# Rapidly Growing Mycobacterial Infection Following Liposuction and Liposculpture—Caracas, Venezuela, 1996-1998

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FROM THE CENTERS FOR DISEASE CONTROL AND PREVENTION

CDC MMWR MORBIDITY AND MORTALITY WEEKLY REPORT

# Rapidly Growing Mycobacterial Infection Following Liposuction and Liposculpture—Caracas, Venezuela, 1996-1998

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DURING OCTOBER 1996-MARCH 1998, nine patients in eight hospitals in Caracas, Venezuela, acquired surgical-site infections (SSI) caused by rapidly growing mycobacteria (RGM). All episodes of RGM infection occurred within 2 months after liposuction or liposculpture (aesthetic surgical procedures). This report describes the findings of an epidemiologic investigation of this cluster by the Venezuelan Ministry of Health and underscores the importance of sterilizing surgical equipment to prevent nosocomial infections.

A confirmed case was defined as RGM in a patient who underwent liposuction or liposculpture during October 1996-March 1998 (study period) in a surgical facility in Caracas, in whom local signs of SSI were present and for whom cultures of surgical site drainage grew RGM. A probable case was defined as RGM in a patient who underwent liposuction or liposculpture in a surgical facility in Caracas during the study period, who had local signs of infection at the surgical site, and for whom microscopic examination of stained smears of surgical site drainage were positive for acid-fast bacilli.

Seven confirmed and two probable cases from eight hospitals were identified. All case-patients were previously healthy women aged 28-49 years (median: 37.5 years). Eight surgeons and surgical teams performed the cosmetic surgery on the women. All nine case-patients underwent general anesthesia during their surgical procedure; procedures consisted of abdominal liposuction (seven patients), anterior and posterior thigh liposuction (three), or bilateral nasolabial fold liposculpture (two). The median time from surgical procedure to onset of infection was 15 days (range: 4-45 days). Clinical findings included fever, local inflammation, microabscesses, purulent drainage from the wound, or fistulae.

Seven case-patients had culture-confirmed RGM; species identified were *Mycobacterium chelonae* (four patients), *M. fortuitum* (two), and *M. abscessus* (one). Molecular typing of RGM isolates were not performed.

All hospitals cleaned surgical instruments (i.e., liposuction and liposculpture cannulae) with tap water and soap followed by low-level disinfection with a commercial quaternary ammonium solution. Environmental cultures, including cultures of tap water, at two surgical units did not yield bacteria or mycobacteria. The epidemiologic investigation did not reveal risk factors such as exposure to certain persons, cleaning solutions, medical supplies, or contaminated quaternary ammonium compounds.

Following the outbreak in Caracas, two of the affected surgical facilities modified their reprocessing procedures for surgical instruments (including suction cannulae) used in cosmetic surgical procedures by replacing quaternary ammonium compounds used for low-level disinfection with either high-level disinfection using 2% gluteraldehyde or ethylene oxide gas sterilization. No further cases of RGM infections complicating cosmetic surgical procedures in Caracas have been reported.

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**CDC Editorial Note:** This is the first official report to CDC of SSI caused by RGM following liposuction or liposculpture. Both surgical procedures involve small surgical wounds with limited environmental exposure; both require using cannulae for tissue suction. The underlying mechanism for the cluster of SSI described in this report was not determined. However, potential causes included contaminated tap water used in cleaning cannulae during liposuction or liposculpture or contamination of the quaternary ammonium solution used to disinfect these instruments.

Nosocomial infections associated with contaminated quaternary ammonium compounds that were used to disinfect patient-care supplies or equipment (e.g., cystoscopes, cardiac catheters, or surgical instruments) have been reported; none of these infections were caused by RGM. Quaternary ammonium compounds are used widely as low-level disinfectants.[1] Surgical instruments used in liposuction and liposculpture procedures are critical items (i.e., intended to enter a normally sterile environment, sterile tissue, or the vasculature) according to the Spaulding Classification.[2] Critical items should be sterilized between patient procedures.

Based on the risk for contamination of postsurgical wounds, aesthetic surgical procedures such as liposuction or liposculpture are considered clean wounds according to the classification system developed by the National Research Council.[3] National Nosocomial Infections Surveillance (NNIS) system data indicate that among 5652 integumental surgical procedures (including aesthetic surgical procedures with risk index=0) performed during 1986-1996 in the United States, only 1.4% were complicated by SSI.

