Introdução à Parasitologia

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O que é Parasitologia?

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Paulo Guedes compara servidores públicos com parasitas

Ministro da Economia fez declaração ao defender reforma administrativa para resolver a situação de estados que gastam mais do que arrecadam.

O que é Parasitologia?

29 DE FEVEREIRO DE 2020, 16H22

Nada se compara ao parasita brasileiro, por Ladislau Dowbor

A economia está parada. Há 50 milhões de desempregados e precários. A fome voltou e os sem-teto estiram-se nas calçadas. Duzentos homens engordam suas imensas fortunas, sem nada produzir. Coincidência? Como nos livraremos deles?

Qual é o papel da Parasitologia para o farmacêutico?

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Biologia

Métodos laboratoriais

Raciocínio epidemiológico

Investigação de surtos

Surto de criptosporidíase em Milwaukee

Surto de criptosporidíase em Milwaukee

A MASSIVE OUTBREAK IN MILWAUKEE OF CRYPTOSPORIDIUM INFECTION TRANSMITTED THROUGH THE PUBLIC WATER SUPPLY

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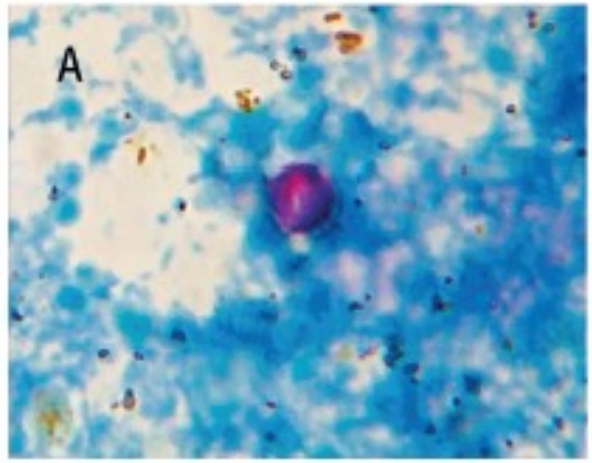
Abstract *Background.* Early in the spring of 1993 there was a widespread outbreak of acute watery diarrhea among the residents of Milwaukee.

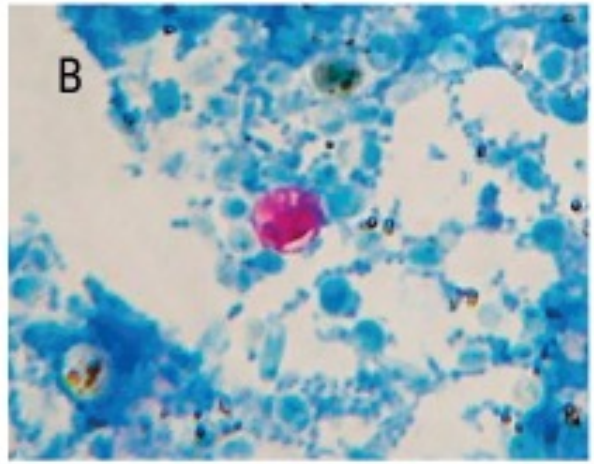
Methods. We investigated the two Milwaukee water-treatment plants, gathered data from clinical laboratories on the results of tests for enteric pathogens, and examined ice made during the time of the outbreak for cryptosporidium oocysts. We surveyed residents with confirmed cryptosporidium infection and a sample of those with acute watery diarrhea consistent with cryptosporidium infection. To estimate the magnitude of the outbreak, we also conducted a survey using randomly selected telephone numbers in Milwaukee and four surrounding counties.

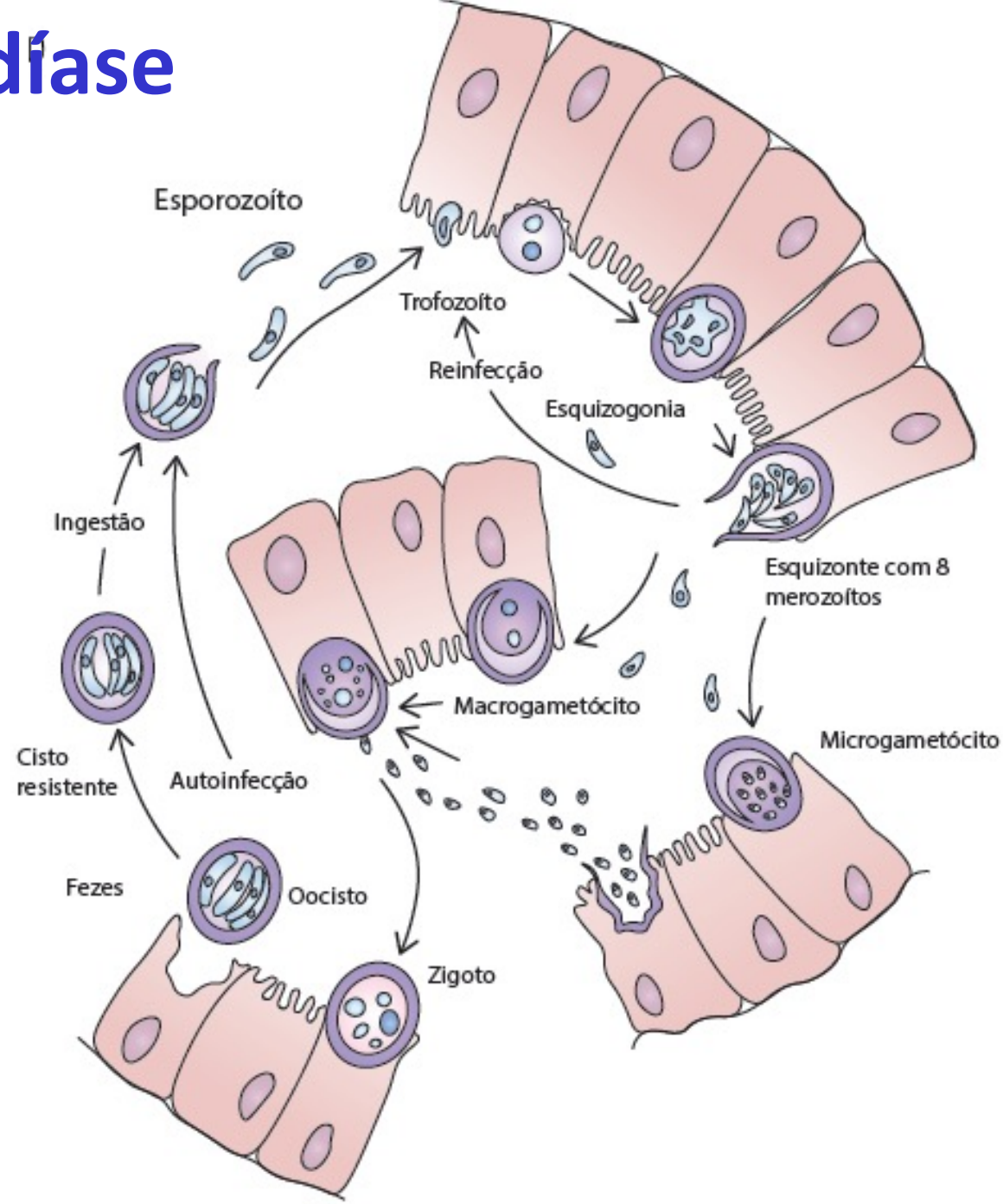
Results. There were marked increases in the turbidity of treated water at the city's southern water-treatment plant from March 23 until April 9, when the plant was shut down. Cryptosporidium oocysts were identified in water from ice made in southern Milwaukee during these weeks. The rates of isolation of other enteric pathogens remained stable, but there was more than a 100-fold increase in the rate of isolation of cryptosporidium. The median duration of illness was 9 days (range, 1 to 55). The median maximal number of stools per day was 12 (range, 1 to 90). Among 285 people surveyed who had laboratory-confirmed cryptosporidiosis, the clinical manifestations included watery diarrhea (in 93 percent), abdominal cramps (in 84 percent), fever (in 57 percent), and vomiting (in 48 percent). We estimate that 403,000 people had watery diarrhea attributable to this outbreak.

