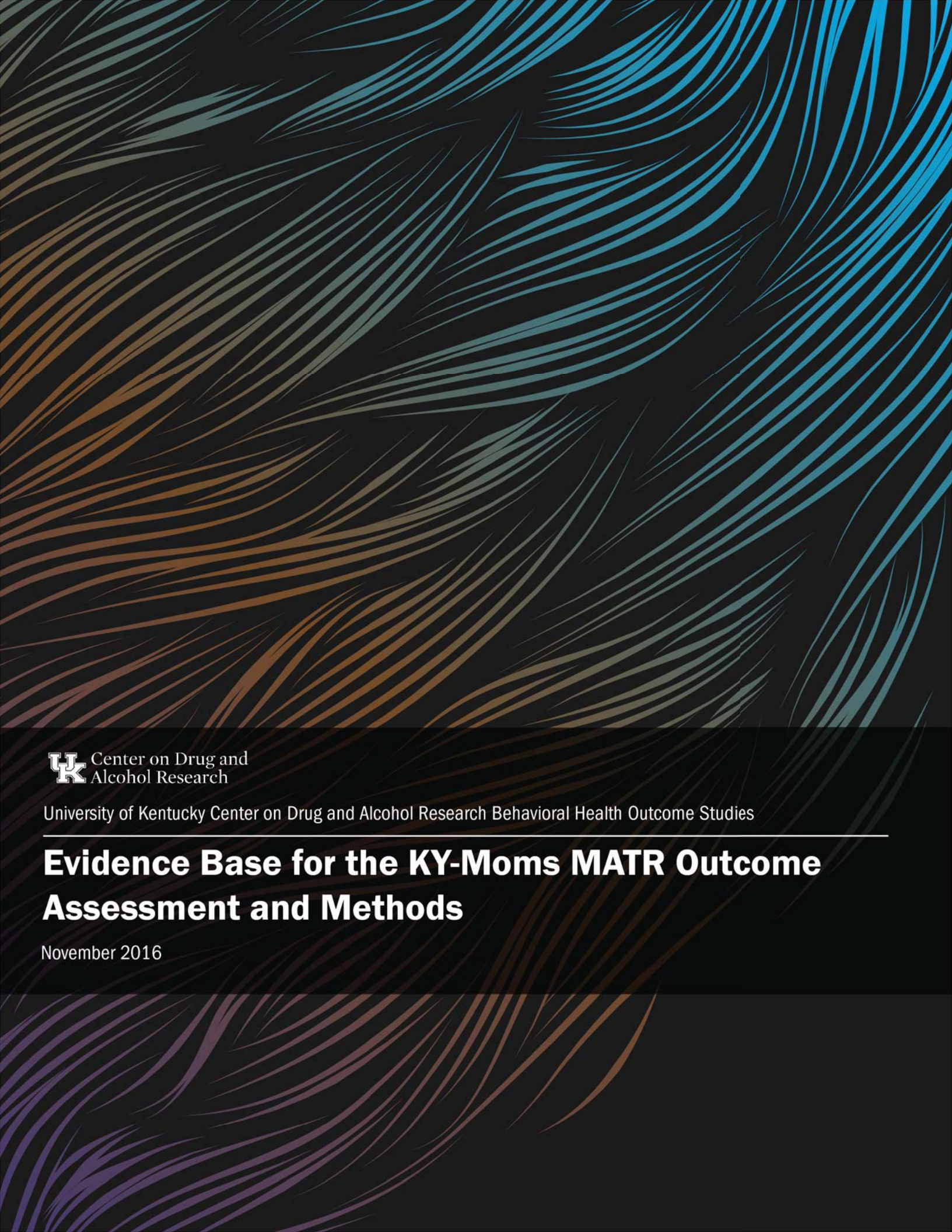

Center on Drug and Alcohol Research

University of Kentucky Center on Drug and Alcohol Research Behavioral Health Outcome Studies

Evidence Base for the KY-Moms MATR Outcome Assessment and Methods

November 2016

Executive Summary

KY-Moms MATR Outcome Evaluation

KY-Moms MATR is a state-funded prevention, outreach, and case management program aimed at reducing substance use and increasing positive birth outcomes for Kentucky women who are at risk for negative birth outcomes. The KY-Moms MATR outcome evaluation was modeled after the Kentucky Treatment Outcome Study (KTOS) which was initiated by the Kentucky Department of Behavioral Health, Developmental and Intellectual Disabilities (DBHDID), which was charged with carrying out the study and contracted with the University of Kentucky Center on Drug and Alcohol Research (UK CDAR) to develop and implement the study. This study began in 2006, was designed specifically for Kentucky, and is based on current research literature which indicates salient factors related to birth outcomes among a population of women who also experienced substance use and co-occurring disorders before and during pregnancy.

What Makes Kentucky Unique?

Kentucky's unique cultural context includes the fact that Kentucky has some of the highest rates in the nation for drug overdose fatalities, smoking (as well as the prevalence of maternal smoking), and serious health conditions (cancer deaths, cardiovascular related deaths, premature deaths, diabetes, obesity), along with the highest number of preventable hospitalizations. Kentucky also ranks as one of the worst states for the number of babies born with low birth weight and the state with one of the highest rates of infant mortality (United Health Foundation, 2015). Further, Kentucky ranks low in financial opportunity, financial well-being, and the percent of children living in poverty (Gallup Polls, 2014, 2015; Hess et al., 2015; Social Security Administration, 2011; United Health Foundation, 2015). **Given this context, the KY-Moms MATR assessment is designed to identify substance use trends, substance use-related co-morbidities, and program outcomes in the context of Kentucky specific economic and health-related concerns.**

What is Evidence-Based Assessment?

Evidence-based assessment is a critical component of evidence-based practice but has **received limited research attention. Information obtained from evidence-based assessments can be used to help determine areas to target in treatment, to develop a case conceptualization, to increase client engagement, and to objectively monitor treatment.** The scope of evidence-based assessment includes both the process through which the assessment is conducted and the instruments utilized for evaluation.

The evidence base for the KY-Moms MATR assessment conforms to the recommendations for evidence-based assessments for service providers in public agencies. The KY-Moms MATR assessment:

1. **Is based on theory and research** as related to substance use and negative birth outcomes including anxiety, depression, partner violence and other victimization experiences, physical health, financial hardship, housing instability, maternal-fetal attachment, and recovery supports.

2. **Is appropriate for the context of Kentucky and programs designed for pregnant women at risk for substance abuse** and includes measures that consider the unique features of Kentucky as well as factors that contribute to risk of substance abuse and negative birth outcomes. Initially, a pilot study was conducted with three regions to ensure the core assessment structure and components were appropriate for this high risk target population and to incorporate specific adaptations to the KY-Moms MATR program.

3. **Is face-valid and user-friendly** as it targets areas identified in theory and research as related to substance use, mental health, victimization and trauma history, and birth outcomes. The KY-Moms MATR assessment is based on the KTOS assessment core structure with modifications for adaptation to high risk pregnant women and a case management as opposed to treatment environment. Like KTOS, KY-Moms MATR is also relatively short, easy to use, and is provided to program staff at no cost. Further, once the intake assessment is completed, clinical providers can download a client-specific narrative report.

4. **Is made up of four core components** (substance use, mental health, victimization and trauma, and quality of life) each with **strong reliability and validity research support** and four supplemental components (maternal-fetal/maternal-infant attachment, health and stress-related health consequences, economic and living circumstances, and recovery supports) most of which have strong reliability and validity research support.

5. **Is focused primarily on dynamic or changeable factors rather than static factors** by including measures such as substance use, mental health symptoms, intimate partner violence, victimization and trauma exposure, quality of life, and recovery supports which can be changed within the context of the program rather than more static constructs generally thought to be less amenable to change (e.g., antisocial personality disorder).

6. **Has been used for 10 years with no reports of adverse reactions or consequences** due to the assessment or the research procedures. In addition, KY-Moms MATR assessment data are entered into an online, secure Client Information System (CIS) developed and maintained by UK CDAR. This server uses HTTPS for secure data transmission, data encryption for all identifying data elements which are also stored separately from assessment responses, secure server infrastructure that is in a locked-down facility with 24/7 monitoring, and user authentication. KY-Moms MATR is reviewed annually by the University of Kentucky Medical Institutional Review Board (IRB) and has a Certificate of Confidentiality issued by the Federal Department of Health and Human Services to provide the highest protection for data privacy and security.

7

Is sensitive to individual-level change so that outcomes can be measured. Results continue to show that the pregnant women who participate in KY-Moms MATR case management make substantial improvements from prenatal intake to follow-up in several important dimensions of their lives including significant reductions in illegal drug and alcohol use, significant reductions in mental health problems and stress, significant reductions in intimate partner violence, significant reductions in economic hardship, and significant improvements in mother-infant attachment. Additionally, clients reported high levels of satisfaction with their experience in KY-Moms MATR case management, and have birth outcomes that are not significantly different from the general population of women giving birth. The 6-month postnatal-follow-up uses the same KY-Moms MATR evidence-based assessment that is conducted at intake in order to examine change over time.

Additional benefit

Provides data analysis and dissemination. An additional benefit of this KY-Moms MATR evaluation is that state-level trends in substance use along with the co-occurring anxiety and depression, domestic violence, economic status, and quality of life trends for pregnant women entering the program are provided each year. An important benefit of state-level outcome studies is that funders and legislators can see up-to-date state-specific data to provide evidence of need for new programs, continuation of current programs, and changes in programmatic policies. Key trends in substance use and policy needs fluctuate annually depending on economic and other state-specific sociopolitical issues, each year's analytical findings, the latest research, and legislative research commission requests, making the need for easily-modifiable annual data collection even more important. In addition to annual statewide reports, the KY-Moms MATR data is used for community-level reports on client characteristics and outcomes for communities applying for Federal or other grants. Specifically,

1. UK CDAR BHOS has produced **over 10 annual reports** using intake data and follow-up data from 2006 through 2016.
2. UK CDAR BHOS has produced **6 regional and other ad hoc reports using KY-Moms MATR data along with over 10 different translational research products.**
3. The KY-Moms MATR data has also been used in **presentations and meetings** with clinical providers, agency boards of directors, and other state planning agencies that work closely with DBHDID.

The evidence base for the KY-Moms MATR assessment suggests it is a robust, pragmatic, reliable, and valid assessment, which provides statewide and regional data about Kentucky drug use trends, substance use-related comorbidities among pregnant women, and case management program outcomes.

Table of Contents

Evidence Base for the KY-Moms MATR Evaluation Assessment and Methods

November 2016

University of Kentucky
Center on Drug and Alcohol Research
Behavioral Health Outcome Studies

Allison Scrivner, TK Logan, Jennifer Cole, & Jaime Miller

Introduction

As Federal government and other funding agencies continue to merge and decrease funding for substance abuse, prevention, and mental health services, it is critical to have statewide outcome studies that document the ongoing need for services and provide up-to-date regional and state data on substance use trends and treatment outcomes for Kentucky especially for pregnant at-risk women. Although Kentucky is represented in a few national datasets that examine substance abuse trends, those national studies do not provide the state, county- and regional-level data and those national surveys do not consider or account for Kentucky's unique cultural context. There are also few national studies that focus on pregnant at-risk women.

KY-Moms MATR is a state-funded prevention, outreach, and case management program aimed at reducing substance use and increasing positive birth outcomes for Kentucky women who are at risk for negative birth outcomes. The program has two components including providing: 1) substance abuse prevention education to pregnant women at all risk levels and 2) client-centered intensive case management services to women at risk for substance abuse during pregnancy (referred to in this report as the KY-Moms MATR program).

Although Kentucky is represented in a few national datasets, those national studies do not provide the state, county- and regional-level data and those national surveys do not consider or account for Kentucky's unique cultural context.

The KY-Moms MATR program outcome evaluation began in 2006 and is conducted by the Behavioral Health Outcome Study team at the University of Kentucky Center on Drug and Alcohol Research (UK CDAR) at the request of the DBHDID and is modeled after the Kentucky Treatment Outcome Study (KTOS). Prenatal intake data are collected face-to-face by KY-Moms MATR program staff as clients enter the program using the evidence-based KY-Moms MATR intake assessment. Client responses are entered into an online secure Client Information System (CIS) developed and maintained by UK CDAR. The structured assessment is based on current research literature and includes factors related to birth outcomes among pregnant women who have experienced substance use and substance use-related problems before and during pregnancy. Specifically, the assessments were developed in collaboration with the DBHDID and include measures of substance use, mental health status, intimate partner violence, victimization and trauma exposure, and other pregnancy health indicators as well as birth outcomes. Once the prenatal intake assessment is completed, clinical providers can download a client-specific narrative report. At prenatal intake, clients are offered the opportunity to be contacted for a postnatal follow-up interview. If the client gives consent to be contacted for a follow-up, an interviewer at UK CDAR contacts that client about 6 months after the birth of their baby (based upon estimated due date reported by the client at prenatal baseline). UK CDAR interviewers obtain verbal consent to complete the follow-up survey at the time of the follow-up interview. Client responses to the follow-up interviews are kept confidential to facilitate accurate reporting of client outcomes and satisfaction with program services. The study generally has a high follow-up rate of over 80% each year and an overall average of 152 follow-ups per year since FY 2010.

What Is Evidence-Based Assessment?

Evidence-based assessment is an essential part of evidence-based practice but has received limited research attention (Beidas, Stewart, & Walsh, 2015; Jensen-Doss, 2015). Information obtained from evidence-based assessments can be used to help determine what to target in treatment or intervention programs, to develop a case conceptualization, to increase client engagement, and to objectively monitor treatment progress (Christon, McLeod, & Jensen-Doss, 2015; Hunsley, 2015; Jensen-Doss, 2015). The scope of evidence-based assessment includes both the process through which the assessment is conducted and the instruments utilized for evaluation.

Standardized assessments are generally recommended to help determine what service(s) to use with clients especially when a comprehensive approach is taken rather than a narrow approach (Basco et al., 2000; Jensen-Doss, Youngstrom, E., Youngstrom, J., Feeny, & Findling, 2014; Jensen-Doss, 2015; Jewell, Handwerk, Almquist, & Lucas, 2004; Tenney, Schotte, Denys, van Megen, & Westenberg, 2003). Fully accounting for clients' concerns has been linked to better client engagement and outcomes (Jensen-Doss & Weisz, 2008; Kramer, Robbins, Phillips, Miller, & Burns, 2003; Pogge et al., 2001). Standardized assessments can also provide valuable information about program outcomes, and understanding program outcomes is a critical component of documenting the effectiveness of evidence-based practice (Beidas et al., 2015).

