

# Salmonella

*Annual Summary*

# 2005



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Centers for Disease Control and Prevention  
Coordinating Center for Infectious Diseases  
National Center for Zoonotic, Vector-Borne and Enteric Diseases  
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The Adobe Acrobat (PDF) version of this document can be viewed on the world-wide web at <http://www.cdc.gov/ncidod/dbmd/phlisdata/salmonella.htm>. Further information concerning data described in this report, including the Kauffmann-White Scheme or the changes in serotype classification instituted in this report, can be obtained by contacting the Enteric Diseases Epidemiology Branch at telephone number (404) 639-2206. For further information concerning Public Health Information Laboratory System (PHLIS) please contact the PHLIS Helpdesk at telephone number (404) 639-3365.

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## National *Salmonella* Surveillance System Annual Summary, 2005

This Annual Summary of the National *Salmonella* Surveillance System contains surveillance data on reported laboratory-confirmed *Salmonella* isolates in the United States for the year 2005. The National *Salmonella* Surveillance System collects reports of isolates of *Salmonella* from human sources from the United States. This information is reported through the Public Health Laboratory Information System (PHLIS), an electronic reporting system, by the State Public Health Laboratory Directors and State and Territorial Epidemiologists to the Enteric Diseases Epidemiology Branch (EDEB) and the Biostatistics Office (BSO) of the Division of Foodborne, Bacterial and Mycotic Diseases in the National Center for Zoonotic, Vectorborne, and Enteric Diseases.

The National *Salmonella* Surveillance System is based on data collected by state and territorial public health laboratories. *Salmonella* isolates are submitted to the state public health laboratory by clinical diagnostic laboratories. The state and territorial laboratories confirm the isolates as *Salmonella*, perform serotyping according to the Kauffmann-White scheme, and submit the data for reporting through PHLIS. Unusual or difficult isolates are forwarded to the National *Salmonella* Reference Laboratory at the Centers for Disease Control and Prevention (CDC) for further characterization or confirmation. These results are reported back to the state laboratory, where they are reported through PHLIS.

The capture of isolates in the National *Salmonella* Surveillance System is considered to be fairly complete. However, some *Salmonella* isolates may not be forwarded to public health laboratories, and therefore are not ascertained. In addition, many cases of salmonellosis are not reported because the ill person does not seek medical care, the health-care provider does not obtain a specimen for diagnosis, or the laboratory does not perform the necessary diagnostics tests. The results of surveillance reported herein should be considered a fraction of all *Salmonella* infections. In addition, not every state submitted data in 2005.

The National *Salmonella* Surveillance System database is dynamic; the number of isolates reported for previous years may change according to the addition or correction of isolate reports. Integrated surveillance system software development in several states and at the CDC has interrupted the normal use of the PHLIS system such that some *Salmonella* surveillance reports are delayed and obtained in a variety of formats outside of the PHLIS system. We encourage reporting partners to use the PHLIS reporting system if serotype specific *Salmonella* reports cannot be transmitted to CDC through new integrated surveillance systems. If PHLIS reporting is impossible, please contact the PHLIS Help Desk (404-639-3365) to arrange alternative data submission pathways.

The number of isolates reported by geographical area (e.g., state) represents the area where laboratory confirmation and serotyping was performed. In some instances, the reporting area is not the same as the area of residence of the person from whom the isolate was obtained. For *Salmonella* serotype Typhi, only the first isolation in a year for each person is counted. For serotypes other than Typhi, only the first isolation within a thirty day period for each person is counted, if the serotype and clinical source (e.g. stool or blood) are the same.

The data presented for *Salmonella* isolates from animals and related sources (e.g., environment and feeds) are gathered from isolates submitted to the U.S. Department of Agriculture, Animal and Plant Health Inspection Services, National Veterinary Services Laboratories (USDA/APHIS/NVSL) for serotyping. These isolates are submitted by animal disease diagnostic laboratories and the USDA, Food Safety and Inspection Service (FSIS) laboratories throughout the United States. Data from other U.S. laboratories that serotype *Salmonella* from animals and related sources and that NVSL receives from are also included. *Salmonella* serotyping results from clinical cases of animal disease are designated as "clinical" (Table 6). Serotyping results from herd and flock monitoring and surveillance, feed sample testing, environmental testing, research projects, and from FSIS food testing programs are designated as "nonclinical" (Table 7). Samples from non-human sources are tested for *Salmonella* for a variety of purposes and are obtained in a variety of ways. The sampling is therefore neither complete nor random and undoubtedly has sampling biases. Any interpretation of data should consider these limitations.

The Statistical Outbreak Detection Algorithm (SODA), developed by BSO and EDEB, is a statistical algorithm based on the National *Salmonella* Surveillance System. It is designed to detect unusual clusters

of isolates of *Salmonella* infection. SODA compares current *Salmonella* isolates reported through PHLIS by serotype to a 5-year historical baseline for that serotype and week to detect unusual increases from the baseline. Analyses can be conducted at state, regional, or national levels. Since 1996, SODA has been implemented at CDC and selected state health departments. If you would like more information on SODA, please call the PHLIS Helpdesk at telephone number (404) 639-3365.

## Changes to the National *Salmonella* Surveillance System

In 2002, the National *Salmonella* Surveillance System implemented several changes in nomenclature and in surveillance practices. First, in order to improve the comparability of United States surveillance data with data from other countries, serotypes are now designated according to the Kauffmann-White Scheme (see below). Second, reporting of *Salmonella* serotype I 4,[5],12:i:- (see discussion of this serotype below) was inconsistent in the past due to variability in the nomenclature used to report this serotype. This resulted in many isolates of this serotype being reported as "Group B" or "Subspecies I". Beginning with the 2002 data, the submitted designation for this serotype was converted to the standard formula whenever possible. Third, many non-subspecies I serotypes were not listed in the surveillance summaries in the past; instead, these isolates were reported by O group or subspecies only. Beginning with the 2002 surveillance data, all serotype formulas that were submitted to the national surveillance system, regardless of subspecies, were incorporated into the surveillance database. Finally, most "variants" of serotypes (monophasic, nonmotile or rough isolates) were not listed by their variant formulas in the past; instead, these isolates were reported by O group or subspecies only. Beginning with the 2002 surveillance data, all serotype variants that were submitted to the national surveillance system were converted to standard serotype formulas whenever possible and incorporated into the surveillance database. Since the 2003 *Salmonella* Surveillance Summary was published, we have updated the nomenclature for many isolates that were submitted in 1995 through 2003 when possible using additional information submitted to PHLIS. We hope that the changes in nomenclature and surveillance practices will improve the accuracy of the surveillance data and enhance the detection of newly emerging serotypes. However, these changes should be kept in mind when comparing recent data to previous years. The increased numbers of specific serotypes, e.g., *Salmonella* serotype I 4,[5],12:i:-, may reflect improved surveillance.

To improve the utility of partial serotype data, we are changing the way that isolates that are not fully serotyped are designated and reported in PHLIS. In the past, these isolates were reported primarily by serogroup. While serogroups A through E are composed mainly of subspecies I serotypes, many of the other O serogroups are represented in several different subspecies. Most of the serogroups higher than E include serotypes from more than one subspecies, and nearly half (15 of 37) include serotypes from five different subspecies. Reporting isolates by serogroup alone combines unrelated isolates of different subspecies in the same serogroup category. Thus, we would like to move away from the "serogroup" categories. When full serotype information is not available, isolates are identified first by subspecies, then O serogroup and any additional serotype antigens. All available serotype information should be submitted to PHLIS (subspecies, O serogroup, O antigens, H antigens, whether one or two H antigens are detected, rough or mucoid status if appropriate). Partially serotyped isolates are listed in Table 3a.

## Highlights for 2005

### Human Sources

A total of 36,184 *Salmonella* isolates were reported from participating public health laboratories in 2005. All states and the District of Columbia reported isolates; Florida, Montana and the District of Columbia reported partial serotype information. This represents a 12% decrease compared with 1995 and a slight increase compared with 2004 (1.5%). The national rate of reported *Salmonella* isolates in 2005 was 12.2 per 100,000 based on 2005 census population figures for the United States.

Similar to other years, *Salmonella* was isolated most frequently from children under 5 years of age, accounting for 20% of isolates (Table 2). Less than 10% of isolates came from persons in each of the second through fifth decades of life, with lower proportions from persons in later decades of life. The

distribution of isolates between the sexes was different, with a greater number of isolates from male than female infants and children and a smaller proportion of isolates from male than female adults (Table 2).

The thirty most common serotypes of *Salmonella* in 2005 are listed in Table 1. These represent 82% of all *Salmonella* isolates. The four most common serotypes in 2005 (Typhimurium, Enteritidis, Newport, and Heidelberg; 52% of all isolates) have been the most common serotypes since 1995, except for 2004 when serotype Javiana replaced Heidelberg as the fourth most common serotype. (During 2004, a multistate outbreak of serotype Javiana infections associated with tomatoes at a gas station deli chain affected more than 400 people in 5 states.) Serotype Typhimurium has been the most commonly isolated serotype since 1997, though Enteritidis was a very close second in 2005 (Figure 4). Serotypes Typhimurium and Enteritidis have both declined substantially (28% and 34%, respectively) since 1995; the total number of *Salmonella* isolates has also declined during this period, though not as substantially as serotypes Typhimurium and Enteritidis.

Among the thirty most common serotypes in 2005, *Salmonella* Hadar has had the largest percent decline during the last decade. Serotype Hadar was the fifth most common serotype in 1995 and has steadily declined to the 21<sup>st</sup> most common serotype in 2005, a 75% decline in number of isolates. Serotype Poona has declined 63% since 1995, although most of the decline was between 1995 and 1997. *Salmonella* Mississippi has had the most dramatic increase, 184% since 1995, most since 2002. *Salmonella* Newport had a large increase in numbers between 1997 and 2002, but has been declining since then. Similarly, serotype Javiana had substantial increases in 2003 and 2004, but declined 25% in 2005.

Among the less common serotypes, there were zero to 3 isolates per year of *Salmonella* Grumpensis in 1995 through 2004, and 127 isolates (36<sup>th</sup> most common serotype) in 2005. Two multi-state clusters of serotype Grumpensis were noted by PulseNet in 2005; the source was not determined. Serotype Mono increased from less than 2 isolates per year in 1995 through 2004 to 37 isolates in 2005. Among the serotypes that averaged at least 10 isolates per year, serotypes Tennessee, Baildon, Eastbourne, Ealing, and IV 44:z4,z23:- more than doubled in numbers from 2004 to 2005.

*Salmonella* Paratyphi B var. L (+) tartrate + (formerly serotype Java) appeared to have increased between 2003 and 2005, but this change may be due to improved reporting. Paratyphi B var. L (+) tartrate + is closely related to serotype Paratyphi B; testing for tartrate fermentation is required to differentiate these two serotypes. The number of isolates reported as serotype Paratyphi B declined between 2003 to 2005, concomitant with the increase in serotype Paratyphi B var. L (+) tartrate +.

*Salmonella* serotype I 4,[5],12:i:- was introduced as the 18th most common serotype in 2002 and has increased in rank to 6th in 2005. The serotype has been tracked in the National Surveillance system since 1998, though many isolates were classified as only "Subspecies I" or "Group B" in the past. Since the 2003 *Salmonella* Surveillance Summary was published, we examined the 1995 to 2003 surveillance data and were able to reclassify some isolates submitted in these years as I 4,[5],12:i:- based on additional data submitted. Recent efforts to correctly classify this serotype may be at least responsible for at least some of the increase in numbers. It is unknown how many of the 479 isolates reported as Subspecies I, Group B in 2005 could be this serotype (Table 3a). In 1998, this serotype was the fourth most commonly identified in Spain; genetic analysis of the Spanish isolates revealed a close relationship to serotype Typhimurium (1). Many U.S. isolates of this serotype were characterized by pulsed field gel electrophoresis (PFGE) and the patterns submitted to PulseNet, the National Molecular Subtyping Network for Foodborne Disease Surveillance. The PFGE patterns for most serotype I 4,[5],12:i:- isolates were closely related to serotype Typhimurium PFGE patterns, indicating that they are most likely variants of serotype Typhimurium.

A large proportion of serotype Typhimurium isolates were resistant to multiple antimicrobial drugs; in a 2003 national survey, 45% were resistant to one or more drugs and 26% had a five-drug resistance pattern characteristic of a single phage type, DT104 (2). Similarly, serotype Newport has emerged as a major multidrug-resistant pathogen. In 2003, 46 (21%) of 222 serotype Newport isolates submitted to the National Antimicrobial Resistance Monitoring System were resistant to at least seven of 17 antimicrobial agents tested, including extended-spectrum cephalosporins (2,3). Similar to other years, there were marked regional differences in the frequency of *Salmonella* isolates among serotypes. The rate of isolations by region has been followed closely for serotype Enteritidis as a means of assessing the impact

of egg safety regulations and industry improvements. As indicated in Figure 2, serotype Enteritidis rates of isolation had been relatively high in New England, Mid Atlantic and Pacific regions, but have shown significant decreases since 1995. However, since 2003 all regions have had small increases in serotype Enteritidis rates of isolation.

### Non-human Sources

Data on *Salmonella* isolates obtained from non-human sources can help identify possible sources of human illness. *Salmonella* Typhimurium, the most common serotype in humans, is identified most commonly from clinical samples from bovine sources, and from non-clinical samples from chicken sources. Serotypes Enteritidis and Heidelberg, the second and fourth most common serotypes in humans, respectively, are identified most commonly from clinical and non-clinical chicken sources (Table 6 and 7).

### **Adoption of the Kauffmann-White Scheme for designation of *Salmonella* serotypes**

*Salmonella* serotyping has been the cornerstone for epidemiological surveillance and outbreak investigations for this important pathogen. The National *Salmonella* Surveillance system has tracked *Salmonella* isolates by serotype since 1968. New subtyping methods have come and gone, but serotyping continues to provide essential subtype information for *Salmonella*. For example, PulseNet, the state-of-the-art genotyping system for *Salmonella*, relies on accurate serotype information as the “first-tier” subtype information. Pulse field-gel electrophoresis (PFGE) pattern determination, by itself, does not replace serotyping, but rather subdivides within serotype.

The Kauffmann-White Scheme for designation of *Salmonella* serotypes is maintained by the WHO Collaborating Centre for Reference and Research on *Salmonella* at the Institut Pasteur and is used by most of the world. Up until 2002, CDC used a slightly different version, the “Modified Kauffmann-White Scheme”. A unified format for serotype designation is essential for accurate surveillance via PulseNet, Global SalmSurv, and other international networks. Therefore, CDC adopted the Kauffmann-White Scheme on January 1, 2003.

The adoption of the Kauffmann-White Scheme affected only a few of the more common serotypes. The primary differences between the two schemes are:

i) *Salmonella* are divided into six subspecies that can be differentiated by biochemical and genetic tests. Under the Kauffmann-White Scheme, subspecies I serotypes are named; subspecies II through VI serotypes are identified by formula. The Modified Kauffmann-White Scheme used names for those subspecies II through VI serotypes that were designated through 1968 and formulas for those serotypes identified after 1968. With the adoption of the Kauffmann-White scheme, all named serotypes are subspecies I; serotypes from all other subspecies are designated by formula. In 2002, there were four named serotypes among the top 100 serotypes that did not belong to subspecies I and were affected by this change:

- *Salmonella* Marina is now designated as *Salmonella* IV 48:g,z51:-
- *Salmonella* Flint is now designated as *Salmonella* IV 50:z4,z23:-
- *Salmonella* Kralendyk is now designated as *Salmonella* IV 6,7:z4,z24:-
- *Salmonella* Chameleon is now designated as *Salmonella* IV 16:z4,z32:-

ii) Under the Kauffmann-White Scheme, serogroups E2 and E3 were combined with serogroup E1. This reflects the fact that the antigenic changes in serogroups E2 and E3 are the result of lysogenic conversion by bacteriophages and thus represent minor variants of serogroup E1 serotypes. The Modified Kauffmann-White Scheme used separate serotype names for these variants. Two serotypes in the top 100 in 2002 were affected by the merging of serogroups E2 and E3 with serogroup E1:

- *Salmonella* Newington is now *Salmonella* Anatum variety (var.) 15+
- *Salmonella* Newbrunswick is now *Salmonella* Give var. 15+

iii) Under the Kauffmann-White Scheme, two biotypes of *Salmonella* Paratyphi B are recognized; they are differentiated primarily by the ability to ferment tartrate. Serotype Paratyphi B is tartrate negative and is associated with more severe, typhoid fever-like disease. Serotype Paratyphi B var. L-tartrate + (also referred to as "Paratyphi var. Java") is tartrate positive and commonly associated with gastroenteritis. *S. Paratyphi B* var. L-tartrate + was known as "Java" in the Modified Kauffmann-White Scheme. The two biovars of Paratyphi B have been a source of confusion in the past because they have the same antigenic formula (I 1,4,[5],12:b:1,2), and are differentiated only by biotype. It is essential that the tartrate test be performed to accurately identify and report the two biotypes.

The *Salmonella* serotypes in this summary that were reported under different designations in 2002 and earlier United States surveillance data are listed on the next page.





**Table I. Table of obsolete *Salmonella* serotype names and their current designations**

Serotype	Obsolete Name	Serotype	Obsolete Name
Amager var. 15+	Tuebingen	II 4,12,[27]:z:e,n,x	Nordenham
Amsterdam var. 15+	Drypool	II 4,12:l,w:e,n,x	Kilwa
Anatum var. 15+	Newington	II 3,10:g,t:-	Islington
Anatum var. 15+, 34+	Minneapolis	II 3,10:m,t:e,n,x	Stikland
Butantan var. 15+	Rosenthal	II 6,7:l,z28:1,5:[z42]	Heilbron
Choleraesuis var. Decatur	Decatur	II 6,7:z39:1,5,7	Gilbert
Duisburg	Salinatis	II 9,12:d:e,n,x	Rhodesiense
Finkenwerder	Heves	II 9,12:g,m,[s],t:[1,5,7]:[z42]	Hamburg
Gallinarum	Pullorum	II 9,12:g,s,t:e,n,x	Neasden
Give var. 15+	Newbrunswick	II 9,12:l,w:e,n,x	Daressalaam
Give var. 15+, 34+	Menhaden	II 9,12:z39:1,7	Wynberg
Lexington var. 15+	Manila	II 9,46:g,[m],[s],t:[e,n,x]	Duivenhoks
Lexington var. 15+, 34+	Illinois	II 35:z29:e,n,x	Utbremen
Lille var. 14+	Bornum	II 40:c:e,n,x,z15	Suarez
Livingstone var. 14+	Eimsbuettel	II 40:z4,z24:z39	Degania
London var. 15+	Portsmouth	II 41:z10:1,2	Negev
Meleagridis var. 15+	Cambridge	II 41:z10:z6	Lichtenberg
Muenster var. 15+	Newhaw	II 42:b:e,n,x,z15	Uphill
Muenster var. 15+, 34+	Arkansas	II 42:g,t:-	Fremantle
Nyborg	Selandia	II 47:b:1,5	Phoenix
Ohio var. 14+	Nienstedten	II 47:d:z39	Quimbamba
Oranienburg var. 14+	Thielallee	II 48:d:1,2	Etosha
Orion var. 15+	Binza	II 48:d:z6	Hagenbeck
Orion var. 15+, 34+	Thomasville	II 48:g,m,t:-	Erlangen
Paratyphi B var. L(+) tartrate+	Java	II 48:k:z39	Sakaraha
Typhimurium var. 5-	Typhimurium var. Copenhagen	II 60:g,m,t:z6	Setubal
Uganda var. 15+	Kinshasa	IV 6,7:z4,z23:-	Roterberg
Weltevreden var. 15+	Lanka	IV 6,7:z4,z24:-	Kralendyk
Westhampton var. 15+	Halmstad	IV 11:z4,z23:-	Parera
II 11:g,[m],s,t:z39	Grabouw	IV 16:z4,z23:-	Ochsenzoll
II 11:m,t:e,n,x	Lincoln	IV 16:z4,z32:-	Chameleon
II 13,22:g,m,t:[1,5]	Limbe	IV 21:z4,z23:-	Soesterberg
II 13,22:z29:1,5	Clifton	IV 40:z4,z32:-	Bern
II 13,23:a:z42	Tygerberg	IV 43:z36,z38:-	Volksdorf
II 13,23:b:[1,5]:z42	Acres	IV 43:z4,z23:-	Houten
II 13,23:g,m,[s],t:[e,n,x]	Luanshya	IV 43:z4,z32:-	Tuindorp
II 13,23:z:1,5	Nachshonim	IV 44:z4,z32:-	Lohbruegge
II 16:l,w:z6	Noordhoek	IV 48:g,z51:-	Marina
II 16:z4,z23:-	Haddon	IV 50:g,z51:-	Wassenaar
II 17:g,t:-	Bleadon	IV 50:z4,z23:-	Flint
II 17:g,t:[e,n,x,z15]	Bleadon	IV 50:z4,z32:-	Bonaire
II 21:z10:[z6]	Wandsbek	IV 51:z4,z23:-	Harmelen
II 4,12,[27]:b:[e,n,x]	Sofia	<i>S. bongori ser. 48:z35:-</i>	Bongor
II 4,12,[27]:e,n,x:1,[5],7	Makumira		

## Overview of *Salmonella* Serotype Designation

### *Salmonella* Taxonomy

The **genus *Salmonella*** divided into two species, *Salmonella enterica* and *Salmonella bongori*.

