

**Pediatric Symptom Checklist:  
Appendix for Re-Endorsement  
Proposal  
(NQF #722)**

**In support of  
NQF TIME LIMITED  
ENDORSEMENT MEASURE  
SUBMISSION & EVALUATION  
FORM**

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# **A Review of Recent Research on the Pediatric Symptom Checklist (PSC) 2001-2014**

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## **STUDIES LISTED BY TOPIC**

### **INTERNATIONAL**

Ahmad A, Khalique N, Khan Z. **Behavioral and emotional problems of adolescents-Relationship with academic achievement.** *Indian Journal of Community Health*. 2006-2007. 18(2), 19(1):3-8.

**Conclusion:** Positive scores on the Y-PSC for adolescent boys in India were related to poor academic achievement.

Bala G, Golubovic S, Milutinovic D, Katic R. **Psychometric properties of the Pediatric Symptom Checklist in preschool children in Serbia.** *Med Glas Ljek komore Zenicko-doboj kantona.* 2012; 9(2):356-362.

**Conclusion:** The PSC filled out by parents is a good tool for early and rapid identification of potential problems of psychosocial functioning of preschool children in Serbia.

Cancecko-Llego CD, Castillo-Carandang NT, Reyes AL. **Validation of the Pictorial Pediatric Symptom Checklist-Filipino Version for the psychosocial screening of children in a low-income urban community.** *Acta Medica Philippina;* 2009; 43:62-68

**Conclusion:** The Pictorial Pediatric Symptom Checklist-Filipino Version is a valid and reliable tool in screening for psychosocial problems in children aged 4 to 7 years old residing in a low-income urban community. Administration by community health workers is feasible and its use in the community setting is particularly relevant since many cases of psychosocial disorders remain undetected.

Chauhan JC, Kumar P, Dutta AK, Basu S, Kumar A. **Assessment of gluten free diet and psychosocial problems in Indian children with Celiac Disease.** *Indian Journal of Pediatrics;* 2010; 77(6):649-654

**Conclusion:** Dietary restrictions have impact on child's social activities and thus psychosocial parameters (PSC score) are better in the dietary compliant group.

Chong SC, Chan YH, Ong HT, Low PS, Tay SK. **Headache diagnosis, disability and co-morbidities in a multi-ethnic, heterogeneous paediatric Asian population.** *Cephalalgia.* 2010 Aug;30(8):953-61. Epub 2010 Mar 12.

**Conclusion:** ICHD-II headache classification, disability assessment with PedMIDAS and screening of psychosocial co-morbidities with the Paediatric Symptom Checklist were conducted. Recognition of the influence of genetics, lifestyle and cultural factors on headache management should be emphasized.

Erdogan S, Ozturk M. **Psychometric evaluation of the Turkish version of the Pediatric Symptom Checklist-17 for detecting psychosocial problems in low-income children.** *J Clin Nurs;* 2011; 20(17-18):2591-9

**Conclusion:** Primary care providers can use the Pediatric Symptom Checklist-17 for early identification of childhood psychosocial problems in primary care settings.

Guzman MP, Jellinek M, George M, Hartley M, Squicciarini AM, Canenguez K, Kuhlthau K, Yucel R, White G, Guzman, Murphy JM. **Mental health matters in elementary school; First grade screening predicts fourth grade achievement test scores.** *European Child and Adolescent Psychiatry;* 2011; 20(8):401-411.

**Conclusion:** Mental health problems on the PSC and TOCA-R in first grade were one of the strongest predictors of lower achievement test scores three years later, supporting the premise that for children mental health matters in the real world.

Leiner MA, Puertas H, Caratachea R, Pérez H, Jiménez P. **Sensitivity and specificity of the pictorial Pediatric Symptom Checklist for psychosocial problem detection in a Mexican sample.** *Rev Invest Clin;* 2010;62(6):560-567

**Conclusion:** The pictorial PSC was a useful tool for screening for psychosocial impairment, with improved sensitivity and specificity in comparison to previous assessments of the written PSC in similar populations within the U.S.

Lowenthal E, Lawler K, Harari N, Moamogwe L, Masunge J, Masedi M, Matome B, Seloilwe E, Grss, R. **Rapid psychosocial function screening test identified treatment failure in HIV Positive African youth.** *AIDS Care*; 2012; 24(6):722-727

**Conclusion:** Having a high score on the PSC was associated with having virologic failure. The PSC may be a useful screening tool in pediatric HIV.

Lowenthal E, Lawler K, Harari N, Moamogwe L, Masunge J, Masedi M, Matome B, Seloilwe E, Jellinek M, Murphy M, Gross R. **Validation of the Pediatric Symptom Checklist in HIV-infected Batswana.** *Journal of Child & Adolescent Mental Health*; 2011; 23(1):17-28

**Conclusion:** The PSC performed well in Setswana-speaking children and is a promising screening tool for pediatric psychosocial problems in busy clinical settings. Screening with the PSC may allow for early detection and treatment of psychosocial problems.

Murphy JM, Guzmán J, McCarthy AE, et al. Mental health predicts better academic outcomes: A longitudinal study of elementary school students in Chile. *Child Psychiatry Hum Dev*. Published online April 26, 2014. doi:10.1007/s10578-014-0464-4.

**Conclusion:** The current study evaluated how Chilean students' mental health in first grade predicted academic achievement. Results indicated that mental significantly predicts academic performance. In sum, the results suggest that school-based mental health problems (i.e., the SFL) may help to improve children's mental health and academic outcomes.

Muzzolon SRB. **Evaluation of the use of the Pediatric Symptom Checklist as screening for emotional and psychosocial problems in a public school in Curitiba, Brazil.** *Arquivos de Neuro-Psiquiatria*; 2008; 66:604

**Conclusion:** The Brazilian PSC version proved to be an effective tool in the early identification of emotional and/or psychosocial problems.

Okuda M, Mari S, Okuda Y, Ichiro K, Norikazu Y, Tatsuya H. **Psychosocial functioning and self-rated health in Japanese school-aged children: A cross-sectional study.** *Nursing and Health Sciences*. 2013; 15(2):157=163.

**Conclusion:** The PSC has high internal consistency among Japanese school-aged children. Further, results indicate that there is an association between psychosocial functioning as measure by the PSC and mental health ratings in school settings.

Plubrukarn R, Amloy K, Kanjanapatanakul W: **The effectiveness of brief psychosocial screening in identifying behavioral problems in children.** *J Med Assoc Thai*; 2011; 94 Suppl 3:S145-51

**Conclusion:** The Thai version, parent completed, PSC may be a useful psychosocial screening tool for the children aged 6-11 years with the recommended cut-off score of 16.

Reijneveld SA, Vogels AG, Hoekstra F, Crone MR. **Use of the Pediatric Symptom Checklist for the detection of psychosocial problems in preventive child healthcare.** *BMC Public Health*; 2006; 6:197

**Conclusion:** The PSC is useful for the early detection of psychosocial problems in preventive child healthcare outside the USA.

Sakaguchi K, Yagi T, Maeda A, Nagayama K, Uehara S, Saito-Sakoguchi Y, Kanematsu K, Miyawaki S. **Association of problem behavior with sleep problems and gastroesophageal reflux symptoms.** *Pediatrics International: Official Journal of the Japan Pediatric Society*. 2014; 56(1):24-30.

**Conclusion:** Associations between sleep problems, gastroesophageal reflux disease symptoms, food habits, and problem behaviors were assessed among Japanese adolescents. Subjects were classified into normal behavior and problem behavior groups using the PSC.

Sinclair J, Holden S. **The mental health surveillance of adolescents within a school setting.** *Mental Health Review Journal*. 2013; 18(2):83-92.

**Conclusion:** A survey of a secondary school population in the UK was completed using the PSC-Y. Students were subsequently assessed by the Child and Adolescent Mental Health Services. Results indicate that the PSC-Y successfully identifies adolescents at risk for mental health problems.

Taiwo AO. **Predictors of psychopathology among Nigerian adolescents: The role of psychosocial, demographics personality, and medical condition reports domain.** *African Health Sciences*. 2011;11(2):228-239.

**Conclusion:** The Pediatric Symptom Checklist was used as a psychopathology symptom schedule. The domains of psychosocial, personality, demographic and medical condition reports all independently and significantly predicted psychopathology among the adolescents but psychosocial domain had the highest contribution of 16% ( $P < 0.0001$ ). Prevalence rate for psychopathology among the sampled adolescents was 0.152 (15.2%) at the criteria of one standard deviation above the mean.

Thun-Hohenstein L, Herzog S. **The predictive value of the Pediatric Symptom Checklist in 5-year-old Austrian children.** *Eur J Pediatr*; 2008; 167(3):323-9. Epub 2007 May 11

**Conclusion:** The PSC is a valid psychosocial screening instrument, at least for this age group, and thus applicable for German-speaking countries.

Vogels A, Jacobusse GW, Reijneveld SA. **An accurate and efficient identification of children with psychosocial problems by means of computerized adaptive testing.** *BMC Medical Research Methodology*. 2011;11:111.

**Conclusion:** This study aimed to assess whether a short Computerized Adaptive Test (CAT) can overcome the weaknesses of short written questionnaires when identifying children with psychosocial problems. Each parent answered the Child Behavior Checklist (CBCL) and one out of three questionnaires: the Pediatric Symptom Checklist (PSC,  $n = 674$ ), the Strengths and Difficulties Questionnaire (SDQ,  $n = 707$ ), [28-31] or a newly developed Dutch questionnaire on psychosocial problems for children in primary education, the PSYBOBA ( $n = 660$ ). An IRT-based CAT is a very promising option for the identification of psychosocial problems in children, as it can lead to an efficient, yet high-quality identification.

Wu WC, Chang HY, Kuo KN, Chen CY, Tu YC, Yang YH. **Psychosocial problems in children with allergic diseases: a population study in Taiwan.** *Child Care Health Dev*; 2011 Sep;37(5):662-70

**Conclusion:** The instrument for psychosocial problems was developed by the research team and based on previous measurements, including Child Behavior Checklist (CBCL; Achenbach 1991), TNO-AZL Children's Quality of Life (TACQOL; Verrips *et al.* 1999), Pediatric Symptom Checklist (PSC; Navon *et al.* 2001), and Child Health Questionnaire – Parent Form 50 (CHQ-PF50; Drotar *et al.* 2006).

### GENERAL SCREENING

Blucker, RT, Jackson, D, Gillapsy, JA, Hale, J, Wolraich, M, Gillapsy, SR. **Pediatric behavioral health screening in primary care: A preliminary analysis of the pediatric symptom checklist-17 with functional impairment items.** *Clinical Pediatrics*. 2014; 53(5):449-455.

**Conclusion:** Youth ages 6 to 16 completed the Pediatric Behavioral Health Screen (PBHS) which includes the PSC-17. A positive screen was found for 26.7% of the sample. Of the youth with positive screens, 68% also experienced behavioral and emotional impairments. Findings indicate that the PBHS has good psychometric validity and clinical use.

Borowsky IW, Mozayeny S, Ireland M. **Brief psychosocial screening at health supervision and acute care visits.** *Pediatrics*; 2003;112(1 Pt 1):129-33

**Conclusion:** In this sample of youth ages 7 to 15, 12% scored positive on the internalizing subscale, 10% on the externalizing subscale, and 7% on the attention subscale. Overall, 11% had a positive PSC-17 total score, and 22% had at least one positive PSC-17 subscale score or a positive total score. Clinicians will miss opportunities to identify emotional and behavioral disorders among children and adolescents who may be at a higher risk if they limit psychosocial screening to health supervision visits.

Duke N, Ireland M, Borowsky IW. **Identifying psychosocial problems among youth: factors associated with youth agreement on a positive parent-completed PSC-17.** *Child Care Health Dev*; 2005;31(5):563-73

**Conclusion:** Findings indicate that when the youth agrees with a positive parent-completed PSC-17, there is higher parent frustration, lower parent-child connectedness, and the youth is more likely to have a diagnosis of an emotional or behavioral disorder.

Gardner W, Kelleher KJ, Pajer KA. **Multidimensional adaptive testing for mental health problems in primary care.** *Med Care*. 2002;40:812–823.

**Conclusion:** There was high agreement between the adaptive test and the full (35-item) PSC.

Hacker KA, Arsenault LN, Williams S, DiGirolamo AM. **Mental and behavioral health screening at preventive visits: Opportunities for follow-up of patients who are nonadherent with the next preventive visit.** *Journal of Pediatrics*; 2011;158(4):666-671

**Conclusion:** A positive PSC score was among the behavioral health risk characteristics predictive of acute care or ED use.

Hacker K, Goldstein J, Link D, Sengupta N, Tendulkar S, Wissow L. **Pediatric provider processes for behavioral health screening, decision making, and referral in sites with colocated mental health services.** *Journal of Developmental and Behavioral Pediatrics*. 2013; 34(9):680-687.

**Conclusion:** The study evaluated how pediatricians experience and use several screening measures in primary care settings. The PSC was used to screen children. Results indicated that the PSC was used consistently in the clinics. However, a few providers noted some confusion with the wording of various PSC items. Generally, the PSC was well received.

Hacker KA, Penfold R, Arsenault L, Zhang F, Murphy JM, Wissow L. **Screening for Behavioral Health Issues in Children Enrolled in Massachusetts Medicaid** DOI: 10.1542/peds.2013-1180. Originally published online December 2, 2013; *Pediatrics*.

**Conclusion:** The researchers examined whether the mandatory MassHealth behavioral screening can identify children without a prior history of behavioral health problems. Among children enrolled in MassHealth, 43% had positive screens and no history of behavioral health. Positive screens were determined in part by positive PSC scores. In sum, the study demonstrates that the mandatory MassHealth behavioral health screening identifies high numbers of previously unidentified children with behavioral health problems.

Hacker KA, Penfold R, Arsenault L, Zhang F, **Murphy JM**, Wissow L. **Behavioral health services following screening in children enrolled in Massachusetts Medicaid.** *Pediatrics*. 2014. Accepted for publication.

**Conclusion:** The study evaluated newly identified youth with positive behavioral health screens among children enrolled in Massachusetts Medicaid. While positive screens are strongly associated with mental health referrals, only a small percentage of youth with positive screens receive mental health care post-screening.



Jonovich SJ, Alpert-Gillis LJ. **Impact of pediatric mental health screening on clinical discussion and referral for services.** *Clinical Pediatrics*. 2014; 53(4):364-371.

**Conclusion:** Youth aged 11 who completed the PCS were more likely to be referred for mental health services as compared to a control group for children who were not offered screening.

Kelley ML, Fals-Stewart, W. **Psychiatric Disorders of Children Living With Drug-Abusing, Alcohol-Abusing, and Non-Substance-Abusing Fathers.** *J. Am. Acad. Child Adolesc. Psychiatry*. 2004;43(5):621–628

**Conclusion:** Children living with DA fathers were more likely to experience a lifetime psychiatric disorder and more negative emotional and behavioral symptomatology [as measures by PSC scores] compared to children living with an AA father or non-substance-abusing parents.

Leiner MA, Balcazar H, Straus DC, Shirsat P, Handal G. **Screening Mexicans for psychosocial and behavioral problems during pediatric consultation.** *Rev Invest Clin*. 2007; 59(2):116-23

**Conclusion:** The PPSC is a simple, effective tool that can detect children and adolescents with possible psychosocial problems during pediatric consultations.

Navon M, Nelson D, Pagano M, Murphy M: **Use of the pediatric symptom checklist in strategies to improve preventive behavioral health care.** *Psychiatr Serv*; 2001 Jun;52(6):800-4

**Conclusion:** Use of the PSC in this study promoted an increase in referrals for children in need.

Okuda M, Mari S, Okuda Y, Ichiro K, Norikazu Y, Tatsuya H. **Psychosocial functioning and self-rated health in Japanese school-aged children: A cross-sectional study.** *Nursing and Health Sciences*. 2013; 15(2):157=163.

**Conclusion:** The PSC has high internal consistency among Japanese school-aged children. Further, results indicate that there is an association between psychosocial functioning as measure by the PSC and mental health ratings in school settings.

Romano-Clarke G, Tang MH, Xerras DC, Egan HS, Pasinski RC, Kamin HS, McCarthy AE, Newman J, Jellinek MS, Murphy JM. **Have rates of behavioral health assessment and treatment increased for Massachusetts children since the Rosie D. decision? A report from two primary care practices.** *Clinical Pediatrics*. 2014; 53(3):243-249.

**Conclusion:** Pediatricians significantly increased their use of screening measures, including the PSC, since the implementation of the Rosie D decision.

Semansky RM, Koyanagi C, Vandivort-Warren R. **Behavioral health screening policies in Medicaid programs nationwide.** *Psychiatr Serv* 2003; 54(5): 736-739.

**Conclusion:** The PSC is the most commonly recommended mental health screen, and it rarely misidentifies children who do not have a behavioral problem.

Sheldrick CR, Henson BS, Neger EN, Merchant S, Murphy JM, Perrin EC. **The baby pediatric symptom checklist: Development and initial validation of a new social/emotional screening instrument for very young children.** *Academic Pediatrics*. 2013; 13(1):72-80.

**Conclusion:** The Baby Pediatric Symptom Checklist is validated for three domains of behavior for infants and very young children.

Sinclair J, Holden S. **The mental health surveillance of adolescents within a school setting.** *Mental Health Review Journal*. 2013; 18(2):83-92.

**Conclusion:** A survey of a secondary school population in the UK was completed using the PSC-Y. Students were subsequently assessed by the Child and Adolescent Mental Health Services. Results indicate that the PSC-Y successfully identifies adolescents at risk for mental health problems.

Studts CR, Van Zyl MA. **Identification of developmentally appropriate screening items for disruptive behavior problems in preschoolers.** *Journal of Abnormal Child Psychology.* 2013; 41:851-863.

**Conclusion:** Results suggest that the PSC-17 is a developmentally appropriate measure for identifying risk for psychosocial problems among preschool-aged children.

Terrone G, Parente I, Romano A, Auricchio R, Greco L, Del Giudice E. **The pediatric symptom checklist as screening tool for neurological and psychosocial problems in a paediatric cohort of patients with coeliac disease.** *Acta Paediatrica.* 2013;102(7):325-328.

**Conclusion:** Symptoms of neurological and behavioral problems among youth with coeliac disease can be identified using the PSC. Individuals with coeliacs scored higher on the PSC than controls. PSC was also implemented in routine follow-up visits.

Vogels A, Jacobusse GW, Reijneveld SA. **An accurate and efficient identification of children with psychosocial problems by means of computerized adaptive testing.** *BMC Medical Research Methodology.* 2011;11:111.

**Conclusion:** This study aimed to assess whether a short Computerized Adaptive Test (CAT) can overcome the weaknesses of short written questionnaires when identifying children with psychosocial problems. Each parent answered the Child Behavior Checklist (CBCL) and one out of three questionnaires: the Pediatric Symptom Checklist (PSC, n = 674), the Strengths and Difficulties Questionnaire (SDQ, n = 707), [28-31] or a newly developed Dutch questionnaire on psychosocial problems for children in primary education, the PSYBOBA (n = 660). An IRT-based CAT is a very promising option for the identification of psychosocial problems in children, as it can lead to an efficient, yet high-quality identification.

### CHRONIC ILLNESS

Bursch B, Tsao JCI, Meldrum M, Zeltzer LK. **Preliminary validation of a self-efficacy scale for child functioning despite chronic pain (child and parent versions).** *Pain* 2006;125(1-2): 35-42.

**Conclusions:** A self-efficacy measure (including the PSC) for parents of children with chronic pain showed significant correlation with the child's measure for their *functioning normally when in pain*.

Crabtree VM, Ivanenko A, Gozal D. **Clinical and Parental Assessment of Sleep in Children with Attention-Deficit/Hyperactivity Disorder Referred to a Pediatric Sleep Medicine Center.** *Clin Pediatr.* 2003; 42(9): 807-813.

**Conclusion:** Children with sleep problems and ADHD were referred to a sleep clinic. Parent responses and scores on the PSC for the study sample were analyzed—the mean PSC score was 36.5.

Das S, Mukherjee A, Lodha R, Vatsa M. **Quality of life and psychosocial functioning of HIV infected children.** *Indian Journal of Pediatrics;* 2010;77(6): 633-637

**Conclusions:** As measured by the PSC, a significantly greater number of children with cystic fibrosis suffered from psychosocial problems as compared to HIV children.

Ivanenko A, Barnes ME, Crabtree VM, Gozal D. **Psychiatric symptoms in children with insomnia referred to a pediatric sleep medicine center.** 2004; *Sleep Medicine:* 5(3):253-9

**Conclusions:** The vast majority of children presenting with persistent insomnia exhibit clinical symptoms of an accompanying psychiatric disorder [as measured by PSC scores], suggesting that comprehensive psychometric assessments are warranted in this population.

Johnston BD, Martin-Herz SP. **Correlates of reinjury risk sibling groups: A prospective observational study.** *Pediatrics*. 2010 Mar;125(3):483-490.

**Conclusion:** The objective of this study was to identify child, parent, and family characteristics that are associated with short-term recurrence of injury within sibling groups. The Pediatric Symptom Checklist was used as a measure of parental concerns about the child's behavior. Along with their siblings, children who receive treatment for injury are at short-term risk for additional injury. Children in single-parent households, in families who receive public assistance, and those with posttraumatic stress disorder arousal symptoms 1 month after injury to themselves or a sibling are at highest risk.

Jordan SS, Hilker KA, Stoppelbein L, Elkin TD, Applegate H, Iyer R. **Nocturnal Enuresis and Psychosocial Problems in Pediatric Sickle Cell Disease and Sibling Controls.** *J Dev Behav Pediatr*. 2005; 26:404-411

**Conclusions:** These findings replicate and extend previous findings and provide further evidence to support a need for monitoring of screening for psychosocial problems among children with SCD and enuresis [due to higher PSC scores].

Kunz JH, Greenley RN, Howard M. **Maternal, paternal, and family health-related quality of life in the context of pediatric inflammatory bowel disease.** *Quality of Life Research*. 2011;20:1197-1204.

**Conclusions:** The primary aim of this study was to examine the associations of disease activity and adolescent adjustment with parent and family health-related quality of life (HRQoL) among families of youths with inflammatory bowel disease (IBD). Youths completed the Pediatric Symptom Checklist. Although mothers and fathers report similar individual and family HRQoL, the strength of associations between disease and youth adjustment factors with these outcomes differs somewhat by parent gender. Findings underscore the importance of examining maternal and paternal functioning separately and incorporating routine family assessment into the course of treatment.

Louthrenoo O, Ukarapol N, Wongsawasdi L. **Psychosocial problems and childhood recurrent abdominal pain.** *J Med Assoc Thai*. 2010 Dec;93(12):1379-84.

**Conclusions:** Psychosocial assessment should be considered even in RAP with identified organic findings.

Perfect MM, Jaramillo E. **Relations between resiliency, diabetes-related quality of life, and disease markers to school related outcomes in adolescents with diabetes.** *School Psychology Quarterly*. 2012;27(1):29-40.

**Conclusion:** The four school-related items on the PSC had unique variance as part of a test battery in predicting self-reported grades and school functioning for adolescents with diabetes.

Perfect MM, Patel PG, Scott RE, Wheeler MD, Patel C, Griffin K, Sorensen ST, Goodwin JL, Quan SF. **Sleep, Glucose, and Daytime Functioning in Youth with Type 1 Diabetes.** *SLEEP*. 2012;35(1):81-91.

**Conclusion:** PSC scores for youth with diabetes correlated with higher glucose and hemoglobin levels, as well as poorer quality of life ratings.

Rockhill CM, Katon W, Richards J, McCauley E, McCarty CA, Myaing MT, Zhoug C, Richardson LP. **What clinical differences distinguish depressed teens with and without comorbid externalizing problems?** *General Hospital Psychiatry*. 2013; 35:444-447.

**Conclusion:** Youth determined to be at risk for a diagnosis of depression completed the PSC. Adolescents ages 13-17 with positive scores greater than 7 on the PSC were categorized as having

externalizing behaviors. Results indicated that youth with depression and externalizing symptoms had a higher rate of obesity and psychosocial impairment than youth with just depression symptoms.

Saini A, Chandra J, Goswami U, Singh V, Dutta AK. **Case control study of psychosocial morbidity in beta thalassemia major.** *J Pediatr*; 2007;50(5):516-20

**Conclusions:** Children with thalassemia have significantly higher psychosocial morbidity, as assessed by a semi-structured interview and 2 preformed questionnaires (PSC).

Santos LHC, Pimentel RF, Rosa LGD, Muzzolon SRB, Antoniuk SA. **Cognitive and behavioral screening of children with learning disabilities: A preliminary study.** *Rev Paul Pediatr*. 2012;30(1):93-99

**Conclusions:** The PSC can be used by pediatricians as a screening tool for detection of cognitive and psychosocial problems in children with learning disabilities.

Steinbaum DP, Chemtob C, Boscarino JA, Laraque D. **Use of a psychosocial screen to detect children with symptoms of posttraumatic stress disorder: an exploratory study.** *Ambul Pediatr*. 2008 Jan-Feb;8(1):32-5

**Conclusions:** Symptoms of PTSD can be identified using the youth self-report version of the PSC-17.

Stone KC, LaGasse LL, Lester BM, Shankaran S, Bada HS, Bauer CR, Hammond JA. **Sleep Problems in Children With Prenatal Substance Exposure: The Maternal Lifestyle Study.** *Arch Pediatr Adolesc Med*; 2010;164(5):452-456

**Conclusions:** Prenatal exposure to nicotine was positively associated with children's sleep problems (as measured on the PSC by item "has trouble sleeping") persisting throughout the first 12 years of life.

Tham SW, Palermo TM, Vavilala MS, Wang J, Jaffe KM, Koepsell TD, Dorsch A, Temkin N, Durbin D, Rivara FP. **The longitudinal course, risk factors, and impact of sleep disturbances in children with traumatic brain injury.** *Journal of Neurotrauma*. 2012; 29: 154-161.

**Conclusion:** The presence of psychosocial problems was a significant predictor of sleep disturbances.

Terrone G, Parente I, Romano A, Auricchio R, Greco L, Del Giudice E. **The pediatric symptom checklist as screening tool for neurological and psychosocial problems in a paediatric cohort of patients with coeliac disease.** *Acta Paediatrica*. 2013;102(7):325-328.

**Conclusion:** Symptoms of neurological and behavioral problems among youth with coeliac disease can be identified using the PSC. Individuals with coeliacs scored higher on the PSC than controls. PSC was also implemented in routine follow-up visits.

Wagner JL, Smith G, Ferguson PL, Fedele DA. **Preliminary psychometrics of the neurological disorders depression inventory for epilepsy-youth.** *Journal of Child Neurology*. 2013; 28(11):1392-1399.

**Conclusion:** Results suggest that the PSC is an effective screening tool for youth with epilepsy. The PSC was associated with other measures of psychosocial functioning, including the Neurological Disorders Depression Inventory for Epilepsy-Youth.

Wagner JL, Smith GM, Ferguson PL, Wannamaker, BB. **Caregiver perceptions of seizure severity in pediatric epilepsy.** *Epilepsia*. 2009; 50(9): 2102-2109

**Conclusions:** Caregiver endorsed behavioral symptoms in youth (e.g. PSC scores) and caregiver self-efficacy for managing seizures did not significantly affect severity description.

