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Contents:

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VIRUS REPORTING SCHEME: A total of 1,420 reports were processed for this period.

Forty four cases of Q fever were reported, 2 from South Australia, 4 from New South Wales and 38 from Queensland. Occupational exposure data were only available for 11 Queensland cases:

- 9 meatworkers
  - 7 males (one from Maryborough aged 28, one from Rockhampton aged 16, one from Beenleigh aged 19, one from Brisbane aged 43, one from Townsville aged 26, one from Toowoomba aged 17 and one from Grafton age unknown), and
  - 2 females (one from Inverell aged 19 and one from Murgon aged 30).
- one station hand, a 18 year old male from Mt Isa, and
- one male farmer from Lismore.

None of the 44 patients was involved in the Q fever vaccine field trial conducted in South Austrlaia.

Cytomegalovirus (CMV) was isolated from:

- the urine of a one year old child with congenital CMV who presented with microcephaly, deafness and mild developmental retardation,
- the urine of a 5 month old female with congenital CMV who presented with bilateral cataracts, microphthalmia and hepatosplenomegaly, and
- the urine of a 19 year old male with Guillain-Barre syndrome.

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Cytomegalovirus (CMV) specific IgM antibody was detected in the serum of a 27 year old female following a miscarriage.

Hepatitis B surface antigen (HBsAg) was detected in the serum of a 44 year old asymptomatic female prior to surgery. The patient was donating blood for possible autologous transfusion.

Herpes simplex virus (HSV) specific IgM antibody was detected in the serum of a 24 year old female with recurrent lymphocytic meningitis.

Varicella-Zoster virus, identified by electron microscopy, was isolated from the vesicle fluid of skin lesions of a 47 year old male with pneumonia.

Epstein-Barr virus (EBV) specific IgM antibody was detected in the serum of a 13 month old female four weeks following a second cardiac surgical procedure to rectify a hypoplastic left ventricular defect. The patient development post-operative jaundice, renal failure and multiple organ failure as a consequence of poor cardiac output. Post-transfusion EBV infection was suspected.

HIV - OCCUPATIONAL EXPOSURE AMONG HEALTH-CARE WORKERS (CANADA)

(Based on CDWR Vol. 13-37, 19 September 1987)

The risk of occupational exposure to the human immunodeficiency virus (HIV) and the risk of subsequent infection are of great concern to health-care workers. Infection control guidelines to prevent exposure to HIV have been reviewed periodically by expert groups to evaluate, based on current epidemiologic evidence the appropriateness of the precautions recommended for health-care facilities[1]. The general consensus is that prevention of exposure to HIV can be achieved by consistent implementation of existing infection control guidelines, summarised below, which will protect staff from occupational exposure to all blood borne pathogens, including HIV. These procedures should be applied routinely for all patients rather than selectively on the basis of prior knowledge of a patient's HIV serostatus. The latter approach will not eliminate occupational exposure to HIV because the infection status of hospital patients who are asymptomatic carriers of HIV is unlikely to be known.

Infection Control Precautions to Prevent Occupational Exposure to Blood-borne Infections by Health-Care Workers.

- Needles, scalpel blades and other sharp instruments should be considered potentially infective and should be handled with care to prevent accidental injuries.

- Disposable needles and syringes, scalpel blades and other sharp items should be placed in puncture-resistant containers located close to the area of use. Care should be taken to avoid overfilling these containers since this may result in accidental needlesticks.

. To prevent needlestick injuries, needles should not be recapped, purposefully bent, broken, removed from disposable syringes, or otherwise manipulated by hand. (There are some proponents of the use of devices to recap syringe needles[2] and thereby avoid the hazards of inappropriate disposal of used needles. Studies of the effectiveness of such devices conducted on representative samples of health-care professionals are needed before any changes in current policies are considered.)

. When the possibility of exposure to blood or other body fluids exists, protective clothing should be worn. Gloves alone may be required, as in handling items soiled with blood or equipment contaminated with blood or other body fluids. Gowns, masks and eye-coverings may be necessary when extensive contact with potentially infective blood or body fluids is anticipated or when there is a risk of splashing.

. Hands and areas exposed should be washed thoroughly immediately after an accidental exposure to blood or body fluids.

. Educational sessions for all health-care workers should be required on a periodic basis to ensure that staff are trained in required infection control procedures and that these are implemented consistently.

National Surveillance Program:

This prospective surveillance program, initiated in September 1985, is coordinated by the Federal Centre for AIDS. The objective is:

. to monitor the occurrence of occupational exposures to HIV-infected blood and body fluids among health-care workers, and
. to determine the risk to health-care workers of acquiring HIV infection as a result of a parenteral or mucous-membrane exposure to infected blood or other body fluids.

To be included in this study, health-care workers must have sustained:

. a documented parenteral or mucous-membrane exposure to the blood or body fluids of a patient with AIDS,

. clinical manifestations of HIV infection, or serologic evidence of the infection

Persons reporting skin contact with infected blood or body fluids also have been enrolled in the program because of the concern that such contact may be a risk to health-care workers. These individuals are considered as a separate group in the analyses.

The surveillance protocol requires that:

. participants receive HIV serology tests (ELISA) within 30 days of the occupational exposure (baseline).

. testing is carried out at 6-weekly intervals for the 6-month period after enrollment, then at 9 and 12 months, at which time post-exposure follow-up is terminated,

. in addition, a medical history and physical examination is done at enrolment with follow-up information collected at 6 and 12 months.

. confidentiality is assured by using a coding system for record management which does not require any personal identifiers.

Serum samples are tested for antibody to HIV at the Retrovirus Laboratory of the Federal Centre for AIDS. The clinical assessments of study participants are carried out by the hospital employee health services and these data are submitted to the study coordinator on standard data collection forms.

Results

As of 1 August 1987, 120 health-care workers have been included:

- . 102 (85%) were females aged between 20 and 60 years (median age 32 years), and
  . 18 (15%) were males aged between 23 and 55 years (median age 29.5 years).

- . 46 exposures were reported in 1985,
  . 47 exposures were reported in 1986, and
  . 27 health-care workers had been enrolled up to 1 August 1987.

Four other employees were excluded because they lacked a baseline serum specimen taken within 30 days of their occupational exposure.

Type of exposure to HIV by occupational group is presented in Table 1.

TABLE 1. Parenteral or mucous membrane exposures by occupational group.

	Needlestick	Eyesplash	Open wound Contamination	Scalpel Wound	TOTAL
Nurse	41	8	14	2	65
Therapist/ technician	5	2	0	0	7
Student/ Resident	7	1	1	1	10
Laboratory technician	4	1	3	2	10
Physician	0	0	1	1	2
Other	0	0	0	0	0
TOTAL	57 (61%)	12 (13%)	19 (29%)	6 (6%)	94 (100%)

The above Table 1 reported 94 parenteral or mucous membrane exposures:

A. Personnel exposed:
- 10.5% of the reported exposures were sustained by laboratory technicians, and
- 89.5% of the reported exposures occurred among personnel involved in direct patient care:
  . nurses (70%)
  . therapists and technicians (7%)
  . medical students and residents (10.5%), and
  . physicians (2%).

B. Types of exposures:
- 61%of the 94 parenteral or mucous membrane exposures were needlestick injuries, and
- other exposures included:
  . eyesplash (13%)
  . open wound contamination (20%), and
  . scalpel wound (6%)

The remaining 26 exposures (22 nurses, 2 therapists, an ambulance attendant and a non-health professional) were skin contact with blood (85%) or body fluids.

TABLE 2 presents the types of exposure to HIV according to the protective apparel worn by the health-care workers.

