

RUBELLA IMMUNISATION SURVEY
AUSTRALIA

NEW ISSUE

MARCH 1983

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MAIN FEATURES

See paragraphs 8 and 12 of the Explanatory notes for information regarding the school immunisation programme which should be considered in the interpretation of results of this survey.

At March 1983, 1,726,600 (69.5 per cent) of the Australian female population aged 15 to 34 years had obtained immunisation against Rubella. 585,900 (23.6 per cent) had not received any immunisation against Rubella. The remaining 171,100 (6.9 per cent) did not know whether they had or had not been immunised against Rubella.

The percentage of females immunised is highest among the younger age groups in the survey, being 86.9 per cent for those aged 15 to 19 years, and decreasing to 46.0 per cent for those aged 30 to 34 years. This trend with age probably reflects the introduction of the school Rubella immunisation programme around 1970-71.

72.8 per cent of Australian born females aged 15 to 34 years reported being immunised against Rubella compared with 56.7 per cent of those in that same age group who were born overseas.

The most frequently reported reason for not obtaining immunisation was that they had 'had Rubella'. This was the reason given by 32.1 per cent of females aged 15 to 34 years who had not received the vaccination. Another 28.4 per cent were reported as having 'never bothered or thought about it'.

For females aged 15 to 29 years who had been immunised against Rubella, most reported having received immunisation at 'school'. Most females in the 30 to 34 year age group gave 'doctor's surgery' as the place where immunisation was received.

EXPLANATORY NOTES

Introduction

In the two weeks commencing 7 March 1983 a survey was conducted throughout Australia to obtain information about the immunisation status of females aged 15 to 34 years in relation to Rubella vaccinations.

Coverage

2. The survey was conducted as part of the regular population survey, which is based on a multi-stage area sample of private dwellings (about 30,000 houses, flats, etc.) and covers about two-thirds of one per cent of the population of Australia.

Scope

3. The survey included all females aged 15 to 34 years, except:

- (a) members of the permanent defence forces;
- (b) certain diplomatic personnel of overseas governments, customarily excluded from census and estimated populations;

- (c) overseas visitors holidaying in Australia;
- (d) members of non-Australian defence forces (and their dependants) stationed in Australia;
- (e) all persons in non-private dwellings (hotels, motels, hospitals, etc.);
- (f) visitors to private dwellings; and
- (g) persons staying at caravan parks.

Survey method

4. Immunisation questions were asked about females aged 15 to 34 years. Where a person was not available for interview, another responsible adult was asked to answer on her behalf.

Definitions

5. *Rubella immunisation*—injection given for the purpose of achieving immunity against Rubella (German Measles). In this survey, information from respondents was not necessarily verified by reference to any vaccination records.

6. *Dependent children*—children 0 to 14 years plus unmarried full-time students between 15 and 25 years of age without dependents of their own and who are living with their parents.

7. *Centre of immunisation*—refers to the place where the respondents reported having received the Rubella immunisation. In cases where respondents reported receiving more than one immunisation the centre reported refers to the place of the most recent immunisation.

8. *Rubella immunisation programme*—the Rubella immunisation programme was introduced throughout Australia during 1970-1971. During the first year of the programme all girls aged 12 to 14 years were vaccinated at school. Since then most State health authorities have conducted the programme annually, immunising all girls in a particular year at high school.

9. Information on the subject of Rubella, including the relationship with congenital abnormality is provided in Appendix I.

Reliability of the estimates

10. Since the estimates are based on a sample, they are subject to sampling variability (see Appendix II for further details). Some figures in this publication are replaced by the symbol *. These have a relative standard error greater than 30 per cent, which is considered too high for the estimate to be used for most practical purposes.

11. In addition to sampling errors, the estimates are subject to non-sampling errors. These may be caused by errors in reporting (e.g. because some answers were based on memory, or because of misunderstanding or unwillingness of respondents to reveal all details) or errors arising during processing (e.g. coding, data recording). Such errors may occur in any statistical collection whether it is a full census count or a sample survey. Every

effort is made to reduce non-sampling errors in the survey to a minimum by careful design and testing of questionnaires, by intensive training and supervision of interviewers, and by efficient operating procedures.

