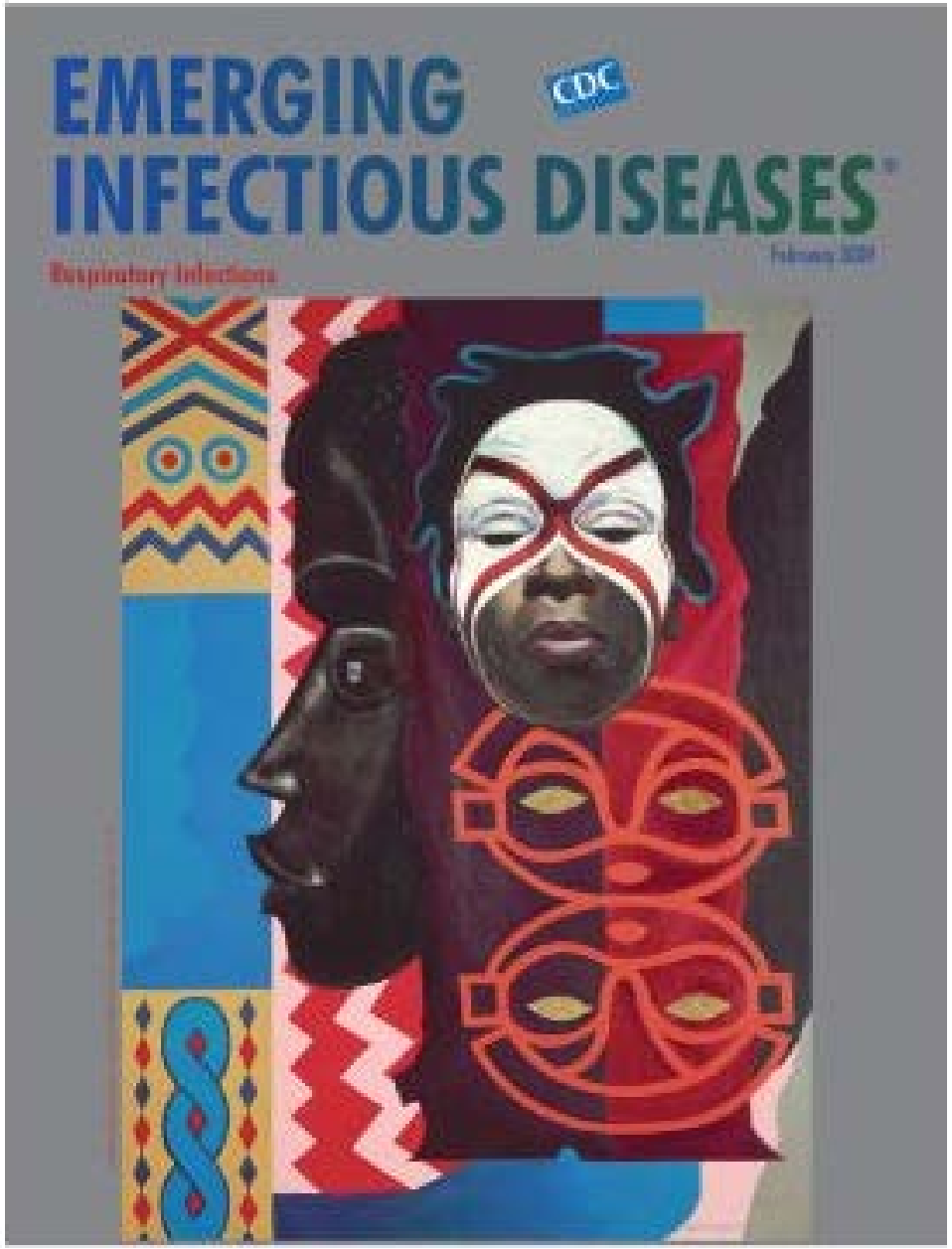
Emerging Respiratory Infections

NZ 2015

Amanda McNaughton

Respiratory Physician

CCDHB Wellington



Respiratory Infection: overview

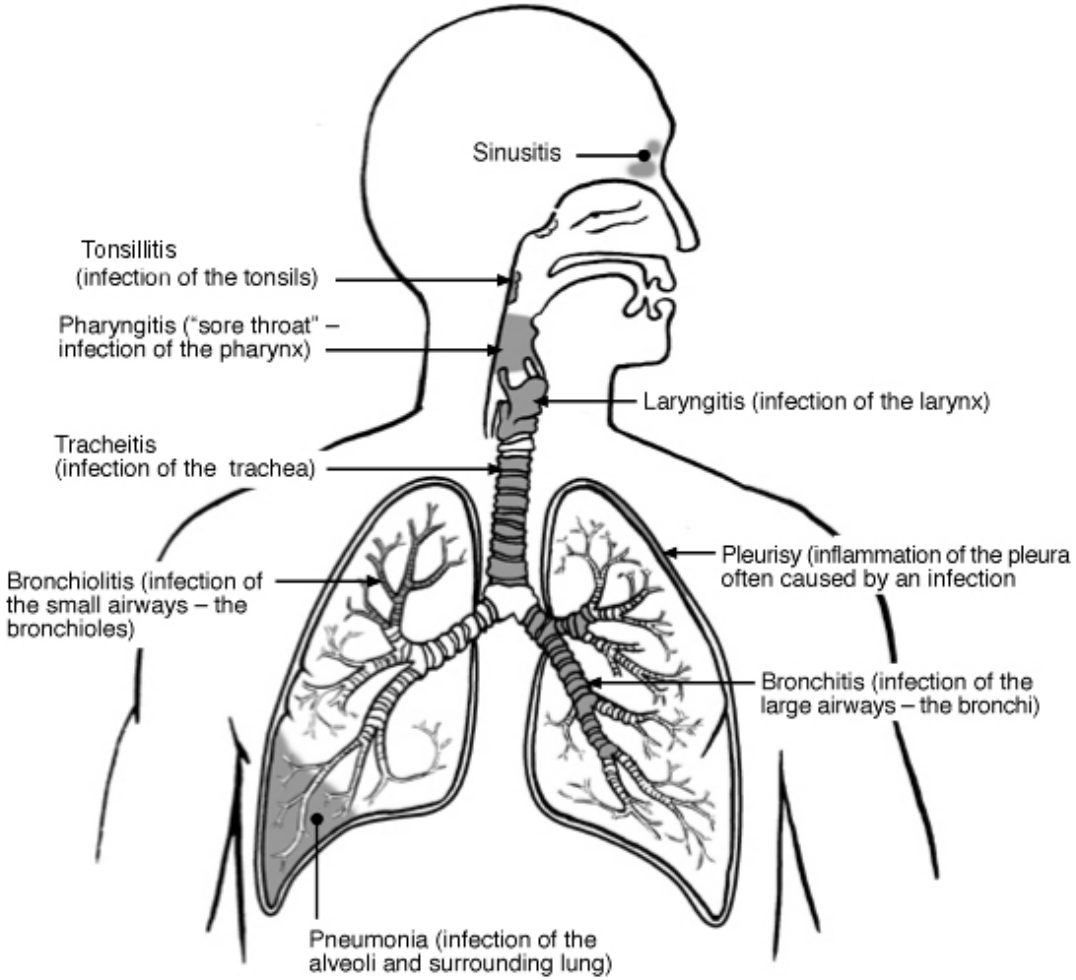
Influenza virus Clinical picture
Emerging infection
New Zealand Influenza

Corona virus Clinical picture
Emerging infection

Human behaviour drives pathogen emergence

Example

Drug resistant organisms



Infections of the respiratory tract

Acute sore throat/ pharyngitis/ tonsillitis	Rhinovirus, Influenza/parainfluenza, Strep grp A,C,G
Acute rhinosinusitis	Rhinovirus, Influenza/parainfluenza, Strep pneumoniae, Haemophilus influenzae, Moraxella catarrhalis
Glandular Fever / Mumps / Whooping cough	
Acute bronchitis	RSV, Rhinovirus, influenza, Strep pneumoniae, Haemophilus influnzae
Bronchiolitis	RSV , Adeno/ rhinovirus, Influenza, parainfluenzae
Pneumonia	Viral, Strep pneumoniae, Mycoplasma sp, Chlamydia sp. Legionella, Staph aureus, TB,

<u>Severe Acute Respiratory Infection</u>

Fever>37.8 C /Cough or sore throat/ Hospital admission

<u>Influenza like illness</u> Acute illness /Fever > 38 C/ Cough or sore throat

Importance of Respiratory Infection

- More infections are spread via respiratory tract than by any other route.
- 3rd cause of death world wide
- Number 1 cause in developing world

