Facultad de Ciencias de la Salud
Programa de Medicina

Investigación de Brotes

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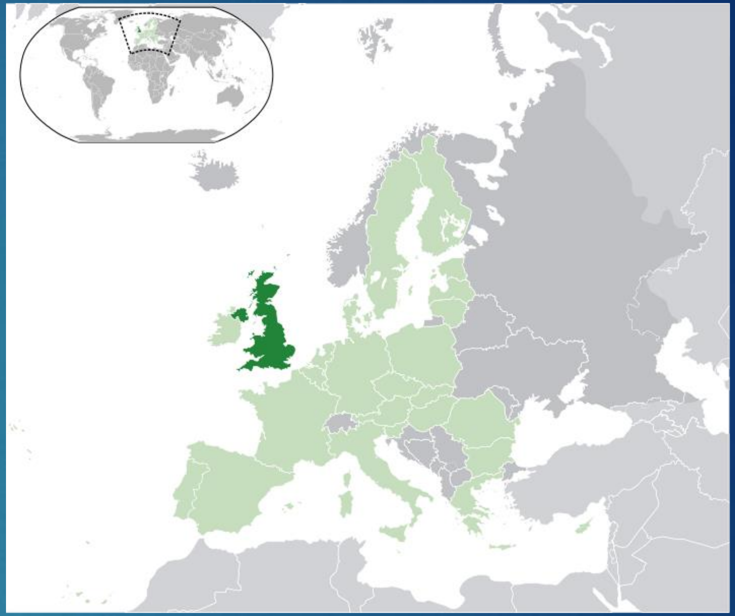
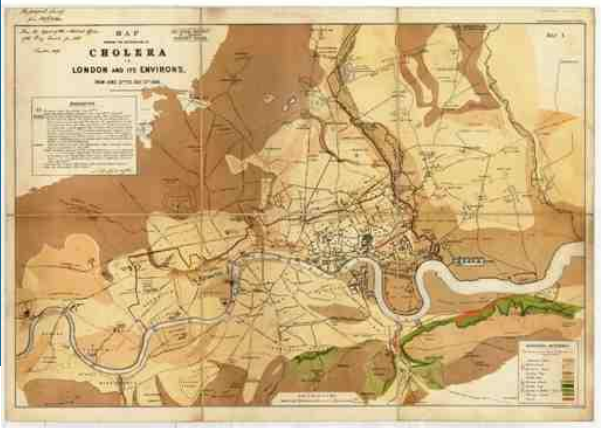
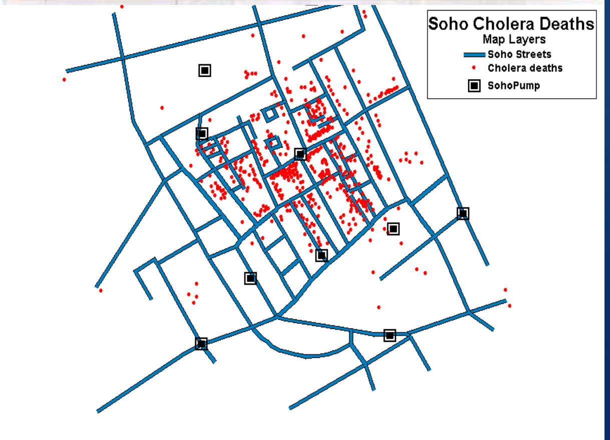
El primer brote epidémico bien documentado



John Snow y la epidemia de 1854

- Para el año 1853 Inglaterra había sufrido ya 2 grandes epidemias de cólera.
- En los años 1853 y 1854, Londres enfrentó una tercera epidemia de cólera.
- Para aquel entonces, los habitantes de ciertos distritos del sur de la ciudad extraían el agua directamente de pequeños afluentes del río Támesis o bien la obtenían a partir de numerosas bombas de agua de uso público, abastecidas por dos compañías, *Southwark and Vauxhall Water Company* y *Lambeth Water Company*.

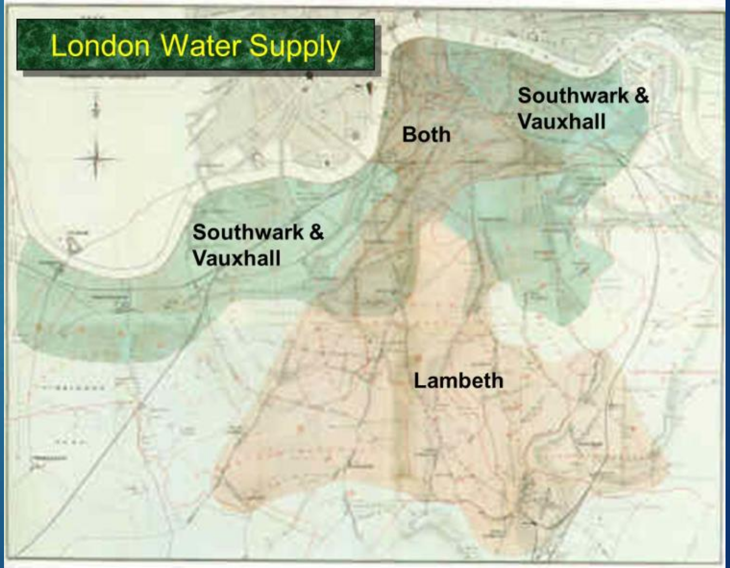




Rev Chil Infect 2007; 24 (4): 331-334

John Snow y la epidemia de 1854

- Por su parte, los desechos humanos eran vertidos en improvisadas alcantarillas o directamente al río, en una época de escasa noción de higiene ambiental.
- Durante la epidemia de cólera de 1848–49, ambas compañías extraían el agua de sectores contaminados del Támesis, presentando similar número de muertes los distritos abastecidos por una y otra compañía.
- En 1853, *Lambeth Water Company* había trasladado sus instalaciones río arriba, hacia un lugar de aguas impolutas, mientras que *Southwark and Vauxhall Water Company* mantuvo sus instalaciones en su lugar original.
- Al tomar conocimiento de este traslado, Snow se dio cuenta de que estaba frente a un experimento natural a través del cual podría demostrar su hipótesis.



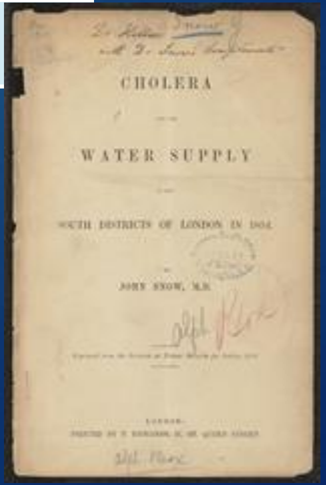
Rev Chil Infect 2007; 24 (4): 331-334

John Snow y la epidemia de 1854

- Snow demostró que la tasa de mortalidad por cólera en hogares abastecidos por *Southwark and Vauxhall Water Company* (S-V) era 8,5 veces mayor a la de hogares abastecidos por *Lambeth Water Company* (L).

Tabla 1. Análisis de John Snow de la epidemia de cólera de 1853–54[2]

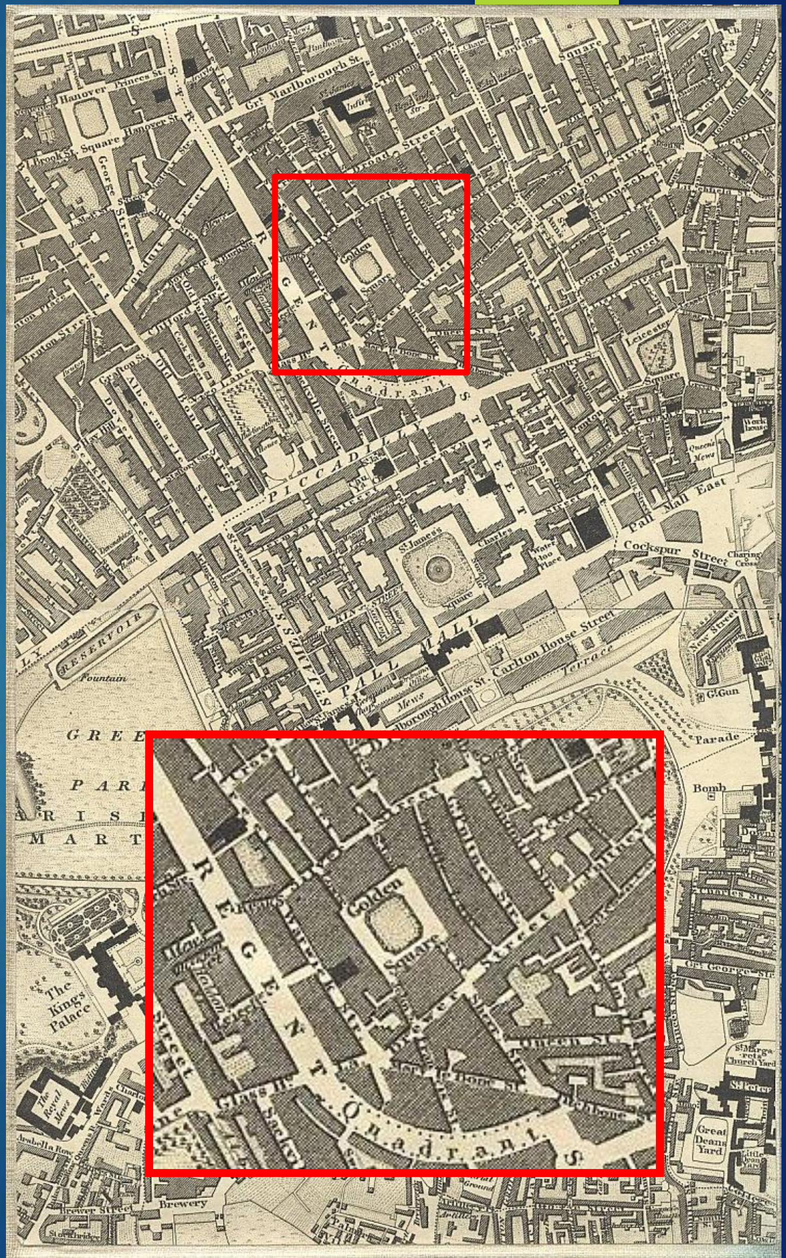
Compañía de agua	Hogares	Muertes por cólera	Muertes por 10.000 hogares
S–V	40.046	1.263	315
L	26.107	98	37



Rev Chil Infect 2007; 24 (4): 331-334

John Snow y la epidemia de 1854

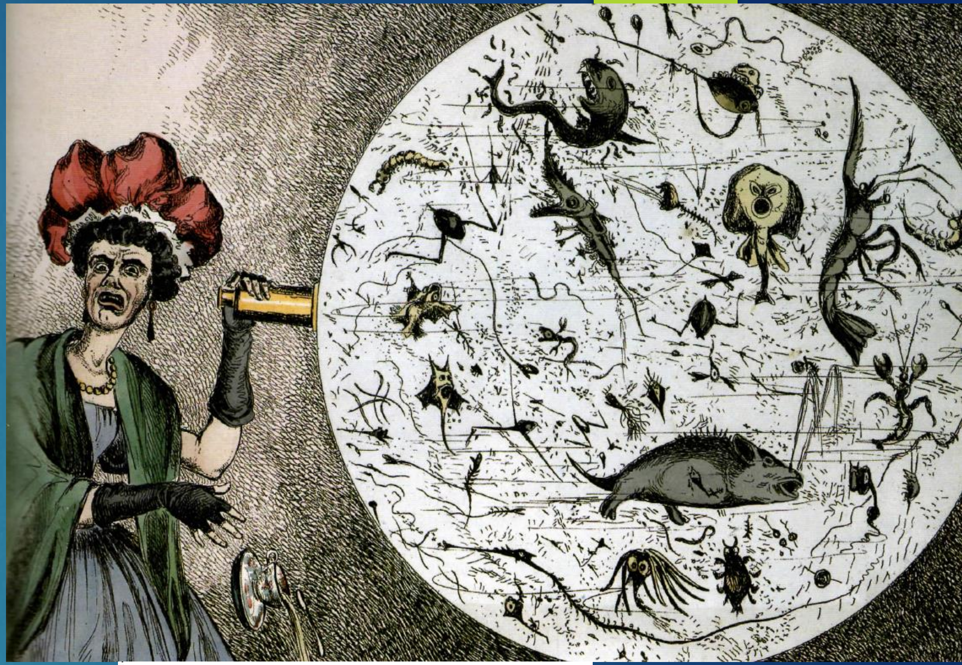
- A principios de septiembre de 1854, un pequeño sector de Londres llamado **Golden Square** fue escenario de un brote epidémico de cólera de inusual intensidad, costando la vida a cerca de 500 personas en tan sólo 10 días.
- Como vecino del área, Snow sabía que la mayoría de los residentes del sector extraían el agua a partir de una bomba de uso público ubicada en ***Broad Street***.
- Fiel a su hipótesis inicial, Snow planteó que el severo brote de cólera en Golden Square se debía a la ingestión de aguas contaminadas provenientes de esta bomba y se propuso, firmemente, demostrarlo.

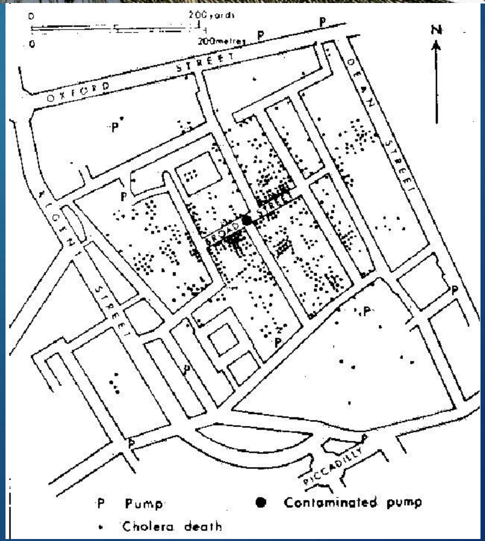


Rev Chil Infect 2007; 24 (4): 331-334

John Snow y la epidemia de 1854

- Para ello, tomó muestras de agua de la bomba de Broad Street y de otras cuatro bombas aledañas, comparando su aspecto macroscópico y microscópico.
- Encontró que el agua de la bomba de Broad Street tenía un aspecto más claro que las demás, sin embargo, vecinos del sector le informaron que el día anterior, sus aguas habían presentado un mal olor.
- Intrigado, registró los nombres y direcciones de **83 personas fallecidas** en el área a causa del cólera, basándose en sus certificados de defunción y visitó algunas de sus casas, preguntando a sus moradores por la proveniencia del agua que habían bebido.



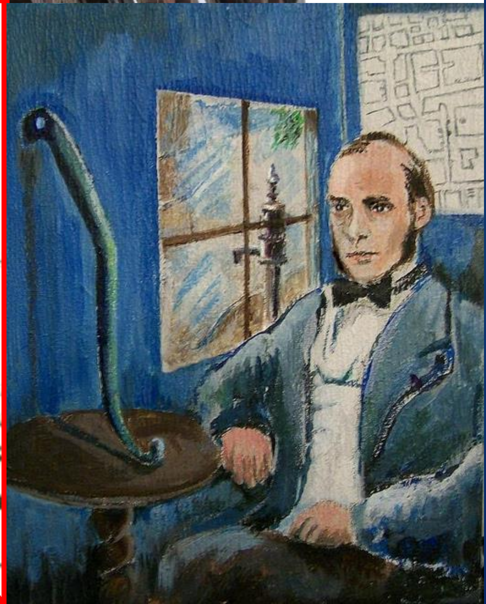


Dobson M. Disease – The extraordinary stories behind history's deadliest killers. Quercus 2007.

Rev Chil Infect 2007; 24 (4): 331-334

John Snow y la epidemia de 1854

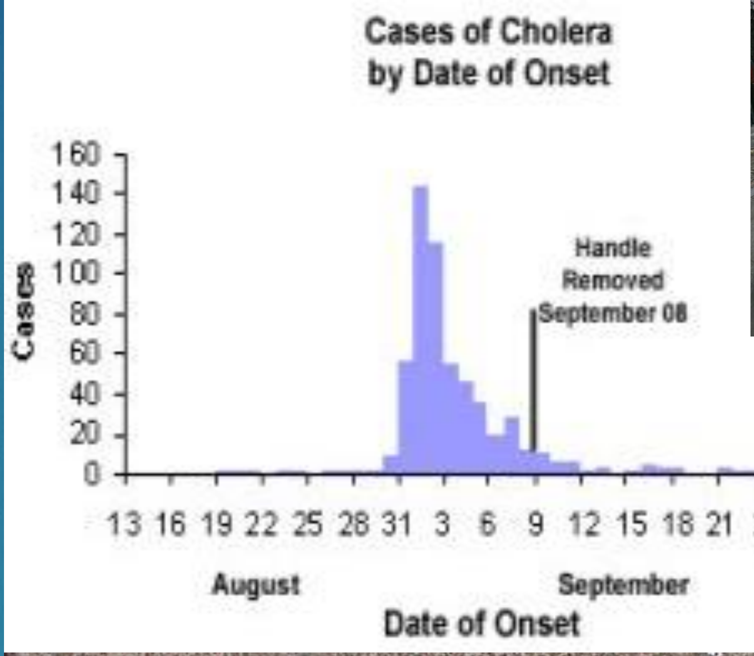
- Prontamente, confirmó que la mayoría de los moradores se abastecían de agua extraída de la bomba de Broad Street.
- Calculó la distancia entre la residencia de cada difunto y la bomba de agua más cercana, observando que en 73 de 83 casos era la bomba de Broad Street y que 61 de 83 difuntos bebían de sus aguas contaminadas en forma constante u ocasional.
- Entusiasmado por los hallazgos de su investigación, presentó los resultados ante la autoridad sanitaria local, quien decidió inhabilitar la bomba de Broad Street mediante la remoción de su palanca.

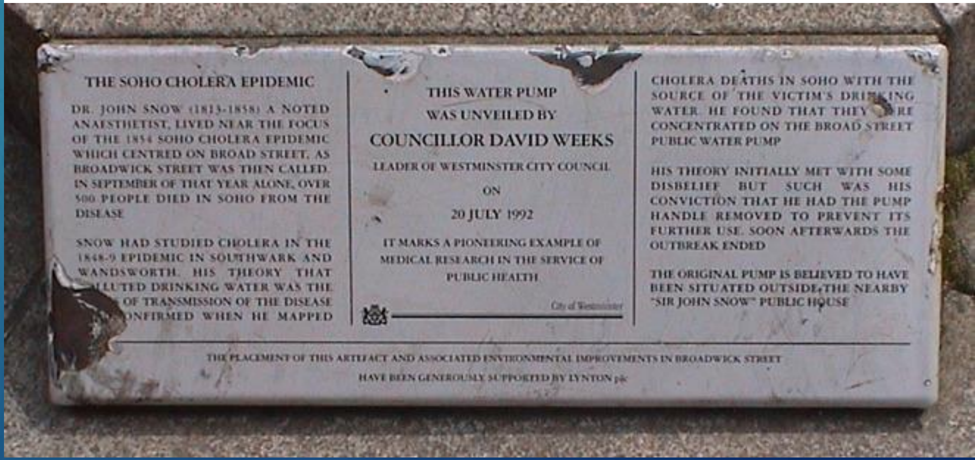


Rev Chil Infect 2007; 24 (4): 331-334

John Snow y la epidemia de 1854

- La importancia del trabajo realizado por John Snow en Inglaterra radica en romper los paradigmas existentes para la época, en la cual aun predominaba la creencia en la teoría miasmática de la enfermedad, también denominada teoría "anticontagionista".
- El brote de cólera ocurrido en la calle londinense de Broad Street en 1848 iba a contradecir dicha teoría.
- Este célebre médico inglés comprendió que el agua estaba contaminada; por lo cual el consideró que bastaba con evitar su fuente.
- La teoría "contagionista" estaba en marcha.
- Snow señaló que las evacuaciones de los pacientes con cólera podían contaminar accidentalmente el agua potable y que la enfermedad se diseminaba de esa manera.