In general, recommendations for evidence-based assessments for case managers in public agencies, who tend to have more limited resources, higher workloads, and more limited time (Glasgow, 2013; Nunno, 2006; Scott & Lewis, 2015) include: (1) the use of theory and research to determine the selection of assessment targets or components most relevant to the client's situation (Hunsley & Mash, 2007); (2) contextual appropriateness for the specific setting in which the measures will be used; in other words that the assessment is appropriate for the target population, local context, and targets the relevant constructs of interest (Glasgow, 2013); (3) having face validity (i.e., measuring what people think it ought to measure) and being user-friendly (including not overburdening staff or clients); (4) having established reliability and validity; (5) measuring dynamic rather than static constructs (amenable to change); (6) not producing adverse reactions or consequences; and (7) being sensitive to change so that outcomes can be measured (Beidas et al., 2015; Glasgow, 2013; Hunsley, 2015; Hunsley & Mash, 2007).

The KY-Moms MATR assessment is not meant to replace case manager decision-making but rather to assist in the assessment process by examining a range of potential co-occurring problems and to provide information about program outcomes. The KY-Moms MATR assessment can be used to determine service needs, engage clients through self-reporting of concerns and problems, and to monitor outcomes.

Evidence-based measures are intended to be used in conjunction with case manager decision-making (Hunsley, 2015). The KY-Moms MATR

assessment is not meant to replace case manager decision-making but rather to assist in the assessment process by examining a range of potential co-occurring problems and to provide information about program outcomes. The KY-Moms MATR assessment can be used to determine service needs, engage clients through self-reporting of concerns and problems, and to monitor outcomes.

The following bulleted points highlight how the KY-Moms MATR assessment, which is based on the KTOS assessment core structure[1], meets each of the evidence-based criteria listed above and one additional benefit is described:

1. **Use of theory and research**. The KY-Moms MATR assessment includes a set of measures developed to provide screening and assessment of psychosocial issues identified in theory and research as related to substance use and negative birth outcomes including anxiety and depression (Federenko & Wadhwa, 2004), partner violence and other victimization experiences (Brady, Back, & Coffey, 2004), physical health (National Institute of Child Health and Human Development, 2013), financial hardship (Stewart, Dean, Gregorich, Brawarsky, & Haas, 2007), housing instability, maternal-fetal attachment (Müller, 1993; Müller, 1994), and recovery supports (or engagement in the treatment process; Peters, Sherman, & Osher, 2008). Specific research support is outlined with each assessment component described in the next section.

2. **Contextual appropriateness**. In 2006, a pilot study was conducted with three regions to ensure the core assessment structure and components were appropriate for this high risk target population before it was applied to the broader state. The KY-Moms MATR assessment structure and components were originally developed to consider the unique sociocultural context of Kentucky (see Figure 1 on the next page) as well as factors that contribute to negative birth outcomes. Revisions were made as needed after data analysis and feedback from users and other stakeholders.
    - More specifically, the Kentucky context includes being 3rd in the nation for highest drug overdose-related deaths and 2nd in the nation for highest smoking rates (United Health Foundation, 2015). Further, Kentucky has one of the highest pre-pregnancy smoking rates (24.2%) and as well ranking 37th in the nation for the prevalence of maternal smoking (with 14.8% of women reporting smoking anytime during pregnancy; United Health Foundation, 2015). Some studies show the maternal smoking rate as high as 20.7% (Curtin & Mathews, 2016).
    - Kentucky ranks 39th in the country for babies born with low birth weight (weight less than 2,500 grams) with between 8.2% and 8.8% of babies born in Kentucky considered low birth weight (United Health Foundation, 2015). In addition, Kentucky ranks 34th in the country for infant mortality due, in part, to poor maternal health and inadequate prenatal care (United Health Foundation, 2015). Kentucky is also one of the lowest states (ranked 47th) for women's life expectancy at birth (Bernardo, 2016),

[1] For more information, see: Logan, TK, Cole, J., Miller, J., Scrivner, A., & Walker, R. (2016), *Evidence Base for the Kentucky Treatment Outcome Study (KTOS) Assessment and Method*s. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research. (Available upon request). There is one minor difference between the KY-Moms MATR and KTOS. The KY-Moms MATR intake and follow-up assessment ask about a 6-month period rather than the 12-month period.

43rd for overall health and well-being of women, and labeled as one of the worst states for women in general (Hess et al., 2015).

- In addition, Kentucky is in the bottom five worst states for overall well-being (which considers social, financial, and physical indicators; Gallup Polls 2014; 2015), preventable hospitalizations (50th), cancer deaths (50th), premature deaths (47th), diabetes (45th), obesity (44th), and is in the bottom 10 of worst states for cardiovascular deaths (43rd). Kentucky was ranked 2nd in the nation for the highest number of self-reported poor physical health days in the past 30 days and 4th in the nation for the overall number of self-reported poor mental health days in the past 30 days.
- Another report on poverty and economic opportunity ranks Kentucky as 48th in the nation for overall economic opportunity (Hess et al., 2015) while Gallup Polls (2014) ranked Kentucky as 46th in the nation for financial well-being (which considers having enough money for food, health care, and people's perceived standard of living). Kentucky also was ranked 2nd in the nation for highest percentage of children living in poverty (United Health Foundation, 2015). In Kentucky 31.6% of employed women work in low paying jobs and the state is ranked as one of the worst states (48th) for poverty and opportunity for women (Hess et al.,2015).

Figure 1.

Kentucky in Context

The KIDS NOW Plus assessment was originally developed to consider the unique features of Kentucky and has been revised frequently after data analysis and feedback from users and other stakeholders to consider the unique context of Kentucky.

Kentucky ranks among the highest in the nation for drug overdose deaths and smoking:

Source: United Health Foundation, 2015

3rd highest in the nation for **DRUG OVERDOSE DEATHS**

2nd highest in the nation for **SMOKING RATES**

37th in the nation for **SMOKING DURING PREGNANCY**

Kentucky ranks as one of the unhealthiest states in the nation:

Source: Gallup Poll, 2014, 2015; United Health Foundation, 2015

34th in the nation for **INFANT MORTALITY**

39th in the nation for **BABIES BORN WITH LOW BIRTH WEIGHT**

47th in the nation for **PREMATURE DEATHS**

45th in the nation for **DIABETES**

44th in the nation for **OBESITY**

43rd in the nation for **CARDIOVASCULAR DEATHS**

Kentucky also ranks as one of the worst in the nation for poverty and opportunity for women as well as one of the highest in the nation for the number of children in poverty:

Source: Gallup Polls, 2014; Hess et al., 2015; Social Security Administration, 2011; United Health Foundation, 2015

48th in the nation for **POVERTY AND OPPORTUNITY FOR WOMEN**

2nd highest in the nation for **CHILDREN IN POVERTY**

Kentucky ranks as one of the states with the lowest financial well-being (which considers having enough money for food, health care, and people's perceived standard of living) and economic opportunity.

46th in the nation for **FINANCIAL WELL-BEING**

48th in the nation for **ECONOMIC OPPORTUNITY**

3. **Face valid and user-friendly**. The KY-Moms MATR assessment is face valid as it targets areas identified in theory and research as related to substance use, mental health, victimization and trauma history, and birth outcomes. Further, many standardized assessments are extremely time consuming, labor intensive, and/or costly (Beidas et al., 2015; Bumbarger & Campbell, 2012; Connors, Arora, Curtis, & Stephan, 2015; Jensen-Doss & Hawley, 2010; Peters et al., 2008). The KY-Moms MATR assessment is based on the KTOS assessment core structure with modifications for adaptation to high risk pregnant women and a case management as opposed to treatment environment. Like KTOS, the KY-Moms MATR assessment is a relatively brief instrument (40 minutes on average) and can be used to document risks, symptoms and patterns of substance use and related psychosocial problems as well as to engage clients in clinical services by allowing clients to report their concerns and problems (Christon et al., 2015; Jensen-Doss, 2015; Peters et al., 2008; Scott & Lewis, 2015).

4. **Established reliability and validity**. The KY-Moms MATR assessment has four core components and four supplemental components. The four core assessment components include: (1) substance use, (2) mental health, (3) victimization and trauma, and (4) quality of life. The four supplemental assessment components that have been associated with substance abuse and poor birth outcomes include: (1) maternal-fetal attachment, (2) health and stress-related health consequences, (3) economic and living circumstances, and (4) recovery supports. Each of the core assessment components and most of the supplementary components of the KY-Moms MATR assessment show excellent reliability and validity. Specific reliability and validity information for each assessment component is outlined in the following section.

Each of the core assessment components and most of the supplementary components of the KY-Moms MATR assessment show excellent reliability and validity.

5. **Measuring dynamic rather than static constructs**. Although KY-Moms MATR does include key demographic indicators, the majority of the assessment components focus on current status, symptoms, and constructs that change over time. For example, substance use, mental health symptoms, victimization and trauma exposure, quality of life, and recovery supports are all changeable within the context of the KY-Moms MATR program whereas measures of personality or criminal histories are considered more static or less amenable to change.

6. **Not producing adverse reactions or consequences.** In the 10 years of conducting KY-Moms MATR no adverse reactions or consequences due to the assessment or the research procedures have been reported. Client responses are entered into an online, secure Client Information System (CIS) developed and maintained by UK CDAR. The web-based intake data collection system uses robust security protocols and state-of-the art technology to provide a secure, user-friendly interface for data collection and management. This server uses HTTPS for secure data transmission, data encryption for all identifying data elements which are also stored separately from assessment responses, secure server infrastructure that is in a locked-

down facility with 24/7 monitoring, and user authentication. The KY-Moms MATR assessment and the research methods are reviewed annually by the CDAR team in collaboration with the state and community substance abuse and mental health treatment programs. The KY-Moms MATR assessment and the research methods are also reviewed annually by the University of Kentucky Institutional Review Board (IRB) and has a Certificate of Confidentiality from the Federal Department of Health and Human Services.

7. **Sensitive to change so that outcomes can be measured**. Results continue to show that the pregnant women who participate in KY-Moms MATR case management make substantial improvements from prenatal intake to follow-up in several important dimensions of their lives including significant reductions in illegal drug and alcohol use, mental health problems and stress, economic hardship, and significant improvements in maternal-infant attachment. Additionally, clients reported high levels of satisfaction with their experience in case management program, higher quality of life, and more recovery supports at follow-up.

Data Analysis and Dissemination. An added benefit of the KY-Moms MATR outcome evaluation is that state-level trends in substance use along with the co-occurring anxiety and depression, employment and economic status, and quality of life trends for clients entering the KY-Moms MATR case management program are provided each year. This data system also provides state-level trends in birth outcomes, risks, recovery and recovery correlates over time. An important benefit of state-level outcome studies is that funders and legislators can see up-to-date state specific data to provide evidence of need for new programs, continuation of current programs, and changes in programmatic policies. Key trends in substance use and policy needs fluctuate annually depending on economic and other state-specific sociopolitical issues, each year's analytical findings, the latest research, and legislative research commission requests, making the need for easily-modifiable annual data collection even more important. In addition to annual statewide reports, the KY-Moms MATR data can be used for community-level reports on client characteristics and outcomes for communities applying for Federal or other grants (see Appendix B). Specifically,

1. UK CDAR BHOS has produced **over 10 annual reports** using KY-Moms MATR intake data and follow-up data from 2006 through 2016.
2. UK CDAR BHOS has produced **6 regional and other ad hoc reports using KY-Moms MATR data along with over 10 different translational research products.**
3. The KY-Moms MATR data has also been used in **presentations and meetings** with clinical providers, agency boards of directors, and other state planning agencies that work closely with DBHDID.

KY-Moms MATR Intake and Follow-up: Evidence-Based Assessments

The following paragraphs describe the specific evidence base the KY-Moms MATR assessment, including the reliability and validity information specific to each assessment component, the relevant research related to supplementary assessment components, and assessment adaptations or additions in consideration of the Kentucky context. Three of the core components and three of the supplemental components were adapted from the Kentucky Treatment Outcome Study (KTOS) assessment that has been developed and refined for almost 20 years.[2] For the KY-Moms MATR program evaluation clients must have participated in the case management program for at least 30 days before the baby was born to be included. The majority of the time references ask about the 6 months before the client became pregnant, the 30 days before the client became pregnant, and the past 30 days. The follow-up assessment is done 6-months after the birth of the baby. That means the majority of time references ask about the 30 days before the baby was born, the past 6 months or the past 30 days. The KY-Moms MATR assessment has demonstrated evidence that most of the components are sensitive to change and KY-Moms MATR provides critical information about program outcomes and factors related to positive birth outcomes.

The KY-Moms MATR assessment has four core components and four supplemental components. The four core assessment components include: (1) substance use, (2) mental health, (3) victimization and trauma, and (4) quality of life. The four supplemental assessment components that have been associated with positive birth outcomes include: (1) maternal-fetal attachment, (2) health and stress-related health consequences, (3) economic and living circumstances, and (4) recovery supports. Specific demographic information is collected in the last section of the assessment.

KY-Moms MATR Core Assessment Components

1. Substance Use

Substance use is the key construct to examine birth outcomes in the high risk pregnant population. The substance use measures include: (1) The Addiction Severity Index (ASI) substance use questions including alcohol and drug use; and (2) targeted questions about smoking, smokeless tobacco, and e-cigarette use, needle use and needle exchange programs per the request of community and state partners.

SUBSTANCE USE MEASURES

The KY-Moms MATR substance use assessment section includes items from the alcohol and drug use sections of the *Addiction Severity Index (ASI)* (5th edition). The ASI was developed as a clinical/research

[2] For more information, see: Logan, TK, Cole, J., Miller, J., Scrivner, A., & Walker, R. (2016), *Evidence Base for the Kentucky Treatment Outcome Study (KTOS) Assessment and Methods*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research. (Available upon request).

assessment of substance use and multiple related problems found in alcohol and drug-dependent individuals. Further, the ASI is a commonly used public domain assessment (McLellan et al., 1985).

The ASI substance use measure has shown very good validity and reliability in measuring substance use. The ASI, like the KY-Moms MATR, assesses several main and supplementary areas. The KIDS NOW PLUS assessments use only the substance use domain of the ASI because of the good validity and reliability of this section and because the other components of KY-Moms MATR were better assessed with other measures.[3]

The KY-Moms MATR assessment uses only the substance use domain of the ASI because of the good validity and reliability of this section and because the other components of KY-Moms MATR were better assessed with other measures.

Several studies have examined the construct validity (i.e., the extent the measure actually measures the construct of interest) of the ASI and with different populations such as veterans, homeless individuals, and individuals with comorbid psychiatric disorders (Cronbach & Meehl, 1955). Construct validity has multiple components including: (1) criterion-related validity, which is the degree to which a measure is related to an external criterion or outcome (e.g., self-reported substance use with urinalysis); (2) convergent validity, which is the degree to which two measures of constructs that are posited by a theory to be related are actually related. For instance, if one has developed a new measure (i.e., series of related questions) of problematic substance use, one would want to examine the relationship of the scores on the new measure along with scores on other similar measures, such as the Alcohol Use Disorders Identification Test (AUDIT), CAGE, and Drug Abuse Screen Test (DAST). And (3) discriminant validity, which refers to whether constructs that are supposed to be unrelated are in fact not related (Campbell, 1959). For example, one would want to demonstrate that scores on a newly developed measure of problematic substance use were not closely correlated with measures of other constructs such as impulsivity or antisocial personality disorder.