Weiss J, Mouttapa M, Nacpil L, Rubin D, Gedissman A. **Addressing obesity among Latino youth in pediatrician's office: Preliminary findings of an obesity prevention program.** *Journal of Behavioral Health.* 2012;1(2):86-92.

**Conclusion:** Psychosocial functioning of youth in a pediatric weight management program was reported by parents using the PSC. Decreases in the outcome variables did not vary by youth's baseline level of psychosocial functioning.

Wolfe-Christensen C, Veenstra AL, Kovacevic L, Elder JS, Lakshmanan. **Psychosocial difficulties in children referred to pediatric urology: A closer look.** *Urology.* 80(4):907-913.

**Conclusions:** According to the PSC, children referred to pediatric urology with voiding dysfunction and/or enuresis were at increased risk for psychosocial problems; the severity of their psychosocial problems was related to the severity of their urologic condition. Patients referred for voiding dysfunction and/or enuresis should be screened for psychosocial difficulties.

Wu WC, Chang HY, Kuo KN, Chen CY, Tu YC, Yang YH. **Psychosocial problems in children with allergic diseases: a population study in Taiwan.** *Child Care Health Dev;* 2011 Sep;37(5):662-70

**Conclusion:** The instrument for psychosocial problems was developed by the research team and based on previous measurements, including Child Behavior Checklist (CBCL; Achenbach 1991), TNO-AZL Children's Quality of Life (TACQOL; Verrips *et al.* 1999), Pediatric Symptom Checklist (PSC; Navon *et al.* 2001), and Child Health Questionnaire – Parent Form 50 (CHQ-PF50; Drotar *et al.* 2006).

### MILITARY FAMILIES

Aranda MC, Middleton LS, Flake E, Davis BE. **Psychosocial screening in children with wartime-deployed parents.** *Mil Med;* 2011 Apr;176(4):402-7

**Conclusion:** Parents reported more child psychosocial symptoms, and youth self reported more psychosocial symptoms if there was a currently deployed parent.

Flake EM, Davis BE, Johnson PL, Middleton LS. **The psychosocial effects of deployment on military children.** *Journal of Developmental & Behavioral Pediatrics;* 2009 Aug;30(4):217-278

**Conclusion:** Families in this study experiencing deployment identified one-third of military children at high risk for psychosocial morbidity on the PSC.

### LONGITUDINAL

Hacker KA, Williams S, Myagmarjav E, Cabral H, Murphy M. **Persistence and change in Pediatric Symptom Checklist scores over 10 to 18 months.** *Acad Pediatr;* 2009;9(4):270-7

**Conclusion:** The statistically significant association between pediatrician referral and improved PSC scores provides evidence for the value of referral in primary care.

Murphy JM, Blais M, Baer L, McCarthy A, Kamin H, Masek B, Jellinek M. **Measuring outcomes in outpatient child psychiatry: Reliable improvement, deterioration, and clinically significant improvement.** *Clinical Child Psychology and Psychiatry,* 2013; 0 (0):1-14.

**Conclusion:** The current study evaluated outcome measurements in child psychiatry by examining PSC scores at intake and follow-up appointments. Reliable improvement and deterioration and rates of clinically significant improvement were calculated for all patients with both intake and follow-up PSC scores. 51.1% of the most highly impaired patients had reliably improved, compared to 6.1% who had reliably deteriorated. Further, 35.9% of patients with positive PSC scores at intake achieved clinically significant improvement. The results suggest that the PSC is an effective tool for evaluating and measuring treatment outcomes in child psychiatry.

Murphy JM, Guzmán J, McCarthy AE, et al. Mental health predicts better academic outcomes: A longitudinal study of elementary school students in Chile. *Child Psychiatry Hum Dev*. Published online April 26, 2014. doi:10.1007/s10578-014-0464-4.

**Conclusion:** The current study evaluated how Chilean students' mental health in first grade predicted academic achievement. Results indicated that mental significantly predicts academic performance. In sum, the results suggest that school-based mental health problems (i.e., the SFL) may help to improve children's mental health and academic outcomes.

Nicholson B, Anderson M, Fox R, Brenner V. **One Family at a Time: A Prevention Program for At-Risk Parents.** *Journal of Counseling and Development* 2002; 80(3): 362-371.

**Conclusion:** This study assessed the effectiveness of a prevention program for low-income, at-risk parents. In conjunction with another measure, a teacher form of the PSC was used to assess behavioral problems in children whose parents were taking part in the program over time. Behavioral problems decreased significantly more than the control group over the course of the program.

Whitaker TM, Bada HS, Bann CM, Shankaran S, LaGasse L, Lester BM, Bauer CR, Hammond J, Higgins R: **Serial pediatric symptom checklist screening in children with prenatal drug exposure.** *J Dev Behav Pediatr*; 2011;32(3):206-15

**Conclusion:** Increased total PSC scores and Positive PSC screens for behavioral concerns in this group of children with prenatal substance exposure.

### PRIMARY CARE

Applegate H. **Clinical Case Study: Pediatric Residents' Discussions of and Interventions for Children's Behavioral and Emotional Problems.** *Journal of Pediatric Psychology*. 2003; 28(5): 315-321.

**Conclusion:** The use of a screening instrument in pediatric primary care shows promise for increasing discussions between residents and parents about children's behavioral and emotional issues.

Berger-Jenkins E, McCord M, Gallagher T, Olfson. **Effect of routine mental health screening in a low-resource pediatric primary care population.** *Clin Pediatr*. 2012; 51(4): 359-365.

**Conclusion:** Use of the PSC in a low-resource primary care setting facilitates parental disclosure and increases clinical attention to mental health problems, without overburdening referral services.

Blucker, RT, Jackson, D, Gillapsy, JA, Hale, J, Wolraich, M, Gillapsy, SR. **Pediatric behavioral health screening in primary care: A preliminary analysis of the pediatric symptom checklist-17 with functional impairment items.** *Clinical Pediatrics*. 2014; 53(5):449-455.

**Conclusion:** Youth ages 6 to 16 completed the Pediatric Behavioral Health Screen (PBHS) which includes the PSC-17. A positive screen was found for 26.7% of the sample. Of the youth with positive screens, 68% also experienced behavioral and emotional impairments. Findings indicate that the PBHS has good psychometric validity and clinical use.

Boothroyd RA, Armstrong M. **An Examination of the psychometric properties of the Pediatric Symptom Checklist with children enrolled in Medicaid.** *Journal of Emotional and Behavioral Disorders*; 2010;18: 113-126

**Conclusion:** Support the use of the PSC as an appropriate measure for screening the psychosocial needs of children enrolled in Medicaid.

Dempster R, Wildman B, Keating A. **The role of stigma in parental help-seeking for child behavior problems.** *J Child Adolesc Psychol*. 2012; DOI:10.1080/15374416.2012.700504

**Conclusion:** Parents of children with behavior problems who had more stigma towards themselves, although they endorsed feeling there was more stigma towards their children, were less likely to pursue treatment. The impact of stigma was related to the severity of the child's symptoms, as measured by the PSC.

Gardner W, Lucas A, Kolko DJ, Campo JV. **Comparison of the PSC-17 and alternative mental health screens in an at-risk primary care sample.** *J Am Acad Child Adolesc Psychiatry*; 2007;46(5):611-618

**Conclusion:** The PSC-17 and its subscales are briefer than alternative questionnaires, but performed as well as those instruments in detecting common mental disorders in primary care.

Glascoe FP. **Screening for developmental and behavioral problems.** *Mental Retardation & Developmental Disabilities Research Reviews*. 2005; **11**(3): 173-179.

**Conclusion:** The PSC is recommended as an "accurate developmental and behavioral screening tool" for use in primary care.

Hacker K, Goldstein J, Link D, Sengupta N, Tendulkar S, Wissow L. **Pediatric provider processes for behavioral health screening, decision making, and referral in sites with colocated mental health services.** *Journal of Developmental and Behavioral Pediatrics*. 2013; 34(9):680-687.

**Conclusion:** The study evaluated how pediatricians experience and use several screening measures in primary care settings. The PSC was used to screen children. Results indicated that the PSC was used consistently in the clinics. However, a few providers noted some confusion with the wording of various PSC items. Generally, the PSC was well received.

Hayutin LG, Reed-Knight B, Blount RL, Lewis J, McCormick ML. **Increasing parent-pediatrician communication about children's psychosocial problems.**

*J. Pediatr. Psychol*;2009; 34:1155-1164

**Conclusions:** Both the Staff-Scored and Parent-Scored administrations of the PSC promote improved parent-pediatrician communication on psychosocial issues.

Kolko DJ, Campo JV, Kelleher K, Cheng, Y. **Improving access to care and clinical outcomes for pediatric behavioral problems: a randomized trial of a nurse-administered intervention in primary care.** *Journal of Developmental & Behavioral Pediatrics*; 2010;31(5):393-404

**Conclusion:** Clinically referred children who met a modest clinical cutoff (75th percentile) on the externalizing behavior scale of the Pediatric Symptom Checklist-17 were randomized to a protocol for on-site, nurse-administered intervention or to enhanced usual care. A psychosocial intervention for behavior problems that was delivered by nurses in the primary care setting is feasible, improves access to mental health services, and has some clinical efficacy.

Kostanecka A, Power T, Clarke A, Watkins M, Hausman CL, Blum NJ. **Behavioral health screening in urban primary care settings: construct validity of the PSC-17.** *J Dev Behav Pediatr*; 2008;29(2):124-128

**Conclusion:** Clinicians using the PSC-17 in urban low-income communities should recognize that the externalizing and attention problems subscales of the PSC-17 may not be valid measures of these dimensions of child behavior in this population.

Jonovich SJ, Alpert-Gillis LJ. **Impact of pediatric mental health screening on clinical discussion and referral for services.** *Clinical Pediatrics*. 2014; 53(4):364-371.

**Conclusion:** Youth aged 11 who completed the PCS were more likely to be referred for mental health services as compared to a control group for children who were not offered screening.

Polaha J, Dalton WT, Allen S. **The prevalence of emotional and behavior problems in pediatric primary care serving rural children.** *J Pediatr Psychol*; 2011;36(6):652-60

**Conclusion:** PSC found high rates of parent-rated psychosocial problems in pediatric primary care.

Romano-Clarke G, Tang MH, Xerras DC, Egan HS, Pasinski RC, Kamin HS, McCarthy AE, Newman J, Jellinek MS, Murphy JM. **Have rates of behavioral health assessment and treatment increased for Massachusetts children since the Rosie D. decision? A report from two primary care practices.** *Clinical Pediatrics*. 2014; 53(3):243-249.

**Conclusion:** Pediatricians significantly increased their use of screening measures, including the PSC, since the implementation of the Rosie D decision.

Rushton J, Bruckman D, Kelleher K. **Primary care referral of children with psychosocial problems.** *Arch Pediatr Adolesc Med*.2002;156 :592– 598.

**Conclusion:** The factors associated with referral dealt with the patient's problems—new or severe PSP, high Pediatric Symptom Checklist score, low/dropping grades, prior use of mental health services, and specific PSP types.

Studts CR, Van Zyl MA. **Identification of developmentally appropriate screening items for disruptive behavior problems in preschoolers.** *Journal of Abnormal Child Psychology*. 2013; 41:851-863.

**Conclusion:** Results suggest that the PSC-17 is a developmentally appropriate measure for identifying risk for psychosocial problems among preschool-aged children.

Vogels AG, Crone MR, Hoekstra F, Reijneveld SA. **Comparing three short questionnaires to detect psychosocial dysfunction among primary school children: a randomized method.** *BMC Public Health*; 2009;9:489

**Conclusion:** Use of the PSC can improve the detection of psychosocial dysfunction among children substantially.

Weiss J, Mouttapa M, Nacpil L, Rubin D, Gedissman A. **Addressing obesity among Latino youth in pediatrician's office: Preliminary findings of an obesity prevention program.** *Journal of Behavioral Health*. 2012;1(2):86-92.

**Conclusion:** Psychosocial functioning of youth in a pediatric weight management program was reported by parents using the PSC. Decreases in the outcome variables did not vary by youth's baseline level of psychosocial functioning.

Weitzman CC, Leventhal JM. **Screening for behavioral health problems in primary care.** *Current Opinion in Pediatrics*. 2006; 18: 641-648.

**Conclusion:** The PSC is recommended as a well-validated and reliable screening measure for use in primary care.

Wildman BG, Stancin T, Golden C, Yerkey T. **Maternal distress, child behaviour, and disclosure of psychosocial concerns to a paediatrician.** 2004; *Child: Care, Health & Development*;30(4):385-94

**Conclusion:** The results supported the hypothesis that mothers' psychosocial functioning is significantly related to concern about child behaviour and disclosure of concerns to the paediatrician.

Wren FJ, Scholle FJ, Heo J, Comer DM. (2003). **Pediatric mood and anxiety syndromes in primary care: who gets identified?** *Int J Psychiatry Med* 2003; 33(1): 1-16.



**Conclusion:** The PSC-17 internalizing subscale was used to identify children with mood and anxiety disorders in primary care settings. Targeted screening for troubled children should be used so that children with internalizing disorders are not overlooked.

Wren FJ, Bridge JA, Birmaher B. **Screening for Childhood Anxiety Symptoms in Primary Care: Integrating Child and Parent Reports.** *J. Am. Acad. Child Adolesc. Psychiatry*, 2004; 43(11):1364–1371

**Conclusion:** There are discrete anxiety domains in which children's reports are likely to yield more information than that of parents.

### LOW-INCOME

Appelgren KE, Spratt E. **Creemos Juntos: Understanding and alleviating parental stress among lowcountry migrant workers.** *Community Mental Health Journal*. 2012;48:79-83.

**Conclusion:** The focus of this study was to determine challenges and needs faced by families of migrant farm workers served by Rural Mission Migrant Head Start in the South Carolina Lowcountry. The PSC was chosen to assess the presence of concerning externalizing and internalizing behaviors already demonstrated by children in this population. Only 1 out of the 14 responding families had a child who scored positive for impaired psychosocial functioning on the PSC.

Blucker, RT, Jackson, D, Gillapsy, JA, Hale, J, Wolraich, M, Gillapsy, SR. **Pediatric behavioral health screening in primary care: A preliminary analysis of the pediatric symptom checklist-17 with functional impairment items.** *Clinical Pediatrics*. 2014; 53(5):449-455.

**Conclusion:** Youth ages 6 to 16 completed the Pediatric Behavioral Health Screen (PBHS) which includes the PSC-17. A positive screen was found for 26.7% of the sample. Of the youth with positive screens, 68% also experienced behavioral and emotional impairments. Findings indicate that the PBHS has good psychometric validity and clinical use.

Jutte DP, Burgos A, Mendoza F, Ford CB, Huffman LC. **Use of the Pediatric Symptom Checklist in a low-income, Mexican American population.** *Arch Pediatr Adolesc Med*; 2003;157(12):1169-76

**Conclusion:** When using the PSC, a new cutoff score of 12 for clinical significance should be considered if screening low-income, Mexican American children for behavioral problems.

Klassen BJ, Porcerelli JH, Sklar ER, Markova T. **Pediatric symptom checklist ratings by mothers with a recent history of intimate partner violence: A primary care study.** *Journal of Clinical Psychology in Medical Settings*, 2013; 20(4):473-477.

**Conclusion:** The purpose of this study was to examine and compare maternal ratings on the Pediatric Symptom Checklist between low-income, urban mothers who had suffered intimate partner violence in the past year and a demographically-matched comparison group of mothers. The PSC shows promise as an adequate screening tool for psychosocial problems in the children of women who have suffered IPV.

Simonian SJ, Tarnowski KJ. **Utility of the Pediatric Symptom Checklist for behavioral screening of disadvantaged children.** *Child Psychiatry & Human Development*; 2001; 31(4): 269-278

**Conclusion:** Scores on the Pediatric Symptom Checklist were significantly related to scores derived from the Child Behavior Checklist. Receiver Operator Characteristic analysis indicated the need for modification of the cutting score previously established with middle-class children.

Williams JR, Fredland N, Han H, Campbell JC, Kub, JE. **Relational Aggression and Adverse Psychosocial and Physical Health Symptoms Among Urban Adolescents.** *Public Health Nursing*; 2009;26(6): 489–499

**Conclusion:** The PSC can be used to measure psychosocial problems among urban adolescents.

### CHILD PSYCHIATRY

Aupont O, Doerfler, L, Connor DF, Stille C, Tisminetzky M, McLaughlin TJ. **A collaborative care model to improve access to pediatric mental health services.** *Administration and Policy in Mental Health and Mental Health Services Research*. 2012; Published online.

**Conclusion:** To examine an innovative collaborative care model known as Targeted Child Psychiatric Services designed for primary care pediatricians (PCPs) and child psychiatrists. The PSC was completed by parents upon referral to the TCPS Program. TCPS could serve as a feasible model of care that addresses the daunting barriers in accessing pediatric mental health services.

Blais M, Kamin H, Jellinek M, Masek B, Murphy M. **Measuring outcomes in outpatient child psychiatry: Rates of reliable improvement, deterioration, and clinically significant change.** *Journal of Clinical Psychology and Psychotherapy*; 2011

**Conclusion:** Far more patients reliably improved than deteriorated based on PSC scores, supporting the benefit of treatment as usual (TAU) over no treatment.

Connor DF, McLaughlin TJ, Jeffers-Terry M, O'Brien WH, Stille CJ, Young LM, Antonelli RC. **Targeted child psychiatric services: a new model of pediatric primary clinician--child psychiatry collaborative care.** *Clin Pediatr*. 2006; 45(5): 423-434.

**Conclusion:** The PSC scores of children referred to child psychiatry from primary care agreed with PCP perception of psychological problems--referred children were moderately to severely impaired, according to the PSC.

Gold J, Buonopane R, Caggiano R, Picciotto M, Vogeli C, Kanner N, et al. **Assessing admissions and outcomes in a child psychiatry system of care.** *American Journal of Managed Care*. 2009; 15;210-216

**Conclusion:** This evaluation suggested that the PSC appeared to be valid and reliable as part of routine intake and discharge follow-up in a large child psychiatry system of care.

Ferguson CJ, Olson CK. **Video game violence use among "vulnerable" populations: The impact of violent games on delinquency and bullying among children with clinically elevated depression or attention deficit symptoms.** *Journal of Youth and Adolescence*. 2014; 43: 127-136.

**Conclusion:** Youth with symptoms of depression and attention-deficit hyperactivity problems completed the PSC-17. Results did not support the hypothesis that violent video games will be associated with increased bullying and delinquent behaviors among youth with pre-existing mental health problems.

Hacker K, Arsenault L, Franco I, Shaligram D, Sidor M, Olfson M, Goldstein J. **Referral and follow-up after mental health screening in commercially insured adolescents.** *Journal of Adolescent Health*. 2014; 55(1):17-23.

**Conclusion:** PSC scores were predictive of mental health referral among adolescents ages 14-17.

Murphy JM, Kamin H, Masek B, Vogeli C, Caggiano R, Sklar K et al. **Using brief clinician and parent measures to track outcomes in outpatient child psychiatry: Longer term follow-up and comparative effectiveness.** *Child and Adolescent Mental Health*. Published online 3 Jan 2012

**Conclusion:** The use of electronic technologies is associated with improved clinician completion rates, it is possible to obtain rating forms from most parents, clinician and parent measures provide related but distinct information, and improvements in functioning found with clinician-report measures are corroborated by independent parent reports.

Murphy JM, Kamin H, Masek B, Vogeli C, Caggiano R, Sklar K et al. **Using brief clinician and parent measures to track outcomes in outpatient child psychiatry: Longer term follow-up and comparative effectiveness.** *Child and Adolescent Mental Health*. Published online 3 Jan 2012.

**Conclusion:** The fact that both broadband and narrowband scales showed significant improvements over the first six months of care establishes the possibility that these measures could be used in experimental designs studying comparative effectiveness.

Murphy JM, Blais M, Baer L, McCarthy A, Kamin H, Masek B, Jellinek M. **Measuring outcomes in outpatient child psychiatry: Reliable improvement, deterioration, and clinically significant improvement.** *Clinical Child Psychology and Psychiatry*, 2013; 0 (0):1-14.

**Conclusion:** The current study evaluated outcome measurements in child psychiatry by examining PSC scores at intake and follow-up appointments. Reliable improvement and deterioration and rates of clinically significant improvement were calculated for all patients with both intake and follow-up PSC scores. 51.1% of the most highly impaired patients had reliably improved, compared to 6.1% who had reliably deteriorated. Further, 35.9% of patients with positive PSC scores at intake achieved clinically significant improvement. The results suggest that the PSC is an effective tool for evaluating and measuring treatment outcomes in child psychiatry.

Rockhill CM, Katon W, Richards J, McCauley E, McCarty CA, Myaing MT, Zhoug C, Richardson LP. **What clinical differences distinguish depressed teens with and without comorbid externalizing problems?** *General Hospital Psychiatry*. 2013; 35:444-447.

**Conclusion:** Youth determined to be at risk for a diagnosis of depression completed the PSC. Adolescents ages 13-17 with positive scores greater than 7 on the PSC were categorized as having externalizing behaviors. Results indicated that youth with depression and externalizing symptoms had a higher rate of obesity and psychosocial impairment than youth with just depression symptoms.

Wolfe-Christensen C, Fedele DA, Grant D, Veenstra AL, Kovacevic LG, Elder JS, Lakshmanan Y. **Factor analysis of the pediatric symptom checklist in a population of children with voiding dysfunction and/or nocturnal enuresis.** *Journal of Clinical Psychology Medicine Settings*. 2014; 21: 72-80.

**Conclusion:** The objective of this study was to evaluate the PSC among youth ages 6 to 16 with voiding dysfunction and/or nocturnal enuresis. Results indicate that the PSC addresses internalizing and externalizing problems, and attention difficulties among youth in this population.

### PEDIATRIC HOSPITAL

Petersen MC, Kube DA, Whitaker TM, Graff JC, Palmer FB. **Prevalence of developmental and behavioral disorders in a pediatric hospital.** *Pediatrics*. 2009;123(3):e490-e495.

**Conclusion:** The objective of this study was to estimate the prevalence of developmental and behavioral disorders in a convenience sample of children in an acute care pediatric hospital setting. The developmental screening tests included 5 tools, one of which was the Pediatric Symptom Checklist.

### RATES OF SCREENING

Berger-Jenkins E, McCord M, Gallagher T, Olfson, M. **Effect of routine mental health screening in a low-resource pediatric primary care population.** *Clinical Pediatrics*. Published online Dec 8, 2011.

**Conclusion:** This study explored the effects of routine screening on mental health problem identification and management in a low-resource setting. Medical records of 5 to 12 year-old children presenting for well visits before and after screening was implemented were reviewed. Even in low-

resource settings, screening may facilitate parental disclosure and increase clinical attention to mental health problems without overburdening referral services.

Hacker K, Goldstein J, Link D, Sengupta N, Tendulkar S, Wissow L. **Pediatric provider processes for behavioral health screening, decision making, and referral in sites with collocated mental health services.** *Journal of Developmental and Behavioral Pediatrics*. 2013; 34(9):680-687.

**Conclusion:** The study evaluated how pediatricians experience and use several screening measures in primary care settings. The PSC was used to screen children. Results indicated that the PSC was used consistently in the clinics. However, a few providers noted some confusion with the wording of various PSC items. Generally, the PSC was well received.

Hacker KA, Penfold R, Arsenault L, Zhang F, Murphy JM, Wissow L. **Screening for Behavioral Health Issues in Children Enrolled in Massachusetts Medicaid** DOI: 10.1542/peds.2013-1180. Originally published online December 2, 2013; *Pediatrics*.

**Conclusion:** The researchers examined whether the mandatory MassHealth behavioral screening can identify children without a prior history of behavioral health problems. Among children enrolled in MassHealth, 43% had positive screens and no history of behavioral health. Positive screens were determined in part by positive PSC scores. In sum, the study demonstrates that the mandatory MassHealth behavioral health screening identifies high numbers of previously unidentified children with behavioral health problems.

Hacker KA, Penfold R, Arsenault L, Zhang F, **Murphy JM**, Wissow L. **Behavioral health services following screening in children enrolled in Massachusetts Medicaid.** *Pediatrics*. 2014. Accepted for publication.

**Conclusion:** The study evaluated newly identified youth with positive behavioral health screens among children enrolled in Massachusetts Medicaid. While positive screens are strongly associated with mental health referrals, only a small percentage of youth with positive screens receive mental health care post-screening.

Kuhlthau K, Jellinek M, White G, VanCleave J, Simons J, Murphy M. **Increases in Behavioral Health Screening in Pediatric Care for Massachusetts Medicaid Patients.** *Arch Pediatr Adolesc Med*. 2011;165(7):660-664.

**Conclusion:** This study explored rates of screening and identification and treatment for behavioral problems using billing data from Massachusetts Medicaid immediately following the start of the state's new court-ordered screening and intervention program using retrospective review of the number of pediatric well-child visits, number of screens, and number of screens that identify risk for psychosocial problems. The PSC is one of the validated, standardized screening tools from a list provided by the state that providers are required to use to screen.

Marks KP, Glascoe FP, Macias MM. **Enhancing the algorithm for developmental-behavioral surveillance and screening in children 0 to 5 years.** *Clinical Pediatrics*. 2011;50(9):853-868.

**Conclusion:** A comprehensive literature search was conducted to investigate a clinician's ability to perform developmental-behavioral surveillance in children 0 to 5 years. When a screen is completed and scored before the visit, the quality of a clinician's surveillance improves via enhanced parent-clinician communication significantly with the Pediatric Symptom Checklist [PSC]<sup>65</sup>. Unstructured surveillance, along with the pattern performance of a broad-band mental health screen such as the PSC,<sup>67-70</sup> or Strengths and Difficulties Questionnaire,<sup>71</sup> might trigger a supplemental ADHD-specific,<sup>102</sup> depression-specific,<sup>103</sup> anxiety-specific, <sup>104</sup> or literacy-specific<sup>105</sup> screening.

Rivara FP, Koepsell TD, Wang J, Durbin D, Jaffe KM, Vavilala M, Dorsch A, Roper-Caldbeck M,

Houseknecht E, Temkin N. **Comparison of telephone with world wide web-based responses by parents and teen to a follow-up survey after injury.** *Health Services Research*. 2011;46(3):964-981.

**Conclusion:** The objective of this study was to identify sociodemographic factors associated with completing a followup survey about health status on the web versus by telephone, and to examine differences in reported health-related quality of life by method of response. The Pediatric Symptom Checklist (PSC) is a well-standardized was used to screen for pediatric behavioral health problems.

Romano-Clarke G, Tang MH, Xerras DC, Egan HS, Pasinski RC, Kamin HS, McCarthy AE, Newman J, Jellinek MS, Murphy JM. **Have rates of behavioral health assessment and treatment increased for Massachusetts children since the Rosie D. decision? A report from two primary care practices.** *Clinical Pediatrics*. 2014; 53(3):243-249.

**Conclusion:** Pediatricians significantly increased their use of screening measures, including the PSC, since the implementation of the Rosie D decision.

