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Research Advisor
Veronica F. Engle, Ph.D., GNP-BC, FGSA, FAAN

Committee
Cynthia Baur, Ph.D. Patricia D. Cunningham, DNSc, PMHNP/CNSBC, APN Patricia M. Speck, DNSc, FNP-BC, APN, DFIAFN, FAAFS, FAAN Wonsuk Yoo, Ph.D.

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Predictors of Drug Court Client Graduation

A Dissertation
Presented for
The Graduate Studies Council
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In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy
From The University of Tennessee

By
Marie E. Gill
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Dedication

This dissertation is dedicated to my husband, Robert Earl Gill, II and to our daughter, Stella Marie Gill for their endless love and support.

Acknowledgements

Abstract

     Background: Substance use disorder in the United States adversely effects society by burdening the justice system with offender incarceration for drug-related crimes, it also strains in the healthcare system with costs in excess of $216 billion dollars for treatment of drug-related mental and physical illnesses. Many offenders of nonviolent crimes with substance use disorder have been diverted to Drug Court (DC) for year-long supervised community-based drug addiction treatment as an alternative to incarceration for non-violent drug-related crimes. Drug Court program outcomes, however, have been studied as a criminal justice intervention, rather than a primary care mental health intervention.   The majority of DC program evaluation has focused on admission data and outcomes using univariate and bivariate analyses, rather than longitudinal data using multivariate analyses to identify multivariate predictors of DC graduation.

     Objective: The purpose of this study is to: (a) describe the Sample Severity for DC clients; (b) discuss the differences between Drug Court graduates and dropouts for Sample Severity, Drug Court Practices, and In-Program Behavior; and (c) develop a prediction model for Drug Court graduation.

     Methods: This is a descriptive longitudinal design using secondary data analysis of existing DC Shelby County DC data. Data were analyzed from January 1, 2009 through March 17, 2011 for clients admitted to Shelby County DC, and either graduated or dropped out of DC. The Multi-Site Adult Drug Court Evaluation (MADCE) Model guided the data selected at three points in time: (a) admission to the DC program (Sample Severity data); (b) during the DC program (DC Practices and In-Program Behavior data); and (c) end of DC program (graduation or dropout data).

     Results: The sample consisted of 310 Shelby County DC clients, predominately male (80.0%), and African American (60.3%) with a mean age of 29.9 years. Most DC clients had a high school diploma or GED (54.5%) or no high school diploma or GED (41.9%). Thirty-four percent were employed at DC admission and worked an average of 10.4 hours per week. Marijuana (56.1%) and alcohol (15.5%) were the top two primary drugs of choice. To compare differences between DC graduates and dropouts, data were analyzed using t-tests or Chi-squared, as appropriate. There were (48.1%) graduates and fewer male graduates ($X^2 = 4.19$, p = .041), and fewer African American graduates ($X^2 = 4.26$, p = .039). There were more graduates who had a high school diploma/GED or a college degree than dropouts ($X^2 = 5.21$, p = .022), and more DC graduates were employed at DC admission ($X^2 = 23.09$, p = .001). Of the seven primary drugs of choice, there was only one significant difference with more graduates listing alcohol as their primary drug of choice than dropouts ($X^2 = 14.05$, p = .002).

     Of the six DC programs, there were significant differences for four programs. There were fewer graduates who participated in the Outpatient program ($X^2 = 4.04$, p = .039) and Residential program ($X^2 = 8.00$, p = .004), more graduates in the Outpatient DUI program ($X^2 = 27.5$, p = .001), and no graduates in the Early Assessment

Intervention Treatment program ($X^2 = 5.66$, p = 017). Graduates spent more days in DC programs (t-test = 15.17, p = .001), and participated in fewer DC programs (t-test = 2.17, p = .031). Of the ten treatment agencies, there were significant differences for only on agency that had no graduates ($X^2 = 4.70$, p = .030).

Of the 27 candidate predictor variables, there were six significant predictors. Having more diluted urine drug screens (OR = 5.081, p = .002) and greater number of days in the DC programs (OR = 1.019, p = .001) were positive predictors of graduation. Male gender (OR = 0.373, p = 0.47), no high school diploma/GED (OR = 0.214, p = .004), rearrests (OR = 0373, p = .002), and number of jail sentencing sanctions (OR = 0.439, p = .001) were negative predictors of graduation. The Hosmer and Lemeshow Goodness of Fit statistic ($X^2 = 11.3724$, df = 8, p = .182) documented that the model predicts the data well. The c statistic (0.949) documented highly acceptable predictive ability of the model with 94.9% of all possible pairs of graduates and dropouts predicted correctly.

Discussion: The final prediction model suggests that males with no high school education diploma or GED, greater rearrests, and more jail sentencing sanctions are at-risk for not graduating from the Shelby County DC. Education is the only modifiable factor for DC graduation which has implications for DC practice changes and future health literacy research with the DC client population. Drug Court practice changes include: (a) evaluate client literacy and health literacy after drug detoxification; (b) develop and evaluate low literacy DC materials and programs; (c) integrate and require adult reading and GED classes; (d) evaluate need for and design and evaluate programs for men; (e) evaluate and refine exiting programs for women. Future research will: (a) validate the prediction model using cross-validation statistics; (b) develop separate prediction models for men and women; (c) develop a unified data base with continuous variables and MADCE Model variables for DC program reports and evaluation; and (d) use the MADCE Model and Social-Ecological Model to examine Offender Perceptions and Post-Program Outcomes in clients.

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Chapter 1. Introduction

Overview

Substance use disorder in the United States adversely effects society reflected in an overburdened justice system from offender incarceration for drug-related crimes (Bureau of Justice Assistance, 2004; Butzin, Saum, & Scarpitti, 2002; Marlowe, 2010) and a strained healthcare system from costs in excess of $216 billion dollars (R. Clark, Connell, & Samnaliev, 2010) associated with drug-related mental and physical illnesses (National Drug Intelligence Center, 2004; Substance Abuse and Mental Health Services Administration, 2008; U.S. Department of Justice, 2010). Effective healthcare treatment programs for substance use disorder, however, are limited and underused (Ericson, 2001). There are many offenders of nonviolent crimes with substance use disorder and other mental health problems who have been diverted to Drug Courts. Drug Court (DC) treatment programs are an exemplar justice intervention for substance use disorder for non-violent criminal arrestees (National Institute of Justice, 2011). Drug Court treatment programs focus on crime reduction outcomes (Government Accountability Office, 2005) with limited focus on mental health outcomes (National Institute on Drug Abuse, 2007). The majority of DC program evaluation has focused on admission data and outcomes using univariate and bivariate analyses, rather than longitudinal data using multivariate analyses to identify multivariate predictors of DC graduation. Thus, the purpose of this study is to: (a) describe the Sample Severity for Drug Court clients; (b) discuss the differences between Drug Court graduates and dropouts for Sample Severity, Drug Court Practices, and In-Program Behavior; and (c) develop a prediction model for Drug Court graduation.

Background

This chapter will provide information on: (a) substance use disorder as a public health problem; (b) DC as a criminal justice intervention; and (c) the Multi-Site Adult Drug Court Evaluation Model. Each of these topics will be discussed in turn.

Substance Use Disorder as a Public Health Problem

Because the DC literature uses multiple terms for drug addiction, it is important to note that a newer mental health term, substance use disorder (American Psychiatric Association, 2012), will be used rather than the older terms: (a) addiction (Lessenger & Roper, 2002; Speck, Connor, Hartig, Cunningham, & Fleming, 2008); (b) drug addiction (Goldkamp, White, & Robinson, 2001; Nolan, 2002; Wolfer, 2006); (c) drug dependence (R. King & Pasquarella, 2009); (d) drug abuse (Bowser, Lewis, & Dogan, 2011; Harrison & Scarpitti, 2002; Longshore et al., 2001; Prendergast, Hall, Roll, & Warda, 2008; Roll, Prendergast, Richardson, Burdon, & Ramirez, 2005; Shaffer, Hartman, Listwan, Howell, & Latessa, 2011; Wenzel, Longshore, Turner, & Ridgely, 2001); (e) drug use (Patra et

al., 2010; Saum, Scarpitti, & Robbins, 2001; Turner et al., 2002); (f) substance abuse (Belenko, 2002; R. Brown, 2010a, 2010b; R. Brown, Allison, & Nieto, 2011; DeMatteo, Marlowe, & Festinger, 2006; Evans, Li, & Hser, 2009); and (g) substance use (Butzin et al., 2002; Hopwood, Baker, & Morey, 2008; Taxman & Bouffard, 2002). Substance use disorder is a complex behavioral disorder characterized by an overconsumption of substance use including alcohol or other legal and illicit drugs accompanied by the development of tolerance and withdrawal, leading to clinically significant impairment in social and occupational functioning (American Psychiatric Association, 2012; National Council of State Boards of Nursing, 2011; Substance Abuse and Mental Health Services Administration, 2011). Illicit drug use includes the use of illegal drugs, like marijuana and heroin, and the inappropriate use of prescription drugs (Physicians and Lawyers for National Drug Policy, 2008). Substance use disorder replaced the term substance abuse and dependence in 2012 (American Psychiatric Association, 2012; National Council of State Boards of Nursing, 2011).

Substance use disorder effects 22.1 million Americans aged 12 years and older (Substance Abuse and Mental Health Services Administration, 2011). Substance use disorder is highest among: (a) American Indian or Alaska Native adult males aged 18 to 25, and (b) unemployed adults who did not graduate from high school and those who completed some college but did not graduate (Substance Abuse and Mental Health Services Administration, 2007). Of the 2 million deaths in the United States annually, one quarter are attributed to substance use disorder (Mathre, 2008; National Institute on Drug Abuse, 2011b). Over $193 billion dollars were spent in 2007 related to substance use disorder on: (a) criminal justice ($113 billion), (b) healthcare ($11 billion), and (c) workforce productivity (468 billion) (National Drug Intelligence Center, 2011; National Institute on Drug Abuse, 2011c).

Substance use disorder is a major public health problem that affects society. Specific public health problems associated with substance use disorder include: (a) low birth weight infants and premature birth (Ladhani, Shah, & Murphy, 2011; Pinto et al., 2010); (b) motor vehicle accidents (Li et al., 2012; National Institute on Drug Abuse, 2010); (c) homicides (Cretzmeyer, Sarrazin, Huber, Block, & Hall, 2003); (d) suicides (Marshall, Galea, Wood, & Kerr, 2011); (d) sexual abuse (Felitti et al., 1998); (e) child abuse (Dube et al., 2003; Swogger, Conner, Walsh, & Maisto, 2011); (f) cardiovascular diseases (Aryana & Williams, 2007; National Institute on Drug Abuse, n.d.; Romanelli & Smith, 2006), (g) hepatitis (Speck et al., 2008); (h) HIV/AIDS (Jarlais, 2010; National Institute on Drug Abuse, 2011a; Orwat et al., 2011); (h) mental illness (Druss et al., 2008; Hu, Kline, Huang, & Ziedonis, 2006); and (i) homelessness (Rhoades et al., 2011). While healthcare treatment for substance use disorder is limited (Hutchings & King, 2009), Drug Courts offer substance use disorder treatment through the criminal justice system to non-violent drug offenders.

Drug Court Treatment Programs

Drug Court treatment programs are a cost effective and non-adversarial approach for treating and rehabilitating persons with substance use disorder arrested for non-violent crimes. Drug Courts save taxpayers money by reducing prison costs associated with incarceration of criminals with substance use disorder. Annual costs for substance use treatment are estimated to be $4,300 dollars per DC client compared to prison costs estimated to be $23,000 per inmate (R. King & Pasquarella, 2009). Drug Court treatment programs also save community resources by diverting less serious drug-related offenders from traditional criminal court, and reducing jail overcrowding (Office of Justice Programs, 1998). The DC approach focuses on client support for health improvement through rehabilitation services and intensive judicial supervision rather than coercion and punishment associated with the traditional criminal justice system experienced by jail inmates (Turner et al., 2002). However, clients are sanctioned for breaking DC rules as a way to keep clients accountable for their poor choices (R. Brown et al., 2011; R. King & Pasquarella, 2009; Turner et al., 2002). The DC client voluntarily enters the DC program and agrees to work with DC staff to attain sobriety and complete the program(Bureau of Justice Assistance, 2004), with 48% graduation rates nationally (R. Brown, 2010b).

There are two DC models: (a) deferred prosecution, and (b) post-adjudication (Butzin et al., 2002; Kalich & Evans, 2006; R. King & Pasquarella, 2009). In the deferred prosecution model, defendants are not required to plead guilty to their charges before entering the DC treatment program (R. King & Pasquarella, 2009). Deferred prosecution is a prison diversion option for first-time drug offenders (Office of Program Policy Analysis & Government Accountability, 2009) In the post-adjudication model, defendants are required to plead guilty to their charges but sentencing is suspended during DC program participation (Kalich & Evans, 2006; Turner et al., 2002). Post-adjudication serves non-violent drug offenders who typically have prior drug convictions (Office of Program Policy Analysis & Government Accountability, 2009). Both models allow expungement of charges upon successful completion of the DC program, but failure to complete the program results in prosecution (R. King & Pasquarella, 2009; Nolan, 2002).

There are over 2,500 DC programs in the United States (National Institute of Justice, 2011). Drug Court programs serve a variety of special populations: (a) adult; (b) juvenile; (c) family; (d) Native Americans in tribal communities with substance use disorder; (e) repeat arrestees for driving while impaired (DWI) including alcohol and other drugs; (f) college students with excessive use of substances; (g) inmates (local, state, and federal) prior to community reentry; and (h) veterans with substance use disorder; (National Association of Drug Court Professionals, n.d.; National Institute of Justice, 2011). All Drug Courts follow the same ten elements for program guidelines and performance benchmarks as outlined in *Defining Drug Courts: The Key Components* specified by the National Association of Drug Court Professionals (Bureau of Justice Assistance, 2004). The ten elements include: (a) integration of drug and alcohol treatment services with the justice system; (b) promote public safety and DC client's due process rights; (c) early identification and prompt client placement in the program; (d) client

access to a continuum of drug, alcohol, and related rehabilitation treatment services; (e) frequent drug and alcohol testing to monitor client abstinence; (f) strategic planning to promote the client's compliance to the program; (g) ongoing interaction between the DC judge and client to foster client's program completion; (h) ongoing monitoring and evaluation to measure program effectiveness; (i) interdisciplinary education to promote effective DC programs; (j) DC partnership building with community organizations to foster local support for program effectiveness (Bureau of Justice Assistance, 2004).

Drug Courts are located in urban, suburban, or rural settings and the urban Drug Courts graduate more than 832 clients annually (Roman, Townsend, & Bhati, 2003). Smaller courts have crime recidivism rates between 22.5 - 24.0 %, whereas large urban Drug Courts have 6 to 7 % higher crime recidivism rates (Roman et al., 2003).

Nationally, the majority of DC clients are: (a) male (74%) (Turner et al., 2002); (b) ranging in age from 28 to 40 years (Brown, 2010); (c) one-third unemployed (Butzin et al., 2002); (d) half with less than a high school diploma (Turner et al., 2002); (e) predominately White (50%-95%) with larger minority populations in urban DC programs (Brown, 2010; Turner et al., 2002); (f) over half with one prior felony conviction (Belenko, 2001); and (g) half with previous incarceration (Belenko, 2001). Because DC clients have low education and employment problems, they are a population at-risk for poor HL.

As a criminal justice intervention, Drug Courts lower substance use disorder and diminish crime and use among DC graduates compared to offenders processed through traditional court (R. King & Pasquarella, 2009; Marlowe, 2010; Taxman & Bouffard, 2002). Reducing substance use disorder reduces crime because: (a) drug users are three to four times more likely to commit crimes including robbery, burglary, prostitution, and shoplifting than non-drug users (Bennett, Holloway, & Farrington, 2008); (b) more than two-thirds of local jail inmates are substance users (Karberg & James, 2005); and (c) more than half of the local, state, and federal inmates use drugs or alcohol at the time of their offense (Mumola & Karberg, 2006). The Multi-Site Adult Drug Court Evaluation (MADCE) study examined reductions in drug relapse at 18 months post-program for DC participants and similar offenders in non-DC criminal justice programs and showed: (a) a self-report of fewer days of drug use relapse (2.1 days versus 4.8 days) (Urban Institute, 2010); and (b) less illegal drug use (29 % versus 46 %) per oral fluids drug test (Rossman, Roman, Zweig, Rempel, & Lindquist, 2011).

Drug Courts use recidivism as the primary outcome for crime reduction. However, recidivism lacks consistent definitions and measurement in the DC literature. Using the Federal Bureau of Investigation (FBI) definition of recidivism as an arrest and charge with a serious offense (Roman et al., 2003), crime recidivism rate at 18 months for DC graduates is 17 % nationally (Huddleston, Marlowe, & Casebolt, 2008) compared to 66 % recidivism rate at 36 months among incarcerated persons (Bureau of Justice Statistics, 2012; Huddleston et al., 2008; McKean & Ransford, 2004). Recidivism rates are best during DC in-program supervision (Belenko, 2001; Government Accountability Office, 2005). Meta-analyses documents a 9-10% reduced crime recidivism for DC

graduates at 1 year (Rempel, 2003; Shaffer, 2006), and reduced recidivism lasting up to18 months (Goldkamp & Weiland, 1993) and 24 months (Gottfredson, Kearley, Najaka, & Rocha, 2005).

Multi-Site Adult Drug Court Evaluation Model

Drug Court criminal justice program evaluation and research are guided by logic models. Logic models describe logical linkages among program resources, activities, and outcomes related to a specific problem or situation like crime recidivism and reduced drug use (Tyler, 2003). Drug Court research logic models illustrate how resources are invested to generate program outcomes including: (a) reduced drug use and crime recidivism; (b) improved employment and family bonding; and (c) improved drug treatment aftercare (R. Brown et al., 2011; National Institute of Justice, 2010). These DC logic models direct data collection for national reports and research. The exemplar DC model is the MADCE Model which was used in the National Institute of Justice (NIJ) MADCE Study. The purpose of the MADCE Study was to evaluate effects of Drug Courts on substance use disorder, crime, and other outcomes related to DC costs and benefits which support policy development and enhance DC program practices (S. Rossman, J. Roman, J. Zweig, M. Rempel, et al., 2011).

The MADCE model conveys how resources as an input result in program activities with immediate and short-term outcomes for clients while they are in the program. Program participation is expected to yield long-term outcomes associated with decreased substance use and criminal behavior. The MADCE model includes six domains: (a) Drug Court Context, (b) Target Population Severity, (c) Drug Court Practices, (d) Offender Perceptions, (e) In-Program Behavior, and (f) Post-Program Outcomes. The MADCE model will be used for this study. The MADCE model is depicted in **Figure 1-1.** Details of this model are discussed in the Chapter 2 and in Chapter 3. Note that for this study's research questions, the MADCE model Target Population Severity domain is referred to as Sample Severity because of the sample characteristics of DC clients.

Significance

Drug Courts have been conceptualized as a legal intervention for substance use disorder (Butzin et al., 2002; Marlowe, 2010) rather than a comprehensive primary care, mental health and intervention. Drug Courts require a mental health and judicial system approach to improve DC treatment program graduation, a health outcome in the DC client population. Because the addictive behaviors associated with substance use disorder are so primary, interventions must be targeted to improve health outcomes among DC clients. Future health literacy research may be particularly important to improve DC outcomes because almost half of all persons admitted to DC have a high school education or less (R. Brown et al., 2011; Butzin et al., 2002; Office of Justice Programs, 1998; Roll et al., 2005; Shaffer et al., 2011; Turner et al., 2002). This study provides the foundation

Drug Court Context	Target Population Severity	Drug Court Practices	Offender Perceptions	In-Program Behavior	Post-Program Outcomes
Community Setting Demographics Urbanicity Drug arrest rate Poverty/economic **Drug Laws** Mandatory sentences Drug law severity **Court Characteristics** Court size Court resources	**Drug Use** Addiction severity Drugs of abuse Drug use history **Criminality** Felony/misdemeanor charge Recidivism risk - prior arrests/convictions Opportunity to offend (street days) **Other Risk Factors** Health problems Mental health problems Employment problems Housing instability Family conflict Family support Close ties to drug users Close ties to law breakers **Demographics** Age, gender, race Marital status, children Education, income	**Use of Legal Pressure** Severity of consequences for failure **Individual Court Experiences** Drug court participation Drug testing requirements practices Sanctions rules, practices Supervision requirements/practices Prosecution involvement Interaction with judge and supervising officers Court appearances **Drug Court Practices** Leverage Program intensity Predictability Rehabilitation focus Timeliness of intervention Admission requirements Completion requirements **Drug Treatment** Treatment history Days of treatment by type Treatment requirements Support services by type offered and used	**Perceived Legal Pressure** Severity and likelihood of termination and alternative sentence **Motivation** Readiness to change stage **Understanding of Rules** Received expected sanctions and rewards Understood expected behavior **Perceived Risk of Sanctions and Rewards** General deterrence Certainty/severity of sanctions Certainty and value of rewards **Perceptions of Court Fairness** Procedural justice Distributive justice Personal involvement of judge and supervising officer	**Compliance with Drug Intervention** Likelihood of entry Number and type of drug test violations Percentage of treatment days attended Treatment duration and retention Treatment graduation and termination **Compliance with Supervision** Court FTAs - percentage of scheduled Case management FTAs - percentage of scheduled Violations of supervision requirements Drug court graduation	**Reduced Drug Use** Any, type, and frequency of self-reported use post-program Results of saliva test **Reduced Recidivism** Any, type, and frequency of self-reported offending post-program Any, type, and number of arrests/convictions post-program Decrease in post-intervention incarceration **Improved Functioning** Reduction in health and mental problems Increase in likelihood and days of employment Gains in economic self-sufficiency Reductions in family problems **Post-Program Use of Services** Type and amount of drug treatment/aftercare Type and amount of other support services

Figure 1-1. Multi-Site Adult Drug Court Evaluation Model.

for future research using health literacy to improve DC graduation by building on previous cross-sectional research using univariate and bivariate analyses. Longitudinal existing DC client data will be used for multivariate secondary data analysis for: (a) Sample Severity of DC clients; (b) differences between Drug Court graduates and dropouts for Sample Severity, Drug Court Practices, and In-Program Behaviors; and (c) a prediction model for Drug Court graduation. Health literacy data, however, were not available for this study. Therefore, a review of literature on: (a) health literacy and health outcomes; (b) literacy and health literacy; and (c) a new health literacy model are presented in Chapter 6, Future Drug Court Health Literacy Research.

Research Questions

This study investigated three research questions to examine the predictors of DC client graduation. Most DC studies have focused on baseline data using univariate and bivariate analyses. Therefore, this study uses longitudinal data and multivariate analyses to identify predictors of DC graduation.

- Research question one is "What is the sample severity for Drug Court clients?"

- Research question two is "What are the differences in Sample Severity, Drug Court Practices, and In-Program Behavior for Drug Court graduates and dropouts?"

- Research question three is "What is the prediction model for Drug Court graduation?"

Assumptions

Assumptions are accepted statements that are unsupported by research. The following were assumptions of this study:

- Drug Court graduation is an indicator of improve health outcomes.

- Drug Court graduation is a surrogate for sobriety or sober living.

- Mental health interventions improve mental health outcomes in DC clients.

- Drug Court data used for secondary analysis is accurate and was collected following DC data collection procedures.

- The DC database offers a breadth of data.

- The DC database generates useful research questions.

- Substance use disorder is a chronic illness.

Limitations

Limitations point out the weakness of the study as identified by the author. The following were limitations of this study:

- Measurement level of the variables was primarily dichotomous.

- Most variables were nominal or ordinal level of measurement.

- Post-program data were not available for secondary data analysis.

- The DC database was not designed for research and analysis.

- Because of missing data for 197 clients, driver's license variables and secondary drugs of choice variables were removed for data analysis.

- Because substance abuse is both a chronic and acute illness, DC mental health interventions are difficult to design and outcomes are difficult to measure.

- Drug Court outcomes focused mainly on crime recidivism with less emphasis on health improvement outcomes.

- Theoretical definitions of variables in the DC dataset were absent.

- Data analysis used logistic regression because "graduation" was a discrete variable.

- Post-Program Outcomes data were not available.

- Offender Perceptions data were not available.

- Health literacy data were not available.

Definitions of Terms

The definitions of terms for this study are listed in **Table 1-1.**

Table 1-1. Definitions of Terms.

Term	Definition
Drug Court	Shelby County Drug Court (DC) is located in Memphis, TN, and serves the Mid-South area with over 1 million people.
All Drug Court Clients	Shelby County DC graduates and dropouts in the study sample from January 1, 2009 through March 17, 2011.
Drug Court Graduates	Clients who attained sobriety and finished the Shelby County DC program from January 1, 2009 through March 17, 2011.
Drug Court Dropouts	Clients terminated from the Shelby County DC program from January 1, 2009 through March 17, 2011.
Drug Court Sample Severity	Shelby County DC client characteristics upon enrollment from January 1, 2009 through March 17, 2011: (a) demographics, (b) drugs of abuse, (c) addiction severity, (d) employment problems, and (e) housing instability.
Drug Court Practices	Shelby County DC practices based on: (a) court experiences, and (b) drug treatment.
In-Program Behavior	Client compliance with Shelby County DC: (a) drug treatment interventions (likelihood of program entry, drug test violations, treatment duration and retention), and (b) attendance of supervised program requirements (failure to attend scheduled court and case management meetings, and program violations).
Drug Court Graduation	A Shelby County DC program outcome of sobriety attainment and treatment program completion.

Chapter 2. Review of Literature

The purpose of this chapter is to: (a) describe the Drug Court Treatment Program; (b) discuss the Multi-Site Adult Drug Court Evaluation (MADCE) Model; and (c) present the MADCE model. The MADCE Model will be used to guide the dissertation because the existing Shelby County DC data is organized by the MADCE Model.

Drug Court Treatment Program

Drug Courts provide year-long supervised community-based drug addiction treatment programs as an alternative to incarceration for non-violent drug-related crimes (Butzin et al., 2002; Marlowe, DeMatteo, & Festinger, 2003). Optimal treatment duration is at least six months but not to exceed eighteen months. Treatment less than 90 days has minimal effects on reducing drug use and diminished effects on reducing drug use beyond eighteen months (National Center for State Courts, 2011). Drug Court clients are the program participants arrested for nonviolent drug-only offenses such as possession and transportation of drugs, and intoxication excluding drug sales (Lessenger & Roper, 2002; Marlowe et al., 2003; National Institute of Justice, 2008). The average DC client is: (a) male; (b) African American; (c) unemployed; (d) low education level with a high school diploma/GED or less; (e) extensive criminal history; and (f) prior failed drug treatments (Belenko, 2001; Office of Justice Programs, 1998).

Drug Court programs are complex with multiple phases and requirements for clients to complete (National Drug Court Resource Center, 2012). Drug Court programs nationally (Gottfredson et al., 2005; Huddleston et al., 2008; National Institute of Justice, 2008) have four phases that require seven to nine mandatory activities per phase, ranging from an as needed basis to three times per week (Roll et al., 2005; Wolfe, Guydish, & Termondt, 2002). The mandatory activities change in frequency during each phase which creates challenges for the clients (Roll et al., 2005; Wolfe et al., 2002). Program challenges for DC clients are that they must independently initiate and keep appointments for complex, year-long, and ever-changing treatment schedules. Because of transportation access problems (Peters & Peyton, 1998) related to charges for driving under the influence (DUI) of drugs or alcohol (National Center for DWI Courts, n.d.), DC clients struggle to keep DC program appointments and consequently clients are at-risk for termination from the program.

Another program challenge is that health literacy literature documents that health literacy interventions improve health outcomes (DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004; J. Gazmararian, Jacobson, Pan, Schmotzer, & Kripalani, 2010; D. G. Morrow, Weiner, Steinley, Young, & Murray, 2007; Pignone, DeWalt, Sheridan, Berkman, & Lohr, 2005). The primary DC program navigational tool, however, is a client handbook that is written at too high a reading level. Clients have low education and are therefore at risk for low literacy and low health literacy. Instructions for persons with low literacy should be written at the fifth grade for comprehension and written at the third

grade level or lower to facilitate comprehension for persons with very low literacy (Doak, Doak, & Root, 1985). Because DC client handbooks are used to instruct clients about program rules, these handbooks must be written at the fifth grade or lower. However, no studies were found that evaluated DC client handbooks for low literacy.

The Fry Index of Readability Formula and the Suitability Assessment of Materials (SAM) are reliable and valid instruments to evaluate health information materials. The Fry Index of Readability Formula assesses readability of materials for grade levels 1 through 17. Scores from the Fry Index of Readability Formula are calculated in three steps: (1) select three random samples of 100-word passages; (2) count the number of sentences in all three 100-word passages and calculate the average; and (3) count the number of syllables in all three 100-word passages and calculate the average. The results are plotted on the Fry graph to indicate the approximate grade level.

