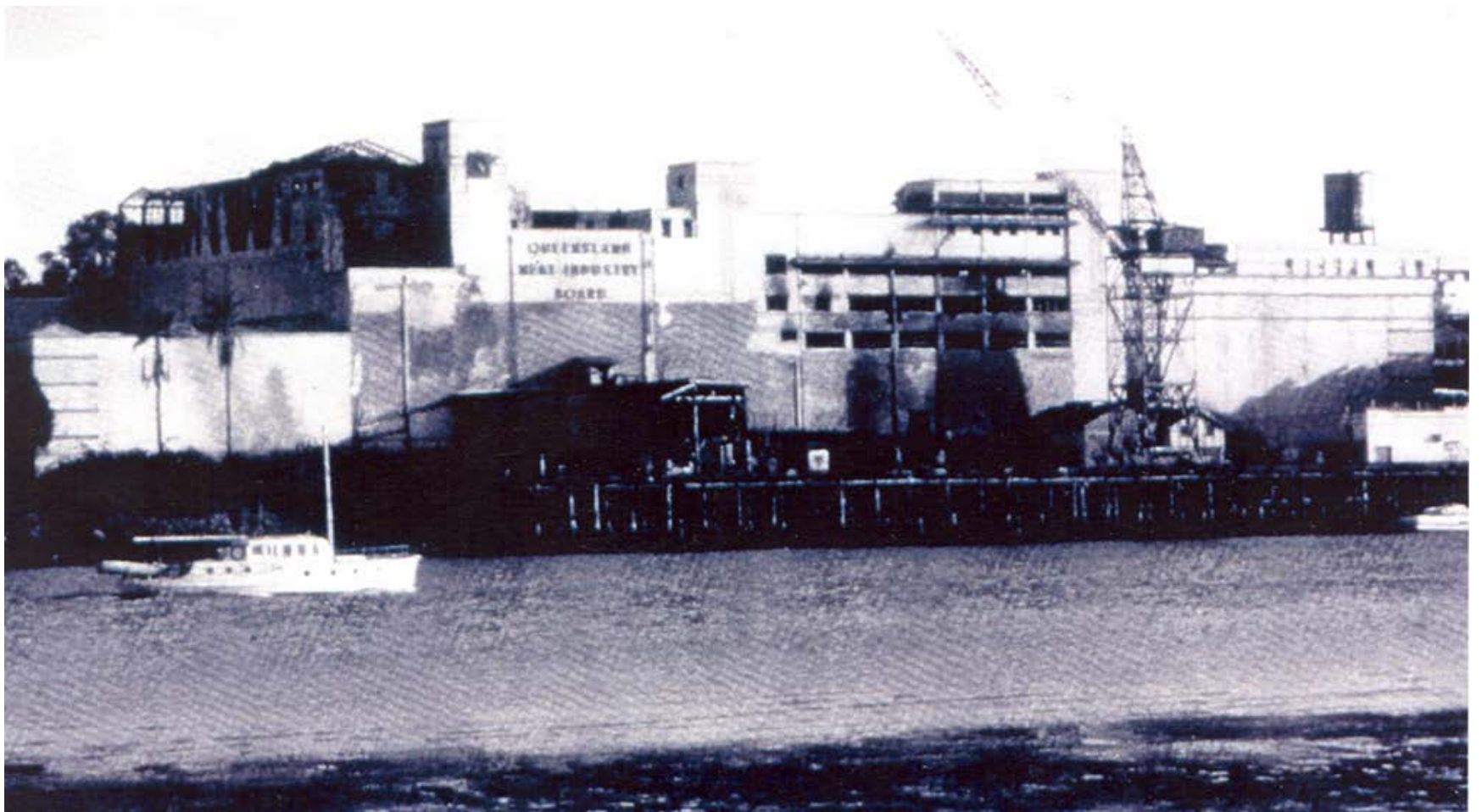


Q FEVER: what the meat industry needs to know

Prof Stephen R. Graves
Medical Director,
Australian Rickettsial Reference
Laboratory