Conclusions. This massive outbreak of watery diarrhea was caused by cryptosporidium oocysts that passed through the filtration system of one of the city's water-treatment plants. Water-quality standards and the testing of patients for cryptosporidium were not adequate to detect this outbreak. (N Engl J Med 1994;331:161-7.)

Surto de criptosporidíase em Milwaukee







Surto de criptosporidíase em Milwaukee

On April 5, 1993, the Wisconsin Division of Health was contacted by the Milwaukee Department of Health after reports of numerous cases of gastrointestinal illness that had resulted in widespread absenteeism among hospital employees, students, and schoolteachers. Little information was available about the nature of the illness or the results of laboratory tests of stool specimens from those who were ill. On April 7, two laboratories identified cryptosporidium oocysts in stool samples from seven adult residents of the Milwaukee area; none of the laboratories surveyed had found evidence of increased or unusual patterns of isolation of any other enteric pathogen.

Surto de criptosporidíase em Milwaukee

The Milwaukee Water Works (MWW), which obtains water from Lake Michigan, supplies treated water to residences and businesses in the City of Milwaukee and nine surrounding municipalities in Milwaukee County. Either of two water-treatment plants, one located in the northern part of the city, and the other in the southern part, can supply water to the entire district; however, when both plants are in operation, the southern plant predominantly serves the southern portion of the district.

Examination of the two plants' records on the quality of untreated water (intake) and treated water (that supplied to customers) revealed an increase in the turbidity of treated water from the southern plant, beginning approximately on March 21, with increases to unprecedented levels of turbidity from March 23 through April 5. These findings pointed to the water supply as the likely source of infection and led to the institution, on the evening of April 7, of an advisory to MWW customers to boil their water. The southern plant was temporarily closed on April 9.

Surto de criptosporidíase em Milwaukee

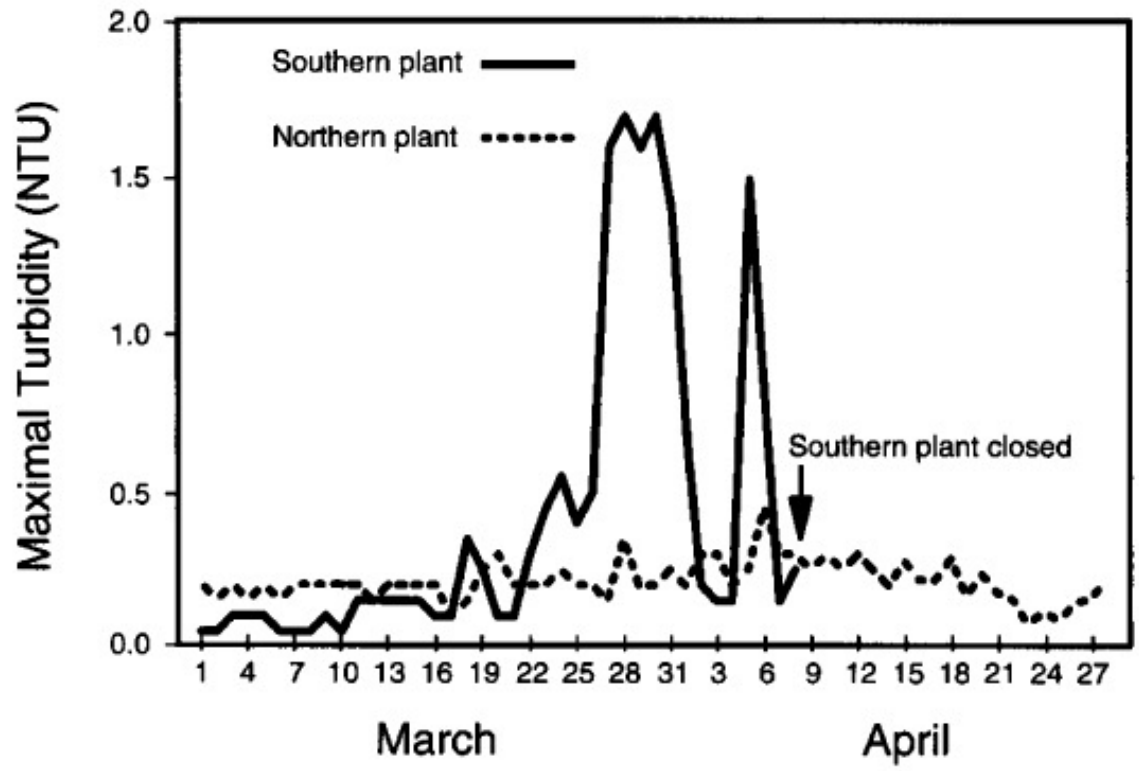


Figure 1. Maximal Turbidity of Treated Water in the Northern and Southern Water-Treatment Plants of the Milwaukee Water Works from March 1 through April 28, 1993.

NTU denotes nephelometric turbidity units.

Surto de criptosporidíase em Milwaukee

Examination of Ice Made during the Outbreak

Water obtained by melting ice blocks produced on March 25 and April 9, 1993, contained cryptosporidium in concentrations of 13.2 and 6.7 oocysts per 100 liters, respectively, when filtered through a membrane filter with an absolute porosity of 0.45 μm and 2.6 and 0.7 oocysts per 100 liters, respectively, when filtered through a polypropylene cartridge filter with a nominal porosity of 1 μm.

Surto de criptosporidíase em Milwaukee

Laboratory Surveillance

During the period from March 1 through April 16, 1993, a total of 2300 stool specimens were submitted to the 14 clinical laboratories in the Milwaukee vicinity for routine culture for bacterial enteric pathogens. Twenty specimens (0.9 percent) were positive for salmonella, 10 (0.4 percent) for shigella, and 11 (0.5 percent) for campylobacter; 1 of 80 specimens (1.3 percent) cultured for yersinia and 1 of 73 (1.4 percent) cultured for aeromonas were positive. During the same period, 14 of 1744 stool specimens examined for ova and parasites (0.8 percent) were found to have giardia, and 5 of 266 specimens cultured for enteric viruses (2 percent) were positive. An enzyme immunoassay kit for rotavirus was used to test 96 specimens, 3 of which (3 percent) were positive. From March 1 through April 6, 12 of 42 stool specimens (29 percent) tested for cryptosporidium were positive; from April 8 through April 16, 331 of 1009 specimens (33 percent) were positive. We found no evidence of cyclospora infection. Oocysts examined by the Centers for Disease Control and Prevention were 4 to 6 μm in diameter and were positive for cryptosporidium with monoclonal-antibody staining.

