# CrimeRisk and CrimeRisk Insights+

## Purpose

CrimeRisk provides an assessment of the relative risk of seven major personal and property crimes at the block and block group level. CrimeRisk Insights+ (CRI+) extends CrimeRisk with three families of measures: Social Disorder, larceny detail, and dayparts and weekparts.

Relative crime rates are very important in real estate applications, insurance underwriting, shopping center and stand-alone retail facilities.

Both products are standardized indexes in which 100 is the national average, built with the same methods and designed to be read together.

## Base Geography

Current Year – Census Block and Block Group (CrimeRisk and CRI+)

Projection Year (five years forward) – Census Block and Block Group (CrimeRisk only)

## Content

**CrimeRisk**

CrimeRisk is a census block and higher-level geographic database consisting of a series of standardized indexes for a range of serious crimes against both persons and property. It is derived from an extensive analysis of seven years of crime reports from the vast majority of law enforcement jurisdictions nationwide.

The crimes included in the database are the “Part I” crimes and include murder, rape, robbery, assault, burglary, larceny, and motor vehicle theft. These categories are the primary reporting categories used by the FBI in its Uniform Crime Reporting (UCR) Program, with the exception of arson, for which data is very inconsistently reported at the jurisdictional level. In accordance with the reporting procedures used in the UCR Program, aggregate indexes have been prepared for personal and property crimes separately, as well as a total index.

### CrimeRisk Insights+

**Social Disorder** covers simple assault, intimidation, vandalism, weapons violations, drug offenses, disorderly conduct and trespassing, plus a total. These offenses occur far more often than serious crime, so they describe the everyday experience of an area.

**Larceny detail** divides the CrimeRisk larceny index into shoplifting, theft from vehicles, and all other larceny.

**Dayparts and weekparts** split personal, property and total crime into four windows: weekday day, weekday night, weekend day and weekend night. Day runs from 6 a.m. to 6 p.m.

| Window | Hours | Share of the week |
|---|---|---|
| Weekday Day | Monday–Friday, 06:00–17:59 | 60 hours (5/14) |
| Weekday Night | Nights beginning Sunday–Thursday, 18:00–05:59 | 60 hours (5/14) |
| Weekend Day | Saturday–Sunday, 06:00–17:59 | 24 hours (1/7) |
| Weekend Night | Nights beginning Friday and Saturday, 18:00–05:59 | 24 hours (1/7) |

## Data Sources

Federal Bureau of Investigation, Uniform Crime Reporting Program and National Incident-Based Reporting System (NIBRS), most recent seven years available; crime incident records with coordinates from Crime-O-Meter and locale public data sources, most recent seven years available; Applied Geographic Solutions, most current Estimates and Projections, business and land use data.

## Detailed Methodology

### Jurisdiction Crime Data

The primary source of CrimeRisk and CRI+ is a careful compilation and analysis of the FBI Uniform Crime Reporting Program data.

On an annual basis, the FBI's Uniform Crime Reporting (UCR) Program collects data from each of about 16,000 separate law enforcement jurisdictions at the city, county, and state levels.

Nearly all agencies now report through the National Incident-Based Reporting System (NIBRS), which records each incident individually; earlier years also include agencies that reported summary counts. NIBRS also records the lower-level offenses, the type of theft and the time of day of each incident, which supply the CRI+ measures, together with the FBI's state and national estimates for those offenses.

A considerable effort was made to correct a number of problems that are prevalent within the FBI databases, including:

- The standardization of jurisdictional names: the FBI does not employ Census Bureau codes in its databases and the jurisdictional names contain numerous typographical errors and format discrepancies which needed to be corrected
- Reporting by individual jurisdictions can be inconsistent from year to year, in that data for some jurisdictions is missing for one or more years and required handling. Only years in which a jurisdiction reported a full twelve months are used
- The standardization of the database to account for jurisdictional overlaps. For example, the California Highway Patrol has jurisdiction over only state and interstate highways in urban areas
- The FBI does not identify the area each agency serves, so each jurisdiction was matched to its census blocks: city agencies to their city, and county agencies to the unincorporated part of the county, including unincorporated communities they police

Once this correction and standardization effort was completed, the database consisted of a time series covering:

- All cities and towns which have their own police agency
- All cities and towns where policing for the local jurisdiction is contracted to a higher level agency but which tracks statistics separately (e.g. the city of Thousand Oaks, California contracts with the Ventura County Sheriff's Department for police services, but the incident reports are separately compiled)
- A record for each state which covers the population not covered by either of the two cases above. This is normally a combination of County Sheriff (or equivalent) and State level jurisdictions. For a very limited number of areas, such as New York City, the local jurisdiction spans several counties.

