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## THE DISEASE PROFILE OF TEXAS PRISON INMATES

194052

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### **Abstract**

*Purpose:* Whereas prison inmates are reported to exhibit poorer overall health status and higher rates of health care utilization than the general population, no current information exists on the overall disease profile of the U.S. prison population. The present study examined the prevalence of major acute and chronic conditions in one of the nation's largest prison populations.

*Methods:* The study population consisted of 170,215 Texas Department of Criminal Justice inmates who were incarcerated between August 1997 and July 1998.

Information on medical conditions and sociodemographic factors was obtained from an institution-wide medical information system.

*Results:* Infectious diseases (29.6 %) constituted the most prevalent major disease category among inmates. This was followed by diseases of the musculoskeletal system and connective tissue (15.3 %), diseases of the circulatory system (14.0 %), mental disorders (10.8 %), and diseases of the respiratory system (6.3 %). Among the specific conditions examined, evidence of tuberculosis infection without active pulmonary disease (20.1 %) was found to be the most prevalent condition, followed by hypertension (9.8 %), asthma (5.2 %), low back pain (5.1 %), and viral hepatitis (5.0 %).

*Conclusion:* The present study shows that for a number of conditions, the prison population exhibited prevalence rates that were substantially higher than those reported for the general population. Moreover, estimates for a number of diseases varied substantially according to age, race, and gender. Understanding the disease profile in US incarcerated populations will permit correctional administrators to develop more efficient health care delivery systems for prison inmates.

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### **Abbreviations or acronyms**

Texas Department of Criminal Justice (TDCJ)

International Classification of Diseases (ICD)

### **Introduction**

Research indicates that prison inmates in the United States exhibit higher rates of health care utilization than the general population.<sup>1-5</sup> This excess has been attributed in part to prison inmates' increased risk for infectious disease<sup>2, 6, 7</sup> and mental disorders.<sup>8, 9, 13</sup> The prevalence of both tuberculosis and hepatitis, for example, are reported to be higher for prisoners than for their same-age peers in the general population.<sup>10-11</sup> Likewise, the incidence of AIDS and a number of other sexually transmitted diseases are reported to be substantially elevated among prisoners.<sup>2, 6-9</sup> Prison inmates are also reported to exhibit elevated rates of affective disorders, schizophrenic disorders, and substance abuse.<sup>8, 9, 12, 13</sup> Scarce information exists, however, on the many other medical conditions that underlie the high health care utilization rates of prisoners. This dearth of information has hindered the organization of effective health care delivery in prison systems. The purpose of the present investigation, therefore, was to examine the prevalence of major diseases, both infectious and chronic, in one of the nation's largest prison populations.

### **Methods**

The cohort under study consisted of 170,215 prison inmates who were incarcerated in the Texas Department of Criminal Justice (TDCJ) system for any duration dating from August 1997 through July 1998. Texas houses one of the largest prison populations in the US<sup>12</sup> and together with California houses almost one-third of all US prison inmates.<sup>12</sup> All inmates included in the present study population have been convicted of criminal offenses. Diagnoses of all medical conditions were made by physicians or mid-level practitioners at the time of each inmate's initial evaluation and/or subsequent medical encounters, and were classified according to International Classification of Disease (ICD-10) coding system. All inmates in Texas are required to have medical and mental health examinations at the time of intake. This evaluation lasts

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approximately 60 minutes and consists of a detailed medical and mental health history, a comprehensive medical physical examination, and a number of diagnostic procedures including a rapid plasma reagin (RPR), Mantoux TB skin test, and other tests as indicated. In the present study, TB class 2 (generally defined as tuberculosis infection without evidence of active pulmonary disease) was defined as a presentation of 10 mm or more induration (5 mm if the inmate was HIV positive) from a tuberculin skin test or documented history of a positive tuberculin skin test, followed by a negative chest x-ray.

All of the aforementioned data, along with sociodemographic information, are maintained in an institution-wide medical information system. This system is routinely updated to ensure that the information is reflective of the inmates' current health status. Prevalence estimates were employed to assess the proportion of inmates with a given medical condition during the study period. The present study assessed only those medical conditions that were present during the period of investigation. Prevalence of the major ICD-10 disease categories and specific medical conditions were estimated across gender and ethnic groups.<sup>13</sup> As a result of the large denominators associated with the present study population, race and gender differences in prevalence were all statistically significant. Due to space limitations, however, 95 percent confidence intervals were not presented. Inmates who presented with more than one medical condition were included in the tabulation of each of the diseases with which they presented. Inmates who were not identified as white, black or Hispanic comprised less than one percent of the population, and were therefore included in the white category.

