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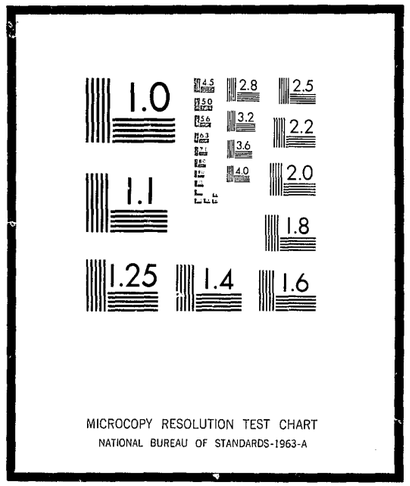

MICROCOPY RESOLUTION TEST CHART
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WASHINGTON, D.C. 20531

Date filmed 6/26/75

March 1974

WP-05-74

ON URBAN HOMICIDE

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WORKING PAPER

"Innovative Resource Planning in Urban Public Safety Systems"

National Science Foundation Grant GI38004
Research Applied to National Needs
Division of Social Systems and Human Resources

Operations Research Center
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139

Supported in part by NSF Grant GI38004 -- "Innovative Resource Planning in Urban Public Safety Systems" -- and in part by ONR Contract N0014-67-A-0204-0063

Concern about the crime problem in America is perhaps only exceeded by the confusion about it. There is widespread skepticism over the accuracy of crime statistics; even Attorney-General Richardson expressed doubt about the 1972 F.B.I. figures. And even if the statistics are accepted at face value, there is bitter disagreement over what they actually mean. We might, as is sometimes said, be about to "turn the corner" on crime, but it is somewhat unclear what we should expect to find there.

Curiously, the problem of inaccurate statistics is least acute for the most terrible of all crimes--murder. Thus the study of homicide levels might be useful in estimating the true incidence of other violent crimes. But there is a more important reason to analyze murder statistics: the rising homicide rate has become increasingly important in American political life. Detroit's reputation as "murder capital of the world," for instance, figured prominently in its last mayoral election. Polls show that an increasing majority of Americans now favors capital punishment, and that the rise in murder is a major reason. (Since the Supreme Court decision in June 1972, twenty-three states have restored the death penalty.) Governor Rockefeller cited the increase in killing in calling for vary harsh drug-control laws. Gun control advocates regularly note the rising murder toll in their arguments. One could go on much further.

The public policy implications of the climbing murder levels obviously make it important that people have an accurate view of the magnitude of the problem. Yet, notwithstanding their accuracy, the annual homicide rates (murder per 100,000 citizens) which are generally used as indices of the situation are misleading and unsatisfactory. Rises and falls in these rates need not correspond exactly to changes in the dangers individual citizens face, and, quite apart from this problem, the risk implications of the annual statistics may be orders-of-magnitude different than they might seem. Approximately 250 residents of Atlanta were murdered in 1972, for example, but this number is small compared to the nearly 500,000 who were not murdered. Few people realize that, if this rate continues, homicide will be the cause of death of roughly 1 of every 27 Atlantans.

The clairvoyance required to grasp what the statistics mean leads one to desire that some new standards be devised to measure the danger of murder. One such standard is the answer to the question: what is the probability that a randomly-chosen baby born now in a given city, who lives there all his life, will eventually die of homicide? Another index is the decrease in life expectancy of this baby because of murder. Either of these numbers, if known, would presumably indicate in a meaningful way the amount of homicide in the city considered. It is not at all difficult to obtain mathematical expressions for these quantities, but these expressions necessarily depend on homicide rates in the future, and these rates are of course not known now. Yet if one were to proceed using sensible

projections in the appropriate equations, presumably some reasonable estimates of homicide risk would result. We describe here an attempt to obtain such projections and to use them to estimate the homicide danger in each of America's fifty largest cities.

It might seem that the murder rate has been rising since the time Cain slew Abel, but this is not really true. From the early 1930's, when the F.B.I. began compiling crime statistics, to the mid-1950's, the murder rate in the United States declined slowly but steadily. There is some evidence that this was the continuation of a trend that started perhaps as early as the end of World War I. Murder levels remained fairly constant from about 1955 to the mid-1960's, when a period of rapid increase began. In the past eight years the rise in murder rates has more than "wiped out" the accumulated decline of the previous forty.

