

A micro-simulation model of the Queensland juvenile justice system

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Juvenile Justice Modelling

A collaborative project supported by the ARC through a *Strategic Partners with Industry – Research and Training Scheme* grant

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Purpose of the Research

1. To develop a model of the juvenile justice system to enable the simulation of short-term and long-term impact of different policy, legislative and theoretical scenarios.
2. To inform decision-makers of the likely consequences of current policies and to anticipate the consequences of policy changes.

Juvenile Justice Simulation Model

Micro-simulation model

- Models the behaviour of individual young people flowing through the juvenile justice system
- Uses rates and probabilities determined from operational data to develop model parameters
- Results can be aggregated to answer a range of questions

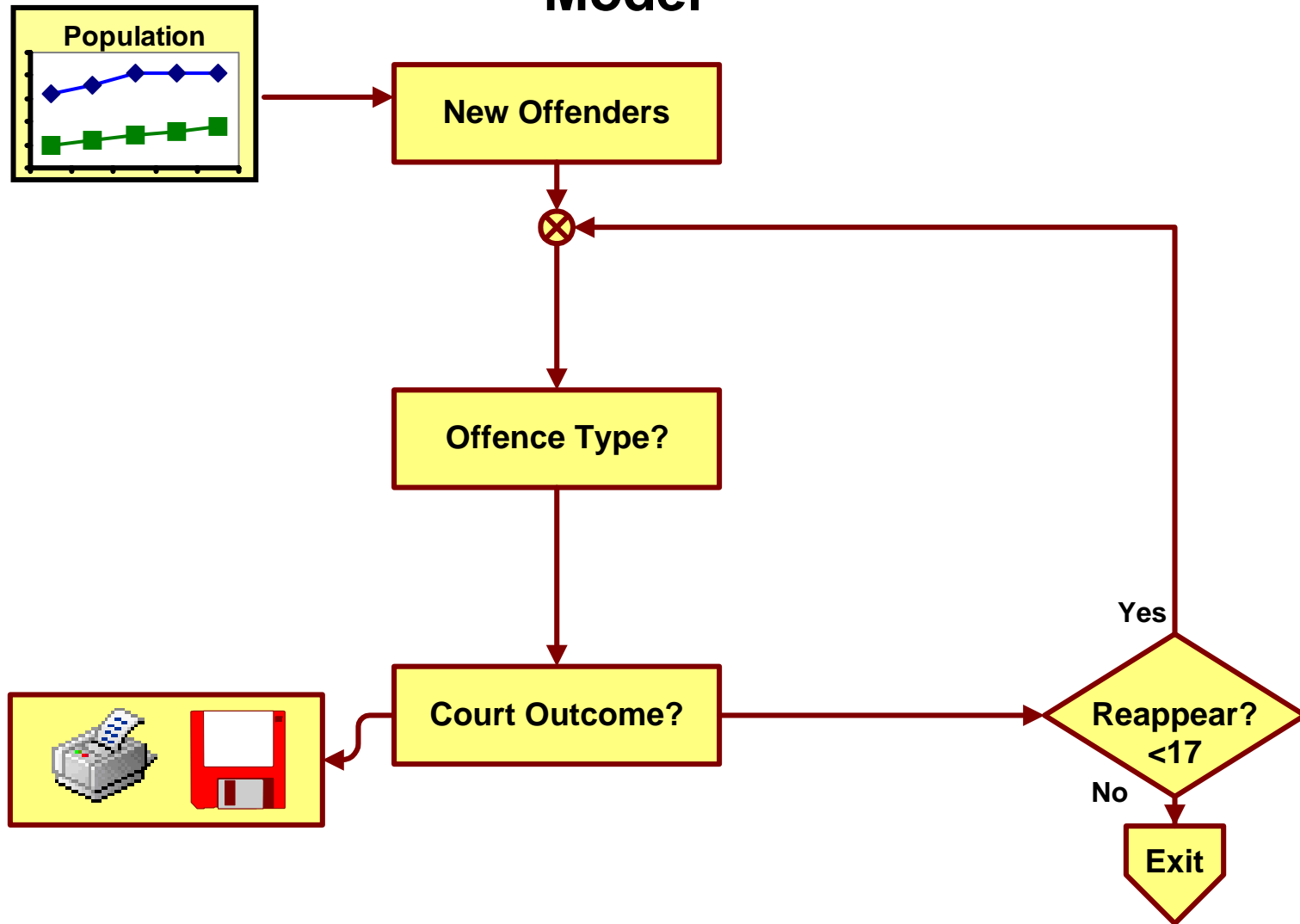
The model is NOT:

- A tool for providing absolute projections of justice system costs or numbers
- A crystal ball (which sees into the future)

