

# Juvenile Justice System: Hepatitis B Program

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# Background

- Rationale

- Adolescents admitted to the juvenile justice system are school dropouts, runaways and underinsured and maybe at higher risk for contracting hepatitis B
- Prior detention most adolescents have not received any immunizations
- The period of detention presents an opportunity to vaccinate eligible adolescents

- Hepatitis B vaccine is funded by Vaccine For Children Program
  - VFC is a federally funded program that provides vaccines at no cost to eligible children through the age of 18 years
  - Most adolescents detained/incarcerated are entitled to receive Hepatitis B vaccines from the VFC

- Objectives

- To provide a guideline to implement and evaluate hepatitis B.
- To increase awareness of the VFC program

# Implementation and Evaluation Guideline

- Develop Policies and Procedure
- Develop Dose Tracking Procedure
  - Vaccine Registry System
  - Alternative Tracking System (immunization records, MS Access/Excel spreadsheet, “VFC” hard copy forms)
- Enroll Facility in VFC Program

- **Educate adolescents and stakeholders**
  - **Adolescents**
    - **HBV video**
    - **“Vaccine Information Statement”**
    - **Add immunization education to health curriculum**
    - **One-on-one education about Hepatitis B**
    - **Posters and brochures**
  - **Stakeholders**
    - **Provide policies and procedures**
    - **Assess knowledge and attitudes**
    - **Discuss vaccine annual report**

- **Enroll Adolescents in the VFC**
  1. **Define eligibility**
  2. **Program enrollment**
  3. **Follow up with dose completion**

- Evaluate effectiveness of the program
  - Missing opportunities
    - Comparing the number of children who received vaccine with the total number of children who need vaccine can give some indication of missed opportunities.
  - Evaluate stakeholder knowledge and attitude toward the program
    - Helps to identify potential obstacles to the program.

# Common Perceived Barriers

- Availability of healthcare providers
- Education
- Tracking system
- Adolescents fear shots
- Cost
- Doctors do not sign vaccine form
- Paper work overwhelming
- Staff shortage
- Immunization records
- Parental consent
- High turnover



# Cost Effectiveness of Vaccination Against Hepatitis B at Juvenile Correctional Facilities

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# Background: Nature of the Problem

- Vaccination against HB is cost-saving in a number of populations:
  - Infant and adolescent - Margolis et al, 1995
  - Adult jail residents - Pisu et al 2002
  - Visitors at STD clinics – Billah (working paper)
  
- Cost effectiveness of HB vaccination at juvenile correctional facilities is not studied
  - 12% of incarcerated youth will be incarcerated in adult facilities – unpublished conference presentation
  - 12% is also the adjusted rate of recidivism among juvenile residents assuming that delinquency in youth is a perfect proxy for crime in adulthood

# Estimating the rate of adult incarceration among juvenile correctional residents

- Delinquency is juvenile behavior that would be criminal violation if the offender were an adult
  - Delinquency as a proxy of crime at juvenile facilities
  
- 78% of juvenile incarcerations are attributable to delinquency = (Census of Juveniles in Residential Placement in 1999)
  
- On average juvenile offenders are at least 19 years at release - National Report Series, OJP, June 2004
  - Thus for juvenile offenders the rate of incarceration at adult facilities can be estimated by recidivism rate

# Estimating the rate of adult incarceration for juvenile correctional residents

- Recidivism rate among adult residents:
  - 18.6% in the 1<sup>st</sup> yr
  - 17.4% in the 2<sup>nd</sup> yr
  - 20% in the 3<sup>rd</sup> yr (Pisu et al, 2002)
  
- Adjusted recidivism rate among juvenile facility residents over 3 yrs after release:
  - 1<sup>st</sup> yr:  $18.6\% * 78\% = 14.5\%$
  - 2<sup>nd</sup> yr:  $17.4\% * (78\% - 14.5\%) = 11.0\%$
  - 3<sup>rd</sup> yr:  $20\% * (78\% - (14.5\% + 11\%)) = 10.5\%$
  - 3 yr average rate =  $(14.5\% + 11.0\% + 10.5\%) \div 3 = 12\%$

# Objectives

- ❑ To model lifetime hepatitis B cases in a population passing through juvenile correction facilities
- ❑ To estimate the cost effectiveness of vaccination

