

*Excerpt from*  
*Neighborhoods  
and Health:*

**Building Evidence for Local Policy**

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### Section 3

## DENVER: INDICATORS OF COMMUNITY ENVIRONMENTAL HAZARDS AND COMMUNITY VIOLENCE IN RELATION TO NEIGHBORHOOD CONDITIONS

### PURPOSE AND APPROACH

This section summarizes the site-specific analysis prepared by the Piton Foundation in Denver.<sup>7</sup> It focuses on the possible effects of two types of conditions that are increasingly discussed as risks to health in urban neighborhoods: environmental hazards and exposure to violence.

#### *Purpose*

The Piton Foundation has a tradition of working closely with residents, activists, and community-based organizations located in or serving Denver's poorer communities. One focus of this work has been the search for more and better data to describe neighborhood realities and inform community action.

Denver Benchmarks is a new initiative embodying this theme in which Piton is partnering with residents, city officials, and other stakeholders to develop measures of community health and quality of life for all Denver neighborhoods. The two neighborhoods that are piloting the initiative (Cole in northeast Denver and Overland in south central Denver) have important socioeconomic differences, but both identified environmental hazards and community violence as their highest priority concerns. Accordingly, the Foundation sought to help these communities learn more about the influence of these problems so they could better address them.

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<sup>7</sup> The study is fully documented in an as yet unpublished report of the Piton Foundation: *Indicators of Community Environmental Hazards and Community Violence in Relation to Neighborhood Conditions*, 2002.



### **Data sources and approach**

The Piton team assembled a considerable amount of information that might serve as the basis for indicators in these areas. They planned to use correlation and mapping analysis to relate data on these problems to health outcomes and other neighborhood conditions.

As to **environmental hazards**, they purchased data on items 1 through 6 below from a commercial vendor (which had obtained and cleaned original data from various national sources). Data on items 7 and 8 were obtained from the Denver Department of Public Health and Environment. Information on all topics was provided for multiple years, and locations were geo-coded so they could easily be analyzed and related to neighborhood boundaries.

1. Storage tanks, used primarily for the storage of petroleum products
2. Environmental Protection Agency (EPA)-designated Superfund sites and sites rated as less serious hazards recorded in the Comprehensive Environmental Compensation and Liability Information System (CERCLIS)
3. Solid waste facilities
4. Solid waste disposal sites registered by the Resource Conservation Recovery Act (RCRA), including those labeled as “violators” and “corrective action sites”
5. Sites where toxic substances had been released into the environment (from the Toxic Release Inventory)
6. Sites of spills of oil or other hazardous substances as reported to the Emergency Response Notification System (ERNS)
7. Sites with state permits to discharge regulated substances into open water
8. Citizen-reported environmental complaints

As to **community violence**, Piton already maintained data on Part I violent crimes by neighborhood (as noted in section 2). For this study, they obtained two new types of data. The first was information on suspensions and expulsions of students in the Denver public school system, coded by reason. They selected several of the reason codes as identifying violence-related offenses and geo-coded them for one academic year (2001/2002) by residence address of the student.<sup>8</sup> The second type of data was on confirmed cases of child abuse and neglect (by address), provided by the state Department of Human Services. For confidentiality reasons, Piton has agreed not to report such data for any area with five or fewer cases. To reduce the impact of this restriction for the analysis (and to address the broader rare events issue), Piton

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<sup>8</sup> Three years of data had been provided by the school district, but analysis by Piton evidenced problems in the data for the first two years that made them unusable.



grouped the data for overlapping three-year periods (starting with 1995–1997 and running through 1998–2000—this allowed reporting for 57 of Denver’s 77 defined neighborhoods).<sup>9</sup>

As to **health outcomes**, Piton already had the measures based on vital statistics from its own data system (as analyzed in section 4). However, the team obtained data on two new indicators from vital records: (1) Apgar scores, which represent the results of tests of physical functioning taken just after birth, and (2) the premature birth rate (live births with a clinical gestation period of 20 to 36 weeks as a percentage of all live births).<sup>10</sup>

## FINDINGS AND IMPLICATIONS

This study had more difficulty in finding strong associations between variables at the neighborhood level than those in the other sites, but it offers useful lessons that could lead to development and use of more effective indicators in the future.

### ***Hypotheses and findings: Environmental hazards***

The team had hoped to test the following two hypotheses in this area, but they were unable to construct reliable measures of hazards needed to test either.

