Influenza and Infectious Disease Surveillance in Australian General Practice APPRISE 2017

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The Australian Sentinel Practices Research Network (ASPREN)

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ASPREN

- Established in 1991 – RACGP

- Optical answer forms

- Influenza and infectious disease

ASPREN

- Mid 2000's

- 04/05 Biosecurity Surveillance System (BSS) budget initiative

- Discipline of General Practice

ASPREN

- Web based reporting
- Data extraction
- Representativeness
- Swab testing

Recruitment and Reporting Overview

- 240 GPs recruited

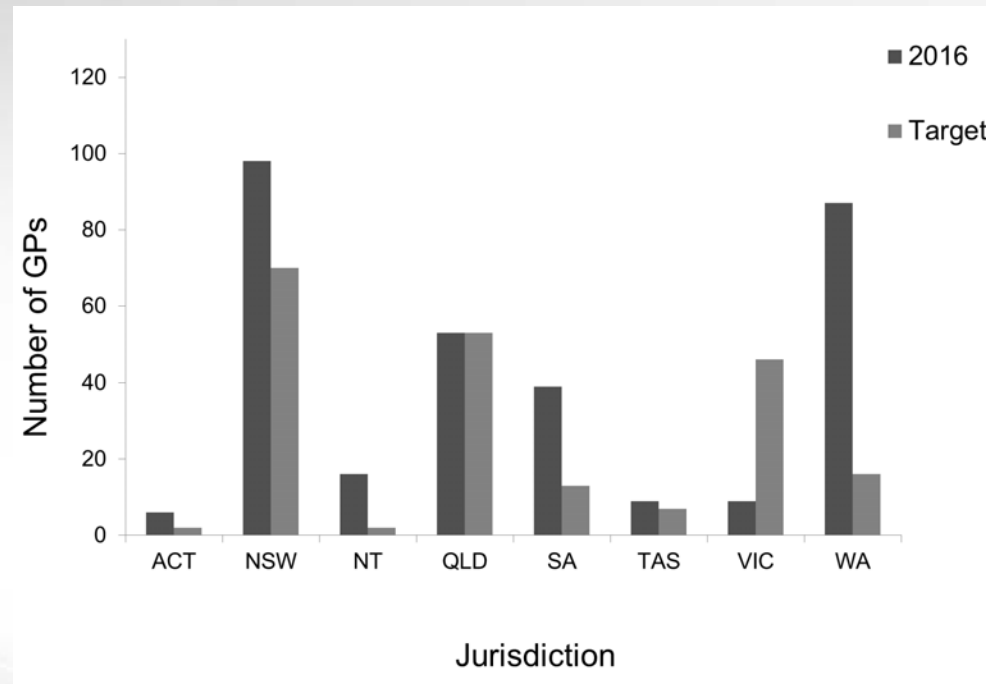- 631,926 consultations for the year (average 14,042 per week)