Grade level readability is one factor that contributes to the overall readability of written materials. Materials written on a third to sixth grade reading level may be difficult to comprehend if the material's organization, layout, and design are neglected. The SAM addresses the material's organization, layout, design, and reading grade level. The SAM rates materials using a 0 -2 scale in for six factors: (a) content; (b) literacy; (c) graphics; (d) layout and type; (e) learning and motivation; (f) and cultural appropriateness. The SAM provides a numerical score (percent) to materials that may fall in one of the three categories: (a) superior, (b) adequate, or (c) not suitable (Doak, Doak, & Root, 1996). Based on an evaluation of seven DC client handbooks by the author using the Fry Index of Readability Formula and the SAM, none of the handbooks meet low literacy standards **(Table 2-1)**.

Multi-Site Adult Drug Court Evaluation Model

The National Institute of Justice (NIJ) has a DC model that supports DC research. The NIJ funded the Multi-Site Adult Drug Court Evaluation (MADCE) research study. The MADCE study used a framework with a logic model design to measure short-term, intermediate, and long-term outcomes for DC clients including changes in drug use and criminal behaviors (National Institute of Justice, 2010) **(Figure 2-1)**. Therefore, the MADCE Model is a good match for DC research, reporting, database development, data collection, and it will be used to guide this study to develop a prediction model for DC treatment program graduation using secondary data analysis of existing DC data. The MADCE Model was created using the Temple University and the Research and Development Corporation (RAND) frameworks (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011) and focusing on DC program evaluation, using recidivism as the primary outcome. The Temple University framework focused on DC management practices among different Drug Courts and does not address how Drug Courts affect behavior change in clients (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). The RAND Corporation framework focused on variations in DC practices and changes in client behaviors while in the DC program (Longshore et al., 2001; Turner et al., 2001). Thus, the MADCE Model addresses linkages between DC practices and

Table 2-1. Fry Index of Readability and the Suitability Assessment of Materials of Drug Court Client Handbooks.

| Drug Court Handbook | Fry Index of Readability* | | | Suitability Assessment of Materials† | | |
	Average # Sentences	Average # Syllables	Grade Level	Points	Percent	Quality§
Buffalo, NY	5.7	169.3	13th	19	34.1	Not suitable
Lewis County, NY	5.7	140.7	8th	16	36.4	Not suitable
Macomb County, MI	3.0	174.7	15th	6	13.6	Not suitable
Orleans Parish, LA	4.3	164.7	13th	10	22.7	Not suitable
Sarasota County, FL	6.3	163.7	11th	2	4.5	Not suitable
Sebastian County, AR	5.0	166.3	13th	5	11.4	Not suitable
Shelby County, TN	6.7	163.0	11th	12	27.3	Not suitable

Note: Fry Index of Readability=Fry Index of Readability Formula.
*Fry Index of Readability Formula score uses the average number of sentences followed by the average number of syllables per 100 words counted in three 100-word samples to plot the reading grade level for the materials.
† The Suitability Assessment of Materials score uses a rating scale for 0-2 points per 22 categories out of 44 total points possible. The percent is scored points divided by the total points.
§ Interpretation for quality is categorized as superior material (70–100%); adequate material (40–69%); and not suitable material (0–39%).

Drug Court Context	Target Population Severity	Drug Court Practices	Offender Perceptions	In-Program Behavior	Post-Program Outcomes
Community Setting Demographics Urbanicity Drug arrest rate Poverty/economic **Drug Laws** Mandatory sentences Drug law severity **Court Characteristics** Court size Court resources	**Drug Use** Addiction severity Drugs of abuse Drug use history **Criminality** Felony/misdemeanor charge Recidivism risk - prior arrests/convictions Opportunity to offend (street days) **Other Risk Factors** Health problems Mental health problems Employment problems Housing instability Family conflict Family support Close ties to drug users Close ties to law breakers **Demographics** Age, gender, race Marital status, children Education, income	**Use of Legal Pressure** Severity of consequences for failure **Individual Court Experiences** Drug court participation Drug testing requirements practices Sanctions rules, practices Supervision requirements/practices Prosecution involvement Interaction with judge and supervising officers Court appearances **Drug Court Practices** Leverage Program intensity Predictability Rehabilitation focus Timeliness of intervention Admission requirements Completion requirements **Drug Treatment** Treatment history Days of treatment by type Treatment requirements Support services by type offered and used	**Perceived Legal Pressure** Severity and likelihood of termination and alternative sentence **Motivation** Readiness to change stage **Understanding of Rules** Received expected sanctions and rewards Understood expected behavior **Perceived Risk of Sanctions and Rewards** General deterrence Certainty/severity of sanctions Certainty and value of rewards **Perceptions of Court Fairness** Procedural justice Distributive justice Personal involvement of judge and supervising officer	**Compliance with Drug Intervention** Likelihood of entry Number and type of drug test violations Percentage of treatment days attended Treatment duration and retention Treatment graduation and termination **Compliance with Supervision** Court FTAs - percentage of scheduled Case management FTAs - percentage of scheduled Violations of supervision requirements Drug court graduation	**Reduced Drug Use** Any, type, and frequency of self-reported use post-program Results of saliva test **Reduced Recidivism** Any, type, and frequency of self-reported offending post-program Any, type, and number of arrests/convictions post-program Decrease in post-intervention incarceration **Improved Functioning** Reduction in health and mental problems Increase in likelihood and days of employment Gains in economic self-sufficiency Reductions in family problems **Post-Program Use of Services** Type and amount of drug treatment/aftercare Type and amount of other support services

Figure 2-1. Multi-Site Adult Drug Court Evaluation Model.

Source: Reprinted with permission from the National Institute of Justice. (2010). Multi-site adult drug court evaluation conceptual framework. Retrieved October 24, 2011, from http://www.nij.gov/topics/courts/drug-courts/madce-conceptual-framework.htm.

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outcomes with emphasis on both client and program characteristics. It helps determine the resources used for inputs to guide program outputs and examine how Drug Courts work best and cost savings for the criminal justice system (Zweig et al., 2011).

Before describing the MADCE Model, it is important to explain the naming convention for terms in the model. The MADCE Model authors refer to the bolded terms listed in the light grey shaded boxes under the column headings as concepts (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011) in **Figure 2-1**. There is no name for the terms listed in the black shaded column heading box. Therefore, domain will be the term used to describe the black shaded column heading box. A domain is the main subject matter of concern embedded with concepts that help describe the concerns (Zajacova, 2012). Domains do not stand apart, rather they relate to all other domains with concepts flowing from the domain (Purnell, 2002). The MADCE domains are: (a) Drug Court Context, (b) Target Population Severity, (c) Drug Court Practices, (d) Offender Perceptions, (e) In-Program Behavior, and (h) Post-Program Outcomes. Each domain in the MADCE Model will be discussed in turn.

Drug Court Context

Drug Court Context describes the differences in Drug Courts in terms of court type, location, resources, eligibility criteria, and screening procedures (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). Even though Drug Courts share common characteristics, all Drug Courts cannot be compared because they are not all exactly the same (Harrison & Scarpitti, 2002). For example, urban Drug Courts frequently have larger caseloads and clients with greater criminal histories than clients in rural Drug Courts, therefore, crime recidivism rates are higher in urban Drug Courts (R. Brown, 2010b).

Target Population Severity

Target Population Severity is the extent of clients' drug use and the severity criminal behaviors along with other characteristics such as health status, social support, and demographics (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). Drug Court clients are often polydrug users with fifteen years or greater history of illicit drug use (Office of Justice Programs, 1998). Persons with extensive histories of intravenous drug use are almost 5.5 times less likely to complete a DC program than non-intravenous drug users (Roll et al., 2005).

Drug Court Practices

Drug Court Practices are the day-to-day management activities that focus on: (a) program participation requirements; (b) client consequences for failure to meet program rules; and (c) treatment guidelines (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et

al., 2011). These activities are process oriented and describe how clients proceed through the DC program (Turner et al., 2001).

Offender Perceptions

Offender perceptions are the client's understanding about DC expectations, perception of DC fairness, and their desire to change behavior (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). Drug Court client's motivation is vital to treatment adherence. Staying of out of jail, stable housing, and family support are extrinsic motivators for completing DC treatment programs (Patra et al., 2010). Drug Court clients' recognition of their mental health problems, with a strong desire to get addiction treatment, are intrinsic motivators for completing a DC program (M. Webster et al., 2006).

In-Program Behavior

In-Program Behavior is the client's participation in drug treatment and compliance with supervision while enrolled in DC. In-program behaviors determine client graduation or termination from the program (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011).

Post-Program Outcomes

Post-Program Outcomes is the period following DC completion that depicts clients' compliance with DC supervision in participation of ongoing drug treatment aftercare (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). The post-program period begins on the graduation date for DC graduates (Rempel, 2003) and may continue up to three years post graduation (Gottfredson et al., 2005) with one DC study showing an unusual fourteen years post-program period (Finigan, Carey, & Cox, 2007). Post-Program Outcome indicators include reductions in clients' drug use, crime recidivism, health problems, and family problems. Other Post-Program Outcomes indicators include clients' economic gain through employment and increased use of drug aftercare support services.

In summary, the MADCE Model was created for DC data collection, program evaluation, and research based on the Temple University and RAND Corporation frameworks. It emphasizes DC program and client characteristics for comparison of differences and similarities among programs. The MADCE Model links DC outcomes during the program such as compliance with drug treatment, and following the DC completion period such as reduced crime recidivism and drug use.

Model Used to Guide Dissertation Research

The MADCE Model will be use for this study. Data are available for three of the six MADCE Model domains: (a) Target Population Severity; (b) Drug Court Practices; and (c) In-Program Behaviors. No data are available for Drug Court Context. However, the Drug Court Context will be described in Chapter 3, Methods, under Site and Sample sections. The MADCE Model guides selection of variables to answer the following research questions:

- Research question one is "What is the Sample Severity for Drug Court clients?"

- Research question two is "What are the differences in Sample Severity, Drug Court Practices, and In-Program Behavior for Drug Court graduates and dropouts?"

- Research question three is "What is the prediction model for Drug Court graduation? "

Summary

In summary, Drug Courts are effective drug addiction treatment programs for non-violent crime offenders. Drug Court clients are typically unemployed males with low education and an extensive criminal history. These programs operate in four phases with mandatory activities up to three times per week in each phase. Optimal treatment duration is at least six months, but not to exceed eighteen months. Program challenges that DC clients face include adhering to treatment activities and using client handbooks to navigate the DC program that are at too high a reading level. The MADCE Model will be used to guide selection of study variables for the secondary data analysis of existing DC data because it was created for DC data collection, database development, reporting, and research. The education variable will serve as proxy for literacy. This study will lay the foundation for future research using a health literacy approach to improve graduation and health outcomes in DC clients.

Chapter 3. Methodology

The methodology chapter describes the study's design, site, sample, instruments, and operational definitions. It also includes the study procedure, and the statistical analysis strategy to answer the research questions. Each will be discussed in turn.

Design

This study is a non-experimental longitudinal design using secondary data analysis of existing Drug Court (DC) records from the Shelby County DC of African American and Caucasian, male and female clients. Data were analyzed from January 1, 2009 through March 17, 2011 for: (a) clients admitted to Shelby County DC, and (b) clients who graduated or dropped out of DC during this time period. The Multi-Site Adult Drug Court Evaluation (MADCE) Model guided the design and data collection. Data evaluated three MADCE Model domain at three points in time: (a) DC admission (Sample Severity domain); (b) during the DC program (Drug Court Practices and In-Program Behavior domain); and (c) at the end of DC program (graduation or dropout). The first MADCE Model domain, Drug Court Context, guides the description of this study's site. The Institutional Review Board (IRB) at The University of Tennessee Health Science Center approved this study as an expedited study with waiver for consent (**Appendix A**). The Shelby County DC also approved the study (**Appendix B**).

Site

The Shelby County DC site will be discussed according to the MADCE Model's Drug Court Context domain. The DC Context domain addresses: (a) community setting; (b) drug laws; and (c) court characteristics. Each will be addressed in turn.

Community Setting

Community setting describes the Shelby County DC location and demographics. Data came from the Shelby County DC in a large Mid-South city. The Shelby County DC program is government-operated serving urban, suburban, and rural adult clients in a tri-state region. Of the 2,550 DC treatment programs in the United States (National Institute of Justice, 2011), the Shelby County DC is one of the top-performing one-hundred mentor courts in the United States that have met special performance criteria outlined in the national Key Components for Drug Courts (Bureau of Justice Assistance, 2004; Speck et al., 2008). The Shelby County DC has a 50 % graduation rate (Shelby County Drug Court, 2007) compared to the national 48 % graduation rate (R. Brown, 2010b), and a 37 % crime recidivism rate (Shelby County Drug Court, 2008) compared to the national crime recidivism rate ranging from 17 - 31 % (Roman et al., 2003). However, crime

recidivism rates are greater in urban Drug Courts because metropolitan areas have the most severe drug problems (Roman et al., 2003).

Shelby County DC clients are predominately African American (63%) males (76%), with an average age of 31 years and a high school education or less (Shelby County Drug Court, 2009b). Nationally, DC clients are predominantly Caucasian males, with an average age over 30 years and a high school education or less (Office of Justice Programs, 1998). Even though DC clients nationally are predominantly Caucasian (50 % or more), race and ethnicity majority often depends on the demographics of the city or town in which the DC is located (Government Accountability Office, 2005).

Drug Laws

Drug laws address mandatory sentences and drug law severity for clients upon admission to DC. In order to be admitted to a DC program nationally, clients must voluntarily enter the program for substance use disorder treatment. Some clients may have a prior criminal record but they must not have any violent felony convictions, any pending felony case, and not on probation or parole, and not serving time for another charge. Clients are not admitted to the Shelby County DC if they are: (a) under age eighteen; (b) convicted of a prior violent felony; (c) pending a felony charge; (d) serving time for another charge; (e) convicted for selling controlled substances; or (f) diagnosed with co-occurring mental illness that is not controlled (Shelby County Drug Court, 2007).

Clients must follow DC rules to remain in the program. The Shelby County DC program rules specify that clients: (a) must abstain from use of alcohol and illicit drugs; (b) be on time for all DC program activities; (c) maintain confidentiality of other DC clients; and (d) not threaten other DC clients and staff or exhibit violent behavior (Personal communication, A. Parkerson, February 4, 2011). Failure to comply with program requirements and rules may result in court ordered sanctions including: (a) community service; (b) increased participation in 12-Step meetings; (c) curfew; (d) written apology letter by DC client; (e) court fee increases; (f) urine drug testing increase; (g) court appearances increase; (h) treatment supervision increase; (i) incarceration; and (j) termination for DC program (Substance Abuse and Mental Health Services Administration, 2001). Good performance, as evidenced by adherence to program rules, may result in special recognition (Substance Abuse and Mental Health Services Administration, 2001) such as verbal praise from the Shelby County DC Judge or rewards such as gift cards to local grocery or department superstores (Shelby County Drug Court, 2007).

Court Characteristics

Court characteristics refer to the court size and court resources. Each will be discussed in turn. Court size depends on the: (a) population size of the jurisdiction served by the DC; and (b) number of DC graduates for two consecutive years. Nationally, small

jurisdictions have fewer than 100,000 people (Bureau of Justice Assistance, 2003). Medium jurisdictions have between 100,000 and 350,000 people (Bureau of Justice Assistance, 2003). Large jurisdictions have more than 350,000 people (Bureau of Justice Assistance, 2003). The Shelby County DC serves over 935,088 people (U.S. Department of Commerce, 2012). Nationally, the number of DC graduates for a two-year period is: (a) less than 255 clients for small courts; (b) 255-470 clients for medium courts; (c) 471- 610 clients for medium to large courts; (d) 611- 832 clients for large courts; and (e) more than 832 clients for the largest courts (Roman et al., 2003). Shelby County DC graduated 352 clients in a two-year period (Shelby County Drug Court, 2009a). Therefore, based on the size of the jurisdiction served by the Shelby County DC and the number of DC graduates for two consecutive years, Shelby County DC is considered a medium to large size court.

Before discussing court resources, the DC program duration and types of program types will be presented. Nationally, DC program duration is typically a minimum of one year or longer depending on each client's progress with treatment (National Institute of Justice, 2006). The minimum duration of the Shelby County DC program is 52 weeks (Shelby County Drug Court, 2009a). The type of Shelby County DC programs with the percent of clients are: (a) Outpatient (58%); (b) Outpatient DUI (7%); (c) Co-occurring Disorder with Trauma (0.2%); (d) Early Assessment Intervention Treatment (1%); (e) Intensive Outpatient (1%); (f) Mother's Intensive Outpatient (6%); and (g) Residential (27%). Clients pay a monthly fee of $100.00 dollars for DC treatment. Each program will be discussed in turn.

The Outpatient program is the most common program and has four phases. The frequency of treatment for each phase are described in **Table 3-1**. Clients must follow all Shelby County DC program rules and meet the requirements of each phase before they can progress to the next phase. Failure to complete a phase forces the client to return to Phase I. Phase I is the drug detoxification phase when clients undergo supervised withdrawal from drugs or alcohol and learn early recovery skills. Phase II is the stabilization phase when clients undergo relapse prevention. Phase III is the adaptation phase when clients learn new life skills that foster responsibility and accountability development. Phase IV is the aftercare phase when the clients develop educational and vocational skills for successful re-entry into the community. Completing Phase IV culminates with graduation. If clients require greater frequency of treatment, they are enrolled in the Intensive Outpatient program that has one additional group counseling session and one additional court status hearing per week during Phase I and Phase II (Shelby County Drug Court, 2007).

Other Shelby County DC outpatient programs follow the same phases, including: (a) Outpatient DUI, (b) Co-occurring Disorder with Trauma, and (c) Early Onset Intervention Treatment programs. The Outpatient DUI program is for clients arrested for driving under the influence of drugs or alcohol. The Co-occurring Disorder with Trauma program is for female clients who have experienced trauma associated with violence, and have substance use disorder with co-occurring mild mental health issues. The Early

Table 3-1. Shelby County Drug Court Outpatient Program Frequency of Treatment by Phase.

Treatment	Phase I (8 weeks)	Phase II (8 weeks)	Phase III (8 weeks)	Phase IV (24 weeks)
Group Counseling Sessions	3/week	2/week	1/week	Counselor determines
Individual Counseling Sessions				
Treatment Agency Provider	1	1	1	1
Drug Court Counselor	2	2	2	2
*12-Step Meetings	1/week	1/week	1/week	2/week
Random Urine Drug Screen	2/week	2/week	2/week	2/week
Office Visits with Drug Court Counselor	1/month	1/month	1/month	1/month
Court Status Hearings	1/wk	2/month	1/month	1/month
Payment for Drug Court Treatment	$100/month	$100/month	$100/month	$100/month
Identify Drug Rehab Sponsor		x		
Provide Drug Rehab Sponsor's Name and Phone Number			x	
Provide Proof of Education		x		
Begin GED Classes (court ordered)		x		

* 12-Step Meetings include: Alcoholics Anonymous, Narcotics Anonymous, or Cocaine Anonymous.

Assessment Intervention Treatment program is a grant supported program designed to identify and treat clients with substance use disorder and co-occurring mild to moderate mental health issues such as schizophrenia, bipolar disorder, major depression, or anxiety.

The Mother's program is an intensive outpatient program available for women with children under age eighteen who have demonstrated noncompliance during the Outpatient program. In addition to drug addiction treatment, clients enrolled in the Mother's program learn parenting skills and job preparedness skills. Shelby County DC counselors determine the phases for this program.

The Residential program offers inpatient treatment for 1 - 6 months to clients who struggle in the Outpatient program or continue with positive urine drug tests. After completing the Residential program, clients transfer to the Outpatient program for the remaining treatment duration. Shelby County DC counselors determine the phases for this program.

Upon admission to the Shelby County DC, clients are provided with two written educational resources: (a) a letter from the Shelby County DC Judge (**Appendix C**), and (b) the Shelby County Drug Court Client Handbook (Personal communication, A. Parkerson, February 4, 2011) (**Appendix D**). The purposes of these resources are to explain DC rules, expectations for clients, and how the program works. The SAM results indicate the client handbook (SAM = 27.3%) is not suitable and the judge's letter (SAM = 68.0%) is adequate for DC clients' readability and comprehension. In addition to receiving a written copy of the letter, the letter is read to the client by the Shelby County DC Judge, client's attorney, or Shelby County DC counselor.

Sample

A nonprobability purposive sample of clients admitted to the Shelby County DC and graduated or dropped out during January 1, 2009 through March 17, 2011 was used for the record review. Inclusion criteria were: (a) men and women; (b) age 18 years and older; (c) African American and Caucasian, and (d) participate in Shelby County DC programs. Clients were age 18 years and older were chosen because the Shelby County DC program is an adult program (Shelby County Drug Court, 2009b). African American and Caucasian clients were chosen because these races comprise the majority Shelby County DC clients. Only 2% of Shelby County DC clients are not African American or Caucasian (Shelby County Drug Court, 2009b). Exclusion criteria was clients enrolled in Screen Court because it is a separate Shelby County DC program in which clients are responsible for their own rehabilitation services.

A power analysis to calculate sample size could not be done because this is a secondary analysis and subsequently there was no control of the number and characteristics of clients included in the Shelby County DC data file (Thomas & Heck, 2001). Furthermore, no meta-analysis or pilot studies were found in the literature to help

determine the effect size for a power analysis calculation (Gillis & Jackson, 2002). A small effect size of 0.20 will be used for this study because clinical researchers in new areas of research often use a small effect size for significant treatment effects (Engle & Graney, 2000; Gillis & Jackson, 2002). The general rule of thumb for sample size calculations for regression equations using six or more candidate predictors is a minimum of 10 to 30 participants per predictor variable (Palmer & O'Connell, 2009; Van Voorhis & Morgan, 2007). Another general rule of thumb for sample size calculations with regression is that the number of participants should exceed the number of candidate predictors by at least 50 (Van Voorhis & Morgan, 2007). Using the former general rule for this study's final sample of 310 used for analysis, the number of candidate predictor variables should range from 10 – 31 variables entered into the multiple logistic regression analysis of research question three.

<div align="center">

Instruments

</div>

The variables for this study were chosen based on the MADCE Model and the review of literature. Variables available in the Shelby County DC data file are categorized according to MADCE Model domains and include: (a) Sample Severity; (b) Drug Court Practices; and (c) In-Program Behavior. The MADCE Model domains and concepts are described in **Figure 3-1.** Note that this study's variables are in italics. Variables for each domain will be discussed in turn.

Sample Severity

Because the Shelby County DC client is the focus of the study rather than the community's population of drug offenders, Target Population Severity domain name in the MADCE Model was changed to Sample Severity. Sample Severity includes the following concepts: (a) drug use; (b) other risk factors; and (d) demographics. Concepts, variables, and operational definitions for Sample Severity are presented in **Table 3-2.** This is followed by text that explains the rationale for the variable selection, recoding, and new variables created.

Drug use. In the MADCE Model, drug use includes the following sub-concepts: (a) addiction severity, (b) drugs of abuse, and (c) drug use history. In this study, drug use describes the severity of the Shelby County DC client's substance use disorder for addiction severity, and drug of abuse.

Addiction severity. Addiction severity describes the severity of the Shelby County DC client's substance use disorder. Data concerning crack/cocaine use is listed in the Shelby County DC data file as the client's primary or secondary drug of choice. Clients' responses for crack/cocaine use as a primary or secondary drug of choice were used to create a new variable called crack/cocaine Use. The cocaine/crack Use variable was selected to measure addiction severity because: (a) the addiction severity is strongest

Sample Severity	Drug Court Practices	In-Program Behavior
Drug Use	**Drug Treatment**	**Compliance with Drug Intervention**
Addiction severity	Days of treatment by type	Likelihood of entry
Cocaine / Crack Use	*Program Type*	*Days to Drug Court Admission*
Drugs of abuse	*Program Days*	Number and type of drug test violations
Primary Drug of Choice	*Program Number*	*Urine Drug Screen Violations Type*
Primary Drug Number	Treatment requirements	*Urine Drug Screen Violations Number*
Other Risk Factors	*Treatment Agency Type*	**Compliance with Supervision**
Employment problems	*Treatment Agency Number*	Violations of supervision requirements
Employment at Drug		*Violations Type*
Court Admission		*Violations Number*
Employment Hours		*Sanctions Type*
Demographics		*Sanctions Number*
Age, gender, race		*Community Service Sanctions Days*
Education		*Jail Sanctions Days*
Education (Literacy)		Drug court graduation
		Graduation (Health Outcome)

Figure 3-1. MADCE Model Domains, Concepts, and Study Variables.

Source: Modified with permission from the National Institute of Justice. (2010). Multi-site adult drug court evaluation conceptual framework. Retrieved October 24, 2011, from http://www.nij.gov/topics/courts/drug-courts/madce-conceptual-framework.htm.

Note. The study variables are in italics.

Table 3-2. Sample Severity Variables.

Concept Drug Use	Variable	Operational Definition
Addiction Severity	Crack/Cocaine Use	0=No, does not use crack/cocaine 1=Yes, does use crack/cocaine
Drugs of Abuse	Only Primary Drug of Choice*	Alcohol Amphetamine Barbiturates Benzodiazepines Cocaine (Crack) Cocaine(Powder form) Crystal Methamphetamine Diluadid® Ecstasy Heroin Marijuana Methadone Opiates Suboxone® Other
	Primary Drug Number	Total number of primary drugs of choice. Range (1-5).
Other Risk Factors	Employment at Drug Court Admission	0=No, not employed at admission 1=Yes, employed at admission.
Employment Problems	Employment Hours	Hours employed/week. Range (0-40).
Demographics	Age	Years old on last birthday
	Male Gender	0=Female, 1=Male
	African American Race	0=Caucasian, 1=African American
	Education	 No High School Diploma/GED High School Diploma/GED Associates/Undergraduate Degree

*Some clients reported more than one primary drug of choice.

for cocaine/crack (Butzin et al., 2002; Wagner & Anthony, 2007); (b) crack/cocaine is one of the most common drugs used self-reported by DC clients (Butzin et al., 2002; Evans et al., 2009); and (c) clients who use cocaine/crack dropout of DC programs more than clients who do not use crack/cocaine (Butzin et al., 2002; Miller & Shutt, 2001). For this study, cocaine/crack use was scored as yes or no.

Drugs of abuse. Drugs of abuse are the Shelby County DC client's first and second choice drugs they prefer to use. Data concerning the client's primary drug (PD) was a variable selected to measure drugs of abuse because PD choice may predict client dropout and graduation from DC. The relationship of drug of choice to DC dropout is equivocal. Drug of choice has been associated with DC dropout for cocaine (R. Brown, 2010a; A. King & Canada, 2004), heroin (Evans et al., 2009), and polydrug use (Evans et al., 2009). Other studies have found that drug of choice was not related to DC graduation (Roll et al., 2005; Shaffer et al., 2011). The Shelby County DC data file listed drugs of abuse as 14 primary drugs of choice. Because Shelby County DC clients reported more than one PD, a new variable was created to distinguish between single drug preferences and multiple drug preferences. Only primary drug of choice variable was created to show a single drug preference among the 14 primary drugs of choice. For this study, only primary drug of choice was scored as yes or no for: (a) alcohol, (b) amphetamine, (c) barbiturates, (d) benzodiazepines, (e) cocaine/crack, (f) cocaine/powder form, (g) crystal methamphetamine, (h) Diluadid®, (i) ecstasy, (j) heroin, (k) marijuana, (l) methadone, (m) opiates, (n) Suboxone®, and (o) other primary drugs. Primary drug number variable was created to show the total number of PDs. So, for clients who reported only 1 PD choice, the primary drug number is listed as 1. For clients who did not list any PD, data are recorded as missing data.

Other risk factors. In the MADCE Model, other risk factors includes the following sub-concepts: (a) health problems, (b) mental health problems, (c) employment problems, (d) housing instability, (e) family conflict, (f) family support, (g) close ties to drug users, and (h) close ties to law breakers. Other risk factors describe the severity of the client sample. In this study, other risk factors includes one sub-concept: employment problems.

Drug Court clients struggle to keep employment because of their drug use and criminal behaviors (Leukefeld, McDonald, Staton, & Mateyoke-Scrivner, 2004) . Many DC clients are unemployed when they enter DC (Leukefeld, Webster, Staton-Tindall, & Duvall, 2007). Employment problems with DC clients has been associated with: (a) marijuana and cocaine use (J. Webster, Staton-Tindall, Duvall, Garrity, & Leukefeld, 2007); (b) less than high school education (Butzin et al., 2002), and less than full-time and no employment at DC admission (Leukefeld et al., 2004; Roll et al., 2005). Therefore, employment for clients is a DC program goal (Brachtesende, 2004; Fielding, Tye, Ogawa, Imam, & Long, 2002). The Shelby County DC data file listed employment as yes or no and listed the number of hours worked per week. Employment at DC admission and employment hours were variables selected to record employment problems. Employment hours represents work consistency which is problematic among

substance abusers (Staton-Tindall, Duvall, Oser, Leukefeld, & Webster, 2008). For this study, employment was scored as yes or no, and employment hours was scored as the number of hours worked per week.