***Salmonella enterica*** is further subdivided into 6 subspecies that are designated by names or Roman numerals. The Roman numerals are simpler and more commonly used. Subspecies IIIa and IIIb were historically considered a separate genus, ***Arizonae***, and are still sometimes referred to by this name. Despite their common history, subspecies IIIb is more closely related to the other *Salmonella* subspecies than to subspecies IIIa, so the two should be considered distinct entities.

<i>Salmonella enterica</i> subspecies	
I	<i>enterica</i>
II	<i>salamae</i>
IIIa	<i>arizonae</i>
IIIb	<i>diarizonae</i>
IV	<i>houtenae</i>
VI	<i>indica</i>

***Salmonella bongori*** was originally designated *Salmonella enterica* **subspecies V**. It has since been determined to be a separate species of *Salmonella*. However, for simplicity and convenience, these strains are commonly referred to as "subspecies V" for the purpose of serotype designation.

### *Salmonella* Serotype Antigens

*Salmonella* serotype is based on the immunoreactivity of two surface structures, **O** and **H antigen**.

**O antigen** is a carbohydrate (also called a polysaccharide) that is the outermost component of lipopolysaccharide. It is a polymer of **O subunits**; each O subunit is typically composed of four to six sugars depending on the O antigen. Variation in O antigen results from variation in the sugar components of the O subunit, from variation in the nature of the covalent bond between the sugars of the subunit, and from variation in the nature of the linkage between the O subunits that form the O antigen polymer.

O antigens are designated by numbers and are divided into **O serogroups**, also called **O groups**. O groups are designated by the primary **O factor(s)** that are associated with the group. Many of the common O groups were originally designated by letter and are still commonly referred to by letter (e.g. *serotype* Typhimurium belongs to Group O:4 or Group B, *serotype* Enteritidis belongs to group O:9 or Group D1; *serotype* Paratyphi A belongs to Group O:2 or Group A).

**Additional O factors** are associated with some O groups and are often variably present or variably expressed. The *Salmonella* O groups and the additional O antigens that may be present in serotypes of that group are listed below. When multiple O factors are present, they are listed sequentially and separated by commas.

**H antigen** is the filamentous portion of the bacterial flagella; H antigen is made up of protein subunits called flagellin. The ends of flagellin are conserved and give the filament its characteristic structure. The antigenically variable portion of flagellin is the middle region of the protein, which is surface-exposed. ***Salmonella*** is unique among the enteric bacteria in that it can express two different H antigens, which are encoded by two different genes. Typically, expression of the two genes is coordinated so that only one flagellar antigen is expressed at a time in a single bacterial cell. The two distinct flagellar antigens are referred as Phase 1 and Phase 2. "**Monophasic**" isolates are those that express only a single flagellin type. These occur naturally in some serotypes (e.g., Enteritidis, Typhi, most subspecies IIIa and IV serotypes), or can occur through the inactivation or loss of the gene encoding the Phase 1 or Phase 2

antigen.

The H antigens of *Salmonella* are listed below. Some antigens are composed of multiple factors, which are separated by commas; for example, the second phase antigen of serotype Typhimurium is composed of factors 1 and 2. H antigens composed of multiple factors are grouped into complexes.

### **Salmonella Serotype Identification**

*Salmonella* serotypes are typically identified in a cascade of tests. First, an isolate is identified and the subspecies is determined, typically by biochemical testing. O antigens and H antigens are detected in independent agglutination assays using antisera that react with groups of related antigens or a single antigen. Both H antigens can sometimes be detected in a single culture, particularly for older strains or for isolates that have been passed multiple times. When only one H antigen is detected, the isolate is inoculated onto the top of a tube of **phase reversal media**, a semisolid media containing antisera to the H antigen that has already been identified. Organisms expressing the previously detected H antigen are immobilized by the added antisera and grow only at the top of the tube. Organisms expressing the second H antigen are able to move away from the top of tube, evidenced by growth throughout the tube. The second H antigen is then determined using organisms recovered from the bottom of the phase reversal media.

### **Salmonella Serotype Designation**

*Salmonella* serotypes are designated according to the convention of the Kauffmann-White Scheme. All *Salmonella* serotypes can be designated by a formula. Additionally, subspecies I serotypes are given a name (e.g., Typhimurium, Enteritidis, Typhi, etc). Before 1968, all serotypes were given names; as a result, some serotypes of subspecies II and IV were originally designated by name. Some of the obsolete names can still be found in the literature (e.g., *Salmonella* IV 48:g,z51:- was formerly known as *Salmonella* Marina); but, subspecies II through IV serotype should now be designated by formula only.

#### **The typical format for a serotype formula is:**

Subspecies [space] O antigens [colon] Phase 1 H antigen [colon] Phase 2 H antigen

#### **Examples:**

I 4,5,12:i:1,2 (*Salmonella enterica* serotype Typhimurium or *Salmonella* Typhimurium)

I 4,12:i:1,2 (*Salmonella enterica* serotype Typhimurium or *Salmonella* Typhimurium)

I 9,12:g,m:- (*Salmonella enterica* serotype Enteritidis or *Salmonella* Enteritidis)

II 47:b:1,5 (*Salmonella enterica* serotype. II 47:b:1,5 or *Salmonella* II 47:b:1,5)

IV 48:g,z51:- (*Salmonella enterica* serotype 48:g,z51:- or *Salmonella*IV 48:g,z51:-)

IIIb 65:(k):z (*Salmonella enterica* serotype IIIb 65:(k):z or *Salmonella* IIIb 65:(k):z)

## Other conventions:

Some O and H factors are variably present. This is indicated in the generic serotype formula by underline when the factor is known to be encoded on a bacteriophage (e.g., O factor 1; only described for O antigens) or by square brackets (e.g., O factor [5] or H antigen [1,2]) when the antigen is known not to be encoded on. For an individual isolate, if the variable factor is detected it is included in the formula without additional notation. If the variable factor is not detected, it is not listed in the formula.

Some O and H factors are variably expressed. Weakly recognized antigens are indicated by parentheses; e.g., O antigen (6),14 or H antigen (k).

For monophasic isolates, the absence of an H antigen is indicated by a minus sign ("-") for the particular phase.

Variants of serotypes that do not express all the recognized antigens characteristic of a particular serotype are not uncommon. This is a particular issue for subspecies I serotypes, where a serotype name cannot be designated without the detection of all the antigens specified in the Kauffman—White scheme for that serotype. Isolates missing one or more antigens are designated by a formula. For example:

- i. Monophasic variants are variants of typically diphasic serotypes that lack the expression of either the flagellar Phase 1 or Phase 2 antigen; these are indicated by a minus sign ("-") in place of the missing phase; e.g., monophasic variants of serotype Typhimurium that lack the second phase H antigen 1,2 are designated as serotype I 4,5,12:i:- or I 4,12:i:-; monophasic variants of *S. Typhimurium* that lack the first phase H antigen are designated as serotype I 4,5,12:-:1,2 or I 4,12:-:1,2.
- ii. Nonmotile isolates express no H antigens and are indicated by minus signs in both phases or by "nonmotile" in place of the H antigens; e.g., serotype I 4,5,12:nonmotile or I 4,5,12:-:-.
- iii. Rough variants are isolates that do not express O antigen. This is indicated by "Rough" in place of the O antigen in the antigenic formula; e.g., I Rough:i:1,2.
- iv. Mucoid variants express a capsule that prevents immunologic detection of the O antigen. They are indicated by "Mucoid" in place of the O antigen in the antigenic formula; e.g., I Mucoid:i:1,2.

Rarely, isolates express a third H antigen that is noted by a colon followed by the antigen after the Phase 2 H antigen (e.g., II 13,23:b:[1,5]:z42).

## **Salmonella Serotype Statistics**

There were 2541 *Salmonella* serotypes as of 2002; approximately 60% belong to subspecies I. In the United States, approximately 99% of reported human isolates belong to subspecies I. The "top 10" serotypes account for approximately 66% of all isolates reported in the United States; the "top 100" serotypes account for about 97% of all isolates. Among the top 100 serotypes, only serotype IV 48:g,z51:- (formerly Marina), IV 50:z4,z23:- (formerly Flint), IV 6,7:4,z24:- (formerly Kralendyk), and IV 16:z4,z32:- (formerly Chameleon) are not subspecies I. Among the non-subspecies I isolates, subspecies IV isolates are the most common, followed by subspecies I, IIb, IIB, IIIa, and II. Subspecies VI and *Salmonella bongori* isolates are very rare.

**Table II. *Salmonella* O serogroups and associated O antigens**

O Group (number designation)	O Group (letter designation)	Antigens present in all serotypes	Additional antigens that may be present in some serotypes
2	A	2,12	1
4	B	4,12	1; 5; 27
7	C1	6,7	14; (Vi)
8	C2	8	6; 20
9	D1	9,12	1; (Vi)
9,46	D2	9,46	none
9,46,27	D3	9,12,46,27	1
3,10	E1	3,10	15; 15,34
1,3,19	E4	1,3,19	10; 15
11	F	11	none
13	G	13	1; 22; 23
6,14	H	6,14	1; 24; 25
16	I	16	none
17	J	17	none
18	K	18	6; 14
21	L	21	none
28	M	28	none
30	N	30	none
35	O	35	none
38	P	38	none
39	Q	39	none
40	R	40	1
41	S	41	none
42	T	42	1
43	U	43	none
44	V	44	1
45	W	45	none
47	X	47	1
48	Y	48	none
50	Z	50	none
51		51	1
52		52	none
53		53	1
54 (provisional)		54	21; 3; 3,15; 4,12; 8,20; 6,7
55		55	none
56		56	none
57		57	none
58		58	none
59		59	1
60		60	none
61		61	none
62		62	none
63		63	none
65		65	none
66		66	none
67		67	none



**Table III. H (flagellar) antigens of *Salmonella***

I complex:	1,2	Other antigens (not part of a complex):	A
	1,5		B
	1,6		C
	1,7		D
	1,2,5		e,h
	1,2,7		I
	1,5,7		K
	1,6,7		(k)
EN complex:	e,n,x		R
	e,n,x,z15		r,i
	e,n,z15		Y
G complex:	f,g		Z
	f,g,m,t		z6
	f,g,s		z10
	f,g,t		z29
	g,m		z35
	g,m,p,s		z36
	g,m,q		z36,z38
	g,m,s		z38
	g,m,s,t		z39
	g,m,t	z41	
	g,p	z42	
	g,p,s	z44	
	g,p,u	z47	
	g,q	z50	
	g,s,q	z52	
	g,s,t	z53	
	g,t	z54	
	g,z51	z55	
	g,z62	z56	
	g,z63	z57	
	g,z85	z60	
	m,p,t,u	z61	
	m,t	z64	
L complex:	l,v	z65	
	l,w	z67	
	l,z13	z68	
	l,z13,z28	z69	
	l,z28	z71	
Z4 complex:	z4,z23	z81	
	z4,z23,z32	z83	
	z4,z24	z87	
	z4,z32	z88	

## Acknowledgements

We thank all those in local, state, and territorial laboratories and departments of public health for their time and efforts to accomplish national case surveillance.

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Popoff MY, Bockemuhl J, Gheesling LL. Supplement 2002 (no. 46) to the Kauffmann-White scheme. Res Microbiol 2004;155(7):568-70.

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These websites contain an excellent overview of the history and current status of *Salmonella* taxonomy and nomenclature:

<http://www.bacterio.cict.fr/salmonellanom.html>

<http://www.bacterio.cict.fr/s/salmonella.html>

**TABLE 1****The 30 most frequently reported *Salmonella* serotypes from Human sources reported to CDC in 2005**

Human 2005			
Rank	Serotype	Reported	Percent
1	Typhimurium *	6982	19.3
2	Enteritidis	6730	18.6
3	Newport	3295	9.1
4	Heidelberg	1903	5.3
5	Javiana	1324	3.7
6	I 4,[5],12:i:-	822	2.3
7	Montevideo	809	2.2
8	Muenchen	733	2.0
9	Saintpaul	683	1.9
10	Braenderup	603	1.7
11	Oranienburg	590	1.6
12	Mississippi	565	1.6
13	Infantis	505	1.4
14	Paratyphi B var. L(+) tartrate+	460	1.3
15	Thompson	428	1.2
16	Agona	367	1.0
17	Typhi	348	1.0
18	Hartford	239	0.7
19	Stanley	224	0.6
20	Berta	209	0.6
21	Hadar	205	0.6
22	Bareilly	201	0.6
23	Anatum	197	0.5
24	Poona	196	0.5
25	Mbandaka	190	0.5
26	Panama	148	0.4
27	Litchfield	141	0.4
28	Sandiego	138	0.4
29	Schwarzengrund	138	0.4
30	Brandenburg	134	0.4
	<b>Sub Total</b>	<b>29507</b>	<b>81.5</b>
	All Other Serotyped	3841	10.6
	Unknown	1113	3.1
	Partially serotyped	1684	4.7
	Rough or nonmotile	39	0.1
	<b>Sub Total</b>	<b>6677</b>	<b>18.5</b>
	<b>Total</b>	<b>36184</b>	<b>100</b>
NOTE: ----- * Typhimurium includes var. 5- (Formerly var. Copenhagen)			



**TABLE 1a**

**The 30 most frequently reported Salmonella serotypes from  
Clinical and Non-Clinical Nonhuman sources reported to CDC and NVSL in 2005**

Clinical Nonhuman 2005	
Rank	Serotype
1	Typhimurium *
2	Newport
3	Agona
4	Montevideo
5	Derby
6	Heidelberg
7	Anatum
8	Muenster
9	Dublin
10	Choleraesuis **
11	Senftenberg
12	Kentucky
13	Infantis
14	Enteritidis
15	Reading
16	I 4,[5],12:i:-
17	Mbandaka
18	Uganda
19	Cerro
20	Meleagridis
21	Muenchen
22	Saintpaul
23	Worthington
24	Thompson
25	Havana
26	Johannesburg
27	Javiana
28	Ohio
29	Oranienburg
30	Brandenburg
	All Other Serotyped
	Rough or nonmotile

NOTE:

\* Typhimurium includes  
\*\* Choleraesuis includes

Non-Clinical Nonhuman 2005			
Rank	Serotype	Reported	Percent
1	Heidelberg	1261	16.8
2	Typhimurium *	1075	14.3
3	Kentucky	705	9.4
4	Hadar	649	8.7
5	Senftenberg	540	7.2
6	Cerro	291	3.9
7	Enteritidis	217	2.9
8	Agona	213	2.8
9	Derby	209	2.8
10	Montevideo	180	2.4
11	I 4,[5],12:i:-	170	2.3
12	Schwarzengrund	138	1.8
13	Mbandaka	129	1.7
14	Saintpaul	116	1.5
15	Worthington	110	1.5
16	Newport	107	1.4
17	Infantis	98	1.3
18	Anatum	94	1.3
19	Thompson	86	1.1
20	Muenster	85	1.1
21	Braenderup	75	1.0
22	Cubana	70	0.9
23	Muenchen	63	0.8
24	Ohio	48	0.6
25	Tennessee	43	0.6
26	Berta	39	0.5
27	Kiambu	39	0.5
28	Uganda	36	0.5
29	IIla 18:z4,z32:-	31	0.4
30	I 8,20:-:z6	28	0.4
	<b>Sub Total</b>	<b>6945</b>	<b>92.7</b>
	All Other Serotyped	506	6.7
	Rough or nonmotile	43	0.6
	<b>Sub Total</b>	<b>549</b>	<b>7.3</b>
	<b>Total</b>	<b>7494</b>	<b>100</b>

NOTE:

\* Typhimurium includes var. 5- (Formerly var. Copenhagen)

**TABLE 2**

**Salmonella isolates from Human sources  
by Age Group and Sex, 2005**

Age Group	Sex			Total
	Female	Male	Unknown	
< 1 Year	1068	1279	185	2532
1 to 4 Years	1993	2315	236	4544
5 to 9 Years	1066	1295	106	2467
10 to 19 Years	1368	1491	105	2964
20 to 29 Years	1540	1329	81	2950
30 to 39 Years	1437	1219	121	2777
40 to 49 Years	1573	1165	94	2832
50 to 59 Years	1359	993	78	2430
60 to 69 Years	984	679	54	1717
70 to 79 Years	873	487	44	1404
80+ Years	651	298	50	999
Unknown Age	2386	2458	3724	8568
	<b>16298</b>	<b>15008</b>	<b>4878</b>	<b>36184</b>

**FIGURE 2**

**Salmonella Isolates from Human sources  
by Age Group and Sex, 2005**

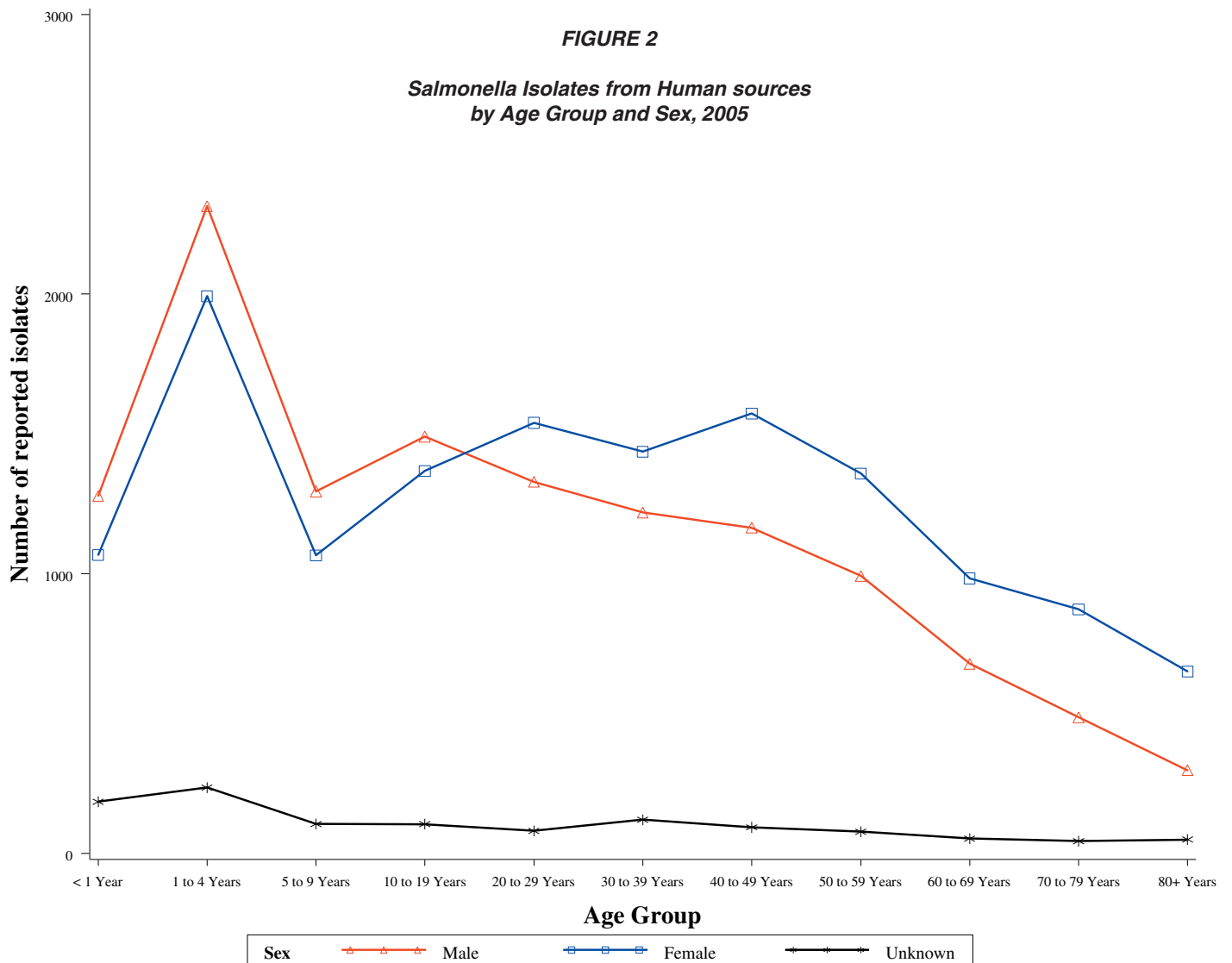


TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Aarhus		6	16	9	6	7	2	7	9	3	5	70
Aba						4			1			5
Abadina								2				2
Abaetetuba	10	17	8	7	7	5	4	3	1	1		63
Aberdeen	5	2	3	4	4	13	5	3	3	6	6	54
Abony	9	2	3	6	4	1	11	9	9	10	2	66
Abortusequi			1									1
Adelaide	98	88	70	73	95	42	81	66	60	76	71	820
Adime									1			1
Aequatoria			1		1					5	2	9
Aflao		1			1							2
Africana				2	6					1		9
Afula										1		1
Agama	3	2	2	2	2	1	1	5	4	2	8	32
Agbeni	5	1	3		1	13	5	4	7	72	15	126
Agege		1										1
Ago	1		1	1		1						4
Agodi								1				1
Agona	683	606	740	991	528	406	372	340	523	407	367	5963
Agoueve	2	4	3	6	2	2	3	6	2	2	3	35
Ahuza		1				2						3
Ajjobo			2	2		2		2	1	1		10
Alabama	1	2	2	2	4	1	1	3		3	3	22
Alachua	53	39	18	14	22	20	9	16	10	28	21	250
Alagbon										1	3	4
Alamo	1			1								2
Albany	49	26	21	23	17	18	17	15	17	34	38	275
Albert	1	1									1	3
Albuquerque								1				1
Allandale				1		1	1			1		4
Allerton										1		1
Altona		1	1		1	4	3	3		2	1	16
Amager	6	1	8	3	4	7	1	2	3	15	5	55
Amager var. 15+										3		3
Amsterdam	11	2	9	5	6	2	5	7	6	3	2	58
Amsterdam var. 15+	8	5	7	4	5	1	5	3		1	2	41
Anatum	174	271	208	138	157	177	188	217	177	250	197	2154
Anatum var. 15+	17	16	20	25	23	8	4	4	10	11	6	144
Anatum var. 15+, 34+		1						1				2
Anecho	2	5	2	2	2	1		5	2		2	23
Anfo											1	1
Ank		2										2
Annedal		1					1					2
Antsalova	2	1		2		3		1		1		10
Apapa			2		2	4	8	10	3	12	7	48

