

# **Outcomes of the ASIST program for high risk offenders with mental illness**

Application of a case-control propensity matching method

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# **Conflict of interest statement**

**I have no actual or potential conflict of interest in relation to this program/presentation**

# Background

- CT was one of first states to create a Jail Diversion program
- CT has had statewide jail diversion since 2000
- Diversion is not always offered when the defendant has a history of non-compliance, failure to appear in court, etc.
- Judges and prosecutors feel more comfortable using supervised release, using alternative to incarceration (AIC) reporting centers
- However, prior to creation of ASIST through an interagency agreement, AICs were not equipped to serve people with mental illness

# ASIST Program Summary

- In 2007, interagency committee created ASIST
  - Serves hard-to-divert population
  - In 7 urban courts
  - Serving about 270-300 clients with mental illness/year
- Program elements
  - Intensive clinical case management (25:1) client : clinician ratio
  - Supervision by Court, Probation or Parole.
  - AIC services available (SA counseling; employment)
  - Clinical treatment by MH staff
  - START NOW skill development groups
    - Cognitive behavioral skills training model

# Start Now model

- Cognitive behavioral skills training model
- Influenced by findings from Trestman and Sampl's research of DBT in 3 CT correctional facilities
- Infused with elements of cognitive neuro-rehab
- Includes motivational interviewing principles
- Incorporates gender-specific approach
- Informed by principles of trauma-informed care principles

# 1st Evaluation: Follow-up Interview Sample (n=111)

- Weak method: pre-post comparison
- Face-to-face interviews BL, 3 mo, & 6 mo.
- Self-reported outcomes (scale):
  - Income, living situation, CJ involvement
  - Substance use (ASI use measure)
  - Medication compliance (DAI-10)
  - Quality of life (single item) (Lehman QOL)
  - Trauma symptoms (Stress Reactions Checklist)
  - Behavioral health functioning (BASIS 24)
- IVs: Demographics, TCU criminal thinking scales
  - Entitlement, Justification, Power Orientation, Cold Heartedness, Criminal Rationalization, Personal Irresponsibility

# Results of follow-up interviews

Applying HLM, the following self-report outcomes improve significantly by 6 months (N=111; 97 in 6-month follow-up group, or 87.4% follow-up)

- Overall BASIS-24 score
  - depression subscale
  - substance abuse subscale
- Stress reaction checklist score
- Living in own apartment
- Other results were not significant

# Classification & Regression Tree

Who benefits from ASSIST the most? Used C&RT – non-parametric statistical algorithms that are an alternative to OLS for multivariable analysis.

## Advantages:

- No assumption about the form of the underlying distribution
- IVs and DV can be any type of scale (nominal, ordinal, or interval)
- Robust against the potential biases that are produced by outliers
- No restrictions on number of predictors

## Disadvantages:

- Data driven - changes in the sample may give different trees
- Does not provide parametric statistics, such as CI
- Can be misleading if important predictors omitted

# Results of C&RT

- Those less likely to be re-arrested were those who had not be arrested before the age of 13.5
- Those with better MH outcomes (on BASIS) were those
  - With lower “Justification” sub-scores on the TCU Criminal Thinking scale
  - Or: Higher Justification can result in MH improvements for those who also had higher Power Orientation on the TCU Criminal Thinking scale

# Creating a Comparison Group: Propensity Matching

- Propensity scoring (PS): allows the researcher to create a close-to-equivalent comparison group
- PS starts with an analysis of baseline characteristics to find out what contributes to the probability of being in the program under study (the treated group)
- The probability of the being in the program for untreated can be assessed to find a similar sample
- Three common methods for estimating effect of treatment on outcomes using PS
  - Sub-classification (comparing cases within strata)
  - Regression adjustment (using PS score as covariate)
  - Case-control matching (matching cases)

