



**Immunisation
Advisory
Centre**

ĀRAINGA MATE

UNIVERSITY OF AUCKLAND

THE SHIVERS PROJECT

SOUTHERN HEMISPHERE INFLUENZA AND VACCINE EFFECTIVENESS RESEARCH & SURVEILLANCE

Dr Nikki Turner

August 2012



Influenza and other respiratory diseases in southern hemisphere

- **CDC Announcement: 27 Dec 2010**
- **Application Due date: 14 Mar 2011**
- **Research for 9 objectives over 5 years :**
 - Two primary objectives
 - Seven additional objectives
- **Notice of award: Oct 2011**
- **PI: Dr Sue Huang, Institute of Environmental Science and Research (ESR), Wellington**

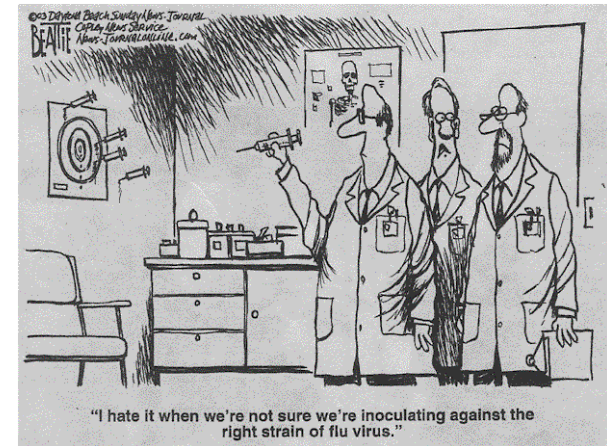




I have flu doctor.....

- **How do we recognise flu**

- How much is really
 - in the community
 - In hospital presentations
- What are its characteristic presentations
- Are we diagnosing it all
- Who is more likely to get flu
- Who is more likely to be severely affected
- Is there subclinical/asymptomatic?



- **How effective are current flu vaccines**

- In subpopulations
- In different years with shifting strains



Project Team – multi-centre and multi-disciplinary collaboration



- **ESR—leading organization**
 - Sue Huang—Principle investigator (PI)
 - Graham Mackereth – Project manager
 - Ruth Seeds – Project Officer
- **Science teams:**
 - Sue Huang/Sally Roberts/Colin McArthur/Cameron Grant/Debbie Williamson/Adrian Trenholme/Conroy Wong/Susan Taylor/Graham Mackereth/Don Bandaranayake/Diane Gross/Marc-Alain Widdowson: objective 1
 - **Nikki Turner/Heath Kelly/Nevil Pierse/Ange Bissielo/Michael Baker/Don Bandaranayake/Sue Huang: objective 2 Vaccine Effectiveness**
 - Michael Baker: objectives 3 & 7
 - Colin McArthur/Sally Roberts: objective 4
 - **Sue Huang/Nikki Turner: objective 5 Primary Care Surveillance**
 - Sue Huang/Don Bandaranayake: objective 6
 - Richard Webby: objective 8
 - Des O’Dea: objective 9

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The Institute of Environmental Science and Research



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Overall aims

- **Disease Burden: What proportion of population getting influenza?**
 - Hospitalization
 - GP consultation
 - Infection
- **Vaccine effectiveness: How effective is influenza vaccine?**
 - Preventing hospitalization
 - Preventing GP consultation
- **Risk factors: What is the high risk group for getting influenza?**
- **Immune response: Is there any difference in T-cell and B-cell response among individuals :**
 - Hospitalization
 - GP consultation
 - Infection





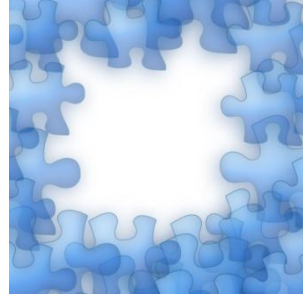
9 objectives



1. **Understand severe respiratory diseases caused by influenza & other pathogens**
2. **Assess influenza vaccine effectiveness**
3. **Investigate interaction between influenza & other pathogens**
4. **Understand causes of respiratory mortality**
5. **Understand non-severe respiratory diseases caused by influenza & other pathogens**
6. **Estimate influenza infection by conducting serosurvey**
7. **Identify & quantify risk factors (age, ethnicity, SES etc) for getting influenza**
8. **Assess immune response among individuals with varying disease spectrum**
9. **Estimate healthcare, societal economic burden caused by influenza and vaccine cost-effectiveness**