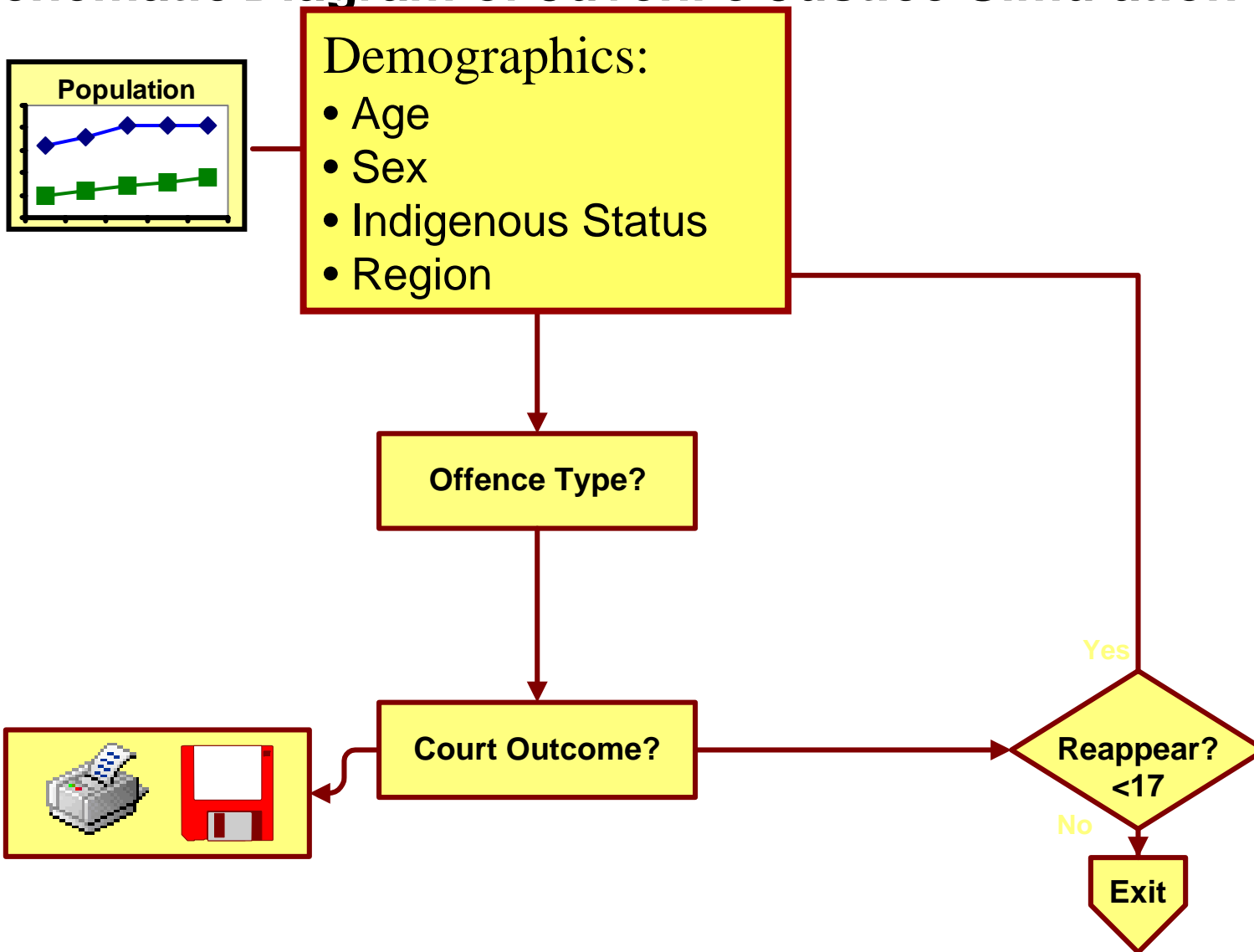
Data Analyses and Limitations

- Model parameters derived from statistical analyses of
 - 1999/00, 2000/01, 2001/02 and 2002/03 snapshots
 - cross sectional analysis
 - offending profiles
 - offence types and sentencing patterns
 - 1983 and 1984 birth cohorts
 - longitudinal analysis
 - reoffending parameters
- Data limitations
 - no date of offending
 - Finalised appearances used as a proxy for offending
 - reported and cleared offending only
 - models system rather than behaviour

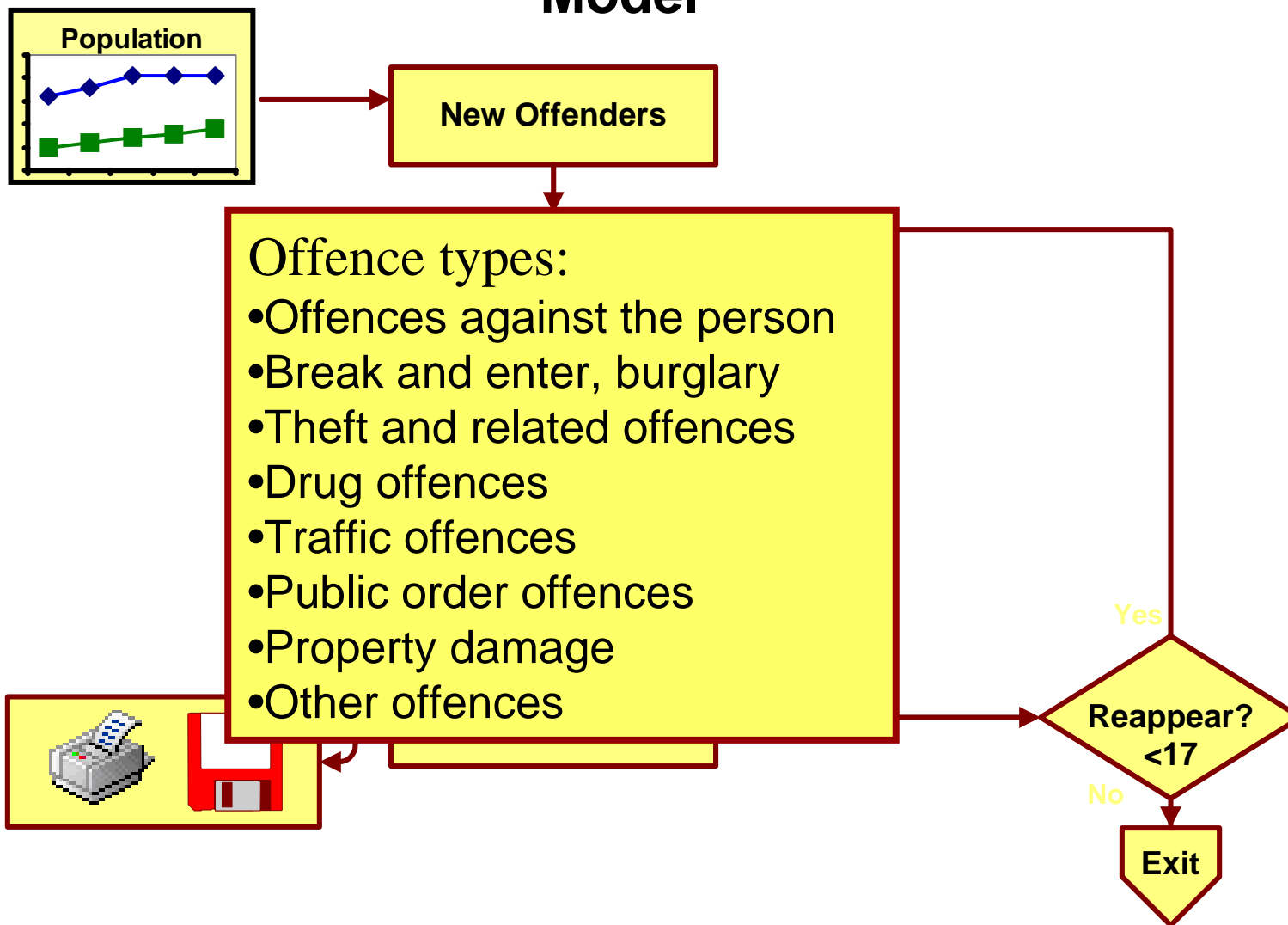
Schematic Diagram of Juvenile Justice Simulation Model