Emerging

e.g. SARS CoV , MERS CoV, Influenza A

Fungi, antibiotic resistant bacteria

Re-emerging

e.g. TB, whooping cough

	Year	Region
Hantavirus pulmonary syndrome, sin nombre virus[26]	1993	USA
Influenza A H5N1[33]	1997	Hong Kong
Influenza A H9N2[28]	1999	Hong Kong
Human metapneumovirus[29]	2001	Netherlands
SARS coronavirus[6,7]	2003	Hong Kong
Human coronavirus NL63[3]	2004	Netherlands
Influenza A H7N7[34]	2004	Netherlands
Human coronavirus HKU1[4]	2005	China
Influenza A, H1 triple reassortant[5,18]	2005	USA
Triple reassortant H3N2 influenza A viruses[11]	2005	Canada
Bocavirus[28]	2005	Sweden
Influenza A H1N1 pdm09[12]	2009	Mexico
Adenovirus 14[9]	2010	USA
MERS-coronavirus[5]	2012	Saudi Arabia
Influenza A H7N9[8]	2013	China

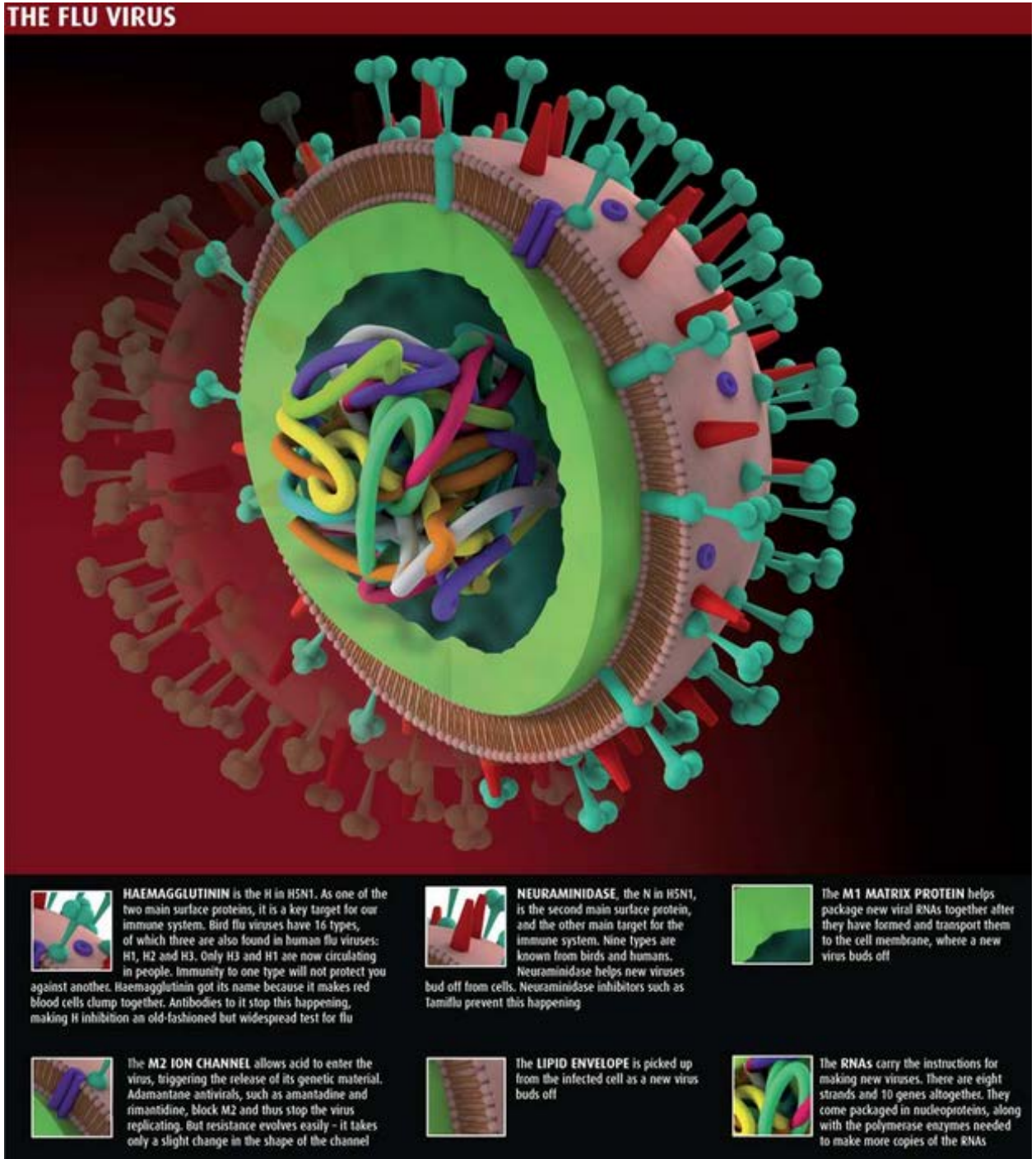
SARS=severe acute respiratory syndrome. MERS=Middle East respiratory syndrome.

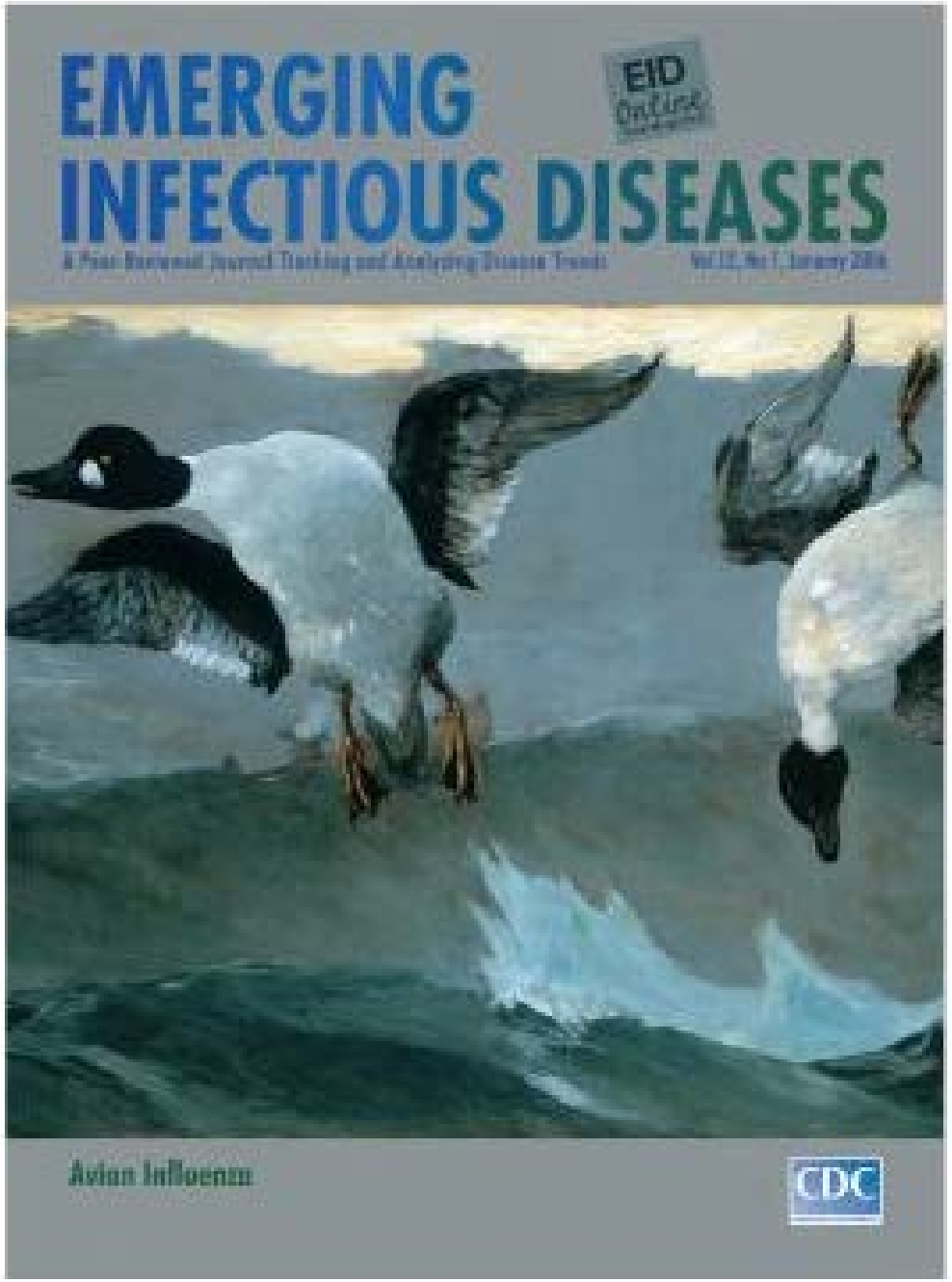
Table 1: Emerging respiratory viruses

Influenza viruses

Haemagglutinin 16 types
Neuraminidase 9 types
144 subtypes ; from H1N1 to H9N16

HA attaches to Resp epithelial cells
Tissue invasion > cell injury/ death
Local inflammation/ immune response
Spread