TABLE 2. Parenteral or mucous membrane exposures and protective apparel worn.

	Needlestick	Eyesplash	Open wound Contamination	Scalpel Wound	TOTAL
Gloves only	24	1	6	1	32
Gloves, gown and mask	15	9	1	1	26
Gloves, gown, mask and eye protection	1	0	1	1	6
Mask and/or Gown	4	0	1	0	2
None	13	2	10	3	28
TOTAL	57	12	19	6	94

Needlestick injury was the most common exposure reported accounting for 61% of the incidents:
. in 3 of these cases, the needlestick occurred while recapping a used needle, and
. in 2 cases, the injury resulted from improper disposal of used needles.

Of the 94 exposures reported in Table 2.:

. 5 of the 57 needlestick injuries could have been prevented by correct handling and disposal of used needles,

. the 19 open wound contaminations were preventable by covering open skin areas before beginning any procedures, and

. 24 (26%) of these exposures could most likely have been prevented by adherence to recommended precautions (as implicated in Table 3).

TABLE 3 Preventable exposures to blood/body fluids

Description of exposure	Number of health-care workers	(%)
Recapping a used needle	3	(12.5%)
Improper disposal of a used needle	2	(8.3%)
Open Wound Contamination	19	(79.2%)
TOTAL	24	(100%)

. 63 (67%) of the 94 parenteral or mucous membrane exposures involved needles or other instruments and occurred during the procedures indicated in Table 4.

TABLE 4. Description of exposure for 63 health-care workers exposed to HIV during use of a needle or instrument

Description of exposure	Number of health-care workers	(%)
Drawing blood	17	(27%)
Giving an injection	17	(27%)
Recapping a used needle	3	(5%)
Improperly disposing of a needle	2	(3%)
Manipulating equipment	9	(14%)
Inserting IV line	11	(17%)
Other	3	(5%)
Unknown	1	(2%)
TOTAL	63	(100%)

. in the majority (85%) of skin contact exposures to blood or body fluids of patients, the health-care worker was not wearing any form of protective clothing.

HIV Serology Test Results:

. There have been no seroconversions to date attributable to occupational exposure to HIV.

. One of the 4 individuals excluded on the basis of the absence of a baseline serology result was seropositive 8 weeks post-occupational exposure. This person also had another risk factor for HIV infection.

According to these data, the statistical maximum risk of HIV infection following a parenteral or mucous membrane exposure to HIV-infected blood or body fluids does not exceed 3% (95% confidence upper limit)[3]

Conclusions

. The results of this surveillance program are consistent with other studies and support a low risk of occupational transmission of HIV infection in the health-care setting.

. The fact that many of the reported exposures to HIV-infected blood/body fluids could have been prevented by adherence to routine infection control precautions indicates the importance of health-care worker compliance with these guidelines.

. This observation is not unique to the Canadian program.

The results of the US national surveillance program indicated that approximately 40% of 938 exposures were probably preventable[4].

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RUBELLA AND CONGENITAL RUBELLA - USA, 1984-86

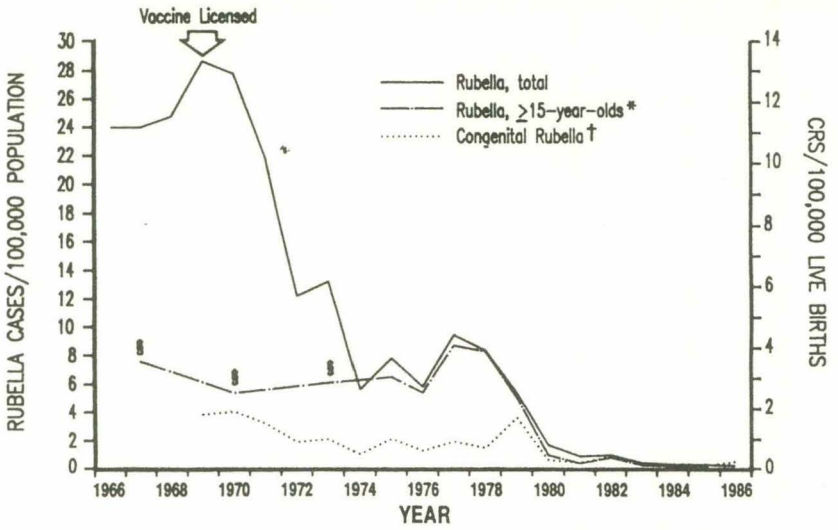
(based on MMWR Vol. 36/No. 40, 16 October 1987)

A. Rubella

In 1986,

. 551 cases of rubella (0.23 cases/100 000 population) were reported in the United States
. the incidence of rubella declined by
  - 12% from the 1985 total (630), and
  - 99% since 1969, the year of rubella vaccine licensure.
. the current total is the lowest since rubella became a notifiable disease in 1986 (Figure 1).

FIGURE 1. Incidence rates of reported rubella cases and congenital rubella cases - USA, 1966-86.



*Includes proration of patients ≥15 years old for whom age was unreported.
†Rate per 10^5 births of confirmed and compatible cases of CRS by year of birth. Reporting for recent years is provisional, as cases may not be diagnosed until later in childhood.
§Average annual United States estimate based on data from Illinois, Massachusetts, and New York City for the 3-year-periods 1966-1968, 1969-1971, and 1972-1974. Age-specific data were not available for U.S. totals until 1975.

- 18 of 52 reporting areas (50 states, the District of Columbia, and New York City) reported no rubella cases, compared with - 15 reporting areas in 1985, and
  - 13 reporting areas in 1984.
- 161 countries (5%) reported rubella cases in 1986, compared with 219 (7%) in 1984.

Comparison of the national data for 1984-1986 indicates that the reported age-specific incidence rates of rubella declined for virtually all age groups during the past 3 years (Table 1).

TABLE 1. Age distribution of persons with reported rubella cases and estimated incidence rates* - USA, 1984-86.

Age Group (years)	1984			1985			1986			Rate Change (%) 1984-1986
	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	
<1	110	(16.2)	3.4	47	(8.6)	1.5	50	(10.5)	1.6	−52.9
1-4	114	(16.8)	0.9	69	(12.6)	0.6	79	(16.7)	0.6	−33.3
5-9	85	(12.5)	0.6	60	(11.0)	0.4	48	(10.1)	0.3	−50.0
10-14	44	(6.5)	0.3	23	(4.2)	0.2	21	(4.4)	0.1	−66.7
15-19	65	(9.6)	0.4	34	(6.2)	0.2	44	(9.3)	0.3	−25.0
20-24	115	(16.9)	0.6	69	(12.6)	0.4	80	(16.9)	0.5	−16.7
25-29	70	(10.3)	0.4	96	(17.6)	0.5	72	(15.2)	0.4	0.0
≥30	76	(11.2)	0.1	148	(27.1)	0.1	80	(16.9)	0.1	0.0
Total, known age	679	(90.3)	–	546	(86.7)	–	474	(86.0)	–	–
Total, unknown age	73	(9.7)	–	84	(13.3)	–	77	(14.0)	–	–
Total cases reported	**752**	**(100.0)**	**0.32**	**630**	**(100.0)**	**0.26**	**551**	**(100.0)**	**0.23**	**−33.3**

*Cases per 100,000 population (projected census data) derived from extrapolating the age distribution of patients with known age to total cases.

. children <5 years of age continued to have the highest overall incidence rate (0.8/100 000) and accounted for 28% of all patients for whom age was reported during 1986.
. the incidence rate for persons <15 years old declined by 42% between 1984 and 1986.
. the rate of persons ≥15 years of age, who accounted for 58% of the cases in 1986, declined by 15% between 1984 and 1986 (0.20/100 000 and 0.17/100 000, respectively).