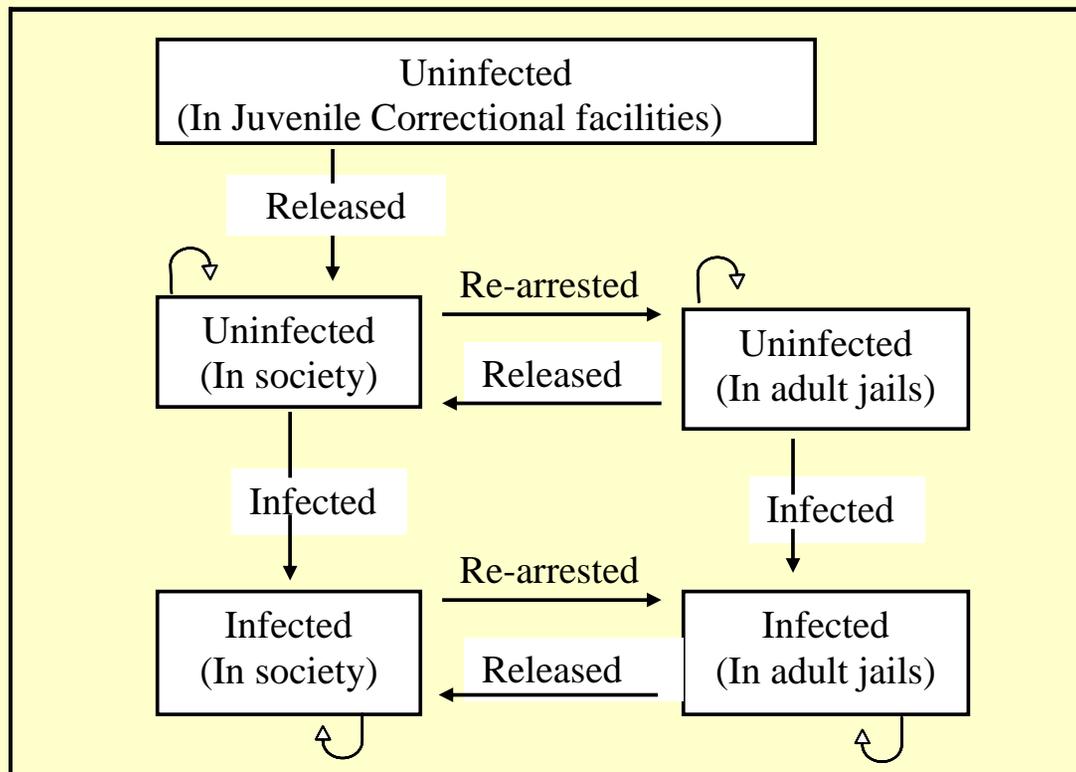
# Methods

- ❑ Societal perspective
- ❑ A Markov simulation using decision analysis software (TreeAge Pro 2005 Suite)
- ❑ Lifetime follow-up of 1000 individuals of age 17 years who are held at juvenile correctional facilities in the first year.
  - Average age in a sample of 371 juveniles held in GA facilities in 2002 - 2004 was 16.5 yrs.
- ❑ The cohort is followed up to age 45 years – Pisu et al, 2002.

# Outcome Measures

- Lifetime number and cost of infections under vaccination vs no vaccination regimes
  - 2 coverage levels are considered:
    - 100% (hypothetical)
    - 67% (observed in a sample of 377 residents of GA state juvenile correctional facilities (Dec 2002 – Sep 2004 of study))

# Lifetime Model of Risk of HBV infection for Juvenile Correctional Residents



# Model Input Data

- ❑ Hepatitis B risk of infection:
  - In society:
    - 0.15% Range: 0.1% - 0.2% - Pisu et al, 2002.
  - In adult correctional facilities:
    - 0.82% Range: 0.45% - 1% - Literature
- ❑ Vaccine efficacy:
  - At 1 dose: 35%
  - At 2 doses: 85%
  - At 3 doses: 95% Pisu et al, 2002.
- ❑ At risk population at entry into juvenile facilities: 75 % Range: 40% - 100% (assumption)
  - In the GA sample 88%, 77% and 66% were eligible for 3, 2 & 1 doses respectively at entry.
- ❑ Cost of vaccine: per dose: \$21

# Model Input Data (cont'd)

- ❑ Rate of release from juvenile facilities: 100% after 1 year (assumption)
- ❑ Annual probability of incarceration in an adult jail:  
12% (Calculated by the authors)
- ❑ Rates of release and recidivism in adult jails (Pisu et al, 2002):

Years after arrest	Rate of release (%)
2	10.0
5	27.0
10	35.0
15	39.8

Years after release	Rate of recidivism (%)
1	18.6
2	17.4
3	20.0

# Model Input Data (cont'd)

- Expected cost of a HBV infection in 2005 US dollars –  
Adjusted from Margolis *et al*, 1995:

