



Molecular Epidemiology of SARS

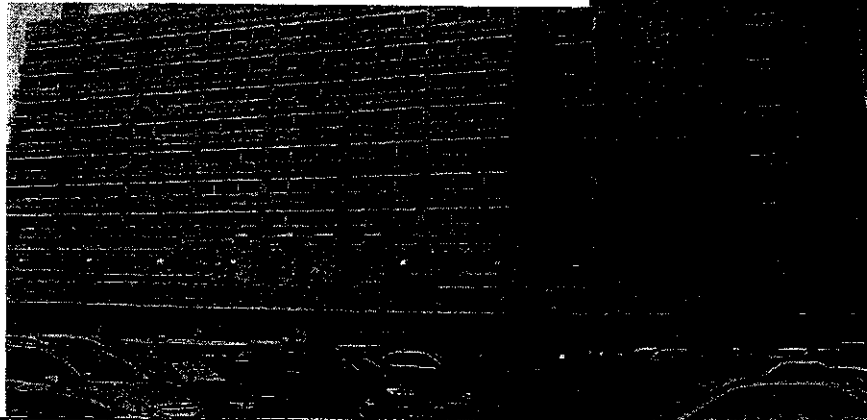
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THE NEW ENGLAND JOURNAL OF MEDICINE

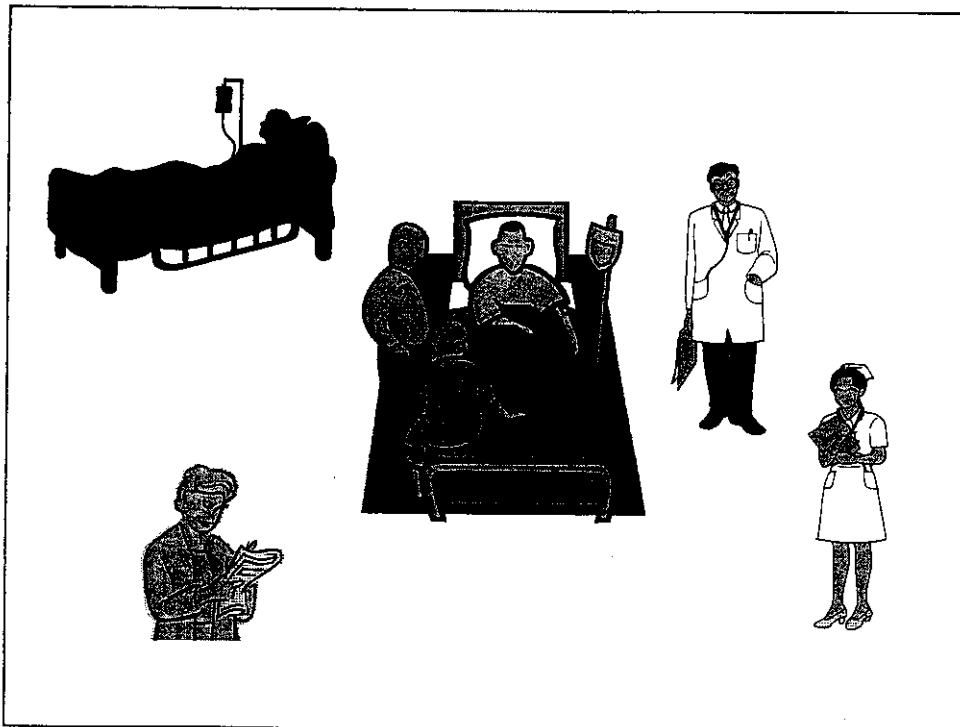
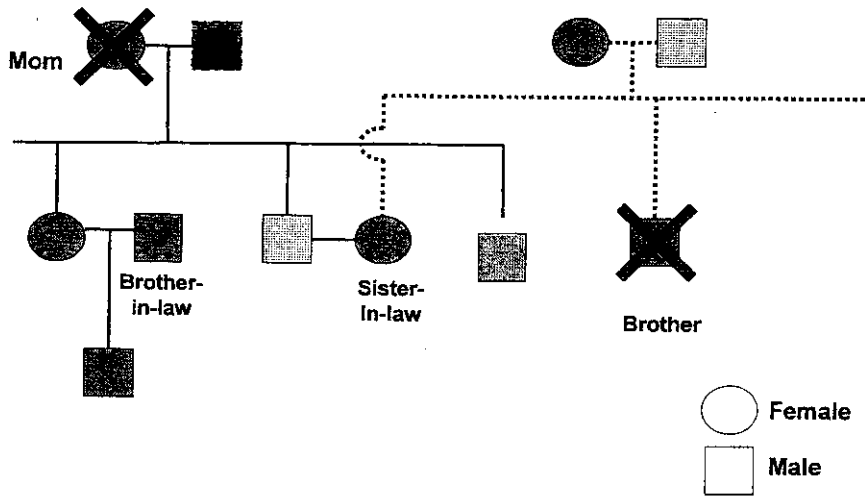
ORIGINAL ARTICLE