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Apeyeme					1	1				1	2	5
Aqua	3	2	1			2	1		1	2	2	14
Aragua		1	1	1		1						4
Arapahoe								1				1
Arechavaleta	6	6	9	4	3	9	3	6	3	14	4	67
Assen					1	1		1			1	4
Athinai				1								1
Ati										2		2
Augustenborg			2				1				1	4
Austin							1					1
Australia							3					3
Avonmouth								1				1
Azteca					1						1	2
Babelsberg						1				2		3
Baguirmi							1					1
Bahati		1										1
Bahrenfeld			1									1
Baildon	14	5	5	73	77	4	2	14	12	7	33	246
Ball		2					1					3
Banalia							1					1
Banana		1	1	1		1	1		3		2	10
Banco				2								2
Bandia										1		1
Bardo	1	28	10	10	13	20	16	49	42	32	27	248
Bareilly	109	115	112	153	171	182	206	183	240	232	201	1904
Barranquilla		1			1		3	1	3	3	1	13
Bassa									1			1
Bassadji							1			1		2
Beaudesert						1			1			2
Belem					1				1			2
Benfica	2	1		1	1		1					6
Benin		1									1	2
Bere	1	2	8	1			1		1		2	16
Bergen					1	2			1			4
Berkeley				1								1
Berta	367	118	87	123	143	312	334	300	201	409	209	2603
Bijlmer											2	2
Binningen										1		1
Birkenhead		2	7	4		2	2		4	5	2	28
Bispebjerg		1	1						1			3
Blegdam		2	4	3	1	2	2	3	2	8	4	31
Blijdorp		1							1			2
Blockley	55	51	62	61	54	28	33	38	67	83	50	582
Blukwa		1	1									2
Bobo											1	1

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Bochum				5	1		3		1			10
Bolton						1						1
Bonames						1			1			2
Bonariensis	5	3	3	6	4	3	6	6	4	3	1	44
Bonn	4	1		1		1	2			2		11
Borbeck	1					1						2
Bournemouth								1	2	1	2	6
Bouso				1							3	4
Bovismorbificans	25	41	47	64	35	55	83	74	69	110	73	676
Bracknell								1				1
Bradford	12	1	3	1		2	1	2	3	1		26
Braenderup	588	531	559	497	529	531	396	389	553	684	603	5860
Brancaaster				1					1			2
Brandenburg	284	181	168	132	117	84	106	140	116	80	134	1542
Brazil	1	1	1		2				2	2	2	11
Brazos			1		1							2
Brazzaville									1		2	3
Bredeney	57	47	51	112	44	25	79	41	56	27	26	565
Brezany							4	2	1		1	8
Brikama		1										1
Bristol			1									1
Bron	2	1					1			3		7
Bronx			2	2			1					5
Brooklyn				1					1			2
Broughton	2				1							3
Brunei										3	2	5
Bsilla							1	1		3	1	6
Budapest	1											1
Bukavu			1			1			1			3
Bukuru										1		1
Burundi	1											1
Butantan					1			1			1	3
Butantan var. 15+						1						1
Buzu	3		5	4	1				1			14
Calabar				1	1							2
California	1	1	9	3	1		1		5	1		22
Camberwell				1								1
Canada		1				1		1	1	1	1	6
Cannstatt			1	1		1	1	3	1			8
Caracas			3		1			1				5
Carmel	1	1			1	1	8	9		9	4	34
Carno					1							1
Carrau	12	30	6	3	12	6	5	3	7	8	9	101
Cerro	74	55	60	52	56	52	31	39	28	19	22	488
Cerro var. 14+									3	3	4	10

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Ceyco							1	1				2
Chailey	6	4	12	9	3	3		1	1	3	2	44
Champaign	1											1
Chandans								3		1	5	9
Charity						1						1
Charlottenburg		1										1
Chester	34	26	36	24	29	23	24	23	51	15	15	300
Chicago				1				1	1			3
Chichiri							1		1			2
Chincol				1	2	2			1		2	8
Chingola			1				1					2
Chittagong											7	7
Choleraesuis	50	41	25	23	25	10	8	11	13	17	7	230
Choleraesuis var. Decatur				2			1	3		1		7
Choleraesuis var. Kunzendorf	25	26	24	13	9	10	5	8	6	9	6	141
Clackamas	1	1	3		3	1		6	4	1	1	21
Claibornei				1	1		1			1		4
Clerkenwell							1					1
Cleveland										1		1
Cochise						1						1
Coeln	2	7	4	5	2	3	3	3	2	3	2	36
Colindale	2	7	1	4	2	3	2	5	8	3	4	41
Colorado	1	1	1	2	2				1			8
Concord	4	5	2	2	3		2	1	3	4	6	32
Corvallis	1	1	1	1	1	1		1	3	4	13	27
Cotham					2	1		3	6	5	9	26
Cremieu			1			2	1				1	5
Cubana	44	34	36	72	42	31	26	21	24	18	13	361
Cuckmere										1		1
Cullingworth		1				1					6	8
Curacao					1	2	1				1	5
Daarle										1	1	2
Dahomey									1			1
Dahra					2	1	1	1	1		2	8
Damman										1		1
Daytona	3	4	6	3	4	3	4	4	10	10	5	56
Denver	5	2	3	1	1	1	1	2	5	1	5	27
Derby	213	143	152	171	174	188	121	169	125	137	123	1716
Derkle						1						1
Dessau			1				1					2
Diguel		4	2	1				2	1		1	11
Diourbel						1					1	2
Djelfa					1							1
Djugu	1	2	2	1	1	1				2	1	11
Doba	1											1

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Doel		2										2
Doncaster									1			1
Doulassame			1	1							1	3
Drogana	3											3
Dublin	81	85	61	78	66	94	76	83	65	73	55	817
Duesseldorf	13	6	6	15	5	1	2		8	9	1	66
Dugbe						1						1
Duisburg	5	3			1	1	2	2	2			16
Dunkwa							1					1
Durban	3	8	8	10	3	4	5	1	3	16	6	67
Durham	6	4	2		1	3	3	4	4	3	8	38
Duval	1		1	1				1		1		5
Ealing	25	26	8	6	6	9	16	10	12	13	27	158
Eastbourne	10	13	3	8	7	10	6	18	18	8	30	131
Ebrie					1	3	2	1	1			8
Echa									1		1	2
Edinburg	4			1	6	2	1	5	20	27	20	86
Edmonton											1	1
Ekpoui						1		1				2
Elisabethville										1		1
Elokate									1			1
Elomrane					3	1	1	1	1	3		10
Emek	6	5	7	7	8	5	2	2	11	6	7	66
Entebbe		8	4		1				1	1		15
Enteritidis	10201	9570	7924	6030	5343	6487	5634	5145	4914	5028	6730	73006
Enugu	1	1	1									3
Epicrates								1				1
Eppendorf					2	2				1		5
Escanaba			3					1				4
Eschweiler											1	1
Essen		2	3	2	3	4	1		1	2	1	19
Etterbeek			1									1
Falkensee	2		1						1		4	8
Fallowfield			3									3
Fann								1			1	2
Farmsen	2	2	6	4	3		1	1	1	1	1	22
Farsta								4		1		5
Fayed	1				6	3	4		1		1	16
Ferruch									1			1
Fillmore								1				1
Finkenwerder					1							1
Fischerkietz				1	1							2
Fischerstrasse						1		1				2
Fitzroy										1		1
Florida	2	7	11	8	1	2	4	2	3	1	6	47

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Fluntern		1		3			2	2	5	8	3	24
Fomeco											1	1
Fortlamy	2											2
Freefalls	2											2
Freetown							1		6	2	11	20
Freiburg									1			1
Fresno	1						3	1				5
Friedenau			1					1	1			3
Friedrichsfelde										2	1	3
Frintrop		1										1
Fulica			1								1	2
Fyris		2		1							1	4
Gabon				1	1			1				3
Galiema									1	1		2
Galil	1		1				2					4
Gallinarum		2	1	1	1		1	3	2		2	13
Gamaba				1								1
Gambia	1		2								1	4
Gaminara	45	44	47	61	52	51	58	44	86	134	99	721
Garba		1					1					2
Gatow	1			2		1	1	1			2	8
Gatuni	1	2		1	1	1	3		2	3	1	15
Georgia	2			2			4	3	2	2	1	16
Gera									1			1
Give	101	114	118	92	98	86	75	55	93	102	103	1037
Give var. 15+	20	22	26	36	23	9	9	5	7	5		162
Give var. 15+, 34+	5	14	1					1				21
Glasgow							1					1
Glidji		1										1
Glostrup	31	13	5	10	7	6	6	2	2	2	10	94
Gloucester	2	2	2									6
Gnesta										1		1
Godesberg	1	1										2
Goeteborg			1									1
Goettingen			1	1	1	3		2	1	2		11
Goldcoast	1		1	1	1					1	2	7
Goma									1			1
Gombe										1		1
Groenekan							1					1
Grumpensis	3			1	2	1	1		1		102	111
Guildford					1							1
Guinea		1								1	3	5
Gustavia						1	1					2
Haardt	16	6	5	2	3	4	4	3	52	29	4	128
Hadar	814	658	643	544	516	354	307	333	280	277	205	4931



TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Hadejia					1							1
Haifa	2	3	4	3	6	11	4	6	3	5	5	52
Halle					1							1
Handen		1										1
Hannover										1		1
Harburg			1					1	1			3
Harleystreet				1								1
Harrisonburg										1		1
Hartford	164	89	110	175	140	150	158	198	188	190	239	1801
Hatfield			1		1				1			3
Hato	1				1	2	5	1	1	2		13
Havana	57	59	47	77	46	26	19	28	29	32	26	446
Hayindogo				1			1	1				3
Heidelberg	2095	1998	2104	1900	1816	1772	1895	1985	1845	1758	1903	21071
Hemingford										1		1
Heron			1									1
Herston							1	1	2	2	2	8
Hessarek									1			1
Hidalgo			1							1		2
Hiduddify				3	1	1		1	2			8
Hillegersberg								1	1			2
Hillingdon		1									1	2
Hindmarsh	2	1	1	3		3	4	2	5	12	5	38
Hofit											1	1
Hoghton										1		1
Holcomb		1	2		1		3	4	1		2	14
Homosassa		1		2								3
Horsham		2			3				1			6
Hull	3						1	1	2		3	10
Hvittingfoss	15	44	26	29	38	34	30	44	32	34	36	362
Ibadan	46	33	42	39	27	17	9	10	17	5	9	254
Idikan		11	4	1		2		1	1		1	21
Ilala			1							1		2
Ilugun		3										3
Imo		1										1
Inchpark					1							1
India		1										1
Indiana	24	28	11	7	14	9	13	24	43	18	17	208
Infantis	521	503	651	600	596	613	441	472	570	588	505	6060
Inganda						1	4		2	1		8
Inpraw									1			1
Inverness	37	20	26	32	24	22	24	30	30	49	44	338
Ipswich	1	1			1							3
Irchel	1											1
Irenea					1				1			2

TABLE 3

**Salmonella isolates from Human sources  
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Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Irumu	31	18	13	15	6	6	9	2	9	13	9	131
Isangi	3	1	1	5	2		3	1	4	3	4	27
Israel									2	1		3
Istanbul	10	9	8	7	25	15	27	33	15	61	9	219
Isuge								1				1
Itami		1	2	8	7	12	50	3	8	7	10	108
Ituri	4	2	1	5	3	2	7	1		1	1	27
Jamaica	6		2	1	2							11
Jangwani	10	7	4	5	6	7	2	3		4	4	52
Javiana	758	749	675	1168	1197	1204	1068	1201	1718	1776	1324	12838
Jedburgh			1								1	2
Jericho											1	1
Jerusalem							1	1	1			3
Joal		1						2	2	4		9
Jodhpur				1				1		1		3
Johannesburg	74	45	45	32	44	31	35	20	17	40	44	427
Jos					1						2	3
Jubilee			1							1		2
Kaapstad		1				1	1		2	1		6
Kaduna											1	1
Kalamu							1					1
Kalina							1				1	2
Kambole				1					1			2
Kande							1	3				4
Kandla								1				1
Kanifing			1									1
Kaolack		1										1
Kapemba										1		1
Kedougou	4			1	2	3	1	1		3	4	19
Kentucky	80	78	60	58	71	48	64	69	59	56	81	724
Kiambu	14	17	14	13	40	24	27	41	84	31	53	358
Kibusi		3										3
Kimberley											1	1
Kimuenza								1			1	2
Kingabwa	1		2		2		3	11	4	7	11	41
Kingston			3	1			2	1		1	1	9
Kinondoni		1	1	1	1			1				5
Kintambo	21	19	14	20	8	3	5	9	10	16	5	130
Kirkee			1		1							2
Kisangani	2										2	4
Kisarawe			2	2			1	2		1	1	9
Kitenge	1											1
Kivu					2							2
Koessen		1										1
Koketime		1										1

TABLE 3

**Salmonella isolates from Human sources  
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Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Kokoli				1								1
Kokomlemle	2	2	3	1	1	2	4	2	1	2	1	21
Konstanz							2		1			3
Korbol											1	1
Kottbus	49	9	11	2	5	15	73	19	7	8	8	206
Kotu										1	4	5
Kralingen					1	1						2
Krefeld	3	2	1		1	1		2	1		1	12
Kristianstad						1	1					2
Kua	2	1	1	1	2	1	2		3	2		15
Kunduchi				1								1
Labadi	2			1								3
Lagos	2	1	1				1	1	1	2		9
Lamberhurst				1		1						2
Lamin				1								1
Landau			1				1					2
Landwasser				1	2		1					4
Langensalza		1		1								2
Lansing					1					2		3
Larochelle	4	4	1	6	4	2		8	4	6	2	41
Lattenkamp							1				1	2
Lawndale		1										1
Leeuwarden							2		1			3
Leopoldville							1					1
Lexington	1	2	1			1	5	1		5	1	17
Lexington var. 15+					1							1
Lexington var. 15+, 34+		1										1
Lika									4			4
Lille			3		1	1		1		1		7
Lille var. 14+						1						1
Limete		1	6	1			1				1	10
Lindenburg	9	5	3	10	5	7	3	2	3	2	4	53
Lindern								1				1
Lindi		1										1
Litchfield	115	158	105	119	135	119	140	125	168	155	141	1480
Liverpool	2	3	3		2	1			1	3	4	19
Livingstone	13	18	6	5	4	6	8	9	2	3	7	81
Livingstone var. 14+					1							1
Llandoff									1			1
Loanda			1			1	1		1	2	2	8
Lockleaze	2			1	1			1			1	6
Lomalinda	15	24	12	16	8	9	5	25	12	15	18	159
Lome		2	2				2		1			7
Lomita	2	5	3	3		2	4	2	6	4		31
London	36	23	33	28	41	26	24	22	45	28	30	336

TABLE 3

**Salmonella isolates from Human sources  
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Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
London var. 15+	1	1	4	2	1							9
Losangeles		1										1
Loubomo							1					1
Louga									1			1
Lovelace				1								1
Lowestoft									1			1
Luciana		1	3	3	6	8	2	6	4	4	4	41
Madelia	8	21	7	12	12	16	3	4	6	6	6	101
Madras											1	1
Magwa			1	1								2
Maiduguri			1									1
Malika											1	1
Malstatt		2				1	1				2	6
Mampeza		1										1
Manchester					1	1	1		1			4
Mango					1							1
Manhattan	72	101	99	73	78	72	50	89	53	80	57	824
Mapo	1								1			2
Mara											1	1
Maracaibo								2				2
Marburg									1			1
Marshall							1					1
Maryland			1	1								2
Massenya									1			1
Matadi	10	27	9	4	2	9	3	5	4	2	2	77
Matopeni				2			1					3
Maumee						1				1		2
Mbandaka	154	223	189	147	231	157	163	171	173	164	190	1962
Meekatharra							1					1
Meleagridis	30	207	43	39	14	13	19	6	14	8	12	405
Meleagridis var. 15+	1				1							2
Memphis		1	1		1					2		5
Menden					1							1
Mendoza			1	3	1		2		1	8	2	18
Menston			1				2		2			5
Mgulani		2			2				1			5
Miami	74	52	76	99	95	81	68	130	66	103	82	926
Michigan	8	1		2	2	1	1		2	6	1	24
Mikawasima	7		2		4	6	3	5	4	1	1	33
Milwaukee							4					4
Mim										1		1
Minnesota	36	28	26	17	23	21	18	35	25	35	55	319
Mississippi	199	180	205	314	248	286	336	315	451	558	565	3657
Mkamba										1		1
Moero	2											2

TABLE 3

**Salmonella isolates from Human sources  
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Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Molade			1	1		4			2		2	10
Mono	1			1			2		2		41	47
Mons		2						1				3
Monschaui	9	11	10	3	5	5	7	5	13	21	14	103
Montevideo	685	1227	718	829	851	841	630	729	890	874	809	9083
Montreal											1	1
Morehead	2											2
Morocco								1				1
Morotai			1							1		2
Moscow		1		4			1					6
Moualine							1					1
Moundou					1							1
Mountpleasant	1		1	1			1		1		1	6
Mowanjum		2										2
Mpouto			1									1
Muenchen	754	595	543	639	1332	642	586	603	795	739	733	7961
Muenster	87	96	73	68	65	113	64	49	70	59	93	837
Muenster var. 15+	4	1	1	1			1	1	9	2	1	21
Muenster var. 15+, 34+			1	2	4	2		1				10
Mundonobo						1					1	2
Nagoya			1					1	1		1	4
Namibia		1										1
Napoli		1			2	2		1		1	6	13
Narashino	1	1	1								1	4
Nchanga				1		1			2			4
Ndolo							1					1
Nessziona			4			1	2			1	1	9
Neukoelln										1		1
Newholland											2	2
Newlands		1										1
Newmexico			1			4	2	2	10	3	3	25
Newport	2566	1985	1584	2273	2618	3074	3168	4251	4000	3329	3295	32143
Newrochelle	2	1	1	1	1							6
Newyork		3	4		1							8
Ngili								2				2
Ngor					2							2
Nieukerk									1			1
Nigeria		1				1			1	2		5
Nikolaifleet							1					1
Nima	1	4	1	5	1	5	6	13	2	5	8	51
Nitra		3			1		1		2			7
Nola		1	1				1					3
Norwich	51	52	56	67	74	69	96	106	121	106	91	889
Nottingham	3	3	5	2		4	2	1	11	1	4	36
Nyanza								1		1		2

TABLE 3

**Salmonella isolates from Human sources  
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Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Nyborg									1			1
Oakland	1	4			1	1	1	1	3			12
Obogu									2			2
Offa								1			1	2
Ohio	105	67	100	79	78	85	64	58	49	74	87	846
Ohio var. 14+							1				1	2
Ohlstedt										1		1
Okatie	1	1							4			6
Oldenburg				1	1			1	1			4
Onderstepoort	1	2			1	2	1	2	2			11
Onireke	1											1
Ontario					1							1
Oranienburg	595	690	623	693	616	563	598	607	589	495	590	6659
Oranienburg var. 14+								2	11	2	5	20
Orientalis	2	6		1	2	5		1	8	2		27
Orion	1	6	3	1		3	3		5	3	2	27
Orion var. 15+	1			1	1		2	1		1		7
Orion var. 15+, 34+	1	1	2	2	4	2	1			1		14
Oritamerin						1	3	1		3	2	10
Oslo	13	31	25	31	28	20	23	19	21	25	30	266
Othmarschen	2	6	6	7	20	27	14	17	17	23	20	159
Ouakam	4			1			1		1			7
Oudwijk				1			1					2
Overschie	3	4	3	3	2	1	1	1	2		3	23
Oxford										1		1
Oyonnax						1					2	3
Pakistan		2	4		6	3	5	5	4	5		34
Panama	173	148	144	119	132	158	162	153	184	150	148	1671
Papuana	1		1				1					3
Paratyphi A	86	86	72	84	77	93	86	107	110	145	120	1066
Paratyphi B	241	298	159	189	172	120	180	124	215	239	105	2042
Paratyphi B var. L(+) tartrate+	268	289	184	248	316	468	467	442	342	354	460	3838
Paratyphi C	2	1	1		1		1			2	1	9
Patience		1						1				2
Penarth						1	1					2
Pensacola	11	4	7	5	8	10	8	8	2	4	14	81
Pharr					1							1
Planckendael			1									1
Plymouth	1	1									4	6
Poano	2	5				2		8	9	6	6	38
Poitiers											1	1
Pomona	23	29	43	20	28	26	38	61	68	70	67	473
Poona	531	415	294	346	249	337	331	283	211	234	196	3427
Portland										1		1
Potsdam	5	3	10	6	9	2	6	4	9	4	4	62

