What's hot in infectious diseases?





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Outbreaks

More than just Zika

Clostridium difficile

How to pay off your debt with donating poop

Lyme disease

A New kid on the block

Multi-drug resistance

Why you may not want to buy meat from China



Garvey et al. Journal of Hopsital Infection. Available online 28 Mar 2106.

Gotting et al., Journal of Hospital Infection. Available online 27 Feb 2016

Kohler et al. Eur Heart J 2015(36):2746-2753

Sax et al., Clin Infect Dis 2015(61):67-75

Public Health England. 10 June 2015. https://www.gov.uk/government/news/mycobacterial-infections-associated-with-cardiopulmonary-bypass-surgery

Sommerstein et al. EID Volume 22, Number 6—June 2016



Mycobacterium chimaera

Novel species within the *M. avium* complex - 2004

Human pathogen

Accurate identification requires 16S rRNA gene sequencing

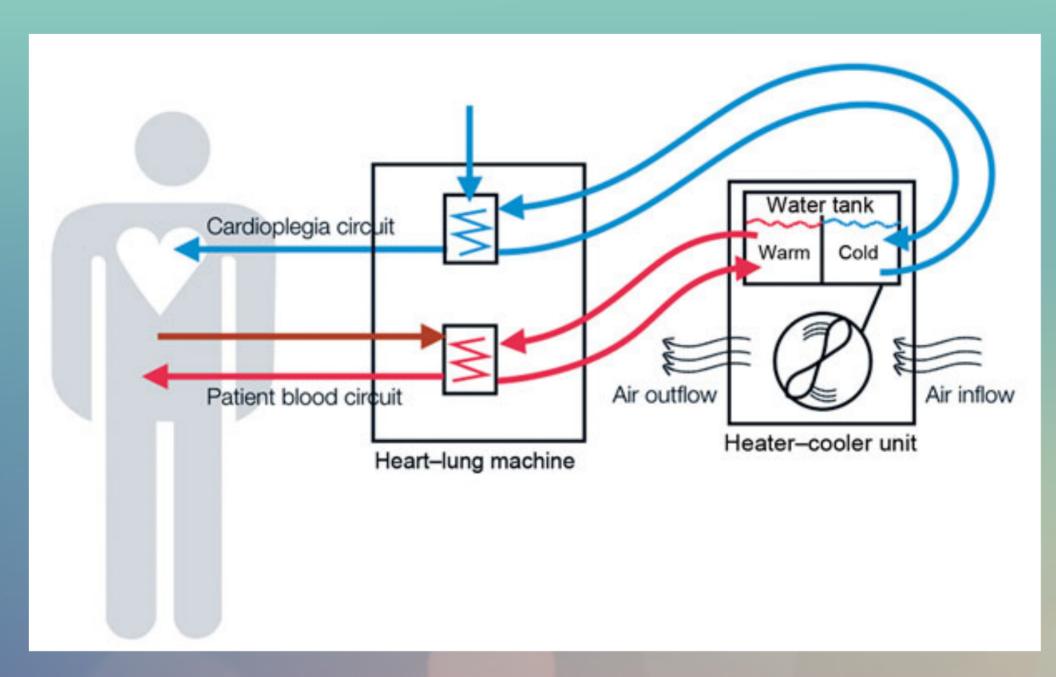




Heater Cooler Device

- oxygenator heat exchangers
- cardioplegia heat exchangers
- warming/cooling blankets





Sommerstein et al. EID Volume 22, Number 6—June 2016









October 2012: 2 cases of invasive *M. chimaera* infection with identical RAPD-PCR

6 cases of prosthetic valve endocarditis or vascular graft infections

- Positive air samples when machines were turned on
- Matching RAPD-PCR patterns among strains from water circuits and air samples





April 2015



Health Canada Santé Canada

July 2015



October 2015







The tank features filling and overflow tubes, heating and cooling coils, probes, and stirring devices. It is not airlight.

The space beneath the tank holds a radiator to dissipate superfluous heat The efficacy of this radiator is increased by a fan that ensures a constant airflow through ventilation grid openings on either side of the heater-cooler unit housing.



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Novel Implications

Substantiate airborne transmission pathway

Prototypical evidence that laminar flow systems may increase SSI risk

Highlight potential risk of add-on airflow devices in the OR



Interim Guidance

Strictly adhere to MIFUs

Relocate HCU

Direct the HCU vent away from surgical field

Patients who have undergone CV surgery in the last 4 years

Nonlocalizing symptoms: fever, mylagias, arthralgias, fatigue and weight loss

Endocarditis, SSI, bacteremia, renal insufficiency, hepatitis, cytopenias, osteomyelitis