Figure 1. ASPREN representation by jurisdiction, 2016.
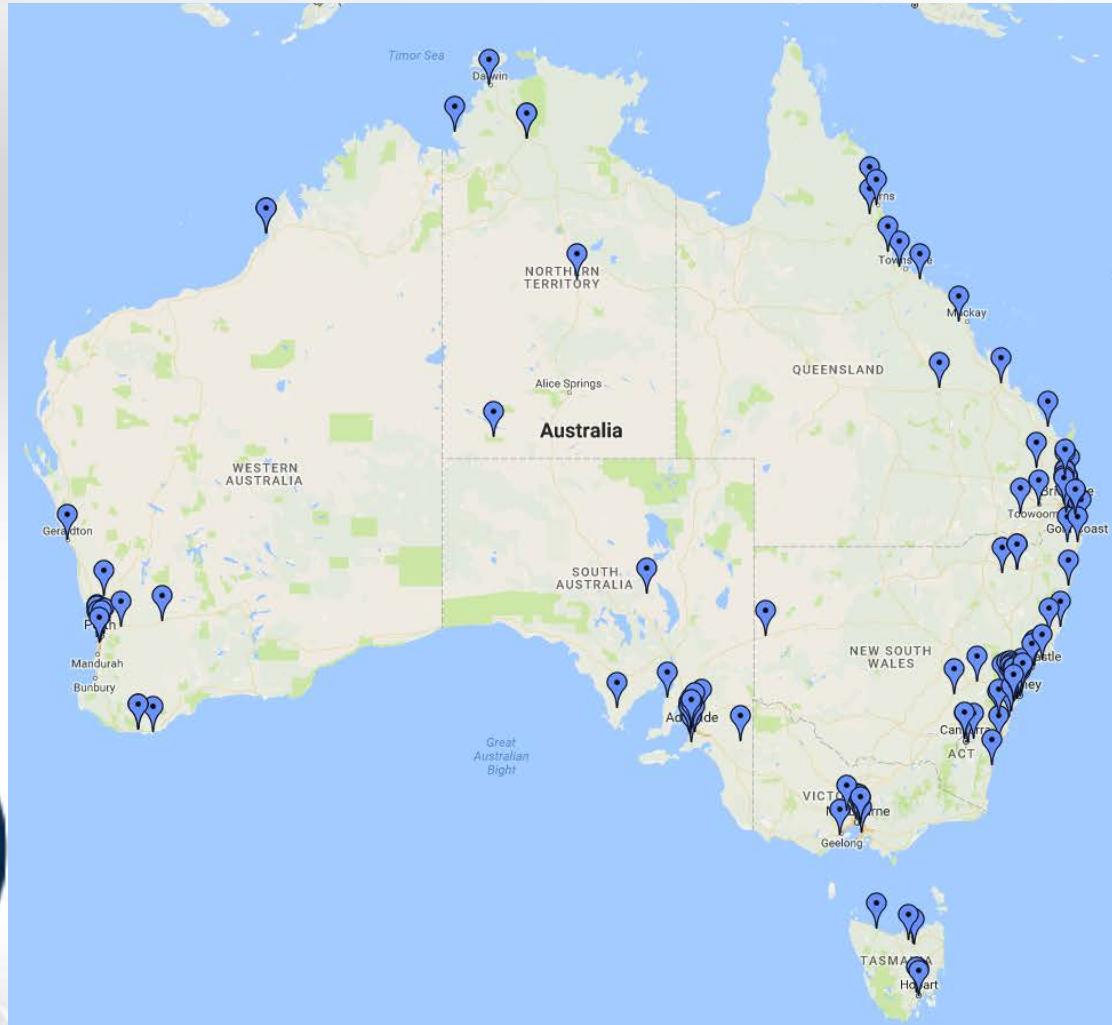
2016 Sentinel Sites

Figure 2. ASPREN sentinel sites, 2016.

Syndromic Surveillance Overview

- In 2016 a total of 4,258 ILI notifications were made throughout all 8 jurisdictions, compared to 6,205 for the same period in 2015.

- ILI rates peaked in week 33 (week beginning 28 August) at 18 notifications per 1,000 consultations (weighted) / 18 notifications per 1,000 consultations (unweighted). Rates are currently at 4 ILI notifications per 1,000 consultations (week ending 27 November).