Sharp LK, Lipsky MS. **Screening for depression across the lifespan: a review of measures for use in primary care settings.** *Am Fam Physician*. 2002;66:1001–1008.

**Conclusion:** The Pediatric Symptom Checklist is an alternative tool for screening pediatric patients for psychosocial problems. Although the Pediatric Symptom Checklist is not specific for depression, its 35-item checklist is designed for parents to complete and may help identify young patients in need of further assessment.

### **PSC-17 AND SUBSCALES**

Anderson, D. L., Spratt, E. G., Macias, M. M., Jellinek, M. S., Murphy, J. M., Pagano, M.,...Barbosa, E. (1999). **Use of the Pediatric Symptom Checklist in the pediatric neurology population.** *Pediatric Neurology*, 20, 116–120.

Blucker, RT, Jackson, D, Gillapsy, JA, Hale, J, Wolraich, M, Gillapsy, SR. **Pediatric behavioral health screening in primary care: A preliminary analysis of the pediatric symptom checklist-17 with functional impairment items.** *Clinical Pediatrics*. 2014; 53(5):449-455.

**Conclusion:** Youth ages 6 to 16 completed the Pediatric Behavioral Health Screen (PBHS) which includes the PSC-17. A positive screen was found for 26.7% of the sample. Of the youth with positive screens, 68% also experienced behavioral and emotional impairments. Findings indicate that the PBHS has good psychometric validity and clinical use.

Ferguson CJ, Olson CK. **Video game violence use among “vulnerable” populations: The impact of violent games on delinquency and bullying among children with clinically elevated depression or attention deficit symptoms.** *Journal of Youth and Adolescence*. 2014; 43: 127-136.

**Conclusion:** Youth with symptoms of depression and attention-deficit hyperactivity problems completed the PSC-17. Results did not support the hypothesis that violent video games will be associated with increased bullying and delinquent behaviors among youth with pre-existing mental health problems.

Gardner, W., Murphy, M., Childs, G., Kelleher, E., Pagano, M., Jellinek, M., Chiappetta, L. (1999). **The PSC-17: A brief pediatric symptom checklist with psychosocial problem subscales. A report from PROS and ASPN.** *Ambulatory Child Health*, 5, 225–236.

Gardner W, Kelleher KJ, Pajer KA, Campo JV. **Primary care clinicians' use of standardized tools to assess child psychosocial problems.** *Ambul Pediatr*. 2003; 3(4): 191-195

Gardner W, Kelleher KJ, Pajer K, Campo JV. **Follow-up care of children identified with ADHD by primary care clinicians: A prospective cohort study.** *J Pediatr.* 2004; 145(6): 767-771.

Gardner, W., Lucas, A., Kolko, D. J., & Campo, J. V. (2007). **Comparison of the PSC-17 and alternative mental health screens in an at-risk primary care sample.** *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 611–618.

Kostanecka, A., Power, T., Clarke, A., Watkins, M., Hausman, C. L., & Blum, N. J. (2008). **Behavioral health screening in urban primary care settings: Construct validity of the PSC-17.** *Journal of Developmental and Behavioral Pediatrics*, 29, 124–128.

McKee L, Roland E, Coffelt N, Olson AL, Forehand R, Massari C. **Harsh Discipline and Child Problem Behaviors: The Roles of Positive Parenting and Gender.** *Journal of Family Violence.* 2007; 22(4): 187-196.

Perfect MM, Jaramillo E. **Relations between resiliency, diabetes-related quality of life, and disease markers to school related outcomes in adolescents with diabetes.** *School Psychology Quarterly.* 2012;27(1):29-40.

Stoppelbein, L., Greening, L., Sytsma-Jordan, S., Elkin, D., Moll, G., & Pullen, J. (2005). **Factor analysis of the Pediatric Symptom Checklist with a chronically ill pediatric population.** *Journal of Developmental and Behavioral Pediatrics*, 26, 349–355.

Stoppelbein L, Greening L, Moll G, Jordan S, Suozzi A. **Factor analyses of the Pediatric Symptom Checklist-17 with African-American and Caucasian pediatric populations.** (2012). *Journal of Pediatric Psychology*, 37(3), 348-357

**Conclusion:** A three-factor solution was replicated for the PSC-17 with African-American and Caucasian children with and without a chronic illness. Cut-off scores for identifying children at risk for emotional/behavioral problems on the total scale and subscales were evaluated using the CBCL as the gold standard.

Studts CR, Van Zyl MA. **Identification of developmentally appropriate screening items for disruptive behavior problems in preschoolers.** *Journal of Abnormal Child Psychology.* 2013; 41:851-863.

**Conclusion:** Results suggest that the PSC-17 is a developmentally appropriate measure for identifying risk for psychosocial problems among preschool-aged children.

Wren FJ, Scholle FJ, Heo J, Comer DM. (2003). **Pediatric mood and anxiety syndromes in primary care: who gets identified?** *Int J Psychiatry Med* 2003; 33(1): 1-16.

### PPSC

Sheldrick RC, Henson BS, Merchant S, Neger E, Murphy JM, Perrin EC. **The Preschool Pediatric Symptom Checklist (PPSC): Development and Initial Validation of a New Social/Emotional Screening Instrument.** *Academic Pediatrics.* 12(5):456-467.

Sheldrick CR, Henson BS, Neger EN, Merchant S, Murphy JM, Perrin EC. **The baby pediatric symptom checklist: Development and initial validation of a new social/emotional screening instrument for very young children.** *Academic Pediatrics.* 2013; 13(1):72-80.

**Conclusion:** The Baby Pediatric Symptom Checklist is validated for three domains of behavior for infants and very young children.



## **WHAT'S NEW WITH THE PSC**

### **HEALTH CARE OUTCOMES**

Applegate H. **Clinical Case Study: Pediatric Residents' Discussions of and Interventions for Children's Behavioral and Emotional Problems.** *Journal of Pediatric Psychology.* 2003; 28(5): 315-321.

Use of the PSC increased discussions between residents and parents about children's behavioral and emotional issues.

After being trained to use the screening instrument, residents increased the number and variety of questions they asked regarding behavioral and emotional issues. Residents' attempts at intervention showed small but consistent increases when handouts on behavior management procedures were made available for distribution to parents.

**Hayutin LG, Reed-Knight B, Blount RL, Lewis J, McCormick ML. Increasing parent–pediatrician communication about children's psychosocial problems. J. Pediatr. Psychol. 2009;34:1155-1164.**

The PSC improved parent–pediatrician communication on psychosocial issues.

The study's authors conclude that the PSC encouraged parents and pediatricians to talk about the children's emotional and behavioral concerns more than they ordinarily would. Both the Staff-Scored and Parent-Scored PSC improved various dimensions of parent–pediatrician communication during medical visits for children with more psychosocial problems.

**Hacker KA, Arsenault LN, Williams S, DiGirolamo AM. Mental and behavioral health screening at preventive visits: Opportunities for follow-up of patients who are nonadherent with the next preventive visit. Journal of Pediatrics; 2011;158(4):666-671**

Positive PSC score was among the behavioral health risk characteristics predictive of acute care or ED use.

Compared with adherent children, the combined acute or emergency care user group was significantly more likely to have had positive PSC scores. Children with positive PSC scores, with “any behavioral problem,” who were in counseling, or who were referred to mental health services were significantly more likely to return for either acute or emergency care, compared with children without these characteristics. Patients who returned for acute or emergency care were more likely to have behavioral health risk characteristics that included a high positive PSC score.

**Hacker K, Goldstein J, Link D, Sengupta N, Tendulkar S, Wissow L. Pediatric provider processes for behavioral health screening, decision making, and referral in sites with collocated mental health services. Journal of Developmental and Behavioral Pediatrics. 2013; 34(9):680-687.**

**Conclusion:** The study evaluated how pediatricians experience and use several screening measures in primary care settings. The PSC was used to screen children. Results indicated that the PSC was used consistently in the clinics. However, a few providers noted some confusion with the wording of various PSC items. Generally, the PSC was well received.



Hacker KA, Penfold R, Arsenault L, Zhang F, Murphy JM, Wissow L. **Screening for Behavioral Health Issues in Children Enrolled in Massachusetts Medicaid** DOI: 10.1542/peds.2013-1180. Originally published online December 2, 2013; *Pediatrics*.

**Conclusion:** The researchers examined whether the mandatory MassHealth behavioral screening can identify children without a prior history of behavioral health problems. Among children enrolled in MassHealth, 43% had positive screens and no history of behavioral health. Positive screens were determined in part by having positive PSC scores. In sum, the study demonstrates that the mandatory MassHealth behavioral health screening identifies high numbers of previously unidentified children with behavioral health problems.

Hacker KA, Penfold R, Arsenault L, Zhang F, **Murphy JM**, Wissow L. **Behavioral health services following screening in children enrolled in Massachusetts Medicaid.** *Pediatrics*. 2014. Accepted for publication.

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Murphy JM, Blais M, Baer L, McCarthy A, Kamin H, Masek B, Jellinek M. **Measuring outcomes in outpatient child psychiatry: Reliable improvement, deterioration, and clinically significant improvement.** *Clinical Child Psychology and Psychiatry*, 2013; 0 (0):1-14.

**Conclusion:** The current study evaluated outcome measurements in child psychiatry by examining PSC scores at intake and follow-up appointments. Reliable improvement and deterioration and rates of clinically significant improvement were calculated for all patients with both intake and follow-up PSC scores. 51.1% of the most highly impaired patients had reliably improved, compared to 6.1% who had reliably deteriorated. Further, 35.9% of patients with positive PSC scores at intake achieved clinically significant improvement. The results suggest that the PSC is an effective tool for evaluating and measuring treatment outcomes in child psychiatry.

Murphy JM, Guzmán J, McCarthy AE, et al. Mental health predicts better academic outcomes: A longitudinal study of elementary school students in Chile. *Child Psychiatry Hum Dev*. Published online April 26, 2014. doi:10.1007/s10578-014-0464-4.

**Conclusion:** The current study evaluated how Chilean students' mental health in first grade predicted academic achievement. Results indicated that mental significantly predicts academic performance. In sum, the results suggest that school-based mental health problems (i.e., the SFL) may help to improve children's mental health and academic outcomes.

**Navon M, Nelson D, Pagano M, Murphy M: Use of the pediatric symptom checklist in strategies to improve preventive behavioral health care. *Psychiatr Serv*; 2001 Jun;52(6):800-804**

PSC score was associated with a greater number of outpatient medical visits. Use of the PSC in this study promoted an increase in referrals for children in need.

A review of the lifetime medical utilization records of the 75 screened children enrolled in Neighborhood Health Plan showed that children who received a positive score on the PSC had an average of 25 percent more outpatient medical visits than children who received a negative score (26.3 visits and 21.1 visits, respectively). As the next step in improving the early identification and treatment of children at risk, the researchers developed a pediatric preventive behavioral health clinical guideline (26) that incorporates the PSC. This guideline has been adopted by Neighborhood Health Plan.

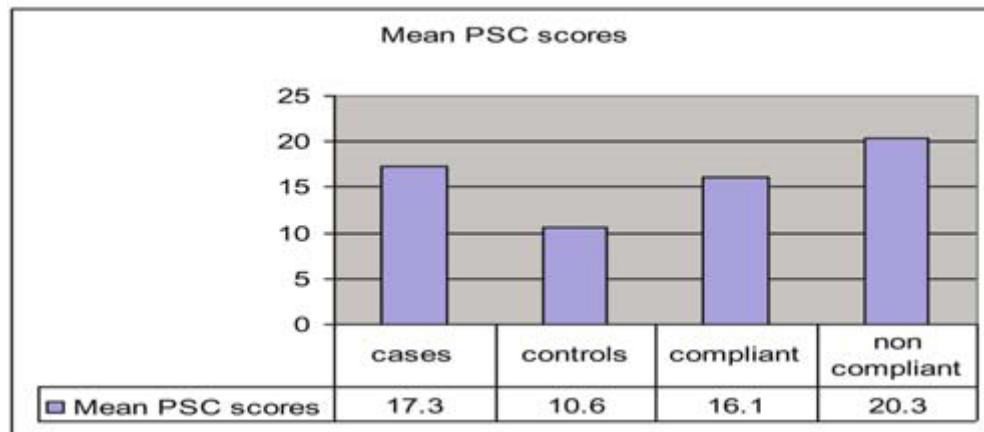
### DISEASE RELATED OUTCOMES

**Chauhan JC, Kumar P, Dutta AK, Basu S, Kumar A. Assessment of gluten free diet and psychosocial problems in Indian children with Celiac Disease. *Indian Journal of Pediatrics*; 2010;77(6):649-654**

PSC scores were linked to dietary non-adherence among a population of children with celiac disease, for whom ascribing to a gluten free diet is the only available treatment and means of preserving long term health.

Celiac children had higher PSC scores than the controls, and the mean PSC score was highest among celiac children who were noncompliant with their gluten free diet. Only 4 children scored in the range to suggest social, emotional and psychosocial impairment on the PSC and all of them belonged to the dietary non-compliant group.

On analysis of individual PSC items, it was found that anger, irritability, behavioral problem, tiredness, decreasing school performance, unhappiness *etc* were higher in celiac patients. When individual items of PSC were compared, few items like complains of aches and pains; is irritable, angry; does not listen to rules; blames others for his/her mistake; teases others; takes the things that does not belong to him/her; refuse to share, were more common in cases. It was found that dietary non-compliant patients were spending most of the time alone; were tired easily; were less interested in school; were afraid of new situation; felt sad and unhappy and also had trouble in concentration. In these patients school grades were also dropping. Anger and anxiety may make a patient more likely to transgress from their prescribed diet, thus these results highlight the need for psychological support to these patients when they are put on a gluten free diet.



**Lowenthal E, Lawler K, Harari N, Moamogwe L, Masunge J, Masedi M, Matome B, Seloilwe E, Grss, R. Rapid psychosocial function screening test identified treatment failure in HIV Positive African youth. *AIDS Care*; 2012; 24(6):722-727**

Having a high score on the PSC was associated with having virologic treatment failure among HIV-infected children and adolescents in Botswana.

The median PSC score was higher for those with virologic failure than for those without, and virologic failure was more common among those with a PSC score > 20. Questions on the PSC that tended to be scored higher among patients with virologic failure were mainly related to attention/executive dysfunction, and depressive symptoms.

If psychosocial dysfunction is found in longitudinal studies like this to precede treatment failure, then by screening for psychosocial dysfunction with the PSC, those children and adolescents at highest

risk of virologic failure might be identified. If found in longitudinal studies to be a predictor of virologic failure, the PSC could easily be utilized in resource-limited settings to allow for prioritization of scarce psychosocial support resources to target children and adolescents at the highest risk of treatment failure.

Terrone G, Parente I, Romano A, Auricchio R, Greco L, Del Giudice E. **The pediatric symptom checklist as screening tool for neurological and psychosocial problems in a paediatric cohort of patients with coeliac disease.** *Acta Paediatrica*. 2013;102(7):325-328.

Symptoms of neurological and behavioral problems among youth with coeliac disease can be identified using the PSC. Individuals with coeliacs scored higher on the PSC than controls. PSC was also implemented in routine follow-up visits.

### ACADEMIC OUTCOMES

Ahmad A, Khalique N, Khan Z. **Behavioral and emotional problems of adolescents-Relationship with academic achievement.** *Indian Journal of Community Health*. 2006-2007. 18(2), 19(1):3-8.

Psychosocial problems identified by psychosocial history the Y-PSC were related to low academic achievement for adolescent boys in India.

Guzman MP, Jellinek M, George M, Hartley M, Squicciarini AM, Canenguez K, Kuhlthau K, Yucel R, White G, Guzman, Murphy JM. **Mental health matters in elementary school; First grade screening predicts fourth grade achievement test scores.** *European Child and Adolescent Psychiatry*. 2011; 20(8):401-411.

Mental health problems on the PSC and TOCA-R in first grade were one of the strongest predictors of lower achievement test scores three years later.

Perfect MM, Jaramillo E. **Relations between resiliency, diabetes-related quality of life, and disease markers to school related outcomes in adolescents with diabetes.** *School Psychology Quarterly*. 2012;27(1):29-40.

The four school-related items on the PSC had unique variance as part of a test battery in predicting self-reported grades and school functioning for adolescents with diabetes.

Murphy JM, Guzmán J, McCarthy AE, et al. Mental health predicts better academic outcomes: A longitudinal study of elementary school students in Chile. *Child Psychiatry Hum Dev*. Published online April 26, 2014. doi:10.1007/s10578-014-0464-4.

**Conclusion:** The current study evaluated how Chilean students' mental health in first grade predicted academic achievement. Results indicated that mental significantly predicts academic performance. In sum, the results suggest that school-based mental health problems (i.e., the SFL) may help to improve children's mental health and academic outcomes.

### SCREENING OUTCOMES

Hacker K, Goldstein J, Link D, Sengupta N, Tendulkar S, Wissow L. **Pediatric provider processes for behavioral health screening, decision making, and referral in sites with**

**collocated mental health services.** *Journal of Developmental and Behavioral Pediatrics.* 2013; 34(9):680-687.

The study evaluated how pediatricians experience and use several screening measures in primary care settings. The PSC was used to screen children. Results indicated that the PSC was used consistently in the clinics. However, a few providers noted some confusion with the wording of various PSC items. Generally, the PSC was well received.

**Gardner W, Kelleher KJ, Pajer K, Campo JV. Follow-up care of children identified with ADHD by primary care clinicians: A prospective cohort study.** *J Pediatr.* 2004; 145(6): 767-771.

Positive scores on the PSC-17 internalizing subscale correlated significantly with children having a mental health visit.

**Gardner W, Lucas A, Kolko DJ, Campo JV. Comparison of the PSC-17 and alternative mental health screens in an at-risk primary care sample.** *J Am Acad Child Adolesc Psychiatry.* 2007;46(5):611-618.

The PSC-17 subscales performed as well as other common screens of childhood mental health (Child Depression Inventory, the parent and child Screens for Child Anxiety-Related Disorders) and Child Behavior Checklist subscales (Aggressive, Anxious-Depressed, Attention, Externalizing, Internalizing, and Total) in predicting diagnoses of attention-deficit/hyperactivity disorder, externalizing disorders, and depression.

Although briefer than alternative questionnaires, the PSC-17 and its subscales perform as well as those instruments in detecting common mental disorders in primary care. The study supports the validity of the PSC-17 as a screen for youth psychosocial impairment in primary care, and also supports the ability of the brief 17-item screen and its subscales to identify youths with ADHD, disruptive behavior disorders, and depression in primary care.

**Hacker K, Arsenault L, Franco I, Shaligram D, Sidor M, Olfson M, Goldstein J. Referral and follow-up after mental health screening in commercially insured adolescents.** *Journal of Adolescent Health.* 2014; 55(1):17-23.

PSC scores were predictive of mental health referral among adolescents ages 14-17.

**Jonovich SJ, Alpert-Gillis LJ. Impact of pediatric mental health screening on clinical discussion and referral for services.** *Clinical Pediatrics.* 2014; 53(4):364-371.

Youth aged 11 who completed the PCS were more likely to be referred for mental health services as compared to a control group for children who were not offered screening.

**Murphy JM, Blais M, Baer L, McCarthy A, Kamin H, Masek B, Jellinek M. Measuring outcomes in outpatient child psychiatry: Reliable improvement, deterioration, and clinically significant improvement.** *Clinical Child Psychology and Psychiatry.* 2013; 0 (0):1-14.

The current study evaluated outcome measurements in child psychiatry by examining PSC scores at intake and follow-up appointments. Reliable improvement and deterioration and rates of clinically significant improvement were calculated for all patients with both intake and follow-up PSC scores. 51.1% of the most highly impaired patients had reliably improved, compared to 6.1% who had reliably

deteriorated. Further, 35.9% of patients with positive PSC scores at intake achieved clinically significant improvement. The results suggest that the PSC is an effective tool for evaluating and measuring treatment outcomes in child psychiatry.

Sheldrick CR, Henson BS, Neger EN, Merchant S, Murphy JM, Perrin EC. **The baby pediatric symptom checklist: Development and initial validation of a new social/emotional screening instrument for very young children.** *Academic Pediatrics*. 2013; 13(1):72-80.

The Baby Pediatric Symptom Checklist is validated for three domains of behavior for infants and very young children

Wren FJ, Bridge JA, Birmaher B. **Screening for Childhood Anxiety Symptoms in Primary Care: Integrating Child and Parent Reports.** *J. Am. Acad. Child Adolesc. Psychiatry*. 2004; 43(11):1364–1371.

Parent SCARED and PSC-I scores were highly correlated.

#### PSC ASSOCIATED WITH PSYCHOSOCIAL DYSFUNCTION IN AT RISK POPULATIONS

Aranda MC, Middleton LS, Flake E, Davis BE: **Psychosocial screening in children with wartime-deployed parents.** *Mil Med*. 2011;176(4):402-407.

Children with a deployed parent demonstrated significantly more symptoms of psychosocial morbidity than children without a currently deployed parent.

Parents of a child with a deployed parent reported more child psychosocial difficulties as measured by parent and youth self-report on the Pediatric Symptom Checklist (than did parents of a child without a currently deployed parent,  $p < 0.01$ ). Parents of a child with a deployed parent endorsed more internalizing symptoms ( $p = 0.02$ ), externalizing symptoms ( $p < 0.01$ ), school problems ( $p = 0.04$ ), and attention problems ( $p = 0.01$ ) than did parents of a child without a deployed parent. The same results were found for reports of psychosocial difficulties ( $p < .01$ ) and internalizing symptoms ( $p < .01$ ), externalizing symptoms ( $p < .01$ ), and school problems ( $p < .01$ ) for the youth self-report, but not for attention problems.

On the parent report, 22.6% ( $n = 12$ ) of the children who had a deployed parent were identified as being "at risk," whereas 9.4% ( $n = 5$ ) of the children who did not have a deployed parent were identified as such ( $p = 0.07$ ). On the youth self-report, 22.2% ( $n = 8$ ) of those with a deployed parent were identified as "at risk," whereas 8.3% ( $n = 3$ ) of those without a deployed parent were identified as "at risk" ( $p = 0.10$ ).

Both when parents were reporting their child's symptoms using the PSC and in a separate, nonlinked group of youth (aged 11-16 years) self-reporting their symptoms, rates of psychosocial problems were higher among children with deployed parents. Compared with the participants with a nondeployed parent, children with a currently deployed parent also demonstrated increased symptoms within each of the 4 measured subdomains (internalizing, externalizing, attention, and school) of the PSC. Moreover, twice as many children with a currently deployed parent scored "at risk" for emotional and behavioral problems than children without a deployed parent, 22 to 23% vs. 8 to 9%, respectively.

Cooke CG, Kelley ML, Fals-Stewart W, Golder J. **A Comparison of the Psychosocial Functioning of Children with Drug- Versus Alcohol-Dependent Fathers.** *The American Journal of Drug and Alcohol Abuse* 2004; 30(4): 695-710.

Children with drug-abusing fathers exhibited significantly more negative child behaviors on the PSC than did children from homes with alcohol-abusing fathers.

Children from the DA families had significantly higher scores on the PSC ( $M = 25.1$ ;  $SD = 19.7$ ) than children from the AA families ( $M = 14.4$ ;  $SD = 10.6$ ),  $t(100) = 3.86$ ;  $p < 0.001$ .

**Flake EM, Davis BE, Johnson PL, Middleston LS. The psychosocial effects of deployment on military children. *Journal of Developmental & Behavioral Pediatrics*. 2009;30(4):217-278.**

Children of military parents demonstrated significantly more symptoms of psychosocial morbidity than children without a currently deployed parent.

Military parents reported high levels of psychosocial difficulties in their children on the PSC ( $M = 22.7$ ,  $SD = 11.7$ ) that was significantly higher than a national normative population. On the PSC, 32% (33/101) of children exceeded the cutoff for “high risk” child psychosocial morbidity (2 were  $> 2$  SD). This is 2.5 times more than national norms. PSC subscale analysis demonstrated that more than a third of parents reported that their children experienced high levels of internalizing symptoms (39%), which included being anxious, worrying often, or crying more frequently. These results suggest that the stresses of deployment seem to be associated with a heightened risk for psychosocial morbidity in military children.

**Kelley ML, Fals-Stewart, W. Psychiatric Disorders of Children Living With Drug-Abusing, Alcohol-Abusing, and Non-Substance-Abusing Fathers. *J. Am. Acad. Child Adolesc. Psychiatry*. 2004;43(5):621–628**

Children living with drug or alcohol abusing fathers experience a greater frequency of emotional or behavioral symptomology as measures by PSC mean scores and case rates.

Children from the alcohol abusing families had significantly higher PSC scores than children from the non-substance abusing families. A significantly greater proportion of children from the alcohol and drug abusing families surpassed the PSC’s clinical cutoff than did children from the non-substance abusing families.

**Lee J, Kolomer S, Thomsen D. Evaluating the effectiveness of an intervention for children exposed to domestic violence: A preliminary program evaluation. *Child Adolesc Soc Work J*. 2012;29:357-372.**

The PSC was part of a test battery to assess the effectiveness of an intervention program for children exposed to domestic violence—PSC scores decreased significantly after the intervention program.

**McCarty CA, Russo J, Grossman DC, Katon W, Rockhill C, McCauley E, Richards J, Richardson L. Adolescents with suicidal ideation: Healthcare use and functioning. *Academic Pediatrics*. 2011;11(5):422-426.**

The parent-report Pediatric Symptom Checklist-17 externalizing scale was used as a measure of externalizing problems for adolescents with suicide ideation and matched controls. The presence of SI is associated with more severe functional impairment, comorbidity, and depression severity.

**McKee L, Roland E, Coffelt N, Olson AL, Forehand R, Massari C. Harsh Discipline and Child Problem Behaviors: The Roles of Positive Parenting and Gender. *Journal of Family Violence*. 2007; 22(4): 187-196.**

Harsh verbal and physical discipline is significantly associated with behavioral problems.

Positive scores on the internalizing and externalizing subscales of the PSC-17 correlated significantly with harsh verbal and physical disciplinary practices by parents. High levels of positive parenting from either parent moderated the association between harsh physical discipline and child externalizing problems.

**Norizan A, Shamsuddin K. Predictors of parenting stress among Malaysian mothers of children with Down syndrome. *J Intellect Disabil Res*. 2010;54(11):992-1003.**

Mean parenting stress was significantly higher among mothers of children with reported behavioural problem compared with those without such problems ( $p = 0.04$ ).

This study examined the level of parenting stress experienced by Malaysian mothers of children with DS and evaluated the child and maternal factors that contributed to parenting stress. Measured child's behavioural problem using the Pediatric Symptom Checklist. With regard to reported child's behaviours, the mean score was 17.4 ( $SD = 9.4$ ) and the score was normally distributed, ranging from 0 to 40. Using the cut-offs, 33 (22.4%) of the children had reported behavioural problems.

**Tham SW, Palermo TM, Vavilala MS, Wang J, Jaffe KM, Koepsell TD, Dorsch A, Temkin N, Durbin D, Rivara FP. The longitudinal course, risk factors, and impact of sleep disturbances in children with traumatic brain injury. *Journal of Neurotrauma*. 2012; 29: 154-161.**

The presence of psychosocial problems was a significant predictor of sleep disturbances.