Evolving

Mutate fast

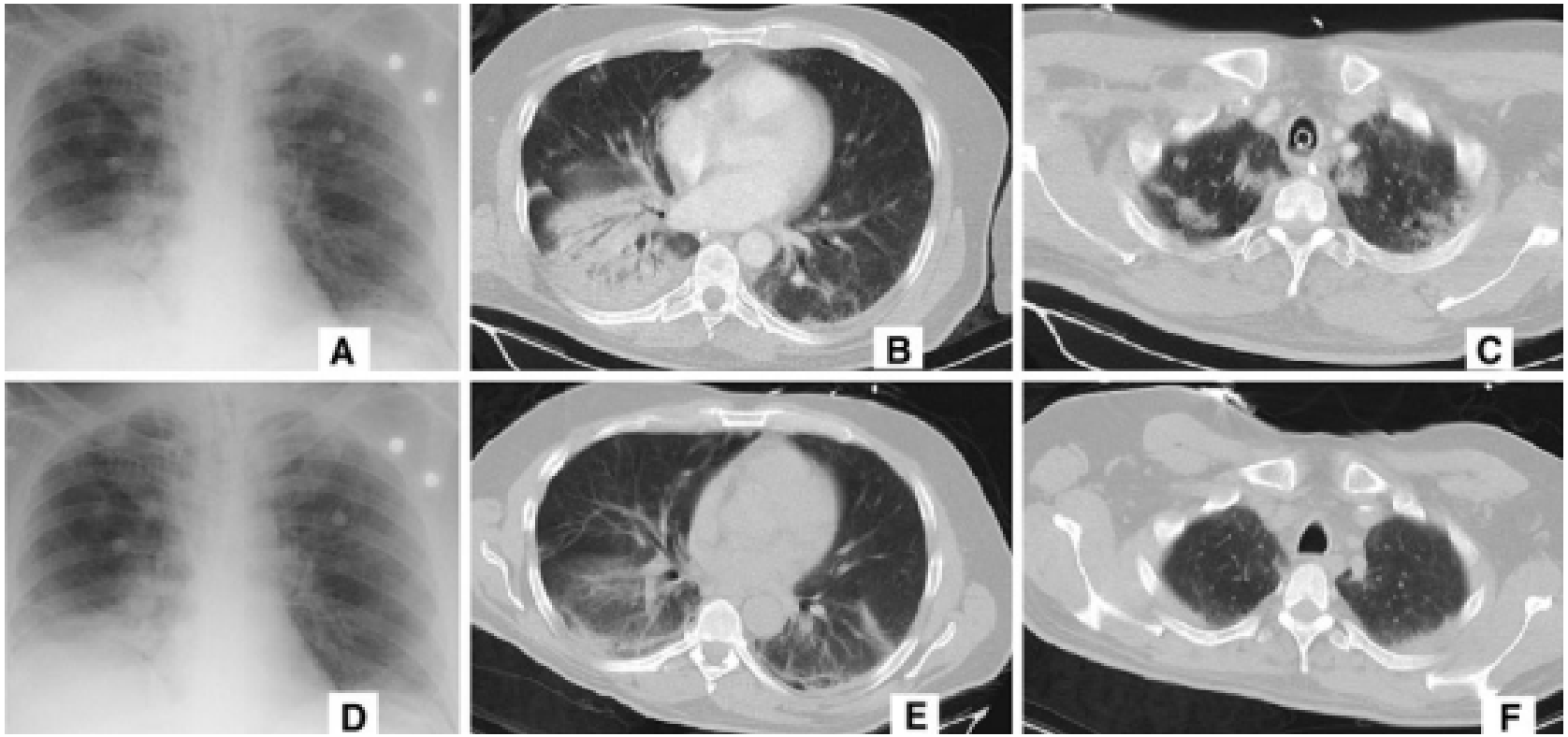
Antigenic drift and shift

Cross species barriers

Some survive months in environment

All exist in wild birds (asymptomatic)

Viral pneumonia. Sudden onset/ Fever >38 C / Cough/ SOB/ Coryza/ Headache/ Malaise

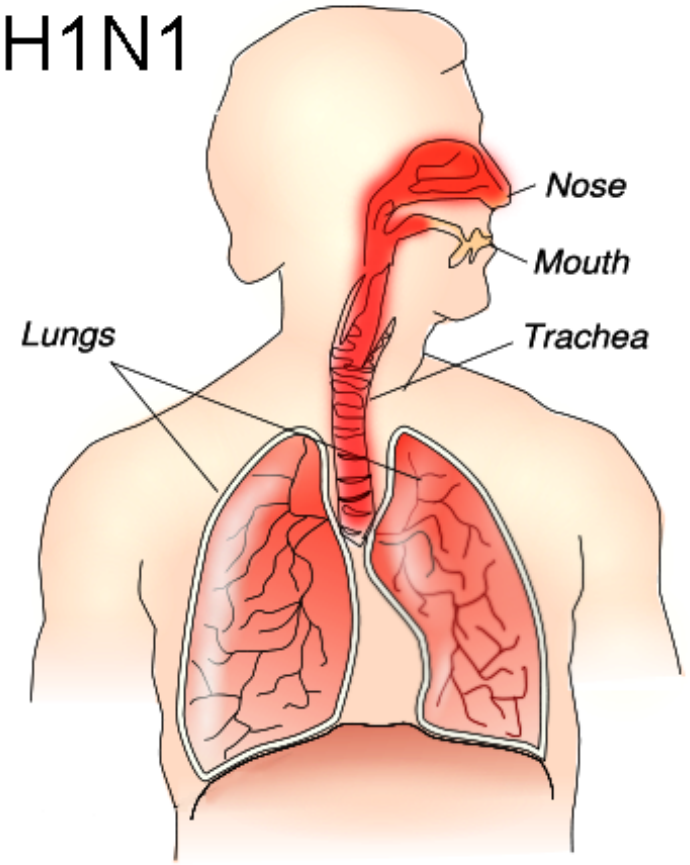


Rapidly progressive clinical and radiological change.

