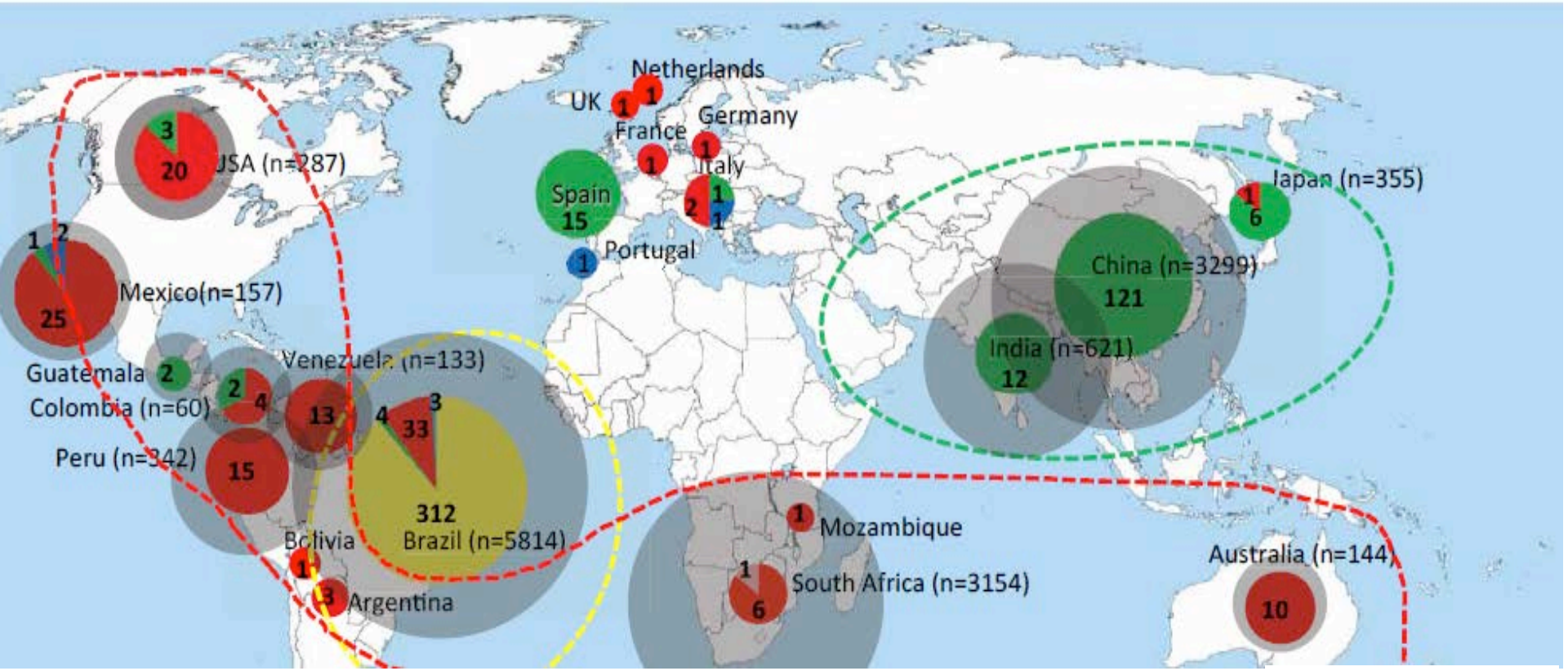
# EPIDEMIOLOGICAL INVESTIGATION OF AN OUTBREAK OF SPOROTRICHOSIS NT, AUSTRALIA

Dr Sarah McGuinness – Infectious Diseases Advanced Trainee

Royal Darwin Hospital & Centre for Disease Control

# Sporotrichosis: introduction

# Sporotrichosis: epidemiology




*Geographical distribution of sporotrichosis*

From Zhang et al, 2015

# Sporotrichosis: clinical presentation

- Most cases limited to:
  - Skin & subcutaneous tissues = fixed form OR
  - Skin, SC tissues and lymphatics = lymphocutanenous form AKA "sporotrichoid" spread


# Sporotrichosis in the NT

- Sporadically occurring cases in past
- Two cases presented in 2013 first NT acquired cases published in literature*

*Subedi et al 2014

# Is it an outbreak?

- May – August 2014: unexpected increase in incidence of cutaneous sporotrichosis cases seen by infectious diseases department

