvonen J, Nishina A, Graham S. Peer harassment, psychological adjustment, and school functioning in early adolescence. Journal of Educational Psychology. 2000;92:349–359. doi: 10.1037/0022-0663.92.2.349.

David Geffen School of Medicine

Mattel Children's Hospital UCLA

UCLA Children's Discovery and Innovation Institute

Academic achievement and PTSD

	Achievement	Behavior	Community violence	Family violence	PTSD	Witness
Achievement	1.000					
Behavior	−.1403	1.000				
Community violence	−.1844*	.3320***	1.000			
Family violence	−.2251**	.4039***	.5704***	1.000		
PTSD	−.3246***	.1973*	.4748***	.4712***	1.000	
Witness	−.1960**	.2809***	.6079***	.5109***	.5130***	1.000

Achievement was measured via standardized test scores amount 110 African American 6th grade students attending 4 “inner city” public schools in Chicago.

David Geffen School of Medicine

Thompson, T., & Massat, C. R. (2005). Experiences of violence, post-traumatic stress, academic achievement and behavior problems of urban African-American children. *Child and Adolescent Social Work Journal*, *22*(5-6), 367-393.

Mattel Children's Hospital UCLA

UCLA Children's Discovery and Innovation Institute

Violence exposure and suspensions

Table IV. Associations between violence exposures and suspension for sixth grade students (N = 24 764)

	Boys			Girls		
		Yes	Adjusted*		Yes	Adjusted*
Violence	Total	n (%)	OR [95% CI]	Total	n (%)	OR [95% CI]
Total						
Victim-perpetrator	2413	514 (21.3)	2.53 [2.19, 2.92]	1069	118 (11.0)	2.43 [2.03, 2.92]
Perpetrator	1338	222 (16.6)	1.96 [1.69, 2.26]	1146	92 (8.0)	1.85 [1.55, 2.21]
Victim	2427	306 (12.6)	1.55 [1.40, 1.72]	1379	94 (6.8)	1.72 [1.48, 2.00]
Witness	3576	336 (9.4)	1.28 [1.14, 1.43]	4676	178 (3.8)	1.17 [1.07, 1.29]
None	2648	181 (6.8)	Ref	4092	99 (2.4)	Ref
Weapon						
Victim-perpetrator	210	60 (28.6)	2.35 [1.85, 2.99]	72	10 (13.9)	1.84 [0.86, 3.91]
Perpetrator	115	30 (26.1)	2.39 [1.64, 3.48]	41	3 (7.3)	†
Victim	1626	311 (19.1)	1.63 [1.44, 1.85]	657	67 (10.2)	1.84 [1.54, 2.22]
Witness	3659	532 (14.5)	1.34 [1.21, 1.49]	3653	237 (6.5)	1.28 [1.15, 1.44]
None	6792	626 (9.2)	Ref	7939	264 (3.3)	Ref
Physical						
Victim-perpetrator	1699	355 (20.9)	1.70 [1.48, 1.94]	703	71 (10.1)	1.70 [1.42, 2.04]
Perpetrator	1820	337 (18.5)	1.53 [1.35, 1.73]	1380	128 (9.3)	1.65 [1.37, 1.99]
Victim	1783	230 (12.9)	1.14 [1.00, 1.29]	893	71 (8.0)	1.57 [1.33, 1.87]
Witness	3368	326 (9.7)	0.98 [0.89, 1.08]	3986	164 (4.1)	1.06 [0.96, 1.16]
None	3732	311 (8.3)	Ref	5400	147 (2.7)	Ref
Verbal						
Victim-perpetrator	383	97 (25.3)	1.90 [1.53, 2.36]	155	23 (14.8)	2.12 [1.49, 3.02]
Perpetrator	568	130 (22.9)	1.70 [1.38, 2.09]	355	47 (13.2)	1.97 [1.51, 2.57]
Victim	1595	257 (16.1)	1.28 [1.11, 1.48]	774	58 (7.5)	1.28 [1.09, 1.52]
Witness	3528	462 (13.1)	1.09 [1.00, 1.18]	3333	194 (5.8)	1.10 [1.01, 1.20]
None	6328	613 (9.7)	Ref	7745	259 (3.3)	Ref
Total	12 402	1559 (12.6)		12 362	581 (4.7)	

*Generalized estimating equation with a link function, clustered on school of enrollment, adjusted for disability, SES, Latino, ethnicity and school type, and mutually adjusted for weapons, physical, and verbal violence.
†Not estimated due to small sample size.