Long-term, age-specific data on the occurrence of rubella are available only from Illinois, Massachussetts, and New York City. In the 3-year period before vaccine licensure (1966-1968), the reported risk of acquiring rubella in these three locations was highest for children 5-9 years of age (Table 2).

TABLE 2 Age distribution of persons with reported rubella cases and estimated incidence rates* - Illinois, Massachusetts, and new York City, 1966, 1968+, 1975-77+, and United States, 1984-1986+

Age Group (years)	1966-1968§			1975-1977§			Total U.S. 1984-1986¶			Rate Change (%) 1966-1986
	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	
<5	1,294	(21.6)	63.3	160	(9.8)	9.8	156	(27.6)	0.9	−98.6
5-9	2,304	(38.5)	101.3	233	(14.2)	11.6	64	(11.3)	0.4	−99.6
10-14	1,020	(17.1)	44.0	229	(13.9)	11.2	29	(5.1)	0.2	−99.6
15-19	759	(12.7)	35.7	634	(38.7)	27.4	48	(8.5)	0.3	−99.3
≥20	601	(10.2)	3.7	384	(23.4)	2.3	269	(47.5)	0.2	−95.7
Total	**5,978**	**(100.0)**	**24.3**	**1,640**	**(100.0)**	**6.7**	**566**	**(100.0)**	**0.2**	**−99.0**

*Reported number of cases per 100,000 population. Patients of unknown age excluded.
†Average annual figures over 3-year period. 1966-1968 represents prevaccine years.
§National age-specific data were not available prior to 1975 and were not consistently reported (i.e., more than 75% of cases) until 1980.
¶Total U.S. data (1985 population projections) are used for the period 1984-1986. Because the overall number of reported rubella cases is currently small, fluctuations introduced by epidemics in New York City in 1984 (*1*)and 1985 (*2*) would have skewed the data for this period.

. children < 10 years of age accounted for 60% of the cases, while only 23% of the total reported cases were among those ≥ 15 years of age.

During 1975-1977, although incidence rates had declined for all age groups, the greatest decreases occurred among persons 15 years of age. Consequently, the highest incidence rates during this period were reported among 15-to 19-year-olds rather than 5-to 9-year-olds

. children < 10 years of age accounted for only 24% of cases, while ≥ 15 years of age made up 62% of cases

. incidence rates were more than tenfold higher for 15-to 19-year-olds than those ≥ 20.

More recently (1984-1986)

. nationally reported incidence rates have declined by 95% or more for all age groups, with the greatest decreases occurring among persons <20 years of age

. persons ⩾15 years of age, who accounted for the majority (56%) of cases, had experienced a >95% reduction in their risk of acquiring rubella, relative to pre-vaccine years

. differences in attack rates between 15-to 19-year-olds and those > 20 years of age were no longer observed.

B. CONGENITAL RUBELLA SYNDROME

Data on cases of congenital rubella syndrome (CRS) are available from:

. reports submitted weekly to the MMWR Morbidity Surveillance System - these CRS reports are case counts with no accompanying data and are tabulated by year of report

. the National Congenital Rubella Syndrome Register (NCRSR) maintained by the Division of Immunisation, Center for Prevention Services, CDC. The NCRSR contains clinical and laboratory information on cases of CRS that are reported by state and local health departments. The NCRSR cases are monitored by year of birth and are classified into six clinical categories, as follows:

1. CRS CONFIRMED - Defects present and one or more of the following

   A. Rubella virus isolated
   B. Rubella-specific IgG present
   C. Infant's rubella IgG antibody titre persists above and beyond that expected from passive transfer of maternal antibody (ie infant's rubella IgG titre does not fall off at the expected rate of one twofold dilution/month).

2. CRS COMPATIBLE - Laboratory data insufficient for confirmation and any two complications listed in A or one from A and one from B

   A. Cataracts and congenital glaucoma (either or both count as one), congenital heart disease, loss of hearing, pigmentary retinopathy
   B. Purpura, splenomegaly, jaundice, microcephaly, mental retardation, meningoencephalitis, radiolucent bone disease.

3. CRS POSSIBLE - Some compatible clinical findings that do not fulfill the criteria for a compatible case.

4. CONGENITAL RUBELLA INFECTION ONLY - No defects present but laboratory evidence of infection.

5. STILLBIRTHS - Stillbirths that are thought to be secondary to maternal rubella infection.

6. NOT CRS - One or more of any of the following inconsistent laboratory findings for a child without evidence of an immunodeficiency disease.

A. Rubella antibody titre absent in a child ≤ 24 months
B. Rubella antibody titre absent in mother
C. Rubella antibody titre decline in an infant consistent with the abnormal decline of passively transferred maternal antibody after birth. (The expected rate of decline of maternal antibodies is one twofold dilution/month).

Infants are diagnosed a having confirmed cases when both defects and laboratory evidence of rubella infection are present. Cases that satisfy only selected clinical criteria in the absence of laboratory confirmation are designated as compatible. Sine the NCRSR cases are classified by year of birth, data are considered provisional for any given year and are subject to updating because of delayed reporting. This summary updates previous reports on surveillance of CRS in the United States.

Recent declines in rates of CRS recorded by NCRSR have paralleled the decline in overall rubella incidence and, more specifically, the incidence for persons ≥ 15 years of age (Figure 1). During 1979-1986, the reported rate of rubella among persons in this age group declined 96%, from 4.8 to 0.2 cases/100,000 population. Similarly, reported data showed that 57 confirmed and compatible cases of CRS occurred in 1979 and that only two such cases occurred in 1985 (a 96% decline)* (Table 3).

(*Cases reported to MMWR have been reclassified by date of birth rather than date of report and stratified into confirmed and compatible cases. Annual totals may change as a result of delayed diagnoses and reporting).

TABLE 3 Annual totals and incidence rates of congenital rubella syndrome (CRS) reported to the National Congential Rubella Syndrome Registry (NCRSR)* - USA, 1969-86

Year	NCRSR Cases†	Incidence Rate§	Year	NCRSR Cases†	Incidence Rate§
1969	62	1.72	1978	30	0.90
1970	67	1.80	1979	57	1.63
1971	44	1.24	1980	14	0.39
1972	32	0.98	1981	10	0.28
1973	30	0.96	1982	12	0.33
1974	22	0.70	1983	7	0.19
1975	32	1.02	1984	2	0.05
1976	22	0.69	1985	2	0.05
1977	29	0.87	1986	12	0.32

*Confirmed and compatible cases only, reported by year of birth. Data are provisional because of delayed reporting.
†The following imported cases are excluded: 1984 (1), 1985 (1), 1986 (2).
§Cases per 100,000 live births per year.

. twelve cases of CRS were reported in 1986, reversing and consistent downward trend since 1982
  - eight cases were reported to the New York city (NYC) Department of health 8-10 months after the peak of a rubella outbreak in NYC [2]

. as of September 1987, NCRSR has received reports of two cases of CRS among children born in 1987.

MMWR Editorial Note:

The primary goal of rubella vaccination programs is to prevent congenital rubella infection (CRI), which can result in miscarriages, abortions, stillbirths, and congenital rubella syndrome (CRS) in infants. When rubella vaccine was licensed in 1969, the United States adopted a policy of universal immunisation of children. The focus of this rubella vaccination strategy was to control rubella in preschool-and young school-aged children, who are the primary sources of rubella transmission. This strategy was designed to reduce and even interrupt circulation of the virus, thereby reducing the risk if exposure for susceptible pregnant women. Vaccinated children would be protected immediately, and immunity was expected to persist through their childbearing years [3]. Accordingly, children of both sexes were the primary target group for vaccination.

