



Dr Bryn Thompson

General Practitioner

Auckland Regional Public Health Service

Saturday, August 10, 2019

(Plenary)

14:20 - 14:40 Tummy Bugs: Update on Notifiable Gastroenteritis, VTEC etc

NOTIFIABLE ENTERICS 101

(WHAT I DIDN'T KNOW AS A GP)

Auckland Regional Public Health Service

Rātonga Hauora ā Iwi o Tamaki Makaurau

Dr Bryn Thompson GP

GPCME SOUTH

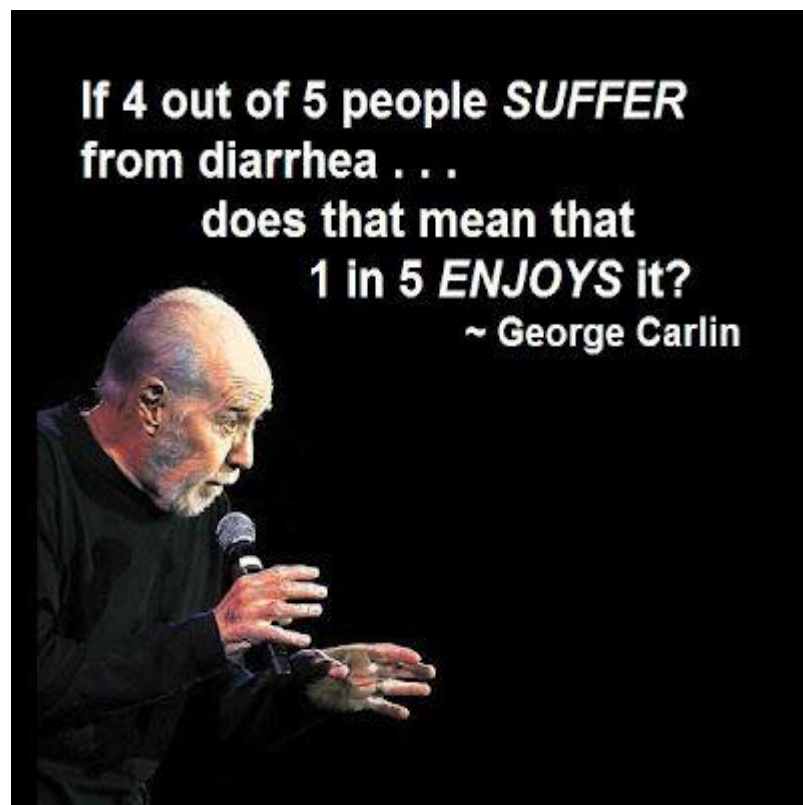
10th August 2019



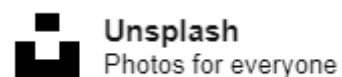
Waitemata
District Health Board
Best Care for Everyone



Working with the people of Auckland, Waitemata and Counties Manukau



No conflict of interest
Photos courtesy of unsplash.com



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Manukau*

- 1) Test?
- 2) Isolation
- 3) Clearance
- 4) VTEC/STEC
- 5) Cholera!!!???
- 6) Salmonella/Typhoid Fever
- 7) Shigella
- 8) Yersiniosis
- 9) Cryptosporidiosis
- 10) Norovirus
- 11) What is an HPO?
- 12) Treat?



What is Diarrhoea?

Acute gastroenteritis is a descriptive term for inflammation of the gastrointestinal tract from any cause. It commonly presents as the sudden onset of diarrhoea and/or vomiting.

Diarrhoea is defined as more frequent and loose stools **three or more times per day.**

It is so helpful to describe:

- Watery
- Bloody
- Explosive
- not
- “Soft”
- “Different”



AUCKLAND REGIONAL / *Te rohe o Tāmaki Makaurau*
HealthPathways

 Community
HealthPathways | Canterbury

 SOUTHERN
HealthPathways



NELSON MARLBOROUGH
HealthPathways

TE ARA TAURIMA
3D HealthPathways Wairarapa, Hutt Valley
and Capital & Coast District Health Boards

Nga Ara Hauora
Northland HealthPathways

 **CarePathways**



MIDLAND REGION
Community **HealthPathways**

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1) When to test

- **Not resolving** within 1 week
- **Travelled** overseas to areas with poor water or sanitation
- **Food handler**, childcare or healthcare worker, or immunocompromised
- **Bloody diarrhoea**
- **Severely unwell**
- **Recent hospitalisation/antibiotics** (Consider *C. difficile*)
- Consider sample for Norovirus if possible outbreak and notify PHU



2) Isolation

Cases of most enteric disease should be considered infectious and should remain off work/school until **48 hours after symptoms have ceased**.

Certain individuals pose a greater risk of spreading infection and additional restriction or exclusion criteria may apply. Microbiological clearance may be required for individuals infected with/exposed to certain pathogens.

The overriding prerequisite for fitness to return to work is **strict adherence to personal hygiene**, whether symptomatic or not.