Diffuse interstitial infiltrates

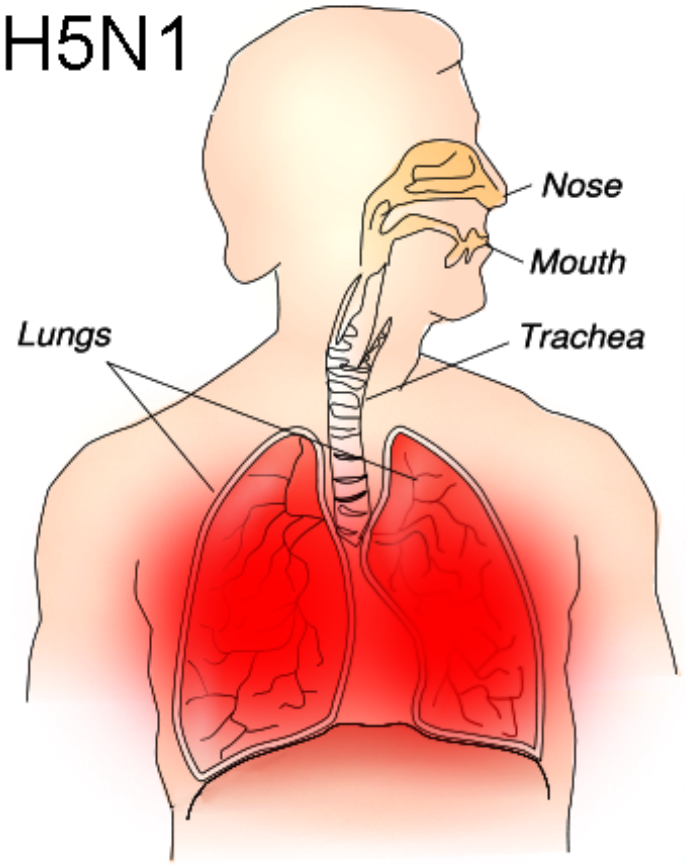
Respiratory failure

H1N1

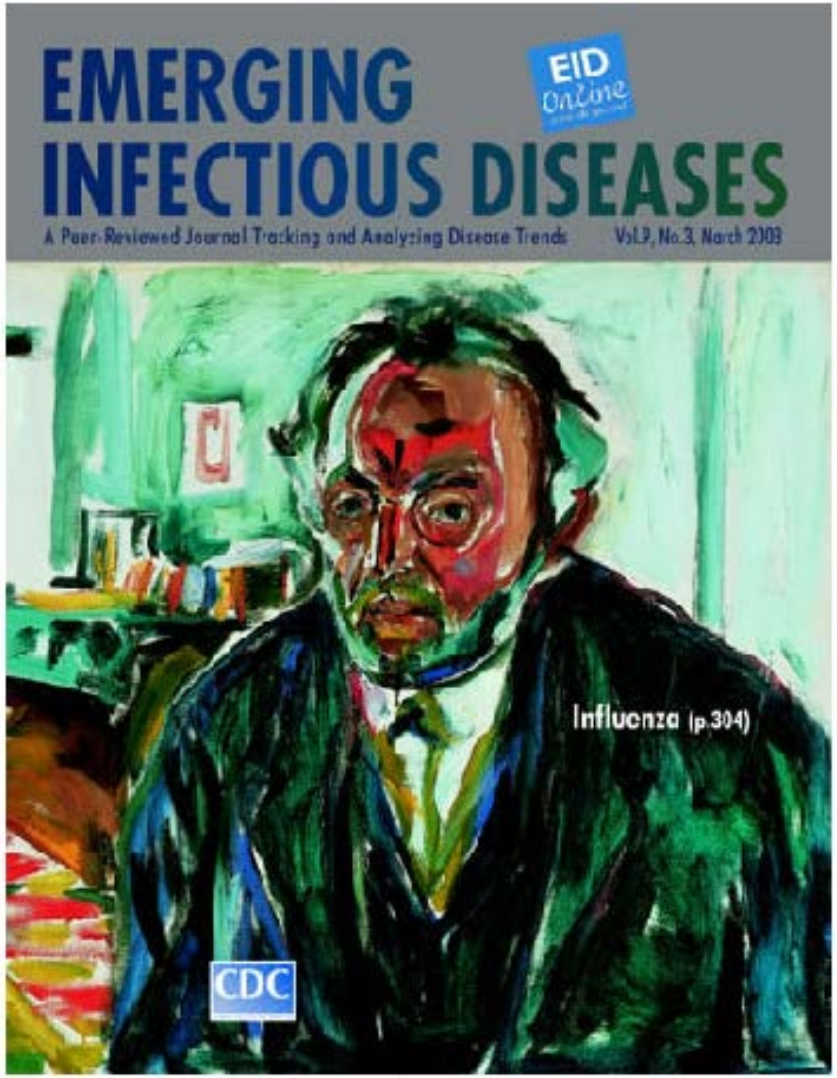


Easily spread
Rarely fatal

H5N1



Spreads slowly
Often fatal



Edvard Munch (1863–1944) Self-Portrait after the Spanish Flu (1919).

