

# Angiostrongyliasis in Thailand – epidemiology and laboratory investigations

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# Angiostrongyliasis in Thailand – Early History

- **1955** : Eosinophilic meningitis first recognized in Thailand (Khwanmitra et al., 1957)
- **1961** : Two patients had eosinophilic meningitis after eating *Pila snalis* (Punyadasni and Punyagupta, 1962)
- **1962** : First case of ocular infection with the parasite (Prommindaroj et al., 1962)

# Angiostrongyliasis in Thailand – Epidemiology

- From 1955 to 1966, there were 1164 cases, comprising 757 males against 407 females
- 21 fatal cases
- 912 cases were from the northeastern provinces

# Angiostrongyliasis in Thailand – Epidemiology

- By 1968, typical eosinophilic meningitis has been recognized in 37 of the 71 provinces, mainly those in the northeastern and central parts of the country (Punyagupta et al., 1970)
- Between 1965 and 1968, 484 cases of typical eosinophilic meningitis throughout the country did not show apparent difference in the age distribution of the patients

# Angiostrongyliasis in Thailand – Epidemiology

- All age groups were affected.
- Youngest patient – 2 years old; oldest patient 65 years old
- Of the 484 study cases, males were affected 2.6 times more frequently than females
- More than half of the patients were farmers

# Angiostrongyliasis in Thailand – Recovery of worms

- From CSF in a number of patients
- From the brain of at least 10 patients
- Many fifth-stage larvae detected in brain of a fatal case in 1990 (infection attributed to eating partially cooked yellow tree monitor)

# Angiostrongyliasis in Thailand – Ocular Infection

- 1960-1966 – 3 cases with young adult worms in anterior chamber of eye
- 1971 – 1 case associated with eosinophilic meningitis
- 1985 – a pediatric case

# Angiostrongyliasis in Thailand – Fatal Cases

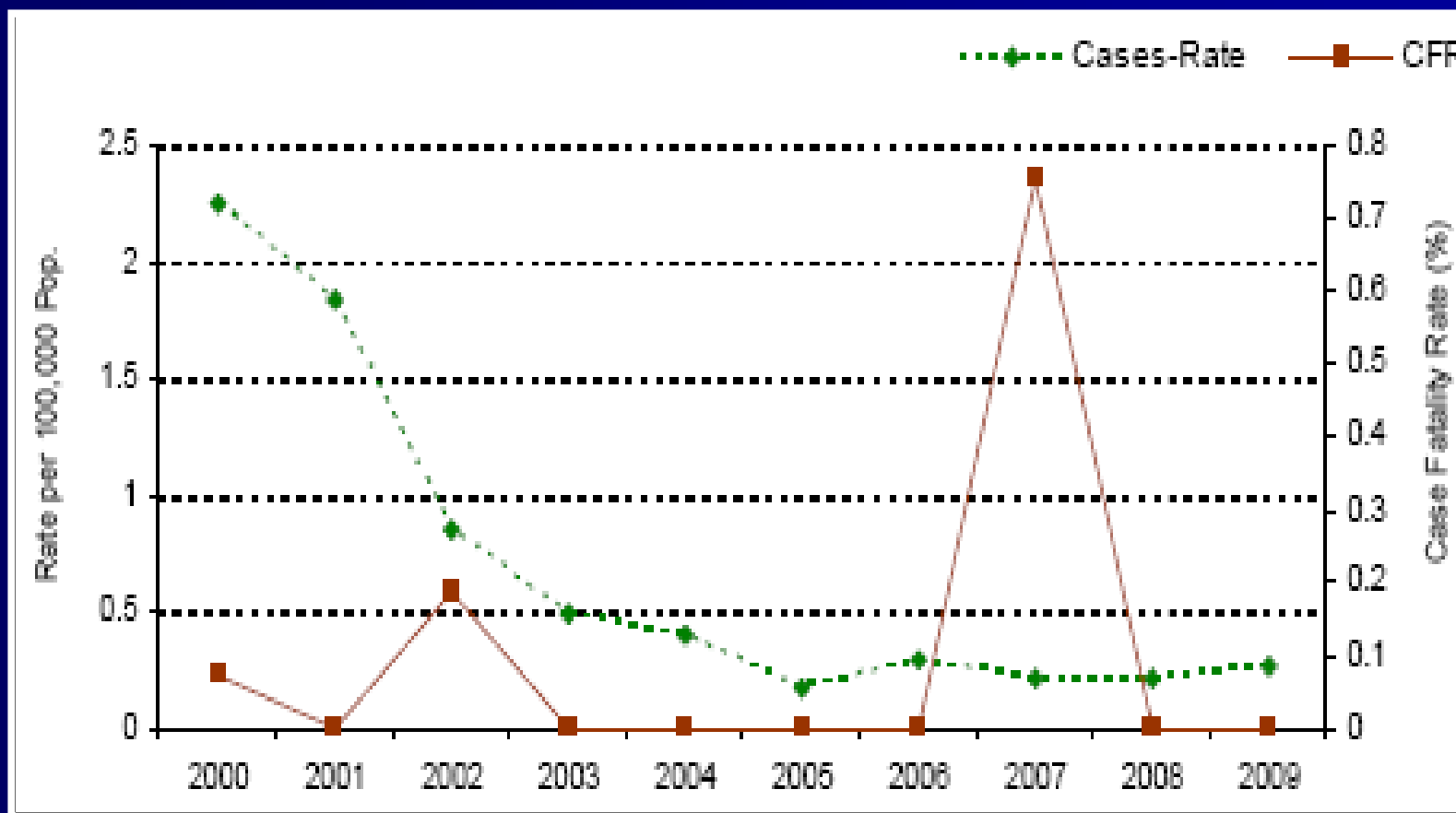
- 1961-1968 – 5 cases
- 1974-1977 – 4 cases
- 1981-1984 – 1 case
- 1990 – 1 case