A Major Outbreak of Severe Acute Respiratory Syndrome in Hong Kong

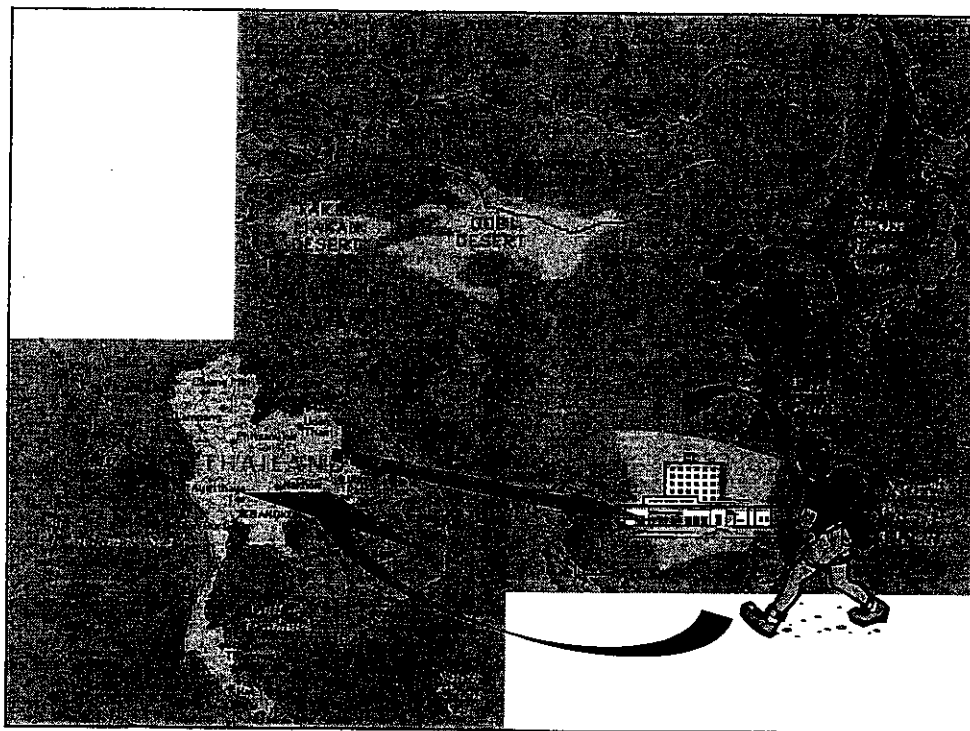
Nelson Lee, M.D., David Hui, M.D., Alan Yu, M.D., Paul Chan, M.D.,
Peter Cameron, M.D., Gavin M. Joynt, M.D., Anil Ahuja, M.D.,
Man Yee Yung, B.Sc., C.B. Leung, M.D., K.F. To, M.D., S.F. Lui, M.D.,
C.C. Szeto, M.D., Sydney Chung, M.D., and Joseph J.Y. Sung, M.D.