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Praha	1				1	1			1		1	5
Putten	8	6	5	9	3	2	9	4	12	4	9	71
Quebec				1								1
Quiniela			1	1						2		4
Ramatgan					1							1
Raus	2	3		3	3							11
Reading	197	131	167	81	97	95	53	81	90	74	55	1121
Rechovot							1		1			2
Redlands		1	1						1			3
Regent	2											2
Remo	1	2		1	2		3			1		10
Richmond	7	6	7	4	2	7	6	11	6	6	8	70
Ridge					1		3	1				5
Riggil							1					1
Riogrande	1				1							2
Rissen	4	5	9	6	6	10	4	7	7	7	5	70
Rissen var. 14+											1	1
Rittersbach								1	1			2
Riverside											1	1
Romanby	5	5	4	1	6	5	1	1	1	1	3	33
Roodepoort			1	2	2	1	1	2	6	3	3	21
Rostock		1					2					3
Rottnest					1							1
Rubislaw	83	71	81	88	98	76	66	83	103	104	100	953
Ruiru					1		1				1	3
Ruzizi					1			1				2
Saarbruecken				1				1				2
Saboya				1								1
Saintemarie										1		1
Saintpaul	467	562	436	479	472	548	471	548	838	695	683	6199
Salford						1						1
Sandiego	117	56	59	55	104	142	115	148	126	112	138	1172
Sangalkam										1		1
Sangera	1							1				2
Sanjuan					2	3						5
Sanktgeorg							1					1
Santiago	1	1			1				2	1		6
Sao		1										1
Sapele								1				1
Saphra	11	11	41	16	13	14	11	4	12	4	5	142
Sarajane				1								1
Schleissheim	5	9	6	8	6	7	4	7	8	3	6	69
Schoeneberg			1				1					2
Schwarzengrund	162	157	144	124	155	113	104	99	181	148	138	1525
Schwerin		1									1	2

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Sculcoates				1								1
Seegefeld						1						1
Sekondi									1			1
Selby										1		1
Sendai	1			2	1	1		1				6
Senegal						1	2	1	1			5
Senftenberg	91	167	180	143	120	148	143	128	99	104	112	1435
Seremban		1	1			1	1	1		2	1	8
Serrekunda				1								1
Shamba			1									1
Shangani		1										1
Sharon	1											1
Sherbrooke						1						1
Shipley										2		2
Shubra	9	2	3	4	7	5	3	7	3	2	2	47
Simi	2							1				3
Singapore	4	12	3	12	4	6	1	2	2	10	5	61
Sinstorf	9	4	8	1	3	3	7		2	1		38
Skansen	1			1								2
Soahanina	1		1			1					1	4
Soerenga		6	1		2	2	3	1	1	3	1	20
Somone		5	3	1	1		1	3				14
Southampton					1	1						2
Southbank		1										1
Spalantor										2		2
Splott											1	1
Stachus		1	3		2	1				1	1	9
Stanley	481	200	164	193	172	239	173	177	227	189	224	2439
Stanleyville	51	26	24	16	11	33	18	18	3	6	7	213
Stellingen	2		3	1					1	1		8
Stendal	1											1
Sterrenbos	1											1
Stockholm					4	2					1	7
Stoneferry									1	1		2
Stormont									1			1
Stourbridge											1	1
Strasbourg		1					1			1		3
Suberu			1	1					1		1	4
Suelldorf					1				2	1		4
Sundsvall	17	25	47	7	4	4	4	7	11	6	9	141
Sya						1						1
Szentes								1				1
Tabligbo											1	1
Tafo					1							1
Takoradi	1	4	5	4	4			1	6	5		30



TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Taksony		5	1									6
Tallahassee	6	5	18	8	5	3	2	4	8	3	7	69
Tamale		2										2
Tambacounda	3		1	1	1	1						7
Tampico					2			1				3
Tananarive	1											1
Tanger	1						1		2			4
Teddington								1				1
Teko				1								1
Telaviv	1			1		1						3
Telekebir	4	13	12	26	16	14	11	11	21	29	45	202
Teltow									1			1
Tennessee	112	96	31	63	29	24	33	36	42	57	132	655
Texas		1									1	2
Thies					1							1
Thompson	625	586	696	571	607	609	514	442	509	494	428	6081
Thompson var. 14+										1		1
Tienba				1								1
Tilene	4	7	2		1	2		2	4		1	23
Tokoin	3					4			2		1	10
Toowong			1									1
Tornow							2		2	3		7
Toucra	3	3				1		2	2	3	2	16
Trachau			1						1			2
Travis			1		1		1			2		5
Treforest							2					2
Tripoli										2		2
Troy				1								1
Tsevie	1	1					2					4
Tshiongwe	2	4				2		2	2	1	4	17
Tucson	2	1	3		1			1		1	4	13
Typhi	442	440	349	382	352	399	344	293	362	306	348	4017
Typhimurium	9147	9001	8291	8101	7126	6495	6061	6312	5905	5872	5974	78285
Typhimurium var. 5-	555	499	827	718	926	933	979	828	865	983	1008	9121
Typhisuis			3				1			2		6
Tyresoe		1								1		2
Uccle			1	3		2			1			7
Uganda	28	63	51	44	58	55	97	61	59	45	47	608
Uganda var. 15+	4	7	6	1	3	4	1	3	2	1		32
Ughelli						1					2	3
Ullevi			1									1
Umhlali						1						1
Uppsala	1	1		1		1				1		5
Urbana	72	60	57	46	56	38	53	41	60	59	44	586
Uzaramo	6			3	1	2	1		3	5		21

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Valdosta										2		2
Vancouver	1											1
Vejle	2		2	1	1		1	1	2	4	1	15
Vejle var. 15+									1			1
Veneziana							1					1
Victoria	1	3	2	1			1	1				9
Vietnam	1											1
Vilvoorde	1	2	1									4
Virchow	60	67	71	64	70	104	80	61	78	79	82	816
Virginia	7	7	2		10	1	5	4	3	10	6	55
Vitkin							1					1
Volkmarisdorf										1		1
Vridi	1											1
Wa		1			1							2
Wagenia						1			1			2
Wandsworth	14	6	5		9	12	3	5	6	2	3	65
Wangata	1		1	1		2		1		3	3	12
Waral	1		1					1	2			5
Warnow								2	1			3
Washington	2	1	3		1				1			8
Waycross		4	4	2	2	5	4	1	2	2	5	31
Wayne	2	1	1									4
Welikade			1	1	1		3	1		1		8
Weltevreden	89	86	106	67	54	59	89	65	71	94	91	871
Weltevreden var. 15+				1	1	1	3			2	1	9
Wentworth										4		4
Wernigerode				3			1				1	5
Weslaco	1			2	1				1		2	7
Westeinde											1	1
Westerstede					1							1
Westhampton	3	6	5	3	2		3	5	8	6		41
Westhampton var. 15+		1			2							3
Weston									1			1
Wichita									1			1
Widemarsh		3	2		1			2	4	1		13
Wien	1				1	1	3					6
Wil		1			1					1		3
Willamette										1		1
Willemstad	1		1									2
Winneba					1			1		1		3
Wisbech		2										2
Woodinville									2			2
Worthington	50	58	48	38	28	28	29	27	17	34	21	378
Yaba											1	1
Yarrabah		1										1

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Yeerongpilly		1										1
Yehuda									1			1
Yoruba				1				1	1			3
Yovokome					1				1			2
Yundum								1				1
Zaiman	1					1						2
Zanzibar	2	2	2	1	1				2		1	11
Zega											2	2
Zerfin									3			3
I 1,3,19:-:1,7				1								1
I 3,10:e,h:-						5	6	2				13
I 3,10:l,v:-								1				1
I 3,10:l,z13:-						2	3					5
I 3,10:r:-						2						2
I 3,15,34:l,v:-								1				1
I 3,15:l,z13:-									1			1
I 4,12:-:1,7								1				1
I 4,12:l,v:-											1	1
I 4,[5],12:-:1,2		2	7	1	2	3	3	4	3	3	1	29
I 4,[5],12:-:1,5	1											1
I 4,[5],12:b:-	5	8	17	5	8	8	4	12	24	50	71	212
I 4,[5],12:b:- var. L(+) tartrate+											6	6
I 4,[5],12:d:-			1				3	5				9
I 4,[5],12:e,h:-			2		2			2	2		2	10
I 4,[5],12:i:-	45	96	189	176	138	233	260	296	548	739	822	3542
I 4,[5],12:r:-	3	2	3				1	1	4	17	2	33
I 4,[5],12:z:-				1								1
I 6,14,24:e,h:-									1			1
I 6,14,25:b:-		1								2		3
I 6,7:-:1,2							1					1
I 6,7:-:1,5	1	12	1	2	2	3	4	9	31	16	23	104
I 6,7:-:1,6									1			1
I 6,7:b:-							1			1	1	3
I 6,7:e,h:-		3						2	1			6
I 6,7:k:-	2		6	2	1	1	3	2	5	3	3	28
I 6,7:l,v:-								2				2
I 6,7:l,w:-						1	2	1				4
I 6,7:r:-										1	1	2
I 6,7:z10:-		2	2									4
I 6,7:z4,z23:-								1				1
I 6,8:-:1,2				1	1	1	1		1		2	7
I 6,8:-:1,5						2		1			1	4
I 6,8:-:e,n,x									1			1
I 6,8:b:-											1	1
I 6,8:d:-		1	1		2	1		3	1	1		10

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
I 6,8:e,h,-			2	1			1		2	3		9
I 6,8:i,-						2						2
I 6,8:z10:-	1							1				2
I 9,12:-:1,5	2					1	2	5	1	1		12
I 9,12:a:-								1				1
I 9,12:l,v:-	1			1				3	1			6
I 9,12:l,z28:-	5	5	8	4	6	9	6	12	15	1	7	78
I 11:e,h,-										1		1
I 11:r:-									2			2
I 13,22:-:1,6						1					1	2
I 13,22:b:-							1	2				3
I 13,23:-:1,5										1		1
I 13,23:b:-	1	1							4	3	8	17
I 13,23:i:-					1			1				2
I 16:d:-						1						1
I 16:e,h,-									1			1
I 16:l,v:-				3							2	5
I 38:k:-			1							1		2
I 40:-:e,n,x										2		2
I 45:b:-					1							1
I 47:z4,z23:-						1				1		2
II 4,12,[27]:b:[e,n,x]			2	1			1		1	1		6
II 4,12,[27]:z:e,n,x					1							1
II 4,12:-:1,6										1		1
II 4,12:a:-							1					1
II 4,12:l,w,e,n,x	4	2		1	3	4						14
II 6,7:b:z42											1	1
II 6,7:l,z28:1,5:[z42]				1								1
II 6,7:m,t:-									1			1
II 6,7:z39:1,5,7									1			1
II 9,12:b:-										1		1
II 9,12:d:e,n,x									1			1
II 9,12:g,m,[s],t:[1,5,7]:[z42]	4		1		1		5	1	2			14
II 9,12:g,m,s,t,e,n,x											1	1
II 9,12:g,s,t,e,n,x								1			1	2
II 9,12:l,w,e,n,x								1				1
II 9,12:l,z28:1,5						1						1
II 9,12:m,t,e,n,x			1									1
II 9,12:z39:1,7						2						2
II 9,46:g,[m],[s],t:[e,n,x]						1						1
II 9,46:m,t,e,n,x										1		1
II 11:g,[m],s,t:z39								1			1	2
II 11:m,t,e,n,x						1						1
II 13,22:g,m,t:[1,5]	1	1	1									3
II 13,22:z29:1,5								1	3			4

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
II 13,23:a:z42	2	1										3
II 13,23:b:[1,5]:z42		1										1
II 13,23:g,m,[s],t:[e,n,x]					1			1				2
II 13,23:z:1,5		1				1						2
II 16:l,w:z6	1											1
II 16:z35:e,n,x										1		1
II 16:z4,z23:-	1											1
II 17:g,t:-							2					2
II 17:g,t:[e,n,x,z15]						1		1				2
II 21:b:1,5									3			3
II 21:z10:[z6]						1	2					3
II 30:l,z28:z6										1	1	2
II 35:g,m,s,t:-								1				1
II 35:z29:e,n,x									1			1
II 40:c:e,n,x,z15						1						1
II 40:m,t:-								1				1
II 40:z4,z24:z39	1				1				1			3
II 41:z10:1,2	1											1
II 41:z10:z6					1			1				2
II 42:b:e,n,x,z15		1						1			1	3
II 42:g,t:-	1											1
II 43:b:-		1										1
II 44:z4,z23:-											1	1
II 47:b:1,5	9	9	5	4	6	6	2		5	1	8	55
II 47:d:1,5		1										1
II 47:d:z39	3					2		4				9
II 48:a:z39			1									1
II 48:a:z6							2	2	1			5
II 48:b:z6	2								1			3
II 48:d:1,2										1		1
II 48:d:z6	1	1	1		1	3		4		1	1	13
II 48:g,m,t:-					1							1
II 48:k:z39				1				1				2
II 48:z39:z81									1	2	1	4
II 50:b:z6	2	1	1	4	3	1	2	4	4	2	1	25
II 58:d:z6			1			1	1			1		4
II 58:l,z13,z28:z6	1	1	2	2						1	1	8
II 60:g,m,t:z6		1										1
IIIa 17:z4,z23:-								1				1
IIIa 18:z4,z23:-								1	7	4	13	25
IIIa 18:z4,z32:-		1							2			3
IIIa 21:g,z51:-			1			1		1			2	5
IIIa 35:g,z51:-											1	1
IIIa 35:z29:-										1		1
IIIa 35:z4,z23:-											1	1

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
IIIa 40:g,z51:-						1			2			3
IIIa 40:z4,z23:-				1		1	1					3
IIIa 41:z4,z23:-	1	1	3			1		4	2	11	6	29
IIIa 42:z4,z23:-			1									1
IIIa 42:z4,z24:-											1	1
IIIa 43:z29:-							1				1	2
IIIa 43:z4,z24:-											1	1
IIIa 44:z4,z23:-			13			5				1		19
IIIa 44:z4,z24:-									1			1
IIIa 45:z4,z24:-								1				1
IIIa 47:g,z51:-				1								1
IIIa 47:z4,z23:-		2	3									5
IIIa 48:g,z51:-	2		1		3	4	2	7	4	3	3	29
IIIa 48:z29:-								1				1
IIIa 48:z36:-							1					1
IIIa 48:z4,z23:-	1		2					2				5
IIIa 48:z4,z24:-		1	1		1	2	2		3		3	13
IIIa 48:z4,z32:-				1								1
IIIa 51:z4,z23:-			1	1	1			1		2		6
IIIa 51:z4,z24:-									1			1
IIIa 53:g,z51:-			1			1					1	3
IIIa 53:z4,z23,z32:-					4	2						6
IIIa 53:z4,z23:-			1		2					1	3	7
IIIa 53:z4,z24:-							1				1	2
IIIa 56:z4,z23:-			1			1					3	5
IIIa 59:z29:-									1			1
IIIa 59:z36:-									1			1
IIIa 59:z4,z23:-			1									1
IIIa 62:z4,z23:-								1				1
IIIb (6),14:z10:z						1						1
IIIb 11:k:z53											1	1
IIIb 16:z10:e,n,x,z15			1	2		1	1	2	2	1		10
IIIb 17:l,v:e,n,x,z15									1			1
IIIb 17:z10:e,n,x,z15								1		1		2
IIIb 18:l,[v],[z13]:z										1		1
IIIb 18:l,v:z										3		3
IIIb 35:l,v:z35	1		2				1		1			5
IIIb 35:r:e,n,x,z15			1									1
IIIb 38:(k):z35						1		1	2			4
IIIb 38:k:z53	2											2
IIIb 38:l,v:z53			1			1	1					3
IIIb 38:r:z											1	1
IIIb 47:k:e,n,x,z15		1										1

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
IIIb 47:r:z53									1			1
IIIb 48:c:z					1		1		2			4
IIIb 48:i:z	1	4	3		1	3	2	1	2	3	4	24
IIIb 48:r:z										1		1
IIIb 48:z52:z		1				1			1	1	1	5
IIIb 50:k:e,n,x,z15				1								1
IIIb 50:k:z				1	1	1		4	6	3		16
IIIb 50:k:z53								1				1
IIIb 50:l,v:z35										1		1
IIIb 50:r:-						1						1
IIIb 50:r:z		1						2	1	3	1	8
IIIb 50:r:z35	1											1
IIIb 50:z52:z35								1	1	1		3
IIIb 50:z52:z53			1									1
IIIb 50:z:z52			2				1	1	1			5
IIIb 53:k:e,n,x,z15				1								1
IIIb 53:k:z									1			1
IIIb 53:z10:z35											1	1
IIIb 58:z52:z35				1						1		2
IIIb 60:r:-							1					1
IIIb 60:r:e,n,x,z15	2	1		1	1		2	1	4	4	1	17
IIIb 60:r:z		1	2	1	1	1		1	2	1		10
IIIb 60:r:z53			1									1
IIIb 60:z52:z53							1					1
IIIb 61:(k):z53							1					1
IIIb 61:-:1,5,[7]			1			2	1		2	1	2	9
IIIb 61:c:-									1			1
IIIb 61:c:z35	2	1		2			2	1	2	1	3	14
IIIb 61:i:z	1		1					1	1			4
IIIb 61:i:z53				1								1
IIIb 61:k:1,5,[7]		5	1		4	2	3		1		2	18
IIIb 61:k:z35		1										1
IIIb 61:l,[v],[z13]:-								1				1
IIIb 61:l,[v],[z13]:1,5,[7]			4	2	3			17	2	2	1	31
IIIb 61:l,[v],[z13]:z35									3	1		4
IIIb 61:l,v:z											3	3
IIIb 61:r:z							1			1		2
IIIb 61:r:z53				1			2	1	1			5
IIIb 61:z52:z53				1					1	1	1	4
IIIb 65:(k):z	1	1	3		1							6
IIIb 65:i:e,n,x,z15			1									1
IIIb 65:l,v:z35	1											1
IIIb 65:l,v:z53			2									2
IV 6,7:g,z51:-	1											1
IV 6,7:z4,z23:-	1	2	3	1		2	1		1			11

TABLE 3

**Salmonella isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
IV 6,7:z4,z24:-	10	16	4	14	4	15	7	9	8	2		89
IV 11:z4,z23:-	7	7	2	4	2		2	1	1		1	27
IV 16:z4,z23:-			2		1						1	4
IV 16:z4,z32:-	12	11	8	8	6	13	20	11	4	3	5	101
IV 18:z36,z38:-			1									1
IV 21:g,z51:-								1				1
IV 21:z4,z23:-						1					2	3
IV 38:z4,z23:-			1			1						2
IV 40:g,z51:-	1											1
IV 40:z4,z32:-					2	2					1	5
IV 43:g,z51:-	1											1
IV 43:z36,z38:-		2				1				1		4
IV 43:z4,z23:-	3	21	1	6	10	3	5		3	7	1	60
IV 43:z4,z32:-	1	1	2	1				2			1	8
IV 44:z36,[z38]-	1						1	4	2	1		9
IV 44:z4,z23:-	5	8	6	7	17	4	5	15	14	7	16	104
IV 44:z4,z24:-				3		1	1			2	1	8
IV 44:z4,z32:-	2	4			2	1		3		1	5	18
IV 45:g,z51:-	9	8	10	3	1	4	5	1	8	8	8	65
IV 48:g,z51:-	77	84	41	48	46	46	46	42	30	13	5	478
IV 48:z4,z23:-									2			2
IV 48:z4,z32:-						1	1		1	1		4
IV 50:g,z51:-	29	18	15	6	14	6	16	23	9	9	7	152
IV 50:z4,z23:-	39	34	43	56	64	59	14	7	6	7	6	335
IV 50:z4,z32:-	1	1			1							3
IV 51:z4,z23:-				1								1
<i>S. bongori</i> ser. 44:z39:-			1									1
<i>S. bongori</i> ser. 48:z35:-	2	1				1				1	2	7
<i>S. bongori</i> ser. 66:z81:-										1		1
Partially serotyped	1250	1161	696	829	914	1013	1288	1244	1362	1324	1684	12765
Rough or nonmotile	24	36	25	35	4	14	21	48	52	61	39	359
Unknown	941	667	361	497	385	634	573	2530	3610	1999	1113	13310
<b>Total</b>	<b>41222</b>	<b>39035</b>	<b>34607</b>	<b>33971</b>	<b>32828</b>	<b>33556</b>	<b>31876</b>	<b>34911</b>	<b>37442</b>	<b>35661</b>	<b>36184</b>	<b>391293</b>



**TABLE 3a**

***Salmonella* partially serotyped isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Group 51		1					2					3
Group 52		2										2
Group 53	1	5	1	1		1	1	1				11
Group 54	1											1
Group 56		3					1					4
Group 58	2		1		1	1	1		1			7
Group 60	1	4	1	1		1						8
Group 62					1							1
Group 63					1							1
Group 65	1	1				1	1	1				5
Group F	3	5	2	6		2	46	7	1	10	35	117
Group G	72	41	8	17	17	18	30	22	1	11	22	259
Group H	1	2		1	2	5		5	1		2	19
Group I	5	5	2	40	44	4	5	2	2	1	7	117
Group J	1	1			1		8	2	1		1	15
Group K	3	5	1	3	4	3	4	4	2		2	31
Group L	2			1		1	2	1			5	12
Group M							1	3		4	8	16
Group N		1		1			1	2			5	10
Group O	2	3		1	4	1	5	6		1	1	24
Group P	3	1	1	1		2	1	3	1	1	4	18
Group Q			1	1	2							4
Group R	2	3		2	1	8	6	3	1	1	4	31
Group S	4	4	2	1	1	3	5		1			21
Group T		1										1
Group U	2	3	1			1					1	8
Group V	11	19	17	5	5	2	9	10	5	4	1	88
Group W	8	13	1	2	2		4	4	1	2		37
Group X	1	5	3		3		1				1	14
Group Y	10	10	4	4	10	8	13	11	5	1	18	94
Group Z	14	14	8	3	10	17	99	72	4	18	114	373
Subspecies I	26	18	10	45	77	76	43	53	99	157	155	759
Subspecies I, Group A	4	3	1	2	4		2	4	4	1	2	27
Subspecies I, Group B	537	474	293	394	366	503	430	561	447	404	479	4888
Subspecies I, Group C1	104	107	88	77	135	87	108	112	160	141	138	1257
Subspecies I, Group C2	109	102	62	47	46	36	103	87	213	151	191	1147
Subspecies I, Group D1	168	170	105	106	79	95	199	140	257	269	283	1871
Subspecies I, Group D2	1	3	1		1	1		1	1	3	5	17
Subspecies I, Group E1	20	23	15	15	17	39	55	24	39	35	35	317
Subspecies I, Group E4		2	2	1	2		1		9	6	7	30
Subspecies I, Group O:30								1				1
Subspecies I, Group O:35								1				1
Subspecies I, Group O:38											1	1
Subspecies I, Group O:48									2			2
Subspecies II	7	21	7	4	5	8	10	5	2	5	9	83