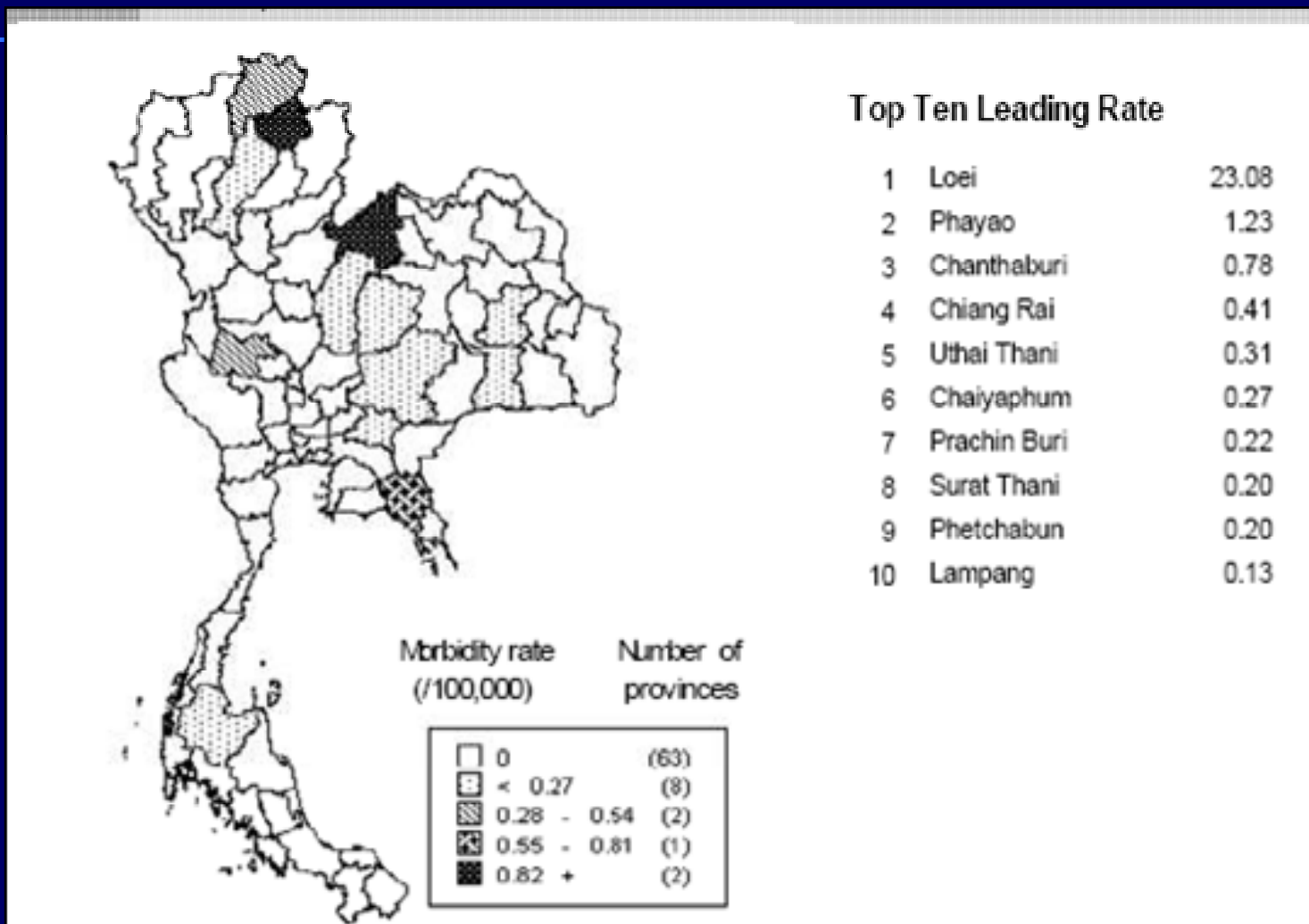
# Angiostrongyliasis in Thailand – Epidemiology