Figure 3. ASPREN ILI rate 2014-16, weighted and un-weighted. Weighted rates are weighted by jurisdiction population size.
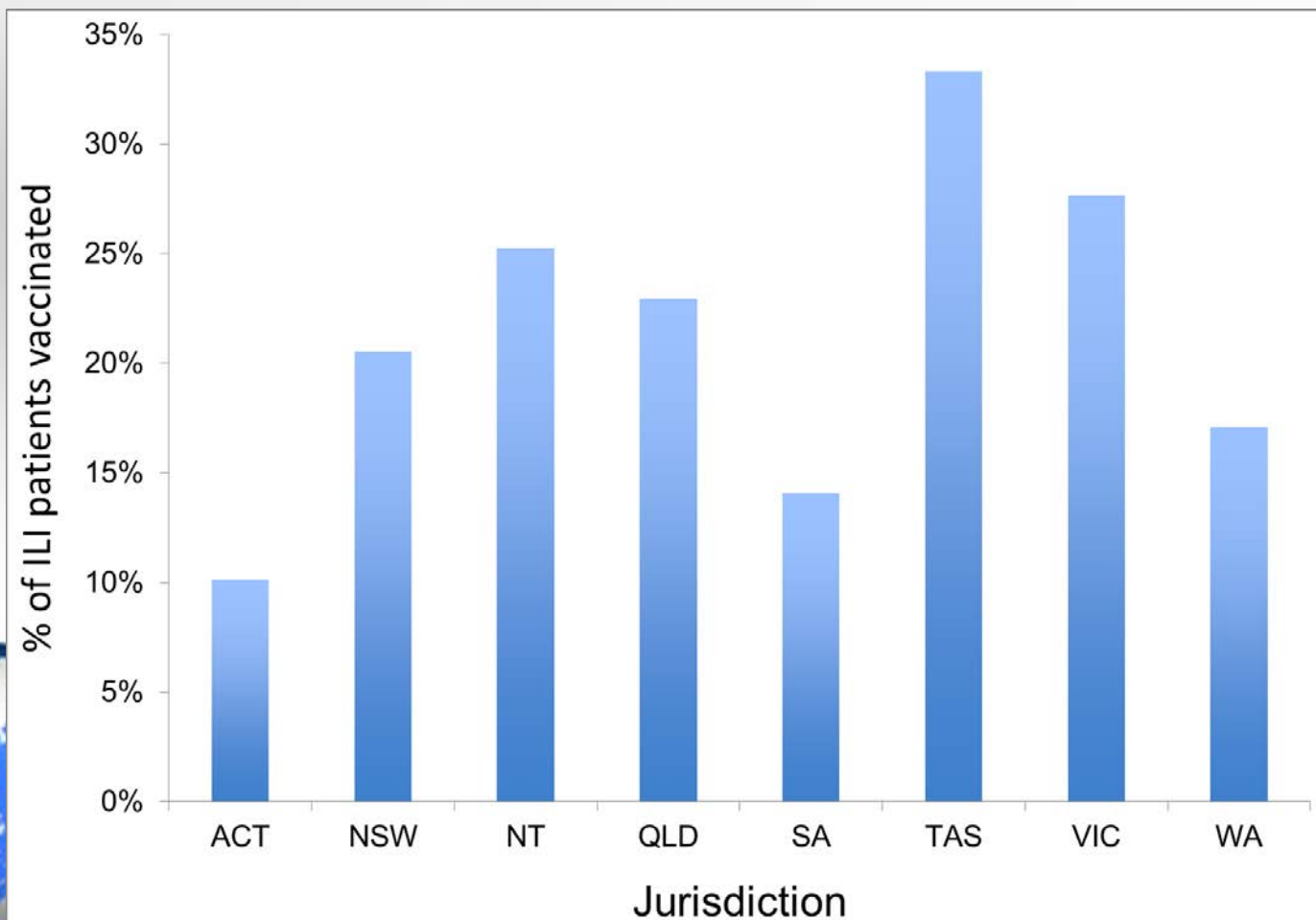
Vaccination Coverage by Jurisdiction

Figure 4. ASPREN vaccination coverage of ILI patients by jurisdiction, 2016.