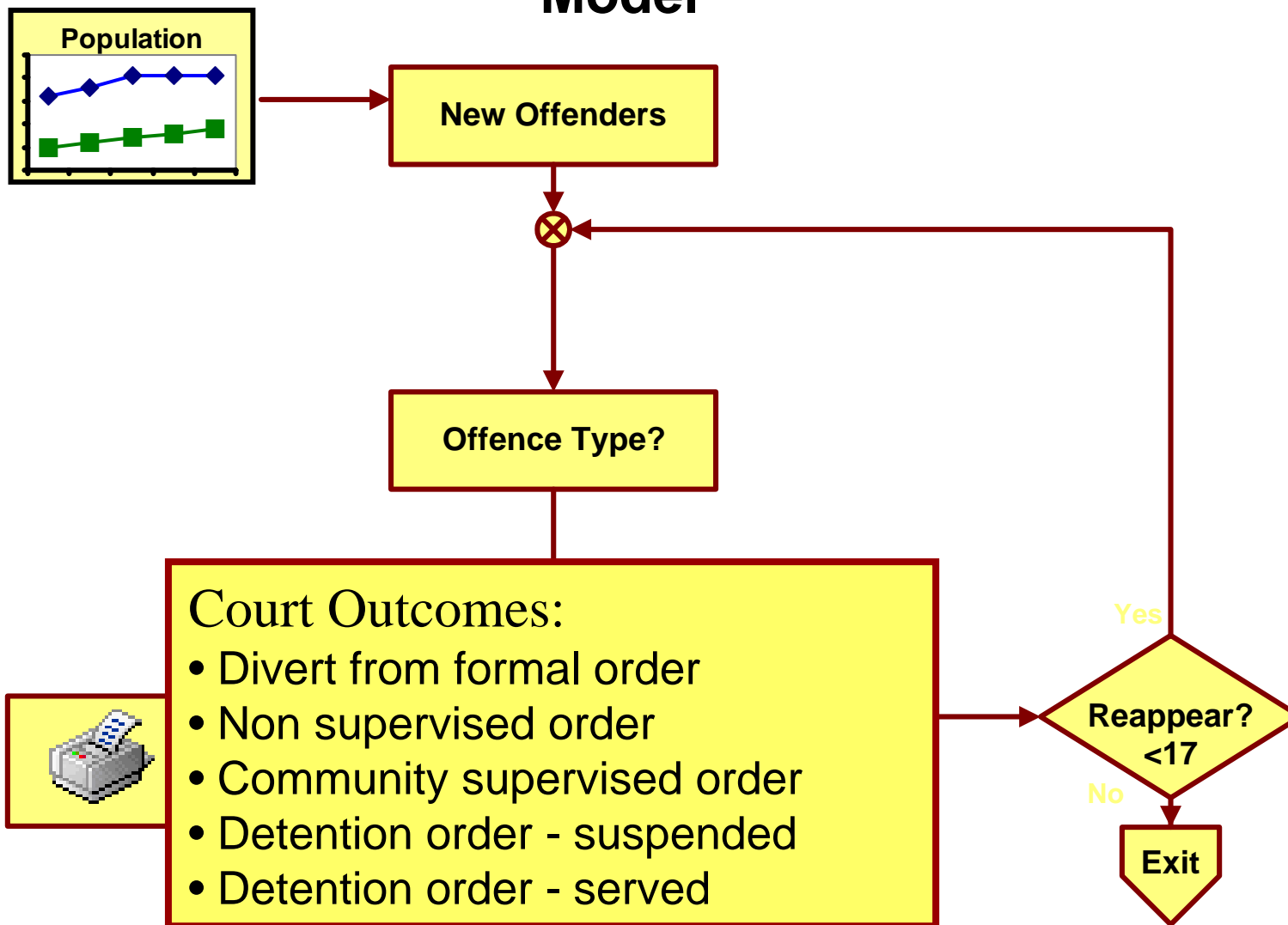
Schematic Diagram of Juvenile Justice Simulation



Schematic Diagram of Juvenile Justice Simulation Model



Schematic Diagram of Juvenile Justice Simulation Model



Predicting Court Outcomes

Logistic Regression Analysis

Parameters which are significant and improve model fit > 1%				
versus	Divert from formal order	Non supervised	Community supervised	Immediate Release
	Make formal order	Supervised order	Detention order	Detention served
Number prior appearances	x	✓	✓	✓
Offence type	x	✓	✓	x
Previous detention order	x	x	✓	x

Also tested: Indigenous status, sex, total number of prior finalised offences, total offences this appearance