This study aimed to examine the prevalence and trajectory of sleep disturbances and their associated risk factors in children up to 24 months following a traumatic brain injury. Assessments for psychosocial problems revealed that children with TBI had higher scores on PSC-17 up to 12 months, and children with moderate or severe TBI continued to have increasing scores at 24 months compared to children with isolated orthopedic injuries. Presence of psychosocial problems as measured by the PSC was associated with more frequent sleep disturbances.

## **PSC's USE AND USABILITY**

### **THE PSC HAS BEEN VALIDATED FOR USE WITH:**

#### **-- Primary care**

Kostanecka A, Power T, Clarke A, Watkins M, Hausman CL, Blum NJ. Behavioral health screening in urban primary care settings: construct validity of the PSC-17. *J Dev Behav Pediatr*. 2008;29(2):124-128.

#### **-- Botswana children with HIV**

Lowenthal E, Lawler K, Harari N, Moamogwe L, Masunge J, Masedi M, Matome B, Seloilwe E, Jellinek M, Murphy M, Gross R. Validation of the Pediatric Symptom Checklist in HIV-infected Batswana. *Journal of Child & Adolescent Mental Health*. 2011;23(1):17-28.

#### **-- Brazilian children**

Muzzolon SRB. Evaluation of the use of the Pediatric Symptom Checklist as screening for emotional and psychosocial problems in a public school in Curitiba, Brazil. *Arquivos de Neuro-Psiquiatria*. 2008;66:604.

**-- Low-income Filipino children**

Cancecko-Llego CD, Castillo-Carandang NT, Reyes AL. Validation of the Pictorial Pediatric Symptom Checklist-Filipino Version for the psychosocial screening of children in a low-income urban community. *Acta Medica Philippina*. 2009; 43:62-68.

**-- Low-income Turkish children**

Erdogan S, Ozturk M. Psychometric evaluation of the Turkish version of the Pediatric Symptom Checklist-17 for detecting psychosocial problems in low-income children. *J Clin Nurs*. 2011; 20(17-18):2591-2599.

**-- Low-income Mexican American children**

Jutte DP, Burgos A, Mendoza F, Ford CB, Huffman LC. Use of the Pediatric Symptom Checklist in a low-income, Mexican American population. *Arch Pediatr Adolesc Med*. 2003;157(12):1169-1176.

**-- Mexican children**

Leiner MA, Puertas H, Caratachea R, Pérez H, Jiménez P. Sensitivity and specificity of the pictorial Pediatric Symptom Checklist for psychosocial problem detection in a Mexican sample. *Rev Invest Clin*. 2010; Nov-Dec;62(6):560-567.

**-- Thai children**

Plubrukarn R, Amloy K, Kanjanapatanakul W: The effectiveness of brief psychosocial screening in identifying behavioral problems in children. *J Med Assoc Thai*. 2011;94 Suppl 3:S145-51.

**-- Austrian children**

Thun-Hohenstein L, Herzog S. The predictive value of the Pediatric Symptom Checklist in 5-year-old Austrian children. *Eur J Pediatr*. 2008;167(3):323-329.

**-- Serbian Children**

Bala G, Golubovic S, Milutinovic D, Katic R. Psychometric properties of the Pediatric Symptom Checklist in preschool children in Serbia. *Med Glas Ljek komore Zenicko-dobojskoga kantona*. 2012; 9(2):356-362.

**--Young Children (<18 months)**

Sheldrick CR, Henson BS, Neger EN, Merchant S, Murphy JM, Perrin EC. **The baby pediatric symptom checklist: Development and initial validation of a new social/emotional screening instrument for very young children.** *Academic Pediatrics*. 2013; 13(1):72-80.

**THE PSC HAS BEEN USED TO:**

**-- Evaluate children enrolled in Medicaid**

Boothroyd RA, Armstrong M. An Examination of the psychometric properties of the Pediatric Symptom Checklist with children enrolled in Medicaid. *Journal of Emotional and Behavioral Disorders*. 2010;18:113-126.

**-- Screen at well child and acute health care visits**

Borowsky IW, Mozayeny S, Ireland M. Brief psychosocial screening at health supervision and acute care visits. *Pediatrics*. 2003;112(1 Pt 1):129-33.

Reijneveld SA, Vogels AG, Hoekstra F, Crone MR. Use of the Pediatric Symptom Checklist for the detection of psychosocial problems in preventive child healthcare. *BMC Public Health*. 2006;6:197.

**-- Screen for specific childhood mental health problems**

Gardner W, Lucas A, Kolko DJ, Campo JV. Comparison of the PSC-17 and alternative mental health screens in an at-risk primary care sample. *J Am Acad Child Adolesc Psychiatry*. 2007;46(5):611-618.

**-- Screen for anxiety**

Wren FJ, Bridge JA, Birmaher B. Screening for Childhood Anxiety Symptoms in Primary Care: Integrating Child and Parent Reports. *J. Am. Acad. Child Adolesc. Psychiatry*. 2004; 43(11):1364–1371.



### **-- Screen for PTSD**

Steinbaum DP, Chemtob C, Boscarino JA, Laraque D. Use of a psychosocial screen to detect children with symptoms of posttraumatic stress disorder: an exploratory study. *Ambul Pediatr*. 2008;8(1):32-35.

### **-- Screen for psychosocial problems in children with pediatric sickle cell disease**

Jordan SS, Hilker KA, Stoppelbein L, Elkin TD, Applegate H, Iyer R. Nocturnal Enuresis and Psychosocial Problems in Pediatric Sickle Cell Disease and Sibling Controls. *J Dev Behav Pediatr*. 2005;26:404-411.

### **-- Screen for psychosocial problems in children with recurrent abdominal pain**

Louthrenoo O, Ukarapol N, Wongsawasdi L. Psychosocial problems and childhood recurrent abdominal pain. *J Med Assoc Thai*. 2010;93(12):1379-1384.

### **-- Screen for psychosocial problems in children with HIV**

Das S, Mukherjee A, Lodha R, Vatsa M. Quality of life and psychosocial functioning of HIV infected children. *Indian Journal of Pediatrics*; 2010;77(6): 633-637.

Lowenthal E, Lawler K, Harari N, Moamogwe L, Masunge J, Masedi M, Matome B, Seloilwe E, Gross, R. Rapid psychosocial function screening test identified treatment failure in HIV Positive African youth. *AIDS Care*. 2012; 24(6):722-727.

### **-- Screen for psychosocial problems in children with pediatric gastroenterology**

Reed-Knight B, Hayutin LG, Lewis JD, Blount RL. Factor structure of the pediatric symptom checklist with a pediatric gastroenterology sample. *J Clin Psychol Med Settings*. 2011;18(3):299-306.

### **-- Screen for psychosocial problems in children with celiac disease**

Chauhan JC, Kumar P, Dutta AK, Basu S, Kumar A. Assessment of gluten free diet and psychosocial problems in Indian children with Celiac Disease. *Indian Journal of Pediatrics*. 2010; 77(6):649-654.

### **--Screen for psychosocial problems in children with coeliac disease**

Terrone G, Parente I, Romano A, Auricchio R, Greco L, Del Giudice E. **The pediatric symptom checklist as screening tool for neurological and psychosocial problems in a paediatric cohort of patients with coeliac disease.** *Acta Paediatrica*. 2013;102(7):325-328.

### **-- Screen for psychosocial problems in children with voiding dysfunction and/or nocturnal enuresis**

Wolfe-Christensen C, Fedele DA, Grant D, Veenstra AL, Kovacevic LG, Elder JS, Lakshmanan Y. **Factor analysis of the pediatric symptom checklist in a population of children with voiding dysfunction and/or nocturnal enuresis.** *Journal of Clinical Psychology Medicine Settings*. 2014; 21: 72-80.

### **--Screen for psychosocial problems in children with epilepsy**

Wagner JL, Smith G, Ferguson PL, Fedele DA. **Preliminary psychometrics of the neurological disorders depression inventory for epilepsy-youth.** *Journal of Child Neurology*. 2013; 28(11):1392-1399.

### **-- Screen for psychosocial problems in children with prenatal drug exposure**

Boraey NF, El-Sonbary MM. **Behavioral problems in children with nephrotic syndrome.** *Journal of Applied Science Research*; 2011;7(12):2001-2007.

Stone KC, LaGasse LL, Lester BM, Shankaran S, Bada HS, Bauer CR, Hammond JA. Sleep Problems in Children With Prenatal Substance Exposure: The Maternal Lifestyle Study. *Arch Pediatr Adolesc Med*. 2010;164(5):452-456.

Whitaker TM, Bada HS, Bann CM, Shankaran S, LaGasse L, Lester BM, Bauer CR, Hammond J, Higgins R: Serial pediatric symptom checklist screening in children with prenatal drug exposure. *J Dev Behav Pediatr*. 2011;32(3):206-215.

### **--Screen for psychosocial problems in children with allergic diseases**

Wu WC, Chang HY, Kuo KN, Chen CY, Tu YC, Yang YH. Psychosocial problems in children with allergic diseases: a population study in Taiwan. *Child Care Health Dev*; 2011 Sep;37(5):662-70

### **-- Screen for psychosocial problems in rural pediatric primary care**

Polaha J, Dalton WT, Allen S. The prevalence of emotional and behavior problems in pediatric primary care serving rural children. *J Pediatr Psychol*. 2011;36(6):652-660.

**-- Screen children whose parents serve in the US military**

Aranda MC, Middleton LS, Flake E, Davis BE: Psychosocial screening in children with wartime-deployed parents. *Mil Med*. 2011;176(4):402-407.

Flake EM, Davis BE, Johnson PL, Middleton LS. The psychosocial effects of deployment on military children. *Journal of Developmental & Behavioral Pediatrics*. 2009;30(4):217-278.

**--Screen infants and young children**

Sheldrick CR, Henson BS, Neger EN, Merchant S, Murphy JM, Perrin EC. **The baby pediatric symptom checklist: Development and initial validation of a new social/emotional screening instrument for very young children.** *Academic Pediatrics*. 2013; 13(1):72-80.

Studts CR, Van Zyl MA. **Identification of developmentally appropriate screening items for disruptive behavior problems in preschoolers.** *Journal of Abnormal Child Psychology*. 2013; 41:851-863.

**LARGE SCALE FEASIBILITY**

**-- The PSC has been incorporated as an outcome measures as a standard of care in a large and diverse system that has been sustainable over more than 4 years**

Gold J, Buonopane R, Caggiano R, Picciotto M, Vogeli C, Kanner N, et al. Assessing admissions and outcomes in a child psychiatry system of care. *American Journal of Managed Care*. 2009;15:210-216.

Murphy JM, Guzmán J, McCarthy AE, et al. Mental health predicts better academic outcomes: A longitudinal study of elementary school students in Chile. *Child Psychiatry Hum Dev*. Published online April 26, 2014. doi:10.1007/s10578-014-0464-4.

Murphy JM, Kamin H, Masek B, Vogeli C, Caggiano R, Sklar K et al. Using brief clinician and parent measures to track outcomes in outpatient child psychiatry: Longer term follow-up and comparative effectiveness. *Child and Adolescent Mental Health*. Published online 3 Jan 2012.

Murphy JM, Masek B, Babcock R, Jellinek M, Gold J, Drubner S, Sklar K, Hacker K. Measuring outcomes in outpatient child psychiatry: The contribution of electronic technologies and parent report. *Clinical Child Psychology and Psychiatry*. 2011;16:146-160.

**-- The psychosocial measure used in a long running, nationwide, school screening program in Chile**

Guzman MP, Jellinek M, George M, Hartley M, Squicciarini AM, Canenguez K, Kuhlthau K, Yucel R, White G, Guzman, Murphy JM. Mental health matters in elementary school; First grade screening predicts fourth grade achievement test scores. *European Child and Adolescent Psychiatry*. 2011; 20(8):401-411.

Murphy JM, Guzmán J, McCarthy AE, et al. Mental health predicts better academic outcomes: A longitudinal study of elementary school students in Chile. *Child Psychiatry Hum Dev*. Published online April 26, 2014. doi:10.1007/s10578-014-0464-4.

**PSC USED AS INCLUSION CRITERIA IN THE STUDY**

Campo JV., Bridge J, Ehmann M, Altman S, Lucas A, Birmaher B, Di Lorenzo C, Lyengar S, Brent DA. **Recurrent abdominal pain, anxiety, and depression in primary care.** *Pediatrics*. 2004; 113: 817-824.

Parental responses to two items from the Pediatric Symptom Checklist (PSC) were used to define the sample: children rated as complaining often when parents were asked: “Does this child complain of aches or pains?” were compared with those rated as complaining sometimes or never; and responses of “often” or “sometimes” when parents were asked: “Does this child have a history of visiting the doctor with the doctor finding nothing wrong?”

Kolko DJ, Campo JV, Kilbourne AM, Kelleher, K. **Doctor-office collaborative care for pediatric behavioral problems: A preliminary clinical trial.** *Archives Pediatr Adolesc Med.* 2012;166(3): 224-231.

Participants were chosen for inclusion in the study if they were referred for behavioral problems and were rated at or above the 75<sup>th</sup> percentile (score > 6) on the externalizing problems subscale of the 17-item Pediatric Symptom Checklist.

Lindhiem O, Kolko DJ. **Trajectories of symptom reduction during treatment for behavior problems in pediatric primary-care settings.** *Adm Policy Ment Health.* 2011;38(6):486-494.

This study examined trajectories of symptom reduction during the course of on-site treatment for behavior problems in pediatric primary-care settings. Eligibility criteria included child age (5–12 years), scores on externalizing problems subscale of the Pediatric Symptom Checklist (PSC-17; Gardner et al., 1999) at or above the 75th percentile, and parent concerns about the child's behavior.

Ohene SA, Ireland M, McNeely C, Borowsky IW. **Parental expectations, physical punishment, and violence among adolescents who score positive on a psychosocial screening test in primary care.** *Pediatrics.* 2006; 117(2): 441-447.

The study population was derived from a sample of clinic-attending adolescents who scored positive on a psychosocial screening test, the 17-item Pediatric Symptom Checklist (PSC-17) and their parents, who were part of a violence intervention study.

#### **PSC USED AS COMPARISON MEASURE TO EVALUATE OTHER SCALES**

Hainsworth KR, Davies KR, Khan KA, Weisman, SJ. **Development and preliminary validation of the child activity limitations questionnaire: flexible and efficient assessment of pain-related functional disability.** *Journal of Pain.* 2007; 8(9):746-52

Jastrowski Mano KE, Anderson Khan K, Ladwig RJ, Weisman SJ. **The impact of pediatric chronic pain on parents' health-related quality of life and family functioning: Reliability and validity of the PEDSQL 4.0 Family Impact Module.** *Journal of Pediatric Psychology.* 2011;36(5):517-527.

Rockhill CM, Katon W, Richards J, McCauley E, McCarty CA, Myaing MT, Zhoug C, Richardson LP. **What clinical differences distinguish depressed teens with and without comorbid externalizing problems?** *General Hospital Psychiatry.* 2013; 35:444-447.

Studts CR, Van Zyl MA. **Identification of developmentally appropriate screening items for disruptive behavior problems in preschoolers.** *Journal of Abnormal Child Psychology.* 2013; 41:851-863.

Sinclair J, Holden S. **The mental health surveillance of adolescents within a school setting.** *Mental Health Review Journal.* 2013; 18(2):83-92

Vessey JA, Horowitz JA, Carlson KL, Duffy M. **Psychometric evaluation of the child-adolescent teasing scale.** *Journal of School Health.* 2008; 78(6):344-50

# **Brief Documents Related to the Pediatric Symptom Checklist**

July 25, 2014



NATIONAL INSTITUTES OF HEALTH

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94942-01A1

Contact PI / Project Leader: [HACKER, KARENA](#)

Title: EXPLORING THE IMPACT OF PEDIATRIC BEHAVIORAL HEALTH SCREENING ON HEALTH CARE USE

Awardee Organization: CAMBRIDGE HEALTH ALLIANCE

## Abstract Text:

DESCRIPTION (provided by applicant): The increasing prevalence of mental illness in children requires that pediatricians improve detection of behavioral health (BH) problems to identify previously unidentified children and facilitate entry into mental health treatment. Yet, little is known about the impact of pediatric BH screening on health care utilization and psychotropic medication use. Expanding this knowledge is critical to informing the development of screening programs and assessing their cost effectiveness. Towards this end, the study will explore the relationship between implementation of pediatric BH screening and the quantity and quality of BH and non-BH care use. The specific aims of the study are: 1) To evaluate the impact of BH screening at the well-child visit (6.5 to 16.5 year olds) on the quantity and quality of health care use (primary care, ambulatory, in-patient and emergency department BH and non-BH visits) and psychotropic medication use in the Cambridge Health Alliance (CHA) system and state-wide among Medicaid children and adolescents; and 2) To determine the magnitude of racial/ethnic, age and socio-economic (SES) differences regarding the impact of BH screening on the quantity and quality of health care use (primary care, ambulatory, in-patient and emergency department BH and non-BH visits) and psychotropic medication in the same systems. To achieve these aims, we propose an innovative, exploratory, population-based, longitudinal study using an interrupted time series (ITS) design to examine changes in population utilization rates of BH and non-BH health care after the implementation of BH screening in two environments: CHA-a local safety-net system-and statewide among Medicaid insured children. We will analyze existing data from 4 clinics of CHA prior to and following initiation of BH screening with the Pediatric Symptom Checklist (PSC) at well child visits. CHA initiated screening in 2003 - 4 years prior to statewide mandatory screening. Then to validate these findings, we will use Medicaid administrative claims data for Massachusetts, prior to and following the *Rosie D vs. Romney* lawsuit remedy in 2008, which mandated statewide BH screening at pediatric preventive visits, and the control state of New York where no mandatory screening is required. The combination of analyses will provide a set of results spanning multiple populations and payers thus offering an innovative approach to minimizing inherent biases and maximizing strengths and generalizability. Recognizing that thresholds for dysfunction, symptom disclosure, and interpretation of screening items, may vary across ethnicities and other groups, we will examine the relationship between BH screening and utilization by ethnicity/race, SES and age. We will use the same datasets and perform stratified ITS analyses. Overall, the study's significance lies in its implications for child mental health policy and primary care practices. This investigation will generate results that have the potential to inform child behavioral health screening practices nationally while providing important data for future child mental health interventions. PUBLIC HEALTH RELEVANCE: Behavioral health problems in children and adolescents often go untreated or are recognized long after early treatment could have been available. This study has the potential to improve the early detection and effective treatment of behavioral health problems in youth. By exploring the effect screening has on future treatment and other health care use, this study will inform the development of behavioral health screening programs, including those targeting racially and ethnically diverse populations.

## Public Health Relevance Statement::

Behavioral health problems in children and adolescents often go untreated or are recognized long after early treatment could have been available. This study has the potential to improve the early detection and effective treatment of behavioral health problems in youth. By exploring the effect screening has on future treatment and other health care use, this study will inform the development of behavioral health screening programs, including those targeting racially and ethnically diverse populations.

## Project Terms:

Accident and Emergency department; Adolescent; Age; age difference; behavioral health; Censuses; Child; Child Mental Health; Child Psychiatry; Childhood; Clinic; clinical research site; cost effectiveness; Data; Data Set; design; Detection; Development; Disclosure; Early Diagnosis; Early treatment; effective therapy; Effectiveness; Emergency Situation; Environment; Ethnicity aspects; evidence base; experience; Functional disorder; Future; Goals; Health Alliance; health care quality; health care service utilization; Health Policy; Health Professional; Health system; Healthcare; Impairment; improved; innovation; Inpatients; Insurance; Intervention; Investigation; Knowledge; Longitudinal Studies; Mandatory Testing; Massachusetts; Medicaid; Mental disorders; Mental Health; Methods; New York; Outcome; Outcome Measure; patient population; Patients; pediatrician; Pharmaceutical Preparations; Policies; Population; population based; Population Heterogeneity; Prevalence; Preventive; Primary Health Care; programs; Provider; public health medicine (field); Race; racial and ethnic; Research; safety net; Screening procedure; Series; severe mental illness; Socioeconomic Status; socioeconomics; statistics; Symptoms; System; Time; Visit; Youth

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# PCC & Service Location Comparison

PCC Number: 110001958H PCC Name: MGH-CHELSEA HEALTHCARE CTR

Regional Network Manager: G. Frederick

	Panel Size as of 12/31/10	Breast Cancer Screening 41-50 years	Breast Cancer Screening 51-64 years	Cervical Cancer Screening 21-29 years	Cervical Cancer Screening 30 - 64 years	Pediatric Behavioral Health Screening	Pediatric Behavioral Health Follow-Up	Well-Child Care
PCC Rank		★★★★	★★★★	★	★★★	★★	N/R	★★
PCC Rate % (N)	2,845	55% (123)	67% (214)	29% (116)	71% (423)	70% (507)	N/A (0)	72% (910)
PCC Plan Rate		44%	52%	45%	65%	71%	54%	73%

## PCC Service Locations and Service Location Rates

110001958H MGH-CHELSEA HEALTHCARE CTR % (N)	2,845	55% (123)	67% (214)	29% (116)	71% (423)	70% (507)	N/A (0)	72% (910)
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908110 UZ  
MH billing in yr

Legend		Breast Cancer Screening 41-50 years	Breast Cancer Screening 51-64 years	Cervical Cancer Screening 21-29 years	Cervical Cancer Screening 30 - 64 years	Pediatric Behavioral Health Screening	Pediatric Behavioral Health Follow-Up	Well-Child Care
90th Percentile Benchmark		60%	68%	63%	78%	97%	79%	86%
First quartile	★★★★	51% - 90%	59% - 100%	56% - 91%	72% - 95%	93% - 100%	68% - 91%	81% - 99%
Second quartile	★★★	42% - 50%	50% - 58%	47% - 55%	66% - 71%	80% - 92%	54% - 67%	75% - 80%
Third quartile	★★	32% - 41%	40% - 49%	35% - 46%	57% - 65%	61% - 79%	42% - 53%	66% - 74%
Fourth quartile	★	8% - 31%	0% - 39%	9% - 37%	16% - 56%	0% - 60%	13% - 41%	37% - 65%
Not Ranked	N/R	<10 eligibles	<10 eligibles	<10 eligibles	<20 eligibles	<40 eligibles	<10 eligibles	<40 eligibles

Behavioral Health Screening Report from 1/1/2008 Through 12/31/2013  
Report on MassHealth Statewide Screening by Quarter, Location, and Age Group

Summary of CBHI Screening Data

December 31 2007 - December 31 2013

QTR	TOTAL VISITS	TOTAL SCREENS	SCREENS_W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
JAN - MAR 2008	110,341	16,432	15,763	14.29%	95.93%	11,046	11.43%	31.47%
APR - JUN 2008	113,615	32,596	31,641	27.85%	97.07%	23,418	9.71%	27.56%
JUL - SEP 2008	126,908	48,895	47,762	37.64%	97.68%	36,992	9.12%	23.95%
OCT - DEC 2008	114,358	50,787	49,213	43.03%	96.90%	39,769	9.65%	21.56%
JAN - MAR 2009	107,945	55,051	53,567	49.62%	97.30%	44,603	9.56%	18.79%
APR - JUN 2009	111,899	62,884	61,407	54.88%	97.65%	51,938	9.62%	16.97%
JUL - SEP 2009	129,681	77,568	75,834	58.48%	97.76%	63,755	8.49%	17.44%
OCT - DEC 2009	117,838	69,403	67,656	57.41%	97.48%	57,863	7.90%	16.08%
JAN - MAR 2010	111,943	68,425	66,628	59.52%	97.37%	56,708	8.30%	16.73%
APR - JUN 2010	118,824	75,784	74,332	62.56%	98.08%	63,099	8.36%	16.52%
JUL - SEP 2010	133,823	87,569	85,986	64.25%	98.19%	73,734	7.56%	15.46%
OCT - DEC 2010	122,697	82,446	80,518	65.62%	97.66%	69,320	7.89%	15.61%
JAN - MAR 2011	114,986	77,587	75,619	65.76%	97.46%	64,686	7.47%	16.32%
APR - JUN 2011	121,964	83,687	81,663	66.96%	97.58%	70,131	7.99%	15.90%
JUL - SEP 2011	137,195	89,415	87,824	64.01%	98.22%	86,881	7.59%	2.82%
OCT - DEC 2011	124,869	82,206	80,211	64.24%	97.57%	80,117	7.64%	2.53%
JAN - MAR 2012	120,361	80,183	77,809	64.65%	97.04%	78,269	7.68%	2.39%
APR - JUN 2012	124,863	85,125	83,183	66.62%	97.72%	84,606	8.02%	0.60%
JUL - SEP 2012	140,860	98,633	96,721	68.66%	98.06%	98,208	7.09%	0.30%
OCT - DEC 2012	129,911	90,289	88,215	67.90%	97.70%	89,861	7.22%	0.32%
JAN - MAR 2013	123,801	87,710	84,991	68.65%	96.90%	87,247	7.15%	0.35%
APR - JUN 2013	128,627	92,793	90,680	70.50%	97.72%	92,115	7.34%	0.64%
JUL - SEP 2013	146,207	104,596	102,762	70.29%	98.25%	103,966	7.11%	0.49%
OCT - DEC 2013	131,405	95,304	92,631	70.49%	97.20%	94,866	7.18%	0.36%
TOTAL		1,795,368						

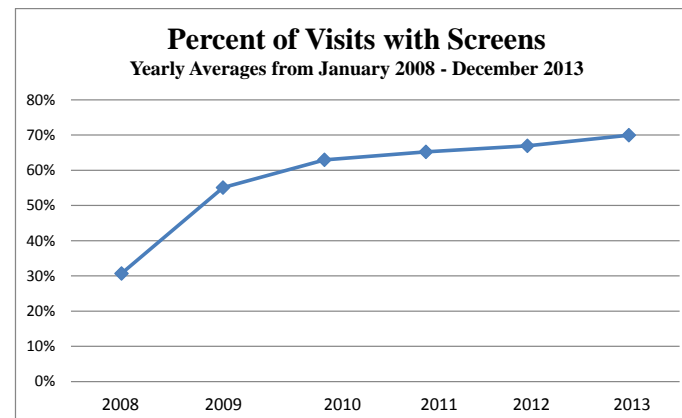


Figure 1. Summary of CBHI Screening Data by Year.