# Outbreak investigation design

- Microbiology database search 2005-2014
  - Royal Darwin Hospital microbiology database
  - Western Diagnostic Pathology database
- Clinical data collected
  - For all probable/confirmed cases
- Active case surveillance initiated

# Outbreak case definition

- Case definition:
  - Clinical evidence of disease PLUS
  - Isolation of *Sporothrix spp.* from culture of tissue specimens AND/OR identification of yeasts on histopathological examination of tissue
  - In a person living in or visiting the Darwin region of the NT since Jan 2013

# Outbreak investigation

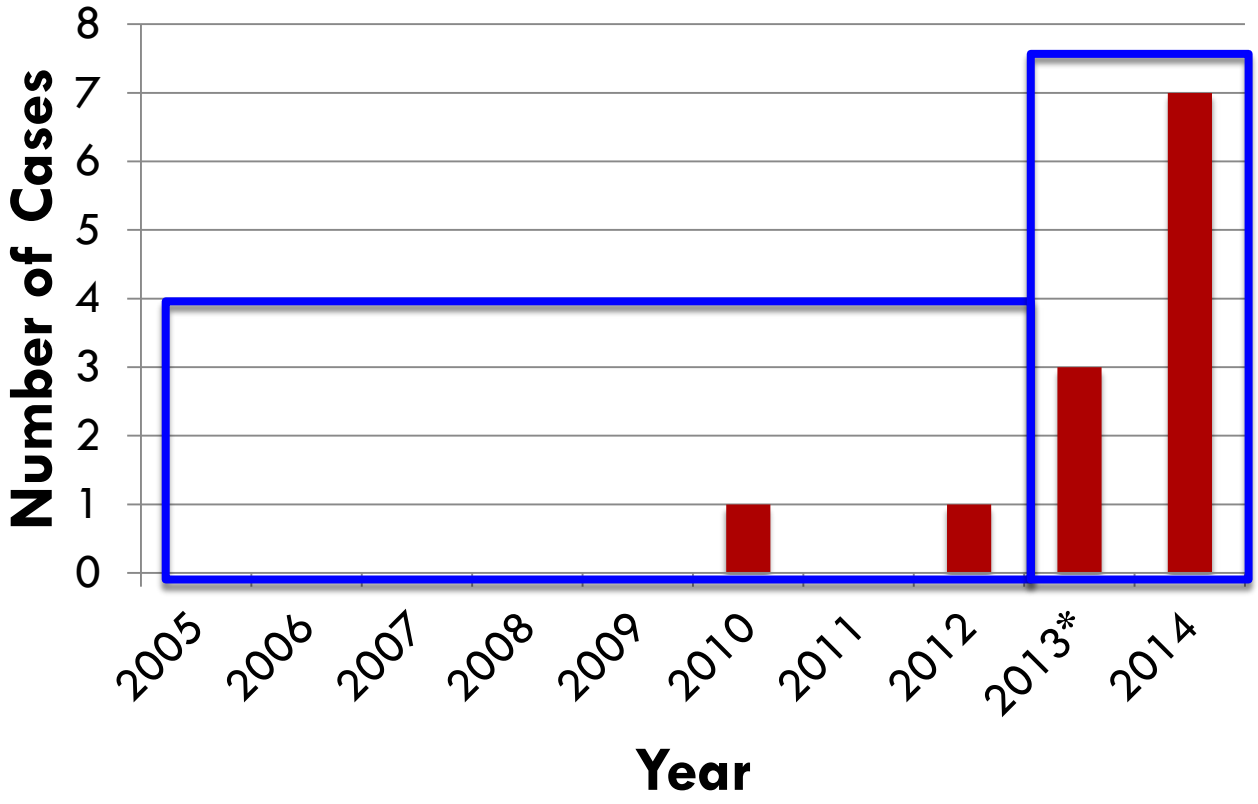
- Epidemiological data collected through individual telephone interviews:
  - Demographic factors
  - Potential risk factors
- Environmental investigation followed identification of a common risk factor
- Molecular sequencing of clinical isolates performed