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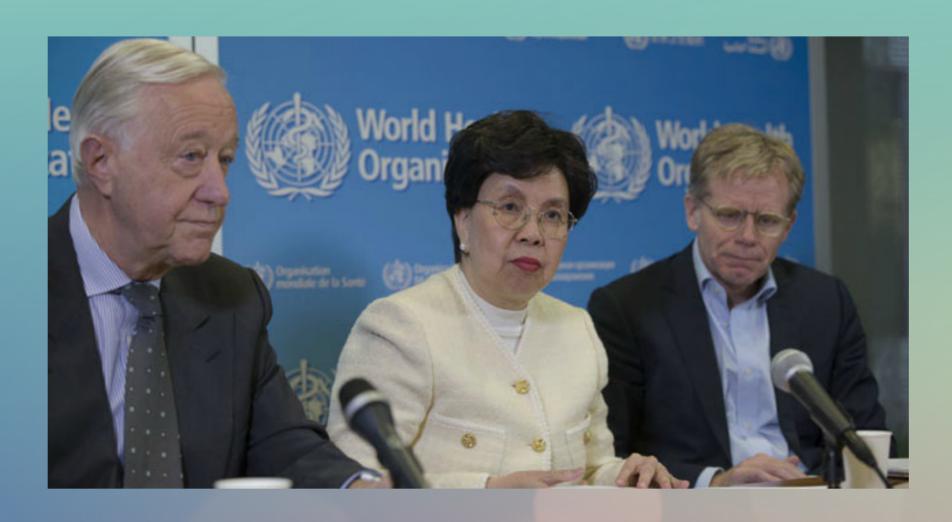
Why you may not want to buy meat from China



Outbreak in West Africa - December 2013

Public Health Emergency of International Concern - August 8, 2014





"The Ebola outbreak in West Africa is no longer a Public Health Emergency of International Concern"

EBOLA CONTACT TRACING



To accurately define and rapidly interrupt all remaining chains of Ebola transmission.

To identify, manage and respond to the consequences of residual Ebola risks.

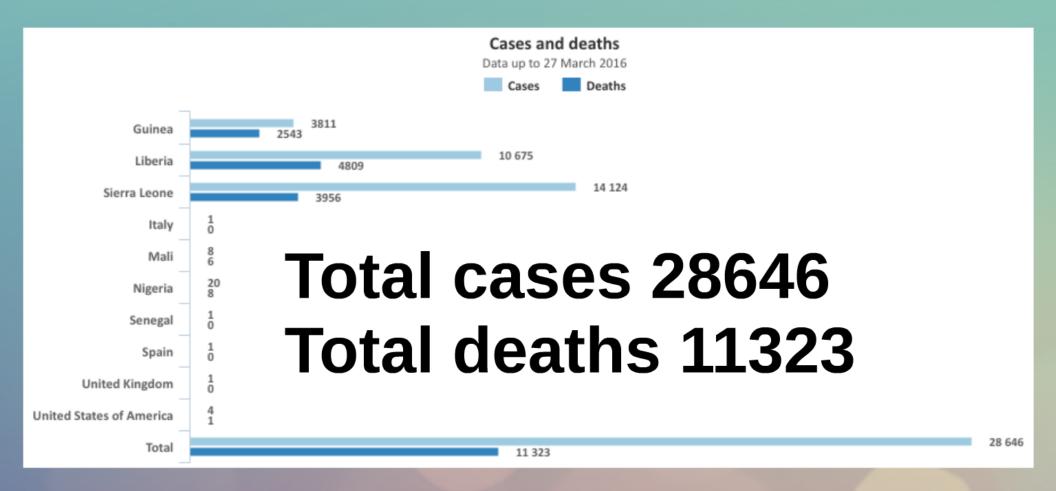


Phase 3 objectives

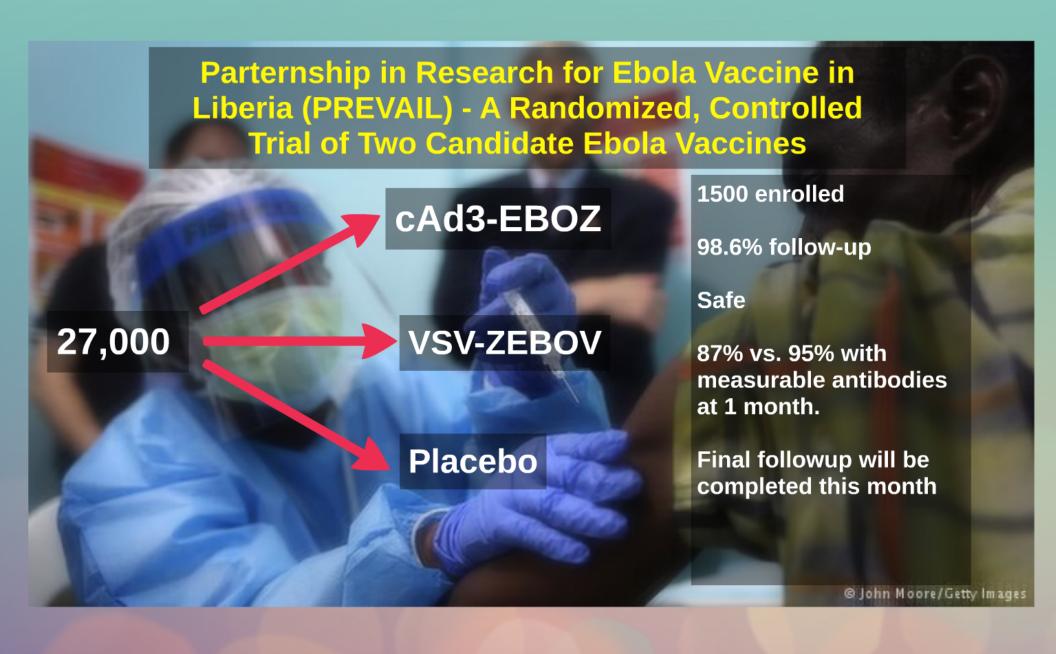
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PREVAIL II - A Randomized, Controlled Ebola Treatment Trial

