Leprosy on the edge of its distribution

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Overall global pattern

History

Initial spread from African origin ??

Maximum extent in 19\textsuperscript{th} century (?) even north of Arctic Circle in Norway !

Subsequent declines in most (but not all ?) of the world
Dissemination of leprosy inferred by SNP analysis of *M. leprae*
Determinants of change

Spread:
- Human travel
- "Appropriate" (socio-economic ?) conditions
- Animal reservoir (armadillo)
- ?

Contraction
- "Improved" (socio-economic ?) conditions
- Case finding and treatment
- BCG
- ?
Problems of data in low-prevalence countries

- Autochthonous vs “imported” not clear
- Europe – omitted from WHO data
- Confidentiality issues
  - precise locations often not reported
- Reporting efficiency unknown
Interpretation of autochthonous cases

Autochthonous implies locally acquired infection

Autochthonous - “continuous”
implies continuous transmission in population

Autochthonous - “secondary”
eg locally acquired by contact of an imported case

Problem of long incubation for inferring transmission
Warning!

What follows is not complete and may not be entirely correct!

Additions and corrections welcome ....
Countries with autochthonous leprosy in 2013

This is misleading, as it does not show localisation of leprosy in many countries.
Disappearance from (North)-Western Europe

- **Britain**
  - Last continuous
  - Dx: 1798

- **Norway**
  - Last continuous
  - Onset: 1951

- **Sweden**
  - Last continuous, onset: 1934

- **Netherlands**
  - Last autochthonous
  - 1957

- **Croatia**
  - Last continuous
  - Dx: 1956

- **Germany**
  - Last (?) secondary
  - Onset: 1961

- **Britain**
  - Last secondary
  - Dx: 1954
Autochthonous cases in recent years

- All in Galicia, Andalucia, Murcia, Valencia, Catalonia (also Madrid but may not be local)

- Numbers by year

- All (?) over 25 years of age

Extracted from Boletins epidemiological semanal
South Africa

Very few cases in Western Cape and “most of the few cases are foreigners”

Leprosy mainly in the north and east
"90 % of all cases in Lower Volga and Northern Caucasus"
China - 1462 cases notified in 2007

“Most cases in the north of China were detected among the migrant population”,

(Jianping Shen, personal communication 2010)
Decline in autochthonous leprosy - Japan

- Incidence rates: (number of cases)

  - No case in anyone born since 1980
  - Trend from north to south

Koba et al, Leprosy Review, 2009
Decline in autochthonous leprosy - Japan

Figure 2. Annual incidence rates of leprosy in Japan by region and over time. Note shading for Okinawa in inset rectangle.

Koba et al, Leprosy Review, 2009
Decline in autochthonous leprosy - Japan

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Koba et al, Leprosy Review, 2009
Australia - cases still appear in the north..., but declining ....

Mean annual leprosy case detection rates in the Northern Territories by 5-year period

Guidelines for the control of leprosy the Northern Territory - 2010

"Guidelines for the control of leprosy in the northern territories 2010"
Argentina -- leprosy restricted to the north and east ... relatively low elevation ....

Endemic areas in colour

In 2011:
354 new cases identified
Only 5 below 15 years of age

No evidence of leprosy in Chile, or SW Argentina

Proceedings of the XVIII Confederale de Lepra de la Republica Argentina
USA - autochthonous cases mainly Louisiana and Texas (c. 20 cases/yr), associated with armadillo reservoir.

Distribution of 9-banded armadillo (increasing):
current
predicted

(accessed 12 September 2013)
Current distribution of 9-banded armadillo

The distribution of *M. leprae* infection in this reservoir is unknown, outside the USA.

"Edge" of autochthonous leprosy in 2013?

Corrections please!
“Conclusions”

Evidence of gradual contraction of leprosy towards the equator

reasons (environment, socio-economics ?) unclear

USA may be an exception, associated with spreading armadillo reservoir

Role of armadillos in Latin America unknown but an important issue

Encourage critical analysis and publication of data on autochthonous cases from low prevalence regions