To make projections for the future, it is important to find out the characteristics of the present period of homicide growth. As a first step toward doing this, one might calculate the changes in homicide rate since the mid-1960's in each of the fifty cities we are concerned about. This is done in Table 1; we use as a base rate the number of murders per 100,000 residents averaged for the years 1963 and 1965 (at the beginning of the growth period), and contrast this number with the comparable quantity for 1971-72. The number in the third column of the chart is the ratio of the 1971-72 rate to that

Table 1: Changes in Homicide Rates in the 50 Largest American Cities+

City	(c) 1963 and 65 homicide rate++	(d) 1971-72 rate++	Demographically-Adjusted Ratio of (d) to (c)
New York	7.49	20.28	2.24
Chicago	10.83	22.78	1.83
Los Angeles	8.38	16.51	1.80
Philadelphia	8.11	21.74	2.44
Detroit	9.64	38.93	3.39
Houston	11.33	24.19	2.05
Baltimore	14.77	36.08	2.15
Dallas	15.44	24.81	1.47
Washington	15.44	34.39	1.92
Cleveland	11.99	38.47	2.83
Milwaukee	3.39	7.53	1.92
San Francisco	6.68	12.78	1.77
San Diego	3.20	4.88	1.46
San Antonio	7.43	15.29	2.02
Boston	7.56	17.16	1.93
Memphis	7.14	17.42	2.39
St. Louis	17.01	34.16	1.72
New Orleans	11.52	23.52	1.87
Phoenix	7.08	11.56	1.67
Columbus	4.65	11.86	2.45
Seattle	4.02	7.92	1.84
Pittsburgh	5.62	10.96	1.83
Denver	9.18	16.63	1.64
Kansas City	12.50	17.16	1.28
Atlanta	18.36	48.79	2.34
Buffalo	3.98	14.94	3.25
Cincinnati	7.52	16.48	1.96
San Jose	2.28	4.83	1.98
Minneapolis	3.48	8.53	2.26
Fort Worth	14.04	25.57	1.69
Toledo	4.35	8.20	1.84
Newark	15.09	36.52	1.98
Portland (O.)	3.71	6.82	1.75
Oklahoma City	6.87	11.92	1.67
Louisville	12.71	22.79	1.59
Oakland	7.16	23.07	2.65
Long Beach (Cal.)	4.26	11.98	2.53
Omaha	4.96	6.92	1.34
Miami	10.88	26.57	2.42
Tulsa	5.16	9.70	1.78
Honolulu	3.04	9.69	3.13
El Paso	2.94	4.19	1.42
St. Paul	2.54	5.81	2.17
Norfolk	9.19	12.99	1.41
Birmingham	15.59	26.25	1.60
Rochester	3.84	10.14	2.14
Tampa	11.13	20.87	1.77
Wichita	3.66	5.60	1.46
Akron	4.29	12.55	2.61
Tucson	3.40	5.89	1.70

+ Indianapolis, Nashville, and Jacksonville are not included because their boundaries changed drastically in the 1960's; thus we are using 50 of the 53 largest cities.

++ Number of murders per 100,000 residents.

for the earlier period, slightly adjusted to account for demographic changes in the city which would in themselves be expected to cause changes in its homicide rate.

The first two columns in the chart reveal that great disparities existed among the homicide rates in different cities in both 1963 and 1965 and 1971-72. The variation is somewhat less in the growth multipliers; while they range from a low of 1.28 (Kansas City) to a high of 3.39 (Detroit), they tend to hover around the number 2--more than three-fourths of the ratios are within .5 of this value. Actually, the variations in the magnification ratios are not terribly large if we consider that each of them could in principle have taken any value from zero up and if we consider further that, because of random fluctuations, we would have anticipated some differences in the observed multipliers even if the same underlying trend prevailed in all cities.

The notion of randomness in homicide rates arises because, quite independent of any trend, one would expect homicide totals to vary from year to year much as annual rainfall varies. Even if an individual, for instance, is by some definition "murder-prone," it is quite uncertain whether circumstances will arise in a given year which lead him to try to kill someone; it is further more unsure whether such an attempt would succeed. This randomness is most apparent in some small, safe cities where the annual number of killings varies between 0 and 2 without any discernible patterns; in such situations, the large

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who have precisely studied the homicide patterns in the United States over the years say that the real cause for the increase is demographic rather than social." (Underlining added.) The major demographic change on the national level (as opposed to particular cities) in the last decade has been in the age distribution of citizens; a leading American criminologist told The Times that national statistics are "a reflection of the fact that during the nineteen-forties and early fifties there was a high fertility rate in this country." And, to be sure, a calculation based on all major demographic changes between 1964 and 1972 confirms that a rise in homicide rates could be expected. But a difficulty arises; the amount of increase one would expect from this source is less than one-tenth the increase that actually occurred! Thus, despite its surface plausibility, the identification of demography as the "real cause" of murder growth is somewhat bewildering, and the predictions of demographers would seem of only marginal value in predicting future homicide levels. It would also seem that the uniform growth has limited power in indicating the true cause of murder growth.