Optimized standard of Care (OSC)

OSC + ZMapp

70 enrolled

Mortality at 28 days: 37% vs. 22%

Was not able to determine if OSC + ZMapp was superior



200

PREVAIL III - A Study of Ebola Survivors and Their Close Contacts

10 year prospective observational study ~ 7500 estimated enrollment

Characterize the clinical sequelae of convalescent EVD

Assess whether convalescent EVD patients can infect household and sexual contacts as determined by development of EVD or Ebola seroconversion in contacts

All participants screened with family illness history, physical exam, and blood tests. They may have an eye exam

Enrolled 1,049 survivors and 1,034 contacts (February 2016) 13% of asymptomatic close contacts tested positive for Ebola antibodies

Uveitis was the most common eye problem

Viral RNA in semen has been detected as long as 488 days after EVD

No sexual transmission documented



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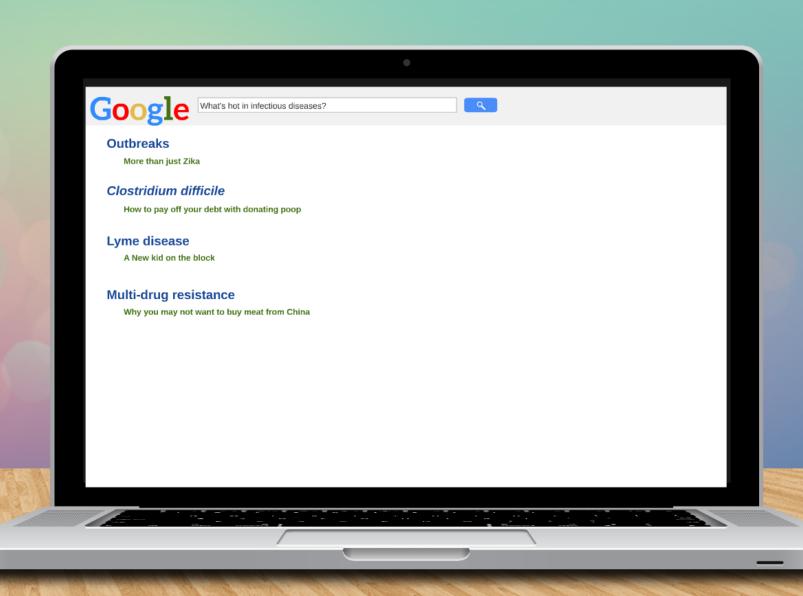
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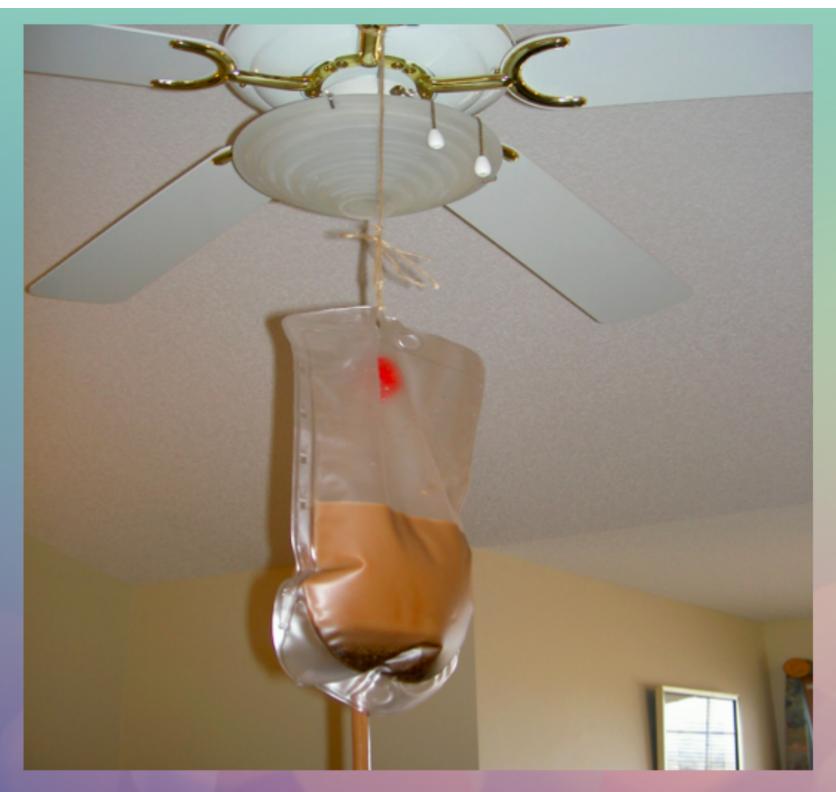


The Canadian Experience with FMT in 2010

Physician	Route of Delivery	Number of patients	Success rate
Ted Steiner		3	100%
Thomas Louie		60	96.6%
Michael Silverman	10	7	100%



