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AN OUTBREAK OF TOXIN A NEGATIVE, TOXIN B POSITIVE *CLOSTRIDIUM DIFFICILE*-ASSOCIATED DIARRHEA IN A CANADIAN TERTIARY-CARE HOSPITAL

Introduction

Toxigenic *Clostridium difficile* is a frequent cause of infectious nosocomial diarrhea accounting for up to 25% of nosocomial diarrhea cases[1]. Clinically significant disease is thought to be due almost exclusively to *C. difficile* strains that produce both toxin A and toxin B. Toxigenic *C. difficile* produces a broad spectrum of gastrointestinal disease varying from asymptomatic carriage to fulminant pseudomembranous colitis (PMC). Relapses after therapy occur in 7% to 20% of cases[2,3]. Predisposing conditions and the use of broad spectrum antimicrobials in a susceptible patient population makes *C. difficile* disease increasingly common in acute-care centres.

The organism can be detected by culture and subsequent toxin testing of the isolate, but this cumbersome and slow method is seldom used routinely. Direct toxin detection in the stool can be accomplished by enzyme-linked immunoassays (EIAs); however, the gold standard diagnostic test remains the tissue culture cytotoxicity assay. Available EIAs can detect toxin A alone, or both toxins A and B. These assays provide results in hours compared to the 1 to 2 days required for completion of the tissue culture cytotoxicity assay. EIAs are less sensitive (70% to 90%) than the cytotoxicity assay but demonstrate excellent specificity (99%)[4]. In equivocal cases, the diagnosis may be established by detecting PMC through direct visualization with sigmoidoscopy or colonoscopy[4,5], depending on the clinical scenario.

Infection with *C. difficile* increases morbidity and mortality among hospitalized patients leading to more investigation, therapeutic interventions, and increased length of stay, all which lead to increased cost of care[3,6-8]. The following is a report of an outbreak of *C. difficile*-associated diarrhea (CDAD) that was caused by a toxin A negative (-), toxin B positive (+) strain of *C. difficile*.

Description of Outbreak

Between 29 June and 30 September 1998, 16 cases of nosocomial diarrhea caused by a unique strain of *C. difficile* were identified at the Health Sciences Centre, a 789-bed tertiary-care university teaching hospital in Winnipeg, Manitoba. A case was defined as anyone who was hospitalized for ≥ 48 hours and developed diarrhea, and whose stool was negative by an EIA that detected only toxin A (*Prima* System™ EIA, Bartels Inc.).

The cases were located on four wards; Wards 1, 2, and 4 were general medical wards, and Ward 3 was an oncology ward. The average age of the cases involved in the outbreak was 57.56 ± 23.29 years; 50% of the cases were female. Four cases had an underlying neoplasm (25%) and seven (43.7%) had renal failure; six (33.3%) of the seven were dialysis dependent. Eight (50%) had been admitted to Ward 1 at some point during their hospitalization.

A leukemic patient, with antibiotic-associated diarrhea, who tested negative for *C. difficile* by an EIA for toxin A on three separate occasions was presumed to be the index case. Due to a high clinical suspicion of CDAD, this case underwent colonoscopy confirming a diagnosis of PMC. Given this presentation, concern was raised that a unique strain of *C. difficile* may be causing this clinical syndrome. Therefore, a stool specimen was evaluated and

found to be positive for *C. difficile* toxin, using the tissue culture cytotoxicity assay capable of detecting both toxins A and B.

Over the next 2 weeks, on the same ward as the index case (Ward 1), three additional cases had similar presentation with the EIA for toxin A being negative, yet all were positive by tissue culture cytotoxicity assay. By the end of the third week of the outbreak, nine similar cases were confirmed. Two of these cases died due to uncontrolled sepsis and multiple organ failure. Two other cases had spontaneous resolution of their diarrhea without relapse, despite not receiving antibiotic therapy for their CDAD. By the fourth week, stool specimens submitted for *C. difficile* toxin testing were evaluated using an EIA capable of detecting both toxins A and B (*TOX A/B TEST*, TechLab). Seven cases were identified as negative for only toxin A by the EIA for toxin A, but were positive by the EIA for both toxins A and B. All cases had received at least one antimicrobial agent (range: 1 to 8) in the month prior to the onset of symptoms. Among the 16 cases with CDAD, three (18.75%) had a clinical relapse. These data indicate that this outbreak was due to a strain of *C. difficile* which was toxin A (-), yet toxin B (+). Environmental cultures did not yield *C. difficile*. Further genetic analysis of the isolates is currently in progress to clarify what portion of the toxin A gene is missing.