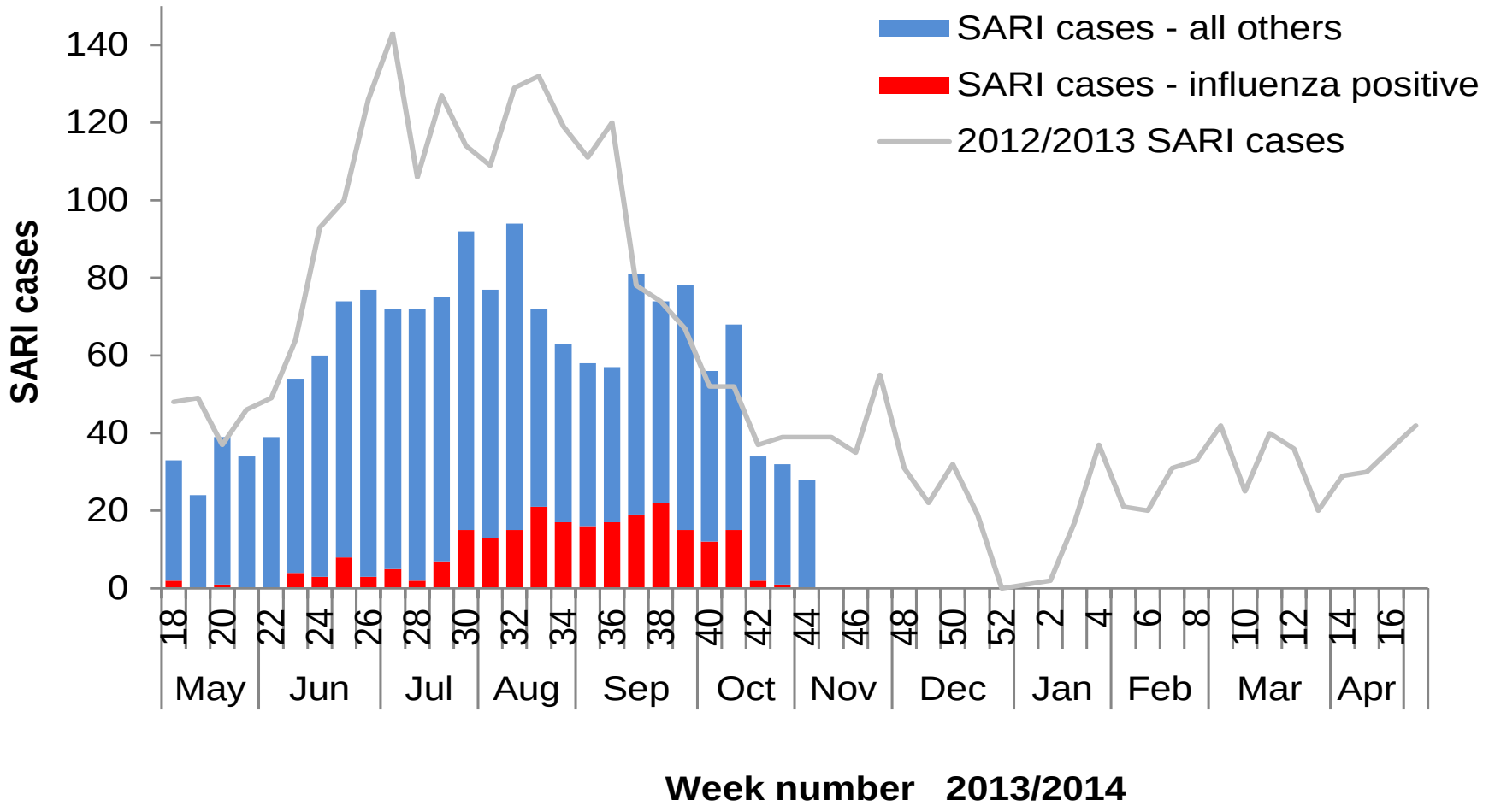
Influenza in NZ

SARI and ILI surveillance Hospital and GP Auckland

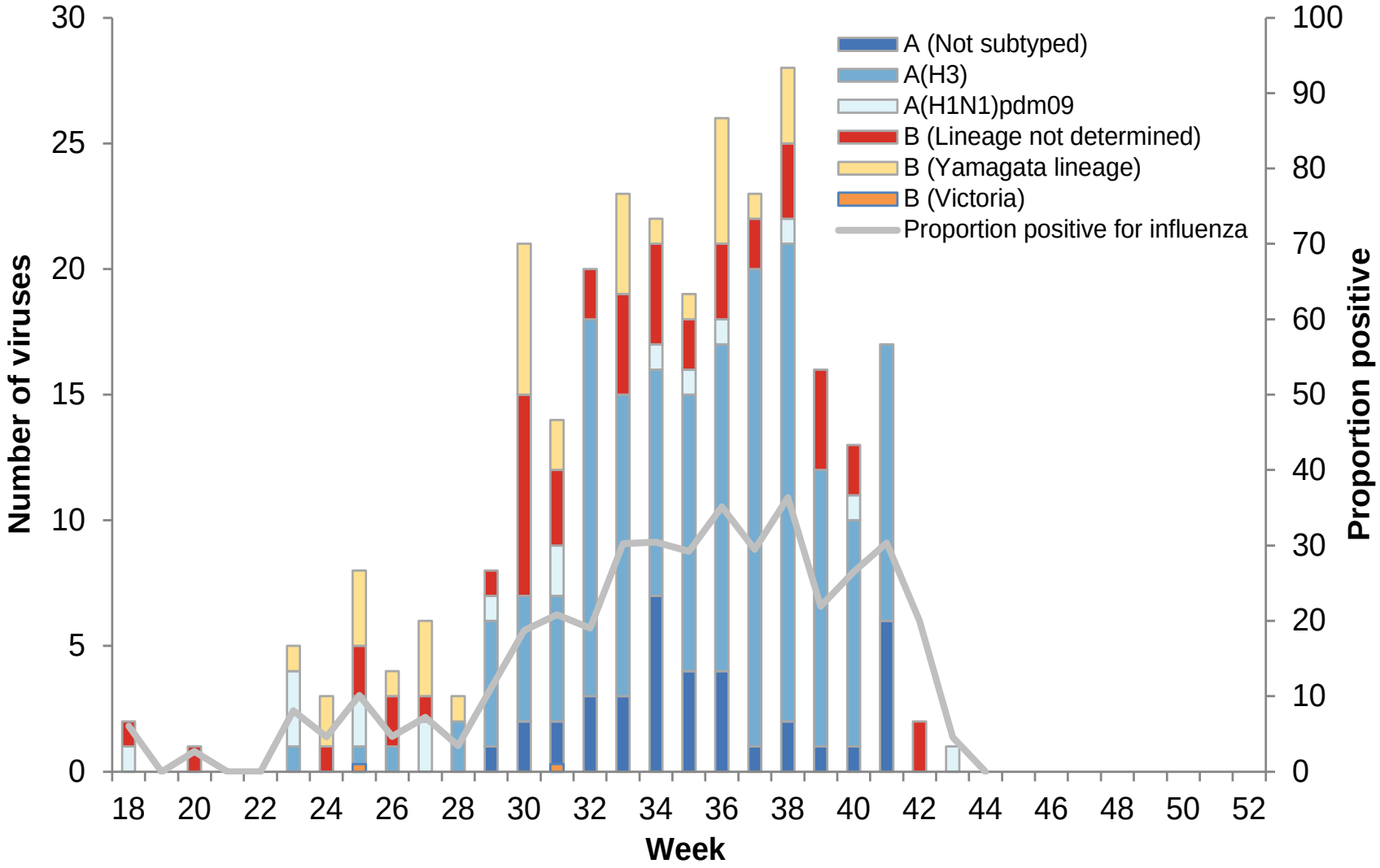
Incidence, prevalence, demographics, clinical

Viral Etiology

SHIVERS SARI and influenza cases, 2013



SHIVERS Influenza cases by type, 2013



THE BURDEN OF RESPIRATORY DISEASE IN AUCKLAND

POPULATION

837,696

AUCKLAND AND COUNTIES MANUKAU DISTRICT HEALTH BOARDS

FROM 29 APRIL – 29 SEPT 2013 THERE WERE

59,688

ACUTE HOSPITAL ADMISSIONS

GP CONSULTATIONS

13,947

PATIENTS WITH INFLUENZA LIKE ILLNESS (ILI)

3,326

PATIENTS TESTED POSITIVE FOR FLU

4,126

PATIENTS POSITIVE FOR 7 NON-FLU RESPIRATORY VIRUSES

HOSPITALISATIONS

1,372

PATIENTS WITH SEVERE ACUTE RESPIRATORY ILLNESS (SARI)

242

PATIENTS TESTED POSITIVE FOR FLU

595

PATIENTS POSITIVE FOR 7 NON-FLU RESPIRATORY VIRUSES

ICU

44

PATIENTS WITH SEVERE ACUTE RESPIRATORY ILLNESS ADMITTED TO ICU

8

PATIENTS TESTED POSITIVE FOR FLU

12

PATIENTS POSITIVE FOR 7 NON-FLU RESPIRATORY VIRUSES

DEATHS

4

DEATHS IN PATIENTS WITH SEVERE ACUTE RESPIRATORY ILLNESS

0

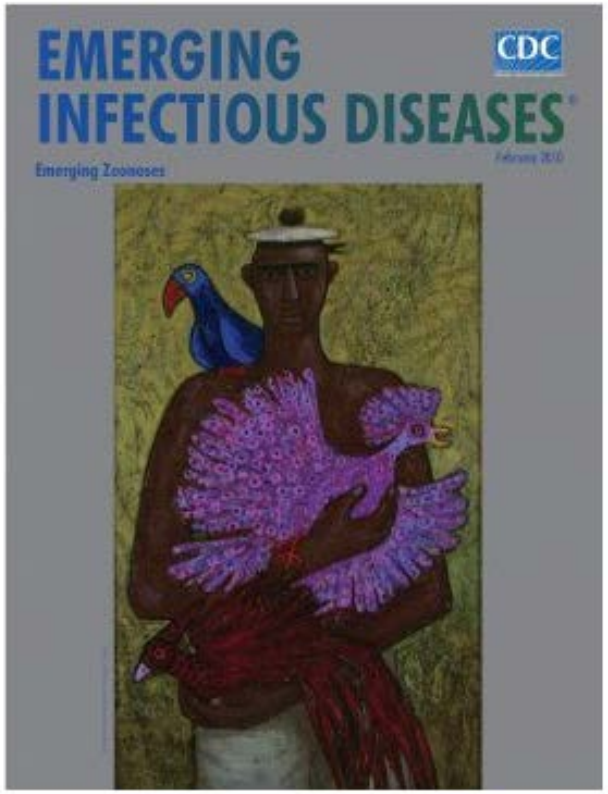
DEATHS IN PATIENTS WHO TESTED POSITIVE FOR FLU

