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**TUBERCULOSIS IN NURSING HOMES AND CORRECTIONAL FACILITIES:
RESULTS OF A 29-STATE SURVEY**

by

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Tuberculosis in Nursing Homes and Correctional Facilities:
Results of a 29-State Survey

The overall incidence of reported tuberculosis (TB) in the United States was 9.5 per 100,000 in 1989 (CDC, unpublished data). The risk in different population groups and geographic areas within the United States is quite disparate. In some groups and areas incidence rates approach zero; in others the epidemiologic pattern resembles that seen in developing countries (1-3). A major challenge for TB control today in the United States is identification of high risk groups and appropriate targeting of TB screening and casefinding activities toward these groups (4).

On a given day, more than 3 million Americans live in residential institutions. These include more than 1,700,000 in nursing homes, more than 850,000 in correctional facilities, more than 200,000 in psychiatric facilities, and more than 300,000 in other institutions (5-8). Residential institutions have long been associated with an increased risk of infectious diseases, including TB, and in recent years a number of TB outbreaks have been reported among residents and employees of institutions (9-14). These reports have raised a number of important questions. Is the excess risk of TB in institutions a widespread phenomenon in the United States today? Should TB screening or casefinding programs be routinely conducted in these facilities even in areas where there is a low prevalence of tuberculosis? National disease surveillance for TB, coordinated by the Centers for Disease Control (CDC), which includes detailed reporting of each individual case (1,2), permitted the study reported here, which examines TB incidence among residents of the Nation's two most populated categories of institutions -- nursing homes and correctional facilities.

Recommendations for prevention and control of TB in nursing homes and in correctional institutions were recently published (15,16). The recommendations were developed in part as a result of a preliminary analysis of data from this survey. This report describes the survey methods and results and reviews information used in development of a rationale for the strategies advocated in the recommendations.

METHODS

The study surveyed all TB cases reported from 29 States during the two year period 1984-1985 (Figure 1). Demographic and clinical characteristics for each patient were collected on the CDC TB case report form (Report of Verified Case of Tuberculosis, CDC form 72.9). The study information was collected on a supplemental form (Residential and Occupational Supplement, CDC form 72.29) which was matched to each case report by means of a unique case number.

The relative risk of TB in nursing homes and correctional facilities was estimated by comparing observed (institutional) with expected (community) TB incidence rates. For computing observed incidence rates, population estimates for the number of residents in facilities in the 29 States during 1984-85 were derived from other National surveys, with adjustments as recommended by the sponsoring agency (Table 1) (17-19). Observed incidence rates in institutional residents are expressed in person-years of experience because of the dynamic nature of these populations which are characterized by numerous admissions and discharges and variable lengths of stay (20). Nursing home populations were considered to be in "steady state" because the number of such residents increased by less than 3 percent per year (Long Term Care Statistics Branch, National Center for Health Statistics, unpublished data). Correctional populations, which were increasing at a faster rate (19,21), were considered to be growing populations.

For nursing homes, observed incidence rates include only cases and resident populations over age 64. For observed rates in correctional populations, however, it was not possible to include only inmates in the age group 15-64 because correctional population estimates by age, by State, are not available. Thus the observed incidence rate in inmates includes: a numerator composed of all inmate TB cases, including 4 (2%) inmates who were age 65 or older; and a denominator composed of the entire inmate population, of whom 99 percent Nationally have been reported to be between the ages of 15-64 (22).

The expected incidence rates used for comparison were rates seen in residents of the 29 States during the survey years who were in the same general age category and who were not living in nursing homes or not living in correctional facilities. Numerators for expected rates in nursing homes were composed of all reported non nursing-home cases age 65 and above. Numerators for expected rates in correctional facilities were composed of all reported non correctional cases ages 15-64. Denominators were derived from age-specific population estimates provided by the U.S. Bureau of the Census (1) with nursing-home or correctional populations excluded.

Relative risks were derived by comparing observed and expected aggregate incidence rates for all 29 States and for States grouped broadly according to relatively high, medium, or low expected TB incidence in the general population rather than on rates in single States. Confidence intervals for relative risks were estimated using the method of Katz and Pike (23).

RESULTS

During the two-year study period, a total of 44,456 TB cases were reported in the United States. The survey States reported 15,379 cases, or 34.6 percent of the total. Within the 29 States, completed study forms were available for 14,885 cases, a response

rate of 97 percent. A comparison of demographic and clinical characteristics of survey cases with all cases reported in the United States (Table 2) indicates that cases in the survey states were comparable according to most characteristics. In the survey States cases were slightly older (mean age 53 vs. 50 years) and less likely to live in urban areas than cases in the United States as a whole. Tuberculosis incidence in the survey States was lower than in the overall United States (Table 2). The older median age of cases in the survey States is consistent with the epidemiologic pattern of TB usually seen in areas of lower TB incidence (24,25).

