Original article

Infectious diseases notification practices, Victoria 2013

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Abstract

Introduction: Infectious disease notification practices in Victoria were reviewed to identify areas for potential improvement.

Methods: Confirmed or probable cases of certain infectious diseases required to be notified to the Department of Health and Human Services (DHHS) Victoria in 2013, excluding elevated blood lead, foodborne or water-borne illness with 2 or more related cases and chlamydial infection, were analysed according to: notification source of doctor ± laboratory vs. laboratory-only; routine follow-up by public health staff for selected conditions vs. not routine; priority for Indigenous status reporting for 18 priority conditions with a target of ≥ 95% completeness vs. other conditions with a target of ≥ 80% completeness; and urgency of notification (conditions requiring immediate [same day] notification vs. conditions requiring notification within 5 days).

Results: Almost half (49%) the 34,893 confirmed and probable cases were notified by laboratory report alone. Indigenous status was complete for 48% of cases. Indigenous status was more likely to be completed for conditions with active vs. no active follow-up (RR 1.88 (95% CI 1.84–1.92)) and priority conditions for Indigenous status reporting vs. other conditions (RR 1.62 (95% CI 1.59–1.66)). Among conditions without active follow-up, doctor-notified cases had more complete Indigenous status reporting than laboratory-only notified cases (86% vs. 6%, RR 15.06 (95% CI 14.15–16.03)). Fewer notifications requiring same day notification were received within the legislated time frame (59%) than notifications required to be notified within 5 days (90%).

Discussion: DHHS Victoria handles a large volume of infectious disease notifications. Incomplete Indigenous status reporting, particularly for conditions without active follow-up, and delayed notification of conditions requiring immediate attention warrant attention. These findings will be used to improve notification practices in Victoria. *Commun Dis Intell* 2016;40(3):E317–E325.

Keywords: public health surveillance; public health practice; disease notification; communicable disease control; Indigenous population; Victoria

Introduction

Infectious disease surveillance data are used to monitor disease epidemiology, detect and manage disease outbreaks, inform the need for public health interventions and monitor the impact of these interventions. In Victoria, the *Public Health and Wellbeing Act 2008* requires doctors and laboratories to notify the Department of Health and Human Services (DHHS) when certain infectious diseases are diagnosed or suspected. Seventy-two conditions are specified in the Public Health and Wellbeing Regulations 2009 as requiring notification; all except elevated blood lead levels are infectious diseases or complications of infectious diseases. Twenty-four notifiable conditions are classified as 'Group A' conditions* and require immediate (same day) notification by telephone on initial diagnosis, whether presumptive or confirmed, followed by written notification within 5 days. This allows immediate public health action, for example providing prophylactic antibiotics to people who have had contact with a case with invasive meningococcal disease. The remaining 48 conditions require notification within 5 days of initial diagnosis. In Victoria, notifications are received centrally and entered into the State's notifiable diseases database, the Public Health Event Surveillance System (PHESS), an electronic platform introduced in 2012, with 2013 being the first full year of use. Although PHESS has capacity to receive electronic notifications directly,[1] in 2013 all clinical and laboratory notifications were entered manually. Active case follow-up by DHHS staff is undertaken for all Group A conditions and selected other conditions based on the need for additional (enhanced) data, to inform public health action. There is no active follow-up for the remaining conditions. Responsibility for public health response to these notifications lies with the DHHS. Additionally, for the purposes of national

* Group A conditions: Anthrax, botulism, chikungunya, cholera, diphtheria, food or water borne illness (2 or more related cases), haemolytic uraemic syndrome, *Haemophilus influenzae* type b, hepatitis A, Japanese encephalitis, legionellosis, measles, meningococcal disease (invasive), Middle East respiratory syndrome coronavirus, Murray Valley encephalitis, paratyphoid, plague, poliomyelitis, rabies, severe acute respiratory syndrome, smallpox, tularaemia, typhoid, viral haemorrhagic fevers, yellow fever.

surveillance of infectious diseases, de-identified data regarding confirmed and probable cases are forwarded daily to the National Notifiable Diseases Surveillance System (NNDSS) for a nationally agreed set of 65 communicable diseases.[2]

This paper represents an audit of notifications received in 2013 by DHHS Victoria into PHESS. Such audits have been performed every 1–3 years since 2004[3–7] to inform Victorian public health staff and notifiers of notification practices in Victoria and identify notifier and system factors that need improvement. Findings of this audit will be used to optimise the utility and efficiency of disease notification in Victoria.