Direct medical: \$ 744

Indirect: \$1,438

Total: \$2,182

# Results

Coverage	Cost of vaccination (\$)	Lifetime no. of cases	No. of cases prevented	Prevented cost			$\Delta$ Total Cost
				Direct medical @ \$744/case	Indirect @ 1,438/case	Total	
0%	0	122	0	0	0	0	0
67%	31,658	48	74	55,056	106,412	161,468	-129,811
100%	47,250	9	113	84,072	162,494	246,566	-199,316

Notes: 25% of cohort is already vaccinated at entry

# Results: continued

- ❑ Program efficacy = % cases prevented (Margolis et al, 1995)
  - 61% at 67% coverage level:  $74 \div 122$
  - 93% at 100% coverage:  $133 \div 122$
  
- ❑ The model for cases was most sensitive to the incidence of HB in adult prisons
  - Program efficacy changed by at most 2 percentage points over the studied range for incidence of HB infection in adult jails (0.45% - 1%)

# Conclusions

- Vaccination for hepatitis B at juvenile correctional facilities is cost saving
  - It is cost saving even with relation to direct medical costs alone
  - It is cost saving even at the partial coverage of 67% which was observed in a study of juvenile correctional facilities

# Acknowledgment

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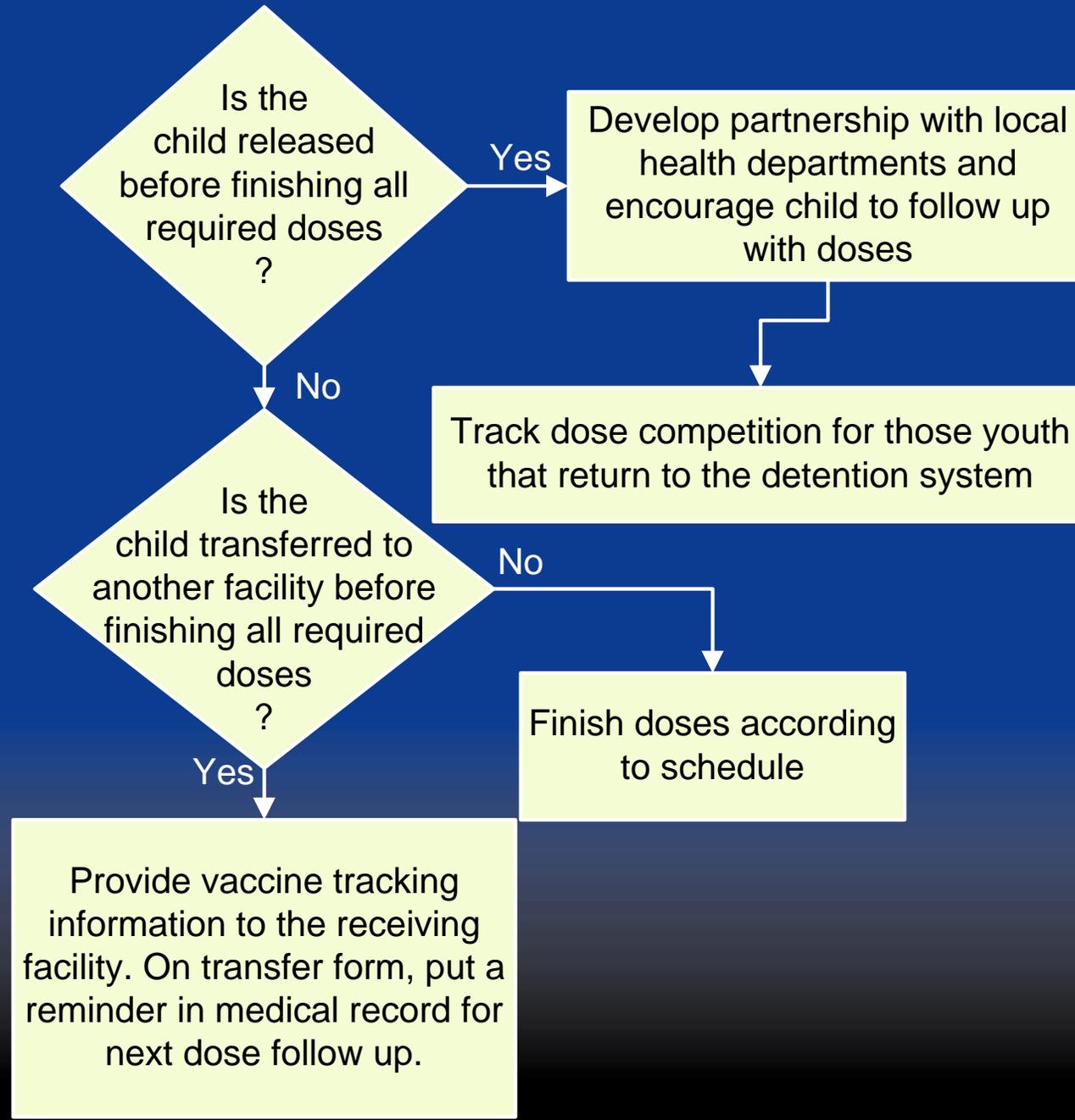
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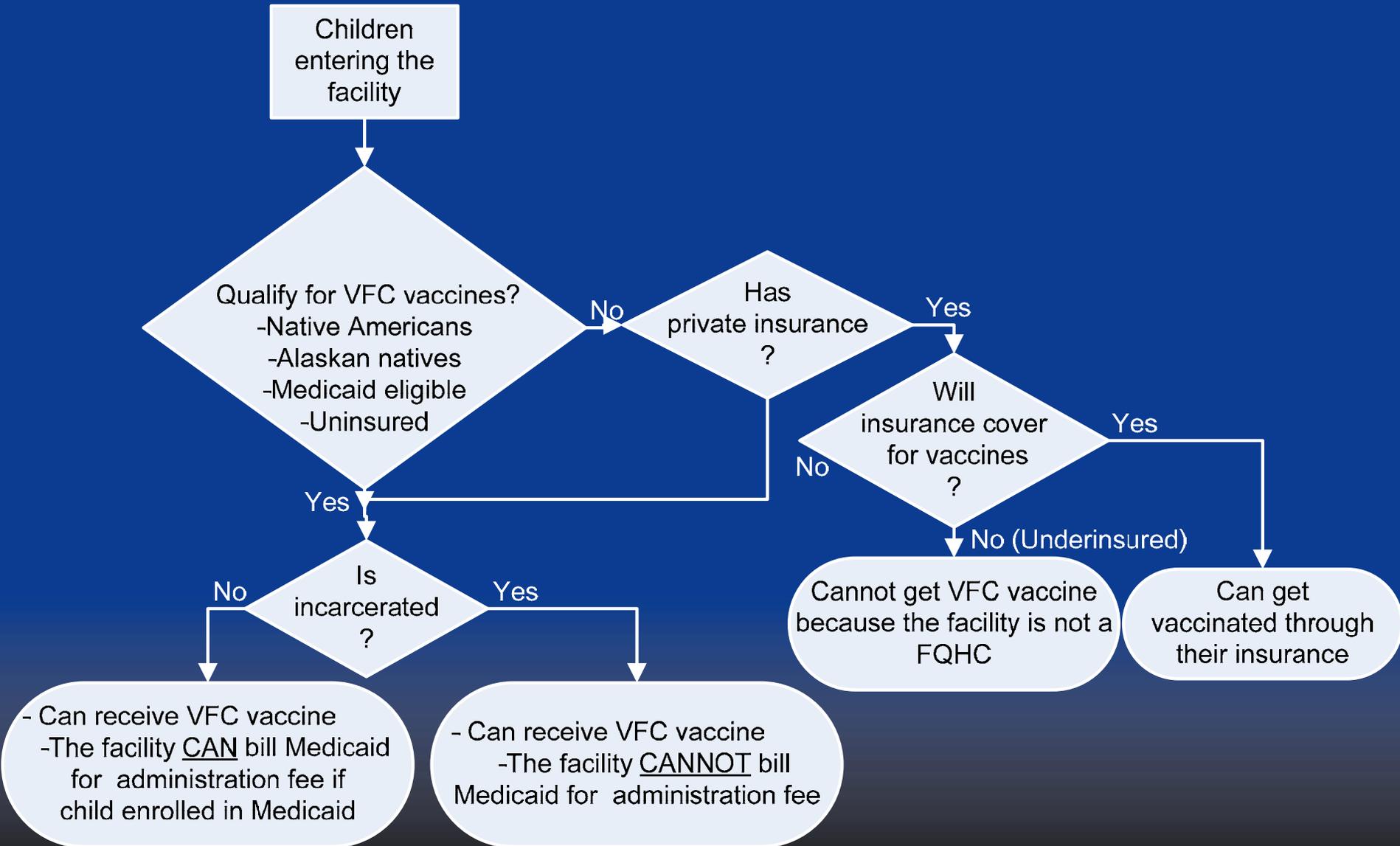
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# • Dose Completion



# • Juvenile VFC Program Eligibility



# • Juvenile VFC Program Enrollment