Crime rates for each jurisdiction are averaged across the years, with the more recent years given greater weight.

### Incident Data

Many cities now post very detailed crime reports to their websites that are available for download, and commercial sources such as Crime-O-Meter compile incidents nationally. These data have specific locations or geocodable addresses which are useful for matching against specific census blocks, and they are what allow the models to describe differences between neighborhoods. Every release our inventory of locales grows; from the largest cities (New York, Los Angeles, Chicago) to many smaller places.

Incident data are only used where they agree with what the jurisdiction reported to the FBI. For each jurisdiction, year and crime type, the two counts are compared, and the data are accepted only where they agree closely in at least two years. Where more than one source is available for a jurisdiction, the one that agrees best is used; sources are never mixed, so no incident is counted twice.

## Models

A wide range of demographic, business and land use attributes were compiled from AGS' databases for every jurisdiction, block group and block: roughly 240 candidate variables, describing who lives in an area as well as what is there, such as the number and type of businesses, the visiting population and how the land is used. Each crime type is modeled separately, and three types of models are used:

- **Jurisdiction models** relate each jurisdiction's crime rate to its characteristics, and describe how crime differs from one city or county to another. In the smallest places a single murder will have a profound effect on the crime rate per 100,000 population, so these models are built on jurisdictions large enough to give stable rates.

- **Block group models** are built from the accepted incident data and explain differences between neighborhoods within the same city. They are tested on cities they have never seen.

- **Block models** explain how each block differs from its block group. A block's estimate takes its overall level from its block group and its position relative to neighboring blocks from the block model.

Where a crime is too rare in the incident data to support a block group model, the jurisdiction model is applied at the block group level, with its differences moderated, since block groups vary far more than the jurisdiction averages the model was built on. Where accepted incident data exist for a block group, the modeled rate is blended with the rate actually observed there.

Under AGS' no "redlining" policy, no data variables were used that relate to race, ethnicity, ancestry or language spoken at home in any CrimeRisk or CRI+ model.

### Scaling and Indexes

The model estimates for blocks and block groups were then scaled to match the master database of jurisdictions. The blocks and block groups within each jurisdiction were scaled to match the crime totals for that jurisdiction, and blocks outside of these areas were scaled to the state totals. CRI+ uses the FBI's state and national estimates for each offense; where the FBI does not publish a state estimate, one is prepared from that state's other offenses.

The final crime rate estimates were then weighted by population and aggregated to the national totals. The results were then converted to indexes relative to the national total.

### Projections

CrimeRisk crime rates are carefully trended forward at the locale, state and national level using the full time series of FBI data. As with the current year data, crime rates are then modeled by block group using socioeconomic characteristics, but these data are based on our five-year projected demographic data. Blocks keep their current year position within their block group. These estimates are scaled, balanced and normalized in the same way as the current year data before being converted to indexes relative to the projected national averages.

## Using the Indexes

An index of 100 is the national average; 150 is 50% above it, and 50 is half of it.

The daypart indexes are all measured against the same yardstick: the national crime rate per hour of the week. They can therefore be compared directly. An area scoring 200 on Weekend Night and 100 on Weekday Day has twice as much crime per hour on weekend nights. Because crime is not spread evenly across the week, the national averages of these indexes are not all 100.

Indexes cannot be added together. The Personal and Property indexes do not sum to the Total index, the larceny detail indexes do not sum to the Larceny index, and the daypart indexes do not

sum to the Personal, Property or Total index. To combine block groups or blocks into a larger area, average their indexes weighted by population.

The aggregate indexes (Total, Personal, Property and Total Social Disorder) are unweighted, in that a murder is weighted no more heavily than a purse snatching in the computation, and an act of vandalism counts the same as a weapons violation. While they provide a useful measure of the relative "overall" crime rate in an area, caution is advised when using any of the aggregate index values.