The ASI substance use scores show high correlation with other measures of substance use. For example, the ASI was examined with other validated comparison instruments including the Michigan Alcoholism Screening Test (MAST; Selzer, 1971), Cohen and Klein Drug Use Scale (Cohen & Klein, 1971), and the Gunderson Drug Scale (Gunderson, Russell, & Nail, 1973) to determine the convergent

[3] Not all dimensions of the ASI have equal support for their reliability and validity. For example, at least one study with a sample of individuals receiving psychiatric care did not find support for discriminant validity of the alcohol, psychiatric, legal, or medical scales (Carey, Cocco, & Correia, 1997). Second, studies conducted with special populations, such as homeless clients and individuals with severe psychiatric disorders have found low test-retest reliability in some of the ASI composite scores including the medical, legal, drug use (Corse, Zanis, & Hirschinger, 1995; Zanis, McLellan, & Corse, 1997), and family/social (Hodgins & El-Guebaly, 1992). Third, there are some problems with the reliability and validity of ASI severity ratings, which are based on subjective judgment of interviewers (Stöffelmayr, Mavis, & Kasim, 1994; Wertz, Cleaveland, & Stephens, 1995). The severity ratings are not intended to be used as outcome measures (McLellan et al., 1992). Thus, ASI severity items were not included in the KTOS interview instruments. Fourth, the authors acknowledge that the family/social dimension of the ASI concentrates on individuals' conflicts with family and other persons; however, other critical dimensions of family and social functioning are not included in the ASI (McLellan et al., 1992).

and discriminant validity of the ASI multidimensional scores and the results showed good convergent and discriminate validity (McLellan et al., 1985).

Other studies have examined how well the ASI self-reported substance use questions correlate with urinalysis results (Chermack et al., 2000; Zanis, McLellan, & Randall, 1994). In a sample of 563 clients admitted for treatment in substance abuse treatment outpatient clinics, conditional kappa values were good and indicated high levels of agreement between self-reported substance use and urinalysis: highest for cannabis (0.93) and lowest for opioids (0.84). Contrary to what may be expected, most of the discordance between self-reported substance use and urinalysis was because clients reported use of a particular substance but had a negative urinalysis for that substance. Part of the discrepancy is due to the fact that the 30-day self-report period is longer than the time frame captured in urinalysis results.

In general, examinations of various facets of the reliability of multiple dimensions of the ASI have found good interrater reliability and good test-retest reliability for the substance use composite scores (Calsyn et al., 2004; McLellan et al., 1985; Mäkelä, 2004; Wertz, Cleaveland, & Stephens, 1995). Test-retest reliability, which is a measure of consistency of responses to the same set of questions at two periods, has been examined by administering the ASI interview to the same persons typically 3 days to 10 days apart (Mäkelä, 2004). Interrater reliability, which is the estimate of the equivalence of the responses between more than one rater, has been examined in these studies by having the rater observe the interview being conducted by the primary reviewer through a one-way mirror or via a videotaped recording and recording the interviewees' responses (Stöffelmayr, Mavis, & Kasim, 1994). The degree of agreement between the primary interviewer's recorded responses and the observer's recorded responses is interrater reliability.

A third type of reliability that has been examined in studies is internal consistency reliability, which is a measure of the correlation between several items that purportedly measure the same construct. In other words, low correlations between items that purportedly measure the same construct indicate that the items are likely not measuring the same construct. In a review of studies that examined the reliability and validity of the ASI, Mäkelä (2004) discussed how three of the seven composite scores had consistently been found to have high internal consistency reliability: alcohol use, medical status, and psychiatric status.

TARGETED SUBSTANCE USE MEASURES

Due to the significant issue with smoking in Kentucky (26.2% of the population, which is the second highest rate in the nation) along with e-cigarette use which is growing each year (Barrington-Trimis et al., 2016; Singh et al., 2016), use of smoking tobacco, smokeless tobacco, and e-cigarettes are assessed with items that are worded to be consistent with the alcohol and drug use questions. The age of first use for smoking, using smokeless tobacco, first alcoholic drink (other than a few sips), and first used illicit drugs is also included in the KY-Moms MATR assessment.

2. Mental Health

Both the PHQ-9 and the GAD-7 have been shown to be valid and reliable measures of depression and anxiety respectively.

Mental health measures are included in the KY-Moms MATR assessment not only because poor mental health can lead to substance use (and vice versa), but also because the mental health (including level of stress) of a pregnant woman can impact her baby's development and birth outcomes (Federenko & Wadhwa, 2004). The goal of administering mental health symptom measures is to characterize severity and change over the course of the program (Scott & Lewis, 2015). The KY-Moms MATR mental health section focuses on depression and anxiety.[4] Items for the depression measure were adapted from the *Patient Health Questionnaire-9 (PHQ-9*) and items for the anxiety measure were adapted from the *Generalized Anxiety Disorder (GAD-7)*. The Patient Health Questionnaire is an instrument for making criteria-based diagnoses of eight DSM-IV mental health disorders, one of which is major depressive disorder (Kroenke, Spitzer, & Williams, 2001). The GAD-7 was developed to identify probable cases of generalized anxiety disorder and to assess symptom severity for the criteria symptoms in the DSM-IV (Spitzer, Kroenke, Williams, & Löwe, 2006). Both the PHQ-9 and the GAD-7 have been shown to be valid and reliable measures of depression and anxiety respectively.

DEPRESSION

The Patient Health Questionnaire-9 (PHQ-9) includes 9 items that comprise the PHQ depression scale, which ask about the 9 symptoms listed as criteria in the DSM-IV for diagnosis of major depressive disorder (Kroenke et al., 2001). The response options range from 0 (*Not at all*) to 3 (*Nearly every day*). Thus, as a severity measure, the PHQ-9 can range from 0 to 27. A diagnosis of major depression is indicated if 5 or more of the criteria have been present at least "more than half the days" in the past 2 weeks, and 1 of the symptoms is depressed mood or anhedonia (Kroenke et al., 2001).

Data from two studies with 6,000 patients in primary care and obstetrics/gynecology clinics provide evidence that the PHQ-9 has good internal consistency reliability (Cronbach's $\alpha = 0.89$) and excellent test-retest reliability (0.84) between the original administration of the PHQ-9 in the clinics and then 48 hours later by telephone.

Data from this same study also found evidence for good criterion-related and convergent validity of the PHQ-9 (Kroenke et al., 2001). Specifically, criterion-related validity was examined with the correlation between the PHQ-9 scores and depression diagnosis by a mental health professional who was blinded to the PHQ-9 score for 580 patients who agreed to be contacted after the initial interview. The PHQ-9 score greater than or equal to 10 had a sensitivity of 88% and a specificity of 88% for major depressive disorder. Sensitivity is a measure of how many of the individuals diagnosed with depression by a mental health professional were also identified by the PHQ-9 as having moderate to severe

[4] Different measures of depression and anxiety were incorporated into the KY-Moms MATR assessment a few years ago because the ASI mental health measures were not found to be sensitive to change over time in the Kentucky target population.

depression, whereas specificity is a measure of how many of the individuals who were not diagnosed with depression by a mental health professional were identified by the PHQ-9 as having minimal or mild depression (i.e., scores of less than 10). Furthermore, in the same study, several validated measures were included to examine the relationship between scores on the PHQ-9 and constructs that are hypothesized to be related to depression such as lower functioning and quality of life. The highest correlations were found between PHQ-9 scores and the functioning scales that previous studies have demonstrated would be most strongly related to depression: overall mental health, social functioning, overall functioning, and role functioning.

In the KY-Moms MATR assessment the items were changed to ask if the client experienced the 9 symptom criteria nearly every day in the same two-week period and the response options were changed to 0 (*No/Absent*) to 1 (*Yes/Present*). Thus, unlike the original PHQ-9 the maximum value is 9. Individuals who responded "Yes" to the depressed mood or anhedonia items and responded "Yes" to at least 5 of the 9 criteria were classified as having met criteria for depression in the KY-Moms MATR study. Excellent internal consistency reliability was found in the sample of KY-Moms MATR clients who were included in the 2016 Report (n = 349): Cronbach's α = 0.924.

ANXIETY

The Generalized Anxiety Disorder (GAD-7) was developed to identify probable cases of generalized anxiety disorder and to assess symptom severity for the criteria symptoms in the DSM-IV (Spitzer et al., 2006). The original scale is a 7 item measure that asks about the frequency of anxiety symptoms over the last two weeks. Response options range from 0 (*Not at all*) to 3 (*Nearly every day*). Total scores range from 0 to 21 with higher scores indicating greater severity/frequency of anxiety.

Internal consistency reliability is excellent for the GAD-7, with Cronbach α ranging from 0.89 - 0.92 (Delgadillo et al., 2012; Löwe et al., 2008; Spitzer et al., 2006). In a second study with adults in a drug treatment facility in England, for the sample of 60 individuals who completed a retest 4 - 6 weeks later, test-retest reliability was good (Intraclass coefficient [ICC] = .85; Delgadillo et al., 2012).

A validation study of the GAD-7 performed in 15 primary care clinics (n = 2,740) found good criterion-related validity for the GAD-7. Specifically, the study found that a cut-off score of 10 was the ideal score to maximizing sensitivity (89%) and specificity (82%) for a diagnosis of generalized anxiety disorder (GAD) made by a mental health professional (Spitzer et al., 2006). In other words, most patients who were diagnosed with GAD by a mental health professional (89%) had GAD-7 scores of 10 or higher, whereas most patients who were not diagnosed with GAD by a mental health professional (82%) had GAD-7 scores lower than 10. Another study also examined the diagnostic accuracy of the GAD-7 in comparison with ICD-10 psychiatric diagnoses that were assessed using the Revised Clinical Interview Schedule (CIS-R)—a well-validated structured diagnostic interview (Delgadillo et al., 2012). A GAD-7 score of 9 or higher had a sensitivity of 80% and specificity of 86% for any anxiety disorder. In other words, 80% of individuals who were diagnosed with an anxiety disorder using the CIS-R had scores of 9 or higher on the GAD-7 and 86% of individuals who were not diagnosed with an anxiety disorder using the CIS-R had scores of 8 or lower on the GAD-7.

Moreover, convergent validity was found for the GAD-7 which was correlated with two anxiety scales: Beck Anxiety Inventory (r = 0.72) and the anxiety subscale of the Symptom Checklist-90 (r = 0.74) (Spitzer et al., 2006). More evidence of good convergent validity was found in the large effect sizes of GAD-7 severity score classification (i.e., minimal, mild, moderate, and severe) with the Medical Outcomes Study Short-Form General Health Survey (SF-20) functioning subscale scores because as anxiety symptoms increase, functioning is hypothesized to decrease (Spitzer et al., 2006).

In the KY-Moms MATR assessments, the response options were changed to 0 (*No/Absent*) to 1 (*Yes/Present*). Thus, unlike the original GAD-7 the maximum value is a 7. Individuals who responded "Yes" to the item about worrying excessively or being anxious about multiple things on more days than not and "Yes" to at least 3 of the 7 symptoms were classified as having met criteria for generalized anxiety in the KY-Moms MATR study. Excellent internal consistency reliability was found in the sample of KY-Moms MATR clients who were included in the 2016 Report (n = 349): Cronbach's α = 0.943.

3. Victimization and Trauma

Trauma and victimization measures are included in KY-MOMS MATR because these experiences have been found to be linked to substance abuse in treatment populations, prison populations, and in the general public. More specifically, victimization and trauma history increases the risk for drug and alcohol use (Brady, Back, & Coffey, 2004; Kessler, Sonnega, Bromet, Hughes, & Nelson; 1995; Logan, Walker, Cole & Leukefeld, 2002; Logan, Walker, Jordan, & Leukefeld, 2006; Regier et al., 1990) and those who have a substance use disorder report more victimization and traumatic events (Cottler, Compton, Mager, Spitznage, & Janca, 1992; Farley, Golding, Young, Mulligan, & Minkoff, 2004; Logan et al., 2002; Logan et al., 2006; Najavits et al., 2003; Najavits, Sonn, Walsh, & Weiss, 2004; Shane, Diamond, Mensinger, Shera, & Wintersteen, 2006). High rates of victimization exposure are also found in individuals involved in the criminal justice system (Goff, E. Rose, S. Rose, & Purves, 2007; Wolff & Shi, 2012) and arrests, incarceration, and violent criminal charges are associated with a history of trauma (Donley et al., 2012; Sadeh & McNiel, 2015). Additionally, the risk of relapse increases as the number of trauma events increase and those who report a relapse also report experiencing interpersonal violence more often than those who had no history of relapse (Farley et al., 2004). More specific to the pregnant population, intimate partner violence increases the risk for both poor maternal health outcomes (increase in blood pressure, vaginal bleeding, edema) and poor fetal outcomes (preterm birth, low birthweight, and other injury to the fetus itself; Silverman, Decker, Reed, & Raj, 2006). The KY-Moms MATR assessment has four main measures of victimization and trauma: (1) the Adverse Childhood Experiences; (2) a victimization screen (3) a partner violence victimization measure; and (4) a measure of Post-Traumatic Stress Disorder (PTSD).

ADVERSE CHILDHOOD EXPERIENCES

Adverse childhood experiences, defined as abuse and household dysfunction, are common. In the Adverse Childhood Experiences Study (ACES), which surveyed over 17,000 adults who were members of a health maintenance organization (HMO), the questionnaire asked about 10 major categories of childhood trauma: three types of abuse (emotional, physical, and sexual), two types of neglect (emotional and physical), and five types of family dysfunction (having a mother who experienced intimate partner violence, having a household member who was an alcoholic, having a household member who was a drug user, a household member who was incarcerated, a household member diagnosed with a mental disorder or committed suicide, or parents who were separated or divorced; Felitti et al., 1998). Almost two-thirds of HMO adult members who participated in the ACES reported at least one adverse childhood experience, and more than 1 in 5 reported 3 or more (Dong et al., 2004). As the number of adverse experiences increase the risk of many health, mental health, and social problems also increases (Edwards et al., 2005; Felitti et al., 1998). For example, increases in ACE scores is associated with a greater likelihood of depressed mood (Anda et al., 2006; Dube, Felitti, Dong, Giles, & Anda, 2003), suicide attempts (Dube et al., 2001), and panic/anxiety (Anda et al., 2006).