Surto de criptosporidíase em Milwaukee

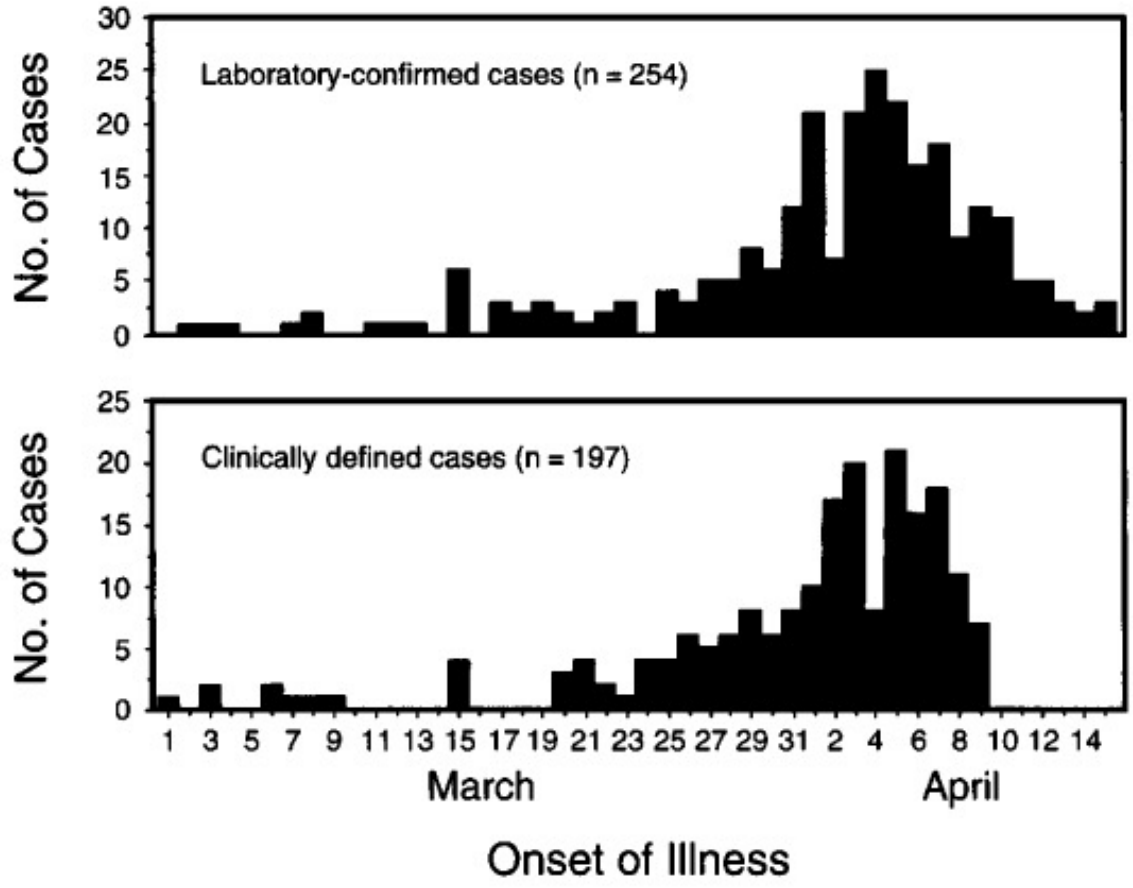


Figure 2. Reported Date of the Onset of Illness in Cases of Laboratory-Confirmed or Clinically Defined Cryptosporidium Infection during the Period from March 1 through April 15, 1993.

The clinically defined cases were identified during a telephone survey begun on April 9 of residents in the area served by the Milwaukee Water Works.

Surto de criptosporidíase em Milwaukee

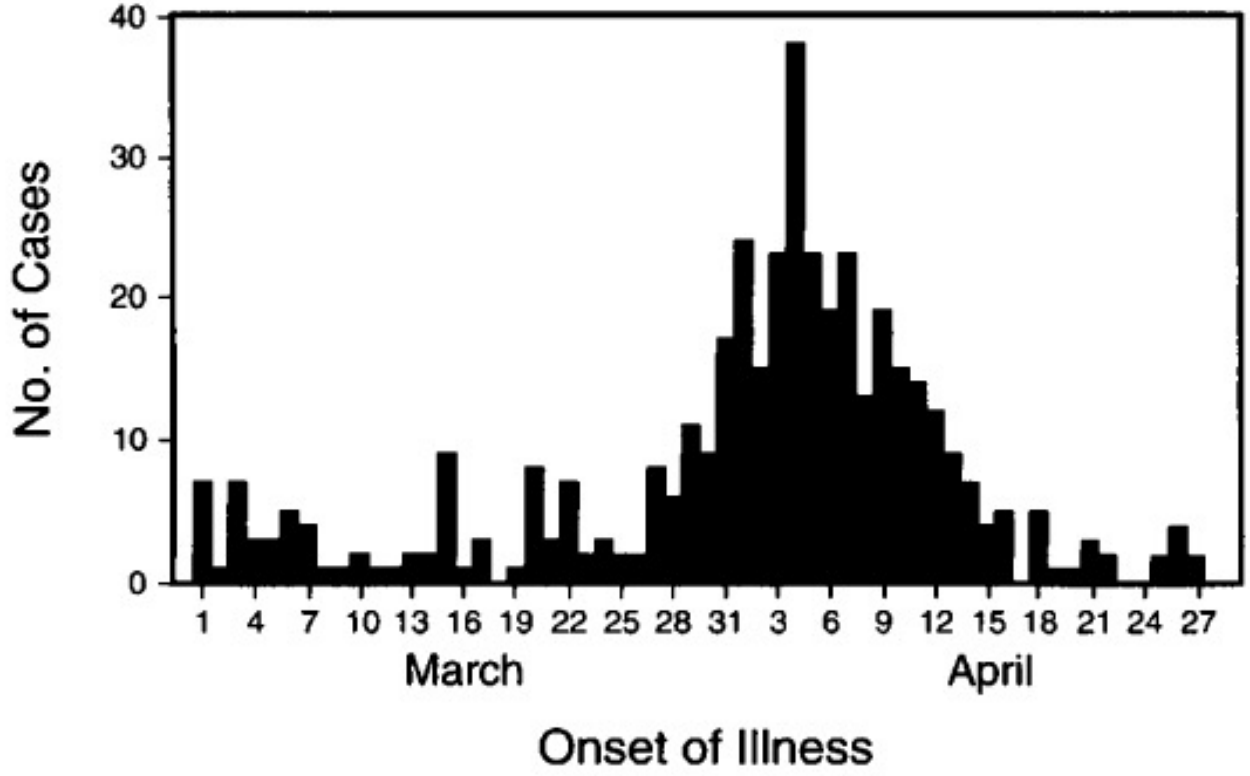


Figure 3. Reported Date of the Onset of Watery Diarrhea during the Period from March 1 through April 28, 1993, in 436 Cases of Infection Identified by a Random-Digit Telephone Survey of the Greater Milwaukee Area.

Surto de criptosporidíase em Milwaukee

Estimate of the Magnitude of the Outbreak

By applying the rate of watery diarrhea among the survey participants (26 percent) to the total population of the greater Milwaukee area (1,610,000 people), we estimated that 419,000 people (95 percent confidence interval, 386,000 to 451,000) in this area had watery diarrhea during the survey period. Using a background rate of 0.5 percent per month for cases of watery diarrhea among residents, we estimated that 16,000 cases of watery diarrhea unrelated to the waterborne outbreak could have been expected during March and April 1993 (unpublished data). Thus, an estimated 403,000 people had watery diarrhea that could be attributed to this outbreak.

Surto de esquistossomose na Córsega

Surto de esquistossomose na Córsega

Outbreak of urogenital schistosomiasis in Corsica (France): an epidemiological case study

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Summary

Background Schistosomiasis is a snail-borne parasitic disease endemic in several tropical and subtropical countries. However, in the summer of 2013, an unexpected outbreak of urogenital schistosomiasis occurred in Corsica, with more than 120 local people or tourists infected. We used a multidisciplinary approach to investigate the epidemiology of urogenital schistosomiasis in Corsica, aiming to elucidate the origin of the outbreak.

Methods We did parasitological and malacological surveys at nine potential sites of infection. With the snails found, we carried out snail–parasite compatibility experiments by exposing snails to schistosome larvae recovered from the urine of a locally infected Corsican patient. Genetic analysis of both mitochondrial (*cox1*) and nuclear (internal transcribed spacer) DNA data from the Schistosoma eggs or miracidia recovered from the infected patients was conducted to elucidate the epidemiology of this outbreak.

Findings We identified two main infection foci along the Cavu River, with many *Bulinus truncatus* snails found in both locations. Of the 3544 snails recovered across all sites, none were naturally infected, but laboratory-based experimental infections confirmed their compatibility with the schistosomes isolated from patients. Molecular characterisation of 73 eggs or miracidia isolated from 12 patients showed infection with *Schistosoma haematobium*, *S haematobium–Schistosoma bovis* hybrids, and *S bovis*. Further sequence data analysis also showed that the Corsican schistosomes were closely related to those from Senegal in west Africa.