Methods

All notifications received by DHHS in 2013 were entered into PHESS and all notifications were included in this analysis, excluding the conditions of elevated blood lead, foodborne and water-borne illness with 2 or more related cases as these are not a single pathogen and are notified by certain institutions only, and chlamydial infection for which the notification process was under review during 2013. De-identified case notification data were extracted from PHESS in April 2014. Cases were reported and analysed according to the following classifications: 'confirmed' and 'probable' cases met nationally agreed case definitions;[8] 'rejected' cases did not meet the national case definition; 'suspected' cases had not been assessed against the national case definition; 'at-risk' cases included contacts of known cases; and 'not notifiable' cases were residents of another Australian jurisdiction and were therefore counted in that jurisdiction. Fields relating to the notified case included event identification, disease-group, condition, onset date, sex, age, Aboriginal and Torres Strait Islander (Indigenous) status and postcode of residence. Notification details included the notifier, date of specimen collection (for laboratory notifications), date the notification was authorised by the notifying doctor or positive result was authorised by the notifying laboratory (signature date), and date the notification was received by DHHS (notification received date).

Case classification, number of notifications per case, and notification source (doctor, laboratory, or both) was described for all notifications. All other analyses, including data completeness and time to notification, were restricted to confirmed and probable cases. The Communicable Diseases Network Australia (CDNA) has set a target for Indigenous status reporting of ≥95% for 18 priority conditions and ≥80% for all other conditions.[2] Confirmed and probable notifications were benchmarked against these targets.

Notification outcomes for different groups, including cases notified by a laboratory but not a medical practitioner (laboratory-only notified cases) with cases notified by a medical practitioner ± laboratory (doctor-notified cases); follow-up by public health staff, which is routine for all notified cases of Group A conditions and selected Group B, C and D conditions, vs. not routine; and priority for Indigenous status reporting for 18 priority conditions vs. all other conditions, were compared using chi-square tests and relative risks (RR) and 95% confidence intervals (95%CI) were generated. A P-value <0.05 was considered statistically significant.

Time to notification was calculated as the number of days between the earliest signature date and the earliest notification received date for each notified case. Cases with missing signature date or a delay of more than 365 days were excluded from the time to notification analysis. Median delay to notification and proportion of cases notified within the legislated time frame of 0 days for Group A conditions or within 5 days for Group B, C and D conditions were reported.

Data were analysed using Stata version 13.1. This project was an audit of disease notifications made under state legislation and was not subject to human research ethics committee review.

Results

A total of 94,592 notifications were received by the department relating to 39,389 cases of notifiable infectious diseases that met the inclusion criteria. Of these, 33,436/39,389 (85%) cases were classified as confirmed and 1,457 (4%) probable. The remaining cases were classified as rejected (1,885 cases, 5%), at-risk (1,477 cases, 4%), not notifiable (1,103 cases, 3%), and suspected (31 cases, 0.08%). Varicella zoster infection, pertussis and dengue made up 98% of the 1,457 probable cases, with psittacosis, legionellosis, HIV (newly acquired), meningococcal infection and rubella also having cases classified as probable. The majority of the 1,477 cases classified as at-risk were tuberculosis (1,327 cases, 90%), followed by typhoid (86 cases, 6%), and paratyphoid (56 cases, 4%).

Of the total 94,592 notifications, 48,913 (52%) were from primary laboratories, 21,417 (23%) from reference laboratories, and 22,681 (24%) from medical practitioners. Seventy-eight notifications were laboratory results where the testing laboratory was not identified, and 1,503 notifications were generated by public health staff at DHHS or other public health units. Of the included 39,389 cases, 40% were notified on a single occasion, with a median of 2 and a maximum of 64 notifications per case (interquartile range 1–3 notifications per

case). Multiple notifications for a single case could result from notification by both clinician and laboratory (according to the legislative requirement); notification by more than 1 clinician; and/or multiple laboratory tests, which sometimes resulted in a high number of notifications for a single case.