Of particular importance, is that the risk of alcohol or drug use increases as the number of adverse childhood experiences increases (Anda et al., 2006; Dube et al., 2003a, b; Felitti et al., 1998). Higher ACE scores are associated with initiating alcohol abuse and smoking in adolescence (Anda et al., 1999; Dube et al., 2006). Additionally, experiencing more types of childhood abuse is associated with greater likelihood of experiencing an unintended first pregnancy among women (Dietz et al., 1999). Poor self-rated health as well as health problems such as ischemic heart disease, cancer, and liver disease were more prevalent in those who reported a higher number of ACEs (Felitti et al., 1998). Poor sleep, severe obesity, and multiple somatic symptoms were increased for those with ACE scores over 4 (Anda et al., 2006). Higher ACE scores have been linked to having a higher number of health risk factors for leading causes of death in adults (Felitti et al., 1998) and a higher rate of mortality in women (Chen, Turiano, Mroczek, & Miller, 2016).

The only report of internal consistency reliability for the ACES survey was conducted with a sample of 75 urban women in a clinical and community sample (Murphy et al., 2014). In this study, internal consistency reliability was excellent (Cronbach's $\alpha = 0.88$). Test-retest reliability was examined for 658 individuals who filled out the questionnaire in two waves of the study (Dube, Williamson, Thompson, Felitti, & Anda, 2004). Kappa coefficients were in the good to excellent range as noted by Fleiss (1981) for abuse categories (0.51 – 0.69) and the household dysfunction categories (0.51 – 0.86) with the exception of having an incarcerated household member (0.46). and test-retest reliability was good for emotional abuse (94%), physical abuse (83%), sexual abuse (90%), and overall ACE score (weighted kappa = .64; Dube et al., 2004).

VICTIMIZATION SCREEN

This screen examines a wide variety of harassment and threatening situations including street harassment, sexual harassment, home invasions, robbery, burglary, assault, rape, stalking, and partner violence. The majority of the threatening situations assessed are included in national surveys

(Breiding et al., 2014; Logan et al., 2006; Logan, 2016; Office for Victims of Crime, 2015; Perreault, 2015; Truman & Langton, 2015). A few modifications were made to more clearly assess exposure to specific threats including: a) assault was assessed by asking about assault with and without a weapon as well as assault by a neighbor, coworker, or schoolmate; b) firearms violence was separated into three categories including directly or indirectly threatened with a gun, being held at gunpoint, and experiencing a public or mass shooting; and c) burglary and robbery were specifically assessed by asking whether they had experienced a robbery or mugging; experienced a home break-in while not at home; and a home invasion while home. The victimization screen also assesses harassment including verbal street harassment and street sexual harassment (Kearl, 2014) as well as road rage (AAA Foundation for Traffic Safety, 2016; Sansone & Sansone, 2010; Smart, Mann, & Stoduto, 2003). The screen also assesses being kidnapped or held hostage (Blumenstein, 2015) and repeated sexual harassment at work, school, or some other place by the same individual or group of individuals (other than an [ex] partner) (Ilies, Hauserman, Schwochau, & Stibal, 2003; Stockdale, Logan, Sliter, & Berry, 2014). Additionally, this screen asks about two indirect victimization experiences including whether someone close to the participant experienced a violent victimization and if someone close to the participant or someone in their family had been murdered (Hale, 1996).

PARTNER VIOLENCE VICTIMIZATION

Experiences with intimate partner violence is measured with 10 questions that assess: (1) verbal and psychological abuse; (2) extreme jealousy and control; (3) threats of violence toward the participant and others close to her; (4) physical violence; (5) stalking; (6) property destruction; (7) sexual degradation and humiliation; (8) implied threats for sex; (9) forced sex; and (10) current concerns about safety or harm from an (ex) partner. These questions were adapted from several selected reliable and valid scales (Logan, Walker, Cole, Ratliff & Leukefeld, 2003; Logan, Walker & Hoyt, 2012; Logan & Cole, 2011; Logan, & Walker, 2010; Logan, Walker, & Cole, 2015; Straus, Hamby, Boney-McCoy, & Sugarman, 1996; Tjaden & Thoennes, 2000; Tolman, 1989; 1999). Due to time constraints it was not possible to include full scales for each of the different components of partner abuse. Good internal consistency reliability was found in the sample of KY-Moms MATR clients who were included in the 2016 Report (n = 349): Cronbach's $\alpha = 0.878$.

POST-TRAUMATIC STRESS DISORDER (PTSD)

One significant possible consequence of victimization is PTSD. About 1 in 10 of individuals with exposure to traumatic events developed PTSD at some point, with the highest risk of PTSD associated with assaultive violence (20.9%; Breslau et al., 1998). Individuals with PTSD have a high rate of alcohol/drug abuse or dependence in their lifetime (Kessler et al., 1995; Regier et al., 1990) and the overall prevalence of PTSD is high among substance users (Cottler et al., 1992; Najavits et al., 2003). The KY-Moms MATR assessment includes a 4-item PTSD Checklist (PCL-5; Weathers et al., 2013). This 4-item PTSD checklist was derived from a 20-item self-report measure of posttraumatic stress symptoms that is designed to reflect the changes to the diagnostic criteria for posttraumatic stress disorder (PTSD) in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). The full PCL-5 displays strong internal consistency (α ranging from .83 to .98), test-retest reliability (.66 to .96), convergent (.62 to .93) and discriminant

validity (.87), and sensitivity to change during treatment (Blevins, Weathers, Davis, Witte, & Domino, 2015; Bovin et al., in press; Wortmann et al., in press).

Two abbreviated scales have been developed from this 20-item measure: an 8-item scale and a 4-item scale (Price, Szafranski, van Stolk-Cooke & Gros, 2016). These abbreviated scales, particularly the 4-item scale, have performed as well or better than the 20-item PCL-5 as a screening measure for PTSD (Price et al., 2016). In a sample of veterans receiving treatment at a psychotherapy clinic, the abbreviated 4-item version of the PCL-5 demonstrated high correlations with the full PCL-5 (86%) and good internal consistency (α = 0.82; Price, et al., 2016). The 4-item scale was found to have a significantly higher specificity (0.52; $p < .01$) than the full PCL-5 (0.35) and 8-item scale (0.39) and using a cut score of 10 on the measure resulted in a sensitivity of .76 (Price et al., 2016). The 4-item scale was also just as good as the full PCL-5 at discriminating between those with PTSD and those without PTSD (AUC = .72; Price et al., 2016). These results suggest that the 4-item measure may be a better screening tool for PTSD (Price et al., 2016).

4. Quality of Life

While symptom change often is the primary goal of a program, quality of life assesses well-being rather than just the absence of a disorder. Quality of life is a commonly used metric for assessing the cost utility of treatment and is an important index in understanding program outcomes (Scott & Lewis, 2015). The KY-Moms MATR Quality of Life measures have two components: (1) the *Satisfaction with Life Scale (SWLS;* Pavot & Diener, 1993), and (2) one global question asking the client to rate their quality of life today.

SATISFACTION WITH LIFE SCALE

The Satisfaction With Life Scale (SWLS) refers to a cognitive, evaluative process, in which individuals assess the quality of their lives on the basis of self-imposed standards (Pavot & Diener, 1993). In the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) the 5 items are global rather than specific.

Evidence of convergent validity has been demonstrated with moderately strong correlations of SWLS with 10 other subjective well-being scales, indicating the SWLS measures the same or a similar construct to the other subjective well-being scales (Pavot & Diener, 1993). Further, changes in life conditions are associated with changes in scores on the SWLS in the ways hypothesized; specifically, increases in caregiver burden were associated with decreases on the SWLS scores (Vitaliano, Russo, Young, Becker, & Maiuro, 1991). Moreover, consistent with theorized relationships between life satisfaction and psychological distress, several studies have found that greater distress (i.e., depression, negative affect, anxiety, and general psychological distress) is associated with lower life satisfaction, which provides evidence of convergent validity (Arrindell, Meeuwesen, & Huyse, 1991; Larsen, Diener, & Emmons, 1985). Finally, there is evidence from numerous studies that the SWLS has discriminant validity (Pavot & Diener, 1993). Specifically, scores on SWLS have not been correlated (positively or negatively) with affect intensity and impulsivity (Diener et al., 1985).

The SWLS has good internal consistency: Cronbach's α = 0.87 (Diener et al., 1985) as well as good test-retest reliability with the correlation coefficient at 0.82 for 76 students who were re-administered the scale two months after the initial administration. In many studies using the SWLS both strong internal consistency reliability (ranging from Cronbach's α = 0.79 – 0.89) and moderate test-retest reliability (ranging from 0.50 – 0.84) have been found (Pavot & Diener, 1993).

In the KY-Moms MATR study, the response options were decreased to 5 options ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). Internal consistency reliability was good in the sample of KY-Moms MATR clients who were included in the 2016 Report (n = 349): Cronbach's α = 0.875.

GLOBAL RATING OF QUALITY OF LIFE

One other question about the client's assessment of their quality of life is included in the KY-Moms MATR assessment. Clients are asked to rate their quality of life, where 1 is approximately worst imaginable, 5 is good and bad parts are about equal, and 10 was best imaginable. Clients are allowed to select their rating anywhere along the scale.

KY-Moms MATR Supplementary Assessment Components

The four supplemental assessment components that have been associated with positive birth outcomes include: (1) maternal-fetal attachment/maternal-infant attachment; (2) health and stress-related health consequences, (3) economic and living circumstances, and (4) recovery supports.

1. Maternal-Fetal Attachment/Maternal-infant attachment

Maternal-fetal attachment, or the extent to which the mother is emotionally engaged in her pregnancy and the unborn baby, is associated with increased personal physical and mental health care while pregnant (Lindgren, 2001). Specifically, women with lower incidence of depression had higher maternal-fetal attachment which, in turn, encouraged them to engage in healthier behaviors (Lindgren, 2001). In addition, high levels of maternal-fetal attachment are thought to moderate the risk for postpartum depression (Priel & Besser, 1999). Little is known, however, about the how the strength of maternal-fetal attachment affects substance use. Research suggests that substance use while pregnant significantly impairs the woman's ability to develop an affectionate relationship with her baby or reduce risky other behaviors which would harm the baby (Rubin, 1984). Specifically, one study found that women receiving methadone treatment have less of an attachment to their babies compared to non-substance abusing women (Mikhail, Youchah, DeVore, Ho & Anyaegunam, 1995). On the other hand, another study found that prenatal attachment was related to a significant reduction in alcohol use (Condon & Hilton, 1988). Similarly, a study found that pregnant women's desire to quit smoking was significantly related to their level of attachment (Slade, Laxton-Kane, & Spiby, 2006).

To measure maternal-fetal attachment, the KY-Moms MATR assessment uses an adapted version of the Prenatal Attachment Inventory (PAI; Müller, 1993) in which consists of 21 items (scored on a 4-pt Likert scale; 4- Almost always, 1- Almost never). Total scores range from 21 to 84 with higher scores indicative of a higher level of attachment. The PAI has high level of internal consistency (Cronbach α = 0.81 - .89) and a strong correlation with the Maternal Fetal Attachment Scale (r = .72; Cranley, 1981) indicative of concurrent validity (Gau & Lee, 2003; Müller, 1993). Exploratory factor analysis shows that there are three potential subscales to the PAI including "anticipation" (e.g., "I wonder what the baby looks like now", "I imagine calling the baby by name", and "I imagine what part of the baby I'm touching"), "differentiation" (e.g., "I think my baby already has a personality", "I know when my baby is asleep", I know why the baby is moving"), and "interaction" (e.g., "In enjoy feeling the baby move", "I let other people put their hands on my tummy to feel the baby move", "I feel love for the baby"; Pallant, Haines, Hildingsson, Cross & Rubertson, 2014). In order to create subscales of equal length, Pallant et al. (2014) removed three items from the "anticipation" subscale after support from a panel review. After analysis, the "anticipation" subscale had a good fit to the Rasch model (p = 0.19) as well as adequate internal consistency. For the purposes of KY-Moms MATR and to reduce the time burden on program staff, the PAI was reduced to 14 items (the majority from the "anticipation" and "interaction" subscales[5]) with total scores ranging from 14 to 56.

[5] From the anticipation subscale, "I buy/make things for the baby, "I share secrets with the baby', and "I try to imagine what the baby is doing in there" were excluded based upon the Pallant et al. decision to make the three subscales of equal length. These questions were removed by a panel of midwives involved in cross-cultural investigation of childbirth. In addition, two questions from the "differentiation" subscale were kept in the measure ("I know things I do make a difference

Furthermore, maternal-*fetal* attachment is a strong predictor of mother-*infant* attachment (Fleming, Ruble, Gordon, & Shaul, 1988) and the subsequent emotional and physical development of the baby (De Wolff, van Ijzendoorn, 1997; Greenberg, 1999; Ranson & Urichuk, 2008). Mother-infant attachment serves as a biological function of ensuring the survival of the species. Because this bond has a direct influence on the baby's future mental health, the relationship should be affectionate and ongoing (Bowlby, 1969). Mother-infant attachment is measured in the KY-Moms MATR assessment with the Maternal Attachment Inventory (MAI; Müller, 1994) which consists of 26 items (scored on a 4-pt Likert scale; 4- Almost always, 1- Almost never). Total scores range from 26 to 104 with higher scores indicative of a higher level of attachment. Internal consistency reliability is high with Cronbach α = .85 and high correlation with other attachment measures such as the How I Feel About the Baby Now ($r = .45$, $p < .001$; Leifer, 1977) and the Maternal Separation Anxiety Scale ($r = .46$, $p < .001$; Hock, McBride, & Gnezda, 1989) and the postnatal version of the Maternal Attitudes and Maternal Adjustment Scale ($r = .30$, $p < .01$; Kumar, Robson, & Smith, 1984). Factor analysis reveals that the MAI retains 3 subscales: "desire for proximity" (e.g., "I feel warm and happy with my baby", "I look forward to being with my baby", and "Just seeing my baby makes me feel good"), "interaction" (e.g., "I know my baby needs me", "I tell others about my baby", and I comfort my baby when he/she is crying"), and "understanding the infant/the infant's needs" (e.g., "I know my baby needs me", I know my baby's personality" and "I understand my baby's signals"). In order to reduce time burden, the KY-Moms MATR assessment contains all the items for the "interaction" and "understanding the infant/the infant's needs" subscales; therefore, there are 14 items with total scores ranging from 14 to 56.

2. Health and Stress-Related Health Consequences

The health and stress-related consequences section includes an assessment of: (1) general health status and prenatal health, (2) chronic pain, and (3) stress-related health consequences.

GENERAL HEALTH STATUS AND PRENATAL HEALTH

General health status is included in the outcome studies because it has been found to be worse among individuals with substance abuse compared to the general population (Morgen, Astone-Twerell, Hernitche, Gunneson, & Santangelo, 2007; World Health Organization [WHO], 2014). In addition, Kentucky ranks high in the nation for a number of significant health conditions including cancer deaths, cardiovascular related deaths, premature deaths, diabetes, and obesity.

General health status is included in the outcome studies because it has been found to be worse among individuals with substance abuse compared to the general population.