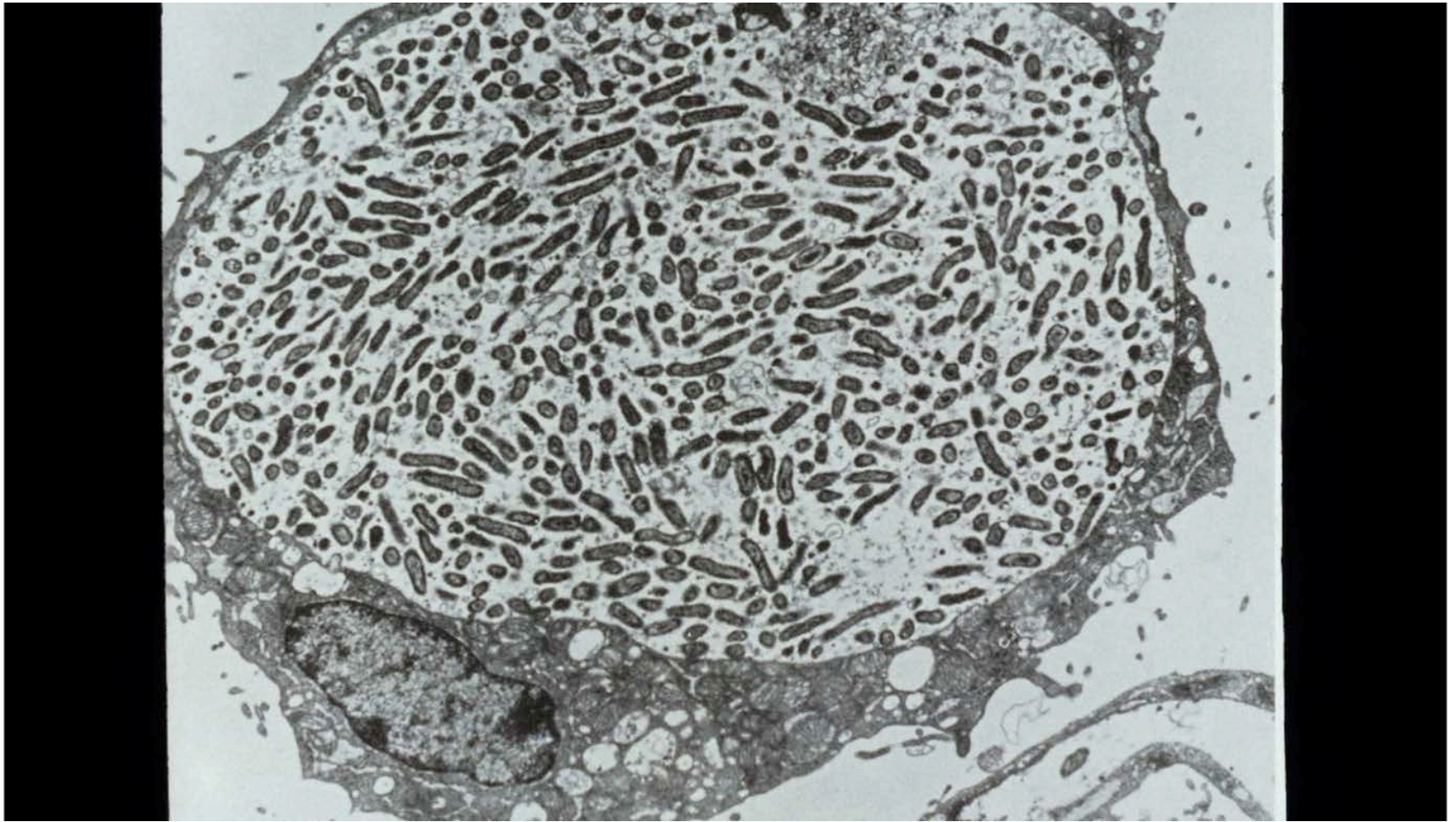
Q Fever: the disease

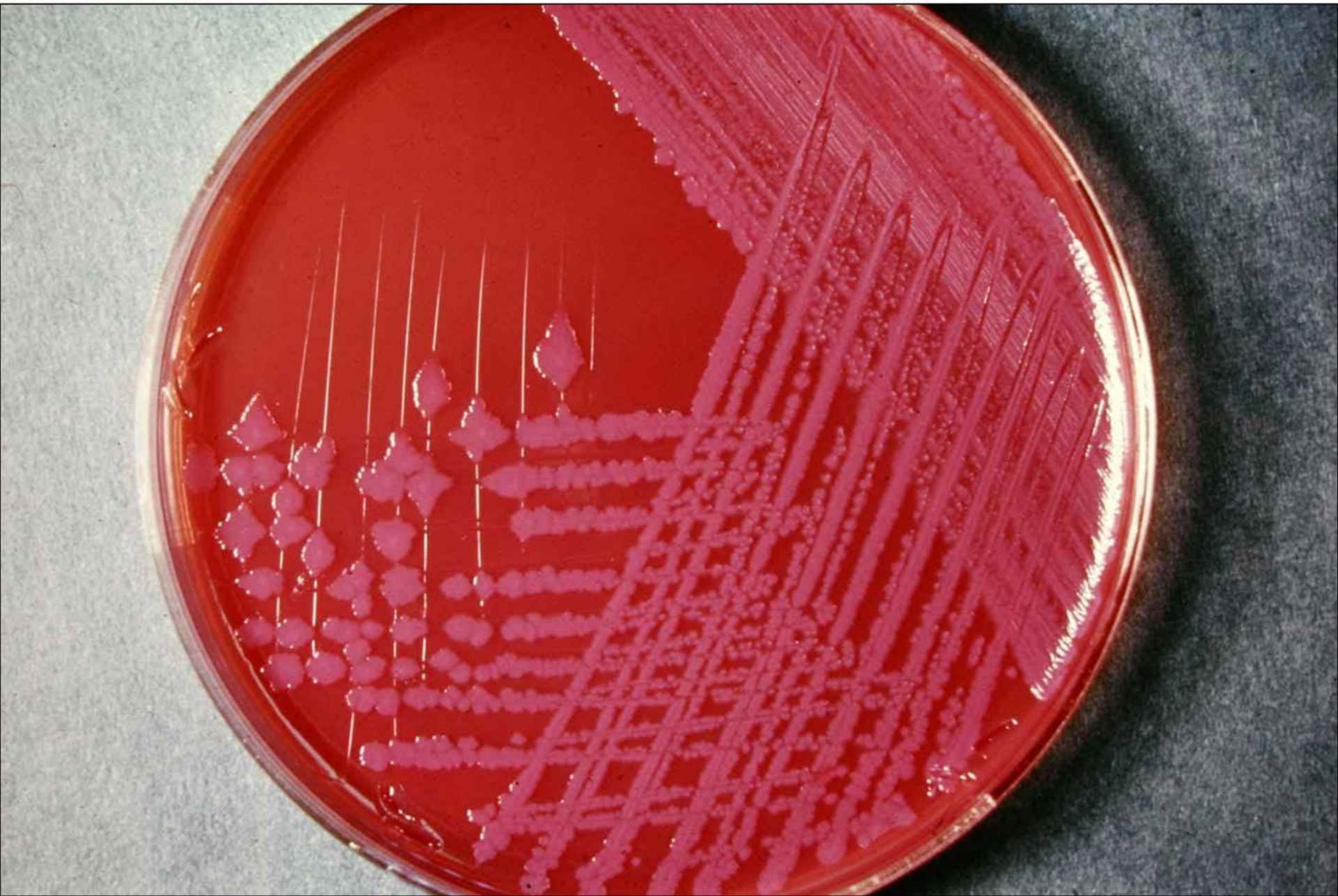
- First recognised as a new infection in Brisbane in 1937 by Dr Edward Derrick.
- Amongst abattoir workers slaughtering pregnant cattle
- Fever and acute onset of fatigue, headache, muscle aches and pains
- Lasted for about a week and then most people recovered
- Q = “query” [not “Queensland” !]