**TABLE 3a**

***Salmonella* partially serotyped isolates from Human sources  
by Serotype and Year, 1995-2005**

Serotype	Year											Total
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Subspecies IIIa	18	11	5	12	16	11	16	11	17	24	27	168
Subspecies IIIa, Group O:13									1			1
Subspecies IIIa, Group O:63								1				1
Subspecies IIIa/IIIb	36	31	22	13	19	36	41	40	32	25	40	335
Subspecies IIIb	24	13	10	6	9	18	6	21	26	16	32	181
Subspecies IIIb, Group O:35									1			1
Subspecies IIIb, Group O:38									1			1
Subspecies IIIb, Group O:42											1	1
Subspecies IIIb, Group O:47									1		3	4
Subspecies IIIb, Group O:57								1				1
Subspecies IIIb, Group O:61	17	10			4	2	5	2				40
Subspecies IIIb, Group O:65											1	1
Subspecies IV	28	20	21	16	25	22	23	19	23	33	44	274
Subspecies IV, Group O:11								1				1
Subspecies VI	1	1										2
<b>Total</b>	<b>1250</b>	<b>1161</b>	<b>696</b>	<b>829</b>	<b>914</b>	<b>1013</b>	<b>1288</b>	<b>1244</b>	<b>1362</b>	<b>1324</b>	<b>1684</b>	<b>12765</b>

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=New England

Serotype	State						Total
	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island	Vermont	
Adelaide	2		2				4
Agbeni					1		1
Agona	1		15	5	3	4	28
Agouvee			1				1
Alachua	3						3
Alagbon	1						1
Albany			3	1			4
Anatum			5		2		7
Baildon			1				1
Bareilly			1		1		2
Benin			1				1
Berta	3	1	4	1			9
Blockley	2		4				6
Bovismorbificans			2				2
Braenderup	9	2	16	2	2	1	32
Brandenburg	1	1		2			4
Cerro			1				1
Concord			2			1	3
Corvallis			1				1
Derby	1		2		2		5
Dublin	1		2				3
Durham	1						1
Ealing	2		3		1	1	7
Eastbourne			2				2
Edinburg	1						1
Enteritidis	101	38	250	52	13	21	475
Falkensee					3		3
Florida			1				1
Freetown	1		1			1	3
Gaminara			3		1		4
Gatuni	1						1
Give			1				1
Grumpensis			2				2
Hadar	1	1	20		1	1	24
Hartford	2	2	6	3		2	15
Havana			2		1		3
Heidelberg	26	16	100	8	7	2	159
Hvittingfoss			1				1
Indiana			3				3
Infantis	12	1	27	2	3	4	49
Inverness			3				3
Isangi						1	1
Istanbul			4				4
Itami				1			1

TABLE 4

*Salmonella* isolates from Human sources  
by Serotype, Geographic Region and State, 2005

Region=New England

Serotype	State						Total
	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island	Vermont	
Javiana	4		22	3	1	1	31
Kentucky	1		2				3
Kingabwa						1	1
Litchfield	3		4	3	2	2	14
Liverpool	1		1				2
Livingstone	1				1		2
Lomalinda			1				1
London	2		2	1			5
Manhattan	2		1		1		4
Matadi			1				1
Mbandaka	3		8	3	1		15
Meleagridis			1				1
Miami	1		2		1		4
Minnesota			1				1
Mississippi	3		5				8
Monschau	1						1
Montevideo	4		10		3	4	21
Muenchen	8	1	18	1	4		32
Muenster	1		1	2			4
Nagoya			1				1
Newport	10	15	58	12	12	3	110
Ohio	4						4
Oranienburg	9		40	5	8	4	66
Oranienburg var. 14+			3	1			4
Oslo			1	1			2
Overschie			1				1
Panama	1		6	3			10
Paratyphi A	4		6				10
Paratyphi B	3			2			5
Paratyphi B var. L(+) tartrate+	2		16		3		21
Pensacola			1				1
Plymouth	1		1				2
Pomona	1		5				6
Poona	5		9				14
Praha			1				1
Putten	1						1
Reading		1					1
Rissen var. 14+			1				1
Roodepoort			1				1
Rubislaw			3				3
Saintpaul	17		13	1	4	2	37
Sandiego			10		1		11
Schwarzengrund	3		7	1			11
Senftenberg	1		3	1			5

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=New England

Serotype	State						Total
	Connecticut	Maine	Massachusetts	New Hampshire	Rhode Island	Vermont	
Stanley	2		8	2		1	13
Stanleyville			1				1
Sundsvall			1				1
Tallahassee			1				1
Teitelkebir			1				1
Tennessee			2		1		3
Thompson	11	4	10	5	2	1	33
Typhi	8		14		1		23
Typhimurium	85	16	180	16	21	21	339
Typhimurium var. 5-		5	69	8	11	1	94
Uganda			5		1		6
Urbana	1						1
Virchow	3		6				9
Wandsworth			1	1			2
Wangata			1				1
Weltevreden			3				3
Worthington	2		1				3
I 4,[5],12:b:-	3						3
I 4,[5],12:b:- var. L(+) tartrate+	3						3
I 4,[5],12:e,h:-	1						1
I 4,[5],12:i:-	12		58		2	11	83
I 4,[5],12:r:-			1				1
I 6,8:-:1,5	1						1
II 47:b:1,5			1				1
IIIb 61:z52:z53			1				1
IV 21:z4,z23:-			1				1
Partially serotyped			16	1			17
Rough or nonmotile	2				2		4
Unknown	19			7	4	2	32
<b>Total</b>	<b>422</b>	<b>104</b>	<b>1141</b>	<b>157</b>	<b>128</b>	<b>93</b>	<b>2045</b>

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=Mid Atlantic

Serotype	States			Total
	New Jersey	New York	Pennsylvania	
Aarhus		1		1
Adelaide	3	4	3	10
Agama		4		4
Agbeni			1	1
Agona	9	45	37	91
Alachua		4	1	5
Albany			1	1
Albert		1		1
Amager		1		1
Amsterdam var. 15+			2	2
Anatum	3	31	9	43
Anfo		1		1
Apapa			1	1
Arechavaleta		2		2
Azteca		1		1
Baildon	2	2		4
Bareilly	3	3	8	14
Berta	3	20	7	30
Bijlmer			2	2
Blockley	4	11	2	17
Bouso			1	1
Bovismorbificans	5	6		11
Braenderup	17	28	38	83
Brandenburg	1	5	6	12
Brazzaville		1		1
Bredeney		1		1
Brezany		1		1
Brunei		1		1
Butantan		1		1
Cerro	1			1
Chailey	1			1
Chandans			5	5
Chester		1		1
Choleraesuis		1		1
Coeln		1		1
Colindale		1		1
Corvallis	1		1	2
Cubana		1		1
Denver	1			1
Derby	2	6	10	18
Diguel		1		1
Dublin	2	7		9
Durban		1		1
Durham		1		1

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=Mid Atlantic

Serotype	States			Total
	New Jersey	New York	Pennsylvania	
Ealing		4	5	9
Eastbourne	2	2	4	8
Edinburg		4		4
Emek			6	6
Enteritidis	130	645	517	1292
Florida	1			1
Fluntern		1		1
Fomeco			1	1
Freetown		1		1
Friedrichsfelde			1	1
Gaminara		4	2	6
Give		7	7	14
Glostrup		2		2
Grumpensis		2	58	60
Haardt		2		2
Hadar	3	31	6	40
Haifa		1		1
Hartford	1	23	4	28
Havana			2	2
Heidelberg	34	227	99	360
Hofit		1		1
Holcomb		1		1
Hvittingfoss		6	3	9
Ibadan		2		2
Indiana		5		5
Infantis	6	42	30	78
Inverness		1		1
Istanbul		1		1
Jangwani			1	1
Javiana	15	25	36	76
Jericho		1		1
Johannesburg		8	1	9
Jos		2		2
Kedougou	1			1
Kentucky	1	11	2	14
Kiambu		2		2
Kimuenza			1	1
Kingabwa		1		1
Kintambo		1		1
Kisarawe		1		1
Kokomlemle		1		1
Litchfield	2	7	4	13
London		14		14
Madras			1	1

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Mid Atlantic

Serotype	States			Total
	New Jersey	New York	Pennsylvania	
Malstatt	1	1		2
Manhattan	1	9		10
Mara			1	1
Mbandaka	1	21	2	24
Meleagridis		1		1
Miami	1	2	1	4
Mikawasima		1		1
Minnesota		1		1
Mississippi		3	1	4
Monschau		1	2	3
Montevideo	9	53	37	99
Muenchen	6	22	43	71
Muenster		9	1	10
Mundonobo			1	1
Napoli		1		1
Newmexico			1	1
Newport	31	144	102	277
Norwich	3	1		4
Ohio		3	4	7
Oranienburg	11	25	30	66
Othmarschen		8		8
Overschie		1		1
Oyonnax		1		1
Panama	7	17	2	26
Paratyphi A	4	17	4	25
Paratyphi B		3	8	11
Paratyphi B var. L(+) tartrate+	4	27	28	59
Pensacola	1			1
Poano		1		1
Pomona		7	6	13
Poona	7	11	17	35
Potsdam		2		2
Putten		2		2
Reading	2	6		8
Richmond	1		2	3
Rubislaw	2	6	2	10
Saintpaul	8	58	61	127
Sandiego	5	23		28
Schwarzengrund	2	23	5	30
Senftenberg	3	8	2	13
Seremban			1	1
Soerenga		1		1
Stanley	1	18	10	29
Stockholm			1	1



**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=Mid Atlantic

Serotype	States			Total
	New Jersey	New York	Pennsylvania	
Stourbridge	1			1
Sundsvall			6	6
Telelkebir	1		2	3
Tennessee		10	9	19
Thompson	2	27	25	54
Typhi	11	25	10	46
Typhimurium	65	404	440	909
Typhimurium var. 5-	42	14		56
Uganda		3	2	5
Ugheili			2	2
Urbana	1	2	5	8
Virchow	2	10		12
Wandsworth		1		1
Wangata		1	1	2
Weltevreden		3	1	4
Worthington		1		1
Zanzibar		1		1
Zega		2		2
I 4,[5],12:b:-		16		16
I 4,[5],12:i:-		87		87
I 6,7:-:1,5		18		18
I 6,7:r:-		1		1
IIIa 42:z4,z24:-		1		1
IV 16:z4,z32:-		1		1
IV 44:z4,z23:-		4		4
IV 44:z4,z24:-		1		1
IV 44:z4,z32:-		3		3
IV 48:g,z51:-			2	2
IV 50:g,z51:-		2	1	3
Partially serotyped	36	19	22	77
Unknown	1	28		29
<b>Total</b>	<b>527</b>	<b>2508</b>	<b>1829</b>	<b>4864</b>

**TABLE 4**

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=East North Central

Serotype	States					Total
	Illinois	Indiana	Michigan	Ohio	Wisconsin	
Aberdeen	1				1	2
Adelaide	8	1	2		2	13
Agbeni				5		5
Agona	25	8	8	19	7	67
Albany	1				2	3
Anatum	15	1	8	7	9	40
Anatum var. 15+			1			1
Apapa			2			2
Apeyeme				1		1
Aqua				1		1
Augustenborg				1		1
Baildon	2			17	3	22
Bareilly	4	4	2	4	6	20
Berta	14	33	11	1		59
Blockley	1	1	3	3		8
Bovismorbificans	3	5	4	11	5	28
Braenderup	36	20	17	57	7	137
Brandenburg	15	2	2	3	1	23
Brazil				1		1
Bredeney	10		1			11
Carrau	1		1			2
Cerro	4				2	6
Cerro var. 14+					2	2
Chester					1	1
Colindale				1		1
Concord			1			1
Corvallis		1				1
Cotham	2	1				3
Cubana		1				1
Dahra					2	2
Denver					1	1
Derby	15	3	4	3	3	28
Dublin	3	3	1			7
Durban			1	1		2
Ealing			1	1		2
Eastbourne	2					2
Edinburg	3			1	5	9
Enteritidis	260	130	208	312	217	1127
Eschweiler					1	1
Freetown					1	1
Fyris					1	1
Gaminara		2	3	1	1	7
Give	1			4	2	7
Grumpensis	1	3	2	1	2	9
Guinea			1			1

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=East North Central

Serotype	States					Total
	Illinois	Indiana	Michigan	Ohio	Wisconsin	
Hadar	8	5	4	5	4	26
Hartford	6	12	6	22	7	53
Havana	2		4	2	2	10
Heidelberg	72	36	64	68	42	282
Hindmarsh				1	3	4
Holcomb				1		1
Hvittingfoss			1	1		2
Indiana	1		1	1		3
Infantis	28	8	6	21	13	76
Inverness		1			1	2
Istanbul					1	1
Jangwani					1	1
Javiana	9	4	6	29	6	54
Johannesburg	2	1	1	3	2	9
Kaduna					1	1
Kedougou				1		1
Kentucky	2	4	1	1	4	12
Kiambu	4		5	3	1	13
Kingabwa				1	1	2
Kingston				1		1
Kintambo				1		1
Kisangani		1				1
Kottbus	2					2
Larochelle					1	1
Limete			1			1
Lindenburg					1	1
Litchfield	1	1	1	3	3	9
Liverpool				1		1
Lomalinda	2		1	1		4
London		1	2	1		4
Madelia					1	1
Mbandaka	8	2	6	12	5	33
Meleagridis	1					1
Mendoza				1		1
Miami	2		3	6	1	12
Minnesota	6	1		2	4	13
Mississippi	1			5	1	7
Monschau		1	4	2		7
Montevideo	37	13	14	27	19	110
Mountpleasant			1			1
Muenchen	28	7	6	17	9	67
Muenster	8	3	3	2	7	23
Muenster var. 15+				1		1
Newmexico		1				1
Newport	55	54	44	85	94	332

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=East North Central

Serotype	States					Total
	Illinois	Indiana	Michigan	Ohio	Wisconsin	
Nima				2		2
Norwich			1		3	4
Nottingham			1			1
Ohio		1	1		4	6
Oranienburg	21	16	27	26	3	93
Oritamerin					2	2
Oslo	1			1	1	3
Othmarschen					5	5
Panama	9	5		1	2	17
Paratyphi A	9		6	1		16
Paratyphi B	3		10	1		14
Paratyphi B var. L(+) tartrate+	8	19		43	14	84
Paratyphi C	1					1
Pensacola	1					1
Plymouth		1				1
Poano			1			1
Pomona	6	1	2	6	1	16
Poona	6	3	5	6	2	22
Putten	1					1
Reading	4		2	3	2	11
Richmond	1					1
Rissen					1	1
Roodepoort				1		1
Rubislaw	1					1
Saintpaul	24	5	21	31	22	103
Sandiego	3	1	2	7	3	16
Saphra	1					1
Schwarzengrund	12	2	12	2	1	29
Senftenberg	6	2	2	3	3	16
Shubra	1			1		2
Singapore		1		2		3
Stanley	15	6	13	4	8	46
Stanleyville	2					2
Teitelkebir	1	3	1	7		12
Tennessee	2	6	5	11	4	28
Thompson	33	14	12	18	9	86
Tucson				3		3
Typhi	33	4	8	2	4	51
Typhimurium	309	95	186	215	121	926
Typhimurium var. 5-		31		45	58	134
Uganda	4	1	3	1	2	11
Urbana	2	1	2	1	2	8
Virchow	5		7	2	3	17
Virginia	1					1
Waycross				2		2

**TABLE 4**

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=East North Central

Serotype	States					Total
	Illinois	Indiana	Michigan	Ohio	Wisconsin	
Weltevreden	4		5	2	1	12
Weltevreden var. 15+		1				1
Worthington	1	4			1	6
I 4,12:l,v:-				1		1
I 4,[5],12:b:-	15			1	2	18
I 4,[5],12:b:- var. L(+) tartrate+					1	1
I 4,[5],12:i:-	43	34		60	45	182
I 6,7:-:1,5	1					1
I 9,12:l,z28:-				1		1
I 13,23:b:-		1				1
II 44:z4,z23:-				1		1
II 48:d:z6					1	1
II 50:b:z6		1				1
II 58:l,z13,z28:z6					1	1
IIIa 21:g,z51:-				1		1
IIIa 35:z4,z23:-				1		1
IIIa 41:z4,z23:-	1					1
IIIa 48:z4,z24:-		1				1
IIIa 53:z4,z23:-				1		1
IIIa 56:z4,z23:-	3					3
IIIb 48:i:z	1					1
IIIb 48:z52:z		1				1
IIIb 53:z10:z35		1				1
IIIb 61:-:1,5,[7]				1		1
IIIb 61:c:z35				2		2
IIIb 61:k:1,5,[7]				1	1	2
IV 11:z4,z23:-		1				1
IV 16:z4,z32:-			1	1		2
IV 40:z4,z32:-				1		1
IV 44:z4,z23:-		1		1		2
IV 44:z4,z32:-				1		1
IV 45:g,z51:-		1		2		3
IV 48:g,z51:-				1		1
IV 50:g,z51:-	1	1		1		3
bongori ser. 48:z35:-			2			2
Partially serotyped	1		55	17	7	80
Rough or nonmotile	11			4	1	16
Unknown	19		67	34	16	136
<b>Total</b>	<b>1339</b>	<b>641</b>	<b>929</b>	<b>1368</b>	<b>876</b>	<b>5153</b>

**TABLE 4**

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=West North Central

Serotype	States							Total
	Iowa	Kansas	Minnesota	Missouri	Nebraska	North Dakota	South Dakota	
Aarhus							1	1
Adelaide			2	1				3
Agona	3	1	4	8				16
Anatum		1	8	5	3		1	18
Anecho			1					1
Apapa		1	1					2
Assen		1						1
Baildon	1			1				2
Banana					1			1
Bardo		1	1					2
Bareilly		1	1	17				19
Berta	3	1	1	11				16
Birkenhead			1					1
Blockley		1	1	1				3
Bournemouth				2				2
Bovismorbificans	4				1			5
Braenderup	7	8	16	15	1		6	53
Brandenburg	1		4	1		1	2	9
Brazzaville			1					1
Bredeney	1						1	2
Carmel				1				1
Cerro var. 14+			1				1	2
Chester				1				1
Choleraesuis				1				1
Concord			1					1
Cotham				1				1
Cubana					1			1
Derby		1	3	2	3		3	12
Dublin	1		2	2				5
Durham			1					1
Eastbourne		1	1	2				4
Edinburg				1			1	2
Enteritidis	96	33	130	137	20	9	28	453
Essen			1					1
Gaminara	2		3	1				6
Georgia				1				1
Give			1	2				3
Grumpensis	1		1	4				6
Hadar	1		6	3	2		1	13
Hartford	4	2	6	7				19
Havana			1					1
Heidelberg	14	13	27	45	8	1	8	116
Hillingdon						1		1
Hvittingfoss	1			1		1	1	4

TABLE 4

*Salmonella* isolates from Human sources  
by Serotype, Geographic Region and State, 2005

Region=West North Central

Serotype	States							Total
	Iowa	Kansas	Minnesota	Missouri	Nebraska	North Dakota	South Dakota	
Infantis	8	6	12	9	5	1	11	52
Istanbul			1					1
Ituri			1					1
Javiana	6	1	5	20	2		2	36
Jedburgh							1	1
Johannesburg	3				1			4
Kentucky	1			1				2
Kiambu		1	1	1				3
Kintambo				1				1
Kottbus			1					1
Krefeld			1					1
Litchfield	1	2		5	1		3	12
London							1	1
Manhattan			6	2				8
Mbandaka	2		3	9				14
Miami	5	1		1				7
Minnesota		1		3	1			5
Mississippi			3	6				9
Molade	1							1
Mono	13							13
Montevideo	10	9	16	12	1		8	56
Muenchen	6	3	9	15	2		2	37
Muenster	8		2	3				13
Napoli	1		1					2
Newport	27	26	50	87	14	4	12	220
Norwich		3		7				10
Nottingham							1	1
Ohio			2	1				3
Oranienburg	3	2	10	7	7		5	34
Orion				1				1
Oslo			2					2
Othmarschen				1				1
Panama		1	2	6	2			11
Paratyphi A		1		3				4
Paratyphi B	8		1	1			6	16
Paratyphi B var. L(+) tartrate+		5	8	21	4			38
Pomona				1				1
Poona	3	2	2	3			1	11
Putten				1				1
Reading	1			1				2
Riverside					1			1
Romanby							1	1
Rubislaw	1		1	1				3
Ruiru			1					1