General questions regarding prenatal health care (e.g., when the baby is due, does the client have an OB/GYN, the number of times the client has visited the doctor, and if the doctor has told the client of

to the baby" and "I know the baby hears me"). Therefore, 6 items are from the "anticipation" subscale, 6 are from the "interaction" subscale, and 2 items from the differentiation subscale are included.

any special health care needs that directly impact the pregnancy or baby) are important because part of the KY-Moms MATR case management program encourages mothers with a higher risk of negative birth outcomes to receive regular prenatal care. In addition to reducing the risk of the baby being born with low birth weight, receiving regular prenatal care allows healthcare providers to identify any pregnancy complications or problems with the baby early on and, therefore, treat them early (National Institute of Child Health and Human Development, 2013).

The general health questions were adapted from the Behavioral Risk Factor Surveillance System (BRFSS) Health-Related Quality of Life (HRQOL; Centers for Disease Control and Prevention, 2000; Hennessy, Moriarty, Zach, Scherr, & Brackbill, 1994). Studies show that the health questions are correlated with each other such that those who self-reported fair/poor overall health also reported more days that their physical and mental health were not good (Centers for Disease Control and Prevention, 2000; Hennessy et al., 1994). Good test-retest reliability was also found for the Healthy Days questions ($r = 0.75$; Andresen, Catlin, Wyrwich, & Jackson-Thompson, 2003). In a validation study of the BRFSS HRQOL, the physical health not good, mental health not good, and days not good health limited activities items were correlated with the SF-36 HRQOL scales in expected ways, demonstrating good criterion-related validity (Newschaffer, 1998). Specifically, the number of days the respondent's physical health was not good and the number of days that poor health limited activities were significantly, negatively correlated with the SF-36 scales meaning that the higher days of reported poor physical or mental health the lower the scores on general health, physical functioning, physical role, mental health, emotional role, social functioning, and vitality. Similarly, the item about the number of days respondents' mental health was not good was significantly, negatively correlated with SF-36 HRQOL scales, with the exception of the physical functioning scale (Newschaffer, 1998).

CHRONIC PAIN

There is a connection between chronic pain and prescription opioids, and a connection between chronic pain and relapse (Atkinson, Slater, Patterson, Grant, & Garfin, 1991; Edlund, Sullivan, Han, & Booth, 2013; Mertens, Lu, Parthasarathy, Moore, & Weisner, 2003; Sheu et al., 2008). Given the significant problem of nonprescription opioid use in Kentucky, it is critical to include an assessment of chronic pain. In general, nonprescription opioid use is a continuing health concern in Kentucky where 4.1% of adults report nonmedical use of pain relievers (Substance Abuse and Mental Health Services Administration, 2015). The two most frequently reported illicit drugs mentioned as clients' primary substance of abuse were prescription opioids and heroin in 2013 (Center for Behavioral Health Statistics and Quality, 2015). Since 2000, the rate of deaths from drug overdose involving opioids has increased 200% (Rudd, Aleshire, Zibbell, & Gladden, 2016). The United Health Foundation (2015) has Kentucky ranked as 3rd in the nation for highest drug overdose-related deaths with 24 deaths per 100,000 in 2011 - 2013. In 2014, Kentucky had the 4th highest age-adjusted drug overdose death rate in the United States, with 24.7 deaths per 100,000 people (Rudd et al., 2016), and prescription opioids was the primary drug class involved in drug overdose deaths (Slavova, Bunn, & Gao, 2015).

There is a connection between chronic pain and prescription opioids, and a connection between chronic pain and relapse.

The chronic pain questions included in the KY-Moms MATR assessment were adapted from the *Brief Pain Inventory (BPI)* which is one of the most widely used tools for assessing clinical pain and has been shown to appropriately measure pain caused by many different clinical conditions (Cleeland, 2009; Cleeland & Ryan, 1994). In an early study of validity and reliability, the BPI was given to cancer patients as well as rheumatoid arthritis patients and the correlation patterns among pain and interference measures were different for diseases with different pain mechanisms. Patients with rheumatoid arthritis were tested early in the day when their pain may be at its worst and showed a high correlation between worst pain scores and current pain scores (.71) while the same correlation among breast, colorectal, and gynecological cancer patients was much lower (.35, .27, and .42; Daut, Cleeland & Flanery, 1983). There are four severity items on the BPI that are rated 0-10 and can be averaged to get a composite score. The KY-Moms MATR assessment uses only one of these items – rating the client's pain on average. Using this single question as a representation of pain severity is supported by the FDA Draft Guidance for Industry: Patient-Reported Outcome Measures (Cleeland, 2009).

STRESS-RELATED HEALTH CONSEQUENCES SCALE

Members of the UK CDAR BHOS research team developed a scale to measure recent stress-related health consequences (Logan & Walker, 2010). Chronic exposure to stress can tax the body by continuously activating the stress response, which alters the body's normal way of responding to external stimuli (McEwen, 2000). When this process interferes with the body's ability to maintain equilibrium, an individual's allostatic load increases (McEwen, 2000, 2004). High allostatic load over time is associated with physical health and mental health problems such as a weakened immune system, impaired memory, increased risk for heart disease, depression, and anxiety (McEwen, 2004). Further, individuals with a high allostatic load seek ways to return to equilibrium, and substance use may achieve this goal, at least initially (Cleck & Blendy, 2008; Wahler, 2012). However, over time addiction alters the way the body responds to stress, increasing allostatic load (Cleck & Blendy, 2008). In addition, for the pregnant woman, chronic stress can increase the chances of delivering the baby early or potentially cause certain developmental problems for the baby later in life (March of Dimes, 2012).

Individuals with a high allostatic load seek ways to return to equilibrium, and substance use may achieve this goal, at least initially.

The scale contains 15 symptoms and behaviors and asks clients to indicate how often they have experienced the symptoms/behaviors in the past 7 days. Examples of symptoms include: unexplained aches and pains, poor sleep, increased heart rate not related to exertion. Response options range from 0 (*None of the time*) to 3 (*All of the time*). The score is computed by summing the responses to all 15 items. Higher scores on the scale indicate greater physiological indicators of stress. The minimum score is 0 and the maximum score is 45. Internal consistency reliability was good in the sample of KY-Moms MATR clients who were included in the 2016 Report (n = 349): Cronbach's α = 0.840.

3. Economic and Living Circumstances, and Criminal Justice Involvement

The economic living circumstances examines; (1) living situation, (2) employment and disability status, (3) economic hardship; and (4) criminal justice system involvement.

Prior research suggests that unemployment and lower socioeconomic status are important predictors of alcohol use relapse following treatment (Adamson, Sellman, & Frampton, 2009). In addition, one study found that individuals with higher resource needs (e.g., housing, employment, child care) were more likely to relapse 2 years after substance abuse treatment (Walton, Blow, Bingham, & Chermack, 2003). In FY 2012, using KTOS data, a regression analysis showed that individuals who reported having difficulty meeting more basic needs were significantly more likely to report using alcohol and/or drugs at follow-up (Logan, Cole, Scrivner, & Spence, 2014). The high percentage of individuals who reported having trouble meeting basic needs at both intake and follow-up shows that economic difficulties continue to be a problem for adults after they are in substance abuse treatment. Two other recent studies using data from the KTOS found that economic indicators and economic hardship are associated with higher stress as well as substance abuse treatment relapse (Wahler & Otis, 2014; Wahler, 2015). In another published study using KTOS data, economic hardship was associated with more stress (Cole, Logan, & Walker, 2011) and stress is associated with increased substance use and abuse and relapse (Sinha, 2008). In addition, pregnant women who have a lower socioeconomic status are more likely to be diagnosed with depression and anxiety, as well as experience increased stress and health problems (Stewart, Dean, Gregorrich, Brawarsky, & Hass, 2007). Women with lower income also are less likely to receive prenatal care or are more likely to deliver their babies early (Adler, 2006).

Pregnant women who have a lower socioeconomic status are more likely to be diagnosed with depression and anxiety, as well as experience increased stress and health problems

Assessing economic and living circumstances is also relevant because Kentucky ranks as one of the highest states (48th in the nation) for poverty as well as the lowest for economic opportunity (Hess et al., 2015) while Gallup Polls (2014) ranked Kentucky as 46th in the nation for financial well-being (which considers having enough money for food, health care, and peoples perceived standard of living). Kentucky also was ranked 49th in the nation for children living in poverty (United Health Foundation, 2015).

LIVING SITUATION

This section assesses where the client has lived in the past 30 days and whether they have been homeless or not. The question and responses are adapted from the Government Performance and Reporting Act of 1993 (GPRA; Public Law 103-62).

EMPLOYMENT AND ECONOMIC ASSISTANCE

The employment status questions were adapted from the ASI and the categories of type of work were adapted from the Standard Occupational Classification (U.S. Dept. of Labor, 2010). Disability status was included due to the high prevalence of disability in Kentucky. Using data from the 2013 American Community Survey (ACS) Kentucky had the 4th highest prevalence rate (16.1%) of disability among non-institutionalized working age individuals (ages 21 – 64) in the U.S. 50 states and territory of Puerto Rico (Erickson et al., 2014). Further, the Social Security Administration (2011) indicates 8.1% of the Kentucky population between 18 and 64 are on disability which is the 2nd highest in the nation.

Economic assistance is included on the KY-Moms MATR assessment because, in addition to referring clients to clinical services and engaging the client in prenatal care, the KY-Moms MATR case managers provide other services that help meet the client's needs, such as public assistance. Clients are asked if they receive public assistance at both intake and follow-up and if so, what type of assistance (i.e., WIC and Supplemental Nutrition Assistance Program (SNAP)).

ECONOMIC HARDSHIP

The KY-Moms MATR assessment includes a measure of economic hardship that was modified from the Survey of Income and Program Participation (SIPP), which is a multi-panel longitudinal nationally representative survey of the non-institutional population conducted by the U.S. Census Bureau. Information on economic hardship was collected as part of the eighth wave of data collection in the 1996 wave, which was in the field in 1998 (Beverly, 2001; Iceland & Bauman, 2004; She & Livermore, 2007). Economic hardship includes difficulty meeting basic needs including food, housing, clothing, and medical care (Beverly, 1999).

In the KY-Moms MATR assessment, the telephone disconnection item was updated to consider difficulty with maintaining their cell phone cost given the prevalence of cell phones rather than landlines with many clients today. Finally, in the SIPP, the inability to obtain health care was measured with two items: needed to go to the doctor or hospital but did not go, or needed to see a dentist but did not go. Because affordable access to prescription drugs is also an important dimension of health care that individuals may lack, an item was added to inquire about participants' inability to obtain a prescription drug because of financial problems.

Economic hardship was measured with two subscales in the KY-Moms MATR study: 5 items measuring difficulty meeting basic living needs and 3 items measuring difficulty meeting health care needs. Good internal consistency reliability was found for the scale as a whole in the sample of clients who were included in the 2016 Report (n = 349): Cronbach's α = 0.769. Good internal consistency reliability was also found for the basic living needs (Cronbach's α = 0.686) and health care needs (Cronbach's α = 0.696) subscales.

CRIMINAL JUSTICE SYSTEM INVOLVEMENT

The KY-Moms MATR criminal justice system involvement asks four questions which were adapted from the KTOS: (1) nights incarcerated in the 6 months before they were pregnant; (2) times arrested and charged in the 6 months before they were pregnant; (3) whether they are currently on probation; and (4) whether they are currently on parole.

In general, research suggests that self-reported criminal justice system involvement is reliable such that self-reported arrests correspond well to arrests noted in official datasets with one study finding self-reported arrests equal to or greater than arrests in the official dataset (Marquis, 1981). Another study that found 73% of those with an official arrest had also self-reported an arrest and 21% had reported an arrest although there was no official history of arrest (Maxfield, Weiler, & Widom, 2000).

Because the criminal justice system involvement questions were recently added to the KY-Moms MATR assessment, the validity and reliability is not yet known. However, because it was adapted from KTOS, consistent with other research, the KTOS criminal justice system self-reported information was found to be valid when compared with an independent database. Specifically, a sub-study to examine the concordance between self-reported criminal justice system involvement in the KTOS assessment with official records was conducted for a 20% random sample of KTOS clients with an intake during FY 2014 and a follow-up during FY 2015 (n = 260). Self-reported criminal justice system status was compared with the Kentucky Offender Monitoring System (KOMS) database. Half of the clients were found in KOMS (n = 130). Of those individuals with information in KOMS, there was a 96.2% agreement for any incarceration, or incarceration was reported on KTOS but was not in the KOMS data at intake (KOMS does not include local jail data). There was 100% agreement with the information in KOMS at the follow-up assessment for incarceration. Additionally, there was an 83.1% agreement for probation at intake and at follow-up and 96.9% agreement for parole at intake and 91.5% agreement at follow-up.

4. Recovery Supports

Research has shown that recovery and positive social supports are linked to a lower risk of relapse. In addition, a lack of social support has been linked to several negative birth outcomes.

The Recovery Supports section closes the KY-Moms MATR assessment by asking about: (1) attending AA/NA/MA or other self-help group meetings and whether or not they have had contact with a sponsor recently; and (2) how many people the client has that they can count on to help them with their recovery and whether their friends or family were supportive of their recovery. The recovery supports questions were adapted from the GPRA (Mulvey, Atkinson, Avula, & Luckey, 2005) with feedback from discussions with state and community stakeholders. Research has shown that recovery and positive social supports are linked to a lower risk of relapse (Havassy, Hall, & Wasserman, 1991). In addition, individuals in recovery cite their access to social and spiritual supports as an important key to their success (Flynn, Joe, Broome, Simpson, & Brown, 2003). In terms of birth outcomes, a lack of social

support has been linked to maternal stress and depression and, in turn, premature birth (Badr, Abdallah, & Mahmoud, 2005), low birthweight (Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993; Elsenbruch et al., 2006), low APGAR scores (Pagel, Smilkstein, Regen, & Montano, 1990), and neural tube defects (Suarez, Cardarelli, & Hendricks, 2003).

KY-Moms MATR Demographic Information

The KY-Moms MATR demographic information includes items that were taken or adapted slightly from the standardized Government Performance and Reporting Act of 1993 (GPRA; Public Law 103-62) monitoring tool, which is used by all Center for Substance Abuse Treatment (CSAT) and Substance Abuse and Mental Health Services Administration (SAMHSA) funded grantees (Mulvey et al., 2005), or were included on KY-Moms MATR as context specific questions: gender, race/ethnicity, age, marital status, education status, medical insurance type, and primary referral source.

Conclusion

The KY-Moms MATR program outcome evaluation is updated and enhanced annually and consists of three main components: (1) an evidence-based intake assessment administered by program staff using a secure, web-based instrument as clients enter the KY-Moms MATR program; (2) an evidence-based follow-up assessment 6-months after the birth of the client's baby. The follow-up rate is over 80% each year with an overall average of 169 follow-ups per year and; (3) data analysis and dissemination.