Desired Outcomes of the study



- Guide improved methods for disease surveillance
- Assist early detection and prediction
- Optimize clinical case management
- Optimize laboratory diagnosis
- Guide better vaccine design
- Guide targeted vaccination strategies for population and subgroups
- Understand host immune response
- Identify better immune diagnostic markers



Tools: Two surveillance systems

- **Hospital-based surveillance: enhanced, active, year-round (5 yrs), population based surveillance for hospital SARI (sudden acute respiratory) cases**
 - Auckland and Middlemore Hospitals
- **Community-based surveillance: enhanced, active, (4 yrs), population based surveillance for community ILI (Influenza-like illness) cases caused by influenza**
 - Recruitment of 50 – 100 ‘sentinel’ General Practices in greater Auckland (200,000 – 400,000 patients)



Study population



- **Population in ADHB & CMDHB:**
 - **837,696**
- **Generally representative of the NZ population:**
 - **Age: similar to NZ**
 - **Ethnicity: higher proportion for Maori Pacific, and Asian**
 - **SES: higher proportion for the most deprived subgroups**



Objective 1

– Hospital-based surveillance

- **Identify the aetiology of hospitalised severe acute respiratory infections, including influenza**
- **Describe possible risk factors eg asthma high BMI, pregnancy etc**
- **Started May 2012**

FOR VE measures:

- Will need to access some practice data PMS extraction
 - Flu vaccination hx
- Will need to access data from occupational health providers
 - Flu vaccination hx