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=West North Central

Serotype	States							Total
	Iowa	Kansas	Minnesota	Missouri	Nebraska	North Dakota	South Dakota	
Saintpaul	7	4	16	22	4	4		57
Sandiego			2	5	2			9
Schwarzengrund			4	2	1			7
Senftenberg	1	1	4					6
Stanley	5		3	2		1	2	13
Stanleyville				1				1
Teitelkebir				3				3
Tennessee		3	3	12	1			19
Thompson	11	4	8	27			2	52
Typhi	5		6	1				12
Typhimurium	34	49	86	247	37	14	56	523
Typhimurium var. 5-	42	18	37		12			109
Uganda			1		4			5
Urbana			2					2
Virchow	1	1	3	2	1			8
Weltevreden			1					1
Wernigerode	1							1
Worthington			1	1	1			3
I 4,[5],12:b:-				1				1
I 4,[5],12:i:-			25	74				99
II 6,7:b:z42				1				1
II 11:g,[m],s,t:z39			1					1
IIIa 41:z4,z23:-			3					3
IIIa 43:z4,z24:-		1						1
IIIb 11:k:z53							1	1
IIIb 48:i:z			1					1
IV 16:z4,z32:-				1				1
IV 21:z4,z23:-						1		1
IV 43:z4,z23:-			1					1
IV 44:z4,z23:-				2				2
IV 45:g,z51:-	1							1
Partially serotyped	4	21	9	6			2	42
Rough or nonmotile			2	1				3
Unknown	18		6	1	33	1		59
<b>Total</b>	<b>378</b>	<b>232</b>	<b>593</b>	<b>916</b>	<b>177</b>	<b>39</b>	<b>171</b>	<b>2506</b>



**TABLE 4**

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=South Atlantic

Serotype	States									Total
	Delaware	District of Columbia	Florida	Georgia	Maryland	North Carolina	South Carolina	Virginia	West Virginia	
Aarhus				1			1			2
Abony									1	1
Adelaide				3		3		1		7
Aequatoria				2						2
Agama				4						4
Agbeni					1					1
Agona	2		1	16	7	7		7	1	41
Alabama								1		1
Alachua			1	2				1		4
Alagbon							2			2
Albany								3		3
Altona								1		1
Anatum			1	8	6	4	5	2		26
Apapa					1					1
Banana				1						1
Bardo					22			1		23
Bareilly				13	3	21	4	16	1	58
Berta				2	8	8		12		30
Blockley			2	1		3	1			7
Bouso				2						2
Bovismorbificans				2		1	1	1		5
Braenderup			5	47	13	17	6	16	4	108
Brandenburg	1		1	5	2	2	2	1	1	15
Bredeney				1	1		1			3
Carmel								3		3
Carrau				1		3		1		5
Cerro			2	2						4
Chester						1				1
Chincol				2						2
Choleraesuis						1				1
Choleraesuis var. Kunzendorf				1						1
Coeln								1		1
Colindale								1		1
Corvallis				2						2
Cotham					1					1
Cubana								1		1
Daarle				1						1
Derby			1	7	2	4		5	2	21
Doulassame				1						1
Dublin			2	1						3
Duesseldorf						1				1
Durban								1		1
Durham				3	2					5

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=South Atlantic

Serotype	States									Total
	Delaware	District of Columbia	Florida	Georgia	Maryland	North Carolina	South Carolina	Virginia	West Virginia	
Ealing	1									1
Eastbourne				2	1			4		7
Edinburg								2		2
Edmonton									1	1
Enteritidis	22		14	190	294	277	297	239	35	1368
Florida							4			4
Freetown				3				1		4
Gambia							1			1
Gaminara				5	2	3	7	5		22
Gatow							1		1	2
Give					1	6	3	2		12
Glostrup			1					2		3
Grumpensis				3			1		2	6
Hadar				7	4	4	4	5	1	25
Haifa								2		2
Hartford			2	13	17	13	8	37	1	91
Havana				2	1			1		4
Heidelberg	5		4	127	25	41	12	46	5	265
Hindmarsh							1			1
Hvittingfoss					3			1		4
Indiana						1				1
Infantis	1			18	5	13	10	14		61
Inverness				11	1	14		1		27
Irumu						8				8
Istanbul								2		2
Javiana	8		10	260	33	148	136	30	5	630
Johannesburg				11	2	1				14
Kentucky					2	4		3		9
Kiambu	2				2		1	1		6
Kottbus				1	1				1	3
Lindenburg									1	1
Litchfield			2	5	3	12	3	7	1	33
Livingstone	1			1						2
Loanda						2				2
Lockleaze					1					1
Lomalinda	1			2				1		4
London				1		1		1		3
Luciana							1			1
Madelia							3			3
Malika							1			1
Manhattan	1				1	4	2			8
Mbandaka				3	1	1	2	2	4	13
Meleagridis				2	1					3

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=South Atlantic

Serotype	States									Total
	Delaware	District of Columbia	Florida	Georgia	Maryland	North Carolina	South Carolina	Virginia	West Virginia	
Miami			1	22	1	7	1	3		35
Minnesota	1			6		3	2	3	1	16
Mississippi				135	2	50	30			217
Molade								1		1
Mono				28						28
Monschau								1		1
Montevideo	1		3	42	15	19	21	12	11	124
Muenchen	2		4	100	1	41	46	10	3	207
Muenster				3	2	1		3		9
Napoli				2						2
Newholland							1			1
Newport	18		16	326	71	250	130	106	19	936
Nima								1		1
Norwich				4	5			2		11
Ohio				3	2	2	4	4		15
Oranienburg			2	12	7	31	11	13		76
Oslo				3	1				1	5
Othmarschen							1		3	4
Overschie					1					1
Panama	1			3	13	2		4		23
Paratyphi A				4	3	1		7		15
Paratyphi B	1			13	2		3	9	1	29
Paratyphi B var. L(+) tartrate+			3	4	5	19	1	1	3	36
Pensacola				3		2	1	3		9
Poano							1	1		2
Poitiers				1						1
Pomona			1	3				1		5
Poona			1	9	7		1	8	2	28
Potsdam						1				1
Reading			1		3		1	1		6
Rissen					1					1
Romanby				1						1
Rubislaw			3	16	3	6	7	1		36
Saintpaul	4		4	41	9	20	14	27	3	122
Sandiego	1		5	5	7	1	2	4	1	26
Schwarzengrund	1			14	3	3	3	4		28
Senftenberg	1		11	1		3	1	3		20
Soahanina				1						1
Splott							1			1
Stanley	2		2	1	4	5	3	2	3	22
Stanleyville					1					1
Suberu			1							1
Tallahassee			2		1				2	5

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=South Atlantic

Serotype	States									Total
	Delaware	District of Columbia	Florida	Georgia	Maryland	North Carolina	South Carolina	Virginia	West Virginia	
Teitelkebir				2	1			3		6
Tennessee				5	4	3	1	2	1	16
Thompson	3			9	3	9	6	9	4	43
Tokoin								1		1
Tshiongwe									3	3
Typhi	2		11	10	31	6		19		79
Typhimurium	17		21	182	101	286	125	289	49	1070
Typhimurium var. 5-			3	136	51					190
Uganda				2				2		4
Urbana				4	1	1				6
Virchow	1				3			1		5
Virginia					1					1
Weltevreden			1	3				4	2	10
Weslaco				1						1
Westeinde									1	1
Worthington				1		1	1			3
I 4,[5],12:b:- var. L(+) tartrate+	1									1
I 4,[5],12:i:-	4		2	11	42				2	61
I 6,7:-:1,5					4					4
I 6,8:b:-					1					1
I 13,23:b:-					6					6
I 16:l,v:-					2					2
II 9,12:g,m,s,t,e,n,x									1	1
II 9,12:g,s,t,e,n,x									1	1
IIIb 61:-:1,5,[7]					1					1
IV 45:g,z51:-					2					2
IV 50:z4,z23:-			5							5
Partially serotyped		10	1006	82	1	12	2	109	17	1239
Rough or nonmotile					6					6
Unknown			16	4	2	38	50			110
<b>Total</b>	<b>106</b>	<b>10</b>	<b>1174</b>	<b>2056</b>	<b>903</b>	<b>1452</b>	<b>992</b>	<b>1159</b>	<b>202</b>	<b>8054</b>

**TABLE 4**

***Salmonella* isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=East South Central

Serotype	States				Total
	Alabama	Kentucky	Mississippi	Tennessee	
Aarhus			1		1
Adelaide	1	1		1	3
Agona	5	4		7	16
Alabama	1				1
Alachua		1	1		2
Albany		1			1
Anatum	1	1	1	3	6
Aqua				1	1
Baildon	2		1	1	4
Bardo		1			1
Bareilly	7	8	2	19	36
Berta		2	2	7	11
Blockley	1	1			2
Bovismorbificans		2			2
Braenderup	12	7	2	5	26
Brandenburg	3		1	3	7
Brazil	1				1
Bredeney	1				1
Bsilla	1				1
Chester				1	1
Choleraesuis var. Kunzendorf		1			1
Cotham	1				1
Cremieu			1		1
Cubana		1		1	2
Curacao				1	1
Daytona		2	1		3
Derby	1	2	1	3	7
Djugu			1		1
Durban		1		1	2
Eastbourne		1			1
Echa			1		1
Enteritidis	70	67	33	100	270
Fann				1	1
Fulica			1		1
Gaminara	4		8	2	14
Give	7	4	10	1	22
Glostrup			1		1
Grumpensis				2	2
Hadar	3	3	1	2	9
Hartford	4	7		4	15
Heidelberg	60	27	13	39	139
Hvittingfoss	1	1			2
Indiana		2			2
Infantis	4	5	3	7	19
Inverness	7		2		9

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=East South Central

Serotype	States				Total
	Alabama	Kentucky	Mississippi	Tennessee	
Irumu			1		1
Javiana	81	16	97	23	217
Johannesburg				1	1
Kalina			1		1
Kentucky	2	3		3	8
Kingabwa				1	1
Kintambo			1		1
Kisangani			1		1
Kotu			4		4
Larochelle		1			1
Litchfield	9	1	1	1	12
Liverpool			1		1
Luciana	2				2
Manhattan		2		1	3
Mbandaka	2	2		13	17
Miami	10	2			12
Minnesota		3		3	6
Mississippi	60	1	96	17	174
Monschau		1		1	2
Montevideo	33	14	24	24	95
Montreal			1		1
Muenchen	53	9	46	12	120
Newport	108	62	123	62	355
Norwich	1	2	12	18	33
Ohio	2	7			9
Ohio var. 14+				1	1
Oranienburg	7	7	5	8	27
Oranienburg var. 14+				1	1
Orion	1				1
Oyonnax			1		1
Panama	2	3		3	8
Paratyphi A				1	1
Paratyphi B	2			2	4
Paratyphi B var. L(+) tartrate+	9	11	18	19	57
Pensacola				1	1
Plymouth	1				1
Pomona				1	1
Poona	4	2	1	1	8
Putten		3			3
Reading				1	1
Richmond				1	1
Romanby		1			1
Rubislaw	2	2	9		13
Saintpaul	17	10	2	9	38
Sandiego	1	2	2	1	6

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=East South Central

Serotype	States				Total
	Alabama	Kentucky	Mississippi	Tennessee	
Schleissheim	2	4			6
Schwarzengrund	3			2	5
Schwerin		1			1
Senftenberg				2	2
Stachus			1		1
Stanley	5	5	2	2	14
Telekebir		1		3	4
Tennessee	1	1		3	5
Thompson	3	9	4	7	23
Typhi	2	6	2	2	12
Typhimurium	195	139	109	101	544
Typhimurium var. 5-		15	36	45	96
Urbana	3	1		1	5
Virchow		1			1
Virginia			1	2	3
Weltevreden	2				2
Worthington	1				1
I 4,[5],12:b:-				3	3
I 4,[5],12:b:- var. L(+) tartrate+				1	1
I 4,[5],12:i:-	51		5	52	108
I 6,8:-:1,2	1				1
I 9,12:l,z28:-	5				5
I 13,23:b:-	1				1
II 30:l,z28:z6				1	1
IIIa 48:g,z51:-			1		1
IIIb 61:c:z35				1	1
IV 16:z4,z23:-		1			1
IV 44:z4,z23:-		2		3	5
IV 48:g,z51:-			1		1
Partially serotyped	6	3	11	18	38
Unknown	8	7	6	121	142
<b>Total</b>	<b>896</b>	<b>516</b>	<b>714</b>	<b>812</b>	<b>2938</b>

**TABLE 4**

***Salmonella* isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=West South Central

Serotype	States				Total
	Arkansas	Louisiana	Oklahoma	Texas	
Adelaide		2	1	4	7
Agona		3		10	13
Agoueve			1		1
Alabama	1				1
Alachua		1	1		2
Anatum	3	6	2	5	16
Anatum var. 15+				3	3
Apeyeme			1		1
Arechavaleta			2		2
Bareilly	23	8	2	6	39
Berta		4	2	2	8
Bovismorbificans				3	3
Braenderup	1	24	15	18	58
Brandenburg				2	2
Bredeney	1			1	2
Canada				1	1
Cerro		1		1	2
Chester		1	1		2
Cubana				1	1
Derby		1	1	5	7
Eastbourne			1		1
Emek			1		1
Enteritidis	76	34	39	55	204
Farmsen				1	1
Gaminara	1	15		7	23
Give		14		7	21
Hadar		5	1	5	11
Hartford	1	2	1	4	8
Havana				2	2
Heidelberg	21	28	7	100	156
Hvittingfoss		6			6
Ibadan				7	7
Infantis	3	3	6	32	44
Inverness		2			2
Javiana	39	74	11	38	162
Johannesburg	2			1	3
Kentucky				4	4
Kiambu	1	1	8	4	14
Lindenburg	2				2
Litchfield	3	4	12	7	26
Lomalinda		2			2
London				1	1
Madelia			1	1	2
Manhattan				5	5
Mbandaka	8		2	6	16



TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=West South Central

Serotype	States				Total
	Arkansas	Louisiana	Oklahoma	Texas	
Mendoza			1		1
Miami	1	2			3
Minnesota	1			3	4
Mississippi	15	92	1	33	141
Montevideo	4	58	4	43	109
Muenchen	3	47	8	23	81
Muenster	1		1	4	6
Newholland			1		1
Newport	117	195	73	115	500
Nima	1				1
Norwich	7	3	4	9	23
Oranienburg	6	13	7	40	66
Oslo				1	1
Othmarschen	1				1
Panama		2	1	6	9
Paratyphi A				5	5
Paratyphi B		2		1	3
Paratyphi B var. L(+) tartrate+	4	5	18	18	45
Pensacola		1			1
Poano			1		1
Pomona		1		4	5
Poona	1		1	7	9
Putten	1				1
Reading		1		2	3
Roodepoort				1	1
Rubislaw	6	15	1	9	31
Saintpaul	2	3	1	11	17
Sandiego		2	1	2	5
Saphra		3			3
Schwarzengrund	2	1			3
Senftenberg		2			2
Stanley	1	2	1	8	12
Telelkebir				1	1
Tennessee		1	1	3	5
Thompson	1	13	4	5	23
Toucra			2		2
Typhi	1	1	2	19	23
Typhimurium	114	107	80	200	501
Uganda		1		2	3
Urbana		2		1	3
Virchow			3		3
I 4,[5],12:i:-		19		10	29
I 6,7:k:-		2			2
I 9,12:l,z28:-		1			1
I 13,22:-:1,6	1				1

**TABLE 4****Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=West South Central

Serotype	States				Total
	Arkansas	Louisiana	Oklahoma	Texas	
II 47:b:1,5				7	7
IIIa 21:g,z51:-			1		1
IV 43:z4,z32:-				1	1
IV 44:z4,z23:-				1	1
Partially serotyped	5	7	33		45
Rough or nonmotile		1			1
Unknown	160	7		49	216
<b>Total</b>	<b>642</b>	<b>853</b>	<b>370</b>	<b>993</b>	<b>2858</b>

**TABLE 4**

***Salmonella* isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Mountain

Serotype	States								Total
	Arizona	Colorado	Idaho	Montana	Nevada	New Mexico	Utah	Wyoming	
Aberdeen	1								1
Abony	1								1
Adelaide	1	6			2	1	2		12
Agbeni		1			4				5
Agona	18	4	3		1	4	4		34
Alachua	1	1							2
Albany	3	9							12
Amsterdam		2							2
Anatum	2	9			3	2	2		18
Bareilly		4	1				2		7
Barranquilla					1				1
Bere					1				1
Berta					1		1		2
Blockley							1		1
Bobo								1	1
Bovismorbificans	2	3	1				1		7
Braenderup	5	11	3	1	2	1	5		28
Brandenburg	5				1	2	2		10
Bredeney		1				1			2
Carrau	1					1			2
Cerro	1				1		1		3
Chester							1		1
Chittagong		7							7
Choleraesuis		1				1			2
Cotham	1				1				2
Cubana	2								2
Cullingworth		6							6
Denver	1					2			3
Derby	1				1				2
Diourbel		1							1
Dublin	1		3				1		5
Ealing		2							2
Eastbourne		2							2
Edinburg			1						1
Enteritidis	85	159	29	33	35	16	89	17	463
Fayed	1								1
Fluntern	1								1
Freetown								1	1
Gallinarum	2								2
Gaminara	2	6			1	1	1		11
Give	3	2				1			6
Goldcoast		2							2
Grumpensis	1	2					6		9
Guinea	1	1							2

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Mountain

Serotype	States								Total
	Arizona	Colorado	Idaho	Montana	Nevada	New Mexico	Utah	Wyoming	
Hadar	2	1	5	2	2	2		2	16
Havana	1								1
Heidelberg	25	44	9	1	10	6	19	4	118
Herston		2							2
Hull	3								3
Hvittingfoss		4							4
Infantis	3	19	2		6	3	11		44
Isangi							1		1
Itami							6		6
Jangwani		2							2
Javiana	27	24	3		3	20	1	1	79
Johannesburg	3								3
Kedougou		2							2
Kentucky	2	4							6
Kiambu	2	4				1	2		9
Kingabwa	2		1						3
Kintambo		1							1
Korbol	1								1
Litchfield						2	1		3
Livingstone	1								1
Lomalinda	2	1				1			4
Luciana	1								1
Mbandaka	2	7	1			12			22
Meleagridis	1						1		2
Miami							1		1
Michigan	1								1
Minnesota	2						5		7
Mississippi		1							1
Montevideo	31	36	2	1	9	13	4		96
Muenchen	8	14	1			7	2	2	34
Muenster	1	5	3			1			10
Nessziona		1							1
Newmexico						1			1
Newport	62	121	10		8	21	56	4	282
Norwich	1				1	3			5
Nottingham	1								1
Offa					1				1
Ohio	1	3	2				1		7
Oranienburg	49	15	2	1	1	3	7	3	81
Oslo					1		1		2
Othmarschen	1								1
Panama	4	15				2	2		23
Paratyphi A	2		1		2				5
Paratyphi B	3	1			7	3			14

TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Mountain

Serotype	States								Total
	Arizona	Colorado	Idaho	Montana	Nevada	New Mexico	Utah	Wyoming	
Paratyphi B var. L(+ tartrate+	3	21	7		1		6	2	40
Poano		1							1
Pomona	2	2					2		6
Poona	23	6	2		3	7	2	2	45
Reading	2	7			1	1			11
Richmond	1								1
Rubislaw	1		1						2
Saintpaul	29	34	4		8	5	8		88
Sandiego	9	14			2	3			28
Schwarzengrund	5	2					1		8
Senftenberg	7	8			3	4			22
Stanley	11	9	1		2	2			25
Tabligbo			1						1
Tallahassee					1				1
Telelkebir		6					3		9
Tennessee	3	17			1	1	1	2	25
Texas	1								1
Thompson	10	23	2		2	2	2	2	43
Tshiongwe		1							1
Typhi	3	15		1	1	1	1		22
Typhimurium	88	224	27	2	34	36	52	7	470
Typhimurium var. 5-	36	104	18		1	7		3	169
Uganda		2			3	1		1	7
Urbana		1				1	1		3
Virchow		9							9
Waycross	1	2							3
Weltevreden	2	4	1		1	3			11
Weslaco							1		1
Worthington	1				1				2
I 4,[5],12:-:1,2		1							1
I 4,[5],12:b:-					1				1
I 4,[5],12:i:-	31		2		3	3	1	3	43
I 6,7:b:-							1		1
I 6,7:k:-		1							1
I 6,8:-:1,2							1		1
II 42:b:e,n,x,z15	1								1
II 48:z39:z81	1								1
IIIa 18:z4,z23:-							1		1
IIIa 35:g,z51:-	1								1
IIIa 41:z4,z23:-					1				1
IIIa 43:z29:-	1								1
IIIa 48:g,z51:-								1	1
IIIa 53:g,z51:-							1		1
IIIb 38:r:z							1		1

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=Mountain

Serotype	States								Total
	Arizona	Colorado	Idaho	Montana	Nevada	New Mexico	Utah	Wyoming	
IIIb 48:i:z	1								1
IIIb 50:r:z	1								1
IIIb 60:r:e,n,x,z15	1								1
IIIb 61:l,[v],[z13]:1,5,[7]					1				1
IV 16:z4,z32:-	1								1
IV 44:z4,z23:-	1				1				2
IV 44:z4,z32:-							1		1
IV 48:g,z51:-							1		1
IV 50:g,z51:-	1								1
IV 50:z4,z23:-							1		1
Partially serotyped	15	16	1	67	9	18	2		128
Rough or nonmotile	2		1		1		3		7
Unknown	1	287			23	3			314
<b>Total</b>	<b>685</b>	<b>1386</b>	<b>151</b>	<b>109</b>	<b>211</b>	<b>232</b>	<b>334</b>	<b>58</b>	<b>3166</b>