Interpretation of results

12. Consideration should be given to the effect on the results of this survey, particularly in relation to age groups, of the Rubella immunisation programme described in paragraph 8. As the programme commenced in 1970-71 most females under 25 years of age would have had the opportunity to receive the vaccination while attending school. Of those aged 25 to 29 years, only some would have had the same opportunity, while those aged 30 to 34 years would probably not have been covered by the programme.

Related publications

13. Another ABS publication which may be of interest is *Perinatal Deaths, Australia, 1981* (3304.0)

14. Current publications produced by the ABS are listed in the *Catalogue of Publications, Australia* (1101.0). The ABS also issues, on Tuesdays and Fridays, a *Publications Advice* (1105.0) which lists publications to be released in the next few days. The Catalogue and Publications Advice are available from any ABS office.

Symbols and other usages

- .. not applicable
- * subject to sampling variability too high for most practical purposes. (See paragraph 10)

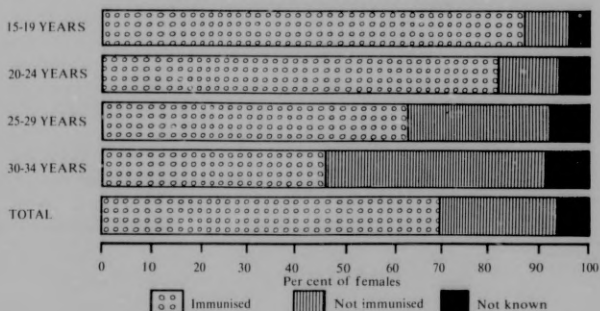
15. Where figures have been rounded, discrepancies may occur between sums of the component items and totals. Published percentages are calculated prior to rounding of figures and therefore some discrepancy may exist between these percentages and those that could be calculated from the rounded figures.

R. J. CAMERON
Australian Statistician

RUBELLA IMMUNISATION SURVEY, MARCH 1983
TABLE 1. FEMALES AGED 15 TO 34 YEARS: IMMUNISATION STATUS, BY AGE

Immunisation status	Age (years)				Total
	15-19	20-24	25-29	30-34	
'000 FEMALES					
Immunised					
at school	473.5	419.7	180.5	51.2	1,124.9
not at school	59.5	109.7	206.0	226.6	601.7
Total immunised	533.0	529.3	386.5	277.8	1,726.6
Not immunised	54.2	76.8	180.7	274.2	585.9
Not known	26.3	42.0	50.6	52.3	171.1
Total	613.5	648.1	617.7	604.3	2,483.6
PERCENTAGE					
Immunised	86.9	81.7	62.6	46.0	69.5
Not immunised	8.8	11.8	29.2	45.4	23.6
Not known	4.3	6.5	8.2	8.7	6.9
Total	100.0	100.0	100.0	100.0	100.0

CHART A. FEMALES AGED 15 TO 34 YEARS : IMMUNISATION STATUS BY AGE



RUBELLA IMMUNISATION SURVEY, MARCH 1983
TABLE 2. FEMALES AGED 15 TO 34 YEARS: IMMUNISATION STATUS, BY
AGE AND STATE OF RESIDENCE