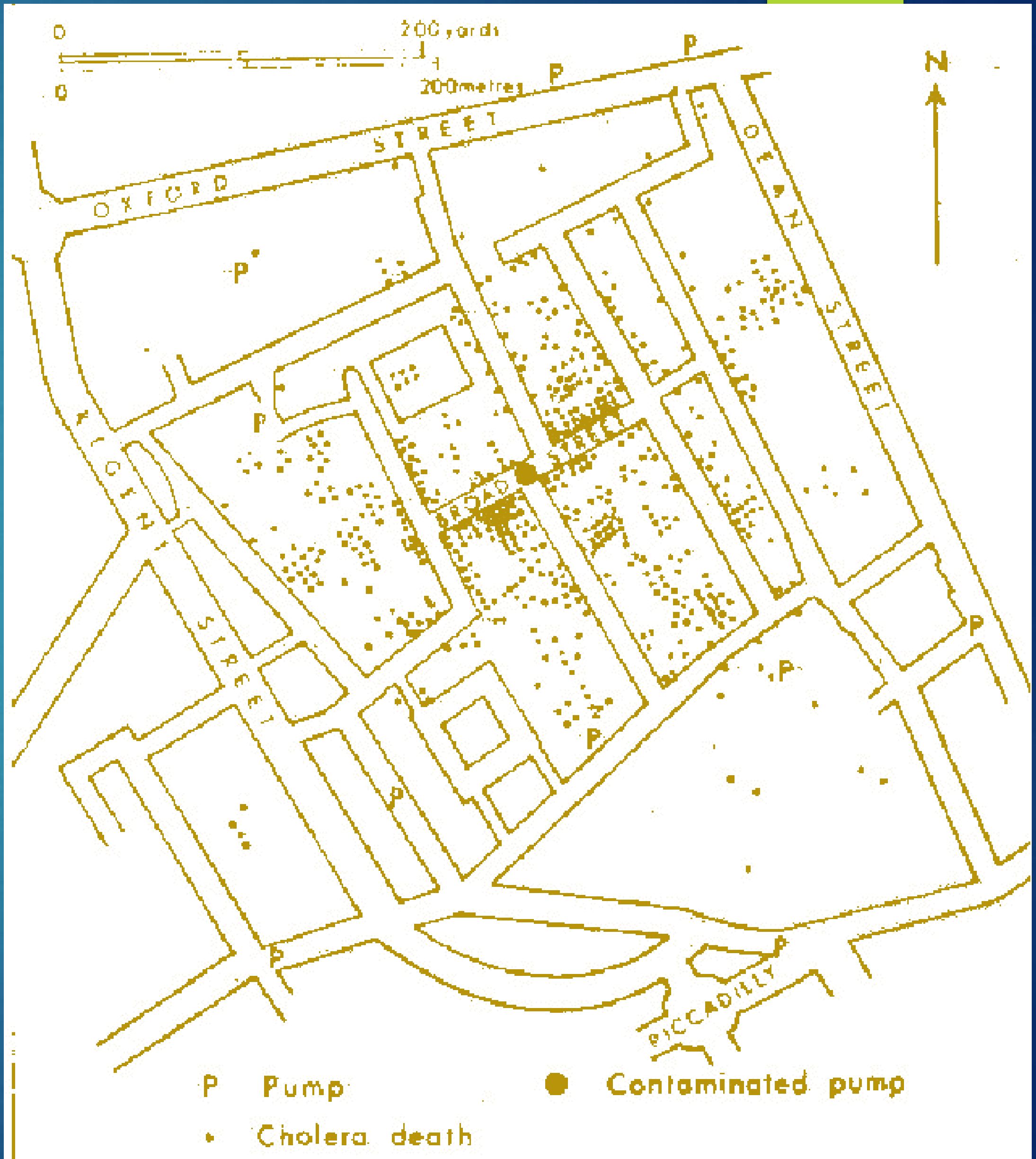




Rodriguez Morales AJ. La Importancia del Legado de John Snow para la Epidemiología.
Rev Soc Med Quir Hosp Emerg Perez de Leon 2005; 36(1-2):3-4.

John Snow y la epidemia de 1854

- El mapa del doctor Snow pasó para la Historia como uno de los primeros ejemplos que ilustra el poder explicativo del análisis espacial.
- Para ilustrar sus hallazgos, Snow confeccionó un mapa del sector, en el cual marcó los puntos correspondientes a defunciones por cólera y las distintas bombas de agua potable existentes, demostrando gráficamente la relación espacial entre las muertes por cólera y la bomba de Broad Street

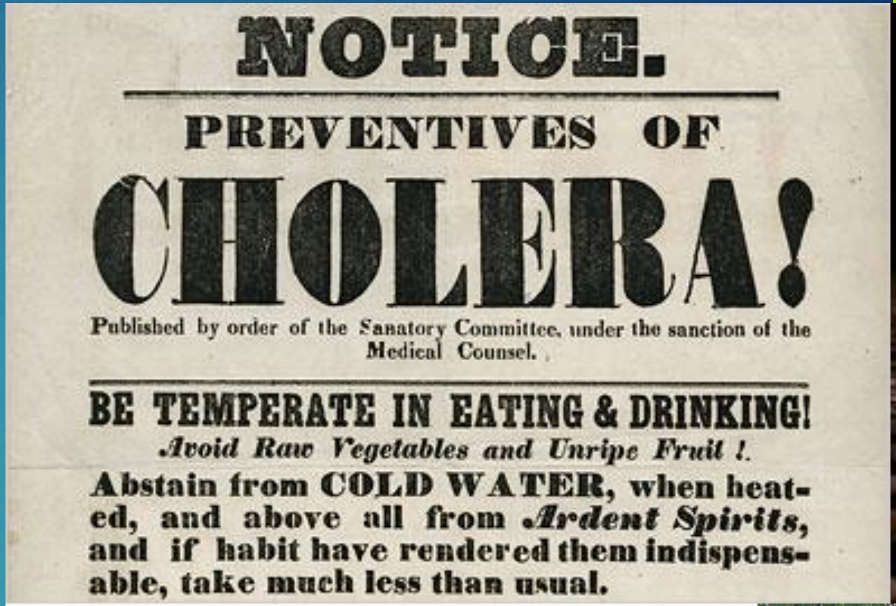


Rodriguez Morales AJ. La Importancia del Legado de John Snow para la Epidemiología. Rev Soc Med Quir Hosp Emerg Perez de Leon 2005; 36(1-2):3-4.

Rev Chil Infect 2007; 24 (4): 331-334.

John Snow y la epidemia de 1854

- Finalmente, el estudio de la bomba *in situ* demostró que 20 pies bajo tierra, una tubería de alcantarillado pasaba a escasa distancia de la fuente de agua de la bomba, existiendo filtraciones entre ambos cursos de agua.
- Las denuncias de mal olor del agua emitidas por los vecinos tenían ahora una explicación lógica.
- Snow intentó hasta su muerte en 1858 convencer a la comunidad médica que el cólera se transmitía mediante la ingestión de una “materia mórbida” presente en las aguas contaminadas del río Támesis, pero sus esfuerzos fueron infructuosos.


NOTICE.

PREVENTIVES OF

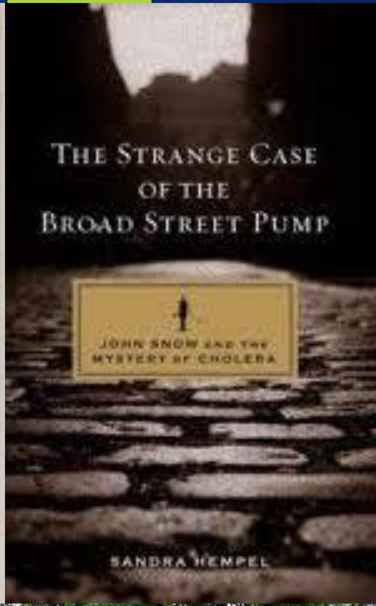
CHOLERA!

Published by order of the Sanatory Committee, under the sanction of the Medical Counsel.

BE TEMPERATE IN EATING & DRINKING!

Avoid Raw Vegetables and Unripe Fruit!

Abstain from COLD WATER, when heated, and above all from *Ardent Spirits*, and if habit have rendered them indispensable, take much less than usual.

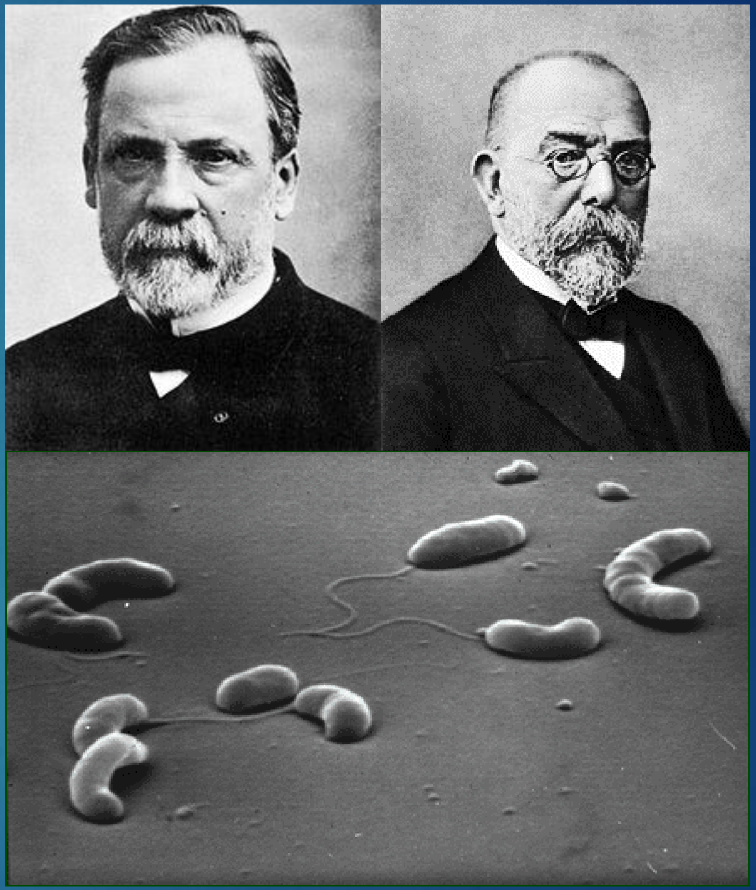


A COURT FOR KING CHOLERA.

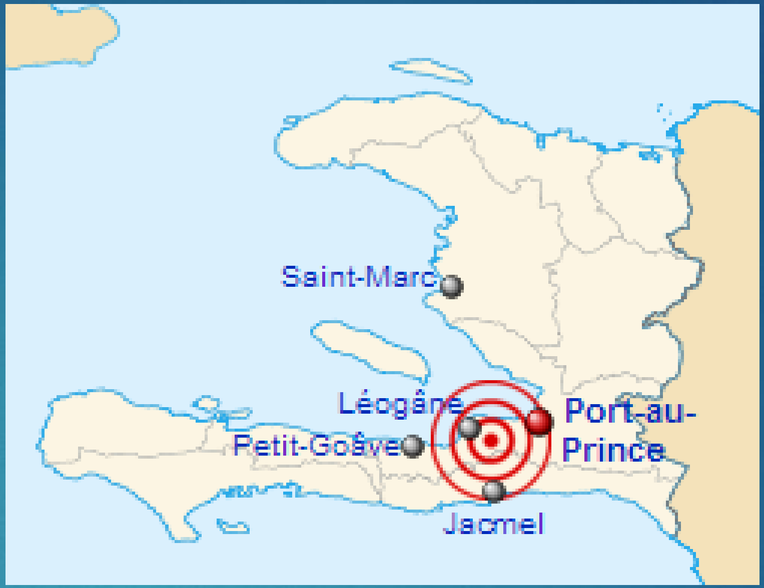
Rodriguez Morales AJ. La Importancia del Legado de John Snow para la Epidemiología.
Rev Soc Med Quir Hosp Emerg Perez de Leon 2005; 36(1-2):3-4.
Rev Chil Infect 2007; 24 (4): 331-334.

John Snow y la epidemia de 1854

- Su teoría debió esperar la cuarta epidemia de cólera de Londres, ocurrida en 1866, para ser finalmente aceptada.
- Al poco tiempo, experimentos realizados por Louis Pasteur demostraron que son microorganismos presentes en el ambiente (y no "miasmas") los causantes de las enfermedades transmisibles.
- Luego Robert Koch aisló y cultivó el *Vibrio cholerae*, la "materia mórbida" a la cual recurrentemente se refería Snow, dándole total crédito a su hipótesis.
- Estudios contemporáneos en los que se aplicaron técnicas de regresión logística a los datos registrados en 1853 demostraron que el planteamiento de Snow siempre estuvo en lo cierto.
- La investigación realizada le sirvió para ser considerado "El Padre de la Epidemiología Moderna", por haber aplicado por primera vez, lo que más tarde fuera denominado como "Método Epidemiológico" a la investigación y solución del brote de cólera de Broad Street.



Rodriguez Morales AJ. La Importancia del Legado de John Snow para la Epidemiología.
Rev Soc Med Quir Hosp Emerg Perez de Leon 2005; 36(1-2):3-4.
Rev Chil Infect 2007; 24 (4): 331-334.



Haiti
12 Enero 2010
7,0 Mw
13 km
18,457°N
72,533°W
316.000 muertes


Rika




HOTEL



TIME
Haiti's Tragedy

Octubre 2010 – 9 meses después: Empieza la epidemia de Cólera

Cholera epidemic in quake-hit Haiti, 135 dead

By Clarens Renois (AFP) – Oct 21, 2010 +1 0

SAINT MARC, Haiti — A cholera epidemic in northern Haiti has claimed 135 lives and infected 1,500 people over the last few days, Claude Surena, president of the Haitian Medical Association, said Thursday.

The epidemic has not yet reached the major displaced persons camps in and around the capital Port-au-Prince, which was ravaged by a 7.0 earthquake in January that left 1.2 million people homeless.

But officials fear an outbreak in densely populated tent cities that have poor sanitation and meager medical facilities has the potential of unleashing a public health disaster.

"According to the results of the analysis carried out in the laboratory it is cholera," Surena confirmed to AFP of the outbreak in Saint Marc, about 100 kilometers (60 miles) north of the capital.

ProMEDmail

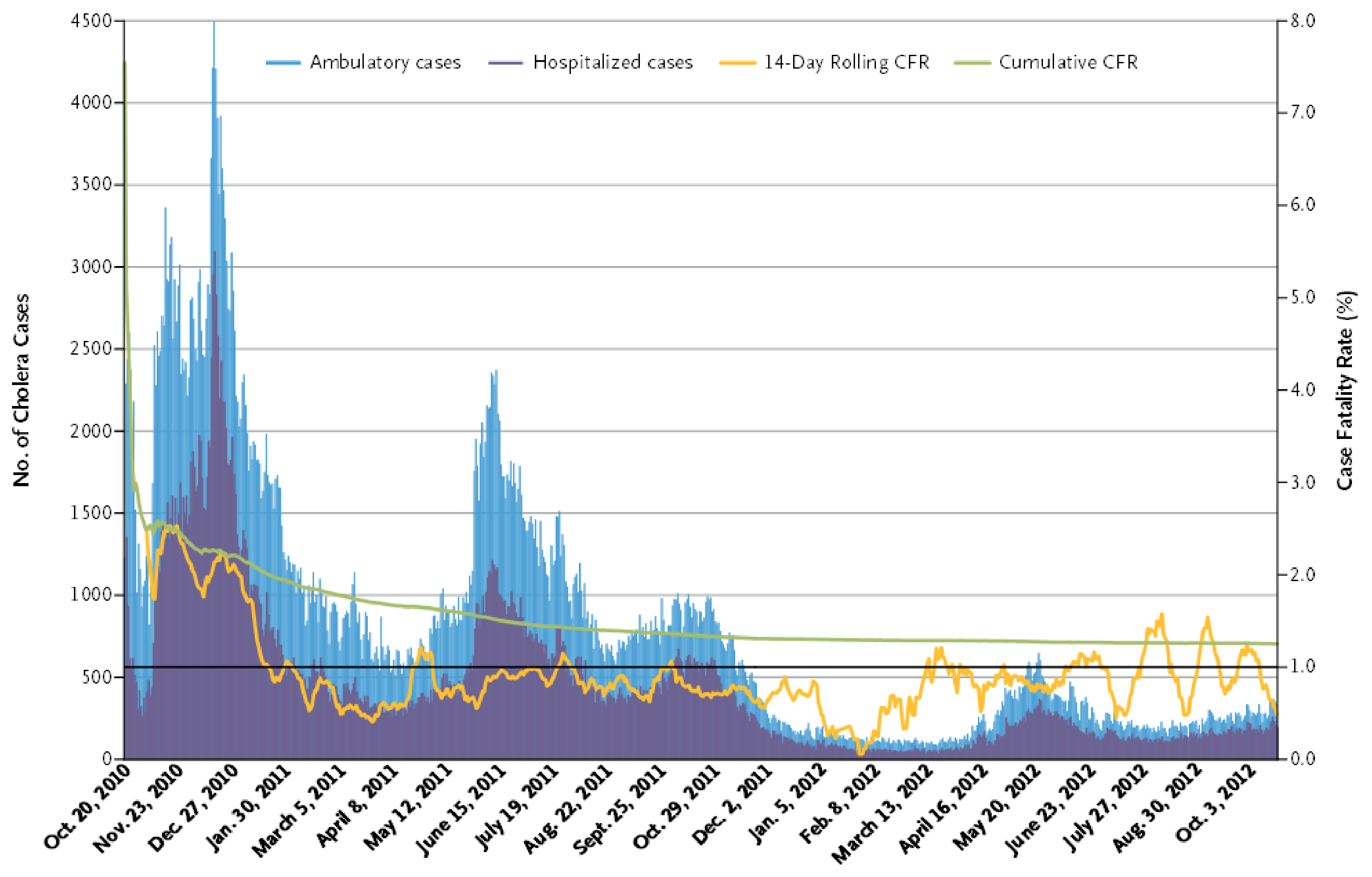


Figure 1. **New Cases of Cholera and Hospitalizations in Haiti during a 2-Year Period.**

Shown are the number of cases of cholera, as documented from the initiation of surveillance on October 20, 2010, through October 20, 2012, according to whether patients were ambulatory or hospitalized (left axis). Also shown are 14-day and cumulative case fatality rates (CFR) (right axis). The black horizontal line shows the 1.0% case fatality rate.

N Engl J Med. 2013 Feb 14;368(7):599-609. doi: 10.1056/NEJMoa1204927. Epub 2013 Jan 9.

Cholera surveillance during the Haiti epidemic--the first 2 years.

Barzilay EJ, Schaad N, Magloire R, Mung KS, Boncy J, Dahourou GA, Mintz ED, Steenland MW, Vertefeuille JF, Tappero JW.