Special Groups

- **Food Handlers** (people whose work involves preparing or serving **unwrapped food to be served raw or not subject to further heating**)
- **Health Care Workers/ECEC Staff**
- **ECEC Attendees**
- **Illness or Disability** (other adults or children at higher risk of spreading the infection due to illness or disability)



MANATŪ HAUORA

So helpful to keep records of
occupation and ECEC attendance

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3) Clearance

- Case vs contacts
- Depends on risk- food handler/ECEC/health/disability
- The role of public health unit (unless local agreement)
- VTEC/STEC (X)
- Typhoid Fever
- Paratyphoid Fever
- Shigella flexneri/boydii/dysenteriae

Lab tests 'formed' samples for public health purposes
but may reject GP requests



4) VTEC/STEC

- Verotoxin producing E coli/Shiga toxin producing E coli
- Some strains can cause HUS- haemolytic uraemic syndrome
- PCR testing has lead to much higher notification rates across NZ



STEC or VTEC= Boston Bun or Chelsea Bun- it simply depends where you live

VTEC/STEC

However, a third of the outbreaks since 2001 came from petting zoos, including the biggest outbreak of STEC Australia has seen: In August 2013, 57 people were infected after visiting a petting zoo at the Ekka Show in Queensland. 37 of those cases were young children.

Research carried out by Taranaki medical student Claire Richardson during her summer break in 2016 prompted the Taranaki District Health Board to begin pre-calving public information campaigns.

A toddler has died and another is seriously sick after visiting a petting zoo in the US. Beautiful 20-month old Colton Guay from Maine visited the Oxford County Fair with his father last week and did what many young children love to do at a fair – he entered the petting zoo to play with the animals, including sheep and goats. Less than a week later, he was dead.

Sick after petting animals

After being rushed to hospital, Colton was diagnosed with haemolytic uremic syndrome (HUS). The syndrome is an effect of being exposed to E. coli bacteria, which lives in the digestive tracts of humans and animals.

Animal waste was the main source of infection, but the toxin producing bacteria were also in places contaminated with animal waste such as muddy puddles, drinking troughs, farm clothing and footwear, and in dogs and other farm animals going inside a house.

17 Sickened, 1 Dead After Eating Ground Beef Contaminated With E. Coli

Health officials have declared the multistate outbreak over, but they're continuing to warn consumers about

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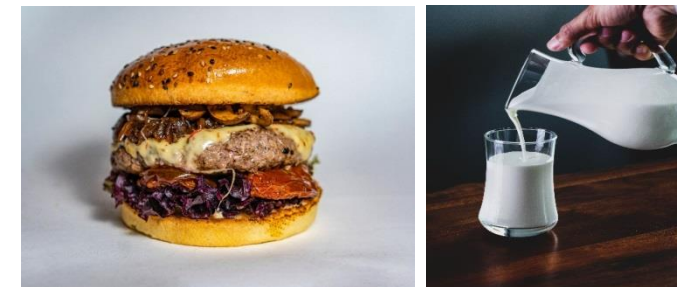


Sources of VTEC

Risk factors	Cases	% Present 2016	% Present 2017	% Present 2018
Overseas acquired	53	9%	18%	24%
Untreated water supply	26	17%	11%	17%
Contact with farm animals	25	14%	17%	16%
Contact with domestic pets	74	43%	42%	47%
Contact with faeces or manure	34	24%	20%	22%
Contact with confirmed case or person with similar illness	22	13%	11%	14%
Recreational water contact	1	1%	1%	0.6%
Consumption of home kill meat	7	5%	4%	4%