David Geffen School of Medicine

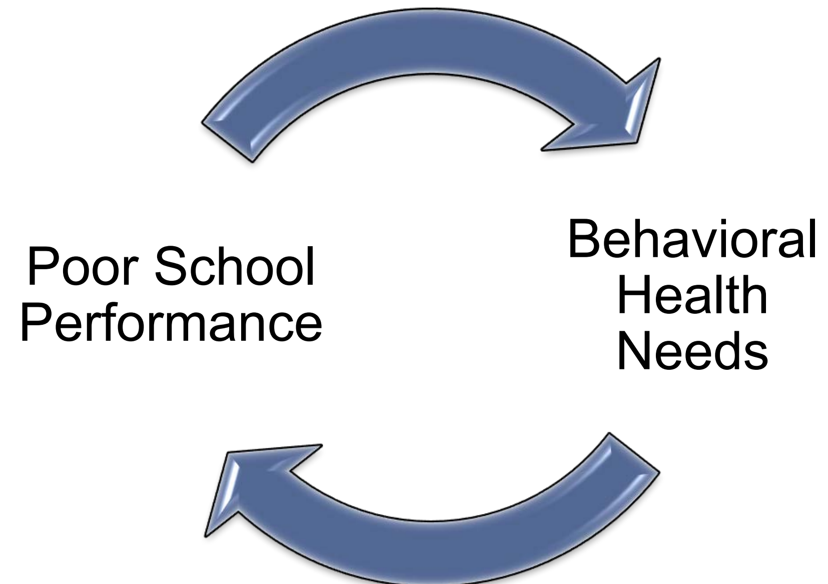
Ramirez, M., Wu, Y., Kataoka, S., Wong, M., Yang, J., Peek-Asa, C., & Stein, B. (2012). Youth violence across multiple dimensions: a study of violence, absenteeism, and suspensions among middle school children. *The Journal of pediatrics*, *161*(3), 542-546.

Mattel Children's Hospital UCLA

UCLA Children's Discovery and Innovation Institute

Can we harness this relationship to help students?

- **School performance is a useful marker for behavioral health needs**
  - Regardless of relationship direction or causality
- But HOW should we use it?
  - Which measure(s)?
  - For whom?
  - When?



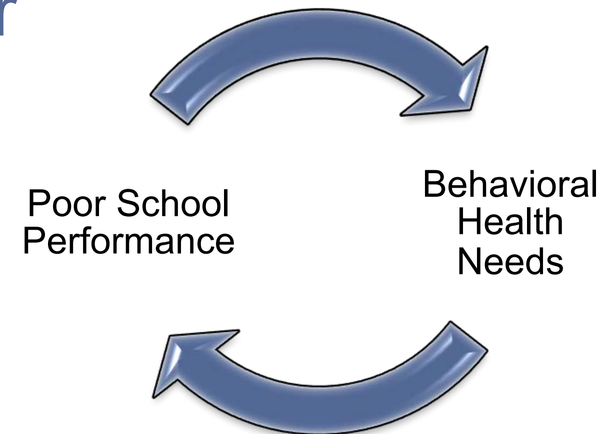
Carter PL, Welner KG. *Closing the opportunity gap: What America must do to give every child an even chance*: Oxford University Press; 2013; Oberg et al. *Current Problems in Pediatric and Adolescent Health Care.* 2016;46(9):291-312; Bryant et al. *Journal of Research on Adolescence.* 2003;13(3):361-397.