Intervention

Following the identification of the first cases caused by this unusual strain of *C. difficile*, an investigation was undertaken which identified that 50% of the cases arose from Ward 1. Existing infection-control practices were reviewed and modifications instituted. The infection control measures undertaken during this outbreak included educating health-care workers and families of patients, and all head nurses. A hospital newsletter focusing on *C. difficile* was distributed. Infection-control precautions for suspected or confirmed cases of *C. difficile* diarrhea included cohorting of cases, single rooms for cases with poor hygiene, gowning and gloving if contamination was likely; precautions were discontinued 48 hours after the last diarrheal stool. Intensified housekeeping measures consisted of changing the pull cords of call bells from string to metal, increasing the availability of hospital-approved disinfectant, and increasing the frequency of cleaning in patient-care areas, specifically rooms, mobile commode chairs, and washrooms. Hand hygiene was promoted by reviewing and reinforcing hand washing practices, and encouraging the use of alcohol-based hand disinfecting solutions. Laboratory-related measures included the prompt collection and analysis of diarrheal stools for the presence of *C. difficile* toxin using the tissue culture cytotoxic assay for toxins A and B.

Discussion

This is believed to be the first outbreak of toxin A (-), toxin B (+) *C. difficile*-associated disease. The exact duration of this outbreak is unknown; it was not until this cluster was noticed that the problem was identified. A 12-month retrospective review of the number of specimens positive for *C. difficile* toxin did not reveal any gross variation in the trend. It was not until 5 August 1998 that changes were made to the *C. difficile* toxin-testing technique leading to the identification of the toxin A (-), toxin B (+) strain. It is also unclear whether this strain arose independently in the institution where the outbreak occurred or whether it was introduced to this institution from another source.

One case (Case 13), transferred from another institution with colonoscopy-proven PMC 14 days after therapy ended, developed diarrhea again and was found to have the toxin A (-), B (+) strain of *C. difficile*. This raised the concern that this strain also may be in the community or other institutions. The same wide range of clinical manifestations observed with *C. difficile* that produces toxin A and toxin B was observed with this unique strain.

It is likely that the CDAD may have been the precipitating event in the two deaths associated with this outbreak. Both cases had serious underlying medical conditions and were profoundly debilitated prior to developing CDAD. *C. difficile*-associated disease carries an overall mortality of 3.4% to 8%[9-11]. One of the key factors that discriminates between mortality and survival is length of time from symptoms to treatment. Earlier diagnosis leads to better outcomes[4]. The 18.75% relapse rate we observed was compatible with the 7% to 20% previously documented[2,3,12]. This is presumed to be due to both relapse and re-infection. Up until 10 years prior to this outbreak, the *C. difficile* tissue culture cytotoxicity assay had been used at this institution. A decision had been made at that time to use an EIA that detected only toxin A as most clinically significant isolates have been shown to produce both toxins.

In a recent survey of 380 Canadian hospitals with > 50 beds, it was determined that the tissue culture cytotoxin assay was used in 44.4% of the institutions, EIAs in 38.3%, culture in 32.1%, and latex agglutination in 13.6%[13]. The ultimate assay for *C. difficile* toxin testing has not been developed[14]. Tests that detect only toxin A may miss *C. difficile* isolates that produce toxin B but not toxin A. The diagnosis of *C. difficile*-associated diarrhea requires both clinical acumen and supportive evidence from the laboratory. The clinical suspicion of CDAD was high in a number of patients whose EIA for toxin A was negative, thus a *C. difficile* tissue culture cytotoxicity assay was undertaken.

Once the outbreak was identified, infection-control practices and procedures were reviewed and intensified. Although the organism was not isolated from the environment, environmental contamination with *C. difficile* is significant, particularly during outbreaks[12,15].

The majority of cases were debilitated and had serious underlying conditions, such as hematologic malignancies and renal failure requiring hemodialysis. All cases had received either oral or parenteral antimicrobial therapy prior to the development of CDAD. Three cases had CDAD diagnosed endoscopically because the EIA for toxin A was negative. Twelve cases occurred prior the initiation of the EIA that detects *C. difficile* toxins A and B. After its introduction, there were four additional cases. Further cases

have not occurred since 30 September 1998. Ongoing surveillance continues.