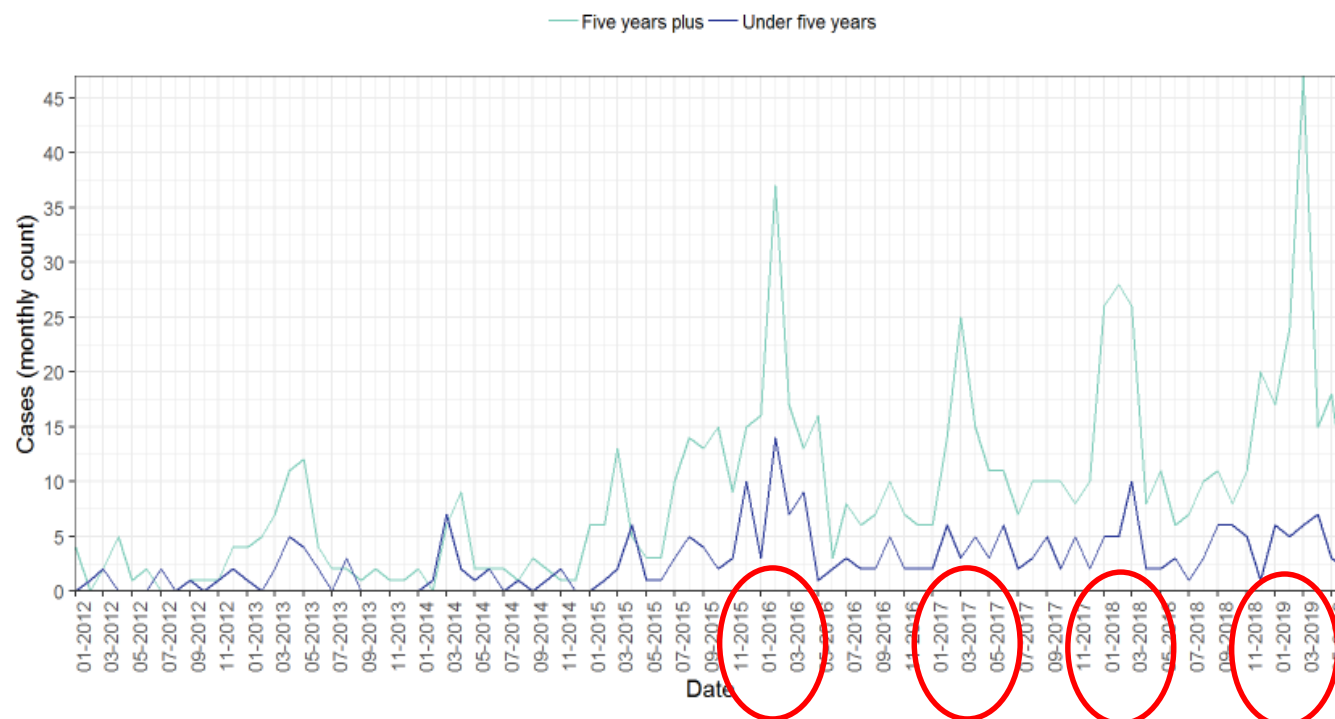
Risk factors associate with VTEC Auckland region, 2016-2018

Source: NDCMS (overseas acquired cases are excluded from the denominator for locally acquired cases)

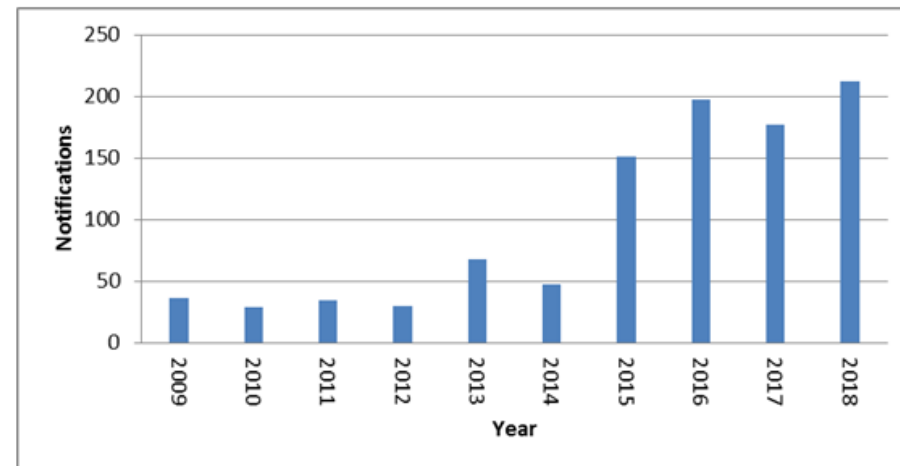


ARPHS Data 2012-present

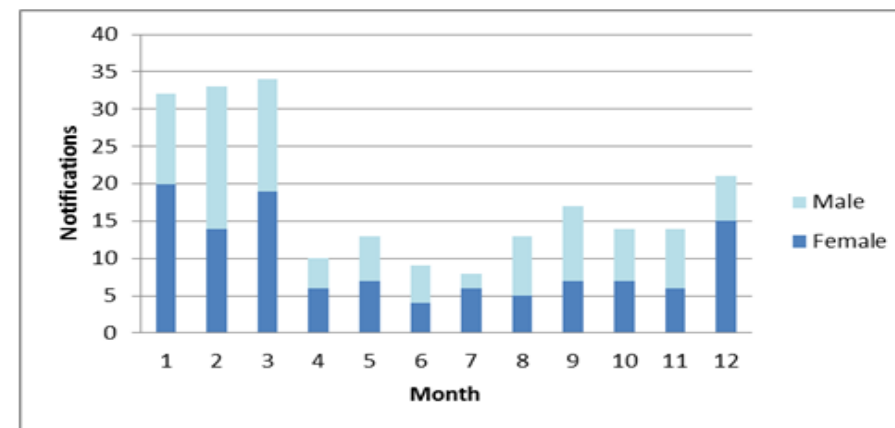
Long term VTEC-STEC infection monthly cases by age category