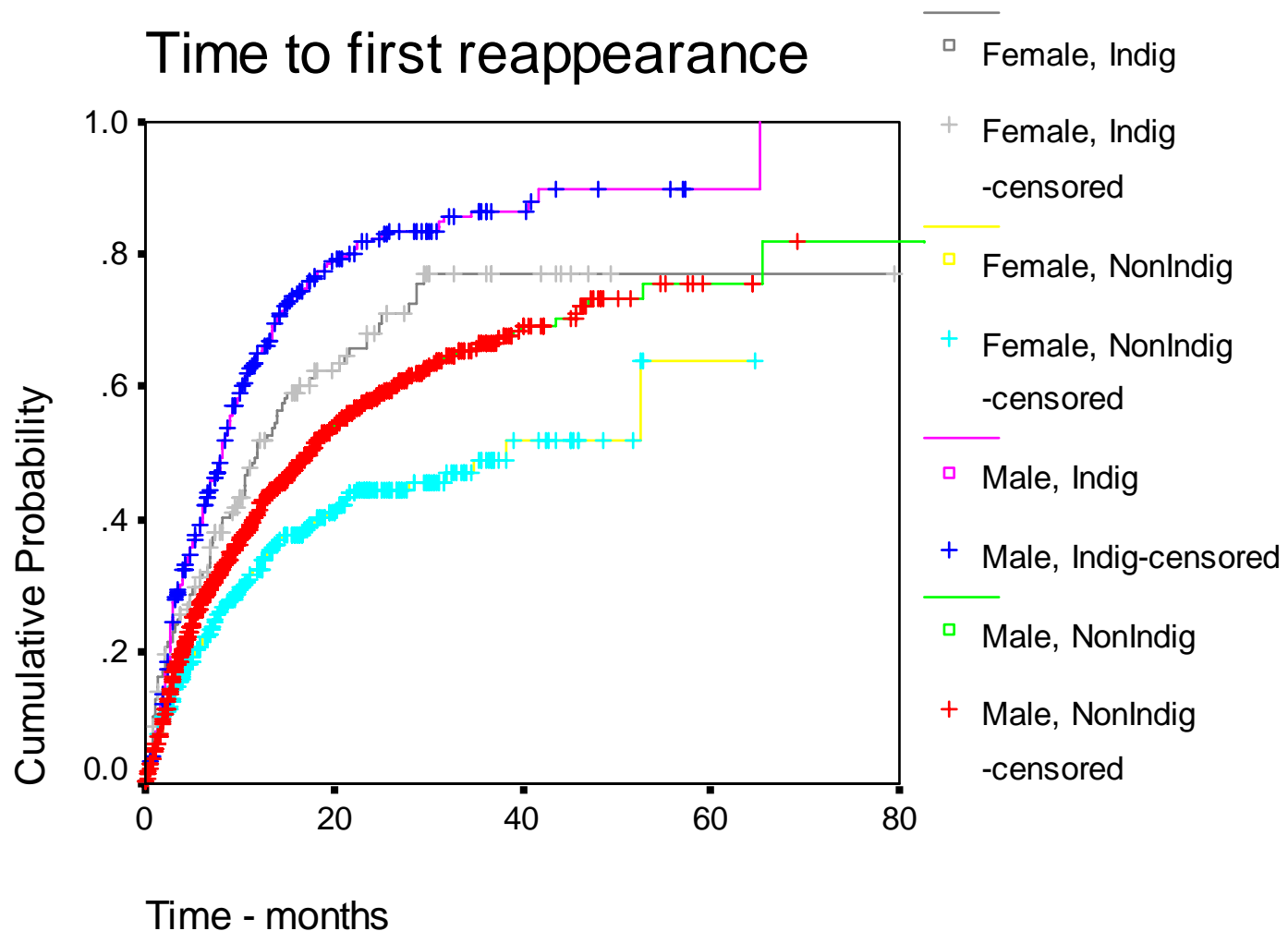
Not tested: Remand in custody

Time to re-appearance

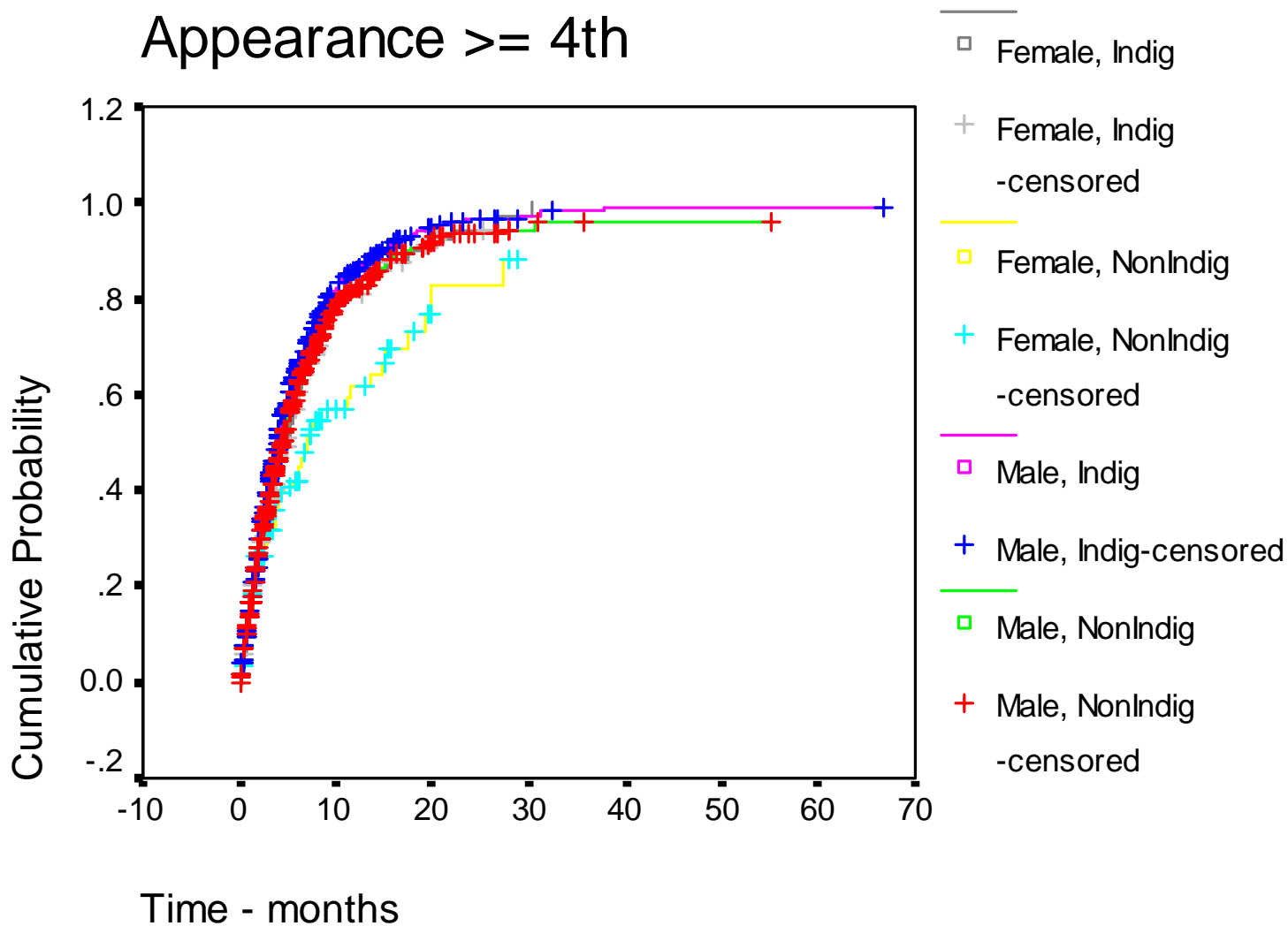
- Critical for model because of significant number of repeat appearances in actual JJ system and impact of prior history on future decisions
- Censoring age of 17 (approx)
- Most young people don't appear until older age groups
- Use survival analysis
- Dataset: 1983 Birth Cohort