Almost half the 34,893 cases classified as confirmed or probable were attributable to 3 diseases: *Campylobacter* infection (5,898 cases, 17%), influenza (5,833 cases, 17%), and varicella zoster infection (5,084 cases, 15%). More confirmed or probable cases were notified in 2013 than during the preceding decade (2003–2012) for cryptosporidiosis, dengue, gonococcal infection, hepatitis D, HIV – unspecified duration, Q fever, salmonellosis, syphilis – infectious (primary, secondary and early latent less than 2 years duration), syphilis – late (more than 2 years or unknown duration), and typhoid (Table 1). More confirmed and probable cases of chikungunya (notifiable from 2005) and varicella zoster infection (notifiable from 2008) were notified in 2013 than in previous years.

Table 1: Conditions for which more confirmed and probable notifications were received in 2013 than for any single year in the preceding decade, 2003 to 2012

Condition	Notified cases	
	2013	Range 2003–2012
Chikungunya virus infection*	30	0–17
Cryptosporidiosis	1,261	215–1,142
Dengue virus infection	407	6–326
Gonococcal infection	2,992	922–2,438
Hepatitis D	23	4–16
HIV – unspecified duration	208	112–183
Q fever	50	16–35
Salmonellosis	2,944	1,160–2,743
Syphilis – infectious	655	55–467
Syphilis – late	572	293–537
Typhoid	46	12–41
Varicella zoster infection†		
Chickenpox	871	222–738
Shingles	1,209	168–1,111
Unspecified	3,004	146–2,626

* Notifiable from 2005 – comparative period 2005–2012.

† Notifiable from 2008 – comparative period 2008–2012.

Among the 34,893 confirmed and probable cases, 49% were notified by the laboratory alone, 45% by both medical practitioner and laboratory, and 6% by medical practitioner alone. The remaining 97 (0.3%) cases were identified through other means including active surveillance by DHHS staff and public health units. Four conditions were notified by both laboratory and doctor in all confirmed and probable cases—newly acquired HIV infection (110 cases), leprosy (3 cases), cholera (1 case) and congenital rubella (1 case) (Figure). More than 80% of confirmed and probable cases were notified by both laboratory and doctor for chikungunya, HIV – unspecified duration, listeriosis, meningococcal disease, paratyphoid, rubella, shigellosis, syphilis – infectious, tuberculosis and typhoid.

Medical practitioners made 22,681 separate notifications relating to 19,047 cases. Of these, 17,594/19,047 (92%) doctor-notified cases were confirmed or probable. The most common methods of initial notification for medical practitioners were facsimile (50%), web and e-notification (23%), and post (19%) (Table 2). Medical practitioners were more likely to first notify Group A conditions by telephone than Group B, C or D conditions (51% vs. 5%, RR 10.5 (95% CI 9.1–12.2)).

Table 2: Method of first notification of doctor-notified cases, Victoria, 2013, by disease group*