Demographics. In the MADCE Model, demographics includes the following sub-concepts: (a) age, (b) gender, (c) race, (d) marital status, (e) children, (f) education, and (g) income. For this study, demographics includes: (a) age, (b) gender, (c) race, and (d) education. Demographic data on admission to Shelby County DC were obtained from DC records on age, race, gender, and education. Age is scored as the client's last birthday. Because the Shelby County DC racial demographic is African American and Caucasian, race is recorded as African American and Caucasian. Gender is recorded as male and female. Education was a chosen variable because nationally, more than half of DC clients have less than twelve years of education (Butzin et al., 2002; National Institute of Justice, 2011; Turner et al., 2002; Turner et al., 2001) and education is a proxy variable for literacy. The Shelby County DC data file reported education as: (a) no degree, (b) GED, (c) high school diploma, (d) Associates degree, and (e) Undergraduate degree. Because over half of the Shelby County DC clients have a high school diploma or GED education or less, new education variables were created. New education variables were recorded as: (a) no high school diploma/GED, (b) high school diploma/GED, and (c) Associates/Undergraduate degree.

It is important to note that although the GED is a high school equivalency certificate, GED recipients are more similar to high school dropouts rather than high school graduates for: (a) low employment and low wages (Tyler, 2003); (b) low post secondary education (Cameron & Heckman, 1993); (c) higher crime rates (Cameron & Heckman, 1993); and (d) greater substance use disorder (Zajacova, 2012). However, of the DC studies that included GED to measure education, most studies grouped GED with high school diploma (Butzin et al., 2002; S. Rossman et al., 2011; Sechrest & Shicor, 2001). Furthermore, of the 310 clients in the Shelby County DC sample, only 7 clients had a GED which means there was not enough variance to measure the GED clients separately. Therefore, GED and high school diploma were grouped together to measure education level.

Drug Court Practices

Drug Court Practices outline how the Shelby County DC functions on a daily basis and the process for Shelby County DC clients to navigate the program. Drug Court Practices includes the following concept: drug treatment. Concepts, variables, and operational definitions for Drug Court Practices are presented in **Table 3-3**. This is followed by text that explains the rationale for the variable selection, recoding, and new variables created.

Table 3-3. Drug Court Practices Variables.

Drug Treatment	Variable	Operational Definition
Days of Treatment by Type	Program Type	Outpatient
		Outpatient DUI
		Co-occurring Disorder with Trauma
		Intensive Outpatient
		Mother's Intensive Outpatient
		Early Assessment Intervention Treatment
		Residential
	Program Days	Days spent in programs. Range (1-848).
	Program Number	Programs for treatment services. Range (1-3).
Treatment Requirements	Treatment Agency Type	Alcohol and Chemical Abuse Rehab Center, Inc.
		Cocaine and Awareness Program
		Case Management Inc
		Designing Men
		Health Arts Research Training Center
		Innovative Counseling and Consulting
		Karat Place
		Once Hopeless Treatment Center
		Positive Decisions Psychology
		Rebos Recovery Center
		Serenity Recovery Centers
		Synergy Treatment Centers
		Veterans Administration
		WAVE
	Treatment Agency Number	Treatment agencies for counseling. Range (1-4).

Drug treatment. In the MADCE Model, drug treatment includes: (a) treatment history, (b) days of treatment by type, (c) treatment requirements, and (d) support services by type offered and used. For this study, drug treatment describes the Shelby County DC client's treatment program requirements and includes the following sub-concepts: (a) days of treatment by type, and (b) treatment requirements.

Days of treatment by type. There are multiple types of DC treatment programs available to meet clients' diverse needs. Consequently, clients may participate in more than one program while enrolled in DC. For example, Shelby County DC clients who struggle in the Outpatient program because they need more supervision or have multiple positive urine drug screens may switch to the Residential program. The Shelby County DC data file listed seven program types. Program type was a new variable created to record the different Shelby County DC programs. In this study, program type was scored as yes or no for the following programs: (a) Outpatient, (b) Outpatient DUI, (c) Co-occurring Disorder with Trauma, (d) Intensive Outpatient, (e) Mother's Intensive Outpatient, (f) Early Assessment Intervention Treatment, and (g) Residential. Because clients participated in more than one program type, Program number was another new variable created to record the number of programs in which the client participated for treatment services. This variable was calculated by counting the number of programs in which each client participated.

For best treatment effects, the number of treatment days must exceed 90 days, but not exceed 18 months (National Center for State Courts, 2011). Days of treatment vary for clients depending on the individual's progress and sanctions. Program days was a new variable created to record the total number of treatment days for each Shelby County DC client. This variable was calculated by subtracting the DC graduation or dropout date from the DC admission date.

Treatment requirements. Drug Courts mandate clients to attend meetings for drug rehabilitation counseling with treatment providers (Belenko, 2001; R. Brown, 2010b; National Institute of Justice, 2011). These drug rehabilitation meetings help clients to learn self-discipline and identify solutions to life problems associated with employment, education, housing, and health (Butzin et al., 2002; Goldkamp & Weiland, 1993; Turner et al., 2002). For this study, the treatment requirements include: (a) treatment agency type, and (b) treatment agency number. The Shelby County DC partners with drug rehabilitation treatment providers from agencies in the community for drug rehabilitation counseling. During the data collection period, there were fourteen agencies included in the Shelby County DC data file that provided drug rehabilitation treatment for Shelby County DC clients. Therefore, treatment agency was a new variable created to record counseling services for Shelby County DC clients. For this study, treatment agency type was scored as yes or no for: (a) Alcohol and Chemical Abuse Rehabilitation Center, Inc, (b) Case Management Inc., (c) Designing Men, (d) Health Arts Research Training Center, (e) Innovative Counseling and Consulting, (f) Karat Place, (g) Once Hopeless Treatment Center; (h) Positive Decisions Psychology, (i) Rebos Recovery

Center, (j) Serenity Recovery Centers, (k) Synergy Treatment Centers, (l) Veterans Administration, and (m) WAVE Women's Treatment for Addiction and Violence Exposure. Because one community counseling agency does not always meet the client's needs, a client may switch to a different agency that better meets the client's needs. Therefore, treatment agency number was a new variable created to record the number of agencies that the client received drug rehabilitation counseling.

In-Program Behavior

In-Program Behaviors describe the client's compliance with the DC interventions and supervised treatments. Client behaviors that are in compliance with the DC interventions and supervised treatments foster successful completion of DC (R. Brown, 2010a; Evans et al., 2009; Roll et al., 2005). In-Program Behavior includes the following concepts: (a) compliance with drug intervention; and (b) compliance with supervision. Concepts, variables, and operational definitions for in-program behavior are presented in **Table 3-4.** This is followed text that explains the rationale for the variable selection, recoding, and new variables created.

Compliance with drug intervention. Compliance with drug intervention describes the Shelby County DC client's behavior responses to the DC program interventions and includes the following sub-concepts: (a) likelihood of entry; (b) number and type of drug test violations; (c) treatment duration and retention.

Likelihood of entry. Quick entry into DC promotes early treatment for substance use disorder and reduced crime recidivism for clients (R. King & Pasquarella, 2009). One study found that admission to DC within 30 days from the time of referral until admission was a predictor of clients' successfully completing DC (Rempel, 2003). The Shelby County DC data file listed the days to DC admission as the number of days from the time the client was referred to the program until the program admission date. Days to DC admission variable was selected to record the likelihood of entry into DC. This variable is in the existing data file recorded as the number of days from the client's referral to DC until admitted into the program.

Number and type of drug test violations. Drug rehabilitation is a key part of DC (National Institute of Justice, 2008). Therefore, clients must demonstrate drug-free behaviors. Urine drug testing clients at random is one method for detecting behaviors that in compliance with the DC treatment intervention (Bureau of Justice Assistance, 2004). Clients who test positive for drugs, miss the drug testing, or have a diluted urine screen result are in violation of mandatory drug testing. Furthermore, clients with multiple drug screen violations may be removed from DC or opt to dropout on their own (R. King & Pasquarella, 2009). Urine drug screen (UDS) violations type is a new variable created to record the type of UDS violations. The UDS violations listed in the Shelby County DC data file include: (a) diluted UDS, (b) missed UDS, and (c) positive UDS. For this study, UDS violations was scored as yes or no for: (a) diluted UDS, (b) missed UDS, and (c)

Table 3-4. In-Program Variables.

Concept	Variable	Operational Definition
Compliance Drug Intervention		
Likelihood of Entry	Days to Drug Court Admission	Days from DC referral until admitted to Drug Court. Range (0-391).
Number and Type of Drug Test Violations	Urine Drug Screen Violations Type	Diluted Urine Drug Screen Missed Urine Drug Screen Positive Urine Drug Screen No Urine Drug Screen Violation
	Urine Drug Screen Violations Number	Urine Drug Screen violations total. Range (0-4).
Compliance with Supervision		
Violations of Supervision Requirements	Violations Type	Bench Warrant Charges Rearrest Inappropriate Behavior Forged Document Missed Outpatient Visits No Case Social Worker No Outside Meetings No Individual Counseling Sessions Phase 4 No Job No Violations
	Violations Number	Violations total. Range (1-4).
	Sanctions Type	Community service Jail sentencing
	Community Service Sanctions Number	Number of Community Service Sanctions. Range (0-4).
	Jail Sentencing Sanctions Number	Number of Jail Sentencing Sanctions. Range (0-10).
	Sanctions Number	Sanctions number total. Range (0-10).
	Community Service Sanctions Days	Sanctions Days for community service. Range (0-31).
	Jail Sentencing Sanctions Days	Sanctions Days for jail sentencing. Range (0-269).
Drug Court Graduation	Graduation (Health Outcome)	1=Yes, does have graduation 0=No, does not have graduation

positive UDS Because some clients had more than one urine drug screen violation, urine drug screen violations number was a new variable created to record the number of UDS violations by type. Additionally, some clients did not have any UDS violations. Therefore, no UDS violations was another new variable added and it was scored as yes or no.

Compliance with supervision. Drug Court clients are expected to comply with court supervised activities (S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). Compliance with supervision includes the following sub-concepts: (a) violations of supervision requirements; and (b) DC graduation.

Violations of supervision requirements. Failure to participate in drug treatment and non- compliance with court supervised activities is a DC program violation (Office of Justice Programs, 1998). The Shelby County DC data file has ten types of violations of supervision requirements. The violations types are: (a) bench warrant, (b) charges, (c) rearrest, (d) inappropriate behavior, (e) forged document, (f) missed outpatient visits, (g) no case social worker, (h) no outside meetings, (i) no individualized counseling sessions, and (j) Phase IV no job. Therefore, violations type was selected to record violations of supervised requirements and was scored as yes or no for: (a) bench warrant, (b) charges, (c) rearrest, (d) inappropriate behavior, (e) forged document, (f) missed outpatient visits, (g) no case social worker, (h) no outside meetings, (i) no individualized counseling sessions, and (j) phase IV no job. Because some Shelby County DC clients had multiple Violations Type, Violations Number was a new variable created to record the number of violations types. Additionally, because some clients did not have any violations of supervision requirements, No Violations was another new variable added.

Nationally, DC clients who violate DC supervised requirements receive sanctions from the Judge for their non-complaint behaviors. Common types of sanctions include: (a) community service (Office of Justice Programs, 1998; Rempel, 2003); and (b) jail time (R. Brown et al., 2011; R. King & Pasquarella, 2009). Shelby County DC has multiple types of sanctions. However, the Shelby County DC data file listed two sanctions. Sanctions type were community service and jail sentencing time, and were scored as yes or no. Some clients did not have any sanctions type while other clients had one or several occurrences of community service sanctions, jail sentencing sanctions, or both sanctions type. Therefore, community service sanctions number was a new variable created to record the occurrences for community service. Jail sentencing sanctions number was a new variable created to record the occurrences for jail sentencing. Sanctions Number was a new variable created to record the total number of community service and jail sentencing sanctions.

Furthermore, the Shelby County DC data file included the number of days that the client was sanctioned for community service and jail time. Community Service Sanctions Days was a new variable created to record the number of days that the client was sanctioned for community service. Jail Sentencing Sanctions Days was a new variable created to record the number of days that the client was sanctioned for jail time.

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Drug Court graduation. Sobriety attainment is a primary goal for DC programs nationally (Bureau of Justice Assistance, 2004). This means that DC clients must stop using drugs and comply with the program requirements to complete the program. Clients with complaint in-program behaviors are more likely to graduate from DC than clients with willfully non-compliant behaviors (R. King & Pasquarella, 2009). The Shelby County DC data file listed the clients who graduated from DC and clients who dropped out. Drug Court Graduation variable was selected to record DC program completion, an improved health outcome for DC clients.

Procedure

This section explains how data were collected and prepared for analysis. The original data were collected and entered by the Shelby County DC staff. The investigator de-identified data, selected variables, addressed missing data, and created new variables or coding.

Original Data

The first step for obtaining and preparing the data for analysis was to ask the Shelby County DC permission to have the data. The investigator sent a written request for the data to the Shelby County DC Database Coordinator. Written and verbal permission was given by the Shelby County DC Judge and Shelby County DC Project Coordinator to have the Shelby County DC data. Written DC permission is documented in **Appendix B**. Data were sent with identifiers including the client's name, court booking number, and Records and Identification Number (RNI) via email in 58 Excel® spreadsheet data files in a zip file. The RNI is a unique number assigned to the offender despite name changes or aliases for criminal arrests (Little, Robinson, Burnette, & Swan, 2010). The 58 data files contained information about employment, education level, demographics, driver's license status, primary and secondary drugs of choice, DC program and treatment agency, urine drug testing, sanctions, child support, custody rights, infants born to mothers while enrolled in DC, and DC graduates and dropouts.

Each of the 58 data files had a file name with a brief description and explanation of the content. These file descriptions were helpful in understanding the data files. However, these descriptions did not explain the abbreviations, naming conventions, and measurement details used all spreadsheet column headings. Education data files were also missing for clients who were DC dropouts. The investigator made a list of questions about the unclear abbreviations, file naming, measurements, and missing education data for client dropouts. This list was emailed to the Shelby County DC Database Coordinator to answer. Follow-up conversations between the Shelby County DC Database Coordinator and investigator were held to clarify explanations. The Shelby County DC Database Coordinator also emailed the missing education file on client dropouts.

Data Collection and Entry

Drug Court counselors and treatment providers collected the original data from clients using self-reports and existing criminal court records at Shelby County DC admission and during Phases I, II, III, and IV. Seven Shelby County DC counselors enter data on each of their clients into the main DC data file called the CZAR. The CZAR is accessible on a password protected shared drive. The CZAR is a standardized program used to generate state and national reports and devise individual treatment plans (K. Eaton, personal communication, May 5, 2011). Counselors use hard copies of Shelby County DC forms to collect admission data, and then use these forms to enter the data into the CZAR.

Data collection and entry training procedures for the counselors are unknown. However, according to the Shelby County DC job descriptions all counselors are required to have experience with data entry and the knowledge, skills, and abilities to prepare detailed comprehensive court and state reports (Shelby County Drug Court, 2007). The Shelby County DC has a counselor who works in a dual role as the Database Coordinator by job title. The Database Coordinator is responsible for extracting data from the CZAR for reports and for checking the data for correct entry from other counselors including missing data and typographical errors. The Data Coordinator notifies counselors of their data entry errors (K.Eaton, personal communication, May 5, 2011).

De-identified Data

Upon receipt of the data files per email from the Shelby County DC Database Coordinator, the investigator downloaded the data on a secured home computer with password protection for one user only. Data were de-identified as follows. Client names were changed to unique and sequential non-identifiable numbers. The court booking number and RNI number linked to a client were removed. No master key was made.

Variable Selection

During the data preparation phase, data were reviewed to identify which data could be used to answer research questions. The MADCE Model guided data selection. All 58 data files were reviewed to find out the level of measurement, aggregate data, missing data, and data definitions (Boslaugh, 2007). Data files that contained summary data only were eliminated because summary data limits the analysis for answering research questions (Graves, 1998). Eliminating summary data reduced the 58 data files to 37 data files. Because there were multiple and duplicate data in each of the remaining 37 reports, Microsoft Access® was used to merge the data into one data file. Merging all data into one data file helped to identify missing data and eliminate duplicate information. Variables were selected, assigned consistent variable names, and placed in a new Excel® spreadsheet as one file for study.

Missing Data

Blank responses in the original Shelby County DC data file were recorded were missing data. The first step for dealing with missing data is to determine the reasons why data are missing. We assume that missing data were missing at random. The missing at random means that the missingness does not depend on the value of a given variable X^1 after controlling for another variable X^2 (Howell, 2009) That is, missing values can be obtained by other variables and missing data are unrelated to the variable itself, after controlling for other variables in the analysis.

Statistical packages like SAS® removes missing data from the analysis as a default. This leads to loss of information, biased estimates, and reduced power. It is important to assess the extent of missing values by counting how many variables are missing for each client. Polit and Beck (2004) recommend removing variables that are missing $15 – 45\%$. Missing data for each client were detected with frequency calculations. In this study, there were 197 clients with $\geq40\%$ of their data with missing values. There was also 67% missing data for secondary drug choice, and 45% missing data for driver's license variables. Missing data were equally distributed for males and females, African Americans and Caucasians, and DC graduates and dropouts presented in **Table 3-5**. Therefore, using the listwise deletion strategy, all clients with $\geq40\%$ missing data, and all variables with $\geq40\%$ missing data, and secondary drug of choice and driver's license variables were removed from the final data set for analysis. Removing clients with missing data did not threaten power because of the large final sample size (n=310) after the 197 clients with missing data were removed.

New Variables Created and Recoding

Discrete variables that were scored as yes or no were transformed to $0 =$ no and $1 =$ yes. For the variables that there were multiple nominal response choices, a new variable was created to represent the total number in that category. This was done for the primary drug number, program number, treatment agency number, urine drug screen number, violations number, and sanctions number. For continuous variables concerning the number of days, for example, with the number of days for participation in the program, a new variable was created to represent the total number of days in that category which was calculated from the dates. This was done for sanctions community service days, and sanctions jail days. A codebook with new theoretical and operational definitions was created for the variables to be used for data analysis and assigned initial numeric codes to text data. Recoded data were checked for errors including inaccurate and duplicate data and inconsistent coding by using frequency checks to find outliers and wild codes that did not fit the data (Gillis & Jackson, 2002).

Table 3-5. Sample Severity of Original Sample, Sample Used for Analysis, and Sample of Clients Deleted for Missing Data.

Variable	Original Sample (N = 507)		Analysis Sample (n = 310)		Deleted Sample (n = 197)	
	M ± SD	n (%)	M ± SD	n (%)	M ± SD	n (%)
Gender						
Male		408 (80.47)		248 (80.00)		160 (81.21)
Female		99 (19.53)		62 (20.00)		37 (18.79)
Race						
African American		311 (61.34)		187 (60.32)		124 (62.94)
Caucasian		196 (38.66)		123 (39.68)		73 (37.06)
Age	30.34 ± 9.38		29.85 ± 9.39		31.18 ± 9.31	

Statistical Analysis

Analyses were conducted using SAS® programs (Schlotzhauer, 2007), with a nondirectional probability of a Type I error of .05 or less as the criterion for statistical significance. Descriptive statistics were used to analyze the first research question to inform the reader about the DC client and lend information for drawing inferences about external validity (Polit & Beck, 2004). The second research question was answered using t-test or chi-square, as appropriate. The third research question was answered using multiple logistic regression, correlation, Hosmer and Lemeshow Goodness of Fit statistic, and c statistic. The statistical analysis for each research question will be discussed in turn.

Research Question One

What is the Sample Severity for Drug Court clients? Data were analyzed using descriptive statistics (mean, standard deviation, frequency, percentage, and p-value) for the study variables. The Sample Severity variables included: (a) age, (b) gender, (c) race, (d) education, (e) employment at DC admission, (f) employment hours worked per week, (g) crack/cocaine use, (h) only primary drug of choice, and (i) primary drug number. Because of low frequency for 7 primary drugs of choice, the following primary drugs of choice were combined into a new category called "other" drugs: (a) amphetamine, (b) barbiturates, (c) benzodiazepines, (d) Diluadid®, (e) ecstasy, (f) methadone, and (g) Suboxone®.

Research Question Two

What are the differences in Sample Severity, Drug Court Practices, and In-Program Behavior for Drug Court graduates and dropouts? Data were evaluated for differences for graduates and dropouts using a t-test for independent samples or chi-square, as appropriate. There were 58 variables to analyze for differences between graduates and dropouts.

Research Question Three

What is the prediction model for Drug Court graduation? Data were analyzed using multiple logistic regression, correlation, Hosmer and Lemeshow Goodness of Fit statistic, and c statistic. Logistic regression was used to determine the relationship between multiple independent variables which may be at any level from nominal to ratio (Munro, 2001) and a categorical dependent variable which yields a predictive equation (Polit & Beck, 2004). Nominal and categorical variables were re-coded before for analysis (Munro, 2001). In this study, logistic regression helped identify and describe statistically significant associations between factors that increase or decrease the likelihood of DC graduation (Roll et al., 2005).

The 58 variables were reduced to 27 candidate predictor variables for the regression analysis by selecting variables with the statistically significant differences between graduates and dropouts, clinical judgment, the literature review, and the frequency of clients with positive data for the variable. Because of low frequency for 5 treatment agencies, the following treatment agencies were combined into a new category called "other" treatment agency: (a) Once Hopeless Treatment Center, (b) Synergy Treatment Centers, (c) Veterans Administration, and (d) WAVE women's addiction treatment agency. For the program type, Co-occurring Disorder with Trauma had only one client, therefore, this program was combined with the Outpatient program type. Because of low frequency for violations types, the following violations types were combined into a new category called "other" violation type: (a) charges, (b) forged document, (c) missed outpatient visits, (d) no social worker, (e) no individualized counseling, and (f) phase 4 no job.

Multiple logistic regression with the dichotomous dependent variable, Shelby County DC graduation (yes/no), using the 27 candidate predictor variables including: (a) Sample Severity (age, gender, education, employment at Drug Court admission, employment hours per week, crack/cocaine use, only primary drug of choice, and primary drug number; (b) DC Practices (program type, program days, program number, agency type, and agency number); and (c) In-Program Behavior (days to Drug Court admission, urine drug screen violations type, urine drug screen violations number, violations type, sanctions type, community service sanctions number, jail sentencing sanctions number, sanctions number, community service sanctions days, jail sentencing sanctions days, and graduation). After the 27 variables were entered into the multiple regression equation, there were 6 significant predictors for graduation using beta coefficient to explain which variables had a positive or negative effect on graduation.

Correlation analysis was performed to investigate multicollinearity among the 6 significant predictor variables and the graduation outcome variable. Multicollinearity is a critical problem in multiple regression (Motulsky, 2002) since collinearities among predictor variables increases the standard error of coefficients, thus reducing tests of significance. Multicollinearity was assessed for all 6 significant candidate predictor variables with the graduation outcome variable. There was no multicollinearity among the 6 predictors in the final multiple logistic regression model.

The final model was assessed for fitting the data and predictive ability. The Goodness of Fit statistic assesses the fit of the model in logistic regression (Ragavan, 2008). This statistic compares the observed probabilities to those predicted by the model (Rosner, 2006). The null hypothesis is that the model fits or predicts the data well. The alternative hypothesis is that the model does not fit or predict the data well. When the significance is large, the null hypothesis is not rejected (Munro, 2001; Ragavan, 2008; Rosner, 2006). In other words, a nonsignificant result indicates that the model fits or is adequate. The Hosmer and Lemeshow Goodness of Fit statistic was used to assess the fit of the multiple logistic regression model for the binary response of DC graduation. A nonsignificant result, usually ($p > .05$) suggests that the fitted model is adequate (Ragavan, 2008).

The predictive ability of the model can be measured by four indices: (a) Somer's D, Goodman Kruskal Gamma (Gamma), (b) Kendall's Tau (Tau-a), and (c) c statistic. These indices measure the degree to which predicted probabilities agree with the outcome (C. J. Peng, Lee, & Ingersoll, 2002). The c statistic was chosen because it measures how well the model can discriminate subjects from having the event from subjects not having the event or nonevent. An event is a positive outcome of interest and a nonevent is a negative outcome of no interest (C.J. Peng & So, 2002). In this study, the event is DC graduation and the nonevent is no DC graduation. The c statistic is the area under the Receiver Operating Characteristic (ROC) curve which plots the sensitivity versus specificity of the model, and it reports the model's overall prediction accuracy (Rosner, 2006). One minus specificity is the proportion of non-event observations that are predicted to have an event outcome. A value of 1 means that the model assigns higher probabilities to all observations with the event outcome, compared with non event observations (C. J. Peng et al., 2002). Higher values mean that the model assigns high probabilities to all observations with the event outcome, compared to the nonevent observations.

Chapter 4. Results

The purpose of this study was to describe DC clients' substance use disorder severity, identify differences between graduates and dropouts, and develop a prediction model for DC treatment program graduation. The results are organized by the research questions and by the MADCE Model domains: (a) Sample Severity, (b) Drug Court Practices, and (c) In-Program Behavior. Research question one is: What is the sample severity for DC clients? Research question two is: What are the differences in Sample Severity, Drug Court Practices, and In-Program Behavior for DC graduates and dropouts? Research question three is: What is the prediction model for DC graduation?

Sample Severity

Descriptive statistics for Sample Severity for all DC clients, DC graduates, and DC dropouts are summarized in **Table 4-1**. The sample consisted of 310 Shelby County DC clients. Most DC clients were male (n = 248, 80.0%) and African American (n = 187, 60.3%). The mean age of the clients was (29.9 ± 9.4) years. Most DC clients had a high school diploma or GED (n = 169, 54.5%) or no high school diploma or GED (n = 130, 41.9%). Few DC clients had a college degree (n = 11, 3.6%). Thirty-four percent of all DC clients were employed at DC admission and worked (10.4 ± 16.9) hours per week. Marijuana (n = 174, 56.1%) and alcohol (n = 48, 15.5%) were the top two drugs listed as the primary drugs of choice for all clients.

Drug Court Graduates and Dropouts Differences

Sample Severity

Sample Severity and analysis of differences between graduates and dropouts using chi-square or t-tests, as appropriate are presented in **Table 4-1**. Of the 310 clients, there were 149 (48.1%) graduates. There were fewer male graduates (n = 112, 75.2%) than male dropouts (n = 136, 84.5%). These differences were statistically significant (X^2 = 4.19, p = .041). There were fewer African American graduates (n = 81, 54.4%) than African American dropouts (n = 106, 65.8%). These differences were statistically significant (X^2 = 4.26, p = .03). The mean age of the graduates (32.3 ± 9.9 years) was greater than the mean age of the dropouts (27.6 ± 8.34 years). Fewer graduates (n = 41, 27.5%) had no high school diploma or GED than dropouts (n = 89, 55.3%). These differences were statistically significant (X^2 = 24.50, p = .001). There were more graduates (n = 99, 66.5%) who had a high school diploma or GED than dropouts (n = 70, 43.4%). These differences were statistically significant (X^2 = 16.46, p = .001).

There were more graduates (n = 9, 6.0%) who had a college degree than dropouts (n = 2, 1.2%). These differences were statistically significant (X^2 = 5.21, p = .02). There

Table 4-1. Sample Severity and Differences between Drug Court Graduates and Dropouts.