This preliminary report of an outbreak of toxin A (-), toxin B (+) CDAD highlights the need for and role of appropriate laboratory diagnostic techniques necessary to ensure that outbreaks such as this are not missed. Centres using EIAs that only detect toxin A should be aware that CDAD caused by *C. difficile* that apparently produces only toxin B may occur. When the clinical scenario suggests CDAD but the diagnostic test is negative, it is also important to ensure that alternative diagnostic techniques be available. This outbreak was brought under control by implementing an alternative diagnostic test, and intensifying infection control interventions by focusing specifically on environmental decontamination, education, hand washing, and patient cohorting and isolation. Other authors have suggested that budgetary cuts have led to decreased ward cleaning and ultimately *C. difficile* outbreaks[15]. It is unknown whether a similar situation may have contributed in part to this outbreak.

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Editorial Comment

The Canadian Nosocomial Infection Surveillance Program (CNISP) is a collaborative national surveillance program between the Laboratory Center for Disease Control (LCDC), Health Canada, and the Canadian Hospital Epidemiology Committee (CHEC), a subcommittee of the Canadian Infectious Disease Society. In 1997, CNISP conducted a Canadian laboratory-based nosocomial *Clostridium difficile*-associated diarrhea (N-CDAD) surveillance project to determine national sentinel hospital prevalence rates of N-CDAD and to measure morbidity, mortality, and health-care burden. The results of this survey are presently being written for publication.

During the survey period, 13% of the inpatients with diarrhea were identified as N-CDAD with a period prevalence mean of 66.3 cases per 100,000 patient days and 5.9 cases per 1,000 patient admissions. N-CDAD was found most frequently in older patients who had been treated with antibiotics and had been hospitalized for > 2 weeks in medical or surgical wards[1]. Forty-one cases died during the surveillance period after being diagnosed with N-CDAD; four were considered to have died directly or indirectly due to N-CDAD. Re-admissions due to N-CDAD in patients previously sent home were 7%, with an average length of stay of

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HEALTH CANADA · SANTÉ CANADA

Notifiable Diseases Summary (Preliminary) · Sommaire des maladies à déclaration obligatoire (Provisoire)

New Cases Reported from 1 October · 31 December 1998 · Nouveaux cas déclarés du 1 octobre · 31 décembre 1998