1. *That environmental hazards are disproportionately located in neighborhoods with significant concentrations of children, people of color, and poverty.*
2. *That infants born to families living in neighborhoods with concentrations of environmental hazards have worse birth outcomes than other children.*

The team had assembled a considerable amount of environmental data, as noted earlier. The problem was that after working with the community to think through the meaning of the data, they mutually discovered that none of this environmental data, as given, yielded useable indicators of hazardous conditions at the neighborhood level (i.e., conditions that would let them reliably rate the extent of hazards in one neighborhood in comparison to another). There were several reasons:

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<sup>9</sup> This rolling three-year average approach is the same method we used with vital records data in section 4. Piton staff also explored the idea of using the Confirmed Child Sexual Abuse Rate and the Rate of Deaths Due to Violent Causes, but the numbers of cases were too small to support neighborhood analysis.

<sup>10</sup> Piton also asked the state’s Department of Health and Environment for a file linking births data to Medicaid records for mothers and children eligible for that program. This would have supported a range of other types of analysis, including examination of service frequencies such as that done in Cleveland (section 6). The Department is attempting to create such a file, but it could not be completed in time for research in this project.

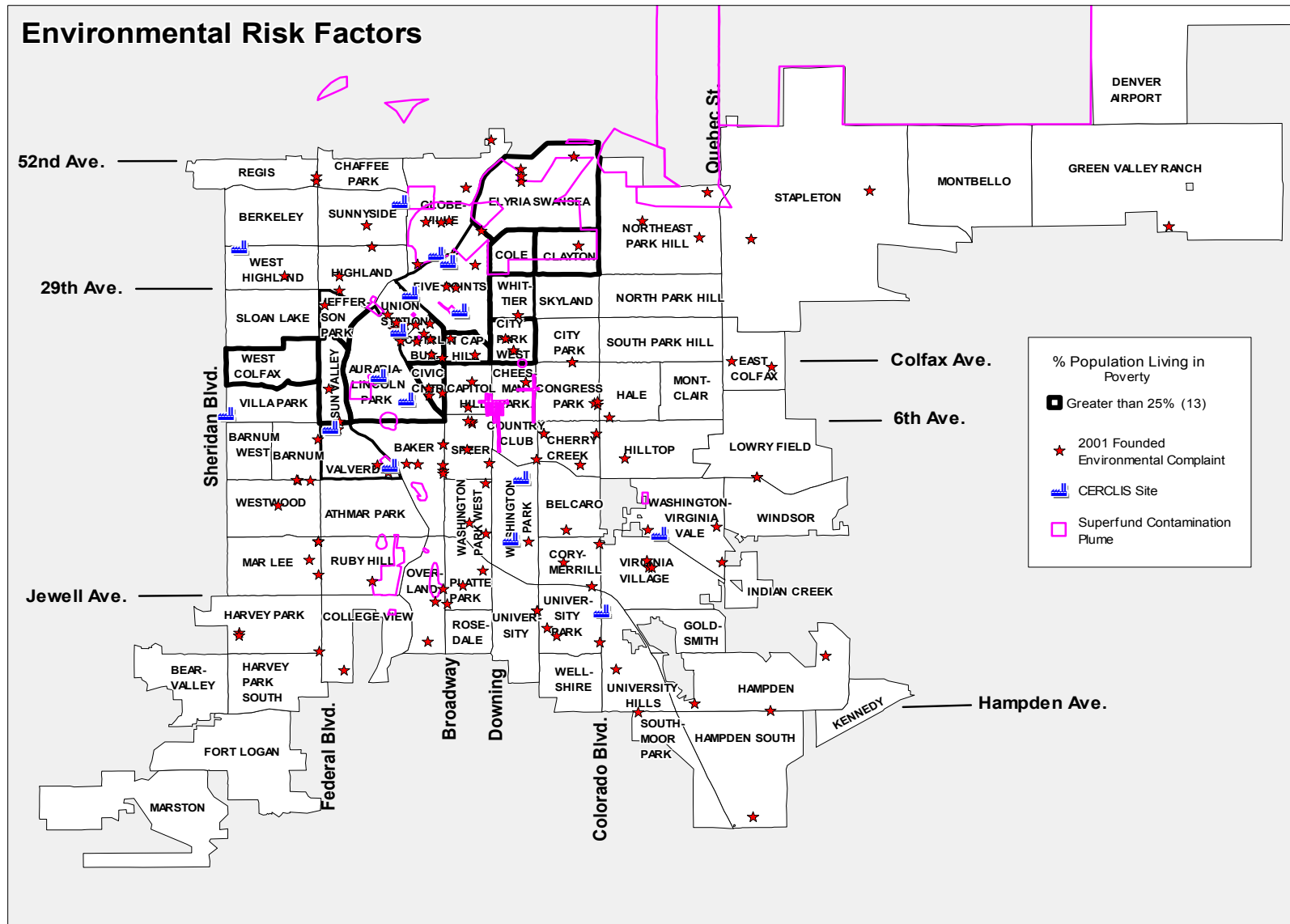


- The existence of many of these conditions does not actually represent a hazard. Properly maintained and operated storage tanks (#1), solid waste facilities (#3 and #4), and permitted discharges into waterways (#7) should not be an environmental concern. The files contain data on “leaking” tanks and solid waste facilities labeled as “violators” and “corrective action sites,” but most of those conditions have been remediated, and there was not enough information on the files to tell whether the remainder are really hazardous or not.
- Some of the other conditions are more likely to be hazardous, but the available data do not offer measures of the extent of the problem. This is true of Superfund and CERCLIS sites (#2), for example. A neighborhood with two such sites might have much higher risks than one with ten, depending on the type and extent of the hazards involved.