# Results




# Database search

- 13 clinical isolates identified in 10 year period




*Cases published in Subedi et al 2014

# Table 1. Sporotrichosis clinical presentation

| Case | Sex | Age (years) | Month/yr of onset of symptoms | Month of diagnostic biopsy | Time to diagnosis (months)* | Site of primary lesion | Sporotrichoid spread | Multiple lesions |
|---|---|---|---|---|---|---|---|---|
| 1 | M | 45 | May 2014 | July 2014 | 2 | Lower leg (R) | Yes | Yes |
| 2 | F | 51 | May 2014 | July 2014 | 2 | Multiple | No | Yes |
| 3 | M | 49 | May 2014 | July 2014 | 2 | Forearm (R) | Yes | Yes |
| 4 | F | 31 | May 2014 | July 2014 | 2 | Finger (R) | Yes | Yes |
| 5 | M | 42 | July 2014 | Aug 2014 | 1 | Hand (R) | Yes | Yes |
| 6 | M | 60 | May 2014 | Aug 2014 | 3 | Lower leg (R) | No | No |
| 7 | M | 42 | April 2014 | Aug 2014 | 4 | Cubital fossa (R) | Yes | Yes |
| 8 | M | 70 | April 2014 | Sep 2014 | 5 | Thigh (R) | No | Yes |
| 9 | M | 29 | April 2014 | March 2015 | 11 | Forearm (L) | Yes | Yes |

* Time from onset of symptoms to confirmation of diagnosis (by culture or histopathology)

# Table 2. Sporotrichosis diagnosis and treatment

| Case | Month of diagnostic biopsy | Culture confirmed | Fungi on histopath | Itraconazole dose prescribed | Completed treatment? | Treatment duration (months) |
|---|---|---|---|---|---|---|
| 1 | July 2014 | Yes | No | 200mg daily | Yes | 3 |
| 2 | July 2014 | Yes | No | 200mg daily | Yes | 4 |
| 3 | July 2014 | Yes | Yes | 200mg daily | Yes | 6 |
| 4 | July 2014 | No* | Yes | 100mg daily | Yes | 3 |
| 5 | Aug 2014 | Yes | Yes | 200mg daily | Yes | 3 |
| 6 | Aug 2014 | Yes | Yes | 200mg daily | Yes | 3 |
| 7 | Aug 2014 | Yes | Yes | 200mg daily | Yes | 6 |
| 8 | Sep 2014 | Yes | Yes | 200mg daily | Yes | 4 |
| 9 | March 2015 | Yes | Yes | 200mg daily | Yes | 3 |