('000)									
Age (years)	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Australia
IMMUNISED									
15-19	181.1	147.8	84.5	45.3	47.5	15.3	3.4	8.1	533.0
20-24	184.7	139.3	85.0	48.2	45.2	14.6	4.6	7.8	529.3
25-29	130.9	109.5	65.5	31.7	28.4	9.9	3.9	6.7	386.5
30-34	92.6	84.7	46.5	18.9	20.9	5.6	2.9	5.6	277.8
Total	589.2	481.3	281.5	144.2	142.1	45.4	14.8	28.2	1,726.6
Per cent	69.6	72.9	71.3	66.6	62.9	62.0	59.1	67.2	69.5
NOT IMMUNISED									
15-19	16.6	11.3	10.4	5.2	6.0	2.1	*	1.9	54.2
20-24	21.7	21.0	14.9	6.1	8.5	3.5	*	*	76.8
25-29	60.0	42.8	24.7	17.5	23.4	6.9	2.4	3.0	180.7
30-34	99.8	62.9	41.3	25.9	27.8	9.3	1.8	5.4	274.2
Total	198.1	138.0	91.2	54.7	65.6	21.8	5.5	11.0	585.9
Per cent	23.4	20.9	23.1	25.3	29.0	29.8	21.9	26.3	23.6
NOT KNOWN									
15-19	9.2	6.5	3.8	2.8	2.1	*	*	*	26.3
20-24	14.7	10.6	5.2	3.5	4.1	2.1	*	*	42.0
25-29	18.5	11.7	7.0	4.6	5.5	1.3	*	*	50.6
30-34	16.5	12.0	6.0	6.7	6.6	2.0	1.8	*	52.3
Total	59.0	40.7	22.0	17.6	18.3	6.0	4.8	2.7	171.1
Per cent	7.0	6.2	5.6	8.1	8.1	8.2	19.1	6.5	6.9
TOTAL									
15-19	206.9	165.5	98.6	53.3	55.5	18.1	5.3	10.1	613.5
20-24	221.1	170.9	105.0	57.8	57.8	20.1	5.9	9.5	648.1
25-29	209.4	163.9	97.3	53.8	57.3	18.1	7.2	10.6	617.7
30-34	208.9	159.6	93.7	51.5	55.4	17.0	6.5	11.7	604.3
Total	846.3	660.0	394.7	216.4	226.0	73.3	25.0	41.9	2,483.6
Per cent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 3. FEMALES AGED 15 TO 34 YEARS: IMMUNISATION STATUS BY
PERIOD OF RESIDENCE IN AUSTRALIA
('000)

Immunisation status	Period of residence in Australia								Total
	Less than 5 years	5-10 years	More than 10 years	Total born overseas		Born in Australia			
				Number	Per cent	Number	Per cent		
Immunised	49.2	59.2	180.2	288.6	56.7	1,438.0	72.8	1,726.6	
Not immunised	53.2	37.1	78.5	168.8	33.1	417.1	21.1	585.9	
Not known	14.9	12.5	24.6	52.0	10.2	119.1	6.0	171.1	
Total	117.3	108.8	283.3	509.4	100.0	1,974.2	100.0	2,483.6	

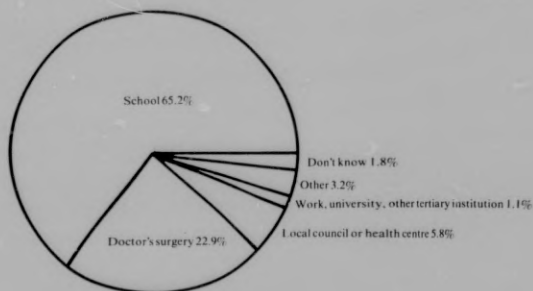
RUBELLA IMMUNISATION SURVEY, MARCH 1983
 TABLE 4. FEMALES AGED 15 TO 34 YEARS: IMMUNISATION STATUS, BY AGE,
 BY MARITAL STATUS AND WHETHER FEMALE HAS DEPENDENT CHILDREN
 ('000)