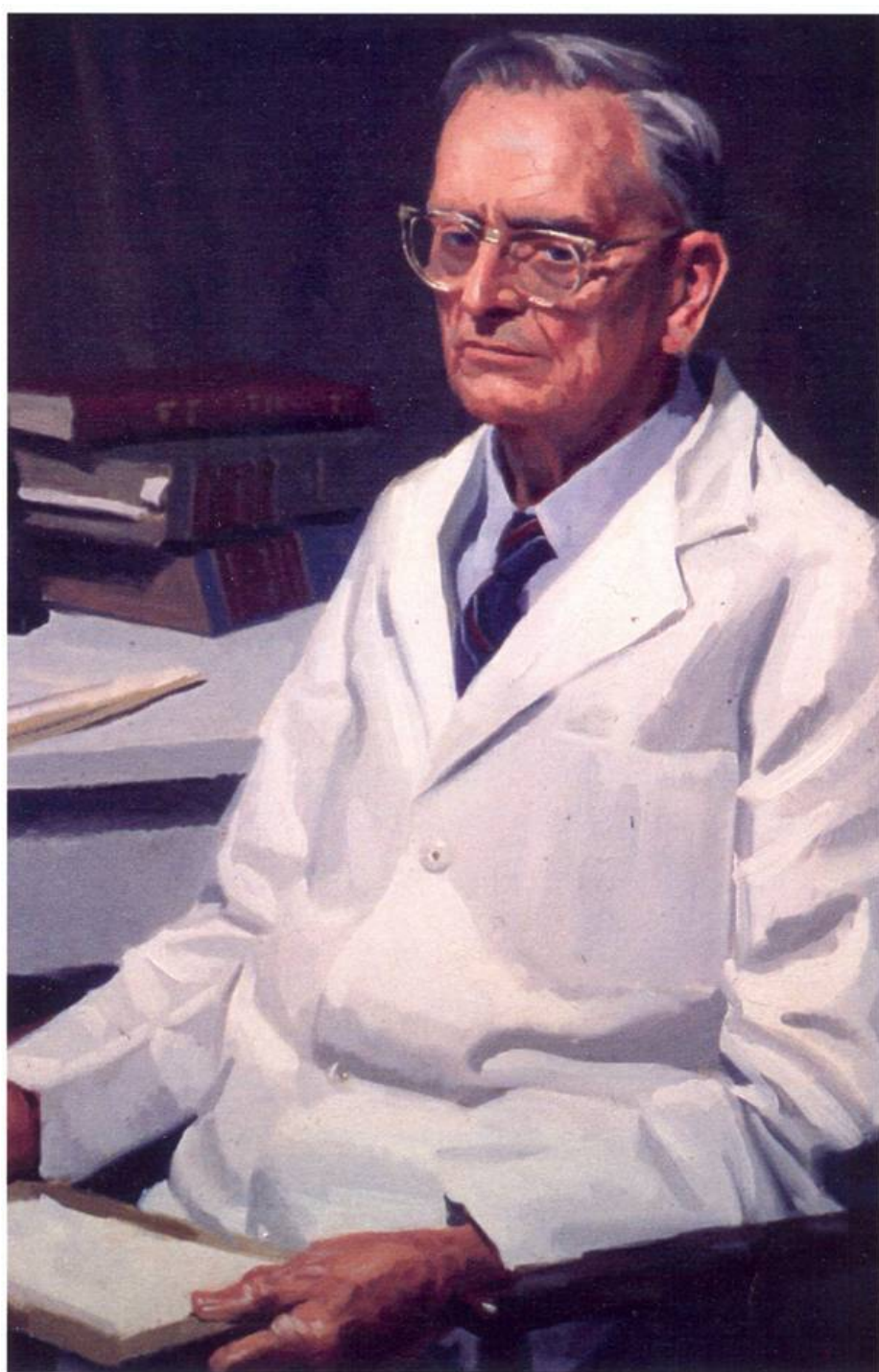


Q Fever: the microbe

- NOT a virus
- NOT a normal bacterium
- This unusual bacterium only grows inside another cell of an animal or human.....an obligate intracellular pathogen.
- Thus it could not be detected by the normal bacteriological methods of the day, growth on an agar plate.
- Derrick was able to cause the same disease in guinea pigs when infected with human samples
- Burnet grew the microbe in the laboratory