- Statistics of the Dept. of Disease Control, MOPH, Thailand - hundreds of eosinophilic meningitis cases continue to be reported annually for the period 2000 to 2009
- Many cases were from the northeastern provinces

# Reported cases and case fatality rate of EM per 100,000 population, for the period 2000 - 2009 (<http://epid.moph.go.th>)



# Reported cases of EM per 100,000 population by Province, 2009 (<http://epid.moph.go.th>)



# Definitive hosts of *Angiostrongylus cantonensis* in Thailand

- *Bandicota indica*
- *Bandicota savilei*
- *Maxomys surifer*
- *Rattus berdmorei*
- *Rattus exulans*
- *Rattus norvegicus*
- *Rattus rattus*

# Intermediate host of *Angiostrongylus cantonensis* in Thailand

## Slug

- *Laevicaulis alte*  
(= *Veronicella alte*)
- *Vaginulus plebeius*
- *Veronicella siamensis*
- *Veronicella* spp.
- *Sarika resplendens*

## Land snail

- *Achatina fulica*
- *Hemiplecta siamensis*

## Freshwater snail

- *Filopaludina martensi*
- *Melanoides tuberculata*
- *Pila ampullacea*
- *Pila angelica*
- *Pila gracilis*
- *Pila polita*
- *Pila scutata*
- *Pila turbines*
- *Sinotiana martensiana*

# Paratenic hosts of *Angiostrongylus cantonensis* in Thailand

- The yellow tree monitor *Varanus nebulosus* (previously *V. bengalensis*) is naturally infected with the third-stage larvae (Radomyos et al., 1994)
- Very high infection rate of 95.5% (21/22 lizards) has been recorded
- Consuming raw liver of monitor lizard reported to have more severe clinical manifestation than snails

# Angiostrongyliasis in Thailand – Laboratory Diagnosis

- Examination of CSF for worms
- Ab detection in CSF and sera using specific 31-kDa Ag
- Ag detection in CSF and sera using specific MAb (AW-3C2)

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