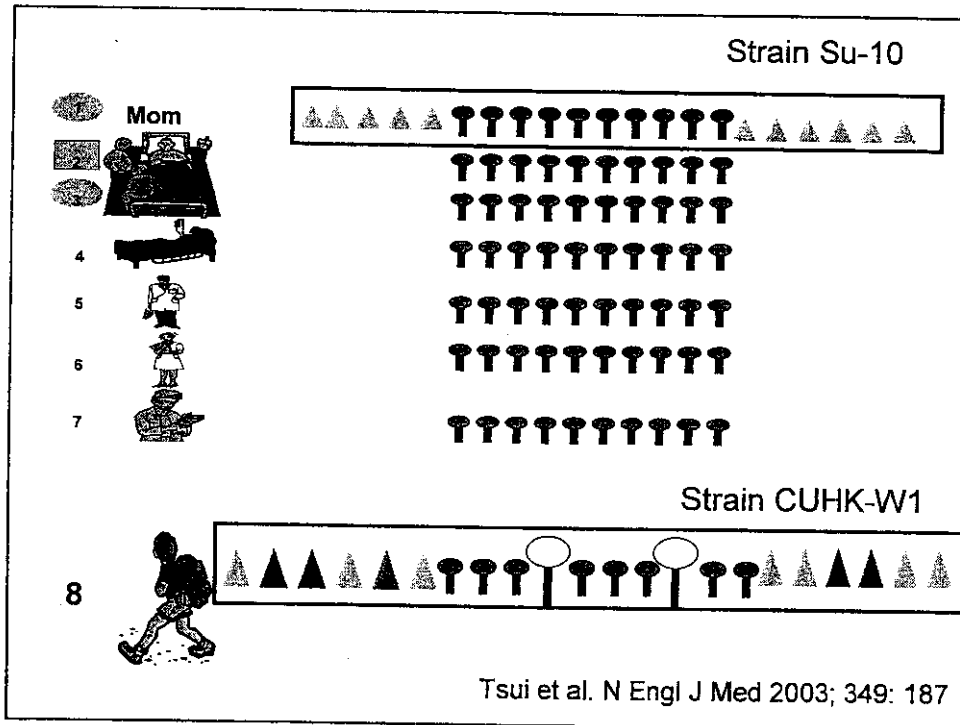


The PWH index case and his family



1	Mom	
2		
3		
4		
5		
6		
7		





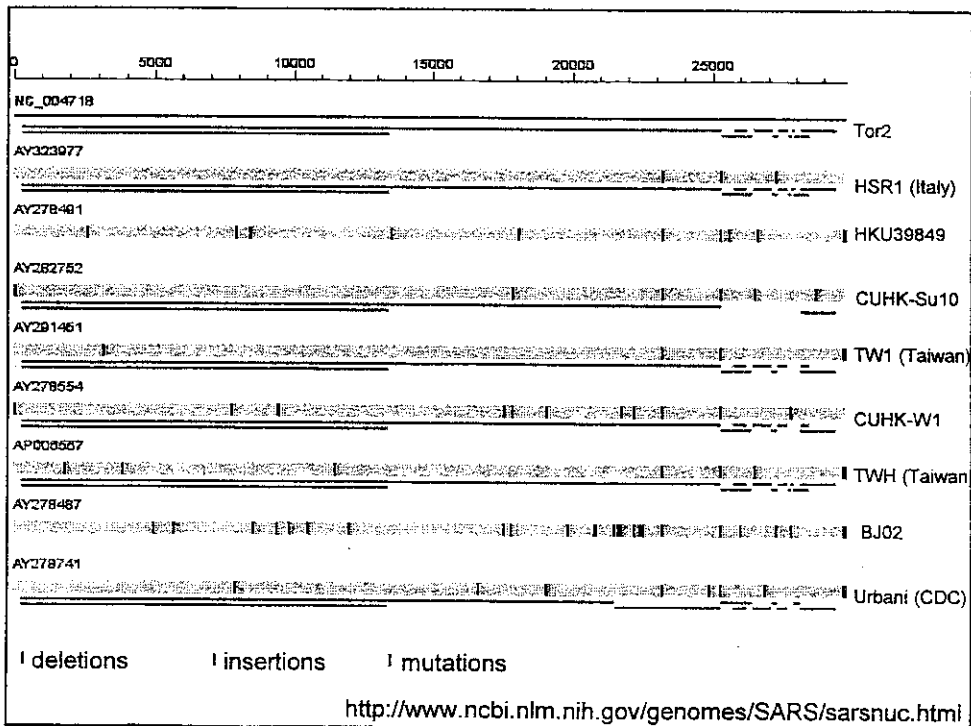
Implications

- More than one strains of virus already in Hong Kong at the beginning of the epidemic
- Relationship between clinical and molecular epidemiology



Other sequences from the National Center for Biotechnology Information

<http://www.ncbi.nlm.nih.gov/genomes/SARS/sarsnuc.html>



Virus isolates from Singapore

AY283798

AY283794

AY283798

AY283797

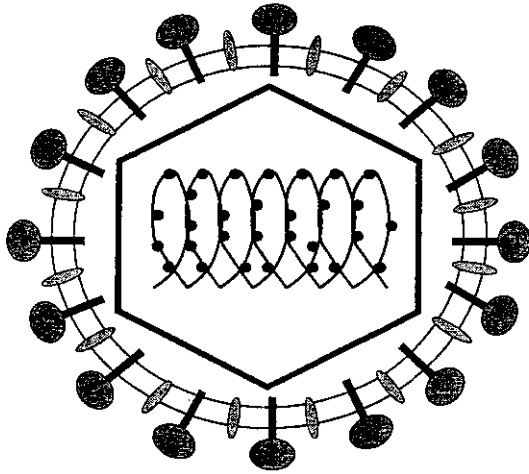
AY283795

The Amoy Gardens



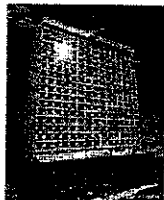
- Alleged index case: renal patient (patient 1) from PWH
- Normally lived in Shenzhen
- Regular haemodialysis
- Fever: 15 March 2003
- Admitted to Ward 8A from 15 to 19 March 2003
- Visited Amoy Gardens on 14 and 19 March 2003
- Amoy SARS outbreak peaked 24 March 2003

Diarrhoea 73%
(Lee et al 19.6%)



Has the virus mutated?





Amoy Gardens Patients

Nucleotide positions*	Open reading frame*	Tor2 'AY274119	Urbani 'AY278741	Mother of J Su-10 'AY282752	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