Variable	All Clients (n = 310) M ± SD	All Clients n (%)	Graduates (n = 149) M ± SD	Graduates n (%)	Dropouts (n = 161) M ± SD	Dropouts n (%)	X^2 or t-test	p-value
Age	29.85 ± 9.39		32.23 ± 9.93		27.66 ± 8.33		-4.37	.001
Gender								
Male		248 (80.00)		112 (75.17)		136 (84.87)	4.19	.041
Female		62 (20.00)		37 (24.83)		25 (15.53)		
Race								
African American		187 (60.32)		81 (54.36)		106 (65.84)	4.26	.039
Caucasian		123 (39.68)		68 (45.64)		55 (34.16)		
Education								
No High School Diploma/GED		130 (41.94)		41 (27.52)		89 (55.28)	24.49	.001
High School Diploma/GED		169 (54.52)		99 (66.44)		70 (43.38)	16.46	.001
Associates/Undergrad- uate Degree		11 (3.55)		9 (6.04)		2 (1.24)	5.21	.022
Employment at Drug Court Admission		106 (34.19)		71 (47.65)		35 (21.74)	23.09	.001
Employment Hours	10.35 ± 16.82		14.78 ± 18.54		6.53 ± 14.07		-4.23	.001
Crack/Cocaine Use		64 (20.65)		26 (17.45)		38 (28.60)	1.79	.181
Only Primary Drug of Choice								
Alcohol		48 (15.48)		35 (23.49)		13 (8.07)	14.05	.002
Cocaine		36 (11.61)		13 (8.72)		23 (14.29)	2.33	.127
Crystal Methamphetamine		15 (4.84)		7 (4.70)		8 (4.94)	0.01	.912
Heroin		17 (5.84)		5 (3.36)		12 (7.45)	2.51	.113
Marijuana		174 (56.13)		77 (51.68)		97 (60.25)	2.31	.129
Opiates		19 (6.13)		10 (6.71)		9 (5.59)	0.17	.681

Table 4-1. *(continued).*

Variable	All Clients (n = 310)		Graduates (n = 149)		Dropouts (n = 161)		X^2 or t-test	*p*-value
	M ± SD	n (%)	M ± SD	n (%)	M ± SD	n (%)		
Other		9 (2.90)		6 (4.03)		3 (1.86)	1.28	.257
Primary Drug Number	1.03 ± 0.18		1.03 ± 0.16		1.04 ± 0.19		0.52	.605

were more DC graduates (n = 71, 47.7%) who were employed at DC admission than dropouts 35 (n =35, 21.7%). These differences were statistically significant (X^2 = 23.09, p = .001). Graduates who were employed at DC admission worked more hours (14.8 ± 18.5) per week than dropouts who worked (6.6 ± 14.0) hours per week. These differences were statistically significant (t-test = -4.23, p = .001). Of the seven primary drugs of choice, there was only one significant difference: more graduates (n = 35, 23.5%) listed alcohol as their primary drug of choice than the DC dropouts (n = 13, 8.1%). These differences were statistically significant (X^2 = 14.05, p = .002).

Drug Court Practices

Drug Court Practices and analysis of differences between graduates and dropouts using chi-square or t-tests, as appropriate are presented in **Table 4-2**. Of the six DC programs, there were significant differences for four programs: Outpatient, Outpatient DUI, Early Assessment Intervention program. There were fewer graduates (n = 109, 73.2%) who participated in the Outpatient program than dropouts (n = 134, 83.2%). These differences were statistically significant (X^2 = 4.04, p = .039).   There were more graduates (n = 31, 20.8%) who participated in the Outpatient DUI program than dropouts (n = 6, 3.4%). These differences were statistically significant (X^2 = 27.5, p = .001). No graduates participated in the Early Assessment Intervention Treatment program, but there were (n = 6, 3.7%) dropouts. These differences were statistically significant (X^2 = 5.66, p = .017). There were fewer graduates (n = 28, 18.8%) who participated in the Residential program than dropouts (n = 53, 32.9%). These differences were statistically significant (X^2 = 8.00, p = .004).

In addition to the DC program types, there were statistically significant differences between graduates and dropouts for program days and program number. Graduates spent more days (396.1 ± 61.3) in DC programs than the number of days (212.2 ± 140.0) dropouts spent in DC programs. These differences were statistically significant (t-test = -15.17, p = .001). Graduates participated in fewer DC programs (1.2 ± 0.40) than the number of DC programs (1.3 ± 0.53) dropouts participated in. These differences were statistically significant (t-test = 2.17, p = .031).

Another difference between graduates and dropouts is the agency type for substance use disorder treatment. Of the ten agency types, there were significant differences for only one agency. Case Management, Inc. had no graduates, but there were (n = 5, 53.1%) dropouts. These differences were statistically significant (X^2 = 4.70, p = .030).

In-Program Behaviors

In-Program Behaviors and analysis of differences between graduates and dropouts using chi-square or t-tests, as appropriate are presented in **Table 4-3.** Of the four urine drug screen violations types, there were significant differences for two types: (a) diluted urine

Table 4-2. Drug Court Practices and Differences between Drug Court Graduates and Dropouts.

Variable	All Clients (n = 310) M ± SD	n (%)	Graduates (n = 149) M ± SD	n (%)	Dropouts (n = 161) M ± SD	n (%)	X^2 or t-test	p-value
Program Type								
Outpatient		243 (78.39)		109 (73.15		134 (83.23)	4.04	.045
Outpatient DUI		37 (11.94)		31 (20.81)		6 (3.73)	27.47	.001
Intensive Outpatient		8 (2.58)		3 (2.01)		5 (3.11)	0.37	.545
Mother's Intensive Outpatient		16 (5.16)		10 (6.71)		6 (3.73)	1.41	.235
Early Assessment Intervention Treatment		6 (1.94)		0 (0.00)		6 (3.73)	5.66	.017
Residential		81 (26.13)		28 (18.79)		53 (32.92)	8.00	.004
Program Days	300.59 ± 142.91		396.12 ± 61.30		212.18 ± 140.01		-15.17	.001
Program Number	1.26 ± 0.48		1.20 ± 0.41		1.32 ± 0.53		2.17	.031
Treatment Agency Type								
Alcohol and Chemical Abuse Rehab Center, Inc.		100 (32.26)		49 (32.89)		51 (31.68)	0.05	.820
Cocaine and Awareness Program		83 (26.77)		33 (22.15)		50 (31.06)	3.13	.077
Case Management, Inc.		5 (1.61)		0 (0.00)		5 (3.11)	4.70	.031
Health Arts Research Training Center		9 (2.90)		7 (4.70)		2 (1.24)	3.28	.070
Innovative Counseling Center		97 (31.29)		49 (32.89)		48 (29.81)	0.34	.560
Karat Place		8 (2.58)		5 (3.36)		3 (1.86)	0.69	.408
Positive Decisions Psychology		46 (14.84)		20 (13.42)		26 (16.15)	0.46	.499
Positive Decisions Psychology		46 (14.84)		20 (13.42)		26 (16.15)	0.46	.499
Rebos Recovery Center		20 (6.45)		11 (7.38)		9 (5.59)	0.41	.521
Serenity Recovery Centers		20 (6.45)		11 (7.38)		9 (5.59)	0.41	.521

Table 4-2. *(continued).*

| Variable | All Clients (n = 310) | | Graduates (n = 149) | | Dropouts (n = 161) | | X^2 or t-test | *p-*value |
	M ± SD	n (%)	M ± SD	n (%)	M ± SD	n (%)		
Other		15 (4.84)		3 (2.01)		11 (6.83)	2.89	.089
Treatment Agency Number	1.3 ± 0.53		1.26 ± 0.50		1.33 ± 0.55		1.02	.309

Table 4-3. In-Program Behavior and Differences between Drug Court Graduates and Dropouts.

Variable	All Clients (n = 310)		Graduates (n = 149)		Dropouts (n = 161)		X^2 or t-test	p-value
	M ± SD	n (%)	M ± SD	n (%)	M ± SD	n (%)		
Days to Drug Court Admission	16.90 ± 42.09		18.90 ± 44.65		15.05 ± 39.61		-0.80	.422
Urine Drug Screen Violations Type								
Diluted UDS		43 (13.87)		29 (19.46)		14 (8.79)	7.51	.006
Missed UDS		87 (28.06)		29 (19.46)		58 (36.02)	10.51	.001
Positive UDS		148 (47.74)		67 (44.97)		81 (50.31)	0.89	.347
No UDS Violations		121 (39.03)		64 (42.95)		57 (35.40)	1.85	.173
Urine Drug Screen Violations Number	1.58 ± 1.77		1.30 ± 1.48		0.35 ± 0.48		2.72	.007
Violations Type								
Bench Warrant		23 (7.42)		4 (2.68)		19 (11.80)	9.36	.002
Rearrest		28 (9.03)		3 (2.01)		25 (15.53)	17.20	.001
Inappropriate Behavior		71 (22.90)		30 (20.13)		41 (25.47)	1.25	.264
No Outside Meetings		20 (6.45)		10 (6.71)		10 (6.21)	0.03	.858
No Violations		184 (59.35)		106 (71.14)		78 (48.45)	16.52	.001
Other		11 (3.55)		3 (2.01)		8 (4.97)	1.98	.159
Violations Number	0.64 ± 0.97		0.43 ± 0.83		0.83 ± 1.06		3.74	.002
Sanctions Type								
Community Service		28 (9.03)		15 (10.07)		13 (8.07)	0.37	.541
Jail Sentencing		218 (70.32)		97 (65.00)		121 (75.16)	3.75	.053

Table 4-3. *(continued).*

Variable	All Clients (n = 310) M ± SD	n (%)	Graduates (n = 149) M ± SD	n (%)	Dropouts (n = 161) M ± SD	n (%)	X^2 or t-test	*p*-value
Sanctions Community Service Number	0.11 ± 0.39		0.13 ± 0.47		0.08 ± 2.29		-1.18	.239
Sanctions Jail Sentencing Number	2.11 ± 2.07		1.60 ± 1.66		2.58 ± 2.29		4.33	.001
Sanctions Number	2.21 ± 2.13		1.74 ± 1.79		2.65 ± 2.32		3.87	.001
Community Service Sanctions Days	0.15 ± 0.72		0.15 ± 0.51		0.16 ± 0.87		0.17	.863
Jail Sentencing Sanctions Days	14.12 ± 27.09		7.58 ± 12.65		20.18 ± 34.54		4.32	.001

drug screen, and (b) missed urine drug screen. There were more graduates (n = 29, 19.5%) with diluted urine drug screen violations than dropouts (n = 14, 8.8%). These differences were statistically significant (X^2 = 7.51, p = .006). There were fewer graduates (n = 29, 19.5%) with missed urine drug screen violations than dropouts (n = 58, 36.0%). These differences were statistically significant (X^2 = 10.51, p = .001). In addition to urine drug screen violations, there were statistically significant differences between graduates and dropouts for the urine drug screen violations number. The urine drug screen violations number (1.30 ± 1.48) was greater for graduates than for dropouts (0.35 ± 0.48). These differences were statistically significant (t-test = 2.72, p = .007).

There were also statistically significant differences between graduates and dropouts for types of violations. Of the six types of violations, there were significant differences for three types of violations: (a) bench warrant, (b) rearrest, and (c) no violations. There were fewer graduates (n = 4, 2.7%) with bench warrants than dropouts (n = 19, 11.8%). These differences were statistically significant (X^2 = 9.36, p = .002). There were fewer graduates (n = 3, 2.0%) with rearrest than dropouts (n = 25, 15.4%). These differences were statistically significant (X^2 = 17.20, p = .001). There were more graduates (n = 106, 71.1%) with no violations than dropouts (n = 78, 48.5%). These differences were statistically significant (X^2 = 16.51, p = .001).

In addition to the type of violations, there were statistically significant differences between DC graduates and DC dropouts for the violations number. The violations number (0.43 ± 0.83) was less for graduates than for dropouts (0.83 ± 1.06). These differences were statistically significant (t-test = 3.74, p = .002).

Finally, of the seven sanctions types, there were significant differences for three sanctions types: (a) sanctions jail sentencing number, (b) sanctions number, and (c) jail sentencing sanctions days. The sanctions jail sentencing number (1.60 ± 1.66) was less for graduates than for dropouts (2.58 ± 2.29). These differences were statistically significant (t-test = 4.33, p = .001). The sanctions number (1.74 ± 1.79) was less for graduates than dropouts (2.65 ± 2.32). These differences were statistically significant (t-test = 3.87, p = .001). The jail sentencing sanctions days (7.58 ± 12.65) was less for graduates than for dropouts (20.18 ± 34.54). These differences were statistically significant (t-test = 4.32, p = .001).

Drug Court Graduation Prediction Model

A prediction model for DC graduation was developed using multiple logistic regression. Twenty-seven variables were entered into the multiple logistic regression analysis. The 27 variables were chosen because there were statistically significant differences for graduates and dropouts. Six variables had statistically significant beta coefficients. Using Pearson Correlation, there was no multicollinearity detected among the variables in **Table 4-4**.

Table 4-4. Pearson Correlation Matrix for Six Model Variables.

Variable	Program Days	Jail Sentencing Number	Gender (Male)	No HS Diploma /GED	Diluted Urine Drug Screen	Rearrest	Graduation
Program Days	1.0000						
Significance Level	-						
Jail Sentencing Number	0.1973	1.0000					
Significance Level	.005	-					
Gender (Male)	-0.0729	-0.0859	1.0000				
Significance Level	.200	.131	-				
No HS Diploma/GED	-0.1905	-0.0338	0.0818	1.0000			
Significance Level	.007	.553	.151	-			
Diluted Urine Drug Screen	0.2486	0.4073	-0.1727	-0.0952	1.0000		
Significance Level	.001	.001	.002	.094	-		
Rearrest	-0.0999	0.1408	0.0450	-0.0169	-0.0613	1.0000	
Significance Level	.079	.013	.429	.767	.282	-	
Graduation	0.6441	-0.2369	-0.1162	-0.2811	0.1556	-0.2355	1.0000
Significance Level	.001	.001	.041	.001	.006	.001	-

Table 4-5 contains beta coefficients, standard errors, Wald's chi-square statistics, odds ratios for the six significant variables and their 95% confidence intervals with *p*-values. Based on the odds ratio, more diluted urine drug screens (OR = 5.081, p = .002) and greater number of days in the program (OR = 1.019, p = .0001) are predictive of graduation from the Shelby County DC treatment program. In contrast, gender (male) (OR = 0.373, p = .047), no high school diploma or GED (OR = 0.214, p = .004), rearrest (OR = 0.068, p = .002), and number of jail sentencing sanctions (OR = 0.439, p = .001) had a negative effect on graduation.

The quality of the model was assessed using the Hosmer and Lemeshow (X^2 = 11.3724, p = .18) Goodness of Fit statistic. The model predicted the data well. The predictive ability of the mode was assessed using the c statistic (0.949). Predictive ability of the model was highly acceptable. This means that for 94.9% of all possible pairs of graduates and dropouts that were predicted to graduate, the model correctly assigned a higher probability to clients who are likely to graduate.

Table 4-5. Multiple Logistic Regression Predicting Drug Court Graduation.

Variable	b*	SE†	Wald's X²	OR‡	(95% CI§)	p-value
Gender (Male)	-0.9854	0.4960	53.9465	0.373	[0.141, 0.987]	.047
No High School Diploma/GED	-1.5431	0.4358	12.5367	0.214	[0.091, 0.502]	.004
Number of Days in Program	0.0190	0.00233	72.5832	1.019	[1.015, 1.024]	.001
Diluted Urine Drug Screen	1.6256	0.6244	6.7788	5.081	[1.495, 17.276]	.009
Rearrest	-2.6886	0.8694	9.5633	0.068	[0.012, 0.374]	.002
Number of Jail Sentencing Sanctions	-0.8235	0.1309	39.5954	0.439	[0.340, 0.567]	.001

*b = unstandardized beta coefficient.
†SE = Standard Error.
‡OR=Odds Ratio.
§CI = Confidence Intervals.

Chapter 5. Discussion and Implications

In this chapter a discussion of results is organized by research questions, and a comparison and contrast of the results with other published studies. First, the Sample Severity significant characteristics for all DC clients in the sample will be discussed. Second, the significant differences in Sample Severity, Drug Court Practices, and In-Program Behaviors for DC graduates and DC dropouts will be presented. Third, the final prediction model for DC graduation will be discussed. Strengths and limitations of the study will be provided, followed by implications for practice. Finally, this chapter will conclude with a summary of the results. Because future DC research will include using a health literacy approach, the discussion of future research will be presented in Chapter 6.

Sample Severity

The first research question of this study focused on describing the Sample Severity for all DC clients in the sample. The Sample Severity variables were gender, race, age, education level, employment at DC admission, employment hours worked per week, and the primary drug of choice for the DC client. Sample Severity was similar to other DC studies for three of the seven Sample Severity variables: (a) male gender, (b) high school diploma/GED, and (c) alcohol primary drug of choice. The literature documents that there are more male DC clients (R. Brown, 2010a; Butzin et al., 2002; Joosen et al., 2005; Roll et al., 2005; S. Rossman et al., 2011; Saum et al., 2001; Turner et al., 2002) who have a high school diploma/GED or less education (R. Brown, 2010a; Butzin et al., 2002; S. Rossman et al., 2011; Shaffer et al., 2011), and prefer alcohol as their primary drug of choice. Alcohol ranks in the top three primary drug choices among DC clients (Butzin et al., 2002; Evans et al., 2009; Saum et al., 2001; Shaffer, 2006; Turner et al., 2002), and is commonly used in combination with other drugs (R. Brown, 2010b) such as cocaine or marijuana (Shaffer et al., 2011). Drug Court clients who preferred alcohol over marijuana were significantly more likely to complete high school, and significantly more likely to be employed compared to DC clients who preferred cocaine (Shaffer et al., 2011). One possible explanation for alcohol preference in this sample is that alcohol is less expensive and easily available (Jung, 2001). Because cocaine or crack use is popular among DC clients (14% - 41.7%) in the literature and associated treatment failure (Leukefeld et al., 2007; Roll et al., 2005; S. Rossman et al., 2011; Turner et al., 2002), it is important to note that in this sample only 20% of clients reported cocaine or crack use.

There were three Sample Severity variables that differed from published studies: (a) African American race, (b) younger age, and (c) less employment. Drug Court literature documents that most DC clients are Caucasian (Joosen et al., 2005; Roll et al., 2005; S. Rossman et al., 2011; Saum et al., 2001; Sechrest & Shicor, 2001; Turner et al., 2002) who were greater than 30 years old (Fielding et al., 2002; Joosen et al., 2005; Roll et al., 2005; S. Rossman et al., 2011; Sechrest & Shicor, 2001; Shaffer et al., 2011), and nearly half or more were employed at DC admission (R. Brown, 2010a; Butzin et al.,

2002; Joosen et al., 2005; Leukefeld et al., 2007; Shaffer et al., 2011). Employment of DC clients is usually 45.0 - 79% (Butzin et al., 2002; Roll et al., 2005; S. Rossman et al., 2011). In contrast, this study's sample was drawn from Shelby County DC and had more African American (60.0%) clients and fewer employed clients (34.1%). There were more African Americans because urban Drug Courts have a larger minority population (R. Brown, 2010b; R. King & Pasquarella, 2009), and African Americans (63.3%) are the majority population in Memphis (United States Census Bureau, 2011). Fewer clients were employed because Memphis has a high unemployment rate (9.6%) (Bureau of Labor Statistics, 2012) compared to the national unemployment rate (8.1%) (National Conference of State Legislature, 2012). Furthermore, a low public high school graduation rate (70.8%) (Memphis City Schools, 2011; Roberts, 2010) and high poverty rates (33.3%) (City-Data, 2012) in Memphis reflect a large, unskilled, and uneducated labor force.

In summary, compared to other DC studies, this study of Shelby County DC clients contributes information about predominately African American men who are unemployed with a high school education or less. While some clients in this sample use cocaine or crack, alcohol was the primary drug of choice.

Drug Court Graduate and Dropout Differences

Sample Severity

The second research question in this study focused on identifying the differences in Sample Severity, Drug Court Practices, and In-Program Behavior for DC graduates and DC dropouts. The Sample Severity variables that were significantly different for graduates and DC dropout included: (a) gender, (b) race, (c) age, (d) education level, (e) employment at DC admission, (f) employment hours worked per week, and (g) the primary drug of choice. For this study, DC graduates were female (24.8%); Caucasian (45.6%); 5 years older on average (32.2 ± 9.93); educated with greater than or equal to a high school diploma/GED (66.4%); employed (47.7%); worked twice more hours per week (14.78 ± 18.54); and used alcohol (23.5%) as their primary drug of choice.

The significant differences in Sample Severity variables for graduates and dropouts are equivocal or not supported in the literature. Gender differences for DC graduation were equivocal. In a few studies, females were more likely to graduate (Dannerbeck, Harris, Sundet, & Lloyd, 2006; A. Gray & Saum, 2005). However, in other studies no gender differences were found in graduation rate (R. Brown et al., 2011; Butzin et al., 2002; Evans et al., 2009; Leukefeld et al., 2007; Saum et al., 2001; Shaffer et al., 2011). This may have occurred because females have demonstrated higher motivation than males for seeking treatment for substance use disorder (M. Webster et al., 2006), and consequently remain in DC treatment longer in order to graduate (Patra et al., 2010). Women may also be more motivated to graduate from DC in order to keep

their children and not lose custody because of their substance use disorder (P. Cunningham, personal communication, October 1, 2012).

Studies on race differences are equivocal. In some studies, DC graduates were Caucasian (Dannerbeck et al., 2006; Evans et al., 2009; A. Gray & Saum, 2005; Patra et al., 2010; Sechrest & Shicor, 2001), while in other studies there were no differences between Caucasian and African American or non-white clients (Butzin et al., 2002; Roll et al., 2005; S. Rossman et al., 2011; Saum et al., 2001; Shaffer et al., 2011). The Shelby County DC may have had more Caucasian graduates because of their higher education levels. While the population in Memphis is primarily African American (63.3%) (United States Census Bureau, 2011), Caucasians (31.0%) in Memphis have more education, with bachelor's degree or higher compared to African Americans (10.0%) (Harvard School of Public Health, 2009).

Results in the literature for employment differences for DC graduation are also equivocal. In some studies more DC graduates were employed (Roll et al., 2005; Sechrest & Shicor, 2001), while in another study there no employment differences were found for graduation (Evans et al., 2009). In this study, more graduates were employed and this may have occurred because the unemployment rate for Caucasians (5.3%) in Memphis three times less than for African Americans (16.9%) (Powell, 2010).

Roll and colleagues (2005), and Gray and Saum (2005) found no age differences in graduation, whereas the Shelby County DC graduates were older (32.2 ± 9.92). This may have occurred because, according to national DC reports, DC graduates are older (National Institute of Justice, 2006; Office of Justice Programs, 1998).

Evans and colleagues (2009), and Sechrest and Shicor (2001) found no differences in education for graduation but there was an education difference, with Shelby County DC graduates having a high school diploma/GED. This may have occurred because low education and unemployment is common among the Shelby County DC dropouts and within the Memphis community. It has also been suggested that persons with more education are employed and committed to work, and consequently they use drugs less, which increases treatment success and improves graduation (Butzin et al., 2002).

Finally, the relationship of alcohol as the primary drug of choice to graduation is equivocal. Alcohol as a primary drug choice was associated with graduation (Joosen et al., 2005; Shaffer et al., 2011; Turner et al., 2002); whereas Roll and colleagues (2005) found methamphetamine was associated with graduation, and Sechrest and Shicor (2001) found amphetamine was associated with graduation. This may have occurred because more Caucasian DC clients have preferred alcohol (Dannerbeck et al., 2006; Shaffer et al., 2011) and more African American DC clients have preferred cocaine (Dannerbeck et al., 2006; Shaffer et al., 2011).

Drug Court Practices

For DC Practices variables, graduates participated in the Outpatient DUI program, and did not participate in the Outpatient, Residential, and Early Assessment Intervention Treatment programs. Treatment agency types did not make a difference for graduation.

Few studies on DC Practices were available for comparison. Drug Court literature has focused on Sample Severity rather than DC Practices and In-Program Behavior. Results in the literature are equivocal for program type and graduation. Evans and colleagues (2009) also found that graduates did not participate in outpatient programs, but did not support having few graduates in residential programs. This may have occurred because outpatient programs have been associated with higher dropouts for mental health problems such as depression and self-reported suicide attempts, and more arrests prior to DC admission (Evans et al., 2009). In contrast to outpatient, residential programs are geared for clients in need of a higher level of care due to increased risk for dropout related to more severe substance use disorder problems (Koob, Brocato, & Kleinpeter, 2011). Residential programs are for DC clients who need a stable living environment to facilitate successful completion of the DC program (Evans et al., 2009). The Shelby County DC Residential program is provided during the first six months of drug treatment to help clients who feel they are struggling in an outpatient treatment program or for clients who continue positive drug tests (Shelby County Drug Court, 2007). Nationally, DC client dropout is less in residential programs (15.5%) than outpatient programs (79.7%) (Evans et al., 2009) and residential programs offer housing stability to keep clients involved with treatment (Belenko, 1999). In contrast, graduates in this study did not participate in Residential programs. This may have occurred because residential programs have more clients with greater issues with substance use disorder and crime, and the Shelby County DC has more outpatient programs. The greater number of graduates in the Outpatient DUI programs may have occurred because alcohol was the drug of choice for 23.5% of graduates and the Outpatient DUI program is a special program for clients with problems with alcohol abuse.

There were no studies identified in the literature that evaluated treatment agencies. In this study, there was only one significant difference for the nine treatment agencies and that agency had only five clients. Thus, this result may have been underpowered. However, for the agencies that did have the power, these results were also nonsignificant. Therefore, the Shelby County DC, treatment agency types did not make a difference for graduation. This may have occurred because all of the Shelby County DC treatment agencies use similar treatment guidelines. It is interesting that there was no difference in graduation rates among the treatment agencies, however. Shelby County DC court has "not found much difference in the agencies for graduation rate over the last three years" (A. Parkerson, personal communication, September, 10, 2012). All of the treatment agencies may benefit from using a continuous quality improvement approach to identify high performing processes to improve graduation rates rather than maintaining the status quo.

Results are equivocal for the number of days spent in programs. Evans and colleagues (2009) also found that a greater number of days in DC programs was associated with graduation, whereas Saum and colleagues (2001) did not find the relationship. Program length of treatment is difficult to interpret. Longer participation in programs associated with graduation may be explained by motivation from the DC Judge to remain in treatment (S. Rossman et al., 2011). Clients with frequent sanctions may remain in the program longer as part of learning drug-free behaviors (Saum et al., 2001). Clients who drop out of DC may have few days in programs simply because they were not in treatment long enough to graduate.

In-Program Behavior

For In-Program Behavior variables, graduates had more diluted urine drug screens; fewer missed urine drug screens; greater number of total urine drug screens; fewer bench warrants; fewer rearrests; more clients with no violations; fewer number of violations; fewer jail sentencing sanctions, fewer number of total sanctions, and fewer number of jail sentencing days. Few studies evaluated In-Program Behaviors for graduates and dropouts. Sechrest and Shicor (2001) found that more (62%)graduates had no positive urine drug screens than dropouts (39%), whereas the Shelby County DC found that graduate have more diluted urine drug screens. This may have occurred because there are reasons for diluted urine drug screens other than a client's attempt to mask his drug use. Diluted urine drug screens may also result from normal fluctuations in urine concentration, salt and protein intake, exercise, older age (P. Cary, 2004), illness, and disease (A. Parkerson personal communication, September 10, 2012). Other than documented illness or disease, Shelby County DC clients with diluted drug screens are sanctioned, and consequently remain in the DC program longer. Additionally, because graduates have fewer missed urine drug screens means that perhaps they had more "opportunities" to have diluted screens. In other words, if the client never shows up for urine drug screening he will not have diluted urine screens, but he will have more missed urine screens, which also results in sanctions. Graduates also had greater number of total urine drug screens because this variable is an aggregate for missed, diluted, and positive screens. Therefore, graduates with more diluted drug screens will also have greater number of total urine drug screens.

No studies were identified in the literature that compared DC graduates with DC dropouts for bench warrant, rearrest, number of violations, and jail sentencing sanctions. However, study findings are consistent with Patra and colleagues (2010) for the number of total sanctions between DC graduates and DC dropouts. In this study, Shelby County DC graduates had fewer total sanctions (1.74 ± 1.79) than DC dropouts (2.65 ± 2.32), and Patra and colleagues (2010) reported DC graduates with (1.2 ± 1.3) total sanctions and DC dropouts with (1.7 ± 1.4) total sanctions. This may have occurred because clients who graduate are motivated by rewards like gift cards and praise from the judge to follow DC rules (Marlowe, Festinger, Dugosh, Arabia, & Kirby, 2008; S. Rossman et al., 2011). They show up for treatment, and consequently they have fewer violations and sanctions (S. Rossman et al., 2011). One possible explanation for the absence of comparable DC

study findings is that the variables in this study specify factors available for analysis in the Shelby County DC data files. Additionally, there was no evidence found to indicate that DC studies, as previously mentioned, were guided by the Multi-Site Adults Drug Court Evaluation (MADCE) Model, and few studies have compared DC graduates and DC dropouts. This is a reflection of literature only recently focusing on evaluation of Drug Courts.

