Australian National Influenza Centres Activity 2011-12

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WHO NIC Meeting
Hanoi May 2012
• Public Health Laboratory Network (PHLN)
• ICPMR NIC (New South Wales: Dr. Dominic Dwyer)
• VIDRL NIC (Victoria: Dr. Mike Catton)
• PathWest NIC (Western Australia: Dr David Smith)
Public Health Laboratory Network (PHLN)

The larger public health laboratories in Australia form a network called the Public Health Laboratory Network (PHLN)

Diagnostic Laboratory Networks in Australia

Reference Laboratories

WHO Collaborating Centre For Influenza.
WHO National Influenza Centres (ICPMR, VIDRL, PathWest)
VIDRL
Smallpox, Measles, Polio Biosafety
QHSS
Rickettsial Reference Laboratory
Australian Animal Health Laboratory
Eg. Foot and Mouth, HPAI

Public Health Diagnostic Laboratories

Bioterrorism Diagnostic Laboratories

Laboratory Response Network (LRN)
ICPMR - NSW
QHSS - Qld
VIDRL/MDU - Vic
PathWest - WA

Other PHLN Laboratories

Regional Laboratories

Private Laboratories

Surge Laboratories
NSW Health Public Laboratory Network

Influenza diagnosis: pre-2009 pandemic
- mainly immunofluorescence assays, some POCT
- some laboratories performed PCR (A/B detection & A subtyping)
- some laboratories performed culture for WHO referral

Influenza diagnosis 2012: post-2009 pandemic
- all laboratories perform PCR (mainly A/B or pH1N1 detection) – with referral to NIC or WHO CC for A subtyping
- only two laboratories now perform virus culture
- limited resistance testing
NSW Private Laboratories

**Influenza diagnosis: pre-2009 pandemic**
- no influenza diagnostics
- limited referrals

**Influenza diagnosis: post-2009 pandemic**
- two largest laboratories perform PCR (A/B, pH1N1 detection)
- limited referrals for A typing
NIC – ICPMR (Sydney) Influenza testing winter 2011

Point Of Care Tests – 320
Direct IFA – 3281
Respiratory viruses multiplex RT-PCR – 3814
Influenza A subtyping PCR – 476
Influenza A H275Y NA mutation detection by PCR (RCA) – 172
Influenza virus culture – 185

(WHO EQAP for PCR and RCPA QAP for PCR and POCT)
(reporting – NSW Health (all respiratory viruses), Commonwealth DoHA, WHO FluNet)
NIC – ICPMR (Sydney) influenza isolates

Influenza viruses 2011 (WHO CC, Melbourne)
• A/California/72009-like – 62%
• A/Perth/16/2009-like – 13%
• B/Brisbane/60/2008-like – 21%

Influenza viruses 2012 (WHO CC)
• A/Victoria/361/2011-like – 70%
• B/Brisbane/60/2008-like – 20%
• B/Wisconsin/1/2010-like – 10%
Influenza research and development (ICPMR, Sydney NIC)

- Oseltamivir resistance testing in Sydney using RCA (follow-up of Newcastle outbreak 2011)
- ILI and pneumonia surveillance via FluCan study
- Antiviral (IV zanamivir, combination therapy) and vaccine trials
- INSIGHT (NIAID funded) studies of community and hospitalised influenza – FLU002, FLU003
- Outbreak investigation eg. H10N7 in poultry workers
- Bacterial and viral coinfections in severe influenza
- Mask use to prevent influenza in health care workers
VIDRL is the virology public health reference laboratory for Victoria serving a population of 5.5M, as well as providing acute virology and general pathology diagnostic testing.

VIDRL has 4 WHO Collaborating Centres (Influenza, Virus Reference & Research, Biosafety and Mycobacterium ulcerans), 3 WHO Regional Reference Laboratories (Polio, Measles, Hepatitis B), and the WHO National Influenza Centre.