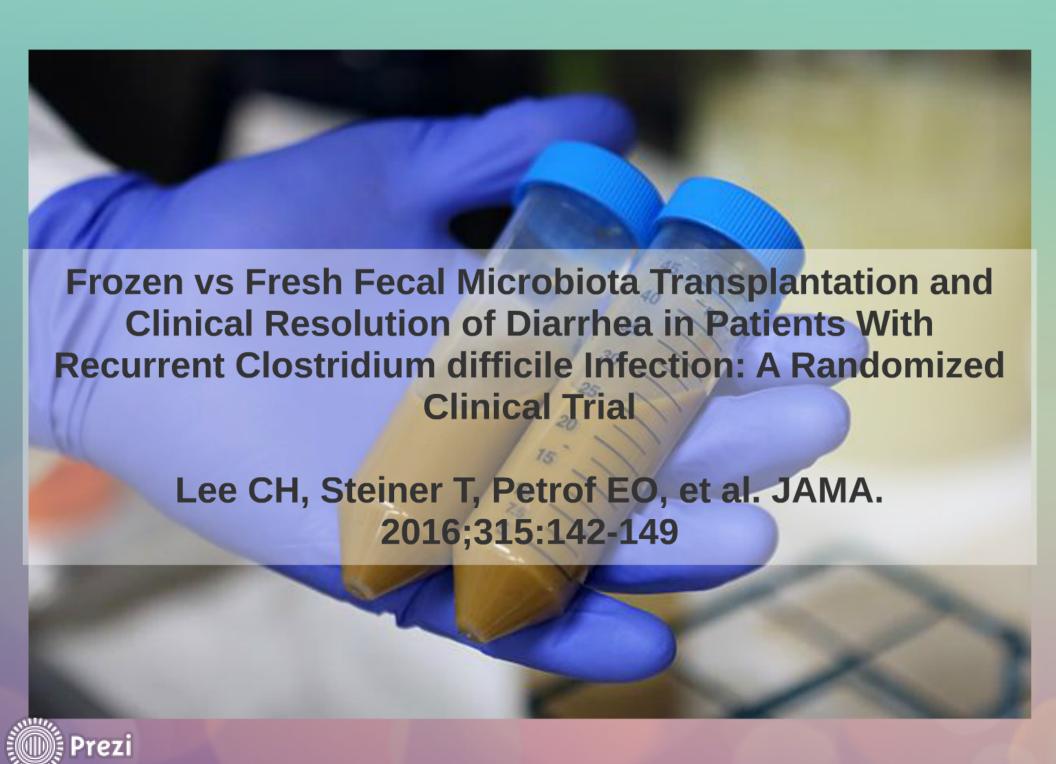


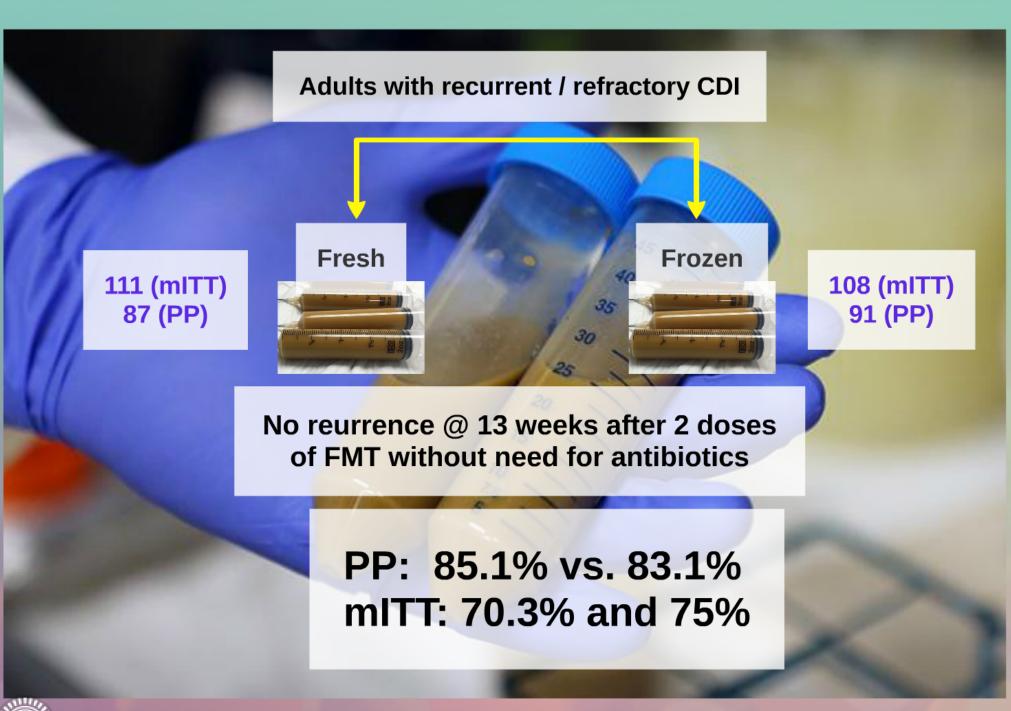














Practical Implications

Frozen stool FMT is non-inferior to fresh stool

FMT efficacy is not > 90%

"...greater support for the practice of using centralized stool banks..."







YOU WANT TO BE A S T O O L D O N O R ?

As we all know from Taro Gomi's childhood classic, Everyone Poops, but not everyone can donate their feces to OpenBiome. After a Boston.com article featured OpenBiome in October of last year, they recieved 459 inquiries—but only 14% made it onto the potential stool donor registry. Below is a breakdown of how most of these applicants were weeded out.