- Later it was thought to be a “rickettsia”, especially when the same bacterium was detected in a tick from the USA by Cox.
- Now known to be closely related to the bacterium causing Legionnaire's Disease [Legionella pneumophila]
- It is a “zoonosis”, ie humans are infected from animal who are themselves “carriers”, ie the animals are not usually ill themselves

Q FEVER: epidemiology

- “Infected” animals excrete the bacterium

Coxiella burnetii

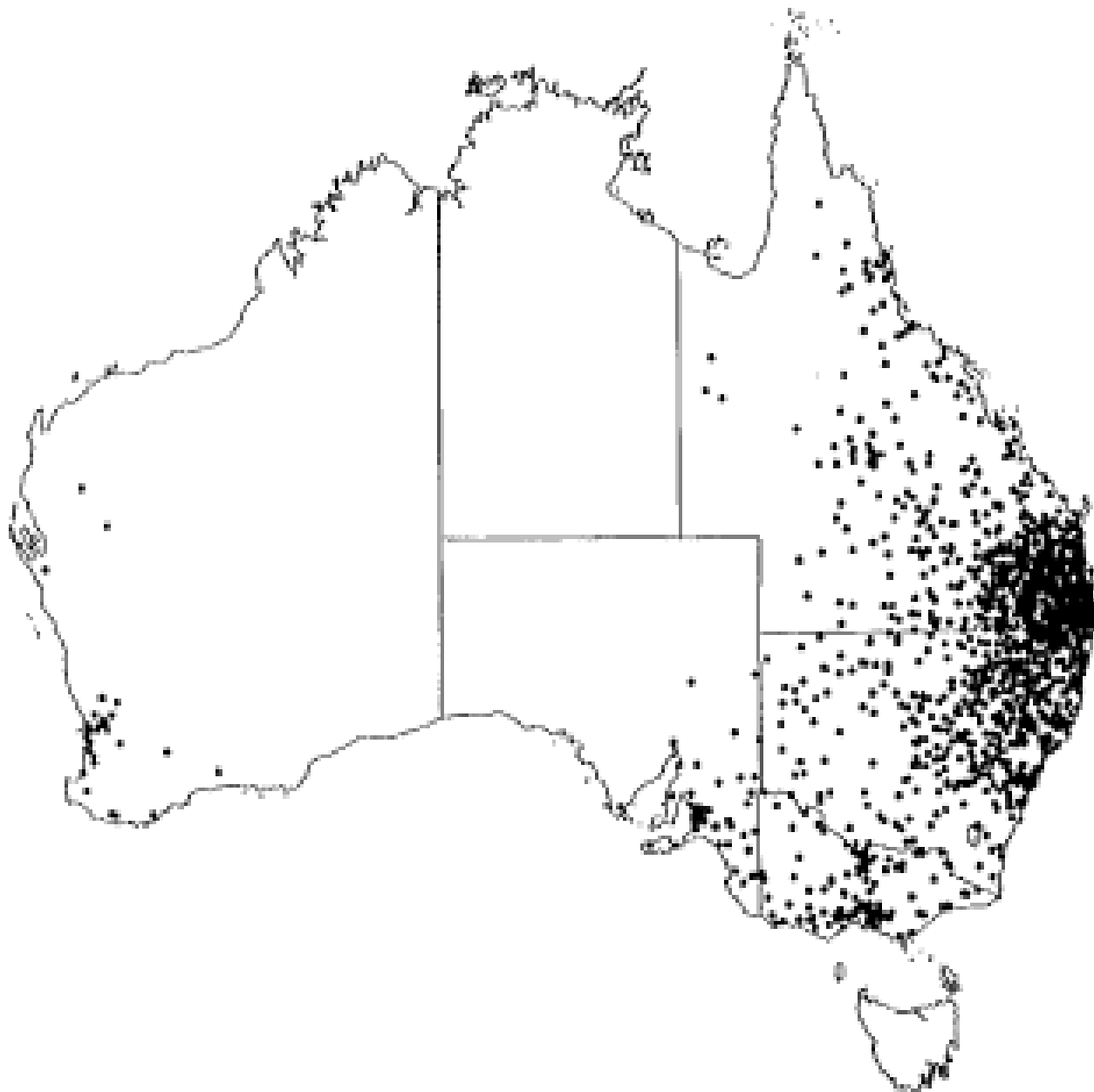
into the environment where it is spread by wind and inhaled by anyone nearby.