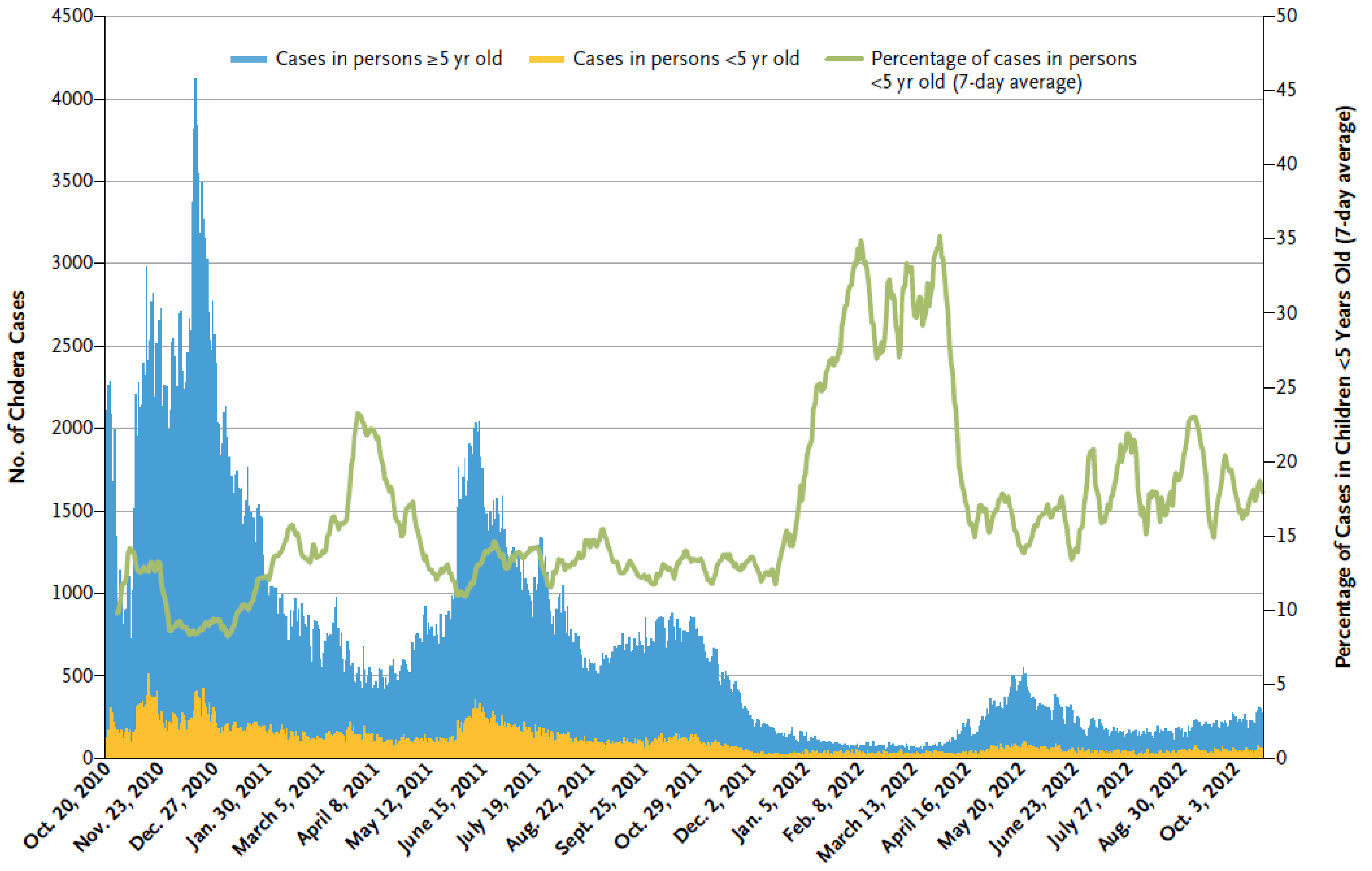


Figure 2. Cases of Cholera in Haiti during a 2-Year Period, According to Age.

Shown are the number of cases of cholera, as documented from the initiation of surveillance on October 20, 2010, through October 20, 2012, according to age (<5 years or ≥5 years) (left axis) and 7-day averages of the percentage of cases in children under the age of 5 years (right axis).

N Engl J Med. 2013 Feb 14;368(7):599-609. doi: 10.1056/NEJMoa1204927. Epub 2013 Jan 9.

Cholera surveillance during the Haiti epidemic--the first 2 years.

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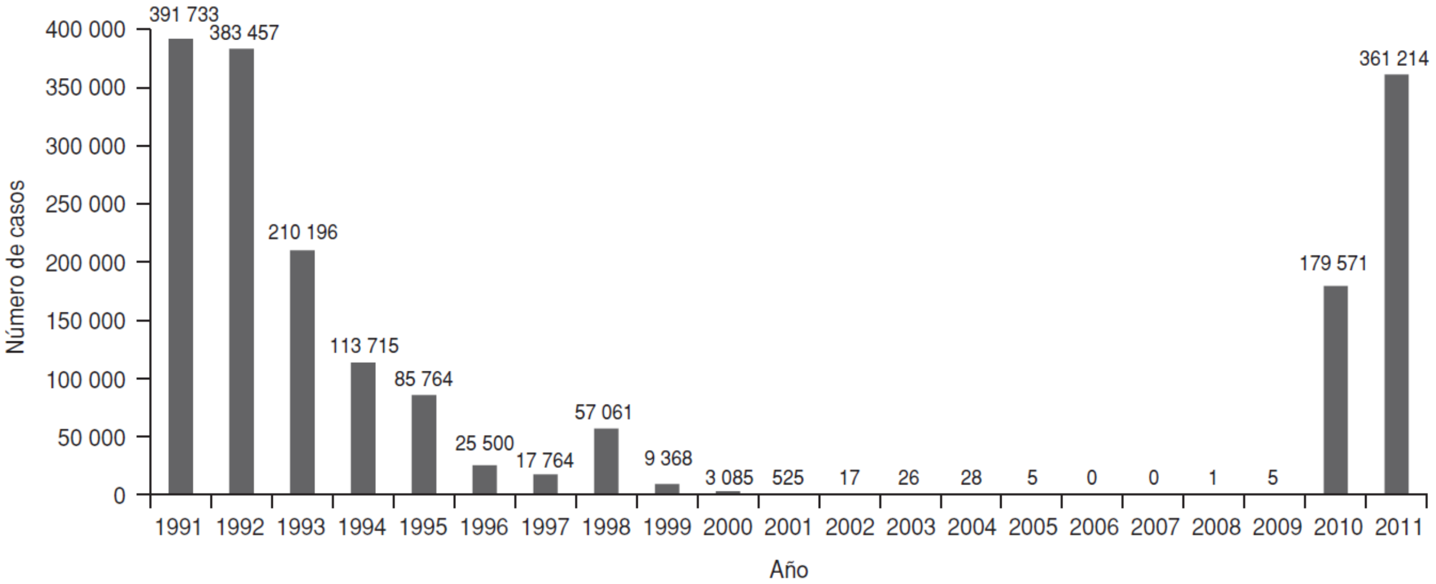
FIGURA 1. Número de casos acumulados de cólera en países de América Latina, 1991–2011

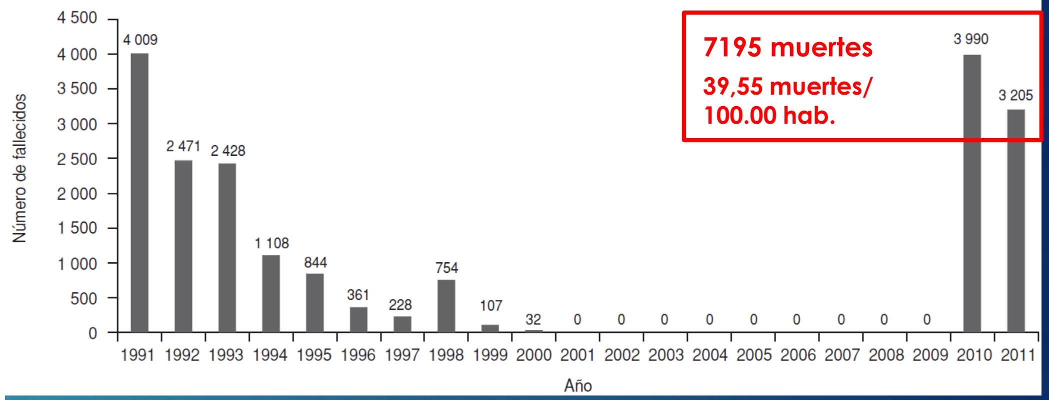


CUADRO 2. Incidencia acumulada (por 100 000 habitantes) de cólera en países de América Latina, 2001–2011

País	Año										
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2011
Argentina	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Bolivia	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Brasil	0,004	. . .	. . .	0,010	0,003	. . .	. . .	. . .	. . .	. . .	0,0005
Chile	. . .	. . .	. . .		. . .	. . .	. . .	. . .	. . .	. . .	0,0060
Colombia	. . .	. . .	. . .	0,005	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Costa Rica	. . .	. . .	. . .		. . .	. . .	. . .	. . .	. . .	. . .	. . .
Ecuador	0,070	. . .	0,200	0,040	. . .	. . .	. . .	. . .	. . .	. . .	. . .
El Salvador	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Guatemala	0,110	0,01	0,010	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Haití	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1 777,9600	3 319,1300
Honduras	0,020	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
México	0,001	. . .	. . .	. . .	. . .	. . .	. . .	0,0010	. . .	0,0009	0,0009
Nicaragua	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Panamá	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Paraguay	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0,0800	. . .	. . .
Perú	1,870	0,06	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
República Dominicana	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1,9300	207,9600
Venezuela	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Total	0,100	0,003	0,005	0,005	0,001	0	0	0,0002	0,0008	31,1800	56,6500

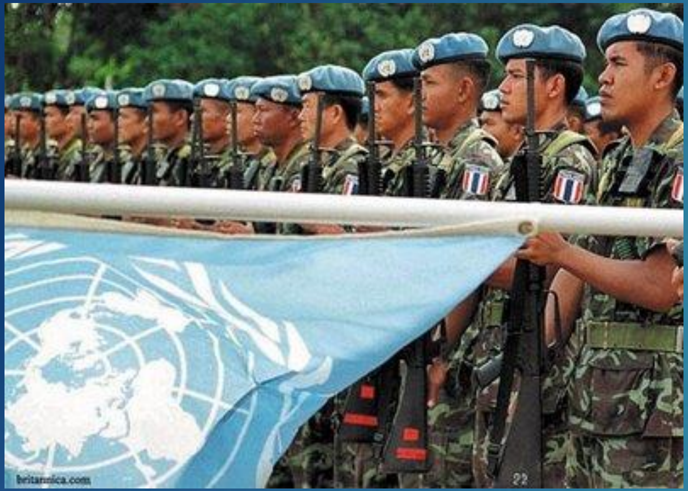
Fuente: elaboración de los autores, con base en las referencias 13 y 15.
(. . .): sin datos.

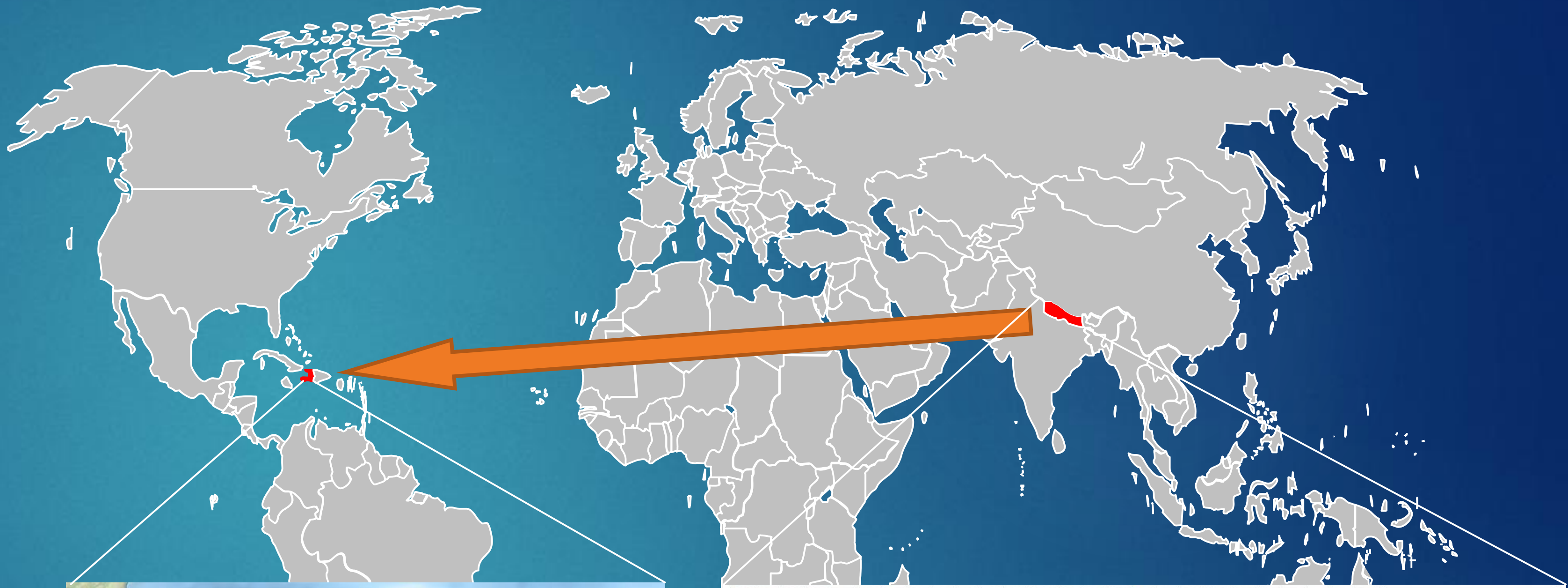
FIGURA 2. Tasa de mortalidad acumulada por cólera en países de América Latina, 1991–2011



Rev Panam Salud Publica. 2013 Jan;33(1):40-6.
La epidemia de cólera en América Latina: reemergencia y morbimortalidad.
Harvez CB, Avila VS.

¿De dónde vino?





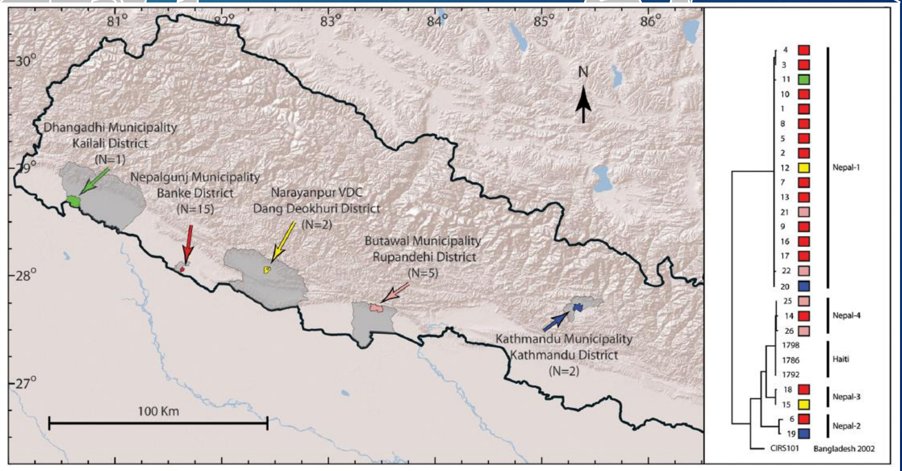


FIG 2 Locations of the five districts in Nepal where the *V. cholerae* O1 Ogawa strains were isolated.

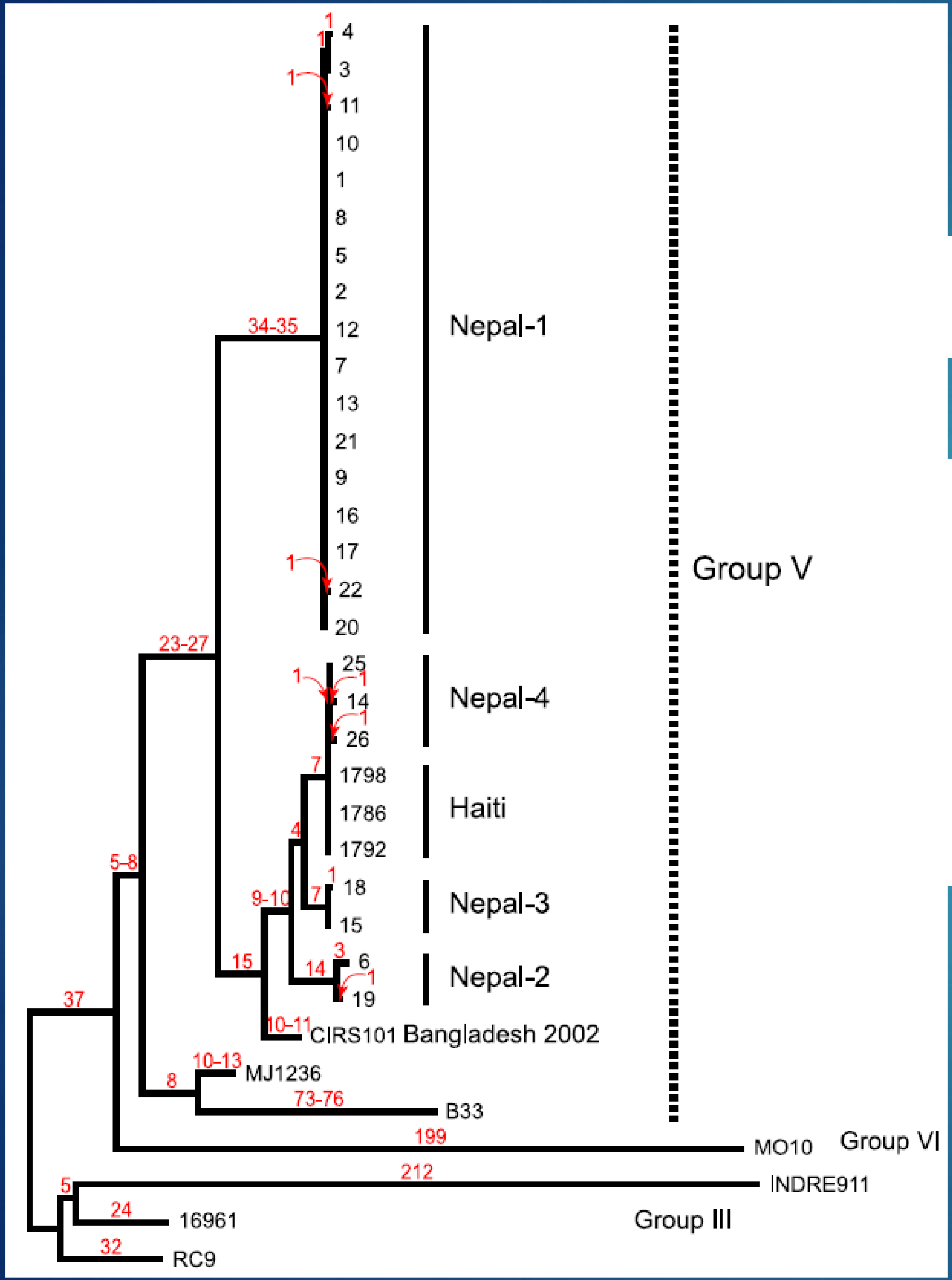


FIG 1 Genetic relationships among *V. cholerae* isolates from Nepal and Haiti. A single maximum parsimony tree was reconstructed using 752 SNPs from 34 whole-genome sequences. There were 184 parsimony-informative SNPs, of which 6 were homoplastic, resulting in a CI of 0.97 (excluding uninformative characters). The branch lengths are labeled in red, and for branches affected by homoplasy, minimum and maximum branch lengths are designated. Members of SNP genotypic group V (16) are indicated. SNP differences among the three most closely related Nepali groups and the Haitian group are shown and characterized in Table S1 in the supplemental material.