Secondary emphasis was placed on vaccinating susceptible adolescents and adults, especially women. by 1977, vaccination of children $\geqslant$ 12 months of age had resulted in marked declines in reported rubella incidence in children and had interrupted the characteristic 6- to 9-year rubella epidemic cycle. However, this strategy had a minimal effect on rubella incidence in persons $\geqslant$ 15 years (Figure 1). Moreover, after some initial decreases, reported incidence rates of CRS stabilised (Figure 1, Table 3). Serologic surveys of various post-pubertal population carried out during the 1970s and early 1980s found rates of rubella susceptibility comparable to those of the pre-vaccine years: 10% to 20% of persons surveyed lacked serologic evidence of immunity to rubella [4].

Beginning in 1977, intensified efforts were initiated to vaccinate all children and post-pubertal females. The number of doses of rubella vaccine distributed in the public sector to persons 15 years of age more than doubled between 1978 and 1986 (CDC, unpublished data). Among persons $\geqslant$ 20 years of age, there was a greater than 15-fold increase. In spite of the greater use of vaccine in this age group, only a small proportion of the susceptible groups have been vaccinated.

The success of the rubella control program is apparent:

. in the period 1979-1985, the reported incidence rates of CRS and of rubella among persons $\geqslant$ 15 years of age declined by approximately 96%, to all-time low levels

. because reported rubella cases are currently few in number, small year-to-year changes should be interpreted with caution.

. incidence rates of rubella in children 15 years of age have, however, continued their downward trend

. as the highly immune cohorts of young children enter the childbearing years, CRS can be expected to continue to decrease in this country.

Despite the success of the US rubella immunisation program, there is still cause for continuing concern:

. in 1986, 58% of reported rubella cases occurred among persons ⩾ 15 years of age (41% of all cases occurred in the 15- to 29-year age group)

. furthermore, with once exception, there is little evidence from serologic studies to show that rates of susceptibility to rubella among adults have declined appreciably since prevaccine years[4-6].

The New York City experience during 1985-1986 demonstrated that urban areas may be at highest risk because both identification and immunisation of susceptible young adults are particularly difficult in such settings. The continued occurrence of rubella in childbearing-aged populations means that potentially preventable cases of CRS will continue to occur during the next several years. Such concerns led the Centres for Disease Control to announce an initiative in February 1985 to hasten elimination of rubella and CRS by targeting susceptible childbearing-aged population for vaccination[7].

The reported figure for CRS cases is believed to underestimate the actual total:

. the Centers for Disease Control estimates of CRS are derived primarily from the NCRSR reporting system, which is a passive system. Passive surveillance, by its nature, results in under reporting of actual disease incidence and in selective reporting of severe and obvious CRS (eg. cardiac or eye defects) recognised early in life. Mild CRS cases (eg. mental or auditory effects) are often reported later, if at all

. infants with CRI and no obvious abnormalities at birth are also likely to be under reported:
  - 18 such infants have been reported to NCRSR since 1969[8]
  - these congenitally infected but apparently normal infants are also important because they reflect the failure to identify and to vaccinate susceptible women of childbearing age

. current CRS surveillance also does not measure other outcomes of CRI, such as miscarriages, induced abortions, or stillbirths. Because of the limitations of current CRS surveillance, it is important that all specialists who treat children with congenital anomalies continue to consider CRS in the differential diagnosis report all suspected cases to their state health departments. More intensified CRS surveillance will be necessary to monitor further reductions in morbidy.

As with other adult immunisations, creative approaches are necessary to enhance rubella immunisation levels in the childbearing-aged population

- aged population
- at present, 10 states still do not require proof of rubella immunity for postpubertal elementary and secondary school students. Since many susceptible persons are no longer in school, school laws alone are insufficient to ensure immunity
- only 9 states and the District of Columbia require proof of immunity for college entry. Requiring proof of immunity to rubella as a condition for college entry can minimise the risk of rubella outbreaks in this population [9].

One way to reach susceptible postpubertal women is to offer rubella vaccine at any encounter with the health-care system. This approach should include postpartum and postabortion vaccination and follow-up vaccination of susceptible individuals identified through pre-employment, premarital, or prenatal screening:

. the family planning clinic setting is an ideal place to offer vaccine and may represent one of the few contacts that hard-to-reach individuals have with the health-care delivery system

. an analysis of CRS surveillance indicates that one-third to one-half of mothers delivering CRS infants had had a previous live birth [10]

. postpartum vaccination would have prevented more than half of the CRS cases that occurred in New York City during 1986 [2].

These data suggest that postpartum vaccination and use of rubella vaccine in family planning clinic would have an important impact on the overall occurrence of reported CRS.

- because younger mothers of CRS infants (those 15 to 19 years of age) are less likely to have had a previous pregnancy, susceptible persons need to be identified and immunised in any of a variety of settings in school, at the workplace, or within the health-care system [10]

- school-base immunisation programs remain a potentially effective means of vaccinating younger susceptible women.

- physicians and other health-care personnel should offer rubella vaccine whenever they encounter a potentially susceptible woman lacking contraindications for vaccination.

Following a university-based rubella outbreak in 1985, investigators developed a method for quantitating missed opportunities for rubella vaccination [11]:

- a missed opportunity was defined as a situation in which either recommendations of the Immunisation Practices Advisory Committee or state recommendations of the Immunisation Practices Advisory Committee or state legislation called for rubella vaccination of an individual, but it did not occur;

- the investigators identified missed opportunities for rubella vaccination at the time of primary or secondary school entry, during the pospartum period, at college matriculation,and prior to employment in a health-care setting;

- analysis of missed opportunities identifies specific gaps in current rubella vaccination strategies that allow susceptible persons to remain at risk for disease. Such analysis can be applied to outbreak cases, sporadically occurring cases, and even to groups of susceptible adults without rubella illness;

- immunisation programs faced with limited resources can use the findings from such analysis to focus on gaps in implementation that are contributing the most to the problem.

Shortly after rubella vaccine licensure, concern about the vaccine's teratogenic potential hindered vaccination of childbearing-aged women. While no CRS-like defects have been detected in 267 infants born to susceptible mothers vaccinated during pregnancy[12], pregnancy remains a contraindication to rubella vaccination. However, routine pregnancy testing prior to vaccination is not recommended. After asking susceptible female patients if they are pregnant, practitioners should have no hesitation about giving non-pregnant women rubella vaccine.

Concerns about rubella vaccine-associated joint reactions have also impeded vaccination of susceptible adults:

- whereas mild, transient arthritis/arthralgia following vaccination is common, persistent or chronic arthritis/arthropathy is rare;

- the small risk of chronic joint symptoms should not interfere with the current strategy of vaccinating susceptible women[13,14];

- studies of large numbers of vaccines have found that vaccination of already immune persons (from either natural disease or vaccination) does not induce joint reactions[15,16]

Rubella control efforts in the USA have been very successful. Elimination of rubella and CRS is a more difficult task but appears feasible with intensification of efforts.