Nursing Homes

Among the 4,919 survey cases who were age 65 or older, 379 (7.7%) were living in a nursing home at the time of diagnosis. A comparison of nursing home cases and non nursing home (community) cases who were age 65 or older revealed some differences (Table 3). Nursing home cases tended to be older (median age 82 vs. 75 years) and more likely to have TB first reported at death than community cases. The aggregate case rate for nursing home residents in the 29 States was 1.8 times higher than the rate seen in elderly persons who were living in the community (95% confidence interval on relative risk 1.64,2.02). Rates varied widely among the 29 States, ranging from zero in 1 State to more than 100 per 100,000 in 3 States (Table 4). When the 29 States were grouped according to the incidence of TB in the general population in the States, into high, medium, or low incidence States, similar aggregate excess risk (with relative risks ranging from 1.7 to 2.4) was seen in high, medium, and low incidence States (Figure 2).

Correctional Institutions

Among 9,664 reported cases who were between the ages of 15 and 64, 177 (1.8%) were inmates of correctional institutions at the time of diagnosis. An additional 4 inmates over age 64 were

reported with tuberculosis, resulting in a total of 181 inmate cases. Inmates reported with TB included 3 in Federal prisons, 103 in State prisons, and 75 in local jails. Inmates with TB were more likely to be younger, male, and residents of urban areas and were less likely to be foreign-born than cases ages 15-64 who were living in the community (Table 5).

The aggregate risk among correctional inmates in the 29 States was 3.9 times higher than the risk for persons of a similar age who were living in the community (95% confidence interval on relative risk 3.35,4.49). As with nursing homes, risk in correctional facilities varied widely among the 29 States (Table 6). Compared to nursing home residents, correctional inmates were found to have larger excess risk when compared with persons of a similar age living in the community. As with nursing homes, similar levels of excess risk were seen among inmates in States with high, medium, and low overall TB incidence (Figure 3).

DISCUSSION

The survey results indicate that excess risk of TB associated with residence in nursing homes and correctional facilities is a widespread phenomenon. The excess risk in both types of institutions was seen in grouped States with low TB incidence as well as in grouped States where TB is a greater problem. The importance assigned to this observed excess risk depends upon a number of factors. Perhaps chief among these factors are issues related to the validity of the study results, including questions related to reporting bias, and compatibility of databases. Another group of factors, more related to the geographic area and the population served, addresses the program implications of the observed excess risk.

A strength of the survey is the large size of the study population. The effects of temporary factors such as reported outbreaks, normal fluctuations in yearly events, and

overreporting or underreporting due to temporary administrative situations are minimized by the use of aggregate data for a large number of States. Conversely, conclusions drawn from the large sample do not address special issues that may be of concern for one State or a small number of States.

Reliance upon routine case reporting, as opposed to active casefinding, for assessing the size of a problem can lead to an underestimation of disease incidence. The extent to which TB cases occurring in institutions were unidentified or unreported is unknown. Anecdotal reports suggest that in some correctional institutions underreporting may have been a significant problem. An indication of underreporting from nursing homes comes from two States that were not in the survey but which had intensive TB screening programs in place in nursing homes (personal communication, Dr. William W. Stead, Arkansas Department of Health and Ms. Mary Hamilton, Indiana State Board of Health). When observed and expected TB incidence rates in nursing homes in these 2 States were computed at CDC through a procedure identical to that used for the survey States, both States noted excess risk among nursing home residents that was far higher than that seen in the survey (Table 7). It is also of note that one of the 2 States, Arkansas, had a relatively high incidence of reported TB among elderly community residents, as previously reported by Stead (26), and the other State, Indiana had a relatively low incidence in the community (1).

Assignment bias resulting from the way in which the data were collected may also have contributed to underreporting of institutional cases. Most survey forms were completed during an interview with the patient. In some geographic areas, however, the forms were, of necessity, completed by office personnel who did not know the patient. For these areas, it is not known to what extent the information regarding residence in a nursing home or prison was captured.

Overreporting probably presented less of a problem than underreporting in this study. Clinical criteria for reported TB cases in adults are well established, and all cases accepted into the reporting system by CDC must meet these criteria (27).