David Geffen School of Medicine

UCLA Children's Discovery and Innovation Institute

Potential Advantages Over Clinical Screening

- Near-universal, passive, automatic longitudinal data collection
- Avoids dependence on systems with unequal access to care that may reinforce health disparities
- Potential to identify needs earlier
  - Early intervention improves outcomes
  - May yield academic and health benefits



Challenge

- Determine which aspects of school performance are the most sensitive and specific indicators of behavioral health needs
- Ensure tool is feasible and useful in diverse communities.

Specific Aims

1) Develop a risk-indicator tool using academic data to identify students at high risk for PTSD, depression, and substance use.

2) Test the sensitivity, specificity, and predictive value of the tool to identify each behavioral health outcome in a variety of datasets.

David Geffen
School of Medicine

Mattel Children's Hospital UCLA

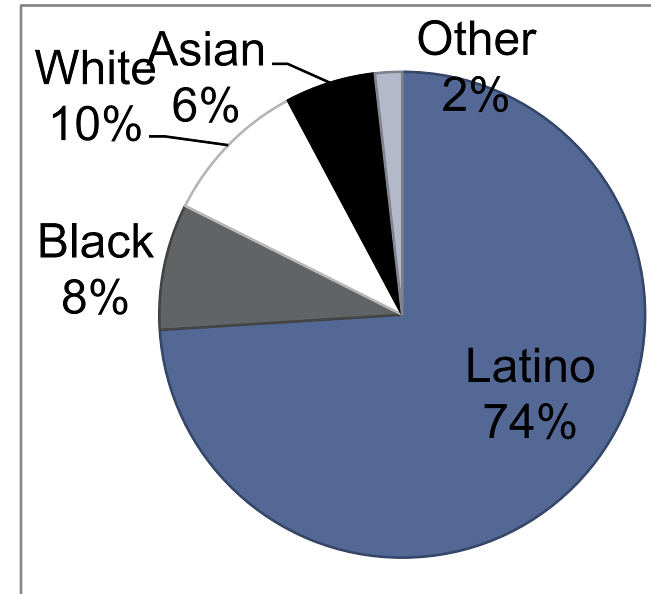
UCLA Children's Discovery
and Innovation Institute

Approach

- Community-based participatory approach to determine candidate variables and outcomes of interest
  - LAUSD Mental Health
  - The L.A. Trust for Children's Health
- Use both national and locally relevant samples to develop and test the risk indicator tool
  - National Longitudinal Study of Adolescent to Adult Health (Add Health)
  - RISE Up
  - 3 LAUSD datasets each focused on different outcome

Community Partners and Context

- Los Angeles Unified School District
  - K-12 Enrollment 588,696 students
  - 84% qualify for free/reduced priced meals
- School Mental Health
  - Conducts screening, provides services
  - Emphasis on trauma and resiliency
- The L.A Trust for Children's Health
  - Facilitates health and wellness services including supporting 15 "Wellness Centers": comprehensive school-based health centers designed to function as a medical home



Community Partner Feedback

- Focus on routinely collected information
- Importance of identifying PTSD
- Challenges with school disciplinary data
- Consider developing individual and school-level models

Data Sources

- National Longitudinal Study of Adolescent to Adult Health
  - Large, nationally representative but no measure of PTSD
- RISE Up
  - Smaller, local sample, contains all 3 outcome measures
  - All participants applied to a charter school
- LAUSD samples
  - Ability to test model in “real world”

Add Health Sample

- Nationally representative school-based sample
  - 80 high schools and 52 feeder school
    - Wave I: 20,745 participants, grades 7-12, collected 1994-1995
    - Wave II: 14,738 participants, grades 8-12, collected 1996
  - High school transcripts from approximately 10,000 students
  - Self-report attendance, truancy, suspensions and expulsions
  - Self-report substance alcohol, marijuana, other drug use, problem substance use and depression (CES-D)
    - No PTSD measure available
  - Free/Reduced lunch status, race/ethnicity, gender, age

Add Health Sample

- Analytic sample = 8,214 participants in grades 9-12 during waves I or II, with valid survey weight, data on at least one outcome, and academic transcript data

