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Running head: ADOLESCENT RISK SCREENING INSTRUMENTS

A Feasibility Study: Using the HEEADSSS Psychosocial Interview Combined with
Bright Futures Youth Risk Screening Instruments in the Primary Care Setting

by

Deanna Bland Hiott

A dissertation submitted to the faculty of the Medical University of South Carolina in partial
fulfillment of the requirement for the degree of Doctor of Philosophy in the College of Graduate
Studies

College of Nursing

2018

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ACKNOWLEDGEMENTS

No one reaches their goals in life without the help and support of others. I am no exception. As I reach this milestone in my career, I want to thank God through whom all things are possible. I want to honor some members of my family who have finished their work here but whose lives have profoundly influenced mine. The original family nurse, Helen Bounds Deese and her husband Owen Lafayette Deese, wonderful grandparents that epitomized unconditional love. My mother Myra Helen Deese Bland White whose toughness taught me to never quit; and my mother-in-law Martha Bramlett Hiott, a gentle southern woman whose love, guidance, quiet strength and faithfulness instilled in me the confidence to succeed. Lastly, I would like to honor my dad, Dr. Maynard Bland, whose work ethic and devotion to medicine intrigued me from a young age igniting my passion for nursing.

Thank you, Steve Hiott, my husband of forty-two years whose love, stability and unwavering support of my dreams is undeserved but appreciated; you kept me going long after I felt like giving up. Thank you to my children, Wesley Celeste, Carrie, Jordan, Steven, Nathan, Ian, and CeJay for supporting a dream that was not yours, a dream that was demanding of my time and difficult to understand. Your faith in my success was humbling; it often propelled me forward in my darkest moments of doubt. You all are and will always be my greatest accomplishments in this lifetime. And thank you to my grandchildren, Noah, Faith, Wyatt and Emme Kate, watching you grow, explore and discover this world with unbridled enthusiasm fed my spirit with hope and joy sustaining me during this arduous journey.

I am grateful to my cohort: Candace, Carley, Crystal, Donna, JoAnna, Kim, Lana, Monica, Pat, Patty, and Solange; other MUSC shining stars who inspired me, Julie, May, Fay, Felicia, Toshua, Michelle, Jennifer, Michael, Lori, Novelette, Marvesh, and Dru. I admire and appreciate the lessons we learned together; you all have a special place in my heart. All our starting points were different, all our aspirations were different but for this moment in time I learned personal and professional wisdom that I will always value.

I am so appreciative to the MUSC College of Nursing staff you often do not realize how instrumental a simple email can be to change a student's outlook for the day. Thank you, Yolanda Long, your presence was a comfort and your assistance invaluable. I want to express my gratitude to the research staff Toni Mauney, Leslie Bell, Erica Ellington, and Stephanie Oppenheimer who guided me when I did not know what I did not know. And to the writing center, thank you.

The passion and keen insight shared by each professor has inspired me. I am still in awe of my original advisor Dr. Marilyn Laken. Your sense of hard work and fair play emboldened me. My chair, Shannon Phillips, has modeled a level of professionalism and scientific thinking that I can only hope to attain. Elaine Amella, I hung on your every word and email; your steady guidance and patience will always be remembered. Dr. Martina Mueller and Mary, I so appreciate your encouragement of my rudimentary statistical analyses. And thank you, Dr. Rushton for feeling this study had merit.

For each faculty member that taught me and pushed me to excellence, thank you: Dr. Stuart and Dr. Gilden, amazing role models, Dr. Pope, Dr. Newman, Dr. Anderson, Dr. Cartmell, Dr. Gregoski, Dr. Jenkins, Dr. Kellechi, Dr. Magwood, Dr. Nemeth, Dr. Dumas and the late Dr. Spruill. I am honored to have learned from the best.

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DEANNA BLAND HIOTT. A Feasibility Study of the HEEADSSS Psychosocial Interview Combined with Bright Futures Youth Risk Screening Instruments in the Primary Care Setting (Under the direction of Dr. Shannon Phillips, Dr. Elaine Amella, Dr. Martina Mueller, Mrs. Mary Dooley and Dr. Francis Rushton).

Abstract

The purpose of this dissertation was to explore adolescent risk screening in the primary care center. The Donabedian Framework of structure, process, outcome was used throughout this dissertation to evaluate the various aspects of adolescent risk screening in the primary care setting. To begin this investigation, an integrative review was completed to determine which adolescent risk screening instruments are available for use in the primary care setting. Next, an integrative review was completed to evaluate the validity and reliability of a commonly used verbal screening instrument called HEEADSSS for use as an adolescent risk screen in the primary care setting. Lastly, a feasibility study was conducted to assess whether the Pediatric Symptom Checklist – Youth (PSC-Y) and the Issues Checklist (IC) administered via a computer tablet could be added to an adolescent office visit to complement the HEEADSSS interview. Provider and adolescent interest, acceptability and participation were examined. Additionally, screening outcomes and the level of agreement between the HEEADSSS psychosocial interview and the PSC-Y and IC instruments were assessed.

INTRODUCTION

Dissertation Overview

Risk screening is an essential component of preventive adolescent healthcare. Many adolescent and adult health problems can be linked to youthful health-damaging behavioral choices (National Research Council & Institute of Medicine, 2007). According to the Centers for Disease Control (CDC), 70% of the deaths occurring each year in the U.S. between the ages of 10 to 24 resulted from vehicle crashes, accidents, homicide and suicide (Kann et al., 2014). Many of these incidents, including the early initiation of sexual activity, co-occurred with alcohol use and substance abuse (Aspy et al., 2012). Fiscal studies estimate that \$36 billion is spent yearly on direct medical costs associated with preventable adolescent morbidities; this number escalates to \$700 billion when indirect costs are added (Park et al., 2001). Adolescent risk screening in the primary care setting is key to identifying and preventing unhealthy behaviors and improving health outcomes. Advancements in the screening of adolescents can lead to identification of hazardous behaviors that can result in unintentional injury, violence, tobacco use, alcohol use, substance abuse, sexual infections, obesity and lack of physical activity (Kann et al., 2014). Unchecked these risky behaviors affect future adult physical and mental health.

Barriers such as confidentiality concerns, provider continuity, and the manner in which questions are asked can impede effective adolescent risk screening (Coker et al., 2010; National Research Council & Institute of Medicine, 2007), while issues that influence provider risk screening include time constraints, reimbursement issues, a lack of support services and a lack of training (National Research Council & Institute of Medicine, 2007). Optimally, screening adolescents in the primary care setting requires a

non-threatening multidimensional screen that is inexpensive or free, short, and easy to administer and score (Pagano, Cassidy, Little, Murphy, & Jellinek, 2000; Yi, Martyn, Salerno, & Darling-Fisher, 2009). Regardless, half of all providers do not use screening tools (Gardner, Kelleher, Pajer, & Campo, 2003). Adolescent risk-taking behaviors increase from 19% in the 7th grade to 36% in the 11th and 12th grades (Park et al., 2001). The American Academy of Pediatrics (AAP) is one of many organizations that recommend adolescent behavioral risk screening at least once a year (Anand, Carroll, & Downs, 2012; Park et al., 2001). Yet, studies have indicated that while 90% of youths report visiting a healthcare provider in the last 2 years, clinicians screened only 49% of them during the visit (National Research Council & Institute of Medicine, 2007). This represents a gap in preventive adolescent care.

Theoretical Framework

Donabedian's framework is a structure-process-outcome model that is used in healthcare to devise quality improvement initiatives (Hearld, Alexander, Fraser, & Jiang, 2008; Yakimo, 2006). Structure involves the physical, human, and financial resources available for providing care such as the pediatric facilities, staff and reimbursement for services. Process is the clinical service provided to a patient or behaviors involved in giving and receiving care. In this case, the process would involve the activities undertaken to identify adolescent risk such as the administration of the Pediatric Symptom Checklist – Youth (PSC-Y), Issues Checklist (IC) and Home, Education, Eating, Activities, Drugs, Suicide, Sexual activity, Safety (HEEADSSS) interview and the provider and adolescent involvement in the process. The outcomes achieved are the result of care or the consequences of care; thus, expected outcomes are the identification

of adolescent risk behaviors. The efficiency and effectiveness of the interaction between the structure and the process can impede or facilitate the outcomes of risk identification. Therefore, the use of this framework can assist with the identification of variables that modify successful risk screening.

Manuscripts

This dissertation consists of three manuscripts: (1) an integrative review of multidimensional adolescent risk screening instruments available for use in the primary care setting, (2) an integrative review of the use of the HEEADSSS psychosocial interview, and (3) a feasibility study of the HEEADSSS Interview compared to Bright Futures youth risk screening instruments in the primary care setting.

Aim 1. The first manuscript, a comprehensive integrative review, assessed the literature concerning available multidimensional risk screens appropriate for use within the primary care setting. The aim of this review was to answer the research question: Which screens are optimal in the primary care setting to identify risk behaviors in adolescents aged 14 – 18 years of age? The available risk screens were then evaluated via the Donabedian Framework using the concepts of structure, process and outcome.

Aim 2. The second manuscript, an integrative review, evaluated the research literature available concerning the use of the HEEADSSS psychosocial interview as an adolescent risk screening instrument for use in the primary care setting. The purpose of this integrative review was to answer the research question: Has the HEEADSSS interview, in its various forms, ever been evaluated for effectiveness, reliability and validity? Since studies of the HEEADSSS psychosocial interview were sparse, a

feasibility study to determine if the PSC-Y and IC could be used to complement the HEEADSSS was developed.

Aim 3. The final manuscript details a feasibility study conducted to evaluate whether the validated and reliable Pediatric Symptom Checklist - Youth (PSC-Y) and the Issues Checklist (IC) administered via a computer tablet could be added to complement the HEEADSSS psychosocial interview. Using the Donabedian Model of structure, process and outcome, provider and adolescent interest, acceptability and participation were examined. Additionally, differences in screening outcomes were explored, as well as levels of agreement between the HEEADSSS interview and the PSC-Y and IC surveys.

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MANUSCRIPT 1 – INTEGRATIVE REVIEW

This manuscript was accepted for publication May 2, 2017 in *Comprehensive Child and Adolescent Nursing* (Hiott, Phillips, & Amella, 2017).

Hiott, D. B., Phillips, S., & Amella, E. (2017). Adolescent risk screening instruments for primary care: An integrative review utilizing the Donabedian Framework. *Comprehensive Child and Adolescent Nursing*, 21.
doi:10.1080/24694193.2017.1330372

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KEY WORDS: Adolescent risk, Primary care, screening, Donabedian Model

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Abstract

Adolescent risk-taking behavior choices can affect future health outcomes. The purpose of this integrative literature review is to evaluate adolescent risk screening instruments available to primary care providers in the United States using the Donabedian Framework of structure, process, and outcome.

Methods: To examine the literature concerning multidimensional adolescent risk screening instruments available in the United States for use in the primary care setting, library searches, ancestry searches and Internet searches were conducted. Library searches included a systematic search of the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Academic Search Premier, Health Source Nursing Academic Ed, Medline, PsycINFO, the Psychology and Behavioral Sciences Collection and PubMed databases with CINAHL headings using the following Boolean search terms: “primary care” and screening and pediatric.

Results: Criteria for inclusion consisted of studies conducted in the United States that involved broad multidimensional adolescent risk screening instruments for use in the pediatric primary care setting. Instruments that focused solely on one unhealthy behavior were excluded, as were developmental screens and screens not validated or designed for all ages of adolescents. In all 25 manuscripts that reviewed 16 screens met the inclusion criteria and were included in the study.

Conclusions: Sixteen screens were examined for factors associated with the Donabedian structure-process-outcome model. This review revealed that many screens contain structural issues related to cost and length that inhibit provider implementation in the primary care setting. Process limitations regarding the report method and administration

format were also identified. The Pediatric Symptom Checklist was identified as a free, short tool that is valid and reliable.

Keywords: Adolescent risk, screening tools, primary care, Donabedian Model

Adolescent Risk Screening Instruments for the Primary Care Setting: An Integrative Review Utilizing the Donabedian Framework

Introduction

Globally researchers estimate that 10% of the world's population has a mental health disorder (Patel & Saxena, 2014). These disorders can result in stigmatization, human rights violations, and premature death. Worldwide many individuals do not have access to pharmacological or psychological therapies, resulting in global mental health cost estimates of 2.5 trillion dollars. To highlight and address these growing needs in 2013 the World Health Organization adopted the Comprehensive Mental Health Action Plan (Patel & Saxena, 2014). Nationally approximately 10% of all hospital admissions for children greater than 3 years old are due to a mental health diagnosis (Bardach et al., 2014). These hospitalizations cost 3.5 billion dollars a year. Globally and nationally mental health disorders are a pervasive reality; early identification using risk screening instruments can improve outcomes (Bardach et al., 2014).

In the United States the Centers for Disease Control and Prevention (CDC) (2012) monitor adolescent risk-taking activities using statistics from the Youth Risk Behavior Surveillance Surveys (YRBSS). The survey responses reveal a trend in the following behaviors: diet, activity, smoking, substance abuse, sexual activity, violence and depression. According to the CDC, 70% of the deaths occurring each year in the U.S. among individuals between the ages of 10 and 24 results from vehicle crashes, accidents, homicide or suicide (Kann et al., 2014). Many of the listed risk behaviors, including the early initiation of sexual activity, co-occurred with alcohol use and substance abuse (Aspy et al., 2012). Most notably, these behaviors and activities are preventable. These statistics illustrate the importance of risk screening as a recommended and essential component of yearly preventive care.

The American Academy of Pediatrics, the National Association of Pediatric Nurse Practitioners and the U.S. Preventive Services Task Force are just a few of the organizations suggesting that yearly screening for behavioral risks is required for adolescents (Anand, Carroll, & Downs, 2012). In addition, the federal Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) requires yearly behavioral and developmental screening of Medicaid-eligible children (Center for Medicare and Medicaid Services, 2014). Adolescents form many life-long health habits during these years; studies indicate that failure to screen for risky behaviors or activities subsequently affects future health outcomes (National Research Council & Institute of Medicine, 2007; Weitzman & Wegner, 2015).

Evidence suggests that early interventions for behavioral health concerns can significantly decrease future mental health problems (Weitzman & Leventhal, 2006). This is significant since \$11.6 billion was spent on mental health hospital visits in the United States between 2006 and 2011 (Torio, Encinosa, Berdahl, McCormick, & Simpson, 2015). Further, fiscal studies estimate that \$247 billion annually is spent on direct and indirect costs related to pediatric mental health care (Perou et al., 2013). Yet, statistics from the National Research Council and the Institute of Medicine (2007) indicate that although 90% of young people may have seen a clinician in the last 2 years, only 49% have received the care and screenings that followed recommended guidelines (National Research Council & Institute of Medicine, 2007). Indeed, in one study the average screening rate for any single risk domain was 25%, while 33% had not been screened in any risk domain during the visit (Hassan et al., 2013). Interestingly, 84% of

the participants felt this was important and were comfortable with this line of questioning (Hassan et al., 2013).

Numerous barriers impede effective adolescent risk screening. Issues such as privacy and confidentiality concerns, provider continuity, and even the way healthcare professionals ask questions may affect the screening outcome (Coker et al., 2010; National Research Council & Institute of Medicine, 2007). Provider related screening issues include time constraints, reimbursement issues, a lack of referral services and training, and liability concerns (National Research Council & Institute of Medicine, 2007; Weitzman & Wegner, 2015). Moreover, a systematic review of this topic indicated that very little information is available concerning the actual screening process (Wissow et al., 2013). For these reasons screening youth in the primary care setting requires a non-threatening multidimensional instrument that is inexpensive or free, short, and easy to administer and score (Pagano, Cassidy, Little, Murphy, & Jellinek, 2000; Yi, Martyn, Salerno, & Darling-Fisher, 2009). Unfortunately, half of all providers do not report using screening instruments (Weitzman & Wegner, 2015; Gardner, Kelleher, Pajer, & Campo, 2003).

The aim of this review is to answer the research question: Which screening instruments are optimal for use in the primary care setting to identify risk behaviors in adolescents aged 14 – 18 years of age?

Theoretical Framework

The Donabedian theoretical model provides an ideal framework through which to assess adolescent risk screening instruments in the primary care environment (Donabedian, 1966, 2005; Hearld, Alexander, Fraser, & Jiang, 2008; McLeroy, Bibeau,

Steckler, & Glanz, 1988; Yakimo, 2006). Donabedian's framework is a structure-process-outcome model (Hearld et al., 2008; Yakimo, 2006). Structure involves the physical, human, and financial resources available for providing care such as the primary care setting's facility, staff, competency levels, instruments used to render care, and reimbursement. Process is the clinical service provided or behaviors involved in giving and receiving care. In this case, the process would involve the activities undertaken to identify adolescent risk such as the administration and interpretation of a screen and the communication between the provider, parent and adolescent in the process. The outcomes achieved are the result of care; thus, expected outcomes are the identification of adolescent risk behaviors. The efficiency and effectiveness of the interaction between the structure and the process can impede or facilitate the outcomes of risk identification. Therefore, the use of this framework can assist with the identification of variables that can influence successful risk screening (Figure 1).

Methods

To examine the literature concerning multidimensional adolescent risk screening instruments available in the United States for use in the primary care setting, library searches, bibliographical ancestral searches and Internet searches were conducted (Figure 2). Criteria for inclusion consisted of primary studies conducted in the United States that used broad multidimensional adolescent risk screening instruments in the primary care setting.

Screening instruments that solely measured one unhealthy behavior were excluded, as were developmental assessment instruments and instruments not designed or validated for all ages of adolescents. The Cumulative Index to Nursing and Allied Health

Literature (CINAHL), Academic Search Premier, Health Source Nursing Academic Ed, Medline, PsycINFO, and the Psychology and Behavioral Sciences Collection databases were searched using the following Boolean search terms: “primary care” AND screening AND pediatric. When the term adolescent was utilized in the search, the returns were inadequate. Thus, broader search terms were used to capture as many results as possible. The search years were not limited to avoid missing relevant, older screening instruments, and 2,443 results were obtained. When these results were narrowed to scholarly peer reviewed academic journals, 1,792 articles remained. After duplicate articles were removed, this number was further lowered to 1,134. All these titles were reviewed and studies that evaluated screens that assessed for only 1 or 2 risk behaviors were excluded, as were studies that were not conducted in either the ambulatory care or school setting. After applying these exclusions to all the study titles, 105 studies investigating multidimensional risk screening instruments available for use in the pediatric primary care setting were retained for a more in-depth examination. A careful review of the 105 abstracts resulted in 17 primary screening studies that met the inclusion and exclusion criteria of multi-problem adolescent risk screens used for all ages of adolescents in the U.S. pediatric primary care setting.

Additional articles were obtained through bibliography searches for additional manuscripts that met the inclusion and exclusion criteria and Internet searches were conducted using the names of screening instruments mentioned in any of the articles. This produced an additional 8 articles for a sample of 25 studies. Lastly, the 25 studies were examined using the Donabedian Model so that the adolescent risk screening

instruments could be evaluated dependent upon their strengths and weaknesses related to structure, process and outcome.

Results

Table 1 depicts the instruments examined, the authors of the study, an instrument description, a brief study description, the reliability and validity scores of each instrument, and each study's level of evidence according to the Centre of Evidence-Based Medicine levels of evidence protocol (CEBM, 2009).

Table 1: Data Extraction and Psychometric Properties of Youth Risk Screening Tools

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
Adolescent Health Review (AHR) (Harrison et al., 2003)	29 items related to 14 health domains: exercise, nutrition, weight control, family, school, emotional distress, suicidal behavior, violent behavior, sexual activity, cigarette, alcohol, marijuana, substance abuse, physical or sexual abuse. 1 page with color-coded domains: green – low risk, yellow – moderate risk and red – high risk. First 6 domains not scored as high risk, remaining 8 are scored high risk.	Study took place in 7 school-based health clinics (SBHC). Each patient completed the survey via computer which was forwarded to provider. N = 692, analyses were conducted separately for males and females.	No validity or reliability scores reported. Test of viability of screening process.	2c
Behavioral Health Screen (BHS), (Diamond et al., 2010)	New scale: Development of comprehensive Screen - 13 domains using 54 items and 39 follow-up items. Administration time 8-15 minutes. Average patient completed the screen in 12.4 minutes. Internet based, print out.	Practicality examined with 24 patients, then validated with 415 patients from primary care waiting rooms ages 12-21.	Reviewed by 20 experts & pediatric focus groups. Cronbach's $\alpha = 0.75 - 0.87$, Sensitivity & Specificity 78-85%, For 83 items, 415 subjects obtained for power	2b
Child Behavior Check List (CBCL) (Rishel et al., 2005)	118 item test completed by parent or care taker in approx. 10 min. Likert scale: not true, somewhat true or often true; 0,1,2.	N = 236 children ages 6 – 17 brought to mental health setting by mothers. CBCL compared with more specific validated test K-SADS and counselor interviews	Cited previous studies 0.9 reliability and validity. Tested Receiver-operating characteristics (ROC). Low, not diagnosis specific. General predictability. Higher specificity (identifies	2b

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
			true negatives) than sensitivity (identifies true positives)	
Child Health Improvement through Computer Automation (CHICA) (Anand et al., 2012)	Automated computer uses clinical guidelines to generate 20 yes/no questions based upon the age of the patient. Generates scannable paper forms for completion by patient.	16,963 urban patients with high Medicaid rates, generated 408,601 questions in 31,843 visits. 89% answered, 11% positive screen.	No validity or reliability studies. Lower than national norms for adolescent risk rates noted. Postulated due to questionnaire handed to adolescent with parent.	2c
Guidelines for Adolescent Preventive Services Questionnaire (GAPS) (A. Gadomski et al., 2003; A. M. Gadomski et al., 2015)	Nine health domains: nutrition, exercise, school, safety, reproductive health, drugs, alcohol, tobacco, psychosocial DartScreen: computerized self-administered. 60-65 core questions which can branch as needed	Formative study based on the GAPS screen. 72 patients aged 15-19. 37 visits without DartScreen, 35 visits with DartScreen audio-recorded	Study assessed whether positive score on DartScreen correlated with discussions on that topic. No psychometrics of the GAPS questionnaire were given.	2c
Health e Touch (Stevens et al., 2008)	Health e Touch is a computerized program administered via tablet that questions patients about alcohol, substance abuse, injury, depression or suicide thoughts or activities. Composed of YRBS, CES-DC, PHQ, CASI-A	878 primary care patients aged 11-20 in 9 urban, low-income clinics. Clinics were randomized to either receive results immediately or 2-3 days later. Randomization was broken for suicide ideation.	All component screens valid and reliable. Findings were significant for increased provider identification in the immediate results sample after suicide screening was removed.	1b

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
			P < .01 When suicidal patients were included with the immediate results group P < .001	
Patient Health Questionnaire for Adolescents (PHQ-A) (Johnson et al., 2002)	Self-report, 83 item screen. Domains: anxiety, eating, mood, substance use. Can be completed in 5 minutes but scoring algorithms could be time consuming.	403 randomly recruited adolescents from PC offices and school health centers in several states tested with PHQ-A and Medical outcomes short form. Psychologist blinded to results conducted global assessment of functioning.	75% sensitivity and 92% specificity. Overall diagnostic agreement co-efficient were 0.66 and 0.65 with some subsamples higher	1b
Pediatric Behavioral Health Screening (PBHS) (Blucker et al., 2014)	Modification: Consists of the PSC-17: For measuring psychosocial adjustment in 4-18-year-old patients by parent report, PBHS Added functional Impairment Items	Data obtained from chart review, 1259 children & adolescents aged 6-16 had wcc, only 925 screened (73.5%)	Cited previous studies, factor analysis and descriptive statistics on sample of 969. Reliability not stated. Validity cited with confirmatory factor analysis (CFA) 3 factor model (0.95) PBHS vs. 1 factor model (0.79)	2c
Problem oriented screening instrument for teenagers (POSIT) (John R. Knight et al., 2001)	Designed for teens 12-19. Self-report, multi-problem screening instrument. 139 yes or no questions. Domains: substance use/physical health/mental health/family/peers/ education/vocation/ social/leisure/ aggression/ delinquency	Screened 173 subjects, 15 – 18 years old during routine care at a hospital based adolescent medical setting. Consecutive sample 93 of 173 completed the retest (53.8%)	The substance use/abuse, mental health status, and aggressive behavior scales had alpha scores >0.70. High intraclass correlation were found for all 10 POSIT scales (0.72-0.88)	2c

