

# Assessing Risk

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**Project 1: Develop  
automated parole  
supervision risk  
assessment  
instruments.**

# Original Risk Study

- 6,327 Georgia parolees completing supervision during 2000
- Outcome is arrest for a new crime during supervision (48%)
- Identify factors that “statistically predict” the outcome

# 11 Empirical Risk Factors

## *Static*

- Age at Sentencing
- Current Property Offense
- Current Drug Sales Offense
- # Prior Incarcerations
- Prior Parole/Probation Revocations
- History of Mental Health Treatment

## *Dynamic*

- # Days Employed
- # of Residences
- # of Months Attending Program
- Proportion of Drug Tests that are Positive
- Arrest for Technical Violation

# Why Logistic Regression?

## Static

## Odds Ratio

↓ Age at Sentencing	0.96
Property Offense	1.25
Drug Sales Offense	1.57
Prior Incarceration	1.26
Prior Revocation	1.63
Mental Health Treatment	1.25

→ odds of arrest are **63% higher** for an offender with a prior revocation

## Dynamic

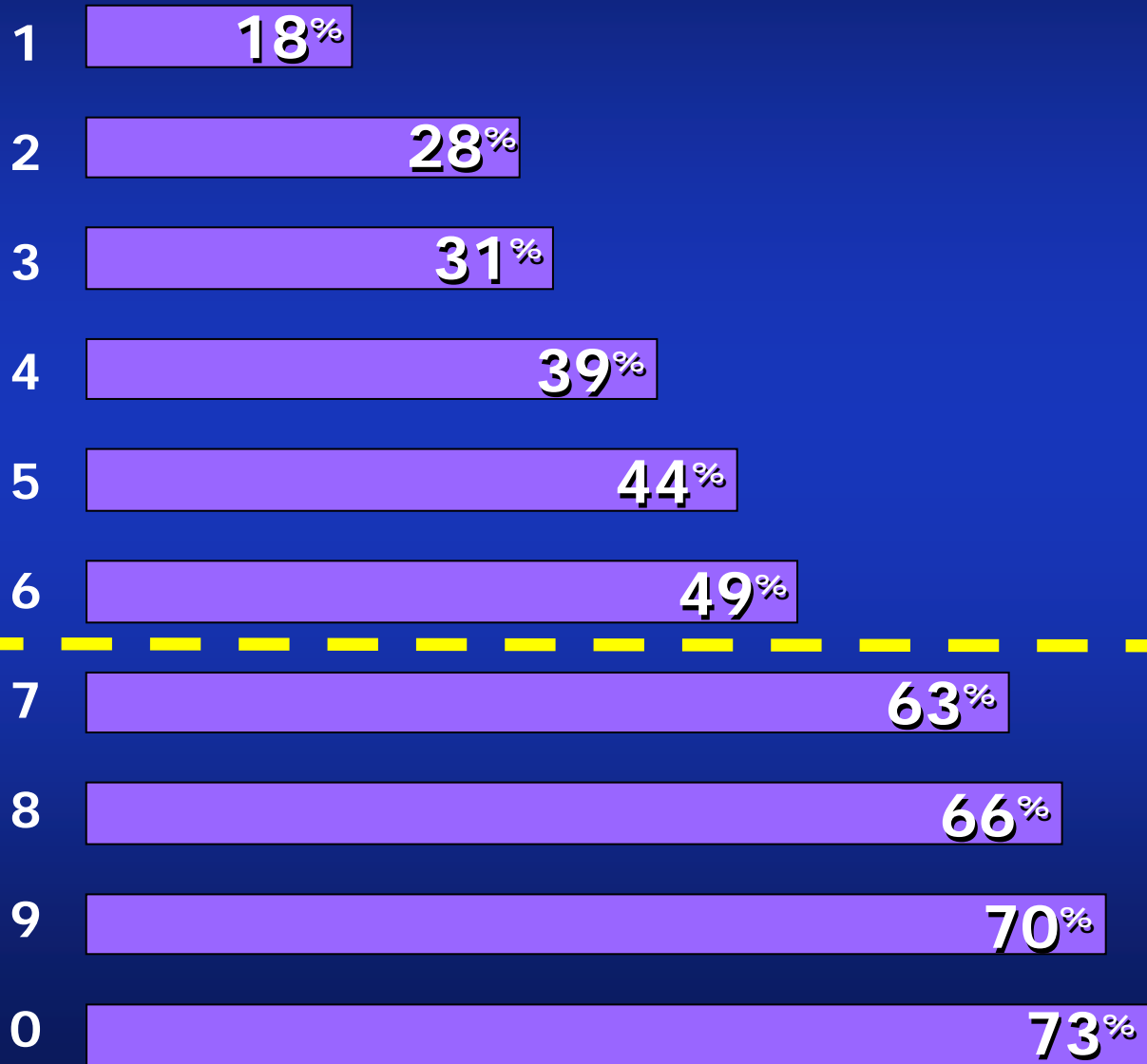
↓ Days Employed	0.99
# of Residences	1.23
% Positive Drug Tests	1.44
↓ # of Months in Program	0.98
Technical Violation Arrest	1.44