With more statistical analysis, one can generate a set of reasonable assumptions about future murder growth for use in estimating homicide probabilities for today's infants. One couples these assumptions with some others, one of which is that all murders in a city are committed against residents of that city. (The relatively small overestimation of risk

inherent in this hypothesis is compensated for by several conservative measures.) It is explicity assumed that no changes will be forthcoming in public policies on homicide-related issues. This is by no means meant to imply the futility of such changes, but it is clearly undesirable to attempt to estimate the probability of any particular reform or its efficacy when in force.

But there are limitations in statistical methods; they suggest certain correlations in future homicide growth among different cities and age groups but leave unclear what the common growth patterns are likely to be. Since there are no tenable and widely-accepted causal models for changes in murder levels, projections for the future necessarily have a speculative component. Under such circumstances, it would be presumptuous to advance one "definitive" model for the evolution of homicide rates; several models which cover the range of plausible behavior for these rates would be more appropriate. The models themselves should be simple and straightforward; they should not be so intricate that, by their very complexity, they create a false atmosphere of exactitude. Following these maxims, we propose four projections for future murder rates:

1. The "Pangloss" Model: In this formulation, the current period of growth is an aberration which will soon end, after which murder rates in each city will plunge to and remain at those of the mid-1950's, the lowest in the past half-century.

2. The Current Rates Model, which simply assumes the continuation of the present pattern throughout the future. Many will consider this model the most relevant to describing the problem at this time.

3. The Saturation Model, based on recent data, which assumes that homicide rates will stabilize at a saturation level about 10% above present levels.

4. The Linear Growth Model, which projects an annual growth of .4 murders per 100,000 people in the national homicide rate. While pessimistic, it is more conservative than a model based on a fixed percentage growth in the murder rates.

Using these models, we calculate the probability of death by homicide and associated decline in life expectancy for a baby born in 1974 in each of the fifty largest American cities, assuming continual residence. The results are presented in Table 2; for ease of comprehension, homicide probabilities are expressed in the form 1 in X; the top number for a given city under a given model is the value of X for that city in that model. The bottom number is the corresponding decline in life expectancy (in years) because of murder. Thus the table indicates, for example, that under the Current Rates model the murder probability for a baby born now in New York is 1 in 67 (yes, 1 in 67) and his expected lifespan is cut by 1/2 year by the amount of murder in this city.

Table 2: Homicide-Risk Indices in the 50 Largest American Cities Under Four Projections of Murder Levels

City	Rank	Pangloss Model	Current Rates Model	Saturation Model	Linear Growth Model
New York	19	131	67	60	27
		.3	.5	.6	1.3
Chicago	18	117	60	54	24
		.3	.6	.6	1.5
Los Angeles	24	161	82	74	33
		.2	.4	.5	1.1
Philadelphia	17	122	62	56	25
		.3	.6	.6	1.4
Detroit	2	69	35	32	14
		.5	1.0	1.1	2.5
Houston	12	110	56	50	23
		.3	.6	.7	1.6
Baltimore	5	74	38	34	15
		.5	.9	1.0	2.3
Dallas	11	107	55	50	22
		.3	.6	.7	1.6
D. C.	6	78	40	36	16
		.5	.9	1.0	77
Cleveland	3	69	35	32	14
		.5	1.0	1.1	2.4
Milwaukee	42	353	179	161	71
		.1	.2	.2	.5
San Francisco	29	208	106	96	42
		.2	.3	.4	.8

City	Rank	Pangloss	Current Rates	Saturation	Linear Growth
San Antonio	26	174	89	80	35
		.2	.4	.4	1.0
San Diego	48	544	276	248	110
		.1	.1	.1	.3
Boston	22	155	79	71	32
		.2	.4	.5	1.1
Memphis	20	153	78	70	31
		.2	.5	.5	1.1
St. Louis	7	78	40	36	16
		.4	.9	1.0	2.2
New Orleans	13	113	58	52	23
		.3	.6	.7	1.5
Phoenix	34	230	117	105	47
		.2	.3	.3	.7
Columbus	33	224	114	103	46
		.2	.3	.3	.8
Seattle	41	335	170	151	67
		.1	.2	.2	.5
Pittsburgh	35	243	123	111	49
		.2	.3	.3	.7
Denver	23	160	81	73	33
		.2	.4	.5	1.1
Kansas City	21	155	79	71	32
		.2	.4	.5	1.1
Atlanta	1	55	28	25	11
		.6	1.2	1.4	3.1