The KY-Moms MATR assessment is a brief self-report instrument that documents symptoms and patterns of substance abuse and related psychosocial problems as they relate to birth outcomes. The KY-Moms MATR is easy to use and takes about 40 minutes to complete. The assessment was developed in collaboration with key stakeholders and adapted to consider the Kentucky context as well as the unique substance abuse and related trends over time in Kentucky. Initially, a pilot study was conducted with three regions to ensure the core assessment structure and components were appropriate for this high risk target population. The KY-Moms MATR assessment has four core components which all have strong reliability and validity research data including: (1) substance use, (2) mental health, (3) victimization and trauma, and (4) quality of life. The four supplemental assessment components that have been associated with substance abuse and relapse include: (1) maternal-fetal attachment; (2) health and stress-related health consequences, (3) economic and living circumstances, and (4) recovery supports. Specific demographic information is collected in the last section of the assessment.

The evidence base for the KY-Moms MATR assessment conforms to the 7 recommendations for evidence-based assessments for case managers in public agencies presented in the first section of this document:

(1) *Use of Theory and Research.* The KY-Moms MATR assessment includes a set of instruments developed to provide screening and assessment of psychosocial issues identified in theory and research as related to substance use and negative birth outcomes including anxiety, depression, partner violence and other victimization experiences, physical health, financial hardship, housing instability, maternal-fetal attachment, and recovery supports

(2) *Contextual Appropriateness.* The KY-Moms MATR assessment was originally developed to consider the unique features of Kentucky as well as contributing factors to negative birth outcomes and has been revised frequently after data analysis and feedback from users and other stakeholders to consider the unique context of Kentucky.

(3) *Face Valid and User-friendly.* The KY-Moms MATR assessment is face valid as it focuses on components identified in theory and research as related to substance use, mental health, victimization and trauma history, and birth outcomes. Further, KY-Moms MATR is easy to use and takes about 40 minutes to complete.

(4) *Established Reliability and Validity.* The KY-Moms MATR assessment has four core components (substance use, mental health, victimization and trauma, and quality of life) each with strong reliability and validity research support and four supplemental components (maternal-fetal attachment/maternal-infant attachment, health and stress-

related health consequences, economic and living circumstances, and recovery supports) many of which have strong reliability and validity research support.

(5) *Measuring Dynamic Rather than Static Constructs.* Although KY-Moms MATR does include key demographic indicators, the majority of the assessment components focus on current status, symptoms, and constructs that change over time.

(6) *Not Producing Adverse Reactions or Consequences.* In the almost 10 years of KY-Moms MATR no adverse reactions or consequences due to the assessment or the research procedures have been reported.

(7) *Sensitive to Change So That Outcomes Can Be Measured.* Results continue to show that the pregnant women who participate in KY-Moms MATR case management make substantial improvements from prenatal intake to follow-up in several important dimensions of their lives including significant reductions in illegal drug and alcohol use, mental health problems and stress, intimate partner violence, economic hardship, and significant improvements in mother-infant attachment. Additionally, clients reported high levels of satisfaction with their experience in the case management program, higher quality of life, and more recovery supports at follow-up.

Additional Benefit of Data Analysis and Dissemination. An added benefit of the KY-Moms MATR outcome evaluation is that state-level trends in substance use along with the co-occurring anxiety and depression, employment and economic status, and quality of life trends for clients entering the KY-Moms MATR case management program are provided each year. This data system also provides state-level trends in birth outcomes, risks, recovery and recovery correlates over time. An important benefit of state-level outcome studies is that funders and legislators can see up-to-date state specific data to provide evidence of need for new programs, continuation of current programs, and changes in programmatic policies. Key trends in substance use and policy needs fluctuate annually depending on economic and other state-specific sociopolitical issues, each year's analytical findings, the latest research, and legislative research commission requests, making the need for easily-modifiable annual data collection even more important. In addition to annual statewide reports, the KY-Moms MATR data can be used for community-level reports on client characteristics and outcomes for communities applying for Federal or other grants.

Key trends in substance use and policy needs fluctuate annually depending on economic and other state-specific sociopolitical issues, each year's analytical findings, the latest research, and legislative research commission requests, making the need for easily-modifiable annual data collection even more important.

The KY-Moms MATR assessment is not meant to replace case manager decision-making but rather to assist in the assessment process by examining a range of potential co-occurring problems and provide information about program outcomes. The KY-Moms MATR assessment can be used to determine needed services, engage clients through self-report of concerns and problems, and monitor outcomes.

The KY-Moms MATR assessment, to minimize burden and cost, is not as lengthy, resource intensive, or as costly as other assessments. This may mean that if diagnosis information specifically, or information for a specialized condition (e.g., personality disorder) is sought the KY-Moms MATR assessment will need to be supplemented. Further, although the KY-Moms MATR assessment is robust and pragmatic assessment, it is relatively short in order to reduce staff burden. Therefore, some of the birth outcome-related risks are not assessed and some components could be measured more comprehensively.

The evidence base for the KY-Moms MATR assessment suggests it is a robust, pragmatic, reliable, and valid assessment, which provides statewide and regional data about Kentucky drug use trends, substance use-related comorbidities among pregnant women, and case management program outcomes.

Appendix A: References

AAA Foundation for Traffic Safety (2016). *Prevalence of self-reported aggressive driving behavior: United States, 2014.* Washington, DC: AAA Foundation for Traffic Safety.

Adamson, S., Sellman, J., & Frampton, C. (2009). Patient predictors of alcohol treatment outcome: A systematic review. *Journal of Substance Abuse Treatment, 36*, 75-86.

Adler, N. (2006). Overview of health disparities. In G. E. Thompson, F. Mitchell, & M. Williams (Eds.), *Examining the Health Disparities Research Plan of the National Institutes of Health: Unfinished business* (pp. 129–88). Washington, DC: National Academy Press.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Anda, R., Croft, J., Felitti, V., Nordenberg, D., Giles, W., Williamson, D., & Giovino, G. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *Journal of the American Medical Association, 282,* 1652–1658.

Anda, R., Felitti, V., Walker, J., Whitfield, C., Bremner, J., Perry, B., Dube, S., & Giles, W. (2006). The enduring effects of abuse and related adverse experiences in childhood: a convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neurosciences*, *56*(3), 174–86.

Andresen, E., Catlin, T., Wyrwich, K., & Jackson-Thompson, J. (2003). Retest reliability of surveillance questions on health related quality of life. *Journal of Epidemiology and Community Health, 57,* 339-343.

Arrindell, W., Meeuwesen, L., & Huyse, F. (1991). The Satisfaction With Life Scale (SWLS): Psychometric properties in a non-psychiatric medical outpatients sample. *Personality and Individual Differences, 12*, 117-123.

Atkinson, J., Slater, M., Patterson, T., Grant, I., & Garfin, S. (1991). Prevalence, onset, and risk of psychiatric disorders in men with chronic low back pain: A controlled study. *Pain, 45*(2), 111-121.

Badr, L., Abdallah, B., & Mahmoud, A. (2005). Precursors of preterm birth: comparison of three ethnic groups in the middle East and the United States. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, *34*(4), 444-452.

Barrington-Trimis, J., Urman, R., Berhane, K., Unger, J., Cruz, T., Pentz, M., Samet, J., Leventhal, A., & McConnell, R. (2016). *Pediatrics, 138,* 1, 1-8.

Basco, M., Bostic, J., Davies, D., Rush, J., Witte, B., Hendrickse, W., & Barnett, V. (2000). Methods to improve diagnostic accuracy in a community mental health setting. *American Journal of Psychiatry, 157*, 1599-1605.

Beidas, R., Stewart, R., & Walsh, L. (2015). Free, brief, and validated: Standardized instruments for low-resource mental health settings. *Cognitive and Behavioral Practice, 22,* 5-19.

Bernardo, R. (2016). 2016's Best and Worst States for Women. Retrieved from WalletHub https://wallethub.com/edu/best-and-worst-states-for-women/10728/.

Beverly, S. (1999). *Economic poverty reconsidered: Material hardship and income-poverty in the United States*. Washington University, St. Louis, Missouri.

Beverly, S. (2001). Material hardship in the United States: Evidence from the Survey of Income and Program Participation. *Social Work Research, 25*(3), 143-151.

Blevins, C., Weathers, F., Davis, M., Witte, T., & Domino, J. (2015). The posttraumatic stress disorder checklist for *DSM-5* (PCL-5). Development and initial psychometric evaluation. *Journal of Traumatic Stress, 28,* 489-498.

Blumenstein, L. (2015). Exploratory study of intimate partner kidnapping: Is this a prevailing issue in intimate partner relationships? *Partner Abuse, 6*(4), 403-424.

Bovin, M., Marx, B., Weathers, F., Gallagher, M., Rodriguez, P., Schnurr, P., & Keane, T. (in press). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifith Edition (PCL-5) in veterans. *Psychological Assessment.*

Bowlby, J. (1969). *Attachment and Loss: Attachment. V*. Basic Books.

Brady, K., Back, S., & Coffey, S. (2004). Substance abuse and posttraumatic stress disorder. *Current Directions in Psychological Science, 13*(5), 206-209.

Breiding, M., Smith, S., Basile, K., Walters, M., Chen, J., & Merrick. M. (2014). Prevalence and characteristics of sexual violence, stalking, and intimate partner violence victimization—National intimate partner and sexual violence survey, United States, 2011. *Morbidity and Mortality Weekly Report, 63*(8), 1-18.

Breslau, N., Kessler, R., Chilcoat, H., Schultz, L., Davis, G., & Andreski, P. (1998). Trauma and posttraumatic stress disorder in the community. The 1996 Detroit Area Survey of Trauma. *Archives of General Psychiatry, 55*(7), 626-632.

Bumbarger, B., & Campbell, E. (2012). A state agency-university partnership for translational research and the dissemination of evidence-based prevention and intervention. *Administration and Policy in Mental Health Services Research, 39*(4), 268-277.

Calsyn, D., Saxon, A., Bush, K., Howell, D., Baer, J., Sloan, K., Malte, C., & Kivlahan, D. (2004). The Addiction Severity Index medical and psychiatric composite scores measure similar domains as the SF-36 in substance-dependent veterans: Concurrent and discriminant validity. *Drug and Alcohol Dependence, 76*, 165-171.

Campbell, D. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin, 56*, 81-105.

Carey, K., Cocco, K., & Correia, C. (1997). Reliability and validity of the Addiction Severity Index among outpatients with severe mental illness. *Psychological Assessment, 9*(4), 422-428.

Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. *Treatment Episode Data Set (TEDS)*. Based on administrative data reported by states to TEDS through July 5, 2016. Retrieved from http://wwwdasis.samhsa.gov/webt/quicklink/KY13.htm.

Centers for Disease Control and Prevention (2000). *Measuring Healthy Days.* Atlanta, GA: CDC. Retrieved from: https://www.cdc.gov/hrqol/pdfs/mhd.pdf

Chen, E., Turiano, N., Mroczek, D., & Miller, G. (2016). Association of reports of childhood abuse and all-cause mortality rates in women. *Journal of the American Medical Association, 73*(9), 920-927.

Chermack, S., Roll, J., Reilly, M., Davis, L., Kilaru, U., & Gravowski, J. (2000). Comparison of patient self-reports and urinalysis results obtained under naturalist methadone treatment conditions. *Drug & Alcohol Dependence, 59*(1), 43-49.

Christon, L., McLeod, B., & Jensen-Doss, A. (2015). Evidence-based assessment meets evidence-based treatment: An approach to science-informed case conceptualization. *Cognitive and Behavioral Practice, 22,* 36-48.

Cleck, J., & Blendy, J. (2008). Making a bad thing worse: Adverse effects of stress on addiction. *Journal of Clinical Investigation, 118*(2), 454-461.

Cleeland, C. (2009). The Brief Pain Inventory: A User's Guide. Retrieved from https://www.mdanderson.org/content/dam/mdanderson/documents/Departments-and-Divisions/Symptom-Research/BPI_UserGuide.pdf (accessed September 2, 2016).

Cleeland, C., & Ryan, K. (1994). Pain assessment: Global use of the brief pain inventory. *Annals Academy of Medicine, 23*(2), 129-138.

Cohen, M., & Klein, D. (1971). A measure of severity of multi-drug use among psychiatric patients. *International Journal of Pharmacopsychiatry, 6*, 83-89.

Cole, J., Logan, T., & Walker, R. (2011). Social exclusion, self-regulation, and stress among substance abuse treatment clients. *Drug and Alcohol Dependence, 113*, 13-20.

Collins, N., Dunkel-Schetter, C., Lobel, M., & Scrimshaw, S. (1993). Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *Journal of personality and social psychology*, *65*(6), 1243.

Condon, J., & Hilton, C. (1988). A comparison of smoking and drinking behaviors in pregnant women: Who abstains and why. *Medical Journal of Australia, 148*, 381-385.

Connors, E., Arora, P., Curtis, L., & Stephan, S. (2015). Evidence-based assessment in school mental health. *Cognitive and Behavioral Practice, 22*(1), 60-73.

Corse, S., Zanis, D., & Hirschinger, N. (1995). The use of the Addiction Severity Index with people with severe mental illness. *Psychiatric Rehabilitation Journal, 19*, 9-18.

Cottler, L., Compton, W., Mager, D., Spitznagel, E., & Janca, A. (1992). Posttraumatic stress disorder among substance users from the general population. *American Journal of Psychiatry, 149,* 664-670.

Cranley, M. (1981). Development of a tool for the measurement of maternal attachment during pregnancy. *Nursing Research, 30*, 281-284.

Cronbach, L., & Meehl, P. (1955). Construct validity in psychological tests. *Psychological Bulletin*, *52*(4), 281–302.

Curtin, S., & Mathews, T. (2016). Smoking prevalence and cessation before and during pregnancy: Data from the birth certificate, 2014. National Vital Statistics Reports, 65(1). Hyattsville, MD: National Center for Health Statistics. 2016.

Daut, R., Cleeland, C., & Flanery, R. (1983). Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. *Pain, 17,* 197-210.

De Wolff, M., & van Ijzendoorn, M. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child development*, *68*(4), 571-591.

Delgadillo, J., Payne, S., Gilbody, S., Godfrey, C., Gore, S., Jessop, D., & Dale, V. (2012). Brief case findings tools for anxiety disorders: Validation of GAD-7 and GAD-2 in addictions treatment. *Drug and Alcohol Dependence, 125*, 37-42.

Diener, E., Emmons, R., Larsen, R., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment, 49*, 71-75.

Dietz, P., Spitz, A., Anda, R., Williamson, D., McMahon, P., Santelli, J., Nordenberg, D., Felitti, V., & Kendrick, J. (1999). Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *Journal of the American Medical Association, 282*, 1359–1364.

Dong, M., Anda, R., Felitti, V., Dube, S., Williamson, D., Thompson, T., Loo, C., & Giles, W. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse and Neglect, 28*, 771-784.