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
	20-30 minutes to administer and 10 minutes to score.			
Pediatric Symptom Checklist (PSC) (Jellinek et al., 1999)	35 item Questionnaire completed by parents reviewing child's symptoms and behaviors with "never, sometimes, or often" scored as 0, 1 or 2. Demonstrates high sensitivity 95% moderate specificity 68%. Agreed with Child Behavior Checklist (CBCL). (Jellinek et al)	Study to assess feasibility of routine screening and compare positive screening with basic demographic information. 21,065 children ages 4 – 15 in 395 practices in 44 states.	Previous reliability and validity studies cited. 2,077 (13%) school age children with psychosocial dysfunction. Parental completion rate of PSC 97%.	2c
Pediatric Symptom Checklist (PSC) (Boothroyd & Armstrong, 2010b)	Same as above	Florida's Medicaid population mailed PSC, 6,590 children ages 6-22	Overall Cronbach's alpha .94 Validity R= .77 Sensitivity .77, specificity .82, ppv .53, npv .93 AUC .87 Test-retest spanned 1-year affecting reliability?	2b
Pediatric Symptom Checklist (PSC) (W. Gardner et al., 2002)	Same instrument used with computerized adaptive questioning.	401 clinicians in 44 states. 21,150 parents of children aged 4-15 answered the PSC instrument via computer adaptive testing. 11.6 questions were answered on average out of the 35-item screen.	High agreement between the 35 question PSC and adaptive PSC. $K = 0.93$. Sensitivity 95%, Specificity 68% Purpose was to see if adaptive testing was feasible not validate.	2b

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
Pediatric Symptom Checklist (PSC) (Navon et al., 2001)	35 item questionnaire, parents impression of psychosocial	PSC completed by parents of 570 children ages 2-18 in the waiting room then 95 children randomly selected for interview and rated on 2 other scales.	PSC valid when compared with follow up Sensitivity 91%, Specificity 65%, Reliable: correlation between initial score and follow up = 0.8, Kappa scores from .44-1.00	1b
Pediatric Symptom Checklist 17 (PSC-17) (Borowsky et al., 2003)	17-item questionnaire like original PSC but shorter measuring 3 subscales Attention, Externalizing (disruptive behaviors), Internalizing (depression, anxiety).	At 8 outpatient clinics parents asked to complete a PSC-17 for children ages 7-15 for all visits not just wcc. N = 2028. Hypothesized that those in with triage visits would more likely score positive	Cronbach a coefficient ranged from .67-.82; also cited previous comparisons with Children’s Behavior Check List	2b
Pediatric Symptom Checklist 17 (PSC-17) (Gardner et al., 1999)	Same as above	Parental reports on 18,045 children from 2 large primary care research networks. Used factor analysis to create shorter version of PSC.	Conformed internalizing, externalizing and attention subscales. Compared with other scales ROC 0.83 – 0.89 with sensitivity of 0.77 – 0.87 and specificity of 0.68 – 0.80 at cut off ranges.	2b
Pediatric Symptom Checklist -17 (PSC-17) (Gardner et al., 2007)	Same as above	269 patients, parents completed the PSC-17 in the waiting room compared with Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version (K-SADS-PL)	Area Under the Curve (AUC) .86 attention, .87agression .68 anxiety* .80 depression	2b

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
			.73 internal. Any 0.74 Versus CBCL 0.78	
Pediatric Symptom Checklist Youth (PSC-Y) (G. Gall et al., 2000)	Designed for youth 6-16, 35 questions rated as never, sometimes, often; 0,1,2. Cut off score 30	Study evaluated the utility of the PSC-Y in a school-based health clinic on 383 students	Stated previous studies noted validity, no statistics given. “This was a test of a real-world setting”.	2c
Pediatric Symptom Checklist Youth (PSC-Y) (Pagano et al., 2000)	Modification: PSC with Pronouns changed for self-report	N = 173 children ages 9 – 14, semi- structured interviews and comparisons rated by parents, teachers then compared with self- report tools.	Strong correlation with parent teacher scores, sensitivity 94%, specificity 88%, highest phi 0.62, highest k .58, test/retest at 4 months Pearson’s r =.45 and Kappa 0.5 Acceptable	2b
Rapid Assessment for Adolescent Preventive Services (RAAPS) (Yi et al., 2009)	17 – 18 item Rapid Assessment for Adolescent Preventive Services questionnaire development based on GAPS tool. Divided into nine sections: eating/weight, physical activity, safety/violence, tobacco, alcohol, drugs, development, emotions, family, friends.	Initial assessment of developing screen at School based health clinics (SBHC), 2 middle schools and 1 alternative high school. N = 145 adolescents aged 9-20. Protocol developed for every positive risk. Providers suggested grammatical changes.	No reliability or validity	2c
Rapid Assessment for Adolescent Preventive Services (RAAPS)	21 item risk screening tool developed to identify youth at greatest risk for mortality and morbidity. Domains: Eating/weight, physical activity,	Three focus groups with adolescents and providers to establish face validity. Content validity based upon state level work group and adolescent	Focus groups - face validity adolescents n = 21, providers n = 7 (consensus)	2b

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
(Salerno et al., 2012)	unintentional injury/violence, substance use, sexual health, depression/self-harm, adult support.	expert panel. Criterion related validity based upon RAAPS and GAPS related questions.	Adolescent expert panel n = 10 content validity and reliability 0.825 – 1.0. Inter-rater content agreement 0.9 – 1. Cohen kappa 0.44 – 0.99. Fishers exact test p > 0.05 indicating no statistical difference between the paired questions in the tests.	
Strengths and Difficulties Questionnaire (SDQ) (Brown & Wissow, 2010)	25 plus item tool with 5 domains: emotional symptoms, conduct problems, attention-hyperactivity, peer problems and pro-social behaviors caregiver and youth report. Responses: 0/not true, 1 somewhat true, 2 certainly true with higher scores indicating greater need. The second page gauges the impact of the dysfunction and is only answered if question 26 is affirmative.	Parents of 767 children ages 5 – 16 completed the SDQ. Providers, n = 53, blinded to results assessed child. Screen identified twice as many with moderate symptoms and 28% with significant difficulties. Latino/other missed 78% and 55% African Americans. Only 27% Caucasians were missed.	Total Difficulties scale has demonstrated good internal consistency (Cronbach's = 0.83) Providers failed to identify problems more often in minority patients p = 0.001).	2b
Strengths and Difficulties Questionnaire (SDQ) (Jee, Halterman, et al., 2011)	Same as above	Before and after study of screening rates. N = 212 ages 11 - 17, 92% screened. Before identification of psychosocial difficulties 27%, after screening implemented detection of difficulties 54%.	2 coders were used and 10% of charts were coded by both, Inter-rater reliability was 90% A 2 tailed alpha value of < 0.05 was significant with all problems < 0.001 at a 95% CI.	2b

Instrument: Adolescent Risk Screen/ Reference	Instrument Description and Scoring	Brief Study Description/Sample	Reliability/Validity	Level of Evidence (CEBM, 2009)
Strengths and Difficulties Questionnaire (SDQ) (Jee, Szilagyi, et al., 2011)	Same as above	138 foster youths aged 11-17 PC well visit with care givers screened. Subset of 50 compared with Children's Interview for Psychiatric Syndromes (ChIPS)	Compared with the Children's Interview for Psychiatric Syndromes with youth/parent report 93% agreement versus 54% youth alone and 71% parent alone	2b
Youth Outcome Questionnaire – 2.01 (Y-OQ-2.01) (Tzoumas et al., 2007)	64 item, 5-point Likert scale. Y-OQ-2.01, parent completed instrument. Domains: intrapersonal distress, somatic, relationships, critical items, social problems, behavioral dysfunction	279 participants randomly selected, ages 4-17 from 2 pediatric PCC.	Study 1: 91% accuracy with 0.80% specificity. Good internal correlations with PSC. Study 2: Compared to PSC 0.86 correlation, internal consistency 0.87 Sensitivity of 0.99, specificity of 0.77	1b
Youth Outcome Questionnaire Self-Report (Y-OQ-SR) (Ridge et al., 2009)	Same as above	206 adolescents ages 12-18. Randomly solicited for participation. Mailed surveys	Alpha coefficients Intrapersonal distress (0.91), behavioral dysfunction (0.81), somatic (0.78), relationships (.75), social problems (0.71), critical (0.74). Total Alpha coefficient 0.95 with high test-retest correlations $r=0.89$,	1b

Table 2 represents a glossary of risk screening instruments and their abbreviations. Each screening instrument was evaluated using the Donabedian Framework of structure, process and outcome. The structure of the risk screening instrument included the cost, covered risk domains, question format (yes/no or likert scales), administration time and ease of scoring. The process of the risk screening instrument assessed the report method (self-report or parent report) and administration format (written or computer). The outcomes of each risk screening instrument measured reliability, validity and study strength.

Table 2: Donabedian Framework Application to Adolescent Risk Screening

Screen Name (Abbreviation)	Structure: Cost/Domains/Items/Question format/Administration time/Scoring Ease	Process: Report method/ Format	Outcomes: Reliability Validity, Yes/No Study Strength +/-
Adolescent Health Review (AHR)	Unknown cost, multiple domains, 29 items. Responses: yes/no, various, computer generated scoring, time unknown	Self-report Computer	No, +
Behavioral Health Screen (BHS)	Unknown cost, multiple domains, 54 items, Internet based, 8-15 minutes to administer. Responses: yes/no, various, computer generated scoring	Self-report Computer	Yes, +
Child Behavior Check List (CBCL)	Fee-based, domains internalizing, externalizing, activity, 118 items. Likert scale: not true, somewhat true, very true, time unknown	Parent Written	Yes, +
Child Health Improvement through Computer Automation (CHICA)	Unknown cost, Various domains, 20 yes/no questions, Minimal time, Easy scoring	Self or parent Computer and Written	No, +
Guidelines for Adolescent Preventive Services (GAPS)	Free, multiple domains, 72 items, yes/no questions, time unknown	Self Written/computer	No, +
Health e Touch Computerized Screen	Unknown cost, select domains, 45-101 items depending on age, 12.5 minutes to complete, computer generated scoring	Self-report Computer	Yes, +
Patient Health Questionnaire for Adolescents (PHQ-A)	Unknown cost, multiple domains, 83 yes/no items, 5 minutes to complete, longer scoring algorithms	Self-report	Yes, +
Pediatric Behavioral Health Screening (PBHS)	Unknown cost, domains externalizing, internalizing, attention plus functional scales, 23 items. Likert scale: never, sometimes, often, time unknown	Parent report Written	Yes, +
Pediatric Symptom Checklist (PSC)	Free, domains externalizing, internalizing, attention, 35 items. Likert scale: never, sometimes, often, time unknown.	Parent Written	Yes, +
Pediatric Symptom Checklist 17 (PSC-17)	Free, domains externalizing, internalizing, attention, 17 items. Likert scale: never, sometimes, often, time unknown.	Parent Written	Yes, +
Pediatric Symptom Checklist Youth (PSC-Y)	Free, domains externalizing, internalizing, attention, 35 items. Likert scale: never, sometimes, often, time unknown.	Self Written/computer	Yes, +
POSIT	Free of charge, multiple domains, 139 yes/no items, 20-30 minutes to administer and 10 minutes to score	Self Written	Yes, +
RAAPS	Fee-based, multiple domains based on GAPS, 21 items, yes/no questions, time unknown	Self-report Computer	Yes, +

Screen Name (Abbreviation)	Structure: Cost/Domains/Items/Question format/Administration time/Scoring Ease	Process: Report method/Format	Outcomes: Reliability Validity, Yes/No Study Strength +/-
Strengths and Difficulty Questionnaire (SDQ)	Free, 5 domains, 25 items. Likert: 0/not true, 1 somewhat true, 2 certainly true 1 page, 5 minutes.	Both Written	Yes, +
Youth Outcome Questionnaire -2.0	Fee-based, multiple domains: 64 items. Likert scale, time unknown	Parent Written/computer	Yes, +
Youth Outcome Questionnaire – Self Report	Fee-based, multiple domains: 64 items. Likert scale, time unknown	Self Written/computer	Yes, +
*Bright Futures Tools Pre-visit and supplementary tools	Free, pre-visit questionnaire, checklist, 50+ items, supplemental questionnaire, 50+ yes/no/sometimes, multiple domains	Both, Self Written	No, -

* Mentioned in various study articles but no direct screening studies found utilizing these screens.

Structure Overview

The Donabedian element of structure involves assessing the components involved in adolescent risk screening. This would include the risk screening instrument, the facility, providers, staff, time, and reimbursement. Review of the screening instruments concerning this element of the Donabedian Model identified a relationship between all these facets of the primary care setting. In principle, the structure of the screen should be organized to determine multiple adolescent behaviors that could be deleterious to health and may need further investigation. Primary care providers report that visit time is limited, behavioral visits take twice as long as unremarkable well or acute visits, and behavioral reimbursements are inadequate (Meadows, Valleley, Haack, Thorson, & Evans, 2011). Due to these constraints, an ideal risk screening instrument would be multidimensional, easily obtainable, inexpensive or free, brief, and easy to administer and score. The screening instrument would need to elicit the most useful information. Likert scales are considered more sensitive and adaptable for assessing behaviors and attitudes, when compared to dichotomous scales (Capik & Gozum, 2015). Thus, the scales in this review were evaluated for their question format for example, whether they used a yes/no format or Likert scales.

Since this review concentrated on multidimensional screening instruments, all the instruments assessed several different domains associated with adolescent risk. Table 2 reveals that ten screening instruments gauged actual risk-taking behaviors such as sexual activity, smoking, substance abuse, and depression, while six screening instruments concentrated on internalizing (depression, anxiety), externalizing (aggression, violence), and attention behaviors displayed by the adolescents. Only six of the reviewed screening instruments are free in the

public domain, the remaining screens charge usage fees or are copyrighted with limited availability and unknown costs.

The length of the screening instruments varied greatly in table 2, with 2 questionnaires containing over 100 items. Six instruments in the table were comprised of 50 to 100 items and the remaining 8 screening instruments had less than 50 items to answer. Four of the studies documented the time needed to complete either the screening instrument and/or the scoring of the instrument as 8-30 minutes. Seven instruments in table 2 used a yes/no answer format and the rest of the screening instruments used Likert scales, except 1 that allowed the patient to check responses to individual questions.

Process

The Donabedian element of process involves assessing the risk-screening instrument as it is involved in the operation of being used by the provider, the parent, and the youth. This review of the screening instruments concerning this element of the Donabedian Model identified a relationship between the parents, youth, provider and the instrument. Ideally, a risk-screening instrument for the older adolescent would involve self-report so feelings and behaviors not noticed by others can be identified (Weitzman & Wegner, 2015). In addition, current evidence suggests that adolescents prefer disclosing personal information by computer (Olson, Gaffney, Hedberg, & Gladstone, 2009; Park et al., 2001). Therefore, the process was assessed in table 2 using the criterion of report method, parent report or self-report, and the administration format, written or computer.

The evaluated studies in table 2 reveal that 10 screening instruments that can be used as self-report, while one questionnaire recommended both a parent and adolescent answer the instrument for the best results. Five instruments were designed for parent report only and four of

the screening instruments were formatted for computer delivery only, with one of these four screens being Internet based. The other instruments in table 2 could be administered either way but most of the reviewed studies used the written versions of the test.

Outcome

The Donabedian element of outcome involves assessing the risk-screening instrument and the screening results. Preferably, the outcomes of an effective adolescent risk screening instrument would determine behaviors that could put the adolescent patient at risk for future health concerns. Reliability and validity scores indicate whether the screening instrument functioned as it was designed. If the instrument uncovered the risks it was purported to expose, the study results should indicate a screening instrument that is valid and reliable. Face, content and construct validity scores would be cited to predict the performance of the instrument in a certain setting with a certain population, along with inter-rater reliability to cite the screens consistency over time (Grove, Burns, & Gray, 2013).

In addition, the cited study should be strong as evidenced by the Centre of Evidence-Based Medicine (CEBM) levels of evidence protocol (Phillips et al., 2009). The strongest studies, level 1, would include systematic reviews of randomized controlled trials (RCT) followed by individual random controlled trials. Level 2 studies would include systematic reviews of cohort studies or individual cohort studies, followed by outcomes research. Level 3 studies would be comprised of varying strengths of case studies. Thus, the screens were evaluated for outcomes based upon the strength of the cited study and the reliability and validity findings.

Overall the sample studies in table 2 produced strong evidence as evaluated using the CEBM protocols. All the studies were level 2 cohort studies except 5 that were judged to be level

1 due to randomization of the sample. The rest of the studies predominately used convenience sampling. All the studies except 5 reported the validity and reliability of the study and the instrument. These 5 studies in table 2 concentrated on using the study as a formative assessment of the risk screen, as feasibility of risk screening with the purported tool or as a risk identification measure.

Discussion

There are adolescent risk screening instruments available for use in the primary care setting, however finding instruments that can be used efficiently and effectively in this fast-paced environment is challenging. Evaluating behavioral risk screening instruments for the primary care setting using the Donabedian Framework can facilitate this process. This framework can aid in identifying the various elements that comprise the adolescent risk screening process. By examining the structure, process, and outcomes separately, it allows those within the primary care setting to identify the unique part of adolescent risk screening that they are responsible for completing. This breakdown identifying structure, process and outcome also assists investigators in identifying the essential elements needed for an adolescent risk screening instrument. The Donabedian framework ultimately offers investigators and primary care providers a clearer picture of each aspect of the adolescent risk screening process and the desired outcomes

Synthesis of the integrative review articles indicated there are a few instruments appropriate for screening adolescents for risky behaviors in the primary care setting. The initial searches produced many screening instruments but most of the screening instruments that were initially gathered only identified one specific risk behavior such as tobacco, alcohol, or substance abuse, high-risk sexual activity, eating disorders, obesity or depression. General multidimensional or multi-problem screening instruments that assess for several of the listed

behaviors or activities are much less common; these would be most effective in the primary care center as research indicates that most adolescent risk behaviors co-occur (Aspy et al., 2012).

Risk screening is a vital part of comprehensive adolescent care. To assess for unsafe mental, behavioral or health activities, efficient and effective, free or low cost, readily available screening instruments are optimal. These instruments need to be comprehensive, brief, understandable, and easy to administer and score. This review process, as conducted through the lens of the Donabedian Framework, revealed several potential drawbacks to current available adolescent risk screening instruments during the examination of the evidence.

When assessing the structure of the reviewed risk-screening instruments, reoccurring concerns are related to the cost, the number of domains covered, the length of the instrument (number of items), the format of the questions (yes/no or Likert scale), and the ease of scoring. Table 2 presents the cost, domains covered, number of items, question format, and administration time of the reviewed screens.

The Child Behavior Checklist (CBCL), the Rapid Assessment for Adolescent Preventive Services (RAAPS) and the two versions of the Youth Outcomes Questionnaire (YO-Q, YO-Q-SR) are the only screening instruments that relied on a fee-based structure. Several instruments had unknown fee structures such as the Adolescent Health Review (AHR), the Behavioral Health Screen (BHS), Child Health Improvement Through Computer Automation (CHICA), the Health eTouch screen, the Patient Health Questionnaire for Adolescents (PHQ-A), and the Pediatric Behavioral Health Screen (PBHS). These screening instruments evaluated adolescent behaviors more specifically, while the free instruments such as the 3 versions of the Pediatric Symptom Checklist (PSC, PSC-17, PSC-Y) and the Strengths and Difficulties Questionnaire (SDQ) tended to assess internalizing, externalizing, and attention difficulties. The

Guidelines for Adolescent Preventive Services Questionnaire (GAPS) was one free instrument that covered specific risk domains. While this instrument is free in the public domain for general use, permission must be obtained to study it or change the format in any way.

As far as the length of the screening instrument, the POSIT and the CBCL both had over 100 items. The Behavioral Health Screen, the GAPS, the Health eTouch, the PHQ-A and the YO-Q (both versions) all had over 50 items. The instruments with fewer than 50 items were the three versions of the Pediatric Symptom Checklist, the Strengths and Difficulties Questionnaire, and the Patient Behavioral Health Screen. However, while these shorter instruments were easier to score, they only assessed internalizing, externalizing, and attention difficulties; they did not cover specific risk behaviors. Other shorter screening instruments that were more specific included instruments with unknown costs or proprietary fees; these included the Adolescent Health Review, the Child Health Improvement Through Computer Automation, and the RAAPS screen.

An additional concern is the format of the questions. It can be proposed that yes/no questions may miss behaviors if the adolescent perceives that they only occasionally engage in a specified risk behavior (Capik & Gozum, 2015). Most all the screening instruments questioning specific behaviors used a yes/no format with the less specific instruments using Likert scales. The only behavior specific screening instruments using the Likert scale was the YO-Q and the YO-Q-SR. These instruments had over 50 questions and require proprietary fees for usage.

To assess the screening process the instruments were evaluated for the method of report and the administration format. Several studies used screening instruments that were answered by parents. As adolescents age and engage in activities and behaviors of which their parents are not aware or may not approve, instruments answered by parents becomes problematic. Studies

revealed that parents or teachers were often unaware of internalizing behaviors experienced by older adolescents (Pagano et al., 2000). Missing internalizing behaviors such as depression and anxiety can be dangerous. Hence, it is ideal for providers to obtain mental health information and behavioral activities from the adolescents themselves.

Among the reviewed adolescent risk screening instruments, several showed promise as self-report instruments. The fee-based RAAPS is a brief self-report instrument that requires a subscription fee and the Guidelines for Adolescent Preventive Services Questionnaire (GAPS) has various age specific versions freely available on the Internet. The GAPS is a written questionnaire that contains 72 items; so, while it covers many domains, its length could be time consuming in the primary care setting. Moreover, no psychometric studies of the GAPS Questionnaire were found. The GAPS question format was used to create a tablet-based instrument, DartScreen that shows promise (Gadomski et al., 2015). Other freely available self-report instruments include the Pediatric Symptom Checklist for Youth (PSC-Y) and the Strengths and Difficulties Questionnaire (SDQ). These screening instruments have 35 and 25 items respectively and are widely used. They are less specific in nature, but valid and reliable.

Information about the Bright Future instruments was added to Table 2 because these instruments were referenced by many studies. No research evaluations were found concerning the Bright Futures instruments except attempts to integrate the information into nurse practitioner and pediatric residency programs (Knight et al., 2001; Porter et al., 1997). However, the PSC is included in Bright Futures as a resource.

Examination of the outcome measures associated with the reviewed studies indicates that overall the investigations were strong as most were level 1, or level 2 studies as rated by the CEBM levels of evidence. However, psychometric information was not available for the

Adolescent Health Review, the Child Health Improvement Through Computer Automation or the GAPS tool.

When viewed through the Donabedian Framework of structure process and outcome, the Pediatric Symptom Checklist and its derivatives are the screens of choice. Although these screens are less specific, they are freely available in the public domain, brief when compared with other screens and use Likert statements. There are self-report forms of the PSC, PSC -17, and PSC – Y and these have been used in written and computerized formats. These instruments have been studied extensively, are included in the Bright Futures Resources, and they are valid and reliable. This indicates that these screening instruments can be trusted to identify the risky adolescent behaviors that providers need to identify for improved adolescent health outcomes.

Limitations

The findings of this integrative review are limited to the search terms used and the inclusion and exclusion criteria employed. Only studies regarding adolescent risk screening instruments in the United States were evaluated. In addition, this study concentrated on multidimensional adolescent risk screening instruments that are appropriate for use in primary care setting.