72

STEPTWO: THE CLINCAL INTERVIEW

of the original 459 applicants remain after the interview...

Applicants who clear the

questionnaire can be seen by OpenBiome's medical staff for a clinical interview similar to that before a blood donation at the Red Cross. Applicants answer a 109-question questionnaire about medical history and

lifestyle and are evaluated for any health problems.



STOOL SCREENING

If OpenBiome's medical staff deems an applicant healthy enough to donate stool, their stool will be screened for viruses and parasites. These pathogens—like rotavirus and norovirus—are usually harmless in small quantities in healthy adults,

of the remaining applicants pass the stool screening



but they may pose risks to fecal matter recipients in poor health. For this reason OpenBiome ensures their donors do not have potentially unsafe levels in their sloo narmiess in small quantities in healthy adults.

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STEP FOUR:

BLOOD SCREENING

applicants—all who passed the racid screening—also pass the blood screening

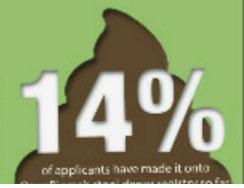
It is unclear what kinds of illness may be passed through stool, so to

be safe. OpenBiome screens applicants' blood for several bloodbourne pathogens, including HIV. Applicants' blood is also screened for indicators of other health problems, like abnormal liver function.

STEP FIVE:

DONATE!

If you become an "active donor," Open Biome will provide you with containers in which to put your donations and will expect you to drop off bowel movements four to five times a week. For an average donation, you will have the satisfaction

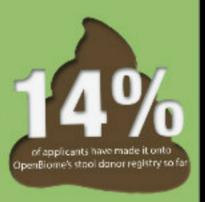




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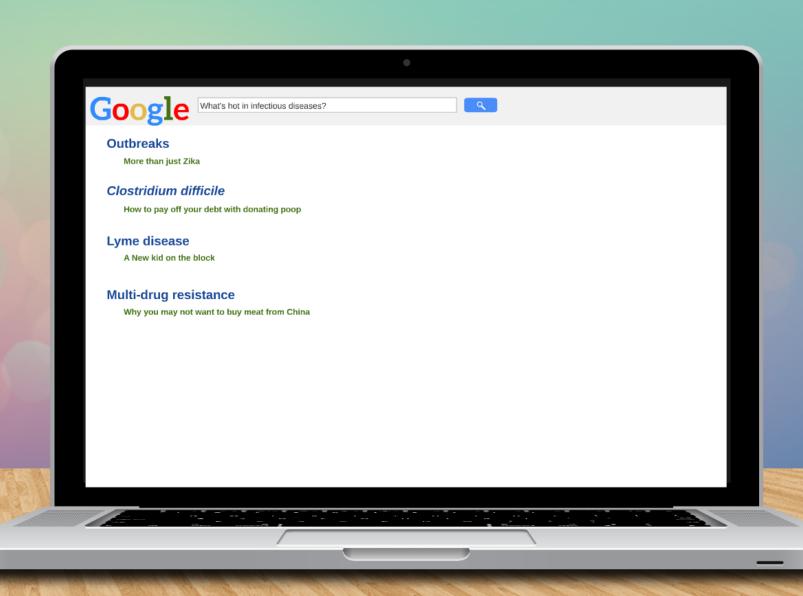
If you become an "active donor," Open Biome will provide you with containers in which to put your donations and will expect you to drop off bowel movements four to five times a week. For an average donation, you will have the satisfaction of creating about three samples (and potentially helping three people). You'll even get to choose your very own donor alias. Check out these monikers of current OpenBiome stool donors:





Special thanks to Laura Borns at OpenBiome.







Lyme borreliosis

Tick-borne multisystem disease with broad manifestations but low spirochaetemia

2

Borrelia burgdorferi sensu lato genospecies:

B. garinii

B. afzelii

B burgdorferi sensu stricto

3

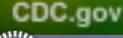
Distinct tissue tropisms of specific genospecies





Identification of a novel pathogenic Borrelia species causing Lyme borreliosis with unusually high spirochaetaemia: a descriptive study

Pritt et al. Lancet Inf Diseases 2016 (Published online February 6, 2016)

