

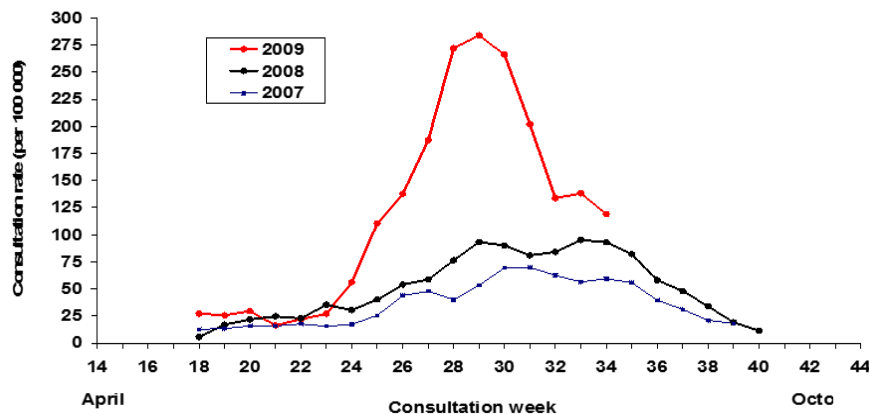
Improving Surveillance for Emerging Infectious Diseases in NZ

Prof Michael Baker

Prof Nick Wilson (presenter)

University of Otago, Wellington, NZ

Weekly rate of ILI per 100,000 registered population, all ages, 2007–2009
From Sentinel General Practice Surveillance System



Outline

Qu 1. What events to place under surveillance for EIDs?

- Pandemic typology
- Position in causal pathway

Qu 2. What functional requirements for EID surveillance?

- Global Health Security Agenda framework
- Aims of public health surveillance
- Public health surveillance quality attributes

Qu 3. What is our current capacity?

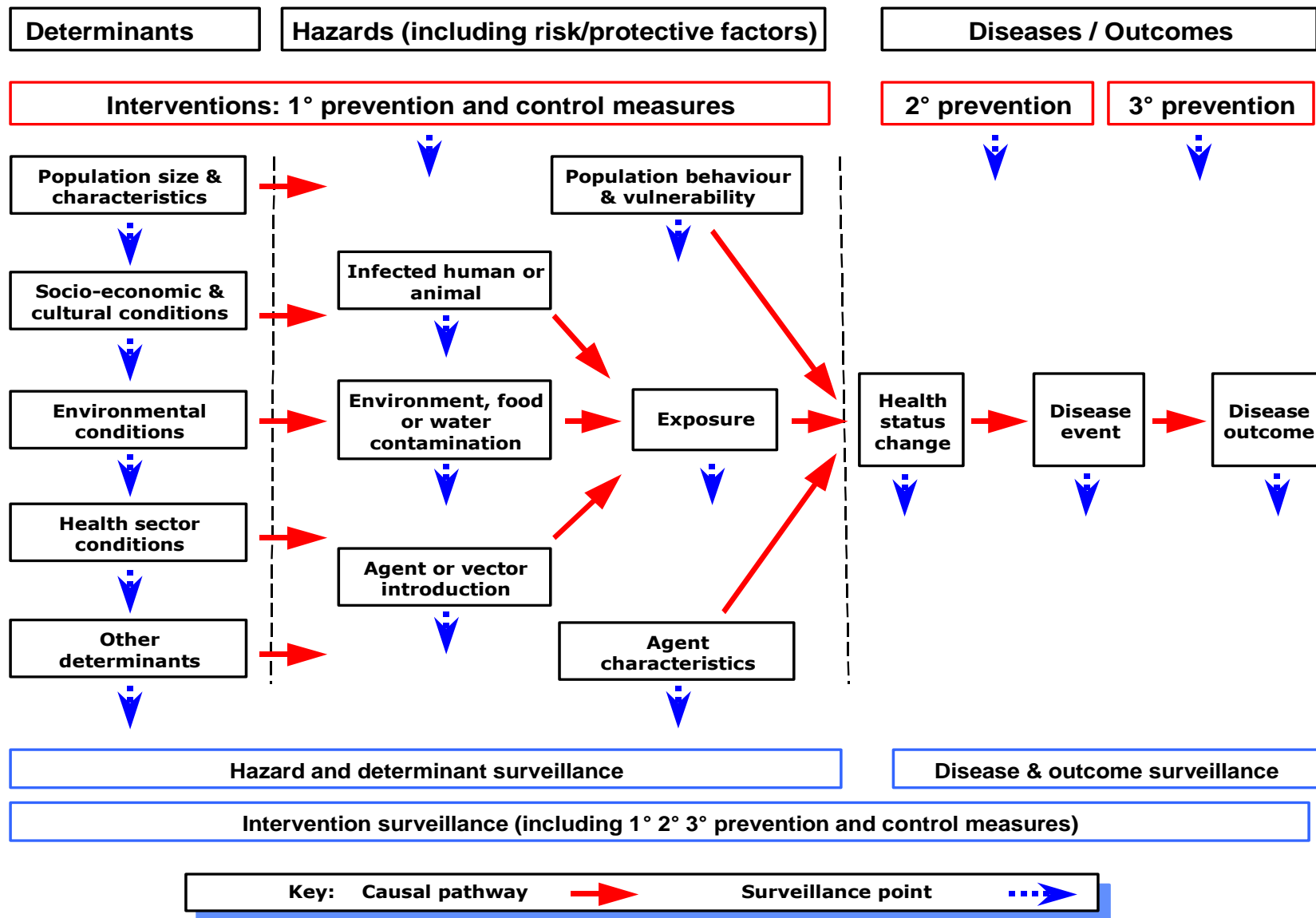
- Learning from past experience
- Pandemic influenza 2009
- Syndromic surveillance for respiratory infections

