

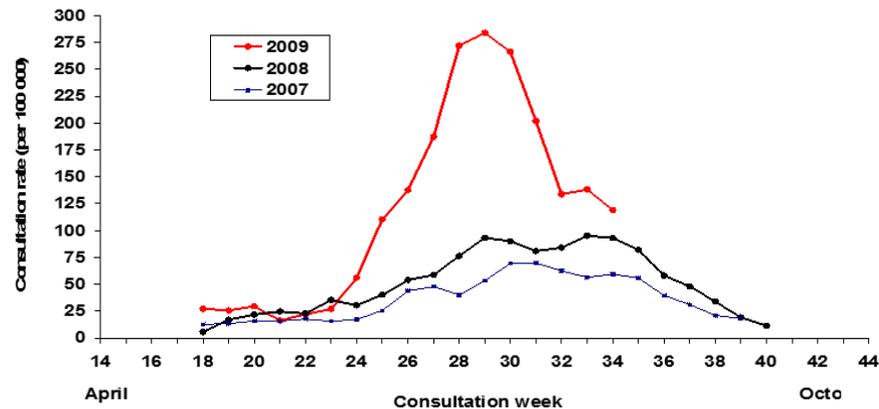
Improving Surveillance for Emerging Infectious Diseases in NZ

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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?

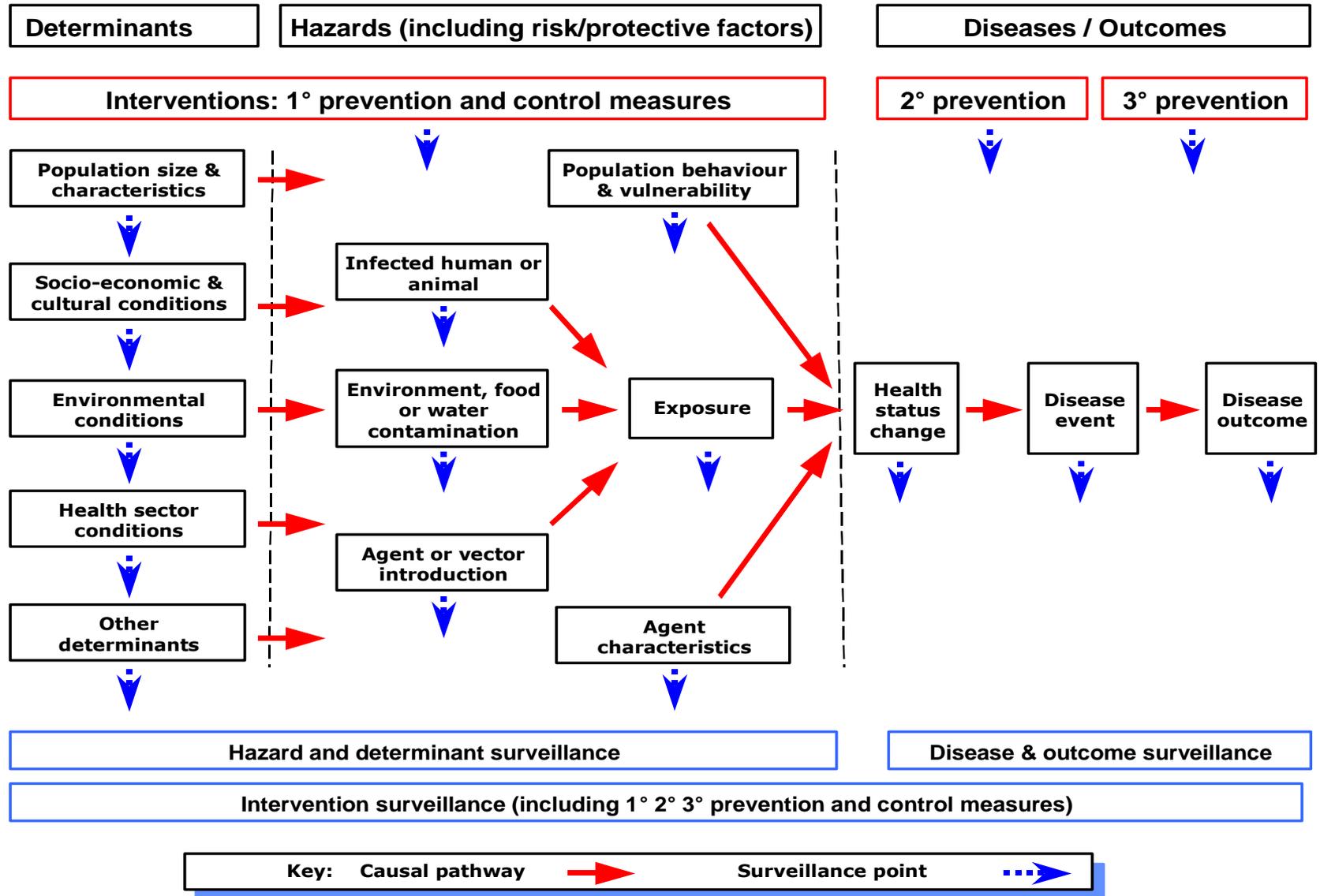
- Learning from past experience
- Pandemic influenza 2009
- Syndromic surveillance for respiratory infections