3852	orf1a	T Serine	T Serine	T Serine	C Serine	C Serine	C Serine	C Serine	C Serine
11493	orf1a	C Tyrosine	C Tyrosine	C Tyrosine	T Tyrosine	T Tyrosine	T Tyrosine	T Tyrosine	T Tyrosine
17166	orf1b	A Isoleucine	A Isoleucine	A Isoleucine	A Isoleucine	A Isoleucine	G Valine	A Isoleucine	A Isoleucine
28102	orf11	A Asparagine	A Asparagine	A Asparagine	A Asparagine	A Asparagine	C Threonine	A Asparagine	A Asparagine
28696	Nucleo- capsid protein	G Glycine	G Glycine	T Cysteine	G Glycine	G Glycine	G Glycine	G Glycine	G Glycine

Chim et al. Lancet (in press)

Deductions

- No significant mutation in Amoy Gardens virus
- Renal patient (patient 1) likely to be the index of the Amoy outbreak
- Renal patient (patient 1) probably acquired infection from PWH: only 3 base differences from CUHK-Su10 (mother of PWH index)
- Caveat: paucity of peer-reviewed published data on SARS-CoV genotypes from Shenzhen (except CUHK-W1) around the time of Amoy outbreak

Conclusions

- Synergy between classical and molecular epidemiology
- Tracing of virus evolution

Thank you