	N (%)		N (%)
Female	4,270 (51)	Alcohol misuse	1,563 (21)
Race/Ethnicity		Marijuana use	946 (13)
White	4,307 (68)	Other drug use	411 (6)
Black	1,431 (13)	Depression symptoms	1,447 (17)
Latino	1,295 (10)		**Mean (Std. Dev)**
Asian	669 (4)	Grade point average	2.6 (0.014)
Other	498 (5)	Household income	$49,809 ($786.69)

David Geffen
School of Medicine

Mattel Children's Hospital UCLA

UCLA Children's Discovery and Innovation Institute

RISE UP Study

- **R**educing **I**nequities in health through **S**ocial and **E**ducational change follow-up study
- Natural experimental study using admissions lotteries for high-performing charter, public high schools in low-income neighborhoods of Los Angeles

Participant recruitment and data collection

- Random sampling of applicants from list of lottery winners and losers for Fall 2013 and Fall 2014 from 5 sample schools.
- Participants attended 147 different high schools at 9th grade; 54% were traditional public schools
- In-person computer-assisted interview at
  - End of 8th grade/beginning of 9th grade
  - Spring 10th grade
  - Spring 11th grade
- 1270 students enrolled, 88% completed all 3 waves
- High school transcripts linked to survey data

Survey measures

- Outcomes
  - Self-reported alcohol, marijuana, other drug use, problem use
  - CES-D depression scale
  - Primary Care PTSD screen
- Academic Indicators
  - Grades by course from high school transcripts
  - Self-reported truancy
  - Changing schools
- Demographics

RISE Up Demographics

	N (%)
Race/Ethnicity (%)	
Latino	1,137 (90)
Black	67 (5)
White/Other	66 (5)
Male (%)	602 (47)
US Born (%)	1,113 (88)
Native English speaker (%)	518 (41)
At least 1 parent:	
US Born (%)	336 (27)
High School Graduate (%)	666 (52)
Working full time (%)	1,105 (87)

Over the course of the study:

- 38% met the clinical cut-off for depression
- 40% met the cut-off for PTSD
- 30%-40% reported some level of alcohol or marijuana misuse