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Pandemic typology (Baker et al, unpublished)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

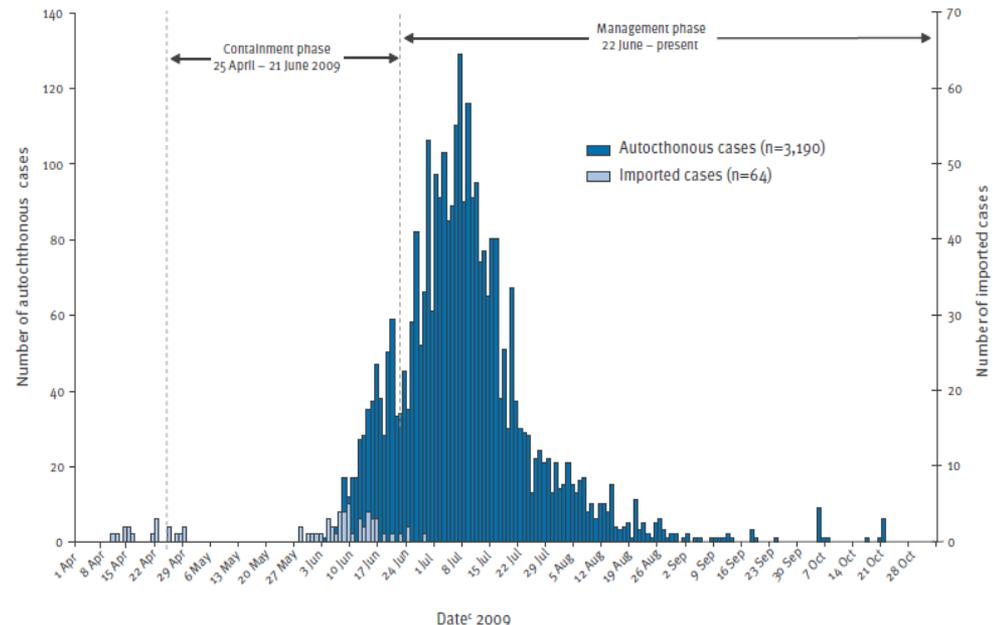
Experience with early detection and assessment