Notifications of VTEC in the Auckland region, 2009-2018



Monthly distribution of reported VTEC, Auckland region, 2018



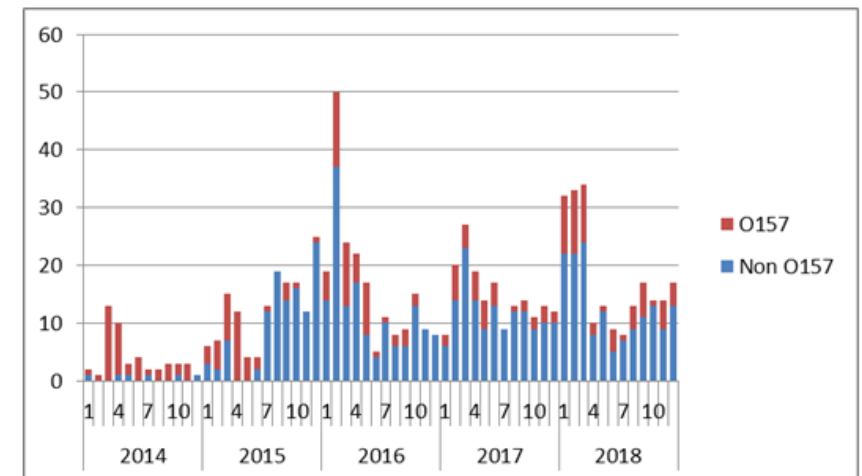
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Haemolytic Uraemic Syndrome

- Approx 10 cases/year NZ
- Auckland 2-3 cases/year
- Mostly (not exclusively) young children
- Diarrhoea, which is often bloody
- Abdominal pain, cramping or bloating
- Vomiting
- Fever
- 83% of typable strains causing HUS NZ = **O157** strains



VTEC serotypes O157 and non-O157 by year and month for the Auckland region, 2014 - 2018



Consider HUS in unwell children with diarrhoea

Treatment VTEC/STEC

- Supportive
- Avoid antibiotics



Clin Infect Dis. 2016 May 15;62(10):1251-1258. doi: 10.1093/cid/ciw099. Epub 2016 Feb 24.

Shiga Toxin-Producing *Escherichia coli* Infection, Antibiotics, and Risk of Developing Hemolytic Uremic Syndrome: A Meta-analysis.

CONCLUSIONS: Overall, use of antibiotics was not associated with an increased risk of developing HUS; however, after excluding studies at high risk of bias and those that did not employ an acceptable definition of HUS, there was a significant association. Consequently, the use of antibiotics in individuals with STEC infections is not recommended.

5) Cholera!!???!!

There are over 200 serogroups of *Vibrio cholerae* but only serogroups O1 or O139 that produce cholera toxin are associated with clinical cholera and have pandemic potential.

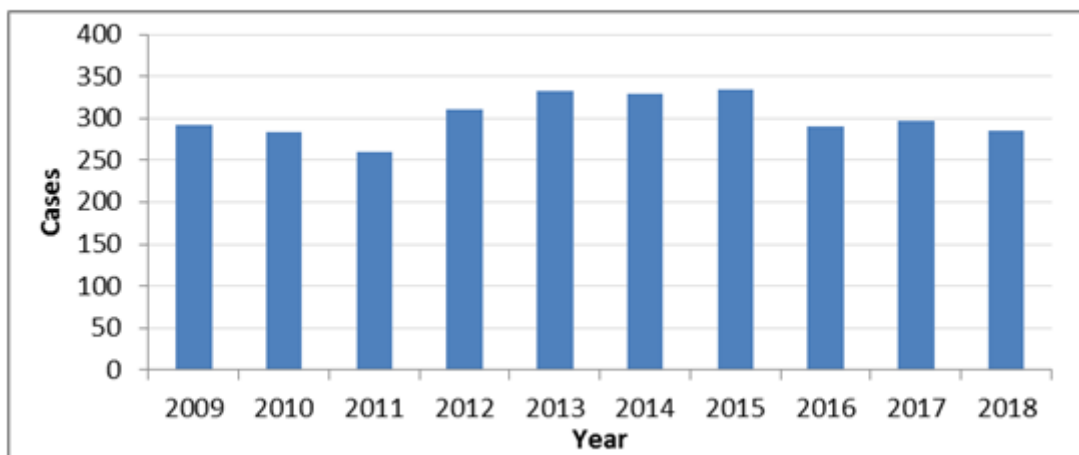
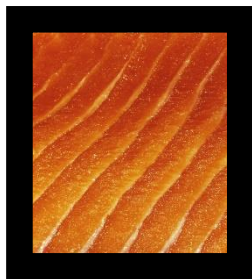
All isolates of *Vibrio cholerae* are initially notifiable as suspected cholera until the strain has been determined.

- Contaminated food or water
- Person to person rare (large inoculum)



In the first six months of 2019, Yemen has seen more suspected cholera cases than in the whole of 2018, according to an international aid organisation.