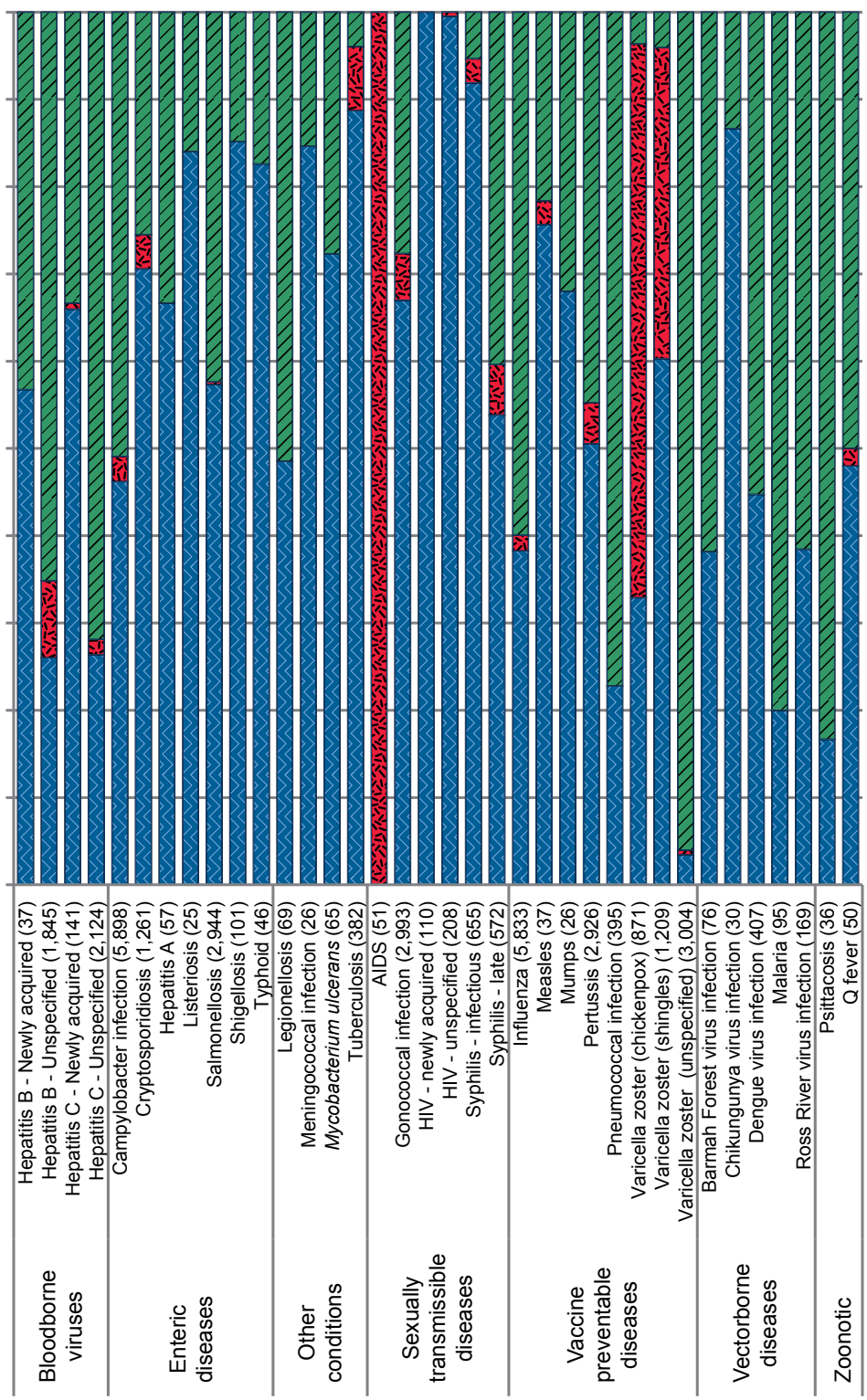
Method of notification	Group A		Groups B, C, D		All	
	n	%	n	%	n	%
Facsimile	49	23	8,704	50	8,753	50
Web / e-notification	34	16	3,933	23	3,967	23
Post	12	6	3,349	19	3,361	19
Telephone	107	51	847	5	954	5
Other	3	1	364	2	367	2
Unknown	4	2	188	1	192	1
Total	209		17,385		17,594	

* Confirmed and probable cases only, excludes chlamydial infection and foodborne or water-borne illness.

Group A conditions require immediate notification by telephone followed by written notification; groups B, C, and D conditions require written notification within 5 days of initial diagnosis

Of the 70,408 separate notifications received from laboratories, 63,711 (90%) related to confirmed or probable cases. Sixty per cent of the 32,850 confirmed or probable cases notified by laboratories were notified using a single laboratory notification, 19% had two, 8% had 3 and 12% had 4 or more separate laboratory notifications per laboratory-notified case.

Figure: Method of notification for confirmed and probable cases notified to the Victorian Department of Health and Human Services, 2013*



* Number of confirmed and probable cases notified in 2013 in parentheses. The following conditions had fewer than 25 confirmed and probable cases notified: hepatitis D (23 cases), *Mycobacterium* infection (non-tuberculosis) (22), paratyphoid (19), Shiga toxin and vero toxin-producing *Escherichia coli* (12), hepatitis E (9), leptospirosis (9), Creutzfeldt-Jakob disease (7), rubella (5), *Haemophilus influenzae* type B (4), leprosy (3), botulism (2), haemolytic uraemic syndrome (2), cholera (1), rubella – congenital (1), tetanus (1).

Age, sex and postcode were complete in ≥99.5% of confirmed and probable cases notified. Country of birth was reported in 41% of cases; more often among cases notified by a doctor than by laboratory-report alone (75% vs. 6%, RR 11.7 (95%CI 11.0–12.4), $P < 0.001$).