Conclusion

Risk screening is an essential component of holistic adolescent care, yet various factors can disrupt screening implementation. Examination of factors associated with the Donabedian structure-process-outcome model revealed various barriers that affect screening in the primary care setting. Structure issues related to cost, length, and question format can affect office finances, visit dynamics and the answers gained through screening. Process elements regarding the report method, the administration and scoring format can influence outcomes due to

adolescent confidentiality concerns, parental involvement, provider efficacy, and time constraints for patient visits. Long screens take more time, which may impede office workflow and create the perception of a hurried environment. Written screens may seem less private, in particular if parents are present during the administration process (Anand et al., 2012). Likewise, parent answered screens can translate into a perceived lack of privacy with resulting concerns over confidentiality, as well as missing information. These factors can diminish trust and can inhibit successful risk screening. Improving the structure of the screening instruments could facilitate the screening process and ultimately improve adolescent health outcomes.

An examination of the literature regarding adolescent risk screening instruments indicates that there are opportunities to improve the structure of risk screening instruments that would in turn improve the process and outcomes. A short, self-report, self-scoring instrument that covers multiple domains with Likert scales offered via a tablet or phone app, could prove less intimidating for adolescents and provide a more intimate environment for disclosure. Adolescents are comfortable with this technology and it may seem less invasive. Moreover, measures such as these would decrease the burden placed on providers and office staff; increasing the likelihood that screening would become a routine part of the adolescent visit.

Declaration of Interests

This work has no funding and the authors declare no conflict of interest. The authors are solely responsible for writing this paper.

Acknowledgements

I am thankful for the support of my dissertation team Dr. Phillips, Dr. Amella, Dr. Nichols, Dr. Mueller and Dr. Rushton. I would also like to thank Dr. Dinolfo for his assistance. Without their guidance and direction, this manuscript would not have been possible.

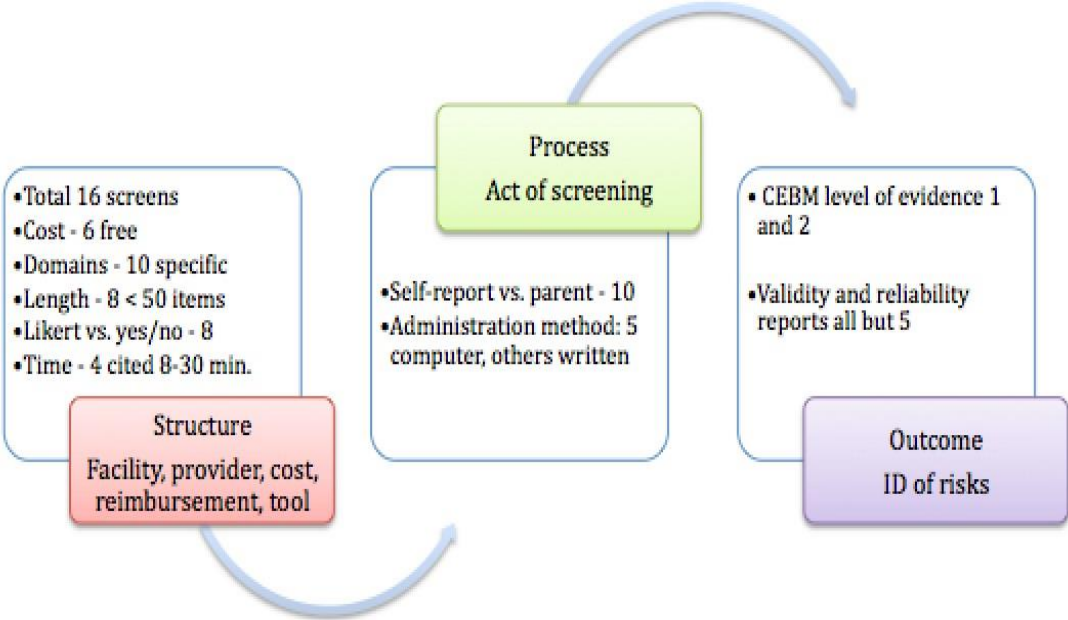


Figure 1: Donabedian Framework Applied to Reviewed Adolescent Risk Screens

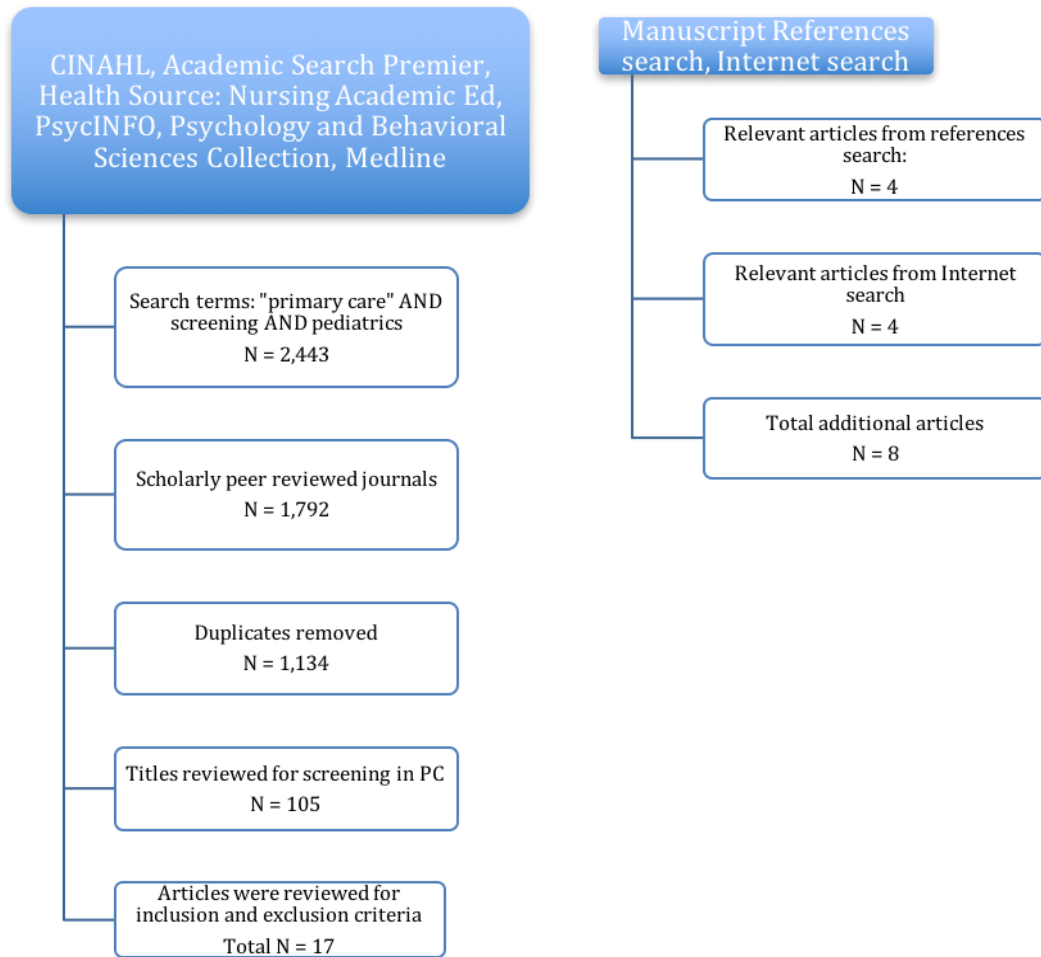


Figure 2: Literature Search for Adolescent Screening Tools

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MANUSCRIPT II – INTEGRATIVE REVIEW

Hiott, D. B.; Phillips, S.; Amella, A. The HEEADSSS Adolescent Risk Screening

Interview: An Integrative Review

Unpublished manuscript, College of Nursing, Medical University of South Carolina,
Charleston, South Carolina.

The HEEADSSS Psychosocial Interview: An Integrative Review

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Abstract

Many primary care providers utilize a psychosocial verbal interview called HEEADSSS to assess adolescent risky behaviors. This integrative review examines available literature concerning the HEEADSSS that covers the domains of Home, Education (alternately Employment), Eating, Activities, Drugs, Sexuality, Suicide and Safety. It is often referred to using the acronyms of HEADS, HEEADS, HEEADSS, HEEADSS or HEEADSSS.

Methods: A systematic search of the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Academic Search Premier, Health Source Nursing Academic Ed, Medline, PsycINFO, the Psychology and Behavioral Sciences Collection and PubMed databases using CINAHL headings was completed. Manuscripts were included when they investigated a version of the HEEADSSS. Manuscripts were excluded if the HEEADSSS was not the focus of the study, if they solely reviewed the screening method, were instructional or were not in English.

Results: Following the literature review and application of inclusion and exclusion criteria, 15 manuscripts were retained in the study sample.

Conclusions: Examination of the literature using the Donabedian Framework indicates that while the structure of the interview is appealing, easy to use and remember, the tool is long, time-consuming and may not be completed during the appointment. The process of a verbal, face-to-face format may raise confidentiality concerns and cause embarrassment, thus outcomes may be limited. Most concerning is the lack of reliability or validity scores for this instrument.

Keywords: “HEEADS”, “HEADSS”, “HEEADSS”, “HEEADSSS”, “home, education, eating, activities, drugs, sex, suicide and safety”.

The HEEADSSS Psychosocial Interview: An Integrative Review

Worldwide, the financial cost of mental health issues is estimated to be 2.5 trillion dollars but the human cost can be far more devastating for patients, families, and communities with lost wages, stigmatization, victimization, and premature death (Patel & Saxena, 2014). In 2013, the World Health Organization (WHO) adopted the Comprehensive Mental Health Action Plan to bring visibility to the current global mental health crisis. Notably, one of the goals is to identify and intervene on mental health issues early in the life course of individuals and families to increase positive health outcomes (Patel & Saxena, 2014).

In the United States (U.S.), it is estimated that 20% of the pediatric population meets the diagnostic criteria for a mental health disorder with approximately 10% of pediatric hospitalizations being due to mental health issues (Bardach et al., 2014). The Centers for Disease Control (CDC) estimates inpatient and outpatient costs total approximately 247 billion dollars annually (Perou et al., 2013). Yearly developmental and behavioral screening in the U.S. is required for Medicaid-eligible children by the federal policy Early Periodic Screening, Diagnosis, and Treatment (EPSDT) (Center for Medicare and Medicaid Services, 2014). Additionally, the American Academy of Pediatrics, the National Association of Nurse Practitioners and the U.S. Preventive Services Task Force recommend assessing behavioral risks each year (Anand, Carroll, & Downs, 2012).

Adolescent risk screening can contribute to a healthier adult population by uncovering unsafe activities early in the life course. Undetected, these risky behaviors can result in death, injury, violence, tobacco use, alcohol and substance abuse, obesity or

sexual activity with the unplanned consequences of pregnancy or disease (Kann et al., 2014). The family practitioner, pediatrician and nurse practitioner are in a unique position to evaluate the adolescent patient for unhealthy behaviors, educate, and refer if additional guidance and support are needed to prevent long-term negative health consequences (Carr-Gregg, Enderby, & Grover, 2003). Yet, studies reveal that half of all providers do not screen adolescent patients for risk behaviors (Gardner, Kelleher, Pajer, & Campo, 2003; Weitzman & Wegner, 2015). The CDC asserts that for surveillance of psychosocial disorders to improve, validation of many current screening instruments is needed (Perou et al., 2013).

While there are adolescent risk screens available for use within the primary care setting, an integrative review examining multidimensional adolescent risk screens appropriate for use in the primary care setting demonstrated barriers for providers and adolescents (Hiott, Phillips, & Amella, 2017). The most notable barriers were the availability of the tool, the cost, the length, and the time to administer and score. The process of screening also produced barriers depending on the report method, parent report or self-report and administration format, oral, written or computer. Adolescents felt the visit was more confidential and private when written and computerized surveys were used. Self-report was preferential to parental report since adolescents may internalize behaviors such as depression and engage in activities unknown to parents and guardians. These barriers influence the effectiveness of an adolescent risk screen in the primary care setting, thereby influencing the outcome of identifying adolescent risky behaviors (Hiott et al., 2017).

In lieu of a screening instrument, many providers use a verbal interview developed by Harvey Berman M.D. in 1972 and refined by Eric Cohen M.D. as a system for organizing the psychosocial history of adolescent patients (Goldenring & Rosen, 2004). The original interview and acronym called HEADS covered the domains of Home, Education/employment, Activities, Drugs and Sexuality; this evolved into the HEEADSSS to cover the additional domains of Eating, Suicide/depression, and Safety (HEEADSSS) (Goldenring & Rosen, 2004; North, 2013). The HEEADSSS acronym provides structure to facilitate communication for assessment of health risk behaviors during the primary care visit. For consistency, the most current acronym (HEEADSSS) will be used throughout this manuscript as the identifier for any version of this interview.

Administration of the HEEADSSS involves an interview that proceeds from expected questions to those of a more personal nature (Goldenring & Rosen, 2004; Klein, Goldenring, & Adelman, 2014). It is reported that with practice, a provider could conduct this interview addressing all 8 domains in 20 minutes; unfortunately, many providers have only 15 minutes for a pediatric visit (Biddle, Sekula, & Puskar, 2010; Goldenring & Rosen, 2004; Klein et al., 2014). The HEEADSSS interview is conducted by introducing personal questions in a face-to-face encounter between the adolescent and the health care provider; therefore, embarrassment and confidentiality concerns could lead to the withholding of important health information (Carr-Gregg et al., 2003).

Although the HEEADSSS interview meets adolescent assessment guidelines provided by the American Medical Association (AMA) and American Academy of Pediatrics (AAP), proponents have suggested it is intended to be used as a complementary strategy for risk assessment in addition to a validated screening

instrument (Goldenring & Rosen, 2004). The purpose of this integrative review is to evaluate the evidence concerning the HEEADSSS interview as an appropriate risk screen for use in a primary care setting to identify adolescent risk behaviors.

Donabedian Framework

The Donabedian Model provides a useful framework through which to evaluate adolescent risk screening in the primary care setting (Donabedian, 1966, 2005; Hearld, Alexander, Fraser, & Jiang, 2008; Hiott et al., 2017; McLeroy, Bibeau, Steckler, & Glanz, 1988; Yakimo, 2006). This model involves a structure-process-outcome framework that seeks to answer the question, ‘What goes on here and how can it be made better?’ (Ayanian & Markel, 2016; Hearld et al., 2008; Yakimo, 2006). The structure portion of the model includes all resources available to render patient care such as: the physical setting, the staff, personnel competency levels, resources, equipment, financial costs and reimbursements. The process construct involves the engagement between the patient and provider as care is rendered. It is the process of giving and receiving care; in this case, the process would be the communication between the provider and adolescent during the HEEADSSS interview. The outcome construct in the Donabedian Model is the result of care. Expected outcomes of the structure and process of the HEEADSSS interview are the identification of adolescent risk behaviors. Figure 1 in Appendix A outlines the components of the HEEADSSS interview as it is reviewed using the Donabedian Framework. The interplay between the structure and process of care can affect the outcome. Thus, using a process improvement model to evaluate the use of the HEEADSSS interview in the primary care setting can identify variables that impede successful risk identification in the adolescent population.

Methods: Literature search methods

To examine the literature concerning the use of the HEEADSSS interview in the primary care setting, library searches, ancestry searches and Internet searches were conducted. A medical reference librarian assisted with searches that included a systematic search of the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Academic Search Premier, Health Source Nursing Academic Ed, Medline, PsycINFO, the Psychology and Behavioral Sciences Collection and PubMed databases with CINAHL headings using the Boolean search terms for the various versions of the HEEADSSS interview identified.

The original HEADS acronym (Home, education, activities, drugs, sex), search S1, yielded 124,933 articles, so it was limited to full text (46,018) peer-reviewed manuscripts with references (1,472). All 1,472 of the titles from S1 were reviewed and none met the inclusion criteria and no results were found for S3 HEEADS, ancestry or Internet searches, while during S2 (HEADSS), S4 (HEEADSS); and S5 (HEEADSSS); 47 manuscripts were identified. After 1 non-English article and 19 duplicate studies were removed, 27 manuscripts were examined. See Figure 2 in Appendix B for a summary of search steps.

The retained 27 manuscripts were examined for inclusion and exclusion criteria. Manuscripts were included if they assessed the HEEADSSS or a version of the HEEADSSS interview as a screening instrument or if they evaluated the construct(s) measured, study outcomes or included any psychometrics indicating validity and reliability of the HEEADSSS. Studies from all countries were included if the study was available in English. Manuscripts were excluded if they mentioned the HEEADSSS or a

version of the interview, but it was not the focus of the study, if they only provided a review of the HEEADSSS screening method or were instructional in nature. Fifteen manuscripts were retained and assessed using the Donabedian Framework to synthesize what the studies revealed about the structure, process and outcomes of the HEEADSSS psychosocial interview as it relates to the guiding research question.

Results

The results of the literature review are summarized in Table 1, Appendix C. A broad overview of the manuscripts indicates that the retained studies originated from 6 countries: United States (n=4), Australia (n=6), Canada (n=2), New Zealand (n=1), India (n=1), and Brazil (n=1).

Structure

According to the Donabedian framework, elements of structure involve instruments, the setting, personnel, and costs. Structurally, this oral interview is free, convenient and easy to complete in an office setting but it is lengthy and can be time consuming. There have been numerous versions of the HEEADSSS that have been evaluated in various settings, the length has been examined as has use of the interview as a screen in addition to comparison studies.

HEEADSSS version. Evaluation of the structure of the HEEADSSS interview as used in the various settings through this lens indicates this verbal screen has undergone metamorphosis over time from the initial acronym of HEADS (Home, Education/employment, Activity, Drugs, Sex). Various iterations of the HEEADSSS interview have been investigated (see Table 1, Appendix C). The HEADSS was examined 12 times, while 1 study involving the HEEADSS version was found. The latest

version HEEADSSS was studied 1 time and 1 study focused on an adaptation called HEADS-ED.

In addition to the various versions of the HEEADSSS, some of the letters making up the acronym were given different meanings in 3 studies. One of the studies attributed the final S in HEEADSSS to sleep instead of safety (Sturrock & Steinbeck, 2013). Another added ED to the end of the acronym to include emotions and discharge resources (Cappelli et al., 2012), while a third study changed activity to alcohol and the suicidality to smoking (van Amstel, Lafleur, & Blake, 2004).

Setting. Sample study settings included 2 acute care hospitals (Sturrock & Steinbeck, 2013; Yeo, Bond, & Sawyer, 2005) and 3 adult and pediatric emergency departments (Cappelli et al., 2012; Hicks, Ward, & Platt, 2014b; van Amstel et al., 2004). Seven studies were conducted in clinics; these included: 1 behavioral clinic, 4 high risk adolescent clinics, and 2 tertiary clinics (Cohen, MacKenzie, & Yates, 1991; Eade & Henning, 2013; Hagel, Mainieri, Zeni, & Wagner, 2009a; Madaan et al., 2014; Palmer, Patterson, & Thompson, 2014; Rayner & Crossen, 2014; Ronis, Frankovich, Yen, Sandborg, & Chira, 2014). Literature was examined in one integrative review relating to risk screening in anti-coagulation patients and 2 studies took place in school settings (Biddle et al., 2010; Hussain, Guppy, Robertson, & Temple, 2013; Jones, Mertyn, Alhucema, Monagle, & Newall, 2012).

Time. Some studies investigated documentation compliance related to the administration and completion of the HEEADSSS in the various facilities. The amount of time taken to complete the HEEADSSS interview was consistently documented in only 4 of the 15 studies. The participants in one study completed the interview in 5-15 minutes

(Cohen et al., 1991). Two investigations using the HEEADSSS stated the average completion time was 20 minutes (Hagel et al., 2009a; Madaan et al., 2014), while the average completion time for one investigation was reported as 39-41 minutes (Sturrock & Steinbeck, 2013).

Study purposes. Fifteen studies evaluated the structure of the HEEADSSS interview by determining if the domains of home, education, eating, activities, drugs, sexual behaviors, suicide and safety correlated or were predictive of certain physical, behavioral or mental problems. HEEADSSS risk screening documentation compliance and population need to guide program formulation were also topics addressed in the studies (Table 1).

Specifically, the HEEADSSS was used to identify problems and concerns of rural high school students to see if any of the uncovered issues were predictive of depression or suicide (Biddle, Sekula, Zoucha, & Puskar, 2010). It was used to obtain information needed to design intervention programs and obtain funding for homeless youth (Cohen et al., 1991) as well as to identify the numbers of adolescents screened for Chlamydia or HIV as an outcome of the HEEADSSS interview (Eade & Henning, 2013). Four studies assessed the role the HEEADSSS interview may play in the management of special at-risk populations such as pediatric rheumatology patients, adolescents requiring anticoagulation therapy, and adolescents in the emergency room or in the hospital (Cappelli et al., 2012; Jones et al., 2012; Ronis et al., 2014; Sturrock & Steinbeck, 2013). The HEEADSSS was used as an instrument to profile designated population needs in 2 studies (Hussain et al., 2013; Madaan et al., 2014), while 2 other studies evaluated the HEEADSSS domains or attempted to engineer a screen using these domains (Hagel et al.,

2009; Palmer et al., 2014). Four studies examined the rate of compliance with completing the HEEADSSS interview and documentation (Hicks, Ward, & Platt, 2014; Rayner & Crossen, 2014; van Amstel et al., 2004; Yeo et al., 2005).

Comparison studies. Of the 15 studies, 3 compared a version of the HEEADSSS to validated and reliable instruments such as the Coping Response Inventory, the Child Behavior Checklist (CBCL), or the Children's Depression Inventory (CDI) and the Child and Adolescent Needs and Strengths – Mental Health tool (CANS-MH) (Biddle et al., 2010; Cappelli et al., 2012; Hagel et al., 2009a). One study compared a version of the HEEADSSS to a facility specific instrument called the Youth Care Plan (YCP) (Sturrock & Steinbeck, 2013).

Process

The process of utilizing the HEEADSSS interview involves communication between the provider and the patient. The HEEADSSS is completed in a face to face interview and relies on the self-report of risk behaviors by the patient. None of the literature assessed patient or provider comfort level, satisfaction, or concerns with the face-to-face, self-report risk screening process. However, 3 studies applied a different delivery format for the screen by using written or computerized questionnaires that had been developed from the HEEADSSS interview for their study purposes instead of the traditional oral interview (Hagel et al., 2009; Hussain et al., 2013; Sturrock & Steinbeck, 2013).

Outcomes

Validity and reliability. Validity and reliability scores are necessary to ensure that instruments measure what they are purported to measure every time they are used. This examination of the literature revealed 1 study evaluated the HEEADSSS interview for inter-rater reliability scores, Cronbach alpha scores and sensitivity and specificity but no internal or external validity information was identified.

The study that produced this data was a comparative study (Cappelli et al., 2012). The purpose was to evaluate if the HEADS-ED was predictive of hospitalization and the need for a psych consult. The inter-rater reliability of the HEADS-ED was 0.78 and correlations between Children's Depression Inventory (CDI) and the Child and Adolescent Needs and Strengths – Mental Health tool (CANS MH) and the HEADS-ED ranged from $r = 0.17 - 0.87$. The HEADS-ED specificity and sensitivity for a psychiatric consult and admission were 87% and 82% respectively as compared to the CBCL.

One other study constructed a questionnaire using the HEEADSSS domains that correlated with the CBCL domains called the Questionnaire based on HEADS-16 (QBH-16) (Hagel et al., 2009a). This questionnaire was used to interview the parents and the adolescent. The QBH-16 was predictive of psychosocial risks 71% of the time with scores ≥ 9 predictive of the likelihood of risk.

Completion and documentation. Four studies focused primarily on completion of the interview and documentation of the results (Hicks et al., 2014; Rayner & Crossen, 2014; van Amstel et al., 2004; Yeo et al., 2005). One study reported that only 10 of every 100 cases had a documented HEEADSSS report in the medical record (Yeo et al., 2005). An additional investigation revealed that 31% of patients had only been asked questions

concerning 3 HEEADSSS domains out of the 8 that it covers, while 28% had not been asked any questions about any HEEADSSS domains (Hicks et al., 2014). One investigation focused on the addition of a HEEADSSS reminder stamp placed on the chart to prompt providers to complete the interview and documentation (van Amstel et al., 2004). Lastly, another study that focused on completion of the HEEADSSS with referred high-risk clients, 81% of which had multiple diagnoses, found that only 7% had a completed HEEADSSS, 43.9% were partially completed and 20% were not completed at all (Rayner & Crossen, 2014).