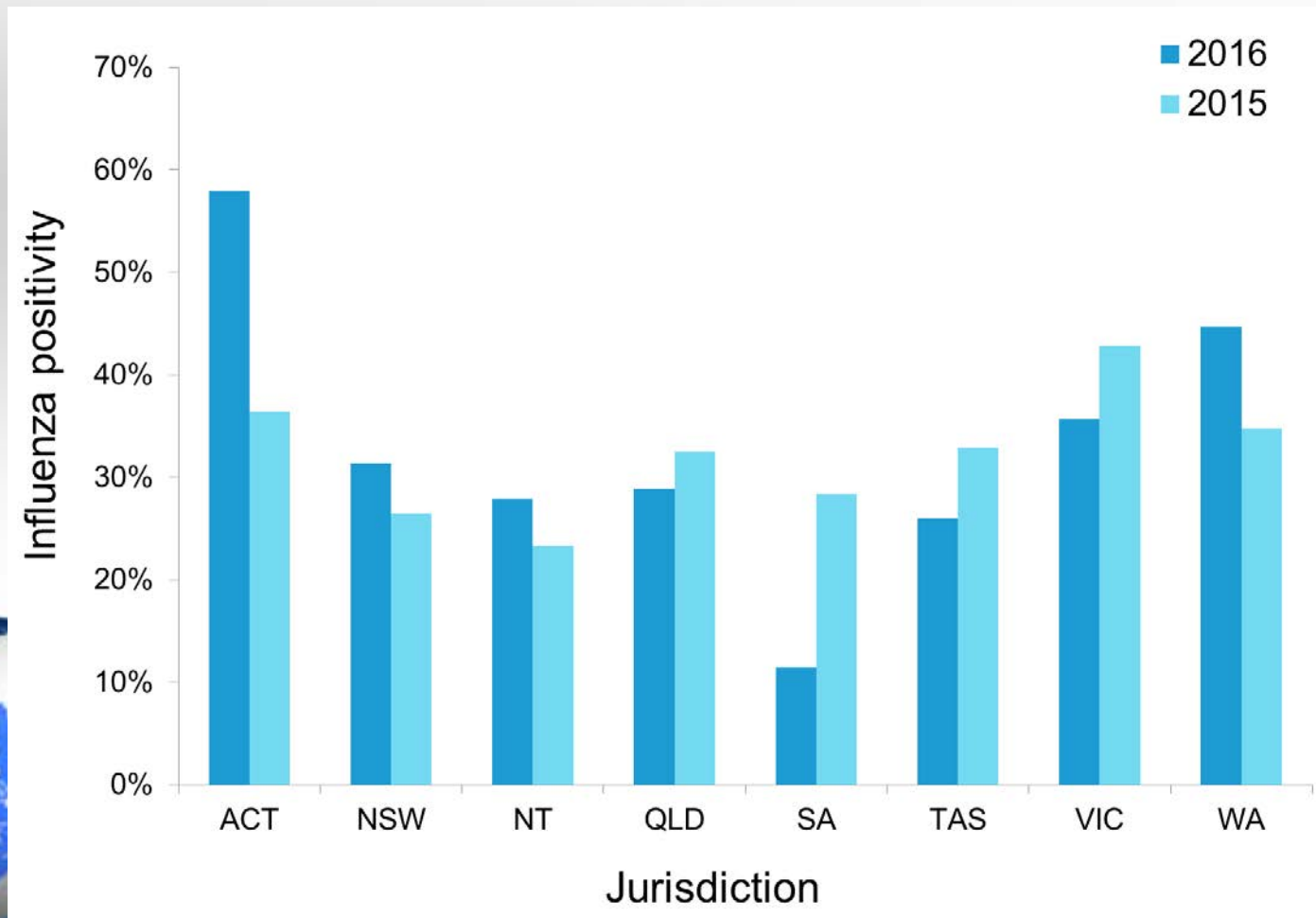# Influenza Positivity by Jurisdiction

Figure 5. ASPREN influenza positivity by jurisdiction, 2016.
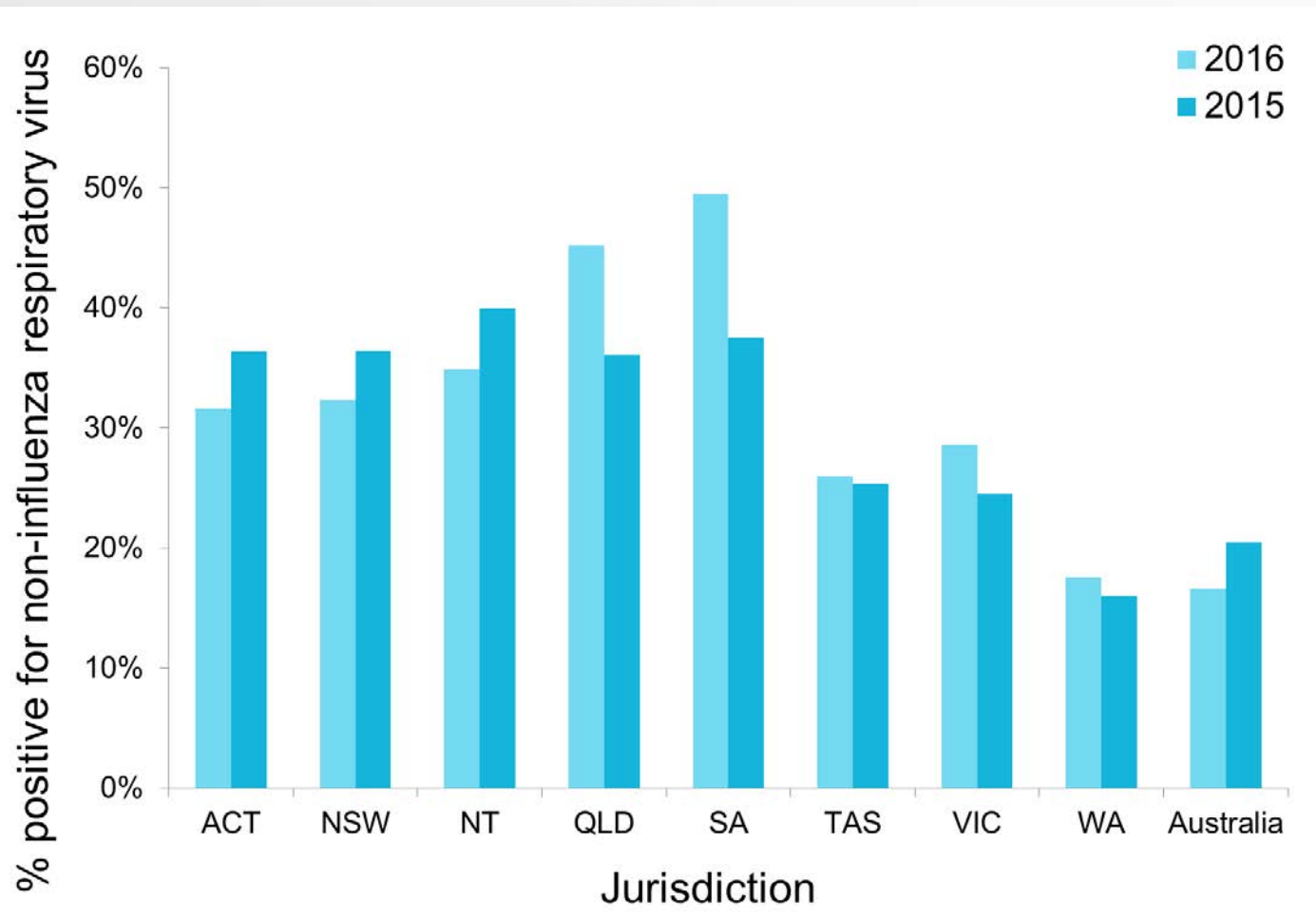
NIRV Positivity by Jurisdiction

Figure 6. ASPREN Non-influenza respiratory virus (NIRV) positivity by jurisdiction, 2016.

ASPREN Research

- Vaccine effectiveness
- Epidemiology of Viral Respiratory Infections in Working Age Adults
- POCT
- Influenza modelling

Vaccine effectiveness

Influenza vaccine effectiveness in Australia: results from the Australian Sentinel Practices Research Network

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The Australian Sentinel Practices Research Network (ASPREN) is a network of sentinel general practitioners run through the Royal Australian College of General Practitioners and the University of Adelaide.[1] It has collected de-identified information on influenza-like illness and other conditions seen in general practice across Australia since 1991. ASPREN GPs are distributed based on a target of one GP per Division of General Practice, or one GP per 200 000 population for metropolitan areas and one GP per 50 000 population for rural and remote areas. Previous evaluations of ASPREN suggest that it provides timely data on influenza-like illness (ILI), and rates consistent with those from other surveillance systems.[2,3] Since 2009, GPs have collected specimens for influenza testing, allowing estimation of influenza vaccine effectiveness (VE). We estimated influenza vaccine coverage and effectiveness for the 2012 season.

Methods

Data were collected throughout 2012. A total of 275 GPs submitted data to ASPREN, of whom 110 submitted swabs. GPs are instructed to swab, at their discretion, roughly 25% of patients presenting with ILI (fever, cough and fatigue) and forward samples to SA Pathology for testing (see Appendix 1, online at mja.com.au, for laboratory methods). GPs also collect demographic data (age, sex) and the year of most recent influenza vaccination. Patients provided written informed consent for a swab sample to be collected and for the results to

variables. All P values were two-sided. VE estimates were made using the test-negative design,[4-6] where the exposure odds among patients testing positive by reverse transcription real-time polymerase chain reaction for influenza are compared with those for patients testing negative. We estimated crude VE as $(1-OR) \times 100\%$ using logistic regression. Adjusted estimates controlled for age group (<5, 5–17, 18–49, 50–64, ≥ 65 years), month of consultation and state or territory (random effect). VE was calculated for the epidemic period in each state or territory. Additionally, VE was estimated excluding patients who were negative for both influenza and non-influenza pathogens (pan-negative), as it has been suggested that this may reduce misascertainment bias due to false-negative influenza tests.[7] All analyses were conducted in Stata version 12 (StataCorp).