SSI caused by RGM following aesthetic surgical procedures is rare. Reports include infection following augmentation mammoplasty procedures[4,5] and an outbreak of infection following either face-lift or augmentation mammoplasty procedures that implicated using contaminated gentian violet skin-

marking solution as the source of infection.[6]

The Venezuelan Ministry of Health operates a national program for surveillance of antimicrobial resistance, and some of the large university hospitals occasionally provide rates of specific hospital-acquired infections. However, no active surveillance programs exist for SSI or systematic monitoring of tap water for microorganisms in health-care settings.

To prevent SSI in health-care settings, all surgical instruments used in liposuction or liposculpture procedures should be cleaned carefully after the procedure and sterilized in accordance with a validated reprocessing protocol provided by the medical device manufacturer. The exclusive use of low- or intermediate-level disinfectants to reprocess surgical instruments between patient procedures is inconsistent with the Food and Drug Administration guidance and recommended standards of practice.[1,2]

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# Fatal Car Trunk Entrapment Involving Children—United States, 1987-1998

*MMWR. 1998;47:1019-1022*

*1 table omitted*

DURING JULY-AUGUST 1998, AT LEAST 11 U.S. children died in three separate incidents of car trunk entrapment. This report summarizes these three incidents, describes characteristics of car trunk entrapment incidents involving children since 1987, and reviews measures to prevent children from becoming trapped in car trunks. The findings indicate that at least nine incidents of fatal car trunk entrapment involving children occurred during 1987-1998, that all incidents occurred in hot weather and involved children aged less than or equal to 6 years, and that these deaths were preventable.

## Case Reports

**Incident 1.** On July 13, 1998, at approximately 6 PM, four children aged 2-5 years were discovered inside the closed trunk of a car in Gallup, New Mexico. The children had climbed into the car's open trunk and had not been seen for 1 hour before a search began. They were found approximately 1 hour after the search began. The outside ambient temperature that afternoon was 90 F (32.2 C). The children were rushed to a local emergency department, where three were pronounced dead. The remaining child, a 5-year-old girl, was transported to a tertiary-care hospital, where her rectal temperature was recorded at 108 F (42.2 C); she died on July 14. No carbon monoxide was detected in blood samples of the children. The autopsy report cited hyperthermia and asphyxia as the causes of death.

**Incident 2.** On August 2, 1998, at approximately 1 PM, two brothers aged 2 and 5 years from Greene County, Pennsylvania, were found dead in the trunk of their parents' car in front of their house. The boys had found the car keys, opened the trunk, and climbed inside. They were missing for several hours during the morning and early afternoon. The outside ambient temperature that afternoon was approximately 85 F (29.5 C). The autopsy report cited hyperthermia and asphyxia as the causes of death.

**Incident 3.** On August 8, 1998, at 4:15 PM, five girls in West Valley City, Utah, aged 2-6 years, were found dead inside the trunk of a car owned by one of the children's parents. The car had been parked at one of the children's residence. The outside ambient temperature was 100 F (37.8 C). The vehicle's trunk-release lever was adjacent to the driver's seat, and at least one of the two 6-year-old girls reportedly knew how to operate the release lever. The children had not been seen for approximately 20 minutes before a search began and were found approximately 1½ hours after the search began. Liver temperatures taken at the death scene 1½-2 hours after the children were found ranged from 99 F to 117 F (37.2 C to 47.2 C). The autopsy report cited the cause of death as hyperthermia.

## Surveillance for Fatalities Associated With Trunk Entrapments, 1987-1998

The LEXIS-NEXIS database[1] was used to search newspapers, magazines, wire services, and broadcast transcripts for additional deaths associated with car trunk entrapment. During 1987-1998, nine incidents were identified of fatal car trunk entrapment involving children, including the three incidents described in this report.

Medical examiner/coroner (ME/C) offices were contacted for information about death investigations and autopsy findings. ME/C offices provided written and verbal cause-of-death information for seven of the incidents, and for two incidents, information was obtained from media sources, who cited coroner's reports for cause-of-death information.

A total of 19 children aged less than or equal to 6 years died in the nine incidents. Eighteen children underwent autopsies. The cause of death for all children was either hyperthermia or a combination of hyperthermia and asphyxia. Three of the nine incidents occurred during the summer of 1998 and accounted for 11 (58%) of the 19 deaths. Eight incidents occurred when outside ambient temperatures were at least 90 F (32.2 C), and at least five (56%) of the cars involved were parked in direct sunlight.