Study strength. The strength of the evidence in the sample studies was determined using the levels of Centre for Evidence Based Medicine (CEBM, 2009; OCEBM Levels of Evidence Working Group). Four studies were level 2b involving either individual cohort studies or retrospective cohort studies; the remaining 11 studies were level 2c focusing on audit or outcomes research (see Table 1, Appendix C).

Discussion

The Donabedian model of structure, process and outcome provided a useful framework to examine the HEEADSSS interview as a screening instrument for use in the primary care setting. Using this framework helped more clearly identify adolescent risk screening limitations regarding the use of this popular interview, as well as define what limitations were involved and when and where they occurred. Since the HEEADSSS interview has been called the ‘gold standard’ of psychosocial interviews for identifying adolescent risk behaviors, it is important to review what is known about this instrument (Sturrock & Steinbeck, 2013).

Structurally, the HEEADSSS is free, easy to remember and administer, and has evolved to cover most of the relevant adolescent risk trends followed by the CDC. However, the exact domains covered can vary as can the acronym. Additionally, the HEEADSSS interview is long and can take up to 20 minutes to complete; in some studies completion time was 40 minutes. This is problematic for providers who have limited clinical time with patients and inadequate reimbursement (Weitzman & Wegner, 2015). Further, findings indicate that completion of the interview and documentation compliance is a problem as well.

The HEEADSSS interview was designed to ask the adolescent patient questions in an open-ended format to illicit as much information as possible. The competency and self-efficacy of the provider are imperative to the success of the HEEADSSS interview, yet studies have indicated that providers often lack confidence when confronting adolescents with behavioral and emotional issues (Weitzman & Wegner, 2015). Not following the interview structure of using open ended questions can influence the process and result in questionable outcomes. No studies were found that assessed provider self-efficacy in administering the HEEADSSS interview.

While the interview length and question format along with time constraints are challenges associated with the HEEADSSS, the process of communication between the patient and provider is an even greater issue. The HEEADSSS interview is a self-report assessment of risk behaviors conducted in a face-to-face setting. Studies have indicated that adolescents often have confidentiality concerns; additionally, embarrassment can alter the interview dynamics between adolescents and their provider (Coker et al., 2010). Yet, none of the studies in this review assessed the comfort level, satisfaction or concerns

of either the patient or the provider in regard to the process of communication during this interview.

To improve adolescent and young adult health outcomes, valid and reliable instruments that can identify risks early in the life course are needed and yet no reliability or validity scores for the HEEADSSS were found (Perou et al., 2013). Research aimed at examining provider efficacy and the validity of this interview are needed. Until this evidence is obtained, it is best to follow the HEEADSSS developers' recommendation that this interview is to be used in conjunction with a reliable, valid screening instrument (Goldenring & Rosen, 2004).

Ultimately, what this means for the provider is that while the HEEADSSS is a common and popular method for assessing adolescent risk worldwide, without validity and reliability scores the results of the HEEADSSS interview in a primary care setting must be approached with caution. Evidence is sparse for using this interview as the sole screening method for identifying adolescent risky behaviors. However, the HEEADSSS interview may be valuable as a conversation guide to follow-up on risks identified with a reliable, validated risk screening instrument used prior to the visit such as the Pediatric Symptom Checklist – Youth (PSC-Y).

When viewed through the lens of the Donabedian Framework of structure, process, outcome, changes in adolescent risk screening measures that are practical for the primary care setting are necessary. Structural innovations would include increased provider training to ensure the HEEADSSS interview is used as designed in an open-ended format; moreover, additional research is needed to evaluate the reliability and validity of the HEEADSSS. Adding a reliable, validated screen prior to the adolescent

health care visit, perhaps while waiting for the appointment, would help providers to focus the interview on noted areas of concern thereby omitting unnecessary lines of questioning and saving time.

Process innovations would include research to explore provider and adolescent perceptions of risk screening in the primary care setting. Utilizing technology such as phones or computer tablets to administer a reliable, validated screen could increase adolescent participation and trust. Further, ensuring that the adolescent has time alone with the provider during the HEEADSSS interview could aid with full disclosure of self-reported risks. To shift the focus of adolescent health care toward prevention, adolescent risk screening in the primary care setting needs a fresh, creative approach to the structure and process to improve the overall outcomes of adolescent risk screening.

Limitations

The search terms, as well as the inclusion and exclusion criteria used for this integrative review limited the study results. Different search terms may have yielded different results. Although information was not excluded from other countries, only manuscripts available in English were included. This may have excluded additional studies.

Conclusion

The purpose of this integrative review was to examine existing literature pertaining to the HEEADSSS interview. The use of the Donabedian framework of structure, process and outcome provided an organized way to review this popular interview for use in the primary care setting. Structural and process changes are needed to innovate adolescent risk screening in the primary care setting. These improvements

include additional research into the HEEADSSS interview, as well as provider and adolescent perceptions of risk screening in the primary care setting. Increased education for healthcare providers concerning adolescent risk screening could increase self-efficacy with the HEEADSSS interview and increase the use of an additional reliable, valid screening instrument before the healthcare visit, such as the Pediatric Symptom Checklist – Youth (PSC-Y). Measures such as these could help ensure provider consistency with the HEEADSSS interview as well as provide focus for visit conversations. The incorporation of technology could further facilitate adolescent risk screening and simplify the process by scoring the screens for the provider.

Ultimately to achieve the goals set by the World Health Organization (WHO), adolescent psychosocial risk needs to be assessed and addressed early in the life course. This is best accomplished in the primary care setting with creative and innovative changes to the structure and process of risk screening to ensure adequate outcomes.

Declaration of Interests

This work has no funding and the authors declare no conflict of interest. The authors are solely responsible for writing this paper.

Acknowledgements

I am thankful for the support of my dissertation team Dr. Phillips, Dr. Amella, Dr. Mueller and Dr. Rushton. I would also like to thank Ayaba Logan for her assistance with library searches. Without their guidance and direction, this manuscript would not have been possible.

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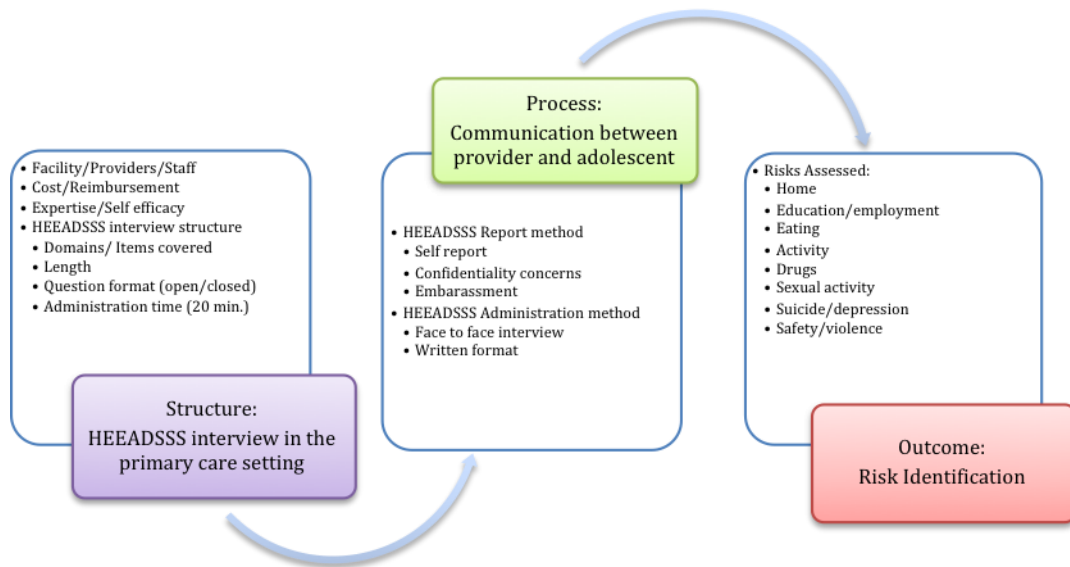


Figure 1: *Donabedian Framework Applied to Adolescent Risk Screening*

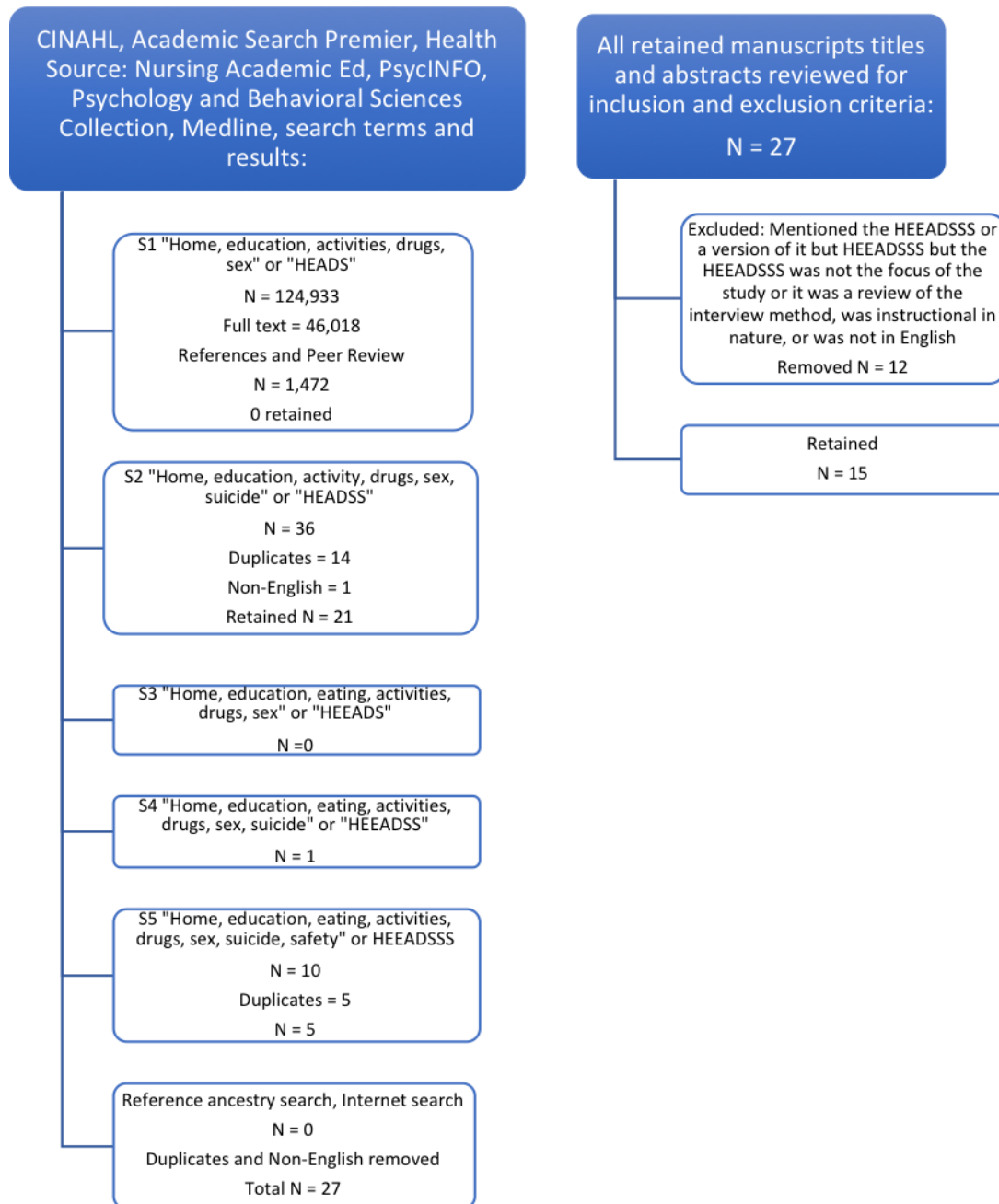


Figure 2: Literature Search

Table 1. HEEADSSS Psychosocial Interview

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
(Biddle, Sekula, Zoucha, & Puskar, 2010)	U.S.	HEADSS = Home Education Activities Drug (use abuse) Sexual behavior Suicidality (depression) *Proposed additions – HEADDSSS Addition of death/safety	Setting/Population: High school students completed qualitative questions from the Child Behavior Checklist and Coping Response Inventory. Procedure: Qualitative content analysis was performed, and themes identified. Study purpose: Is HEADSS appropriate for guiding suicide risk assessment of rural adolescents?	Studied as screen: Yes Constructs: Depression/suicide Comparative Results: Qualitative responses/themes lined up with topic headings in HEADSS. Proposed to add death and safety - HEADDSSS Psychometrics: None	2c Ecological research
(Eade & Henning, 2013)	Australia	HEADSS = Home Education Activities Drug (alcohol) Sexuality Suicide	Setting/Population: Retrospective audit of 100 first time patients at the health services' inner city drop-in clinic and clinical refuge outreach (CRO) Study purpose: Identify percentage of young people screened for Chlamydia after HEADSS youth psychosocial assessment and identify the percentage of positive tests.	Studied as a screen: Yes Construct: Chlamydia Result: 85 were complete, 43 tested for Chlamydia, 11 positive. HEADSS was used to gauge sexual activity and determine if Chlamydia testing was needed. HEADSS did provide guidance for screening for STDs Psychometrics: None	2c Audit
(Cappelli et al., 2012)	Canada	HEADS-ED = Home	Setting/Population: 313 patients average age 14.3 in E.D.	Studied as a screen: Yes	2b Cohort study

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
		Education Activities (peers), Drugs (alcohol) Suicidality Emotions (behavior) Discharge (resources) *Authors noted various versions	Procedure: Completed the Children's Depression Inventory (CDI). Crisis staff completed the HEADS-ED and the Child and Adolescent Needs and the Strengths-Mental Health tool (CANS MH) Study Purpose: To determine if completion of the HEADS-ED correlated with the need for a psych consult.	Constructs: Risk identification Psychosocial risk, Results: Comparative study - Psychometrics of the HEADS ED (home, education, activities/peers, drugs/alcohol, suicidality, emotions/behavior, discharge resources) *Psychometrics: Inter-rater reliability 0.785. Correlations between CDI and the CANS MH and the HEADS-ED ranged from $r = 0.17 - 0.87$ Specificity 87%, sensitivity 82% for psych consult and admission.	
(Cohen, MacKenzie, & Yates, 1991)	U.S.	HEADSS = Home Education Activities Drug use/abuse, Sexual behavior, Suicidality (depression)	Setting/Population: Used to assess 1,015 new patients aged 12-24 at high risk clinic. Procedure: To identify needs of this population in the community. Interviews lasted 5-20 minutes. Conducted by physicians or NPs. Study Purpose: Compared non- homeless to homeless teens for risky behaviors and HIV.	Studied as a screen: Yes Constructs: Risky behaviors, HIV Results: 63% homeless, all risk behaviors increased with greater risk for HIV Psychometrics: No reports of validity or reliability concerning the HEADSS interview.	2c - Audit/ outcomes research
(Hagel, Mainieri,	Brazil	HEADSS = Home	Setting/Population: 98 adolescents (12-17) and families	Studied as screen: Yes	2b Cohort study

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
Zeni, & Wagner, 2009)		Education Activities Drugs Sex Suicide	seen in a behavioral clinic Time - 20 min. Procedure/Study Purpose: Assess effectiveness of QBH-16 (Questionnaire based on HEADSS) as compared with the Children's Behavior Checklist (CBCL) Totals over 64 on the CBCL is 87% predictive of a mental disorder. Parents answered q 1-6, adolescents answered q 7-16	Constructs: HEADSS constructs in QBH-16 Results: Only CBCL totals were used to diagnose but these were correlated with the QBH-16. Psychometrics: The QBH-16 was predictive, with scores >9 predictive of likelihood ratio (LR) >5.5, scores <6 had LR of 0.13	
(Hicks, Ward, & Platt, 2014)	U.S.	HEADSS = Home Education (employment) Activities Drug use Sexuality Suicide	Setting/Population: Convenience sample of 200 subjects aged 15 to 25 years seeking emergency care Procedure: Were HEADSS questions asked in the PED or AED? Study Purpose: Assess patients views of age for PED vs AED, if they had a PCP, were HEADSS questions asked, needed resources	Studied as a screen: Yes Construct: HEADSS preferences - compliance Results: Combined 31% at least 3 HEADSS topics addressed, 28% no HEADSS topics addressed. Psychometrics: None	2c Audit/ Outcomes research
(Hussain, Guppy, Robertson, & Temple, 2013)	Australia	HEADSS = Home Education (employment, eating and exercise) Activities	Setting/Population: 355 first year college students (244 females/111 males) mean age 20.5 Procedure: Cross-sectional study used online survey based on the 52 question Adolescent Screening	Studied as a screen: Yes, Construct: Profile YA perceived health/support Results: most young adults said their health was good	2c Outcomes/ ecological research

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
		(peers) Drug use (cigarettes, alcohol), Sexuality, Suicide (depression, mood)	Questionnaire (ASQ) modeled on HEADSS survey Study Purpose: Examine the perceptions of first year college students about academic/social stressors and self-rated health. Also, examine accessibility practitioners and support services	Psychometrics: None	
(Jones, Mertyn, Alhucema, Monagle, & Newall, 2012)	Australia	HEEADSSS = Home Education (employment) Eating, Activities, (peers) Drugs, Sexual activity Suicide (depression) Safety	Setting/Population: Literature - Integrative review Study purpose: Integrative review to see if there is evidence that psychosocial screening (HEEADSSS) is being coupled with Anticoagulation therapy (AT) education.	Studied as a screen: Yes Construct: Psychosocial screening Result: No evidence to suggest psychosocial issues discussed so suggestion for the addition of HEEADSSS to provide screening. Psychometrics: None	2c Audit, ecological study
Madaan	India	HEADSS = Home Education Activities Drugs Sexuality Suicide (depression)	Setting/Population: 316 females at adolescent clinic at hospital Time – 20 min. Procedure: HEADSS assessment completed to assess common health problems and needs of adolescents.	Studied as a screen: Yes Construct: Profile adolescent female health Results: Used as a screen for community assessment Psychometrics: None	2c/ Audit/ outcomes research

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
			Study Purpose: To study health profile of adolescent girls		
(Palmer, Patterson, & Thompson, 2014)	Australia	HEADSS	<p>Setting/Population: 11 cancer patients average age 20, 10 clinicians.</p> <p>Procedure: Collaborative project to improve psychosocial screening for oncology patients ages 15-25. Feedback to build upon HEADSS</p> <p>Study Purpose: Improve what currently exists for the psychosocial assessment of and planning for the 15–25-year-old age oncology patient.</p>	<p>Studied as a screen: Yes</p> <p>Construct: HEADSS – base for engineering assessment instrument</p> <p>Results: Study outlining the development of an AYA psychosocial screening tool based upon HEADSS for a specific population.</p> <p>Psychometrics: None</p>	2c/ ecological research
(Rayner & Crossen, 2014)	New Zealand	HEeADSS = Home, Education (employment), Eating, Activities (affect), Drug use (cigarettes) Sexual risk behaviors, Suicide	<p>Setting/Population: Adolescent Resilience Clinic (ARC), Retrospective review of patients 12-18.</p> <p>Procedure/purpose: Assessing number of adolescents screened using the HEeADSS tool.</p>	<p>Studied as a screen: Yes</p> <p>Constructs: Completion audit</p> <p>Results: Referred due to multiple issues. 81% had multiple diagnoses. Only 7% had a complete HEeADSS, 43.9% had some documentation, 20% had no documentation</p> <p>Psychometrics: None</p>	2c/ Audit/ outcomes research
(Ronis, Frankovich,	U.S.	HEADSS = Home,	Setting/Population: 90 females ages 15-19 screened prior to	Studied as a screen: No	

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
Yen, Sandborg, & Chira, 2014)		Education, Activities, Drugs, Sexual activity, Suicide (depression)	counseling at a tertiary care Rheumatology clinic Procedure: HEADSS used to screen all prior to reproductive counseling in rheumatology patients. Study Purpose:	Constructs: Psychosocial screening before reproductive counseling Results: HEADSS was used to screen patients as part of the study but the HEADSS was not studied. Psychometrics: None	
(Sturrock & Steinbeck, 2013)	Australia	HEADSS = Home, Education, Eating, Activities (peers) Drugs (alcohol), Suicidality (depression), Sexuality, Sleep	Setting/Population: 40 AYA aged 12-24 years admitted to a university teaching hospital Time HEADSS – 39-41 minutes Time - YCP – 6-8 minutes Procedure: Comparative study of youth entering an adult hospital one with HEADSS and no youth care plan (YCP) and other with HEADSS and no YCP Study Purpose: How comprehensive was the YCP	Studied as a screen: Yes Constructs: Psychosocial risk Comparative study YCP versus HEADSS Results: Psychosocial risks detected with the Youth Care Plan are 72.5%, of those identified by HEADSS interview. YCP missed drug use and depression Psychometrics: None	2b Cohort Study
(van Amstel, Lafleur, & Blake, 2004)	Novia Scotia, Canada	HEADSS Home, Education, Alcohol, Drugs, Smoking, Sex.	Setting/Population: Hospital ER HEADSS completion data Procedure/Purpose: Study to see if HEADSS acronym stamp improved psychosocial documentation in the ER	Studied as a screen: No Constructs: Record completion Results: Study focuses on if HEADSS prompt increases documentation. Slight increase from pre: 0-7% documentation to post: 8-12%	2c/ Audit Outcomes research

Author/Date	Country	HEADSS/ HEEADSS HEEADSSS	Study Details: Setting, Population, Procedure, Purpose	Study Results: Study of HEEADSSS as a screen? Construct Measured, Results, Psychometrics (Validity/Reliability)	CEBM Level
				increases in documentation of education, smoking, and alcohol. Psychometrics: None	
(Yeo, Bond, & Sawyer, 2005)	Australia	HEADSS Home Education (employment) Activities (peers) Drugs Sexual activity, Suicide (depression)	Setting/Population: Retrospective review of 100 consecutive charts of patients aged 13-18 year-old adolescents admitted to The Royal Children's Hospital, Melbourne Procedure/Purpose: Study assessed to see if the tool was used effectively to document psychosocial risk.	Studied as a screen: Yes Constructs: Documentation compliance Results: Inadequate completion. Only 10/100 records were complete or thorough. Psychometrics: None	2c/ Audit/ outcomes research

Note. CEBM = Centre for Evidence Based Medicine. Available at <http://www.cebm.net>

FEASIBILITY STUDY: Manuscript III

Hiott, D. B.; Phillips, S.; Amella, E.; Dooley, M.; Mueller, M.; Rushton, F. A Feasibility Study of the HEEADSSS Psychosocial Interview Combined with Bright Futures Youth Risk Screening Instruments in the Primary Care Setting

Unpublished manuscript, College of Nursing, Medical University of South Carolina, Charleston, South Carolina.

A Feasibility Study of the HEEADSSS Psychosocial Interview Combined with Bright
Futures Youth Risk Screening Instruments in the Primary Care Setting

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Abstract

Objective: The aim of this study was to assess the feasibility of adding the Pediatric Symptom Checklist Youth (PSC-Y) and the Issues Checklist (IC) administered via a computer tablet to complement the HEEADSSS interview to screen for adolescent risk behaviors in the primary care setting in adolescents ages 12 – 18 years. The Donabedian Framework of structure, process, outcome was used to evaluate this study.

Methods: This feasibility study used a quasi-experimental, cross-sectional analytic design combined with qualitative descriptive interviews to explore provider and adolescent perceptions of the instruments and study procedures.

Results: The Bland-Altman analysis indicated that the PSC-Y and IC are in agreement with the HEEADSSS interview and all three methods did identify risks in adolescents 12 – 18 years. The PSC-Y and IC did not correlate with the domains of the HEEADSSS interview, but the PSC-Y and the IC intensity score were positively correlated. Providers noted the study did not interfere with office dynamics or influence schedules. Adolescents liked using a tablet and felt the surveys were ‘easy’. The mean completion time for both surveys was 7.7 minutes and most parents attended the visit.

Conclusion: The Donabedian Framework was used to organize the various components of this study. The PSC-Y and IC are viable instruments for use with adolescent risk screening that can indicate problem areas before the provider enters the room.