## Results

Sociodemographic characteristics of the total TDCJ inmate population are presented in table 1. The vast majority of inmates were male and between 30-49 years old. Blacks constituted 44 percent of the total inmate population, while whites and Hispanics represented 30 and 26 percent, respectively. Prevalence estimates of all major

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International Classification of Disease (ICD-10) categories in the TDCJ study population are presented overall and for males and females separately in table 2. Infectious diseases comprised the most common category of health conditions in the Texas prison system. Diseases of the musculoskeletal system and connective tissue were the second most common disease group overall. Interestingly, whereas this category is ranked second among males, it ranked only third among females. Diseases of the circulatory system comprised third most common disease group among males, and the fifth most common among females. Table 3 presents the prevalence of major conditions according to ethnicity. Hispanics exhibited lower overall disease rates than whites or blacks. In all of the ethnic groups, however, the top four disease categories consisted of: infectious disease, mental disorders, diseases of the circulatory system, and diseases of the musculoskeletal system and connective tissue.

Table 4 shows the number of medical conditions according to sociodemographic factors in the study population. Sixty percent of the study population exhibited at least one medical condition during the one-year study period. This proportion was higher among females than among males; and higher among whites and blacks than among Hispanics. The proportion of the study population that exhibited two or more medical conditions during the study period was higher among females than among males; and higher among whites than among blacks or Hispanics.

Table 5 presents prevalence estimates of specific diseases for the entire study population according to gender and ethnicity. The first column shows that evidence of tuberculosis (TB) infection, as defined by a positive tuberculin skin test, was the most common condition in the TDCJ, occurring in 20.1 percent of inmates. Hypertension was ranked second, followed by asthma, low back pain, viral hepatitis and affective disorders. Of the fifteen most prevalent conditions, ten were chronic conditions, two were mental disorders, and three were infectious diseases. Among male inmates, positive tuberculin skin tests were more prevalent among blacks and Hispanics than among whites.

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Similarly, hypertension, the second most prevalent disease overall, was more prevalent among blacks males than among Hispanics or whites. Affective disorders, which include major depression and dysthymia, was much more prevalent among whites than among either blacks or Hispanics. Among female inmates, positive tuberculin skin tests were more common among blacks than among Hispanics or whites. By contrast, viral hepatitis was more prevalent among white and Hispanic females, than it was among black females. As in the male population, affective disorders were much more common among whites than either Hispanics or blacks. Finally, infection with HIV was more common among black females than among either white or Hispanic females.

Table 6 presents disease prevalence among TDCJ inmates according to gender and age. Among males, a number of medical conditions exhibited stepwise increases in prevalence according to age: hypertension, low back pain, diabetes, arthritis, hernia and heart disease. In particular, hypertension and diabetes were strikingly more prevalent in the 50 and over age group than in the two younger age groups. Similar age-disease patterns among female inmates: tuberculosis class 2, affective disorder, hypertension, asthma, arthritis, diabetes, low back pain, and heart disease. Particularly noteworthy is that hypertension, arthritis, diabetes, and heart disease all exhibited dramatic increases in female inmates who were 50 and over subgroup.

## DISCUSSION

The purpose of the present study was to describe the patterns of disease prevalence in the Texas Department of Criminal Justice (TDCJ) prison population. The findings show that 53.0 percent of the study population exhibited at least one medical condition during the twelve-month study period. As reported, this proportion varied substantially according to race, gender, and age. The study population also exhibited a number of interesting specific disease patterns, many of which also varied substantially according to the sociodemographic factors under study.