Each of the population denominators used in the survey came with its own set of potential limitations. As summarized in Table 1, institutional population estimates were obtained by imputation of data from surveys conducted by other agencies. For nursing homes, adjustments to reflect percent occupancy rates, proportion of residents who were age 65 or older, and the change in the size of the nursing home population between the 1982 NMFI and 1984-1985, were based upon National estimates that may not have accurately reflected the characteristics of homes in the survey States. Furthermore, as reported by NCHS, 35 States obtained at least some data for the NMFI independently under an arrangement with NCHS. In these States, the timing of surveys did not always coincide with the NMFI and licensing policies may have resulted in differing local opinions as to which facilities should be included in the survey (28). Other aspects of the survey may also have varied in these States (28). Because the nursing home population was growing at a rate of less than 5 percent per year, the impact of varied timing of surveys in these States is thought to be minimal.

Information on thousands of board and care homes, such as Adult Foster Care Homes in Michigan and Adult Congregate Living Facilities in Florida was not complete in the 1982 NMFI (28). Every effort was made to exclude residents of these facilities from both numerators and denominators in calculating tuberculosis case rates. Patients who were reported as residents of these homes were recorded as living in "other" institutions rather than in nursing homes and not included in determination of nursing home rates.

Estimates of correctional populations, as provided by the U.S. Department of Justice, were obtained from one-day counts conducted each December in Federal and State prisons. The jail population was imputed from the 1983 Jail Census, adjusted to reflect the increase in size seen in the total U.S. jail population between 1983 and 1984-1985 (Table 1). The study authors were cautioned that there was great variety among States in the growth of the jail population and that U.S. estimates of the growth of this population would be especially unreliable for individual States (Bureau of Justice Statistics, U.S. Department of Justice, unpublished data). Thus, incidence among jail inmates, especially for individual States, is perhaps the most unreliable of all measures reported from this survey. Jail population estimates, because of the extreme mobility of the population, are always suspect even without imputation to reflect population growth, and other authors have reported similar difficulty in obtaining useful estimates (13,29).

Other authors have discussed, in detail, both the strengths and weaknesses of Census Bureau estimates of the general population, as used in this study (30). Undercounting or overcounting of the general population could, of course, affect the validity of the survey results.

General population estimates and estimates of the nursing home population required adjustment to compensate for a lack of participation in the study by 2 large areas in the survey States -- Cook County (Chicago) in Illinois and Wayne County (Detroit) in Michigan. In each of the 2 States an estimate of the general population in the 2 age groups 65+ and 15-64 for the State exclusive of the non-participating area was needed. Age-specific general population estimates for the survey years for Cook county and Chicago were provided by the Illinois Department of Health. However, age-specific general population estimates for the survey years were not available for Wayne County or Detroit. The

assumption was made that the proportion of the Wayne county and Detroit population who were age 65+ and age 15-64 was similar to the proportion in Cook County (another large urban area) who were in these age groups. A similar set of assumptions was used to estimate the size of the nursing home population in each of the 2 States exclusive of non-participating counties. No adjustments of this type were needed for correctional populations because jail population counts are available by county.

IMPLICATIONS OF THE STUDY RESULTS

The survey is the first to examine TB incidence in the 2 largest institutional populations in the United States. The large size of the sample population and the finding of homogeneity in the extent of excess risk in each of the two types of institutions in low, medium, and high incidence States, (Figures 2 and 3), suggest a real association between crude TB incidence and residence in these institutions. No conclusions can be drawn from these data regarding the causes for the association (31,32).

It is evident that there are demographic differences between the institutional populations and the best available community populations used for comparison. Demographic characteristics may account for a significant proportion of the excess risk seen, especially in correctional facilities. Nursing home residents nationwide are older (suggesting a higher expected case rate) but much more likely to be female (suggesting a lower expected case rate) than elderly persons living in the community (1,2,28). Correctional inmates Nationwide are much more likely to be male and non-white than persons ages 15-64 in the community, both of which are factors suggesting a higher expected case rate (1,2,22). Because detailed enumeration of institutional populations with regard to age, race, and sex in these institutions in survey areas only during the survey years is not available (Long Term Care Statistics Branch, National Center for Health Statistics, unpublished data; Bureau of Justice

Statistics, U. S. Department of Justice, unpublished data), the extent to which factors such as age, race, and sex may account for the observed excess risk is not precisely known.

The public health implications of the observed excess risk of TB appear to be quite different for the 2 types of institutions. The survey results indicate that TB can be disproportionately more common in these institutions in any State, regardless of the background incidence of the disease. However, in the design of intervention strategies, factors such as the number of expected cases, the extent of excess risk, unique characteristics of the 2 institutional populations, changes that have occurred since the time the survey was conducted, and local and State issues are important.