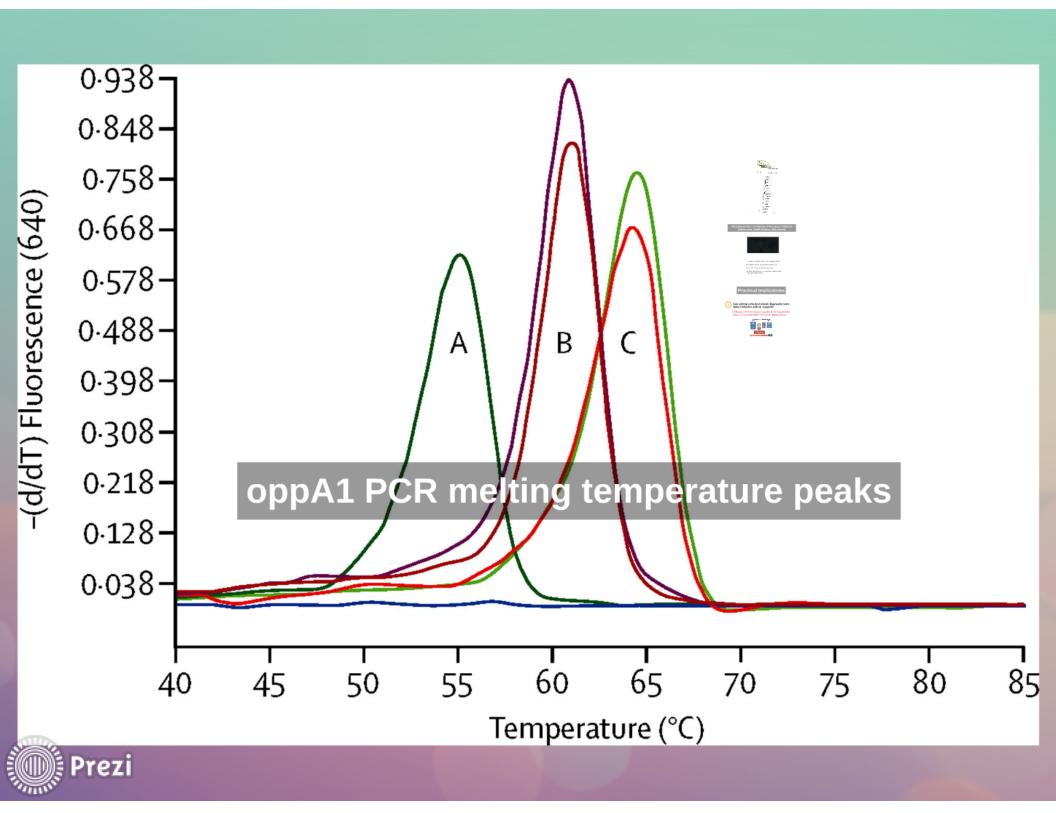




Mayo Medical Laboratories provides diagnostic PCR testing for Lyme borreliosis

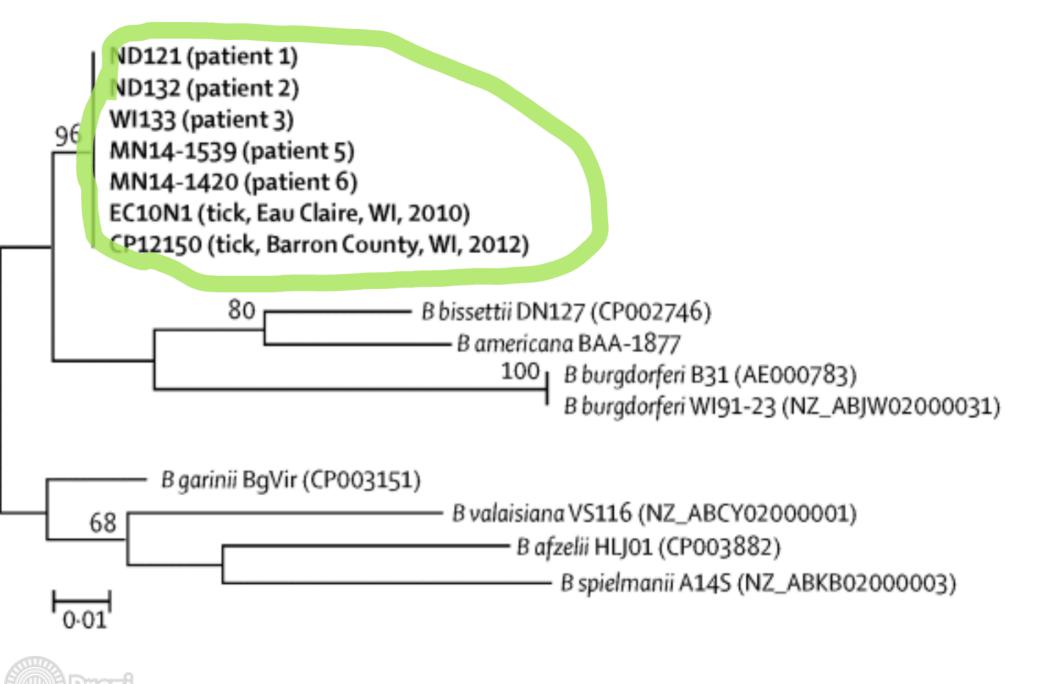
From Nov 2003 to Sept 2014, they received 100545 specimens for testing







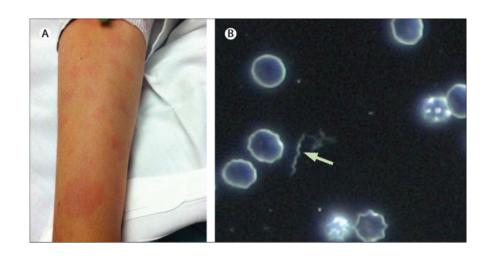








All patients were residents of the upper midwest (Minnesota, North Dakota, Wisconsin)



