Lifetimes at Risk: A GIS Supported Partnership for Adolescent Violence Reduction
Overview

- 12 & Under Violence - The Philadelphia Story
- Lifetimes at Risk
- Research into Action
- Adolescent Violence Reduction Program (AVRP)
- Refocusing Efforts
12 & Under Violence - The Philadelphia Story

Violence is a serious public health threat

- 2006 toll
  - 179 juvenile homicide victims (ages 7-24)
  - 862 gunshot wound victims (ages 7-24)

- Citywide interventions
  - Individual-level (e.g. delinquency prevention)
  - Community-based (e.g. juvenile re-entry programs)
  - Multi-agency (e.g. Youth Violence Reduction Program)

- “Deep-end” vs. early-intervention
  - Heavy emphasis on deep-end offenders
  - Need to target new programs for youngest offenders
Lifetimes at Risk

- **Why 12 & Under?**
  - 6 out of 10 offenders ages 12 & under go on to become serious, violent and chronic offenders
  - Average cost is $1.7-$2.3 million per youth
  - Less researched than deep-end youth

- **Issue & Policy Brief**
  - *Lifetimes at Risk: Young Offenders Between 10-12 Years of Age* - published in Fall 2005
  - Examined & proposed solutions to chronic offending among early adolescent children in Philadelphia

- **Data & Methods**
  - GIS used primarily for identifying hotspots and framing intervention strategies
Lifetimes at Risk

Key Findings

- Volume of arrests of youth ages 10-12
  - Averaged 9% of juvenile arrests 1999-2004
  - Account for 1 in 10 juvenile offenders 17 and under
  - Arrests by grade: 5th (133), 6th (289), 7th (597)

Table 1. Number of Juveniles Arrested by Age Group/Year

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Year 1999</th>
<th>Year 2000</th>
<th>Year 2001</th>
<th>Year 2002</th>
<th>Year 2003</th>
<th>Year 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-12</td>
<td>948 (8%)</td>
<td>1124 (9%)</td>
<td>1090 (9%)</td>
<td>1044 (9%)</td>
<td>1055 (9%)</td>
<td>1019 (9%)</td>
</tr>
<tr>
<td>13-15</td>
<td>4621 (40%)</td>
<td>5527 (44%)</td>
<td>5572 (44%)</td>
<td>5075 (44%)</td>
<td>5360 (44%)</td>
<td>4993 (44%)</td>
</tr>
<tr>
<td>16-17</td>
<td>6071 (52%)</td>
<td>5934 (47%)</td>
<td>5864 (47%)</td>
<td>5460 (47%)</td>
<td>5622 (47%)</td>
<td>5228 (47%)</td>
</tr>
<tr>
<td>Total</td>
<td>11640</td>
<td>12585</td>
<td>12562</td>
<td>11579</td>
<td>12037</td>
<td>11240</td>
</tr>
</tbody>
</table>
Lifetimes at Risk

Key Findings

- Demographic characteristics 10-to-12 year old offenders
  - 8 in 10 arrests was an African-American youth (up 27%)
  - 1 in 4 arrests was a female youth (up 53%)
  - 69% increase in arrests of African-American girls
  - Disproportionate arrests - African-American youth 2.3 times more likely to be arrested than Caucasians
Lifetimes at Risk

Key Findings

- Arrest Characteristics
  - Part 1 Crime – 38% of 2004 arrests (down 29%)
  - Top three crimes – theft, agg. assault, robbery
  - 1 in 6 arrests was for Part 1 Violent Crime (down 27%)
  - 10-to-12 year olds are responsible for 1 in 10 violent crimes committed by a juvenile
  - Other serious crime is on the rise, driven by weapons violations (up 70% from 1999)
Lifetimes at Risk

GIS Analysis

- Volume and Trends
  - Volume of arrests by police sector
  - Percent of total arrests by police sector
  - Raw change by police sector
  - Rate of arrests per 1,000 population

- Identifying hotspots and correlated risk factors
  - Hotspot sectors with high and worsening volume of arrests
  - Quartic kernel density estimation of arrest hotspots
  - Predictive indicators and hotspots
  - Community stressors index
Arrests for Part 1 Crime Minus Theft (2002-2004), Raw Change by Police Sector
Classified by Natural Breaks, Excluding Sectors with Zero Arrests

Legend
Police Districts
- Police Districts

Arrests, Pt 1 Crime Minus Theft (2002-2004)
Youth Ages 10-12
- Decrease between 6 and 10 arrests
- Decrease between 1 and 4 arrests
- No Change
- Increase between 1 and 3 arrests
- Increase between 4 and 9 arrests
- Zero Arrests 2002-2004

Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Philadelphia Police Dept.
Arrests for Part 1 Crime Minus Theft (2002-2004), Rate per 1,000 Population

Classified by Natural Breaks, Excluding Sectors with Zero Arrests

Legend

Police Districts
- Blue

Extreme Outliers
- Yellow: Low Population, High Arrest Sectors

Arrests, Pt 1 Crime Minus Theft (2002-2004)
Rate Per 1,000 Youth Ages 10-12
- Light Pink: 2 - 27
- Pink: 32 - 77
- Red: 143 - 167
- Grey: Insufficient Population

Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Philadelphia Police Dept.
Hotspot* Sectors with High and Worsening Levels of Youth Arrests

*Hotspot is defined as police sectors where: (1) arrests of youth ages 10-12 for part 1 crime minus theft > 1 standard deviation above the mean; AND (2) total number of arrests of youth ages 10-12 for part one crime minus theft has increased between 2002 and 2004.
Hotspots for Arrests of Youth Ages 10-12 for Part 1 Crime Minus Theft

Quartic kernal density estimation surface using a half-mile bandwidth and incremental mean threshold classification scheme

Nearest Neighbor Index = 0.48
Z score = -26.13 std deviations
Significance level = 0.01

There is a less than 1% likelihood that this clustered pattern could be the result of random chance

Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Philadelphia Police Dept.

Legend
Hotspot Sectors
- Sectors where volume of arrests 2002-04 is >1 StdDev and increasing
AVRP Pilot Regions
- AVRP Pilot Regions

Police Districts
- Police Districts

Arrests, Pt 1 Crime Minus Theft (2002-2004)
Density of arrests
- Less than or equal to the mean
- 2 mean
- 3 mean
- 4 mean
- 5 mean
- Greater than 5 times the mean
Concentration of Young Offender Arrests by Selected Risk Factors

Exploring Correlated Risk Factors
Is there a correlation between high risk zip codes and hotspots?

- 8 of 47 zip codes - or 17% - have a total risk load of 3 to 4
- 67% of sector hot spots intersect a zip with risk load >= 3
- 59% of density hot spots intersect a zipcode with risk load >=3

Legend

Hotspot Sectors
- See attached definition

Density Hotspots
- See attached definition

- 3 mean
- 4 mean
- 5 mean
- Greater than 5 times the mean

Index of Juvenile Crime Predictors

Total Risk Factors
- 0
- 1
- 2
- 3 - 4

Key Definitions

Hotspot Sectors: Police sectors where the volume of arrests* is greater than one standard deviation above the mean and has increased from 2002-2004.

Density Hotspots: Areas where density of arrests (using the quartic kernal density estimation method) is greater than twice the mean value.

*Arrests of youth ages 10-12 for part 1 crimes minus theft from 2002-2004

Index of Juvenile Crime Predictors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Criteria for high risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Percentage of cases of lead poisoning or elevated blood lead levels was &gt; 1 standard deviation above the citywide mean was ranked high risk</td>
</tr>
<tr>
<td>Low Birth Weight</td>
<td>Total number of babies born with low birth weight was &gt; 1 standard deviation above the citywide mean</td>
</tr>
<tr>
<td>Truancy Violations</td>
<td>Total number of arrests of youth 17 and under for truancy violations &gt; 1 standard deviation above the citywide mean</td>
</tr>
<tr>
<td>CPS Abuse &amp; Neglect</td>
<td>Total number of substantiated cases of CPS abuse and neglect &gt; 1 standard deviation above the citywide mean</td>
</tr>
</tbody>
</table>

A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative risk load. Because there are four variables in the index, each zip code has a maximum possible risk value of four (4).

Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Philadelphia Police Dept., U.S. Census Bureau
Map shows the relationship between areas with a high cumulative load of violence factors and areas where there is an extremely high level of risk for negative outcomes for adolescents as a result of exposure to violence.