Indigenous status was complete in only 48% of confirmed and probable cases. Conditions with routine active follow-up by DHHS public health staff were more likely to have Indigenous status reported than those without active follow-up (83% vs. 44%, RR 1.88 (95% CI 1.84–1.92), $P < 0.001$). This difference in Indigenous status completeness was less marked among conditions notified by a doctor (92% with active follow-up vs. 86% with no active follow-up, RR 1.07 (95% CI 1.05–1.08), $P < 0.001$) than among laboratory-only notifications (63% vs. 6%, RR 10.97 (95% CI 10.13–11.89), $P < 0.001$). Among conditions without routine active follow-up, doctor-notified cases were more likely to have Indigenous status reported than laboratory-only notified cases (86% vs. 6%, RR 15.06 (95%CI 14.15–16.03), $P < 0.001$) (Table 3).

Notifications were received for 15 of the 18 priority conditions for Indigenous status data completeness identified by CDNA.[2] Among these, Indigenous status completeness ranged from 58% for gonococcal infection to ≥95% for hepatitis A, hepatitis B (newly acquired), HIV, leprosy and tuberculosis (Table 4). These priority conditions for Indigenous status reporting were more likely to have Indigenous status completed than other conditions (71% vs. 44%, RR 1.62 (95%CI 1.59–1.66), $P < 0.001$). Indigenous status was complete for 89% of notified priority condition cases for which active follow-up by DHHS public health staff is routine compared with 58% for gonococcal infection, which is the only priority condition without routine active follow-up.

Table 4: Completeness of Indigenous status reporting for priority diseases,* Victoria, 2013

Priority condition	Cases notified	Indigenous status complete %
Dengue virus (locally acquired)	0	–
Donovanosis	0	–
Gonococcal infection†	2,992	58
Haemophilus influenzae type b	4	75
Hepatitis A	57	96
Hepatitis B (newly acquired)	37	95
Hepatitis C (newly acquired)	141	64
HIV	369	95
Leprosy	3	100
Measles	37	92
Meningococcal disease (invasive)	26	81
Pertussis <5 years	227	79
Pneumococcal disease <5 years	38	89
Pneumococcal disease ≥50 years	235	89
Shigellosis	101	89
Syphilis – congenital	0	–
Syphilis - infectious	655	86
Tuberculosis	382	100
All priority conditions	5,304	71
Other (non-priority) conditions‡	29,589	44

* Target for priority diseases is ≥95% Indigenous status complete and ≥80% for all other diseases.

† Gonococcal infection is the only priority condition for Indigenous reporting that is not routinely followed up by the Department of Health and Human Services staff.

‡ All other notifiable conditions not listed above as priority conditions.

Table 3: Completeness of Indigenous status reporting for conditions with and without active follow-up, by notifier

	All notifications			Doctor notified			Lab-only notified					
	n	N	%	n	N	%	n	N	%	RR*	(95% CI)	*P*-value
Conditions with active follow-up of all notified cases												
Group A	232	293	79	172	209	82	60	84	71	1.15	0.99–1.34	0.038
Group B, C, D	2,464	2,936	84	1,961	2,121	92	503	815	62	1.50	1.42–1.58	<0.001
Conditions without active follow-up of all notified cases†												
Group B, C, D	14,054	31,664	44	13,118	15,264	86	936	16,400	6	15.06	14.15–16.03	<0.001
All conditions	16,750	34,893	48	15,251	17,594	87	1,499	17,299	9	10.00	9.53–10.50	<0.001

* Relative risk for having Indigenous status complete if notified by a doctor vs. laboratory only.

† Barmah Forest virus infection, campylobacteriosis, cryptosporidiosis ≥6 months of age, gonococcal infection (laboratory notified), hepatitis B (unspecified duration), hepatitis C (unspecified duration), influenza, non-tuberculosis mycobacterium infection (excluding *Mycobacterium ulcerans*), pertussis (aged ≥5 years), invasive pneumococcal infection (aged 5–49 years), Ross River virus infection, salmonellosis, syphilis – late (laboratory notified), and varicella zoster infection

Group A conditions require immediate notification by telephone followed by written notification; groups B, C, and D require written notification within 5 days of initial diagnosis.