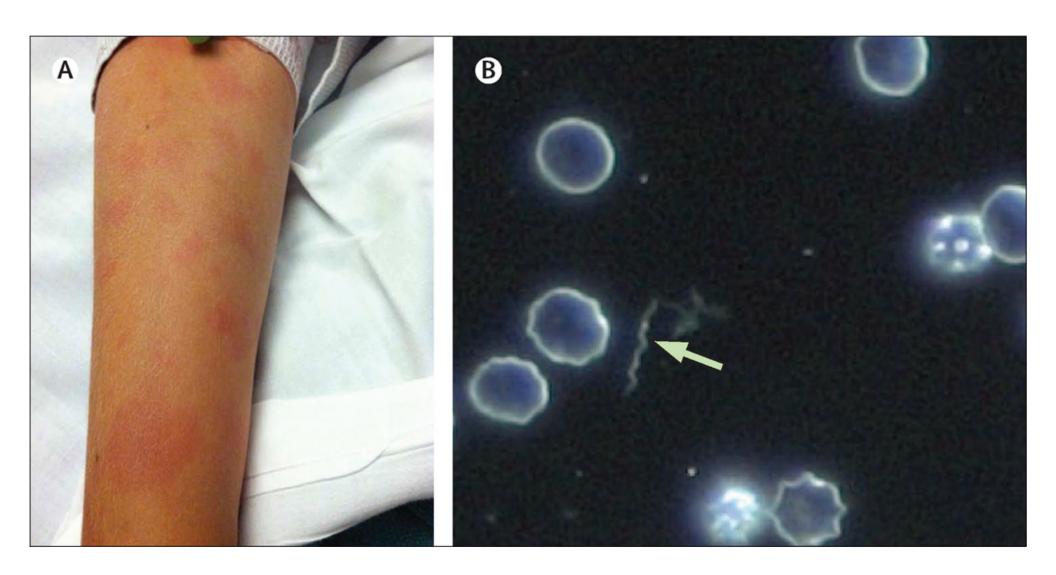
Five had acute febrile illness; 4 with nausea/vomitting

Sixth patient had one month unilateral knee pain

Three patients had neurological symptoms

For all five blood species, the estimated genome copies/ml was (50-8000X higher)







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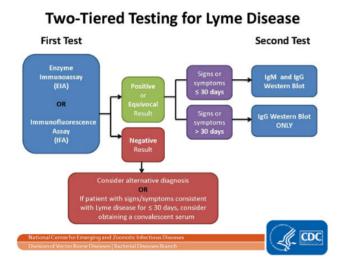


Practical Implications



Can exiting Lyme borreliosis diagnostic tests detect infection with B. mayonii?

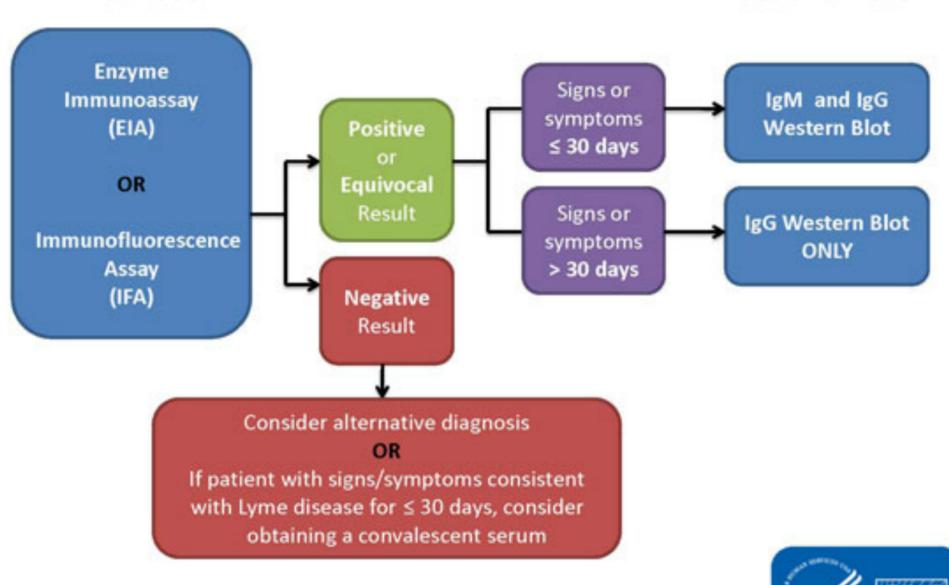
Unknown if PCR assays specific for *B burgdorferi* sensu stricto will detect the novel genospecies





Two-Tiered Testing for Lyme Disease

First Test Second Test



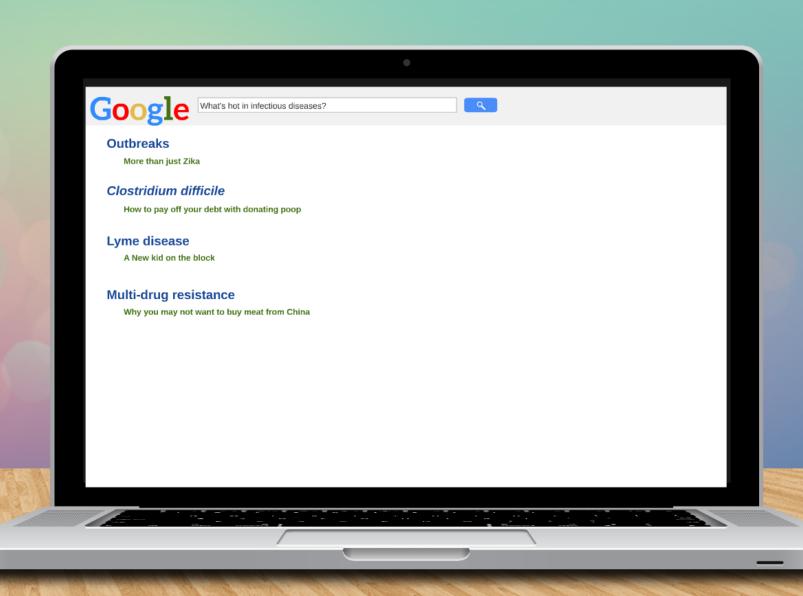
Borrelia Mew Mayonii

Mayo Clinic researchers in Minnesota, North Dakota and Wisconsin, have discovered a new bacterial species that causes Lyme disease in people, Borrelia mayonii. This bacteria causes an illness that appears to be associated with nausea and vomiting, diffuse rashes (rather than a single bull's-eye rash), and a higher concentration of bacteria in the blood.