**TABLE 4**

***Salmonella* isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Pacific

Serotype	States					Total
	Alaska	California	Hawaii	Oregon	Washington	
Aberdeen		3				3
Adelaide		11			1	12
Agbeni		2				2
Agona	5	44	2	6	4	61
Agoueve		1				1
Alachua		3				3
Albany		10	1	1	2	14
Amager		1	1		2	4
Anatum		19	1	1	2	23
Anatum var. 15+		2				2
Anecho				1		1
Apapa		1				1
Bardo		1				1
Bareilly		6				6
Bere		1				1
Berta		43	1			44
Birkenhead			1			1
Blegdam		4				4
Blockley		3	1		2	6
Bonariensis		1				1
Bovismorbificans		7	1	1	1	10
Braenderup		68	6	1	3	78
Brandenburg		43	3		6	52
Bredeney		3	1			4
Brunei		1				1
Cerro		4		1		5
Chailey			1			1
Chester		5		1	1	7
Choleraesuis		1		1		2
Choleraesuis var. Kunzendorf		4				4
Clackamas				1		1
Colindale		1				1
Concord		1				1
Corvallis		2	2	2	1	7
Cotham		1				1
Cubana		3		1		4
Daytona					2	2
Derby	1	17	1		4	23
Dublin		17		3	3	23
Ealing		4		2		6
Eastbourne		2		1		3
Edinburg		1				1
Enteritidis	7	886	22	75	88	1078
Falkensee		1				1
Fluntern					1	1

**TABLE 4**

***Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005***

Region=Pacific

Serotype	States					Total
	Alaska	California	Hawaii	Oregon	Washington	
Freetown		1				1
Gaminara		5			1	6
Give	1	10	6			17
Glostrup		4				4
Grumpensis	1	6		1		8
Haardt				2		2
Hadar	1	33		5	2	41
Haifa		2				2
Hartford		7		1	2	10
Havana		2			1	3
Heidelberg	14	193	19	47	35	308
Hvittingfoss		3			1	4
Idikan		1				1
Indiana		3				3
Infantis	1	61	1	5	14	82
Isangi		2				2
Itami		1		2		3
Javiana		30		4	5	39
Johannesburg		1				1
Kentucky		19			4	23
Kiambu		6				6
Kimberley					1	1
Kingabwa		3				3
Kottbus		1			1	2
Lattenkamp				1		1
Lexington			1			1
Litchfield	1	17			1	19
Livingstone		2				2
Lomalinda		3				3
London		2				2
Manhattan		19				19
Matadi					1	1
Mbandaka		25		2	9	36
Meleagridis		2	1		1	4
Miami	1	1			2	4
Minnesota		2				2
Mississippi		2			2	4
Montevideo		68	4	15	12	99
Muenchen	1	56	10	7	10	84
Muenster		15		2	1	18
Napoli		1				1
Narashino	1					1
Newport	3	226	21	19	14	283
Nima		4				4
Norwich		1				1



TABLE 4

**Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Pacific

Serotype	States					Total
	Alaska	California	Hawaii	Oregon	Washington	
Nottingham		1				1
Ohio	1	12	2	9	12	36
Oranienburg		64	5	8	4	81
Oslo		4	8	1	2	15
Panama		15	4	2		21
Paratyphi A	1	33	1		4	39
Paratyphi B	1		7		1	9
Paratyphi B var. L(+) tartrate+		52		17	11	80
Pomona		12		2		14
Poona		20			4	24
Potsdam		1				1
Reading		11	1			12
Richmond		1			1	2
Rissen		3				3
Rubislaw					1	1
Saintpaul		71	5	8	10	94
Sandiego		5		2	2	9
Saphra		1				1
Schwarzengrund		13	2		2	17
Senftenberg		21	2	1	2	26
Singapore	1	1				2
Stanley		37		5	8	50
Stanleyville				1	1	2
Sundsvall		1			1	2
Teitelkebir		4			2	6
Tennessee	2	6		1	3	12
Thompson		52	3	6	10	71
Tilene	1					1
Tucson		1				1
Typhi	1	59	11	4	5	80
Typhimurium	11	475	45	78	83	692
Typhimurium var. 5-		160				160
Uganda		6				6
Urbana	1	6		1		8
Vejle					1	1
Virchow		16		1	1	18
Virginia		1				1
Weltevreden		4	39	1	4	48
Worthington		2				2
Yaba		1				1
I 4,[5],12:b:-		29				29
I 4,[5],12:e,h:-		1				1
I 4,[5],12:i:-	3	110		12	5	130
I 4,[5],12:r:-		1				1
IIIa 18:z4,z23:-		12				12

**TABLE 4****Salmonella isolates from Human sources  
by Serotype, Geographic Region and State, 2005**

Region=Pacific

Serotype	States					Total
	Alaska	California	Hawaii	Oregon	Washington	
IIIa 41:z4,z23:-					1	1
IIIa 48:g,z51:-				1		1
IIIa 48:z4,z24:-		2				2
IIIa 53:z4,z23:-		2				2
IIIa 53:z4,z24:-		1				1
IIIb 48:i:z				1		1
IIIb 61:l,v:z		3				3
IV 45:g,z51:-				1	1	2
Partially serotyped	1		6		11	18
Rough or nonmotile			1	1		2
Unknown		72	2		1	75
<b>Total</b>	<b>62</b>	<b>3473</b>	<b>252</b>	<b>376</b>	<b>437</b>	<b>4600</b>

**TABLE 5**

**Salmonella isolates from Human sources  
by Serotype and Geographic Region, 2005**

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Aarhus		1		1	2	1				5
Aberdeen			2					1	3	6
Abony					1			1		2
Adelaide	4	10	13	3	7	3	7	12	12	71
Aequatoria					2					2
Agama		4			4					8
Agbeni	1	1	5		1			5	2	15
Agona	28	91	67	16	41	16	13	34	61	367
Agoueve	1						1		1	3
Alabama					1	1	1			3
Alachua	3	5			4	2	2	2	3	21
Alagbon	1				2					3
Albany	4	1	3		3	1		12	14	38
Albert		1								1
Altona					1					1
Amager		1							4	5
Amsterdam								2		2
Amsterdam var. 15+		2								2
Anatum	7	43	40	18	26	6	16	18	23	197
Anatum var. 15+			1				3		2	6
Anecho				1					1	2
Anfo		1								1
Apapa		1	2	2	1				1	7
Apeyeme			1				1			2
Aqua			1			1				2
Arechavaleta		2					2			4
Assen				1						1
Augustenborg			1							1
Azteca		1								1
Baildon	1	4	22	2		4				33
Banana				1	1					2
Bardo				2	23	1			1	27
Bareilly	2	14	20	19	58	36	39	7	6	201
Barranquilla								1		1
Benin	1									1
Bere								1	1	2
Berta	9	30	59	16	30	11	8	2	44	209
Bijlmer		2								2
Birkenhead				1					1	2
Blegdam									4	4
Blockley	6	17	8	3	7	2		1	6	50
Bobo								1		1
Bonariensis									1	1
Bournemouth				2						2
Bouso		1			2					3

TABLE 5

**Salmonella isolates from Human sources  
by Serotype and Geographic Region, 2005**

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Bovismorbificans	2	11	28	5	5	2	3	7	10	73
Braenderup	32	83	137	53	108	26	58	28	78	603
Brandenburg	4	12	23	9	15	7	2	10	52	134
Brazil			1			1				2
Brazzaville		1		1						2
Bredenev		1	11	2	3	1	2	2	4	26
Brezany		1								1
Brunei		1							1	2
Bsilla						1				1
Butantan		1								1
Canada							1			1
Carmel				1	3					4
Carrau			2		5			2		9
Cerro	1	1	6		4		2	3	5	22
Cerro var. 14+			2	2						4
Chailey		1							1	2
Chandans		5								5
Chester		1	1	1	1	1	2	1	7	15
Chincol					2					2
Chittagong								7		7
Choleraesuis		1		1	1			2	2	7
Choleraesuis var. Kunzendorf					1	1			4	6
Clackamas									1	1
Coeln		1			1					2
Colindale		1	1		1				1	4
Concord	3		1	1					1	6
Corvallis	1	2	1		2				7	13
Cotham			3	1	1	1		2	1	9
Cremieu						1				1
Cubana		1	1	1	1	2	1	2	4	13
Cullingworth								6		6
Curacao						1				1
Daarle					1					1
Dahra			2							2
Daytona						3			2	5
Denver		1	1					3		5
Derby	5	18	28	12	21	7	7	2	23	123
Diguel		1								1
Diourbel								1		1
Djugu						1				1
Doulassame					1					1
Dublin	3	9	7	5	3			5	23	55
Duesseldorf					1					1
Durban		1	2		1	2				6
Durham	1	1		1	5					8

TABLE 5

*Salmonella* isolates from Human sources  
by Serotype and Geographic Region, 2005

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Ealing	7	9	2		1			2	6	27
Eastbourne	2	8	2	4	7	1	1	2	3	30
Echa						1				1
Edinburg	1	4	9	2	2			1	1	20
Edmonton					1					1
Emek		6					1			7
Enteritidis	475	1292	1127	453	1368	270	204	463	1078	6730
Eschweiler			1							1
Essen				1						1
Falkensee	3								1	4
Fann						1				1
Farmsen							1			1
Fayed								1		1
Florida	1	1			4					6
Fluntern		1						1	1	3
Fomeco		1								1
Freetown	3	1	1		4			1	1	11
Friedrichsfelde		1								1
Fulica						1				1
Fyris			1							1
Gallinarum								2		2
Gambia					1					1
Gaminara	4	6	7	6	22	14	23	11	6	99
Gatow					2					2
Gatuni	1									1
Georgia				1						1
Give	1	14	7	3	12	22	21	6	17	103
Glostrup		2			3	1			4	10
Goldcoast								2		2
Grumpensis	2	60	9	6	6	2		9	8	102
Guinea			1					2		3
Haardt		2							2	4
Hadar	24	40	26	13	25	9	11	16	41	205
Haifa		1			2				2	5
Hartford	15	28	53	19	91	15	8		10	239
Havana	3	2	10	1	4		2	1	3	26
Heidelberg	159	360	282	116	265	139	156	118	308	1903
Herston								2		2
Hillingdon				1						1
Hindmarsh			4		1					5
Hofit		1								1
Holcomb		1	1							2
Hull								3		3
Hvittingfoss	1	9	2	4	4	2	6	4	4	36
Ibadan		2					7			9

TABLE 5

*Salmonella* isolates from Human sources  
by Serotype and Geographic Region, 2005

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Idikan									1	1
Indiana	3	5	3		1	2			3	17
Infantis	49	78	76	52	61	19	44	44	82	505
Inverness	3	1	2		27	9	2			44
Irumu					8	1				9
Isangi	1							1	2	4
Istanbul	4	1	1	1	2					9
Itami	1							6	3	10
Ituri				1						1
Jangwani		1	1					2		4
Javiana	31	76	54	36	630	217	162	79	39	1324
Jedburgh				1						1
Jericho		1								1
Johannesburg		9	9	4	14	1	3	3	1	44
Jos		2								2
Kaduna			1							1
Kalina						1				1
Kedougou		1	1					2		4
Kentucky	3	14	12	2	9	8	4	6	23	81
Kiambu		2	13	3	6		14	9	6	53
Kimberley									1	1
Kimuenza		1								1
Kingabwa	1	1	2			1		3	3	11
Kingston			1							1
Kintambo		1	1	1		1		1		5
Kisangani			1			1				2
Kisarawe		1								1
Kokomlemle		1								1
Korbol								1		1
Kottbus			2	1	3				2	8
Kotu						4				4
Krefeld				1						1
Larochelle			1			1				2
Lattenkamp									1	1
Lexington									1	1
Limete			1							1
Lindenburg			1		1		2			4
Litchfield	14	13	9	12	33	12	26	3	19	141
Liverpool	2		1			1				4
Livingstone	2				2			1	2	7
Loanda					2					2
Lockleaze					1					1
Lomalinda	1		4		4		2	4	3	18
London	5	14	4	1	3		1		2	30
Luciana					1	2		1		4

TABLE 5

**Salmonella isolates from Human sources  
by Serotype and Geographic Region, 2005**

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Madelia			1		3		2			6
Madras		1								1
Malika					1					1
Malstatt		2								2
Manhattan	4	10		8	8	3	5		19	57
Mara		1								1
Matadi	1								1	2
Mbandaka	15	24	33	14	13	17	16	22	36	190
Meleagridis	1	1	1		3			2	4	12
Mendoza			1				1			2
Miami	4	4	12	7	35	12	3	1	4	82
Michigan								1		1
Mikawasima		1								1
Minnesota	1	1	13	5	16	6	4	7	2	55
Mississippi	8	4	7	9	217	174	141	1	4	565
Molade				1	1					2
Mono				13	28					41
Monschau	1	3	7		1	2				14
Montevideo	21	99	110	56	124	95	109	96	99	809
Montreal						1				1
Mountpleasant			1							1
Muenchen	32	71	67	37	207	120	81	34	84	733
Muenster	4	10	23	13	9		6	10	18	93
Muenster var. 15+			1							1
Mundonobo		1								1
Nagoya	1									1
Napoli		1		2	2				1	6
Narashino									1	1
Nessziona								1		1
Newholland					1		1			2
Newmexico		1	1					1		3
Newport	110	277	332	220	936	355	500	282	283	3295
Nima			2		1		1		4	8
Norwich		4	4	10	11	33	23	5	1	91
Nottingham			1	1				1	1	4
Offa								1		1
Ohio	4	7	6	3	15	9		7	36	87
Ohio var. 14+						1				1
Oranienburg	66	66	93	34	76	27	66	81	81	590
Oranienburg var. 14+	4					1				5
Orion				1		1				2
Oritamerin			2							2
Oslo	2		3	2	5		1	2	15	30
Othmarschen		8	5	1	4		1	1		20
Overschie	1	1			1					3

TABLE 5

**Salmonella isolates from Human sources  
by Serotype and Geographic Region, 2005**

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Oyonnax		1				1				2
Panama	10	26	17	11	23	8	9	23	21	148
Paratyphi A	10	25	16	4	15	1	5	5	39	120
Paratyphi B	5	11	14	16	29	4	3	14	9	105
Paratyphi B var. L(+) tartrate+	21	59	84	38	36	57	45	40	80	460
Paratyphi C			1							1
Pensacola	1	1	1		9	1	1			14
Plymouth	2		1			1				4
Poano		1	1		2		1	1		6
Poitiers					1					1
Pomona	6	13	16	1	5	1	5	6	14	67
Poona	14	35	22	11	28	8	9	45	24	196
Potsdam		2			1				1	4
Praha	1									1
Putten	1	2	1	1		3	1			9
Reading	1	8	11	2	6	1	3	11	12	55
Richmond		3	1			1		1	2	8
Rissen			1		1				3	5
Rissen var. 14+	1									1
Riverside				1						1
Romanby				1	1	1				3
Roodepoort	1		1				1			3
Rubislaw	3	10	1	3	36	13	31	2	1	100
Ruiru				1						1
Saintpaul	37	127	103	57	122	38	17	88	94	683
Sandiego	11	28	16	9	26	6	5	28	9	138
Saphra			1				3		1	5
Schleissheim						6				6
Schwarzengrund	11	30	29	7	28	5	3	8	17	138
Schwerin						1				1
Senftenberg	5	13	16	6	20	2	2	22	26	112
Seremban		1								1
Shubra			2							2
Singapore			3						2	5
Soahanina					1					1
Soerenga		1								1
Splott					1					1
Stachus						1				1
Stanley	13	29	46	13	22	14	12	25	50	224
Stanleyville	1		2	1	1				2	7
Stockholm		1								1
Stourbridge		1								1
Suberu					1					1
Sundsvall	1	6							2	9
Tabligbo								1		1



TABLE 5

*Salmonella* isolates from Human sources  
by Serotype and Geographic Region, 2005

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Tallahassee	1				5			1		7
Teitelkebir	1	3	12	3	6	4	1	9	6	45
Tennessee	3	19	28	19	16	5	5	25	12	132
Texas								1		1
Thompson	33	54	86	52	43	23	23	43	71	428
Tilene									1	1
Tokoin					1					1
Toucra							2			2
Tshiongwe					3			1		4
Tucson			3						1	4
Typhi	23	46	51	12	79	12	23	22	80	348
Typhimurium	339	909	926	523	1070	544	501	470	692	5974
Typhimurium var. 5-	94	56	134	109	190	96		169	160	1008
Uganda	6	5	11	5	4		3	7	6	47
Ughelli		2								2
Urbana	1	8	8	2	6	5	3	3	8	44
Vejle									1	1
Virchow	9	12	17	8	5	1	3	9	18	82
Virginia			1		1	3			1	6
Wandsworth	2	1								3
Wangata	1	2								3
Waycross			2					3		5
Weltevreden	3	4	12	1	10	2		11	48	91
Weltevreden var. 15+			1							1
Wernigerode				1						1
Weslaco					1			1		2
Westeinde					1					1
Worthington	3	1	6	3	3	1		2	2	21
Yaba									1	1
Zanzibar		1								1
Zega		2								2
I 4,12:l,v:-			1							1
I 4,[5],12:::1,2								1		1
I 4,[5],12:b:-	3	16	18	1		3		1	29	71
I 4,[5],12:b:- var. L(+) tartrate+	3		1		1	1				6
I 4,[5],12:e,h:-	1								1	2
I 4,[5],12:i:-	83	87	182	99	61	108	29	43	130	822
I 4,[5],12:r:-	1								1	2
I 6,7:::1,5		18	1		4					23
I 6,7:b:-								1		1
I 6,7:k:-							2	1		3
I 6,7:r:-		1								1
I 6,8:::1,2						1		1		2
I 6,8:::1,5	1									1
I 6,8:b:-					1					1

TABLE 5

**Salmonella isolates from Human sources  
by Serotype and Geographic Region, 2005**

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
I 9,12:l,z28:-			1			5	1			7
I 13,22:-:1,6							1			1
I 13,23:b:-			1		6	1				8
I 16:l,v:-					2					2
II 6,7:b:z42				1						1
II 9,12:g,m,s,t,e,n,x					1					1
II 9,12:g,s,t,e,n,x					1					1
II 11:g,[m],s,t:z39				1						1
II 30:l,z28:z6						1				1
II 42:b:e,n,x,z15								1		1
II 44:z4,z23:-			1							1
II 47:b:1,5	1						7			8
II 48:d:z6			1							1
II 48:z39:z81								1		1
II 50:b:z6			1							1
II 58:l,z13,z28:z6			1							1
IIIa 18:z4,z23:-								1	12	13
IIIa 21:g,z51:-			1				1			2
IIIa 35:g,z51:-								1		1
IIIa 35:z4,z23:-			1							1
IIIa 41:z4,z23:-			1	3				1	1	6
IIIa 42:z4,z24:-		1								1
IIIa 43:z29:-								1		1
IIIa 43:z4,z24:-				1						1
IIIa 48:g,z51:-						1		1	1	3
IIIa 48:z4,z24:-			1						2	3
IIIa 53:g,z51:-								1		1
IIIa 53:z4,z23:-			1						2	3
IIIa 53:z4,z24:-									1	1
IIIa 56:z4,z23:-			3							3
IIIb 11:k:z53				1						1
IIIb 38:r:z								1		1
IIIb 48:i:z			1	1				1	1	4
IIIb 48:z52:z			1							1
IIIb 50:r:z								1		1
IIIb 53:z10:z35			1							1
IIIb 60:r:e,n,x,z15								1		1
IIIb 61:-:1,5,[7]			1		1					2
IIIb 61:c:z35			2			1				3
IIIb 61:k:1,5,[7]			2							2
IIIb 61:l,[v],[z13]:1,5,[7]								1		1
IIIb 61:l,v:z									3	3
IIIb 61:z52:z53	1									1
IV 11:z4,z23:-			1							1
IV 16:z4,z23:-						1				1

TABLE 5

**Salmonella isolates from Human sources  
by Serotype and Geographic Region, 2005**

Serotype	Region									Total
	New England	Mid Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
IV 16:z4,z32:-		1	2	1				1		5
IV 21:z4,z23:-	1			1						2
IV 40:z4,z32:-			1							1
IV 43:z4,z23:-				1						1
IV 43:z4,z32:-							1			1
IV 44:z4,z23:-		4	2	2		5	1	2		16
IV 44:z4,z24:-		1								1
IV 44:z4,z32:-		3	1					1		5
IV 45:g,z51:-			3	1	2				2	8
IV 48:g,z51:-		2	1			1		1		5
IV 50:g,z51:-		3	3					1		7
IV 50:z4,z23:-					5			1		6
<i>S. bongori</i> ser. 48:z35:-			2							2
Partially serotyped	17	77	80	42	1239	38	45	128	18	1684
Rough or nonmotile	4		16	3	6		1	7	2	39
Unknown	32	29	136	59	110	142	216	314	75	1113
<b>Total</b>	<b>2045</b>	<b>4864</b>	<b>5153</b>	<b>2506</b>	<b>8054</b>	<b>2938</b>	<b>2858</b>	<b>3166</b>	<b>4600</b>	<b>36184</b>