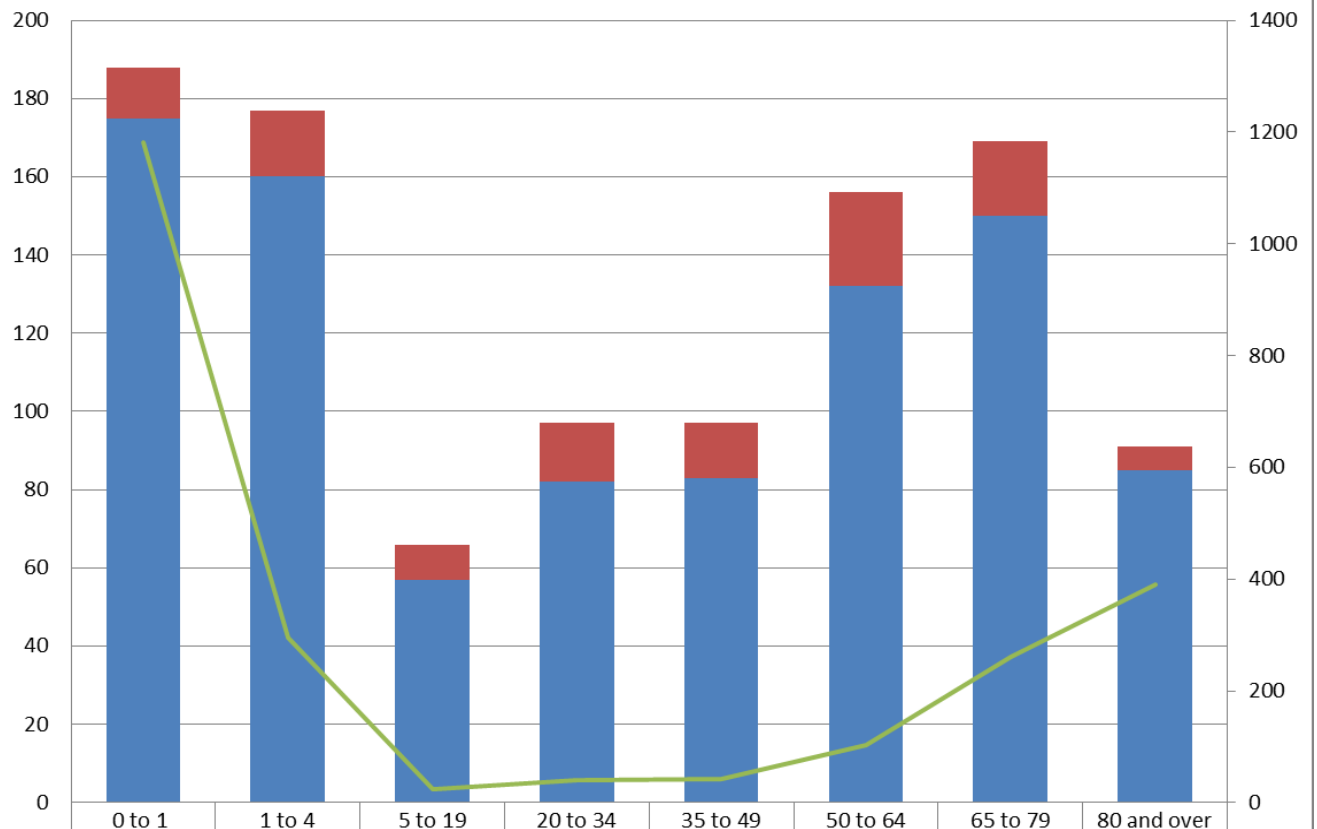
WHO SRI case definition

An acute respiratory illness with :

- A history of fever or a measured fever $\geq 38^{\circ}\text{C}$ **AND**
- Cough **AND**
- Onset within past 7 days **AND**
- Requiring inpatient hospitalization



Number of SARI and influenza positive cases



■ Influenza +ve	13	17	9	15	14	24	19	6
■ SARI cases	175	160	57	82	83	132	150	85
— SARI incidence	1181.8	294.9	24.7	39.4	41.9	102.5	260.9	390.9