(Appendix 2, online at mja.com.au). Three-hundred and sixty-one samples were excluded: one was missing laboratory results; 121 were missing patient vaccination information; and four were missing the patient's date of birth. Patients without vaccination information were younger by 3.7 years ($P=0.04$) but had a similar sex distribution to other patients ($P=0.4$). Data were plotted to identify the epidemic period (Weeks 10–43 of 2012, see Appendix 2), excluding a further 235 patients. The final sample for VE estimates consisted of 1414 patients, including 593 (42%) who were influenza test-positive (Box 1).

Demographic and clinical characteristics are shown in Box 2. Vaccination coverage among test-negative patients was 27%. Coverage was highest among those aged ≥ 65 years (84%), 37% among patients aged 50–64 years,

Abstract

Objective: To estimate influenza vaccine coverage and effectiveness against medically attended laboratory-confirmed influenza for the 2012 season.

Design, setting and participants: Test-negative design involving patients recruited as part of the Australian Sentinel Practices Research Network, a network of sentinel general practitioners throughout Australia. Throughout 2012, at the discretion of the GP at one of 102 participating practices, patients presenting with influenza-like illness were swabbed and included in the study.

Main outcome measure: Influenza vaccine effectiveness (VE) estimated as $(1-OR) \times 100\%$ by logistic regression.

Results: 1775 patients were swabbed. The epidemic period was identified as Weeks 10 to 43 of 2012. After exclusions, there were 1414 patients for the VE analysis, including 593 (42%) who tested influenza-positive and 821 who tested negative. 27% of test-negative patients were vaccinated, of whom most were aged 50 years and over. The overall VE, adjusted for age group, month of presentation and state or territory, was 23% (95% CI, −4% to 43%) against all influenza types, 15% (95% CI, −17% to 38%) against influenza A, 13% (95% CI, −20% to 36%) against influenza A(not H1) and 53% (95% CI, 5% to 77%) against influenza B.

Conclusion: Vaccination against influenza was modestly protective, reducing the risk of medical presentation with influenza by around 23%.

Epidemiology of Viral Respiratory Infections in Working Age Adults

Research Questions

- **Who** presents to Australian GP with 'Influenza-like illness'?

- **Which** viruses caused these illnesses and how do they vary from year to year and by age groups?

- **What** proportion of influenza like illness is potentially preventable and how?

Epidemiology of Viral Respiratory Infections in Working Age Adults

Recommendations

- GP Sentinel surveillance should continue

- Vaccination strategies should adopt the "Ontario Model" of universal vaccination

- Public awareness : "Flu" vs. "Colds"

- Employer policies on "sick leave" – reduce unnecessary consultations

- Future research should look at co-morbidities –ILI and Respiratory viruses

POCT Results - Feedback

Cons	Pros
• Time taken to perform sample	• Ability to treat high risk patients
• Operator error	• Turnaround time faster than laboratory
• Equipment error / expired kits	• Cheaper than PCR
• Lack of redundancy	• Outbreak management
• Not Medicare billable	• Decreased antibiotic use
	• Reduction of unnecessary investigation
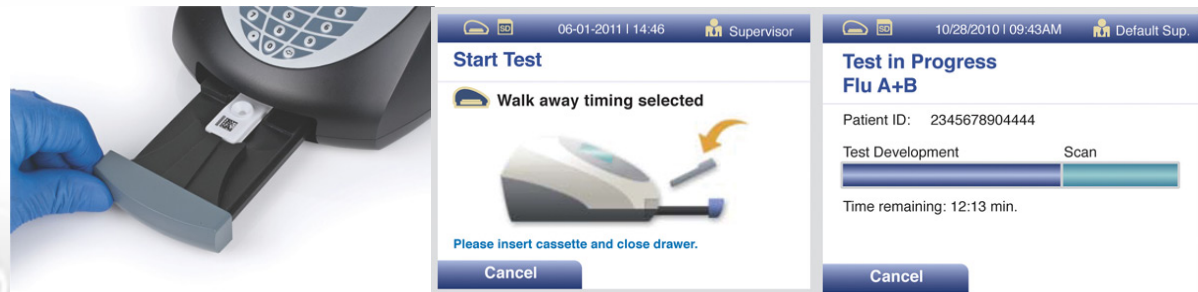
POCT Conclusions and Future Directions