Pregnant animals are the most heavily infected and extremely high concentrations of bacteria are released into the environment during the birthing process.

- Australian animals known to be “infected” with the Q Fever bacterium include:
 - Goats [may show increase abortion rate]
 - Sheep
 - Cattle
 - Dogs
 - Cats
 - Kangaroos
 - Bandicoots
- and other native animals

Several Australian tick species also contain it.

eg 5% of paralysis tick in NE NSW contains *C.burnetii*.



Australians likely to be exposed to Q Fever

- Anyone associated with animals in their work or hobbies.

eg

Cattle farmers

Dairy goat workers

Shearers

Stock transport drivers

Abattoir workers

Veterinarians

Wild-life workers

Q FEVER: how is it diagnosed by the doctor

- Q Fever is very difficult for a doctor to diagnose on symptoms alone.
- There is no one symptom that makes the doctor think “this is probably Q fever”
- Even knowing about the patient’s animal contact is not enough. Many Q fever patient have had no contact with animals but are infected by inhaling contaminated air blowing the bacterium from the infected animal to the patient.
- Laboratory tests are nearly always needed to confirm a suspected diagnosis of Q fever.

- When the doctor thinks the patient may have Q fever a blood test is arranged through a pathology service and the test detects antibodies produced by the patient's immune system in response to infection with *Coxiella burnetii*.
- There are many different types of antibodies produced following natural infection and the pathologist/medical microbiologist is usually able to diagnose the infection based on the pattern of antibodies produced and so inform the treating doctor.
- Other tests may include a chest X-Ray to look for pneumonia, or an echocardiogram to look for abnormalities of the heart valves, or blood tests of liver function, etc

PATHOLOGY REPORT

Australian Rickettsial Reference Laboratory Foundation Ltd

REFERING DOCTOR

[REDACTED]

[REDACTED]

Ballarat
VIC, 3350
PH:



NATA/RCPA Accreditation No.14342
ABN 14 103 665 621

BARWON HEALTH
THE GEELONG HOSPITAL
BELLERINE ST
PO BOX 281
Geelong VIC 3220
AUSTRALIA

PATIENT DETAILS	PATIENT NAME	SEX/DOB	ADDRESS
	[REDACTED]	F / 30-11-1955	[REDACTED] DAYLESFORD VIC, 3461

SPECIMEN DETAILS	SPECIMEN DATE	LAB NO.	SPECIMEN TYPE	SPECIMEN SITE	EXT REF NO.
	05-10-2015	73793	Serum	Blood	20830907

Coxiella burnetii (Q-fever) Serology

(An immunofluorescence assay detecting IgA, IgM, IgG and total antibody to Coxiella burnetii)

Phase 2 Result

Phase 2 IgA

Phase 2 IgM

Phase 2 IgG

Phase 2 Total

NOT DETECTED (titre < 25)

DETECTED (titre >= 3200)

DETECTED (titre = 400)

DETECTED (titre >= 3200)

Phase 1 Result

Phase 1 IgA

Phase 1 IgM

Phase 1 IgG

Phase 1 Total

NOT DETECTED (titre < 25)

NOT DETECTED (titre < 25)

NOT DETECTED (titre < 25)

NOT DETECTED (titre < 25)

COMMENTS

09-10-2015

Serology consistent with recent, acute Q Fever. A new diagnosis of acute Q Fever should prompt a clinical assessment for cardiac or vascular pathology due to the increased risk of chronic Q Fever where there is a pre-existing abnormality. Please send a follow-up serum in 3-6 months to confirm normal sero-progression and to rule out the development of chronic Q Fever.