Drug Court Graduation Prediction Model

The final research question focused on developing a prediction model for DC graduation. In this study, the final prediction model for graduation included six variables: (a) number of diluted urine drug screens, (b) number of program days, (c) male gender, (d) no high school diploma or GED, (e) number of rearrests, and (f) number of jail sentencing sanctions. There were two positive predictors and four negative predictors for DC graduation. More diluted urine drug screens and a greater number of program days had a positive predictive effect for graduation. Male gender, no high school diploma or GED, greater rearrests, and more jail sentencing sanctions had a negative predictive effect for graduation. There was no multicollinearity with the model evaluation. The predictors in this study will be compared to the candidate and graduation predictor variables in eleven multivariate DC studies in **Table 5-1**. Six studies used only baseline data (Butzin et al., 2002; Dannerbeck et al., 2006; A. Gray & Saum, 2005; Roll et al., 2005; Sechrest & Shicor, 2001; Shaffer et al., 2011). Three studies used outcome data (R. Brown, 2010a; Evans et al., 2009; Saum et al., 2001), and three studies have used in-program treatment data (R. Brown et al., 2011; Evans et al., 2009; S. Rossman, J. Roman, J. Zweig, C. Lindquist, et al., 2011). In contrast, this longitudinal study looked at three points in time and had 58 variables and 27 candidate predictor variables for the regression model.

Candidate Predictor Variables

Of the eleven studies for comparison using the MADCE Model, six studies only looked at Sample Severity for candidate predictor variables (Butzin et al., 2002; Dannerbeck et al., 2006; A. Gray & Saum, 2005; Roll et al., 2005; Sechrest & Shicor, 2001; Shaffer et al., 2011), and three studies looked at Sample Severity plus one other domain measured by one candidate predictor variable (R. Brown, 2010a; R. Brown et al., 2011) or two candidate predictor variables (Saum et al., 2001). Two studies looked at Sample Severity plus two or more other domains for candidate predictor variables (Evans et al., 2009; S. Rossman, M. Rempel, et al., 2011).

This study looked at Sample Severity, Drug Court Practices, and In-Program Behavior domains. The study by Rossman and colleagues (2011) is the only study comparable to this study because they looked at all three MADCE Model domains, and they also included Offender Perceptions that was not included in this study. Furthermore, this study and the eleven other studies did not examine the Post-Program Outcomes

Table 5-1. Multivariate Drug Court Studies' Candidate and Predictor Variables for Graduation.

Author(s)	Study Title	Domain	Variables	
			Candidate	Graduation Predictors
Brown (2010)	Associations with substance abuse treatment completion in drug court.	Sample Severity	Age, gender; employment; education; cocaine use disorder.	Employed; education (high school diploma/GED or greater); no cocaine use.
		Drug Court Practices	Treatment setting.	
Brown, Allison, & Nieto (2011)	Impact of jail sanctions during drug court participation upon substance abuse treatment completion.	Sample Severity	Gender; age; race; education; employment; polysubstance misuse.	Education (high school or greater); ↑employment; no polysubstance misuse;
		In-Program Behavior	First sanction at ≤ 30 days; first sanction at > 30 days.	↓First sanction at ≤ 30 days; ↑first sanction at > 30 days.
Butzin, Saum, & Scarpitti (2002)	Factors associated with completion of a drug treatment court diversion program.	Sample Severity	Race; education; employment; marital status; frequency of drug use; education by race.	Education (high school or greater); ↑employment; education by race (Caucasian).
Dannerbeck, Harris, Sundet, & Lloyd (2006)	Understanding and responding to racial differences in drug court outcomes.	Sample Severity	Gender; age; race; legal status (diversion); legal status (re-entry); employment; marital status; community status; race; and cocaine use.	Gender (female); ↑age; race (Caucasian); ↑employment; marital status (married); race (Caucasian) and no cocaine use.
Evans, Li, & Hser (2009)	Client and program factors associated with dropout from court mandated drug treatment.	Sample Severity	Age; race; gender; employment; psychiatric severity; county of residence; residing with dependent children; methamphetamine primary drug; arrests 12 months before DC program intake.	↓Psychiatric severity; county of residence; ↑residing with dependent children; ↑methamphetamine primary drug; ↓arrests before DC program intake.
		Offender Perceptions	Readiness for treatment.	↑Readiness for treatment.
		Drug Court Practices	Residential care; treatment services per day.	↑Residential care.

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Table 5-1. *(continued).*

Author(s)	Study Title	Domain	Variables	
			Candidate	Graduation Predictors
Gray, & Saum (2005).	Mental health, gender, and drug court completion.	Sample Severity	Gender; age; race; education; drug use severity; criminal history; depression; anxiety; Prescription medication for psychological/emotional problems.	Race (Caucasian); ↓drug use severity; ↓criminal history; ↓depression; (+) Prescription medication (psychological/emotional problems).
Roll, Prendergast, Richardson, Burdon, & Ramirez (2005)	Identifying predictors of treatment outcome in a drug court program.	Sample Severity	Age; education; ethnicity; gender; marital status; age first used drugs; employment; drug of choice; needle use for route of drug administration; frequency of drug use; last used; take medication; years of drug use.	↑Employment; ↓needle use for drug route.
Rossman, Roman, Zweig, Lindquist, Rempel, Williamson, . . . Fahrney (2011)	The multi-site adult drug court evaluation: Study overview and design, volume 1.	Sample Severity	Age; antisocial personality disorder; race; days unavailable on street; depression; family drug abuse; education; income; gender ; married or in a relationship; minor children; prior arrests; primary hard drug of choice.	↑Age; ↓antisocial personality disorder; ↓ prior arrests.
		Drug Court Practices	Drug treatment in weeks.	↑Drug treatment in weeks.
		Offender Perceptions	Attitude toward judge scale; deterrence score; distributive justice indicator; procedural justice scale; readiness to change score.	↑Client attitude toward judge.
		In-Program Behavior	Case management contacts; court appearances; drug tests; sanctions.	↑Drug testing; ↓sanctions; ↑court appearances.
Saum, Scarpitti, & Robbins (2001)	Violent offenders in drug court.	Sample Severity	Gender; race; age; crack use; criminal charge history; violent charge history.	↑Age; no crack use; ↓criminal history.
		Drug Court Practices	Length of stay in treatment; therapeutic community treatment.	

Table 5-1. *(continued).*

Author(s)	Study Title	Domain	Predictor Variables	
			Candidate	Graduation
Sechrest, & Shicor (2001)	Determinants of graduation from a day treatment drug court in California: A preliminary study	Sample Severity	Race; marijuana use.	Race (Caucasian); ↓marijuana use.
Shaffer, Hartman, Listwan, Howell, & Latessa (2011)	Outcomes among drug court participants: Does drug of choice matter?	Sample Severity	Gender; race; age; employment; education; drug of choice; Level of Service Inventory-Revised for recidivism; prior treatment.	↑Age; ↑employment; ↓Level of Service Inventory-Revised (recidivism).

domain. Offender Perceptions and Post-Program Outcomes domains should be included in future research.

Graduation Predictor Variables

In this study, there were significant variables predicting graduation in three MADCE Model domains. For Sample Severity there was significance for gender and education. For DC Practices there was significance for number of days in the program. For In-Program Behavior there was significance for diluted urine drug screens, rearrests, and jail sentencing sanctions. Because the majority of DC studies only looked at Sample Severity, there are few references to support graduation predictor variables in the DC Practices and In-Program Behavior domains. Therefore, significant predictors from this study will be compared to the significant predictors in the eleven DC studies, and findings are organized by the MADCE Model domains.

Sample severity. In this study, male gender was a negative predictor for DC graduation. Of the eleven multivariate studies identified, there was only one study (Dannerbeck et al., 2006) that found gender as a predictive for graduation. Like this study, Dannerbeck and colleagues (2006) found females predictive for DC graduation. Rossman and colleagues (2011) did not find gender predictive for graduation. One possible explanation for this finding is that most of the other DC studies had samples that were predominately employed Caucasians and had more females. Therefore, this study sample may have more single mother issues because the tri-state area (Tennessee, Mississippi, and Arkansas) has the greatest teenage pregnancy rates in the United States (Hamilton & Ventura, 2012), and Memphis has teen pregnancy rate that is close to double the national average especially for African American teenagers. Furthermore, young African American single mothers face obstacles for employment, child support, and childcare (Choi & Jackson, 2011; Conners, Bradley, Whiteside-Mansell, & Crone, 2001). Another possible explanation for why gender was a predictor for DC graduation is that mothers with substance use disorder do not want to lose their children, therefore, these women are motivated to complete the DC program (Dakof et al., 2010).

In this study, not having a high school diploma or GED was a negative predictor for graduation. Only three of the eleven studies found education predictive for graduation (R. Brown, 2010a; R. Brown et al., 2011; Butzin et al., 2002). Rossman and colleagues (2011) did not find education predictive for graduation. One possible explanation for the findings in this study is that there were more African American clients with less than a high school diploma or GED and these clients had more unemployment than clients in the other studies. Higher levels of education is also associated with better employment opportunities (Cameron & Heckman, 1993; Farrell, 2011). This supports the reasons for DC focus on clients' literacy, education, and employment because employment is associated with successful completion of Drug Court programs (Leukefeld et al., 2007; Roll et al., 2005), especially ongoing employment in higher paying jobs (Leukefeld et al., 2004).

Drug Court practices. In this study, a greater number of days spent in the DC treatment program was positive predictor of DC graduation. Of the eleven multivariate studies identified, there were two studies (S. Rossman et al., 2011; Saum et al., 2001) that looked at length of stay in DC treatment, but only one study had a found that the greater number of weeks that the client spent in treatment was a positive predictor for successful program outcome (S. Rossman, M. Rempel, et al., 2011). One possible explanation for the finding in this study is that clients who struggle with remaining drug free get sanctioned, and consequently they stay in the DC program longer (Saum et al., 2001). Likewise, dropouts will spend fewer days in programs because they do not stay long enough to graduate.

In-program behavior. In this study, a greater number of jail sentencing sanctions was a negative predictor for graduation in this study. Of the eleven studies, there were two studies that looked at In-Program Behavior and the findings were significant for sanctions (R. Brown et al., 2011; S. Rossman et al., 2011). One possible explanation for this finding is that more jail sentencing sanctions is indicative of noncompliant behaviors, and consequently places the client at greater risk for not graduating from DC (R. Brown et al., 2011).

In this study, more diluted urine drug screen was positive predictor of DC graduation. None of the eleven DC studies looked at diluted urine drug screens. One possible explanation for the unexpected finding in this study is that urine drug screens may test as diluted due to medical reasons such as hepatitis C, diabetes, and kidney problems (A. Parkerson, personal communication, September, 2012); salt and protein intake; exercise; and older age (P. Cary, 2004). Therefore, it is possible for DC clients to have diluted urine drug tests and graduate from the program.

In this study, more rearrests was a negative predictor for graduation. None of the eleven DC studies looked at rearrest during DC participation. More rearrests is indicative of criminal activity associated with repetitive noncompliant behaviors for substance abuse treatments and criminal justice procedures (S. Rossman et al., 2011). Clients with repetitive noncompliant behaviors are at-risk for not graduating from DC.

Last of all, based on the Hosmer and Lemeshow Goodness of Fit analysis ($X^2 = 11.3$, p = .18), this multiple logistic regression model fit the data well and explains the relationship between DC graduation and the independent variables included in this model. The c statistic (.949) showed excellent predictive ability (94.9%) for the model to correctly assign higher probabilities to clients who are likely to graduate. Therefore, the graduation prediction model can be used to guide DC programs.

To apply this model in practice with Drug Courts and future research, it is important to identify which variables in the model are amenable to treatment or can be identified as high risk upon admission to DC. Based on the final prediction model, education is the only variable that is amenable to treatment, and male gender and low education are the high risk variables that can be identified upon DC admission.

Therefore, future intervention research must be designed to target males and clients with low education. This author is interested in focusing on the education variable as it relates to literacy and health literacy which will be discussed in Chapter 6. Based on the final prediction model, there is also client information for In-Program Behavior that can be useful to practice in Drug Courts to identify high risk clients during the program to lead to increased interventions. For example, Drug Courts can monitor for the number of diluted drug screens, rearrests, and jail sentencing sanctions to identify if these behaviors are more than the average and occurring earlier during the program. Using this information may help DC counselors detect which clients need interventions earlier in the program. More details about the interventions will be discussed later in this chapter for the implications for DC practice.

Strengths and Limitations

Strengths

The strengths of this study include: (a) the MADCE Model to guide the study, (b) a longitudinal design, (c) multivariate analysis, (d) the Shelby County DC sample, and (e) Goodness of Fit statistics to validate the DC graduation prediction model. The first strength of this study was the use of the Multi-Site Adult Drug Court Evaluation (MADCE) Model to guide the study. This model also guided one the largest DC studies in the United States to evaluate DC effectiveness for: (a) reducing crime and drug use, (b) improving cost savings, and (c) policy and practice implications. The MADCE Model layout is similar to a logic model that illustrates the interaction of client and programmatic factors. The design of the MADCE Model was a good fit for the Shelby County DC data for analysis because these data are collected for reporting purposes to both state and national agencies for program evaluation. The MADCE Model was used to select 58 study variables using data from three of six domains. Using the MADCE Model, this study evaluated twelve program variables, whereas most studies looked at one or two program variables at most. This is a key strength because the program variables explain how the DC system provides care and ways clients navigate this system to receive help. The concept of system of delivery is common in health care and also recognized in the health literacy literature for ways people navigate complex systems to receive care. Furthermore, of the twelve program variables, this study evaluated six types of DC programs and nine treatment agencies, whereas other studies have looked at outpatient and residential programs only and treatment agency evaluation is scant in the literature. This study has also evaluated three types of urine drug screens in comparison to most studies that have only evaluated one type. This study has also looked at five types of violations, whereas most studies have looked only at one. Additionally, this study has evaluated two types of sanctions, whereas most studies have evaluated only one.

The second strength was the longitudinal design of this multivariate analysis for Sample Severity, Drug Court Practices, and In-Program Behavior variables was at three

points in time: (a) on DC admission, (b) during DC program, and (c) at end point outcomes. This design is more robust than studies in the literature that had designs for two points in time or baseline data only.

The third strength was that this study used multivariate analysis to predict DC graduation with variables from three MADCE domains Sample Severity, Drug Court Practices, and In-Program Behavior. The outcome variable was DC graduation. In this case, DC provides substance use disorder treatment to clients in the program. Because sobriety is requisite for successful program completion, DC graduation signifies improved health. Interestingly, the bivarate analysis showed race, gender, age, education, and employment differences for graduation which may inform Drug Courts of programmatic changes to narrow these differences.

The fourth strength was the sample of the Shelby County DC treatment program. This study sample was predominately African American which is unlike most DC studies. Therefore, the question of race differences could be addressed. Additionally, the Shelby County DC is an urban court located in the Mid South and not much DC research has been done in this region.

The final strength was using Goodness of Fit statistics to validate the DC graduation prediction model. The graduation prediction model demonstrated positive predictive value from the Hosmer and Lemeshow Goodness and Fit statistic and c statistic.

Limitations

The limitations of this study include: (a) limited MADCE Model domains, (b) secondary data analysis, (c) no cross validation methods for the graduation prediction model, and (d) generalizability issues. The first limitation was there was no data for all domains of the MADCE Model. Data were not available for the Offender Perceptions and Post-Program Outcomes domains.

The second limitation was using secondary data analysis because the Shelby County DC data files were used for required reports and data were not designed for research and analysis, which is a common limitation for secondary data analysis (Gillis & Jackson, 2002). Because this study used secondary data analysis there were also issues with the quality of data including: (a) self reported data, (b) level of measurement, and (c) missing data.

Most of the Shelby County DC client data were self-reported, and as such is subject to concerns over reliability and validity. Self-reported data yields information that is otherwise difficult to obtain, yet validity and accuracy remains a limitation for researchers to content (LoBiondo-Wood & Haber, 2002). Because this was a secondary data analysis, this investigator could not address this limitation directly. Another self report issue was that for the primary drug of choice, clients reported more than one drug

without distinguishing their top preference. This limitation was handled by counting each preference named and creating a new variable called 'primary drug number' to list how many primary drugs the client preferred.

Using the highest level of measurement possible is ideal for maximizing choices for statistical procedures (LoBiondo-Wood & Haber, 2002). This study had two issues for the level of measurement. Several data files used text for data entry, data was not coded, and the level of measurement was low for most variables which influenced the analyses performed (Polit & Beck, 2004). This limitation was handled by eliminating aggregate data and using dummy coding to transform the data for analysis with inferential statistics. Data were also primarily discrete rather than continuous level of measurement. This limitation was handled by using dummy coding to transform discrete variables into continuous. Discrete variables were also summed to create continuous variables

Missing data is another problem associated with secondary data limitations. A key limitation in this study was the amount of missing data in the original datasets obtained from the Shelby County DC. The initial sample size was 507 DC clients with 76 variables. Data were missing at random for $\geq 40\%$ of clients, 67% for secondary drug of choice, and 45% driver's license variables. Because the initial sample size was large (507), listwise deletion was used to remove 170 clients without losing power (Howell, 2009; Polit & Beck, 2004). Secondary drug choice and driver's license variables were deleted from all clients. This deletion option is suitable for dealing with missing data that are 15% or greater (Cameron & Heckman, 1993). After clients and variables with missing data were removed, there was no missing data for the final sample of 310 DC clients. This sample size was still adequate for multiple logistic regression.

The fourth limitation was that the logistic model was not internally and externally validated using cross-validation to measure the predictive performance of the graduation prediction model. This limitation was handled by assessing the fit of the data to the model using Hosmer and Lemeshow Goodness of Fit statistic, and assessing the predictive ability of the model using the c statistic. The model fit the data well and had 95% predictive. Another model limitation was of the six predictors in the graduation prediction model; only education was amenable to treatment.

The final limitation concerns the generalizability of results because of a predominately African American (60.3%) sample. This distribution of African Americans is similar to the population demographics in Memphis. Therefore, the Shelby County DC client sample matches the population from which it came. This raises the question about regional differences for population demographics. Results from this study may be generalized to other large southern cities whose African American population is similar.

Implications for Practice

Significant variables in the graduation prediction model that can be obtained on admission to DC are having a high school diploma or GED, and being a female client. Thus, male clients and clients without a high school diploma or GED are at risk for not graduating. One intervention that Drug Courts may have not considered to improve DC outcomes is the role of education and literacy for adults. Results from this study indicate that education plays a critical role for DC graduation. Specifically, a high school diploma is the minimum level of education for DC graduation. Improving education and literacy for adults facilitates better reading skills requisite for understanding DC rules as printed in Drug Court client handbooks. Policies that focus on education improvement from pre-school through high school, and reading instruction programs for adults are some ways to begin addressing low education among DC clients. In contrast to Drug Courts, education in correctional facilities has been available since 1798 (U.S. Department of Education, 2012). Today over 90% of federal and state prisons have some form of educational programs for inmates (U.S. Department of Education, 2012), yet 40 % of prisoners have not completed high school or earned a GED (Erisman & Contardo, 2005). Prisoners with a high school diploma or GED still have poor reading and math skills (Erisman & Contardo, 2005). Because DC clients have similar educational preparation as prisons, DC clients may benefit from policies and programs that support adult reading programs and educational programs to help clients advance their level of education.

Less than a high school education is prevalent in the Shelby County DC and in the Memphis population. Low education is also regional issue for the South (Carnevale & Smith, 2012), therefore other Drug Courts in the South may need to consider low education as a high risk factor for dropout. Generally, persons with low education also have low literacy and low health literacy. Most Shelby County DC clients have low education, and subsequently are considered low literate. Additionally, DC clients have short attention spans due to poor memory and lower concentration resulting from drug effects on the brain. According to Doak, Doak, and Root (1985), when teaching persons such as DC clients with low literacy and poor memory, it is important to: (a) assess the clients' readiness to learn; (b) teach the smallest amount possible; (b) make teaching points vivid for the clients' immediate application; (c) have clients restate information; and (d) review repeatedly. Most low literate learners do not prefer print sources, but rely on an oral tradition for learning and seek information from radio, television, friends, and family members. Therefore, teaching materials for DC clients must be available in multi-modal formats for hands-on application that is easily accessible for clients' use at their own pace repeatedly. For example, the Shelby County DC Client Handbook could be made into a recording available via CD, telephone application, or website. Computers could be made available for guided practice to learn about drug effects on the body and how to improve health behaviors to become sober. Health videos and programs about drug addiction recovery could be viewed as a group, followed by a discussion of key points and frequently asked questions. Group discussion is a good way for clients to learn about risks and benefits in health information because clients can hear rationale for decision-making (Nielsen-Bohlman, Panzer, & Kindig, 2004). It is also important to include frequently asked questions during a discussion because persons with low literacy

do not tend to ask questions because asking questions requires using problem-solving skills and more advanced vocabulary that these persons lack (Doak et al., 1996).

While print resources are not an optimal format for understanding among persons with low literacy, all Shelby County DC print resources will be written in a conversation style with short words and sentences, and ideas chunked into categories with advanced organizers that tell readers what is coming next in the intended message. A summary will be included to remind the reader of key points. Because pictures help persons with low literacy remember information better than words, simple line drawings will be used to reduce text, emphasize instructions, and facilitate recall of new information (Doak et al., 1985).

Another practice implication concerning low education is to assess clients' reading skills on admission to DC and offer classes for teaching adults to read. Even clients with a high school diploma should be assessed for reading skills because having a high school diploma does not mean that a person can read or read well enough to understand instructions, and reading skills are often five grade level below the actual grade level completed (Doak et al., 1985). Partnering with local literacy councils, schools, or libraries to provide reading assessment and reading classes brings the community together to help the larger problem of societal low education.

The prediction model documents gender differences for graduation from the Shelby County DC. Males are at risk for not graduating, yet unlike women, there are no special programs designed specifically for men. The practice implication is that a program may be designed to target meeting men's needs for recovery such as dealing with stress associated with unemployment and anger management training. A primary care mental health provider may help identify specific treatment options and services to include in programs that target meeting men's needs for drug addiction recovery.

Interestingly, the variables in the prediction model do not support the effectiveness of any particular DC program or treatment agency. When looking at the differences between DC programs and treatment agencies, there were very few differences. It is reasonable that at least one DC program and one treatment agency would indicate top performance so that more clients could be placed in that particular program and treatment agency. Therefore, these results have implications for future program evaluation for DC program type and treatment agency type.

Program evaluation helps verify the impact of services for clients, improve delivery of efficient and cost effective services, and confirm if goals are met based on proper data collection that measures the intended outcome (Centers for Disease Control and Prevention, 2012). Future program evaluation may require using a systems approach to learn best practices of successful programs followed by a gap analysis of agencies with lower graduation rates. A systems approach focuses on process, clients, agency personnel, community partners, and problem solving for the purpose of generating value or quality for clients and their families, and for society (American Society of Health-System Pharmacists Foundation, 2012). Value is determined by the client and

community. Using a balanced view from the perspective of the client, agency, and community, quality markers would encompass clinical and functional outcomes, risk status outcomes, satisfaction with treatment process and outcomes, and cost outcomes of the treatment process. After determining the standard level of performance for each quality marker, agencies would measure their performance, identify performance gaps, and develop continuous quality improvement plans to improve and sustain performance. This approach would enable the Shelby County DC to make outcomes-based decisions and facilitate strategies that are determined to be effective for this complex and vulnerable client population.

Finally, because clients with greater rearrests, diluted urine drug screens, and jail sentencing sanctions were more likely to not graduate, DC counselors may examine monthly data and by DC phase on these three variables to identify which clients need earlier interventions during the program. This data could also be used to examine how high risk clients transition the DC phases and in which phases they encounter more problems. Interventions may include increasing the number of one-on-one counseling sessions with the DC counselors and face-to-face meetings with the judge to discuss the client's progress and understanding about the DC program rules.

Summary of Results

Drug Courts use the criminal justice system to provide year-long supervised community-based drug addiction treatment programs as an alternative to incarceration for non-violent drug-related crimes. Graduating from DC is indicative of success in reducing drug use and criminal activity. While several DC studies have described the DC client and examined associations with successful completion of the program, this study is among few studies have used multivariate analyses of client and program variables to predict DC graduation. This study used the MADCE Model to describe the Shelby County DC sample, identify differences between DC graduates and DC dropouts, and develop a prediction model for DC graduation. This study contributed sample severity information about DC clients who are predominately African American men who and unemployed with a high school education or less. The significant differences for Sample Severity and DC graduation were not supported in the literature or were equivocal. Of the few studies on Drug Court Practices available for comparison, results were equivocal. Of the few studies on In-Program Behavior available for comparison, results were equivocal. Predictors for DC graduation were female gender, a high school education/GED or more, greater number of days in the program, more diluted urine drug screens, fewer rearrests, and fewer jail sentencing sanctions. Information related to these predictors may guide policy development for improving public school education; assisting Drug Courts to identify clients at-risk for dropout and customize treatment services to promote graduation; and direct future research about why more women graduate from DC, and what role literacy and health literacy may have in DC graduation. Future DC health literacy research will be discussed in Chapter 6.

Chapter 6. Future Drug Court Health Literacy Research

Overview

Of the six predictors for DC graduation, only one predictor is amenable to intervention (education). Shelby County DC clients who had a high school diploma or GED were more likely to graduate from DC. Thus, future research should address improving literacy and health literacy of DC clients. This is important because DC can be re-conceptualized as a primary care mental health intervention, and health literacy is associated with improved health outcomes This chapter will discuss future DC and DC health literacy research, and a discussion of four health literacy models and new Multidimensional Health Literacy Model developed by the author to guide future DC health literacy research. Future research areas include: (a) completing prediction model validation and developing separate prediction models by gender and race; (b) future research with female DC clients; (c) creating a minimum data set for the Shelby County DC to use for future research and DC program evaluation; (d) conducting a literacy and health literacy assessment of all Shelby County DC clients; (e) using the Social-Ecological Model to address psycho-social issues facing DC clients, and (f) using the Multidimensional Health Literacy Model and Multi-Site Adult Drug Court Evaluation Model to guide health literacy research with DC clients and DC programs. Each will be discussed in turn.

Future Research

Graduation Prediction Model Validation

Validation of the graduation prediction model is an essential step for evaluating the predictive performance of the model. Cross validation is one statistical method for confirming a model prediction ability using new data (Starkweather, 2011). This method is more precise than calculating the fit of the model as seen with the Goodness of Fit statistics which tend to indicate a better fit than what actually exists. Cross validation does not use the entire data set when building a model. Instead, cross validation involves removing some cases before the data is modeled to create a testing set, and then builds a model using the leftover cases called the training set. Then, the model that was created with the training set is tested with the testing set to see if the results compare to the original model (Arlot, 2010).

This approach can be done using multiple partitions of the data for testing the model. Four new separate DC graduation prediction models can be developed for men, and for women, and for African Americans and Caucasians. The 27 candidate predictor variables used in this study were based on the differences between graduates and dropouts in research question two using the entire sample. However, when evaluating four groups separately such as women only, the differences between graduates and

dropouts may be very different from this study because the sample is totally different. Likewise, when developing a model for Caucasians only, the first step is to do the analysis in research question two on the Caucasian sample and then see what the differences are between the graduates and dropouts to find out what the candidate predictor variables will be. Each of the four new prediction models will also be validated using the Goodness of Fit, c-statistic, and cross validation techniques. Model validation using cross validation analysis will be included as the final step for each model separately.

Female Drug Court Clients

This study lays the foundation for future research to focus on female DC clients to explain why women were more likely to graduate from the Shelby County DC. Women in DC have been reported as having more emotional issues and problems with depression, and seek out treatment on their own (A. Gray & Saum, 2005; M. Webster et al., 2006). Those who were treated for depression and emotional issues were more likely to graduate from DC (A. Gray & Saum, 2005). It has also been suggested that women with children are highly motivated to graduate from DC or they risk losing their child custody rights(Office of Justice Programs, 1998). Future research opportunities will focus on why women graduate from DC. Future research may also evaluate the need for, and design and evaluate programs for men.

Drug Court Minimum Data Set

To conduct future prospective research, a DC minimum data set will have to be developed for the Shelby County DC. A minimum data set can guide DC program evaluation and be used for research, and procedures developed to ensure quality data collection and recoding. The level of measurements and type of data will need to be addressed. Before constructing a minimum data set, a data collection plan must be developed to ideally yield accurate, valid, and meaningful data that are effective in answering research questions (Polit & Beck, 2004). The first step in a data collection plan is to determine what data need to be gathered. Based on the MADCE Model and Multidimensional Health Literacy Model (described in this chapter), a minimum data set was developed that includes: (a) concepts, (b) operational definitions, (c) feasibility, and (d) DC use as shown in **Table 6-1**. Because DC clients' mental clarity from drug effects may vary based on the stage of recovery, an interprofessional team will help identify the timing for data collection to improve the accuracy of self-reported data. A psychologist will identify and manage clients' neurological changes with the brain from drug abuse. A sociologist will identify and manage psychological and sociological issues. Public health experts will identify and manage client issues and effects on the family, community, and larger social issues. A reading expert will identify and manage client issues for reading and learning. Drug Court staff will identify and manage criminal justice issues and help determine what type of data collection strategy is reasonable with their workload assignment.