- Hundreds of subtypes
- “Detectives paradise”
- Some labs don’t type



Count of EpiSurvNumber	RptYear	RptMth							
	2019							2019 Total	Grand Total
AddLab	1	2	3	4	5	6			
Salmonella Agona		1						1	1
Salmonella Anatum		1						1	1
Salmonella Bovismorbificans	2	1		1				4	4
Salmonella Brandenburg	1	2	1					4	4
Salmonella enterica subsp. enterica (I) ser. 4,12 : i : -						1		1	1
Salmonella enterica subsp. enterica (I) ser. 4,5,12 : b : -		1						1	1
Salmonella enterica subsp. enterica (I) ser. 4,5,12 : i : -	1	3	5	1		1		11	11
Salmonella Enteritidis phage type 1						1		1	1
Salmonella Enteritidis phage type 11		2						2	2
Salmonella Enteritidis phage type 1b						1		1	1
Salmonella Enteritidis phage type 8					2			2	2
Salmonella Enteritidis phage type RDNC	1							1	1
Salmonella Enteritidis phage type Untypable					1			1	1
Salmonella Heidelberg	3							3	3
Salmonella Infantis	1		1					2	2
Salmonella Kentucky			1					1	1
Salmonella Lexington					1			1	1
Salmonella Mbandaka					1			1	1
Salmonella Mississippi					1	1		2	2
Salmonella Newport				1				1	1
Salmonella Oslo			1					1	1
Salmonella Paratyphi A	1	1						2	2
Salmonella Paratyphi B var Java		3			1			4	4
Salmonella Reading			1					1	1
Salmonella Senftenberg						1		1	1
Salmonella Stanley		1				1		2	2
Salmonella Thompson			1					1	1
Salmonella Typhi			1					1	1
Salmonella Typhimurium phage type 101	2		1	1				3	3
Salmonella Typhimurium phage type 108/170	13			2				15	15
Salmonella Typhimurium phage type 12		1						1	1
Salmonella Typhimurium phage type 156					1			1	1
Salmonella Typhimurium phage type 193				1				1	1
Salmonella Typhimurium phage type 23				1				1	1
Salmonella Typhimurium phage type 42			1			1		2	2
Salmonella Typhimurium phage type 56 variant						1		1	1
Salmonella Typhimurium phage type RDNC		2	1					3	3
Salmonella Typhimurium phage type Untypable				1				1	1
Salmonella Virchow						1		1	1
Salmonella Enteritidis phage type 21						1		1	1
Salmonella Enteritidis phage type 21 variant			1					1	1
Salmonella Papuana				1				1	1
Salmonella Schwarzengrund			1					1	1
Salmonella Enteritidis phage type 26		1						1	1
Salmonella Enteritidis phage type 43			1					1	1
Salmonella Typhimurium phage type 10	1							1	1
Salmonella enterica subsp. enterica (I) ser. 6,7 : r : -	2							2	2
Salmonella Concord		1						1	1
Salmonella Carrau		1						1	1
enterica subsp. enterica (I) ser. 4,5,12 : i : -					1			1	1
Salmonella Vejle						1		1	1
Salmonella enterica subsp. enterica (I) ser. 4,5,12 : i : - \						1		1	1
Grand Total	27	22	18	10	9	13		99	99

Salmonella

Risk factors

Risk factor	2016	2017	2018
Case overseas during the incubation period	41%	41%	35%
Case travelled within NZ during the incubation period*	12%	7%	6%
Contact with a confirmed case/another unwell person *	18%	17%	3%
Environmental risk factors *			
Direct contact with pets	41%	29%	20%
Implicated restaurant or premises	23%	16%	17%
Contact with manure or compost	18%	5%	1%
Recreational swimming pool and other	13%	14%	8%
Untreated water from tank, bore or stream	10%	7%	5%
Visit farm	5%	10%	4%
Consumed food at large gathering	12%	5%	9%
Contact with animal faeces	7%	7%	3%
Contact with sick animals	2%	1%	0%
Foods *			
Chicken	52%	37%	33%
Other meats and poultry products	41%	29%	21%
Takeaway foods	16%	17%	17%
Tofu / soy products	5%	5%	2%
Cold sliced meat	-	5%	15%
Raw eggs	3%	2%	2%
Sesame seed products	3%	2%	2%
Untreated raw milk	2%	-	0.3%

Risk factors for salmonellosis, Auckland region 2016-2018

*

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Typhoid Fever

2017

- Nearly 11 million cases
- >116,000 deaths

Source country	Cases
India	11
Samoa	11
Pakistan	2
Philippines	2
Total	26

Country of origin for imported typhoid fever, Auckland 2018



Frequently no diarrhoea and diagnosed as inpatient with blood culture.
Can be challenges requiring stool samples.

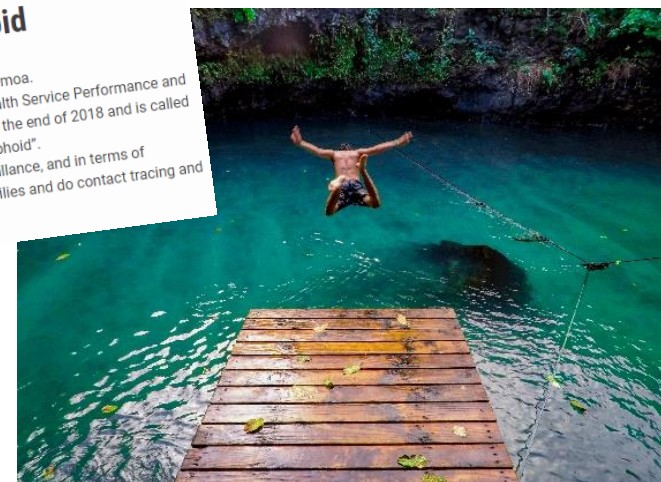
Remember vaccination For Typhoid Fever

- Visiting friends and relatives
- India
- Samoa
- Not good protection against Paratyphoid