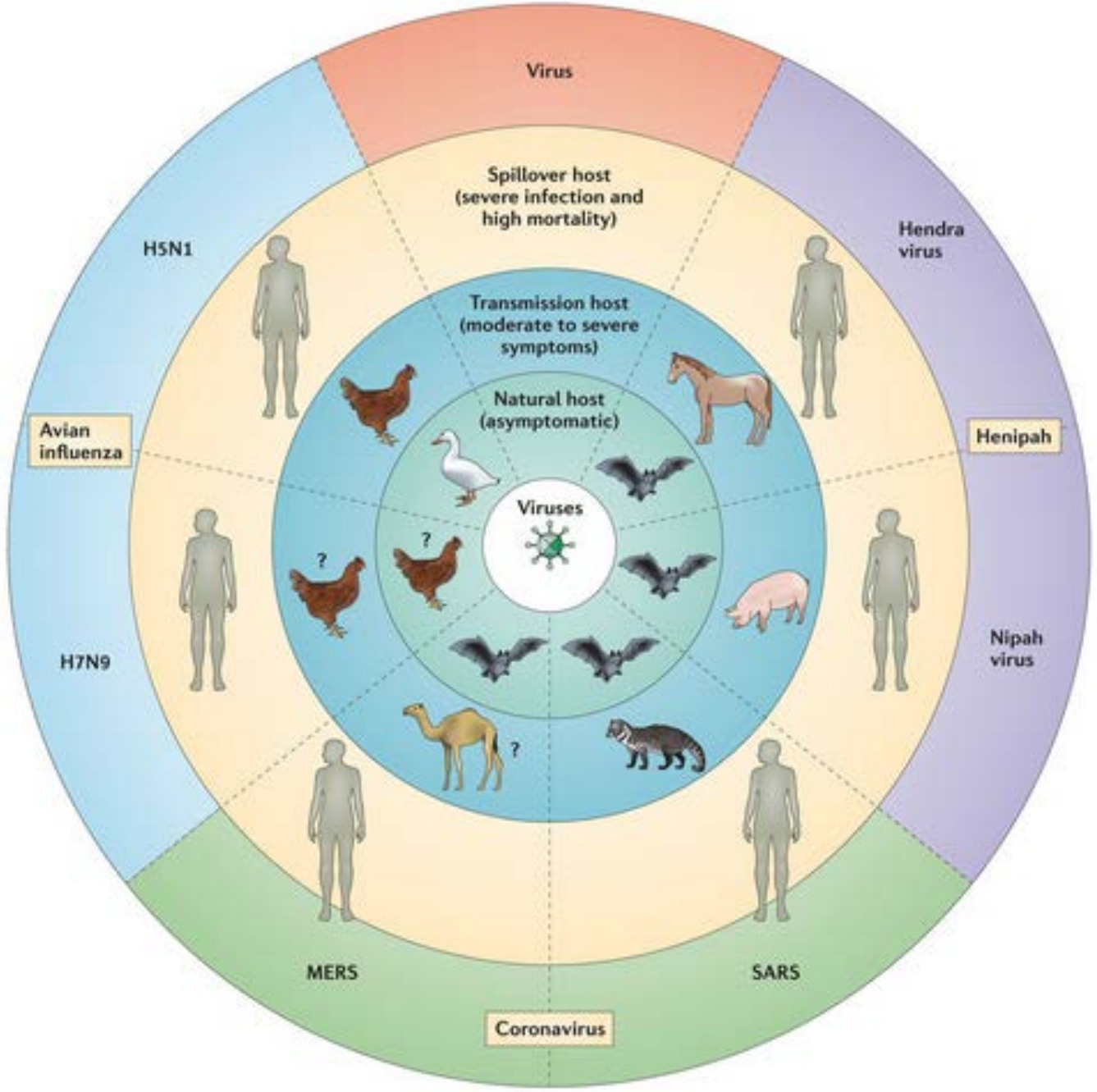
2

DEATHS IN PATIENTS POSITIVE FOR 7 NON-FLU RESPIRATORY VIRUSES

Corona Virus

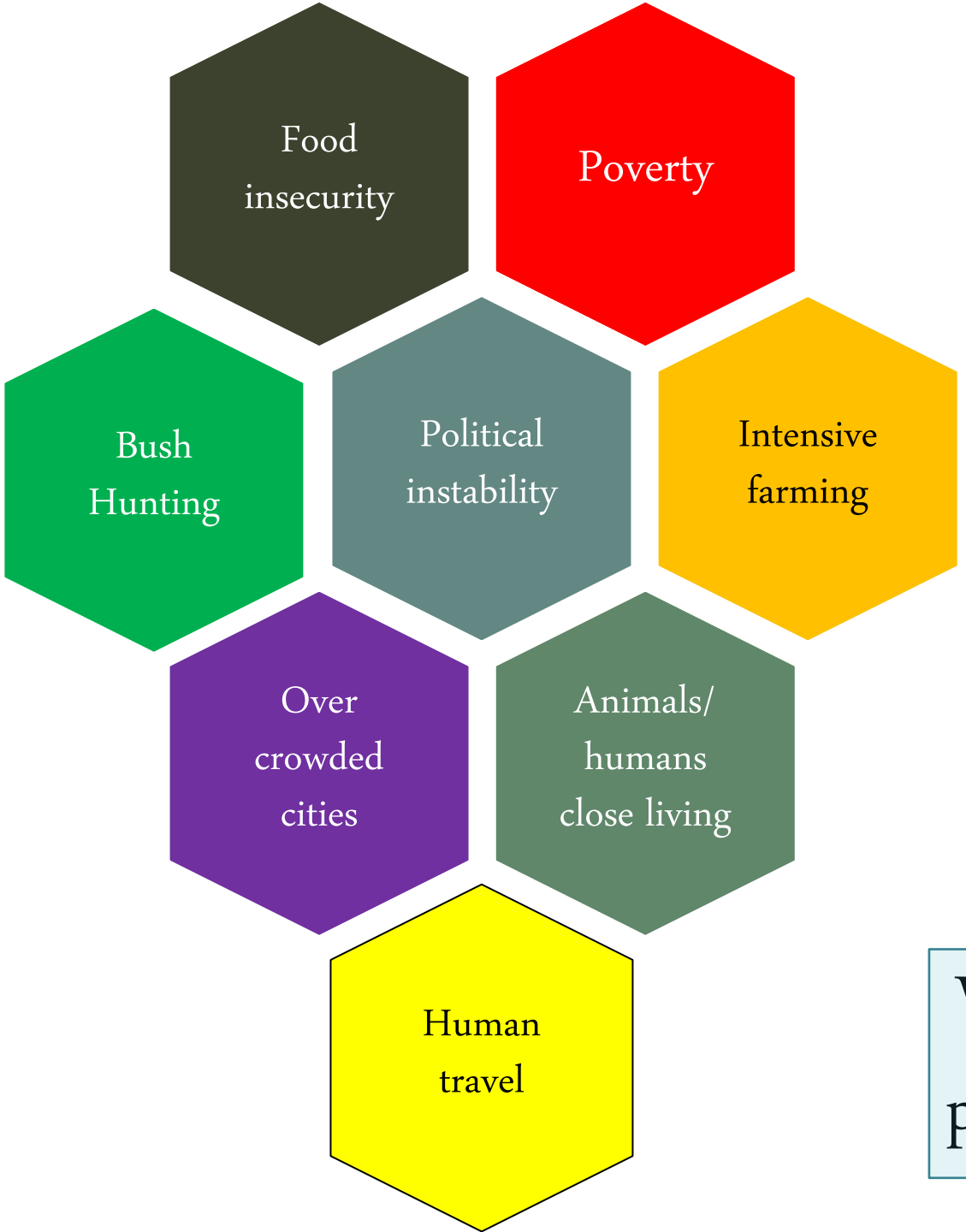
SARS CoV	2003	30 Countries	10%†
MERS CoV	2012-3	Middle East	30%†





Nature Reviews | Immunology

Increased metabolism & higher body temperatures of bats during flight:
Powerful selective force against virulence
Promotes diversity of viruses that infect bat populations



We are driving pathogen emergence

Detecting emerging infection Assam 2007-10

Monsoon season 100's of cases encephalitis
?Japanese B encephalitis

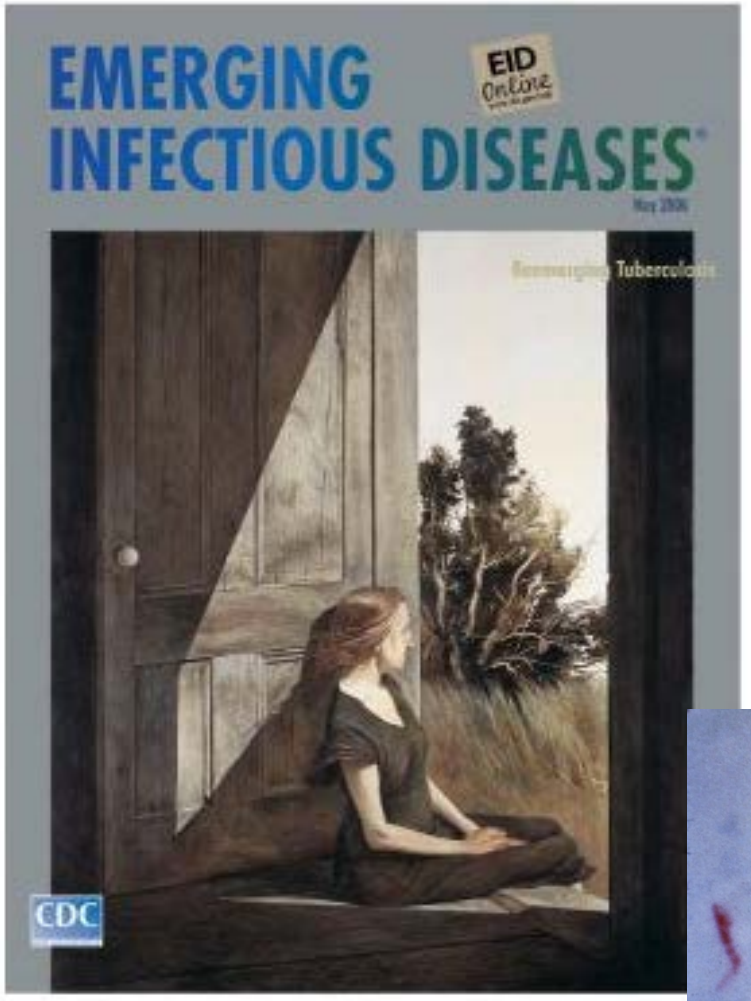
1/3 die / 1/3 neurological disability/ 1/3 recover fully

Clustered in time and place

Secret Mission: Blood and CSF samples to Indian 'ESR"

70% positive serology

Scientists > villages, caught mosquitoes, tested pigs
Space scientists : monsoon flooding prediction models
Targeted, appropriate, vaccination programme