# Case-Control Matching

- Useful for studies with limited number of treated cases but a larger number of not-treated cases
- Greedy match algorithm with nearest available pair matching method
  - Once a match is made, the match is not reconsidered (vs. optimal match algorithm, which will reconsider previous matches before making the current match)
  - Treated cases are ordered and sequentially matched to the nearest unmatched not-treated cases
  - If more than one unmatched control matches to a case, the control case is selected randomly

# PS matching Steps

- Define ASIST clients for PS matching
  - enrolled in the program during period 7/1/2007 to 12/31/2010
  - excluding parole cases
- Identify the “universe” for the control sample
  - high risk offenders with mental illness who didn’t receive ASIST program
  - individuals received DMHAS services from 7/1/2007 to 12/31/2010, and were under pre-trial or probation supervision during the same time
  - Not incarcerated at the time of target arrest (first arrest in window)
- Source of administrative data: DMHAS, DOC, and Judicial Branch
- Used Link King program and apply both probabilistic and deterministic record linkage protocols to identify same individual cross different sources of admin data

# Multiple Imputation

- Many covariates have more than 10% missing values
- Multiple imputation – based on available covariates to impute missing values
  - generate 10 data sets without missing values
  - conduct separate PS on all 10 data sets
  - combine results from 10 data sets to derive the final PS

# Variables included in MI & PS matching

- Demographic variables
  - Gender, race, & age
- MH/SA history (from DMHAS)
  - Primary dx (Mood disorder, schizophrenia), SA, SMI, dual dx, ASPD, & GAF scores
- CJS history (from Judicial)
  - # adult arrests, felony arrest, violent crime, LSI-R, prison sentence more than 1 year, & age 1<sup>st</sup> arrested
- DOC assessment scores (from DOC)
  - Need scores for MH, SA, edu, voc, & medical
  - Severity, history, length, discipline, gang, & overall