Disease / Maladie	ICD-9 / CIM-9	Canada†			Newfoundland / Terre-Neuve			Prince Edward Island / Île-du-Prince-Édouard			Nova Scotia / Nouvelle-Écosse			New Brunswick / Nouveau-Brunswick			Quebec / Québec		
		0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97
AIDS-Sida	042-044	–	105	443	–	1	–	–	–	–	–	5	8	–	1	3	–	37	160
Amoebiasis · Amibiase	006	299	1258	1806	–	–	5	–	2	1	3	22	16	–	–	5	56	208	242
Botulism · Botulisme	005.1	–	3	16	–	–	–	–	–	–	–	–	–	–	–	–	–	1	11
Brucellosis · Brucellose	023	2	9	13															
Campylobacteriosis · Campylobactériose	008.41	2948	12380	13544	40	214	109	9	45	49	39	214	213	56	279	249	788	3081	3447
Chancroid · Chancre mou	099.0			1				–	–	–									1
Chickenpox · Varicelle	052	2176	9221	29597	20	402	569				3	24	334	1	2	4	–	–	
Chlamydia, genital · Chlamydiose génitale	099.81*	8231	30245	34144	93	375	335	32	144	139	301	1216	1127	259	959	819	1825	6646	6380
Cholera · Choléra	001	2	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Diphtheria · Diphtérie	032			1															
Giardiasis · Giardiase	007.1	1373	4483	5677	16	54	42	4	9	5	28	96	92	16	74	133	242	889	899
Gonococcal Infections · Infections gonococciques[1]	098	1057	4074	4522	–	2	3	–	1	1	17	84	108	2	17	47	148	463	551
Gonococcal Ophthalmia neonatorum · Ophtalmie gonococcique du nouveau-né	098.4	2	18	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1
Haemophilus influenzae B (all invasive) · (invasive) à H. influenzae B[2]	320.0,038.41*	12	50	80	–	–	–	–	–	–	–	–	3	–	–	–	4	17	20
Hepatitis A · Hépatite A	070.0,070.1	186	937	1904	–	2	3	–	1	–	1	9	15	2	5	7	32	181	569
Hepatitis B · Hépatite B	070.2,070.3	444	1702	1591	–	1	3	–		–	10	40	28	2	8	6	201	709	455
Hepatitis C · Hépatite C		4531	16481	19571	5	34	43	6	22	–	97	386	528	47	181	172	483	2403	1693
Hepatitis non-A, non-B · Hépatite non-A, non-B		–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Legionellosis · Legionellose	482.41	30	84	81	–	–	–	–	1	–	1	4	–	1	3	–	6	20	24
Leprosy · Lèpre	030	–	3	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Listeriosis (all types) · Listériose (tous genres)	027.0,771.22*	18	49	47	–	1	–	–	–	2	–	–	–	–	1	1	–	–	–
Malaria · Paludisme	084	60	294	1029	–	–	–	–	–	–	–	1	1	–	2	1	18	103	158
Measles · Rougeole	055	4	18	584	–	–	9	–	–	–	–	–	2	–	–	4	–	3	4
Meningitis, pneumococcal · Méningite à pneumocoques	320.1	28	59	65	–	–	1	2	2	2	–	–	1	–	–	5	–	–	–
Meningitis, other bacterial · Autres méningites bactériennes[3,4]		12	51	205	1	4	2	–	–	–	1	2	3	2	3	1	–	–	70
Meningitis/Encephalitis viral · Méningite/encéphalite virale[5]		204	540	425	1	1	1	–	1	1	–	3	1	–	2	8	32	64	157
Meningococcal Infections · Infections à méningocoques	036	33	126	251	2	3	3	–	1	–	2	4	2	–	2	6	10	40	88
Mumps · Oreillons	072	33	110	264	–	–	–	–	–	–	–	2	2	1	2	3	18	25	13
Paratyphoid · Paratyphoïde	002.1-002.9	8	18	14													2	6	3
Pertussis · Coqueluche	033	3483	7519	4439	5	40	34	8	21	47	9	48	38	58	234	73	2152	4332	1075
Plague · Peste	020	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Poliomyelitis · Poliomyélite	045	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Rabies · Rage	071																		
Rubella · Rubéole	056	6	67	4007	1	1	–	–	–	–	–	–	2	–	–	2	–	1	8
Congenital Rubella · Rubéole congénitale	771.0		1	1															
Salmonellosis · Salmonellose[6]	003	1373	5933	6015	14	163	49	–	29	31	31	177	101	18	133	129	211	1087	1229
Shigellosis · Shigellose	004	383	1363	1509	2	2	3	–	–	7	2	9	10	1	12	12	38	270	474
Syphilis, Congenital · Syphilis congénitale	090	–	3	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Syphilis, Early Latent · Syphilis, latente récente	092	2	5	40	–	–	–	–	–	–	–	–	–	–	–	–	1	2	2
Syphilis, Early Symptomatic · Syphilis, symptomatique récente	091	26	143	76	–	–	–	–	–	–	–	2	1	–	–	–	–	–	6
Other Syphilis · Autres syphilis	090,092-097	55	218	582	–	–	–	–	–	–	1	7	9	1	5	10	7	26	43
Tetanus · Tétanos	037	–	1	4	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–
Trichinosis · Trichinose	124	13	32	21															6
Tuberculosis · Tuberculose	010-018	253	850	904	4	8	12	–	–	–	–	3	3	–	–	–	60	223	246
Typhoid · Typhoïde	002.0	8	47	47												3	1	14	13
Verotoxigenic E. coli · E. coli vérotoxinogènes	008.01*	206	1202	1273	3	7	1	–	11	8	3	73	6	3	33	23	46	342	369
Yellow Fever · Fièvre jaune	060	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

(1) Includes all 098 categories except 098.4.
(2) Includes buccal cellulitis or epiglottitis 464.3 in a child < 5 years with no other causative organisms isolated.
(3) Includes encephalitis.
(4) All other categories except Haemophilus 320.2, Listeriosis 027.0, Meningococcal 036, Pneumococcal 320.1 and Tuberculosis 013.0.
(5) All categories except Measles 055, Mumps 072, Poliomyelitis 045, Rubella 056 and Yellow Fever 060.
(6) Excludes Typhoid 002.0 and Paratyphoid 002.1 to 002.9.
* ICD-9 codes used in the list may be incomplete. All 5 digit codes are unofficial and are for LCDC surveillance purposes only.
† May not represent national total if data from the provinces are incomplete.