## Report on MassHealth Statewide Screening by Quarter and Location

### Behavioral Health Screening Report

#### Quarter 1: December 31, 2007 - March 31 2008

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	20,396	3,671	3,503	17.17%	95.42%	2,420	9.21%	33.42%
2 - Central Region	7,553	1,665	1,568	20.76%	94.17%	1,281	35.05%	23.00%
3 - Northeast Region	16,458	2,736	2,684	16.31%	98.10%	2,445	10.06%	10.34%
4 - Metro West Region	11,824	1,204	1,147	9.70%	95.27%	536	10.82%	54.65%
5 - Southeast Region	22,880	4,362	4,201	18.36%	96.31%	3,348	4.78%	21.55%
6 - Boston Region	29,565	2,693	2,562	8.67%	95.14%	963	12.46%	60.64%
N/A	1,590	73	70	4.40%	95.89%	25	8.00%	64.38%
Out of State	75	28	28	37.33%	100.00%	28	17.86%	0.00%

#### Quarter 2: April 1 2008 - June 30 2008

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	20,891	7,077	6,897	33.01%	97.46%	5,360	11.59%	23.57%
2 - Central Region	7,912	2,556	2,424	30.64%	94.84%	1,856	21.23%	27.35%
3 - Northeast Region	17,027	4,699	4,587	26.94%	97.62%	4,202	8.73%	10.51%
4 - Metro West Region	12,056	2,794	2,694	22.35%	96.42%	1,487	6.25%	46.10%
5 - Southeast Region	23,405	8,836	8,623	36.84%	97.59%	7,208	5.98%	18.10%
6 - Boston Region	30,413	6,288	6,080	19.99%	96.69%	3,163	11.10%	48.23%
N/A	1,850	311	302	16.32%	97.11%	108	12.96%	65.27%
Out of State	61	35	34	55.74%	97.14%	34	8.82%	2.86%

#### Quarter 3: July 1 2008 - September 30 2008

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	23,200	11,556	11,297	48.69%	97.76%	9,772	11.83%	15.13%
2 - Central Region	9,084	3,677	3,551	39.09%	96.57%	3,422	13.47%	6.91%
3 - Northeast Region	18,974	7,664	7,504	39.55%	97.91%	5,736	7.01%	24.83%
4 - Metro West Region	13,927	4,298	4,206	30.20%	97.86%	2,171	7.55%	48.70%
5 - Southeast Region	26,417	12,012	11,762	44.52%	97.92%	10,584	6.66%	11.73%
6 - Boston Region	33,036	9,113	8,884	26.89%	97.49%	5,074	9.09%	43.47%
N/A	2,223	497	480	21.59%	96.58%	155	7.10%	68.61%
Out of State	47	78	78	165.96%	100.00%	78	15.38%	0.00%

#### Quarter 4: October 1 2008 - December 31 2008

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	21,362	11,855	11,503	53.85%	97.03%	10,665	13.31%	9.91%
2 - Central Region	7,859	3,406	3,288	41.84%	96.54%	3,037	13.50%	10.80%
3 - Northeast Region	17,213	8,371	8,171	47.47%	97.61%	6,390	8.70%	23.49%

4 - Metro West Region	12,501	4,861	4,748	37.98%	97.68%	2,516	6.36%	48.08%
5 - Southeast Region	23,943	11,642	11,377	47.52%	97.72%	10,800	6.92%	7.22%
6 - Boston Region	29,287	10,002	9,490	32.40%	94.88%	5,993	8.31%	39.82%
N/A	2,124	600	589	27.73%	98.17%	319	12.54%	46.83%
Out of State	69	50	47	68.12%	94.00%	49	12.24%	2.00%

**Quarter 1: January 1 2009 - March 30 2009**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	19,853	12,218	11,858	59.73%	97.05%	11,128	12.53%	8.89%
2 - Central Region	7,650	3,746	3,605	47.12%	96.24%	3,420	13.22%	8.62%
3 - Northeast Region	16,027	8,106	7,895	49.26%	97.40%	6,800	7.66%	15.54%
4 - Metro West Region	11,570	5,183	5,087	43.97%	98.15%	2,912	7.80%	43.62%
5 - Southeast Region	22,940	13,046	12,736	55.52%	97.62%	12,195	7.60%	6.45%
6 - Boston Region	27,915	12,050	11,692	41.88%	97.03%	7,651	9.06%	36.26%
N/A	1,917	668	660	34.43%	98.80%	472	9.75%	29.34%
Out of State	73	34	34	46.58%	100.00%	25	16.00%	26.47%

**Quarter 2: April 1 2009 - June 30 2009**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	20,940	14,016	13,634	65.11%	97.27%	13,153	13.01%	6.11%
2 - Central Region	7,838	4,077	3,959	50.51%	97.11%	3,843	12.26%	5.71%
3 - Northeast Region	16,440	9,439	9,225	56.11%	97.73%	7,854	8.12%	14.94%
4 - Metro West Region	11,602	5,659	5,556	47.89%	98.18%	3,549	9.50%	36.97%
5 - Southeast Region	23,810	14,879	14,574	61.21%	97.95%	13,895	7.08%	6.53%
6 - Boston Region	29,250	14,034	13,686	46.79%	97.52%	9,116	8.69%	34.60%
N/A	1,950	750	743	38.10%	99.07%	504	11.71%	32.53%
Out of State	69	30	30	43.48%	100.00%	24	25.00%	20.00%

**Quarter 3: July 1 2009 - September 30 2009**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	23,726	17,100	16,726	70.50%	97.81%	16,025	12.16%	6.22%
2 - Central Region	9,770	5,531	5,341	54.67%	96.56%	5,115	9.89%	7.38%
3 - Northeast Region	19,848	12,111	11,838	59.64%	97.75%	10,015	7.99%	16.66%
4 - Metro West Region	14,320	7,243	7,110	49.65%	98.16%	4,810	6.34%	33.37%
5 - Southeast Region	26,217	17,435	17,105	65.24%	98.11%	15,773	6.17%	9.43%
6 - Boston Region	33,343	17,187	16,763	50.27%	97.53%	11,360	7.26%	33.05%
N/A	2,372	915	906	38.20%	99.02%	615	7.97%	31.80%
Out of State	85	46	45	52.94%	97.83%	42	16.67%	8.70%

**Quarter 4: October 1 2009 - December 31 2009**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	21,632	15,431	15,033	69.49%	97.42%	14,563	11.34%	5.54%
2 - Central Region	8,899	5,195	5,057	56.83%	97.34%	4,924	9.61%	5.10%
3 - Northeast Region	17,771	10,929	10,602	59.66%	97.01%	9,173	6.19%	15.23%
4 - Metro West Region	13,398	6,697	6,571	49.04%	98.12%	4,543	4.75%	31.87%
5 - Southeast Region	23,935	15,849	15,540	64.93%	98.05%	14,553	6.29%	8.03%
6 - Boston Region	29,860	14,446	14,008	46.91%	96.97%	9,488	7.22%	32.77%
N/A	2,304	828	818	35.50%	98.79%	591	9.14%	28.50%
Out of State	39	28	27	69.23%	96.43%	28	32.14%	0.00%

**Quarter 1: January 1 2010 - March 31 2010**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	21,188	15,343	14,939	70.51%	97.37%	14,523	12.06%	5.23%
2 - Central Region	8,517	5,173	4,979	58.46%	96.25%	4,795	9.59%	7.23%
3 - Northeast Region	16,873	10,594	10,265	60.84%	96.89%	8,377	6.41%	20.36%
4 - Metro West Region	12,569	6,347	6,242	49.66%	98.35%	4,348	5.68%	31.21%
5 - Southeast Region	23,093	15,722	15,394	66.66%	97.91%	14,637	6.33%	6.77%
6 - Boston Region	27,623	14,430	14,010	50.72%	97.09%	9,424	7.72%	33.67%
N/A	2,045	773	756	36.97%	97.80%	562	7.47%	27.17%
Out of State	35	43	43	122.86%	100.00%	42	42.86%	2.33%

**Quarter 2: April 1 2010 - June 30 2010**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	22,520	17,161	16,807	74.63%	97.94%	16,205	11.61%	5.51%
2 - Central Region	9,081	5,740	5,584	61.49%	97.28%	5,337	8.09%	6.90%
3 - Northeast Region	17,696	11,149	10,958	61.92%	98.29%	8,940	6.81%	19.31%
4 - Metro West Region	13,231	6,811	6,743	50.96%	99.00%	4,649	6.04%	31.42%
5 - Southeast Region	24,552	17,561	17,274	70.36%	98.37%	16,466	7.13%	6.13%
6 - Boston Region	29,581	16,463	16,088	54.39%	97.72%	10,859	7.70%	33.72%
N/A	2,136	863	842	39.42%	97.57%	607	9.39%	29.32%
Out of State	27	36	36	133.33%	100.00%	36	22.22%	0.00%

**Quarter 3: July 1 2010 - September 30 2010**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	25,399	20,125	19,777	77.87%	98.27%	18,870	10.09%	6.05%
2 - Central Region	10,351	6,756	6,627	64.02%	98.09%	6,276	8.44%	7.00%
3 - Northeast Region	20,841	12,657	12,365	59.33%	97.69%	10,419	6.50%	17.06%
4 - Metro West Region	15,428	8,298	8,194	53.11%	98.75%	5,764	4.51%	30.26%
5 - Southeast Region	27,236	19,693	19,450	71.41%	98.77%	18,586	6.64%	5.49%
6 - Boston Region	32,141	19,011	18,582	57.81%	97.74%	13,100	6.79%	30.43%

N/A	2,369	998	960	40.52%	96.19%	690	9.13%	30.86%
Out of State	58	31	31	53.45%	100.00%	29	44.83%	3.23%

**Quarter 4: October 1 2010 - December 31 2010**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	22,842	18,395	17,894	78.34%	97.28%	17,261	10.83%	5.94%
2 - Central Region	9,371	5,928	5,736	61.21%	96.76%	5,511	8.24%	6.87%
3 - Northeast Region	18,982	11,951	11,627	61.25%	97.29%	10,027	7.14%	15.61%
4 - Metro West Region	14,022	7,651	7,548	53.83%	98.65%	5,256	4.74%	31.05%
5 - Southeast Region	24,614	18,317	18,024	73.23%	98.40%	17,276	6.66%	5.58%
6 - Boston Region	30,608	19,223	18,751	61.26%	97.54%	13,276	7.14%	30.36%
N/A	2,208	954	911	41.26%	95.49%	686	9.48%	27.99%
Out of State	50	27	27	54.00%	100.00%	27	62.96%	0.00%

**Quarter 1: January 1 2011 - March 31 2011**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	21,175	17,190	16,741	79.06%	97.39%	16,194	10.22%	5.37%
2 - Central Region	8,922	5,791	5,630	63.10%	97.22%	5,404	6.64%	6.60%
3 - Northeast Region	17,212	11,117	10,805	62.78%	97.19%	9,500	6.79%	14.11%
4 - Metro West Region	12,759	6,816	6,734	52.78%	98.80%	4,677	4.40%	31.21%
5 - Southeast Region	23,313	17,745	17,408	74.67%	98.10%	16,436	6.65%	7.19%
6 - Boston Region	29,392	18,007	17,431	59.31%	96.80%	11,815	6.87%	34.03%
N/A	2,163	892	843	38.97%	94.51%	633	8.37%	28.92%
Out of State	50	29	27	54.00%	93.10%	27	22.22%	6.90%

**Quarter 2: April 1 2011 - June 30 2011**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	22,675	18,593	18,127	79.94%	97.49%	17,574	10.65%	5.08%
2 - Central Region	9,445	6,105	5,969	63.20%	97.77%	5,701	6.42%	6.45%
3 - Northeast Region	18,575	12,506	12,191	65.63%	97.48%	10,754	7.36%	13.53%
4 - Metro West Region	13,352	7,263	7,175	53.74%	98.79%	5,070	4.87%	30.02%
5 - Southeast Region	24,420	18,811	18,522	75.85%	98.46%	17,639	7.34%	6.09%
6 - Boston Region	31,176	19,503	18,817	60.36%	96.48%	12,747	7.59%	34.32%
N/A	2,262	878	834	36.87%	94.99%	618	9.71%	29.50%
Out of State	59	28	28	47.46%	100.00%	28	17.86%	0.00%

**Quarter 3: July 1 2011 - September 30 2011**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	25,313	20,304	20,021	79.09%	98.61%	20,259	10.00%	0.22%

2 - Central Region	10,727	7,195	7,040	65.63%	97.85%	7,169	7.24%	0.28%
3 - Northeast Region	20,677	12,732	12,426	60.10%	97.60%	12,689	7.87%	0.33%
4 - Metro West Region	15,668	7,772	7,685	49.05%	98.88%	7,752	4.59%	0.24%
5 - Southeast Region	27,588	20,985	20,783	75.33%	99.04%	20,945	7.34%	0.19%
6 - Boston Region	34,671	19,420	18,891	54.49%	97.28%	17,068	6.35%	12.10%
N/A	2,500	986	957	38.28%	97.06%	978	6.85%	0.61%
Out of State	51	21	21	41.18%	100.00%	21	9.52%	0.00%

**Quarter 4: October 1 2011 - December 31 2011**

REGION	TOTAL_V	TOTAL_S	SCREENS	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	22,562	18,167	17,697	78.44%	97.41%	18,164	10.31%	0.02%
2 - Central Region	10,034	6,824	6,608	65.86%	96.83%	6,813	6.84%	0.16%
3 - Northeast Region	18,682	10,242	9,888	52.93%	96.54%	10,239	7.67%	0.02%
4 - Metro West Region	14,084	7,196	7,120	50.55%	98.94%	7,187	5.04%	0.07%
5 - Southeast Region	25,561	19,944	19,713	77.12%	98.84%	19,943	6.70%	5.01E-05
6 - Boston Region	31,699	18,935	18,334	57.84%	96.83%	16,876	7.28%	10.86%
N/A	2,186	874	827	37.83%	94.62%	871	8.04%	0.34%
Out of State	61	24	24	39.34%	100.00%	24	4.17%	0.00%

**Quarter 1: January 1 2012 - March 31 2012**

REGION	TOTAL_V	TOTAL_S	SCREENS	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	22,140	18,249	17,712	80.00%	97.06%	18,249	10.02%	0.00%
2 - Central Region	9,676	6,684	6,342	65.54%	94.88%	6,674	7.58%	0.15%
3 - Northeast Region	18,245	9,133	8,759	48.01%	95.90%	9,130	8.27%	0.03%
4 - Metro West Region	13,465	7,423	7,330	54.44%	98.75%	7,413	4.84%	0.13%
5 - Southeast Region	24,499	19,164	18,805	76.76%	98.13%	19,161	6.85%	0.02%
6 - Boston Region	30,120	18,636	18,011	59.80%	96.65%	16,748	7.05%	10.13%
N/A	2,174	874	831	38.22%	95.08%	874	8.01%	0.00%
Out of State	42	20	19	45.24%	95.00%	20	15.00%	0.00%

**Quarter 2: April 1 2012 - Jun 30 2012**

REGION	TOTAL_V	TOTAL_S	SCREENS	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	22,165	18,564	18,086	81.60%	97.43%	18,563	10.39%	5.39E-05
2 - Central Region	9,948	7,148	6,940	69.76%	97.09%	7,147	8.52%	0.01%
3 - Northeast Region	19,484	10,278	9,953	51.08%	96.84%	10,276	9.04%	9.73E-05
4 - Metro West Region	14,180	8,484	8,350	58.89%	98.42%	8,477	4.67%	0.08%
5 - Southeast Region	25,153	19,886	19,609	77.96%	98.61%	19,885	6.98%	5.03E-05
6 - Boston Region	31,657	19,789	19,316	61.02%	97.61%	19,287	7.54%	2.52%
N/A	2,238	958	911	40.71%	95.09%	953	8.08%	0.42%
Out of State	38	18	18	47.37%	100.00%	18	22.22%	0.00%

**Quarter 3: July 1 2012 - September 30 2012**

REGION	TOTAL_V	TOTAL_S	SCREENS_	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	22,666	18,284	17,994	79.39%	98.41%	18,281	8.45%	0.00%
2 - Central Region	11,639	8,257	8,092	69.52%	98.00%	8,240	8.46%	0.04%
3 - Northeast Region	22,184	13,915	13,549	61.08%	97.37%	13,882	8.46%	0.03%
4 - Metro West Region	16,257	9,710	9,607	59.09%	98.94%	9,694	3.68%	0.03%
5 - Southeast Region	27,699	21,965	21,688	78.30%	98.74%	21,905	6.48%	0.00%
6 - Boston Region	34,490	22,170	21,553	62.49%	97.22%	21,876	6.92%	1.30%
N/A	5,878	4,303	4,209	71.61%	97.82%	4,301	5.93%	0.02%
Out of State	47	29	29	61.70%	100.00%	29	10.34%	0.00%

**Quarter 4: October 1 2012 - December 31 2012**

REGION	TOTAL_V	TOTAL_S	SCREENS_	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	20,540	16,446	16,049	78.14%	97.59%	16,444	8.45%	6.08E-05
2 - Central Region	10,935	7,873	7,663	70.08%	97.33%	7,860	7.79%	0.03%
3 - Northeast Region	19,834	12,524	12,181	61.41%	97.26%	12,493	8.53%	7.98E-05
4 - Metro West Region	14,962	8,613	8,505	56.84%	98.75%	8,598	3.48%	0.01%
5 - Southeast Region	25,556	20,282	20,027	78.37%	98.74%	20,224	6.36%	0.01%
6 - Boston Region	32,354	20,754	20,145	62.26%	97.07%	20,445	7.64%	1.37%
N/A	5,702	3,786	3,634	63.73%	95.99%	3,786	7.13%	0.00%
Out of State	28	11	11	39.29%	100.00%	11	0.00%	0.00%

**Quarter 1: January 1 2013 - March 31 2013**

REGION	TOTAL_V	TOTAL_S	SCREENS_	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	19,241	15,500	15,126	78.61%	97.59%	15,494	8.53%	0.02%
2 - Central Region	10,663	7,836	7,550	70.81%	96.35%	7,831	7.30%	0.01%
3 - Northeast Region	18,502	11,923	11,519	62.26%	96.61%	11,837	8.85%	0.40%
4 - Metro West Region	13,789	8,137	8,015	58.13%	98.50%	8,109	3.53%	0.09%
5 - Southeast Region	24,376	19,761	19,401	79.59%	98.18%	19,695	6.22%	0.04%
6 - Boston Region	29,319	19,245	18,305	62.43%	95.12%	18,979	7.59%	1.25%
N/A	7,877	5,302	5,069	64.35%	95.61%	5,298	6.55%	0.06%
Out of State	34	6	6	17.65%	100.00%	4	25.00%	0.00%

**Quarter 2: April 1 2013 - June 30 2013**

REGION	TOTAL_V	TOTAL_S	SCREENS_	% VISITS	% SCREENS	TOTAL	% BHNEED	% W/O
	ISITS	CREENS	W_VISIT	W/SCREENS	W/VISITS	SCREENS W/MODIFIER		
1 - Western Region	19,675	15,979	15,610	79.34%	97.69%	15,977	8.26%	6.26E-05
2 - Central Region	11,374	8,453	8,251	72.54%	97.61%	8,438	7.94%	0.08%
3 - Northeast Region	19,282	12,845	12,531	64.99%	97.56%	12,776	9.27%	0.31%
4 - Metro West Region	14,141	8,799	8,683	61.40%	98.68%	8,784	4.01%	0.08%
5 - Southeast Region	25,320	20,705	20,414	80.62%	98.59%	20,663	6.38%	0.04%

6 - Boston Region	30,544	20,407	19,784	64.77%	96.95%	19,879	7.96%	2.55%
N/A	8,260	5,582	5,385	65.19%	96.47%	5,577	5.94%	0.07%
Out of State	31	23	22	70.97%	95.65%	21	19.05%	8.70%

**Quarter 3: July 1 2013 - September 30 2013**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	21,693	17,207	16,916	77.98%	98.31%	17,200	7.65%	0.02%
2 - Central Region	13,113	9,710	9,491	72.38%	97.74%	9,681	8.18%	0.15%
3 - Northeast Region	22,494	15,278	14,942	66.43%	97.80%	15,173	8.59%	0.48%
4 - Metro West Region	16,501	10,516	10,401	63.03%	98.91%	10,492	4.62%	0.10%
5 - Southeast Region	28,811	23,451	23,184	80.47%	98.86%	23,414	6.25%	0.06%
6 - Boston Region	34,236	22,443	21,912	64.00%	97.63%	22,023	7.58%	1.72%
N/A	9,324	5,987	5,912	63.41%	98.75%	5,980	6.14%	0.10%
Out of State	35	4	4	11.43%	100.00%	3	0.00%	25.00%

**Quarter 4: October 1 2013 - December 31 2013**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	20,146	15,902	15,556	77.22%	97.82%	15,892	8.32%	0.04%
2 - Central Region	11,922	8,924	8,535	71.59%	95.64%	8,914	8.42%	0.01%
3 - Northeast Region	20,278	13,719	13,368	65.92%	97.44%	13,648	8.88%	0.30%
4 - Metro West Region	14,898	9,675	9,403	63.12%	97.19%	9,651	3.98%	0.08%
5 - Southeast Region	24,695	20,032	19,738	79.93%	98.53%	19,993	6.22%	0.07%
6 - Boston Region	30,645	21,274	20,399	66.57%	95.89%	20,998	7.14%	1.25%
N/A	8,783	5,776	5,630	64.10%	97.47%	5,768	6.83%	0.14%
Out of State	38	2	2	5.26%	100.00%	2	0.00%	0.00%

**Summary: December 31 2007 - December 31 2013**

REGION	TOTAL_V ISITS	TOTAL_S CREENS	SCREENS_ W_VISIT	% VISITS W/SCREENS	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIER	% BHNEED	% W/O MODIFIER
1 - Western Region	523,942	374,333	365,503	69.76%	97.64%	358,236	10.31%	4.19%
2 - Central Region	232,270	144,250	139,830	60.20%	96.94%	138,689	8.95%	3.76%
3 - Northeast Region	449,597	256,618	249,833	55.57%	97.36%	232,775	7.96%	8.90%
4 - Metro West Region	330,504	167,450	164,854	49.88%	98.45%	138,445	4.83%	17.12%
5 - Southeast Region	600,032	412,085	405,352	67.56%	98.37%	395,224	6.64%	3.95%
6 - Boston Region	742,942	395,523	383,494	51.62%	96.96%	318,208	7.49%	19.18%
N/A	84,432	44,428	43,079	51.02%	96.96%	40,971	6.99%	7.72%
Out of State	1,202	681	671	55.82%	98.53%	650	21.08%	4.11%

## Report on MassHealth Statewide Screening by Age

### Quarter 1: December 31, 2007 - March 31 2008

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	28,072	2,058	1,999	7.12%	97.13%	1,501	6.20%	25.61%
2 6mos to 2yrs	33,776	5,678	5,506	16.30%	96.97%	3,727	9.04%	33.18%
3 3yrs to 6 yrs	15,899	2,901	2,761	17.37%	95.17%	2,021	13.61%	29.16%
4 7 yrs to 12 yrs	16,000	3,162	3,004	18.78%	95.00%	2,163	15.53%	30.68%
5 13 yrs to 17 yrs	12,562	2,340	2,221	17.68%	94.91%	1,455	13.47%	35.73%
6 18 yrs to 20 yrs	4,032	293	272	6.75%	92.83%	179	14.53%	36.86%
							14.20%	

### Quarter 2: April 1 2008 - June 30 2008

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	27,194	3,193	3,116	11.46%	97.59%	2,405	2.58%	23.90%
2 6mos to 2yrs	33,081	10,874	10,661	32.23%	98.04%	7,487	6.62%	30.42%
3 3yrs to 6 yrs	16,530	6,063	5,857	35.43%	96.60%	4,471	12.10%	25.81%
4 7 yrs to 12 yrs	18,680	7,309	7,056	37.77%	96.54%	5,402	13.66%	25.52%
5 13 yrs to 17 yrs	13,750	4,573	4,409	32.07%	96.41%	3,247	12.23%	28.60%
6 18 yrs to 20 yrs	4,380	584	542	12.37%	92.81%	406	9.85%	30.14%
							12.66%	

### Quarter 3: July 1 2008 - September 30 2008

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	27,894	4,076	4,008	14.37%	98.33%	3,256	1.63%	19.82%
2 6mos to 2yrs	33,318	14,259	14,011	42.05%	98.26%	10,246	5.61%	27.62%
3 3yrs to 6 yrs	19,061	9,202	8,961	47.01%	97.38%	6,903	11.10%	24.63%
4 7 yrs to 12 yrs	22,828	11,804	11,499	50.37%	97.42%	9,157	12.14%	22.10%
5 13 yrs to 17 yrs	18,753	8,468	8,256	44.02%	97.50%	6,591	11.74%	21.74%
6 18 yrs to 20 yrs	5,054	1,086	1,027	20.32%	94.57%	839	10.97%	22.65%
							11.66%	

### Quarter 4: October 1 2008 - December 31 2008

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	26,807	5,083	4,994	18.63%	98.25%	4,227	1.87%	16.76%
2 6mos to 2yrs	32,254	15,855	15,491	48.03%	97.70%	11,996	6.41%	24.13%
3 3yrs to 6 yrs	16,498	9,306	8,979	54.42%	96.49%	7,192	12.29%	22.61%
4 7 yrs to 12 yrs	18,851	11,281	10,837	57.49%	96.06%	8,951	13.32%	20.57%
5 13 yrs to 17 yrs	15,677	8,289	7,995	51.00%	96.45%	6,621	12.28%	20.00%
6 18 yrs to 20 yrs	4,271	973	917	21.47%	94.24%	782	12.66%	19.63%

### Quarter 1: January 1 2009 - March 30 2009



AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	22,465	5,999	5,885	26.20%	98.10%	5,068	2.37%	15.39%
2 6mos to 2yrs	34,484	19,128	18,818	54.57%	98.38%	15,242	6.10%	20.15%
3 3yrs to 6 yrs	16,813	10,463	10,137	60.29%	96.88%	8,498	12.72%	18.52%
4 7 yrs to 12 yrs	16,495	10,689	10,316	62.54%	96.51%	8,708	13.40%	18.32%
5 13 yrs to 17 yrs	13,201	7,621	7,324	55.48%	96.10%	6,201	13.64%	18.48%
6 18 yrs to 20 yrs	4,487	1,151	1,087	24.23%	94.44%	886	13.54%	22.94%

Quarter 2: April 1 2009 - June 30 2009

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	21,747	6,259	6,090	28.00%	97.30%	5,296	1.72%	15.02%
2 6mos to 2yrs	33,054	19,866	19,578	59.23%	98.55%	16,126	6.10%	18.25%
3 3yrs to 6 yrs	17,767	12,046	11,736	66.06%	97.43%	10,009	11.30%	16.59%
4 7 yrs to 12 yrs	20,054	14,222	13,826	68.94%	97.22%	11,806	14.06%	16.53%
5 13 yrs to 17 yrs	14,375	9,130	8,876	61.75%	97.22%	7,604	13.28%	16.39%
6 18 yrs to 20 yrs	4,902	1,361	1,301	26.54%	95.59%	1,097	11.12%	19.03%

Quarter 3: July 1 2009 - September 30 2009

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,318	7,476	7,289	31.26%	97.50%	6,179	1.54%	17.04%
2 6mos to 2yrs	33,625	21,584	21,208	63.07%	98.26%	17,418	5.34%	18.89%
3 3yrs to 6 yrs	20,778	14,489	14,172	68.21%	97.81%	11,953	11.09%	17.16%
4 7 yrs to 12 yrs	25,519	18,292	17,841	69.91%	97.53%	15,234	11.58%	16.32%
5 13 yrs to 17 yrs	20,590	13,816	13,506	65.59%	97.76%	11,436	9.92%	16.86%
6 18 yrs to 20 yrs	5,851	1,911	1,818	31.07%	95.13%	1,535	10.68%	19.52%