Interpretation The freshwater swimming pools of the Cavu River harbour many *B truncatus* snails, which are capable of transmitting *S haematobium*-group schistosomes. Our molecular data suggest that the parasites were imported into Corsica by individuals infected in west Africa, specifically Senegal. Hybridisation between *S haematobium* and the cattle schistosome *S bovis* had a putative role in this outbreak, showing how easily and rapidly urogenital schistosomiasis can be introduced and spread into novel areas where *Bulinus* snails are endemic, and how hybridisation could increase the colonisation potential of schistosomes. Furthermore our results show the potential risk of schistosomiasis outbreaks in other European areas, warranting close monitoring and surveillance of all potential transmission foci.

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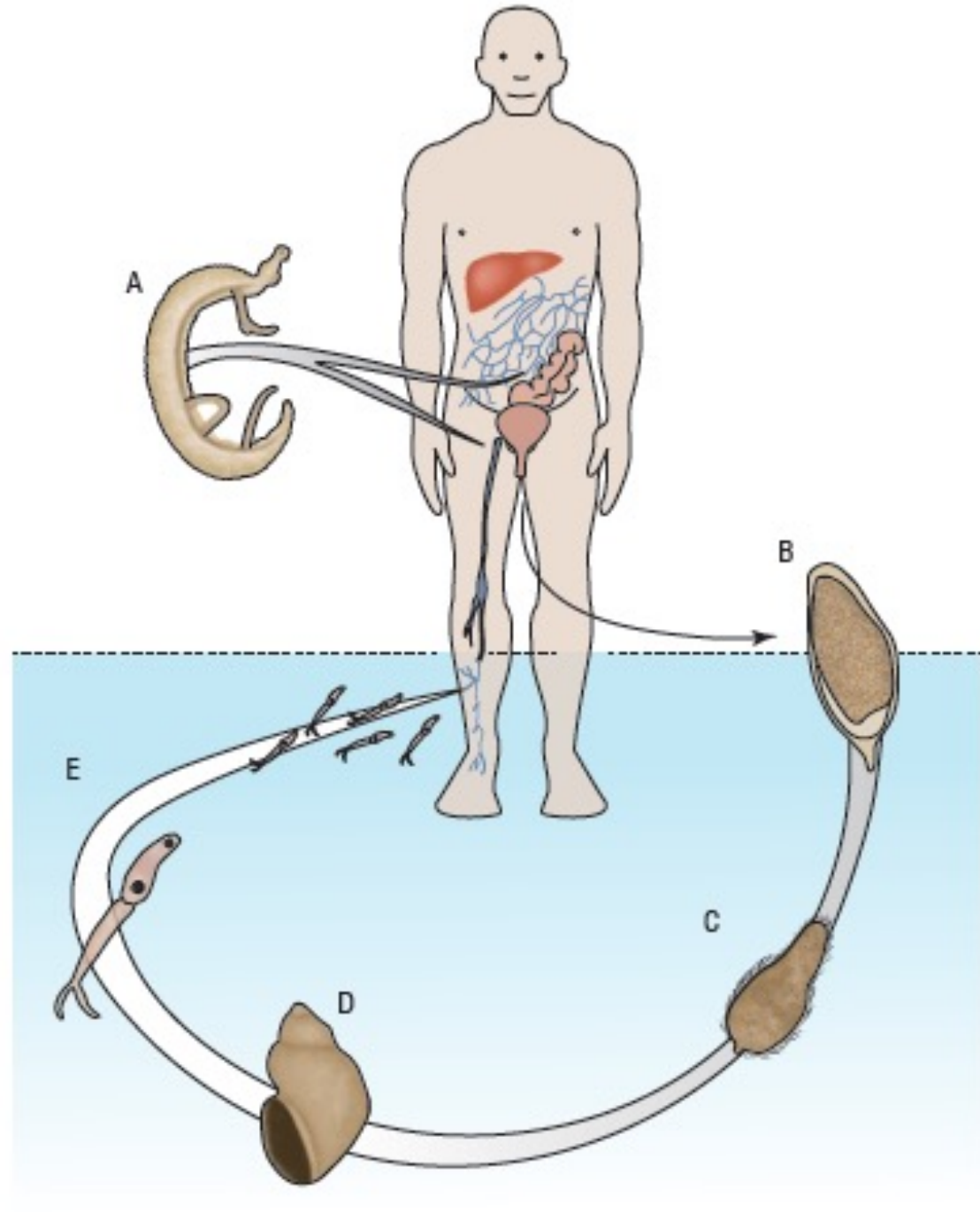


Surto de esquistossomose na Córsega

At the beginning of 2014 a cluster of urogenital schistosomiasis cases were diagnosed in patients in France (March, 2014) and Germany (January, 2014).[18–20] The patients had never visited a schistosomiasis-endemic country, but all had spent their holidays in southern Corsica in August, 2013. Corsica, a French Mediterranean island, is very popular with tourists because of its natural beauty and Mediterranean climate. The freshwater intermediate host for schistosomes, *Bulinus truncatus*, is endemic in Corsica,[13] widely distributed throughout the perimeter of the island.[21] The infected individuals had all been swimming in the Cavu River in the north of Porto Vecchio. After these first cases were reported, the French

Surto de esquistossomose na Córsega

Vecchio. After these first cases were reported, the French Institute for Public Health Surveillance (Institut National de Veille Sanitaire [INVS]) and the European Centre for Disease Prevention and Control published a rapid risk assessment, which was followed by a large campaign between April, 2014, and April, 2015, to increase awareness of the risk of urogenital schistosomiasis infection in Corsica and the possible misdiagnosis of haematuria by European health practitioners. Subsequently, 124 more cases were reported in French nationals who visited Corsica and swam in the Cavu River in 2013. A case of acute schistosomiasis acquired in Corsica during the summer of 2015 has also been reported, suggesting that transmission is still persisting[22] and poses a risk for further infections. Preliminary molecular analysis of schistosome eggs obtained from a German national who had the first reported case of urogenital schistosomiasis acquired in Corsica

Surto de esquistossomose na Córsega

	Sequence identification		mtDNA *cox1* haplotype code*	Genetic profile†
	rDNA ITS	mtDNA *cox1*		
Patient 1				
3 eggs	*S haematobium*	*S bovis*	Sb2	Hybrid
1 egg	*S haematobium*	*S haematobium*	ShB	*S h*
Patient 2				
1 egg	*S haematobium*	*S haematobium*	ShD	*S h*
1 egg	*S bovis*	*S bovis*	Sb2	*S b*
Patient 3				
2 eggs	*S haematobium*	*S bovis*	Sb2	Hybrid
Patient 4				
7 miracidia	*S haematobium*	*S haematobium*	ShB	*S h*
1 miracidium	*S haematobium*	*S haematobium*	ShC	*S h*
Patient 5‡				
8 miracidia	*S haematobium*	*S haematobium*	ShA	*S h*
Patient 6‡				
8 miracidia	*S haematobium*	*S haematobium*	ShA	*S h*
Patient 7				
1 egg	*S haematobium*	*S bovis*	Sb1	Hybrid
2 eggs	*S haematobium*	*S bovis*	Sb2	Hybrid
1 egg	*S haematobium*	*S bovis*	Sb3	Hybrid
Patient 8				
6 miracidia	*S haematobium*	*S haematobium*	ShD	*S h*
1 miracidium	*S haematobium*	*S haematobium*	ShE	*S h*
1 miracidium	*S haematobium*	*S haematobium*	ShF	*S h*
Patient 9				
1 miracidium	*S haematobium*	*S bovis*	Sb4	Hybrid
1 miracidium	*S haematobium*	*S bovis*	Sb5	Hybrid
1 miracidium	*S haematobium*	*S bovis*	Sb6	Hybrid
7 miracidia	*S haematobium*	*S haematobium*	ShD	*S h*
Patient 10§				
5 miracidia	*S haematobium*	*S bovis*	Sb2	Hybrid
1 miracidium	*S haematobium*	*S bovis*	Sb7	Hybrid
Patient 11§				
1 miracidium	*S haematobium*	*S haematobium*	ShD	*S h*
6 miracidia	*S haematobium*	*S bovis*	Sb2	Hybrid
1 miracidium	*S haematobium*	*S bovis*	Sb8	Hybrid
Patient 12				
5 miracidia	*S haematobium*	*S bovis*	Sb2	Hybrid

Numbers of eggs or miracidia are the number successfully profiled, rather than the number extracted. Of the 12 patients, patients 1–6 were tourists and 7–12 were Corsican locals. rDNA=ribosomal DNA. mtDNA=mitochondrial DNA. ITS=internal spacer region. *S haematobium=Schistosoma haematobium*. *S bovis=Schistosoma bovis*. *S h*=pure *S haematobium*. *S b*=pure *S bovis*. Hybrid=*S haematobium*–*S bovis* hybrids. *The mtDNA *cox1* haplotype codes for each genetic type. †Genetic profile identifies the type of infection. ‡Patients from the same family. §Patients from the same family.