Conclusions

Pandemic typology (Baker et al, unpublished)

Pandemic Type	Examples (*PHEIC)
A. Pandemic IDs transmitted between people with short to medium incubation periods	
1. ID with well-established pandemic potential	Pandemic influenza 1918, 1957, 2009*
2. Poorly characterised emerging ID with pandemic potential	SARS 2002, MERS-CoV 2012
3. Synthetic or weaponised ID with pandemic potential	Synthetic bioterrorist agent, eg smallpox
4. Well characterised ID with re-introduction potential	Diphtheria 1998, Polio 2014*, Measles (post-elimination)
5. Exotic ID with pandemic potential in low income countries	Plague in India 1994, Ebola 2014*
B. Pandemic IDs with predominantly asymptomatic transmission & long incubation	
6. ID with high asymptomatic transmission, long latency and pandemic potential	HIV/AIDS 1981, nvCJD 1996
7. Increase in serious antimicrobial resistance	Drug resistant tuberculosis (MDR / XDR / TDR)
C. Pandemic IDs predominantly transmitted from animals, vectors, food, and water	
8. Exotic vector borne & zoonotic ID with moderate to high introduction potential	Arboviral diseases eg, Zika 2016*, Dengue, Chikungunya
9. Imported food, drink or other product with serious contaminant	Botulism in canned food, Radiological agent in food

Position in causal pathway



Global Health Security Agenda

Identifies capacities under:

- Prevent
- Detect
- Respond

Surveillance needed to support all capacities

Source: Tappero et al. Lancet 2015;385:1884-2015

Global Health Security Agenda independent assessment: Country X

Target	Status
Summary	
Prevent	
Antimicrobial resistance	
Zoonotic disease	
Biosafety and biosecurity	
Immunisation	
Detect	
National laboratory system	
Surveillance for priority syndromes	
Real-time reportable disease surveillance	
Reporting	
Workforce development	
Respond	
Emergency operations centres	
Multisectoral response	
Medical countermeasures/deployment	
 No capacity  Limited capacity  Demonstrated capacity	

Public health surveillance aims

Control-focussed surveillance provides information to support control measures – **EID detection & response**

1. Identify events that require a specific response
2. Track delivery and quality of control measures

Strategy-focussed surveillance provides information to support prevention strategies – **EID prevention**

3. Monitor event occurrence & distribution
4. Monitor event impacts & help set priorities
5. Monitor hazards, risk factors & determinants to improve prevention
6. Monitor & evaluate interventions
7. Support modelling of future scenarios
8. Support research & identify hypotheses
9. Fulfil legislative & international reporting
10. Monitor context for surveillance

Public health surveillance quality attributes

Control-focused surveillance (case-based, event-based screening, service tracking)

- Sensitivity
- Timeliness
- Stability

Strategy-focused surveillance (monitoring, prevalence surveys)

- Representativeness
- Data quality (completeness, validity)