Technology can help increase self-report and the sense of privacy.

Keywords: Pediatric Symptom Checklist – Youth (PSC-Y), Issues Checklist (IC), HEEADSSS, Primary care, adolescent risk screening, Donabedian Framework

A Feasibility Study of the HEEADSSS Psychosocial Interview Combined with Bright Futures Youth Risk Screening Instruments in the Primary Care Setting

It has been proposed that 10 % of the world's population is affected by a mental or behavioral disorder (Patel & Saxena, 2014). Further, poor adolescent behavioral choices can have a lasting impact on adult health and well-being (Adrian, Charlesworth-Attie, Vander Stoep, McCauley, & Becker, 2014; McGue & Iacono, 2005). Mental and behavioral problems lead to higher health costs and lower productivity; this in turn leads to health disparities that can influence multiple generations (McGue & Iacono, 2005; Titchkosky & Aubrecht, 2015). The goals of the World Health Organization (WHO) and the World Innovation Summit for Health (WISH) are focused on empowering those with a mental illness, building a mental health workforce, creating collaborative team-based approaches, reducing premature death, and using technology (Patel & Saxena, 2014; Saxena & Setoya, 2014). The aim of these initiatives was to identify and treat mental and behavioral disorders early in the life course to prevent problems downstream, while introducing the concepts of prevention and recovery (Patel & Saxena, 2014; Saxena & Setoya, 2014).

In the United States, midcourse reviews of *Healthy People 2020* indicate that suicide rates, suicide attempts, disordered eating, and depression levels have increased (Shim & Compton, 2017). Ten percent of pediatric national hospitalizations are for a primary mental health diagnosis, many times with substance abuse as a comorbid diagnosis (Bardach et al., 2014). The Annual Report on Health Care for Children and Youth revealed that increases in suicide and self-injury hospitalizations for ages 10 - 14

increased by 151% between 2006 and 2011 (Torio, Encinosa, Berdahl, McCormick, & Simpson, 2015). During this same time frame, \$11.6 billion was spent on hospital visits, with Medicaid covering half of these visits.

Often behavioral and mental health issues are first brought to the attention of the primary care provider. New healthcare models such as the Patient Centered Medical Home (PCMH) have been devised to identify, diagnose, treat and manage physical, mental and behavioral health concerns early in the life course (Ader et al., 2015).

The primary care setting can provide an optimal environment for identification of life altering risky behaviors in the adolescent population. Many providers commonly utilize a verbal interview to inquire about risky behaviors during the healthcare visit that covers the domains of Home, Education/employment, Eating, Activities, Drugs, Sexuality, Suicide/depression, and Safety (HEEADSSS) (Goldenring & Rosen, 2004; North, 2013). Although the HEEADSSS interview covers adolescent guidelines provided by the American Medical Association (AMA) and American Academy of Pediatrics (AAP), proponents have suggested it is intended to be used as a complementary strategy for risk assessment, since it was originally designed to be a way to organize the psychosocial review of systems (Goldenring & Rosen, 2004).

Currently, little information exists regarding the efficacy of the HEEADSSS psychosocial adolescent interview. An integrative review of this verbal interview revealed it is used internationally in the health care setting; yet it has been minimally evaluated as a screen and no studies investigating the reliability or validity of this instrument have been identified (Hiott, Phillips, Amella, & Mueller, 2018). While the HEEADSSS interview is easy to remember and use, it can take 5 – 40 minutes to

complete (Hiott et al., 2018). Additionally, research suggests that adolescents prefer written or computer-generated risk assessments due to embarrassment and privacy concerns (Wissow et al., 2013) and that structured encounter forms can assist with documentation and help guide the direction of the clinical visit (Yi et al., 2009).

The objective of this study was to assess the feasibility of adding the Pediatric Symptom Checklist Youth (PSC-Y) and the Issues Checklist (IC) administered via a computer tablet to complement the HEEADSSS interview, to assess provider and adolescent interest, acceptability, and participation in screening using the Donabedian Model of structure, process and outcome. Levels of agreement were explored, as well as differences in screening outcomes between the HEEADSSS interview and the PSC-Y and IC surveys.

Theoretical frameworks

Donabedian's framework is a structure-process-outcome model that was designed to organize system improvements particularly in healthcare (Hearld et al., 2008; Yakimo, 2006). Structure focuses on the physical, human, and financial resources available for patient care. In the primary care setting, elements of structure include: the facility, staff, instruments, equipment, billing and reimbursement. In this study, the elements of structure that were examined included the PSC-Y and IC surveys, the HEEADSSS interview and the use of a computer tablet. The structural components of the surveys such as the questions asked, the answer format (yes/no or Likert), and the length were examined, along with the HEEADSSS interview and the use of a computer tablet to determine adolescent and provider interest, acceptability and usability in the primary care setting.

Process is the clinical service provided to a patient; this aspect of the Donabedian framework involves the provider giving care and the patient receiving care. In this case, the process involves the activities undertaken to identify adolescent risk such as the administration of the PSC-Y and the IC via a computer tablet, as well as completion of the HEEADSSS interview by the provider. An analysis of the process of risk screening verbally during the HEEADSSS interview included assessment for participation and acceptability as well as the administration of the PSC-Y and IC via a computer tablet.

In the Donabedian framework, outcomes achieved are the consequences of patient care. Expected outcomes in this feasibility study were the feasibility outcomes as well as the identification of adolescent risk behaviors. The efficiency and effectiveness of the reciprocal action between the structure and the process can promote or hinder the outcomes of risk identification. Therefore, the use of the Donabedian framework can assist with the identification of variables that modify successful risk screening in the primary care setting.

Methodology

Design

This feasibility study was conducted using a quasi-experimental, cross-sectional analytic design. This design compared the HEEADSSS psychosocial interview with other existing validated instruments in a cross-sectional convenience sample of adolescents aged 12 - 18 years (Thiese, 2014). This study method was combined with qualitative descriptive interviews using a directed content analysis based upon the Donabedian Framework of structure, process, outcome to explore provider and adolescent perceptions of the instruments and study procedures (Hsieh & Shannon, 2005; Sandelowski, 2000).

Ethics

Medical University of South Carolina (MUSC) Institutional Review Board (IRB) approval was obtained prior to study initiation (Pro00058642).

Setting, sample and procedures:

Setting. This study took place in two independently-owned primary care pediatric offices in the southeastern United States. One site was located in an urban setting, while the second site was in a rural setting.

The patient population of the urban clinic was 16,540 patients with an adolescent population of 4,750 patients ages 10 – 21 years for the 2016 – 2017 year. The racial composition of the pediatric population was 80% White, 7.4% Black, 2.8% Latino, 2.2% Asian and 7.8% unknown and other.

The second clinic was a designated rural health care center and a level 3 Patient Centered Medical Home (PCMH). This clinic saw 6,050 patients each year in 16,500 visits. Of those, patients ages 12 to 18 made up 35% of the practice.

Sample. The study sample included English-speaking male and female adolescents aged 12-18 years. The study excluded individuals with a documented acute medical or psychiatric illness (ICD-9 codes 295-299, ICD-10 codes F-20-F29), or a developmental delay (ICD-9 codes 315, 317-319, ICD-10 codes F70-F79, F80-F89). The provider study sample included male and female medical doctors (MDs) and nurse practitioners (NPs).

Procedures. The primary investigator (PI) met with interested providers at the 2 study sites. Informed consent was obtained from each provider and then a presentation reviewing how to initiate and complete a HEEADSSS interview was shown to each

provider to ensure consistency. Providers were compensated for participation with a \$50 gift card. The office receptionist was provided with a copy of inclusion criteria and she offered all adolescents and parents or guardians meeting the inclusion criteria the opportunity to participate in the study when they received their reminder call about the adolescent well visit or at check in. When the patients arrived for their visit, the PI invited interested parents or legal guardians and the adolescent to a private conference room to further inform them about the adolescent screening study.

Informed consent was obtained, and a HIPAA disclosure was signed before the adolescents enrolled in the study. They then completed the PSC-Y and IC risk screens in the exam room via tablet before seeing the MD or NP. The tablet was presented to the patient in the exam room and subjects were only able to access the two risk screens and the post visit survey on the tablet. The PI pre-screened one subject at a time and administered the post-visit survey to one subject at a time. Research Electronic Data Capture (REDCap) platform was used to capture and securely record the answers to the instrument questions (Harris et al., 2009). The PI exited the room to provide privacy for the adolescent to answer the screens. The adolescents were told to come to the door when they were finished. The adolescents were checked on in 5-minute increments. If they were not finished they were given additional time in 5-minute intervals until they had completed the instruments. This portion of the study was timed using a watch.

Once the adolescent completed the survey and returned the tablet to the PI, the PI began audio recording the visit by voicing the provider ID number and the adolescent ID number. The PI then paused the audio recorder. When the provider was ready to go into the room for the adolescent's exam and HEEADSSS interview, they were reminded that

they needed to say hello and identify themselves before unpausing the recorder to avoid recording identifiable information.

The researcher checked the computerized results of the PSC-Y and IC while the provider was with the patient recording the HEEADSSS interview. Results were available to the provider after the HEEADSSS interview was completed when the provider exited the room. Areas of the PSC-Y and IC screens that identified risks were shared with the MD or NP. This portion of the study identified the numbers and types of risk behaviors discovered by each instrument.

After the well visit with the provider, the adolescent completed a brief post-visit survey in the secure REDCap database via the tablet to determine perceptions of satisfaction with the risk-screening event. The survey contained 5 statements utilizing a 5-point Likert scale to assess perceptions and satisfaction with the screening instruments, the HEEADSSS, Y-PSC and IC, as well as the mode of screening, interview and computer. The post visit survey was not timed. Adolescent participants were compensated for participation with a \$5 gift card at the end of the visit. Any adolescents consenting to an additional qualitative interview were compensated with a \$10 gift card as well.

The HEEADSSS interview was recorded and transcribed. A checklist was created in REDCap to use when assessing the transcriptions to judge if a HEEADSSS domain was evaluated and if a risk was identified. Each transcription was evaluated two separate times by the PI to assess for errors. Definitions for risks identified were based upon a positive reply in response to the question.

Interviews. Additionally, key informant interviews were later conducted and audio-recorded with a subset of providers and a subset of adolescents to assess study feasibility. The PI used semi-structured questions to guide provider and adolescent interviews. These audio-recorded interviews were sent for transcription and quality checks on the transcribed interviews were completed. All interviews and transcriptions were stored in the university's secure 'Box' database. Seventeen adolescents consented to an interview with 15 completing the interview process and 3 of the 5 providers followed up with an interview.

Instruments

The PSC-Y and IC risk screens used in this study were set up in REDCap as they were originally designed and validated (Harris et al., 2009). A post-visit survey was also administered in REDCap. All participants were de-identified, and a codebook was developed for future analysis.

Pediatric Symptom Checklist – Y. The Pediatric Symptom Checklist – Youth (PSC-Y), a screening tool in the public domain, covers internalizing, externalizing and attention difficulties (Allen & McGuire, 2011). It is a 35 item self-report instrument that can be used for adolescents ages 12 and older. Items are rated “never” (0), “sometimes” (1), or “often” (2). These responses were totaled within REDCap to evaluate the risk score. The cutoff score for the adolescent self-report is 30 or higher; this indicates psychosocial impairment and the need for a follow up evaluation. Answers missing four or more items invalidate the screen, so REDCap was set up to require an answer for each statement. The PSC-Y has a demonstrated sensitivity of 94% and a specificity 88% (Pagano et al., 2000).

Issues Checklist. The Issues Checklist (IC) assesses adolescent/parent or guardian conflict. This 44-item screen asks adolescents to identify whether a particular topic has been a source of conflict in the last 2 weeks with a 'yes' or 'no' response (Lewandowski & Palermo, 2009). If the adolescent answers 'yes', then they are prompted to rate the intensity of the conflict, with higher scores indicating more conflict. This instrument names specific behaviors such as drug use, sexual activities and disrespect; therefore, the IC was included to identify behaviors of concern. The IC is considered positive for risks if 13 or more topics are checked and/or intensity ratings are greater than or equal to 1.7. Since missing answers could invalidate the survey, REDCap was set up to require an answer for each statement. Reliability and validity have been demonstrated, as well as good internal consistency, $\alpha = .87$ (Lewandowski & Palermo, 2009).

Post-visit survey. Lastly, the PI administered post visit surveys to adolescents to measure perceptions and satisfaction with the risk screens and delivery methods. Adolescent surveys contained 5 questions with a 5-point Likert scale (strongly disagree, disagree, neutral, agree and strongly agree) to determine satisfaction with perceptions of the pre-screening risk instruments and the computerized format. The PI included questions concerning satisfaction and perceptions related to the HEEADSSS interview and provider interviews.

Interviews. Additionally, key informant interviews were later conducted and audio-recorded with a subset of providers and a subset of adolescents to assess study feasibility. The PI used semi-structured questions to guide provider and adolescent interviews. These audio-recorded interviews were sent for transcription and quality checks on the transcribed interviews were completed. All interviews and transcriptions

were stored in the university's secure 'Box' database. Seventeen adolescents consented to an interview with 15 completing the interview process and 3 of the 5 providers followed up with an interview.

Statistical and Qualitative Analyses

Statistical analyses. Formulas were developed within REDCap so that sum totals of the results from the PSC-Y could be obtained as well as the IC totals and the IC intensity levels. These screening totals from the PSC-Y and IC were used to examine correlations between individual risks across the surveys and demographic features. Univariate frequencies, bivariate frequencies, and means were computed and compiled to describe the study sample and various outcomes such as the post-visit survey, time to complete the surveys and parental presence. Pearson's correlations were obtained for PSC-Y, the IC, and the HEEADSSS, as well as Bland-Altman plots to assess agreement. The software used for these analyses was SPSS version 25.

The Bland-Altman plot is used by medical researchers to compare different methods of measurement to see if they can be used interchangeably (Myles & Cui, 2007). This is achieved by plotting on a graph the mean difference in the scores of 2 different measurements (Myles & Cui, 2007). The plotted difference scores are compared to the mean for each subject. The Bland-Altman method measures the mean differences and 95% limits of agreement (2SD). The Bland-Altman plot was used to evaluate bias and levels of agreement between these surveys and the HEEADSSS interview separately and together. Since the instruments use different scaling survey scores were converted to z-scores and then used to create the Bland-Altman plots.

Qualitative analyses. Basic qualitative description focuses on evaluating participant concerns, attitudes and responses to a service or event; in this study it was used to evaluate perceptions of adolescent risk screening in the primary care setting (Sandelowski, 2000). Semi-structured, open-ended questions were used to guide individual interviews with adolescents and providers; these interviews were audio-recorded and then transcribed.

Subsequently, the transcribed interviews were coded using directed content analysis (Hsieh & Shannon, 2005; Sandelowski, 2000). Directed content analysis uses deductive methods to analyze and code key informant interviews according to a pre-selected theory, in this instance the Donabedian Framework of structure, process, outcome. Each transcribed interview was read slowly and carefully several times before key words and phrases that related to risk screening in the primary care setting from either the provider's or the adolescent's point of view were identified. These words and phrases were underlined; and this process continued until all the transcribed interviews had been reviewed. The underlined phrases were then categorized according to structure (facility, staff, equipment, schedules), process (HEEADSSS interview, risk survey), or outcome (identification of risk, acceptability of risk screening). Similar findings were identified within each category and then grouped into themes.

Using this deductive method of analysis, the 'who, what and where' of adolescent risk screening within the primary care setting was examined to provide a descriptive summary of this event from the perspectives of the adolescent, as well as the provider (Hsieh & Shannon, 2005; Sandelowski, 2000). To ensure quality, senior faculty reviewed

the coding and offered guidance to this process and the PI triangulated methods and research sources.

Results

Demographics

This study consisted of 2 samples, a sample of adolescents, $n = 30$, and a sample of providers, $n=5$. The mean age of the adolescent sample was 14 years old with 18 males and 12 females included in the study. Twenty-seven adolescents were from the rural practice and 3 were from the urban practice. The ethnicity of the sample included 26 White, 2 Black, 1 Asian and 1 more than one race. The provider sample was comprised of 2 medical doctors (MDs), 1 male and 1 female, both from the urban setting and 3 nurse practitioners (NPs), 2 females and 1 male, from the rural setting.

All adolescents who consented and enrolled completed the entire study, which included: the PSC-Y survey and the IC survey, the audio-recording of the visit with HEEADSSS interview and the post visit survey. A subset of providers ($n = 3$) and adolescents ($n = 15$) completed an additional interview for qualitative data collection.

Eighty-three percent ($n=25$) of adolescents were accompanied by a parent or guardian into the exam room for the visit and 17% ($n=5$) needed assistance with the directions to start the surveys or asked parents about the survey questions. Completion time for both surveys ranged from 4 minutes to a maximum of 17 minutes with a mean completion time of 7.7 minutes. Overall, 73% ($n=22$) of the adolescents took 7 minutes or less to complete both the surveys, however interruptions were not recorded or timed.

Pediatric Symptom Checklist – Youth

The mean PSC-Y score was 16.5 with 13.3% (4) adolescents testing positive for risk behaviors (score ≥ 30) indicating the need for further screening. PSC-Y scores were not correlated with the number of risks identified with the HEEADSSS ($r = 0.24$, p-value 0.20) while the PSC-Y was positively correlated with the intensity scores of the Issues Checklist (IC) ($r = 0.68$, p-value 0.00).

Issues Checklist

The mean number of topics endorsed on the IC for all participants was 22.6 topics; 80% (n=24) of the surveyed adolescents had 13 or more topics checked. The mean intensity rating of the IC was 1.5 with a range of 0.88 to 3.18. Seven adolescents or 23% of the adolescent study population had a positive intensity rating (≥ 1.7) indicating more anger during conversations concerning risk behaviors with parents. Neither the IC topics total nor the IC intensity rating total correlated with the number of risks identified with the HEEADSSS ($r = 0.016$, p-value = 0.93 and $r = 0.224$, p-value = 0.24 respectively).

HEEADSSS

Table 1 summarizes the HEEADSSS elements that were evaluated during the visit and the number of times a risk was identified during the interview. Overall, 4 – 11 HEEADSSS domains were evaluated with providers addressing at least 7 of the 11 documented domains 66.7% of the time. During the HEEADSSS interviews, 60% (n=18) had no risks identified, while 40% (n=12) had one or more risks identified. Table 1 summarizes the HEEADSSS interview results revealing how many topic domains were evaluated and subsequently how many risks were identified.

Table 1 summarizes the results of the HEEADSSS.

Table 1. HEEADSSS Interview Results		
HEEADSSS Elements	Risk evaluated	Risk identified
Home	96.7% (29/30)	13.3% (4/30)
Education/employment	100% (30/30)	13.3% (4/30)
Eating/diet	96.7% (29/30)	10% (3/30)
Exercise	23.3% (7/30)	6.7% (2/30)
Activities	96.7% (29/30)	3.3% (1/30)
Drugs	86.7% (26/30)	0% (0/30)
Alcohol	30% (9/30)	0% (0/30)
Smoking	36.7% (11/30)	6.7% (2/30)
Sexual activity	90% (27/30)	6.7% (2/30)
Suicide/depression	43.3% (13/30)	3.3% (1/30)
Safety	13.3% (4/30)	10% (3/30)

Post Visit Survey

Table 2 summarizes the results of the post-visit survey.

Table 2. Adolescent Risk Screening Perceptions	
Post-visit survey questions	Results
<i>'It was easy to complete this survey'</i>	90% agree/strongly agree (27/30)
<i>'I prefer answering personal questions via survey.'</i>	30% agree/strongly agree (9/30)
<i>'I prefer using a tablet or phone to answer questions.'</i>	57% agree/strongly agree (17/30)
<i>'I would prefer a written questionnaire.'</i>	70% disagree/strongly disagree (21/30)
<i>'I prefer my doctor to just ask me questions'</i>	16.7% agree (5/30)

Agreement of PSC-Y, IC, HEEADSSS

Lastly, this feasibility study was conducted to assess levels of agreement between the Pediatric Symptom Checklist - Youth (PSC-Y), the Issues Checklist (IC) and the HEEADSSS interview. Since the minimum and maximum values for all the instruments are different, z -scores were calculated for each instruments prior to developing the Bland-Altman (BA) plots. Then using the z -scores the variables were transformed into

difference scores by subtracting the z -scores of the HEEADSSS identified risk scores for each subject from the PSC-Y identified risk scores for each subject. This same process was then repeated with the HEEADSSS twice more using the IC topic score and the IC intensity score. Next the means of the z -scores of the HEEADSSS and the PSC-Y were calculated, as were the HEEADSSS and the IC topic scores and the HEEADSSS and the IC intensity scores. The differences were then plotted against the means in each scatter plot (figures 1, 2, 3). The upper and lower confidence intervals (CI) were then calculated by multiplying the standard deviation (SD) by 1.96 and adding or subtracting from the mean difference, respectively. These plots in figures 1, 2 and 3 show that all the scores of the adolescents lie within 95% CI for the PSC-Y and the HEEADSSS, the IC topic score and the HEEADSSS and the IC intensity score and the HEEADSSS. This indicates that these surveys agree with the HEEADSSS interview.

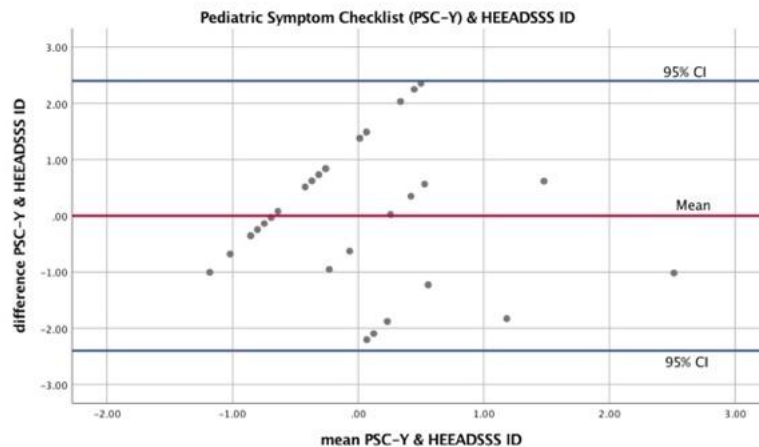


Figure 1: *Bland-Altman plot: Pediatric Symptom Checklist – Youth and HEEADSSS Risks Identified*

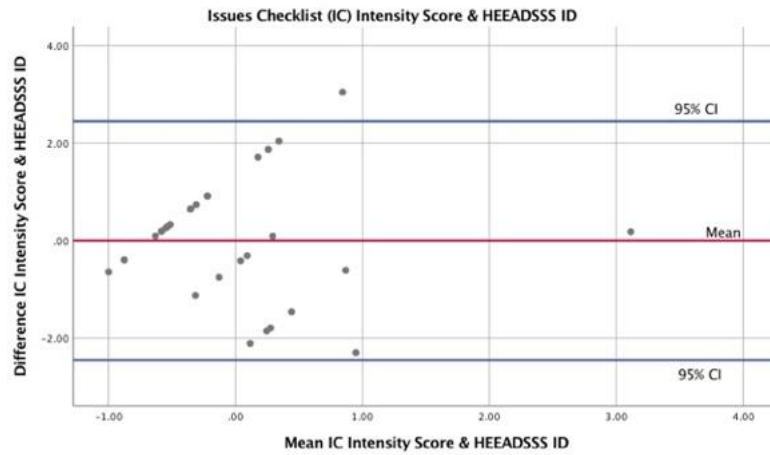


Figure 2: *Bland-Altman plot Issues Checklist Intensity Scores and HEEADSSS Risks Identified*

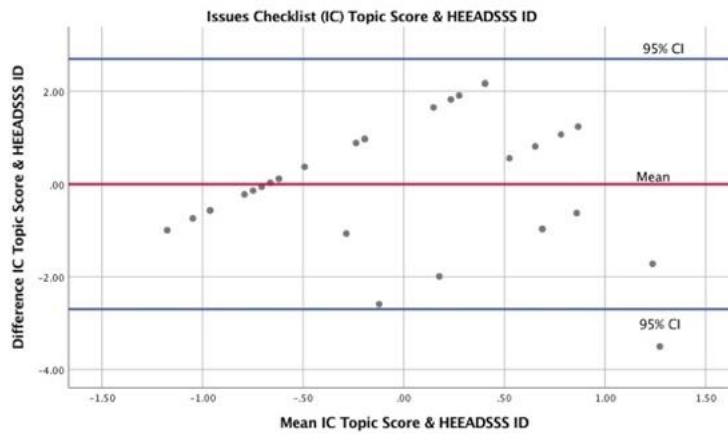


Figure 3: *Bland-Altman plot Issues Checklist Topics and HEEADSSS risk identified*

Qualitative Results

Directed content analysis was used to organize the descriptive results into categories from the Donabedian Framework consisting of structure, process and outcomes of risk screening. Adolescent themes focused on the survey designs, screening emotions, technology use, honesty and awareness. Themes and subthemes are presented in table 3. Provider themes focused on the HEEADSSS feasibility, screening

improvement, and risk identification. Themes and subthemes using the Donabedian Framework are available in Table 3 and 4.