The method of trunk entry varied among the nine incidents. In two incidents, children found the keys to their parents' cars and opened the trunks. In two other incidents, children entered trunks without using a key—either a driver's side trunk-release lever or a manual release on the trunk itself was present. In one additional incident, four children climbed into an open trunk. The method of trunk entry could not be determined for the remaining four incidents. At least 15 children died in cars parked either at their own houses or at a relative's or neighbor's house. In three incidents, a dead child was alone in the trunk. In one incident, one 3-year-old child survived, and a 4-year-old child died. In six incidents, children were missing approximately 1 to 2½ hours. In two other incidents, they were missing for 5-8 hours.

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**CDC Editorial Note:** Although heat-related deaths in the United States have been described previously,[2,3] the number and characteristics of car trunk entrapment-related deaths have not been described, and the identified cases probably represent a minimum number of such deaths. No surveillance system exists to detect or report car trunk entrapment-related deaths, and no *International Classification of Diseases*, Ninth Revision, external cause-of-injury code exists for deaths associated with car trunk entrapments.

Heatstroke (hyperthermia) is a medical emergency and is often fatal despite medical care.[4] Heatstroke is usually designated when a rectal or core temperature reaches 105 F (40.6 C).[4,5] The car trunk entrapment-related deaths described in this report were mainly heat related—no deaths were identified that occurred when the outside temperature was <85 F (<29.5 C), and all causes of death included hyperthermia.

Cars parked in direct sunlight can reach internal temperatures up to 131 F-172 F (55 C-78 C) when outside temperatures are 80 F-100 F (27 C-38 C).[6,7] Cars that are parked in direct sunlight and that are poorly ventilated also reach higher temperatures more rapidly than cars that are parked in the shade or that have windows completely opened.[7] Most temperature increases inside cars occur during the first 15 minutes of being left in the sun.[8] In at least two incidents during the summer of 1998, deaths occurred in dark cars, and the dark color probably contributed to the intense heat in the trunks.[6]

The major mechanism for heat loss by the body in high ambient temperatures is evaporation.[7] This mechanism is quickly defeated in the rising humidity of closed car trunks. Younger children are more sensitive to heat than older children and adults and are at greater risk for heatstroke.[5] In addition to heatstroke, asphyxia was listed as a contributing cause of death in four of the seven incidents for which ME/C data were obtained. The combination of high temperature, humidity, and poor ventilation all contribute to the extreme danger of car trunks.[7]

The findings in this report are subject to at least three limitations. First, because LEXIS-NEXIS may exclude cases in areas with minimal media coverage, may overlook cases that are not in the database because of search technique, and does not contain all newspapers in the country, the total number of cases identified may be underestimated. Second, because primary source ME/C data were not obtained for two incidents, information accuracy in media reports used for analysis is unknown. Third, because autopsy findings are often minimal or nonspecific, determining cause of death for these types of deaths is largely dependent on the circumstances and a thorough examination of the death scene.

State and local public health officials can use the findings in this report to guide prevention messages about children playing in or around car trunks. Effective public health strategies to prevent deaths associated with car trunk entrapments should include (1) preventing children's access to car keys; (2) keeping cars locked, with trunks closed, when cars are not in use; and (3) supervising young children closely when they are around cars.

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# Decrease in AIDS-Related Mortality in a State Correctional System—New York, 1995-1998

*MMWR. 1999;47:1115-1117*

*1 table omitted*

THE NEW YORK STATE DEPARTMENT OF Correctional Services (NYSDOCS) administers one of the largest prison systems in the United States, with a population of approximately 70,000 inmates; in 1995, blinded seroprevalence studies indicated that an estimated 9500 inmates were infected with human immunodeficiency virus (HIV).[1] This report summarizes an analysis of death records of inmates, which indicate a substantial reduction in the acquired immunodeficiency syndrome (AIDS)-related deaths from 1995 through 1998 and describes the programs that may have contributed to this decline.