Nursing Homes

Excess risk of TB among nursing home residents, when compared with persons of a similar age living in the community, was relatively small (relative risk 1.8). However, the population used for comparison, elderly persons, are themselves a group at high risk for TB (1,2). Today in most areas of the United States TB case rates are higher among the elderly than among any other age group and the elderly make up a large reservoir of tuberculous infection. The incidence of TB observed among nursing home residents, 39.2 per 100,000, was higher than incidence among prison inmates and nursing home residents produced twice as many TB cases as did correctional inmates.

Lengths of stay in nursing homes tend to be variable with a significant proportion of residents staying for short periods (33). Thus, tuberculous infection, if acquired in nursing homes, can result in TB cases in the community, in nursing homes, or in acute care hospitals. In each of these settings the risk of exposure and infection of persons in all age groups has been amply demonstrated in reported outbreaks (9-11).

The elderly are the fastest growing segment of the United States population, especially the oldest elderly (34). At the time of the 1980 Census, over 2 million persons, 9 percent of all elderly persons, were over the age of 85. By the year 2000 this number is expected to more than double, to more than 5 million, or 15 percent of elderly persons. It is certainly expected that greater numbers of elderly persons will create greater demands for care related to chronic disability (35). However, with rising costs associated with institutionalized care and the availability of numerous community- or home-based alternatives (i.e., personal care homes, congregate housing, life care, adult day care, home health care, etc.), the effect of the aging of the population on the size and characteristics of nursing home populations is unknown (35,36). Thus, although there appears to be a current need for concerted public health intervention aimed at prevention and control of TB in this setting, the future impact of TB related to nursing homes is difficult to determine. For the greatest impact, future TB control interventions for the elderly may need to focus on other settings where care is provided to the elderly in addition to nursing homes.

Correctional Institutions

Correctional institutions present a significant challenge for TB control during the 1990's. A major change has occurred in the problem of TB in correctional facilities since the survey was conducted. The epidemic of human immunodeficiency virus (HIV) has been shown to disproportionately affect residents of correctional facilities (12,29,37) and has been associated with a corresponding increase in correctional TB. The incidence of TB in New York State prisoners increased from 15.4 per 100,000 during the time period 1976 through 1978 to 116 per 100,000 in 1986-1988 (12,37). All State prison systems have identified some HIV among inmates, usually in association with a history of intravenous drug use (29). The occurrence in tandem of risk for both TB and HIV among inmates may have a major impact on TB

epidemiology in the 1990's (38,39).

Correctional inmates are different from nursing home residents with regard to a characteristic that has particular importance for public health -- they are younger. The median age for the over 200,000 prison inmates who are released to the community each year is 27 (40,41). One-third of released prisoners are under 25 (41). Young adults are the age group who have the 2 greatest opportunity to expose and infect children if TB develops following incarceration. The potential for infection of children and other household members, coupled with the long duration of risk for reactivation TB in these young adults themselves after incarceration, suggests a relatively large future public health impact related to correctional TB today. A strong association between correctional TB and TB in the community has been previously reported by Stead (14).

While nursing home populations may be growing slowly, inmate populations are experiencing explosive growth, with many facilities operating at well over capacity (6). This growth, with attendant crowding and increased potential for airborne spread of infection if cases occur and remain unidentified, is expected to continue into the 1990's (42). Additional inmates also means more releases to the community where the above-mentioned longer term impact may occur. Based upon these observations, a strong current and future need for strategies to prevent and control TB among correctional populations is apparent.

Recently published recommendations for prevention and control of TB in nursing homes and correctional institutions (15,16) call for the following activities: 1) immediate diagnostic measures, including sputum examinations and a chest radiograph for new entrants or employees who have signs and symptoms of infectious pulmonary disease; 2) TB screening for all at entry or upon

employment with the Mantoux tuberculin skin test, or with a chest radiograph for those who have a positive tuberculin skin test and/or HIV infection; 3) routine repeat tuberculin skin testing at least annually in most geographic areas for skin-test negative prisoners, prison and jail staff who work with prisoners, and for nursing home employees; 4) reporting of all cases of active TB to the local or State health department; 5) use of AFB isolation precautions (43) for patient who have active TB that may be infectious; 6) contact examinations following exposure to active pulmonary TB; and 7) provision of treatment and preventive therapy according guidelines established by the American Thoracic Society and CDC. The recommendations also emphasize the need for participation by the health department in policy development, training, outbreak investigations, examination of community contacts to active TB cases, medical followup for persons released while on treatment or preventive therapy, and maintenance of a case registry including cases reported by nursing homes and correctional institutions.