Donley, S., Habib, L., Jovanovic, T., Kamkwalala, A., Evces, M., Egan, G., Bradley, B., & Ressler, K. (2012). Civilian PTSD symptoms and risk for involvement in the criminal justice system. *Journal of the American Academy of Psychiatry and the Law, 40(4),* 522-529.

Dube S., Anda, R., Felitti, V., Chapman, D., Williamson, D., & Giles, W. (2001). Childhood abuse, household dysfunction and the risk of attempted suicide throughout the life span: Findings

from Adverse Childhood Experiences Study. *Journal of the American Medical Association*, 286, 3089–3096.

Dube, S., Felitti, V., Dong, M., Chapman, D., Giles, W., & Anda, R. (2003a). Childhood abuse neglect and household dysfunction and the risk of illicit drug use: The Adverse Childhood Experiences Study. *Pediatrics, 111,* 564–572.

Dube, S., Felitti, V., Dong, M., Giles, W., & Anda, R. (2003b). The impact of adverse childhood experiences on health problems: evidence from four birth cohorts dating back to 1900. *Preventative Medicine, 37,* 268-277.

Dube, S., Miller, J., Brown, D., Giles, W., Felitti, V., Dong, M., & Anda, R. (2006). Adverse childhood experiences and the association with ever using alcohol and initiating alcohol use during adolescence. *Journal of Adolescent Health, 38*(4), 444.e1-10.

Dube, S., Williamson, D., Thompson, T., Felitti, V., & Anda, R. (2004). Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse and Neglect*, *28*(7), 729–737.

Edlund, M., Sullivan, M., Han, X., & Booth, B. (2013). Days with pain and substance use disorders: Is there an association? *Clinical Journal of Pain, 29*(8), 689-695.

Edwards, V., Anda, R., Dube, S., Dong, M., Chapman, D., & Felitti, V. (2005). The wide-ranging health consequences of adverse childhood experiences. In K. Kendall-Tackett, & S. Giacomoni (Eds.), *Child Victimization: Maltreatment, Bullying, and Dating Violence Prevention and Intervention*. Kingston, NJ: Civic Research Institute

Elsenbruch, S., Benson, S., Rücke, M., Rose, M., Dudenhausen, J., Pincus-Knackstedt, M. K., Klapp, B.F., & Arck, P. C. (2007). Social support during pregnancy: effects on maternal depressive symptoms, smoking and pregnancy outcome. *Human reproduction*, *22*(3), 869-877.

Erickson, W., Lee, C., & von Schrader, S. (2014). *2013 Disability Status report: Kentucky*. Ithaca, NY: Cornell University Employment and Disability Institute (EDI).

Farley, M., Golding, J., Young, G., Mulligan, M., & Minkoff, J. (2004) Trauma history and relapse probability among patients seeking substance abuse treatment. *Journal of Substance Abuse Treatment, 27*(2), 161–167.

Federenko, I., & Wadhwa, P. (2004). Women's mental health during pregnancy influences fetal and infant developmental and health outcomes. *Cns Spectrums*, *9*(3), 198-206.

Felitti, V., Anda, R., Nordenberg, D., Williamson, D., Spitz, A., Edwards, V., & Marks, J. (1998). The relationship of adult health status to childhood abuse & household dysfunction. *American Journal of Preventative Medicine, 14*(4), 245-258.

Fleiss, J. (1981). *Statistical methods for rates and proportions*. New York: Wiley.

Fleming, A., Ruble, D., Gordon, L., Shaul, D. (1988). Postpartum adjustment in first-time mothers: Relations between mood, maternal attitudes, and mother-infant interaction. *Developmental Psychology, 14,* 71–81.

Flynn, P., Joe, G., Broome, K., Simpson, D., & Brown, B. (2003). Recovery from opioid addiction in DATOS. *Journal of substance abuse treatment*, *25*(3), 177-186

Gallup Polls (2014) *State of American well-being: 2014 financial well-being rankings.* Retrieved from: http://info.healthways.com/hubfs/Well-Being_Index/2014_Data/Gallup-Healthways_State_of_American_Well-Being_2014_Financial_Rankings.pdf

Gallup Polls (2015). *State of American well-being: 2015 state well-being rankings.* Retrieved from: http://info.healthways.com/hubfs/Well-Being_Index/2015_Data/Gallup-Healthways_State_of_American_Well-Being_2015_State_Rankings.pdf?t=1454003500629

Gau, M. & Lee, T. (2003). Construct validity of the prenatal attachment inventory: A confirmatory factor analysis approach. *Journal of Nursing Research, 11*(3), 177-187.

Glasgow, R. (2013). What does it mean to be pragmatic? Pragmatic methods, measures, and models to facilitate research translation. *Health Education & Behavior, 40*(3), 257-265.

Goff, A., Rose, E., Rose, S., & Purves, D. (2007). Does PTSD occur in sentenced prison populations? A systematic literature review. *Criminal Behavior and Mental Health, 17(3),* 152-162.

Greenberg, M. (1999). Attachment and psychopathology in childhood. In: Cassidy J, Shaver PR, eds. *Handbook of attachment*. New York: Guilford Press.

Gunderson, E., Russell, J., & Nail, R. (1973). A drug involvement scale for classification of drug abusers. *Journal of Comparative Psychology, 1*, 399-403.

Hale, C. (1996). Fear of crime: A review of the literature. *International Review of Victimology, 4*, 79-150.

Havassy, B., Hall, S., & Wasserman, D. (1991). Social support and relapse: Commonalities among alcoholics, opiate users, and cigarette smokers. *Addictive Behaviors, 16*, 235-246.

Hennessy, C., Moriarty, D., Zach, M., Scherr, P., & Brackbill, R. (1994). Measuring health-related quality of life for public health surveillance. *Public Health Reports, 109*(5), 665-672.

Hess, C., Milli, J., Hayes, J., Hegewisch, A., Mayayeva, Y., Roman, S., Anderson, J., & Augeri, J. (2015). *The Status of Women in the States: 2015.* Institute for Women's Policy Research; Washington, DC.

Hock, E., McBride, S. & Gnezda, M. (1989). Maternal separation anxiety; Mother-infant separation from the maternal perspective. *Child Development, 60*, 793-802.

Hodgins, D., & El-Guebaly, N. (1992). More data on the Addiction Severity Index: Reliability and validity with the mentally ill substance abuser. *Journal of Nervous & Mental Disease, 180*(3), 197-201.

Hunsley, J. (2015). Translating evidence-based assessment principles and components into clinical practice settings. *Cognitive and Behavioral Practice, 22,* 101-109.

Hunsley, J., & Mash, E. (2007). Evidence-based assessment. *Annual Review of Clinical Psychology, 3*, 29-51.

Iceland, J., & Bauman, K. (2004). Income poverty and material hardship: How strong is the association? *National Poverty Center Working Paper Series#04-17*. University of Michigan, Gerald R. Ford School of Public Policy.

Ilies, R., Hauserman, N., Schwochau, S., & Stibal, J. (2003). Reported incidence rates of work-related sexual harassment in the United States: Using meta-analysis to explain reported rate disparities. *Personnel Psychology, 56*, 607-631.

Jensen-Doss, A. (2015). Practical, evidence-based clinical decision making: Introduction to the special series. *Cognitive and Behavioral Practice, 22,* 1-4.

Jensen-Doss, A., & Hawley, K. (2010). Understanding barriers to evidence-based assessment: Clinician attitudes toward standardized assessment tools. *Journal of Clinical Child & Adolescent Psychology, 39*(6), 885-896.

Jensen-Doss, A., & Weisz, J. (2008). Diagnostic agreement predicts treatment process and outcomes in youth mental health clinics. *Journal of Consulting and Clinical Psychology, 76*(5), 711-722.

Jensen-Doss, A., Youngstrom, E., Youngstrom, J., Feeny, N., & Findling, R. (2014). Predictors and moderators of agreement between clinical and research diagnoses for children and adolescents. *Journal of Consulting and Clinical Psychology, 82(6)*, 1151-1162.

Jewell, J., Handwerk, M., Almquist, J., & Lucas, C. (2004). Comparing the validity of clinician-generated diagnosis of conduct disorder to the Diagnostic Interview for Children. *Journal of Clinical Child and Adolescent Psychology, 33(*3), 536-546.

Kearl, H. (2014). *Unsafe and harassed in public spaces: A national street harassment report.* Reston, VA: Stop Street Harassment. Retrieved from: http://www.stopstreetharassment.org/wp-content/uploads/2012/08/National-Street-Harassment-Report-November-29-20151.pdf (accessed on September, 28 2016).

Kessler, R., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C.(1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52,* 1048-1060.

Kramer, T., Robbins, J., Phillips, S., Miller, T., & Burns, B. (2003). Detection and outcomes of substance use disorders in adolescents seeking mental health treatment. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(11), 1318-1326.

Kroenke, K., Spitzer, R., & Williams, J. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*, 606-613.

Kumar, R. Robson, K., & Smith, A. (1984). Development of a self-administered questionnaire to measure maternal adjustment and maternal attitudes during pregnancy and after delivery. *Journal of Psychosomatic Research, 28*, 43-51.

Larsen, R., Diener, E., & Emmons, R. (1985). An evaluation of subjective well-being measures. *Social Indicators Research, 17*, 10-18.

Leifer, M. (1977). Psychological changes accompanying pregnancy and motherhood. *Genetic Psychology Monographs, 95*, 55-96.

Lindgren K. (2001). Relationships among maternal-fetal attachment, prenatal depression, and health practices in pregnancy. *Research in Nursing & Health, 24*, 203–217.

Logan, T. (2016). Personal safety concerns and responses. Unpublished data.

Logan, T. & Cole, J. (2011). The Intersection of partner stalking and sexual abuse. *Violence Against Women, 17*(7), 904-924.

Logan, T., Cole, J., Scrivner, A. & Spence, M. (2014). *Adult Kentucky Treatment Outcome Study 2014 Annual Report.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, T. & Walker, R. (2010). Toward a deeper understanding of the harms caused by partner stalking. *Violence and Victims, 25*(4), 440-455.

Logan, T., Walker, R. & Cole, J. (2015). Silenced Suffering: The Need for Better Measures of Partner Sexual Violence. *Trauma, Violence, and Abuse, 16*(), 111-135.

Logan, T., Walker, R., Cole, J., & Leukefeld, C. (2002). Victimization and substance use among women: contributing factors, interventions, and implications. *Review of General Psychology, 6(4),* 325-397.

Logan, T., Walker, R., Cole, J., Ratliff, S., & Leukefeld, C. (2003). Qualitative differences among rural and urban intimate violence victimization experiences & consequences: a pilot study. Journal of Family Violence, 18, 2, 83-92.

Logan, T., Walker, R., & Hoyt, W. (2012). The economic costs of partner violence and the cost-benefit of civil protective orders. *Journal of Interpersonal Violence, 27*(6), 1137-1154.

Logan, T., Walker, R., Jordan, C., & Leukefeld, C. (2006). Women and victimization: Contributing factors, interventions, and implications. Washington, DC: American Psychological Association Press.

Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care, 46*(3), 266-274.

Mäkelä, K. (2004). Studies of the reliability and validity of the Addiction Severity Index. *Addiction, 99*, 398-410.

March of Dimes (2012). Stress and pregnancy. Retrieved from http://www.marchofdimes.org/pregnancy/stress-and-pregnancy.aspx.

Marquis, K. (1981). *Quality of prisoner self-reports: Arrest and conviction response error*s. Santa Monica: Rand Corporation.

Maxfield, M., Weiler, B., & Widom, C. (2000). Comparing self-reports and official records of arrests. *Journal of Quantitative Criminology, 16*(1), 87-110.

McEwen, B. (2000). The neurobiology of stress: From serendipity to clinical relevance. *Brain Research, 886*, 172-189.

McEwen, B. (2004). Protection and damage from acute and chronic stress: Allostasis and allostatic overload and relevance to the pathophysiology of psychiatric disorders. *Annals of the New York Academy of Sciences, 1032*(1), 1-7.

McLellan, A., Cacciola, J., Kushner, H., Peters, R., Smith, I., & Pettinati, H. (1992). The fifth edition of the Addiction Severity Index: Historical critique and normative data. *Journal of Substance Abuse Treatment, 9*, 199-213.

McLellan, A., Luborsky, L., Cacciola, J., Griffith, B., Evans, R., Barr, H., & O'Brien, C. (1985). New data from the Addiction Severity Index: Reliability and validity in three centers. *Journal of Nervous and Mental Disease, 173*, 412-423.

Mertens, J., Lu, Y., Parthasarathy, S., Moore, C., & Weisner, C. (2003). Medical and psychiatric conditions of alcohol and drug treatment patients in an HMO: Comparison with matched controls. *Archives of Internal Medicine, 163*, 2511-2517.

Mikhail, M., Youchah, J., DeVore, N., Ho, G., & Anyaegbunam, A. (1995). Decreased maternal-fetal attachment in methadone-maintained pregnant women: A preliminary study. *Journal of the Association for Academic Minority Physicians, 6*, 112-114.

Morgen, K., Astone-Twerell, J., Hernitche, T., Gunneson, L., & Santangelo, K. (2007). Health-related quality of life among substance abusers in residential drug abuse treatment. *Applied research in Quality of Life, 2*(4), 239-246.

Müller, M. (1993). The development of the prenatal attachment inventory. *Western Journal of Nursing Research, 15*, 199-215.

Müller, M. (1994). A questionnaire to measure mother-to-infant attachment. *Journal of Nursing Measurement, 2*(2), 129-141.

Mulvey, K., Atkinson, D., Avula, D., & Luckey, J. (2005). Using the internet to measure program performance. *American Journal of Evaluation, 26*(4), 587– 597.

Murphy, A., Steele, M., Dube, S., Bate, J., Bonuck, K., Meissner, P., Goldman, H., & Steele, H. (2014). Adverse Childhood Experiences (ACEs) questionnaire and Adult Attachment Interview (AAI): Implications for parent child relationships. *Child Abuse & Neglect, 38*(2), 224-233.

Najavits, L., Runkel, R., Neuner, C., Frank, A., Thase, M., Crits-Christoph, P., & Blaine, J. (2003). Rates and symptoms of PTSD among cocaine-dependent patients. *Journal of Studies on Alcohol,* 64, 601-606.

Najavits, L., Sonn, J., Walsh, M., & Weiss, R. (2004). Domestic violence in women with PTSD and substance abuse. *Addictive Behavior*, 29, 707-715.

National Institute of Child Health and Human Development. (2013). *What is prenatal care and why is it so important?* Retrieved from https://www.nichd.nih.gov/health/topics/pregnancy/conditioninfo/pages/prenatal-care.aspx.

Newschaffer, C. (1998). *Validation of Behavioral Risk Factor Surveillance System (BRFSS) HRQOL measures in a statewide sample*. Atlanta: U.S. Department of health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. [http://www.cdc.gov/hrqol/measurement_properties/newschaffer.htm].