TABLE 6

**Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Clinical Nonhuman Source									Total
	All Others	Bovine	Chicken	Equine	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
Adelaide							2	1		3
Agona	1	180		87	12	10	75		13	378
Agoueve								1		1
Alachua							5			5
Albany			2			1			3	6
Alpenquai								1		1
Amsterdam									1	1
Amsterdam var. 15+		2								2
Anatum		71		23	6	27	59		3	189
Anatum var. 15+		8		10			4		1	23
Arechavaleta		1		8						9
Baildon								1		1
Banana		1								1
Bardo		11		1						12
Bareilly		3		3	1	1				8
Beaudesert								3		3
Benin						1				1
Bere							1			1
Bergedorf								1		1
Berta				3			1		1	5
Blockley						1				1
Bovismorbificans		15		1		1	9			26
Braenderup		6		8	2	3	7			26
Brandenburg		4				1	23		2	30
Bredeney		8		1		1	6		12	28
Buzu		1								1
Cannstatt		1		1		1				3
Cerro		78	1	4		2	1	1		87
Choleraesuis var. Kunzendorf		1					153			154
Colorado								1		1
Cubana		3				1	3		1	8
Daytona				1						1
Derby	1	5	2			2	194			204
Dublin		161			1	2	2			166
Eastbourne								1		1
Enteritidis	1	17	67	7	26	10	3	1		132
Florida								1		1
Fresno		2			1			1		4
Gallinarum						1				1
Gaminara						1		1		2
Give		14		7	3		1			25
Give var. 15+		14		6		1	1			22
Haardt			1							1

TABLE 6

**Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Clinical Nonhuman Source									Total
	All Others	Bovine	Chicken	Equine	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
Hadar	1	1	1		3		4		19	29
Hannover								1		1
Hartford				13	2	4	2			21
Havana		24		1		1	10	5		41
Heidelberg	4	10	18	2	16	2	121		28	201
Hindmarsh		1								1
Hvittingfoss				2						2
Indiana					4				1	5
Infantis	2	53	1	11	6	2	65		1	141
Inverness				1						1
Javiana		2		30	3	2		1		38
Johannesburg		10	2			4	21	1	3	41
Kentucky	9	90	28	1	9	9	3			149
Kiambu	1			2		1				4
Kisarawe								3		3
Krefeld							6			6
Lexington var. 15+		1								1
Lille						1	1			2
Litchfield		4		5	1	1		1		12
Liverpool		1			1		2			4
Livingstone		2				2	1			5
London	1	5		8			10			24
London var. 15+		1					1			2
Manhattan		1					4			5
Mbandaka	1	54	6	7	2	6	17			93
Meleagridis	1	40		11		7	1			60
Meleagridis var. 15+		3		1						4
Miami				4				2		6
Minnesota		9		3		4			2	18
Mississippi					1					1
Molade						1				1
Montevideo	3	151	4	10	41	11	10	1	24	255
Muenchen	1	21		14	3	4	12	2	1	58
Muenster		137		10	6	5	5		4	167
Muenster var. 15+		4			1					5
Newport		525		199	65	26	16	3	1	835
Norwich				1						1
Ohio		9	3	5		1	14			32
Oranienburg		4		9	3	7	5	2	1	31
Orion var. 15+		6			1					7
Orion var. 15+, 34+						4				4
Oskarshamn								1		1
Ouakam				1	2		1			4

TABLE 6

**Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Clinical Nonhuman Source									Total
	All Others	Bovine	Chicken	Equine	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
Panama						10	1	11		22
Paratyphi B var. L(+) tartrate+		2		14	2		2			20
Pensacola				1						1
Pomona		1						1		2
Poona		1		1						2
Putten							4			4
Reading		46		47	32	2	3			130
Rissen							1			1
Rubislaw		1		15	2					18
Saintpaul		6		13	19	2	3	1	11	55
Sandiego				3						3
Schwarzengrund	1	3	1			1	16		1	23
Senftenberg		8	5	3	7	8	34		89	154
Soerenga					1					1
Stanley					1	1		1		3
Taksony				2	1				1	4
Tennessee	1	1	3	1	1	1	3		1	12
Thompson		21	2	13	6	1		1		44
Typhimurium	3	323	11	193	84	18	104		4	740
Typhimurium var. 5-	2	338	9	24	52	22	505		1	953
Uganda		59	2	15	1	4	11			92
Uganda var. 15+		4					2			6
Urbana				2	1				1	4
Virchow				1						1
Virginia		5						1		6
Weltevreden					1			1		2
Westhampton									1	1
Westhampton var. 15+									1	1
Worthington		3	2	6			35		4	50
Yovokome							1			1
I 3,10:-:l,w							1			1
I 3,10:e,h:-									1	1
I 3,15:e,h:-		1								1
I 4,[5],12:-:1,2				1	1					2
I 4,[5],12:-:1,5				1						1
I 4,[5],12:d:-			1				1		1	3
I 4,[5],12:e,h:-		1								1
I 4,[5],12:i:-		47	10	40	9	2	14			122
I 4,[5],12:r:-							1			1
I 47:z4,z23:-							1			1
I 6,7:-:1,5		2		1						3
I 6,7:-:e,n,z15			1							1
I 6,7:b:-						1				1

TABLE 6

**Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Clinical Nonhuman Source									Total
	All Others	Bovine	Chicken	Equine	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
I 6,7:k:-			1				1			2
I 6,7:l,w:-							2			2
I 8,20:i:-		1								1
I 8:-:1,2		1								1
II 40:z4,z24:z39								1		1
II 58:l,z13,z28:z6								1		1
III 50:z52:z						1				1
III 53:z10:z								1		1
IIIa 18:g,z51:-					1					1
IIIa 18:z4,z23:-						1		8	1	10
IIIa 18:z4,z32:-	1				1			1	4	7
IIIa 21:z29:-								4		4
IIIa 21:z4,z24:-					1					1
IIIa 40:g,z51:-								2		2
IIIa 40:z4,z24:-			10							10
IIIa 41:z4,z23:-					1			2		3
IIIa 44:z4,z23,z32:-					1	1		1		3
IIIa 44:z4,z23:-								1		1
IIIa 44:z4,z24:-					1					1
IIIa 44:z4,z32:-							1			1
IIIa 48:g,z51:-					1	2		2		5
IIIa 48:z36:-							1			1
IIIa 50:z36:-		1								1
IIIa 51:z4,z23:-								2		2
IIIa 53:z4,z23,z32:-								1		1
IIIa 53:z4,z23:-					1					1
IIIa 56:z4,z23:-								3		3
IIIa 63:z36:-						1				1
IIIb (6),14:z10:z					1			2		3
IIIb 16:z10:e,n,x,z15								3		3
IIIb 35:i:z35								2		2
IIIb 35:l,v:z35					2					2
IIIb 38:(k):z35				1				5		6
IIIb 38:l,v:z53								2		2
IIIb 38:r:z35								1		1
IIIb 47:k:z35								1		1
IIIb 48:k:1,5,(7)								2		2
IIIb 48:k:z								1		1
IIIb 48:k:z53								1		1
IIIb 48:l,v:1,5,(7)								1		1
IIIb 48:z52:z								5		5
IIIb 50:k:z					1			3		4
IIIb 53:z10:z35								1		1

TABLE 6

**Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Clinical Nonhuman Source									Total
	All Others	Bovine	Chicken	Equine	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
IIIb 57:c:e,n,x,z15								1		1
IIIb 58:z52:z35								1		1
IIIb 61:-:1,5,[7]						24				24
IIIb 61:c:z35								2		2
IIIb 61:l,[v],[z13]:z35								1		1
IIIb 61:l,v:1,5,7				1						1
IIIb 61:r:z53								1		1
IIIb 65:l,v:z								1		1
IIIb 65:z10:e,n,x,z15								2		2
IIIb 65:z52:z35								1		1
IV 16:z4,z32:-								1		1
IV 43:z4,z23:-					1			2		3
IV 43:z4,z32:-						2		1		3
IV 44:z36,[z38]:-								1		1
IV 44:z4,z32:-								1		1
IV 48:g,z51:-								1		1
IV 50:g,z51:-						1		5		6
IV 50:z4,z23:-								1		1
Rough or nonmotile	1	22	1	2	3	2	61		1	93
<b>Total</b>	<b>36</b>	<b>2674</b>	<b>195</b>	<b>923</b>	<b>459</b>	<b>281</b>	<b>1691</b>	<b>138</b>	<b>245</b>	<b>6642</b>



TABLE 7

**Non-Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Non-Clinical Nonhuman Source										Total
	All Others	Bovine	Chicken	Equine	Feed/Feed Supplements	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
Abony	1										1
Adelaide			3								3
Agona	2	1	72		1		50	16		71	213
Alabama			5								5
Alachua			7							1	8
Albany			1							21	22
Altona			2								2
Amager			14				1				15
Amsterdam			2								2
Amsterdam var. 15+			2								2
Anatum		10	34				16	6		28	94
Anatum var. 15+										1	1
Apapa			1								1
Arechavaleta							1				1
Babelsberg			1								1
Banana			1								1
Bareilly			15				5				20
Barranquilla			7								7
Bere			2								2
Berta	15		9							15	39
Blockley			2			2					4
Bovismorbificans			7								7
Braenderup	1		63			1	6	4			75
Brandenburg			4				1	1			6
Bredeney							1			20	21
Cerro	8	259	9				7			8	291
Choleraesuis var. Kunzendorf			1				1				2
Cubana		24	15				20			11	70
Daytona										1	1
Derby			2				2	192		13	209
Dublin		1									1
Ealing			2								2
Enteritidis	3	1	177			4	26			6	217
Gallinarum	4										4
Gaminara		3					3				6
Georgia			2								2
Gera			1								1
Give			1				3		3		7
Give var. 15+			2								2
Godesberg			2								2
Haardt			1				1				2
Hadar	2		20		1	1	1			624	649
Hartford							1				1
Havana			10				3			1	14

TABLE 7

**Non-Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Non-Clinical Nonhuman Source										Total
	All Others	Bovine	Chicken	Equine	Feed/Feed Supplements	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
Heidelberg	2		1013			39	38	43		126	1261
Indiana			1				6				7
Infantis	1	18	47				25		1	6	98
Istanbul			1							2	3
Javiana			15				1			5	21
Johannesburg	1		11				1	4		4	21
Kentucky	27	6	630			24	12			6	705
Kiambu			39								39
Lexington			3								3
Lille			8				1	2		2	13
Litchfield			2			1	1				4
Liverpool	1		2								3
Livingstone			9								9
Llandoff			1								1
London		1	1							15	17
London var. 15+										2	2
Luciana			1								1
Manhattan			1								1
Mbandaka	3	2	75			1	4	25	1	18	129
Meleagridis		4	1					2			7
Minnesota			3								3
Molade			2								2
Montevideo	3	17	97				7			56	180
Muenchen	3	1	48	2			5			4	63
Muenster		8	7			2	3			65	85
Muenster var. 15+, 34+			1								1
Newport	3	10	15				50	4		25	107
Norwich			3					1			4
Ohio	9		30		2	1	1	1		4	48
Oranienburg	5		12								17
Orion		1	10				1			2	14
Orion var. 15+			1							1	2
Orion var. 15+, 34+			4							2	6
Ouakam			9							6	15
Paratyphi B var. L(+) tartrate+				1			2		1		4
Pomona			8							1	9
Presov									2		2
Putten			1								1
Reading	1	1	1							17	20
Rissen			3								3
Rubislaw	2		4				3				9
Ruiru			2								2
Saintpaul	3			6			7	1		99	116
Sandiego			2								2

TABLE 7

**Non-Clinical Salmonella isolates from Nonhuman sources  
Reported to CDC and NSVL by Serotype and Source, 2005**

Serotype	Non-Clinical Nonhuman Source										Total
	All Others	Bovine	Chicken	Equine	Feed/Feed Supplements	Other Birds /Wild Animals	Other Domestic Animals /Environment	Porcine	Reptile	Turkey	
Schwarzengrund	2	1	72				1			62	138
Senftenberg	1	3	219			7	10	1	1	298	540
Soerenga			1								1
Taksony			8								8
Tennessee			15				1		1	26	43
Thompson			75			1	2			8	86
Typhimurium	119	2	318	2			100	64		34	639
Typhimurium var. 5-	163	8	106			2	33	75		49	436
Uganda			27				9				36
Urbana			1							1	2
Westhampton			1							9	10
Widemarsh			2								2
Worthington			32					33		45	110
I 11:r:-							1				1
I 3,10:e,h:-			1							1	2
I 3,15,34:z10:-			2								2
I 3,15:z10:-			1								1
I 4,[5],12:-:1,2			5							1	6
I 4,[5],12:d:-			2								2
I 4,[5],12:i:-	1		140	2		1	16	9		1	170
I 4,[5],12:r:-			1								1
I 6,7:-:1,5			4				1				5
I 6,7:k:-			13								13
I 6,7:z10:-			1								1
I 6,8:-:1,2			1								1
I 8,20:-:z6	3		25								28
I 8,20:i:-			4								4
IIIa 18:z4,z23:-							1			2	3
IIIa 18:z4,z32:-										31	31
IIIa 40:z4,z24:-			10								10
IIIa 51:z4,z23:-									1		1
IIIa 53:z4,z23:-										2	2
IIIb 17:z10:e,n,x,z15							1				1
IIIb 47:l,v:e,n,x,z15	1										1
IIIb 61:r:z53	1										1
IV 11:z4,z23:-	1										1
IV 16:z4,z32:-									9		9
IV 40:z4,z32:-	1										1
IV 44:z36,[z38]:-			2								2
IV 45:g,z51:-					1						1
IV 48:g,z51:-									3		3
Rough or nonmotile		3	31				3			6	43
<b>Total</b>	<b>393</b>	<b>385</b>	<b>3743</b>	<b>13</b>	<b>5</b>	<b>87</b>	<b>496</b>	<b>484</b>	<b>23</b>	<b>1865</b>	<b>7494</b>

**TABLE 8**

**The 30 most frequently reported *Salmonella* serotypes from Human sources  
Percent Change in reported isolates**

Rank			Serotype	Reported Isolates			Percent Change		
1995	2000	2005		1995	2000	2005	1995-2000	2000-2005	1995-2005
2	1	1	Typhimurium *	9702	7428	6982	-23	-6	-28
1	2	2	Enteritidis	10201	6487	6730	-36	4	-34
3	3	3	Newport	2566	3074	3295	20	7	28
4	4	4	Heidelberg	2095	1772	1903	-15	7	-9
6	5	5	Javiana	758	1204	1324	59	10	75
64	21	6	I 4,[5],12:i:-	45	233	822	418	253	1727
8	6	7	Montevideo	685	841	809	23	-4	18
7	7	8	Muenchen	754	642	733	-15	14	-3
16	11	9	Saintpaul	467	548	683	17	25	46
12	12	10	Braenderup	588	531	603	-10	14	3
11	10	11	Oranienburg	595	563	590	-5	5	-1
23	19	12	Mississippi	199	286	565	44	98	184
14	8	13	Infantis	521	613	505	18	-18	-3
20	13	14	Paratyphi B var. L(+) tartrate+	268	468	460	75	-2	72
10	9	15	Thompson	625	609	428	-3	-30	-32
9	14	16	Agona	683	406	367	-41	-10	-46
17	15	17	Typhi	442	399	348	-10	-13	-21
27	27	18	Hartford	164	150	239	-9	59	46
15	20	19	Stanley	481	239	224	-50	-6	-53
18	18	20	Berta	367	312	209	-15	-33	-43
5	16	21	Hadar	814	354	205	-57	-42	-75
33	23	22	Bareilly	109	182	201	67	10	84
25	24	23	Anatum	174	177	197	2	11	13
13	17	24	Poona	531	337	196	-37	-42	-63
29	26	25	Mbandaka	154	157	190	2	21	23
26	25	26	Panama	173	158	148	-9	-6	-14
31	31	27	Litchfield	115	119	141	3	18	23
30	29	28	Sandiego	117	142	138	21	-3	18
28	33	29	Schwarzengrund	162	113	138	-30	22	-15
19	40	30	Brandenburg	284	84	134	-70	60	-53

NOTE:

\* Typhimurium includes var. 5- (Formerly var. Copenhagen)

Figure 3

S. Enteritidis isolation rates per 100,000 population by region: 1970-2005

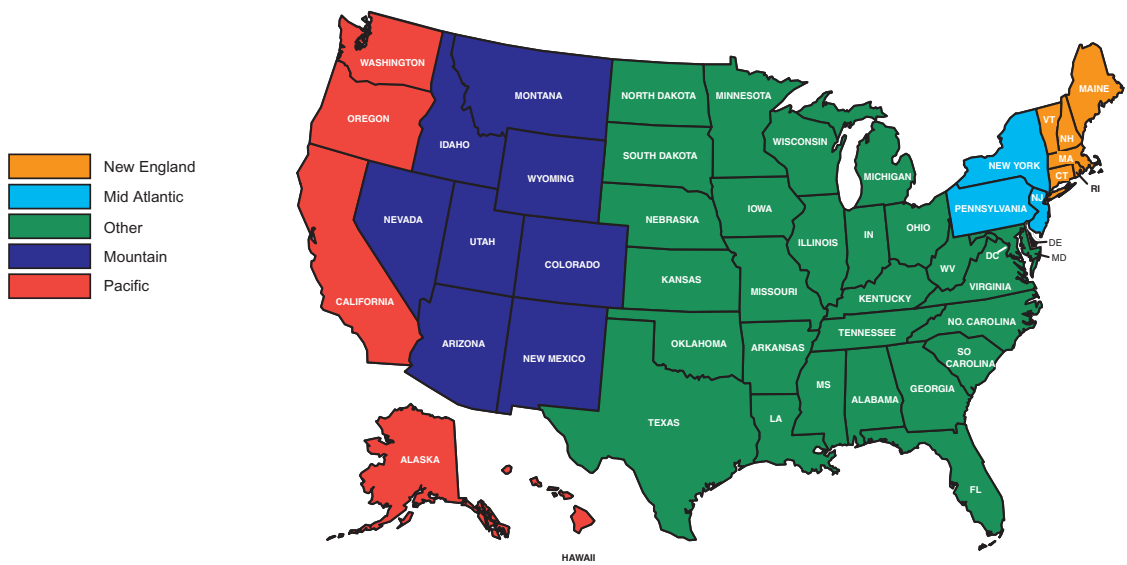
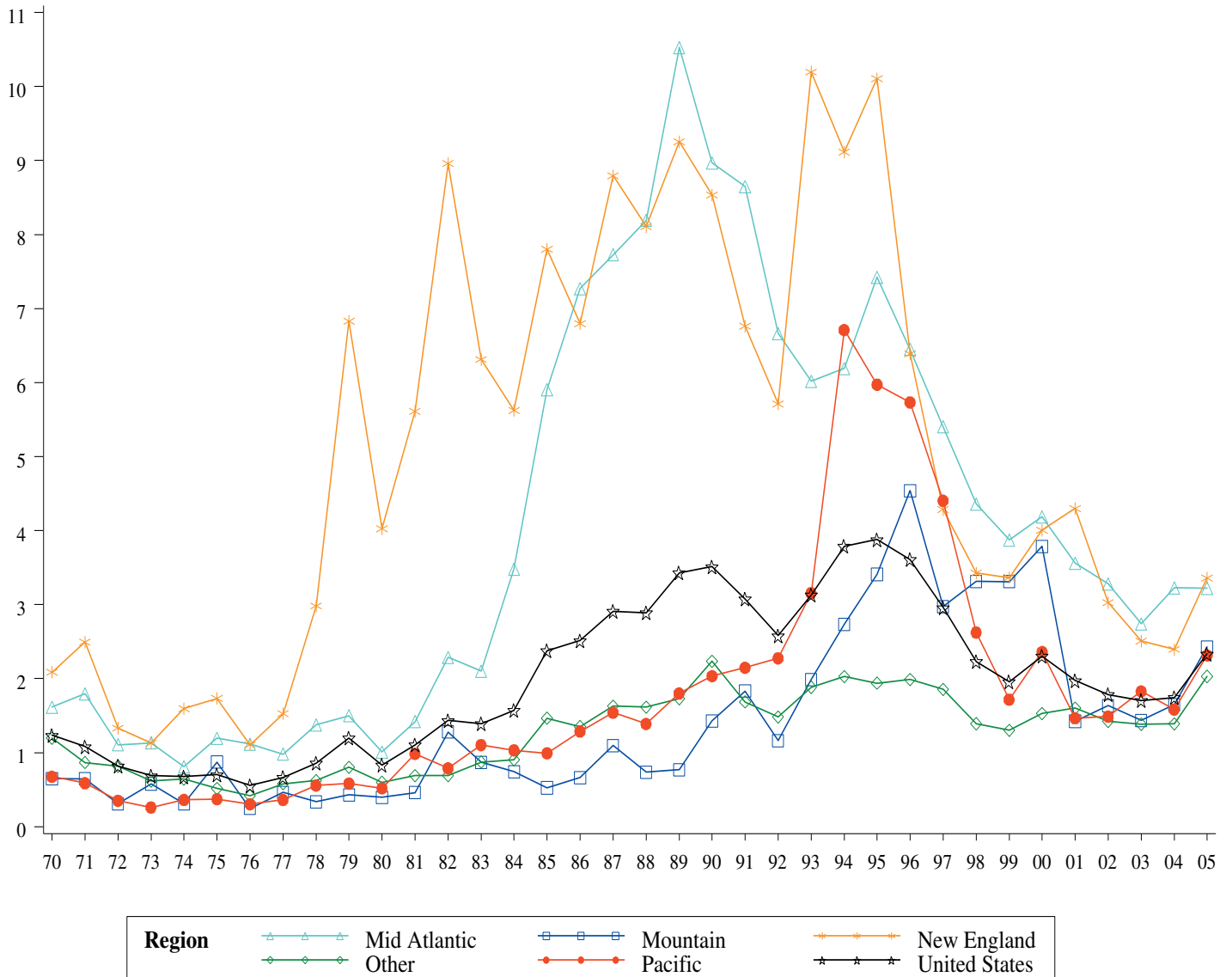


Figure 4

Top 4 *Salmonella* Serotype isolation rates in the United States per 100,000 population: 1970-2005