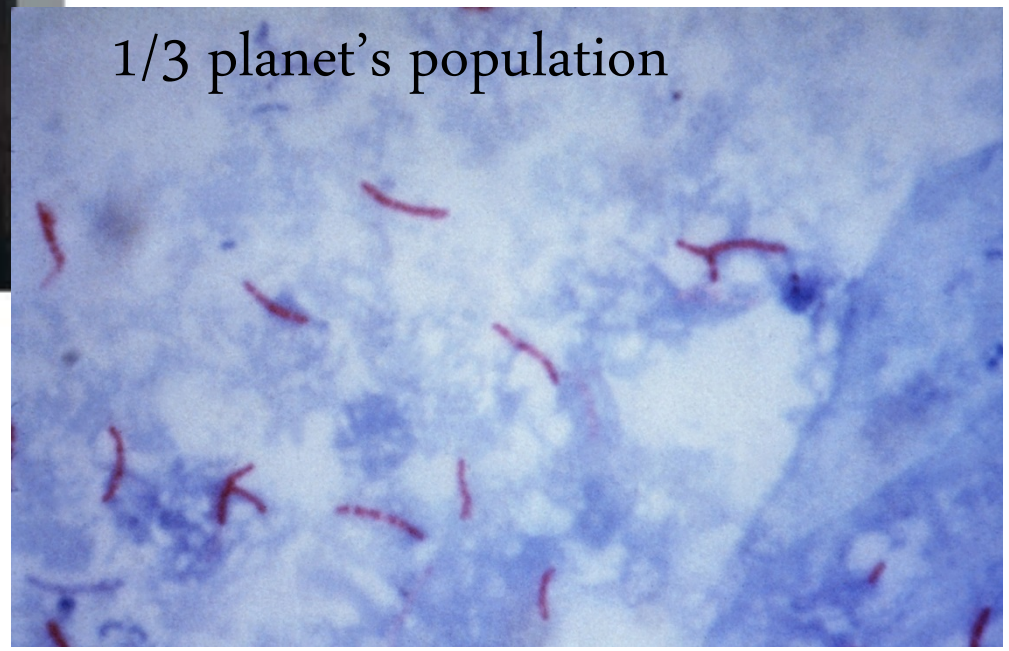


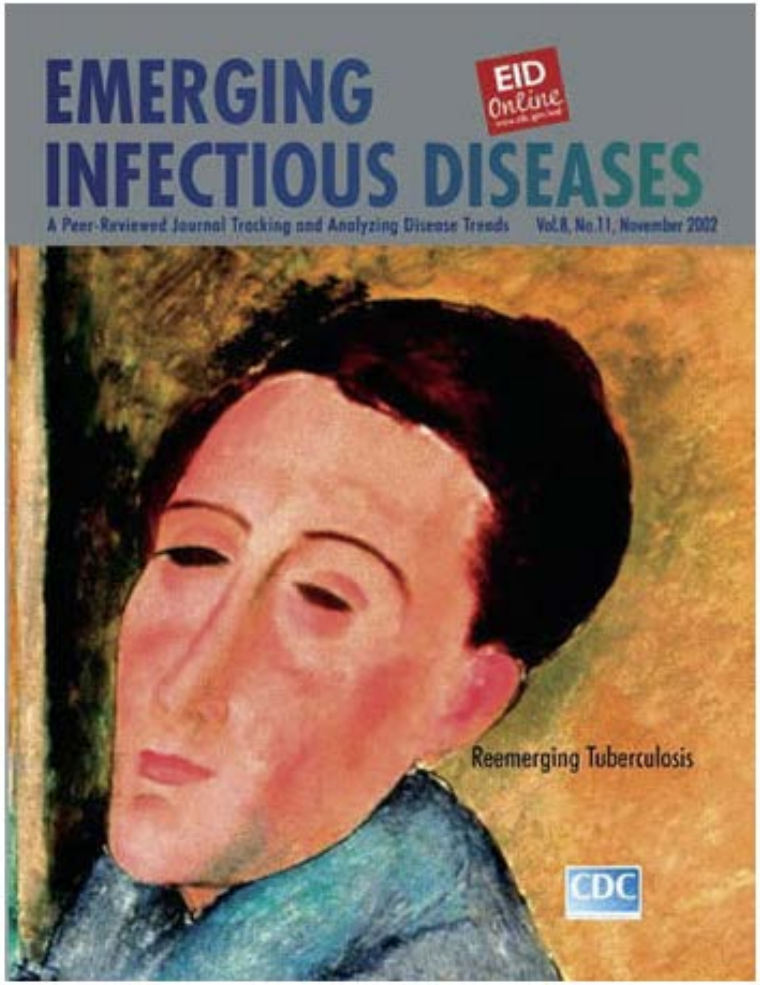
Mycobacterium tuberculosis

Most important reservoir:

Humans:

1/3 planet's population





Amedeo Modigliani (1884-1920). Self-Portrait, 1919. Oil c

294 cases 2012

77% born outside NZ

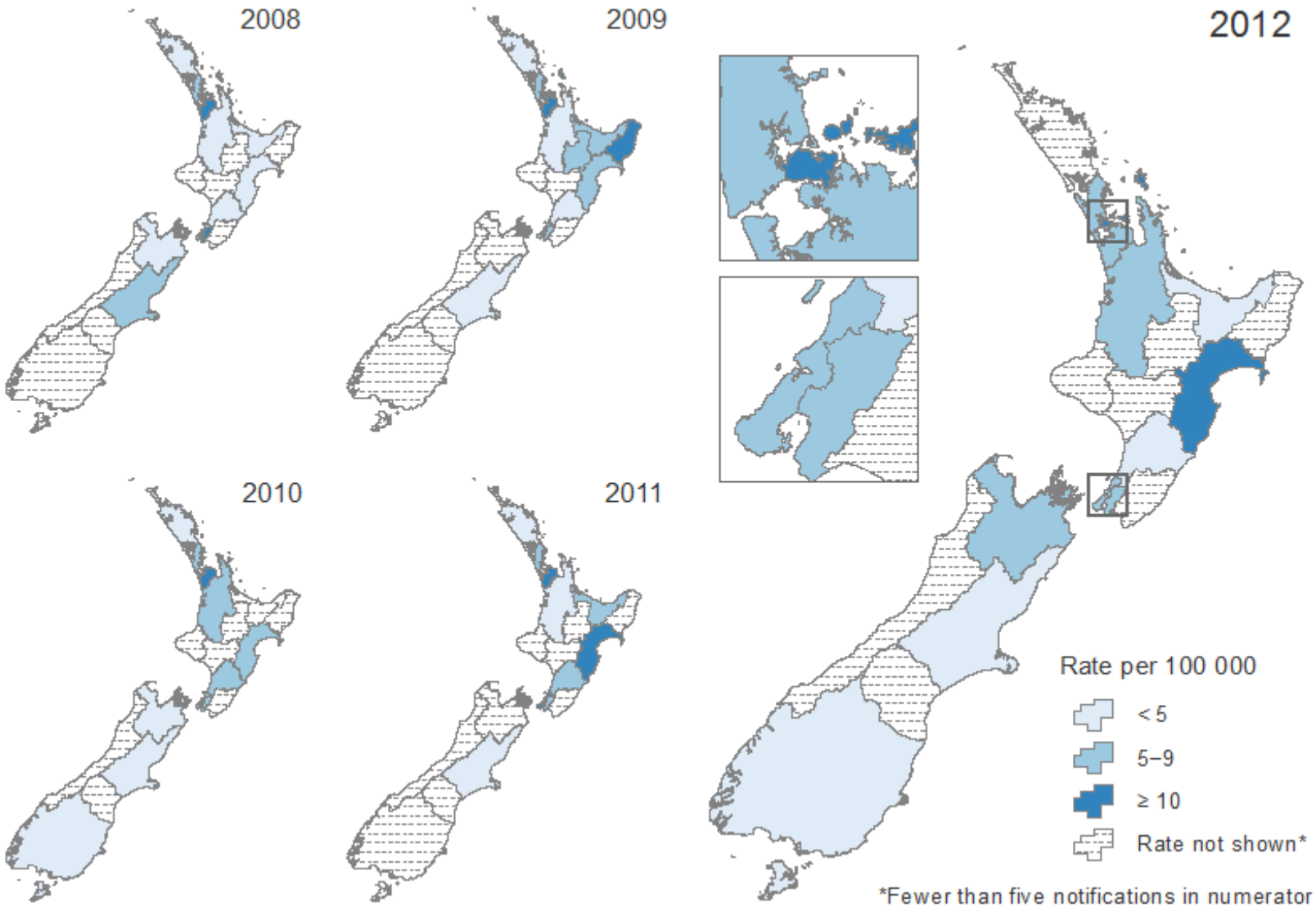
22% Immune suppressed

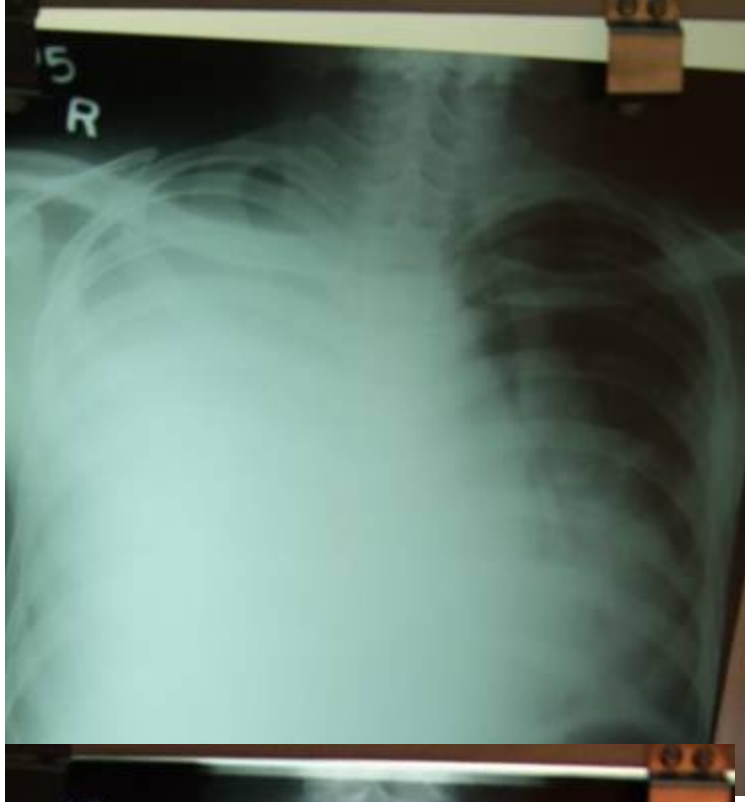
4 cases HIV +

4 cases M bovis

4 cases MDRTB

4 deaths

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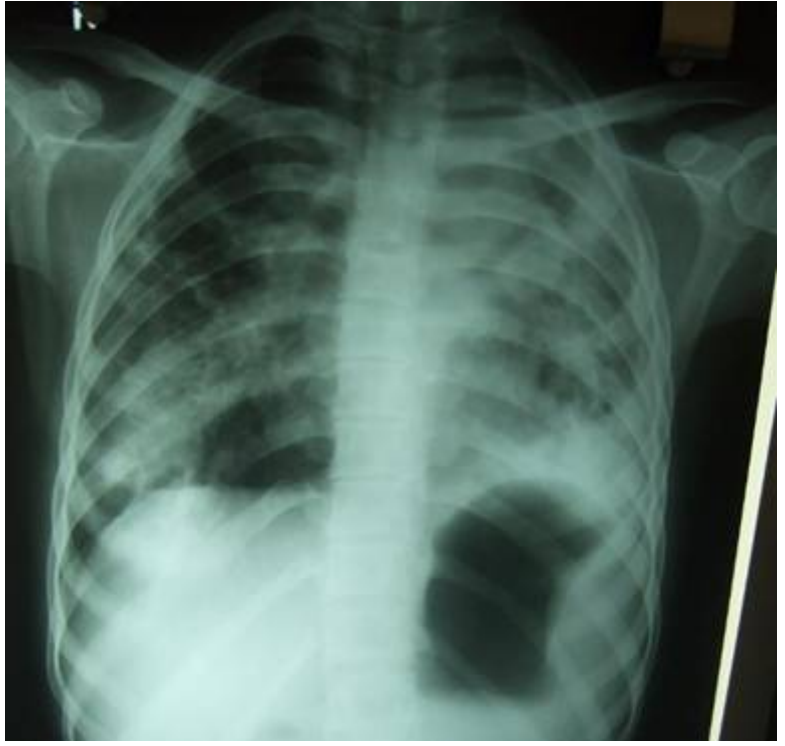


R


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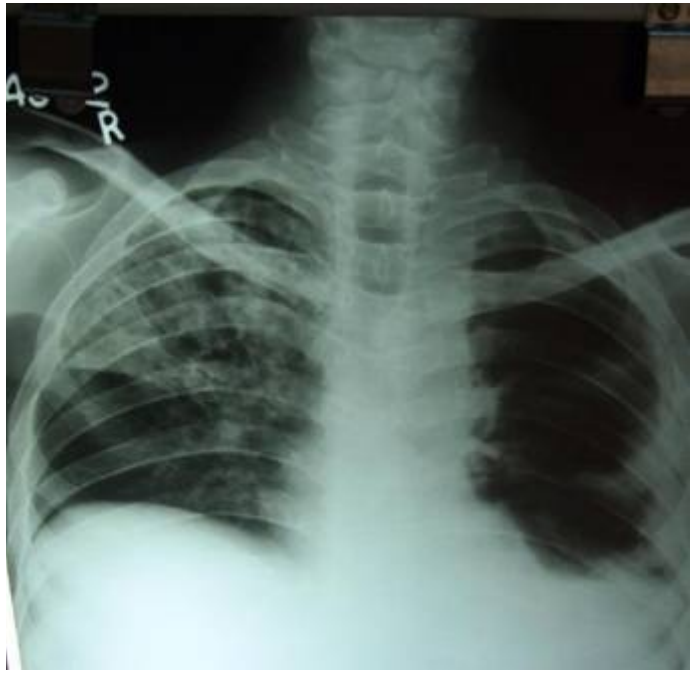
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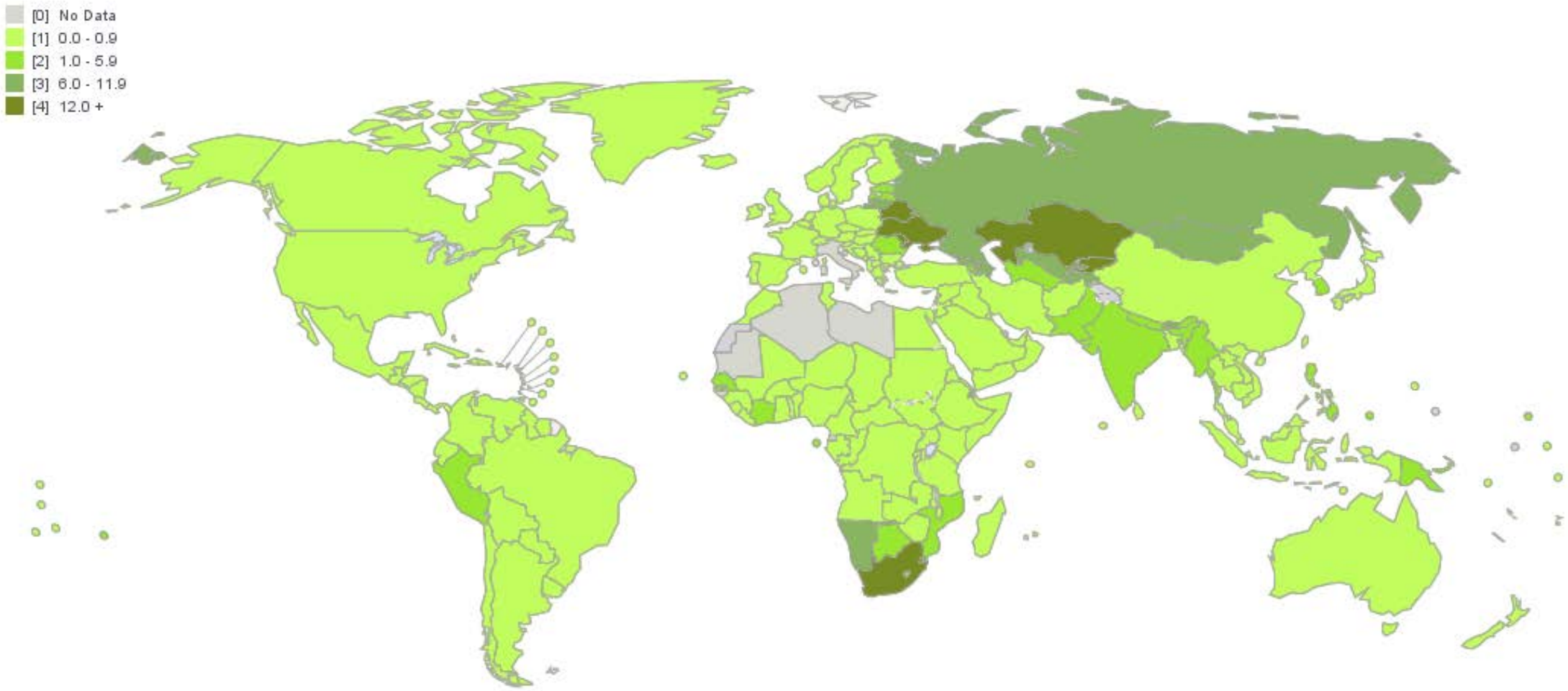
Notified MDR-TB cases (number per 100 000 population)

2005 2006 2007 2008 2009 2010 2011 2012 2013

Notified MDR-TB cases (number per 100 000 population), 2013



? Any chance of Drug Resistance

Ask:

- Have you ever been treated for tuberculosis?
- Have you ever taken injections for more than 1 or 2 weeks?
- Have you ever taken a medicine that turned your urine orange-red?
- Foreign Born patients from high incidence areas

- Importance of Respiratory Infection
- Time and Place: think about, and look for pathogen
- Mask
- Vaccination
- Antimicrobial use : careful consideration