The survey results provide a baseline measure of TB risk associated with residence in nursing homes and correctional institutions in the United States during the mid 1980's. Consideration of the unique characteristics of the two institutional populations, combined with other issues of importance for specific geographic areas, provides a rationale for development of approaches for prevention and control of TB in these institutions.

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TABLE 1

Sources for Institutional Population Estimates and
Factors for which Adjustment was Performed

1310 2

<u>Population Estimated (29 Survey States only)</u>	<u>Database Used</u>	<u>Data Items Used</u>	<u>Factors for Which Adjustment Performed</u>
Nursing home residents, age 65+	1982 National Master Facility Inventory (NMFI) ¹⁷	Number of beds in nursing and related care homes with 3 or more beds, by State, 1982 (Includes beds in hospital based facilities as provided to NCHS by the American Hospital Assoc.)	National percent occupancy (91%). National proportion of residents who were age 65+ (87%). National change in size of the nursing home popula- tion from 1982 to the study midpoint, December 31, 1984 (increase of 5.44% in 2 years). (Personal communication, Long Term Care Branch, National Center for Health Statistics.)
Federal prison inmates	Average population counts for selected Bureau of Prisons Institutions, Fiscal years 1984 - 1985 (personal communication, Bureau of Prisons, US Dept. of Justice)	Average number of inmates in Federal prisons	Adjustment not required.
State prison inmates	Prisoners in custody of State correctional authorities, 1984 and 1985 (personal communication, Bureau of Justice Statistics, US Dept. of Justice)	Single-day count of prisoners in custody, December 31, 1984 and December 31, 1985	Adjustment not required.
Local jail inmates	1983 National Jail Census ¹⁸	Single-day count of persons being held in local jails, June 30, 1983	National change in size of the jail population from the 1983 census to 1984 and 1985 (increase of 5% from 1983 to 1984 ¹⁹ increase of 22% from 1983 to 1985) (Personal communication, Bureau of Justice Statistics, U.S. Department of Justice)

TABLE 2

Characteristics of TB Cases in 29 Survey States
and in the United States, 1984 - 1985

	<u>Survey States</u>	<u>U.S.</u>
Pulmonary major disease site	83.5%	83.4%
Culture positive	84.9%	84.4%
Reported at death	6.3%	5.3%
Cavitary disease	28.4%	27.1%*
Male	66.1%	65.0%
Nonwhite	51.0%	47.6%
Foreign-born	15.5%	19.6%*
Urban (city >100,000)	33.7%	45.7%
Age 0-14	5.1%	5.6%*
Age 15-64	62.9%	65.5%*
Age 65+	32.0%	28.9%*
Median age	53	50*
Total cases	15,379	44,456
Case rate per 100,000 per year	8.48	9.36

* Information on cavitary disease, foreign-born status, and age derived from 88% of U.S. cases for which this information is available. Other variables derived from 100% of U.S. cases.

TABLE 3

Characteristics of Nursing Home TB Cases and
Community TB Cases
Age 65 and Older

	<u>Nursing Home</u>	<u>Community</u>
Pulmonary major disease site	86.3%	84.7%
Culture positive	90.7%	88.3%
Reported at death	22.0%	12.4%
Cavitary disease	17.0%	21.0%
Male	53.3%	64.3%
Nonwhite	27.2%	33.5%
Foreign-born	4.2%	8.8%
Urban (city >100,000)	21.4%	27.3%
Age 65-74	20.8%	49.9%
Age 75-84	41.4%	37.6%
Age 85+	37.7%	12.6%
Median age	82	75

TABLE 4

Reported Tuberculosis Incidence Among Nursing Home Residents
and Community Residents, Age 65+, for States with
High, Medium, and Low Overall Tuberculosis Incidence, 1984-1985