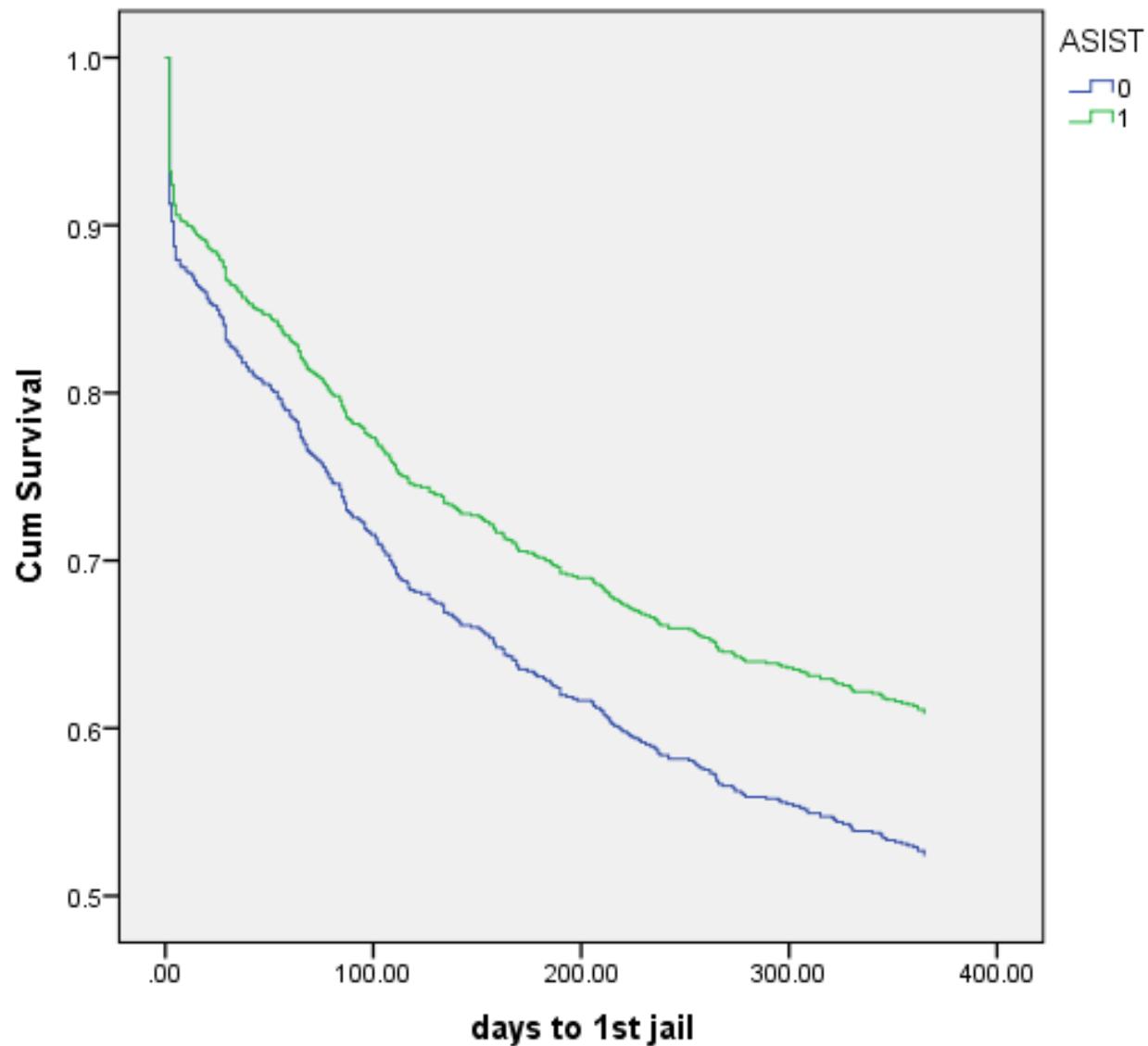
# PS matching summary

- Pre-PS matching
  - ASIST clients were older, more likely to be female, African American, having SMI, SA, dual dx, PD, and ASPD dx, lower GAF score, higher LSI score, more arrests (felony & violent crimes), higher % of prison $\geq$ 1 year
  - Worse on DOC assessment scores, except the following: SA, education, vocational needs, length & gang scores.
- Post-PS matching
  - all covariates were balanced (non-significant) between ASIST and non-ASIST groups.