Current NZ capacity

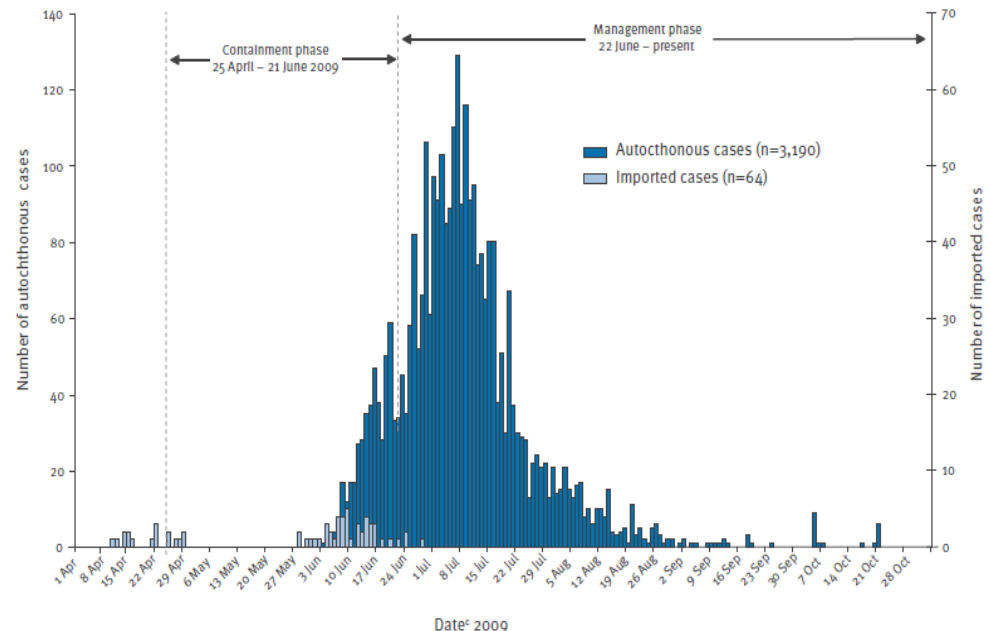
Experience with early detection and assessment

- Surveillance of 2009 influenza H1N1 pandemic
- Syndromic surveillance for respiratory infections

Surveillance of H1N1 pandemic & NZ

Timeline

- 11 April 2009, Mexico notified potential PHEIC to WHO
- 25 April, WHO Director General declared outbreak constituted a PHEIC
- 25 April, group of students & teachers arrived in Auckland after a trip to Mexico. 9 confirmed as NZ's first cases