# Calculating a Parolee's Probability of Arrest Using Logistic Regression

$$p = e^{\text{logit}} / (1 + e^{\text{logit}})$$

**logit** = .072 - .046 (age at sentencing) + .415 (property offense) + .483 (drug sale offense) + .225 (# prior incarcerations) + .093 (# prior drug convictions) + ....

# % of Parolees Arrested By Risk Level



High Risk

# Our Instrument vs. LSI-R

## Georgia

Statistically significant factors only

10 risk factors

Assess risk

0 minutes to complete

\$0/assessment

## LSI-R

Statistical & theoretical factors

54 risk factors

Assess risk & need

45 minutes to complete

\$5/assessment

# Our Performance vs. LSI-R

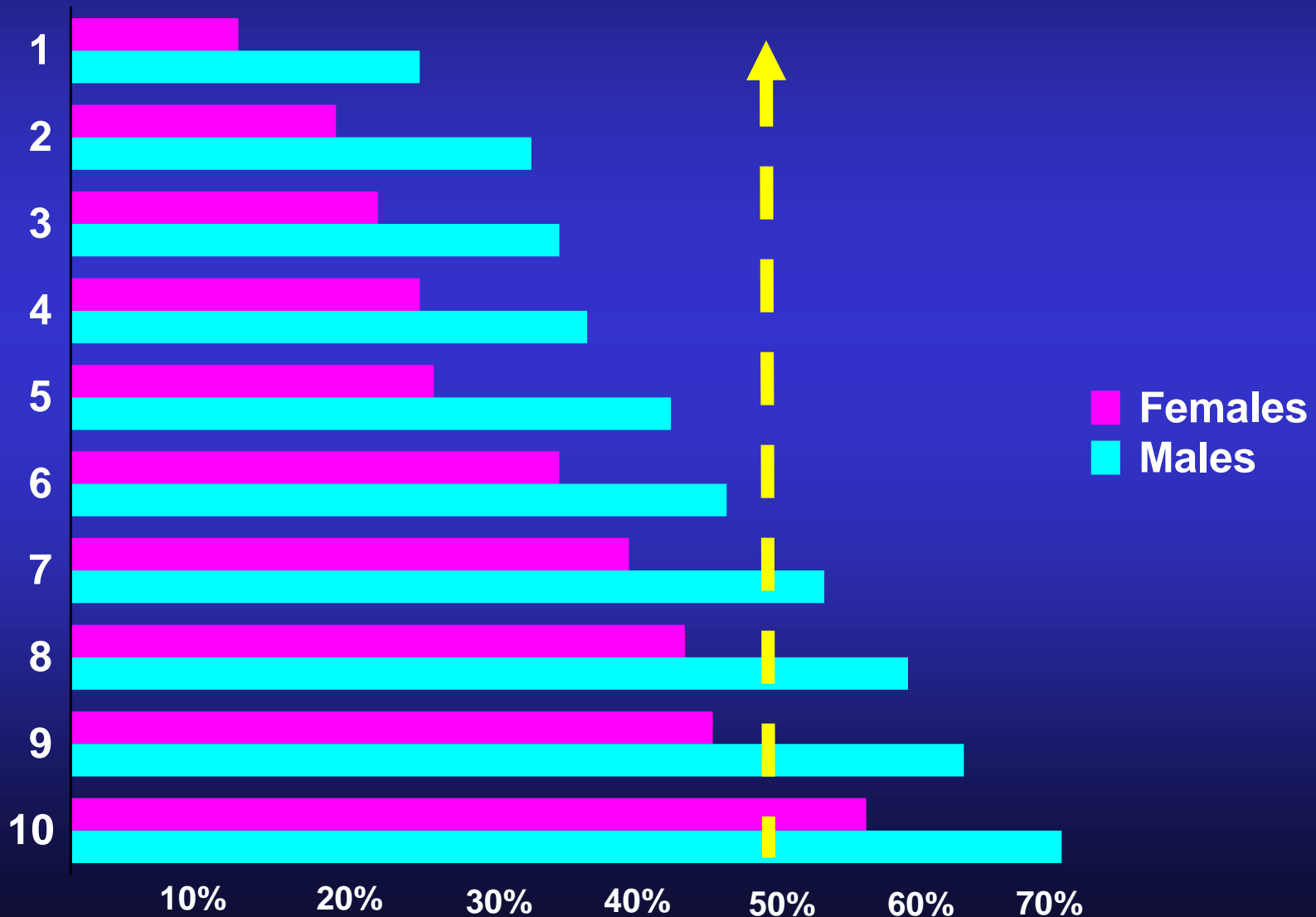
- Same correlation with arrest behavior
- Higher proportion of parolees correctly classified as “arrested”
- Higher proportion of “high risk” parolees get arrested