- This difficulty also exists in interpreting the ERNS database on spills (#6) and the Toxic Release Inventory data (#5). The latter file indicates only 36 incidents in Denver, occurring in 13 neighborhoods.
- One might expect complaint volumes (#8) to be a more sensitive indicator. However, complaints do not appear to be correlated with either neighborhood poverty or what is known about locations of actual environmental problems. Staff surmise that some neighborhoods simply have more active complainers than others.

The team did run correlations relating the location of these conditions to the neighborhood distributions of children, poverty, and minorities, but they found no significant associations. Piton already produces “asset and risk factor” maps for Denver, and this analysis has allowed them to add a new map to the risk factor section (showing Superfund contamination plumes, CERCLIS sites, and confirmed environmental complaints—figure 3.1). Beyond that, however, interpreting the nature and extent of environmental hazards in neighborhoods will require deeper information on conditions at each location.



Figure 3.1: Environmental Risk Factors in Denver County





### ***Hypotheses and findings: Community violence***

There are many reasons to expect a higher incidence of violence in neighborhoods distressed on other measures. The Piton team sought to test the following hypothesis with the new indicators they had obtained.

3. *That violent events are disproportionately located in neighborhoods with significant concentrations of children, people of color, and poverty.*

This hypothesis was supported by most of the available indicators. As expected, there was a high correlation between the rate of violent crime and the other measures: 0.624 with respect to poverty rates, and poverty is closely correlated with the minority percentage of total population at the neighborhood level (0.658). Correlations with poverty were even higher for two of the new measures: 0.719 for the rate of confirmed child abuse and 0.703 for violence-related school suspensions and expulsions. The latter relationship is also directly observable by comparing the map for the latter variable in Denver (figure 3.2) with that for poverty (figure 8.3).