Quarter 4: October 1 2009 - December 31 2009

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,151	7,630	7,467	32.25%	97.86%	6,544	1.18%	13.91%
2 6mos to 2yrs	32,684	20,729	20,375	62.34%	98.29%	17,065	4.66%	17.07%
3 3yrs to 6 yrs	18,548	12,845	12,514	67.47%	97.42%	10,636	10.14%	16.59%
4 7 yrs to 12 yrs	21,590	15,543	15,073	69.81%	96.98%	13,109	11.27%	15.10%
5 13 yrs to 17 yrs	17,015	11,199	10,844	63.73%	96.83%	9,310	10.82%	16.37%
6 18 yrs to 20 yrs	4,850	1,457	1,383	28.52%	94.92%	1,199	11.43%	17.30%

Quarter 1: January 1 2010 - March 31 2010

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
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1 <6mos	22,825	8,125	7,950	34.83%	97.85%	6,829	1.10%	15.66%
2 6mos to 2yrs	34,627	22,863	22,523	65.04%	98.51%	18,770	4.93%	17.51%
3 3yrs to 6 yrs	18,268	13,162	12,820	70.18%	97.40%	10,810	10.90%	17.53%
4 7 yrs to 12 yrs	17,724	13,409	12,953	73.08%	96.60%	11,130	12.63%	16.56%
5 13 yrs to 17 yrs	13,419	9,360	8,973	66.87%	95.87%	7,926	11.99%	14.85%
6 18 yrs to 20 yrs	5,080	1,506	1,409	27.74%	93.56%	1,243	14.08%	17.00%

**Quarter 2: April 1 2010 - June 30 2010**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	22,369	8,139	8,015	35.83%	98.48%	6,817	1.22%	16.08%
2 6mos to 2yrs	34,545	23,637	23,332	67.54%	98.71%	19,496	4.71%	17.20%
3 3yrs to 6 yrs	19,684	14,650	14,362	72.96%	98.03%	12,170	10.02%	16.72%
4 7 yrs to 12 yrs	21,588	16,808	16,425	76.08%	97.72%	14,024	12.43%	16.34%
5 13 yrs to 17 yrs	15,127	10,750	10,486	69.32%	97.54%	9,092	12.53%	15.34%
6 18 yrs to 20 yrs	5,511	1,800	1,712	31.07%	95.11%	1,500	11.73%	16.50%

**Quarter 3: July 1 2010 - September 30 2010**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	22,738	8,528	8,409	36.98%	98.60%	7,236	1.40%	15.04%
2 6mos to 2yrs	33,371	23,722	23,413	70.16%	98.70%	19,768	4.68%	16.22%
3 3yrs to 6 yrs	22,651	16,964	16,667	73.58%	98.25%	14,303	9.21%	15.34%
4 7 yrs to 12 yrs	27,352	20,778	20,376	74.50%	98.07%	17,561	10.33%	15.15%
5 13 yrs to 17 yrs	21,478	15,340	14,976	69.73%	97.63%	12,999	9.38%	14.93%
6 18 yrs to 20 yrs	6,233	2,237	2,145	34.41%	95.89%	1,867	10.39%	16.32%

**Quarter 4: October 1 2010 - December 31 2010**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,458	9,726	9,570	40.80%	98.40%	8,211	1.41%	15.45%
2 6mos to 2yrs	32,630	23,717	23,372	71.63%	98.55%	19,739	5.08%	16.38%
3 3yrs to 6 yrs	20,110	15,374	15,029	74.73%	97.76%	12,888	9.50%	15.79%
4 7 yrs to 12 yrs	23,539	18,492	17,964	76.32%	97.14%	15,686	11.26%	14.90%
5 13 yrs to 17 yrs	17,763	13,202	12,745	71.75%	96.54%	11,213	10.35%	14.78%
6 18 yrs to 20 yrs	5,197	1,935	1,838	35.37%	94.99%	1,583	12.57%	17.88%

**Quarter 1: January 1 2011 - March 31 2011**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	24,352	10,550	10,379	42.62%	98.38%	8,848	1.76%	15.91%
2 6mos to 2yrs	34,222	25,253	24,916	72.81%	98.67%	20,912	4.93%	16.80%
3 3yrs to 6 yrs	19,350	15,099	14,730	76.12%	97.56%	12,538	9.03%	16.64%

4 7 yrs to 12 yrs	18,542	14,835	14,282	77.03%	96.27%	12,444	11.16%	15.88%
5 13 yrs to 17 yrs	13,667	10,069	9,654	70.64%	95.88%	8,479	11.22%	15.52%
6 18 yrs to 20 yrs	4,853	1,781	1,658	34.16%	93.09%	1,465	11.67%	17.46%

**Quarter 2: April 1 2011 - June 30 2011**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,588	10,240	10,080	42.73%	98.44%	8,536	1.55%	16.34%
2 6mos to 2yrs	33,805	25,050	24,695	73.05%	98.58%	20,879	4.98%	16.28%
3 3yrs to 6 yrs	21,081	16,538	16,168	76.69%	97.76%	13,922	9.22%	15.55%
4 7 yrs to 12 yrs	22,541	18,166	17,556	77.88%	96.64%	15,256	11.94%	15.77%
5 13 yrs to 17 yrs	15,679	11,741	11,345	72.36%	96.63%	9,954	11.43%	14.97%
6 18 yrs to 20 yrs	5,270	1,952	1,819	34.52%	93.19%	1,584	11.74%	18.65%

**Quarter 3: July 1 2011 - September 30 2011**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,990	9,716	9,529	39.72%	98.08%	9,160	1.66%	5.70%
2 6mos to 2yrs	33,857	23,839	23,565	69.60%	98.85%	23,133	4.96%	2.96%
3 3yrs to 6 yrs	23,506	17,365	17,066	72.60%	98.28%	16,961	8.78%	2.29%
4 7 yrs to 12 yrs	28,068	20,966	20,562	73.26%	98.07%	20,499	10.22%	2.22%
5 13 yrs to 17 yrs	21,690	15,310	14,985	69.09%	97.88%	14,969	9.95%	2.20%
6 18 yrs to 20 yrs	6,084	2,219	2,117	34.80%	95.40%	2,159	10.05%	2.70%

**Quarter 4: October 1 2011 - December 31 2011**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,703	9,763	9,557	40.32%	97.89%	9,243	1.97%	5.33%
2 6mos to 2yrs	33,192	23,447	23,164	69.79%	98.79%	22,841	4.55%	2.57%
3 3yrs to 6 yrs	20,796	15,558	15,202	73.10%	97.71%	15,229	9.25%	2.11%
4 7 yrs to 12 yrs	24,376	18,560	18,029	73.96%	97.14%	18,244	10.52%	1.69%
5 13 yrs to 17 yrs	17,918	12,999	12,506	69.80%	96.21%	12,730	10.60%	2.05%
6 18 yrs to 20 yrs	4,884	1,879	1,753	35.89%	93.29%	1,830	12.24%	2.55%

**Quarter 1: January 1 2012 - March 31 2012**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	24,150	10,153	9,902	41.00%	97.53%	9,657	2.15%	4.89%
2 6mos to 2yrs	35,687	25,827	25,356	71.05%	98.18%	25,257	4.95%	2.21%
3 3yrs to 6 yrs	20,459	15,616	15,209	74.34%	97.39%	15,332	8.75%	1.82%
4 7 yrs to 12 yrs	20,527	16,070	15,481	75.42%	96.33%	15,763	11.50%	1.91%
5 13 yrs to 17 yrs	14,496	10,561	10,047	69.31%	95.13%	10,344	11.21%	2.05%
6 18 yrs to 20 yrs	5,042	1,956	1,814	35.98%	92.74%	1,916	12.68%	2.04%

**Quarter 2: April 1 2012 - Jun 30 2012**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,769	10,034	9,858	41.47%	98.25%	9,937	2.18%	0.97%
2 6mos to 2yrs	34,994	25,879	25,523	72.94%	98.62%	25,714	4.98%	0.63%
3 3yrs to 6 yrs	21,927	16,947	16,604	75.72%	97.98%	16,855	9.25%	0.53%
4 7 yrs to 12 yrs	23,222	18,491	17,915	77.15%	96.88%	18,408	11.52%	0.45%
5 13 yrs to 17 yrs	15,688	11,594	11,213	71.48%	96.71%	11,529	11.67%	0.55%
6 18 yrs to 20 yrs	5,263	2,180	2,070	39.33%	94.95%	2,163	12.07%	0.78%

**Quarter 3: July 1 2012 - September 30 2012**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	24,870	11,086	10,920	43.91%	98.50%	11,009	1.20%	0.62%
2 6mos to 2yrs	34,672	26,404	26,038	75.10%	98.61%	26,305	4.23%	0.28%
3 3yrs to 6 yrs	24,511	19,184	18,838	76.86%	98.20%	19,105	9.01%	0.29%
4 7 yrs to 12 yrs	28,534	22,695	22,220	77.87%	97.91%	22,611	9.79%	0.21%
5 13 yrs to 17 yrs	22,161	16,659	16,236	73.26%	97.46%	16,589	9.31%	0.28%
6 18 yrs to 20 yrs	6,112	2,605	2,469	40.40%	94.78%	2,589	9.31%	0.31%
							9.37%	

**Quarter 4: October 1 2012 - December 31 2012**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	25,766	11,296	11,122	43.17%	98.46%	11,224	1.36%	0.56%
2 6mos to 2yrs	33,763	25,563	25,235	74.74%	98.72%	25,460	4.32%	0.29%
3 3yrs to 6 yrs	21,328	16,707	16,345	76.64%	97.83%	16,631	8.87%	0.34%
4 7 yrs to 12 yrs	25,146	20,238	19,651	78.15%	97.10%	20,155	10.38%	0.23%
5 13 yrs to 17 yrs	18,957	14,379	13,888	73.26%	96.59%	14,298	9.90%	0.31%
6 18 yrs to 20 yrs	4,951	2,106	1,974	39.87%	93.73%	2,093	11.99%	0.43%
							9.72%	

**Quarter 1: January 1 2013 - March 31 2013**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	24,898	11,095	10,828	43.49%	97.59%	11,023	1.30%	0.55%
2 6mos to 2yrs	35,556	27,436	26,892	75.63%	98.02%	27,287	4.51%	0.37%
3 3yrs to 6 yrs	21,282	17,110	16,624	78.11%	97.16%	17,040	8.72%	0.29%
4 7 yrs to 12 yrs	21,804	18,037	17,365	79.64%	96.27%	17,954	10.28%	0.29%
5 13 yrs to 17 yrs	15,285	11,972	11,383	74.47%	95.08%	11,897	10.90%	0.30%
6 18 yrs to 20 yrs	4,976	2,060	1,899	38.16%	92.18%	2,046	11.78%	0.53%
							9.97%	

**Quarter 2: April 1 2013 - June 30 2013**

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	23,682	10,564	10,352	43.71%	97.99%	10,467	1.46%	0.81%
2 6mos to 2yrs	35,560	27,732	27,355	76.93%	98.64%	27,511	4.54%	0.72%
3 3yrs to 6 yrs	22,893	18,751	18,374	80.26%	97.99%	18,636	8.88%	0.54%
4 7 yrs to 12 yrs	24,674	20,636	20,047	81.25%	97.15%	20,497	10.60%	0.56%
5 13 yrs to 17 yrs	16,575	12,939	12,475	75.26%	96.41%	12,848	10.24%	0.58%
6 18 yrs to 20 yrs	5,243	2,171	2,077	39.61%	95.67%	2,156	9.97%	0.60%
							9.91%	

Quarter 3: July 1 2013 - September 30 2013

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	24,702	11,248	11,039	44.69%	98.14%	11,146	1.47%	0.78%
2 6mos to 2yrs	35,562	27,325	27,009	75.95%	98.84%	27,133	4.56%	0.61%
3 3yrs to 6 yrs	25,226	20,186	19,858	78.72%	98.38%	20,082	8.64%	0.40%
4 7 yrs to 12 yrs	31,000	25,187	24,695	79.66%	98.05%	25,082	9.64%	0.32%
5 13 yrs to 17 yrs	23,479	17,934	17,522	74.63%	97.70%	17,828	8.79%	0.43%
6 18 yrs to 20 yrs	6,238	2,716	2,639	42.31%	97.16%	2,695	10.17%	0.55%
							9.02%	

Quarter 4: October 1 2013 - December 31 2013

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	24,402	11,401	11,074	45.38%	97.13%	11,335	1.40%	0.53%
2 6mos to 2yrs	34,019	26,452	25,967	76.33%	98.17%	26,319	4.60%	0.41%
3 3yrs to 6 yrs	21,288	17,305	16,871	79.25%	97.49%	17,239	8.62%	0.31%
4 7 yrs to 12 yrs	26,588	21,981	21,251	79.93%	96.68%	21,892	9.76%	0.30%
5 13 yrs to 17 yrs	20,143	15,951	15,359	76.25%	96.29%	15,886	9.90%	0.26%
6 18 yrs to 20 yrs	4,965	2,214	2,109	42.48%	95.26%	2,195	11.07%	0.59%
							9.43%	

Summary: December 31 2007 - December 31 2013

AGEGRPVISIT	TOTAL_VISI TS	TOTAL_SCR EENS	SCREENS_ W_VISIT	% VISITS W/SCREEN S	% SCREENS W/VISITS	TOTAL SCREENS W/MODIFIE R	% BHNEED	% W/O MODIFIER
1 <6mos	583,910	203,438	199432	34.15%	98.03%	185,154	1.62%	8.83%
2 6mos to 2yrs	816,338	532,119	524003	64.19%	98.47%	475,831	4.94%	10.32%
3 3yrs to 6 yrs	486,254	343,831	335884	69.08%	97.69%	311,424	9.57%	9.22%
4 7 yrs to 12 yrs	545,242	397,651	386224	70.84%	97.13%	361,736	11.12%	8.82%
5 13 yrs to 17 yrs	409,448	276,196	267224	65.26%	96.75%	251,046	10.67%	8.88%
6 18 yrs to 20 yrs	123,729	42,133	39849	32.21%	94.58%	38,007	11.34%	9.59%
	2,964,921	1,795,368						
		1,017,678					10.45%	

## Blue Cross Blue Shield of MA Pediatric Mental Health Screening

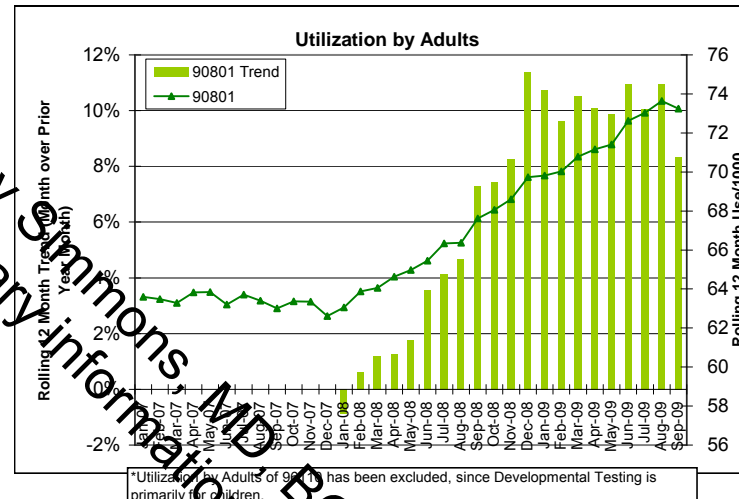
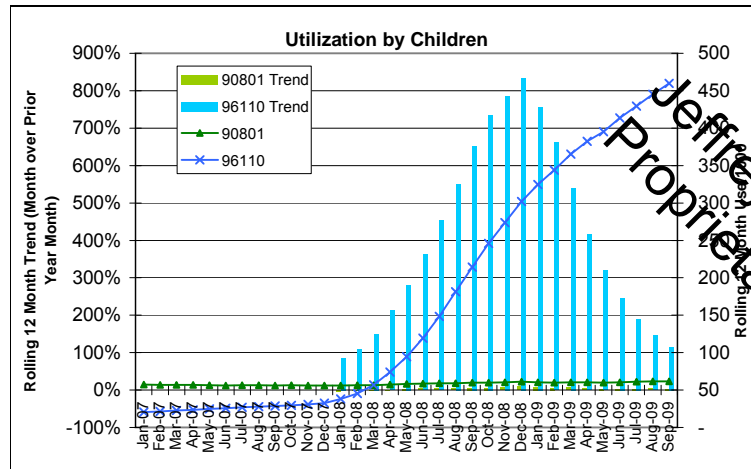
### Utilization of Procedure Codes 90801 & 96110

Local HMO/POS, Fully Insured & ASC

Incurred Jan '06 through Sept '09, Paid through Oct '09

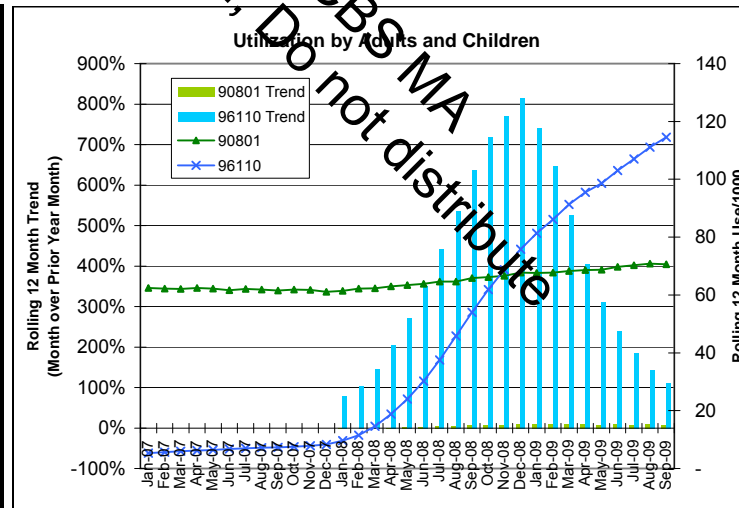
Completion Applied

90801 - Psychiatric diagnostic interview examination; 96110 - Developmental testing; limited



### Sum of Encounters (All Ages) By Procedure Code

Cpt Pmod1 Cd	90801	96110	Grand Total
(blank)	29,848	62,794	92,642
U1 - Medical level of care 1, as defined by each state		30,923	30,923
59 - Distinct Procedural Service		23,504	23,504
AJ - Clinical Social Worker	2,021		2,021
HO - Masters Degree Level	1,735		1,735
U2 - Medical level of care 2, as defined by each state		1,532	1,532
AH - Clinical Psychologist	1,388		1,388
U5 - Medical level of care 5, as defined by each state		943	943
25 - Significant, separately identifiable evaluation and management service by the same physician on the same day of the procedure or other service	35	395	430
AF - Specialty Physician	285		285
HA - Child/adolescent Program	266		266
SA - Nurse Practitioner rendering service in collaboration with a physician	165	77	242
U6 - Medical level of care 6, as defined by each state	175	55	230
52 - Reduced Services		195	195
TD - RN	185		185
51 - Multiple Procedures		185	185
U7 - Medical level of care 7, as defined by each state	31	114	145



\*Child defined as 18 years or younger

# Blue Cross Blue Shield of MA Pediatric Mental Health Screening

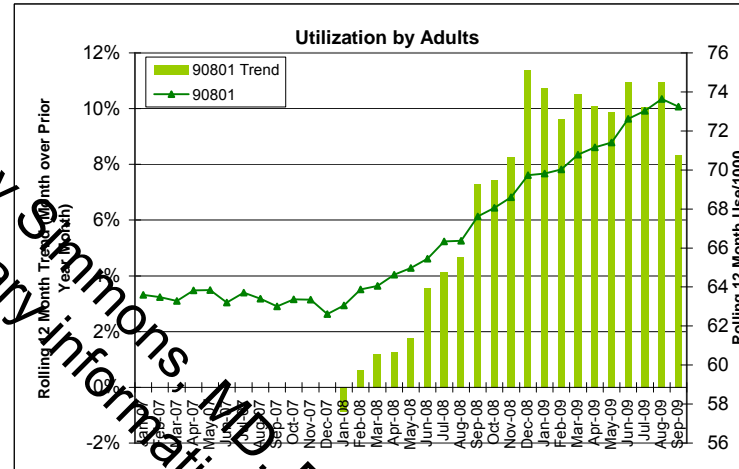
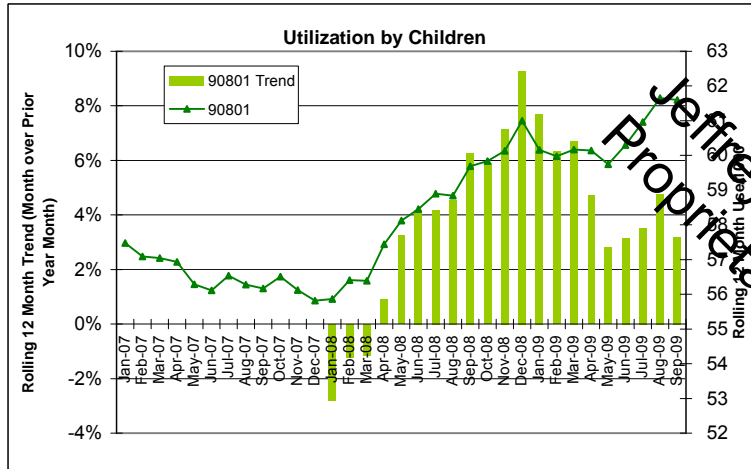
## Utilization of Procedure Codes 90801

Local HMO/POS, Fully Insured & ASC

Incurred Jan '06 through Sept '09, Paid through Oct '09

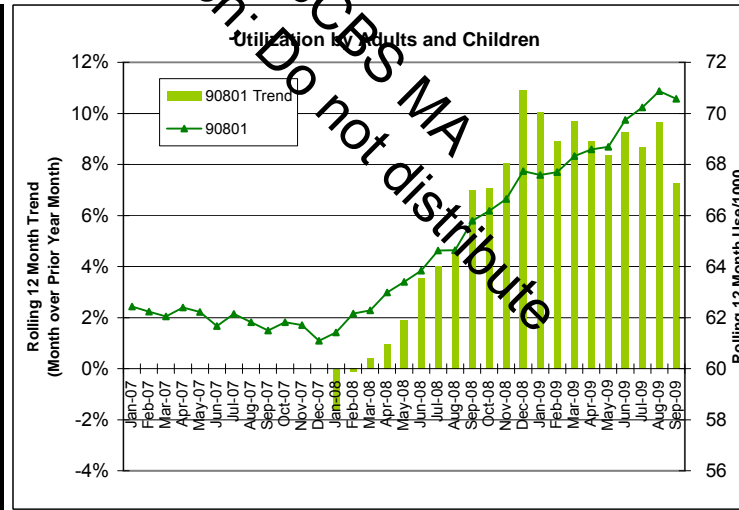
Completion Applied

90801 - Psychiatric diagnostic interview examination



## Sum of Encounters (All Ages) By Procedure Code

Cpt Pmod1 Cd	90801	96110	Grand Total
(blank)	29,848	62,794	92,642
U1 - Medical level of care 1, as defined by each state		30,923	30,923
59 - Distinct Procedural Service		23,504	23,504
AJ - Clinical Social Worker	2,021		2,021
HO - Masters Degree Level	1,735		1,735
U2 - Medical level of care 2, as defined by each state		1,532	1,532
AH - Clinical Psychologist	1,388		1,388
U5 - Medical level of care 5, as defined by each state		943	943
25 - Significant, separately identifiable evaluation and management service by the same physician on the same day of the procedure or other service	35	395	430
AF - Specialty Physician	285		285
HA - Child/adolescent Program	266		266
SA - Nurse Practitioner rendering service in collaboration with a physician	165	77	242
U6 - Medical level of care 6, as defined by each state	175	55	230
52 - Reduced Services		195	195
TD - RN	185		185
51 - Multiple Procedures		185	185
U7 - Medical level of care 7, as defined by each state	31	114	145



\*Child defined as 18 years or younger

# Blue Cross Blue Shield of MA Pediatric Mental Health

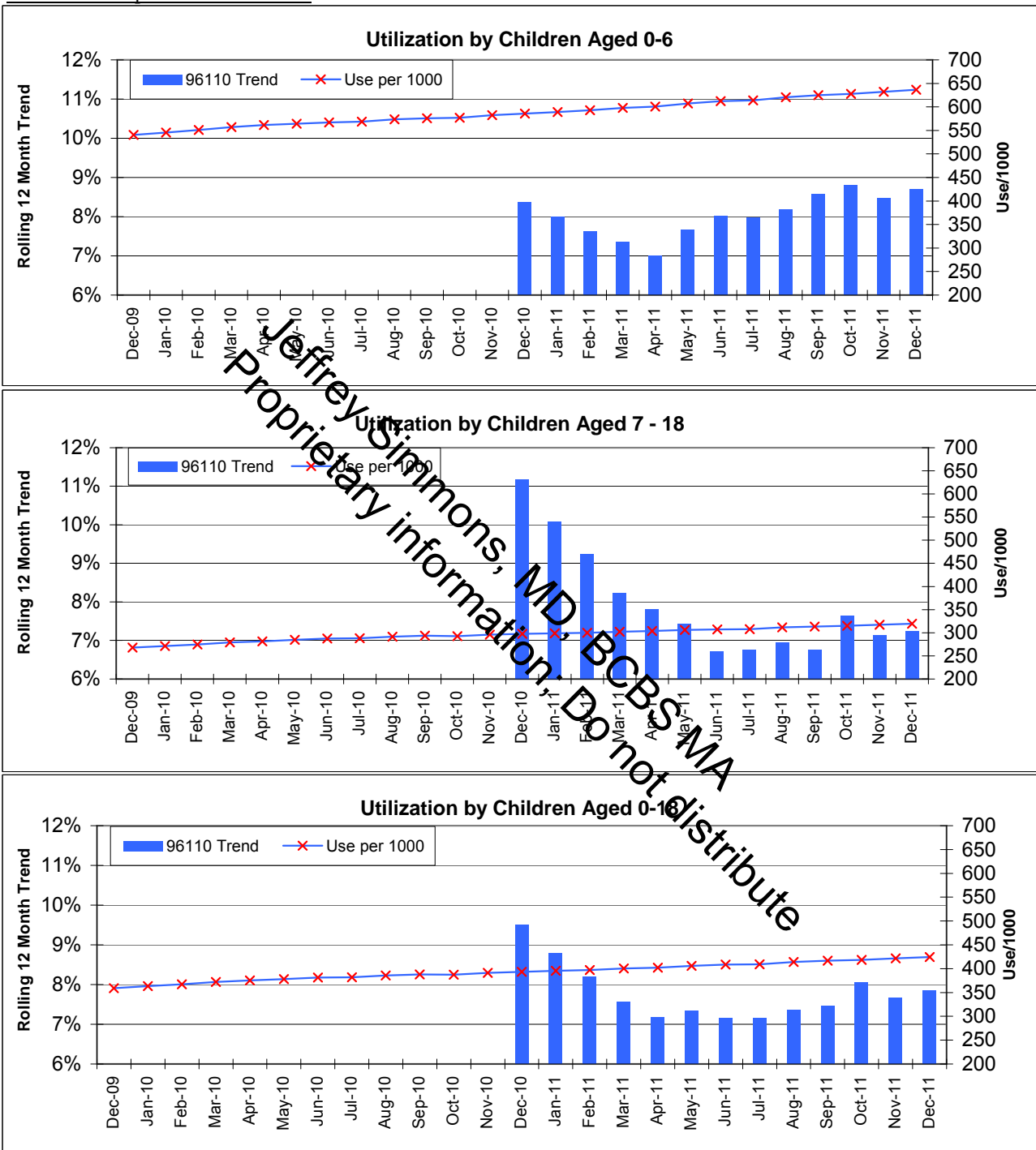
## Utilization of Procedure Code 96110

Commercial Products (HMO,POS,PPO,SPPO); Fully Insured & ASC

Incurred Jan '09 through Dec '11 paid through May '12

Completion Applied

96110 - Developmental Test Limited



### Notes:

- \* The ratio of children aged 7-18 vs. 0-6 year olds is approximately 2:1.
- \* The use per 1000 from Dec '09 to Dec '11 increased from 359 to 424 (+18.1%) in children of all ages.
- \* Average membership for all ages in this same time frame declined from 574,511 to 504,155 (-12.2%).
- \* Trend has been between ~7% and ~8% in the last 11 months ending Dec '11 for all ages.