Table 6-1. Data for Minimum Data Set for Shelby County Drug Court.

Concepts	Variables	Operational Definitions	Feasibility	Drug Court Use
Mental Health	Depression and anxiety	Brief Jail Mental Health Screen	3 minutes to administer, free, and no training required.	Identifies clients who need further mental health evaluation
	Exposure to violence	Adverse Childhood Event Screening: 10 items; 1 point each; risk increases with score.	Administered by Drug Court counselor; quick and easy	Identifies clients at risk for mental/physical health problems and abuse.
	Memory	Find a valid/reliable instrument to measure memory	Administered by Drug Court counselor	Identifies clients with memory problems or memory loss.
	Readiness to change	The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES); 19-item Likert scale scoring 1-5 per item for Recognition, Ambivalence, and Taking Steps.	Valid, reliable, and free public domain access; quick and easy to administer by Drug Court counselor; higher scores are most predictive of successful change	Identifies client's recognition of drug/alcohol problem, openness to change, and steps taking toward change.
Demographics	Zip code	Zip code of client's residence	Self-reported during client interview	Identifies geographic proximity for community services including health and education,
	Education level	Education in years	Self-reported during client interview	Identifies education level for literacy comparison.
Personal Resources	Kinship and Family conflict	Find valid/reliable instrument to measure kinship for African American/Caucasian races	Self-reported during client interview	Identifies persons involved in the clients success during and after the program.
	Housing stability	Homeless yes/no; Safe yes/no	Self-reported during client interview.	Identifies homeless persons and others who need safe housing.
	Transportation	Car, bus, motorcycle, bike, walk, friend or family	Self-reported during client interview	Identifies clients without transportation.
	Health insurance	Medicare, Medicaid, private, none: yes/no	Self-reported during client interview	Predicts clients access to health care services
Health Literacy	Literacy	Wide Range Achievement Test-3, Reading subset. Identifies literacy.	15 minutes to administer and requires training.	Evaluates word reading for recognizing and naming letters, pronouncing printed words.

Table 6-1. *(continued).*

Concepts	Variables	Operational Definitions	Feasibility	Drug Court Use
	Health literacy	Rapid Assessment of Adult Literacy (REALM); Score 0-60.	3 minutes screen that gives grade equivalents for reading common medical words. Some training required.	Identifies clients with low health literacy.
	Technological skills	Self-rated scale 0 – 5 rank skills for internet search, Twitter®, Facebook®, instant messaging, text, email.	Self-reported during client interview.	Identifies clients' skills for learning and communication.
	Preferred learning style	Kolb Learning Style Inventory, Version 4 that identifies nine styles: Initiating, Experiencing, Imagining, Reflecting, Analyzing, Thinking, Deciding, Acting, and Balancing. Psychometrics with high reliability and high internal and external validity compared to Version 3.0	Used to identify how one learns and deals with ideas and day to day situations. Cost $35/assessment, takes 15-20 minutes and available online or paper.	Identifies how clients' preferred learning style and how they learn best. May be used to select teaching modalities that best fit clients' learning style.
Behavior Change	Child custody rights	Child custody rights yes/no and reason for no custody rights	Self-report and verified by Drug Court counselors using legal records.	Identifies clients who are sober and responsible for caring for children.
	Days in treatment agency for all clients.	The number of days spent in each agency for drug rehab treatment.	Reported by treatment agency.	Identifies clients who are adhering to Drug Court rules and seeking improved health.
	Drug test results by Drug Court phase for all clients.	The number of positive urine drug tests and for which drugs, as possible.	Screening tests for positive drug use and reported by Drug Court counselors.	Identifies clients who are still using drugs and which drugs when possible.
	Days in each Drug Court phase for all clients	The number of days spent in each treatment phase.	Reported by Drug Court counselors	Identifies treatment progress and attendance issues for clients and at-risk for treatment failure.

Table 6-1. *(continued).*

Concepts	Variables	Operational Definitions	Feasibility	Drug Court Use
	Post program crime recidivism	Drug Court clients rearrested.	Data collected by Drug Court counselors from Court records	Identifies clients with drug use relapse.
	Post program drug use	Still using drugs yes/no, and list which drugs still using.	Self- reported by client with choice of reporting to Drug Court counselor or anonymous telephone hotline.	Identify clients at-risk for crime recidivism and poor mental health outcomes.
	Post program employment	Employed yes/no and hours worked per week.	Self-reported by Drug Court client	Identifies clients who have sustained employment and drug rehabilitation success and economic gain.
	Post program housing stability	Safe housing yes/no	Self-reported by Drug Court client	Identifies clients who are living in a safe, drug-free and crime-free environment.
	Post program use of services for drug rehab	Number of times per week client attends Alcohol/Narcotic/Cocaine Anonymous	Self-reported by Drug Court client	Identifies the clients who are accessing care for substance use disorder.

The next step in a data collection plan is to develop data collection forms and protocols, and data management procedures. Data collection forms with be designed to capture data in the minimal data set and additional data that must be reported to state and national Drug Court agencies. For quality control measures, prior to developing the data collection forms, an information technology consultant will help design the electronic forms to make a "forced choice" data entry to help eliminate missing data. The information technologist will also set up the data files and give access to data collectors. Data will be collected by Shelby County DC counselors. As part of the data collection protocol, all Shelby County DC counselors will be trained on proper data collection and entry procedures. Annual training will be available to include any data collection procedure revisions. Data collection procedures will include: (a) timing for data collection for optimal responses from clients; (b) how to ask clients questions; and (c) procedures to follow in the event that the client becomes distracted or cannot complete the data collection. In order to test for interrater reliability, the data collection trainer will observe the Shelby County DC counselors while interviewing the client and entering data. The purpose of this observation is to test the counselor's consistency for proper interviewing and data collection skills. Additionally, for quality and control measures, the Shelby County DC data manager and program coordinator will check the electronic data files at random for data entry errors. The final step in a data collection plan is to manage data according to the data management plan. Ongoing data management promotes building an accurate minimum data set that will be useful for research using multivariate analyses.

Literacy and Health Literacy Assessment

Currently there is no literacy and health literacy assessment conducted by Drug Courts. Future health literacy DC research should include a literacy and health literacy assessment for clients and embedded in the data collection process. The Wide Range Achievement Test-3 Reading subset (WRAT-3) may be used to evaluate literacy in DC clients. The WRAT-3 Reading subset is a valid and reliable instrument used to evaluate reading, recognizing and naming letters, and pronouncing printed words (Ashendorf, Jefferson, Green, & Stern, 2009). The Rapid Assessment of Adult Literacy (REALM) may be used to evaluate health literacy in DC clients. The REALM is a valid and reliable instrument that identifies clients' health literacy and clients who are at-risk for low health literacy (Davis et al., 1993). The best time to administer these instruments to clients is after the drug effects subside on the brain that cause decreased memory and concentration.

Social-Ecological Model

The Social-Ecological Model (Golden & Earp, 2012) may help guide future DC research because clients' substance use disorder affects population health, with consequences for the individual, the family, the community, and society as a whole, all addressed in the model (Nigg et al., 2005). Therefore, the Social-Ecological model may

be useful for planning and evaluating health promotion and education programs, and guiding research for improved mental health outcomes using health promotion and illness prevention interventions (Golden & Earp, 2012). Specifically, the Social-Ecological model can be used at the individual level to examine a DC client's health knowledge, attitudes, and beliefs about substance use disorder and motivation to successfully complete the DC program. Because literacy is also a public health concern, the Social-Ecological Model can be used to promote improved educational opportunities for DC clients. This model can be used at the family level to evaluate the client's support from interpersonal groups such as family members and peers (Langille & Rodgers, 2010). Family support promotes treatment success in Drug Courts.

The Social-Ecological Model can be used at the community level to examine the effect of institutional rules, polices, and regulations for availability of mental health services and educational programs to persons like DC clients in the community who are underserved for these services (Golden & Earp, 2012). From the community perspective, there should be interest in supporting DC programs because these programs save taxpayer dollars and reduce crime, and subsequently improves the financial status of the community to offer more mental health and education services (Nigg et al., 2005). This model can be used at the societal level to guide DC research for improved mental health outcomes and funding opportunities from DC agencies such as the National Association of Drug Court Professionals, National Drug Court Institute, and the United States Department of Justice. From the larger societal perspective, the Social-Ecological Model also examines the importance of parenting during the first three year of life (Quinn, Thompson, & Ott, 2005); the impact of teenage pregnancy; and effects of poverty on health outcomes related to substance use disorder and criminal activity involvement common to DC clients.

Multidimensional Health Literacy Model and Multi-Site Adult Drug Court Evaluation Model

In this study, the Multi-Site Adult Drug Court Evaluation (MADCE) Model was used to guide the research to describe the Shelby County DC clients, examine the differences between the graduates and dropouts, and create a prediction model for DC graduation. As previously discussed, literacy and health literacy are essential requisites for DC clients to successfully participate in DC program and graduate. However, the MADCE Model and DC literature has not addressed health literacy, and health literacy literature has not addressed DC clients, their primary care mental health needs, and their decision-making and need to make behavior change.

The Multidimensional Health Literacy Model (MHLM) was developed to understand the processes that link health literacy, informed decision-making, and self-care with health outcomes in persons with chronic illness (Gill & Engle, 2011; Gill, Engle, Speck, & Cunningham, 2011; Gill, Speck, & Engle, 2011). The MHLM is depicted in **Figure 6-1**. The MHLM combines the concepts of : (a) literacy (oral, print, mathematics, cultural and conceptual knowledge); (b) health education (disease
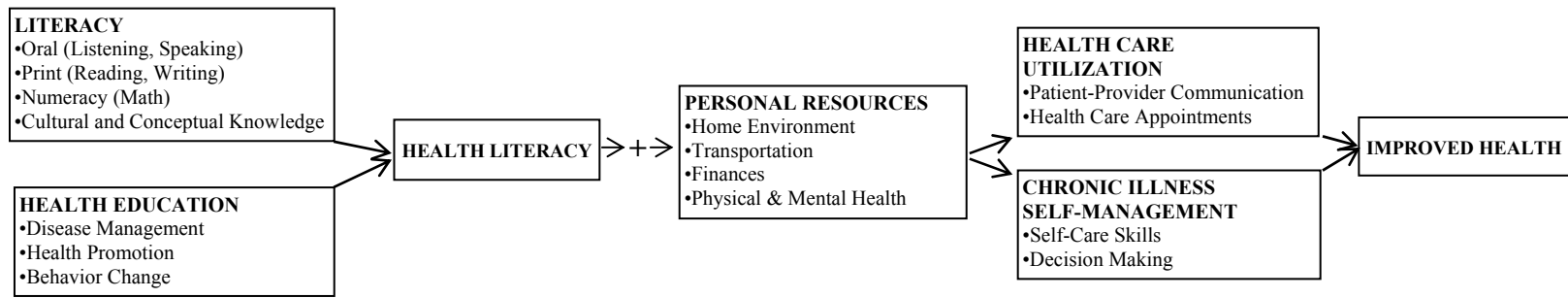
Figure 6-1. Multidimensional Health Literacy Model.

management, health promotion, and behavior change); (c) health literacy; (d) personal resources (home environment, transportation, personal finances, and physical and mental health); (e) health care utilization (patient-provider communication, and health care appointments); and (f) chronic illness self-management (self-care skills, and decision-making). The decision-making component in the MHLM is especially important because informed decision-making helps clients choose behaviors that lead to improved health outcomes. Informed decision-making requires literacy and health literacy skills to promote attainment and understanding of health information. This model assumes that literacy skills and health education are the foundation for health literacy. When these skills are combined with personal resources, then clients can access and use effectively health care services and manage their chronic illnesses to improve their health. Thus, both the MADCE Model and MHLM can be used to guide DC research. The MHLM will be described in detail in the MHLM development section later in this chapter.

Health Literacy Models

Before discussing HL models, it is important to point out that authors use conceptual model (D. Baker, 2006; Nutbeam, 2008; Paasche-Orlow & Wolf, 2007) and conceptual framework (Nielsen-Bohlman et al., 2004) to describe concept linkages with HL. Because conceptual model and conceptual framework are closely related terms that are often used interchangeably in research literature (Cameron & Heckman, 1993; LoBiondo-Wood & Haber, 2002; Zajacova, 2012), the term "model" will be used in this discussion to facilitate reading ease, clarity, and consistency.   There are four health literacy models: (a) The Institute of Medicine (Nielsen-Bohlman et al., 2004), (b) Baker's Individual Capacities and Literacy model (D. Baker, 2006), (c) Paasche-Orlow and Wolf's Causal Pathways model (Paasche-Orlow & Wolf, 2007), and (d) Nutbeam's Asset model (Nutbeam, 2008). Each model will be described in turn, followed by a critique of the models.

Institute of Medicine Model

The first model is from the Institutes of Medicine (IOM) report "Health Literacy: A Prescription to End Confusion" (Nielsen-Bohlman et al., 2004). The IOM Model illustrates health literacy as a direct relationship with literacy and health outcomes. Literacy, health literacy, and health outcomes and costs are main concepts in this model. Conceptual definitions, propositions, and assumptions in this model will be discussed in turn.

Literacy is defined as reading, writing, basic mathematics, speech, and speech comprehension skills (Kirsch, 2001). Health literacy is defined as the "degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Nielsen-Bohlman et al., 2004). "Health outcomes" is defined as an individual's health status resulting from choosing a healthy lifestyle, knowing when to seek medical care, taking advantage of

preventive measures to reduce unnecessary hospitalizations (U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion, 2010). Costs are disease costs and economic costs to society and the healthcare system resulting from limited health literacy (Nielsen-Bohlman et al., 2004).

The propositions in the model are: (a) literacy is the foundation for health literacy; (b) health literacy bridges an individual's cognitive, social, emotional, and physical skills with the healthcare setting; and (c) health literacy proficiency suggests causal connection with improved health outcomes and costs. The model assumes that literacy skills are requisite for individuals to understand health information and communicate health concerns to their providers. No research studies were identified that used this model.

Baker's Individual Capacities and Literacy Model

The second health literacy model is derived from the IOM model (D. Baker, 2006). Baker's model shows health literacy as a direct relationship with literacy and health outcomes. Concepts in Baker's model are listed in two domains: (a) individual capacity, and (b) health literacy. Conceptual definitions propositions and assumptions in this model will be discussed in turn.

Individual capacity is personal resources used for dealing with health information, health care providers, and health care systems. Personal resources include an individual's reading fluency and prior knowledge. Baker (2006) defines reading fluency as the "ability to mentally process written materials and new knowledge" (p.878). Reading fluency is comprised of: (a) prose skills (read and understand text); (b) quantitative or numeracy skills (apply mathematics); and (c) document skills (locate and use information). Baker (2006) defines prior knowledge as "one's knowledge before reading health information or talking with a health care provider" (p. 879). Prior knowledge is comprised of: (a) vocabulary, and (b) conceptual knowledge of health and healthcare. Vocabulary is one's knowing what words mean. Conceptual knowledge provides basic meaning to how one understands aspects of the world (Lambon, Pobric, & Jefferies, 2009) such as how the body works or how disease affects the body (D. Baker, 2006).

Health literacy is the second domain which includes: (a) health-related print literacy, and (b) health-related oral literacy. Health-related print literacy is the ability to understand written health information (D. Baker, 2006). Health-related oral literacy is the ability to orally communicate about health (D. Baker, 2006). Health-related print literacy and health-related oral literacy depend on individual's reading fluency and prior knowledge (D. Baker, 2006).

The propositions in the model are: (a) reading fluency and prior knowledge influences one's ability to understand written health information and communicate health needs, and (b) health literacy is a surrogate for reading fluency and prior knowledge. The model assumes that positive behavior change and improved health outcomes depend on

an individual's culture and ability to: (a) read; (b) communicate; (c) understand health-related information; and (d) access health care.

Paasche-Orlow and Wolf's Causal Pathways Model

The third model developed by Paasche-Orlow and Wolf (2007) is a logic model and extension of the IOM and Baker models. This model uses causal pathways to illustrate health literacy as a direct relationship with health outcomes. The concepts in this model are: (a) health literacy, (b) access and utilization of health care, (c) provider-patient interaction, and (d) self-care. Conceptual definitions, propositions, and assumptions in this model will be discussed in turn.

Health literacy includes an individual's socioeconomic factors and cognitive and oral literacy skills used to make health decisions (Paasche-Orlow & Wolf, 2007). Access and utilization of health care refers to navigational skills requisite for one to move throughout a complex system to receive medical care (Paasche-Orlow & Wolf, 2007). Patient-provider interaction includes communication skills and patient-centered decision-making abilities (Paasche-Orlow & Wolf, 2007). Self-care includes a patient's understanding of his or her health condition and how to follow the doctor's medical care instructions using additional health education resources (Paasche-Orlow & Wolf, 2007).

The propositions in the model are: (a) demographics and social and cognitive factors determine health literacy (Osborn, Paasche-Orlow, Bailey, & Wolf, 2011); and (b) limited health literacy influences health care at three intersections- health care access and utilization, patient-provider relationship, and self-care. The model assumes that health literacy should be viewed as both individual and system phenomenon by which limited health literacy is most likely to lead to worse health outcomes. The model also assumes that limited health literacy is defined as ≤ 7th grade reading ability (Paasche-Orlow & Wolf, 2007; Ruth M. Parker, Wolf, & Kirsch, 2008) and it is strongly associated with race, ethnicity, age, and educational attainment (Nielsen-Bohlman et al., 2004). One research study was identified that used this model. Osborn and colleagues (2011) used Paasche-Orlow and Wolf's Causal Pathways model to examine relationships between health literacy and patients': (a) knowledge about hypertension; (b) self-efficacy to manage hypertension; (c) self-care behavior for physical activity; and (d) self-reported health. Results from this study showed direct relationships in: (a) health literacy and patients' hypertension knowledge; (b) patients' self-efficacy and self-care behaviors; and (c) patients' self-care behaviors and self-reported health (Osborn et al., 2011).

Nutbeam's Asset Model

The fourth model is Nutbeam's Asset Model which is an extension of his early work that depicted health literacy as a key outcome from health promotion and health education. Nutbeam's perspective on health literacy is from the public health viewpoint that stresses the importance of using health promotion actions towards improving one's

control over modifiable determinants of health such as education , literacy , physical environment, and social support (Nutbeam, 2000). Nutbeam proposed that health literacy was more than providing health information and teaching reading skills. Instead, health literacy informs people how to access and use health information to improve health and ultimately promote greater independence and empowerment in health decision-making. (Nutbeam, 2000). It is from the public health and health promotion perspective that Nutbeam stresses that health literacy is an asset to be developed.

The Asset Model depicts health literacy as a direct relationship with health outcomes. In the Asset Model, health literacy is an asset from which to build improved health outcomes attained by one's active participation in adult education programs in the community (Nutbeam, 2008). Because this model was designed for use in public health settings the term individual is used, rather than patient to describe concepts in the model. Nutbeam uses multiple terms to label the pathway that shows health literacy as the outcome of education and communication that influences improved health outcomes. Therefore, conceptual phrase will be the term used to describe concepts in the model. The main conceptual phrases in the Asset Model are: (a) prior understanding of an individual's capacity; (b) tailored information; (c) developed knowledge and capability; (d) social organizational and advocacy skills; (e) self-management and negotiation skills; (f) improved health literacy; (g) health behaviors and practices; (h) engagement in social action for health; (i) participation in changing social norms and practices; and (j) improved health outcomes. Conceptual phase definitions, propositions, and assumptions will be discussed in turn.

Prior understanding of an individual's capacity is the health care provider's assessment of an individual's reading and math skills and health knowledge. Tailored information is health education materials and communication efforts designed for low literate learners. Developed knowledge and capability is using tailored health education materials to expand an individual's health knowledge and capability to use this knowledge.   Social organizational and advocacy skills are interpersonal skills used for social interaction and expressing one's health needs. Self-management and negotiation skills are interpersonal skills requisite for system navigation to attain health services that help with disease self-management. Improved health literacy is the result of health education and health promotion, rather than a single factor to influence a health outcome. Health behaviors and practices are personal behavior and practice changes that render greater control of one's health resulting from adequate health literacy. Engagement in social action for health is social actions needed to change one's own health. Participation in changing social norms and practices is the capability to empower change in one's actions and health behaviors, and empower others to make healthy decisions. It is critical to empower others to make sound health decisions in daily life for improved health behaviors, and empowerment is enhanced by health literacy (Kickbusch, 2001). Improved health outcomes is disease improvement through one's healthy choices and using opportunities to promote improved health behaviors in others. The propositions and assumptions in the model will be discussed in turn.

The propositions in the Asset Model are: (a) health literacy is a distinct outcome from health and patient education; (b) health education is directed towards empowering individuals to exert greater control over modifiable health risks; and (c) the model can be applied in multiple settings. The Asset Model assumes that: (a) this model offers a positive impact on the health of the community; (b) health education improves people's knowledge, understanding, and capacity to act independently; (c) health education raises community awareness of the social determinants of health; and (d) there are individual and community benefits from improved health literacy.

Multidimensional Health Literacy Model

The Multidimensional Health Literacy Model (MHLM) was developed by the author to how address knowledge gaps in current health literacy models. The knowledge gaps in current health literacy models indicated a need for further model development to: (a) address independent relationships between literacy and health outcomes; (b) explore use of behavior change theories and linkages to an individual's decision-making concerning his or her health; (c) examine health literacy and improved health outcomes in individual's with mental health problems; (d) use health literacy models to guide research outside health care settings like Nutbeam's Asset Models suggests; and (d) incorporate oral and print literacy with equal attention as Nutbeam's perspective of empowerment suggests. This section will describe: (a) gaps in the health literacy models; (b) steps of the MHLM development; (c) MHLM concepts, definitions, and propositions; (d) critique of MHLM and MADCE Model, and (e) integrating MHLM and MADCE Model.

Gaps in Current Health Literacy Models

Analysis of the four health literacy models identified common themes and knowledge gaps presented in **Table 6-2.** The MHLM addresses the following knowledge gaps in four health literacy models: (a) explore behavior change theories and linkages to an individual's decision-making concerning his or her health; (b) examine improved health outcomes in persons with substance use disorder, a mental health problem, and (c) guide and critique Drug Court research outside the health care setting. Ways the MHLM addresses each knowledge gap will be discussed in turn.

Behavior change theories and decision making. Use of behavior theories is not evident in Baker's health literacy model or Paasche-Orlow and Wolf's health literacy model. However, Nutbeam's approach to health literacy is based on health education, and behavior theories have been used to guide educational programs (Nutbeam, 2000) The MHLM is designed to use common behavior change theories to examine DC client decision-making and subsequent behavior change for living a sober lifestyle. The Transtheoretical Stages of Change Model (TTM) will be used in the MHLM to illuminate research findings associated with DC client graduation and sobriety attainment. Drug

Table 6-2. Common Themes and Knowledge Gaps in Current Health Literacy Conceptual Models.

Common Themes	Knowledge Gaps
Models build sequentially from parsimonious to complex designs with additional concepts and bi-directional arrows that link health literacy with improved health outcomes.	Limited empirical evidence that supports independent relationships between health literacy and health outcomes.
Models associate an individual's existing health knowledge and literacy skills as a foundation for health literacy proficiency.	Use of behavior change theories to examine how patients make health decisions lacks clear definition in current models.
Models emphasize health literacy for physical health problems and societal problems.	Models do not emphasize health literacy for mental health problems.
Models show individual's communication with health care provider and health care system as a facilitator for improved health outcomes, along with the interplay of health education and health promotion to foster improved health outcomes.	Health literacy models have not been used to guide or critique research outside health care settings.

Court programs use cognitive behavior therapy (R. Brown, 2010a; Lessenger & Roper, 2002) and behavior-change theories including the TTM to teach DC clients how to make healthy decisions and improve their health (DiClemente, Schlundt, & Gemmell, 2004; J. M. Prochaska et al., 2004).

Health outcomes in persons with substance use disorder. Health literacy is a new science that is expanding from multiple research contributions in: (a) chronic illness self-management in primary care (David W. Baker et al., 2011; DeWalt et al., 2004; J. A. Gazmararian et al., 1999; D. G. Morrow et al., 2007; Pignone & DeWalt, 2007; Schillinger, 2001); (b) defining health literacy (D. Baker, 2006; DeWalt et al., 2004; Nielsen-Bohlman et al., 2004; Paasche-Orlow, Gazmararian, & Parker, 2004; Speros, 2005); (c) HL measurement instruments (Davis et al., 1991; Davis, Michielutte, Askov, Williams, & Weiss, 1998; McCormack et al., 2010; R. M. Parker, Baker, Williams, & Nurss, 1995; Weiss et al., 2005); and (d) low literacy patient education teaching strategies (D. R. Brown et al., 2004; Cornett, 2009; Friedman & Hoffman-Goetz, 2008; J. A. Gazmararian, Williams, Peel, & Baker, 2003). A few HL researchers have purposed the concept of mental health and health literacy (Federman, Sano, Wolf, Siu, & Halm, 2009; A. Lincoln et al., 2008; Alisa Lincoln et al., 2006). However, mental health illness studies using a health literacy approach are limited. The MHLM will provide the conceptual framework to select variables in DC research concerning mental health needs for DC clients with substance use disorder. The MHLM will also be used to examine substance use disorder as a chronic illness in DC clients and health literacy interventions for self-care skills development to promote improved chronic illness self-management.

Guide or critique research outside health care settings. Four health literacy models have been used to critique and guide HL research within primary health care settings. The MHLM will be used to critique DC research literature to detect missing literacy and health literacy concepts. The MHLM will also be used to: (a) lay the foundation for health literacy research in DC settings to examine predictors for sobriety attainment and DC program graduation for clients; and (b) guide future health literacy research in DC settings.

Steps of Multidimensional Health Literacy Model Development

The first step in the development of the Multidimensional Health Literacy Model (MHLM) was to evaluate health literacy research literature. A literature search began using CINHAL, PubMed, Web of Science, Scopus, PsychINFO, and Google Scholar electronic data bases from 1971 to present. The following search terms were used in the review: (a) health literacy, (b) literacy, (c) low-literate, (d) low literacy, (e) limited literacy, (f) poor literacy, (g) health literacy conceptual framework testing, (h) health literacy model testing, (i) theory testing, (j) behavior change, (k) decision-making, (l) decision-making theories, (m) conceptual framework, and (n) health literacy model testing. Books and websites for health literacy and literacy provided details about models,

behavior change theories, and health literacy statistics. Discussions with a health communication expert advanced insights about low health literacy, public health and communication issues, campaigns, and theories for behavior change. Attending a national health literacy research conference and discussing the MHLM with conference health literacy mentors provided insights about using the model to guide health literacy research outside health care settings.

The second step in the development of the MHLM was to identify common concepts in four health literacy models. Nursing, medical, and public health communication, psychology, and sociology literature identified common concepts: (a) health literacy, (b) literacy, (c) patient education, (d) health education, (e) patient-provider communication, and (f) health outcomes. Health literacy was depicted as a direct path to improved health outcomes (D. Baker, 2006; Nielsen-Bohlman et al., 2004; Nutbeam, 2008; Paasche-Orlow & Wolf, 2007).

The third step in the development of the MHLM was to determine new conceptual propositions that enhance current health literacy models. The MHLM uses a theoretical approach to enhance current health literacy literature by linking health literacy with decision-making and behavior change for improved health outcomes among patients with both physical and mental health problems. Main concepts forming the MHLM include: (a) literacy; (b) health education; (c) health literacy; (d) personal resources; (e) health care utilization; (f) chronic illness self-management; and (g) improved health outcomes (**Figure 6-1**). Conceptual definitions and propositions in the MHLM will be discussed in turn.

Multidimensional Health Literacy Model Concepts, Definitions, and Propositions

Literacy. In the MHLM, literacy is defined as the ability to use reading, writing, speaking, listening, and math skills to perform daily tasks (Zarcadoolas, Pleasant, & Greer, 2006). According to the National Center for Education Statistics (NCES), literacy is "using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (Kutner, Greenberg, Jin, & Paulsen, 2006). Based on the results from the National Assessment of Adult Learning (NAAL) prison survey, greater than 50 % of prison inmates survey had below basic level literacy skills for reading, writing, and mathematics (Greenberg, Dunleavy, & Kutner, 2007). These persons have poor literacy skills. Poor literacy skills have been associated with: (a) poverty (Kutner et al., 2006) and low income wages (Arcs & Nichols, 2007); (b) less than a high school diploma or general educational development (GED) certificate (Rudd, 2008); (c) school dropouts (National Institute of Literacy, 1998); and (d) violent crime (Greenberg et al., 2007) Literacy has four components: (a) oral literacy; (b) print literacy; (c) numeracy or math skills; and (d) cultural and conceptual knowledge (Nielsen-Bohlman et al., 2004). Each literacy component will be discussed in turn.