Structure. Adolescent themes and sub-themes concerning the survey design mentioned the long length of the surveys, the breadth of answer choices available and feeling like the surveys ‘meant something’ to them. Providers consistently mentioned ‘time’ as the biggest concern involving the theme of HEEADSSS feasibility however in sub-themes they noted that the study minimally affected their patient flow. They reflected that the structure of the HEEADSSS did offer a ‘foundation’ upon which to introduce questions but also noted that the HEEADSSS was broad and could be administered in an open or closed format with topics left to the provider.

Process. Adolescent themes focused on the technology and the emotions elicited during the risk screening process. The adolescents enjoyed speaking with their providers in a face-to-face setting unless the questions were ‘personal’ then they expressed they felt ‘shy’ and were concerned about issues of confidentiality and judgement. While a few conceded that the recording of the visit felt ‘weird’, they disclosed that the use of the tablet felt ‘easier’ and allowed them more time to think, since the “tablet can’t talk back to me”. Technology was not without concerns, however, as a participant did mention not wanting his/her name to get out. Provider themes concerning the risk screening process suggested that adolescent screening could be improved, and providers noticed that checking a box is easier and more confidential, especially if parents are in the room.

Outcome. Adolescent themes focused on issues involving provider judgment of their behaviors. While adolescents expressed trust in their providers, they felt the surveys on the tablets offered a more comfortable way to reveal their personal concerns and

behaviors. Additionally, they expressed they felt happy to participate in the study as they felt it was ‘a good thing’.

Provider themes centered on risk identification. Providers observed that while using the HEEADSSS they did identify some risks they may not have otherwise discovered. The identification of these risks led providers to feel that before using the HEEADSSS they may have ‘assumed’ some adolescents were not at risk due to their outward appearance.

Providers gave mixed reviews on the use of a tablet for survey completion. They felt that using a tablet could simplify risk screening, especially if the results could be synchronized with the medical record. However, they believed the surveys were long and not specific enough.

Table 3 summarizes adolescent themes, sub-themes and illustrative quotes.

Table 3. Adolescents: Themes, Subthemes and Illustrative Quotes	
Structure theme: Survey design	
Survey Choices	"I liked that (on the surveys) you had yes, no, maybe, often and stuff. But if you just had yes or no, like sometimes you would have done it if you did something, you wouldn't know what to pick."
Meaningful to me	"Well what I did like is was there was actually some like questions that I thought had like meaning and meant to me and I appreciated that they actually, like I felt like they meant something to me and did something for me."
Different setting	"Because it would be easier for the scientists to test, like not just people that go to the doctors, because it would be a wider range of students and kids to take the quizzes, survey."
Length	"It (the study) would be easier if it didn't have as many questions."
Process themes: Risk screening emotions and technology use	
Face to face	"good unless personal"
Judgement	"...always that thought in the back of your mind, that you know they're going to think about you differently because of your decisions..."
Intimidation	"I felt shy and I didn't want to talk about it (personal questions from provider)."
Confidentiality concerns	"Well, I do smoke and all that... I do... it's an e-cigarette. I mean, I don't want somebody to know. Yeah, cause I felt embarrassed and weird at the same time. Yeah cause I really didn't know how to answer that question. I was like, oh my gosh... I mean it bothered me they would now tell my mom."
Ease of administration	"... I guess because I'm younger, and my generation, it just seems easier doing it paperless. I also didn't have to answer anybody. I had time to think more."
Technology muted response	"I would rather there just the tablet so they can't ... the tablet can't talk back to me or nothing.... I would rather answer the personal questions on the tablet."
Technology concerns	"Well, I mean I didn't mind answering the questions, it's just technology. I don't want my name to get out or anything..."
Lack of comfort with recording	"It (being recorded) felt a little weird."
Outcome themes: Honesty and awareness	
Honesty with risk behaviors	"...I understand that, in fact, that people would be more honest when they don't have to tell somebody, because they'd feel like they're being judged."
Heightened parental awareness	"People need to know about how their children are and act."
Improved Study completion	"I guess it was okay. I mean, I don't have any problems with it, you know. If it helps then, you know it's a good thing."

Table 4: Summarizes provider themes, sub-themes and illustrative quotes.

Table 4. Providers: Themes, subthemes and illustrative quotes	
Structure theme: HEEADSSS feasibility	
Time constrictions	“Yeah, that (time) would be my biggest problem... You know, the fiscal reality is we have so many visit(s) we got to get in in a day to make the practice support itself.”
HEEADSSS Strengths	“Yeah, the strength being that (the HEEADSSS interview) at least it gives you a foundation on where to build from as far as identifying risk in different population and what those risks may be...”
HEEADSSS Weaknesses	“... but the weaknesses that ... It's very broad spectrum. There's a lot of different routes to take with it. There's a lot of different questions and it's gonna be provider based on how much you find... Because nobody asks the same question. They might not ask them the same way. Are they asking yes, no? Or are they asking them more specifically to engage in conversation with? There's a lot of ... It's not really what I would consider a screening tool.”
Study Doable	“Did increase the time of the visit just a little bit, but not significantly. So I like the way it was designed.”
Process theme: Screening improvement	
Improvement needs	“We can do a better job asking questions but we have a time allotment.”
Improved Privacy and Confidentiality	“Sometimes patients are a lot more comfortable to check a box on a piece of paper than they are to come out and divulge information to a provider that's asking questions, especially in front of their parents.”
Simplification Of Screening	“The only thing that might be help is if there was some way to prescreen adolescents prior to their visit... most kids have access to a cell phone, or a tablet, and somehow that they could go ahead and answer these questions prior to getting there...”
Study Process Acceptability	“No, it was fine for me (recording the HEEADSSS). I mean, I didn't mind doing that. I was surprised that the kids were really as open to it as they were.”
Outcome theme: Risk identification	
Unanticipated Outcomes	“So, a couple of kids I even had to end up sending to therapy, or suggesting therapy because of some of the stuff that we did find out with that (the HEEADSSS interview).”
Provider Assumptions	“And, it did make me rethink, because like I said, normally I would just kind of like look at a screening thing, and look at a kid.”
Simplification	“Yeah, I would definitely use it (an electronic screening device) because it simplifies my job and I'd still get the screenings done and the documentation.”
Need better tools	“You know, stuff that we wouldn't have asked on the screening tools we were using.”

Discussion

To improve adult health, assessments and interventions must start upstream during the adolescent years. The yearly adolescent checkup offers a strategic opportunity to evaluate the adolescent for risk behaviors that can negatively influence health. The emphasis on Patient Centered Medical Home (PCMH) status is helping to increase the use of evidence based-practice (EBP) recommendations (Ader et al., 2015). However, a third of adolescents age 13 - 17 had no preventive visits during these years and 40% had only one visit (Nordin, Solberg, & Parker, 2010). Due to the lack of adolescent preventive visits, it has been recommended that providers need to see all visits as an opportunity to provide preventive care using the ‘no-missed-opportunities paradigm’ (Nordin, et al., 2010).

This study assessed the feasibility of evaluating adolescents for risk behaviors in the primary care setting using 3 different surveys and 2 different survey methods, the HEEADSSS oral interview, the Pediatric Symptom Checklist – Youth (PSC-Y) and the Issues Checklist (IC) administered via a computer tablet. Agreement between the differing screens was analyzed using Bland-Altman plots. Adolescent and provider acceptability and favorability were evaluated using data from key informant interviews as well as statistical analysis of the post-visit survey and the HEEADSSS interview.

Statistical evaluation of the PSC-Y, the IC and the HEEADSSS interview did demonstrate agreement between the number of risks identified these two different surveys and the HEEADSSS interview. This is a significant finding. The HEEADSSS is considered by some to be the gold standard in psychosocial interviews (Sturrock & Steinbeck, 2013). To find surveys that agree with this interview indicates that providers

could use these surveys prior to the visit to identify areas of risk to later target for discussion. This could save providers time.

Additionally, these surveys focus on different areas of risk. The PSC-Y focuses on internalizing behaviors such as depression and anxiety, externalizing behaviors such as anger and attention disorders. The IC focuses on discussions with parents over specific risk behaviors and the intensity of the emotion, calm or angry, that was present during the discussion. Using reliable and valid screens that assess for different risk behaviors adds to the domains covered by the HEEADSSS, while providing insightful information to guide the HEEADSSS interview with the adolescent. More importantly, this could compensate for the lack of reliability and validity scores with the HEEADSSS.

Interestingly, the PSC-Y and the intensity portion of the IC were correlated. Further analysis will be needed to investigate this find. It is possible that they correlate since both these tools measured adolescent 'feelings' and offered a Likert scale to gauge emotional responses.

Most adolescents were able to complete the surveys with no help and the time to complete the surveys averaged slightly more than 7.5 minutes. This indicates that surveys could be completed in the waiting room or exam room while the adolescent is waiting to see the provider. However, in most instances parents accompanied adolescents into the exam room. This is a relevant finding since research reveals that adolescents are less likely to reveal risky behaviors in the presence of parents and guardians (Herrera, Benjet, Méndez, Casanova, & Medina-Mora, 2017). In this study, during the follow-up interviews one adolescent admitted to smoking and was concerned her mother would find

out. Other adolescents expressed that they felt the surveys on the tablet would enable adolescents answering them to be more ‘honest’ in their responses.

Providers and adolescents indicated that the instruments and the methods used were acceptable. Adolescent themes focused on the survey designs, technology, emotions, and honesty. Even though some adolescents found it ‘weird’ to be recorded during the HEEADSSS interview, they participated because they felt the study was meaningful. Answers to the brief post-visit survey closely aligned with adolescent observations and thoughts voiced during the qualitative interviews. Adolescents agreed that the surveys were easy to complete, they did not want written surveys and over half were interested in surveys being completed via a tablet or phone. While most did not prefer their provider to ‘just ask them questions’, slightly more than a third preferred answering questions by survey. Many mentioned that they liked that the surveys asked them about things that mattered to them and that the surveys asked them how they felt. They also liked that the surveys offered more than ‘yes’ or ‘no’ responses. Reluctance to share personal issues in a face-to-face format, as well as concerns about confidentiality and judgement were like findings from other studies that evaluated adolescent risk screening (Coker et al., 2010).

Key informant interviews with providers centered around the feasibility of the HEEADSSS as a screening instrument, screening improvements and risk identification. The most pervasive provider concern was the time required to complete the HEEADSSS. Time for the primary care provider is limited, so respecting this was vital. Although providers were concerned about the study interfering with office flow, they concluded that the study was efficient and did not hamper workflow.

They did feel that the HEEADSSS format offered an understandable and easy prompt to guide questioning. Yet, they also mentioned that the structure of the HEEADSSS interview was flexible and consequently providers may use closed questions requiring a ‘yes’ and ‘no’ answer or skip topics altogether.

The Pediatric Symptom Checklist – Youth (PSC-Y) and the Issues Checklist (IC) received mixed reviews. While the adolescents liked the focus on feelings and answer choices, one provider felt that the results of the surveys were not clear. This provider mentioned that he/she preferred surveys that measured one domain at a time as he/she felt this provided clearer results. Other providers liked the surveys but felt they were long. Providers also felt that the use of tablets could simplify the screening process and increase the perception of privacy and confidentiality.

Lastly, providers found that the HEEADSSS identified risks that they felt they otherwise would not have previously identified, as providers mentioned that they did not usually ask about the home environment. Moreover, they recognized some of their own bias regarding questioning adolescents about behavioral risks, noting that they previously gauged an adolescents risk level by observing attitude and dress. While most felt that using a survey administered via a computer tablet could simplify the risk screening process, they suggested that better risk screening instruments are necessary.

Limitations

This feasibility study had several limitations. This study worked with providers in only two settings, thus the results of this study have limited generalizability. Selection bias may have resulted from the use of a convenience sample and since this was a

cross-sectional study, it did not reflect changes over time. And while the time to complete the adolescent surveys was measured, it did not account for interruptions to this process.

Summary and Significance

Ambitious goals for mental and behavioral health have been set by the World Health Organization (WHO) and the World Innovation Summit for Health (WISH). These goals aim to empower patients with mental and behavioral health problems by using collaborative approaches, a more informed workforce, and technology (Patel & Saxena, 2014; Saxena & Setoya, 2014). Finding a solution to adolescent mental and behavioral health disorders will no doubt be found upstream from the problem through prevention, identification, and treatment.

In the U.S., *Healthy People 2020* mid-term evaluations illustrate the complexity of finding solutions to the adolescent mental and behavioral health crisis (Shim & Compton, 2017). Suicide attempts, suicide deaths, eating disorders and major depressive episodes for adolescents are on the rise; yet, the rates of children ages 4 – 17 years with mental or behavioral health problems receiving treatment have stagnated (Shim & Compton, 2017).

Recommendations for improving mental health care in the primary care setting suggest increasing provider mental health training, educating them on behavioral health screening instruments and increasing referrals, collaboration, and follow-up (Tynan & Woods, 2013). A life course viewpoint that emphasizes prevention, early identification and treatment begins with consistently screening adolescents in the primary care setting regardless of the visit type by applying the ‘no-missed-opportunities’ paradigm and using valid and reliable instruments (Nordin, et al., 2010).

The purpose of this feasibility study was to assess provider and adolescent interest and acceptability of using the Pediatric Symptom Checklist - Youth (PSC-Y) and the Issues Checklist (IC) administered via a computer tablet as instruments to complement the HEEADSSS interview. Agreement between the PSC-Y, IC, and the HEEADSSS interview was assessed using Bland-Altman plots. The Donabedian Framework of structure, process, outcome provided an organized and logical way to evaluate screening methods, screening instruments, adolescent and provider interest and acceptability.

The structure of the study included: the facility, the staff, the providers, the surveys and the tablet. The process evaluated the HEEADSSS interview and the completion of the risk screens on the computer tablet. Outcomes consisted of the adolescent and provider perceptions of interest and acceptability, as well as the identification of risks.

Perceptions of the structural elements revealed that adolescents were agreeable to completing the screens via the tablet and thought the surveys were easy. Furthermore, they were appreciative that the screens asked them about how they felt. Providers were pleased that these interventions did not interrupt office flow and uncovered some underlying adolescent risks. However, they were less enthusiastic about the screens used, the PSC-Y and IC, finding them long and less specific in identifying risks.

Examination of the process revealed that most adolescents were able to complete the screens in a few minutes and preferred to answer questions via a survey on a tablet rather than written surveys or face-to-face conversations with the provider. Providers felt that tablets could 'simplify' risk screening but felt more specific screens were needed. Additionally, providers felt that while the HEEADSSS provided direction for the

conversation during the adolescent visit, its success depended on the provider and the way the questions were asked.

Evaluation of the outcomes reinforced earlier comments by adolescents that they felt the surveys on the tablet would yield more honest answers. They added that they completed the survey because they felt it was important and as one adolescent stated, “if it helps, it’s a good thing”. Among providers, an interesting outcome involved their realization that they often base their risk screening questions on adolescent attitude and dress. Additionally, they were surprised the HEEADSSS revealed risks for a few adolescents in the home domain, noting that they do not commonly inquire about home life.

The Bland-Altman plots indicated agreement between the PSC-Y and IC and the HEEADSSS interview. This would indicate that the administration of either of these surveys before the visit could guide the provider to discuss the identified areas of risk later during the interview. The instruments used are recommended and available in the *Bright Futures Toolkit* (Jellinek, Patel, & Froehle, 2002). The PSC-Y is a self-report instrument that assesses for internalizing, externalizing and attention disorders. The Issues Checklist can also be used as self-report and asks adolescents about topics of recent conversations with parents such as drugs, smoking, dating, sexual activity, friends, cleaning up, and chores; it then asks them to rate the intensity of the emotions felt during the conversation. Although the IC was added to this study as a way to explore adolescent behavioral activities, it provided adolescents a way to express their feelings about family conflict. This may be why the IC intensity score correlated with the PSC-Y.

Consequently, although the PSC-Y and IC could potentially be substituted for the HEEADSSS interview, a reasonable alternative is to administer these before the visit so they can provide the clinician with valuable information on the adolescent's mental health and state of mind before entering the room. The study determined that the use of these surveys to investigate adolescent risk within the primary care setting is feasible. The Donabedian Framework of structure, process, outcome provided an organized and logical way to evaluate the screening instruments as well as adolescent and provider interest and acceptability in this study. Future implications include continued examination of appropriate risk screening instruments delivered in innovative ways to engage adolescents.

Acknowledgements

I would like to thank my committee for their assistance and guidance, in particular Dr. Francis Rushton who believed this study had merit. I would like to acknowledge the expert advice and assistance of Leslie Bell, Toni Mauney, Erica Ellington, and Stephanie Oppenheimer.

Declaration of Interests

This work has no funding and the authors declare no conflict of interest. The authors are solely responsible for writing this paper. REDCap version 8.1.1, a secure web application copyright by Vanderbilt University, was used to secure and manage the online database; grant support UL1 TR001450.

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Conclusion

This compendium is comprised of three manuscripts that examine different aspects of adolescent risk screening in the primary care setting. Each manuscript offers a different view of the challenges associated with this facet of adolescent care. All the studies reflected in the three manuscripts utilized the Donabedian Framework of structure, process, outcome to evaluate the designated components of adolescent risk screens and adolescent risk screening.

The first manuscript evaluated the literature to review adolescent risk screens available for use in the primary care setting. There are few multidimensional or multi-problem risk screening instruments available. Multidimensional screens assess for several risk behaviors; this is important as research demonstrates that most adolescent risk behaviors co-occur (Aspy et al., 2012).

When the structure of the multidimensional risk screens was examined, several problems were identified. These problems included: cost, the number of domains assessed, length of the screen, format of the questions ('yes'/'no' or Likert), and ease of scoring.

Another concern involving adolescent risk screening in the primary care setting involved the process of assessing for risks. Some screens used parent report rather than self-report. Studies indicate that internalizing behaviors such as depression are often missed by parents and that adolescents are less likely to admit to risky behavior in the presence of parents or guardians (Herrera, Benjet, Méndez, Casanova, & Medina-Mora, 2017; Pagano, Cassidy, Little, Murphy, & Jellinek, 2000).

Outcomes of the evidence examined the strength of the studies that examined the instruments and the validity and reliability of the screens examined. Psychometric properties were unavailable for several studies. Consequently, when recommending adolescent risk screening surveys, the Pediatric Symptom Checklist (PSC) and its derivatives are validated, reliable and brief. This instrument is free in the public domain and available in the *Bright Futures Mental Health Toolkit*.

Manuscript 2 examined a common risk screening interview used in pediatric and primary care settings called the HEEADSSS. HEEADSSS stands for home, education, eating, activities, drugs, sexual activity, suicide (depression), and safety. The HEEADSSS interview is used worldwide for identifying adolescent risk behaviors has been called the ‘gold standard’ of psychosocial interviews, and yet little is known about its psychometric properties (Sturrock & Steinbeck, 2013). The Donabedian Framework of structure, process, outcome was used to examine what is known about the HEEADSSS interview.

The structure of the HEEADSSS was examined by evaluating the various iterations of the HEEADSSS that have been studied. The acronym has been added to over time with the addition of new letters and new domains and some versions of the HEEADSSS had other words substituted for some of the letters. This review of the literature examined settings that used the HEAADSSS, documentation rates, completion time, as well as the purposes of the studies.

The process of using the HEEADSSS was evaluated in only 3 studies; these evaluated using the HEEADSSS in a written or computerized format. No studies evaluated the provider or adolescent perceptions, comfort levels or satisfaction with the

face-to-face, self-report format.

In this literature review outcomes were assessed by examining any reliability or validity scores reported and documentation of completion rates. No reliability or validity scores were discovered for the HEEADSSS interview and completion and documentation rates of the results of the HEEADSSS interview were low. Studies revealed that documentation of the HEEADSSS interview averaged about 10% with 20% to 28% of adolescents not being asked any HEEADSSS questions at all.

This review of the evidence concerning the HEEADSSS interview was compiled to afford health care providers current, relevant information about this often-used instrument. It is easy to remember but can take 5 – 40 minutes to complete. Use of this interview has not been evaluated psychometrically. Additionally, no studies have examined the perceptions, comfort levels or satisfaction of providers or adolescents concerning this often-used self-report, face-to-face interview.

The evidence surrounding multidimensional risk screens available for use in the primary care setting and the HEEADSSS interview demonstrate gaps in preventive care for the adolescent population. In order to explore process improvements regarding adolescent risk screening within the primary care setting a feasibility study was devised to examine adolescent and provider interest and acceptability of using the HEEADSSS interview combined with the Pediatric Symptom Checklist – Youth (PSC-Y) and the Issues Checklist (IC).

Manuscript 3 reviews the feasibility study that was implemented. The objective of this feasibility study was to examine adolescent and provider interest and acceptability of using the PSC-Y and the IC administered via a computer tablet as instruments to

complement the HEEADSSS interview. Agreement was assessed between all the instruments used with Bland-Altman plots and the Donabedian Framework was used to evaluate the structure, process and outcome of the feasibility study.

Adolescents felt that the study was important and wanted to help. They felt the surveys were easy and relevant. Providers were surprised that adolescents were so receptive and pleased that it did not interfere with their schedules. Another structural element was the use of the tablet, adolescents preferred using a tablet or phone over written surveys. Yet, when it came to the risk screening process, while they enjoyed talking with their provider, they felt less comfortable speaking with them about personal matters.

Providers agreed that improvements need to be made in adolescent risk screening in the primary care center. They agreed that it would be very helpful to the risk screening process if the adolescents could complete the surveys before their visit and felt that the use of technology could be very useful.

Providers were less enthusiastic about the screens used, the Pediatric Symptom Checklist – Youth (PSC-Y), the Issues Checklist (IC) and the HEEADSSS. Generally, the providers felt the IC was long. Some providers liked the PSC-Y but felt that they did not get as clear a picture of the specific psychosocial risk areas as they did with screens that assess for only one risk domain. However, other providers felt that the PSC-Y would be helpful to determine the adolescents state of mind.

Reviews for the HEEADSSS were mixed as well. Providers acknowledged that the HEEADSSS did prompt them to ask adolescents about some topics they do not routinely address, and the interview did produce the needed outcome of risk

identification. Providers voiced concerns about structure of the HEEADSSS interview. They noted that it is so loosely structured that topics could be asked in a closed format eliciting a 'yes' or 'no' answer, topics could be ignored, or time could run out before the interview was finished. This would ultimately interfere with the risk screening process.

Statistically, when the PSC-Y, IC, and the HEEADSSS interview were evaluated using the Bland-Altman plot, agreement was found. This indicates that similar numbers of risk were uncovered and that the PSC-Y and the IC could potentially substitute for the HEEADSSS or vice-versa. Since the areas of risk reviewed by each screen differ, this could reveal other concerning behaviors that need to be discussed during the HEEADSSS interview. Consequently, a logical choice would be to use these instruments to complement the HEEADSSS interview by administering them before the visit. Interestingly, the PSC-Y and IC intensity score were correlated. More research would need to be completed to determine what this means.