Cumulative Probability Distribution

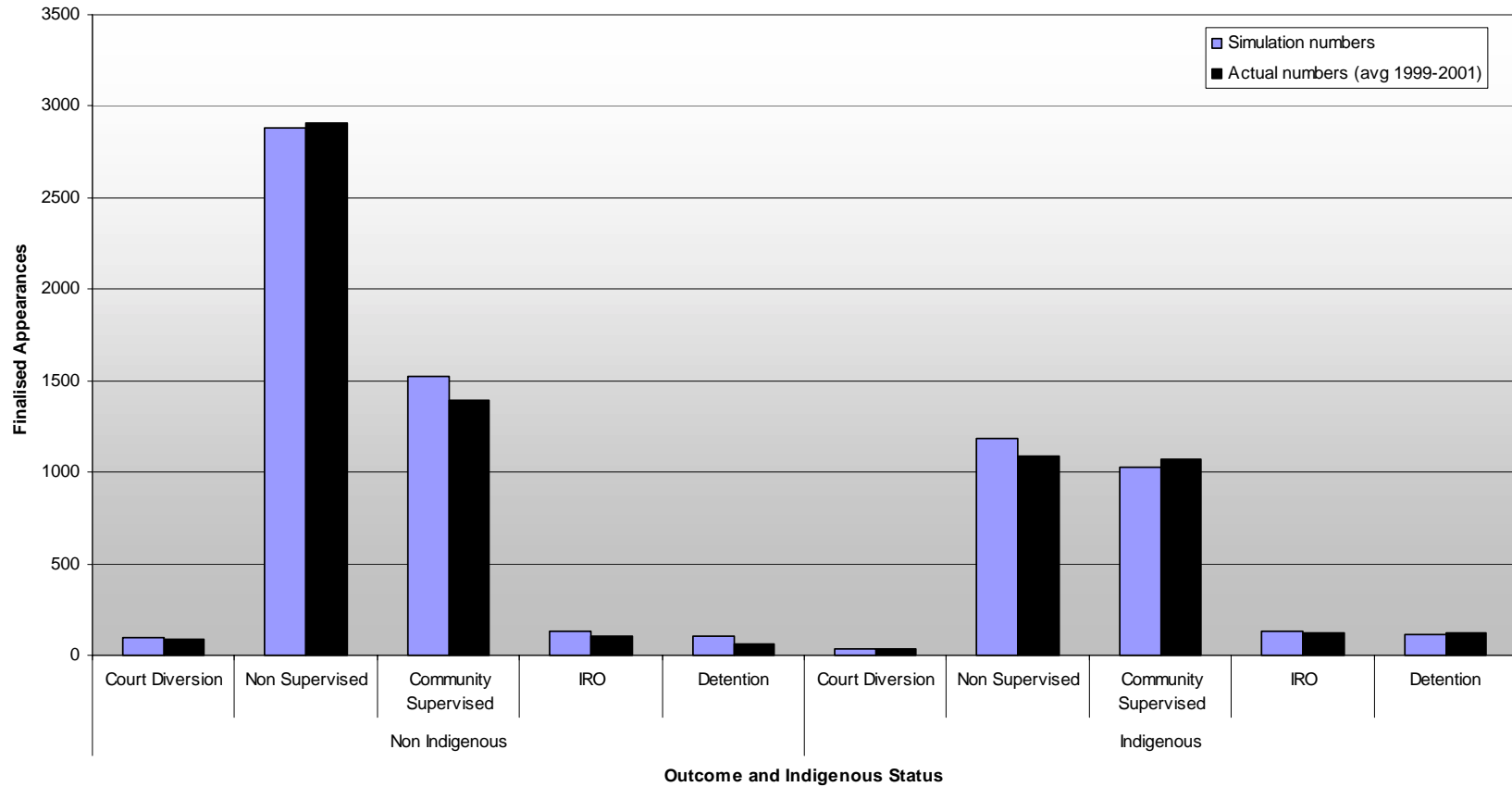
Time to first reappearance



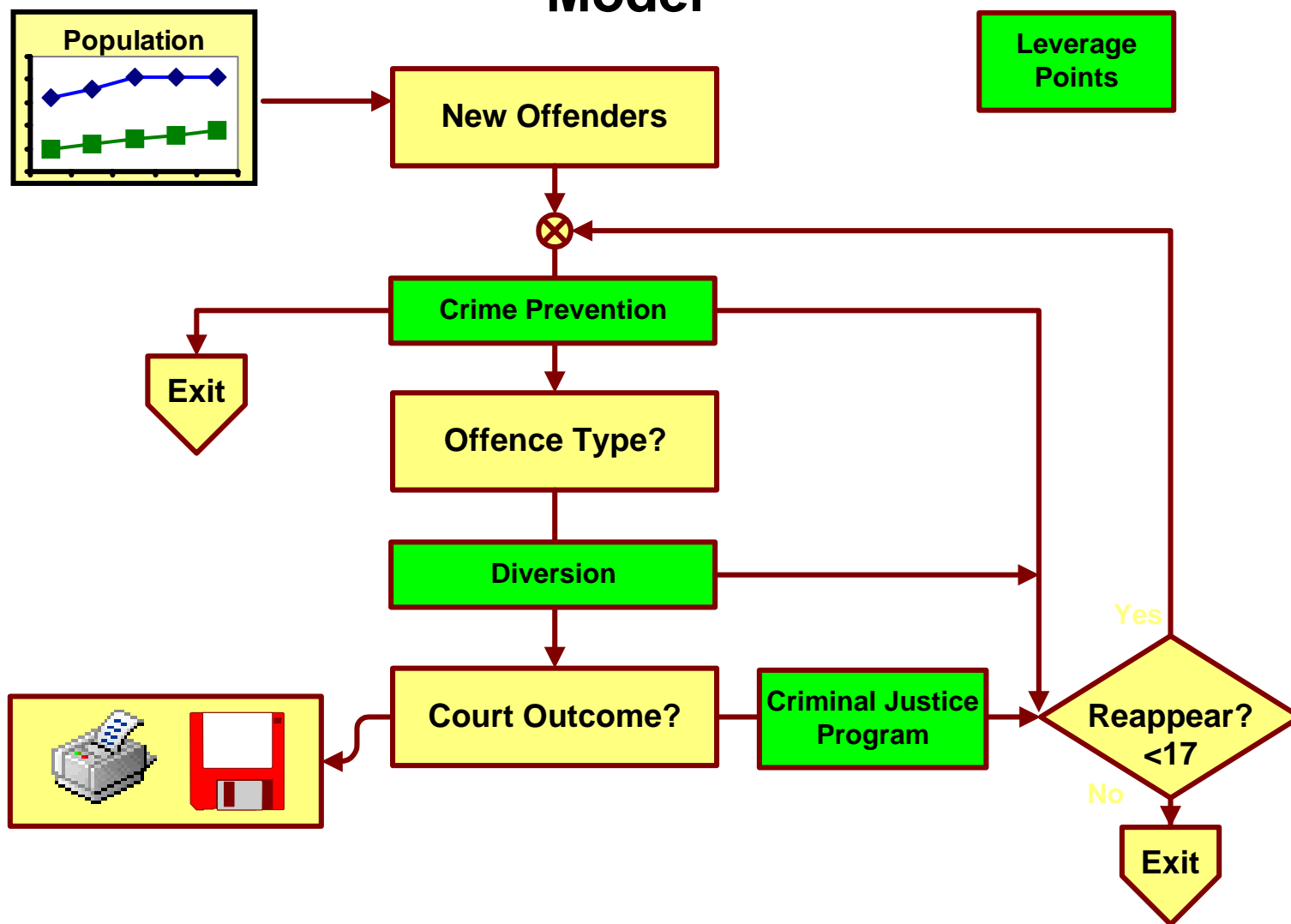
Time to reappear Appearance \geq 4th



Baseline Results (for 2001)



Schematic Diagram of Juvenile Justice Simulation Model



Process for Running Simulations

- Identify scenarios
 - Possible programs, policies or interventions (current and proposed) that may (or may not) have both short and long-term impacts of the juvenile justice system
- Quantify scenarios
 - Provide the information necessary for the model to run including who will be impacted, by how much and how much it will cost
- Run model
 - Need to run the model multiple times to get good results
- Interpret the results of the model

Output from the model

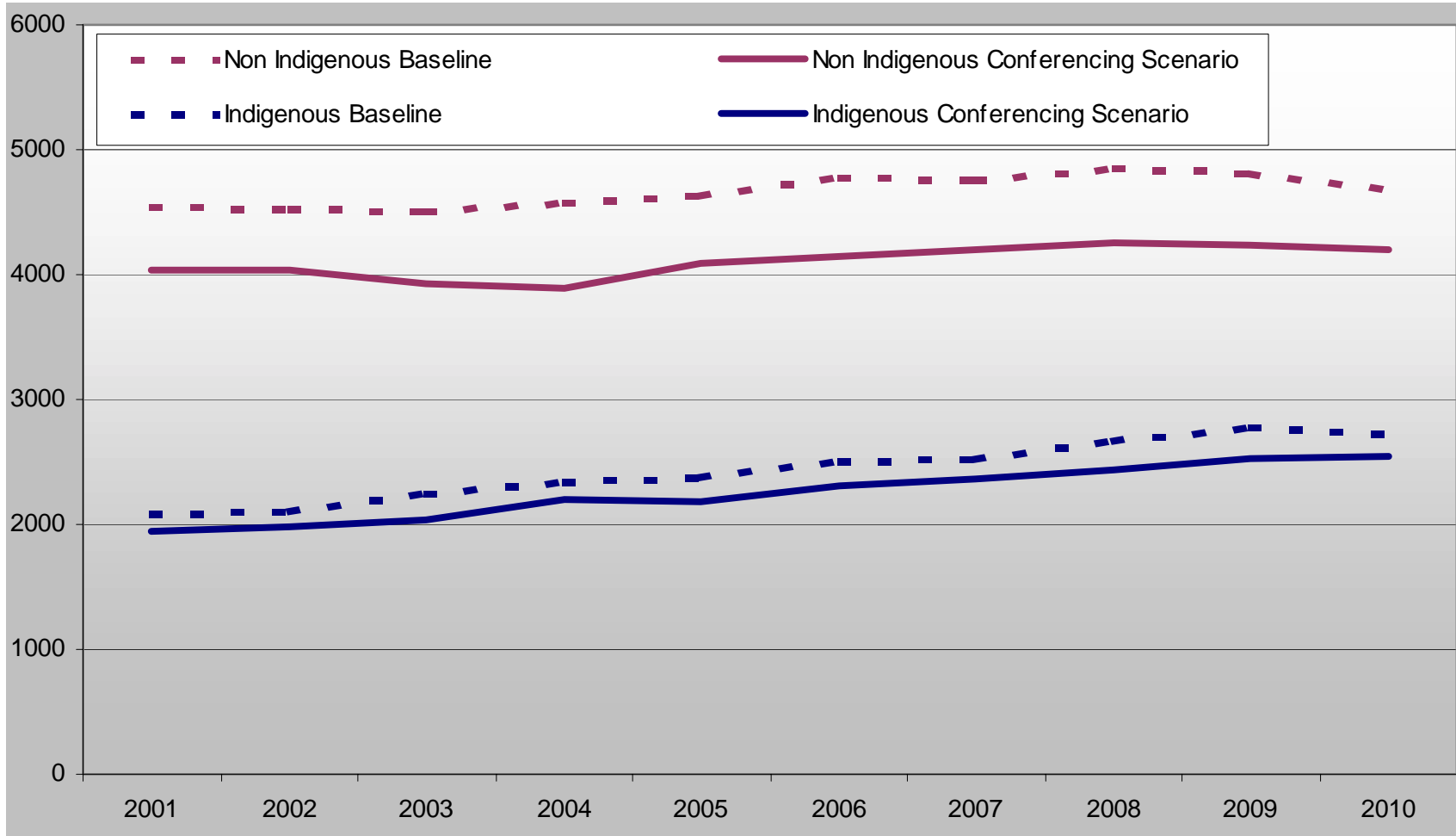
- Baseline output
 - Future **projections** of number of children in the system based on
 - No changes to the current system
 - Relevant population projections
 - These are not predictions
- Relative impact of interventions on the baseline
 - best case/worst case/most likely case