Marital and immunisation status	Age (years)				Total	
	15-19	20-24	25-29	30-34	Number	Per cent
WITHOUT DEPENDENT CHILDREN						
Married or have been married						
Immunised	13.7	130.0	97.1	36.6	277.4	68.1
Not immunised	*	15.7	43.4	32.9	94.2	23.1
Not known	*	11.0	14.8	9.1	35.6	8.7
Total	16.7	156.7	155.3	78.5	407.2	100.0
Never married						
Immunised	502.9	273.7	58.4	18.5	853.5	80.2
Not immunised	50.2	39.2	31.0	22.1	142.6	13.4
Not known	24.1	23.7	13.6	7.1	68.5	6.4
Total	577.2	336.6	103.0	47.7	1,064.5	100.0
Total						
Immunised	516.6	403.7	155.5	55.1	1,130.9	76.8
Not immunised	52.5	54.9	74.4	55.0	236.7	16.1
Not known	24.9	34.7	28.3	16.2	104.1	7.1
Total	593.9	493.3	258.3	126.3	1,471.8	100.0
WITH DEPENDENT CHILDREN						
Married or have been married						
Immunised	8.2	109.7	223.0	221.6	562.4	58.4
Not immunised	*	17.8	102.6	215.9	337.9	35.1
Not known	*	6.1	21.3	34.8	62.7	6.5
Total	10.3	133.6	346.8	472.2	963.0	100.0
Never married						
Immunised	8.2	15.9	8.0	*	33.3	68.1
Not immunised	*	4.1	3.7	3.3	11.3	23.1
Not known	*	*	*	*	4.3	8.9
Total	9.3	21.2	12.6	5.8	48.9	100.0
Total						
Immunised	16.4	125.6	231.0	222.7	595.7	58.9
Not immunised	*	21.9	106.3	219.2	349.2	34.5
Not known	*	7.2	22.2	36.1	67.0	6.6
Total	19.6	154.8	359.4	478.1	1,011.9	100.0
TOTAL						
Married or have been married						
Immunised	21.9	239.7	320.1	258.2	839.8	61.3
Not immunised	3.8	33.5	146.0	248.7	432.1	31.5
Not known	*	17.0	36.1	43.9	98.3	7.2
Total	27.0	290.3	502.1	550.8	1,370.2	100.0
Never married						
Immunised	511.1	289.6	66.4	25.5	886.8	79.6
Not immunised	50.4	43.2	34.7	25.5	153.8	13.8
Not known	24.9	24.9	14.5	8.5	72.8	6.5
Total	586.5	357.8	115.6	53.6	1,113.5	100.0
Total						
Immunised	533.0	529.3	386.5	277.8	1,726.6	69.5
Not immunised	54.2	76.8	180.7	274.2	585.9	23.6
Not known	26.3	42.0	50.6	52.3	171.1	6.9
Total	613.5	648.1	617.7	604.3	2,483.6	100.0

RUBELLA IMMUNISATION SURVEY, MARCH 1983
TABLE 5. FEMALES AGED 15 TO 34 YEARS WHO WERE IMMUNISED:
CENTRE WHERE IMMUNISATION RECEIVED, BY AGE

Centre of immunisation	Age (years)				Total
	15-19	20-24	25-29	30-34	
'000 FEMALES					
School	473.5	419.7	180.5	51.2	1,124.9
Doctor's surgery	29.4	65.1	137.6	163.6	395.7
Local council or health centre	22.6	26.8	27.6	23.7	100.7
Work, university, other tertiary inst.	*	3.3	8.3	6.3	19.3
Other	2.5	7.1	22.6	23.1	55.3
Don't know	3.4	7.4	9.9	9.9	30.7
Total immunised	533.0	529.3	386.5	277.8	1,726.6
PERCENTAGE					
School	88.8	79.3	46.7	18.4	65.2
Doctor's surgery	5.5	12.3	35.6	58.9	22.9
Local council or health centre	4.2	5.1	7.1	8.5	5.8
Work, university, other tertiary inst.	*	0.6	2.1	2.3	1.1
Other	0.5	1.3	5.8	8.3	3.2
Don't know	0.6	1.4	2.6	3.5	1.8
Total immunised	100.0	100.0	100.0	100.0	100.0

CHART B. FEMALES AGED 15 TO 34 YEARS : CENTRE WHERE FEMALES WERE IMMUNISED



RUBELLA IMMUNISATION SURVEY, MARCH 1983
TABLE 6. FEMALES AGED 15 TO 34 YEARS WHO WERE IMMUNISED: CENTRE WHERE
IMMUNISATION RECEIVED, BY STATE OF RESIDENCE