Cause of death was determined by comparison of death and autopsy reports by an analyst in New York and was confirmed by a second analyst. The first AIDS-related deaths occurred in the NYSDOCS prison system in 1981. Although the number of AIDS-related deaths continued to increase until 1995, most of the increase after 1985 reflected increases in the size of the prison population; the AIDS-related death rate was relatively stable. During the early 1990s, approximately two thirds of deaths occurring among inmates were AIDS-related. From 1990 through 1995, AIDS-related death rates averaged 36.4 per 10,000 inmates (range: 32.5-40.7). This rate declined to 26.3 per 10,000 inmates in 1996 and 8.6 per 10,000 inmates in 1997 (the first year since 1988 that AIDS was not the major cause of deaths in the NYSDOCS system). Based on data from January-November 1998, the projected annualized AIDS-related death rate for 1998 decreased to 6.1 per 10,000 inmates.

During 1993-June 1998, the annual death rate in the NYSDOCS system from causes other than AIDS has remained stable at an average of 22.4 per 10,000 inmates (range: 20.3-24.2). The number of inmates who met the statutory medical requirements (terminal illness and significant disability) for a medical parole related to HIV/AIDS has declined from 55 in 1995 to 32 in 1996, 13 in 1997, and seven in 1998.

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**CDC Editorial Note:** As of December 31, 1995, 24,226 HIV-infected persons were incarcerated in state and federal prisons, corresponding to 2.3% of the state and federal prison population in the United States[1]; 21% of these persons had a confirmed AIDS diagnosis. During 1991-1995, AIDS caused approximately one third of all deaths in U.S. prisons.[1]

The decline in the AIDS-related deaths observed in the NYSDOCS is similar to that reported for the entire United States during the same time period[2] and corresponds to advancements in treatment of HIV infection.[3-7] The finding that death rates for causes other than AIDS were stable suggests that increases in deaths from other causes in HIV-infected persons is not responsible for the decline in AIDS-related mortality. The decrease in the number of inmates granted medical parole related to HIV/AIDS suggests that severe HIV-related morbidity also has declined.

In 1983, the NYSDOCS opened the first in-house medical unit for treatment of prisoners with AIDS at Sing Sing Correctional Facility. The decrease in death rates observed since 1995 followed system-wide efforts in the 70 state prisons to standardize HIV care and to assure that antiretroviral medications and chemoprophylaxis of opportunistic infections are available throughout the system. These efforts included (1) in 1996, establishment of an HIV Treatment Guidelines work group in collaboration with the New York State Department of Health AIDS Institute to develop HIV treatment guidelines and regularly update them to be consistent with nationally recognized best practices; (2) in 1996, initiation of a quarterly live satellite videoconference series in collaboration with Albany Medical Center's Division of HIV Medicine and the New York State STD/HIV Prevention and Training Centers on "Management of HIV/AIDS in the Correctional Setting"; (3) in 1996, development of medical record flow sheets to monitor care being given to HIV-infected prisoners; and (4) in 1997, identification through the NYSDOCS pharmacy system of cases of apparently inappropriate care (e.g., monotherapy with protease inhibitors) and notification of other health-care team members for appropriate review and action.

Proper adherence to antiretroviral medications is essential to avoid development of resistant strains of HIV, but adherence to multidose treatment schedules with exacting requirements for dose-associated fasting or food may be more difficult in prison. Close supervision and intensive patient education is required to assure that prisoner patients understand how to take the medications correctly. Self-administration of medications and directly observed therapy can help resolve some of these issues.

Confidentiality may be more difficult to maintain in a corrections system than it is in other health facilities and may lead some inmates to refuse HIV testing, thus delaying effective HIV treatment. Another challenge is the frequent transfer of inmates from one prison to another, resulting in frequent changes of primary and specialty providers. Standardization and coordination of treatment across prisons is necessary to ensure optimal care.

One important limitation of the findings of this report is that the precise reason for the decline in AIDS-related deaths in NYSDOCS cannot be determined. The effect attributable to the systematic changes in education and management within the prison system cannot be differentiated from the advances in treatment. Nevertheless, the decline in death rates is associated with the timing of both of these events.

The findings of this report indicate that substantial decreases in AIDS-related deaths are possible in prisons that implement systems to provide up-to-date treatment of HIV infection. Health-care provider training, treatment protocols, and patient education programs that are consistent throughout the prison system can be provided to address the challenges of caring for HIV-infected patients in prisons.