Table 1: **Genetic profiles of individual eggs or miracidia**

Surto de esquistossomose na Córsega

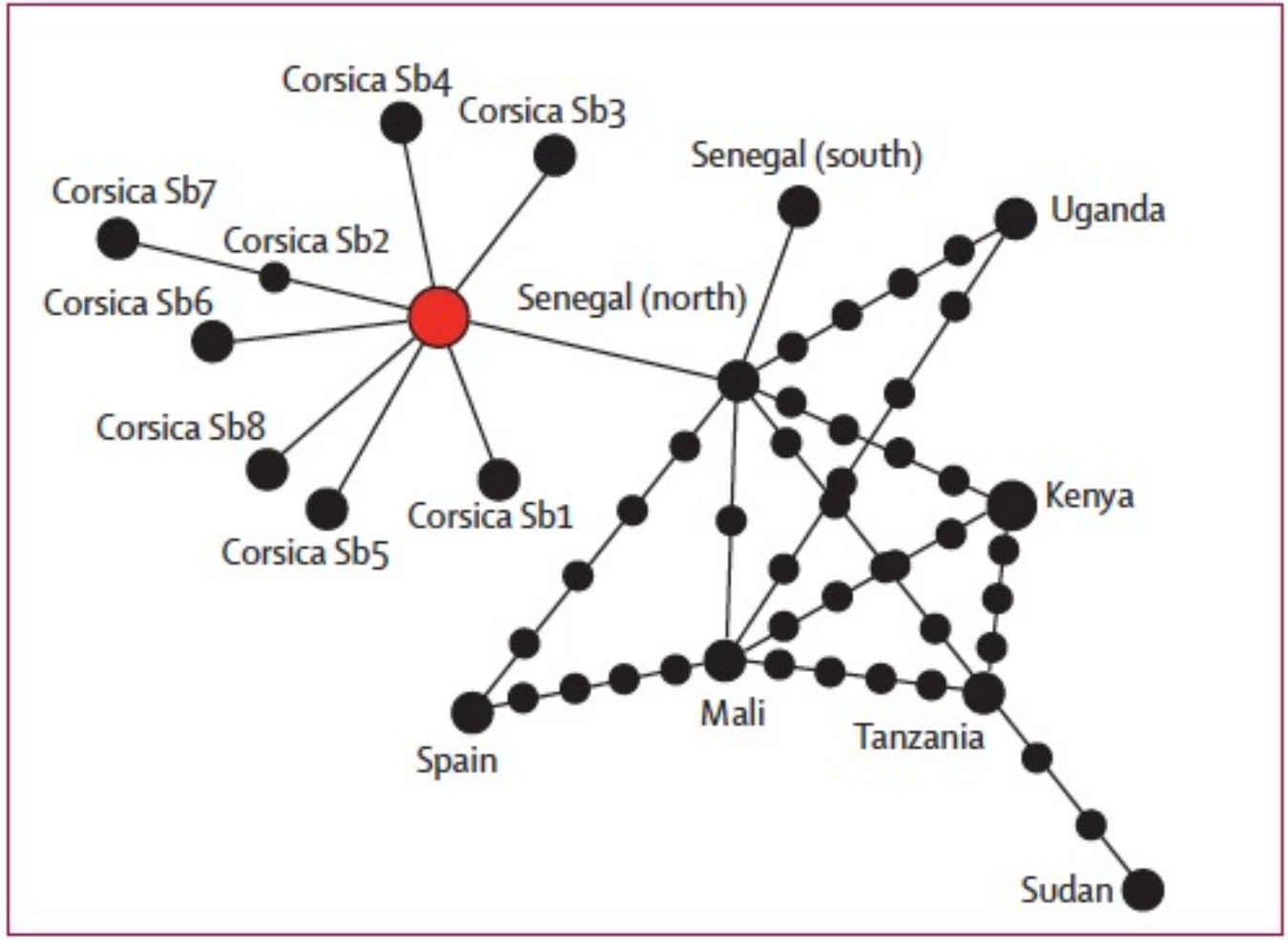
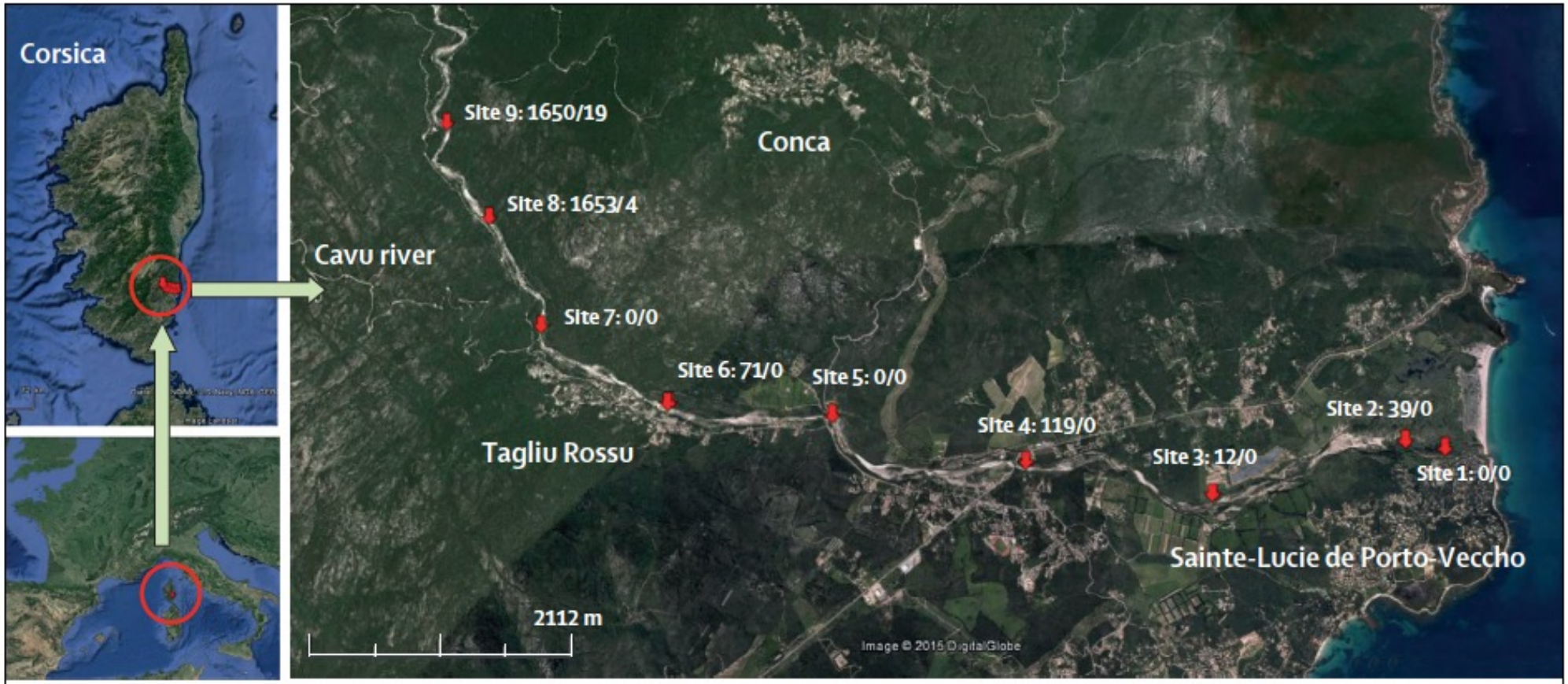


***Figure 3: Schistosoma bovis* mitochondrial DNA *cox1* haplotype network**
Our data were compared with available *S bovis cox1* haplotype data (appendix p 2). *cox1*=mitochondrial cytochrome oxidase subunit I.