Nunno, M. (2006). The effects of the ARC organizational intervention on caseworker turnover, climate, and culture in children's services systems: Commentary. *Child Abuse and Neglect, 30*(8), 849-854.

Office for Victims of Crime (2015). Section 6: Statistical Overviews. In *2015 National Crime Victims' Rights Week (NCVRW) Resource Guide*. Washington, DC: Office of Justice Programs, US Department of Justice. Retrieved from: http://ovc.ncjrs.gov/ncvrw2015/pdf/FullGuide.pdf (accessed on September, 28 2016).

Pagel, M., Smilkstein, G., Regen, H., & Montano, D. (1990). Psychosocial influences on new born outcomes: a controlled prospective study. *Social science & medicine*, *30*(5), 597-604.

Pallant, J., Haines, H., Hildingsson, I, Cross, M., & Rubertson, C. (2014). Psychometric evaluation and refinement of the Prenatal Attachment Inventory. *Journal of Reproductive and Infant Psychology, 32*(2), 112-125.

Pavot, W., & Diener, E. (1993). Review of the Satisfaction with Life Scale. *Psychological Assessment, 5*(2), 164-172.

Perreault, S. (2015). Criminal victimization in Canada, 2014. *Juristat, 35*(1), 1-43.

Peters, R., Sherman, P., & Osher, F. (2008) Treatment in jails and prisons. In K.T. Mueser, & D.V. Jeste (Eds.), *Clinical Handbook of Schizophrenia*, 354-364. New York, NY: Guilford Press.

Pogge, D., Wayland-Smith, D., Zaccario, M., Borgaro, S., Stokes, J., & Harvey, P. (2001). Diagnosis of manic episodes in adolescent inpatients: Structured diagnostic procedures compared to clinical chart diagnoses. *Psychiatry Research, 101*(1), 47-54.

Price, M., Szafranski, D., van Stolk-Cooke, K., & Gros, D. (2016). Investigation of an abbreviated 4 and 8 item version of the PTSD Chcklist 5. *Psychiatry Research, 239,* 124-130.

Priel, B., & Besser, A. (1999). Vulnerability to postpartum depressive symptomatology: Dependency, self-criticism and the moderating role of antenatal attachment. *Journal of Social and Clinical Psychology, 18*(2), 240–253.

Ranson, K., & Urichuk, L. (2008). The effect of parent–child attachment relationships on child biopsychosocial outcomes: a review. *Early Child Development and Care*, *178*(2), 129-152.

Regier, D., Farmer, M., Rae, D., Locke, B., Keith, S., & Judd, L. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: Results from the Epidemiologic Catchment Area (ECA) Study. *Journal of the American Medical Association, 264,* 2511-2518.

Rubin, R. (1984). *Maternal identity and the maternal experience*. New York: Springer.

Rudd, R., Aleshire, N., Zibbell, J., & Gladden, R. (2016). Increases in drug and opioid overdose deaths-United States, 2000-2014. *Morbidity and Mortality Weekly Report, 64*(50), 1378-1382.

Sadeh, N., & McNiel, D. (2015). Posttraumatic stress disorder increases risk of criminal recidivism among justice-involved persons with mental disorders. *Criminal Justice and Behavior, 42(6),* 573-586.

Sansone, R., & Sansone, L. (2010). Road rage: What's driving it? *Psychiatry (Edgemont), 7*(7), 14-18.

Scott, K., & Lewis, C. (2015). Using measurement-based care to enhance any treatment. *Cognitive and Behavioral Practice, 22*, 49-59.

Selzer, M. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry, 127*, 1653-1658.

Shane, P., Diamond, G., Mensinger, J., Shera, D., & Wintersteen, M. (2006). Impact of victimization on substance abuse treatment outcomes for adolescents in outpatient and residential substance abuse treatment. *The American Journal on Addictions, 15(1),* 34-42.

She, P., & Livermore, G. (2007). Material hardship, poverty, and disability among working-age adults. *Social Science Quarterly, 88*(4), 970-989.

Sheu, R., Lussier, D., Rosenblum, A., Fong, C., Portenoy, J., Joseph, H., & Portenoy, R. (2008). Prevalence and characteristics of chronic pain in patients admitted to an outpatient drug and alcohol treatment program. *Pain Medicine*, 911-917.

Silverman, J., Decker, M., Reed, E., & Raj, A. (2006). Intimate partner violence victimization prior to and during pregnancy among women residing in 26 US states: associations with maternal and neonatal health. *American journal of obstetrics and gynecology*, *195*(1), 140-148.

Singh, T., Arrazola, R., Corey, C., Husten, C., Neff, L., Homa, D., & King, B. (2016). Tobacco use among middle and high school students—United States, 2011-2015. *MMWR Morbidity and Mortality Weekly Report, 65,* 361-367.

Sinha, R. (2008). Chronic stress, drug use, and vulnerability to addiction. *New York Academy of Sciences, 1141*, 105-130.

Slade, P., Laxton-Kane, M., & Spiby, H. (2006). Smoking in pregnancy: The role of the transtheoretical model and the mother's attachment to the fetus. Addictive Behaviors, 31, 743–757.

Slavova, S., Bunn, T. L., & Gao, W. (2015). *Drug overdose hospitalizations in Kentucky, 2000-2013*. Lexington, KY: Kentucky Injury Prevention and Research Center.

Smart, R., Mann, R., & Stoduto, G. (2003). The prevalence of road rage: Estimates from Ontario. *Canadian Journal of Public Health, 94*(4), 247-250.

Social Security Administration (2011). *Annual statistical report on the Social Security Disability Insurance Program, 2011.* Retrieved from: https://www.ssa.gov/policy/docs/statcomps/di_asr/2011/sect01.html

Spitzer, R., Kroenke, K., Williams, J., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine, 166*, 1092-1097.

Stewart, A., Dean, M., Gregorich, S., Brawarsky, P., & Haas, J. (2007). Race/ethnicity, socioeconomic status and the health of pregnant women. *Journal of health psychology*, *12*(2), 285-300.

Stockdale, M., Logan, T., Sliter, K., & Berry, S. (2014). Interpersonal Violence Victimization and Sexual Harassment: A Prospective Study of Revictimization. *Sex Roles, 71*, 55-70.

Stöffelmayr, B., Mavis, B., & Kasim, R. (1994). The longitudinal stability for the Addiction Severity Index. *Journal of Substance Abuse Treatment, 11*(4), 373-378.

Straus, M., Hamby, S., Boney-McCoy, S., & Sugarman, D. (1996). The revised conflict tactics scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues, 17*, 3, 283-316.

Suarez, L., Cardarelli, K., & Hendricks, K. (2003). Maternal stress, social support, and risk of neural tube defects among Mexican Americans. *Epidemiology*, *14*(5), 612-616.

Substance Abuse and Mental Health Services Administration (SAMHSA). (2015*). 2013-2014 National Survey on Drug Use and Health: Model-based prevalence estimates (50 states and the District of Columbia)*. Rockville, MD: Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality.

Tenney, N., Schotte, C., Denys, D., van Megen, H., & Westenberg, H. (2003). Assessment of DSM-IV personality disorders in obsessive-compulsive disorder: Comparison of clinical diagnosis, self-report questionnaire, and semi-structured interview. *Journal of Personality Disorders, 17*(6), 550-561.

Tjaden, P. & Thoennes, N. (2000). *Extent, nature and consequences of intimate partner violence* (NCJ 181867). Washington, DC: National Institute of Justice, Office of Justice Programs, U.S. Department of Justice.

Tolman, R. M. (1989). The development of a measure of psychological maltreatment of women by their male partners. Violence and Victims, 4 (3), 159-177.

Tolman, R. M. (1999). The validation of the psychological maltreatment of women inventory. Violence and Victims, 14, 1, 25-35.

Truman, J., & Langton, L. (2015). Criminal victimization, 2014. (NCJ 248973). Washington, DC: U.S. Department of Justice, Office of Justice Statistics, Bureau of Justice Statistics.

United Health Foundation (2015) *America's health rankings: Annual report.* Retrieved from http://cdnfiles.americashealthrankings.org/SiteFiles/Reports/2015AHR_Annual-v1.pdf (accessed September 7, 2016).

U.S. Department of Labor (2010). *2010 Standard Occupational Classification Major Groups.* Retrieved from http://www.bls.gov/soc/major_groups.htm

Vitaliano, P., Russo, J., Young, H., Becker, J., & Maiuro, R. (1991). The screen for caregiver burden. *The Gerontologist, 31*, 76-83.

Wahler, E. (2012*). The relationship of social stress, economic hardship, and psychological distress to addiction severity among Kentucky substance abuse treatment participants* (Doctoral dissertation). Retrieved from http://uknowledge.uky.edu/csw_etds/1

Wahler, E. (2015). Social disadvantage and economic hardship as predictors of follow-up addiction severity after substance abuse treatment: Does referral to treatment by the criminal justice system matter? *Alcoholism Treatment Quarterly, 33*(1), 6-27.

Walton, M., Blow, F., Bingham, C., & Chermack, S. (2003). Individual and social/environmental predictors of alcohol and drug use 2 years following substance abuse treatment. *Addictive Behaviors, 28*(4), 627-642.

Wahler, E. & Otis, M. (2014). Social disadvantage, economic hardship, and psychological distress as predictors of sustained abstinence from substance use after treatment. *Substance Use and Misuse, 49*(13), 1820-1832.

Weathers, F., Litz, B., Keante, T., Palmierei, P., Marx, B., & Schnurr, P. (2013). *The PTSD Checklist for DSM-5 (PCL-5).* Boston, MA: National Center for PTSD.

Wertz, J., Cleaveland, B., & Stephens, R. (1995). Problems in the application of the Addiction Severity Index (ASI) in rural substance abuse services. *Journal of Substance Abuse, 7*(2), 175-188.

Wolff, N., & Shi, J. (2012). Childhood and adult trauma experiences of incarcerated persons and their relationship to adult behavioral health problems and treatment. *International Journal of Environmental Research and Public Health, 9(5),* 1908-1926.

World Health Organization. (2014). *Global status report on alcohol and health* (2014 ed.). Geneva, Switzerland: World Health Organization Press.

Wortmann, J., Alexander, J., Weathers, F., Resick, P., Dondanville, K., Hall-Clark, B., & Litz, B. (in press). Psychometric analysis of the PTSD Checklist-5 (PCL-5) among treatment-seeking military service members. *Psychological Assessment.*

Zanis, D., McLellan, A., & Corse, S. (1997). Is the Addiction Severity Index a reliable and valid assessment instrument among clients with sever and persistent mental illness and substance abuse disorders? *Community Mental Health Journal, 33*(3), 213-227.

Zanis, D., McLellan, A., & Randall, M. (1994). Can you trust patient self-reports of drug use during treatment? *Drug & Alcohol Dependence*, *35*, 127–132.

Zeanah, C., Benoit, D., & Barton, M. (1995). Working model of the child interview. *Unpublished manuscript,* Brown University, RI.

Appendix B: Reports Generated Using KY-Moms MATR Data

In addition to the annual report submitted to the state, regional reports and other ad hoc data reports are generated upon request.

Annual Reports

Logan, TK, Scrivner, A., Cole, J. & Miller, J. (2016). *KY-Moms MATR 2016 Annual Outcome Report.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A., & Cole, J. (2015). *KY-Moms MATR 2015 Annual Outcome Report.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, & Scrivner, A. (2014). *KY-Moms MATR 2014 Outcome Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, & Scrivner, A. (2013). *KY-Moms MATR 2013 Outcomes Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., Logan, TK, & Stevenson, E. (2012). *KY-Moms MATR 2012 Annual Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Stevenson, E. (2011). *KY-Moms MATR 2011 Annual Follow-up Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Stevenson, E. (2010). *KY-Moms MATR 2010 Annual Follow-up Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2009). *KY-Moms MATR FY 2008 Annual Follow-up Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2008). *KY-Moms MATR FY 2008 Preliminary Annual Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2007*). KY-Moms MATR FY 2007 Annual Follow-up Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2006). *KY-Moms MATR Preliminary Analysis Baseline Data: January 1, 2006 to November 3, 2006*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Select Regional and Other Ad Hoc Reports

Scrivner, A., Logan, T., & Miller, J. (2016). *KY-Moms MATR Program Report: Communicare.* Center on Drug and Alcohol Research, University of Kentucky.

Walker, R., Cole, J., & Logan, TK. (2013*). Return on Investment for KY-Moms MATR, 2012: A Supplementary Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2008*). KY-Moms MATR FY 2008 First Quarter Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2008*). KY-Moms MATR FY 2008 Second Quarter Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2008*). KY-Moms MATR FY 2008 Third Quarter Report*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., & Shannon, L. (2007*). KY-Moms MATR FY 2007 Annual Report: Communicare*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Translational reports

Logan, TK, Scrivner, A., Cole, J. & Miller, J. (2016). *KY-Moms MATR 2016 Fact Sheet.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A., Cole, J. & Miller, J. (2016). *KY-Moms MATR 2016 Findings at a Glance.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A., Cole, J. & Miller, J. (2015). *KY-Moms MATR 2015 Fact Sheet.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A., Cole, J. & Miller, J. (2015). *KY-Moms MATR 2015 Findings at a Glance.* Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A., & Cole, J. (2014). KY-Moms MATR 2014 Fact Sheet. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, & Scrivner, A. (2014). *KY-Moms MATR 2014 Findings at a Glance*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A, & Cole, J. (2013). *KY-Moms MATR 2013 Fact Sheet*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A, & Cole, J. (2013). *KY-Moms MATR Annual Report: 2013 Outcomes Findings at a Glance*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Logan, TK, Scrivner, A., Stevenson, E., Cole, J. & Parish, D. (2012). *KY-Moms MATR Findings at a Glance.: FY 2011 Outcomes*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Scrivner, A., Walker, R., Stevenson, E., Cole, J. & Logan, TK. (2011). Substance abuse risk during pregnancy: An overview of the KY-Moms MATR Evaluation- Characteristics at the beginning of care. KY Treatment In-Focus, 3(3), 1-4. Center on Drug & Alcohol Research, University of Kentucky

Scrivner, A., Walker, R., Stevenson, E., Cole, J. & Logan, TK. (2011). Substance abuse risk during pregnancy: An overview of the KY-Moms MATR Evaluation- Birth Event Characteristics. KY Treatment In-Focus, 3(4), 1-4. Center on Drug & Alcohol Research, University of Kentucky.

Walker, R., Mateyoke-Scrivner, A., Stevenson, E. (2011). *KY-Moms MATR 2011 Annual Report Summary*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.

Walker, R., Mateyoke-Scrivner, A., Shook, L. (2010). *KY-Moms MATR 2010 Annual Follow-up Report Summary*. Lexington, KY: University of Kentucky, Center on Drug and Alcohol Research.