TABLE 1 Different point mutations observed among the three sequenced isolates from the Haiti outbreak and the three most closely related isolates from Nepal[a]

		Nucleotide or amino acid in:						
			Haitian isolate			Nepalese isolate		
Chromosome	Position	Reference strain	1786	1792	1798	14	25	26
I	2787016	C	C	C	C	T	T	T
		Gly	Gly	Gly	Gly	Arg	Arg	Arg
I	1090536	T	T	T	T	T	T	G
		Ile	Ile	Ile	Ile	Ile	Ile	Ser
II	962762	C	C	C	C	T	C	C
		Ala	Ala	Ala	Ala	Ala	Ala	Ala

[a] The reference strain is *Vibrio cholerae* O1 biovar El Tor strain N16961 (Bangladesh 1971). The NCBI reference sequences or accession numbers are NC_002505 for chromosome I and NC_002506 for chromosome II.

MBio. 2011 Sep 1;2(4):e00157-11. doi: 10.1128/mBio.00157-11. Print 2011.

Population genetics of Vibrio cholerae from Nepal in 2010: evidence on the origin of the Haitian outbreak.

Hendriksen RS, Price LB, Schupp JM, Gillece JD, Kaas RS, Engelthaler DM, Bortolaia V, Pearson T, Waters AE, Upadhyay BP, Shrestha SD, Adhikari S, Shakya G, Keim PS, Aarestrup FM.

¿Qué es un brote o epidemia?

Un brote o epidemia ocurre cuando hay ***más casos de una enfermedad particular*** *que lo esperado, en un momento y tiempo dado, en un grupo de población.*

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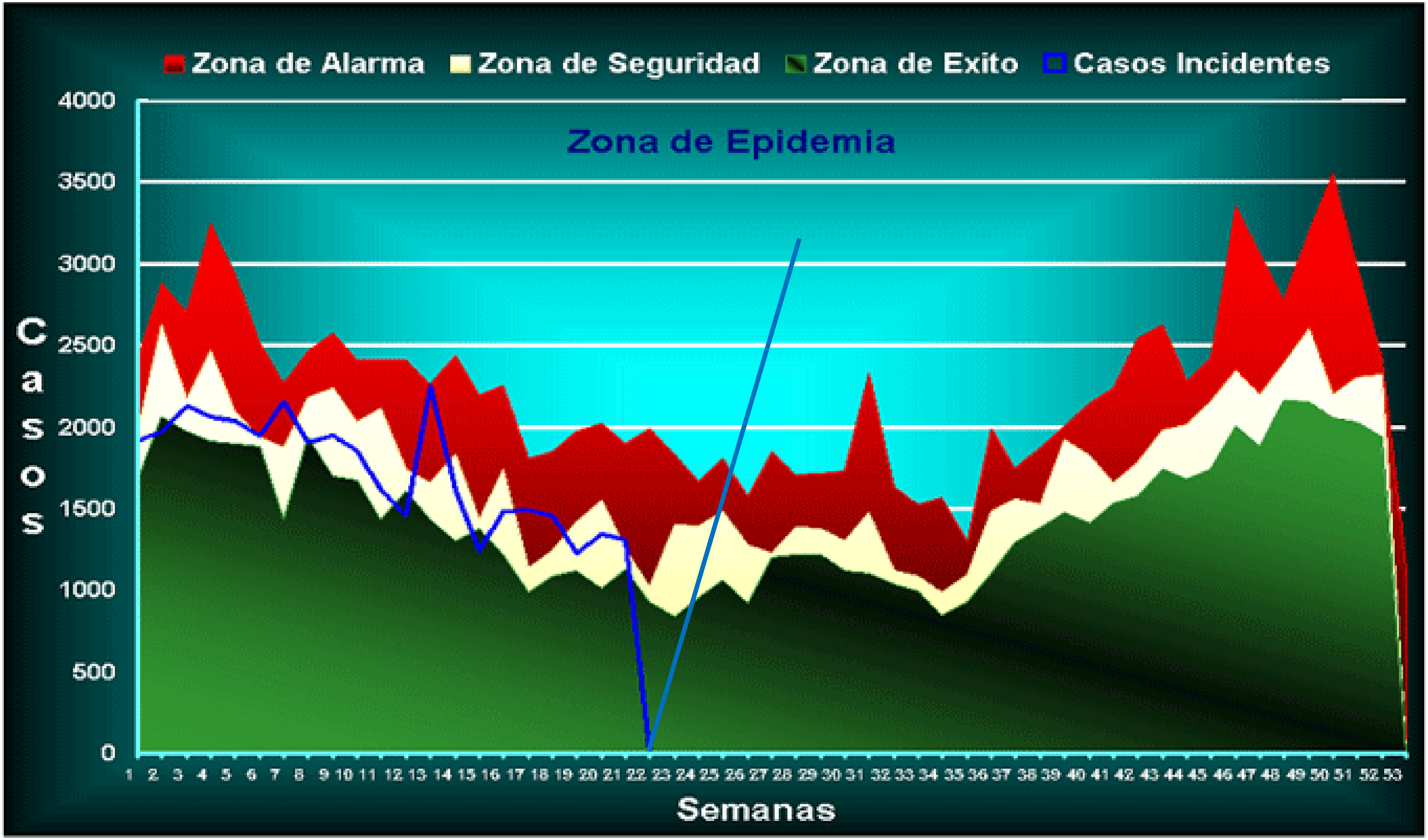
Vigilancia Epidemiológica



¿Qué ocurre si hay 1 caso de fiebre por virus Ebola en Colombia?

MUNDO

Miércoles, 26 de marzo de 2014

Ya hay 60 muertes por el virus de ébola en Guinea en lo que va del año

La ciudad africana se encuentra en cuarentena a causa del virus mortal. Se trata del primer brote de este virus en el occidente del continente en dos décadas.

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EL ÉBOLA ES CONSIDERADO EL VIRUS MÁS MORTAL.

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Centers for Disease Control and Prevention
CDC 24/7: Saving lives, protecting people, reducing health costs

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Emergency Preparedness and Response

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Chikungunya Virus - An Emerging Threat to the Americas

CE = Free Continuing Education

Date: Tuesday, February 18, 2014

Time: 2:00 - 3:00 pm (Eastern Time)

To Join:

Dial-In: 888-233-9077 (U.S. Callers)
773-799-3915 (International Callers)

Passcode:8291522

Access Webinar: https://www.mymeetings.com/nc/join.php?i=PW4203438&p=8291522&t=c

Presenter(s):

J. Erin Staples, MD, PhD
Medical Epidemiologist
Arboviral Diseases Branch
National Center for Emerging and Zoonotic Infectious Diseases
Centers for Disease Control and Prevention

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Chikungunya virus disease

- Mosquito-borne viral disease characterized by acute onset of fever and severe polyarthralgia
- Often occurs in large outbreaks with high attack rates
- Outbreaks have occurred in countries in Africa, Asia, Europe, and the Indian and Pacific Oceans
- In 2013, first locally-acquired cases in the Americas reported on islands in the Caribbean

CDC

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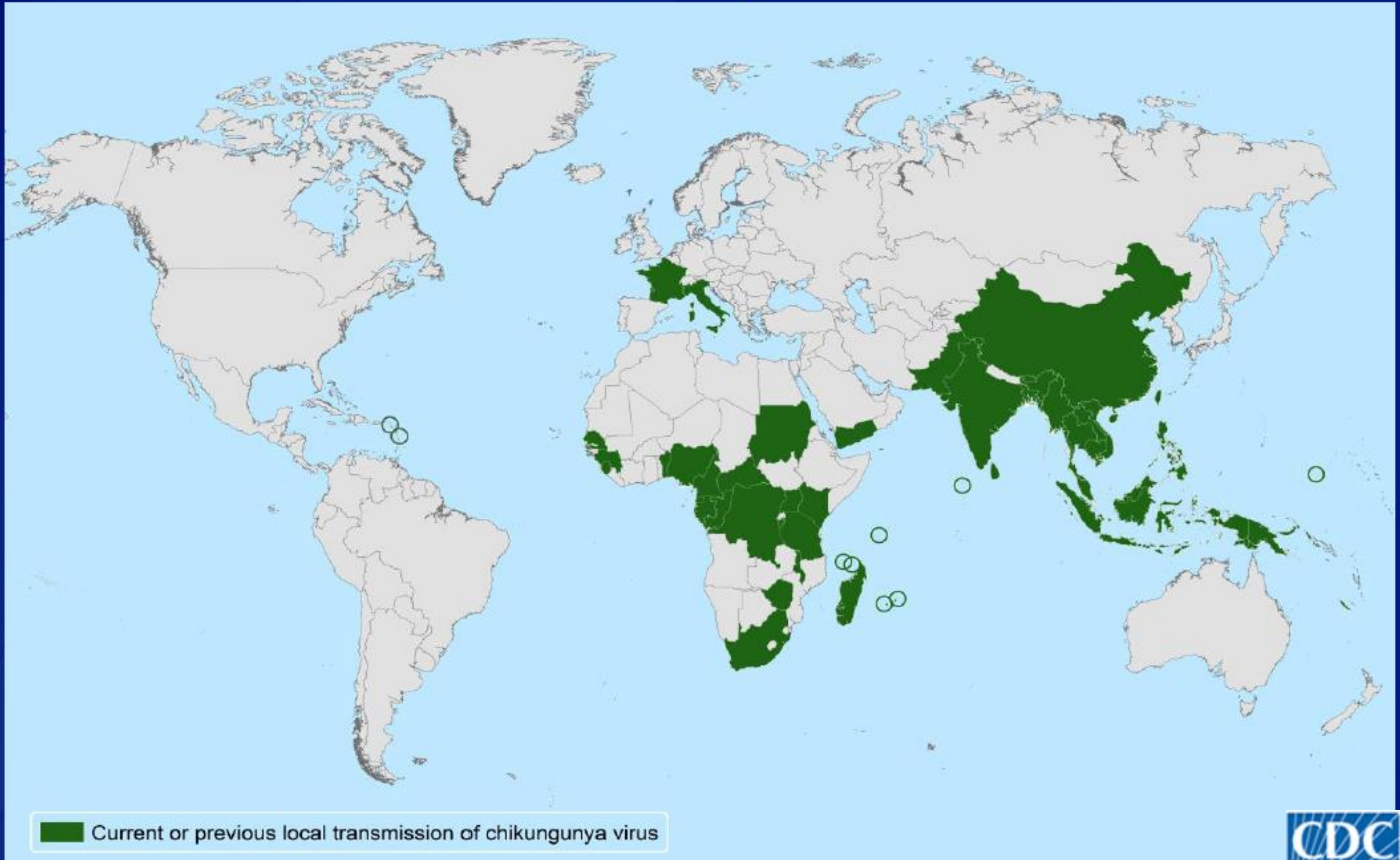
Countries with reported local transmission of chikungunya virus*

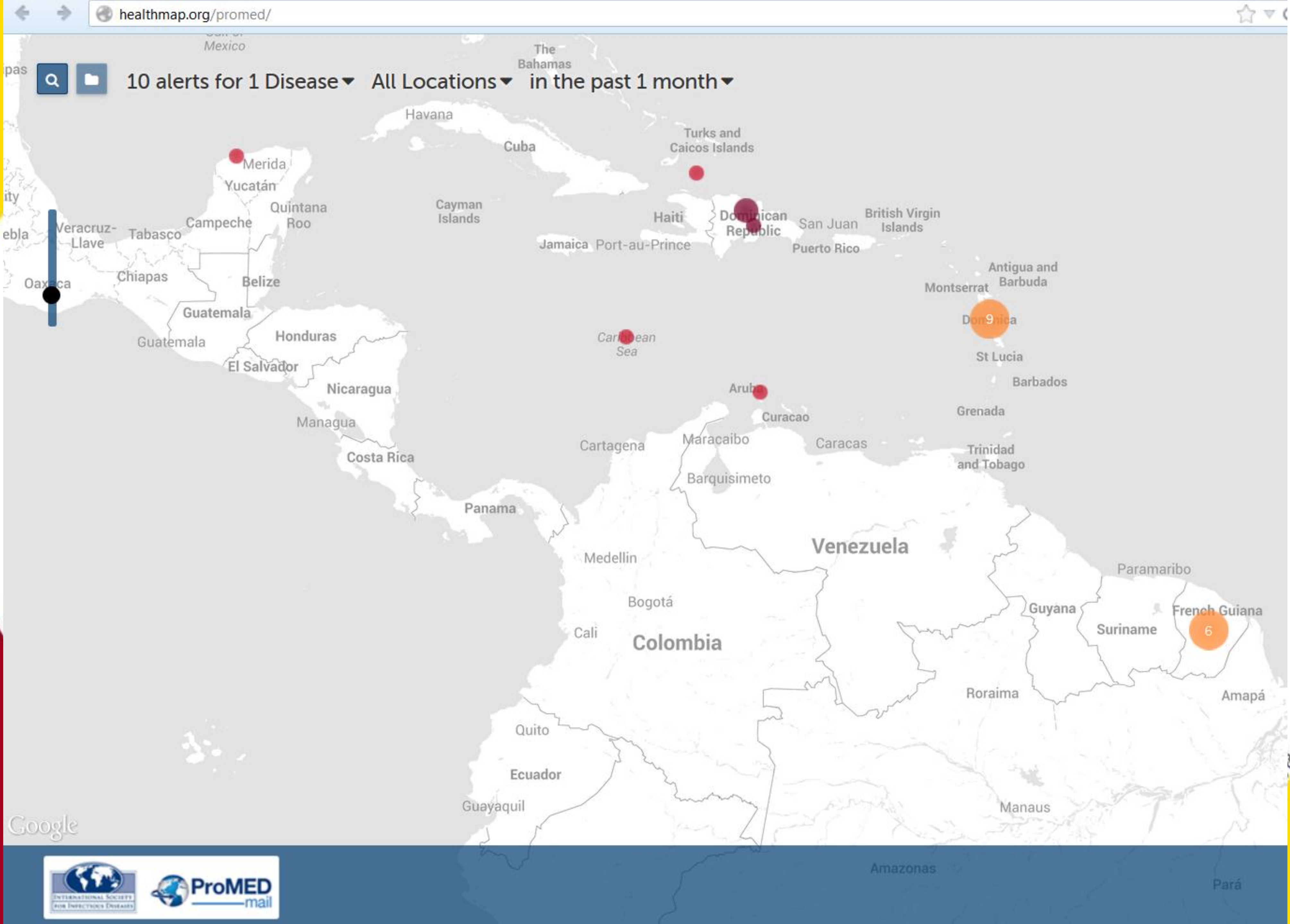


*As of February 10, 2014

Chikungunya virus in the Americas*

- Seven Caribbean countries have reported locally-acquired cases
- >1,000 laboratory-confirmed cases have been reported
- Virus expected to spread to new areas

*As of February 10, 2014


healthmap.org/promed/
10 alerts for 1 Disease
All Locations
in the past 1 month
Mexico
The Bahamas
Havana
Cuba
Turks and Caicos Islands
Merida
Yucatán
Quintana Roo
Campeche
Tabasco
Veracruz-Llave
Cayman Islands
Haiti
Dominican Republic
San Juan
British Virgin Islands
Jamaica
Port-au-Prince
Puerto Rico
Antigua and Barbuda
Montserrat
Chiapas
Belize
Guatemala
Honduras
Dominica
9
St Lucia
Barbados
Caribbean Sea
El Salvador
Nicaragua
Aruba
Curacao
Grenada
Managua
Cartagena
Maracaibo
Caracas
Trinidad and Tobago
Costa Rica
Barquisimeto
Panama
Venezuela
Medellin
Paramaribo
Bogotá
Guyana
French Guiana
Suriname
6
Cali
Colombia
Roraima
Amapá
Quito
Ecuador
Guayaquil
Manaus
Amazonas
Pará
Google
International Society for Infectious Diseases
ProMED mail

Mosquito vectors

- Predominantly *Aedes aegypti* and *Aedes albopictus*
- Same mosquitoes that transmit dengue
- Widely distributed throughout Americas
- Aggressive daytime biters

Aedes aegypti

Aedes albopictus

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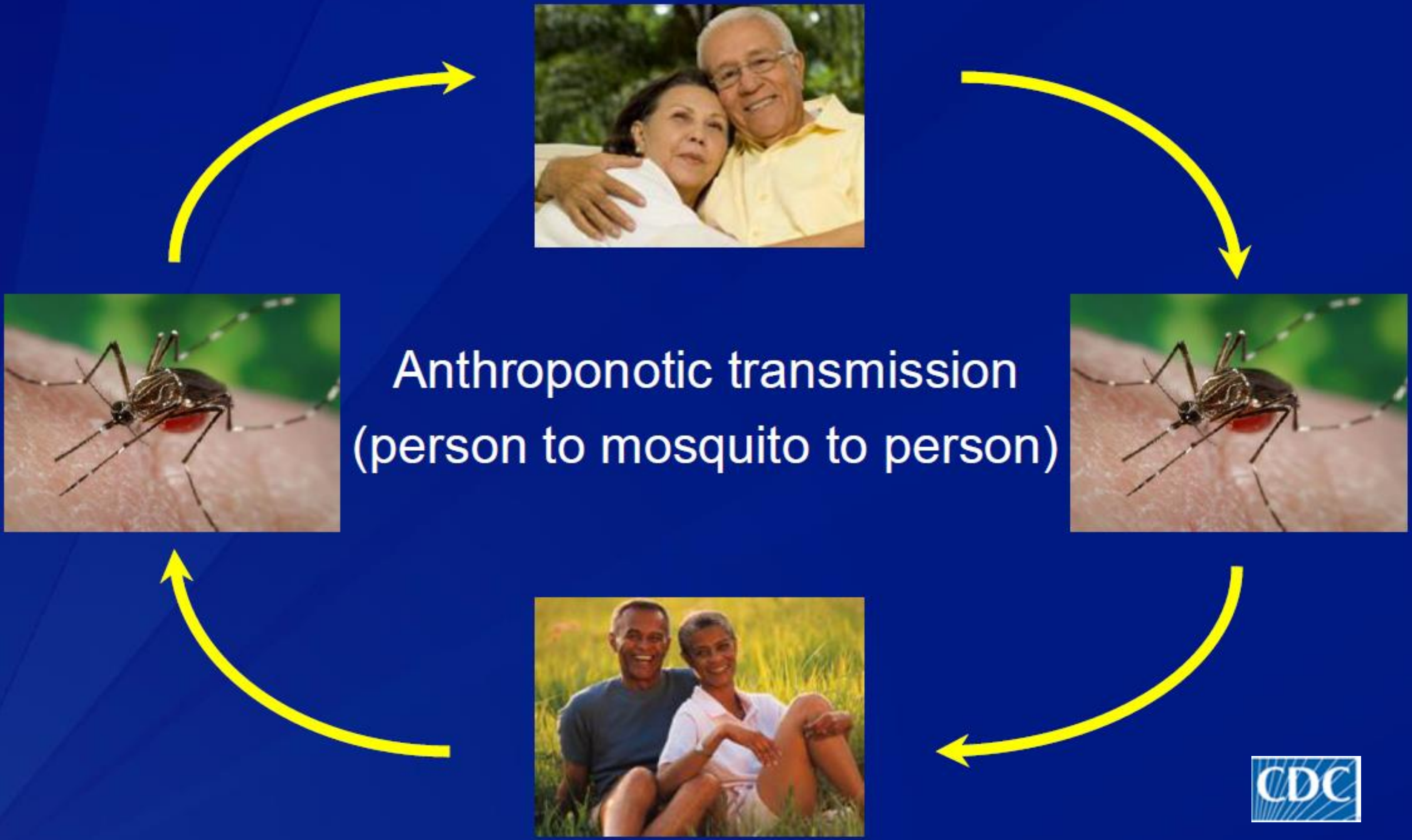
Primary transmission cycle