(1) Comprend toutes les rubriques 098, sauf 098,4.
(2) Comprend cellulite buccale ou épiglottite 464,3 chez un enfant < 5 ans chez qui aucun autre microorganisme causal n'a été isolé.
(3) Comprend encéphalite.
(4) Toutes les autres rubriques sauf à Haemophilus 320,2, listériose 027.0, à méningocoques 036, à pneumocoques 320,1 et tuberculeuse 013,0.
(5) Toutes les rubriques, sauf rougeole 055, oreillons 072, poliomyélite 045, rubéole 056 et fièvre jaune 060.
(6) Sauf typhoïde 002,0 et paratyphoïde 002,1 à 002,9.
* Les codes de la CIM-9 figurant dans la liste ne sont peut-être pas complets. Quant aux codes à 5 chiffres, ils ne sont pas officiels, ayant été établis uniquement aux fins de la surveillance du LLCM.
† Il se peut que ce chiffre ne représente pas le total national si les données provenant des provinces sont incomplètes.

New Cases Reported from 1 October - 31 December 1998 - Nouveaux cas déclarés du 1 octobre - 31 décembre 1998

Disease Maladie	ICD-9 CIM-9	Ontario			Manitoba			Saskatchewan			Alberta			British Columbia Colombie-Britannique			Yukon			Northwest Territories Territoires du Nord-ouest		
		0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97	0-D 0-D	Cum. 98	Cum. 97
AIDS-Sida	042-044	_	41	175	_	5	4	_	_	7	_	1	43	_	14	43	_	_	_	_	_	_
Amoebiasis - Amibiase	006	135	565	988	9	48	45	6	44	51	21	54	78	69	310	372	_	2	3	_	3	_
Botulism - Botulisme	005.1	_	1	_	_	1	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	5
Brucellosis - Brucellose	023	1	6	2	_	_	2	_	_	_	_	_	4	_	_	_	_	_	_	1	3	5
Campylobacteriosis - Campylobactériose	008.41*	1031	4330	5253	71	250	227	51	270	207	396	1257	1183	481	2419	2581	2	8	9	2	13	17
Chancroid - Chancre mou	099.0	_	_	_	_	_	_	_	_	_				_	_	_						
Chickenpox - Varicelle	052	2483	_	20284 10559	773	2954	2587	645	2399	2317	1965 1472	8070 5195	7942 4547	_	_	4116	3 43	69 177	138 173	184 305	654 1124	346 1045
Chlamydia, genital - Chlamydiose génitale	099.81*		9056											_								
Cholera - Choléra	001	_	1	_	_	_	_	_	_	_	2	2	_	_	_	_	_	_	_	_	_	_
Diphtheria - Diphtérie	032																		1			
Giardiasis - Giardiase	007.1	403	1429	2393	55	182	84	58	232	241	287	549	568	253	938	1181	8	18	21	3	15	18
Gonococcal Infections - Infections gonococciques[1]	098	352	1505	1919	99	424	518	71	326	342	183	518	406	138	569	477	6	11	_	41	154	150
Gonococcal Ophthalmia neonatorum - Ophtalmie gonococcique du nouveau-né	098.4	2	16	1	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Haemophilus influenzae B (all invasive) - (invasive) à H. influenzae B[2]	320.0,038.41*	5	9	6	1	2	3	1	14	23	_	7	4	_	_	_	_	_	_	1	1	1
Hepatitis A - Hépatite A	070.0,070.1	55	234	450	2	31	95	14	43	188	32	91	213	48	334	362	_	1	2	_	5	_
Hepatitis B - Hépatite B	070.2,070.3	16	84	175	3	15	36	9	75	33	36	92	77	185	689	774	1	3	_	1	6	4
Hepatitis C - Hépatite C		1059	4830	6472	_	_	_	201	755	604	1175	2677	1666	1425	5277	8286	19	79	87	14	37	20
Hepatitis non-A, non-B - Hépatite non-A, non-B		_	_	_	_	_	_	_	_	_	_	_	3	_	_	_	_	_	_	_	_	_
Legionellosis - Legionellose	482.41	9	37	45	_	_	2	_	_	_	12	17	10	_	_	_	_	_	_	1	2	_
Leprosy - Lèpre	030	_	1	4	_	1	_	_	_	_	_	1	_	_	_	_	_	_	_	_	_	_
Listeriosis (all types) - Listériose (tous genres)	027.0,771.22	10	33	36	_	_	_	3	8	8	5	6	_	_	_	_	_	_	_	_	_	_