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# Forecasted State-Specific Estimates of Self-Reported Asthma Prevalence—United States, 1998

*MMWR. 1998;47:1022-1025*

*1 table omitted*

ASTHMA IS A CHRONIC INFLAMMATORY DISorder of the lungs characterized by episodic and reversible symptoms of airflow obstruction.[1] During 1993-1994, an estimated 13.7 million persons in the United States reported having asthma, and from 1980 to 1994 the prevalence of self-reported asthma in the United States increased 75%.[2] Despite this increase, surveillance data are limited for asthma at the state and local levels.[3] To estimate the 1998 prevalence rate of asthma for each state, CDC analyzed national self-reported asthma prevalence data from 1995. This report summarizes the results of the analyses, which project that approximately 17 million persons in the United States have asthma.

For this analysis, persons were considered to have asthma if they had had asthma diagnosed by a physician at some time in their life and had reported symptoms of asthma during the preceding 12 months. Using methods that have been applied elsewhere to forecast cancer rates,[4] state-specific asthma prevalence

estimates for 1998 were calculated using a three-step procedure: (1) race-, sex-, and age-specific asthma prevalence rates were calculated for each of the four U.S. census regions using data from the 1995 National Health Interview Survey (NHIS); (2) each state's 1998 demographic composition as estimated by the Bureau of Census was multiplied by the corresponding regional prevalences; and (3) linear extrapolations of region-specific increases in asthma prevalence from 1980 to 1994 were applied to the 3-year period from 1995 to 1998 for each state. Confidence intervals and relative standard errors for all estimates were calculated using regression parameters provided by CDC's National Center for Health Statistics for prevalence of chronic conditions.[5]

In 1998, asthma affected an estimated 17,299,000 persons in the United States. The state with the largest estimated number of persons with asthma was California (2,268,300), followed by New York (1,236,200) and Texas (1,175,100) (Table 1). State-specific prevalence rates ranged from 5.8% to 7.2%. Differences in asthma prevalence rates between states were not significant. By region, 1-year period prevalence estimates ranged from 6.4% to 6.8% in the Northeast, 5.8% to 6.1% in the South, 6.6% to 6.7% in the Midwest, and 6.0% to 7.2% in the West.* The narrow range of prevalence rates within each of these regions indicates that state-specific differences in demographic composition minimally influenced estimated asthma prevalence.

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**CDC Editorial Note:** The findings in this report project state-specific prevalence rates of 5.8% to 7.2%. These findings are consistent with those from a study in Oregon, which estimated asthma prevalence at 6%-7%.[6] However, surveys of self-reported asthma prevalence in Bogalusa, Louisiana,[7] Chicago, Illinois,[8] and Bronx, New York[9] all indicated estimates considerably higher than those in this report. State program planners can use these findings to estimate the burden of asthma within their states.

The findings in this report are subject to at least two limitations. First, the findings assume a linear growth in asthma prevalence since 1995. Although this linear assumption was selected after review of regional growth trends in asthma prevalence during the preceding 15 years,[2] changes in the trends of self-reported asthma rates that may have occurred in the 3-year interval during 1995-1998 could not be captured by these linear extrapolations. Second, these results are based on the assumption that age, sex, and race-specific rates of asthma do not vary within any of the four geographic regions of the United States. Each state's estimated prevalence reflects its regional placement in the United States and its demographic composition. These analyses do not account for differences among states in the relative presence or absence of environmental risk factors in asthma prevalence, possible differences in genetic susceptibility toward the condition, or other sociodemographic indicators (e.g., poverty status). As a result, these findings underestimate the variability in asthma prevalence between states within regions. They also do not accurately represent asthma prevalence in geographic subpopulations within states.

Asthma is the ninth leading cause of hospitalization nationally.[10] Its severity can be managed with appropriate medical treatment, education, and environmental modification.[1] However, fewer than 10 states have conducted asthma prevalence surveys. The initiation of state-based asthma control and management programs will require better state and local data on asthma prevalence to evaluate the effectiveness of these programs. State-level surveillance could incorporate existing data such as hospital discharge data and managed-care data. Questions about asthma could also be added to state and community-level surveys such as the State and Local Integrated Telephone Survey and other surveys conducted in individual states such as the Behavioral Risk Factor Surveillance System.

State-based surveys should include questions related to asthma diagnosis, severity, management techniques, and known geographic and household risk factors. These surveillance data will provide a foundation for planning and evaluating asthma-control programs, identifying high-risk and hard-to-access populations, and structuring health promotion and education initiatives.

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*Northeast=Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; Midwest=Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; South=Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; West=Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.