- 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

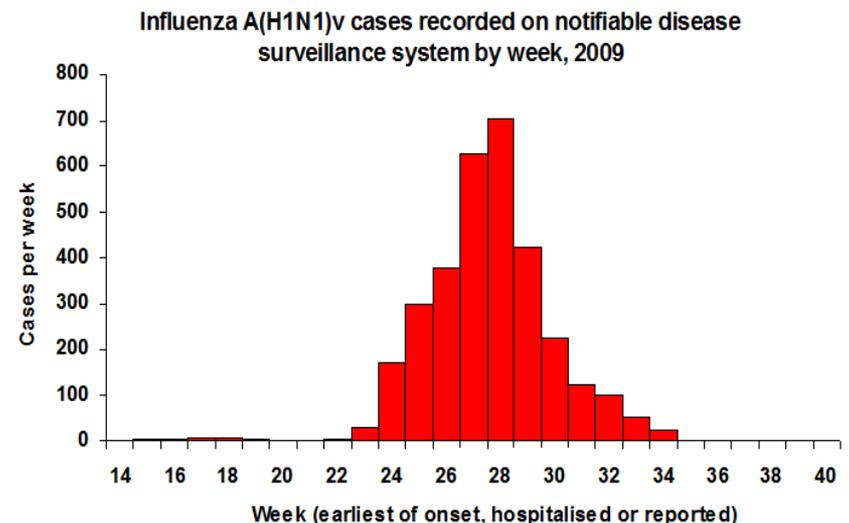


Surveillance of H1N1 pandemic in NZ

Assessment

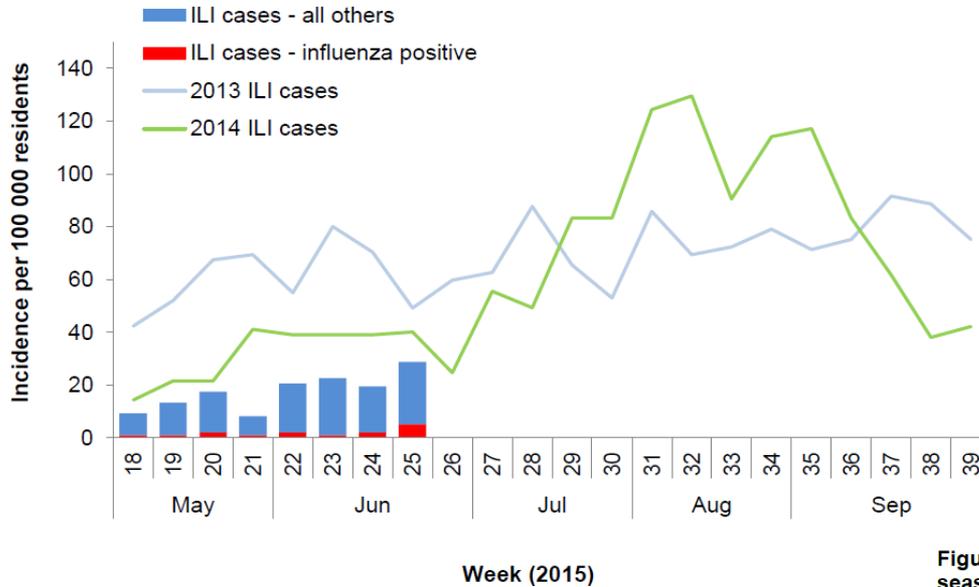
- Good rapid assessment of key epidemiological parameters (published rapidly: *Eurosurveillance*)
- Good laboratory capacity & response
- Surveillance data informed transition to management phase (albeit could have been faster?)
- Poor – limited behavioural surveillance (response to hygiene messages 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)

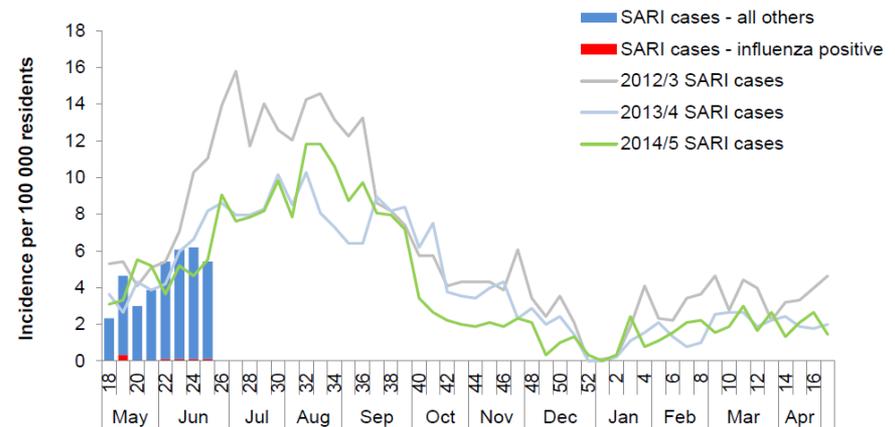
Figure 1 Weekly resident ILI and influenza incidence since 27 April 2015



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

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

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



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