Surto de esquistossomose na Córsega



Site 1	41°42'1.27"N	9°23'44.47"E	Site 4	41°42'6.36"N	9°21'10.29"E	Site 7	41°42'54.04"N	9°18'14.86"E
Site 2	41°42'4.27"N	9°23'30.51"E	Site 5	41°42'23.15"N	9°20'0.65"E	Site 8	41°43'26.86"N	9°17'55.09"E
Site 3	41°41'53.74"N	9°22'16.88"E	Site 6	41°42'29.79"N	9°19'0.92"E	Site 9	41°43'56.66"N	9°17'38.11"E

***Figure 1*: Map of the Cavu River in the south of Corsica**

Malacological sampling was done at sites 1–9 along the Cavu River. n/n=number of *Bulinus truncatus* snails collected at the site/number of infected patients that had unique water contact at the site

Surto de esquistossomose na Córsega

	Number of exposed snails	Number of surviving snails	Number of infected snails	Prevalence of infection
1 miracidium	24	18	3	17%
2 miracidia	48	48	6	13%
3 miracidia	35	34	8	24%

Infections performed on snails collected in the Cavu River with schistosomes recovered from a single patient identified as patient 12. Infection was confirmed by natural cercarial emission at 48 days post exposure.

Table 4: **Experimental infection of *Bulinus truncatus* snails**

Surto de de toxoplasmose no Paraná

Santa Isabel do Ivaí

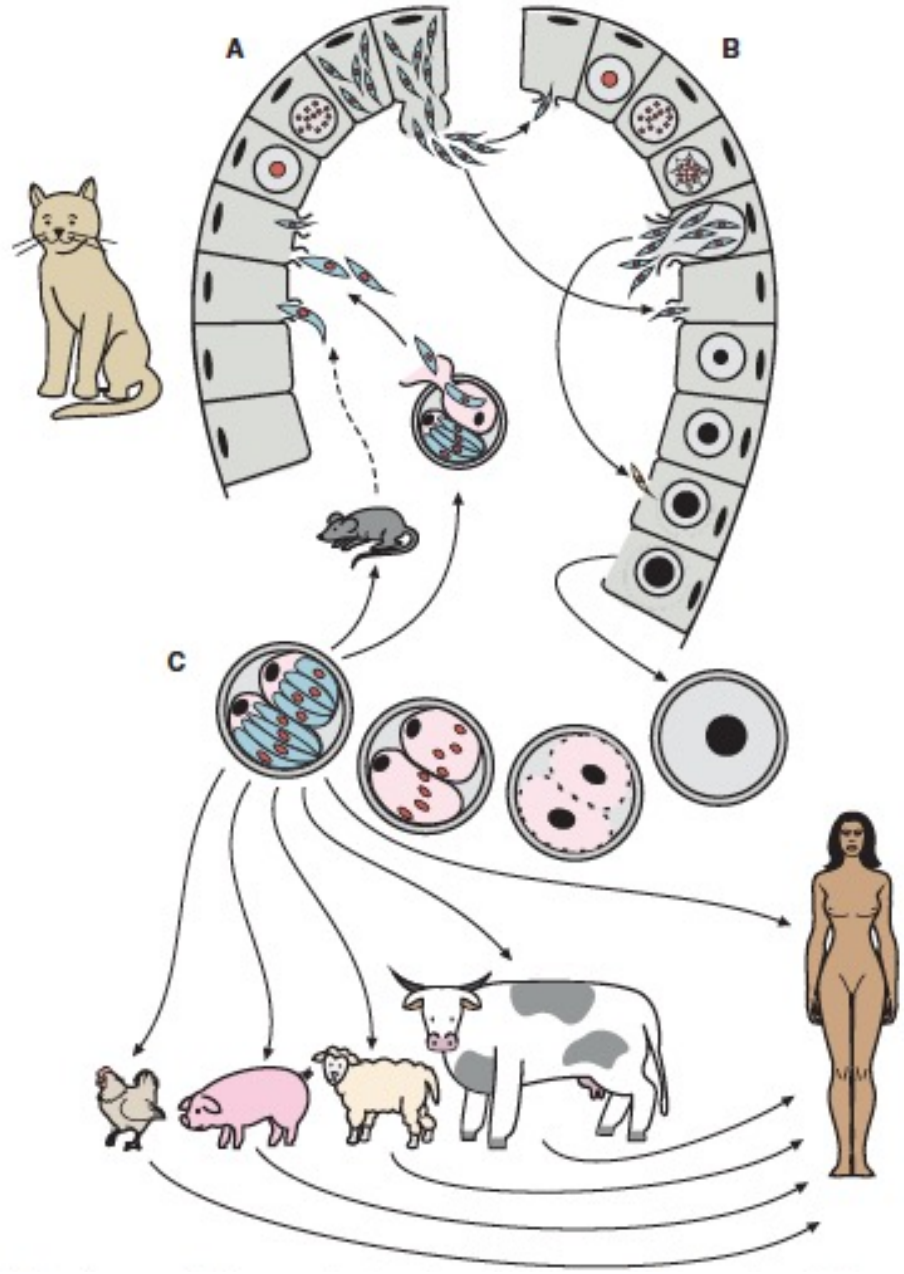
Surto de de toxoplasmose no Paraná

Waterborne Toxoplasmosis, Brazil, from Field to Gene

Lenildo de Moura,*[1]
Lilian Maria Garcia Bahia-Oliveira,†[1]
Marcelo Y. Wada,* Jeffrey L. Jones,‡
Suely H. Tuboi,* Eduardo H. Carmo,*
Walter Massa Ramalho,* Natal J. Camargo,§
Ronaldo Trevisan,§ Regina M. T. Graça,¶
Alexandre J. da Silva,‡ Iaci Moura,‡
J.P. Dubey,# and Denise O. Garrett**

Water was the suspected vehicle of *Toxoplasma gondii* dissemination in a toxoplasmosis outbreak in Brazil. A case-control study and geographic mapping of cases were performed. *T. gondii* was isolated directly from the implicated water and genotyped as SAG 2 type I.

Surto de de toxoplasmose no Paraná



Surto de de toxoplasmose no Paraná

In November 2001, in Santa Isabel do Ivai, (southern state of Paraná), a local physician requested serologic tests to diagnose dengue, mononucleosis, cytomegalovirus infection, hepatitis, and toxoplasmosis in 2 persons in whom fever, headache, and myalgias had developed. Positive results were obtained for anti–*T. gondii*–immunoglobulin M (IgM) and IgG only. Through the end of 2001, 294 similar cases, which were serologically confirmed as toxoplasmosis, were reported to health authorities in the same area.