Other modes of transmission

- Documented rarely
  - *In utero* transmission resulting in abortion
  - Intrapartum from viremic mother to child
  - Percutaneous needle stick
  - Laboratory exposure
- Theoretical concern
  - Blood transfusion
  - Organ or tissue transplantation
- No evidence of virus in breast milk

CDC

Fever and polyarthralgia

- Fever
  - Abrupt onset
  - Typically ≥39.0°C (≥102.2°F)
- Joint pain
  - Often severe and debilitating
  - Involves multiple joints
  - Usually bilateral and symmetric
  - Most common in hands and feet

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Clinical features of chikungunya virus infections compared with dengue virus infections

	Chikungunya	Dengue
Fever (>39°C)	+++	++
Arthralgia	+++	+/-
Arthritis	+	-
Headache	++	++
Rash	++	+
Myalgia	+	++
Hemorrhage	+/-	++
Shock	-	+

Pan American Health Organization

World Health Organization

REGIONAL OFFICE FOR THE Americas

Number of Reported Cases of Chikungunya Fever in the Americas, by Country or Territory 2013-2014 (to week noted)

Cumulative cases

Epidemiological Week / EW 12 (Updated 21 March 2014)

Country/Territory	Week[a]	Suspect Cases[b]		Confirmed Cases[b]		Deaths	Population[d] X 1000
		Number	Incidence rate[c]	Number	Incidence rate[c]		
Latin Caribbean							
Cuba						0	11,266
Dominican Republic						0	10,404
French Guiana (*)	Week 12	0	0	32	12.9	0	249
Guadaloupe (**)	Week 12	1960	421	586	125.8	0	466
Haiti						0	10,317
Martinique	Week 12	7630	1,889	1,141	282.4	2[##]	404
Puerto Rico			0	0	0.0	0	3,688
Saint Barthelemy	Week 12	420	4,719	134	1,505.6	0	9
Saint Martin (French part) (***)	Week 12	2640	7,397	782	2,191.1	3[#]	36
Subtotal		*12650*	34	*2,675*	7.3	*5*	*36,839*

Pan American Health Organization
World Health Organization
REGIONAL OFFICE FOR THE Americas

Number of Reported Cases of Chikungunya Fever in the Americas, by Country or Territory 2013-2014 (to week noted)

Cumulative cases

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Country/Territory	Week[a]	Suspect Cases[b]		Confirmed Cases[b]		Deaths	Population[d] X 1000
		Number	Incidence rate[c]	Number	Incidence rate[c]		
Non-Latin Caribbean							
Anguilla[$]	Week 10		0	14	87.5	0	16
Antigua & Barbuda			0	0	0.0	0	90
Aruba[$]	Week 6		0	1	0.9	0	109
Bahamas			0	0	0.0	0	377
Barbados			0	0	0.0	0	289
Cayman Islands			0	0	0.0	0	54
Curacao			0	0	0.0	0	147
Dominica (****)	Week 12	394	540	56	76.7	0	73
Grenada			0	0	0.0	0	110
Guyana			0	0	0.0	0	800
Jamaica			0	0	0.0	0	2,784
Montserrat			0	0	0.0	0	5
Saint Kitts & Nevis	Week 8		0	1	2.0	0	51
Saint Lucia			0	0	0.0	0	163
Saint Vincent & the Grenadines			0	0	0.0	0	103
Sint Maarten (Dutch part)[Ξ]	Week 10		0	115	287.5	0	40
Suriname			0	0	0.0	0	539
Trinidad & Tobago			0	0	0.0	0	1,341
Turks & Caicos Islands			0	0	0.0	0	48
Virgin Islands (UK)	Week 10		0	7	21.9	0	32
Virgin Islands (US)			0	0	0.0	0	105
Subtotal		*394*	5	*194*	2.7	*0*	7,276
TOTAL		13044	30	2,869	6.5	5	44,115

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INSTITUTO NACIONAL DE SALUD

MinSalud
Ministerio de Salud y Protección Social

PROSPERIDAD PARA TODOS

CIRCULAR CONJUNTA EXTERNA N° 000014 DE 2014

Bogotá, D.C., 12 MAR 2014

PARA: GOBERNADORES, ALCALDES, SECRETARIOS DE SALUD DEPARTAMENTALES, DISTRITALES Y MUNICIPALES, DIRECTORES DE SALUD DEPARTAMENTAL, COORDINADORES DE VIGILANCIA EN SALUD PÚBLICA, ENTIDADES ADMINISTRADORAS DE PLANES DE BENEFICIOS, ENTIDADES RESPONSABLES DE REGÍMENES ESPECIALES Y DE EXCEPCIÓN, INSTITUCIONES PRESTADORAS DE SERVICIOS DE SALUD Y PUNTOS DE ENTRADA INTERNACIONALES.

ASUNTO: Instrucciones para la detección y alerta temprana ante la eventual introducción del virus de la Fiebre Chikungunya en Colombia.

INSTITUTO NACIONAL DE SALUD

MinSalud
Ministerio de Salud y Protección Social

PROSPERIDAD PARA TODOS

000014 12 MAR 2014

En Colombia, el Laboratorio de Virología del Instituto Nacional de Salud procesa sueros para diagnóstico del virus *Chikungunya* –CHKV que previamente han resultado negativos para dengue. A la fecha no existe evidencia por laboratorio de circulación autóctona ni de casos importados de CHKV en Colombia.

Recientemente se han notificado y descartado dos (2) pacientes sospechosos provenientes de zonas con transmisión autóctona del virus, como Saint Martin/Sint Maarten, los cuales fueron remitidos a Medellín y Bogotá.

Ante la progresión de la transmisión autóctona de la fiebre por Chikungunya en las Américas y teniendo en cuenta que en el país existe una alta infestación de los dos vectores transmisores de la enfermedad, la intensificación de las actividades comerciales, la mayor frecuencia de viajes y el incremento del turismo con diferentes países del Caribe, existen condiciones de vulnerabilidad y receptividad para la introducción del virus en el país.

Por lo anteriormente expuesto, el Ministerio de Salud y Protección Social, en coordinación con el Instituto Nacional de Salud, en desarrollo de las funciones establecidas en el Decreto 3518 de 2006 -*Sistema de Vigilancia en Salud Pública*-, imparten instrucciones de obligatorio cumplimiento en todo el territorio nacional, que deberán acatar los responsables de las mismas, aplicando las siguientes definiciones:

- *Caso sospechoso:* Paciente con fiebre mayor de 38,5°C y artralgia severa o artritis de comienzo agudo, que no se explica por otras condiciones médicas y en quien se ha descartado dengue, y que reside o ha visitado áreas endémicas o epidémicas[3] en las que ha sido confirmado Fiebre Chikungunya, durante las dos semanas previas al inicio de los síntomas.

- *Caso confirmado:* Todo caso sospechoso confirmado con cualquiera de las siguientes pruebas específicas para *CHIKV:*

  - Detección de IgM técnica ELISA: Para el adecuado procesamiento de esta técnica, el suero debe tomarse antes del sexto día de inicio de los síntomas.
  - Aislamiento viral: Para intentar el aislamiento viral, se debe tomar suero en los primeros ocho días de inicio de los síntomas.
  - Detección de ARN viral por RT-PCR en tiempo real: Tomar suero en los primeros ocho días de inicio de los síntomas.
  - Aumento de 4 veces el título de anticuerpos específicos para CHIKV, en muestras pareadas.

Al igual que en cualquiera de los demás eventos sujetos a vigilancia, las muestras deben ser remitidas al Laboratorio Departamental de Salud Pública -LDSP respectivo, de acuerdo a las medidas de bioseguridad y garantizando una temperatura de 4°C hasta por 72 horas.

Field Epidemiology

A definition has been proposed by Goodman. The essential elements are:

1. The problem is unexpected
2. An immediate response may be necessary
3. Epidemiologists must travel to & work on location in the field
4. The extent of investigation is likely to be limited because of imperative for timely intervention

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Objectives of OI

1. Primary- to control the spread of disease
2. To determine the causes of disease, its source & mode of transmission
3. To determine who is at risk
4. To determine what exposures predispose to disease
5. To know magnitude of the problem

Dr Abhinav Sinha MBBS, MD

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Objectives continued….

6. To identify new agent
7. To determine the effectiveness of control measures
8. To identify methods for present & future prevention & control
9. Research & training opportunities
10. Public, Political and legal concerns

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Unique aspects of OI

1. There is a pressure & urgency to conclude the investigations quickly which may lead to hasty decisions.
2. Data sources are often incomplete & less accurate.
3. Decreased statistical power due to analysis of small numbers.
4. Publicity surrounding the investigation – community members may have preconceived ideas.

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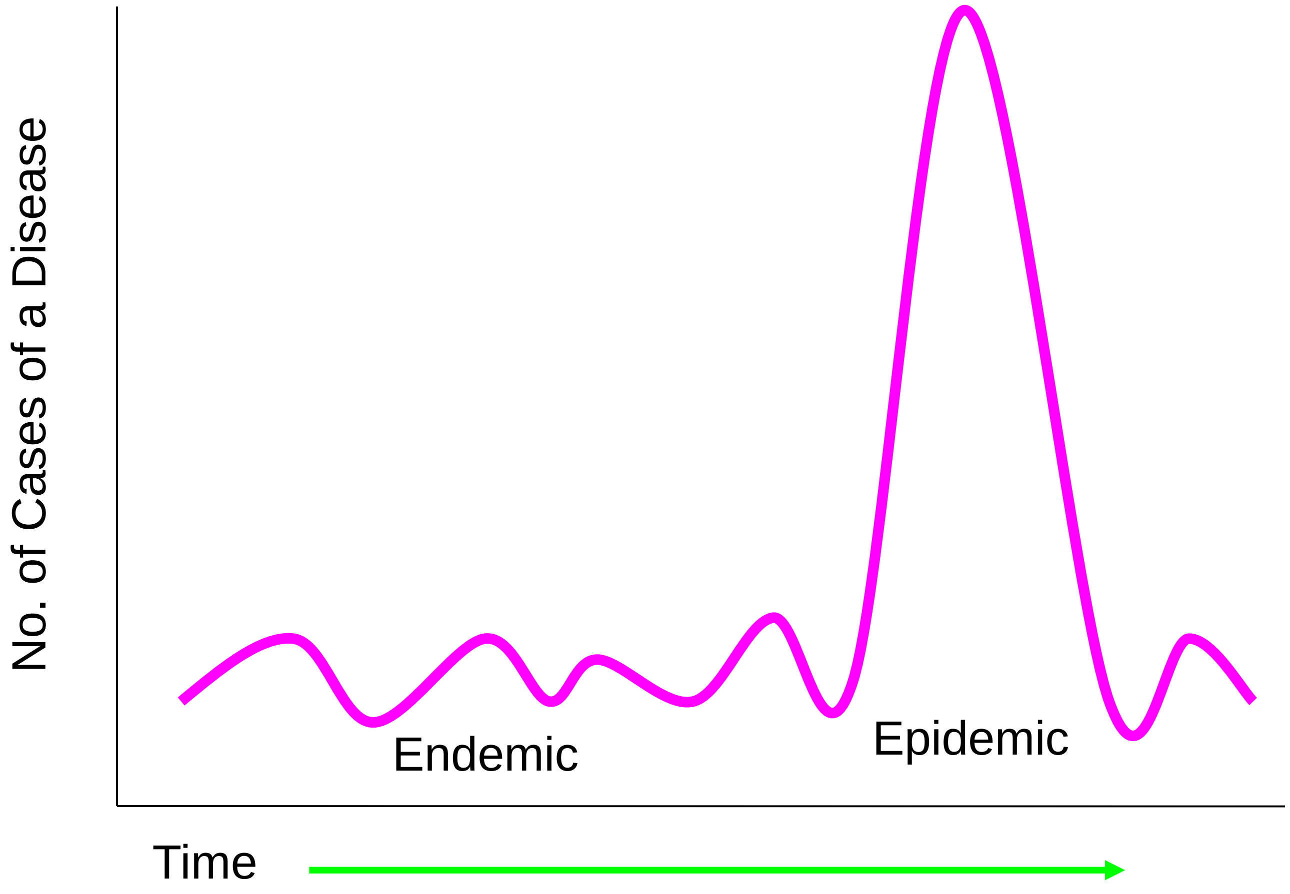
Endemic vs. Epidemic



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Why investigate outbreaks or epidemics?

- Control and prevention
- Severity and risk to others
- Research opportunities to gain additional knowledge
- Training opportunities
- Program considerations
- Public, political, or legal concerns

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Step 1: Verify the outbreak

- Determine whether there is an outbreak – an excess number of cases from what would be expected
- Establish a case definition
  - Non-ambiguous
  - Clinical / diagnostic verification
  - Person / place / time descriptions
- Identify and count cases of illness

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Step 2: Plot an Epidemic Curve

- Graph of the number of cases (y-axis) by their date or time of onset (x-axis)
- Interpreting an epidemic curve
  - **Overall pattern**: increase, peak, decrease
    - Type of epidemic?
    - Incubation period?
  - **Outliers**:
    - Unrelated?
    - Early or late exposure?
    - Index case? Secondary cases?

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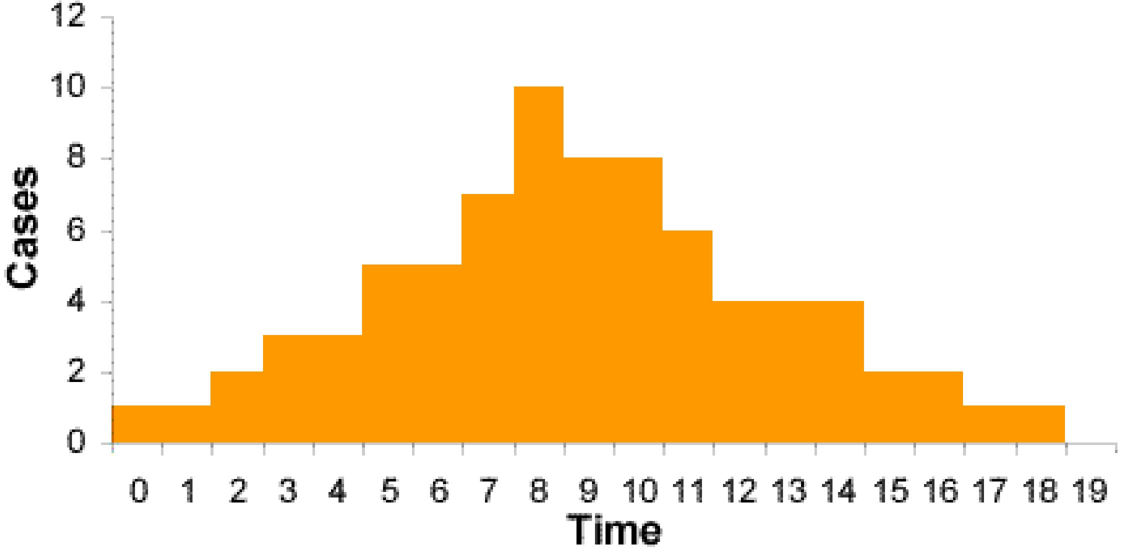
Vector-borne Disease



- Starts slowly
- Time between the first case and the peak is comparable to the incubation period.
- Slow tail

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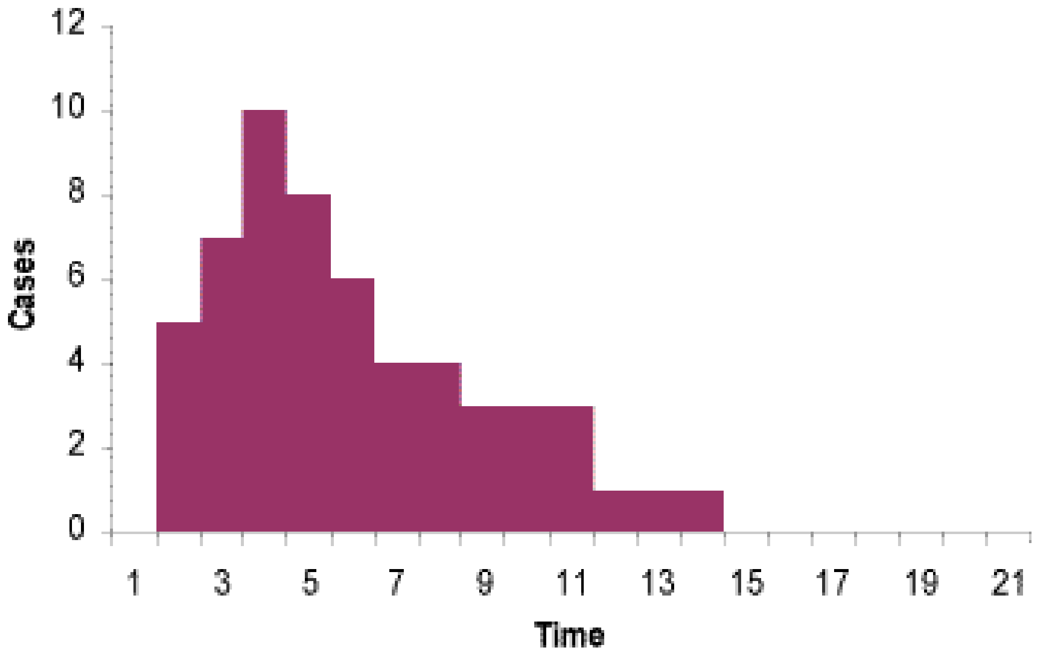
Point Source Transmission



- This is the most common form of transmission in food-borne disease, in which a large population is exposed for a short period of time.

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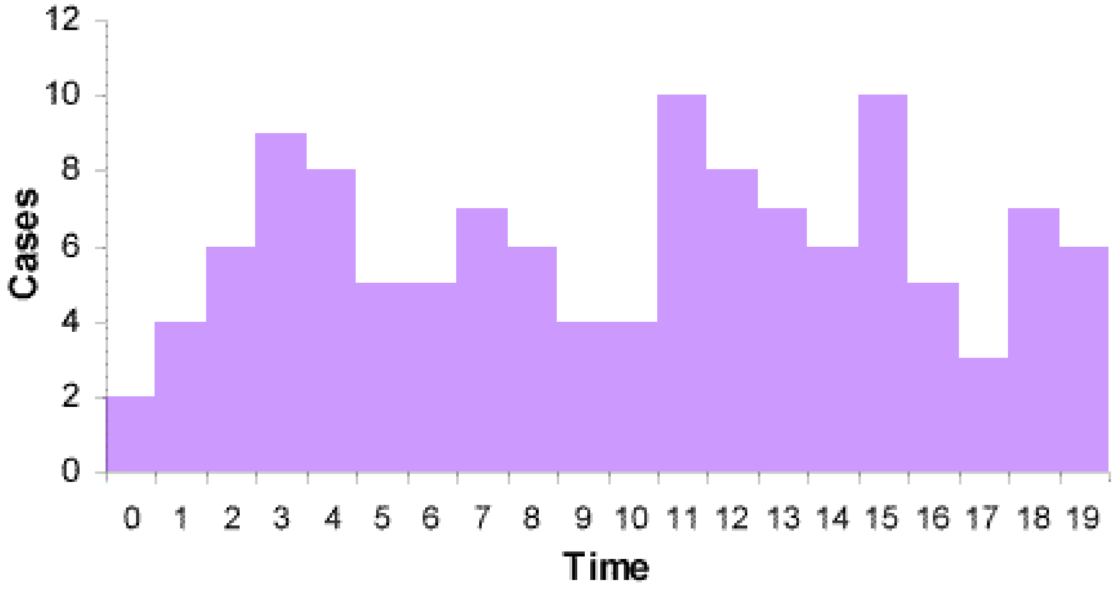
Continuing Common Source or Intermittent Exposure



- In this case, there are several peaks, and the incubation period cannot be identified.