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Our findings support previous research that has indicated higher rates of health problems among prison inmates than the general population.<sup>1-5</sup> Examination of chronic conditions in the TDCJ inmate population yielded some particularly interesting findings. Hypertension was the most common chronic disease with a prevalence estimate of 9.8 percent. This estimate is remarkably consistent with that reported for the general population, reported at 10.0 percent<sup>14</sup> but substantially higher than that reported by Novick and colleagues in their study of New York city inmates (3 percent).<sup>9</sup> Among both males and females, Hispanics demonstrated a lower prevalence of hypertension than either whites or blacks. These ethnic patterns are reflective of those reported for the general population.<sup>15</sup> Diabetes mellitus occurred in 2.6 percent of TDCJ inmates. This estimate is approximately equal to that reported for a general US population (2.9 percent)<sup>14</sup>, but higher than that reported for New York City prison inmates (0.6 percent).<sup>9</sup> In the present study, diabetes was more common among Hispanics and blacks than among whites. This pattern, present in both male and female inmates, is reflective of ethnic patterns in the general US population.<sup>16</sup>

Our findings show that a number of chronic conditions increased dramatically with age. In fact, among both male and female inmates, hypertension, diabetes, and arthritis all more than doubled in the 50 and over subgroup. These findings are consistent with a number of investigations<sup>21-23</sup> that have reported higher disease prevalence, especially for chronic conditions, among elderly inmates. As a result of longer prison sentences, restrictive prison release policies, and the aging of the general population, the U.S. prison population is aging<sup>21</sup>. Given elderly inmates' increased occurrence of chronic and particularly costly medical conditions<sup>23</sup>, epidemiologic information on this segment of the prison population will be integral to proper planning of correctional health care.

Prison inmates have long been recognized as exhibiting higher rates of affective disorders, schizophrenic disorders, and substance abuse than their counterparts in the free world.<sup>9, 12, 13, 23</sup> Inmates are reportedly twice as likely to have a lifetime history of

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psychiatric disorder than non-incarcerated adults and are substantially more likely to have multiple psychiatric disorders.<sup>17, 18</sup> In the present study, mental disorders constituted the third most common major disease category among females and the fourth most common among males. In fact, two mental disorders were among the 15 most prevalent specific diseases in the study cohort. Affective disorders were the sixth most common disease, with an estimated prevalence of 3.9 percent. This finding was consistent with that reported for the general population, estimated at 3.7 percent.<sup>19</sup> However, in her two studies of male jail detainees, Teplin<sup>12,13</sup> reported prevalence estimates of 3.4 and 3.9 percent for current major depression; this classification did not include dysthymia or other affective disorders, both of which were included in the present study.

Schizophrenic disorders constituted the twelfth most common disease with an estimated prevalence of 2.0 percent. This estimate was slightly higher than that reported for the general population, estimated at 1.0 percent.<sup>20</sup> Teplin<sup>12,13</sup> reported a prevalence of schizophrenia of 2.7<sup>12</sup> and 2.9<sup>13</sup> for male jail detainees. This estimate was slightly higher than that exhibited by TDCJ male inmates (1.9 percent).

Consistent with a number of previous studies,<sup>6,9</sup> the present investigation suggests that TDCJ inmates were particularly susceptible to a number of infectious diseases. Because scarce information exists on the prevalence of infectious disease on random samples of the general population, it was difficult to determine the extent to which TDCJ inmates exhibited elevated rates of infectious disease. By far, the most prevalent medical condition exhibited by TDCJ inmates was evidence of TB infection without active pulmonary infection, present in 20.1 percent of TDCJ inmates. Inmates who are infected with TB can, as a result of immune suppression or other causative factors, develop active pulmonary TB. Therefore, all TDCJ inmates who test positive for TB but exhibit a negative chest x-ray are placed on a clinically indicated regimen of prophylactic Isoniazid therapy. The 20.1 percent prevalence of TDCJ inmates who exhibited a positive tuberculin skin test is higher than such prevalence estimates reported

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among New Mexico male prison inmates (10.3 percent)<sup>29</sup> and Maryland state male prison inmates (12.7 percent)<sup>30</sup> but slightly lower than that reported among New York State inmates (27.0 percent)<sup>31</sup> and Chicago inmates (22.3 percent).<sup>6</sup> Due to high-rates of HIV-associated immunosuppression, crowded living conditions, and often poor ventilation systems, US prisons constitute a particularly high risk environment for the rapid spread of tuberculosis.<sup>23</sup> In fact, prevalence of TB in prisons has risen dramatically in the 1980s and 1990s as more HIV-infected inmates have entered the prison system.<sup>31</sup> Moreover, following release from prison, inmates have been reported to spread tuberculosis to their home communities.<sup>32</sup> Obtaining accurate information on both active pulmonary TB and evidence of TB infection in prison populations, therefore, is critical if prison health care providers are to prevent and control institution-wide TB epidemics.