<i>Centre of immunisation</i>	<i>N.S.W.</i>	<i>Vic.</i>	<i>Qld</i>	<i>S.A.</i>	<i>W.A.</i>	<i>Tas.</i>	<i>N.T.</i>	<i>A.C.T.</i>	<i>Australia</i>
'000 FEMALES									
School	402.2	303.4	159.2	103.5	98.0	32.0	9.7	16.9	1,124.9
Doctor's surgery	125.0	118.8	76.3	24.9	32.0	9.4	2.2	6.9	395.7
Local council or health centre	22.0	30.3	28.8	7.3	5.2	2.4	2.1	2.7	100.7
Work, university, other tertiary inst.	4.0	9.1	2.4	2.5	*	*	*	*	19.3
Other	26.0	11.2	8.8	3.5	3.8	0.8	*	*	55.3
Don't know	10.0	8.4	5.9	2.5	2.2	*	*	*	30.7
Total immunised	589.2	481.3	281.5	144.2	142.1	45.4	14.8	28.2	1,726.6
PERCENTAGE									
School	68.3	63.0	56.6	71.8	68.9	70.4	65.9	60.1	65.2
Doctor's surgery	21.2	24.7	27.1	17.3	22.5	20.7	15.2	24.6	22.9
Local council or health centre	3.7	6.3	10.2	5.1	3.7	5.3	14.1	9.5	5.8
Work, university, other tertiary inst.	0.7	1.9	0.9	1.7	*	*	*	*	1.1
Other	4.4	2.3	3.1	2.4	2.7	1.7	*	*	3.2
Don't know	1.7	1.7	2.1	1.8	1.6	*	*	*	1.8
Total immunised	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 7. FEMALES AGED 15 TO 34 YEARS WHO WERE NOT IMMUNISED:
REASONS IMMUNISATION WAS NOT OBTAINED, BY AGE

Reason not immunised	Age (years)				Total
	15-19	20-24	25-29	30-34	
'000 FEMALES					
Had Rubella	12.9	16.3	55.7	102.9	187.8
Blood test showed immunity	*	4.6	31.6	49.5	87.3
Don't want or can't have children	*	*	*	5.6	8.0
Absent when given at school	8.1	7.6	4.4	*	20.7
Never bothered or thought about it	13.0	26.7	52.7	74.0	166.4
Other	12.2	14.0	20.4	25.5	72.1
Don't know	6.3	7.0	14.2	16.1	43.6
Total not immunised	54.2	76.8	180.7	274.2	585.9
PERCENTAGE					
Had Rubella	23.8	21.3	30.8	37.5	32.1
Blood test showed immunity	*	6.0	17.5	18.1	14.9
Don't want or can't have children	*	*	*	2.0	1.4
Absent when given at school	15.0	9.9	2.4	*	3.5
Never bothered or thought about it	24.0	34.8	29.2	27.0	28.4
Other	22.4	18.2	11.3	9.3	12.7
Don't know	11.6	9.1	7.8	5.9	7.4
Total not immunised	100.0	100.0	100.0	100.0	100.0