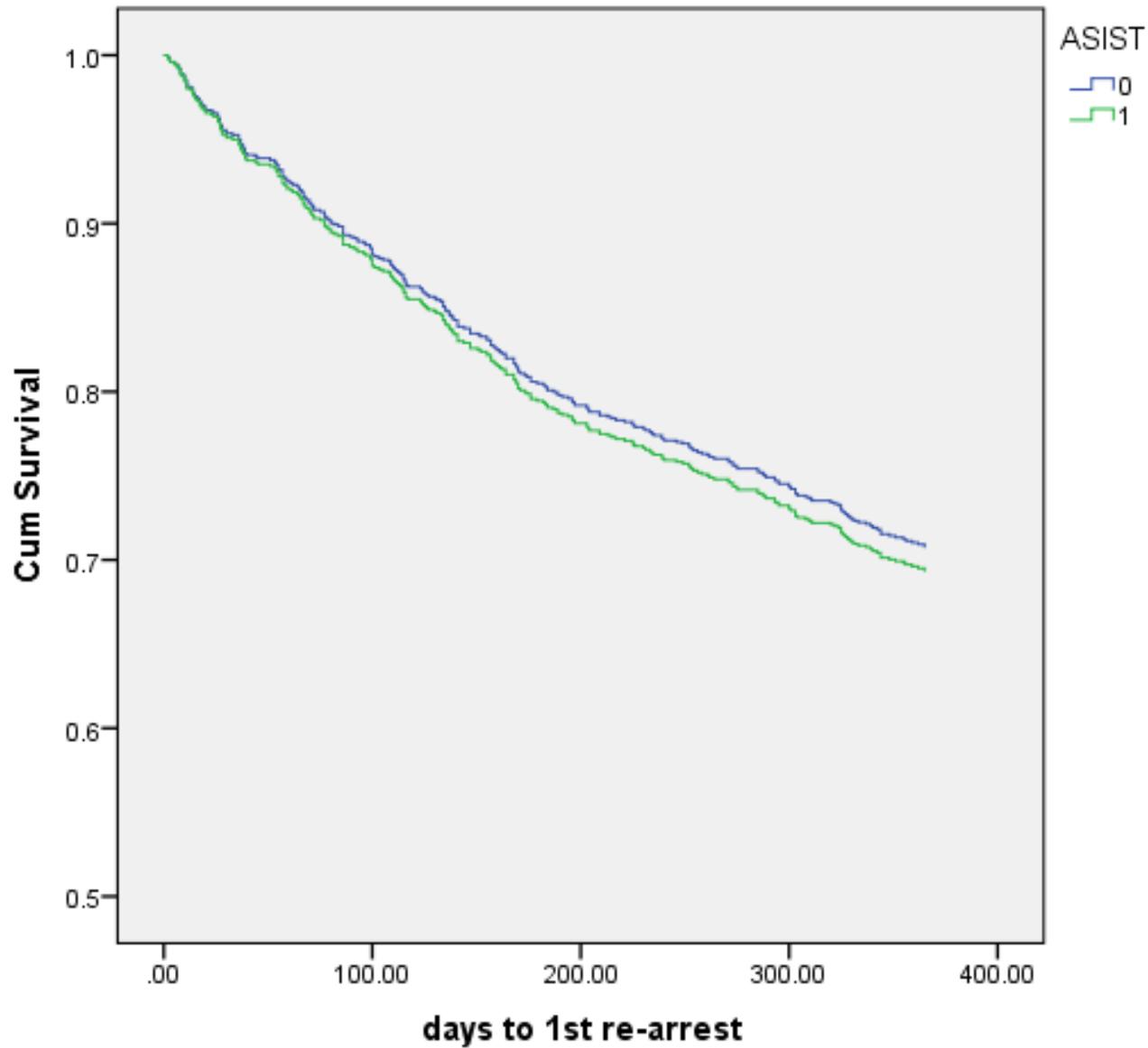
# Survival Analysis

- 12 month Recidivism
  - Time to 1<sup>st</sup> incarceration
  - Time to 1<sup>st</sup> re-arrest
  - Time to 1<sup>st</sup> felony arrest
- Starting time
  - ASIST: treatment intake date
  - Non-ASIST: target arrest date (1<sup>st</sup> arrest after the study window start date)
- Censored at 12 months after starting time