Viral hepatitis was the fifth most common condition among TDCJ inmates, with an estimated prevalence of 5.0 percent. This estimate is slightly lower than that reported among New York city inmates, estimated at 8 percent.<sup>9</sup> Braithwaite and colleagues<sup>10</sup> determined that the prevalence of hepatitis in prisons has been reported to range from 2.3 to 67.2 percent. HIV infection was the fifteenth most prevalent condition in the TDCJ system, estimated at 1.6 percent. For both males and females, HIV infection was substantially more prevalent among blacks than among whites or Hispanics. Research based on mandatory screening and blinded seroprevalence studies among inmates shows that HIV infection rates vary substantially from system to system.<sup>10</sup> While most prison systems are reported to have rates of HIV infection at 1.0 percent or below, some are reported to have rates as high as 20-26 percent. The high rates of HIV among prison populations are attributable to high-risk behaviors in which a number of criminals reportedly engage prior to incarceration. For example, 40 to 80 percent of prison inmates are reported to have used intravenous drugs.<sup>32</sup> Eleven percent of incarcerated men are reported to have had sex with a prostitute, while between two and four percent are reported to have engaged in bisexual or homosexual relationships.<sup>32</sup> A number of

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investigations have reported that HIV transmission may occur following incarceration. In fact, two studies<sup>33,34</sup> have documented intraprisn spread of HIV infection. It is important to note that the lack of mandatory HIV and hepatitis screening processes in place in the TDCJ system during the study period may have resulted in underestimation of both of these conditions.

A number of methodologic factors precluded direct comparison of the study population with the general population. For example, the disease diagnosis protocol employed in the present study may not be reflective of the methodology used to estimate prevalence in the general population. Moreover, the age distribution of prisoners is substantially different from that of the general population. In interpreting results it is important to consider that prison populations are, on average, younger than the general population. In fact, only 8 percent of the present study population was over the age of 50. Moreover, comparisons with previous prison inmate populations are hampered by non-parallel periods of follow-up. Clearly, this issue is less problematic in assessing persistent, chronic conditions than it is in evaluating short-term, acute conditions. A study design in which parallel methods are employed to estimate disease prevalence in both prison and general population samples would permit age-adjusted direct comparisons between incarcerated and nonincarcerated samples. It is also important to note that diagnoses of medical conditions in the present study were made by several practitioners at different prison sites. While practitioners relied on standardized institutional clinical guidelines to make all diagnoses, no system-wide data on the reliability and validity of such diagnoses was available for assessment. Consequently, prevalence information reported in this study is subject to biases generally associated with clinically obtained data. In short, while the present study provides compelling preliminary evidence that prison inmates have elevated risk for a number of diseases, the extent to which the disease burden exceeds that of the general population is not yet clear.

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Research indicates that the following factors may contribute to prisoners' excess disease prior to incarceration: low socioeconomic status<sup>2, 10</sup> poor access to health care in their home communities,<sup>2</sup> and high risk behaviors.<sup>2</sup> Following incarceration, a number of environmental factors including crowded living conditions, lack of temperature control, poor sanitation, and increased psychological stress<sup>2, 10</sup> may further contribute to excess disease among inmates. Despite the high rates of health care utilization among prison inmates, correctional medicine is substantially behind other health care fields in its understanding of the health care needs of their patient populations.<sup>2</sup> To organize efficient delivery of health care in prison systems, correctional administrators need detailed information on the disease patterns of their populations. To this end, it will be important for future investigations to continue to explore the disease profile of inmate populations.