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5. Am J Dis Child 91969) 118: 107-11
6. Tex Med (1987) 83: 43-7
7. MMWR (1985) 34: 65-6
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10. Abstracts - 113th Meeting of Am Pub Health Assoc (1985)
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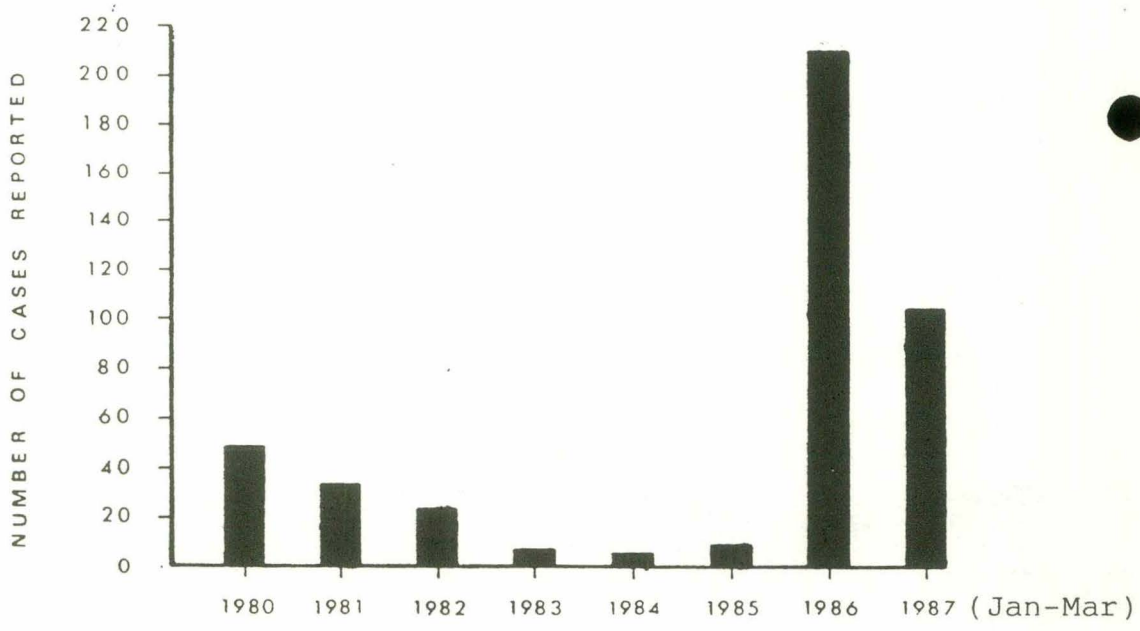
ONGOING EPIDEMIC OF RUBELLA - NEWFOUNDLAND AND LABRADOR (CANADA)
(based on CDWR Vol. 13-26, 4 July 1987)

The last epidemic of rubella in the province of Newfoundland and Labrador occurred in 1974-75; since then up to May 1986, the number of rubella notifications had been minimal ranging from less than 1 to 8 per 100 000 annually (provincial population 570 000) (Figure 1)

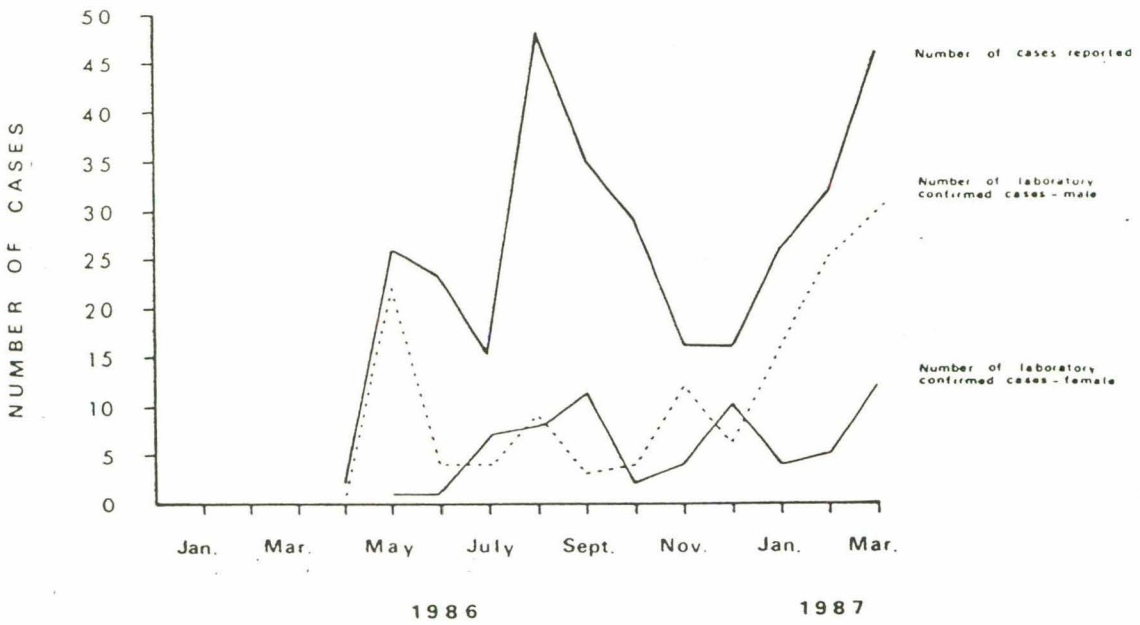
FIGURE 1. Reported Cases of Rubella, Newfoundland and Labrador, 1980-1987 (1st Quarter).



This low prevalence trend changed abruptly in May 1986 when 26 cases were reported in that month alone. Since then, the province has been experiencing a widespread and continuing epidemic of rubella. Up to the end of the first quarter of

this year, there have been over 300 cases reported and almost 66% of these have been laboratory confirmed (Figure 2), and new cases are continuing to be reported throughout the province.

FIGURE 2. Rubella Epidemic, Newfoundland and Labrador 1986-1987 (1st Quarter)



- the majority of those affected have been males (68%),
- more than one half of all the cases have been in the age group 15 to 19 years, and within this age group males have accounted for 82% (Table 1)

TABLE 1 Age and Sex-specific distribution of Laboratory-confirmed rubella cases, May 1986- March 1987, Newfoundland and Labrador*

Age Group	Number of positive cases					
	Male	(%)	Female	(%)	Total	(%)
10	1	11.1%	8	88.9%	9	4.5%
10-14	11	42.3%	15	57.7%	26	12.9%
15-19	95	81.9%	21	18.1%	116	57.7%
20-24	23	76.7%	7	23.3%	30	14.9%
25-29	2	25.0%	6	75.0%	8	4.0%
30-34	2	33.3%	4	66.7%	6	3.0%
35	2	33.3%	4	66.7%	6	3.0%
Total	136	67.7%	65	32.3%	201	100%

* Based on 201 laboratory-confirmed cases.
A much larger number of females than males was tested.

It is probable that the actual magnitude of the epidemic is greater than the routine notifications indicate.

A rubella vaccination program was instituted in Newfoundland in 1971, but until 1972, it was directed only to prebubertal girls. Since 1972, however, combined measles-mumps-rubella (MMR) vaccine has been given to all infants at 1 year of age. This adequately explains the present outbreak of rubella which has primarily affected young males in their mid-to-late teens who were not given the vaccine during the initial phase of the vaccination program and now constitute a large susceptible pool. There is no doubt that this population played a crucial role in the initial spread of the disease, and continues to sustain the epidemic to date.

Over 10 000 women are currently tested for rubella immune status annually in the province as part of an antenatal screening program.

A previous review of laboratory data on provincial rubella screening for the period 1976 to 1981 indicated that immunity in this population ranged from 88 to 94% with an average of 92%[1]. The present outbreak appears to indicate that a small susceptible female population still exists, including young females under the age of 19 years. These may well represent the small percentage of non-responders to the vaccine, since the vaccine is not considered to be 100% efficacious. The last cases of congenital rubella syndrome in the province were diagnosed in 1974, which may be proof that the antenatal screening program has been a success. However, it is not known how many pregnant women have been among those affected in the present epidemic of rubella.