Dr Stephen Graves

PATHOLOGY REPORT

Australian Rickettsial Reference Laboratory Foundation Ltd

REFERING DOCTOR

[REDACTED]

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PH:

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PO BOX 281
Geelong VIC 3220
AUSTRALIA

PATIENT DETAILS	PATIENT NAME	SEX/DOB	ADDRESS		
	[REDACTED]	M / 29-07-1973	[REDACTED] Hillside VIC, 3037		
SPECIMEN DETAILS	SPECIMEN DATE	LAB NO.	SPECIMEN TYPE	SPECIMEN SITE	EXT REF NO.
	03-12-2015	75229	Serum	Blood	15-45594437

Coxiella burnetii (Q-fever) Serology

(An immunofluorescence assay detecting IgA, IgM, IgG and total antibody to Coxiella burnetii)

Phase 2 Result

Phase 2 IgA
Phase 2 IgM
Phase 2 IgG
Phase 2 Total

DETECTED (titre = 800)
DETECTED (titre = 200)
DETECTED (titre >= 3200)
DETECTED (titre >= 3200)

Phase 1 Result

Phase 1 IgA
Phase 1 IgM
Phase 1 IgG
Phase 1 Total

DETECTED (titre = 1600)
NOT DETECTED (titre < 25)
DETECTED (titre = 1600)
DETECTED (titre = 1600)

COMMENTS

11-12-2015

Serology is consistent with **chronic Q Fever**, provided the patient has a clinically compatible condition, eg vascular infection, endocarditis, osteomyelitis or hepatitis. If treatment is being considered, referral to an Infectious Diseases specialist is recommended. Repeat serology in 6 months is recommended. Dr Stephen Graves.

Q Fever: treatment

- Treatment depends on the type of Q fever
- A) acute Q fever.

This is the most common form of the infection and 95% patient are in this group.

Treatment is a 2 week course of antibiotics and lots of rest in bed and TLC !

Recovery will also occur without antibiotics due to the patient's immune system but it takes longer and there is a risk of subsequently developing chronic Q fever.

Q Fever: treatment

- B) chronic Q fever.

This is the most serious form of the disease and occurs in 1-5% of patients when the immune system doesn't completely destroy the bacteria from the initial infection and a relapse occurs months to years later.

It usually involves massive infection of arteries, heart valves and sometimes bones [especially in children]. These organs are badly damaged.

It is very difficult to treat and may take several years. Mortality can be high.

Q Fever: treatment

- C) post-Q fever fatigue syndrome

This condition occurs in about 10% of infected persons some time after the initial acute Q fever infection.

It can last for years but there may be spontaneous recovery at any stage.

Patients often don't have the energy for a normal lifestyle and may stop working.

There is no known cure other than the passage of time.

It can be very debilitating for the patient and their family.

Prevention of Q fever

- Avoiding animals in work and play (difficult)
- Modifying working environment (difficult)
eg using face masks
- Vaccination (the best option)

Only vaccination is effective.

Vaccination against Q Fever

- A. vaccination of animals

this option is not available in Australia but a animal vaccine [“Coxevac”] is available in Europe. It cannot be used in Australia due to quarantine restrictions .

This vaccine reduces the excretion of *Coxiella burnetii* by the vaccinated animal and thus reduces the risk of human infection.

The Australian Rickettsial Reference Laboratory [in association with its research partners] is currently trying to develop a dairy goat vaccine in Australia.

Vaccination against Q Fever

- B. vaccination of humans

this option is only available in Australia. No other country has this vaccine ["QVAX"].

Made in Melbourne by CSL/Sequiris.

The government does NOT provide it free of charge and users must pay full market price.

Many doctors do not know it is even available !

The patient often has to ask the doctor for the vaccine. It may be provided routinely as part of the person's workplace safety, eg abattoir workers.

QVAX

- It is a very effective vaccine. Virtually everyone vaccinated is protected from Q Fever for a long time.
- There have been concerns about adverse reactions in persons who have had prior exposure to the bacterium via natural infection but are not aware of this.
- Hence, a preliminary skin test and blood test [looking for pre-existing immunity in the patient] is undertaken 1 week prior to vaccination.
- If both tests are NEGATIVE the person is vaccinated.
- If either test is POSITIVE the person is assumed to be immune and is not vaccinated.

QVAX

- Who should receive QVAX ?
- Anyone starting out in an industry that involves animal contact.
eg most universities vaccinate their veterinary students now
- Anyone living in a rural community in Queensland, NSW, Victoria.
- I recommend students in these rural communities be vaccinated in their last year at secondary school [late teens] so they are protected as they start their working life.