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**Table 1: Sociodemographic Characteristics of the TDCJ Inmate Population**

Variable	Overall (n=170,215)		Males (n=155,949)		Females (n=14,268)	
	n	%	n	%	n	%
<b>Race</b>						
White	50,322	30	45,375	29	4,949	35
Hispanic	44,202	26	42,200	27	2,002	14
Black	75,691	44	68,374	44	7,317	51
<b>Age</b>						
18-29	54,995	32	51,486	33	3,508	25
30-49	102,194	60	92,074	59	10,117	71
50+	13,027	8	12,384	8	643	4

**Table 2: Prevalence of major disease categories in the TDCJ Prison system<sup>a</sup>**

Disease	Overall (n=170,215)		Males (n=155,947)		Females (n=14,268)	
	Frequency	Prevalence	Frequency	Prevalence	Frequency	Prevalence
Infective and Parasitic Disease	50,336	29.6	45,144	28.9	5,288	37.0
Neoplasms	1,239	0.7	1,116	0.7	123	0.9
Endocrine, Metabolic, Nutritional and Allergic Diseases	5,569	3.3	4,996	3.2	573	4.0
Diseases of the Blood and Blood-forming Organs	838	0.5	731	0.5	107	0.8
Mental Disorders	18,368	10.8	15,539	10.0	2,828	19.8
Diseases of the Nervous System and Sense Organs	7,132	4.2	6,409	4.1	723	5.1
Diseases of the Circulatory System	23,828	14.0	22,066	14.2	1,762	12.4
Diseases of the Respiratory System	10,808	6.3	9,665	6.2	1,143	8.0
Diseases of the Digestive System	10,034	5.9	9,045	5.8	989	6.9
Diseases of the Genitourinary System	1,267	0.7	952	0.6	315	2.2
Diseases of the Skin and Subcutaneous Tissue	4,114	2.4	3,745	2.4	369	2.6
Diseases of the Musculoskeletal System and Connective Tissue	6,093	15.3	23,917	15.3	2,174	15.2
Congenital Anomalies	689	0.4	652	0.4	37	0.3

<sup>a</sup> = prevalence estimates represent the percentage of inmates with a given disease during the study period

**Table 3: Prevalence of major disease categories in the TDCJ Prison system according to race<sup>a</sup>**

	White (n=50,322)		Hispanic (44,204)		Black (n=75,691)	
	Frequency	Prevalence	Frequency	Prevalence	Frequency	Prevalence
Infective and Parasitic Disease	11,925	23.7	12,004	27.2	26,407	34.8
Neoplasms	503	1.0	227	0.5	509	0.7
Endocrine, Metabolic, Nutritional and Allergic Diseases	1,475	2.9	1,454	3.3	2,640	3.5
Diseases of the Blood and Blood-forming Organs	139	0.3	97	0.2	602	0.8
Mental Disorders	7,888	15.7	2,644	6.0	78,361	10.4
Diseases of the Nervous System and Sense Organs	2,457	4.9	1,380	3.1	3,295	4.4
Diseases of the Circulatory System	67,241	13.4	38,301	8.7	13,274	17.5
Diseases of the Respiratory System	3,662	7.3	1,190	2.7	5,956	7.9
Diseases of the Digestive System	3,652	7.3	2,282	5.2	4,100	5.4
Diseases of the Genitourinary System	451	0.9	237	0.5	579	0.8
Diseases of the Skin and Subcutaneous Tissue	1,301	2.6	763	1.7	7,050	2.7
Diseases of the Musculoskeletal System and Connective Tissue	9,513	18.9	4,931	11.2	11,649	15.4
Congenital Anomalies	304	0.6	128	0.3	257	0.3

<sup>a</sup> = prevalence estimates represent the percentage of inmates with a given disease during the study period

**Table 4: Number of TDCJ inmates with Diagnosed Medical Conditions during the Study Period<sup>a</sup>**

Variable	No medical conditions	1+ medical condition(s)	2 + medical conditions
Overall	39.6	60.4	31.9
Gender			
Male	40.4	59.6	30.9
Female	30.7	69.3	42.4
Race			
White	35.1	64.9	36.8
Hispanic	49.8	50.3	21.6
Black	36.5	63.4	34.6
Age			
18-29	56.3	43.7	16.0
30-49	33.6	66.3	36.7
50+	15.4	84.6	60.8

<sup>a</sup>= prevalence estimates represent the percentage of inmates with a given disease during the study period