The median time to notification for confirmed and probable Group A conditions was zero days (range 0 to 52 days), with 59% of notifications received on the same day as the signature date and within the legislated time frame for notification (Table 5). For Group B, C and D conditions the median delay from signature date to notification was 1 day, with 90% of cases notified within the legislated time frame of 5 days from the signature date. Among medical practitioners, 100% of Group A conditions were notified within the legislated time frame (same day as diagnosis) when notified by web or e-notification; 79% when notified by telephone and 50% when notified by fax (Table 5). For Group B, C and D conditions notified by medical practitioners, ≥97% were notified within the legislated time frame (within 5 days of diagnosis) when notified by web or e-notification, telephone or facsimile, and 77% when notified by post.

Discussion

A major finding of this audit was the low proportion of notified cases with completed Indigenous status. Reporting Indigenous status in health data is essential in order to quantify health disparities between Indigenous and non-Indigenous Australians, inform policy development and service delivery planning, and measure the effectiveness of interventions against targets of improved Indigenous health.[9] In 2011, CDNA set national targets for data completeness of Indigenous status at ≥95% for 18 priority conditions and ≥80% for all other notifiable conditions.[2] In Victoria in 2013, Indigenous status was complete for 71% of the priority diseases and 42% of other diseases. The proportion of all confirmed and probable cases with complete Indigenous status was 48% in 2013, similar to previous Victorian reports of 45% to 51% from 2004 to 2011.[3–5,7] Overall, 48% of cases in the NNDSS in 2013 had Indigenous status reported, ranging from 18% in New South Wales to >90% in the Northern Territory, South Australia, and Western Australia.[2] Similarly, ethnicity was reported for 49% of cases notified to the US National Notifiable Diseases Surveillance System from 2006 to 2010.[10] When restricted to doctor-notified confirmed and probable cases in Victoria, the proportion with complete Indigenous status was 87% in 2013, a slight improvement compared with 80% to 84% from 2006 to 2011.[3,5–7] Despite awareness of the issue, there has not been substantial progress in improving completeness of Indigenous status reporting in Victoria. In this study we have provided more detailed analysis of Indigenous status reporting, highlighting higher completion rates among doctor notified cases, conditions with active follow-up, and priority diseases, in order to highlight areas that require attention and potential strategies for improvement.

In particular, more needs to be done to meet the CDNA targets for Indigenous status reporting for gonococcal infection, which is the only priority condition for which active case follow-up of laboratory notifications is not routine in Victoria. Indigenous status was complete for 83% of cases with active follow-up; therefore re-instituting routine active case follow-up for laboratory-notified

Table 5: Proportion of cases notified within 0 days, 1–5 days, and >5 days of signature date, by condition group, Victoria, 2013

	Number of cases*	Days to notification %		
		0	1–5	>5
Group A				
All cases	285	59	30	11
Notifier				
Both doctor and laboratory	201	62	29	9
Laboratory only	82	50	35	15
Doctor only	2	100	0	0
Method of doctor notifications (if known)				
Facsimile	18	50	44	6
Web / e-notification	10	100	0	0
Post	2	0	0	100
Telephone	77	79	16	5
Other†	3	67	33	0
Groups B, C and D				
All cases	31,779	33	56	10
Notifier				
Both doctor and laboratory	14,659	38	53	9
Laboratory only	15,250	27	61	12
Doctor only	1,870	51	40	9
Method of doctor notifications (if known)				
Facsimile	6,702	64	32	4
Post	1,090	8	69	23
Web / e-notification	1,610	79	18	3
Telephone	326	86	14	0.6
Other‡	80	59	34	7
Total	30,325	47	48	5

* Confirmed and probable cases only; elevated blood lead, chlamydial infection and food-borne or water-borne illness excluded. Excludes notified cases where signature date was missing, or the date difference between 'signature date' and 'date notified' was greater than 365 days or less than 0 days (assuming transcription errors by notifier or data entry errors).

† Number of days between earliest signature date and the earliest notification received date.

‡ All other methods of notification.

Group A conditions require immediate notification by telephone followed by written notification; groups B, C, and D require written notification within 5 days of initial diagnosis.

cases of gonococcal infection is likely to improve completeness of Indigenous status reporting for gonococcal infection to >80%.