Scenario 1 - Youth Justice Conferencing

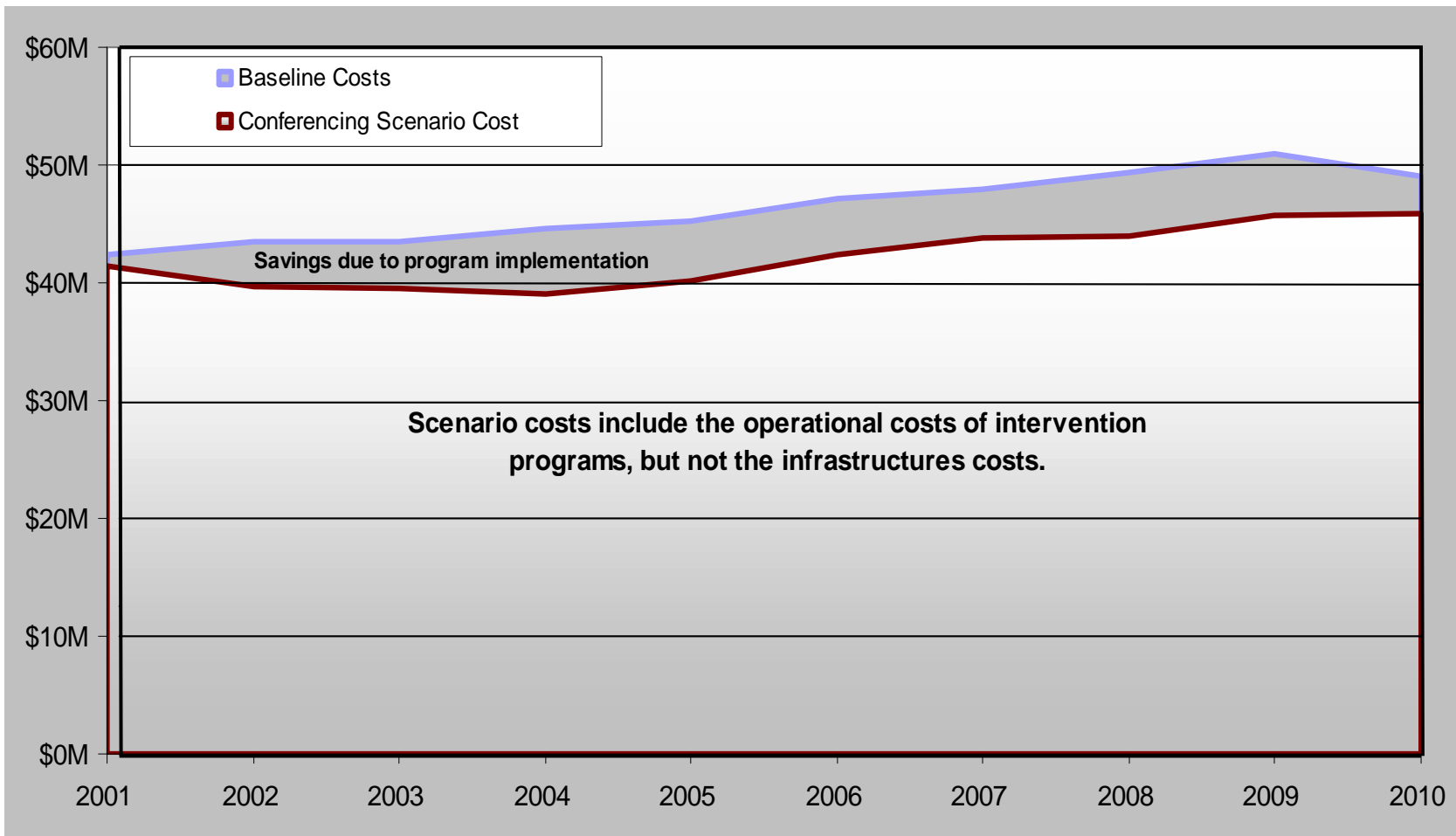
Program Description:

- Police referral of young offenders to youth justice conferencing as an alternative to court
- Estimated cost of \$1,000 per participant
- Rolled out across Queensland
- NSW evaluation figures (Luke & Lind, 2002)
 - Referrals favour property and first time offenders
 - A referral to the program will reduce the likelihood of offending by 20%