REFERENCES

CDWR (1983) 9:161-63.

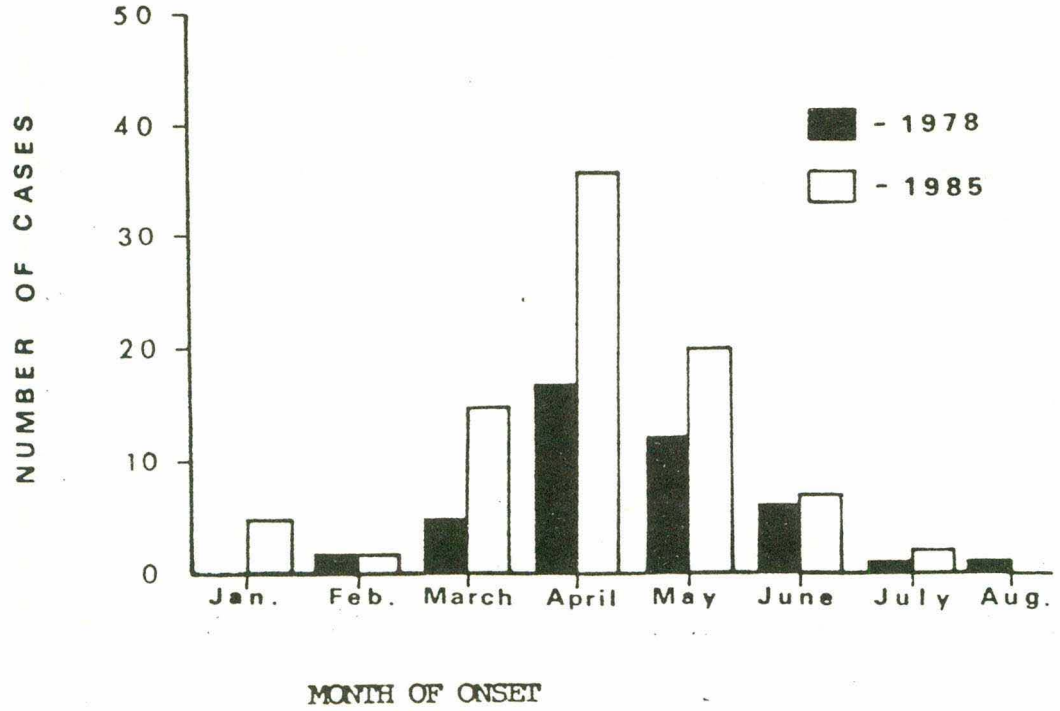
SEQUENTIAL RUBELLA OUTBREAKS IN HAMILTON, ONTARIO (CANADA)

(based on CDWR Vol. 13-29, 25 July 1987)

Outbreaks of rubella occurred in the Hamilton region during the spring of 1978 and 1985. A total of 138 cases were reported, 51 in 1978 and 87 in 1985.

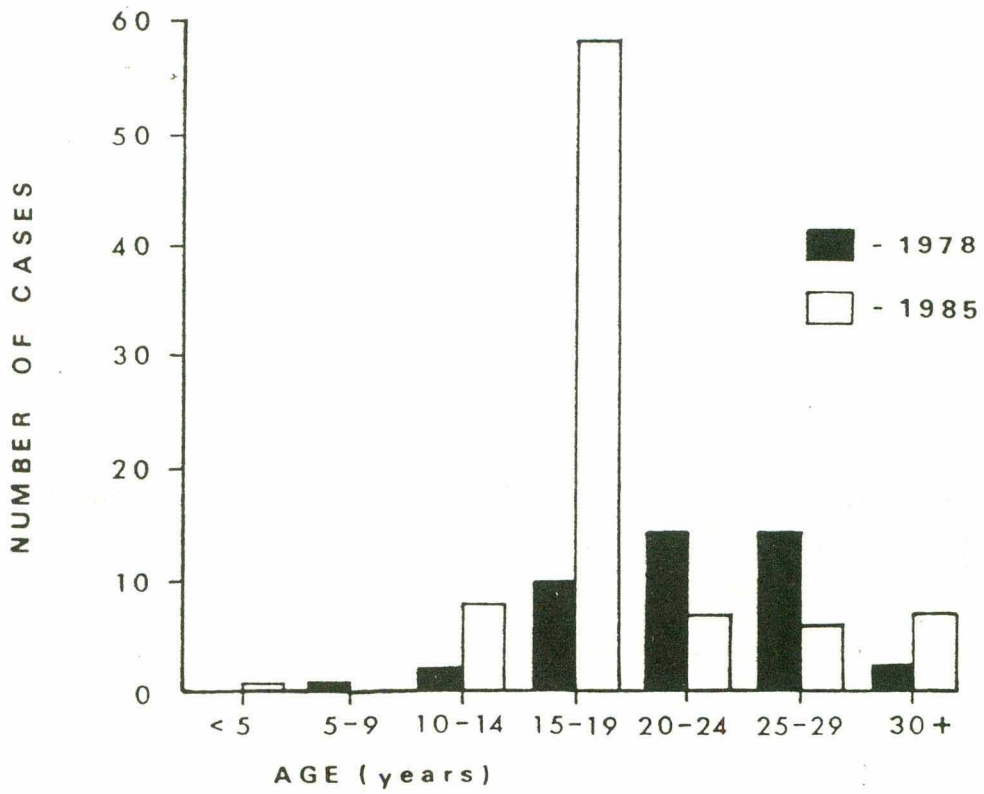
In 1978 the index case was diagnosed in February, the peak number of cases occurred in April, and the final case was detected in August (Figure 1).

FIGURE 1. Monthly distribution of rubella infections during 2 separate outbreaks in Hamilton, Ontario



The outbreak in 1985 also occurred in the spring and peaked in April with cases occurring from January to August. The age distribution of cases in both outbreaks is shown in Figure 2.

FIGURE 2. Age distribution of rubella cases for 2 separate outbreaks in Hamilton, Ontario



Most of the cases involved adolescents or young adults between the age of 15 and 25, and in 1985, 67% of the cases occurred in the 15-19 year old group. The majority of cases in 1978 were female (38 females and 13 males) while males and females were represented in approximately equal numbers in 1985 (45 males and 42 females).

Outbreaks were analysed by asking referring physicians of identified cases to provide patient data including date of onset, nature of acute illness, and rubella vaccination history. Information was obtained from physicians in:

. 42 of 51 cases in 1978, and
. 61 of 87 cases in 1985, or
. 103 of 138 cases for both outbreaks.
. in the 1978 outbreak
  - 38 of 42 patients had a rubelliform rash, and
  - the remaining 4 were detected through a rubella immunity screening program.
  - 29 had lymphadenopathy and 26 had symptoms of an upper respiratory tract infection.
  - joint pain was present in 14 and conjunctivitis in 9 cases.

. in the 1985 outbreak, 60 of the 61 patients had symptoms consistent with rubella infection and the distribution of symptoms was similar to that in the 1978 outbreak.

During the 2 outbreaks, a total of 16 pregnancies (10 in 1978 and 6 in 1985) were identified as being complicated by rubella infection:

. in 1978, 4 of the 10 cases had therapeutic abortions
  - 3 of the 4 cases did not exhibit strong clinical signs or symptoms of rubella but were identified as part of a prenatal screening program for measuring immunity to rubella,
  - 2 of the products of conception that were examined showed the presence of rubella virus.