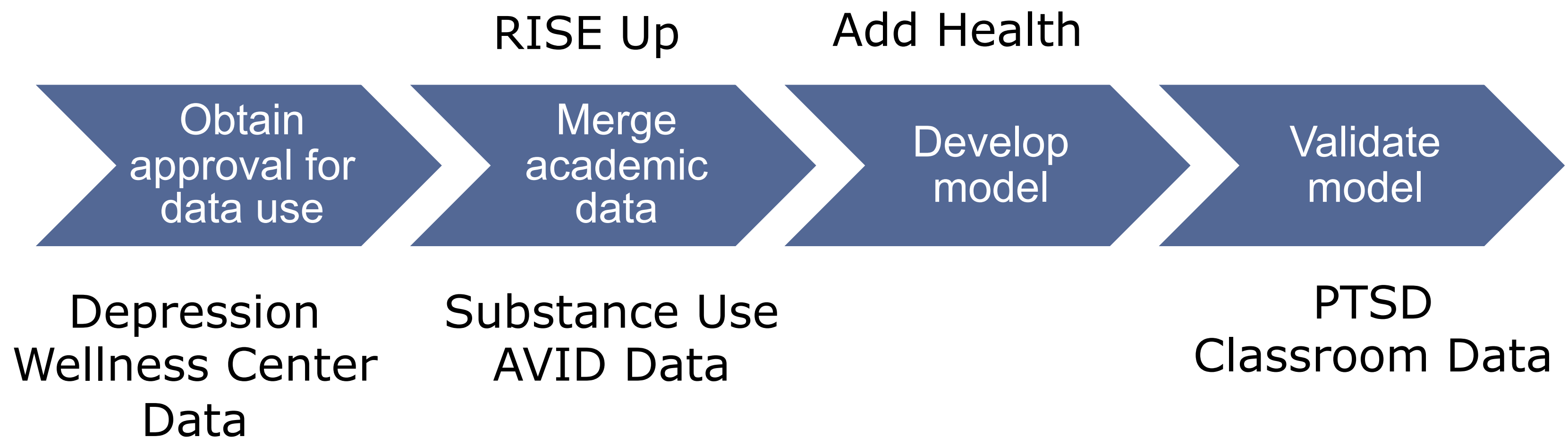
Analytic Strategy

- Build separate models for each outcome as well as a model for any of the 3 behavioral health needs
- Build models in Add Health and RISE Up
  - Split sample for model development and validation in Add Health
  - Rise Up model will be externally validated in 3 different LAUSD data sets
- Forward selection based on incremental increase in area under the receiver operating characteristic (ROC) curve (AUC) of the overall model
  - Candidate variables include absolute values as well as change from prior year

LAUSD Validation Data Sets

- Substance use
  - Surveys from 240 9-10th grade students with self-reported substance use from AVID study.
- Depression
  - Clinical chart review data from 260 adolescents seen in school-based health centers with PHQ2/PHQ9 screening results.
- PTSD
  - Surveys from 4448 9-12th grade students who underwent screening for PTSD (PC-PTSD) and have school data already merged as part of a school-based resilience classroom curriculum.
  - 24.5% screened positive for PTSD

Timeline and Next Steps



David Geffen School of Medicine

Mattel Children's Hospital UCLA

UCLA Children's Discovery and Innovation Institute

Timeline

- Currently constructing model in Add Health
  - Plans for model development by July with model validation in August
- Finished merging academic and health data in RISE Up
  - Anticipate model development in August
  - Validate model in 3 LAUSD datasets in September
- Plans for dissemination
  - Peer review publication for academic audience
  - White paper and executive summary for LAUSD

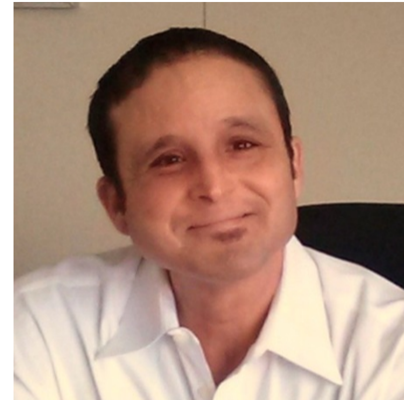
Future Work

- Pilot test use of tool for population health management at Wellness Center schools
  - Identifying students for additional screening and linkage to care
- Validate tool with other districts
- Develop school-level tool to inform district resource allocation
- Ultimate goal: use school data as an automatic community-based universal screening tool for behavioral health risk, which could transform how we approach adolescent behavioral health

Commentators

- Maryjane Puffer,
  The L.A. Trust

- Joshua Kaufman,
  LAUSD School Mental Health



Violence exposure and absenteeism

Table III. Associations between violence exposures and absenteeism for sixth grade students (N = 27 110)