RUBELLA IMMUNISATION SURVEY, MARCH 1983

CHART C. FEMALES AGED 15 TO 34 YEARS : REASONS FOR NOT OBTAINING IMMUNISATION

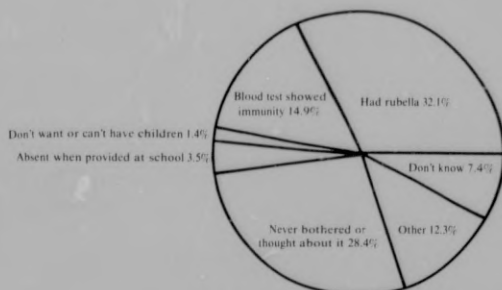


TABLE 8. FEMALES AGED 15 TO 34 YEARS WHO WERE NOT IMMUNISED: REASON IMMUNISATION WAS NOT OBTAINED, BY STATE OF RESIDENCE

Reason not immunised	N.S.W.	Vic.	Qld	S.A.	W.A.	Tas.	N.T.	A.C.T.	Australia
'000 FEMALES									
Had Rubella	56.1	38.9	30.6	21.9	25.4	8.0	2.6	4.3	187.8
Blood test showed immunity	33.8	23.5	10.0	6.3	8.5	2.3	*	2.3	87.3
Don't want or can't have children	*	2.9	*	*	*	*	*	*	8.0
Absent when given at school	6.3	3.9	5.0	1.4	3.0	*	*	*	20.7
Never bothered or thought about it	57.7	38.5	27.4	15.0	16.9	7.8	*	2.4	166.4
Other	25.1	17.4	12.0	6.5	7.5	1.9	*	*	72.1
Don't know	16.9	12.9	5.0	2.9	3.8	1.1	*	*	43.6
Total not immunised	198.1	138.0	91.2	54.7	65.6	21.8	5.5	11.0	585.9
PERCENTAGE									
Had Rubella	28.3	28.2	33.6	40.0	38.7	36.6	46.9	38.9	32.1
Blood test showed immunity	17.1	17.0	10.9	11.6	13.0	10.3	*	20.5	14.9
Don't want or can't have children	*	2.1	*	*	*	*	*	*	1.4
Absent when given at school	3.2	2.8	5.5	2.6	4.6	*	*	*	3.5
Never bothered or thought about it	29.1	27.9	30.1	27.4	25.7	35.9	*	21.7	28.4
Other	12.7	12.6	13.1	11.9	11.5	8.7	*	*	12.3
Don't know	8.5	9.3	5.5	5.3	5.8	5.0	*	*	7.4
Total not immunised	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 9. FEMALES AGED 15 TO 34 YEARS WHO WERE NOT IMMUNISED: REASONS IMMUNISATION WAS NOT OBTAINED, BY PERIOD OF RESIDENCE IN AUSTRALIA ('000)

Reason not immunised	Period of residence in Australia						Total born overseas		Born in Australia		Total
	Less than 5 years	5-10 years	More than 10 years	Total born overseas		Born in Australia					
				Number	Per cent	Number	Per cent				
Had Rubella	9.3	8.4	22.8	40.5	24.0	147.3	35.3	187.8			
Blood test showed immunity	2.9	3.7	13.1	19.6	11.6	67.7	16.2	87.3			
Don't want or can't have children	*	*	*	2.5	1.5	5.5	1.3	8.0			
Absent when given at school	*	*	*	2.5	1.5	18.2	4.4	20.7			
Never bothered or thought about it	20.4	10.4	23.5	54.3	32.2	112.1	26.9	166.4			
Other	13.6	6.6	9.3	29.4	17.4	42.6	10.2	72.1			
Don't know	6.1	6.9	6.9	20.0	11.8	23.6	5.7	43.6			
Total not immunised	53.2	37.1	78.5	168.8	100.0	417.1	100.0	585.9			

APPENDIX I

The following information has been supplied by the Commonwealth Department of Health

1. Background of Rubella

(a) History

For many centuries rubella was undoubtedly confused with measles and scarlet fever. Rubella has also been known as German measles, French measles and 3-day measles. The first accurate description of rubella is attributed to Hoffman (1740). Hiro and Tasaka (1938) established the viral nature of the disease by transmission of rubella to susceptible children by using filtered throat washings of patients.

In the Reports on Australian Censuses of 1911, 1921 and 1933, the Commonwealth Statistician had noted the extraordinary concentration of deaf-mutes in certain age-groups. An epidemiologist, H.O. Lancaster (School of Public Health and Tropical Medicine, Sydney), was later able to demonstrate the correlation between the concentration of deaf-mutes in specific age-groups and rubella epidemics. However, it was the Australian, Sir Norman Gregg (1941) who was the first to describe congenital defects in infants of mothers who had acquired rubella early in pregnancy.

(b) Explanation of rubella

(i) *What is it?* Rubella is a mild, infectious, and highly communicable disease — caused by a virus.

(ii) *Is it Contagious?* Rubella is highly contagious and occurs sporadically or in epidemics (major epidemics occur from 5 to 9 years apart). The infection appears primarily in children although adults are also susceptible to it.

The period of infectiousness in acquired rubella is believed to be of short duration — from 1 week prior to the rash to about 5 days thereafter. It is clear however that patients who do not develop a rash with rubella infection are also infectious. Infants with congenital rubella must also be considered as a source of infection.

(iii) *How is it transmitted?* By droplet infection — uncovered coughs and sneezes. By direct contact — kissing, etc. By articles freshly contaminated by the virus — handkerchiefs, etc.