Legend
- Neighborhoods
  - City planning analysis units
- Community Violence Index
  - See attached definition
- Community Characteristics Index
  - Total Risk Load
    - 0 [214 or 56.17% of tracts]
    - 1 [54 or 14.17% of tracts]
    - 2 [20 or 5.25% of tracts]
    - 3 [25 or 6.56% of tracts]
    - 4 [27 or 7.09% of tracts]
    - 5 [41 or 10.76% of tracts]

**Community Violence Index (2004)**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Criteria for high risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homicide</td>
<td>Number of victims of homicide (all ages) &gt; 1 standard deviation above citywide mean</td>
</tr>
<tr>
<td>Gunshot Wounds</td>
<td>Number of victims of gunshot wound incidents (all ages) &gt; 1 standard deviation above citywide mean</td>
</tr>
<tr>
<td>Part 1 Violent Crime</td>
<td>Number of arrests for part 1 violent crime (all ages) &gt; 1 standard deviation above the citywide mean</td>
</tr>
</tbody>
</table>

A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative violence load. Because there are three variables in the index, each census tract has a maximum possible violence load of three (3).


<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Criteria for high risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Population 17 and Under in Poverty</td>
<td>A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative risk load. Because there are 5 variables in the index, each census tract has a maximum possible risk load of five (5).</td>
</tr>
<tr>
<td>2 Number of Arrests for Domestic Abuse</td>
<td>A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative risk load. Because there are 5 variables in the index, each census tract has a maximum possible risk load of five (5).</td>
</tr>
<tr>
<td>3 Population 17 and Under in Father–Absent Households</td>
<td>A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative risk load. Because there are 5 variables in the index, each census tract has a maximum possible risk load of five (5).</td>
</tr>
<tr>
<td>4 Population 25 and Over With No High School Diploma</td>
<td>A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative risk load. Because there are 5 variables in the index, each census tract has a maximum possible risk load of five (5).</td>
</tr>
<tr>
<td>5 Population 16 and Over Who Are Unemployed</td>
<td>A risk value of one (1) was assigned for each variable classified as high risk. Values were totaled for each zip code to produce a cumulative risk load. Because there are 5 variables in the index, each census tract has a maximum possible risk load of five (5).</td>
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Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Philadelphia Police Dept., U.S. Census Bureau, PASDA
Research Into Action

Recommendations from Issue Brief

- **Policy, practice and research**
  - Many recommendations
  - Focus on AVRP

- **Build on success of YVRP**
  - Multi-agency, individual level intervention
  - Targets youth ages 18-24 who are at risk of killing or being killed
  - Create new program specifically for youth ages 10-15

- **Theory of change**
  - National research and the city’s own track record show that early identification of high-risk juveniles coupled with targeted, intensive, best-practice interventions can slow and even halt the trajectory toward violent offending among youth
  - Increase pro-social behaviors
  - Improve peer and community norms to NOT support violence
Research Into Action

A turning point for the city

- Escalating Violence
  - After years of decline, violent crime is on the rise
  - From 2001-2006, arrests of youth ages 17 and under for part 1 violent crime increased 24%
  - 31% increase in homicides (all ages) with 47% increase in the number of victims ages 17 and under

- Citywide Violence Prevention Initiative
  - Launched umbrella initiative January 2006
  - Launched Adolescent Violence Reduction Program (AVRP) in July 2006
AVRP – Core Components

Targeted Youth Ages 10-15

- To be effective, must be highly targeted
  - Only youth at highest risk of becoming victims or perpetrators of violent crime
  - AVRP should not be used as a catch-all program

- Eligibility criteria include:
  - Arrested before age 13
  - Victim of violence
  - Family member or friend of murder victim
  - Parent or sibling who is incarcerated or on parole or probation for a violent offense
  - Sibling in YVRP
  - Arrested and referred by DA and/or Juvenile Probation Office
AVRP – Core Components

Intensive Services

- **Approach:**
  - To be effective, AVRP must provide a constellation of targeted, intensive services to youth participants, families and communities

- **Component 1:**
  - Center-Based Program focusing on violence prevention, anger management, parent education and other needs-based youth services

- **Component 2:**
  - Youth Workers who provide supervision, monitoring and support for the AVRP youth at home and in their communities

- **Component 3:**
  - Community engagement to build more support for actions and activities that keep youth safe in their neighborhoods
AVRP – Core Components

Targeted neighborhoods

- Factors limiting scale of deployment
  - Budget
  - Availability of qualified service providers
  - Capacity of administrative agencies to coordinate program

- Initial roll-out to 2 pilot regions
  - Ensure intensity and quality of services
  - Ramp-up at later date if feasible
  - Choose pilot regions on basis of concentration of at-risk, eligible youth; severity of existing violence problem; and availability of high-quality service providers
Selecting Intervention Areas to Maximize Program Effectiveness

Recommended Pilot Regions

Legend
Community Characteristics Index
See appendix for definition
▲ Zips with high risk for neg. outcomes

Hotspot Sectors
See appendix for definition
- YVRP Districts (3)
- OLDS Districts (13)

Density Hotspots
See appendix for definition
- 3 mean
- 4 mean
- 5 mean
- Greater than 5 times the mean

Existing DHS Resources
Community-Based Prev. Services
- 0 - 4 programs
- 5 - 11 programs
- 12 - 20 programs
- 21 - 42 programs

Map shows the location of targeted violence reduction and child abuse prevention initiatives along with the relative level of existing DHS program resources and areas considered high risk for negative outcomes for adolescents exposed to violence.

Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Phila. Dept. Police, Phil. Dept. Human Services, U.S. Census Bureau
AVRP – Core Components

Ongoing Evaluation

- Annual Evaluation/Monthly Dashboards

- Individual-level outcomes
  - Increased school attendance, decreased truancy
  - Decrease in number and severity of incidents of victimization
  - Decrease in number and severity of arrests
  - Aggression Replacement Training (ART) to increase pro-social behaviors and skill competencies; decrease in measures of impulsivity and frequency and intensity of acting-out behaviors
  - Get Real About Violence (GRAV) (less favorable attitudes toward verbally aggressive behaviors and watching fights; decrease in intent to engage in verbally aggressive behaviors and watching fights; decrease in norms that support/promote violence)

- Macro-level outcomes
  - Decrease in number and severity of arrests of youth 10-15 in pilot regions and citywide
AVRP – Implementation Issues

- **Management structure**
  - AVRP managed jointly by three separate entities
  - Insufficient coordination and collaboration
  - Poor utilization and application of technical capacity
  - Differing and shifting expectations
  - Political pressures

- **Model vs. Reality**
  - Pressure for rush ‘to scale’
  - Eligibility criteria relaxed, applied unevenly
  - Core program and center-based curriculum components (GRAV and ART) implemented sporadically or not at all
  - Pilot regions replaced by citywide implementation
  - Abbreviated RFP process

- **Net result**: generalized, catch-all program rather than targeted, intensive services
Refocusing AVRP

- 6 Month Review
  - Implementation issues addressed
  - Renewed commitment to model

- FY 08 Re-Launch

- GIS-Supported Partnership
  - Program Re-Launch
    - Coordinating Efforts: Center-Based and Youth-Worker Providers
    - Assigning Youth to Regions and Providers
  - Program Monitoring and Evaluation
    - Monthly Dashboard of Key Indicators and Trends
    - Comparison of Q4 Referrals to Volume of Arrests of Youth Ages 10-15
    - Macro-Level Analysis of AVRP Impact
Coordination of Efforts: Center-Based and Youth Worker Providers

Legend
AVRP Service Providers
by Admin Location
- Youth Worker Provider
- CBO Provider
AVRP Service Regions
by Zip Code
- East
- North
- Northeast
- Northwest
- Police District 12
- Police District 25
- South
- West
- Shared betw. Regions

Note on AVRP service regions and provider assignments:
1. AVRP was originally designed for implementation in a small number of high-need police districts. In July 2006, the program was expanded and redesigned to deliver services citywide based on newly created zip code regions. To ensure continuity between services already initiated based on the original model, there is some overlap between the 12th and 25th police districts. New regions created in the North, East, and West. Four zip codes are shared between regions. The District 25 region overlaps with the North region in two zip codes (19120 and 19140) and with the East region in one zip code (19134). The District 12 region overlaps with the West region in one zip code (19143).

2. Assignment of service providers to service regions was also impacted by the rapid rate of expansion. Contracting of service providers and hiring of personnel occurred simultaneously as referrals. Given the concern that no child should have to wait for services, some existing service providers were asked to receive clients from adjacent areas while new providers completed hiring their full complement of staff.

3. Another factor in assigning service providers to regions was an unanticipated growth in demand in certain areas. Police district data was used as the basis for determining the original level of slots required for each region. However, demand for services grew faster in some regions than in others requiring a re-balancing of slots and service provider level across regions.

Map: Philadelphia Safe & Sound
Author: Janine Gottlieb
Data: Philadelphia Police Dept., Philadelphia Dept. of Human Services, Philadelphia Dept. of Social Services
Future Plans

- Cross-systems data analysis
  - Profile of pathways to AVRP
  - Analysis of outcome data on AVRP youth participants

- Web-based data entry system
  - Replace legacy systems
  - Improve data quality
  - Embed address validation
  - Automate application of eligibility algorithm
  - Automate initial assignment to service region and providers
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Changing Systems, Getting Results.