The culmination of these studies did reveal the need for innovation with adolescent risk screening in the primary care setting. Free, short, easy to score, valid and reliable risk screens that are self-report and offer Likert responses are needed in a format that adolescents feel is easy and confidential. Valuable information regarding the HEEADSSS interview revealed this interview is a practical instrument that can be easily incorporated into the adolescent visit. However, its usefulness may depend upon the provider's ability to use the interview as it was designed, as well as the adolescents' level of trust. As suggested when it was developed, the HEEADSSS should be used in addition to other risk screening measures (Goldenring & Rosen, 2004).

The PSC-Y and the IC are both validated and reliable screens that can indicate the need to further question adolescents about risk behaviors. The Donabedian Framework of structure, process and outcome provided an organized and logical way to evaluate screening methods, screening instruments, and adolescent and provider interest and acceptability especially in the primary care setting. Future implications include continued examination of appropriate risk screening instruments delivered in innovative ways to engage adolescents.

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APPENDIX A: MUSC IRB Approval Letter



**Institutional Review Board for Human Research (IRB)
Office of Research Integrity (ORI)
Medical University of South Carolina**

**Harborview Office Tower
19 Hagood Ave., Suite 601, MSC857
Charleston, SC 29425-8570
Federal Wide Assurance # 1888**

APPROVAL:

This is to certify that the research proposal **Pro00058642** entitled:

A Comparison Study of the HEEADSSS Interview with Bright Futures Youth Risk Screening Instruments in the Primary Care Setting

submitted by: **Deanna Hiott**
Department: **Medical University of South Carolina**
Review for **Pro00058642**

for consideration has been reviewed by the IRB and approved with respect to the study of human subjects as adequately protecting the rights and welfare of the individuals involved, employing adequate methods of securing informed consent from these individuals and not involving undue risk in the light of potential benefits to be derived therefrom. No IRB member who has a conflicting interest was involved in the review or approval of this study, except to provide information as requested by the IRB.

Continuing Review Approval Date: **10/3/2017**
Approval Expiration: **10/2/2018**

Type: **Expedited**

Vice Chairman, **IRB-I - Medical University of South Carolina**
* **Susan Newman, Ph.D., RN, CRRN**

Statement of Principal Investigator:

As previously signed and certified, I understand that approval of this research involving human subjects is contingent upon my agreement:

1. To report to the Institutional Review Board for Human Research (IRB) any adverse events or research related injuries which might occur in relation to the human research. I have read and will comply with IRB reporting requirements for adverse events.
2. To submit in writing for prior IRB approval any alterations to the plan of human research.
3. To submit timely continuing review reports of this research as requested by the IRB.
4. To maintain copies of all pertinent information related to the research activities in this project, including copies of informed consent agreements obtained from all participants.
5. To notify the IRB immediately upon the termination of this project, and/or the departure of the principal investigator from this Institution and the project.

* **Electronic Signature:** *This document has been electronically signed by the IRB Chairman through the HSSC eIRB Submission System authorizing IRB approval for this study as described in this letter.*

APPENDIX B: MUSC Off Campus Site Form
Seneca, SC

PI Name: Hiott, Deanna B.



Office of Research Integrity
19 Hagood Ave, Suite 601
(843) 792-4148
Fax (843) 792-7457

Off Campus Study Site Form

PRO/HR # Pro00058642

STUDY TITLE: Adolescent Risk Screening

PRINCIPAL INVESTIGATOR: Deanna B. Hiott MSN, RN

ADDRESS OF OFF-SITE FACILITY: 15579 Wells Highway, Seneca SC 29678

***complete a new form for each off site facility*

NAME OF NON-MUSC INVESTIGATOR/ INSTITUTIONAL OFFICIAL: Practice Owner: Dr. Frank Stewart

SECTION I.

A. Is the off-campus site "engaged" in human subject's research pertaining to this study?

To make this determination you will need to consult the OHRP website to assist in determining if the off campus site's role in this study makes the site "engaged." In general, an institution is considered *engaged* in a particular non-exempt human subjects research project when its employees or agents for the purposes of the research project obtain: (1) data about the subjects of the research through intervention or interaction with them; (2) identifiable private information about the subjects of the research; or (3) the informed consent of human subjects for the research. See the following link for categories and guidance:
<http://www.hhs.gov/ohrp/policy/engage08.html>

1. Check either A or B below: (Completion of A or B is required)

(A) Activities at the off-campus site are consistent with examples under Category A; the site is engaged in human subjects research

If you checked this section, please identify the specific type of activity or activities to be done at this off site campus by providing the number of the example from the OHRP website. For example: A1, A2, A3, etc.

PI Name: Hiott, Deanna B.

(B) Activities at the off-campus site are consistent with examples under category B; the site is not engaged in human subjects' research

If you checked this section, please identify the specific type of activity or activities to be done at this off site campus by providing the number of the example from the OHRP website. For example: B1, B2, B3, etc.
B1

2. Does the off-campus site have a Federal Wide Assurance (FWA)?

Yes If yes, what is their FWA:
 No

3. Does the off-campus site have an Institutional Review Board for Human Research?

Yes No

If Yes, the individual or site must contact that IRB and provide MUSC with documentation on whether IRB approval is required.

Please provide the name, address and phone number of the IRB:
N/A

If Yes, has the off-campus site's IRB approved this study?

Yes No

If the off-campus site's IRB has not approved this study, will review by that IRB be required?

Yes No

If no, please explain.

SECTION II. *(Complete this section if you selected Section I.A(1)(A)).*
A. List all community individuals that will be engaged in the study.

Individuals are "engaged" if they will: (1) obtain data about research participants through intervention or interaction with them; or (2) obtain identifiable private information or identifiable specimens about the participants of the research – even if they do not directly interact with them or (3) the informed consent of human subjects for the research. More information pertaining to what constitutes engagement can be found in the OHRP guidance on engagement at: <http://www.hhs.gov/ohrp/policy/engage08.html>

PI Name: Hiott, Deanna B.

Individual's Name <i>Use full legal name</i>	Individual's Credentials and/or Position <i>(e.g., M.D., Executive Director, recruitment specialist)</i>	Individual's Role on the study <i>(e.g., consent, deliver interventions, data analysis)</i>
N/A		

To expand table, move to the end of the last row and press the tab key.
****Any community individual "engaged" in research will need to complete the CITI MIAMI training course and be listed on the eIRB personnel list.**
**** If any community individual member of a facility is considered "engaged" in research, the site is then considered "engaged in research under section I(A)(1) of this form.**

B. For each individual listed above who will be involved in the informed consent process, please complete the information below.

Name: Current Position/Role at the Facility: Human Subjects Education/Training:

You may copy and paste this box as many times as needed. Box expands.

***For those individuals and/or sites that do not have their own IRB, MUSC may consider taking on the role of IRB of Record. Please review the [guidance](#) provided by SCTR (pg2) on how to apply for a Federal Wide Assurance (FWA) / Institutional Authorization Agreement (IAA). Contact your MUSC IRB administrator if you have questions.

**MUSC may assume IRB responsibilities for non-affiliated institutions and investigators only under certain conditions (i.e., such as when an approved IRB Authorization Agreement exists designating the MUSC IRB to serve as the IRB of Record and the facility applies for and receives and FWA from OHRP).

PI Name: Hiott, Deanna B.

**If the MUSC IRB takes on the role of IRB of Record, individuals must complete an IRB approved education program ([CITI.MIAM!](#)) for the protection of human research participants prior to conducting this, or any other, research involving human participants.

APPENDIX C: MUSC Off Campus Site Form
Greenville, SC

PI Name Hiott, Deanna B.



Office of Research Integrity
19 Hagood Ave, Suite 601
(843) 792-4148
Fax (843) 792-7457

Off Campus Study Site Form

PRO/HR # Pro00058642

STUDY TITLE: Adolescent Risk Screening

PRINCIPAL INVESTIGATOR: Deanna B. Hiott MSN, RN

ADDRESS OF OFF-SITE FACILITY: 525 Verdae Blvd #200, Greenville, SC 29607

***complete a new form for each off site facility*

NAME OF NON-MUSC INVESTIGATOR/ INSTITUTIONAL OFFICIAL: Practice Owner: Scott Dobson M.D.

SECTION I

A. Is the off-campus site "engaged" in human subject's research pertaining to this study?

To make this determination you will need to consult the OHRP website to assist in determining if the off campus site's role in this study makes the site "engaged." In general, an institution is considered *engaged* in a particular non-exempt human subjects research project when its employees or agents for the purposes of the research project obtain: (1) data about the subjects of the research through intervention or interaction with them; (2) identifiable private information about the subjects of the research; or (3) the informed consent of human subjects for the research. See the following link for categories and guidance:

<http://www.hhs.gov/ohrp/policy/engage08.html>

1. Check either A or B below: (Completion of A or B is required)

(A) Activities at the off-campus site are consistent with examples under Category A; the site is engaged in human subjects research

If you checked this section, please identify the specific type of activity or activities to be done at this off site campus by providing the number of the example from the OHRP website. For example: A1, A2, A3, etc.

(B) Activities at the off-campus site are consistent with examples under category B; the site is not engaged in human subjects' research

PI Name Hiott, Deanna B.

If you checked this section, please identify the specific type of activity or activities to be done at this off site campus by providing the number of the example from the OHRP website. For example: B1, B2, B3, etc.

B1

2. Does the off-campus site have a Federal Wide Assurance (FWA)?

Yes If yes, what is their FWA:
 No

3. Does the off-campus site have an Institutional Review Board for Human Research?

Yes No

If Yes, the individual or site must contact that IRB and provide MUSC with documentation on whether IRB approval is required.

Please provide the name, address and phone number of the IRB:
 N/A

If Yes, has the off-campus site's IRB approved this study?

Yes No

If the off-campus site's IRB has not approved this study, will review by that IRB be required?

Yes No

If no, please explain.

SECTION II. (Complete this section if you selected Section I.A(1)(A)).
A. List all community individuals that will be engaged in the study.

Individuals are "engaged" if they will: (1) obtain data about research participants through intervention or interaction with them; or (2) obtain identifiable private information or identifiable specimens about the participants of the research – even if they do not directly interact with them or (3) the informed consent of human subjects for the research. More information pertaining to what constitutes engagement can be found in the OHRP guidance on engagement at: <http://www.hhs.gov/ohrp/policy/engage08.html>

PI Name Hiott, Deanna B.

Individual's Name <i>Use full legal name</i>	Individual's Credentials and/or Position <i>(e.g., M.D., Executive Director, recruitment specialist)</i>	Individual's Role on the study <i>(e.g., consent, deliver interventions, data analysis)</i>
N/A		

To expand table, move to the end of the last row and press the tab key.
 **Any community individual "engaged" in research will need to complete the CITI MIAMI training course and be listed on the eIRB personnel list.
 ** If any community individual member of a facility is considered "engaged" in research, the site is then considered "engaged in research under section I(A)(1) of this form.

B. For each individual listed above who will be involved in the informed consent process, please complete the information below.

Name: Current Position/Role at the Facility: Human Subjects Education/Training:

You may copy and paste this box as many times as needed. Box expands.

***For those individuals and/or sites that do not have their own IRB, MUSC may consider taking on the role of IRB of Record. Please review the [guidance](#) provided by SCTR (pg2) on how to apply for a Federal Wide Assurance (FWA) / Institutional Authorization Agreement (IAA). Contact your MUSC IRB administrator if you have questions.

**MUSC may assume IRB responsibilities for non-affiliated institutions and investigators only under certain conditions (i.e., such as when an approved IRB Authorization Agreement exists designating the MUSC IRB to serve as the IRB of Record and the facility applies for and receives and FWA from OHRP).

PI Name Hiott, Deanna B.

**If the MUSC IRB takes on the role of IRB of Record, individuals must complete an IRB approved education program [\(CITI MIAMI\)](#) for the protection of human research participants prior to conducting this, or any other, research involving human participants.

APPENDIX D: IRB Approved Provider Consent

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Version Date: 02/22/18

Medical University of South Carolina
CONSENT TO BE A RESEARCH SUBJECT

TITLE OF RESEARCH: A Feasibility Study of the HEEADSSS Psychosocial Interview Combined with Bright Futures Youth Risk Screening Instruments in the Primary Care Setting

A. PURPOSE OF THE RESEARCH

You are being asked to volunteer for a research study. This study is sponsored by the Medical University of South Carolina. The purpose of this research is to evaluate the HEEADSSS adolescent risk screen. You are being asked to participate in this study because you are a provider at Parkside Pediatrics or Oconee Pediatrics and you use the HEEADSSS screening interview with your pediatric patients. The investigator in charge of this study is Deanna Hiott MSN,RN. This study is being done at Parkside Pediatrics, Greenville S.C. and at Oconee Pediatrics, Seneca S.C. Approximately 6 providers and 30 adolescents will participate in this study.

B. PROCEDURES

If you agree to be in this study, the following will happen:

1. You will attend a one-time 2-hour in-service on the HEEADSSS interview to ensure consistency among providers.
2. You will provide your adolescent patients with a physical examination as usual. You will review the adolescent's medical chart and question them about health risk behaviors as usual.
3. Before you enter the adolescent's room, the researcher will give you a 'paused' audio-recorder. You will enter the room and greet the patient as usual, then you will un-pause the recorder and audio record the adolescent visit.
4. The adolescent appointment will be digitally audio recorded to see how you use the HEEADSSS interview to question adolescents about health behaviors to identify adolescent health risks.
5. This audio recording will only be used by the researcher and will be coded with a unique identifier. You will only be identified by a random ID number.
6. After the visit is over, your patient will meet with the researcher in another room. She will have them complete a survey concerning risk-screening.
7. At this time, the results of the initial computer risk screen will be provided to you.
8. The recorder may be stopped at any time if deemed necessary by the provider or patient.
9. Although these screens do not ask about thoughts of suicide or self-harm specifically, you will be notified by the researcher of any high-risk behaviors noted in the study screens that could indicate the patient may hurt themselves or others.



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10. Lastly, you will complete a one-time interview at a time and place that is convenient with you. This may be accomplished over the telephone.

C. DURATION

Participation in this study will add no additional time to the provider's portion of the adolescent visit.

However, total provider participation in the study will require an initial one-time 3.5-hour investment: 30 minutes for consent, an additional 2 hours for participation in the HEEADSSS review seminar over a period of 1 visit and 1 hour for the interview.

D. RISKS AND DISCOMFORTS

We do not anticipate that you will experience any risks or discomfort from this study. If you become uncomfortable, you can choose to stop participation in the study by notifying the researcher and the interview will be deleted.

There is the potential risk associated with breach of confidentiality related to the data collected about you. To minimize this risk, only the random ID number rather than your name will identify all data. Whenever data are reported, no individual subject will be identified.

E. BENEFITS

There will be no direct benefit to you from participating in this study. However, it is hoped that the information gained from the study will help healthcare providers discover risk screening methods that are easy to administer and effective to use during an adolescent well visit.

F. COSTS

There will be no additional costs to you as a result of being in this study.

G. PAYMENT TO PARTICIPANTS

A one-time \$50 gift card will be issued to the provider for participation.

Payments that you receive from MUSC for participating in a research study are considered taxable income per IRS regulations. Payment types may include, but are not limited to: checks, cash, gift



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certificates/cards, personal property, and other items of value. If the total amount of payment you receive from MUSC reaches or exceeds \$600.00 in a calendar year, you will be issued a Form 1099.

H. ALTERNATIVES

If you choose not to participate in this study, your patient's visit will proceed as usual.

I. EMPLOYEE PARTICIPATION

Your participation or discontinuance will not constitute an element of your job performance or evaluation, nor will it be a part of your personnel record at Parkside Pediatrics.

Results of this research will be used for the purposes described in this study. This information may be published, but you will not be identified. Information that is obtained concerning this research that can be identified with you will remain confidential to the extent possible within State and Federal law. The investigators associated with this study, the sponsor, and the MUSC Institutional Review Board for Human Research will have access to identifying information. All records in South Carolina are subject to subpoena by a court of law.

Your participation in this study is voluntary. You may refuse to take part in or stop taking part in this study at any time. You should call the investigator in charge of this study if you decide to do this. Your decision not to take part in the study will not affect your current or future medical care or any benefits to which you are entitled.

The investigators and/or the sponsor may stop your participation in this study at any time if they decide it is in your best interest. They may also do this if you do not follow the investigator's instructions.



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Volunteers Statement

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my participation in this study or study related injury, I may contact Deanna Hiott (864-354-0065). I may contact the Medical University of SC Hospital Medical Director (843/792-9537) concerning medical treatment.

If I have any questions, problems, or concerns, desire further information or wish to offer input about my rights as a research subject in this study, I may contact the Medical University of SC Institutional Review Board for Human Research IRB Manager or the Office of Research Integrity Director at (843) 792-4148. This includes any questions about my rights as a research subject in this study.

I agree to participate in this study. I have been given a copy of this form for my own records.

If you wish to participate, you should sign below.

Signature of Person Obtaining Consent Date

*Name of Participant Date



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APPENDIX E: IRB Approved Adolescent Consent

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Version Date: 02/22/2018

**Medical University of South Carolina
CONSENT TO BE A RESEARCH SUBJECT**

TITLE OF RESEARCH: A Feasibility Study of the HEEADSSS Psychosocial Interview Combined with Bright Futures Youth Risk Screening Instruments in the Primary Care Setting

If participants include those under 18 years of age: 1) The subject's parent or legal guardian will be present when the informed consent form is provided. 2) The subject will be able to participate only if the parent or legal guardian provides permission and the adolescent provides his/her assent. 3) In statements below, the word "you" refers to your child or adolescent who is being asked to participate in the study.

A. PURPOSE OF THE RESEARCH

You are being asked to volunteer for a research study. Research studies are voluntary and include only people who choose to take part. Please read this consent form carefully and take your time making your decision. As your study doctor or study staff discusses this consent form with you, please ask him/her to explain any words or information that you are unsure of or find confusing. The purpose of this study is to explore the effectiveness of adolescent risk screens. You are being asked to participate in this study because you are an adolescent and your health provider may talk to you about risky health behaviors during this visit. The study is sponsored by the Medical University of South Carolina. The investigator in charge of this study is Deanna B. Hiott MSN, RN. The study is being done at Parkside Pediatrics and Oconee Pediatrics. Approximately 36 people will take part in this study.

B. PROCEDURES

If you agree to be in this study, the following will happen:

1. Before the check-up, you will meet with the researcher in a private room. She will have you complete 2 risk-screening questionnaires on an iPad. The results of the risk screen will only be shared with the researcher and your provider.
2. The risk screens will be coded with a unique numerical identifier. You will only be identified by a random ID number.
3. Then you will have your physical examination as usual. Your healthcare provider will review your medical chart and question you about health risk behaviors as usual.
4. Your check-up will be digitally audio recorded to hear how the doctor questions you about your health behaviors and to identify adolescent health risk behaviors.
5. This audio recording will only be used by the researcher and will be coded with a unique identifier. You will only be identified by a random ID number.



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6. After your check-up is over, the researcher will have you complete a post-visit survey on the same iPad. This survey will be coded with the same unique identifier. You will only be identified by a random ID number.
7. This post-visit survey may ask you what you thought about the teen risk screens and your thoughts about your doctor visit.
8. The researcher will also review your health record.
9. All information is confidential and private and will not be shared unless there is concern you may hurt yourself or hurt others.
10. If you agree to additional contact, the researcher may interview you in a private room and ask you questions about this study.
11. This interview will be recorded but you will only be identified with the same id number so no one will know it is you.
12. Would you like to participate in another interview concerning risk screening today or over the phone? Please both initial your answer (parent and adolescent).

_____ Yes, I agree to another interview

_____ No, I do not agree to another interview

C. DURATION

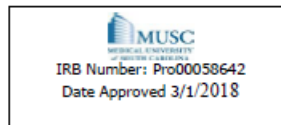
Participation in the study will take about 1 hour over a period of 1 visit. The additional interview may take up to 1 hour.

D. RISKS AND DISCOMFORTS

We do not anticipate that you will experience any risks or discomfort from this study. When you are completing the questionnaire for the study, you may have uncomfortable thoughts or feelings. If you become uncomfortable, you can choose not to answer the question or you can choose to stop participation in the study.

If there is a concern you may hurt yourself or others the study will be stopped and your provider will assist you. You may be referred to a counselor for additional assistance.

There is the potential risk associated with breach of confidentiality related to the data collected about you. To minimize this risk, only a code number rather than your name will identify all data. Whenever data are reported, no individual subject will be identified.



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E. BENEFITS

There will be no direct benefit to you from participating in this study. However, it is hoped that the information gained from the study will help doctors discover risk screening methods that are easy to administer and effective to use during an adolescent well visit.

F. COSTS

There will be no additional costs to you as a result of being in this study. However, routine medical care for your condition (care you would have received whether or not you were in this study) will be charged to you or your insurance company.

G. PAYMENT TO PARTICIPANTS

In return for your time and effort, you will receive a \$5 Starbucks card or a \$5 Walmart card for participation in this study. If you choose to participate in the extra interview you will also receive a \$10 Walmart or Target gift card.

Payments that you receive from MUSC for participating in a research study are considered taxable income per IRS regulations. Payment types may include, but are not limited to: checks, cash, gift certificates/cards, personal property, and other items of value. If the total amount of payment you receive from MUSC reaches or exceeds \$600.00 in a calendar year, you will be issued a Form 1099.

H. ALTERNATIVES

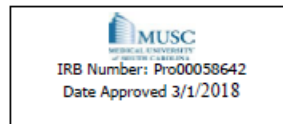
If you choose not to participate in this study, your check-up will proceed as usual.

I. FUTURE CONTACT

The researcher in charge of this study might like to contact you in the future about other research opportunities. Please initial by your choice below:

_____ Yes, I agree to be contacted

_____ No, I do not agree to be contacted



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J. PATIENT PARTICIPATION

Your decision not to take part in the study will not affect your current or future medical care or any benefits to which you are entitled.

Results of this research will be used for the purposes described in this study. This information may be published, but you will not be identified. Information that is obtained concerning this research that can be identified with you will remain confidential to the extent possible within State and Federal law. The investigators associated with this study, the sponsor, and the MUSC Institutional Review Board for Human Research will have access to identifying information. All records in South Carolina are subject to subpoena by a court of law.

Your participation in this study is voluntary. You may refuse to take part in or stop taking part in this study at any time. You should call the investigator in charge of this study if you decide to do this. Your decision not to take part in the study will not affect your current or future medical care or any benefits to which you are entitled.

The investigators and/or the sponsor may stop your participation in this study at any time if they decide it is in your best interest. They may also do this if you do not follow the investigator's instructions.



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Volunteers Statement

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my child's participation in this study or study related injury, I may contact Deanna Hiott (864-354-0065). I may contact the Medical University of SC Hospital Medical Director (843/792-9537) concerning medical treatment.

If I have any questions, problems, or concerns, desire further information or wish to offer input about my child's rights as a research subject in this study, I may contact the Medical University of SC Institutional Review Board for Human Research IRB Manager or the Office of Research Integrity Director at (843) 792-4148. This includes any questions about my rights as a research subject in this study.

I agree to participate in this study. I have been given a copy of this form for my own records.

If you wish to participate, you should sign below.

Signature of Person Obtaining Consent Date

*Name of Participant Date

Signature of Parent/Legal Guardian Date

*12-17 years of age:

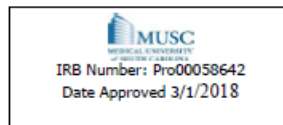
"My participation has been explained to me, and all of my questions have been answered. I am willing to participate."

Signature: _____

Age: _____ Date of Birth: _____



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APPENDIX F: Parkside Pediatric Letter of Support



"Great futures. Small beginnings."

Dr. Dobson
Parkside Pediatrics
525 Verdae Blvd #200
Greenville, SC 29607

MUSC IRB
Office of Research Integrity
19 Hagood Avenue, Suite 601
MSC857

To MUSC IRB,

This letter is to acknowledge that Deanna Hiott MSN, MUSC doctoral student did present her study to Dr. Dobson, Dr. Hipp and Dr. Dukes. Additionally this student met with the office managers to discuss the implementation of this study.

Dr. Dobson granted permission for this student to perform this study addressing adolescent risk screening at Parkside Pediatrics.