Ministry creates program to eliminate typhoid

- Posted on February 6, 2019 by Ali Carter
- The Ministry of Health is currently implementing a program to eliminate typhoid in Samoa.
 - According to Dr. Tagaloa Robert Thomsen, the Assistant Chief Executive Officer (Health Service Performance and Quality Assurance – Medical and Allied Division), the program was initiated towards the end of 2018 and is called "Improved surveillance and microbiological capacity for detecting and managing typhoid".
 - "Works will be conducted over a three-year period so starting from improving surveillance, and in terms of laboratory picking up the typhoid and then informing us, and then we go to the families and do contact tracing and collect samples," he said.



Typhoid Vaccine Acceleration Consortium conducting studies in Nepal, Malawi, Burkino Faso, Bangladesh to build evidence of the effectiveness of a new typhoid conjugate vaccine in protecting children and adolescents from typhoid. Studies in Approved as young as 6/12 in Typhoid endemic countries.



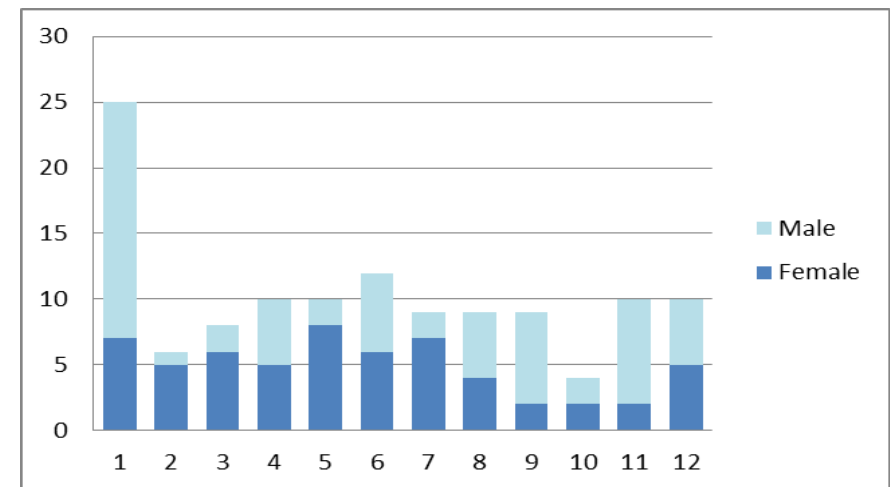
7) Shigella

- Mostly overseas acquired
- MSM
- Locally acquired- especially Pacific Islanders
 - Person to person
 - Imported foods

Most common:

S flexneri- requires high risk exclusion

S sonnei- requires 48 hour symptom free



Monthly distribution by gender of shigellosis cases in the Auckland region, 2018

Shigella

Source Country	Total	%
Tonga	20	25%
India	20	25%
Samoa	15	19%
Indonesia	7	9%
Fiji	3	4%
Singapore	2	3%
Pakistan	2	3%
Bangladesh	2	3%
Cambodia	1	1%
Philippines	1	1%
Botswana	1	1%
United States of America	1	1%
Thailand	1	1%
Australia	1	1%
Viet Nam	1	1%
Jordan	1	1%
Kenya	1	1%
Grand Total	80	100%

Country of origin for shigellosis, Auckland region, 2018



Ask about food brought back from overseas-fruit is banned some other foods are not.