Malaria - Paludisme	084	19	100	444	_	6	20	2	4	6	14	40	94	7	37	305	_	_	_	_	1	_
Measles - Rougeole	055	4	9	22	_	_	_	_	2	23	_	1	245	_	2	275	_	1	_	_	_	_
Meningitis, pneumococcal - Méningite à pneumocoques	320.1	_	_	24	6	11	2	2	6	1	13	22	19	3	11	7	_	_	1	2	7	2
Meningitis, other bacterial - Autres méningites bactériennes[3,4]		_	9	88	_	_	5	1	5	7	7	26	25	_	_	_	_	_	_	_	2	4
Meningitis/Encephalitis viral - Méningite/encéphalite virale[5]		_	1	167	42	153	28	_	56	8	114	224	41	15	34	12	_	_	_	_	1	1
Meningococcal Infections - Infections à méningocoques	036	15	48	84	1	6	8	_	1	9	_	14	30	3	5	38	_	1	_	_	1	3
Mumps - Oreillons	072	4	28	84	1	1	3	_	14	5	4	20	32	5	17	141	_	1	1	_	_	_
Paratyphoid - Paratyphoïde	002.1-002.9		5	5		1	2				6	6	4				_	_	_			
Pertussis - Coqueluche	033	613	1261	1057	59	289	104	93	278	483	358	690	769	100	296	730	_	_	7	28	30	22
Plague - Peste	020	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Poliomyelitis - Poliomyélite	045	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_
Rabies - Rage	071																_	_	_	_	_	_
Rubella - Rubéole	056	1	14	28	1	21	3914	_	_	11	3	27	35	_	3	5	_	_	2	_	_	_
Congenital Rubella - Rubéole congénitale	771.0			1		1											_	5	8	4	25	22
Salmonellosis - Salmonellose[6]	003	614	2638	2828	42	189	160	47	235	204	245	677	797	147	575	659	_	1	2	_	2	2
Shigellosis - Shigellose	004	73	328	370	63	232	104	26	111	85	129	239	161	49	159	279						
Syphilis, Congenital - Syphilis, congénitale	090			1	_	_	_	_	_	1	_	3	_	_	_	2	_	_	_	_	_	_
Syphilis, Early Latent - Syphilis, latente récente	092	1	3	17	_	_	_	_	_	1	_	_	4	_	_	16	_	_	_	_	_	_
Syphilis, Early Symptomatic - Syphilis, symptomatique récente	091	4	7	32	_	_	_	_	_	1	3	6	4	19	128	32	_	_	_	_	_	_
Other Syphilis - Autres syphilis	090,092-097	33	145	422	_	_	_	_	_	_	13	34	40	_	_	68	_	1	_	_	_	_
Tetanus - Tétanos	037	_	1	2	_	_	_	_	_	_	_	_	1	_	_	_	_	_	_			
Trichinosis - Trichinose	124				_	_	_	_	_	_	_	_	_				_	_	_	13	32	15
Tuberculosis - Tuberculose	010-018	57	231	194				_	_	_				116	345	416		2	2	16	38	31
Typhoid - Typhoïde	002.0	5	26	27	1	2	2				1	3	2		2		_	_	_	_	_	
Verotoxigenic E. coli - E. coli vérotoxinogènes	008.01*	57	308	423	18	85	77	9	41	36	45	194	189	22	108	134	_	_	_	_	_	7
Yellow Fever - Fièvre jaune	060	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_	_

SYMBOLS

. Not reportable
.. Not available
_ No cases reported

SIGNES

. À déclaration non obligatoire
.. Non disponible
_ Aucun cas déclarés

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13.6 days. The costs of re-admissions alone for N-CDAD per year per site were estimated at $128,200[2].

As reported in the above outbreak, CDAD is a serious problem within hospitals. Appropriate laboratory diagnostic techniques, early diagnosis, stringent antibiotic use, and infection-control practices are the necessary components to control the occurrence and spread of CDAD. Hospital laboratories and health-care workers need to be aware of the potential misdiagnosis or underreporting of CDAD. Additional surveillance and research is needed to identify the changing etiology of this condition.

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