06/26/2012



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State	Medicaid Program Name	Is Screening Required?	Website	PSC Recommended?	Website Including PSC Recommendation	Which Other Measures are Recommended?
Arizona	Arizona Health Care Cost Containment System	yes	<a href="http://www.arahccos.org/shared/Downloads/MedicaidPolicyManual/Chac600.pdf">http://www.arahccos.org/shared/Downloads/MedicaidPolicyManual/Chac600.pdf</a>	yes	<a href="http://www.arahccos.org/shared/Downloads/MedicaidPolicyManual/AppendixII.pdf">http://www.arahccos.org/shared/Downloads/MedicaidPolicyManual/AppendixII.pdf</a>	The PEDS screening should be completed for NICU-discharged EPSDT members from birth through eight (8) years of age.
California	Medi-Cal	no	<a href="http://files.medi-cal.ca.gov/cdradocuments/followups/masterlist_ofnewfollowups/mcfolwup9814.pdf">http://files.medi-cal.ca.gov/cdradocuments/followups/masterlist_ofnewfollowups/mcfolwup9814.pdf</a>	yes	<a href="http://www.dhs.ca.gov/services/chds/cdradocuments/followups9814.pdf">http://www.dhs.ca.gov/services/chds/cdradocuments/followups9814.pdf</a>	General Screening Tools: ASQ, ASQ-3, PEDS, PEDS-DM Other Tools: ASQ-SE, M-CHAT, PODS-T-II, SCQ, SESBS-DP, EMPP
Delaware	Delaware Health and Social Services	yes	<a href="http://legis.delaware.gov/LIS/lis145.nsf/vol_ea10a10418+119d9f5e4e6a.htm?open">http://legis.delaware.gov/LIS/lis145.nsf/vol_ea10a10418+119d9f5e4e6a.htm?open</a>	yes	<a href="http://odapics.saspublications.org/content/106/1/165.full.pdf+html">http://odapics.saspublications.org/content/106/1/165.full.pdf+html</a>	In AAP position paper: PEDS, ASQ, CDI, Denver-II screening test, Bayley Infant Neurodevelopmental Screener, Battelle Developmental Inventory, Early Language Milestone Scale, Brigance Screens, CAT-CLAMS, Temperament and Aypical Behavior Scale, Child Behavioral Checklist, The Conny Temperament Scales, Eyberg Child Behavior Inventory, Pediatric Symptom Checklist, Family Psychosocial Screening, CHAT.
Georgia	Department of Community Health	yes	<a href="http://www.aabap.ga/member_programs/developmental_screening.html">http://www.aabap.ga/member_programs/developmental_screening.html</a>	yes	<a href="https://georgia.wellcare.com/WC-assets/georgia/assets/PProvider_EPSDT_DevelopmentDelay.pdf">https://georgia.wellcare.com/WC-assets/georgia/assets/P-provider_EPSDT_DevelopmentDelay.pdf</a>	PEDS, M-CHAT, ASQ, CDI, BINS, Brigance Screens, BOIST, ECBI, SESBI-R, Family Psychosocial Screening, SWIWS
Illinois	Dept of Healthcare and Family Services	yes	<a href="http://www.hfs.illinois.gov/assets/hf200.pdf">http://www.hfs.illinois.gov/assets/hf200.pdf</a>	no, but it appears on the Illinois Department of Healthcare and Family Services Assessment Form for children 6-12	<a href="http://www.hfs.illinois.gov/assets/comm_assessment_appendix_b.pdf">http://www.hfs.illinois.gov/assets/comm_assessment_appendix_b.pdf</a>	ASQ, ASQ-SE, Battelle Developmental Screener, Bayley Infant Neurodevelopmental Screener, BITSEA, Brigance Early Preschool, Chicago Early Developmental Screening Inventory, Denver DST/Denver II, Developmental Profile II, Dial-R Developmental Assessment, Dial -3, Early Language Milestone Scales Screen, Early Screening Inventory, Early Screening Profiles, Infant-Toddler Symptom Checklist, Minnesota Preschool Screening Instrument, M-CHAT, PEDS, PEDS: DM, POINT, Project Memphis DST, Revised Developmental Screening Inventory, Revised Parent Developmental Questionnaire, TABS Screener Vineland Adaptive Behavior Scales, Vineland Social-Emergency Early Childhood Scales, Vineland Social Maturity Scale
Maine	MaineCare	yes	<a href="http://www.mainecarealliance.org/body_and_resources/doc_view/515.first_steps-phase_2-chapter.html">http://www.mainecarealliance.org/body_and_resources/doc_view/515.first_steps-phase_2-chapter.html</a>	yes	<a href="http://ncrcps.org/ap_content/uploads/Maine-ped_symptom_check-11.pdf">http://ncrcps.org/ap_content/uploads/Maine-ped_symptom_check-11.pdf</a>	PEDS, ASQ, M-CHAT-I, M-CHAT-2
Massachusetts	MassHealth	yes	<a href="http://www.mass.gov/eohhs/docs/masshealth/providermanuals/app-w-all.pdf">http://www.mass.gov/eohhs/docs/masshealth/providermanuals/app-w-all.pdf</a>	yes	<a href="http://www.mass.gov/eohhs/docs/commissions-and-initiatives/chbs/screening-for-behavioral-health-conditions/the-masshealth-approved-screening-tools/">http://www.mass.gov/eohhs/docs/commissions-and-initiatives/chbs/screening-for-behavioral-health-conditions/the-masshealth-approved-screening-tools/</a>	ASQ-SE, BITSEA, CRAFT, M-CHAT, PEDS, PHQ-9, SEQ
Michigan	Dept of Community Health	yes	<a href="http://www.michiganhealth.com/providers/critical-resources--media/documents/preventive-care/mch-dev-screening-overview.aspx">http://www.michiganhealth.com/providers/critical-resources--media/documents/preventive-care/mch-dev-screening-overview.aspx</a>	N/A	N/A	ASQ, ASQ-SE, PEDS, PEDS: DM
Minnesota	Department of Human Services	no	<a href="http://www.health.state.mn.us/divs/fmh3/devmhc/scrprogram.html">http://www.health.state.mn.us/divs/fmh3/devmhc/scrprogram.html</a>	yes	<a href="http://www.health.state.mn.us/divs/fmh3/devmhc/scrpage.html">http://www.health.state.mn.us/divs/fmh3/devmhc/scrpage.html</a>	ASQ-3, BEH II, Bayley-III, Brigance Early Childhood Screens, CDR-PQ, DIAL-4, ESI-R, ESP, FirstSTEP Preschool Screening Tool, IDI, MPIS-R, PEDS, ASQ-SE, BITSEA
North Carolina	Department of Health and Human Services	yes	<a href="http://complan.hhs.nc.gov/media/publications/tcr-abcd-project.pdf">http://complan.hhs.nc.gov/media/publications/tcr-abcd-project.pdf</a>	yes	<a href="http://www.eohhs.gov/training/ppe-dev-center/wp-content/uploads/files/step-by-step-from-peds-to-his-instructions.pdf">http://www.eohhs.gov/training/ppe-dev-center/wp-content/uploads/files/step-by-step-from-peds-to-his-instructions.pdf</a>	ASQ, PEDS
Tennessee	TennCare	yes	<a href="http://www.tn.gov/tencare/beneficiaries/beneficiaries.shtml">http://www.tn.gov/tencare/beneficiaries/beneficiaries.shtml</a>	yes	<a href="http://www.tn.gov/tencare/beneficiaries/beneficiaries.shtml#screeningtools">http://www.tn.gov/tencare/beneficiaries/beneficiaries.shtml#screeningtools</a>	CDI, PEDS, Brigance Screens
Texas	Texas Health and Human Services Commission	yes	<a href="http://www.dshs.state.tx.us/nhtscsp/providers_components.shtml">http://www.dshs.state.tx.us/nhtscsp/providers_components.shtml</a>	yes	<a href="http://www.bhssthis.com/cons/temrod013">http://www.bhssthis.com/cons/temrod013</a>	ASQ, ASQ-SE, PEDS, M-CHAT

## Report on the use of the Pediatric Symptom Checklist in a 4 site Federal Demonstration of Integrated Health and Mental in Pediatrics

### Developing Models of Integrated Health Care: A Federal Demonstration Program

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#### Background

Based on its recognition of the importance of mental health to children's overall health and well-being, the limited access that young people have to mental health services relative to primary care services, and the paucity of models that address these issues, the Maternal and Child Health Bureau of the US Health Resources & Services Administration began a 2-phase initiative, "Integrated Health and Behavioral Health Care for Children, Adolescents and Their Families," in 2000.

#### Goals of the MCHB IHBHC Program

- Promote the development of integrated service delivery models that meet the unique needs of different communities' children and adolescents:
  - integrate physical health and medical care, mental health care, and substance abuse prevention and treatment services
  - encompass the continuum of preventive, treatment and maintenance services
- Position grantees for further development, and sustainability of services system

#### Phases of the IHBHC Program

- Planning Grants
  - 23 two-year awards in 3 cohorts
- Implementation Grants
  - 4 three-year awards in 2 cohorts
  - additional cohort of awards in FY 2006

#### Evaluation/Dissemination contracts

- Team from MGH conducted evaluation; Preliminary report completed May, 2005; Final report due April, 2006
- Professional dissemination contractor Products due December, 2005

#### Implementation Grantees

##### New York City: Gouverneur Healthcare Services

**Site:** large pediatric clinic in health center in inner city area of a major city; **Size:** 9.5 FTE MD's; 6 FTE behavioral health (BH) staff

##### Rochester, NY: Unity Health Systems

**Site:** 12 sites in a primary health care network in urban/suburban medium sized city

**Size:** 34 Family Practitioners/Pediatricians; 9 BH staff

##### Missouri: Burrell Behavioral Health System

**Site:** 4 different practices: pediatric, family practice, university, and dental in a high poverty area of a small city; **Size:** 6 FTE MD's; 4.5 FTE BH staff

##### Tennessee: Cherokee Health Systems

**Site:** health system serving a rural area including pediatric and family practice; **Size:** 18 FTE MD's; 66 FTE BH staff

#### Findings

##### Models of intervention

- All 4 sites provided co-located BH services
- Various types of BH clinicians across sites
- Grantees with multiple small practices put BH clinicians on-site using a circuit rider approach
- Patients with extensive problems were referred out for more comprehensive services

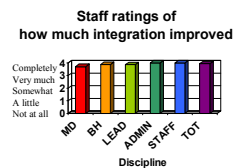
##### Models of screening

- All 4 sites employed routine screening (all used the PSC and/or other screens, like the GAPS)
- Urban, suburban and rural sites employed routine screening
- Total screens across all 4 sites = 8579

##### Specific Results

##### Perceptions of Primary Care, BH, & Admin staff from all sites (N=70)

- Quality of patient care is now higher 96%
- Physical & BH care are better integrated 97%
- Continue integrated care 97%
- Continue to screen for BH problems 97%
- More patients with BH problems identified 90%



#### Degree of Primary Care/BH integration achieved across 14 domains\*

	Pre	Post	Change In mean	Range (change)
Governance & leadership	3.0	3.8	0.8	(0-2)
Blending of staff	2.0	4.0	2.0	(1-3)
Operations & management	2.3	2.3	0.0	(0-0)
Facilities & equipment	1.5	3.0	1.5	(0-2)
Financing	2.0	2.8	0.8	(0-2)
Legal & regulatory	2.8	4.3	1.5	(0-3)
Functioning in managed care	1.0	1.5	0.5	(0-1)
Interactions among disciplines	2.0	3.8	1.8	(1-3)
Education & training	1.8	3.5	1.8	(1-3)
IT & medical records	2.3	4.0	1.8	(0-3)
QA & QI	2.8	3.3	0.5	(0-2)
Evaluation	1.5	3.3	1.8	(1-2)
Involvement with community	2.0	3.0	1.0	(1-1)
Strategic planning	2.3	4.7	2.3	(0-3)
Mean of 14-points	2.2	3.4	1.3	(.5-1.9)

\*Mean across 4 implementation grantees; Integration ratings: 1=Not at all; 2= Minimal; 3=Moderate; 4=Very much; 5=Completely integrated

##### Conclusions

MCHB successfully implemented the IHBHC Program and the result was the successful implementation of 4 different models. All models involved co-location of BH services in primary care and routine psychosocial screening. Almost all staff from the four implementation sites rated the overall quality of care, as well as the degree of integration, as having improved and the wish to continue after funding ended. The implications are that, for **only** a small investment, health care systems can develop an integrated approach to comprehensive health care of children and adolescents.

The Primary Care Clinician (PCC) Profile Report is a practice-management tool that reports information about your practice and the PCC Plan. The PCC Profile Report provides information on selected clinical measures that you can use to improve healthcare delivery and, ultimately, the health outcomes of your PCC Plan members. PCC Profile Report information is based on claims; therefore, the quality of the data is dependent on the accuracy of information submitted on claims. This User's Guide provides an overview of the methodologies utilized in the PCC Profile Report; the detailed data specifications are available upon request from your Regional Network Manager (RNM).

The report displays rates of service for members enrolled in your PCC practice and for the PCC Plan as a whole. The benchmark is the rate achieved by the percentile of profiled PCCs in the PCC Plan. Please refer to your prior Profile Reports for trend data displayed in previous cycles.

Measure and Rationale	Members Eligible for the Measure	Data Presented
<b>PCC Panel Information</b> Member data are presented to support quality improvement initiatives.	Members eligible are all members enrolled in your panel as of 12/31/10.	Data include members in your panel and in the PCC Plan by age, gender, disability status, DMH status, Essential or Basic coverage, length of enrollment, and the proportion of members in your panel with one or more visits during the measurement period (access).
<b>PCC &amp; Service Location Comparison</b> Your performance is compared to other PCCs with PCC Plan members in their panel. Your overall PCC rates and rates for each service location within your PCC practice inform your practice about opportunities to improve care at the service location level.	Members are included according to their eligibility for each measure.	Rates for each measure are divided into quartiles and ranked using stars as shown in the Legend. PCCs with the highest performance receive 4 stars and those with the lowest receive one star.  The rates presented here are described in the sections below.
<b>Pediatric Behavioral Health</b> Early detection and follow-up of behavioral health conditions can significantly improve health outcomes for children. This measure provides information on two rates related to the behavioral health of your members under the age of 21. <ul style="list-style-type: none"> <li>The rate of members in your practice who received a behavioral health screen at the time of the most recent well-child care visit;</li> <li>The rate of follow-up for a behavioral health need identified during the behavioral health screen at the time of the most recent well-child care visit.</li> </ul> Data are presented to support quality improvement initiatives. The rate of behavioral health screening at the time of the well-child care visit and the rate of follow-up for a potential behavioral health need identified at the behavioral health screen may reflect opportunities for improvement.	Members eligible for this measure are: <ul style="list-style-type: none"> <li>Members between the ages of 0 – 20 with a well-child care visit between 7/1/10 and 12/31/10;</li> <li>Continuously enrolled in the PCC Plan between 7/1/10 and 12/31/10 or, if the member is &lt;6 months of age, then continuously enrolled in the PCC Plan from the age of 31 days through the end of 12/31/10;</li> <li>Enrolled in your panel as of 12/31/10.</li> </ul>	<b>Rates:</b> The screening rate is the percent of members whose most recent well-child care visit* (provided by you or any other MassHealth provider during the measurement period) included a behavioral health screen. The behavioral health screen is identified by the CPT code 96110 billed for the member on the same date of service as the well-child care visit. The follow-up rate is the percent of members who received follow up care for the potential behavioral health (BH) need identified during the behavioral health screen at the time of the most recent well-child care visit. A potential BH need is identified by the presence of a U-even modifier (U2, U4, U6, or U8) that accompanies the claim for the behavioral health screen (96110).** Follow-up is identified by a claim submitted within 90 days after the behavioral health screen. The claim for follow up may be submitted by a behavioral health provider or any MassHealth outpatient provider that includes: a principal or secondary behavioral health diagnosis; or selected CPT service codes; or a claim for Early Intervention (EI) services; or Individualized Education Program (IEP) services.***

\* WELL-CHILD CARE VISIT CODES: CPT codes: 99381-99385, 99391-99395, 99431, 99432, 99460, 99461. ICD-9 codes V20.2; V70.0; V70.3; V70.5-6; V70.8-9 from all diagnostic fields or T1015 with one of the previous ICD-9 codes.

\*\*BEHAVIORAL HEALTH SCREENING CODE: CPT code 96110 and state-defined modifiers U1-U8

\*\*\* BEHAVIORAL HEALTH SCREENING FOLLOW-UP: An office visit with any MassHealth outpatient provider that includes a principal or secondary behavioral health diagnosis; a visit with a behavioral health provider; or claim submitted with any of the following CPT codes: 90801, 90804, 90847, 90853, 96101, 96110, 96118, 96153, H0018, H2015, T1018, T1023, T1024



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### **Evaluation of the Expansion of the Comprehensive Children Mental Health Initiative (CMHI)**

Under a five year contract from the Center for Mental Health Services, SAMHSA, Westat is leading the national evaluation of the Comprehensive Community Mental Health Services for Children and Their Families Program [also referred to as the Children's Mental Health Initiative (CMHI)]. The CMHI is based on the Systems of Care (SOC) framework, defined as a comprehensive spectrum of mental health and other necessary support services which are organized into a coordinated network to meet the multiple and changing needs of children, youth, and young adults with serious emotional disturbances (SED), and their families. Systems of care developed in response to the need to improve the organization, coordination and delivery of children's mental health services and address clinical and functional outcomes of children, youth, and young adults with significant mental health needs. Additionally, CMHI Systems strive to develop coordination of services for children and youth beyond mental health services to those provided by other child serving agencies such as education, juvenile justice, and child welfare. The creation of a SOC involves a multi-agency, public and private approach to delivering services, an array of service options, and flexibility to meet their full range of needs.

From 1993 through 2010, SAMHSA awarded grants to communities in all 50 states to develop systems of Care at the local level. In 2011, with the goal of scaling up the CMHI program, SAMHSA awarded 1-year systems-of-care expansion planning grants to jurisdictions (typically States, counties, or tribal groups) to develop a comprehensive strategic plan for providing and expanding services provided by systems of care to additional areas of the state, and to populations not currently served by an SOC. In 2012, SAMHSA began awarding 4-year Systems-of-Care Expansion Implementation Grants intended to help jurisdictions carry out plans to implement the systems-of-care framework throughout the jurisdiction. Since 2011, SAMHSA has funded a total of 72 grants under this program and expects to continue to fund new grants each year.

Over the next five years, FY 2014 through FY 2018, the Westat team in collaboration with a variety of academic and advocacy institutions, will evaluate CMHI expansion planning and implementation grantees through a variety of evaluation and data collection methods including: stakeholder interviews, web-based surveys, network analysis, geographic information systems (GIS) analysis and direct data entry of client level services and outcomes in web-based electronic data systems.

Westat will collect data from grantees at three levels including the jurisdiction or system level, the local service level, and the child and family level. Data collected at the system level will examine the extent to which system-level policies, administration, financing, and monitoring reflect systems-of-care values and support systems-of-care practice at the service level across jurisdictions. At the service level, data will be collected at the local agency level to address client-level practice across multiple direct service providers within a community as well as child and family service experiences. Data will be collected on individual children and families: to determine the characteristics of those being served, the services provided and received, and to assess longitudinally clinical and functional outcomes. By examining all three levels the evaluation will provide a complete picture of the implementation outcomes of the grant programs, and the experience of all the participants.

**TABLE. PSC TEST-RETEST STUDY IN MGH CHILD PSYCHIATRY – MOTHERS ONLY (N=25)**

<b>Scale</b>	<b>Test-Retest <i>r</i></b>	<b>Mean Score</b>	<b><i>SE</i></b>	<b><i>SD</i></b>	<b>Positive Rate</b>	<b>Cronbach's Alpha Coefficients <math>\alpha</math></b>	<b>Cohen's Kappa</b>
Global	.93						.56
<i>T1</i>		26.16	2.47	12.37	56%	.89	
<i>T2</i>		24.76	2.44	12.22	36%	.90	
Attention	.90						.79
<i>T1</i>		4.44	.56	2.80	20%	.74	
<i>T2</i>		4.48	.62	3.10	28%	.81	
Externalizing	.90						.87
<i>T1</i>		4.28	.78	3.91	20%	.86	
<i>T2</i>		3.60	.71	3.57	16%	.84	
Internalizing	.93						.92
<i>T1</i>		5.12	.64	3.19	56%	.87	
<i>T2</i>		4.76	.61	3.06	52%	.85	

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Behavioral health services following implementation of screening in children enrolled in  
Massachusetts Medicaid

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fax 412-578-8325

**Short Title:** Behavioral health services following screening in MA

**Abbreviations:**

ADHD: Attention deficit hyperactivity disorder  
ADD: attention deficit disorder; BH-Behavioral Health;  
CBHI: Childrens Behavioral Health Initiative;  
CPT: Current Procedural Terminology  
HMORN:HMO research network  
HCPC; Healthcare Common Procedural Codes  
MCO: managed care organizations  
PCC: Primary Care Clinician;;  
PPV: positive predictive value  
RUCA: Rural urban community area  
SFY: State Fiscal Year

**Key Words:** Behavioral health services, screening, primary care, Medicaid, children

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authors

Contributor's Statement:

Karen A. Hacker: Dr. Hacker conceptualized the analyses, guided the analysis and led the writing of the manuscript. She approved the final manuscript.

Robert Penfold: Dr. Penfold provided guidance on the analysis and reviewed and edited the manuscript and approved the final manuscript

Lisa Arsenault: Dr. Arsenault provided guidance on the analysis and reviewed and edited the manuscript and approved the final manuscript

Fang Zhang: Dr. Zhang provided guidance on the analysis and reviewed and edited the manuscript and approved the final manuscript

Michael Murphy: Dr. Murphy provided guidance on the analysis and reviewed and edited the manuscript and approved the final manuscript

Larry Wissow: Dr. Wissow provided extensive guidance on the conceptualization of the study, the analysis and edited the manuscript and approved the final manuscript. He also provided funding of for the project through his NIH center grant.

**What's Known on This Subject:**

Behavioral health (BH) screening is known to increase identification of children with BH issues, but in small-scale studies, rates of follow-up after screening have been reported to be low.

**What This Study Adds:**

This study tracks post-screening BH services after a state-wide effort to improve detection and treatment of child BH problems. Nearly 60% of children identified with BH problems received BH services, but only 30% of newly identified children received BH services



## Abstract.

**Objectives:** To determine the relationship of child BH screening results to receipt of BH services in Massachusetts Medicaid (MassHealth) children.

**Methods:** Following a court decision, Massachusetts primary care providers were mandated to conduct BH screening at well-child visits and use a CPT code along with a modifier indicating whether a BH need was identified. Using MassHealth claims data, a cohort of continuously enrolled (July 2007 – June 2010) children was constructed. The salient visit (first use of the modifier, screening code, or claim in FY'09) was used as a reference point to examine BH history and post-screening BH services. Bivariate and multivariate logistic regression analyses were performed to determine predictors of receipt of post-screening BH services.

**Results:** Of 261,160 children in the cohort, 45% (118,464) were screened and 37% had modifiers. Fifty-seven percent of children screening positive received post-screening BH services compared to 22% of children screening negative. However, only 30% of newly identified children received BH services. The strongest predictors of post-screening BH services for children without a BH history were being in foster care (Odds Ratio (OR) =10.38, 95% confidence interval (CI) 9.22-11.68) and having a positive modifier (OR 3.79 95% CI 3.53-4.06).

**Conclusion:** Prior BH history, a positive modifier and foster care predicted post-screening BH services. Only one third of newly identified children received services. Thus while screening is associated with an increase in BH recognition, it may not be sufficient to improve care. Additional strategies may be needed to enhance engagement in BH services.

## INTRODUCTION

Today, 1 in 5 children suffer from behavioral health (BH) problems but fewer than 30% receive treatment.<sup>1,2</sup> BH screening in primary care is recommended as a way to identify children with BH issues and facilitate their entry into BH treatment<sup>3,4</sup> However, while screening has improved identification,<sup>5</sup> thus far there has been little evidence to suggest that it leads to adequate BH treatment for newly identified issues.<sup>6</sup>

In 2008, Massachusetts implemented one of the largest enhanced children's mental health programs in the nation—the Children's Behavioral Health Initiative (CBHI)—resulting from a court-ordered remedy for the class action suit, *Rosie D vs. Patrick*.<sup>7</sup> Part of the initiative mandated providers to conduct BH screening at well-child visits for all children  $\leq 21$  years of age who were covered by Medicaid health insurance (MassHealth). Providers could choose from an approved list of 8 validated screening tools (see supplemental table).<sup>8</sup> Screening was reimbursed and billed using the Current Procedural Terminology (CPT) code 96110.<sup>9</sup> In July of 2008, providers were also required to use a modifier along with the 96110 code to indicate whether a child had a BH issue identified at the screening visit although these codes were not required for reimbursement until 2011.<sup>9</sup>

Previous studies of post-screening service utilization have been limited often relying on small samples.<sup>10-12</sup> Of the two papers written to date about data from CBHI, the one that explored outcomes reported that referrals for BH services statewide in Massachusetts increased after the CBHI program was implemented<sup>13</sup> but was cross sectional in design and could not follow individual children to determine whether they received services. An earlier paper by our group on CBHI utilized multiple years of data but focused on individual background features rather than outcomes.<sup>14</sup>

To date, little is known about whether children who receive screening go on to obtain specialty BH services or what predicts receipt of services. To address this research gap, the current study sought to determine whether screened children, particularly those "newly identified" as having BH issues, received BH services following their screening visits. Secondly, we sought to identify predictors of BH service receipt among screened children.