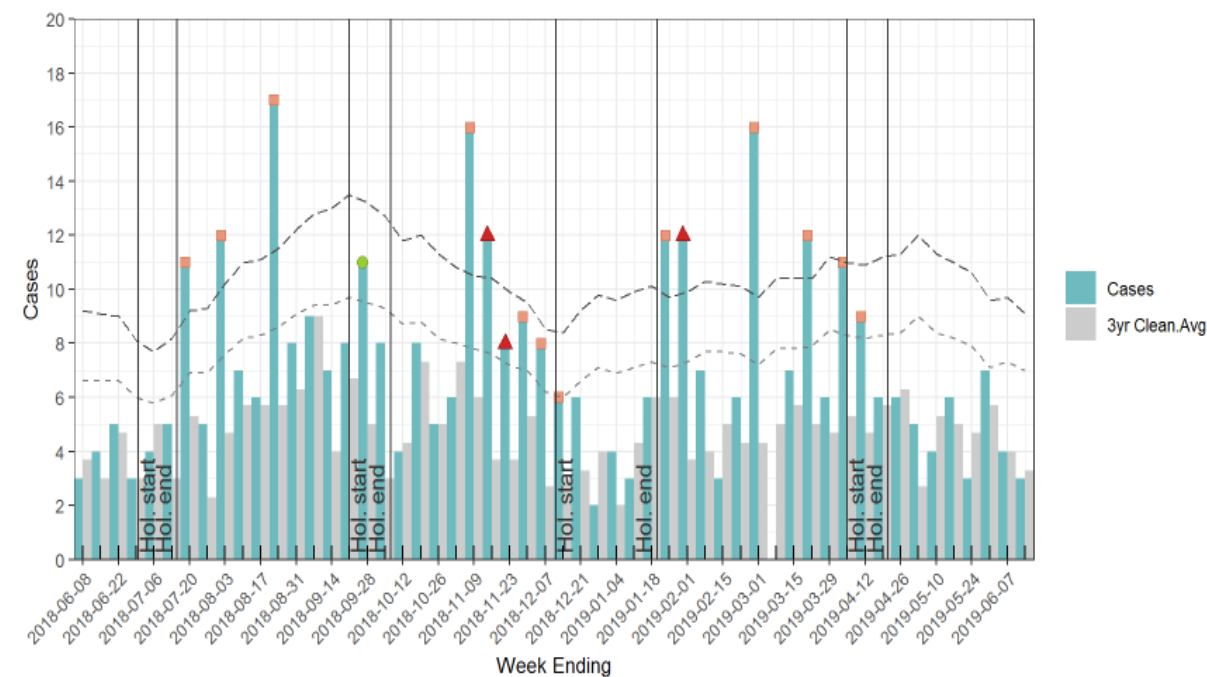
8) Yersiniosis

- So much we do not know
- National working group (Multi-agency)
- Rates in Auckland 'Yo Yo'
- Higher rates in Asian population

Ethnic group (TR)	Last 4 weeks	Last 12 months
Asian	9 (35%)	145 (37%)
European	10 (38%)	173 (44%)
MELAA	0 (0%)	7 (2%)
Maori	3 (12%)	19 (5%)
Pacific Peoples	1 (4%)	32 (8%)
Not Entered	3 (12%)	20 (5%)

¹ Note: ethnicity is total response

ARPHS Yersiniosis CHL/NBC surveillance chart (last 12 months)



9) Cryptosporidiosis

- No swimming for minimum 2 weeks after cryptosporidium infection.
- Leading cause of outbreaks from pool use.
- Resistant to normal chlorination

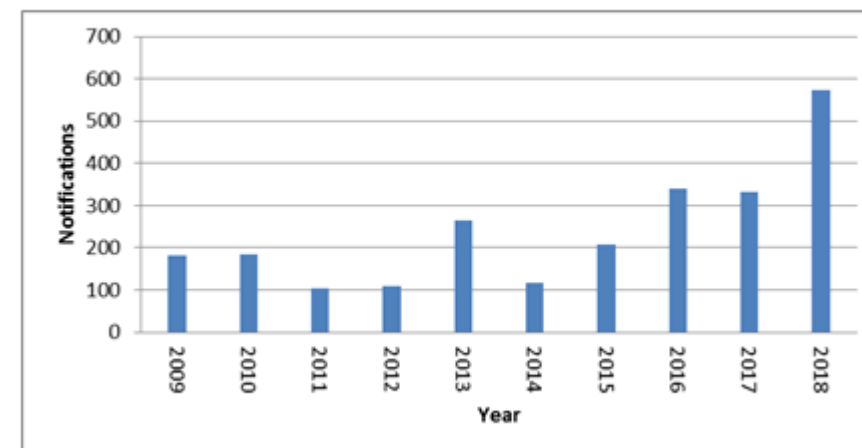


Age-gender distribution and age-specific incidence rates of cryptosporidiosis, Auckland region, 2018

Age-group	Female	Male	2018	Rate per 100,000
<1	5	6	11	49.2
1 to 4	53	66	119	133.1
5 to 9	34	44	78	68.6
10 to 14	17	18	35	33.3
15 to 19	10	5	15	13.6
20 to 29	63	21	84	27.6
30 to 39	71	38	109	42.3
40 to 49	38	23	61	27.9
50 to 59	13	7	20	9.8
60 to 69	13	11	24	15.9
70+	6	11	17	12.3
Total	323	250	573	33.4

*Rates are based on 2018-estimated mid-year population (Source: Statistics New Zealand)

Notifications of cryptosporidiosis in the Auckland region, 2009-2018



10) Norovirus

- Outbreaks of Norovirus infection frequently reported in elderly care settings.
- Hospital patients and nursing home residents represent high-risk populations for the transmission of gastrointestinal illness.
- Relatively immune suppressed.