Clinical diagnostic testing for respiratory viruses and influenza subtyping are undertaken by nucleic acid testing (NAT).
• Influenza surveillance is carried out between March & October (inclusive) via a network of 103 community medical practices (73 metropolitan and 30 rural), who provide weekly reports of total cases, cases of influenza-like illness and take respiratory swabs for NAT on a proportion of cases.

• ILI Surveillance data is also provided to VIDRL by the Melbourne Medical Deputising Service who provide after hours community healthcare.

• A weekly surveillance report is published online at www.victoriaflusurveillance.com.au and www.vidrl.org.au. This includes community ILI rates, laboratory test data from surveillance samples, and from clinical samples and surveillance data from the Influenza Complications Network (FLUCAN).
Nucleic acid testing is done for influenza A, B, & C, and 11 other respiratory viruses on clinical material from hospitalised patients, and patients with influenza-like illness via VIDRL’s general practitioner influenza surveillance program.

<table>
<thead>
<tr>
<th></th>
<th>Total Respiratory Viral NAT</th>
<th>Total Influenza</th>
<th>Flu A</th>
<th>Flu B</th>
<th>Flu C</th>
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<tbody>
<tr>
<td>2011</td>
<td>5433</td>
<td>435</td>
<td>283</td>
<td>151</td>
<td>1</td>
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<tr>
<td>2012 (Jan-May)</td>
<td>1461</td>
<td>26</td>
<td>23</td>
<td>3</td>
<td>0</td>
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All influenza positive results notified daily to Department of Health Victoria.

Influenza positive clinical material referred to the WHO CC for culture, and detailed analysis including antiviral susceptibility testing as required.

Influenza A positive samples are subtyped weekly. Untypable samples are referred to the WHO CC.

Fortnightly analysis of influenza detections and subtyping results provided to the Commonwealth Department of Health and Ageing, and the Department of Health Victoria.

Weekly reporting of influenza virus detections to WHO via FluNet.
PathWest Laboratory Medicine NIC (Western Australia)

- PathWest Laboratory Medicine WA is the combined public sector diagnostic pathology service for Western Australia, serving a population of ~2.2 million. This includes community, hospital and public health testing.

- The NIC is located at the QE2 Medical Centre, Perth, and is integrated with the routine diagnostic reference and public health testing services.

- The Microbiology Department performs ~400,000 PCR tests and ~400,000 serological tests for a wide range of pathogens.

- Supports influenza diagnostic, surveillance and research activities.

- Surveillance is conducted in collaboration with the Communicable Disease Control Directorate and includes a sentinel general practitioner network as well as surveillance of hospital presentations and pneumonia.
Influenza testing at PathWest NIC

- The PathWest NIC tests >10,000 samples annually for influenza
  - ~10% are surveillance samples and the remainder are diagnostic samples from the community and hospitals.
- Samples tested by multiplex PCR for matrix gene and HA gene targets.
- Samples received in viral transport medium are also cultured.
- Additional testing
  - Weekly testing H1N1 positives for H275Y mutation
  - Batch testing for D22G mutation for hospitalised patients
- WHOCC in Melbourne receives all positive cultures, culture-negative samples from patients who die or those with suspected to have resistant virus, and HA untypable influenza viruses
- There is a large amount of additional diagnostic testing at other public and private laboratories, but positive samples are all referred to the NIC.
- Provides diagnostic laboratory support for the Northern Territory
Influenza research and development

• Trial of effectiveness of universal paediatric vaccination in Western Australia
• Use of surveillance data for the calculation of influenza vaccine effectiveness
• Molecular epidemiology of influenza A/H3 in Western Australia
• Surveillance and disease burden – impact of influenza and other respiratory viruses on emergency departments and hospitalisation
• PCR-based screening for influenza B lineages
• Investigation of influenza as an unrecognised cause of death in the community and hospitals, in collaboration with the Forensic Pathology service