Deanna Hiott will serve as the primary investigator (PI). We have agreed the study steps include:

Step 1: Receptionists will ask for participants during reminder calls for ages 14-18. (Script will be provided. Those interested will be emailed a consent form for review).

Step 2: At check-in the receptionist will notify the PI of interested parties.

Step 3: The PI will consent parents and gain assent from adolescents, then generate a de-identification number that will be used to label the survey screens in REDCap and identify the HEEADSSS interview on the audio recorder.

Step 4: The PI will screen the adolescents with the Y-PSC and IC on the tablet

Step 5: The patient will be roomed by PI and audio recorder placed in the room and started when physician enters.

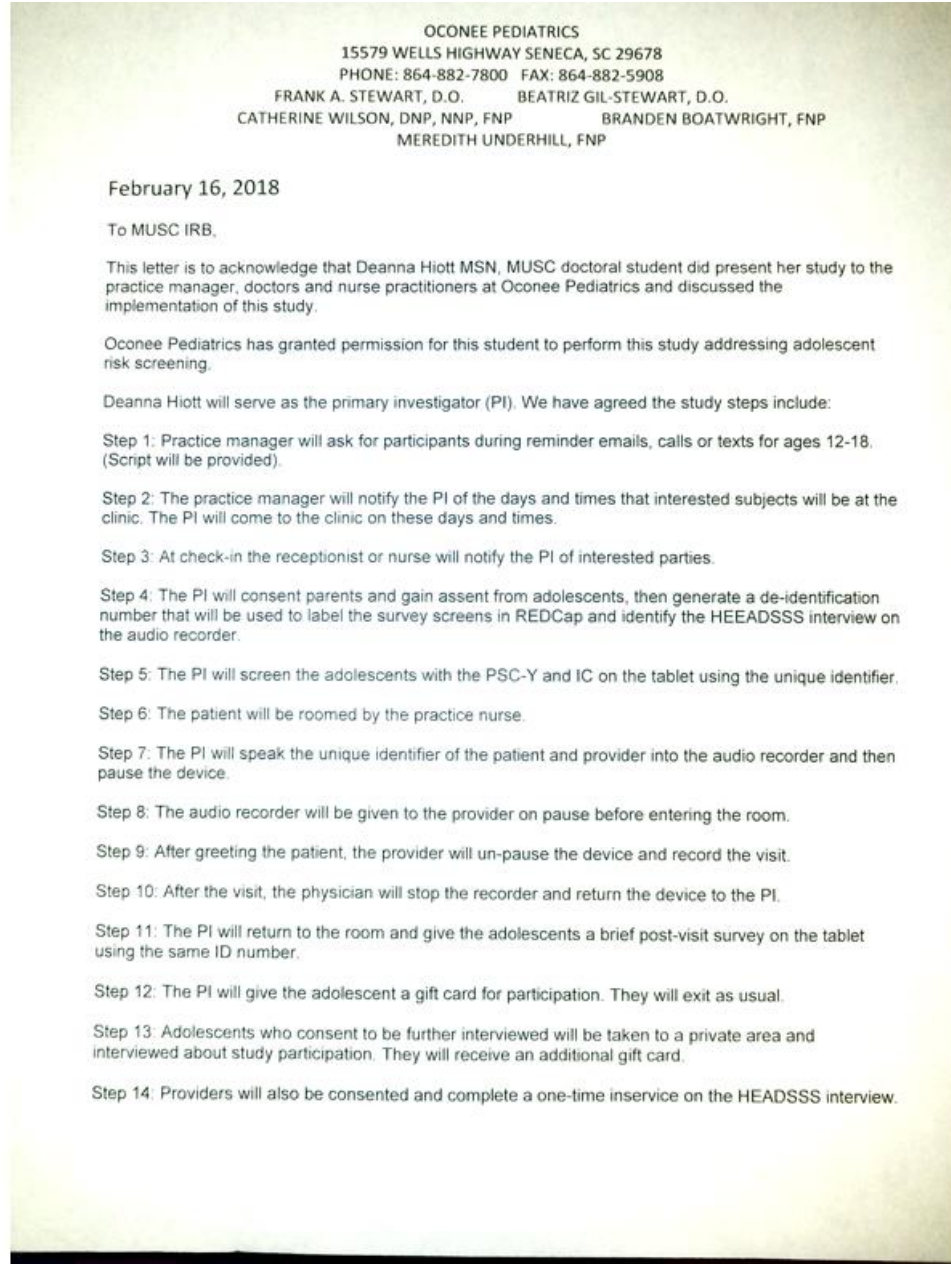
Step 6: After the visit, the physician will stop the recorder. The PI will return to the room and give the adolescents a brief post-visit survey on the tablet using the same ID number, give them a gift card for participation. They will exit as usual.

Step 7: Providers will also be consented and complete a one-time 5 question survey as well.

Thank you,

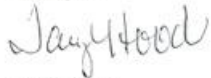

Danielle Schoviak, RN BSN
Manager, Clinical Services

APPENDIX G: Oconee Pediatrics Letter of Support



Step 15: Providers will participate in a one-time interview regarding the study and receive a gift card.

Thank you.



Tammy Hood
Office Manager
Oconee Pediatrics
tammyhood@aol.com
864-882-7800

APPENDIX H: Provider HEEADSSS PowerPoint Presentation

HEEADSSS

Inservice for Parkside Providers



The goal of screening...

- Adolescents do not recognize dangerous behavior patterns as dangerous
- They see their activities not as problems but as solutions.
- Challenge is to explore these behaviors and the context in which the adolescent lives
- Goal is to develop realistic solutions with patient buy-in

Slide 2

In General: Full HEEADSSS

- **Home** – “Tell me about your living situation”
- **Education/Employment** – “What are you good at in school”
- **Eating** – “What do you think about your weight & shape”
- **Activities** – “What do you do for fun”
- **Drugs** – “Do your friends smoke or use drugs... do you”
- **Sexuality** – “Do you have any romantic relationships”
- **Suicide & Depression** – Have you felt down, depressed or hopeless?
- **Safety** – “Do you feel safe at school & home”

Slide 3

Strength Based Interviewing, Why?

- Raise adolescent awareness of strengths
- Facilitate personal responsibility for health & well-being
- What does it look like?
 - Similar to motivational interviewing
 - Open-ended questions
 - Identification of what the adolescent is doing well
 - Followed by reflective summary statement of strength
- How do you do it?
 - Respectful listening & guiding, not paternalism
 - Reflecting strengths back
 - Way of organizing & prioritizing the visit
 - Time efficient

Slide 4

Confidentiality

- Confidentiality a concern for young people
- Provide a safe space
- Discuss early on in the engagement process
- Explain the extent and limits of confidentiality
- Exceptions:
 - Someone is hurting you
 - You are going to hurt yourself
 - You are going to hurt others

DISCUSSING CONFIDENTIALITY

▶ **You may say, for example:** "During this visit, I'll ask you some very personal questions to best help you. I promise that whatever you say will be kept private between us, and not be passed along to your parents or anybody else outside this office, unless you give permission."

▶ **Clinicians may end the introduction with:**
 "The only exception would be in a circumstance in which a disclosure to someone is required by law." Some specify the circumstances (eg, the patient is planning to kill or seriously injure himself or someone else; or the patient is experiencing, or is planning to commit, physical or sexual abuse or neglect).

▶ **Other clinicians prefer a nonqualified ending:**
 "If you tell me something that is so bad for your health that I think it is best to get somebody else involved in your care, like a parent or another doctor, I will tell you that. If you disagree, then together we can discuss the way to proceed." This method reinforces the strength of the physician-patient relationship.



Slide 5

Interview tips

- Introduce yourself first.
- Ask the young person to introduce you to others who may be present.
- Don't simply ask, "Why are you here?"
- Chat about lighter, non-threatening topics.
- Provide an outline of what's going to happen.
- Prepare them for the sensitive nature of some of the questions.
- Let them know they can choose not to answer questions.
- Acknowledge they may feel uncomfortable at times.
- Build rapport so that the teen feels heard - someone cares; it might be useful to return.

Slide 6

Interview tips

- Ask open-ended questions for rapport building and engagement.
- Goal isn't just to elicit information about what might be 'wrong' with the teen
- Spend time during the interview asking for feedback.
- Check that you understand the main concerns and difficulties.
- Clarify the young person's goal.
- Before concluding, ask if they have any questions or anything more to add.
- Parents, family members, or other adults should not be present during the interview (unless the young person specifically gives permission, or requests it).

Slide 7

Wrapping up

- Allow teen to express any concerns you have not covered.
- Ask the teen who they can trust and confide why they trust that person.
- For young people who demonstrate significant risk factors, relate your concerns.
- A youth focus will ensure their participation in deciding on what to work on and how.
- If the teen’s life is going well, say so.

▪ Source: www.headspace.org.au/what-works/resources; Parker, A. G. et al. (2010)

Slide 8

Open Ended Questions

Category	Poor	Better
Home	"Do you get along with your mom and dad?"	"Where do you live and who lives there with you? (No assumptions made.)"
Education	"How are you doing in school?"	"Tell me about school." OR: "What do you enjoy about school? What do you dislike? (Open-ended; harder to answer "OK.")"
Eating	"What do you eat?"	"Tell me what you think about your weight and shape." OR: "Tell me about what you like and don't like about your body." (Open-ended; can't answer "OK.")
Activities	"Do you have any activities outside school?"	"What do you and your friends like to do for fun?" (Open-ended.)
Drugs	"Do you use drugs?"	"What kinds of drugs have you seen around your school or at parties?" OR: "Do any of your friends use drugs or alcohol?" (Less personal; eases into a difficult discussion.)
Sexuality	"Have you ever had sex?"	"You told me you've been going out with Steve for the past 3 months. Has your relationship become sexual?" (Context makes question seem less intrusive.) OR: "Are you attracted to anyone currently?" (Nonjudgmental.)

From Goldenring JM, et al.

Slide 9

If there is a Problem:

- How should providers address a suspected or identified risk?
 - Reflect back positive points
 - Pause for a moment
 - Share your concerns
 - Ask permission to address the problem
 - Address the problem

Slide 10

Home example questions

- Tell me about your living situation? Who lives at home with you?
 - What makes your parents proud of you?
 - What are relationships like at home? To whom can you talk at home?
 - What responsibilities do you have at home?
 - How do you get along with the different people in your household?
 - What do you like to do together as a family? Do you eat meals together?
 - Do you feel that you are allowed to become more independent or make more of your own choices as you have become older?
 - Do you feel you have a say in family rules and decisions?
 - Have you moved recently? Have you ever run away... why?
-
- Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 11

Education/Employment Example Questions

- What are you good at in school? What's going well?
 - What are your favorite subjects at school?
 - How are your grades? Any recent changes?
 - How are you doing in school?
 - Have you changed schools in the past few years?
 - What are your future education/employment plans/goals?
 - Are you working?
 - Are you able to take responsibility for your actions even when things don't work out as you planned?
- Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 12

Eating example Questions

- What do you think about your weight & shape?
 - How do you stay healthy?
 - What do you think about your diet?
 - Have you had any recent changes in your weight?
 - How much exercise do you get in an average day?
 - What do you think would be a healthy diet?
- Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 13

Activities example questions

- What do you do for fun? What are you good at? Any Hobbies?
 - Do you have friends you socialize with?
 - What do your friends like about you the most?
 - Do you feel you have at least 1 friend or a group of friends with whom you are comfortable?
 - Do you participate in any sports, other activities or attend a church or club?
 - What do you and your friends like to do together after school or on the weekends?
 - How do you “fit in” at school or in your neighborhood?
 - Do you have at least 1 adult in your life who cares about you and to whom you can go for help?
- Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 14

Drugs example questions

- Do you have friends who use illegal drugs or alcohol? Do you?
 - Do you have friends who use tobacco products (cigars, cigarettes, chew)? Do you?
 - Does anyone in your family use tobacco, alcohol, or other drugs?
 - Is there any history of drug or alcohol problems in your family?
- Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 15

Sexuality example questions

- Do you have any romantic relationships?
- Have you ever had sex?
- Has anyone ever made you do something you didn't want to do?
- How many sexual partners have you had in the last month, year, lifetime?
- What do you do to prevent pregnancy and STIs?

▪ Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 16

Suicide example questions

- In the past two weeks have you felt down, depressed or hopeless?
- In the past two weeks have you had little interest or pleasure in doing things?
- Are you having trouble getting to sleep?
- Have you thought about hurting yourself? Have you ever done it?
- Have you thought about hurting someone else? Have you ever done it?
- Do you have someone you talk to about your problems
- What do you do when you feel sad?
- When you are stressed out, what do you do?
- What do you like about yourself?

▪ Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 17

Safety example questions

- Do you feel safe at home? At school?
- Do you always wear a seatbelt when driving in the car?
- Do you use safety equipment for sports and activities (such as a helmet when biking?)
- Have you ever been seriously injured? How?

- Example HEEADSSS Questions (David A. Klein, John M. Goldenring, & William P. Adelman, 2014)(Duncan et al., 2007) (Goldenring & Rosen, 2004)

Slide 18

Dr. Klein on the HEEADSSS

- <https://youtu.be/Doplg517o00>

- David A. Klein, John M. Goldenring, & William P. Adelman, 2014)

Slide 19

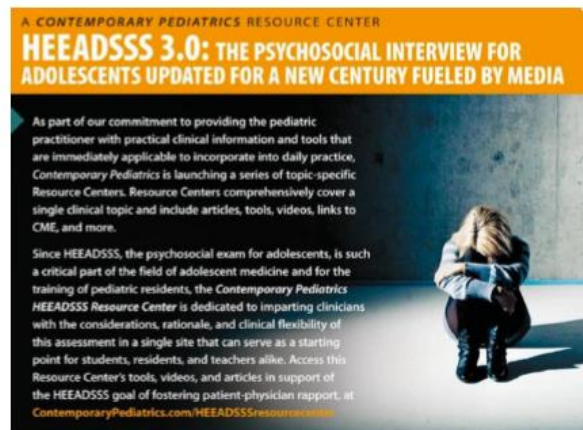
Example Interview

- <https://youtu.be/laXq43U1t3I>

- Western Australian Clinical Training Network, 2016

Slide 20

Contemporary Pediatrics Resource Center



Slide 21

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APPENDIX I: Pediatric Symptom Checklist – Youth

Pediatric Symptom Checklist - Youth Report (Y-PSC)

Please mark under the heading that best fits you:

	Never	Sometimes	Often
1. Complain of aches or pains.....	—	—	—
2. Spend more time alone.....	—	—	—
3. Tire easily, little energy.....	—	—	—
4. Fidgety, unable to sit still.....	—	—	—
5. Have trouble with teacher.....	—	—	—
6. Less interested in school.....	—	—	—
7. Act as if driven by motor.....	—	—	—
8. Daydream too much.....	—	—	—
9. Distract easily.....	—	—	—
10. Are afraid of new situations.....	—	—	—
11. Feel sad, unhappy.....	—	—	—
12. Are irritable, angry.....	—	—	—
13. Feel hopeless.....	—	—	—
14. Have trouble concentrating.....	—	—	—
15. Less interested in friends.....	—	—	—
16. Fight with other children.....	—	—	—
17. Absent from school.....	—	—	—
18. School grades dropping.....	—	—	—
19. Down on yourself.....	—	—	—
20. Visit doctor with doctor finding nothing wrong.....	—	—	—
21. Have trouble sleeping.....	—	—	—
22. Worry a lot.....	—	—	—
23. Want to be with parent more than before.....	—	—	—
24. Feel that you are bad.....	—	—	—
25. Take unnecessary risks.....	—	—	—
26. Get hurt frequently.....	—	—	—
27. Seem to be having less fun.....	—	—	—
28. Act younger than children your age.....	—	—	—
29. Do not listen to rules.....	—	—	—
30. Do not show feelings.....	—	—	—
31. Do not understand other people's feelings.....	—	—	—
32. Tease others.....	—	—	—
33. Blame others for your troubles.....	—	—	—
34. Take things that do not belong to you.....	—	—	—
35. Refuse to share.....	—	—	—

APPENDIX J: Issues Checklist

BRIGHT FUTURES  TOOL FOR PROFESSIONALS

Issues Checklist (Abridged)

DIRECTIONS

Circle “yes” for topics you have discussed with your parents/son or daughter during the last 4 weeks, and “no” for topics that have not come up. For each issue answered “yes,” circle a number between 1 (calm) and 5 (angry) to answer the question, “How did you feel when you discussed this topic?”

Have You Discussed?	How Did You Feel When You Discussed This Topic?						
			Calm	A little angry			Angry
1. Telephone calls	yes	no	1	2	3	4	5
2. Bedtime	yes	no	1	2	3	4	5
3. Cleaning bedroom	yes	no	1	2	3	4	5
4. Doing homework	yes	no	1	2	3	4	5
5. Putting away clothes	yes	no	1	2	3	4	5
6. Using the television	yes	no	1	2	3	4	5
7. Cleanliness (washing, showers, brushing teeth)	yes	no	1	2	3	4	5
8. Which clothes to wear	yes	no	1	2	3	4	5
9. How neat clothes look	yes	no	1	2	3	4	5
10. Making too much noise at home	yes	no	1	2	3	4	5
11. Table manners	yes	no	1	2	3	4	5
12. Fighting with brothers and sisters	yes	no	1	2	3	4	5
13. Cursing	yes	no	1	2	3	4	5
14. How money is spent	yes	no	1	2	3	4	5
15. Picking books or movies	yes	no	1	2	3	4	5
16. Allowance	yes	no	1	2	3	4	5
17. Going places without parents (shopping, movies, etc.)	yes	no	1	2	3	4	5
18. Playing stereo or radio too loudly	yes	no	1	2	3	4	5
19. Turning off lights in house	yes	no	1	2	3	4	5
20. Using drugs	yes	no	1	2	3	4	5

(continued on next page)

Issues Checklist (Abridged) (continued)

Have You Discussed?			How Did You Feel When You Discussed This Topic?				
	yes	no	Calm	A little angry			Angry
21. Taking care of records, games, bikes, pets, and other things	yes	no	1	2	3	4	5
22. Drinking beer or other alcoholic beverages	yes	no	1	2	3	4	5
23. Buying records, games, toys, and other things	yes	no	1	2	3	4	5
24. Going on dates	yes	no	1	2	3	4	5
25. Who friends should be	yes	no	1	2	3	4	5
26. Selecting new clothes	yes	no	1	2	3	4	5
27. Sex	yes	no	1	2	3	4	5
28. Coming home on time	yes	no	1	2	3	4	5
29. Getting to school on time	yes	no	1	2	3	4	5
30. Getting low grades in school	yes	no	1	2	3	4	5
31. Getting in trouble at school	yes	no	1	2	3	4	5
32. Lying	yes	no	1	2	3	4	5
33. Helping out around the house	yes	no	1	2	3	4	5
34. Talking back to parents	yes	no	1	2	3	4	5
35. Getting up in the morning	yes	no	1	2	3	4	5
36. Bothering parents when they want to be left alone	yes	no	1	2	3	4	5
37. Bothering adolescent when he/she wants to be left alone	yes	no	1	2	3	4	5
38. Putting feet on furniture	yes	no	1	2	3	4	5
39. Messing up the house	yes	no	1	2	3	4	5
40. What time to have meals	yes	no	1	2	3	4	5
41. How to spend free time	yes	no	1	2	3	4	5
42. Smoking/spit tobacco	yes	no	1	2	3	4	5
43. Earning money away from the house	yes	no	1	2	3	4	5
44. What adolescent eats	yes	no	1	2	3	4	5

Source: Adapted, with permission, from Robin AL, Foster SL. 1989. *Negotiating Parent-Adolescent Conflict: A Behavioral-Family Systems Approach*. New York, NY: Guilford Press.

APPENDIX K: Adolescent - Post-visit Survey

1. It was easy to complete this survey.

0 1 2 3 4
Strongly disagree / disagree / Neutral / Agree / Strongly agree

2. I prefer answering personal questions via survey.

0 1 2 3 4
Strongly disagree / disagree / Neutral / Agree / Strongly agree

3. I prefer using a tablet or phone to answer questions.

0 1 2 3 4
Strongly disagree / disagree / Neutral / Agree / Strongly agree

4. I would prefer a written questionnaire.

0 1 2 3 4
Strongly disagree / disagree / Neutral / Agree / Strongly agree

5. I prefer my doctor to just ask me questions.

0 1 2 3 4
Strongly disagree / disagree / Neutral / Agree / Strongly agree

APPENDIX L: Provider Interview Guide

Interview Guide for Adolescent Behavioral Risk Screening in the Primary Care Setting: Healthcare Providers

“Thank you for helping us with our study. Feedback from providers with your expertise is very valuable to determine the acceptability of this research. Today, I will be asking you questions about your thoughts concerning your participation in the study.

Then I would like you to review and comment on the use of 2 Bright Futures instruments, the Pediatric Symptom Checklist – Youth (PSC-Y) and the Issues Checklist (IC), as additional behavioral health risk screening tools. The instruments are provided on a tablet and designed to provide a means to evaluate the adolescent’s engagement in potentially risky behavior.

- A. Provider structure process outcomes feasibility questions:**
- a. What were your concerns about participating in this research study?
 - b. How do you feel about adolescent risk screening?
 - c. How might we improve the study to make it easier on participating providers?
 - d. How did you feel about recording the HEEADSSS?
- B. Process Questions:**
- a. What are your reasons for using or not using the HEEADSSS in this office?
 - b. How do you feel about the HEEADSSS interview as a risk screen?
 - c. What do you believe are the strengths and/or weaknesses of the HEEADSSS interview?
 - d. What other risk assessments do you currently use?
- C. Outcome Questions:**
- a. Can you tell me what an ideal risk screen would look like to you?
 - b. Would you participate in a study such as this again?

D. Tablet review

“Great, thank you. Now, I’d like to review the PSC-Y and IC with you. If you notice something you like or don’t like, or if something confuses you or catches your attention we would like to know about that.”

“The PSC-Y and the IC have been entered into the REDCap database so these screens can be administered electronically to adolescents [show them on tablet]. Please take a few minutes to look over each of these instruments on paper and then review each screen on the tablet. Remember, if you notice something you like or don’t like, or if something confuses you or catches your attention we would like to know about that.” [allow time for provider to review the paper copies of the screen and the screens on the tablet].

Questions:

- What do you like about the screens on the tablet?
- What don't you like about them?
- What would make them more useful?
- Do you think the PSC-Y and IC on the tablet would be helpful to providers? How?
- Do you think most providers would use them? Why or why not?
- Do you think they would be helpful to adolescents? How?
- Do you think most adolescents will use them? Why or why not?
- How could you see providers using them to help evaluate adolescent risky behaviors?

E. General questions

“Thank you. We have some general questions about the electronic screening as a whole.”

If providers and adolescents had the choice of using an electronic screening device to evaluate risky behaviors, do you think they would want to use it? Why or why not?

“Thank you so much for your help today. Is there anything else you can think of that you would like to share with us?”

End interview, collect tablet, provide compensation.

APPENDIX M: Adolescent Interview Guide**Interview Guide for risk screening in the primary care center: Adolescents**

"Thank you for agreeing to help us with our study. We'd like to ask you a few questions about this study so we can continue to improve what we're doing. We are recording this so we don't miss anything. This recording and your answers to these questions are de-identified. In other words, no one will know what you said or hear what you said but me. I appreciate your input. There are no right or wrong answers. All your thoughts about this study are important. Thank you for agreeing to speak with me."

Study structure

How did you feel about this study?

What concerns did you have about participating in this study?

How did you feel about the visit being recorded?

Tell me something that would have made this easier for you?

Risk screening process

What did you like about the screens on the tablet?

What don't you like about them?

What would make them better?

How do you feel about answering personal questions on a tablet?

How do you feel answering personal questions from your provider?

Risk screening outcomes

Would you recommend participation in a study such as this to your friends?

Would you participate in this study again?

Tablet use

Have you ever used a tablet computer, iPad, the internet or a smartphone?

Have you ever used any of these devices to answer any kind of survey?

How did you feel about answering these screens on the iPad?

"Thank you so much for your help today. Is there anything else you can think of that you would like to share with us?"

End interview, provide compensation