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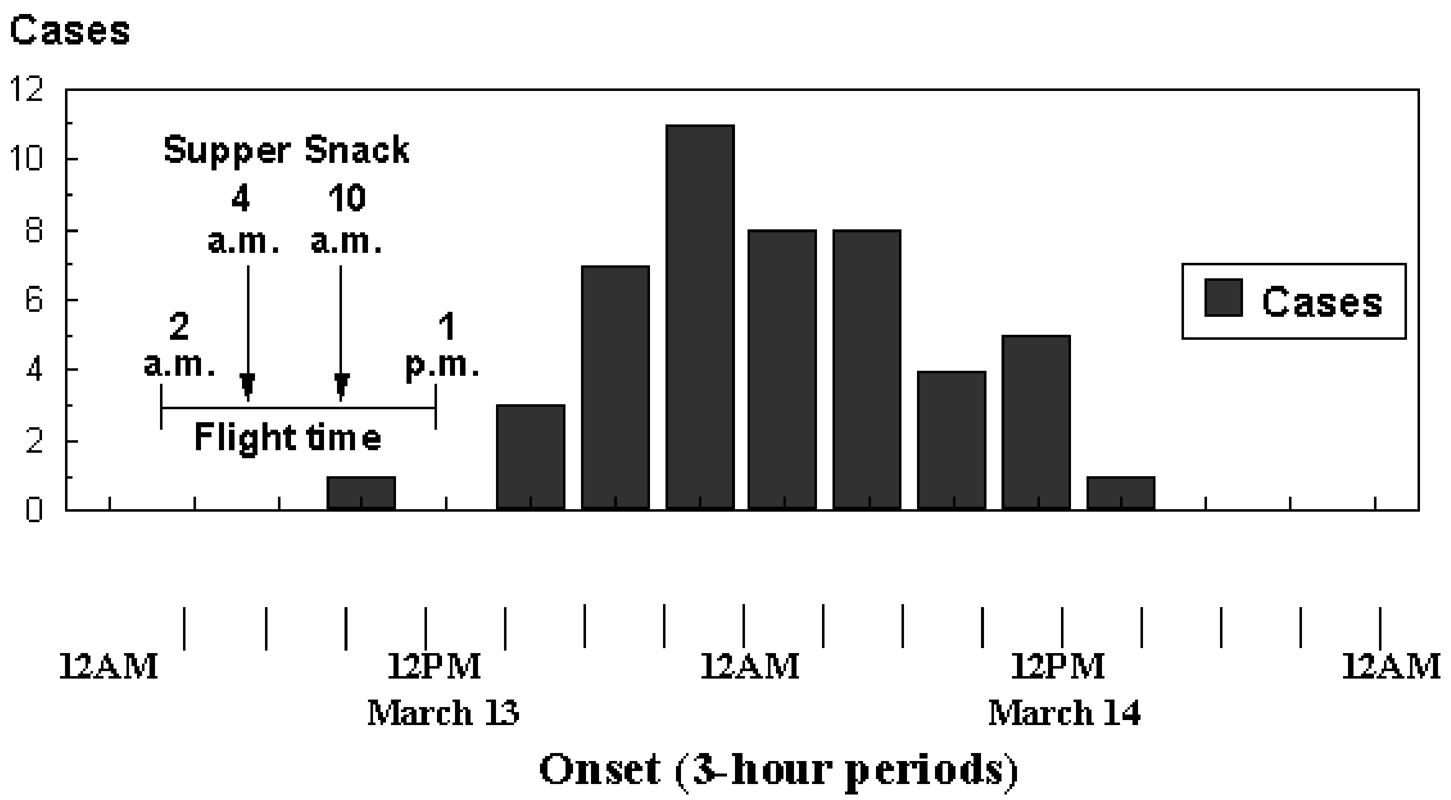
Salmonellosis in passengers on a flight from London to the United States, by time of onset, March 13--14, 1984



Source: Investigating an Outbreak, CDC

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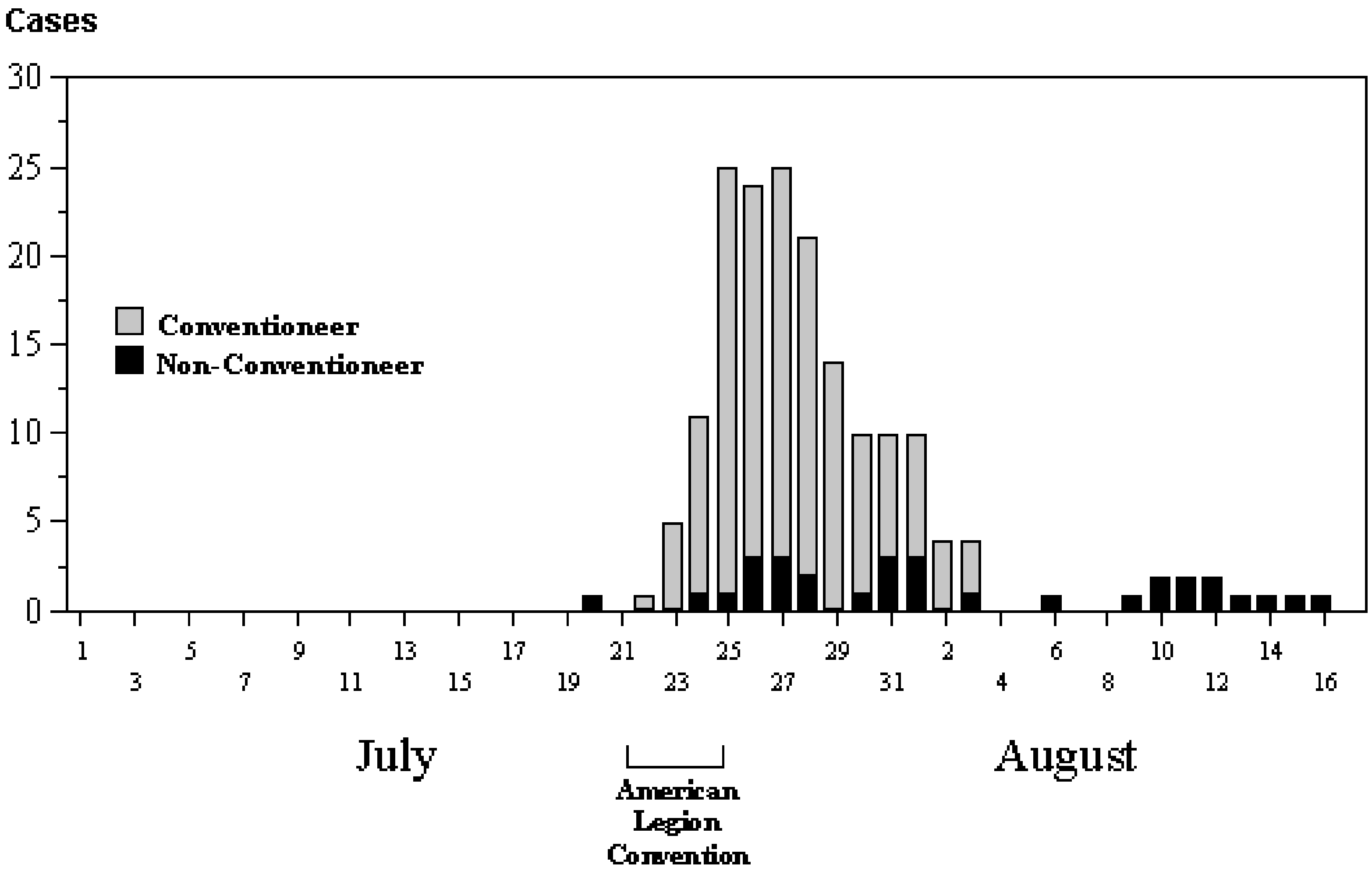
Legionnaires' Disease
By date of onset, Philadelphia, July 1-August 18, 1976



Source: Investigating an Outbreak, CDC

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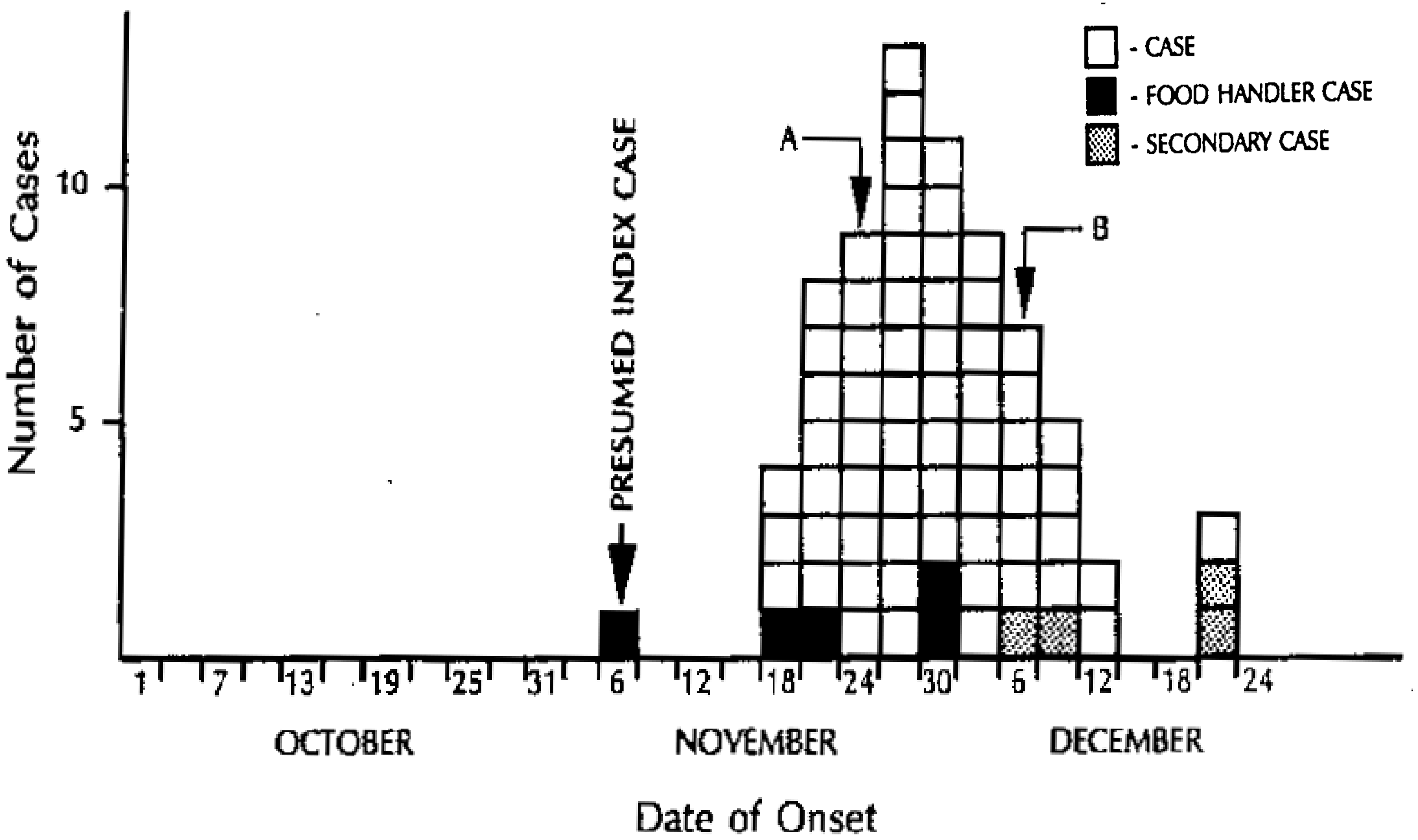
Foodborne Outbreak (Propagated)



Source: CDC, unpublished data, 1978

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Step 3: Calculate attack rates

Attack rate = (ill / ill + well) x 100 during a time period

If there is an obvious commonality for the outbreak, calculate attack rates based on exposure status (a community picnic)

If there is no obvious commonality for the outbreak, calculate attack rates based on specific demographic variables (hepatitis cases in a community)

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Step 4: Determine the source of the epidemic

If there is an obvious commonality for the outbreak, identify the most likely cause and investigate the source to prevent future outbreaks

If there is no obvious commonality for the outbreak, plot the geographic distribution of cases by residence/ work/school/location and seek common exposures

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Step 5: Recommend control measures

- Control of present outbreak
- Prevention of future similar outbreaks

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The vast majority of outbreaks are food-borne

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Aeromonas

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Glossary

Anthroponosis An infectious disease in which the etiological agent is carried by humans and is transferred to other humans and animals.

Foodborne disease Any disease resulting from the consumption of contaminated food, pathogenic bacteria, fungus, viruses, or parasites that contaminate food, as well as chemical or natural toxins such as poisonous mushrooms.

Organism life cycle A period involving all different generations of a species succeeding each other through means of reproduction, whether through asexual reproduction or sexual reproduction (a period from one generation of organisms to the same point in the next).

Taxonomy The science of classification, in microbiology the arrangement of microorganisms into a classification.

Zoonosis Any infectious disease that can be transmitted between species (by various ways, by a vector or by their products, and food) from animals to humans or from humans to animals (less common).

Introduction

Aeromonas is a Gram-negative, facultative anaerobic rod that morphologically resembles members of the family *Enterobacteriaceae*. Diseases produced by some species of this genus are called aeromoniasis (ICD-10 A05.8).

The Pathogen

In taxonomy bank of the NCBI 29 species of *Aeromonas* have been described (Table 1), many of them associated with human diseases. The most important pathogens are *Aeromonas hydrophila*, *Aeromonas caviae*, and *Aeromonas veronii* biovar *sobria* (Table 1). The organisms are ubiquitous in fresh and brackish water. *Aeromonads* are estuarine bacteria and are ubiquitous in fish and shellfish, meats, and fresh vegetables. They group with the gamma subclass of the Proteobacteria (g-proteobacteria).

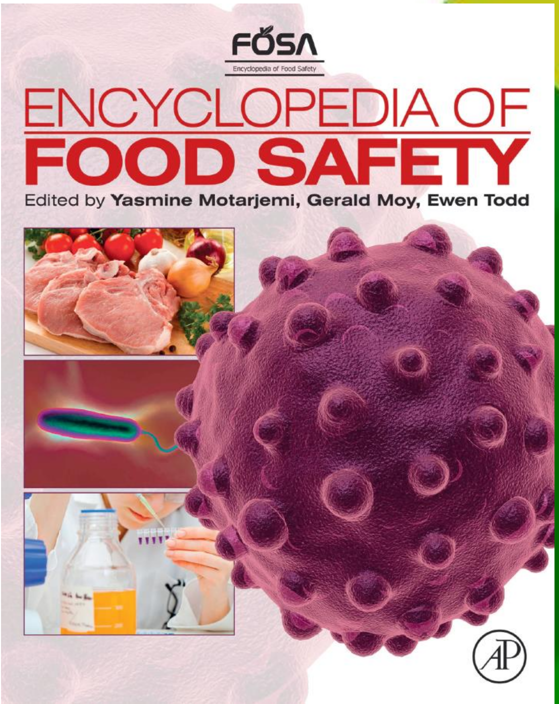
Table 1 Main species included in the genus *Aeromonas*, characterized and reported in the National Center for Biotechnology Information (NCBI) Taxonomy Browser (2012) (http://www.ncbi.nlm.nih.gov/taxonomy)

Aeromonas allosaccharophila	*Aeromonas media*
Aeromonas aquariorum	*Aeromonas molluscorum*
Aeromonas bestiarum	*Aeromonas piscicola*
Aeromonas bivalvium	*Aeromonas popoffii*
Aeromonas cavernicola	*Aeromonas rivuli*
Aeromonas caviae	*Aeromonas salmonicida*
Aeromonas cf. bestiarum/salmonicida	*Aeromonas sanarellii*
Aeromonas diversa	*Aeromonas schubertii*
Aeromonas encheleia	*Aeromonas sharmana*
Aeromonas enteropelogenes	*Aeromonas simiae*
Aeromonas eucrenophila	*Aeromonas sobria*
Aeromonas fluvialis	*Aeromonas taiwanensis*
Aeromonas guangheii	*Aeromonas tecta*
Aeromonas hydrophila	*Aeromonas veronii*
Aeromonas jandaei	

Aeromonas hydrophila, the most clinically important species of the genus, is a widespread representative of *Aeromonas* found in water, water habitants, domestic animals, and foods (fish, shellfish, poultry, and raw meat). The microorganism has the potential to be a foodborne pathogen, especially strains from hybridization group (HG1), associated with clinical cases of illness. *Aeromonas* species have been recognized as potential or emerging foodborne pathogens for more than 20 years. Additionally, as it affects fish, amphibians, and reptiles, *Aeromonas* is also considered a zoonotic bacteria. Aeromoniasis is rare in wild or domestic mammals and birds.