Projected Juvenile Court Appearances Baseline and Conferencing Scenario



Projected Juvenile Justice Costs – Baseline and Conferencing Scenario

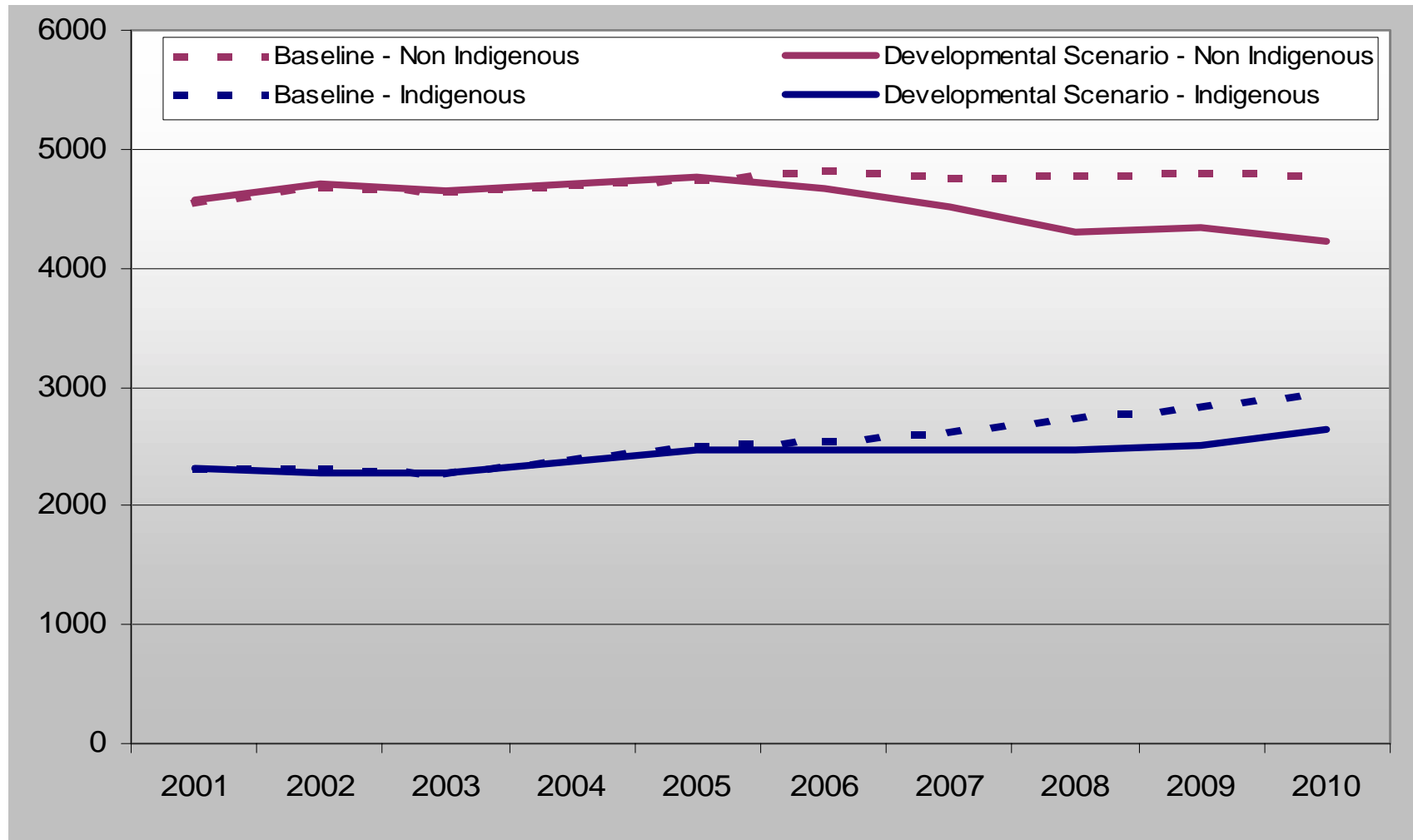


Scenario 2 Developmental Crime Prevention Program

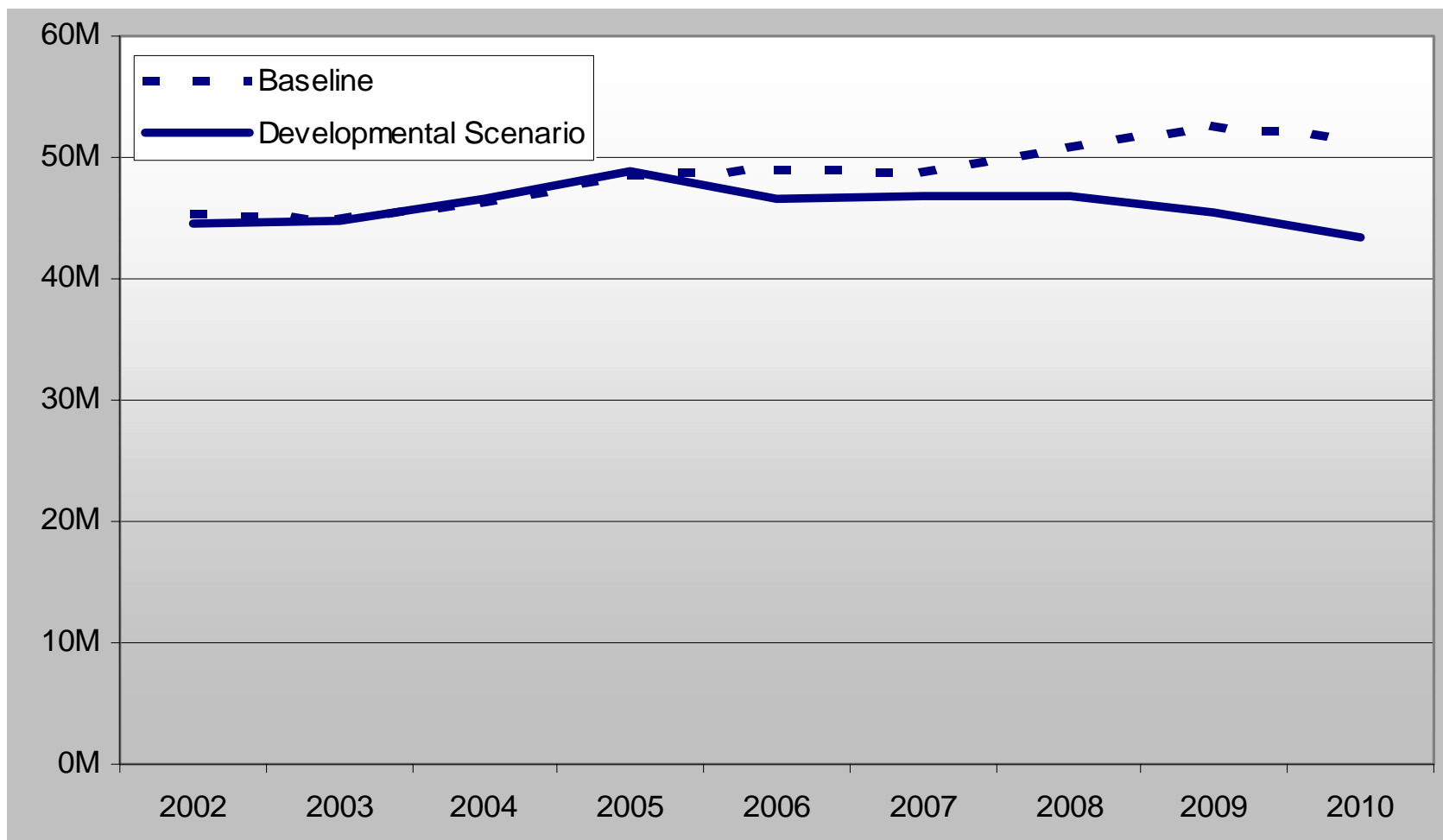
Program Description:

Family based program aimed at 5 to 10 year olds to be implemented across entire state. Evaluations of similar programs have demonstrated a 12% reduction in *initiation* of juvenile criminal careers. It is assumed that a child requires at least 6 months exposure to the program to benefit from the results.