. the 6 pregnancies in 1985 were continued to term, with delivery of normal infants. Maternal infection occurred after the first trimester in all 6 cases and available information suggests that all infants were healthy at birth. There has been no long-term follow-up of these children.

Although information regarding the source of infection was not available for the 1978 outbreak, a questionnaire was mailed to physicians of cases in 1985 and replies were received for 31 of the 87 cases:

. school was the source of infection in 21 (67%) of the 31 cases, with family, friends, and the workplace being identified for 5, 4 and 1 case, respectively.

Laboratory diagnosis of these 2 outbreaks differed somewhat because of changes in rubella serodiagnostic techniques:

. in 1978, 38 of 51 cases were initially detected by the presence of a rubelliform rash. All 51 cases were confirmed by a combination of specific rubella antibody testing, ie,
  - either a negative rubella passive haemagglutination (PHA) test result together with a positive haemagglutination inhibition (HI)

- or enzyme immunosorbent assay (ELISA) test (41 cases)
- or by a 4-fold increase in HI titre (all cases).
  . 10 sera were negative by PHA but positive by HI with titres ranging from 16 to 2048.
  . this combination of test results has been used by other laboratories to indicate recent rubella infection.
  . in addition, 36 out 40 tested were positive for rubella IgM antibody by sucrose density gradient fractionation of sera.

. in the 1985 outbreak, all patients were tested for rubella IgM antibody by the Rubazyme M test and infection was confirmed by the presence of specific rubella specific IgM in all 87 cases:
  - 41 cases in 1985 were also diagnosed by IgG seroconversion (ELISA); in 23 of these 41 patients, the acute serum collected up to 3 days after the onset of rash lacked rubella specific IgM antibody; however, all sera collected on the fourth day or later after onset of symptoms were positive for rubella IgM antibody (Table 1).

TABLE 1. Correlation of rubella IgM antibody positivity with time of serum collection following onset of symptoms for the 1985 rubella outbreak in Hamilton, Ontario.

Date after onset of symptoms	Number of sera tested	Number Positive	(%)
1	5	2	(40%)
1	23	9	(39%)
2	21	18	(86%)
3	13	10	(77%)
4	19	19	(100%)
Total	81	58	

Details of vaccination history as provided by the referring physician indicated a history of prior vaccination from only 8 of 103 cases (from both outbreaks for whom replies were received) and in only 4 of these was a date available. For the other 4, the referring physician used a history of previous vaccination, as given by the patient's mother but the date of vaccination could not be verified. Thus only 1 of 42 patients in 1978 and 7 of 61 in 1985 reported previous rubella immunisation.

Continued outbreaks of rubella such as those described here that occurred in Hamilton in 1978 and 1985 should remind us of the ever present possibility for new cases of congenital rubella syndrome (CRS):

- since rubella is now more common in adolescents and young adults than children and some cases may be subclinical, a serodiagnosis is vital when exposure to rubella occurs in early pregnancy.
- a combined PHA negative and ELISA/HI positive test result has been employed in the Hamilton area as a sentinel system to indicate rubella activity in the community and a rubella IgM (ELISA) antibody test has been used to confirm recent infections.
- the efficacy of this approach was apparent in the detection of 3 pregnancies which may have resulted in the birth of babies with CRS.
- results of rubella IgM antibody testing in pregnancy should be interpreted in light of the serum collection date since it has been shown here that IgM antibody response may not occur until 4 days from the onset of symptoms.

It appears that the major problem in rubella control is not vaccine failure but the presence of remaining susceptibles despite rubella immunisation programs.

- because rubella vaccine was not available in Ontario prior to 1970, the population group most affected in the recent outbreak, those aged 15 to 19, may have missed routine immunisation as infants and have not yet received vaccine as part of the mandated school immunisation program introduced in the province in 1982.
- The immunisation of School Pupils Act requires that Medical Officers of Health in the province's 43 health units maintain a record of immunisation for every pupil under the age of 18 years who attends either a publicy or privately funded school.
- those children whose records do not comply with the prescribed imunisation program, which includes diphtheria, tetanus, polio, measles, mumps and rubella, may be suspended from school if they have not been exempted from the Act for medical reasons or because of the religious beliefs of a parent.
- in addition, in the event of an outbreak of disease, those pupils who are exempt and non-immune may be excluded from school for the duration of the outbreak[1].

With full implementation of this Act, immunisation levels in the province for these diseases were over 95% in 1986. However, it appears that there still exists a small group of young women of childbearing age who are susceptible to rubella and the potential threat of CRS and vaccination awareness programs should be directed towards this group.

REFERENCE

1. CDWR (1985) 11:49-51

AUSTRALIA - COMMUNICABLE DISEASES INTELLIGENCE

REPORTING PERIOD - 19-10-87 to 1-11-87 BULLETIN NUMBER 87/22

VIRAL IDENTIFICATIONS FROM CONTRIBUTING LABORATORIES

VIRUS OR VIRAL ANTIGEN	ICPMR (NSW)/ WVH (ACT)	RAHC (NSW)	PHH/ POW (NSW)	FAIR-FIELD (VIC)	RCH (VIC)	IMVS (SA)	STATE LAB (QLD)	STATE LAB (WA)	Total
0100 ADENOVIRUS NOT TYPED		1			6		6		13
0101 ADENOVIRUS TYPE 1					6	1		2	9
0102 ADENOVIRUS TYPE 2				2	5	3		1	11
0103 ADENOVIRUS TYPE 3	1			3					4
0104 ADENOVIRUS TYPE 4					2				2
0105 ADENOVIRUS TYPE 5				3	1				4
0126 ADENOVIRUS TYPE 26	1								1
0199 ADENOVIRUS TYPING PENDING			5		5				10
0201 INFLUENZA A VIRUS			1	4	1	11	3	1	21
0202 INFLUENZA A VIRUS SUBTYPE H3N2				2	1	1			4
0203 INFLUENZA B VIRUS			4	2	4	22		4	36
0206 INFLUENZA A VIRUS SUBTYPE H1N1						3			3
0301 PARAINFLUENZA VIRUS TYPE 1				1			1		2
0303 PARAINFLUENZA VIRUS TYPE 3	1			5	3	10	5	5	29
0400 RESPIRATORY SYNCYTIAL VIRUS (RS)		2	2	6	9	1	12	3	35
0500 RHINOVIRUS (ALL TYPES)	1			3	11	3	8		26
0600 MYCOPLASMA PNEUMONIAE	6	2	1		2	7	37	8	63
0700 ORNITHOSIS-PSITTACOSIS	1					2			3
0810 COXSACKIEVIRUS A10				1					1
0816 COXSACKIEVIRUS A16	4	1							5
0902 COXSACKIEVIRUS B2					1				1
1005 ECHOVIRUS TYPE 5	1								1
1018 ECHOVIRUS TYPE 18					1			1	2
1022 ECHOVIRUS TYPE 22	1	2							3
1100 POLIOVIRUS NOT TYPED			1						1
1101 POLIOVIRUS TYPE 1	1			1				2	4
1200 MUMPS VIRUS					1		2	1	4
1300 HERPES VIRUS GROUP-NOT TYPED	2		1					2	5
1301 HERPES SIMPLEX VIRUS NOT-TYPED								2	2
1302 EPSTEIN-BARR VIRUS (EB VIRUS)	4					6	29	3	42
1303 VARICELLA-ZOSTER VIRUS	3		3	2		1	4	3	16
1306 HERPES SIMPLEX TYPE 1	55			31	18	11	39	21	175
1307 HERPES SIMPLEX TYPE 2	153			66		18	68	41	346
1399 HERPES VIRUS TYPING PENDING					3				3
1401 COXIELLA BURNETI	4					2	38		44
1502 PICORNA VIRUS-NOT TYPED			4				7		11
1521 MEASLES VIRUS	1						1		2
1522 RUBELLA VIRUS	2		3			2	15		22
1532 HEPATITIS B ANTIGEN	53		3	38		7	20	18	139
1535 HEPATITIS A ANTIBODY	4					7	2	3	16
1541 CHLAMYDIA A - C TRACHOMATIS	14		1			35	22	45	117
1556 CMV - CYTOMEGALOVIRUS	7	1	5	9	1	7	36	22	88
1563 CORONAVIRUS								1	1
1564 ROTAVIRUS	16	3	4	2	17	14	5	5	66
1565 CALICI VIRUS	1								1
1599 ENTEROVIRUS TYPING PENDING			5		4				9
9992 ROSS RIVER VIRUS							6		6
9993 ASTROVIRUS	1								1
9994 SMALL VIRUS (LIKE) PARTICLE	2	4							6
9995 DENGUE							2		2
9998 ARBO. GROUP B.							2		2
Total	340	16	43	181	102	174	370	194	1,420

