



# Capsule Serotypes of Invasive *Haemophilus influenzae* in Singapore

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## • Introduction and purpose

• Our hypothesis was that type b was an unusual capsule type amongst invasive *Haemophilus influenzae* isolates recovered in Singapore between 1999 and 2013.

• *H. influenzae* can cause severe invasive infections, particularly in

- children less than five years old
- the immunosuppressed.

• Historically the majority of invasive strains were encapsulated.

• Non-invasive strains, associated with respiratory infections such as exacerbation of chronic bronchitis and otitis media, were largely non-encapsulated.

• Capsules can be typed into six different Pitman types, a-f.

• The predominant type amongst invasive isolates was type b.

• A polysaccharide vaccine against type b was introduced in Europe in the 1970s.

• The rate of carriage amongst pre-school children remained at 4% in England and Wales.

• An improved conjugate vaccine, called Hib, was introduced in 1992.

- Carriage rates in children < 5 years old dropped to 'almost undetectable'.
- The annual incidence of invasive Hib disease consequently fell from 34/100,000 to <1/100,000
- In Singapore it was reported as 4.4/100,000 from 1994-2003.

• The international literature has since shown a high proportion of invasive strains to now be 'non-encapsulated' or, less often, 'capsulated but non-type b'. This prompted us to look at invasive isolates in our community, particularly as Hib became a routine component of the Singapore childhood immunisation schedule in 2013, although it had been available, on request, for many years.

## • Methods

• Hospitals were invited to contribute stored invasive isolates of *H. influenzae*. Their identification was established by three methods to ensure the exclusion of *H. haemolyticus*: MALDI TOF mass spectroscopy (Bruker) and two PCR methods to detect the protein D gene and the fuculose kinase gene (1). The presence of the capsule locus was detected by PCR (2); a second PCR determined the capsule type (3). All isolates were also typed by MLST (4).

## • Results

• We recovered 63 blood isolates from 1999 – 2013 from hospitals that predominantly deal with adults; all were confirmed as *H. influenzae*. Seven had a capsule locus: six were Pitman type b and one was type a. Fifty six were non-encapsulated.

• Six different isolates previously recorded as being type b by serological methods were all non-encapsulated by these PCR methods. Four of the six confirmed type b isolates were MLST types 118, 118, 119 and 724; the remaining two type b isolates were the same new ST, different by one allele from ST6.

## • Conclusion

• The majority (88%) of invasive isolates seen in Singapore between 1999 and 2013 were non-encapsulated in concordance with the literature.

• Only one of 63 invasive isolates was capsulated with a non-type b capsule.

• Discrepancies between serological and PCR methods raise questions about the accuracy and validity of previously reported serotyping data.

## • References

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