	<u>Nursing Home</u>		<u>Community</u>	
	<u>TB</u> <u>Cases</u>	<u>Case</u> <u>Rate*</u>	<u>TB</u> <u>Cases</u>	<u>Case</u> <u>Rate*</u>
<u>High Incidence States</u>				
Alabama	18	48.6	463	50.0
Alaska	3	175.0	26	85.9
Delaware	2	39.9	31	23.5
District of Columbia	7	157.7	88	60.0
Florida	33	45.3	604	15.7
Georgia	31	53.4	350	31.5
Hawaii	1	14.2	96	51.6
South Carolina	15	66.1	242	37.2
Tennessee	55	118.9	537	49.0
TOTAL	165	64.7	2,437	29.9
<u>Medium Incidence States</u>				
Arizona	7	41.0	212	28.3
Connecticut	14	28.0	89	11.6
Louisiana	34	77.6	156	18.8
Massachusetts	26	27.8	222	15.1
Michigan [†]	17	25.1	273	18.8
New Mexico	5	91.7	82	30.5
Rhode Island	3	19.2	38	14.5
Virginia	29	53.6	382	34.6
Washington	10	19.1	100	10.6
West Virginia	8	37.8	117	23.8
TOTAL	153	36.4	1,671	20.0
<u>Low Incidence States</u>				
Colorado ^{††}	1	6.8	28	10.6
Idaho	1	13.2	16	7.6
Iowa	7	10.4	43	5.7
Illinois [§]	34	50.4	174	12.0
Maine	4	18.2	31	11.0
Minnesota	9	11.3	72	7.5
Nevada	0	0.0	19	10.8
South Dakota	2	13.8	14	7.4
Utah	2	22.1	27	10.9
Wyoming	1	26.8	8	10.0
TOTAL	61	21.0	432	9.4
TOTAL 29 SURVEY STATES	379	39.2	4,540	21.5

*Case rate per 100,000 per year

[†]Michigan exclusive of Detroit and Wayne County

^{††}Colorado 1984 only

[§]Illinois exclusive of Chicago and Cook County

TABLE 5

Characteristics of Correctional TB Cases and
Community TB Cases
Ages 15 - 64

	<u>Correctional</u>	<u>Community</u>
Pulmonary major disease site	89.8%	83.9%
Culture positive	87.7%	84.1%
Reported at death	1.1%	3.3%
Cavitary disease	35.1%	34.3%
Male	96.6%	68.2%
Nonwhite	62.2%	58.7%
Foreign-born	5.7%	19.8%
Urban (city >100,000)	42.9%	37.4%
Age 15-34	50.3%	32.3%
Age 35-54	40.7%	43.2%
Age 55-64	9.0%	24.6%
Median age	34	43

TABLE 6

Reported Tuberculosis Incidence Among Correctional Inmates
Ages 15 and Above and Community Residents, Ages 15-64, for States with
High, Medium, and Low Overall Tuberculosis Incidence, 1984-1985

	<u>Correctional</u>		<u>Community</u>	
	<u>TB</u> <u>Cases</u>	<u>Case</u> <u>Rate*</u>	<u>TB</u> <u>Cases</u>	<u>Case</u> <u>Rate*</u>
<u>High Incidence States</u>				
Alabama	16	48.4	578	11.2
Alaska	2	55.1	110	15.7
Delaware	0	0.0	71	8.5
District of Columbia	5	45.8	246	28.3
Florida	40	43.1	1,976	13.9
Georgia	41	70.0	1,102	14.0
Hawaii	1	27.7	301	21.3
South Carolina	12	48.3	709	16.0
Tennessee	11	37.8	548	8.7
TOTAL	128	49.1	5,641	13.5
<u>Medium Incidence States</u>				
Arizona	2	8.2	299	7.5
Connecticut	1	7.3	217	5.1
Louisiana	9	22.0	546	9.5
Massachusetts	6	33.5	539	6.9
Michigan [†]	4	7.8	346	3.3
New Mexico	1	13.7	96	5.2
Rhode Island	1	39.1	64	5.0
Virginia	6	17.3	499	6.4
Washington	10	47.6	273	4.7
West Virginia	0	0.0	111	4.4
TOTAL	40	18.1	2,990	5.8
<u>Low Incidence States</u>				
Colorado ^{††}	1	15.5	59	2.7
Idaho	1	25.8	32	2.6
Iowa	0	0.0	75	2.0
Illinois [§]	2	3.5	342	4.3
Maine	0	0.0	45	3.0
Minnesota	5	44.9	165	3.0
Nevada	2	21.3	54	4.2
South Dakota	2	74.9	34	3.9
Utah	0	0.0	41	2.1
Wyoming	0	0.0	5	0.8
TOTAL	13	11.9	852	3.2
TOTAL 29 SURVEY STATES	181	30.6	9,483	7.9