## **METHODS**

Data were extracted from the Medicaid State Information System and covered state fiscal years (SFY) 2008 to 2010 (July 2007-June 2010). The dataset included eligibility, all encounter (managed care) and claims (fee-for-service) for physical and BH services, and pharmacy files for all children enrolled in both managed care organizations (MCOs) and fee-for-service arrangements. In MA, the majority of children are enrolled in one of 5 integrated MCOs, where physical and BH care are managed, or in the Primary Care Clinician program (PCC) where BH is managed and physical care remains fee-for-service. Approximately 11% of children are in fee-for-service for both BH and physical care. Children with severe psychiatric disorders and those in foster care were included in the dataset. However, BH services provided by non-MassHealth providers (school counselors, Department of Mental Health and Department of Children and Families staff) were not included since these services are not billed. The data were de-identified by MassHealth before delivery and unique study IDs provided. Prior to primary data analysis, we conducted descriptive quality assurance analyses. No significant irregularities in rates of demographic characteristics or over time were found, giving us confidence in the quality of the data. This study was approved by the Cambridge Health Alliance Institutional Review Board in 2011.

## **Sample**

The initial sample was constructed using SFY'09 data (one year after the modifier scheme was mandated by MassHealth). There were 544,833 children with any enrollment in SFY'09 who were < 16 years of age. To insure continuous enrollment, we identified children with 300 or more days of eligibility in SFY'09. This process excluded 154,500 (28%) children. Excluded children were significantly younger, more likely to be in foster care and more likely to be of unknown race/ethnicity than those with 300 days of enrollment ( $p < .0001$ ). Screens were identified by presence of a 96110 CPT code. Screens with a modifier of U1, 3 or, 5 (no BH issue identified) were termed negative modifier or negative screens. Screens with a modifier of U2, 4, or 6 (BH issue identified) were termed positive modifier or positive screen for the purposes of this study. The modifier numbers signified the provider type; physician (1, 2) Nurse practitioner (3,4) and Physician Assistant (5, 6).

The resulting 390,383 eligible children The characteristics of this population are described elsewhere.<sup>14</sup> were then categorized into six groups (Figure 1) based on their service use and BH screening in SFY'09: 1) at least one BH screen with a “negative” modifier but no positive modifier; 2) at least one BH screen with a “positive” modifier; 3) at least one BH screen but without any modifiers; 4) children with well-child care but no claim for a BH screen; 5) children with neither well-child visits nor BH screen claims; and 6) children with eligibility but no claims or encounters. Given the nature of the data, we cannot determine whether a screen without a modifier was positive or negative or why the modifier was missing. However, in a previous study that examined characteristics of children based on modifiers we found that children with negative modifiers closely resembled those without modifiers. (hacker)

An index or “salient” screening visit date was assigned to children/youth based on the date of the first negative modifier (for those without positive modifiers-Group 1), the first

positive modifier (for Group 2), and the first use of 96110 for those without any modifiers (Group 3). For groups without visits including a screening claim, the first well-child visit (Group 4) or the first claim/encounter (Group 5) were used as the salient visits. We excluded Group 6 (no claims or encounters in SFY'09) from further study since they had no “salient visit” from which to examine past utilization.

To construct our continuously enrolled cohort, we further limited our sample to children with at least 300 days of eligibility in each of FY'08, FY09 and FY10 (July 2007-June 2010). This created a group with near-continuous enrollment and a range of 301 to 729 days of coverage before and after the salient visit. Approximately 22-27% of children were lost from each group defined above in this process.

## **Variables**

The dependent variable of interest--post-screening specialty BH services- included the four categories shown in Table 2. These include the following; a psychopharmacology visit defined as a claim for psychopharmacology occurring; a psychiatric visit defined as the presence of any claim/encounter with CPT codes used by psychiatrists, psychologists and social workers (90801-90899); and a health or behavioral assessment defined as visits with CPT codes (96100-96103, 96105, 96111, 96115-96120, 96125, 96150-96155) and non-physician mental health visits defined as other BH professional codes (Healthcare Common Procedural Codes; HCPC - H codes). In addition, the new HCPC codes introduced in Massachusetts to track remedy services for the CBHI (S9484 and S9485-crisis intervention and T1027, T1017 and T2022-family counseling and case management) were included. We examined visits occurring at any time after the salient visit and within 3 months of the salient visit.

Psychopharmacology agents were defined using the HMO research network (HMORN)<sup>15</sup> and the Mental health Research Network (MHRN)<sup>16</sup> categories for medications based on National Drug Codes. This included ADD-Other (non-stimulant medications), antidepressants, anti-anxiety-other (non-benzodiazepines), anticonvulsants, antipsychotic-1<sup>st</sup> generation, antipsychotic-2<sup>nd</sup> generation, benzodiazepines, COMBO (all combination psychotropic medications), hypnotic-other (e.g., zolpidem), lithium, and stimulants (a full list of study medications is available upon request). Drugs with possible dual use were excluded, including: antidepressants used primarily for migraines and enuresis in children (imipramine, amitriptyline), antidepressants used for sleep (doxepin, trazadone) when no other psychiatric medication was being used and there was no BH ICD9CM code, and anticonvulsants unless accompanied by any BH ICD9CM code. For example, if a patient had a bipolar diagnosis on any prior visit and also used an anticonvulsant, they were included as using psychopharmacology. Medication coding was done by algorithm and by data analysts who were naïve as to screening and treatment coding.

The independent variables of interest included race/ethnicity (White, Black, Asian, Hispanic, Native American, mixed race, and unknown), urban/rural residence based on ZIP code coding from the Rural-Urban Commuting Area Codes (RUCAs),<sup>17</sup> foster care, age (as categorical variables: <5, 5-7, 8-10, 11-13, 14-16), and gender.

Past BH history was defined similarly to BH services with one addition: the presence of any claim with a BH diagnosis (International Classification of Disease, 9<sup>th</sup> revision, clinical modification (ICD9-CM) codes 290-319 on any claim) was also included in the definition.

## **Analysis**

Descriptive statistics for demographic and clinical characteristics were generated for each of the six groups of children using SAS 9.3.<sup>18</sup> As the cohort was developed, sensitivity analyses were

conducted to compare the sample to those children that did not meet eligibility criteria using chi-square statistics. Intergroup differences were also assessed using chi-square statistics and a Type-1 error of 0.01.

Multivariate logistic regression was used to determine predictors of future BH treatment for all children. Given the large number of children with unknown race/ethnicity, a problem common to Medicaid claims data studies,<sup>19,20</sup> we imputed race data for our final models using SAS PROCMI and all available independent and dependent variables. To verify our analyses we compared results to regression models using race data without imputation and found similar results. Tests for interaction of variables (BH screen, past BH history, and well-child care) were also conducted. To examine predictors of future BH treatment, models were first fit for all children. In an exploratory, univariate model, BH history was found to be the strongest predictor of future treatment (Odds Ratio 9.58,  $p < .001$ ). We therefore assessed the interaction between key variables: BH screen modifier (positive, negative, unknown), past BH history (present or absent) and well child visit (present or absent) in a fully saturated model. All BH history interaction terms were found to be significant ( $p < .001$ ). Therefore, to enhance the interpretability of results, stratified multivariate logistic regression models were fitted – one for children with a BH history and one for those without a BH history.

## RESULTS

### **Sample characteristics**

There were 261,160 children with at least 300 days of enrollment in each of FY08, 09 and 10. For the derivation of the sample see Figure 1. Children not meeting this criterion were more likely to be younger ( $< .001$ ) compared to children with continuous eligibility.

The final sample characteristics are shown in Table 1. About half (45%) of all children in the sample were screened (n=118,464). Approximately 19% (n=22,714) did not have a modifier code. Of the 95,750 patients with modifier codes, 14.7% screened positive. About 29% of all children had well-child visits without screens and another 29% did not have well child visits or screens during the index year.

### **Post-Screening Services**

Table 2 explores the differences among groups for post-screening specialty BH services. About 27% of all children received some form of BH service after screening and 98% of them received their services within 3 months following their salient visit (data not shown). Children with positive modifiers were significantly more likely to receive subsequent BH services than any other group. The leading forms of services (20%) were for “psychiatry visits” (psychiatric evaluation and/or therapeutic procedures by licensed mental health professionals). The most common treatment types within these services were psychotherapy (90806) and initial evaluation (90801). Among children who received BH services, 65% had claims for psychotherapy only, 26% received a combination of psychopharmacology and psychotherapy, and 9% only had claims for psychopharmacology (data not shown).

For each of the five screening groups, Table 3 shows post-screening BH services for children with and without a BH history. For all BH services except psychopharmacology, children with past BH history and a positive modifier were the most likely to receive BH services. Children without BH history who either had negative modifiers or were screened without modifiers were the least likely to receive services. Children with a BH history but without well-child care or screening were significantly more likely to have claims for psychopharmacology than any other group.



## **Predictors of Obtaining Services**

In our final models (Table 4), predictors of specialty BH services after the salient visit at any time and within a 3 month period were examined for all children and stratified by BH history. The second strongest predictor of services--regardless of BH history or timeframe--is having a positive screening modifier, with only foster care eligibility a uniformly stronger predictor. For children without a BH history, only being in foster care was a stronger predictor of receiving future services. Among children with a BH history, in addition to foster care eligibility, older age ( $\geq 8$  years) was a slightly stronger predictor of receiving services than having a positive modifier. Additionally, minority children (particularly Asians) were less likely to receive BH services than children of white race.

## **DISCUSSION**

In this study, 45% of MassHealth children received BH screening and 56% of those with positive modifiers received some BH services following their screening visit. Both rates represent the higher range of what has been reported elsewhere<sup>21-24</sup> Regardless of past BH history, a positive modifier increased the chance of receiving BH services from 10% to 30%. Only being in foster care (about 2% of the sample) was a consistently stronger predictor of receiving BH services.

The finding that BH history predicted receipt of BH services comes as no surprise. Prior research has demonstrated that children with positive modifiers are likely to have a history of BH services.<sup>14</sup> and that retrospective BH service use predicts future service use<sup>25</sup> In Massachusetts, providers were mandated to screen all children regardless of their history. But, even for children with existing BH histories (for whom screening is presumably not needed), it is possible that screening is still useful since a positive screen may prompt a clinician to reevaluate symptoms and make other treatment recommendations. .

For newly identified children, a positive screen predicted the receipt of specialty BH services. While this is an important finding, it is also important to note that a substantial portion of these children (over 70%) still failed to receive BH services following screening. This is of concern since the positive predictive value (PPV) of BH screens is about 55%<sup>24</sup> (the PPV of the positive modifier is unfortunately unknown) and Massachusetts represents an environment with ample specialty supply. Thus the gains in specialty service use seen in this study are modest and suggest that screening alone may be insufficient to improve care. It is likely that additional services linking primary care to specialty care may be necessary to fully support entry into BH care.

Even without referral to specialty mental health it is possible that many newly identified children had their BH needs met in primary care (e.g., for ADHD treatment) as recommended by the American Academy of Pediatrics.<sup>26</sup> To test this theory, we examined children with positive modifiers (but no billed BH services) to see if they had subsequent pediatric visits with associated BH diagnoses. We found that an additional 394 children with a BH history and 207 children without a BH history obtained at least one other pediatric visit with a BH diagnosis within 180 days of their screening visits. If these were included as BH service, it would raise the rate of newly identified children receiving BH service after screening modestly (from 30%) to 34%--still leaving a majority of positively screened children without evidence of BH services.

The other major predictor of services in this study was being in foster care regardless of BH history. Children in foster care have been found to be at higher risk for BH issues than other children insured by Medicaid.<sup>27-32</sup> Both their reasons for placement (e.g. abuse) as well as the transitions experienced while in foster care, contribute to their risk for BH issues.<sup>33,34</sup> Additionally, the fact that they are more likely to receive specialty care is probably a function of

the case management and outreach they receive as part of the foster care system. Other studies have noted that the child welfare system facilitates entry into BH treatment which was demonstrated here as well.<sup>33</sup>

Consistent with other studies, male gender and older age were predictive of future services<sup>14,33,35-37</sup> We also found that minority children (Hispanic, Black and Asian) were significantly less likely to receive services after their salient visit when compared to White children despite the introduction of mandatory screening. This was particularly true for the Asian population. According to a recent Institute of Medicine Report, minority youth are less likely to receive BH services when compared to their non-minority counterparts.<sup>38</sup> Disparities persist in BH treatment despite known high risk status<sup>39</sup> even in children involved with the child welfare system.<sup>40</sup> Future work is needed to better understand how mandated screening can improve engagement in BH treatment for minorities.

Lastly, it should be noted that BH services received by newly identified children were more likely to be for psychotherapy than for psychopharmacology suggesting that psychopharmacology was not the first treatment choice for these children. In contrast, children without well-child visits or screens were most likely to have claims for psychopharmacology perhaps because they had more severe psychiatric illness requiring medication but less connection to well-child care where screening occurs.<sup>41</sup>

## **Limitations**

This study was conducted using data from the first years of implementation of BH screening mandate. The percentage of well-child visits in which screening occurred continued to climb over subsequent years of the program, exceeding 67% by the end of 2011 (over 75% for 3-17 year olds. It is possible that our results would change as screening rates increased and as

MassHealth improved access to BH services; however, we were unable to examine this trend given the limited time period covered by the dataset. To date, there is no other state that has tracked this information for comparison but in a prior study of a Massachusetts pediatric practice, screening rates plateaued at about 70-80% after 4 years of screening (hacker, penfold). Some providers may not screen or bill for screening due to fears about insurance billing families, patient low literacy, unavailable translations, developmental delay (see Hacker paper 1) or children not coming in for well-child care.

Other limitations of our study include the fact that information was unavailable on a variety of important influential demographic variables such as language of care or other social determinants of health.<sup>42-44</sup> MassHealth children are likely different than commercially insured children. Moreover, the amount of “unknown” race data limits our ability to fully understand the contribution of race to our outcomes. The psychopharmacology information was limited to claims filled and did not represent prescriptions written. Finally, since mental health services delivered in schools were not included in the data, we may have underestimated the amount of BH services received.

We recognize that some children lacking a BH screening CPT code may have been screened without documentation and that screens without modifiers (due to provider oversight or inconclusive results) could have been either positive or negative. Finally, by creating a sample which eliminated children who did not meet criteria, we may have introduced bias into the study even though attrition was similar across groups.

## **Conclusions**

For children newly identified by BH screens, being in foster care and having a positive modifier at a screening visit are strong predictors of receiving post-screening specialty BH services. Yet,

many newly identified children do not receive services and racial/ethnic disparities persist. Thus while positive screening is strongly associated with increased service use, additional strategies may be necessary to achieve the goal of connecting all children with mental health problems to needed services.

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**Table 1 Characteristics of FY'09 cohort<sup>a</sup> (at least 300 days of eligibility in FY'08 and FY'10) N=261,160**

Characteristic	Total  N=261,160 N (%)	Negative Modifier <sup>b</sup>  N=83,448 N (%)	Positive Modifier  N=12,302 N (%)	Screen without Modifier  N=22,714 N (%)	Well Child Visit without Screen  N=67,393 N (%)	No Well Child Care or Screen  N=75,303 N (%)	P-Value
Gender							
Male	134,825 (51.63)	41,654 (49.92)	7,517 (61.10)	11,653 (51.30)	34,635 (51.39)	39,366 (52.28)	<.001
Female	126,335 (48.37)	41,794 (50.08)	4,785 (38.90)	11,061 (48.70)	32,758 (48.61)	35,937 (47.72)	
Age							
<5 years	68,895 (26.38)	27,026 (32.39)	3,581 (29.11)	7,790 (34.30)	20,205 (29.98)	10,293 (13.67)	<.001
5-7 years	49,692 (19.03)	16,038 (19.22)	2,396 (19.48)	4,340 (19.11)	12,383 (18.37)	14,535 (19.30)	
8-10 years	47,701 (18.27)	14,423 (17.28)	2,292 (18.63)	3,753 (16.52)	11,292 (16.76)	15,941 (21.17)	
11-13 years	46,190 (17.69)	13,475 (16.15)	2,149 (17.47)	3,556 (15.66)	11,265 (16.72)	15,745 (20.91)	
14-16 years	48,682 (18.64)	12,486 (14.96)	1,884 (15.31)	3,275 (14.42)	12,248 (18.17)	18,789 (24.95)	
Mean Age (SD <sup>c</sup> )	8.37/SD (4.63)	7.66/SD (4.64)	7.95/SD (4.57)	7.48/SD (4.66)	8.12 (4.69)	9.73 (4.24)	
Race/ethnicity							<.001
White	75,135 (28.77)	24,132 (28.92)	3,972 (32.29)	5,796 (25.52)	19,154 (28.42)	22,081 (29.32)	<.001
Asian	9,564 (3.66)	2,993 (3.59)	175 (1.42)	823 (3.62)	3,157 (4.68)	2,416 (3.21)	
Black	24,274 (9.29)	6,596 (7.90)	1,000 (8.13)	2,548 (11.22)	6,973 (10.35)	7,157 (9.50)	
Hispanic	46,661 (17.87)	15,313 (18.35)	2,516 (20.45)	4,722 (20.79)	10,997 (16.32)	13,113 (17.41)	
Native American	409 (.16)	130 (.16)	18 (.15)	28 (.12)	103 (.15)	130 (.17)	
Multiracial	7,976 (3.05)	2,584 (3.10)	414 (3.37)	729 (3.21)	2,190 (3.25)	2,059 (2.73)	
Unknown	97,141 (37.20)	31,700 (37.99)	4,207 (34.20)	8,068 (35.52)	24,819 (36.83)	28,347 (37.64)	
Urban <sup>d</sup> (N=259,308)	252,382 (97.33)	80,621 (97.20)	11,910 (97.38)	22,364 (99.02)	65,287 (97.53)	72,200 (96.77)	<.001
Foster Care	3,711 (1.42)	1,074 (1.29)	384 (3.12)	255 (1.12)	1,064 (1.58)	934 (1.24)	<.001
Past BH history	78,008 (29.87)	22,587 (27.07)	7,598 (61.76)	6,105 (26.88)	20,057 (29.76)	21,661 (8.29)	<.001

<sup>a</sup>Cohort has to have had at least 300 days of eligibility in FY'08 and at least 300 days of eligibility and utilization in FY'10 <sup>b</sup>Modifiers were used to indicate whether a BH need was identified or not. <sup>c</sup>Standard Deviation <sup>d</sup>The N for Urban/Rural was slightly reduced due to missing data.

**Table 2. Ambulatory behavioral health services and psychopharmacology after salient screening visit in FY'09 or FY'10 (N=261,160)**

Service Type	All N=261,160 N (%)	Negative Modifier N=83,448 N (%)	Positive Modifier N=12,302 N (%)	Screen without Modifier N=22,714 N (%)	Well Child Visit without Screen N=67,393 N (%)	No Well Child Visit or Screen N=75,303 N (%)	P-Value
Any use (includes all of the following)	69,341 (26.6)	18,496 (22.2)	6,958 (56.6)	4,813 (21.2)	17,242 (25.6)	21,832 (29.0)	<.001
Any use (includes all of the following) within 90 days	64,911 (24.9)	17,288 (20.70)	6,721 (54.6)	4,530 (19.9)	16,168 (24.0)	20,204 (26.8)	<.001
Psychopharmacology	24,346 (9.3)	5,167 (6.2)	2,447 (19.9)	1,234 (5.4)	6,061 (9.0)	9,437 (12.5)	<.001
Psychiatry Visit <sup>a</sup>	51,543 (19.7)	13,979 (16.8)	5,439 (44.2)	3,394 (14.9)	12,923 (19.2)	15,808 (21.0)	<.001
Health or Behavior Assessment <sup>b</sup>	9,185 (3.5)	2,511 (3.0)	1,197 (9.7)	835 (3.7)	2,466 (3.7)	2,176 (2.9)	<.001
Non-Physician Mental Health Visit <sup>c</sup>	24,088 (9.2)	6,119 (7.3)	2,965 (24.1)	1,858 (8.2)	6,058 (9.0)	7,089 (9.4)	<.001

<sup>a</sup> Claims/encounters with CPT codes 90801-90899

<sup>b</sup> HBIA codes 96100-96103, 96105, 96111, 96115-96120, 96125, 96150-96155

<sup>c</sup> HCPC H codes plus S9484 and S9485 (crisis intervention) and T1027, T1017, T2022 codes (Family counseling and case management)

**Table 3 Ambulatory behavioral health (BH) services and psychopharmacology after salient screening visit in FY'09 or FY'10 by history (N=261,160)**

Service Type	Negative Modifier N=83,448		Positive Modifier N=12,302		Screen without Modifier N=22,714		Well Child Visit Without Screen N=67,393		No Well Child Visit Or Screen N=75,303		P-Value
	-BH history N=60,861	+BH history N=22,587	-BH history N=4,704	+BH history N=7,598	-BH history N=16,609	+BH history N=6,105	-BH history N=47,336	+BH history N=20,057	-BH history N=53,642	+BH history N=21,661	
	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	N(%)	
Any use (includes all of the following)	6,076(10.0)	12,420(55.0)	1,394(29.6)	5,564(73.2)	1,652(10.0)	3,161(51.8)	5,172(11.0)	12,070(60.2)	7,158(13.3)	14,674(67.7)	<.001
Any use (includes all of the following) within 90 days	5,221(8.6)	12,067(53.4)	1,270(27.0)	5,451(71.7)	1,449(8.7)	3,081(50.5)	4,435(9.4)	11,733(58.5)	5,949(11.1)	14,255(65.8)	<.001
Psychopharm	842(1.4)	4,325(19.2)	197(4.2)	2,250(29.6)	165(1.0)	1,069(17.5)	898(1.9)	5,163(25.7)	1,781(3.3)	7,656(35.3)	<.001
Psychiatry Visit <sup>a</sup>	4,246(7.0)	9,733(43.1)	933(19.8)	4,506(59.3)	1,090(6.6)	2,304(37.7)	3,603(7.6)	9,320(46.5)	5,350(10.0)	10,458(48.3)	<.001
Health or Behavior Assessment <sup>b</sup>	774(1.3)	1,737(7.7)	221(4.7)	976 (12.9)	272(1.6)	563(9.2)	710(1.5)	1,756(8.8)	594(1.1)	1,582(7.3)	<.001
Non-Physician Mental Health Visit <sup>c</sup>	1,988(3.3)	4,131(18.3)	569(12.1)	2,395(31.5)	642(3.9)	1,216(19.9)	1,576(3.3)	4,482(22.4)	1,794(3.3)	5,295(24.4)	<.001

<sup>a</sup>Claims/encounters with CPT codes 90801-90899

<sup>b</sup>HBIA codes 96100-96103, 96105, 96111, 96115-96120, 96125, 96150-96155

<sup>c</sup>HCPC H codes plus S9484 and S9485 (crisis intervention) and T 1027, T1017, T2022 codes (Family counseling and case management)

**Table 4. Predictors of post-screening BH<sup>a</sup> services or psychopharmacology stratified by BH history N=261,160**  
(p<= 0.005)

	<b>Any BH Services or Psychopharmacology after Salient Visit</b>		<b>Any BH Services or psychopharmacology within 90 days following Salient Visit</b>	
	BH History Absent (N=183,152)	BH History Present (N=78,008)	BH History Absent (N=183,152)	BH History Present (N=78,008)
	Odds Ratio (95% CI) <sup>b</sup>	Odds Ratio (95% CI)	Odds Ratio (95% CI) <sup>b</sup>	Odds Ratio (95% CI)
<b>Group</b>				
Negative Screen	1.00	1.00	1.00	1.00
Positive Screen	<b>3.79 (3.54-4.06)</b>	<b>2.29 (2.16-2.43)</b>	<b>3.93 (3.66-4.22)</b>	<b>2.26 (2.13-2.40)</b>
Undetermined Screen	1.00 (0.95-1.06)	0.94 (0.88-0.99)	1.03 (0.97-1.09)	0.95 (0.89-1.00)
Well Child Visit, No Screen	<b>1.09 (1.05-1.14)</b>	<b>1.22 (1.17-1.27)</b>	<b>1.09 (1.04-1.14)</b>	<b>1.21 (1.16-1.26)</b>
No Well Child Visit, No Screen	<b>1.33 (1.13-1.56)</b>	1.20 (1.04-1.39)	<b>1.35 (1.14-1.60)</b>	1.19 (1.03-1.38)
<b>Gender</b>				
Female	1.00	1.00	1.00	1.00
Male	<b>1.28 (1.24-1.31)</b>	<b>1.20 (1.17-1.24)</b>	<b>1.27 (1.23-1.31)</b>	<b>1.19 (1.15-1.23)</b>
<b>Age</b>				
<5 years	1.00	1.00	1.00	1.00
5-7 years	<b>1.16 (1.11-1.21)</b>	<b>1.96 (1.87-2.06)</b>	<b>1.11 (1.06-1.17)</b>	<b>1.92 (1.82-2.01)</b>
8-10 years	<b>1.24 (1.18-1.29)</b>	<b>2.73 (2.61-2.87)</b>	<b>1.63 (1.11-1.22)</b>	<b>2.66 (2.54-2.78)</b>
11-13 years	<b>1.32 (1.27-1.39)</b>	<b>2.97 (2.83-3.11)</b>	<b>1.29 (1.23-1.35)</b>	<b>2.88 (2.75-3.02)</b>
14-16 years	<b>1.52 (1.45-1.59)</b>	<b>3.03 (2.90-3.17)</b>	<b>1.51 (1.44-1.58)</b>	<b>2.93 (2.80-3.06)</b>
<b>Race<sup>c</sup></b>				
White	1.00	1.00	1.00	1.00
Asian	<b>0.66 (0.62-0.71)</b>	<b>0.70 (0.66-0.74)</b>	<b>0.67 (0.63-0.71)</b>	<b>0.71 (0.67-0.75)</b>
Black	<b>0.77 (0.74-0.81)</b>	<b>0.73 (0.70-0.77)</b>	<b>0.78 (0.73-0.82)</b>	<b>0.72 (0.68-0.77)</b>
Hispanic	<b>0.77 (0.73-0.81)</b>	<b>0.74 (0.71-0.77)</b>	<b>0.79 (0.75-0.83)</b>	<b>0.74 (0.71-0.78)</b>
Native American	<b>0.71 (0.59-0.86)</b>	<b>0.64 (0.53-0.76)</b>	0.70 (0.55-0.88)	<b>0.64 (0.56-0.73)</b>
Multiracial	1.01 (0.93-1.08)	<b>0.86 (0.79-0.94)</b>	0.99 (0.91-1.08)	<b>0.85 (0.79-0.93)</b>
<b>Foster care</b>				
No	1.00	1.00	1.00	1.00
Yes	<b>10.38 (9.22-11.68)</b>	<b>4.51 (3.99-5.09)</b>	<b>9.76 (8.68-10.98)</b>	<b>4.09 (3.64-4.59)</b>
<b>Urban</b>				
No	1.00	1.00	1.00	1.00
Yes	0.89 (0.81-0.97)	0.97 (0.89-1.06)	0.87 (0.79-0.96)	0.99 (0.91-1.08)
<b>Well Child Care</b>				
Yes	1.00	1.00	1.00	1.00
No	0.98 (0.84-1.15)	1.23 (1.06-1.42)	0.93 (0.78-1.10)	1.21 (1.05-1.40)

<sup>a</sup>Behavioral Health, <sup>b</sup>Confidence Interval <sup>c</sup>race/ethnicity missing/unknown data was imputed using SAS PROCMI program