**Table 5: 15 most prevalent diseases according to gender and ethnicity<sup>a</sup>**

Disease	Entire cohort			White		Hispanic		Black	
	All	Males	Females	Males	Females	Males	Females	Males	Females
1. Tuberculosis (class 2) <sup>b</sup>	20.1	20.4	16.2	14.6	10.4	20.4	16.9	24.2	19.9
2. Hypertension	9.8	9.8	10.1	7.3	6.4	4.9	5.0	14.0	14.0
3. Asthma	5.2	5.0	7.4	5.1	8.7	1.9	3.6	6.7	7.5
4. Low Back Pain	5.1	5.3	2.6	6.2	3.1	4.4	2.4	5.2	2.2
5. Viral Hepatitis	5.0	4.6	8.5	6.2	11.6	4.2	9.5	3.8	6.1
6. Affective Disorders	3.9	3.3	10.2	6.1	15.1	1.7	7.2	2.5	7.8
7. Arthritis	3.5	3.3	4.7	4.1	5.7	2.4	4.2	3.4	5.0
8. Fractures	2.9	3.0	1.3	3.9	1.5	2.1	1.1	3.0	1.2
9. Cirrhosis	2.8	2.6	5.2	3.5	6.3	2.4	6.0	2.0	4.3
10. Diabetes Mellitus	2.6	2.6	2.8	2.0	1.7	2.8	3.3	2.8	3.3
11. Hernia	2.0	2.1	0.6	2.4	0.4	1.9	0.5	2.0	0.7
12. Schizophrenic Disorders	2.0	1.9	2.7	1.6	1.0	1.1	0.8	2.6	4.7
13. Epilepsy	1.9	1.9	2.1	2.3	2.2	1.1	1.9	2.0	1.9
14. Heart Disease	1.7	1.5	2.0	2.2	1.7	0.8	1.2	1.4	2.4
15. HIV/AIDS	1.6	1.5	2.4	1.3	1.4	0.6	1.0	2.3	3.5

<sup>a</sup>= prevalence estimates represent the percentage of inmates with a given disease during the study period

<sup>b</sup>= TB (class 2) was defined as a presentation of 10 mm or more induration from a tuberculin skin test or documented history of a positive tuberculin skin test, followed by a negative chest x-ray.

**Table 6: 15 most prevalent diseases according to gender and age**

Disease	Entire cohort		18-29 years		30-49 years		50 and older		
	All	Males	Females	Males	Females	Males	Females	Males	Females
1. Tuberculosis (class 2) <sup>b</sup>	20.4	20.4	16.2	11.0	8.1	23.9	18.1	33.2	29.4
2. Hypertension	9.8	9.8	10.1	3.2	2.2	10.7	10.8	30.2	41.9
3. Asthma	5.2	5.0	7.4	5.5	6.7	4.7	7.4	4.5	10.2
4. Low Back Pain	5.1	5.3	2.6	2.5	0.7	6.4	2.9	9.0	6.4
5. Viral Hepatitis	5.0	4.6	8.5	1.3	3.5	6.2	10.2	6.4	9.3
6. Affective Disorders	3.9	3.3	10.2	2.7	7.6	3.6	10.9	3.3	13.7
7. Arthritis	3.5	3.3	4.7	0.9	1.4	3.7	5.4	10.8	2.2
8. Fractures	2.9	3.0	1.3	2.6	0.8	3.1	1.4	3.7	2.8
9. Cirrhosis	2.8	2.6	5.2	0.6	2.1	3.5	6.2	3.9	6.7
10. Diabetes Mellitus	2.6	2.6	2.8	0.4	0.4	2.6	3.0	11.2	11.6
11. Hernia	2.0	2.1	0.6	1.2	0.3	2.2	0.6	4.7	1.2
12. Schizophrenic Disorders	2.0	1.9	2.7	0.9	1.6	2.5	3.1	1.8	3.1
13. Epilepsy	1.9	1.9	2.1	1.3	3.9	2.1	2.1	2.1	3.9
14. Heart Disease	1.7	1.5	2.0	0.4	0.6	1.2	2.0	8.4	8.9
15. HIV/AIDS	1.6	1.5	2.4	0.7	1.8	2.1	2.7	1.1	1.6

a= prevalence estimates represent the percentage of inmates with a given disease during the study period

b= TB (class 2) was defined as a presentation of 10 mm or more induration from a tuberculin skin test or documented history of a positive tuberculin skin test, followed by a negative chest x-ray.

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