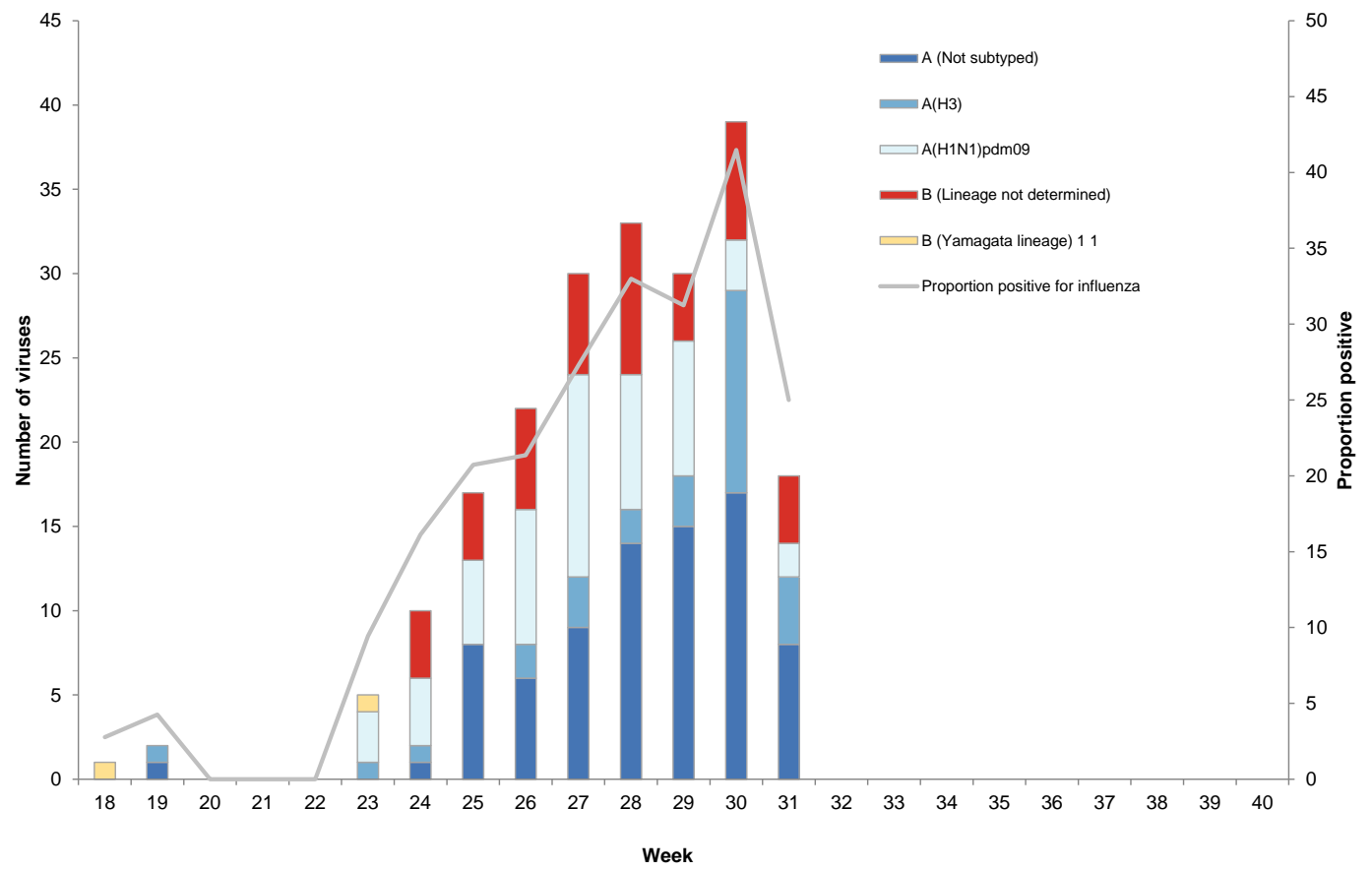


Influenza and non-influenza respiratory viruses among SARI cases, between 30 April 2012 to 26 August 2012

SARI cases virology	Cumulative since 30 April 2012		
	Cases	ICU	Deaths
<i>Influenza viruses</i>			
No. of specimens tested	588	20	
No. of positive specimens (%)	87 (14.8)	2 (10.0)	
Influenza A			
A (not subtyped)	15	-	
A (H1N1)pdm09	42	1	
A (H3N2)	9	-	
Influenza B			
B (lineage not determined)	19	1	
B (Yamagata)	2	-	
B (Victoria)	0	-	
Influenza and non-influenza co-detection (% +ve)	3 (3.4)	-	
<i>Non-influenza respiratory viruses</i>			
No. of specimens tested	338	5	
No. of positive specimens (%) ¹	111 (32.8)	3 (60.0)	
Respiratory syncytial virus (RSV)	34	-	
Parainfluenza 1 (PIV1)	6	-	
Parainfluenza 2 (PIV2)	0	-	
Parainfluenza 3 (PIV3)	1	-	
Rhinovirus (RV)	69	3	
Adenovirus (AdV)	8	-	
Human metapneumovirus (hMPV)	6	-	
Single virus detection (% of positives)	100 (87.9)	-	
Multiple virus detection (% of positives)	11 (12.1)	-	