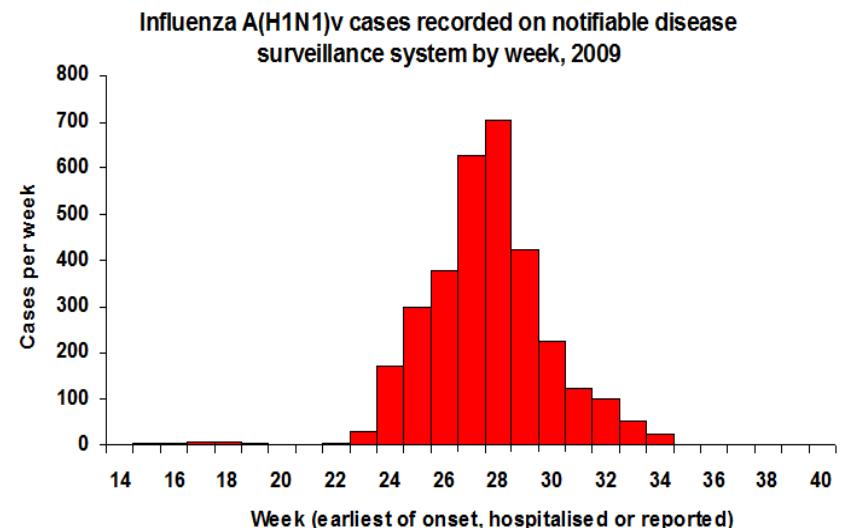


Surveillance of H1N1 pandemic in NZ

Assessment

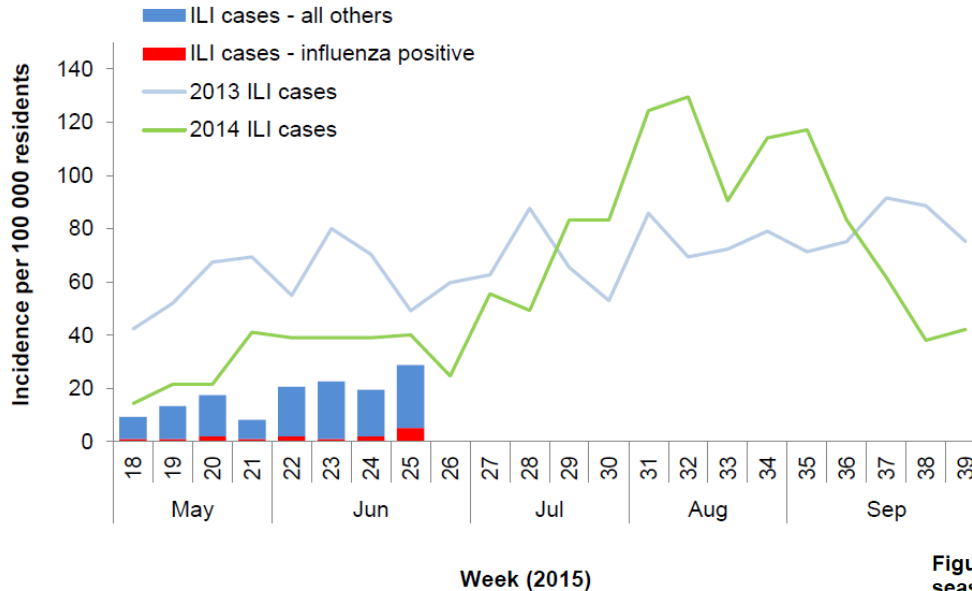
- Good rapid assessment of key epidemiological parameters (published rapidly: *Eurosurveillance*)
- Good laboratory capacity & response
- Surveillance data informed transition to management phase (albeit could have been faster?)
- Poor – limited behavioural surveillance (response to hygiene messages etc)
- Poor – no official review

Source: Baker, Wilson et al.
***Eurosurveillance* 2009;14:pii=19319**



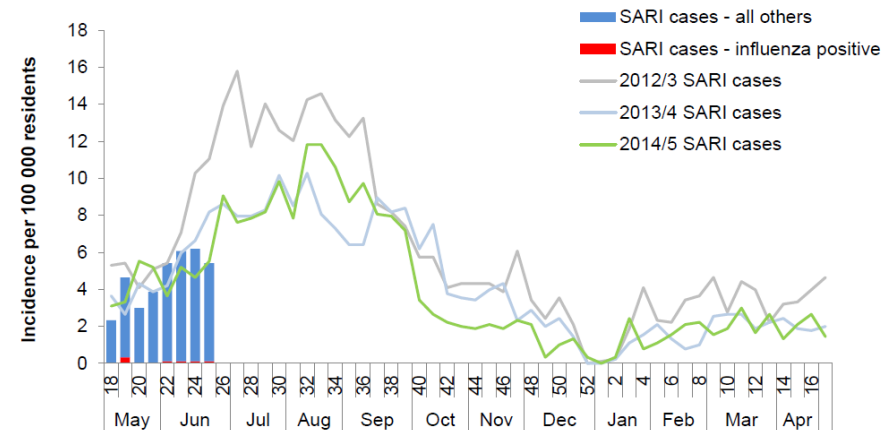
Establishing Syndromic Surveillance for Respiratory Infections (SHIVERS Project funded by CDC)

Figure 1 Weekly resident ILI and influenza incidence since 27 April 2015



ILI surveillance in primary care
45% no influenza or other virus
detected (Auckland region)

Figure 2 Weekly resident SARI and influenza incidence since 27 April 2015 and previous seasons SARI incidence



SARI surveillance in hospital
25% no influenza or other virus
detected

Possible Next Steps for Improving Emerging ID Surveillance in NZ

1. Review EID surveillance needs – EID scenarios including extreme events eg, where border closure needed for NZ (Boyd et al – submitted)
2. Stocktake of surveillance capacity –
 - Learning from SHIVERS, AMR, & recent international work (Global Health Security Agenda, IHR, APSED Framework)
 - Potential of ‘Big data’ including NZ’s national linked data (IDI – hospitalisations, primary care)
3. Develop a suitable EID Surveillance Strategy – implement & test in exercises

Conclusions

- 1) EID are unpredictable, but are likely to fall into distinct typologies
- 2) NZ well positioned for effective EID surveillance
- 3) Need an EID Surveillance Strategy for NZ