- Cheaper than conventional tests

- Sensitivity is high, but would still require PCR confirmation to be utilised for surveillance purposes

- Fast turnaround time advantageous to clinical practice

- Increases accessibility in rural and remote areas

- Ability to calculate influenza vaccine effectiveness estimates in the Indigenous population

POCT for rural and remote area influenza surveillance in Australia

aspren

Modelling

- Characterising seasonal influenza epidemiology using primary care surveillance data"

- Authors: Robert C Cope; Joshua V Ross; Monique Chilver; Nigel P Stocks; Lewis Mitchell.

Australian General Practice

- 24.6 million Australians (**24,619,567 – population clock**)
- 35,000 GPs (? FTE)
- 140 million services / year
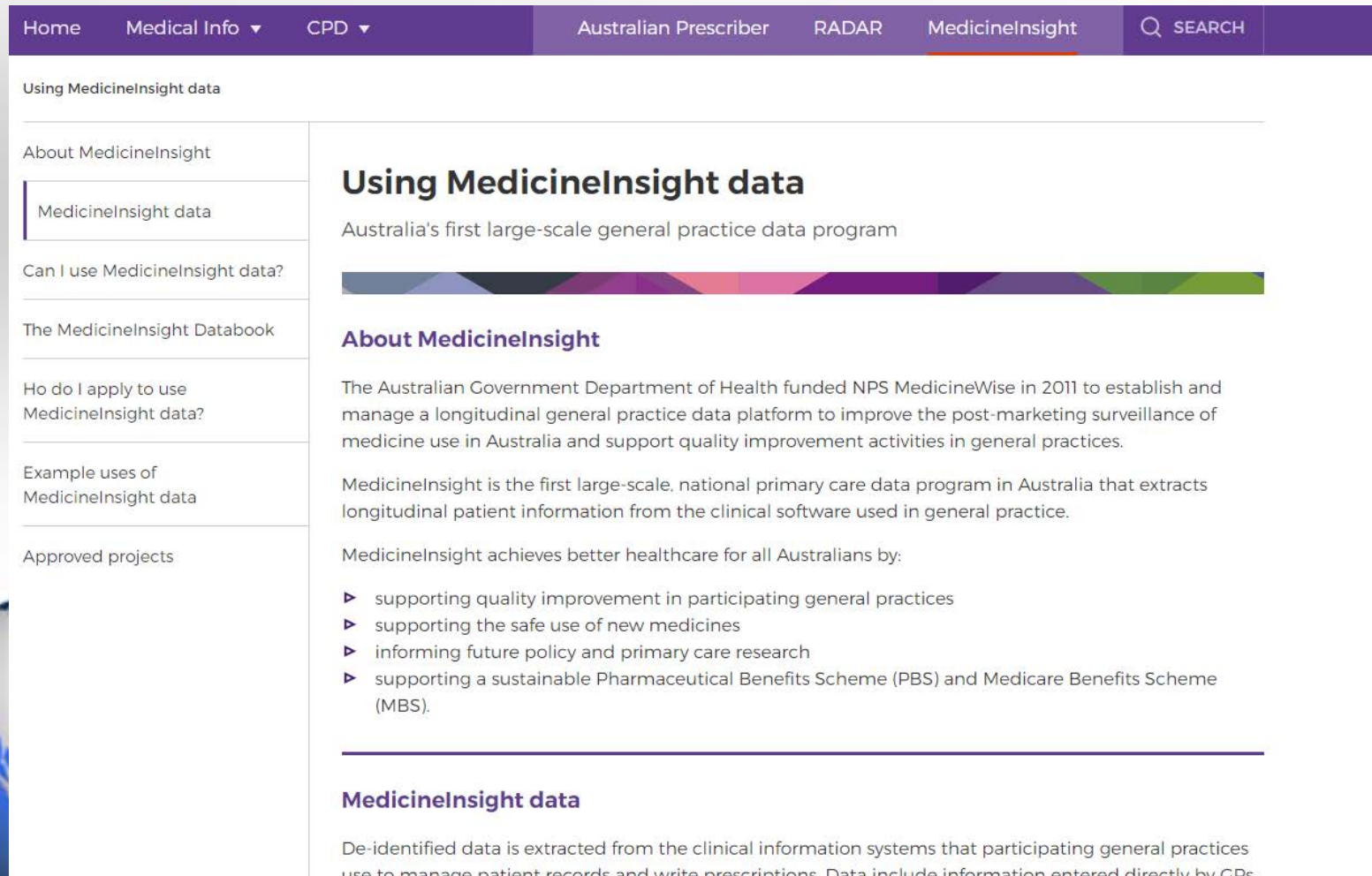- 85% of all Australians visit a GP at least once a year
- Average number of visits 5-6