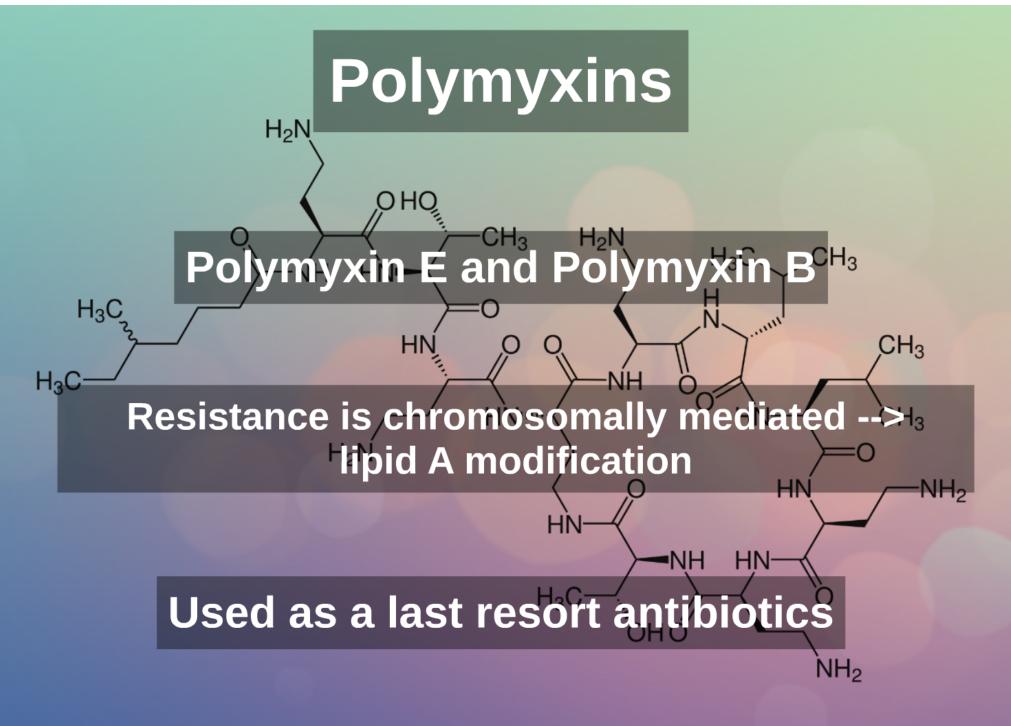
lymestats.org



Source: Mavo Clinic





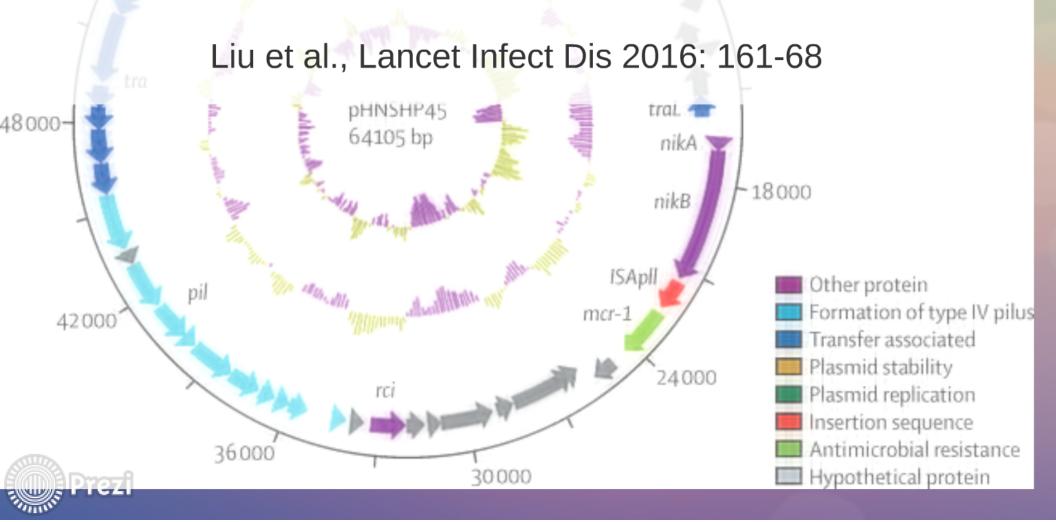








Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study



Major increase in colistin resistance in E.coli from of animals

Rapid increase might be plasmid mediated

Selected on E. coli strain (colistin MIC 8 mg/L; polymyxin MIC 4 mg/L) was selected for conjugation experiments

Collected clinical isolates of E. coli and K. pneumoniae from two hospitals in Guangdong and Zhejiang