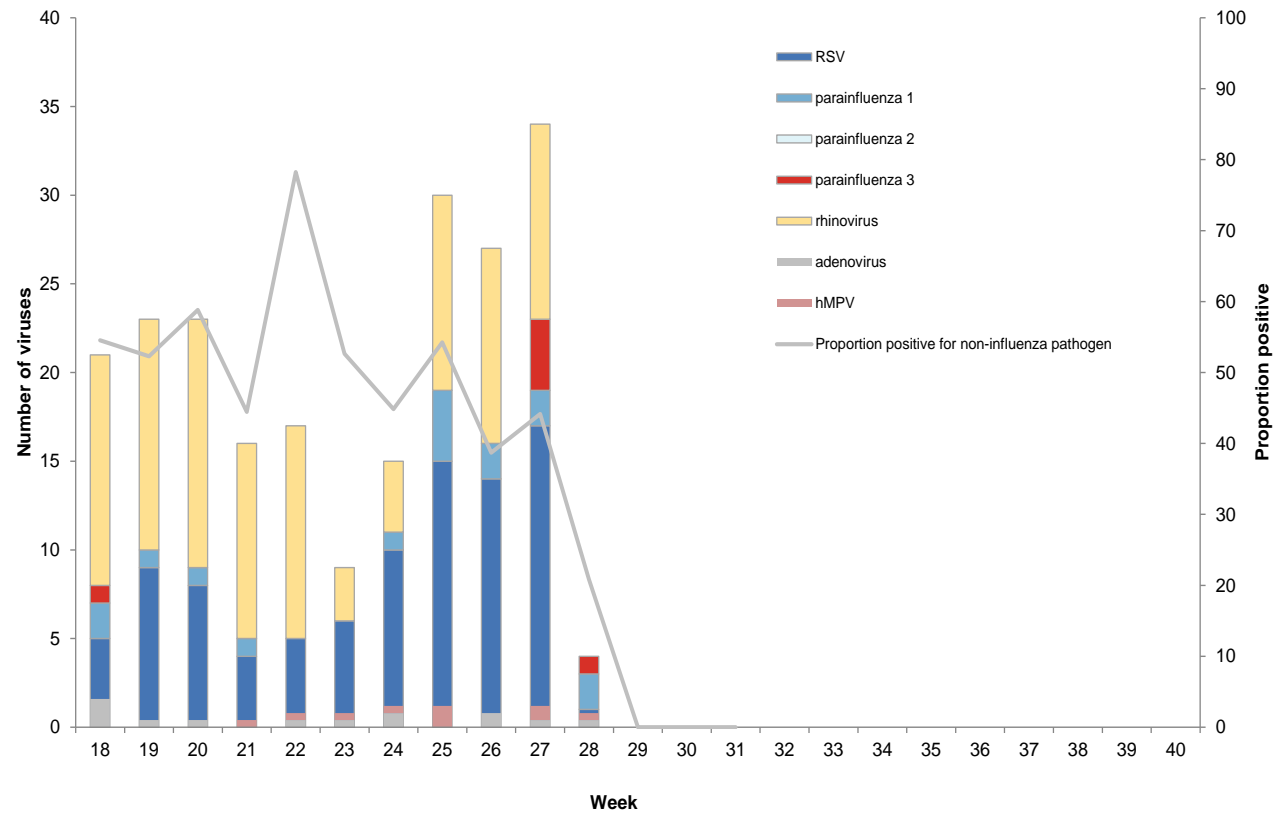


Temporal distribution of the number and proportion of influenza viruses from SARI specimens by type and week





Temporal distribution of the number and proportion of non-influenza viruses from SARI specimens by type and week





Objective 5

– Community-based surveillance

- **Identify the aetiology of acute respiratory infections (ILI) presenting to general practice , including influenza**
 - Cough and fever
- **Describe possible risk factors eg asthma high BMI, pregnancy, ethnicity, age, ses**
- **Utilise this data for VE measures**



Needs.....

- **Sentinel GP surveillance starting in 2013**
 - Approx 60 GPs: ~ 180,000 registered patients (14% Auckland population)
- **?All year round**
- **All acute respiratory illnesses presenting if possible**
 - Swab
 - PMS data extraction
 - Questionnaire (subgroup) for more in depth information



Case definition/s

ILI:

An acute respiratory illness with onset during the last 7 days with: a history of fever or measured fever of $\geq 38^{\circ}\text{C}$, and cough, requiring GP consultation

ARI (smaller subgroup):

An acute onset of at least one of the following four respiratory symptoms: cough, sore throat, shortness of breath, coryza; And a clinician's judgement that the illness is due to an infection



ILI: data and sample requirement

- **Recruitment: sufficient number of general practices covering total of ~160 000 to 170 000 enrolled patients**
- **Data requirement:**
 - Data from existing PMS
 - Data from an advanced form (on the specimen request form)
- **Sample requirement:**
 - Nasopharyngeal swab or throat swab



ARI: data and sample requirement

Recruitment:

- 2-4 general practices covering total of 10 000 to 20 000 enrolled patients

Data requirement:

- Data from existing PMS
- Data from an advanced form (specimen request form)
- Data from an advanced form (case report form)

Sample requirement:

- Nasopharyngeal swab or throat swab



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Weekly Hospital Surveillance SARI, Influenza and Respiratory Pathogens

**2012 Influenza Season, Week 30,
ending 29 July 2012**

www.esr.cri.nz/shivers