Ideally, Indigenous status would be ascertained at the time of notification. This requires educating clinician-notifiers of the importance of completing the Indigenous status field on the notification form. As Indigenous status was complete for 87% of doctor-notified cases in 2013, there is some scope for improvement as a result of clinician education. A DHHS communication strategy in 2009 aimed to increase the proportion of notified cases for which a notification was received from a doctor. This contributed to a temporary increase in this proportion to 58% in 2009,[11] but by 2013 this had fallen back to the baseline of 50%, indicating only modest gains in Indigenous status ascertainment are likely to be achieved through clinician education and that such education needs to be ongoing to maintain these gains. Inclusion of an Indigenous status identifier on laboratory request forms has potential to do more to improve ascertainment,[12] particularly for laboratory-only notified cases without routine follow-up such as gonococcal infection. Although this can be encouraged through clinician-education, changes to legislation and regulations requiring inclusion of Indigenous status on pathology request slips could prove more effective.[12] This requirement would also improve Indigenous status ascertainment in other datasets such as cancer registries. Regardless of the method used to improve completeness of Indigenous status, individuals should retain the right to withhold their Indigenous status through use of the 'declined to answer' response.

Another potential approach is to undertake record linkage with other data sets to improve Indigenous status reporting completeness. In response to poor completeness of Indigenous status identified in previous audits of Victorian notification practices, a data-linkage pilot study was performed that aimed to improve Indigenous status reporting for 3 of the nominated priority conditions for Indigenous reporting completeness.[13] Data from newly acquired hepatitis B and C and gonococcal infection cases notified in Victoria in 2009–10 were linked with Victorian hospitalisation data (1997–2011). Among the 82% of cases able to be linked, the proportion with missing Indigenous status decreased from 62% for hepatitis B, 68% for hepatitis C, and 33% for gonococcal infection to less than 0.2% for all conditions. Importantly, this resulted in a 2–4 fold increase in notification incidence among Indigenous Victorians for each of these conditions.[13] Although the pilot data-linkage study illustrated potential use of other Victorian Government datasets to improve completeness of Indigenous status for data analysis and reporting, it was a retrospective study that did not update or correct the Indigenous status field in PHESS. The use of record linkage to update the Indigenous status field in PHESS raises ethical and privacy issues as people have the right to withhold their Indigenous status for some or all health service interactions. At present, these ethical and privacy issues prevent updating the Indigenous status field in PHESS using information already contained in PHESS, related to an individual's previous disease notification(s), or other health-related data sources. However, such record linkage is routine in certain countries, indicating these issues may not be insurmountable. For example, a National Health Index (NHI) number is assigned to individuals accessing health and disability support services in New Zealand. The NHI holds various demographic and health data, including self-reported ethnicity. The NHI is included in the national notifiable communicable diseases database (EpiSurv), which facilitates record linkage with the New Zealand Health Information Service.[14]

In Victoria, the *Public Health and Wellbeing Act 2008* requires both doctors and laboratories to notify all infectious diseases scheduled in the Public Health and Wellbeing Regulations 2009. In 2013, only 45% of confirmed and probable cases had both medical practitioner and laboratory notifications, similar to our findings for 2004 to 2011 (43% to 52%).[4–7] A 2008 survey of 152 Victorian medical practitioners identified the most common reasons for not notifying as: 1) assumption that the laboratory would notify; 2) belief that doctors notify confirmed, not suspected cases; and 3) notification was time consuming process.[11,15] The proportion of notifications received by laboratory alone increased from 38% in 2011 to 49% in 2013.[7] In comparison, in the proportion of notifications made by laboratory alone was estimated to be 4% in South Australia, 33% in Western Australia, and ≥95% in all other Australian jurisdictions in 2013.[16] This highlights the variability of surveillance practices in different Australian jurisdictions and potential issues with comparing notification data between jurisdictions. Unlike Victoria, in New South Wales, the Northern Territory, Queensland and Tasmania certain high-incidence conditions (e.g. chlamydial genital infection) require notification from the laboratory but not the doctor and in each of these jurisdictions laboratory only notifications account for ≥98% of all notified cases. The value of requiring dual notification by laboratories and clinicians for all notifiable conditions is currently under review in Victoria. If doctor notifications were not required for all conditions, the notification burden on clinicians and workload of DHHS surveillance staff would be reduced without impacting case ascertainment or timeliness of notification for high incidence diseases which require laboratory