Current year indexes are relative to the current national average and projection year indexes to the projected national average. A change between the two shows how an area is expected to move relative to the nation, not the change in its crime rate.

## Definitions

Source: Federal Bureau of Investigation, Uniform Crime Reporting Program

### CrimeRisk – Part I Offenses

The Uniform Crime Reporting (UCR) Program collects data about Part I offenses in order to measure the level and scope of crime occurring throughout the Nation. The program's founders chose these offenses because they are serious crimes, they occur with regularity in all areas of the country, and they are likely to be reported to police.

**Murder and nonnegligent manslaughter:** the willful (nonnegligent) killing of one human being by another. Deaths caused by negligence, attempts to kill, assaults to kill, suicides, and accidental deaths are excluded. The program classifies justifiable homicides separately and limits the definition to: (1) the killing of a felon by a law enforcement officer in the line of duty; or (2) the killing of a felon, during the commission of a felony, by a private citizen.

**Rape:** "Penetration, no matter how slight, of the vagina or anus with any body part or object, or oral penetration by a sex organ of another person, without the consent of the victim." This definition allows for gender neutrality, the penetration of any bodily orifice, penetration by any object or body part, and offenses in which physical force is not involved.

**Robbery:** the taking or attempting to take anything of value from the care, custody, or control of a person or persons by force or threat of force or violence and/or by putting the victim in fear.

**Aggravated assault (Assault index):** an unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault usually is accompanied by the use of a weapon or by means likely to produce death or great bodily harm. Simple assaults are excluded.

**Burglary (breaking or entering):** the unlawful entry of a structure to commit a felony or a theft. Attempted forcible entry is included.

**Larceny-theft, except motor vehicle theft (Larceny index):** the unlawful taking, carrying, leading, or riding away of property from the possession or constructive possession of another. Examples are thefts of bicycles, motor vehicle parts and accessories, shoplifting, pocket-picking, or the stealing of any property or article that is not taken by force and violence or by fraud. Attempted larcenies are included. Embezzlement, confidence games, forgery, check fraud, etc., are excluded.

**Motor vehicle theft:** the theft or attempted theft of a motor vehicle. A motor vehicle is self-propelled and runs on land surface and not on rails. Motorboats, construction equipment, airplanes, and farming equipment are specifically excluded from this category.

### CrimeRisk Insights+ Offenses

The CRI+ offenses are defined by the FBI's National Incident-Based Reporting System (NIBRS), which records offenses beyond Part I, including many that are rarely serious but occur often.

**Simple assault:** an unlawful physical attack by one person upon another where neither the offender displays a weapon, nor the victim suffers obvious severe or aggravated bodily injury.

**Intimidation:** to unlawfully place another person in reasonable fear of bodily harm through the use of threatening words and/or other conduct, but without displaying a weapon or subjecting the victim to actual physical attack.

**Vandalism:** to willfully or maliciously destroy, damage, deface, or otherwise injure real or personal property without the consent of the owner or the person having custody or control of it.

**Weapons violations:** the violation of laws or ordinances prohibiting the manufacture, sale, purchase, transportation, possession, concealment, or use of firearms, cutting instruments, explosives, incendiary devices, or other deadly weapons.

**Drugs and alcohol:** violations of laws governing controlled and regulated substances, including their unlawful manufacture, distribution, sale, purchase, possession or use, and the equipment used to prepare or use them.

**Disorderly conduct:** any behavior that tends to disturb the public peace or decorum, scandalize the community, or shock the public sense of morality.

**Trespassing:** to unlawfully enter land, a dwelling, or other real property.

**Shoplifting:** the theft, by someone other than an employee of the victim, of goods or merchandise exposed for sale.

**Theft from vehicle:** the theft of articles from a motor vehicle, locked or unlocked, and the theft of any part or accessory affixed to the interior or exterior of a motor vehicle.

**Other larceny:** all other larceny-theft, including pocket-picking, purse-snatching, theft from buildings, theft from coin-operated machines, and theft of bicycles.

## Further Information

Contact customer service at 877-944-4AGS or email support@appliedgeographic.com.