Oral literacy. In the MHLM, oral literacy is defined as using speaking and listening skills to understand the spoken word in a familiar language used for communication, knowledge acquisition, and access to health care treatment services (Nielsen-Bohlman et al., 2004). Because words, phrases, and concepts have different meanings among persons of different cultures (Osborne, 2005), language differences may lead to health communication barriers between patients and providers to have the same vocabulary explain self-care skills for disease management. Persons who do not speak English struggle with understanding instructions given in English, and consequently these persons are at-risk for poor health outcomes (Parikh, Parker, Nurss, Baker, & Williams, 1996; Sarfaty, Turner, & Damotta, 2005; Sudore et al., 2009). Persons are also at risk for poor health outcomes who speak English, but do not have vocabulary to understand health-related concepts (D. Baker, 2006) or to dialogue with health care providers (Roter, 2011).

Health literacy research has focused on oral literacy for: (a) patient-provider communication challenges (Roter, 2011; Schillinger et al., 2003); (b) use of medical jargon with patients with limited health literacy (Castro, Wilson, Wang, & Schillinger, 2007); (c) simulated prenatal genetic counseling with low literate participants (Roter, Erby, Larson, & Ellington, 2009); and (d) development and preliminary testing of an oral literacy conceptual framework that explored health communication challenges experienced by participants with low literacy (Roter, Erby, Larson, & Ellington, 2007).

Print literacy. In the MHLM, print literacy is defined as the ability to read, write, and understand a written language familiar to the reader (Nielsen-Bohlman et al., 2004). In addition to understanding the meaning of printed text, print literacy also includes the ability to decode letters and sound out words (Nielsen-Bohlman et al., 2004). Print literacy skills are used for tasks associated with the printed word in a variety of sources such as reading and following instructions written in health education brochures, food labels, or prescription medication bottles.

In the health literacy literature, print literacy skills are a marker for defining the terms: (a) low literate, and (b) illiterate. Persons with print literacy skills who can read and understand simple text are often referred to as low literate (Nielsen-Bohlman et al., 2004; Schwartzberg, VanGeest, & Wang, 2005). Simple text uses: (a) an active voice and conversational style; (b) words with less than three syllables; (c) short sentences; (d) single message per paragraph; (e) consistent terms; (f) headers or organizers; (g) topic sentences; (h) summary and review paragraph (Doak et al., 1985); and (i) text written at or below third grade level (Davis et al., 1993). Persons who lack print literacy skills to function in daily life are referred to as illiterate (Zarcadoolas et al., 2006). Health literacy research has focused on print literacy for reading skills evaluation (D. W. Baker et al., 2007; Barragan et al., 2005; Cavanaugh et al., 2009; Davis et al., 2006; Kilbridge et al., 2009; Nielsen-Bohlman et al., 2004; Michael S. Wolf et al., 2007), rather than oral literacy with speaking and listening skills evaluation. However, Roter and colleagues (2009) have develop a conceptual framework for oral literacy demand. Oral literacy demand refers to the burden of using unnecessary medical jargon, complex language,

abstract examples, and inappropriate speed for speech during an encounter with a patient that hinders the patient's understanding (Roter, 2011).

Numeracy (math skills). In the MHLM, numeracy is defined as using basic mathematic skills to perform simple calculations in daily life such as measuring over-the-counter cold medication dosages (Lokker et al., 2009; Yin et al., 2010), using a nutrition label contents to count carbohydrates per serving size (R. L. Rothman et al., 2006), and tips for servers in restaurants (Nielsen-Bohlman et al., 2004). Numeracy is also referred to in the health literacy literature as quantitative literacy (D. Baker, 2006; Kutner et al., 2006). Numeracy is listed in the MHLM as a separate literacy component because the literature deals with using numbers in different ways. Some authors refer to using numbers as quantitative literacy (D. Baker, 2006; Zahnd, Scaife, & Francis, 2009) while others use numeracy (S. M. Brown et al., 2011; Golbeck, Paschal, Jones, & Hsiao, 2011; Nutbeam, 2008). However, for health literacy because individuals need to understand what numbers represent such as body temperature, blood glucose readings, calories, carbohydrates, 2 pills twice a day, numeracy is a separate skill and separate component of literacy. Health literacy research has focused on numeracy for: (a) medication management (Estrada, Martin-Hryniewicz, Peek, Collins, & Byrd, 2004; Lokker et al., 2009; Waldrop-Valverde, Jones, Gould, Kumar, & Ownby, 2010); (b) disease risk perception (Haggstrom & Schapira, 2006); (c) chronic disease self-management (Apter et al., 2009; Cavanaugh et al., 2009; Osborn, Cavanaugh, Wallston, White, & Rothman, 2009; R. L. Rothman et al., 2006); (d) use of health care services (Aggarwal, Speckman, Paasche-Orlow, Roloff, & Battaglia, 2007); and (e) development of a scale to evaluate parents' health literacy (Kumar et al., 2010).

Cultural and conceptual knowledge. In the MHLM, cultural knowledge is defined as knowledge that is socially learned and assigns meaning to health, illness, and health information based on one's beliefs and values (Nielsen-Bohlman et al., 2004; Osborne, 2005). It influences one's; (a) behaviors and responses to diagnosis of health problems and treatment (Myaskovsky et al., 2011; Olafsdottir & Pescosolido, 2011); and (b) language requisite for health care services (Zarcadoolas et al., 2006). Health literacy research has focused on cultural knowledge for: (a) cultural influences and health literacy with non-English speaking immigrants' access to cultural appropriate health information and making informed decisions about their health (Kreps & Sparks, 2008); and (b) cultural influences on health literacy, cancer screening, and chronic disease outcomes among minorities and non-English speaking populations (Shaw, Huebner, Armin, Orzech, & Vivian, 2009).

In the MHLM, conceptual knowledge is defined as the ability to understand concepts and recognize their application in different situations such as reading and understanding newspaper text or reading and following instructions on a medication bottle (D. Baker, 2006; Nielsen-Bohlman et al., 2004). Health literacy research has focused on conceptual knowledge for: (a) the development of a new instrument to measure oral health conceptual knowledge among low income adults (Macek et al., 2010); and (b) linking health literacy to conceptual knowledge about blood pressure

control in patients from six primary care safety net clinics located in three states in the United States (Osborn et al., 2011).

Health education. In the MHLM, health education is defined as the building block to HL that raises one's awareness of health issues and empowers positive changes in health behaviors (Nutbeam, 2008). Health education includes any learning activity that improves one's knowledge, understanding, disease self-management skills (Nutbeam, 2008) and health practices (Zarcadoolas et al., 2006) for better health (Marsick & Smedley, 1989).

Health literacy research has focused on health education for: (a) diabetes self-management (Osborn, Bains, & Egede, 2010; R. Rothman et al., 2002; Schillinger et al., 2002), congestive heart failure (Chen, Yehle, Plake, Murawski, & Mason, 2011; D. Morrow et al., 2006; Murray et al., 2009); (b) hypertension control (Pandit et al., 2009); (c) patient knowledge of coronary artery disease (Eckman et al., 2011); (d) cancer screening (Lindau, Basu, & Leitsch, 2006; Peterson, Dwyer, Mulvaney, Dietrich, & Rothman, 2007; Volk et al., 2008); and (e) medication adherence (J. Gazmararian et al., 2010; Kripalani, Gatti, & Jacobson, 2010; M. S. Wolf et al., 2007). Health education components include: (a) disease management; (b) health promotion; and (c) behavior change. Each component will be discussed in turn.

Disease management. In the MHLM, disease management is defined as self-management (Disler, Gallagher, & Davidson, 2011) of chronic diseases that focuses on the long-term self-care skills (A. H. Cary, 2008) that improve physical and mental health or slow down disease progression (A. H. Cary, 2008; Niesink et al., 2007). Health literacy research has focused on disease management for: (a) diabetes (Cavanaugh et al., 2009; P. Gray, Turner, & Bentley, 2010; Hill-Briggs et al., 2011; Schillinger et al., 2002); (b) congestive heart failure (Agency for Healthcare Research and Quality, 2003; Dennison et al., 2011; McNaughton, Collins, & Kripalani, 2011; D. Morrow et al., 2006); (c) hypertension (Pandit et al., 2009); and (d) chronic obstructive pulmonary disease (Kiser et al., 2011).

Health promotion. In the MHLM, health promotion is defined as behaviors that improve the health status of individuals, families, and communities (Kulbok, Laffrey, & Chitthathairatt, 2008; Mayben & Giordano, 2007) by using health education and communication to: (a) enhance disease prevention (Mayben & Giordano, 2007); (b) reduce premature deaths; and (c) promote quality of life (Zarcadoolas et al., 2006). Health literacy research has focused on health promotion for: (a) weight loss (Davis et al., 2008), physical activity (Osborn et al., 2011); and (b) breast cancer screening (Kagawa-Singer, Tanjasiri, Valdez, Yu, & Foo, 2009).

Behavior change. In the MHLM, behavior change is defined as acting in one's own interest based on attitude, beliefs, perceptions of disease risks (Arora, Ayanian, & Guadagnoli, 2005; Swendeman, Thomas, Chiao, Sey, & Morisky, 2005), and health communications influences such as education materials and discussions with health care

providers (Obregon, 2005). Behavior change theories attempt to explain the motivation for changing one's behavior. Behavior change theories that inform change for persons with chronic illnesses include: (a) Transtheoretical Stages of Change (TTM); (b) Theory of Reasoned Action (TRA); (c) Theory of Planned Behavior (TPB); (d) Social Cognitive Theory (SCT); and (e) Health Belief Model (HBM) (Ahmad, 2005).

The TTM is the most cited theory used in health promotion studies concerning: (a) exercise (Conn, Tripp-Reimer, & Maas, 2003); (b) smoking cessation (Clarke & Aish, 2002; Gil et al., 2002; Thyrian et al., 2006); (c) heart failure self-care (Paradis, Cossette, Frasure-Smith, Heppell, & Guertin, 2010; Paul & Sneed, 2004; Sneed & Paul, 2003); (d) diabetes self-care (Jones et al., 2003); (e) chronic pain self-management (Kerns & Rosenberg, 2000); and (f) drug and alcohol abstinence (Finnell, 2003; Morrison et al., 2010). The TTM states that behavior change is a process in which individuals proceed through stages of readiness for change based on self-motivation (Ahmad, 2005; Glanz, Rimer, & Lewis, 2002; J. M. Prochaska et al., 2005; J. O. Prochaska, 2008; Spring, 2008). This model helps explain and predict how persons stop risky behaviors or adopt healthy behaviors (J. M. Prochaska et al., 2004). Health literacy research has not focused on the use behavior change theories.

Health literacy. In the MHLM, health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (S. Ratzan & Parker, 2000). This definition was chosen because it was developed for the National Library of Medicine and used by *Healthy People 2010.*   Health literacy and literacy have been used interchangeably as identical terms, but are not the same (Zarcadoolas et al., 2006). However, health literacy has been described as using literacy skills within a health context (Nielsen-Bohlman et al., 2004; Rudd, Renzulli, Pereira, & Daltroy, 2005; Zarcadoolas et al., 2006). Health context refers to the health setting and any activities related to health such as taking a child's temperature, choosing the lowest sodium content foods, and completing a health insurance form(Nielsen-Bohlman et al., 2004).

Personal resources. In the MHLM, personal resources are defined as services and conditions that improve access to health care and promote improved health outcomes (Stanhope, 2008). Health literacy and personal resources are requisites for health care utilization (Cho, Lee, Arozullah, & Crittenden, 2008; Lee, Arozullah, & Cho, 2004) and chronic illness self-management (Disler et al., 2011). Health literacy research has focused on personal resources for: (a) home environment for social support (Nutbeam, 2000; Pieper & Whaley, 2011); (b) transportation (Artinian, Lange, Templin, Stallwood, & Hermann, 2001); (c) personal finances (Herndon, Chaney, & Carden, 2011; Weiss & Palmer, 2004); (c) physical and mental health (Wolf, Feinglass, Thompson, & Baker, 2010). Personal resources components include: (a) home environment; (b) transportation; (c) finances; and (c) physical and mental health. Each component will be discussed in turn.

Home environment. In the MHLM, home environment is defined as a shelter that promotes stimulation for optimal psychological development (Eliopoulos, 2005). Ideal healthy living conditions that promote healthy behavior are clean, comfortable, pest and chemical-free, learning stimulated, and violence exposure absence (Palepu, Marshall, Lai, Wood, & Kerr, 2010). Healthy behavior development is associated with a supportive home environment and family members with adequate literacy (Pieper & Whaley, 2011). Health literacy research has included home environment factors for: (a) healthy eating behaviors association with stronger reading fluency (Pieper & Whaley, 2011); and (b) healthy environments that promote positive lifestyle choices, such as smoking cessation and physical exercise (Nutbeam, 2000).

Transportation. In the MHLM**,** transportation is defined as the mechanism used to access treatment and prevention services for chronic diseases (Baren et al., 2006; Kessler, Wang, Kendrick, Lurie, & Springgate, 2007). Transportation includes: (a) public sources such as buses or taxis (Whetten et al., 2006); and (b) private sources such as personal automobile or reliance on a relative or friend with an automobile (Arcury, Preisser, Gesler, & Powers, 2005). Adequate literacy is associated with having transportation for health care access and utilization(Arcury et al., 2005; A. F. Brown et al., 2004; U.S. Department of Health and Human Services and Missouri Foundation For Health, 2008), and illness self-management and improved health outcomes (Pignone & DeWalt, 2006).

Health literacy research has focused on transportation for: (a) car ownership (Artinian et al., 2001); (b) possession of a driver's license (Bastable, 2011); and (c) reliance on public transportation (Sarfaty et al., 2005). Research literature outside health literacy has focused on transportation for: (a) drug treatment programs with emphasis on individuals with a high school diploma or less (Hser, Maglione, Polinsky, & Anglin, 1998); (b) individuals with diabetes and low socioeconomic status who lack close proximity to health care services (A. F. Brown et al., 2004); and (c) individuals living in rural communities away from health care services who possessed a drivers license or had a family member with a drivers license (Arcury et al., 2005).

Finances. In the MHLM, finances is defined as personal expenses resulting from frequent hospitalizations (Weiss & Palmer, 2004) and poor financial status (Ngoh, 2009). Persons with low literacy have higher rates of hospitalization and consequently yield increased personal expenses (D. W. Baker et al., 2002; Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011; Herndon et al., 2011; Ngoh, 2009) and increased health care costs (Berkman et al., 2011). Poor financial status is a common risk factor or low health literacy (Ngoh, 2009) . Low literacy is associated with low income and unemployment (Irelan, 1971). Health literacy research has focused on finances for health care costs from high rates of hospitalization (D. W. Baker et al., 2002; Weiss & Palmer, 2004), rather than personal costs.

Physical and mental health. In the MHLM, physical and mental health is defined as physical and mental health impairments that influence literacy-related skills and abilities (Schwartzberg et al., 2005). Health literacy research has focused on physical and

mental health for: (a) physical limitations (Wolf et al., 2010); (b) depression (J. Gazmararian, Baker, Parker, & Blazer, 2000; Pizur-Barnekow, Doering, Cashin, Patrick, & Rhyner, 2010); (c) overall poor mental health and mortality (Wolf et al., 2010); and (d) depressive symptoms in persons with drug addictions (Alisa Lincoln et al., 2006).

Health care utilization. In the MHLM, system navigation is defined as the ability for an individual to move from place to place for services, goods, or information (Nutbeam, 2008; Paasche-Orlow & Wolf, 2007). System navigation requires print and oral literacy skills for persons to: (a) read posted healthcare signs(Rudd et al., 2005); (b) understand medical jargon (Castro et al., 2007; Safeer & Keenan, 2005); (c) engage in effective patient-provider communication (Ferreira et al., 2005; Schillinger, Bindman, Wang, Stewart, & Piette, 2004; Williams, Davis, Parker, & Weiss, 2002); and (d) keep health care appointments (D. O. Clark et al., 2008; Sarfaty et al., 2005). However, no studies have been found in the health literacy literature that measure system navigation. Instead, the health literacy research literature has focused on health care utilization as the proxy measure for system navigation because several studies have shown an association of low literacy and higher rates of: (a) emergency room visits (D. W. Baker et al., 2004; Cho et al., 2008); (b) hospitalization (D. W. Baker, Parker, Williams, & Clark, 1998; D. W. Baker, Parker, Williams, Clark, & Nurss, 1997); and (c) re-hospitalization(Arozullah, Lee, Khan, & Kurup, 2003). Health care utilization components include: (a) patient-provider communication; and (b) health care appointments. Each component will be discussed in turn.

Patient-provider communication. In the MHLM, patient-provider communication is defined as using print literacy and oral literacy skills to promote understanding about: (a) self-care skills (Rudd et al., 2005); (b) treatment adherence (Lareau & Yawn, 2010); and (c) access and utilization of health services (Ferreira et al., 2005; S. C. Ratzan, 2001; Schillinger et al., 2004; Williams et al., 2002). Health literacy research has focused on patient-provider communication for: (a) appointment adherence for colorectal cancer screening among persons with low literacy (Ferreira et al., 2005); (b) poor health literacy as a marker of patient-provider communication problems in diabetes self-care; and (c) limited health literacy and communication barriers between English-speaking and Spanish-speaking physicians and patients (Sudore et al., 2009).

Health care appointments. In the MHLM, health care appointments is defined as use of outpatient physician visits, a common measure of health care access and utilization (D. W. Baker et al., 2004). Health literacy research has focused on health care appointments for: (a) cholesterol screening in patients enrolled in a commercial health care plan (Hardie, Kyanko, Busch, Losasso, & Levin, 2011); and (b) keeping physician office appointments for chronic illness self-management among socioeconomically vulnerable older adults (D. O. Clark et al., 2008) with Hispanic ethnicity (Sarfaty et al., 2005), and new Medicare enrollees (D. W. Baker et al., 2004).

Chronic illness self-management. In the MHLM, self-management is defined as patient and health care provider initiated skills and behaviors intended for physical and

mental chronic illness treatment and health improvement in daily life functioning (D. O. Clark et al., 2008; Disler et al., 2011).   Self-management is critical to chronic illness improvement (Bodenheimer, Lorig, Holman, & Grumbach, 2002; D. O. Clark et al., 2008) in which an individual remains active in care and treatment decisions (Disler et al., 2011; Evangelista & Shinnick, 2008; Sakraida & Robinson, 2009).

Health literacy research has focused on self-management for: (a) improved inhaler techniques for patients with chronic obstructive pulmonary disease (Kiser et al., 2011); (b) improved blood pressure, cholesterol, and hemoglobin A1C levels among patients with diabetes and lower socioeconomic status (Hill-Briggs et al., 2011); (c) influence of low health literacy and understanding of self-management treatments and access to community resources in patients with chronic obstructive pulmonary disease (Disler et al., 2011), and patients with Type 2 diabetes mellitus and Stage 3 chronic kidney disease (Sakraida & Robinson, 2009). Chronic illness self-management components include: (a) self-care skills; and (b) decision making. Each component will be discussed in turn.

Self-care skills. In the MHLM, self-care skills is defined as using knowledge and desire to manage chronic disease specific conditions to help make decisions about daily activities to control illnesses (Evangelista & Shinnick, 2008; Paasche-Orlow & Wolf, 2007). Self-care skills is a component of self-management (Disler et al., 2011) yet, some authors consider self-care skills and self-management skills as the same (Moser & Watkins, 2008). Health literacy research has focused on self-care skills for: (a) the influence of health literacy on patient decision-making for heart failure self-care (Moser & Watkins, 2008); and (b) principles for teaching heart failure self-care skills to patients with low health literacy.

Decision-making. In the MHLM, decision-making is defined as a complex process in which an individual uses information that influences health choices and behaviors (DeWalt, Boone, & Pignone, 2007; Reyna, 2008; Spring, 2008). Decision-making includes (a) defining the problem (Arora et al., 2005), (b) locating an evaluating health information (Nutbeam, 2008), (c) analyzing risks and benefits (Berger & Hudmon, 1997), and (d) considering options for self-care (Arora et al., 2005; Bodenheimer et al., 2002). Health literacy research has focused on decision-making for the influence of low health literacy and passive shared decision-making with a health care provider about medical care (DeWalt et al., 2007; Naik, Street, Castillo, & Abraham, 2011; Yin et al., 2012).

Improved health. In the MHLM, improved health is defined as outcomes of a chronic illness that lead to better health determined by one's knowledge or comprehension of health information (Schwartzberg et al., 2005). Health literacy research has focused on improved health for: (a) blood pressure control (Pandit et al., 2009); (b) heart failure self-management (Evangelista et al., 2010; D. Morrow et al., 2006; Murray et al., 2009); (c) diabetes self-management (Cavanaugh et al., 2009; Schillinger, Barton, Karter, Wang, & Adler, 2006; Wallace et al., 2009); (d) chronic obstructive pulmonary disease self-management (Kiser et al., 2011); (e) health-related

quality of life and prostate cancer (Song et al.); and (f) cancer screening (Lindau et al., 2006; Peterson et al., 2007).

Multidimensional Health Literacy Model and Multi-Site Adult Drug Court Evaluation Model Critique

It is important to discuss the similarities and differences between the MHLM and MADCE Models used to guide the dissertation research. Both models focus on: post-intervention outcome improvement; behavior change in clients; client's utilization of services; and theory to support the model. The differences between the models focus on: individual outcome versus program outcome evaluation; and health care system versus criminal justice system setting. Similarities and differences between the MHLM and MADCE Model will be discussed in turn, followed by a critique of the MADCE Model.

The MHLM and MADCE Models are compared for similarities and differences as summarized in **Table 6-3.** These similarities and differences help identify how the models build upon one another, and what additional information should be included for future health literacy research with the DC client population. Both models focus on post-intervention outcome improvement. In the MHLM, health literacy is the intervention for the client's improved health attainment. In the MADCE Model, the DC program is the intervention for the client's improved functioning for sobriety and reduced criminal recidivism. The MHLM and MADCE focus on behavior change in clients. In the MHLM, behavior change is a component of health education. In the MADCE Model, behavior change is associated with both in-program and post-program domains. The MHLM and MADCE focus on the client's utilization of services. In the MHLM, utilization of services targets health care services. In the MADCE, utilization of services targets DC program and post-program drug treatment services. The MHLM and MADCE are supported by theory. In the MHLM, the TTM for behavior change supports the model. In the MADCE, procedural justice and distributive justice support the model.

The MHLM and MADCE Model differ in the evaluation of outcomes. In the MHLM, evaluation of outcomes focuses on the individual such as a patient. In the MADCE, evaluation of outcomes focuses on DC programs and client cohorts, rather than on the individual DC client. The MHLM and MADCE Model differ in the system setting. In the MHLM, the setting is health care systems oriented. In the MADCE, the setting is criminal justice system oriented. Based on the MHLM and MADCE Model similarities and differences, a critique of the MADCE model for health literacy research will be discussed.

Multi-Site Adult Drug Court Evaluation Model Critique

One critique of the MADCE Model for health literacy research is that health literacy is absent. Health literacy addresses how clients obtain and process information used in making decisions vital to health improvement. While the MADCE Model

Table 6-3. Similarities and Differences of the Multidimensional Model and Multi-Site Adult Drug Court Model.

Similarities/Differences	MADCE*	MHLM†
Similarities		
Goal	Improve function and health	Improve function and health
Outcome	Behavior change influenced by family support and home environment	Behavior change influenced by family support and home environment
Theory	Behavior Change, Deterrence Theory, and Therapeutic Jurisprudence	Behavior change
Program Success Supervision	Judge	Health care provider
Rules	Yes	Yes
Adherence	Yes	Yes
Appointments	Yes	Yes
Differences		
Health Literacy and Literacy Affect Outcomes	No	Yes
Treatment Approach	Criminal justice, punitive	Health promotion and education
Motivation	External for ↓crime	Internal for ↑health
Outcomes	Program and client	Client
Treatment Rules Assumption	Client understands	Client may not understand
Navigate Systems	Not addressed	Requires health literacy

*MADCE = Multi-Site Adult Drug Court Evaluation Model.
†MHLM = Multidimensional Health Literacy Model.

contains clients' perceptions of understanding DC rules, perceived risks and benefits of decision-making, and compliance behaviors during DC program enrollment, there are no linkages to literacy or health literacy and improved outcomes.

A second critique of the MADCE Model is that while education is listed as a sub-concept for demographics, literacy is absent. Years of education completed is not a direct correlate with literacy because it overestimates print literacy skills by as much as five grade levels (Doak et al., 1985). However, education level is used commonly in research as a proxy variable for literacy because persons without a high school diploma or GED have lower levels of literacy proficiency that persons who do have a high school diploma or greater (Nielsen-Bohlman et al., 2004). Furthermore, persons with a high school education or lower have limited health literacy skills (Kirsch, Jungeblut, Jenkins, & Kolstad, 2002).

The MHLM addresses this critique by adding literacy as a main concept in the model along with the four literacy components: (a) oral literacy; (b) print literacy, (c) numeracy, and (d) cultural and conceptual knowledge. Using the MHLM helps examine DC clients' skills for listening and speaking (oral literacy); reading and writing (print literacy), simple math computations (numeracy), and using health information based on one's beliefs (cultural and conceptual knowledge).

A third critique of the MADCE Model is that health education is absent. The DC client handbook is the standard primary health education tool for DC clients to understand DC rules and ways to learn behavior modification leading to sobriety. However, the DC client handbook is not addressed in the MADCE Model as a DC intervention. Because low education is common to DC clients, low literacy health education materials are imperative for DC program use. The MHLM addresses this critique by adding health education as a main concept in the model along three components: (a) disease management; (b) health promotion; and (c) behavior change. Using the MHLM helps examine DC clients' skills for self-care (disease management), preventative health actions (health promotion); and change health behaviors based on their perceptions of disease risk (behavior change).

Based on the critique and similarities and differences of the MHLM and MADCE Model, it is reasonable that these models are integrated for future DC and DC health literacy research. Integrating the MHLM and MADCE Model will foster the re-conceptualization of DC as a primary care mental health intervention.

Integrating the Multidimensional Health Literacy Model and Multi-Site Adult Drug Court Evaluation Model

When integrating the MHLM and MADCE Model, it is possible to see how the MHLM builds upon the information in the MADCE model to promote health literacy research with DC clients. The MHLM offers using literacy and health literacy information to examine how clients successfully navigate complex systems to receive

health information and services to help them make informed decisions about ways to improve their health outcomes. For example, clients who have adequate literacy and health literacy skills have the ability to find health information about their health needs and use that information to make decisions about how to improve their health. The MADCE model does not consider the effects of literacy and health literacy for clients to make decisions about how to succeed in DC and consequently improve their health. Therefore, the MADCE Model may benefit from adding information about literacy and health literacy. Adding literacy and health literacy information to the MADCE Model also has important implications about assumptions in that DC clients are expected to` understand and follow DC treatment program rules, therefore, the client is expected to show up for appointments with the DC judge, counselors, and treatment providers. However, this assumption is potentially misleading because clients do not always show up for appointments. This absenteeism may be due to literacy and health literacy factors or brain changes with using drugs that effect memory and concentration. It is reasonable to examine reasons why DC clients do not show up for appointments and if literacy and health literacy are contributing factors. If so, then interventions for helping persons with low literacy and low HL may be considered for clients in DC treatment programs. For example, because the Shelby County DC Client Handbook was evaluated in this study and it was not suitable for low literacy, then future research will include development of new client handbook in multi-modal formats for low literacy learners. A pilot test will be done to evaluate how helpful the handbook is to clients for understanding the DC program rules and how to apply these rules to graduate.

Integrating the MHLM and MADCE Model also shows what other information would need to be collected for future health literacy research with the DC client population in addition to literacy and health literacy data. Because health education is an important component of teaching clients how to change their behaviors to improve their health, then evaluating learning styles is important information to include in future research. Identifying learning styles helps the DC Judge, counselors, and treatment providers customized instructions and communicate these instructions in a manner that the client can best understand.

Understanding how clients prefer to receive health information is also important information, and many Americans use technology as a primary source of communication. Technology also promotes multi-modal teaching and learning strategies which is helpful when communicating information to persons with low literacy or persons with memory problems. Technology allows written information to be recorded for others to listen to repeatedly at their convenience. Repetition strengthens learning. Therefore, it is important to collect information from DC clients about their use of technology like smart phones, DVD and MP3 players, computers, instant messaging, and social networks.

Another important information component to add for future research is family support and home environment. These are personal resources that help clients succeed in DC treatment programs. Because of co-occurring mental health problems in DC clients, mental health status and memory are also important pieces of information to include in future research. Drug Court treatment programs provide treatment in four phases.