**Project 2: Update  
parole supervision  
risk assessment  
instruments – split  
genders & add timing.**

# Why Gender-Specific Assessment?

- Experts describe different pathways to crime
- 44% males vs. 28% females arrested (39,546 parolees)
- 36% of males and 46% of females are “high risk” on my instrument

# % Males & Females Arrested by Original Risk Scale



# Gender Differences

	Males	Females
Age at Sentence	30yrs	33yrs
Property Offense	36%	50%
Prior Incarceration	45%	30%
Mental Health History	19%	47%
Mood Disorder	2%	12%
Family Beatings	2%	12%
Cognitive Program	8%	17%
Months Employed	12	9

# Timing of Outcomes

	<u>6 Mos</u>	<u>12 Mos</u>	<u>Ever</u>
Violation	38%	43%	47%
Fail Drug Test	25%	33%	41%
Technical Arrest	12%	18%	27%
Misd Arrest	9%	14%	22%
Felony Arrest	10%	14%	27%
Revocation	4%	11%	27%

# Analytical Strategy

- Data mining sequence detection to identify patterns & timing among supervision events
- Cox regression survival analysis to identify predictors of arrest controlling for days on supervision

# 22 Empirical Risk Factors

## *12 Static*

Age at Sentencing

Prison Admission for Revocation

*Female+*

Forgery Offense

*Female+*

Theft Offense

*Male only*

Drug Possession Offense

# Prior Incarcerations

*Male+*

Prior Misdemeanor Arrests

*Female+*

Prior Felony Arrests

History of Family Alcoholism

*Male+*

Probation Diversion Admissions

*Female+*

History of Mental Health Treatment

*Female+*

History of Chronic Illness

*Female Only*

# 22 Empirical Risk Factors

## *10 Dynamic*

# Days Employed

Positive Drug Tests

*Male+*

Failed Drug Test by Day 60

*Male+*

Non-Drug Violations

Administrative Hearing

Cognitive Program

Substance Abuse Program

Education Program

Program Attendance

Cognitive Program Absence *Female Only*

# Calculating a Parolee's Probability of "Survival" Using Cox Regression

- Estimate individual survival probability:  
 $P = \exp(Z)$ ,  $Z$  is the regression equation
- Save group baseline survival estimates for time periods of interest
- Compute individual survival estimates for a future time period:  
 $\text{Yr1 survival} = (\text{Yr1 baseline survival})^P$