- An outbreak is 2 or more cases.
- Please notify your PHU

Norovirus

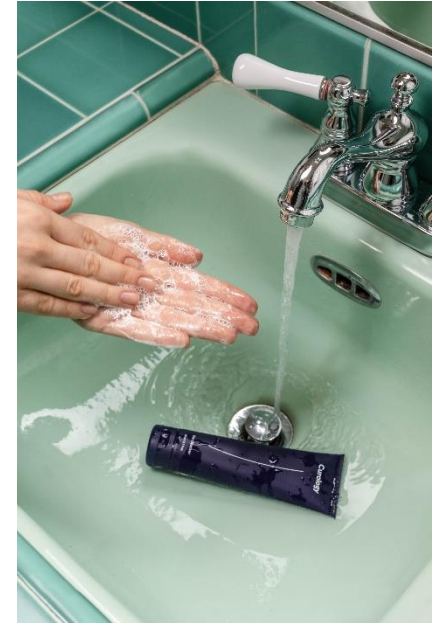
- Incubation period for illness is 10 to 50 hours (median 32 hours)
- Duration 2 to 171 hours (median 36 hours)
- Asymptomatic infection has been documented with one-third of those infected in one volunteer study.
- Viral excretion persists well beyond symptoms.



Norovirus is highly contagious.
10-100 viral particles may be sufficient to infect an individual.

Norovirus

- Norovirus GI and GII pathogenic only in humans.
- Faecal-oral spread but evidence airborne aerosolised spread
- Tolerates 60° C, freezing, Chlorine to 1ppm
- Spread via environmental contamination: carpet, door handles



Rotavirus

- Most common cause of severe gastroenteritis in young children worldwide.
- Prior to vaccine, it was estimated that 1 in 52 children were hospitalised with rotavirus gastroenteritis by 3 years of age.
- One year following vaccine introduction rotavirus hospitalisation rates for children aged under 5 years declined by 85% (2015) compared with the previous five-year average (2010–2014).
- Reduced community infections following vaccine introduction.



Special cases

Notification is required for

Single cases of chemical, bacterial or toxic food poisoning such as botulism, histamine (scombroid) poisoning and toxic shellfish poisoning (any type).

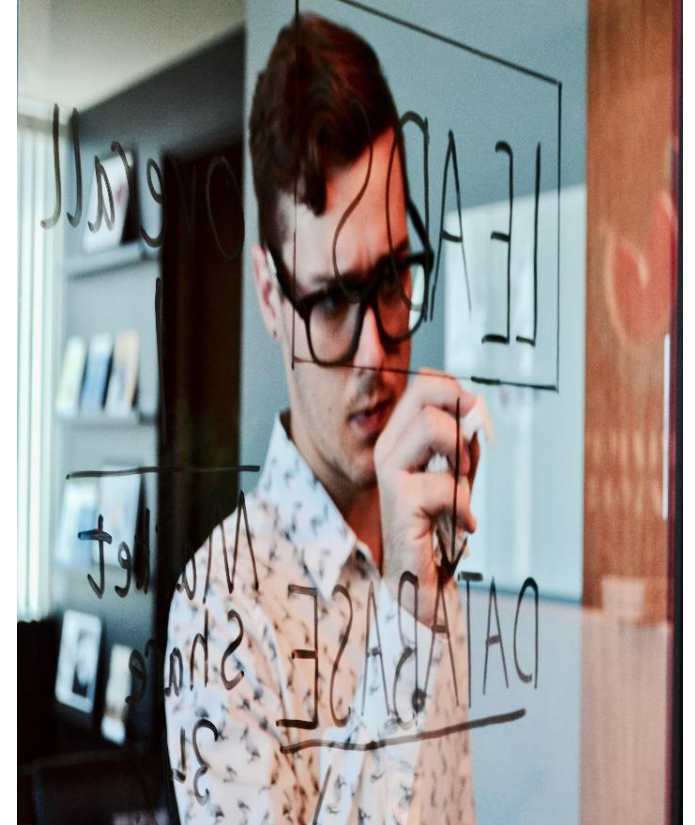
Any suspected outbreak of acute gastroenteritis where there is a suspected common source.

Single cases in a high-risk category (food handler, early childhood service worker, or other person at increased risk of spreading infection)



11) Health Protection Officers

- Identify and manage potential health risks to the public.
- Environmental health, communicable diseases, food and water safety.
- Mosquitoes, lead, chemical spills, water quality, infectious diseases
- Outbreak management. Especially institutions and preschools.



Whole Genome Sequencing (WGS)

- The near future
- Pathogenic bacteria and virus in biowaste, soil and water
- Identification of virus and bacteria
- Water microbiology testing and research
- Faecal source tracking
- Drinking water investigations
- Recreational water
- Food forensic investigations



12) Treat?

Public vs personal care



Auckland Regional Public Health Service @aklpublichealth

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The burden of **foodborne diseases** is substantial

Every year foodborne diseases cause:

almost
in 10
people to fall ill

33 million
healthy life years lost

Foodborne diseases can be deadly, **especially in children <5**


420 000
deaths



Children account for
almost **1/3**
of deaths from
foodborne diseases

**FOODBORNE DISEASES ARE PREVENTABLE.
EVERYONE HAS A ROLE TO PLAY.**

For more information: www.who.int/foodsafety

#SafeFood

Source: WHO Estimates of the Global Burden of Foodborne Diseases. 2015.



**World Health
Organization**