Violence	Boys Total	Boys Yes n (%)	Boys Adjusted* OR [95% CI]	Girls Total	Girls Yes n (%)	Girls Adjusted* OR [95% CI]
Total						
Victim-perpetrator	2568	1231 (47.9)	1.53 [1.38, 1.70]	1138	494 (43.4)	1.65 [1.44, 1.88]
Perpetrator	1427	690 (48.4)	1.51 [1.34, 1.71]	1237	500 (40.4)	1.46 [1.28, 1.66]
Victim	2606	1053 (40.4)	1.18 [1.07, 1.29]	1522	592 (38.9)	1.40 [1.23, 1.58]
Witness	3898	1446 (37.1)	1.03 [0.93, 1.15]	5262	1806 (34.3)	1.16 [1.06, 1.28]
None	2889	1017 (35.2)	Ref	4563	1334 (29.2)	Ref
Weapon						
Victim-perpetrator	218	121 (55.5)	1.70 [1.24, 2.33]	68	35 (51.5)	1.68 [1.04, 2.69]
Perpetrator	117	58 (49.6)	1.39 [1.01, 1.92]	44	17 (38.6)	1.17 [0.72, 1.91]
Victim	1707	827 (48.5)	1.45 [1.32, 1.59]	715	310 (43.4)	1.38 [1.18, 1.62]
Witness	3898	1726 (44.3)	1.25 [1.17, 1.33]	4023	1513 (37.6)	1.12 [1.03, 1.22]
None	7448	2705 (36.3)	Ref	8872	2851 (32.1)	Ref
Physical						
Victim-perpetrator	1820	859 (47.2)	1.25 [1.12, 1.39]	756	296 (39.2)	1.14 [0.98, 1.32]
Perpetrator	1927	951 (49.4)	1.31 [1.18, 1.46]	1473	644 (43.7)	1.37 [1.23, 1.53]
Victim	1918	761 (39.7)	0.98 [0.87, 1.10]	978	381 (39.0)	1.20 [1.04, 1.38]
Witness	3665	1397 (38.1)	0.94 [0.85, 1.05]	4471	1564 (35.0)	1.03 [0.94, 1.13]
None	4058	1469 (36.2)	Ref	6044	1841 (30.5)	Ref
Verbal						
Victim-perpetrator	402	196 (48.8)	1.31 [1.10, 1.55]	160	83 (51.9)	1.76 [1.27, 2.44]
Perpetrator	593	304 (51.3)	1.42 [1.21, 1.67]	382	156 (40.8)	1.23 [1.02, 1.50]
Victim	1726	766 (44.4)	1.14 [1.04, 1.26]	846	358 (42.3)	1.35 [1.17, 1.55]
Witness	3803	1586 (41.7)	1.04 [0.96, 1.14]	3728	1405 (37.7)	1.12 [1.02, 1.23]
None	6864	2585 (37.7)	Ref	8606	2724 (31.7)	Ref
Total	13 388	5437 (40.6)		13 722	4726 (34.4)	

*Generalized estimating equation with a link function, clustered on school of enrollment, adjusted for disability, SES, Latino, ethnicity and school type, and mutually adjusted for weapons, physical, and verbal violence.

David Geffen School of Medicine

Ramirez, M., Wu, Y., Kataoka, S., Wong, M., Yang, J., Peek-Asa, C., & Stein, B. (2012). Youth violence across multiple dimensions: a study of violence, absenteeism, and suspensions among middle school children. *The Journal of pediatrics*, *161*(3), 542-546.

Mattel Children's Hospital UCLA

UCLA Children's Discovery and Innovation Institute

Upcoming Webinars

S4A
Systems for Action

Archives

http://systemsforaction.org/research-progress-webinars

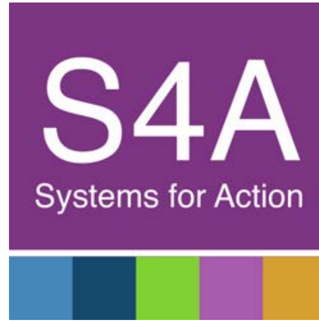
Upcoming

Wednesday, June 20, 2018, 12 p.m., ET
Systems for Action Individual Research Project
Financing Integrated Health and Social Services for Populations with Mental Illness
Yuhua Bao, PhD, Weill Cornell Graduate School of Medical Sciences, and Lisa Dixon, MD, MPH, NY State Psychiatric Institute/Columbia University Medical Center

Wednesday, July 11, 2018, 12 p.m., ET
Systems for Action Individual Research Project
Redesigning Health and Social Systems for the Cheyenne River Sioux Tribe Using Community-Engaged Decision-Making
Barabara J. Quiram, PhD, and David Washburn, ScD, SM, Texas A&M University

Wednesday, July 25, 2018, 12 p.m., ET
Systems for Action Individual Research Project
Integrating Health and Social Services for Veterans by Empowering Family Caregivers
Megan Shepherd-Banigan, PhD, MPH, Department of Veteran Affairs and Duke University

Questions?



www.systemsforaction.org

Acknowledgements

Systems for Action is a National Program Office of the Robert Wood Johnson Foundation and a collaborative effort of the Center for Public Health Systems and Services Research in the College of Public Health, and the Center for Poverty Research in the Gatton College of Business and Economics, administered by the University of Kentucky, Lexington, Ky.

and