

# SALMONELLOSIS IN NORTH DAKOTA ANIMALS AND POULTRY

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Salmonellosis is the disease caused by bacteria of the genus *Salmonella*. These bacteria are able to affect all species of domestic animals and fowl in North Dakota. From January, 1980, to October, 1983, salmonellosis was diagnosed in cattle, horses, pigs, and sheep with a population at risk in excess of 26,000 animals. More than 3 percent of these animals died (Table 1). Domestic poultry (turkeys, chickens, and geese) experienced salmonellosis in flocks exceeding 800,000 birds with a death loss of 2 percent (Table 2). Outbreaks of salmonellosis also occurred in dogs, cats, snakes, coyotes, wild turkeys, and cockatiels. During this period, 24 different serotypes of salmonellae were isolated from these various species (Tables 3 and 4).

**TABLE 1. Salmonella Morbidity and Mortality in Domestic Animals in North Dakota, January 1980-October 1983.**

	Animals in Herd	Number of Animals Sick	Number of Animals Dead	Percent of Sick & Dead Information Available
Porcine	13,971	1,073	538	72%
Bovine	8,859	502	267	77%
Ovine	3,094	8	34	20%
Equine	70	3	4	60%
Canine	252	2	5	50%
Feline	19	8	0	100%
Miscellaneous	202	6	6	100%

**Table 2. Spectrum of Salmonella Species Isolated in North Dakota.**

	Birds in Flock	Number of Birds Sick	Number of Birds Dead	Percent of Cases Where Sick and Dead Information Available
Turkey	788,200	13,668	17,396	46%
Chicken	530	60	68	50%
Goose	15,111	366	344	57%

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The genus *Salmonella* contains over 1300 different serotypes, all of which are potential pathogens. Some salmonellae are uniquely species-associated (1). For instance, *S. typhi* and *s. paratyphi* affect only man, and *S. cholerae-suis* is associated with disease in pigs. Although *S. cholerae-suis* is a potential pathogen in man, it is rarely associated with human disease. Other *Salmonella* spp. such as *S. typhimurium* are not species-specific and cause disease in man, animals and poultry. *S. typhimurium* has been the most frequent salmonellae isolate at the North Dakota Veterinary Diagnostic Laboratory for many years.

Occasionally salmonellosis has spread from animals to owners, owner's families, veterinarians, and veterinary technicians. In these instances the disease has involved *S. typhimurium* and the source has invariably been sick cattle or horses.

Occasionally serotypes of salmonellae increase in incidence dramatically and become predominant isolates. Such is the case for *S. agona* (United States and United Kingdom), *S. wien* (Europe) and *S. dublin* (Europe and United States) (1). A rare serotype in the late 1960's, *S. agona*, became the third most common human salmonellae isolate in 1976. From an early concentration in poultry, the organism has now spread to other domestic animals.

*S. wien* rose from an obscure bacterium to a common human salmonellae isolate in Europe in the mid 1970's. This organism was never associated with an animal reservoir and has again become a rare isolate.

*S. dublin* is of particular interest because we have recently isolated it for the first time in North Dakota. *S. dublin* was a rare organism in the United States and, as recently as 1971, had not been reported east of the Rocky Mountains(2). The numbers and geographic distribution of isolates of *S. dublin* increased annually and, in January of 1980, the first isolate was recovered east of the Rocky Mountains. Since that time many Midwestern states have experienced *S. dublin* disease outbreaks. *S. dublin* is well adapted to cattle and infection in other species of animals and man most likely originated from infected cattle.

Probably the number of herds affected by *S. dublin* will increase in North Dakota in coming years. This has

**Table 3. Salmonella Isolates by Species in North Dakota, January 1980-October 1983.**

Salmonella Species	Goose	Bovine	Canine	Chicken	Equine	Feline	Ovine	Porcine	Turkey	Wild Turkey	Snake	Coyote
<i>S. agona</i>							1	2	10			
<i>S. anatum</i>			2					3	2			
<i>S. arizona</i>		3					13	1	16		1	
<i>S. binza</i>												1
<i>S. bredeney</i>								1				
<i>S. californica</i>	1							1				
<i>S. cerro</i>								1				
<i>S. cholera-suis</i>								11				
var kuzendorf		1						1				
<i>S. derby</i>	1		1									
<i>S. dublin</i>		1										
<i>S. hadar</i>									3			
<i>S. havanna</i>		3										
<i>S. heidelberg</i>	1	1						1	6			
<i>S. indiana</i>			1			2		2				
<i>S. infantis</i>								2				
<i>S. new-brunswick</i>										1		
<i>S. newport</i>					1			1				
<i>S. poona</i>									10			
<i>S. pullorum</i>				2					2			
<i>S. saint-paul</i>	1					1						
<i>S. san-diego</i>									1			
<i>S. senftenberg</i>								1				
<i>S. thomasville</i>									1			
<i>S. typhimurium</i>	1	29		1	5			5	1			
var. copenhagen	1	14			1			5				

**Table 4. Spectrum of Salmonella Species Isolated in North Dakota.**

	1980	1981	1982	1983 (January-October)
<i>S. agona</i>	10	1	1	1
<i>S. anatum</i>	1	1	3	2
<i>S. arizona</i>	2	17	5	10
<i>S. binza</i>	--	--	--	1
<i>S. bredeney</i>	--	--	2	1
<i>S. californica</i>	--	--	--	2
<i>S. cerro</i>	--	1	--	--
<i>S. cholera-suis</i> (kuzendorf)	2	8	--	2
<i>S. derby</i>	--	2	--	1
<i>S. dublin</i>	--	--	--	1
<i>S. hadar</i>	--	2	1	--
<i>S. havanna</i>	--	3	--	--
<i>S. heidelberg</i>	5	1	2	1
<i>S. indiana</i>	--	--	--	3
<i>S. infantis</i>	--	--	1	1
<i>S. new-brunswick</i>	1	--	--	--
<i>S. newport</i>	--	--	1	1
<i>S. poona</i>	2	6	2	--
<i>S. pullorum</i>	1	1	1	1
<i>S. saint-paul</i>	--	1	1	--
<i>S. san-diego</i>	1	--	--	--
<i>S. senftenberg</i>	--	1	--	--
<i>S. thomasville</i>	--	--	1	--
<i>S. typhimurium</i>	19	17	2	5
var. copenhagen	4	4	7	6

been the case in most states once it became established in the cattle population. Presently most North Dakota salmonellae isolates originate from cattle (Table 3) and their frequency of isolation is expected to increase. *S. typhimurium* will probably continue to be the most common isolate, but *S. dublin* may become almost as frequent (Table 4). In addition, we may experience a higher morbidity and mortality in affected herds. Finally, *S. dublin* will undoubtedly affect other species with cattle as the reservoir of infection.

**LITERATURE CITED**

1. Cherbin, C.E. Antibiotic Resistance of *Salmonella* in Europe and the United States. Rev. Inf. Dis. 3:1105-1126, 1981.
2. Bulgin, M.S. *Salmonella dublin*. JAVMA. 182:116-118, 1983.