*Fungal culture not performed

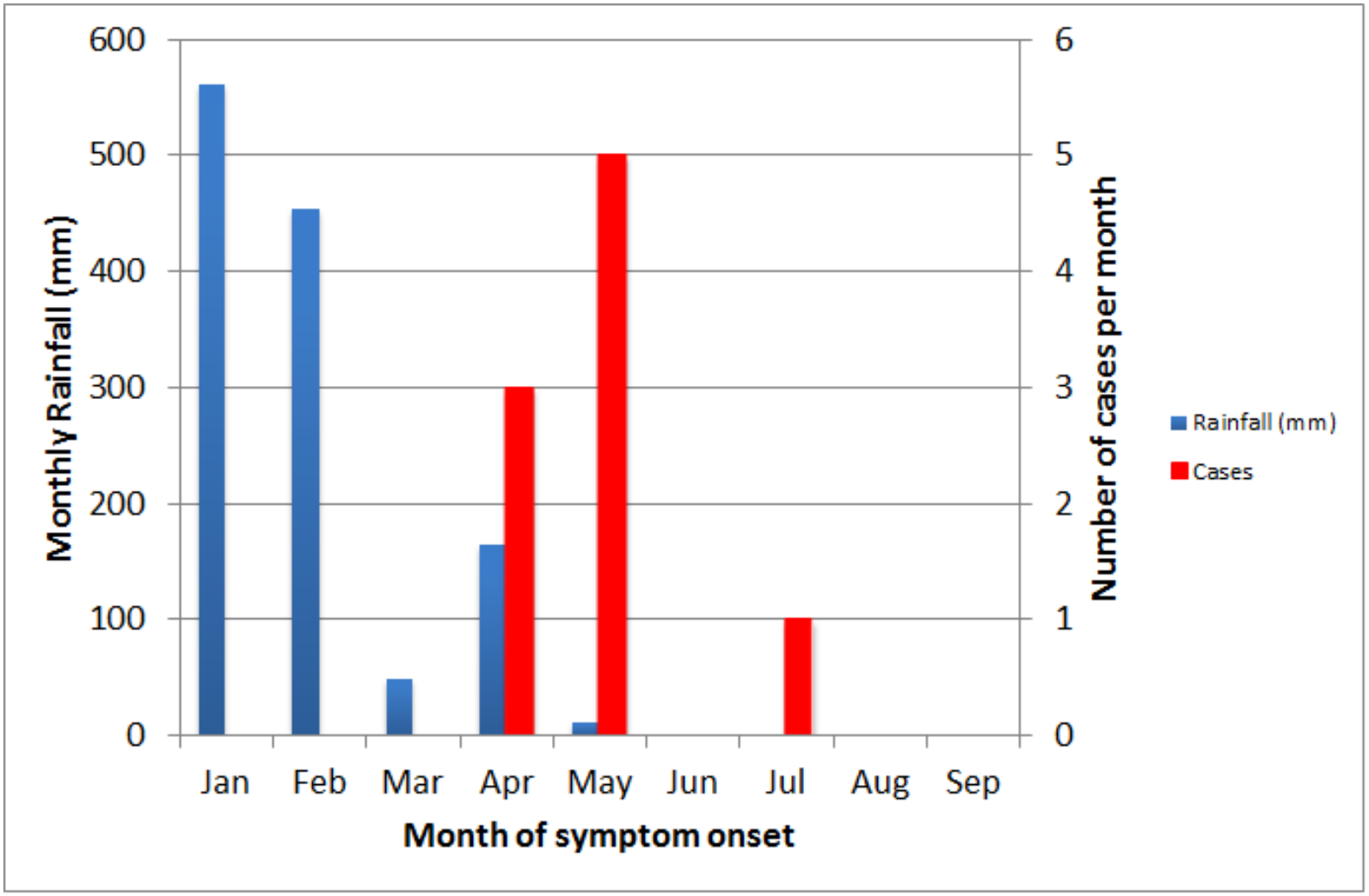
# Table 3. Sporotrichosis risk factors

| Case | Residence | Relevant hobbies | Hay contact | Hay source | Time of hay exposure |
|---|---|---|---|---|---|
| 1 | Palmerston area | Gardening, outdoor photography | Yes | Farm | April 2014 |
| 2 | Darwin Rural | Gardening | Yes | Farm | April 2014 |
| 3 | Palmerston area | Gardening | Yes | Nursery | April 2014 |
| 4 | Darwin Rural | Gardening | Yes | Farm | April 2014 |
| 5 | Darwin Rural | Gardening | Yes | Farm | April 2014 |
| 6 | Darwin Urban | Gardening | Yes | Nursery | April 2014 |
| 7 | Darwin Urban | Gardening, chicken coop | Yes | Farm | Dec 2013 – May 2014 |
| 8 | Palmerston area | Gardening | Yes | Nursery | April |
| 9 | Palmerston area | Gardening, archery | Yes | Nursery | Jan-Feb 2014 |

# Environmental investigation

- Implicated hay supplier visited by environmental health officers
- Hay stored in semi-enclosed shed over past two monsoon seasons (2012-2013 and 2013-2014)
- No storage of hay in the preceding 30 years

# Correlation of cases with rainfall



# Linking 2013 cases

- Two 2013 NT-acquired cases re-interviewed
- Both confirmed contact with hay at the end of the 2012-2013 wet season (April/May)
- One confirmed hay purchased from implicated farm

# Table 4. Internal transcribed spacer (ITS) region sequencing results

| 2014 Case | Sequence type (ST) |
|---|---|
| 1 | ST 1 |
| 2 | ST 2 |
| 3 | ST 1 |
| 4 | N/A |
| 5 | ST 2 |
| 6 | ST 2 |
| 7 | N/A |
| 8 | ST 2 |
| 9 | ST 1 |