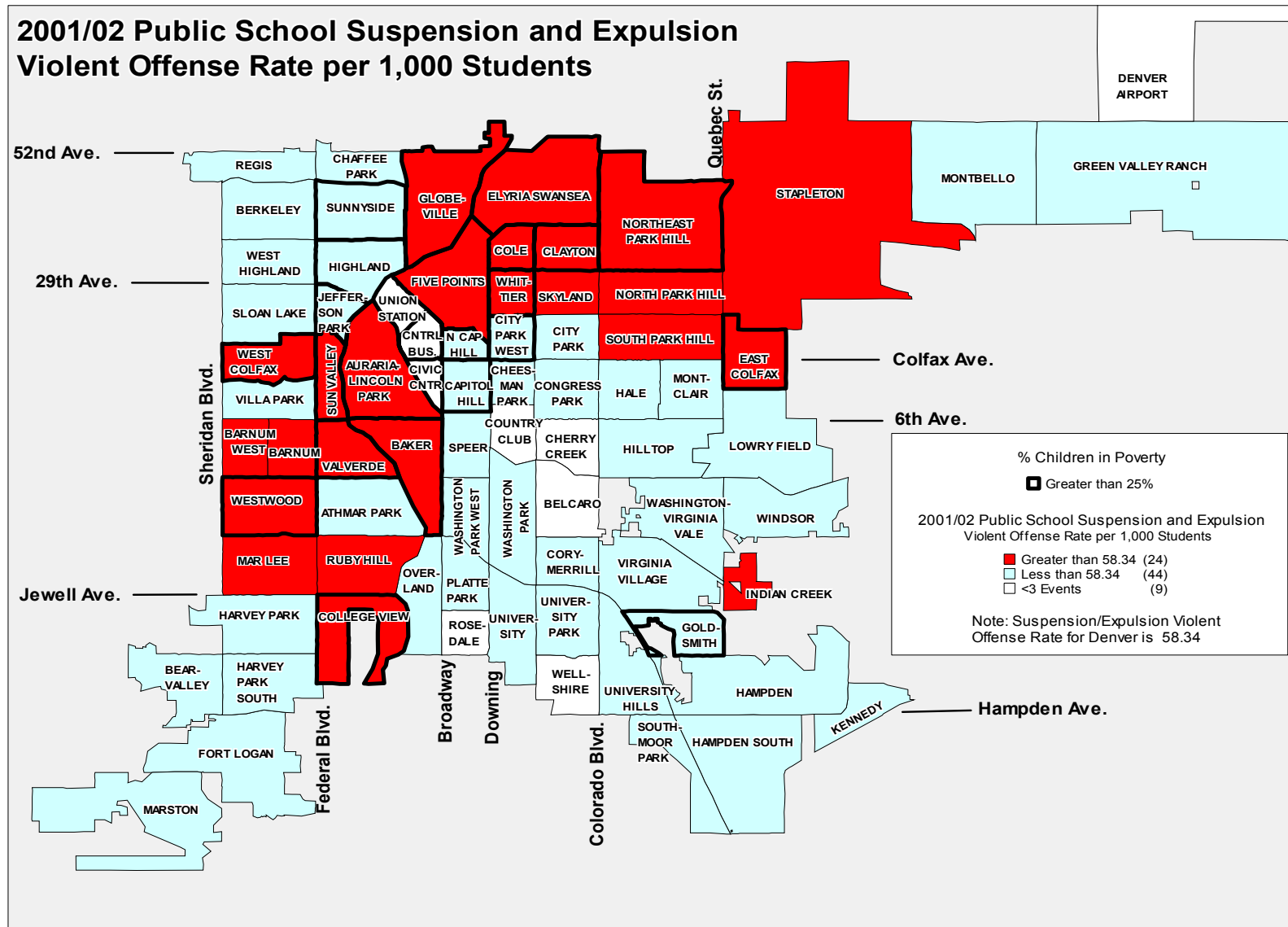
Piton advises caution in the use of these measures. Even though Piton was conservative in selecting suspension/expulsion reason codes as violence related, one couldn't be sure that there was not bias in assigning the codes initially. Staff errors or misjudgments are possible in child abuse/neglect designations as well. Furthermore, it is suspected that abuse/neglect cases are recorded more often for low-income families because, as beneficiaries of various Department of Human Services subsidy programs, they have more contact with city social service professionals. Furthermore, Piton and the communities see reported violent crime as only a very limited starting point to understanding. To gain enough knowledge to plan a sensible response, more information about the perpetrators, the victims, and the circumstances of these crimes is indicated.

### ***Community process***

Using the relationships forged through Denver Benchmarks, Piton is beginning discussions with the Denver Department of Safety, the Colorado Judiciary, and the Colorado Department of Corrections to seek new and deeper data that could result in more powerful indicators of neighborhood safety and risk for violence. Piton will also be pursuing more information about the circumstances of environmental hazards and how to measure them more meaningfully.



Figure 3.2: Public School Suspension and Expulsion Violent Offense Rate per 1,000 Students in Denver County, 2001-2002





Work with the communities continues and does seem to be having an influence. One example is a shift in orientation of the work in the Overland neighborhood. That community had come together initially with the sole objective of securing the rehabilitation of a Superfund site. Once that objective was achieved, the group might well have disbanded. However, with their participation in the Benchmarks process (and following the approach being taken in the Cole neighborhood), they have now embarked on their own strategy to create a comprehensive plan for community change.

Finally, Piton has also been working with other agencies on the broader policy front. The City Council has recently approved a resolution in support of Denver Benchmarks. In the resolution, the Council urges city agencies to share data and otherwise cooperate with Denver Benchmarks, and use their data in policymaking and resource allocation, and the Council pledges to use its own data in decision-making.