*Case rate per 100,000 per year

[†]Michigan exclusive of Detroit and Wayne County

^{††}Colorado 1984 only

[§]Illinois exclusive of Chicago and Cook County

TABLE 7

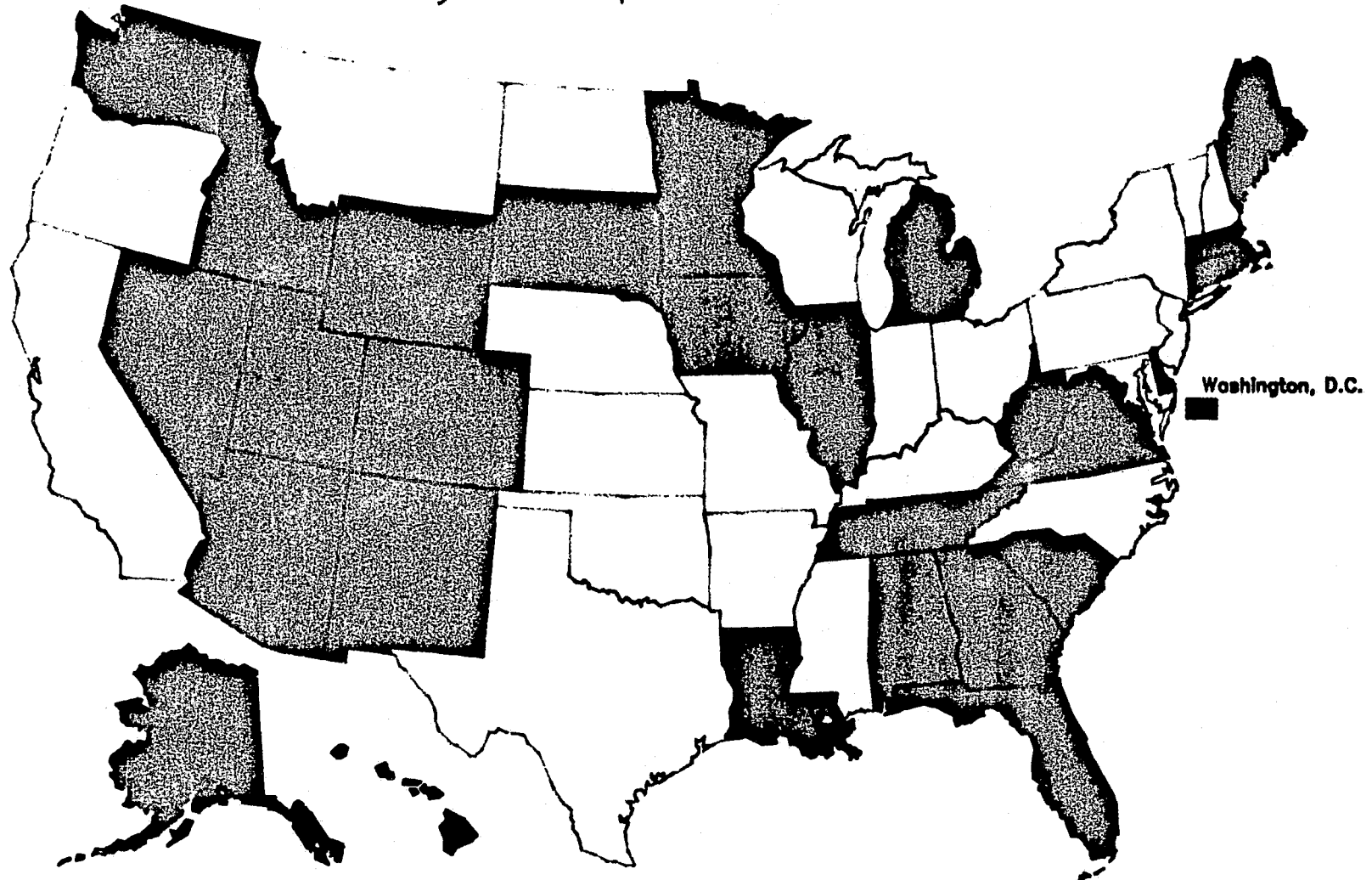
Reported TB Among Nursing Home Residents and
Community Residents, Age 65+, for Arkansas,
Indiana, and 29 Survey States, 1984-1985

	<u>Nursing Home</u>		<u>Community</u>		<u>Relative Risk</u> (95% C.I.)
	<u>TB Cases</u>	<u>Case Rate*</u>	<u>TB Cases</u>	<u>Case Rate*</u>	
Arkansas	60	179.8	285	44.5	4.0 (3.06,5.34)
Indiana	76	97.9	207	17.2	5.7 (4.38,7.40)
Survey States	379	39.2	4,540	21.5	1.8 (1.64,2.02)

* Case rate per 100,000 per year

FIGURE 1

State Health Departments Participating
In a Survey of Reported Tuberculosis Patients



Note: Illinois excludes Chicago and Cook County.
Michigan excludes Detroit and Wayne County.