Clinical Presentation

Two major diseases have been associated with *Aeromonas*: gastroenteritis and wound infections, with or without bacteremia or sepsis. Gastroenteritis typically occurs after the ingestion of contaminated water or food (aeromoniasis is a foodborne disease), usually presenting with selflimiting diarrhea, with children being the most susceptible population, whereas wound infections result from exposure to contaminated water. Although some potential virulence factors (e.g., endotoxins, hemolysins, enterotoxins, and adherence factors)



Cystoisospora belli (Syn. *Isospora belli*)

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DM Castañeda-Hernández, Fundación Universitaria del Área Andina, Pereira, Colombia

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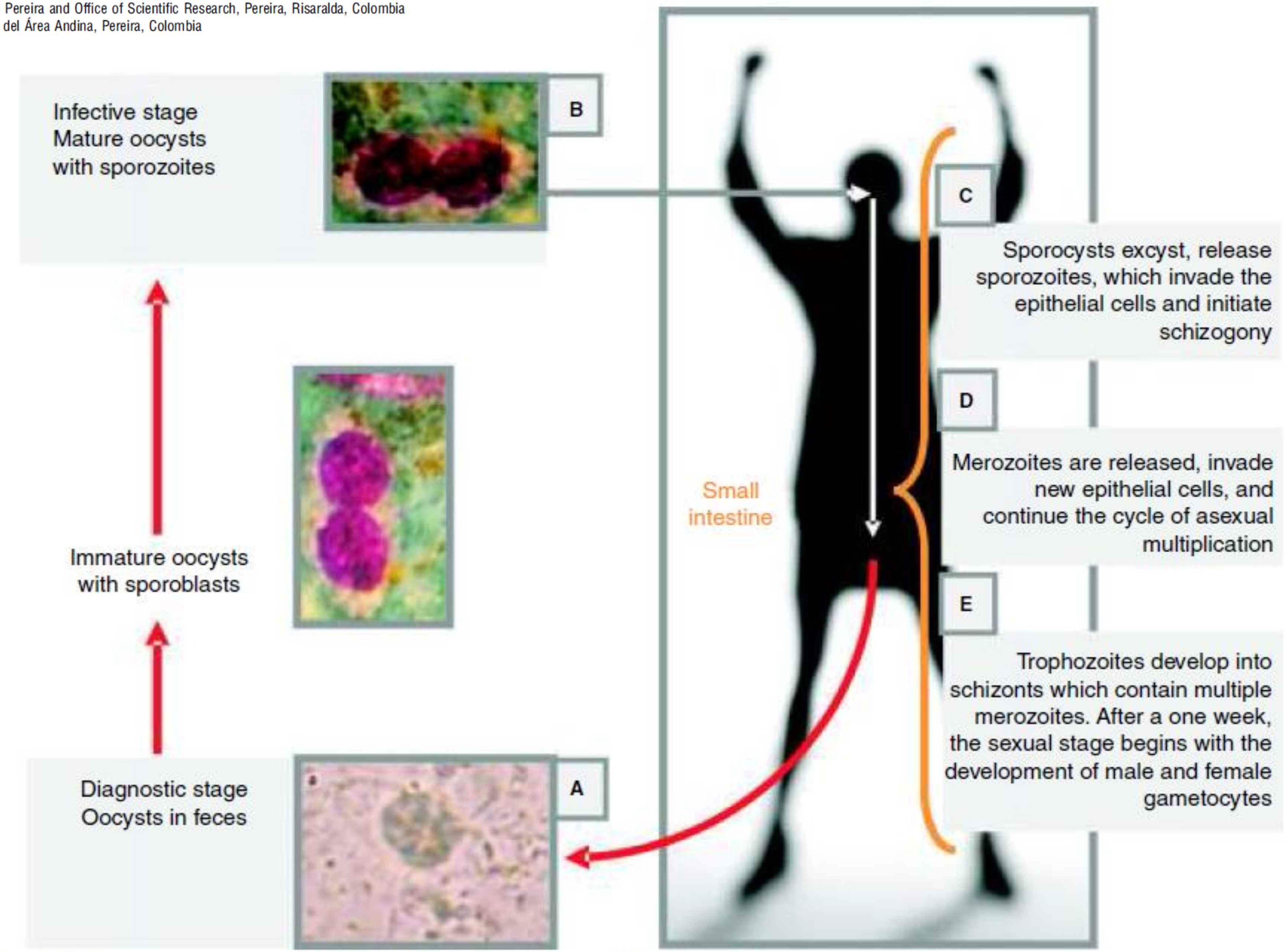
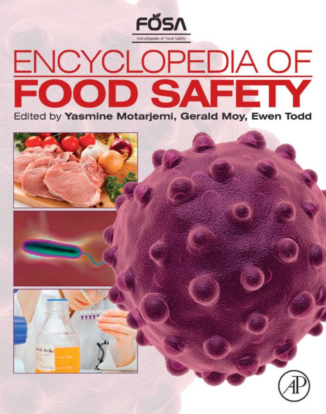


Figure 1 Transmission and life cycle of *Cystoisospora belli* in human beings.



Foodborne Disease Outbreak

- An incident in which (1) two or more persons experience a similar illness after ingestion of a common food, and (2) epidemiologic analysis implicates the food as the source of the illness
  - Intoxication – ingestion of foods with
    - Toxicants found in tissues of certain plants (Jimpson Weed) and animals (seal liver)
    - Metabolic products (toxins) formed and excreted by microorganisms while they multiply (botulinum toxin)
    - Poisonous substances introduced during production, processing, transportation or storage (chemicals, pesticides)

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Foodborne Disease Outbreak (cont.)

- Infections – Caused by the entrance of pathogenic microorganisms into the body and the reaction of the body tissues to their presence or to toxins they generate within the body

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Types of Foodborne Contamination

- <u>Physical</u>
  - Glass, metal fragments, tacks, dirt, bone, etc.
- <u>Chemical</u>
  - Pesticides, cleaning compounds, poisonous metals, additives and preservatives
- <u>Biological</u>
  - Bacteria, viruses, fungi, yeast, molds, parasites, poisonous fish and plants, insect and rodents

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Bacterial Requirements

- Food: Most bacteria require what is known as *potentially hazardous food*
  - Milk or milk products, eggs, meat, poultry, fish, shellfish, crustaceans, raw seed sprouts, heat treated vegetables and vegetable products (fruits?)
    - Generally high protein, moist foods

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Bacterial Requirements (cont.)

- Water: Bacteria require moisture to thrive
  - The water activity (Aw) is the amount of water available in food
  - The lowest Aw at which bacteria will grow is 0.85
    - Most potentially hazardous foods have a water activity of 0.97 to 0.99
- pH: Best growth at neutral or slightly acidic pH
  - Potentially hazardous foods have a pH of 4.6 – 7.0

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Bacterial Requirements (cont.)

- Temperature: The danger zone for potentially hazardous foods is 45 to 140 degrees Fahrenheit
  - This is the zone where most bacterial growth occurs
- Time: Potentially hazardous foods must not be allowed to remain in the danger zone for more than 4 hours
- Oxygen: Some bacteria require oxygen while others are anaerobic and others are facultative

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Major Causes of Foodborne Disease

- Improper cooling of foods
- Improper cooking of foods
- Improper reheating of foods
- Improper holding temperature of foods
- Cross contamination
- Infected food handlers, poor employee hygiene

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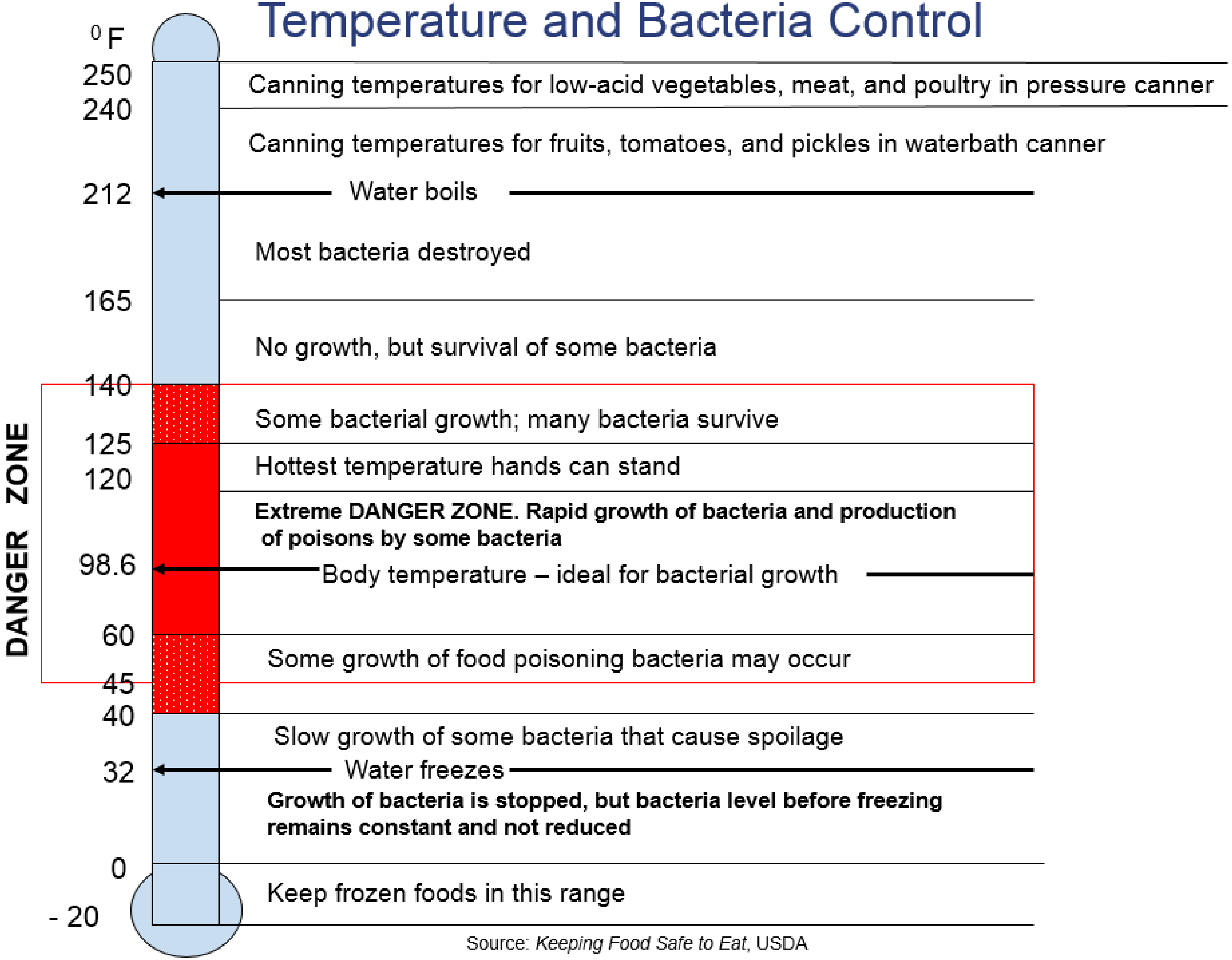
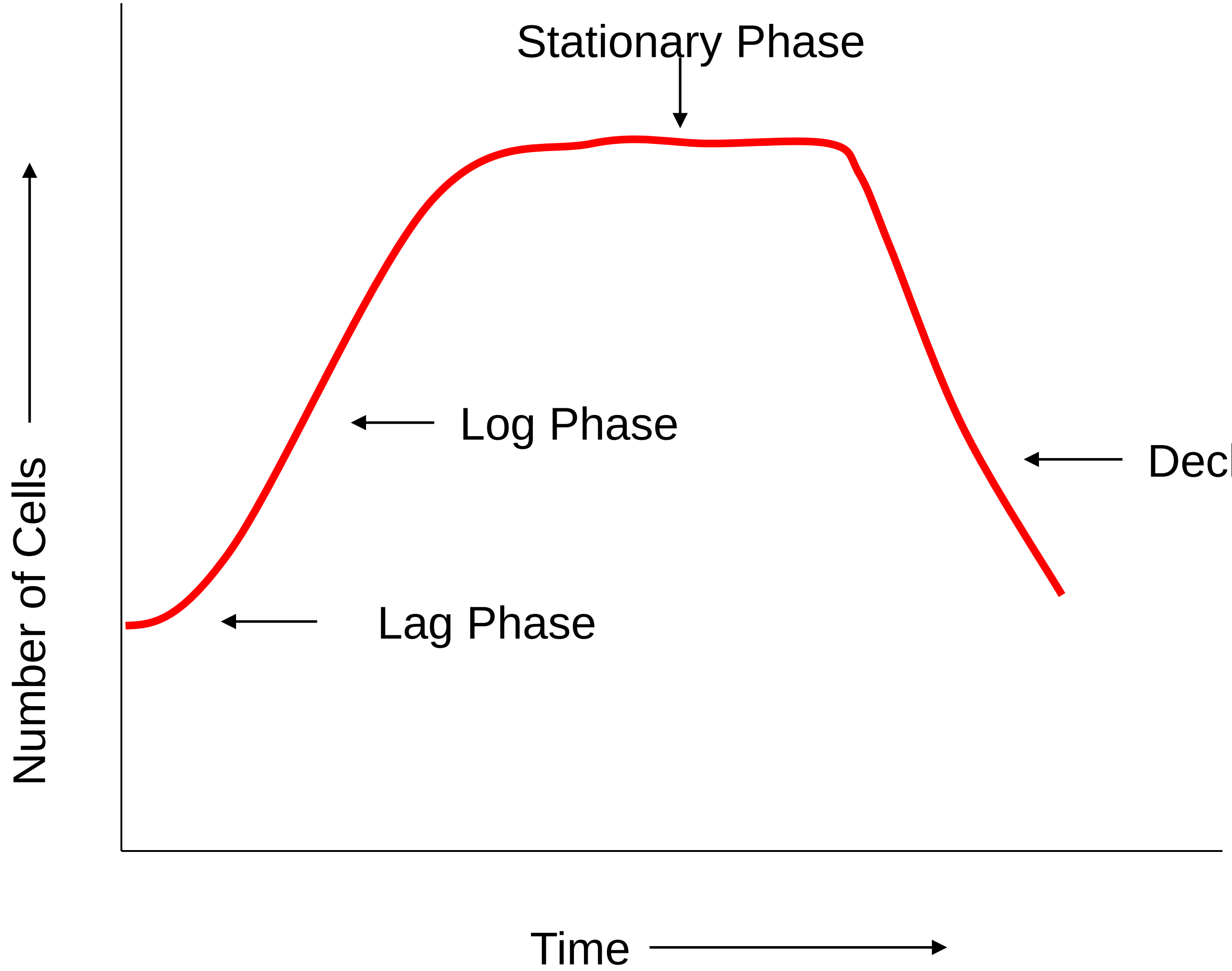
Temperature and Bacteria Control



Source: *Keeping Food Safe to Eat*, USDA

Bacterial Growth Curve



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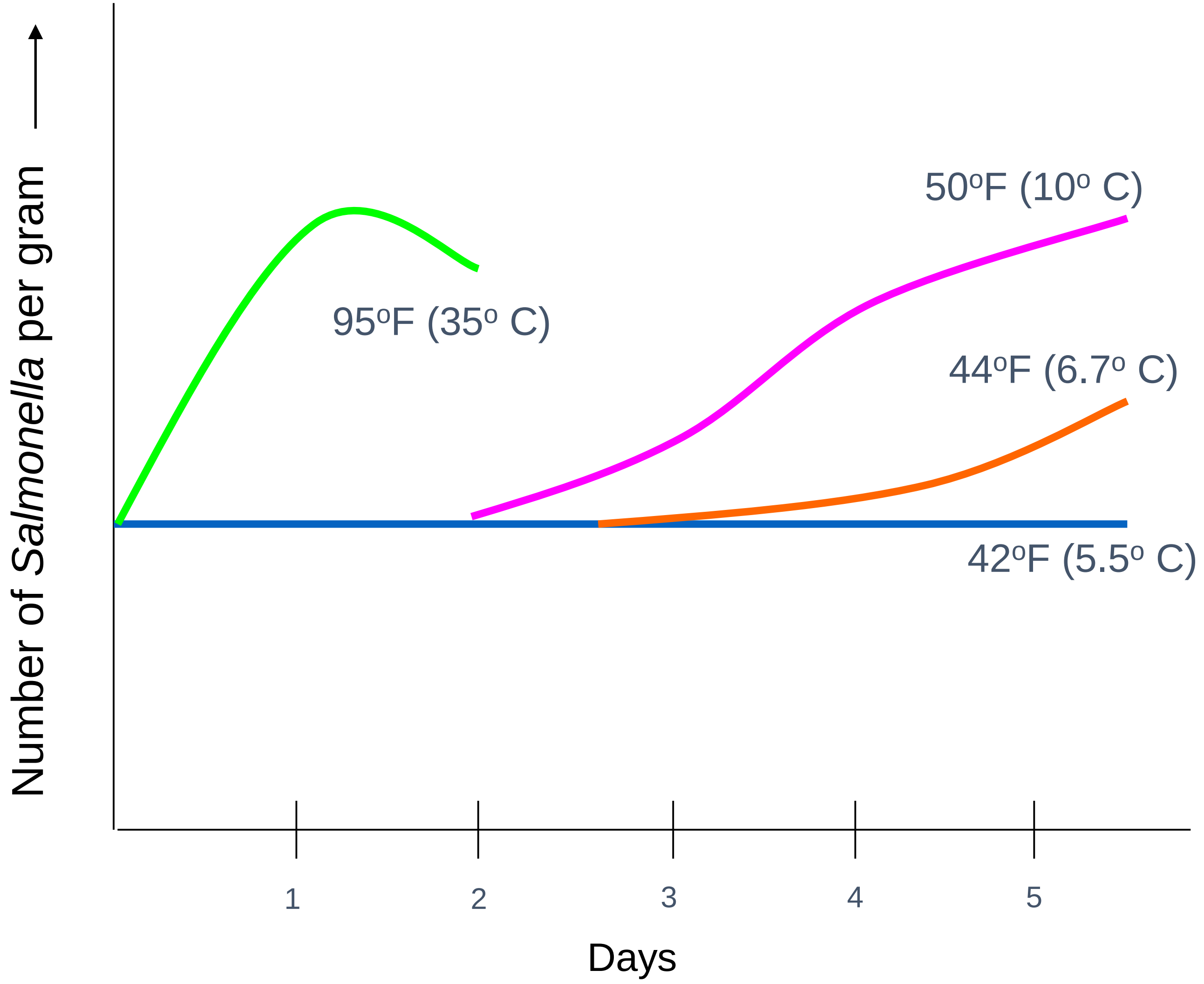
Effect of Temperature in *Salmonella* Growth



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Incubation Periods

2-4 hours	Staphylococcus aureus	Cooked ham, meat, eggs, sauces and gravies
12 hours	Clostridium perfringens	Cooked meats, gravy
12-36 hours	Salmonella*	Meat, poultry, eggs
12-36 hours	Clostridium botulinum	Canned foods, smoked fish
12 hours	Vibrio parahemolyticus*	Raw fish, shellfish
24-48 hours	Shigella*	Contaminated by carrier, not foodborne

* Fever

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National Data on Etiology of Foodborne Illness

Agent	
Bacteria (40 agents)	68.7%
Salmonella	25.0%
Staph. aureus	12.7%
Clostridium perfringens	10.0%
Clostridium botulinum	9.5%
Viral (11 agents)	9.4%
Parasites (31 agents)	0.5%
Fungal (16 agents)	1.8%
Plants (36 agents)	-
Fish (28 agents)	12.3%
Chemicals (28 agents)	7.3%

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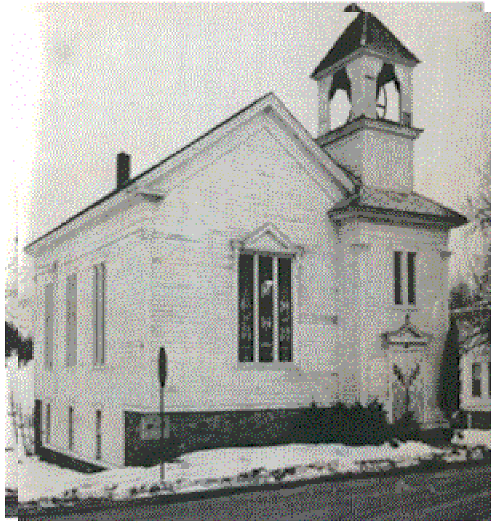
Investigating an Epidemic: Oswego, NY



On April 19, 1940, the local health officer in the village of Lycoming, Oswego County, New York, reported the occurrence of an outbreak of acute gastrointestinal illness to the District Health Officer in Syracuse. Dr. A. M. Rubin, epidemiologist-in-training, was assigned to conduct an investigation.

When Dr. Rubin arrived in the field, he learned from the health officer that all persons known to be ill had attended a church supper the previous evening, April 18. Family members who had not attended the church supper had not become ill. Accordingly, the investigation was focused on the circumstances related to the supper.

Source: CDC

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Interviews regarding the presence of symptoms, including the day and hour of onset, and the food consumed at the church supper, were completed on 75 of the 80 persons known to have been present. A total of 46 persons who had experienced gastrointestinal illness were identified.

Q: Is this an Epidemic?
Endemic for the region?
Due to seasonal variation?
Due to random variation?