City	Rank	Pangloss	Current Rates	Saturation	Linear Growth
Buffalo	27	178	91	82	36
		.2	.4	.4	1.0
Cincinnati	25	161	82	74	33
		.2	.4	.5	1.1
San Jose	49	550	279	251	111
		.1	.1	.1	.3
Minneapolis	39	311	158	142	63
		.1	.2	.2	.6
Ft. Worth	10	104	53	47	21
		.3	.7	.7	1.6
Toledo	40	324	165	147	66
		.1	.2	.2	.5
Newark	4	73	37	33	15
		.5	.9	1.0	2.3
Portland(Or.)	44	389	198	178	79
		.1	.2	.2	.4
Oklahoma City	32	222	113	102	45
		.2	.3	.3	.8
Louisville	15	117	60	54	24
		.3	.6	.6	1.5
Oakland	14	115	59	53	24
		.3	.6	.7	1.5
Long Beach	31	222	113	102	45
		.2	.3	.3	.8
Omaha	43	384	195	175	78
		.1	.2	.2	.5

City	Rank	Pangloss	Current Rates	Saturation	Linear Growth
Miami	8	100	51	46	21
		.4	.7	.8	1.7
Tulsa	37	274	139	125	56
		.1	.3	.3	.6
Honolulu	38	274	139	125	56
		.1	.3	.3	.6
El Paso	50	634	322	289	128
		.1	.1	.1	.3
St. Paul	46	457	232	209	92
		.1	.2	.2	.4
Norfolk	28	205	104	94	42
		.2	.3	.4	.8
Birmingham	9	101	52	46	21
		.4	.7	.7	1.7
Rochester	36	262	133	120	53
		.1	.3	.3	.7
Tampa	18	128	65	58	26
		.3	.5	.6	1.3
Wichita	47	474	241	216	96
		.1	.1	.2	.4
Akron	30	212	108	97	43
		.2	.3	.4	.8
Tucson	45	451	229	206	91
		.1	.2	.2	.4

At this point, the reader might well be slipping into incredulity; a crude calculation might serve as the needed shock therapy. If the annual homicide rate in a given city is stable at, say, 30 per 100,000, a citizen picked at random has about a $\frac{30}{100000}$ = .0003 chance of being murdered per year. Over an average lifespan of 70 years, the chance of being victimized is approximately 70 x .0003 = .021, or about 1 in 48. This method is both nonrigorous and potentially misleading, but it at least suggests why the results in Table 2 are of the right order-of-magnitude.

There is no need for a great deal of discussion of the results; the numbers speak loudly for themselves. It is interesting that the projected homicide probability in the safest city under the most optimistic model is 1 in 634; a rather crude survey suggests that many people in Boston and New York think this probability at current rates is 1 in 1000 or less. (Indeed, a police official associated with crime analysis in a large American city did not think .001 an unreasonable estimate for the chance of being murdered in one of the most dangerous parts of that city.) At current murder levels, a typical baby born in a large American city (who lives there all his life) has almost a 2% chance of dying by homicide; among males, the figure is 3%. Thus an urban American boy born in 1974 is more likely to die by murder than an American soldier in World War II was to die in combat. The projections under the linear-growth model reach incredible levels, with

murder probabilities up to 1 in 12 and life expectancies diminished by over 3 years. One wants to dismiss such results as Cassandra-like ravings, but the facts will not cooperate. The murder rates in some sections of some cities are already very close to the maximum levels predicted in the linear-growth formulation. And in 1916, the homicide rate for all of Memphis was 90 per 100,000, indicating that levels much higher than today's are hardly out of the question. All in all, there is very little encouraging in these projections.

It should be acknowledged that, while Table 2 presents average risk levels for babies born now, most babies are not in fact subject to this much danger. The apparent paradox in this statement is resolved by a simple example: if one averages ten numbers, nine of which are ones and one of which is a nine, then 90% of the numbers are below the group average of two. A somewhat similar phenomenon arises in connection with murder. But, tragically, the second aspect of the example is also apparent in homicide data--some citizens actually face dangers far greater than those indicated by the averages in the tables.

There is very little to be added usefully at this point; statisticians do well to remember that they are not philosophers, sociologists, political scientists, or behavioral psychologists. But it should be restated that the calculations proceeded on the explicit assumption that no changes in public policy or citizen response toward homicide will be forthcoming. There is no reason that this need be so. Perhaps the best way to invalidate

the grim predictions we have come upon is to invalidate the premise of public inaction on which they were based.

END