FIGURE 2

Reported Tuberculosis Incidence Rates Among Nursing Home Residents and Community Residents, Age 65+, for States with High, Medium, and Low Overall Tuberculosis Incidence

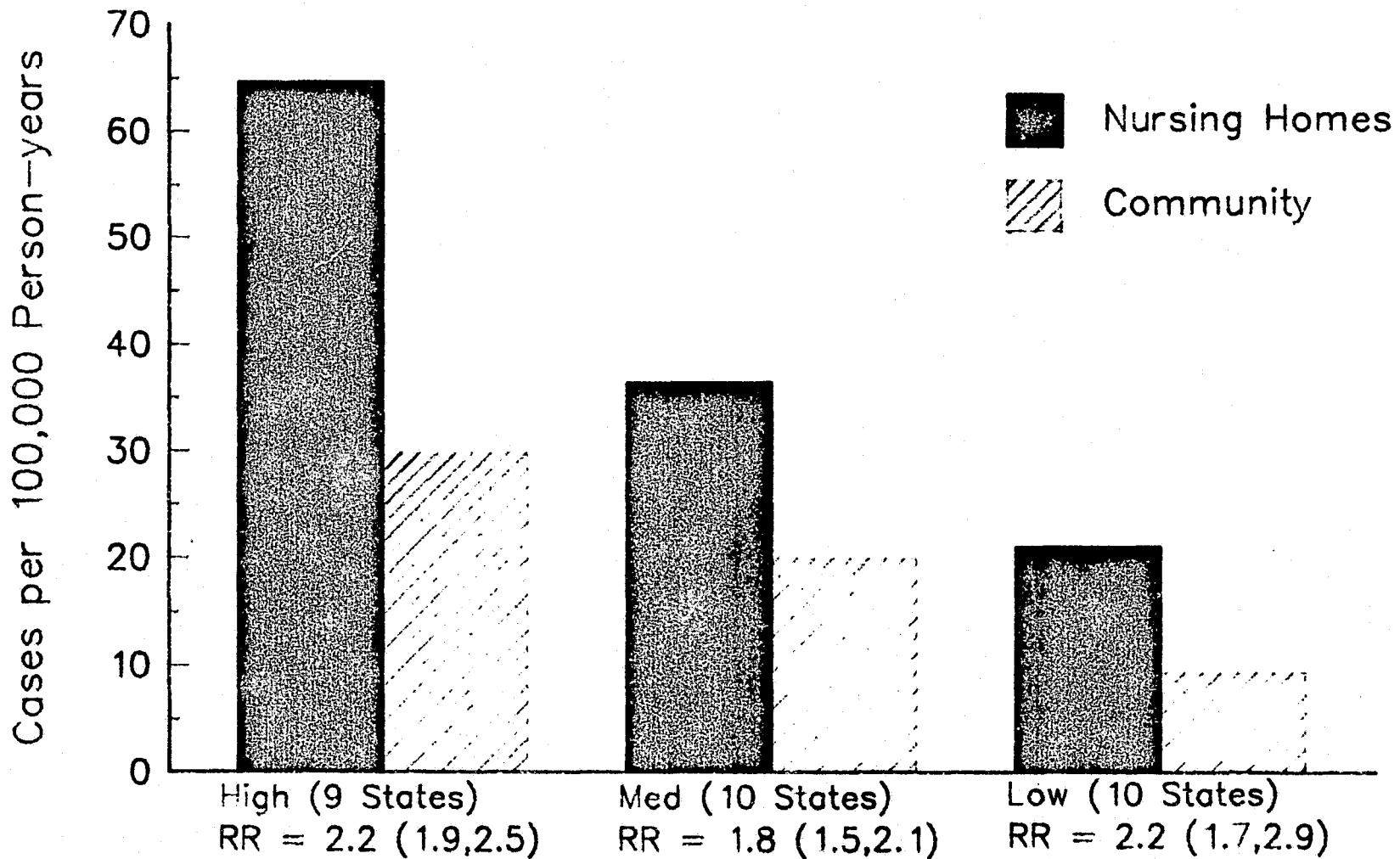


FIGURE 3

Reported Tuberculosis Incidence Rates Among Correctional Inmates, Age 15+, and Community Residents, Age 15-64, for States with High, Medium, and Low Overall Tuberculosis Incidence