Projected Juvenile Court Appearances – Baseline and Developmental Scenario



Projected Juvenile Justice Costs – Baseline and Developmental Scenario



Pathways Project

- Universal program targeting disadvantaged community
 - Rate of juvenile court appearances = 158 per 1,000 population
 - Brisbane: 20 per 1,000
 - 49.8% housing commission
 - 22.6% unemployed
 - 32.0% single parent
 - 24.8% speak language other than English
- Delivered to preschool and grade 1 children (age 4 - 6 years) and their families

Current evaluation results

- Rowe Behaviour Rating Inventory
 - Results for Communication program
 - Baseline - 14.4% 'at risk'
 - Post intervention - 11.1% 'at risk'
 - Results for Social Skills program
 - Baseline - 15.8% 'at risk'
 - Post intervention - 10.5% 'at risk'
- Baseline: 15% of children identified as 'at risk'
- Post intervention: 10% of children identified as 'at risk'
- 33% reduction of 'at risk' children

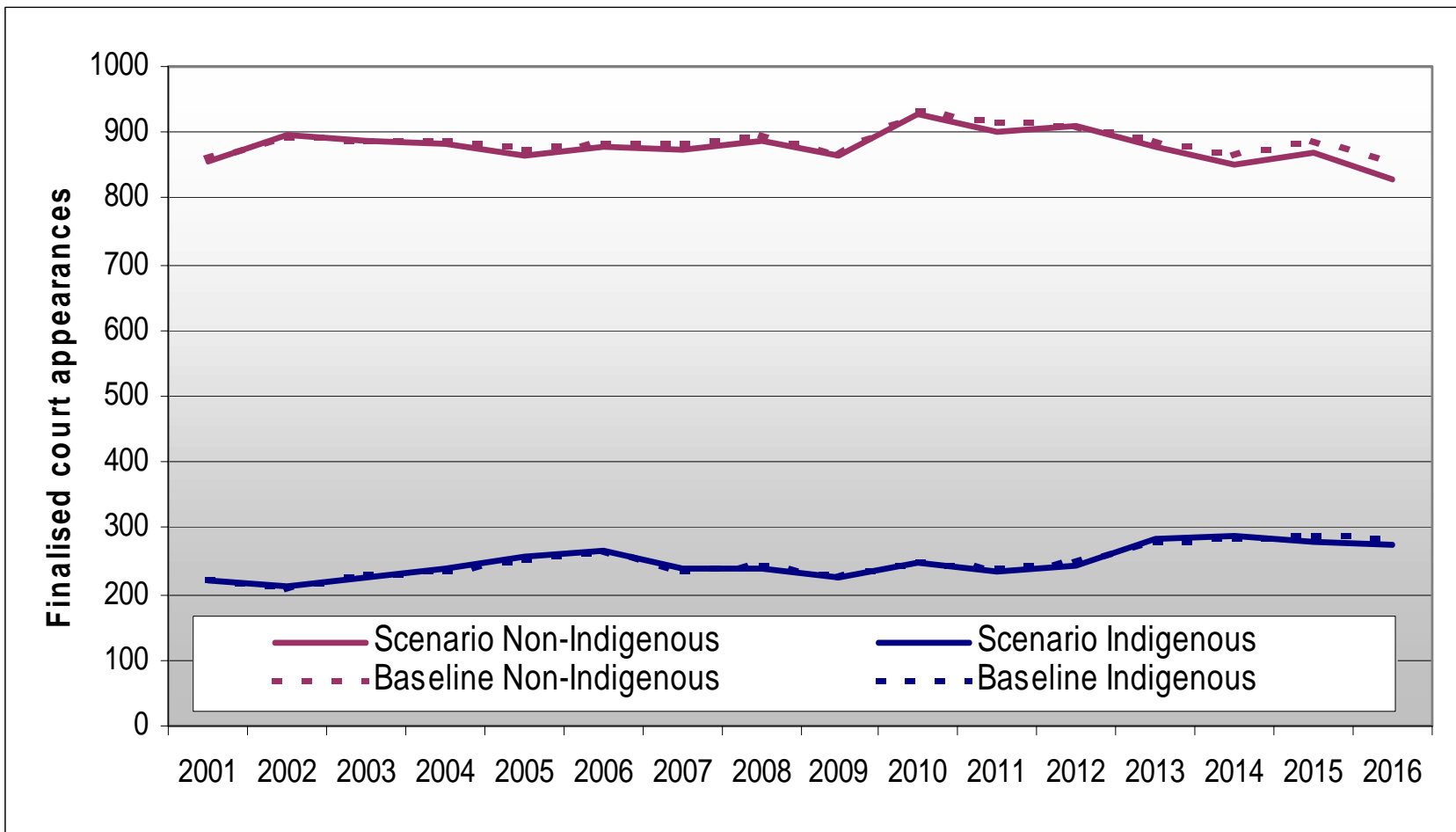
Model Requires Reduction in *Initiation* of Offending

- What is the **estimated** reduction in initiation of offending as a result of the crime prevention program?
- 50% of children identified as 'at risk' at age 5 offended as adolescents (Bor, Najman, O'Callaghan, Williams & Anstey, 2001)
- the Pathways program resulted in a 33.3% *reduction* in 'at risk' children in the community
 - ❖ 15% reduction in *initiation* of offending

Brisbane DoF Region

- Model uses DoF regions (total of 11) as the smallest geographic location
- Pathways community
 - 1.9% of population of Brisbane region
 - responsible for 10% of juvenile appearances in Brisbane region
 - rate of offending is 158 per 1,000
 - rate of offending is 20 per 1,000 in the Brisbane region
- Simulations run until 2016
 - 4 year olds in 2001 leave the system in 2014
 - last 3 years full impact of the program

Brisbane Region



Summary Model Output

- Brisbane region (2012 – 2016)
 - reduction of 84 appearances over 5 years
 - 1.5% in non-Indigenous appearances
 - 1.2% in Indigenous appearances
- Estimating down to target community (2016)
 - Baseline - 128 court appearances (150/1000 pop)
 - Scenario - 105 court appearances (119/1000 pop)
- A rate reduction in offending of 20.7%

Cost of Pathways

- Over the last 5 years of scenario,
 - there will be a saving of \$2.23M in the juvenile justice system (court and corrections) costs
 - Pathways costs for five years is estimated at $5 * 386,000 = 1.93\text{M}$
 - saving of \$300,000 for 5 years
- Does not include costs to
 - Education system
 - Health system
 - Police system
 - Adult corrections system
 - Community
 - Victims

Conclusions

- Developmental/community crime prevention
 - No reduction in offending for a long time
 - Small area projects have little impact on regional offending rates
- However
 - Intervention will eventually result in substantial reductions in crime for the target community
 - Small reductions result in large cost savings
 - Many benefits in addition to crime prevention

Juvenile Justice Model

- Ready to be used for appropriate programs
- Interest from numerous government agencies
 - Emergency services
 - QRail
 - Crime prevention Queensland
 - Pathways to Prevention program
- Ongoing maintenance and improvement

Future work

- Collaborative crime and justice modelling centre with Griffith University
- Development of adult criminal justice system model
- Spatial modelling and visualisation
- Liaison with criminal justice and other agencies to develop a linked data warehouse

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