Surto de de toxoplasmose no Paraná

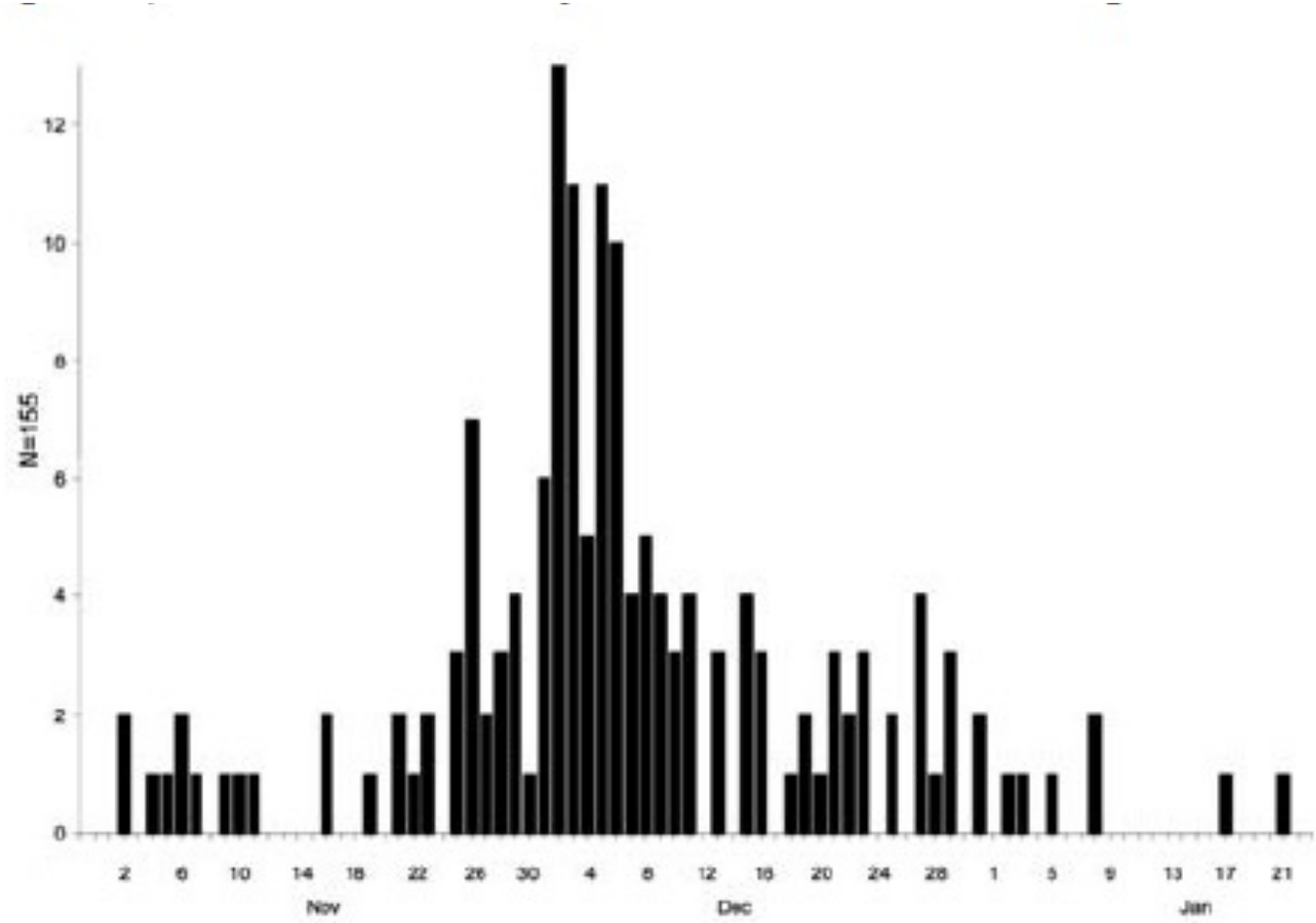


Figure 1. Epidemic plot of the 155 cases registered from November 2001 to January 2002. The dates of the initial symptoms are known only for the 155 individuals among 156 who participated in the case control study.

Surto de de toxoplasmose no Paraná

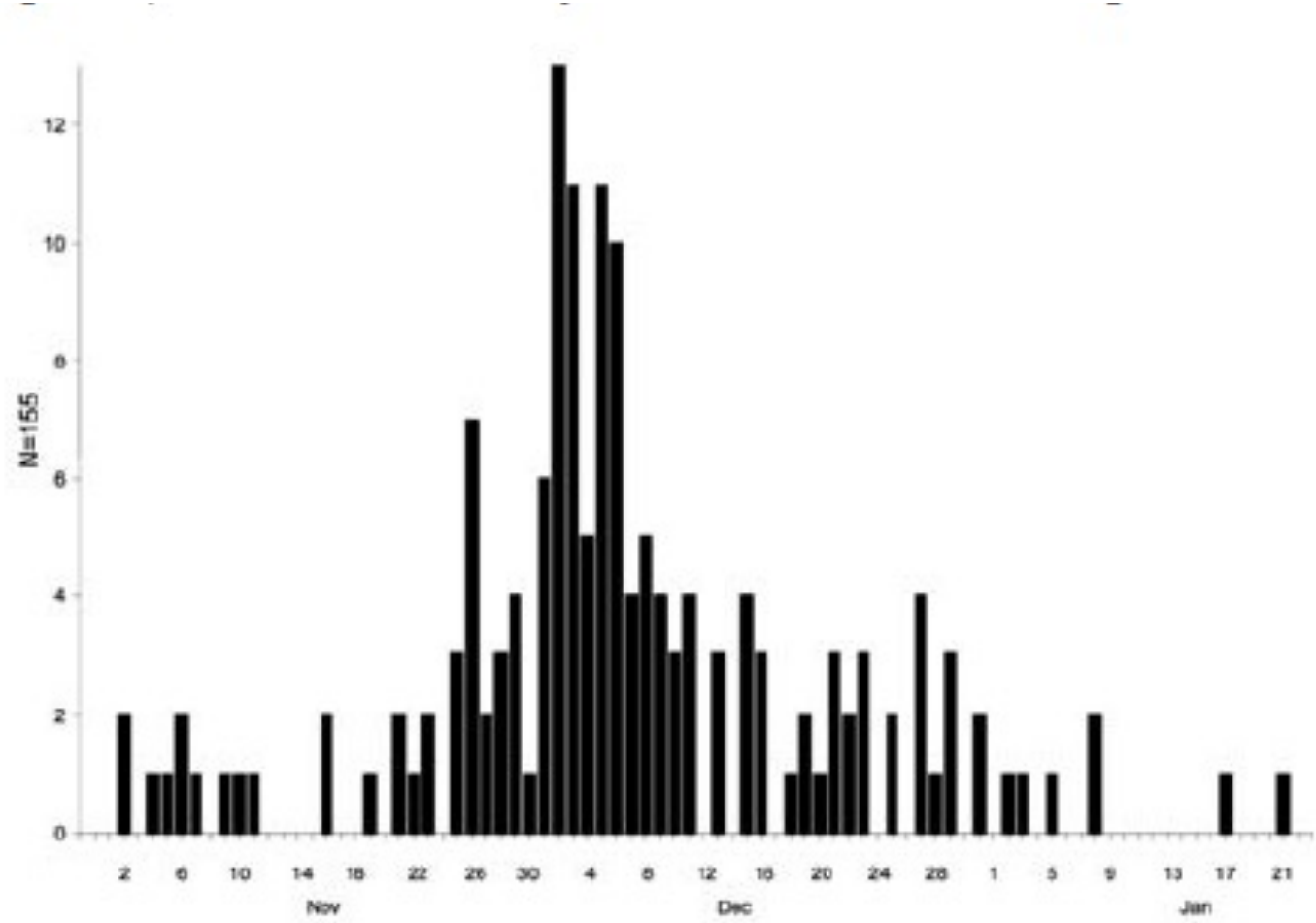


Figure 1. Epidemic plot of the 155 cases registered from November 2001 to January 2002. The dates of the initial symptoms are known only for the 155 individuals among 156 who participated in the case control study.

Surto de de toxoplasmose no Paraná

Case-patients were located by active contacting of and passive reporting from local physicians, and media campaigns (television, radio, and newspapers). A matched case-control study was conducted from January 15 to February 2, 2002. Acute cases were defined by standard serologic criteria (*4*) and were selected from a list of volunteers. A total of 2,884 of 6,771 persons living in the urban area of the city volunteered to be serologically tested. A total of 426 (11.5%) persons had anti–*T. gondii* IgM and IgG antibodies; 1,255 (51%) were positive only for IgG antibodies. Of 426 persons who had anti–*T. gondii* IgM and IgG antibodies, 176 met the case definition; of these, 156 (89%) participated in the case-control study. Sex and age matched controls (±5 years, n=220) were selected from the same group of volunteer who were asymptomatic and seronegative for *T. gondii*.