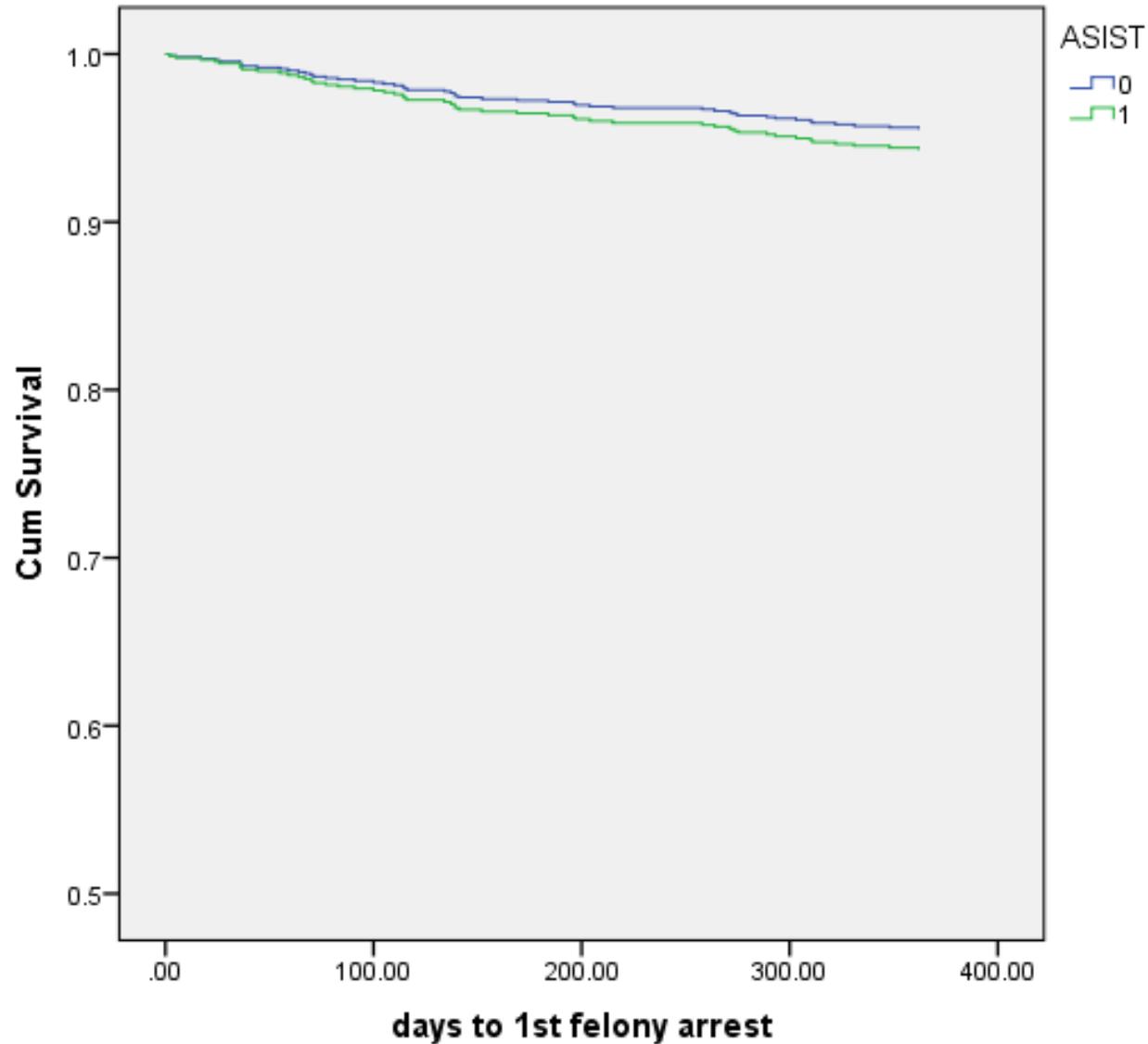
# Time to 1<sup>st</sup> Incarceration



# Time to 1<sup>st</sup> re-arrest (n.s.)



# Time to 1<sup>st</sup> felony arrest (n.s.)



# Limitations of PS method

- The assumption of **strongly ignorable treatment assignment** is required for PS to eliminate selection bias in observational studies
  - No unmeasured confounders
    - all variables that affect treatment assignment and outcome have been measured.
  - every subject has a nonzero probability to receive either treatment

# Summary of ASIST Evaluation

- Start Now is a valuable program component
- Add screening on Criminal Thinking?
- ASIST program is effective in:
  - improving clinical functioning, stress reaction, and living situation (with a weak pre-post design)
  - better survival rate to incarceration (robust design)
- Thus, “hard-to-divert” cases can be effectively served in the community, with the combination of justice supervision and clinical services
- Ponder: Why does incarceration decline, but not arrests?

# Discussion & Next Steps

- We need further work to make Start Now an EBP
- Again, think about focusing on cases most likely to succeed
- Look at the people who failed – is there a trend?
- Cost study
- Editorial: sometimes, no bad news is good news