confirmation. However, the trade-off associated with reliance on laboratory only notifications is the potential loss of certain clinical, demographic and epidemiological information which can enable DHHS to identify sources of exposure and implement strategies to prevent further cases. For example, cases notified by a doctor were 12 times more likely to have completed country of birth compared to laboratory only notifications. For several conditions, additional data are collected by public health officers during routine case follow-up with the treating doctor and/or case through telephone contact or a request to complete an enhanced surveillance form (ESF). To expedite this, DHHS are trialling a system for selected conditions whereby doctors making web notifications are immediately directed to the appropriate ESF so that enhanced data are collected at the time of notification. Active case follow-up also provides an opportunity to collect missing notification data. Among conditions with routine active case follow-up, the difference in completeness of reporting of Indigenous status between doctor notified and laboratory-only notified cases (RR 1.88) were considerably less marked than among conditions with no routine active follow-up (RR 15.06). This suggests that for conditions with routine case follow-up, Indigenous status and other missing demographic information can be collected during case follow-up for laboratory-only notified cases.

As several high-incidence conditions are currently not routinely followed up, alternate ways to obtain data relevant to notified cases need to be considered. The modernisation of surveillance in Australia through formalised data linkages with existing datasets has been identified as a national surveillance strategic priority,[17] while development of secure and reliable record linkage has been identified in surveillance strategies in Australian and international jurisdictions.[18,19] It might be possible to obtain demographic data, including Indigenous status, postcode of residence and country of birth from electronic medical records if this information was automatically included on electronically generated pathology request slips and notification forms.[12] This would result in more complete data without the need for medical practitioners to separately notify each diagnosed case. Linkage of case notification data with extracts from other government databases has potential to be more easily achieved. In New South Wales and Western Australia, linkage of the Australia Childhood Immunisation Register data with state-based disease notification data has been successfully piloted for a 17-year birth cohort (more than 2 million children) to improve vaccination status reporting.[20] This allows identification of vaccine failures and population-based assessment of vaccine effectiveness and can be used to evaluate and inform the Australian Immunisation Program. Updating PHESS records regarding vaccination status using data obtained via record linkage is unlikely to raise the same ethical and privacy concerns as Indigenous status fields.

Electronic laboratory reporting (ELR), the automated transmission of laboratory results from laboratories to public health units, is recognised to improve notification timeliness and accuracy and therefore public health response capacity.[21–23] PHESS is a customised version of a commercial product known as Maven Enhanced Disease Surveillance System (Maven EDSS), developed by Consilience Software, Austin Texas USA. In 2014, Maven EDSS was used in 7 US states, 5 US cities (including New York City) and New South Wales – the most populous Australian state with 32% of the national population.[1] The use of ELR is expanding in New South Wales, with 4 laboratories commencing ELR in 2013 and additional laboratories added subsequently.[24] Electronic laboratory notifications from some laboratories are received directly into the New South Wales surveillance system, the Notifiable Conditions Information Management System (NCIMS). As yet, the Victorian PHESS database does not receive laboratory reports electronically. However, a pilot is underway for ELR from a Victorian public health laboratory with plans to expand this to other Victorian laboratories. As more than 90% of notified cases include a laboratory notification, this has the potential to reduce notification delay as well as reducing data entry workload and errors within DHHS.

DHHS Victoria continues to receive and respond to a high number of notifications of communicable diseases. In 2013, fewer than half the notified cases had Indigenous status completed, although higher ascertainment was achieved for doctor-notified cases, priority conditions for Indigenous reporting, and conditions with active follow-up. An increasing proportion of cases were notified by laboratory alone in Victoria. This is in keeping with national trends, with the potential consequence of incomplete demographic and risk factor data for notified cases. Possible actions to ensure adequate data quality and completeness in this context include prioritisation of data fields and diseases for which data completeness is necessary; education and support of doctors to ensure appropriate and timely notification; automation of systems to pre-populate laboratory request slips and notification forms with relevant demographic data; and development of ELR and data linkage capacity. Notifying doctors should be reminded of the requirement for immediate notification by telephone for Group A conditions to facilitate rapid public health response and prevention of further cases. DHHS Victoria will continue to work with notifiers and data cus-

todians on these issues to ensure timely, complete and efficient notification to inform and monitor public health actions.

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