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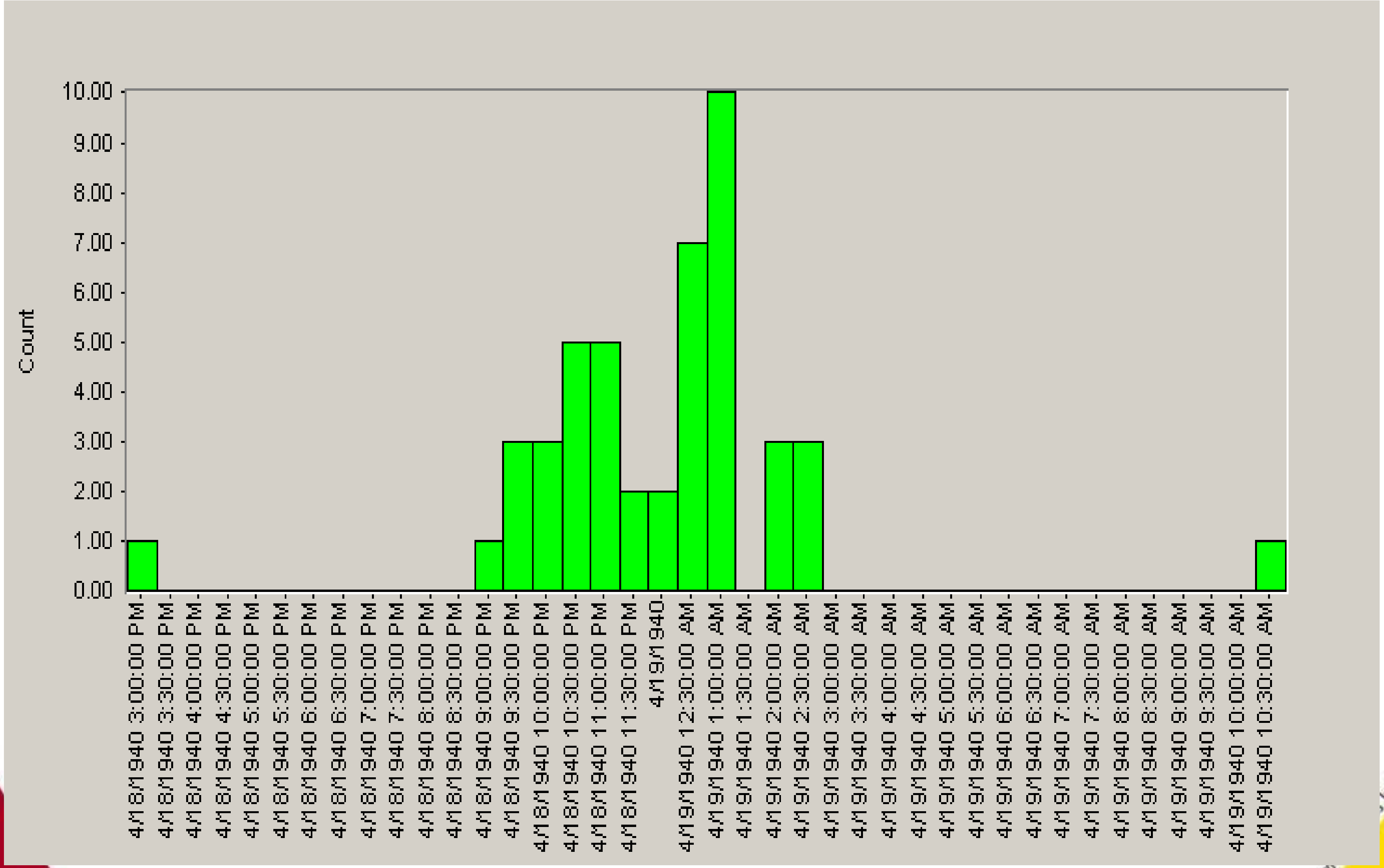
Incidence of Cases of Diarrhea Among People Attending Lycoming,Oswego Church Supper, June 1940



The supper was held in the basement of the village church. Foods were contributed by numerous members of the congregation. The supper began at 6:00 PM and continued until 11:00 PM. Food was spread out upon a table and consumed over a period of several hours.

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Church Supper Menu

Main Dishes	• Baked ham • Spinach • Mashed potatoes • Cabbage salad • Fruit Salad
Side Dishes	• Jello • Rolls • Brown Bread
Desserts	• Cakes • Vanilla Ice Cream • Chocolate Ice Cream
Beverages	• Milk • Coffee • Water

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Surveillance

Ongoing systematic collection, collation, analysis and interpretation of data; and the dissemination of information to those who need to know in order that action may be taken.

World Health Organization

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Purposes of Public Health Surveillance

- Estimate magnitude of the problem
- Determine geographic distribution of illnesses
- Portraying the natural history of disease
- Detect epidemic / Define a problem
- Generate hypotheses and stimulate research
- Evaluate control measures
- Monitor changes in infectious agents
- Detect changes in health practice
- Facilitate planning

CDC

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Passive Surveillance

- Physicians, laboratories, and hospitals are given forms to complete and submit with the expectation that they will report all of the cases of reportable disease that come to their attention
- Advantages: Inexpensive
- Disadvantages: Data are provided by busy health professionals. Thus, the data are more likely to be incomplete and underestimate the presence of disease in the population

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Active Surveillance

- Involves regular periodic collection of case reports by telephone or personal visits to the reporting individuals to obtain the data
- Advantages: More accurate because it is conducted by individuals specifically employed to carry out the responsibility
- Disadvantages: Expensive

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Sentinel Surveillance

- Monitoring of key health events, through sentinel sites, events, providers, vectors/animals
- Case report indicates a failure of the health care system or indicates that special problems are emerging
- Advantages: Very inexpensive
- Disadvantages: Applicable only for a select group of diseases

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"Good surveillance does not necessarily ensure the making of right decisions, but it reduces the chances of wrong ones."

Alexander D. Langmuir

NEJM 1963;268:182-191

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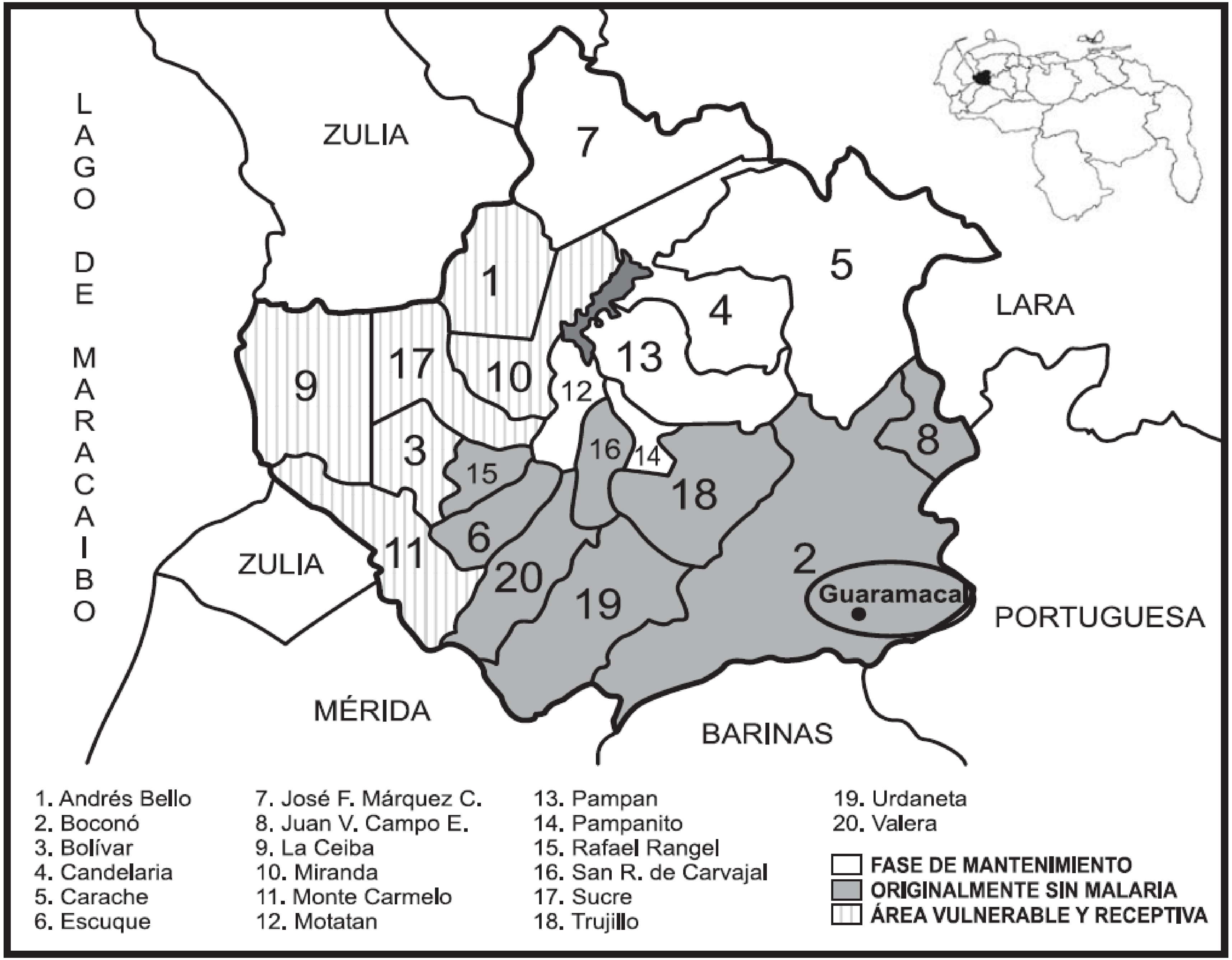
Fig. 1. Áreas epidemiológicas de la malaria en el Estado Trujillo, Venezuela, año 2000 y situación relativa del área de estudio.



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BOLETÍN
DE MALARIOLOGÍA
Y SALUD AMBIENTAL
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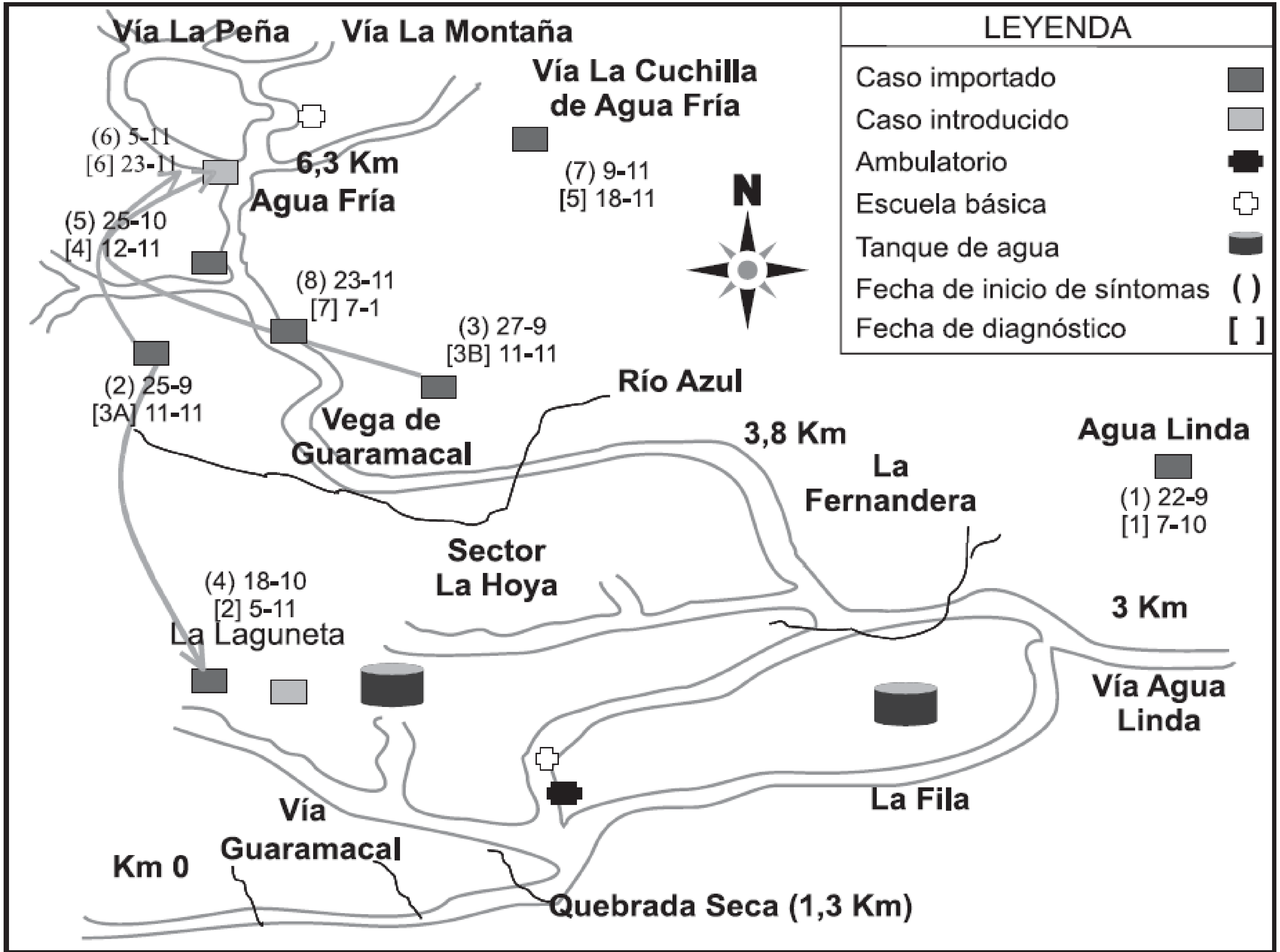
Descripción de un Brote Epidémico de Malaria de Altura en un área originalmente sin Malaria del Estado Trujillo, Venezuela

Jesús A. Benítez[1], Alfonso Rodríguez[2], Mayira Sojo[1], Hugo Lobo[3],
Carlos Villegas[3], Leonardo Oviedo[3] & Eric Brown[2].

Tabla I. Caracterización epidemiológica de los casos de Malaria en la Parroquia Guaramacal, Municipio Boconó, Trujillo. 1999-2000.

Caso	Edad (años)	Género	Residencia**	Clasificación Epidemiológica	Fecha de Inicio de los Síntomas	Fecha de Diagnóstico
1	31	M	Agua Linda	Importado	22/09/99	07/10/99
2	31	F	La Laguneta	Introducido	18/10/99	05/11//99
3	24	M	Agua Fría	Importado	25/09/99	11/11/99
4	22	M	Agua Fría	Importado	27/09/99	11/11/99
5	50	M	Agua Fría	Importado	25/10/99	12/11/99
6	50	F	Agua Fría	Introducido	05/11/99	23/11/99
7	39	M	Agua Fría	Importado	09/11/99	18/11/99
8	35	M	Agua Fría	Importado	23/11/99	07/01/00
9	35	M	Agua Fría	Importado	25/09/99	11/11/09

Fig. 2. Croquis de la zona investigada en la Parroquia Guaramacal, Municipio Bocono, Estado Trujillo. (Nov. 1999 - Ene. 2000)



Urban outbreak of acute orally acquired Chagas disease in Táchira, Venezuela

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Key words: chagas disease; outbreak; acute; oral; transmission; Venezuela

J Infect Dev Ctries 2013; 7(8):638-641. doi:10.3855/jidc.3620

Figure. Study area of the AOACD outbreak, Táchira, Venezuela, November 2010

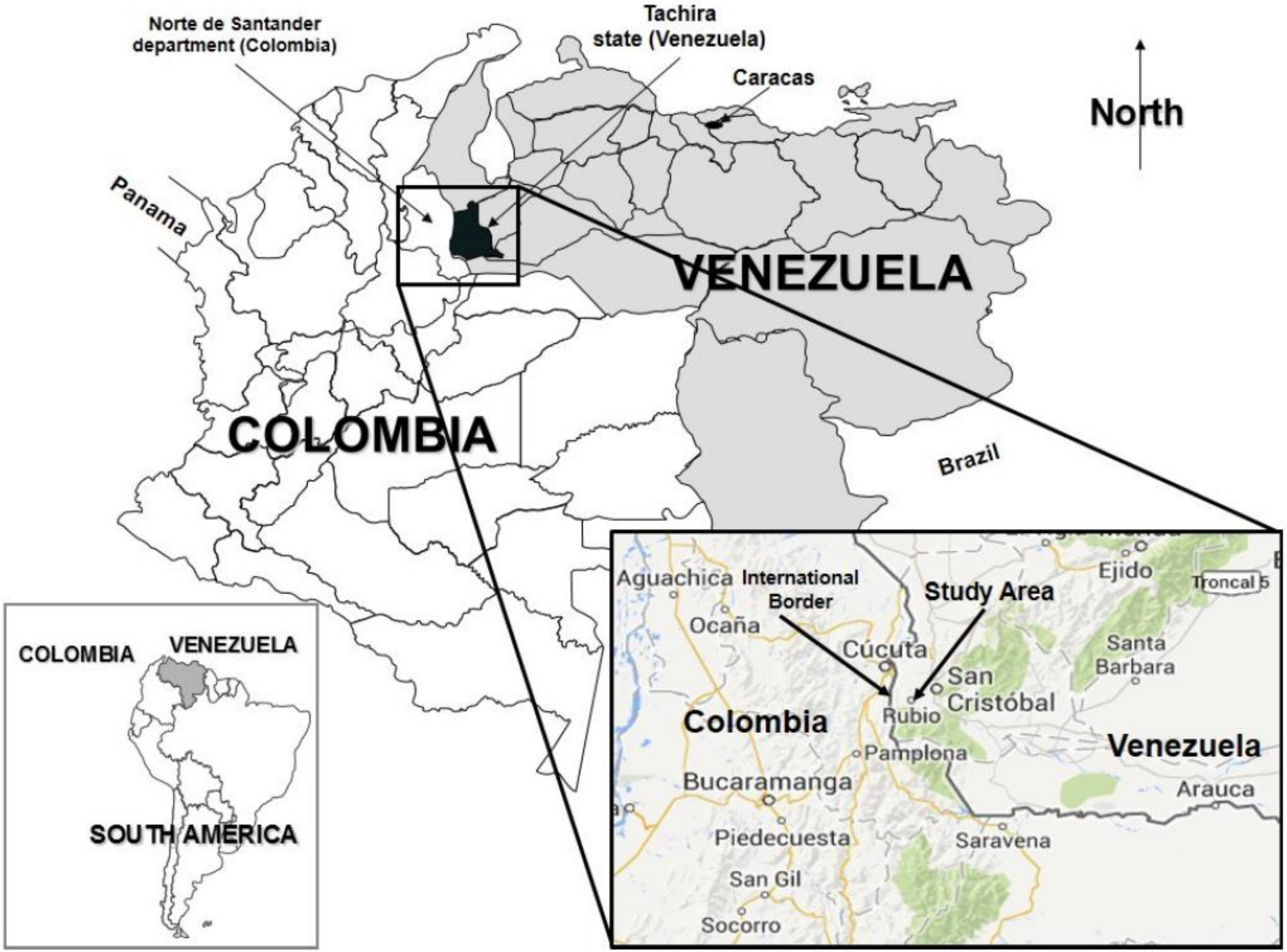

Table. Summary of the cases of the AOACD outbreak, Táchira, Venezuela, November 2010

					Test performed				
#	**Age (years)**	**Sex**	**Time living in the area (years)**	**Occupation**	**BS**	**ELISA IgG**	**IFI**	**IH**	**Outcome**
1	2	F	2	Pre-scholar	+	NT	NT	NT	Died*
2	2	F	2	Pre-scholar	-	+	+	-	Survived
3	26	F	25	University Student	-	+	+	-	Survived
4	24	F	24	Teacher	-	+	-	+	Survived
5	42	F	30	Housewife	-	+	+	-	Survived
6	31	M	31	Informatics	-	+	-	+	Survived

BS = blood smear; ELISA=enzyme-linked immunosorbent assay; IFI = indirect immunofluorescence; IH = indirect haemagglutination; F = female; m = Male; + = positive; - = negative; NT = not tested

*In this case the necropsy was made (finding amastigotes at myocardium).

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