Surto de de toxoplasmose no Paraná

Table 2. Risk for *Toxoplasma gondii* infection shown as odds ratios estimated with conditional backward elimination logistic regression, N=376

Variable	Odds ratio	Wald confidence limits		p value*
		Lower	Upper	
Drinking water from reservoir A	4.55	2.01	5.49	0.001
Drinking >10 glasses of water per day	3.29	1.46	4.46	0.001
Having household water storage tank	1.81	0.99	3.33	0.054
Eating commercial ice cream	4.55	2.01	5.49	0.001

*Significant ($p \leq 0.001$, rounded).

Surto de de toxoplasmose no Paraná

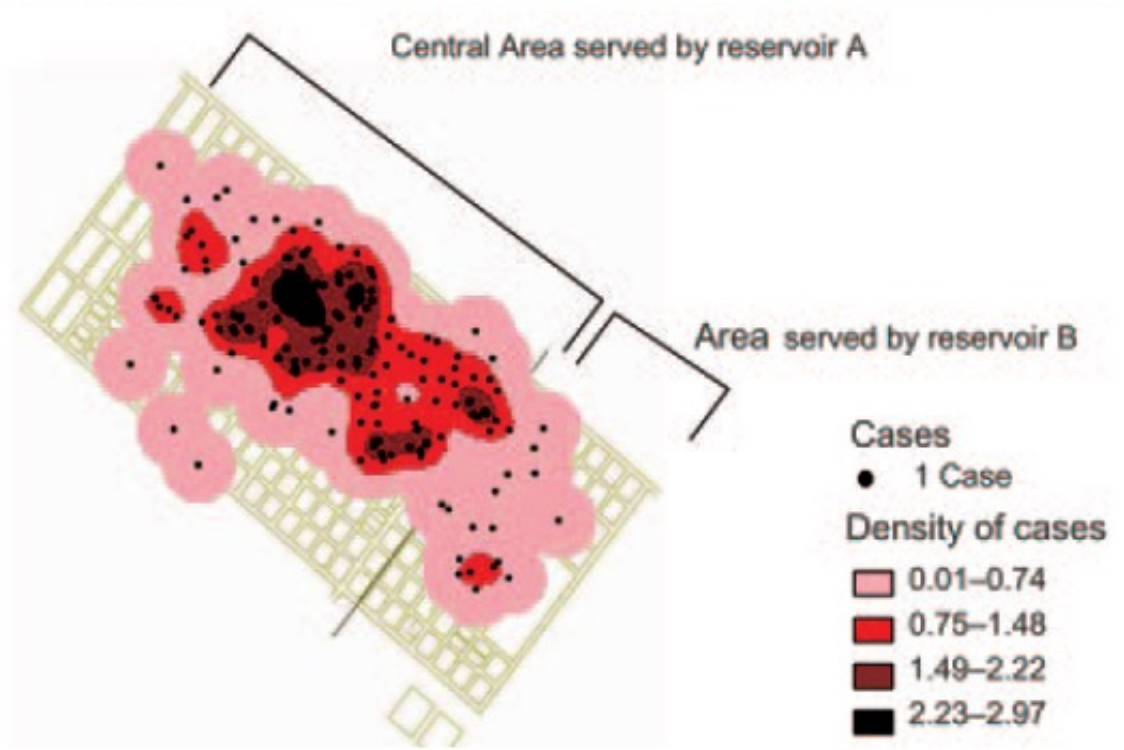


Figure 2. Spatial distribution in km^2 of the 176 cases that met the case definition. The number of cases is higher in the central area than in the periphery. The reservoir tanks served 2 different parts of the city as depicted by the letters A and B. Water samples from reservoir B, which was considered not implicated in the outbreak, were not investigated; during the water sample collection period (January 9–18), there were no identified household tanks served by reservoir B that had stored water that had been distributed during the outbreak peak.

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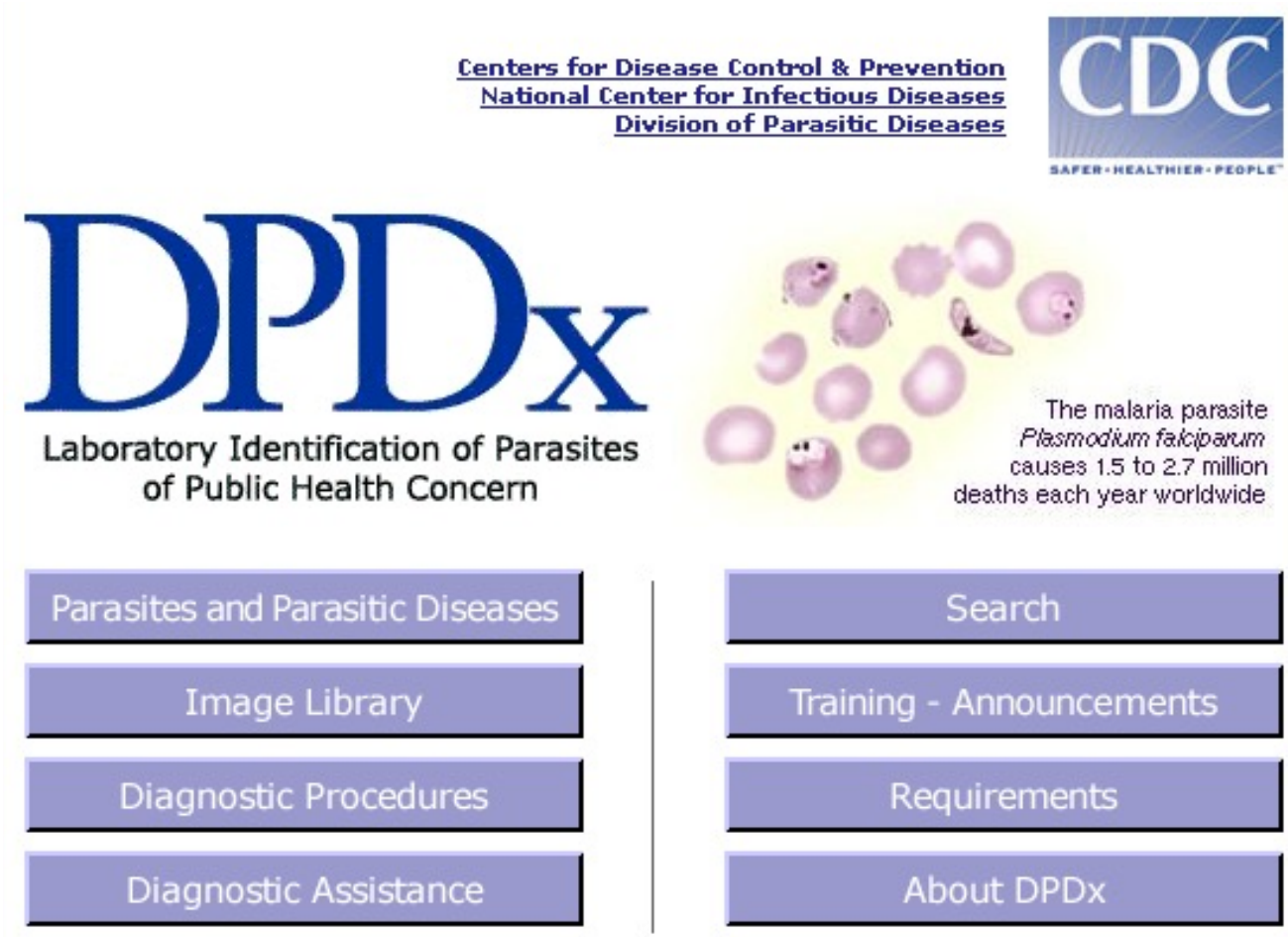
Material complementar do curso de Parasitologia



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