AUSTRALIA - COMMUNICABLE DISEASES INTELLIGENCE

PERIOD :19-10-87 to 1-11-87 BULLETIN NO 87/22

Viral Identifications by Clinical Information Table 1.
Code 00,99 -No ill or data; 01,02,11,12 -Respiratory; E3 -Encephalitis; M3 -Meningitis; 04 -Paralysis; 05,13 -CNS other unspec.; 07,49 -GI; 17,47 -Hepatic; 19 -CVS; 89 -Urinary; 06 -Skin/mucous.

VIRUS OR VIRAL ANTIGEN	No-ill or data	Respir atory	Enceph alitis	Mening -itis	Para- lysis	CNS other unspec	GI	Hepa -tic	CVS	Urin -ary	Skin/ mucs memb
0101 ADENOVIRUS TYPE 1.....		7					1				
0102 ADENOVIRUS TYPE 2.....		7									1
0103 ADENOVIRUS TYPE 3.....		2					1				
0104 ADENOVIRUS TYPE 4.....		1					1				
0105 ADENOVIRUS TYPE 5.....		3									
0201 INFLUENZA A VIRUS.....		17					1				
0202 INFLUENZA A VIRUS SUBTYPE H3N2		4									
0203 INFLUENZA B VIRUS.....	3	27				1					2
0206 INFLUENZA A VIRUS SUBTYPE H1N1		2									
0301 PARAINFLUENZA VIRUS TYPE 1....		2									
0303 PARAINFLUENZA VIRUS TYPE 3....		25					2				
0400 RESPIRATORY SYNCYTIAL VIRUS (RS).....	1	32									
0500 RHINOVIRUS (ALL TYPES).....		1									
0600 MYCOPLASMA PNEUMONIAE.....	1	59									
0700 ORNITHOSIS-PSITTACOSIS.....		3									
0810 COXSACKIEVIRUS A10.....											1
0816 COXSACKIEVIRUS A16.....											5
0902 COXSACKIEVIRUS B2.....				1							
1005 ECHOVIRUS TYPE 5.....				1							
1018 ECHOVIRUS TYPE 18.....				1							
1022 ECHOVIRUS TYPE 22.....		2									1
1101 POLIOVIRUS TYPE 1.....		1				1	1				
1200 MUMPS VIRUS.....	1										
1300 HERPES VIRUS GROUP-NOT TYPED..											1
1301 HERPES SIMPLEX VIRUS NOT-TYPED	1			1							
1302 EPSTEIN-BARR VIRUS (EB VIRUS).	7	9	1								4
1303 VARICELLA-ZOSTER VIRUS.....		1	1	4		2					10
1306 HERPES SIMPLEX TYPE 1.....	10	10									95
1307 HERPES SIMPLEX TYPE 2.....	16	1	1			1				1	93
1401 COXIELLA BURNETI.....	7	11									3
1521 MEASLES VIRUS.....		1									1
1522 RUBELLA VIRUS.....	2	2	1					1			14
1532 HEPATITIS B ANTIGEN.....	38	2						95			1
1535 HEPATITIS A ANTIBODY.....	2							10			
1541 CHLAMYDIA A - C.TRACHOMATIS...	5										1
1556 CMV - CYTOMEGALOVIRUS.....	12	23		1		1	1	5	1		1
1563 CORONAVIRUS.....		1									
1564 ROTAVIRUS.....							64				
1565 CALICI VIRUS.....	1										
9992 ROSS RIVER VIRUS.....	2	2									1
9993 ASTROVIRUS.....							1				
9994 SMALL VIRUS (LIKE) PARTICLE...							6				
9995 DENGUE.....	2										
Total.....	111	258	4	9		6	79	111	1	1	235

AUSTRALIA - COMMUNICABLE DISEASES INTELLIGENCE

PERIOD : 19-10-87 to 1-11-87 BULLETIN NO 87/22

Viral Identifications by Clinical Information Table 2.
Code 10 -Eye; 59 -Genital; 39 -Endo/sal gland;
38 -RES; 29 -Muscle/joint; 69 -Congenital; P8 -PUO;
G8 -Fever/malaise; 09 -Other; A1 -SIDS ...

VIRUS OR VIRAL ANTIGEN	Eye	Genital	Endo/sal gland	RES	Muscle/joint	Congenital	PUO	Fever/malaise	Other	SIDS
0101 ADENOVIRUS TYPE 1.....										1
0102 ADENOVIRUS TYPE 2.....							1	1	2	
0103 ADENOVIRUS TYPE 3.....	2									
0105 ADENOVIRUS TYPE 5.....									1	
0126 ADENOVIRUS TYPE 26.....									1	
0201 INFLUENZA A VIRUS.....					1		1	5	1	
0202 INFLUENZA A VIRUS SUBTYPE H3N2							1	1		
0203 INFLUENZA B VIRUS.....							3	7		
0206 INFLUENZA A VIRUS SUBTYPE H1N1							2			
0301 PARAINFLUENZA VIRUS TYPE 1....								1		
0303 PARAINFLUENZA VIRUS TYPE 3....								3		
0400 RESPIRATORY SYNCYTIAL VIRUS (RS).....								9		
0600 MYCOPLASMA PNEUMONIAE.....	1				2			23	3	
1018 ECHOVIRUS TYPE 18.....							1			
1101 POLIOVIRUS TYPE 1.....	1									
1302 EPSTEIN-BARR VIRUS (EB VIRUS).			9		2			19	6	
1303 VARICELLA-ZOSTER VIRUS.....			1			1		1	1	
1306 HERPES SIMPLEX TYPE 1.....	6	55						2	1	
1307 HERPES SIMPLEX TYPE 2.....		231						1	3	
1401 COXIELLA BURNETI.....			2		6		3	23	4	
1522 RUBELLA VIRUS.....			3	1	4	1		1	1	
1532 HEPATITIS B ANTIGEN.....								2	1	
1535 HEPATITIS A ANTIBODY.....									4	
1541 CHLAMYDIA A - C.TRACHOMATIS...	1	110						1		
1556 CMV - CYTOMEGALOVIRUS.....		3	6	3	1	8	2	16	15	
1564 ROTAVIRUS.....		1								1
9992 ROSS RIVER VIRUS.....					1			1		
9998 ARBO. GROUP B.					2			1		
Total.....	11	400	21	4	19	10	14	118	44	2