Because DC clients must complete all four phases to graduate, it is important to track their progress during each phase to determine attendance problems and at what point clients dropout and reasons they dropout. Therefore, adding information about clients' progress during each treatment phase is important for future research. Drug Court clients are also expected to have transportation to participate in DC. Therefore, information about what kind of transportation the client has is another important piece of information to collect.

Finally, in this study, women were successful in DC and women with children do not want to risk losing custody rights. Therefore, it is possible that women are more successful in DC because they are motivated to finish so that they do not lose child custody rights. Child custody rights information is another important piece of information to include in future health literacy research with DC clients.

In summary, education was the only predictor in this study that is amenable to intervention for the Shelby County DC treatment program. Clients in this program with a high school diploma or GED were more likely to graduate. Therefore, future research should address improving literacy and health literacy of DC clients. Cross validation of the graduation prediction model is the first step for beginning research to improve literacy and health literacy in DC clients. This step is important because cross validation is a statistical method to validate the graduation prediction model internally and externally. Because female clients in the Shelby County DC were more successful with graduation than males, future research will focus on why females are more likely to graduate from DC. It was suggested that retaining child custody rights is one possible explanation for DC graduation among clients who are mothers.

To conduct future prospective research, a minimum data set will need to be developed for the Shelby County DC to guide program evaluation and ensure quality data collection and recoding. Because there is no literacy and health literacy data in Drug Courts currently, literacy and health literacy assessments should be conducted and include this data in the Shelby County DC minimum data set for analysis. To get a wider community perspective on substance use disorder, crime, and literacy the Social-Ecological Model will be used in planning and evaluating DC programs for health promotion and education. While the MADCE Model was used to guide this research to describe differences between graduates and dropouts, this model does not address literacy and health literacy issues. To deal with this deficiency, four health literacy models were studied for similarities and knowledge gaps in key concepts, definitions, and propositions. The MHLM was developed to address gaps in health literacy models and synthesize key concepts necessary for health literacy and improved health. Literacy and health education are prerequisites for health literacy. Health literacy is conceptualized as personal resources, health care utilization, and chronic illness self-management which lead to improved health. However, the MHLM does not use the criminal justice perspective like the MADCE Model does for treating DC clients. Therefore, the MHLM may be integrated with the MADCE Model to guide research in DC treatment programs to study health literacy in persons with multiple mental health problems including substance use disorder.

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Appendix A. Letter of Approval from The University of Tennessee Health Science Center Institutional Review Board

THE UNIVERSITY OF TENNESSEE
Health Science Center

Institutional Review Board
910 Madison Avenue, Suite 600
Memphis, TN 38163
Tel: (901) 448-4824

May 24, 2012

Marie E Gill
College of Nursing
Department of Nursing
657 Alexander Building

Re: 12-01904-XM
Study Title: Predictors of Drug Court Client Outcomes

Dear Ms. Gill,

The Administrative Section of the UTHSC Institutional Review Board (IRB) has received your written acceptance of and/or response dated May 23, 2012 to the provisos outlined in our correspondence of May 21, 2012 concerning the application for the above referenced project.

The IRB determined that your application is eligible for **exempt** review under 45CFR46.101(b)(4) in that it involves the study of existing data or other materials that are publicly available or the information will be recorded in a way that subjects cannot be individually identified. Informed consent is waived in accord with 45CFR46.116 (d). Your application has been determined to comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects. Therefore, this letter constitutes full approval of your application (version 1.1) for the above referenced study.

This study may not be initiated until you receive approval from the institution(s) where the research is being conducted.

In addition, the request for waiver of HIPAA authorization for the conduct of the study itself is approved. The waiver applies to the Shelby County Drug Court on clients who were enrolled in the Shelby County Drug Court treatment program for substance abuse during January 1, 2009 through March 17, 2011.

In the event that volunteers are to be recruited using solicitation materials, such as brochures, posters, web-based advertisements, etc., these materials must receive prior approval of the IRB.

Any alterations (**revisions**) in the protocol must be promptly submitted to and approved by the UTHSC Institutional Review Board prior to implementation of these revisions. You have individual responsibility for reporting to the Board in the event of unanticipated or serious adverse events and subject deaths.

Sincerely,

Signature applied by Donna L Stallings on 05/24/2012 11:44:03 AM CDT

Signature applied by Terrence F Ackerman on 05/24/2012 12:31:38 PM CDT

Appendix B. Shelby County Drug Court Permission to Use Data for Dissertation

Angela Parkerson
201 Poplar Ave
Memphis, TN 38103
May 10, 2012

Institutional Review Board
910 Madison Avenue, Suite 600
Memphis, TN 38163

Re: Permission statement to use data for dissertation
Study Title: Predictors of Drug Court Client Outcomes

The University of Tennessee Health Science Center IRB Office,

As the Advising Coordinator for The Shelby County Drug Court, I have given Ms. Marie
E. Gill, PhD student, permission to analyze archival data stored by our Drug Court and
publish the results in her dissertation. I have spoken with Ms. Gill and understand how
she will be using our data for her dissertation project "Predictors of Drug Court Client
Outcomes".

Should you have any questions, please feel free to contact me.

Sincerely,

Angela Parkerson

Angela Parkerson, Advising Coordinator for The Shelby County Drug Court
(901) 222-3555
angela.parkerson@shelbycountytn.gov

Appendix C. Shelby County Drug Court Judge's Draft Letter of Agreement with Client

To: Drug Court Client

Congratulations on entering the Shelby County Drug Court Program. I can assure you that if you take this program seriously, a year from now on your graduation date your quality of life will have greatly improved. I look forward to each graduation day. To see clients reunited with their families is a great event. To see a son or daughter make their parents proud is an overwhelming experience.

I hope you stay the course and become a successful graduate. Please keep the following in mind:

1. If you are caught selling drugs, you will be terminated from the program and receive the maximum sentence.

2. If you attempt to substitute someone else's urine on a drug test, you will be terminated and receive the maximum sentence.

3. If you submit a bogus or forged AA attendance meeting sheet, you will be subject to at a minimum 30-day sanction or termination from the program with the maximum sentence.

4. If you are caught in possession of synthetic drugs which includes, but not limited to spice, charge, bath salts, or any drug paraphernalia that list "not for human consumption", you will be subject to a minimum 30-day sanction or termination from the program with the maximum sentence.

5. Finally, in the event that you do relapse, **COME TO COURT**, and be honest with the Drug Court Team. You will be sanctioned, but if you run and the Sheriff has to arrest you, you will be terminated from the program and receive the maximum sentence.

In closing, a year goes by fast. Take your treatment seriously. If you follow the rules, the Drug Court Team will support you all the way.

Remember, what goes around comes around. If you deceive people that have tried to help you, you will get burned. I will be your best friend or your worst enemy. I want to be your friend, so keep it straight!

Best wishes,

Judge Tim Dwyer
Shelby County Drug Court
Division 8

I acknowledge reading this statement.

_____
Signature   Date

Shelby County Drug Court
Client Handbook

* Reprinted with permission from Shelby County Drug Court. (n.d.). *Shelby County Drug Court client handbook*. Unpublished report, The Shelby County Drug Court. Memphis, TN.

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Welcome to the Shelby County Drug Court Program. This handbook is designed to answer questions, address concerns, and provide overall information about the Drug Court Program. As a participant, you will be expected to follow the instructions given in Drug Court by the Judge and comply with the treatment plan developed for you by your counselor. This handbook will detail what is expected of you as a Drug Court participant and review general program information. All participants are encouraged to share this handbook with family and friends.

PROGRAM DESCRIPTION AND ELIGIBILITY

The Shelby County Drug Court Program is a court-monitored program of drug treatment and rehabilitation services for some chemically dependent defendants. Entry into Drug Court is voluntary. Drug Court includes regular court appearances before a Judge. Treatment includes drug testing, group counseling, and required attendance of Alcohol Anonymous (AA) groups, Cocaine Anonymous (CA) groups, and/or Narcotics Anonymous (NA) groups from a defined list provided by the Drug Court. Counselors may also assist with obtaining education and skills assessments and will provide referrals for vocational training, education and/or job placement services. The program length, determined by each participant's progress, is typically twelve months. You must prove you can abstain from drugs or alcohol for 6 consecutive months before you are allowed to graduate from this program. Drug Courts offer you a clear choice: *participation in treatment instead of incarceration.*

Drug Court has been developed as an option for clients who have possession offenses and/or committed substance abuse related crimes. Drug Court is not available to individuals with violent felony convictions, any defendant who has a significant criminal record, or any defendant who has been convicted of a serious drug offense.

Following arrest, if you are eligible, you may be offered a choice between the Drug Court Program or traditional criminal prosecution. An Assistant Public Defender or other attorney will advise you and discuss the Drug Court Program with you. If you choose to participate in the Drug Court Program, you will be released from jail, subject to conditions that relate to your Drug Court participation.

If you are recommended to the Judge for consideration into the Drug Court Program, you will be interviewed by a member of the Drug Court staff to assess your social, family, criminal, employment, education and substance abuse histories, as well as your overall attitude toward entry into a treatment program. A Drug Court counselor then completes a formal assessment report and presents it to the Drug Court Team to consider your acceptance into the program.

You will be required to waive your preliminary hearing and to appear in the Drug Court on a regular basis. You will be required to plead guilty and your Public Defender or private attorney will continue to represent you throughout your participation in Drug Court. Your release will continue subject to your compliance with conditions related to your Drug Court participation. You will be required to sign a waiver that will be reviewed completely by you and your attorney prior to signing. Some of the things in the

waiver are non-negotiable. These include but are not limited to submitting to random searches of your person and property, submitting to drug and alcohol urine testing, participating in individual and group counseling,

and being subjected to a graduated system of rewards and sanctions used by the Drug Court as well as accepting any conditions the Judge feels are appropriate for your recovery. Successful completion and graduation from the program will result in having your guilty plea set aside and the charges dismissed, unless otherwise specified at the time of your guilty plea or entry into the drug court program. Your case will not be expunged until 6 months after graduation.

Judge Tim Dwyer of Shelby County General Sessions Court Division 8 serves as the Drug Court Judge. Final determination of entry into Drug Court belongs to the Judge, with input from the appropriate parties and agencies.

Termination from the program will result in your case proceeding to sentencing on the basis of your guilty plea.

Any statements you make about your offense(s) in Drug Court or in the process of recovery from addiction, to members of the Drug Court team, care providers, or in open court, shall not be the basis for a new criminal charge.

DRUG COURT SUPERVISION

As a Drug Court participant, you will be required to appear in Drug Court on a regular basis. The Judge will be given a progress report prepared by your assigned treatment provider and Drug Court Counselor regarding your drug test results, attendance, and your participation in treatment. The Judge may ask you questions about your progress and discuss any specific problems you have been experiencing.

If you are doing well, you will be rewarded and encouraged to continue with the program and work with your counselor towards success. If you are not doing well, the Judge will discuss this with you and determine further action. The goal of Drug Court is to help you achieve total abstinence from illicit, illegal, or addictive drugs and alcohol however, a positive or "dirty" drug test will not necessarily terminate you from the program. If you are having problems, the Judge may order a variety of sanctions such as additional testing, written assignments, more frequent court appearances, community service, jail, or additional groups or classes.

Keep in mind that all Drug Court appearances are **mandatory** and failure to appear will result in the Court issuing a bench warrant for your arrest and/or termination. If you are ill or have an emergency, which will keep you from attending Court, notify your counselor as soon as possible prior to your Court date. If you do not appear in Court on the date and time scheduled, you will be arrested. If you cannot appear as scheduled, you must notify your Drug Court Counselor as soon as possible to explain why you cannot appear.

PROGRAM RULES

As a Drug Court participant, you will be required to abide by the following rules:

1. Attend all ordered treatment sessions.
> This includes individual and group counseling, educational sessions, and other sessions as directed. If you are unable to attend scheduled sessions you must contact your counselor and your treatment provider.

2. Be on time.
> If you are late for treatment, you may not be allowed to participate and will be considered non-compliant. Contact your treatment providers if there is a possibility you may be late.

3. Do not make threats towards other participants or staff or behave in a violent manner.
> Violent or inappropriate behavior will not be tolerated and will be reported to the Court. This may result a sanction and/or termination from the Drug Court Program.

4. Attend all scheduled Drug Court sessions.
> You must attend all court sessions as ordered by the Court. As a participant, you will be expected to dress appropriately for court and all drug court activities. Clothing bearing drug or alcohol related themes or promoting or advertising alcohol or drug use is considered inappropriate. Sunglasses and hats are not to be worn in Court.

5. Abstain from use of alcohol and illicit drugs.
> This condition is fundamental to successful completion of the program.

6. Maintain confidentiality of other drug court participants.
> Treatment cannot succeed unless all participants maintain the confidentiality of other participants and of the information disclosed in treatment.

7. Pay fees in a timely manner.
> Fee payments cannot slipped under the door or given to staff at the treatment center. Proof of payment must be provided to your Drug Court Counselor. Payments will be reported to the Judge as part of your regular progress report. Inability/failure to pay may result in termination from the Program. All fees must be paid prior to graduation.

8. Court Orders.
> You understand that your person, residence, or automobile may be searched regardless of time, place, or circumstances.

TREATMENT PROCEDURES

The Shelby County Drug Court has partnered with treatment professionals to assist you. Upon your acceptance into the Drug Court Program, you will be instructed to contact one of the Treatment Providers for enrollment. A multi-phase, outpatient program will be developed which includes:

1. Treatment Planning

An initial treatment plan will be developed by you and your counselor at your treatment provider following an overall assessment of your problems and needs. The plan will act as a guide for your first phase of treatment. This plan will help you set goals, select methods for accomplishing those goals and develop target dates for achieving those goals. The plan will be kept in your treatment file for regular review and necessary updates as you progress   through the Program. Any revisions to the plan will be made and signed by you and your counselor.

2. Drug and Alcohol Testing

You will be tested throughout the entire treatment process. During this program you will be tested frequently and randomly. The Drug Court Judge will have access to all drug test results including any failures to produce a screen and may order a drug test at any time. Attempts to dilute, adulterate, or tamper with drug or alcohol testing may lead to discharge from Drug Court. The goal of Drug Court is to help you achieve total abstinence from illicit or illegal drugs and alcohol. The Judge will be reviewing your overall performance in the Program. No new criminal charges will be filed as the result of any "dirty" test.

3. Counseling

As part of your treatment plan, you will be required to actively participate in different types of counseling. Together they are designed to help you develop self-awareness, help you realize self-worth, and teach you to practice self discipline.

The group counseling sessions will include problem identification and alternative solutions. You may also be required to address other life areas such as education, employment, housing, health issues, or family counseling. The educational sessions will include videos, lectures, guest speakers, and question/answer session. Your attendance at counseling sessions will be reported to the Judge as part of your progress report. You must contact your treatment provider or your counselor if you are unable to attend or will be late to a scheduled session for permission to be excused.

4. Outside Meetings

In addition to attending a formal treatment in a classroom setting, you will be required to attend AA/NA/CA meetings while in the Drug Court program. The number of meetings required is dependant upon your compliance and phase. This type of interaction with others who are in recovery has been proven to be highly effective in keeping clients on target toward their own recovery.   You will be given a meeting sheet that requires the signature of the chairperson of the meeting you attend.

TREATMENT PHASES

The phases are described below:

Phase I - Early Recovery Skills

You are required to attend three (3) group counseling sessions per week for eight (8) weeks plus individual counseling sessions as needed for special circumstances occurring in the first phase of treatment. You are required to attend at least one (1) Alcoholics / Narcotics / Cocaine Anonymous meeting per week unless otherwise instructed. During this phase, you must schedule office visits once per month with your respective Drug Court Counselor. You will be assessed fees totaling $1200 for the 12 months you will be receiving treatment via Drug Court. Payments will begin one month from the date of your acceptance into the program. You will also required to be present in court once per week.

Phase II - Relapse Prevention

During the second phase, you are required to attend two (2) group counseling sessions per week plus individual counseling sessions as needed for eight (8) weeks. You are required to attend at least one (1) Alcoholics / Narcotics / Cocaine Anonymous meeting per week unless otherwise instructed. As with phase one, you are required to comply with mandatory office visits with your respective Drug Court Counselor. You may be stepped down to two– (2) status hearings per month. You should begin actively pursuing sponsorship while in this phase. GED or proof of education must be submitted during this phase. If you do not have at least a GED or its equivalent then you will be ordered to begin attending GED classes.

Phase III - Life Skills

During this phase, you will attend one (1) group session per week plus individual counseling as needed for eight (8) weeks. You are required to attend at least one (1) Alcoholics / Narcotics / Cocaine Anonymous meeting per week unless otherwise instructed. Office visits with your Drug Court Counselor are still mandatory and you must have a sponsor to stay compliant in this phase. Your sponsor's name and number must be provided to your counselor and your treatment provider. Based on your level of compliance, you may be allowed to attend (one) 1 status hearing per month.

Phase IV - Aftercare/Support

Lasting twenty-eight (28) weeks, this is the longest phase of your participation in the Drug Court Program. During this phase, you are required to attend two (2) Alcoholics / Narcotics / Cocaine Anonymous meeting per week unless otherwise instructed. You must maintain contact with your sponsor. Individual sessions with your treatment provider must be completed as directed. You will turn in a written copy of your relapse prevention plan. In order to graduate, you must successfully complete all of the aforementioned requirements in addition to anything else mandated by the Court.

You must be drug free to move from phase to phase. If you have a positive drug screen in Phase I, Phase II, or Phase III, you are subject to start the phase over from week one. You must remain drug free, with no positive drug screens, for 8 consecutive weeks to move to the next phase.

If you are a participant of the Mother's Program, please see your counselor to obtain a copy of phasing schedule and requirements as they differ from those listed above.

Also, if you are participating in the Residential Program, your phases will differ from those above. Please discuss your requirements with your counselor.

SANCTIONS

Should you fail to comply with the requirements of the Drug Court, the Judge may impose a graduated series of sanctions to get you back on track. Several actions that could result in a sanction include:

1. Failure to appear in Court
2. Failure to attend treatment sessions
3. Failure to report to your counselor
4. Failure to drug test on the date/time or frequency directed by the Court or your treatment provider.
5. Submitting a drug test which is positive for either alcohol or illegal drugs.
6. Submitting a diluted drug screen (for information on creatinine levels see page 11).
7. Failure to attend the required number of outside meetings.
8. Forging AA/NA/CA meeting sheets.

Types of Sanctions:
1. Community Services
2. Increase in Outside meetings (90 meetings in 90 days)
3. Curfew
4. Written letter by participant
5. Increase in fees
6. Increase frequency of drug testing
7. Increase frequency of court appearances
8. Increase monitoring and/or treatment intensity
9. Incarceration
10. Termination from the Drug Court Treatment Program

TERMINATION FROM PROGRAM

This is a voluntary program. If you no longer wish to participate in the program, contact your attorney to discuss your options. The Court may remove you from the program for continued non-compliance, new criminal charges, or bench warrants. All termination decisions will be made by the Drug Court Judge. If you are terminated, you will be sentenced on the original charge.

GRADUATION

You must be clean for at least six months before being allowed to successfully complete this program. Your family and friends will be invited to your graduation as the Judge congratulates you on successfully completing Drug Court and achieving your goal to establish a drug-free life.

CONCLUSION

Drug Court has been developed to help you achieve abstinence from illicit drugs and alcohol. The Program is designed to promote self-sufficiency, sober living, and provides you with the skills necessary to become a productive member of your community. The Program is voluntary. The Judge, the court staff, and your treatment provider are present to guide and assist you, but the final responsibility is yours. You must be motivated to make this change and commit to a drug and alcohol free life. We hope this Handbook has been helpful to you and answered most of your questions. If you have any additional questions or concerns about Drug Court, please feel free to contact your Drug Court Counselor, or your Public Defender or private attorney.

GOOD LUCK TO YOU!

Drug Court Frequently Asked Questions (FAQs)

NOTE: The following questions are among the most frequently asked by Drug Court candidates and clients.

"What do I do when work, child care, or transportation problems interfere with my Drug Court obligations?"

       Remember: if you are successful in Drug Court, you will avoid going to jail. To succeed in Drug Court means putting your treatment obligations first. Failure to organize your life to fulfill Drug Court requirements could result in a jail sanction, which is something all Drug Court participants wish to avoid. Sometimes, this might mean that you have to inform your employer that you are not available for overtime or out of town work. The Court strongly encourages honesty with your employer about your Drug Court obligations, so that together you can design your work schedule to fit around Drug Court.

       Regarding your transportation and/or child care needs, it might be helpful to enlist support and assistance of clean and sober family members and friends. As you become more involved in your treatment and with peer support groups, such as NA or AA, you will develop a new support network which will help you successfully fulfill your Drug Court obligations. Remember also to always discuss your problems <u>as they arise</u> with your Drug Court counselor and/or attorney.

"What do I do if a family or medical emergency arises?"

       Unexpected situations can arise at any time. If this occurs while you are participating in Drug Court, contact your Drug Court counselor and treatment provider immediately so that a plan can be made to help you get through this period without relapsing.

"Can I get Court permission to leave the state temporarily?"

       Under the Drug Court terms and conditions, you cannot leave Shelby County without first obtaining Court permission. Depending upon your progress in Drug Court, the Court may grant your request to leave the county temporarily. If you are planning to go out of state, you MUST ask for permission at least two (2) weeks prior to your scheduled departure. Contact your Drug Court counselor before finalizing any plans.

"Am I in violation of Drug Court for taking prescriptions or over-the counter medication?"

       In general, it is best to try to avoid taking nonessential medications during your participation in Drug Court.

       If you are under the care of a physician, who has prescribed medications for your medical needs for a limited time, be sure to bring your prescription to the treatment provider and inform your counselor **before taking the medication make sure that it is**

approved. The Drug Court may ask you to obtain a note from your physician explaining the reason for this prescription and an estimation of how long you will be taking it. Furthermore, it is mandatory that you tell your physician that you are in a recovery program. Recovery from drug abuse is a health issue of which your physician should be made aware.

You should also be informed that many over-the- counter medications (such as certain cold/flu and asthma medications) can affect the result of a urine test. It is your responsibility to get permission and inform your treatment provider of any over-the-counter medications before you take it. **NEVER ingest a medication which was prescribed for someone else!** It is a <u>felony</u> for another person to furnish you with a controlled substance or for you to be in possession of a controlled substance that is not prescribed to you. It is always best to see your physician <u>prior</u> to any self-medicating.

"What happens if I get a traffic ticket while I am in Drug Court?"

You must notify your Drug Court counselor of any tickets or misdemeanor citations you receive while in Drug Court; failure to do so could result in a sanction.

"What happens if I miss a drug test?"

A missed drug test is considered to be a positive or "dirty" drug test. Why? Many people choose not to drug test when they are scheduled because they have used controlled substances and thus fear a positive test. It is best to submit to all court-ordered drug tests, and deal with the consequences when you next go to court. (While positive drug tests are never encouraged, you should inform your counselor and treatment provider when you know you will be testing "dirty" so that together, you can work on ways to deal with your current relapse and devise strategies for relapse prevention in the future.)

If you arrive late for drug testing or were unable to test for any reason, contact your counselor immediately. Bring any documentation which shows why you missed your drug test to your treatment provider and your next Court appearance.

"What products contain alcohol?"

It is **YOUR** responsibility to limit your exposure to the products and substances detailed below that contain ethyl alcohol.

It is **YOUR** responsibility to read product labels, to know what is contained in the products you use and consume and to stop and inspect these products BEFORE you use them. When in doubt, don't use, consume or apply.

Cough syrups and other liquid medications: Drug Court participants have always been prohibited from using alcohol-containing cough/cold syrups, such as Nyquil®.

Other cough syrup brands and numerous other liquid medications rely upon ethyl alcohol as a solvent. Drug Court participants are required to read product labels carefully to determine if they contain ethyl alcohol (ethanol). All prescription and over-the-counter medications should be reviewed with your treatment provider before use. Information on the composition of prescription medications should be available upon request from your pharmacist. Non-alcohol containing cough and cold remedies are readily available at most pharmacies and major retail stores.

Non-Alcoholic Beer and Wine: Although legally considered non-alcoholic, NA beers (e.g. O'Douls®, Sharps®) do contain a residual amount of alcohol that may result in a positive test result for alcohol if consumed. Drug Court participants are not permitted to ingest NA beer or NA wine.

Food and Other Ingestible Products: There are numerous that contain ethyl alcohol that could result in a positive test for alcohol. Flavoring extracts, such as vanilla or almond extract, and liquid herbal extracts (such as Ginko Biloba), could result in a positive screen for alcohol or its breakdown products. Communion wine, food cooked with wine, and flambé dishes (alcohol poured over a food and ignited such as cherries jubilee and baked Alaska) must be avoided. Read carefully the labels on any liquid herbal or homeopathic remedy and do not ingest without approval from your case manager.

Mouthwash, Breath Strips, and Breath Freshening Gum: Most mouthwashes (Listermint®, Cepacol®, etc.) and other breath cleansing products contain ethyl alcohol. The use of mouthwash containing ethyl alcohol can produce a positive test result. You are required to read product labels and educate yourself as to whether a product contains ethyl alcohol. Use of ethyl alcohol-containing mouthwashes, breath strips, and gum by Drug Court participants is not permitted. Non-alcoholic mouthwashes are readily available and are an acceptable alternative. If you have questions about a particular product, bring it in to discuss with your treatment provider.

Hand sanitizers: Hand sanitizers (e.g. Purell®, Germex®, etc.) and other antiseptic gels and foams used to disinfect hands contain up to 70% ethyl alcohol. Excessive, unnecessary or repeated use of these products could result in a positive urine test. Hand washing with soap and water are just as effective for killing germs.

Hygiene Products: Aftershaves and colognes, hair sprays and mousse, astringents, insecticides (bug sprays such as Off®) and some body washes contain ethyl alcohol. While it is unlikely that limited use of these products would result in a positive test for alcohol (or its breakdown products) excessive, unnecessary, or repeated use of these products could affect test results. Participants must use such products sparingly to avoid reaching detection levels. You must limit their use of topically applied (on the skin) products containing ethyl alcohol.

Solvents and Lacquers. Many solvents, lacquers, and surface preparation products used in industry, construction, and the home, contain ethyl alcohol. Both excessive inhalation of vapors, and topical exposure to such products, can potentially cause a

positive test result for alcohol. As with the products noted above, you must educate yourself as to the ingredients in the products they are using. There are alternatives for nearly any item containing ethyl alcohol. Frequency of use and duration of exposure to such products should be kept to a minimum. A positive test result will not be excused by reference to use of an alcohol-based solvent. If you are in employment where contact with such products cannot be avoided, you need to discuss this with your counselor. Do not wait for a positive test result to do so.

Remember! When in doubt, don't use, consume or apply.

"What can make a drug screen diluted and what is creatinine?"

Creatinine is protein electrolytes in urine. Everyone has it and no two people will have the same levels. The levels are affected by your physical activity, foods that you eat, and the amount of **any fluid** you intake, not just water, but also "juicy juice, kool-aid, cokes, and coffee," **anything you drink**. Coffee, tea, and cokes (products with high caffeine quantity) are diuretics which will make you urinate more often and will make you thirsty thereby making you want to drink more and become more diluted. Watch your fluid intake!

Eating regular meals especially breakfast can help. You **have** to eat whether you are trying to diet to lose weight or not. Do **not** screen on an empty stomach. If you do not put protein into your system, you cannot get protein out of it.

Drinking excessive amounts of water (or any fluids) will dilute your drug screen and a diluted screen gives the appearance of someone trying to flush drugs out his/her system.

Clients on medications for kidney/heart/diabetes need to take their medications-do not skip days. Along with kidney disease, leukemia or other blood disorders, some medications require someone to drink more fluids. This is why it is important for a client to inform the provider of any and all medications, and provide a copy of the prescription.

Drug Court guidelines tell us that low creatinine levels represent a diluted screen and the client is subject to sanction.

Drug Court Team Members Who Can Answer Your Questions:
Lakesha Becton (901) 545-3507
Katrina Butler   (901) 545-4892
Anita Johnson   (901) 545-4891
Angie Vernon (901) 545-2924
Kyle Eaton (901) 545-4890
Angela Parkerson (901) 545-2823

Vita

Marie E. Gill was born in 1964 in Tell City, Indiana. She received a Bachelor of Science Degree in Nursing from The University of Tennessee Health Science Center in 1988, a Master of Science Degree in Education from the University of Memphis in 1995, and a Master of Science Degree in Nursing from the University of Memphis in 2006. Marie has 25 years of nursing experience in a variety of areas including nursing education, patient teaching, clinical nursing, program evaluation, and grant reporting. She is a member of the Tennessee Nursing Association and Southern Nursing Research Society. Marie has presented posters and one roundtable discussion at three national conferences and co-authored 12 abstracts presented at national meetings. Marie was accepted in the doctoral program at The University of Tennessee Health Science Center in 2009 and will graduate with a Doctor of Philosophy in Nursing in December 2012.