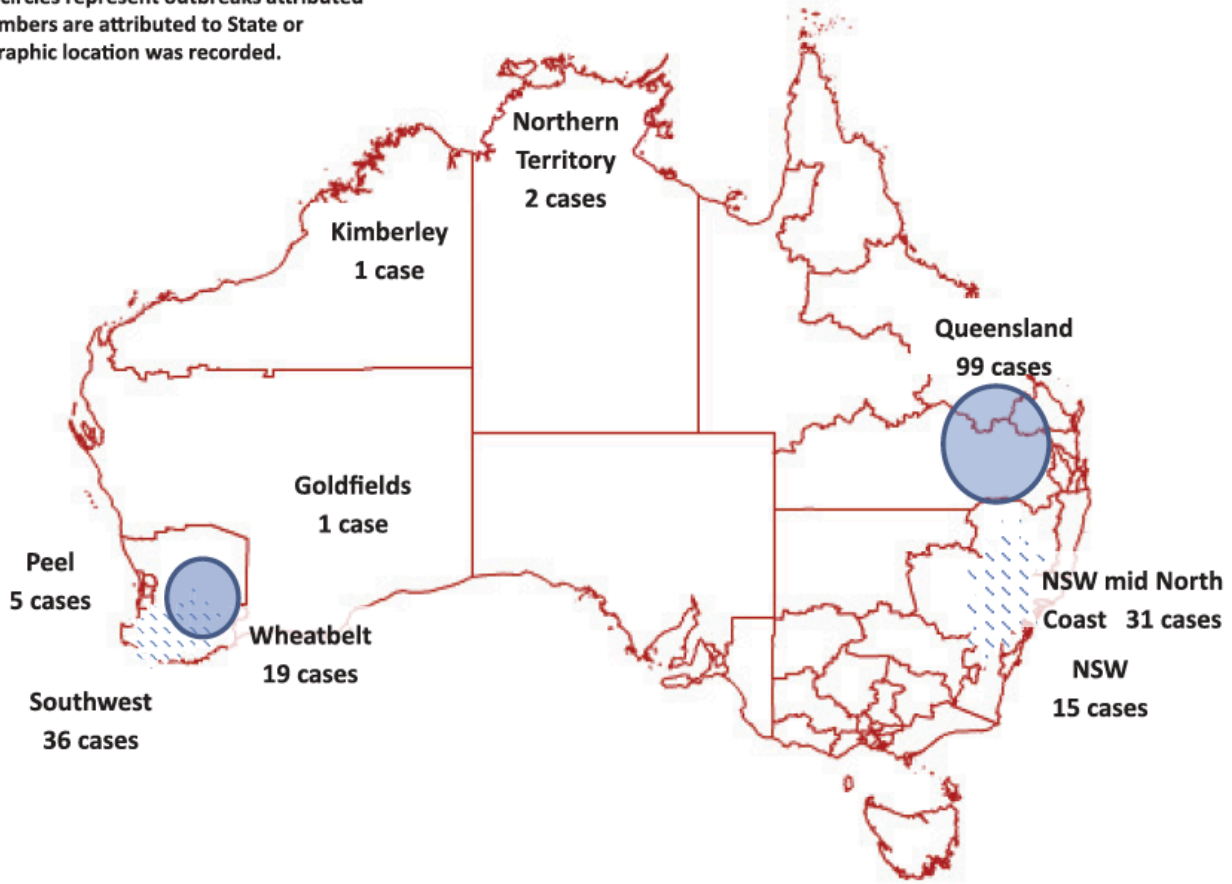
| 2013 Case | Sequence type (ST) |
|---|---|
| 1 | ST 1 |
| 2 | ST 2 |

# Investigation conclusions

- Mulching hay originating from single farm likely source of outbreak
- Sequencing data supported hypothesis of common source of infection

# Sporotrichosis in Australia

Distribution of all *Sporothrix schenckii* human Australian isolates reported in Australia. Blue circles represent outbreaks attributed to mouldy hay. [6, 25] Case numbers are attributed to State or Territory if no specific geographic location was recorded.




Reproduced with permission from Subedi et al, Am J Trop Med Hyg 2014; 91(6): 1263-1268
Previous Australian outbreaks due to contaminated hay: Feeney et al 2007, Conias et all 1998

# Public Health Response

- Information distributed
- Recommendations made:
  - Avoid storage of hay during monsoon season
  - Distribute information leaflets with hay sales, advising protective clothing when handling hay
- Media release issued led to outbreak coverage in local print media and radio
- Ongoing surveillance for further cases

# Conclusions

- Uncommon infection & one of many DDx for chronic skin lesions in tropics
- Delay in diagnosis common
- Ongoing risk of sporotrichosis

# Acknowledgements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- Dr Shrada Subedi
- Patients

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RESEARCH ARTICLE Open Access

# Epidemiological investigation of an outbreak of cutaneous sporotrichosis, Northern Territory, Australia

Sarah L. McGuinness[2], Rowena Boyd[2], Sarah Kidd[3], Charlie McLeod[1], Vicki L. Krause[2] and Anna P. Ralph[1,4*]

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