**Project 3: Develop  
parole release  
guidelines with  
automated risk  
component.**

# Guidelines Risk Study

- 33,456 Georgia prisoners released 2002-2003
- Outcome is conviction for a new felony in 3-year follow up (27%)
- Identify factors that “statistically predict” the outcome
- Automate to free up Hearing Examiner time for case analysis

# **New Guidelines Risk Factors**

**Burglary, Forgery, Obstruction, Theft Offense**

**# Adult Felony Conviction Counts**

**# Prison Incarcerations**

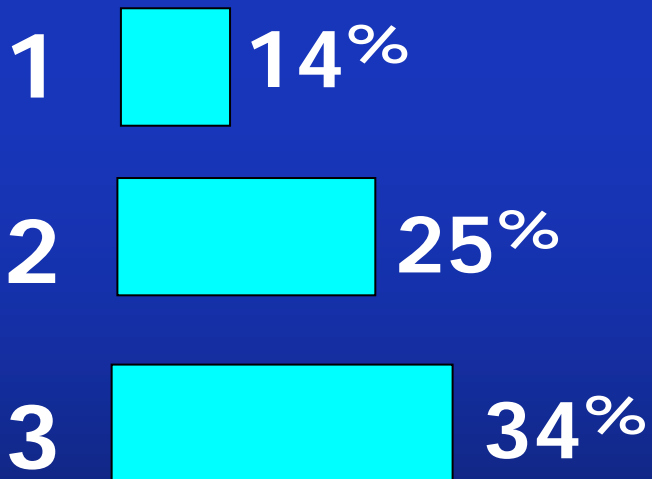
**Age at Start of Sentence**

**History of Drug or Alcohol Problem**

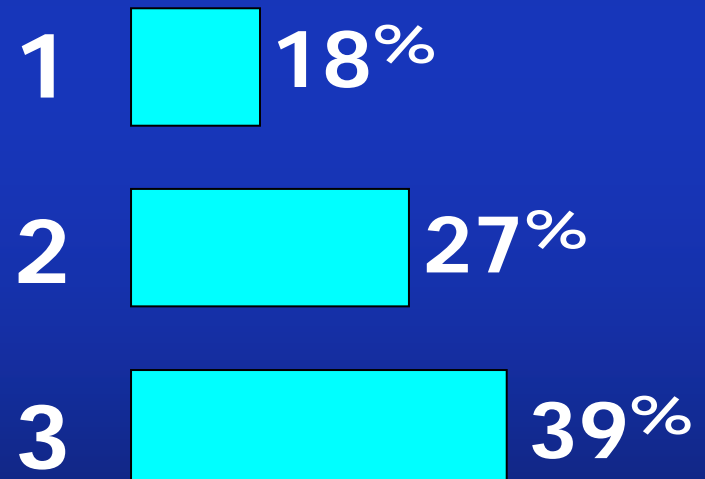
**Employed at Time of Arrest (full or part)**

# Released Prisoners Re-Convicted by Risk Scales

## Old Scale



## New Scale



# New Parole Guidelines Grid (Months to Serve in Prison)

<u>Crime Severity</u>	<u>Low</u>	<u>Medium</u>	<u>High Risk</u>
1	15 <b>17</b> 19	17 <b>20</b> 22	20 <b>22</b> 26
2	18 <b>20</b> 22	20 <b>22</b> 24	24 <b>26</b> 28
3	20 <b>22</b> 24	22 <b>24</b> 28	26 <b>28</b> 32
4	22 <b>24</b> 26	24 <b>28</b> 34	28 <b>32</b> 38
5	30 <b>34</b> 40	34 <b>42</b> 52	40 <b>50</b> 60
6	36 <b>40</b> 52	40 <b>50</b> 60	52 <b>65</b> 78
7	40 <b>44</b> 60	48 <b>60</b> 78	60 <b>76</b> 102
8	<b>65%</b> sent	<b>75%</b> sent	<b>90%</b> sent

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