National Prescribing Service (NPS)

- BEACH

- Medicineinsight established 2011

- 550 practices - 3.5 million patients

Medicineinsight

Using MedicineInsight data

About MedicineInsight

MedicineInsight data

Can I use MedicineInsight data?

The MedicineInsight Databook

Ho do I apply to use MedicineInsight data?

Example uses of MedicineInsight data

Approved projects

Using MedicineInsight data

Australia's first large-scale general practice data program

About MedicineInsight

The Australian Government Department of Health funded NPS MedicineWise in 2011 to establish and manage a longitudinal general practice data platform to improve the post-marketing surveillance of medicine use in Australia and support quality improvement activities in general practices.

MedicineInsight is the first large-scale, national primary care data program in Australia that extracts longitudinal patient information from the clinical software used in general practice.

MedicineInsight achieves better healthcare for all Australians by:

▷ supporting quality improvement in participating general practices
▷ supporting the safe use of new medicines
▷ informing future policy and primary care research
▷ supporting a sustainable Pharmaceutical Benefits Scheme (PBS) and Medicare Benefits Scheme (MBS).

MedicineInsight data

De-identified data is extracted from the clinical information systems that participating general practices use to manage patient records and write prescriptions. Data include information entered directly by GPs

Medicineinsight

Some examples of where the data are currently being used are shown below.

For public good

Informing National Medicines Policy

Drug utilisation reports to assess uptake of new medicines, adherence to guidelines/PBS, effects of policy change

Pharmacovigilance

Post-authorisation surveillance of new medicines & vaccines, validating safety signals from ADR reporting, risk management plan evaluation

Primary Healthcare Research

Epidemiology, Pharmacoepidemiology, Health Services Research

Informing Health Policy & Service Planning

Real world data insights for planning delivery of primary care services

Quality Improvement

Data-driven interventions for GPs and practices

Representativeness of MedicineInsight data

The demographic profile for 'active' patients who have had one or more visits to a practice within 3 years is shown in Table 1 and compared to the most recent data from MBS statistics and a range of national data. Comprehensive socio-demographic and geographic characteristics of MedicineInsight patients are described in Appendix 1 and the geographical distribution of MedicineInsight practices is presented in Appendix 2.

TABLE 1   CHARACTERISTICS OF MEDICINEINSIGHT PATIENTS COMPARED WITH AVAILABLE NATIONAL DATA (SEPTEMBER 2016 DATABASE BUILD)

Characteristics of patients		MedicineInsight (%)	National data (%)	National data source*
Number of active patients	1+ visits in the last 3 years	N=3,823,369		
Gender of patients	Female	53.8	50.2	ABS[1]
Age of patients	0 – 14	17.1	18.9	
	15 – 24	12.4	13.4	
	25 – 44	30.0	28.5	
	45 – 64	23.7	24.7	
	65 – 74	8.6	8.1	
	75+	7.1	6.4	
Indigenous status	Aboriginal and/or Torres Strait Islander	1.9	2.5	ABS[2]
DVA status		0.8	1.0	DVA[3]
State	NSW	30.9	32.0	ABS[4]
	VIC	19.8	24.8	
	SA	2.4	7.2	
	QLD	19.5	20.1	
	TAS	6.9	2.2	
	WA	14.9	10.9	
	NT	2.1	1.0	
	ACT	2.9	1.6	
Region	Major city	66.1	72.2	ABS[4]
	Inner regional	20.3	18.0	
	Outer regional	10.5	8.4	
	Remote	1.7	1.0	
	Very remote	0.4	0.5	

Refer to Appendix 3 for the proportion of MedicineInsight patients with some of the common conditions.

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