(iv) *What are the symptoms?* The incubation period of acquired rubella is 14 to 21 days, with an average of 17 days. Often the rash

heralds the illness, but a 1 to 2 day prodrome (early manifestation of the impending disease) is usual. In such cases the disease is gradual in onset with mild upper respiratory tract symptoms and slight fever.

The rash generally appears within 2 days of onset of the disease and lasts only for 1-2 days. It first appears behind the ears and on the forehead, spreading to the face, trunk and limbs on the following day, the rash of the previous day having nearly faded. It consists of discrete pink spots which are most profuse on the trunk where they may join together. The characteristic feature of the disease is the enlarged lymph glands at the back of the neck and head which may be tender and painful.

In children, the clinical course is frequently mild. Adults may have a more severe course with a longer prodrome and more extensive rash. Painful and inflamed joints are especially common in females.

Complications are infrequent in acquired rubella. The most serious, encephalitis (inflammation of the brain), is uncommon.

(v) *How is it treated?* No specific treatment is required and drugs are rarely indicated in this mild illness.

2. Dangers of Rubella to the Unborn Child (Congenital Rubella)

Since the original reports of Gregg, it has been recognised that maternal rubella acquired in the first three months of pregnancy frequently results in foetal malformations such as congenital cataracts, congenital heart disease, deafness, microcephaly, (condition characterised by a small head), and mental retardation. A wide spectrum of involvement has been noted among individual infants with congenital rubella; some infants are born with nearly all the recognised lesions, whereas others show no detectable abnormalities at birth. Some infants, apparently normal during the newborn period, will only later show signs of congenital rubella infection.

The congenital malformations following maternal rubella appear to be a direct consequence of viral infection of developing tissue of the placenta and embryo. It is clear that if foetal infection occurs, it almost invariably produces clinical abnormalities.

3. Prevention and importance of prevention

To prevent infection in pregnancy two options have been considered: either to eliminate rubella from the community or to ensure that women of child bearing age are immune to rubella due to previous infection or vaccination. Australia has adopted the latter approach.

In 1970, Cendevax rubella vaccine, which contains the Cendehill strain of live rubella virus, was licensed for use in Australia, and extensive programmes of use followed, particularly with females in the 12 to 14 years age group.

The National Health and Medical Research Council has recommended certain procedures for immunisation. The following are relevant extracts from their publication 'immunisation procedures'—

'Rubella

Unlike many other vaccines which are designed to prevent or ameliorate severe disease in the vaccinee, the aim of rubella vaccination is to ensure the immunity of women of child-bearing age in order to protect foetuses from rubella damage in utero.

Optimum age

Whilst the vaccine has been shown to evoke an antibody response lasting for a number of years, the exact duration of immunity will only be known when the vaccine has undergone further years of observation. Consequently, it is considered that mass immunisation will be most effective in girls between the age of 10 and 14 years thus supplementing natural infection in childhood, which produces permanent immunity in about 75 percent of young women, and providing protection to almost all women during their child-bearing period.

It is desirable that all women of child-bearing age who have not experienced rubella be immunised, subject to the contra-indications described below. A convenient time to immunise women is the immediate post-partum period.

Side-effects

Slight enlargement of post-auricular and post-occipital nodes is described occasionally. Arthralgia is also observed, but these reactions are mild and infrequent.

Contra-indications

Since the virus can cross the placental barrier, immunisation of pregnant women is contra-indicated.

As far as possible, steps should be taken to ensure that a vaccinated woman does not become pregnant for at least two menstrual cycles.

Mode of administration

Immunisation involves administering one subcutaneous injection of vaccine which will evoke an antibody response in more than 95 per cent of susceptible vaccinees.

4. Conclusion

There have been a number of studies undertaken which reflect the effectiveness of various immunisation programmes. In England, which has a similar policy to

Australia, a study¹ showed that after eight years of the vaccination programmes results indicated only moderate success as measured by such factors as the number of terminations due to rubella in pregnancy. The study concluded that termination in patients with proven rubella in early pregnancy still plays a major part in preventing congenital rubella. It seems likely that this situation will continue until a much greater percentage of the child-bearing population is immune.

In the United States² when rubella vaccine was first licensed (1969), it was decided that the major emphasis of the rubella immunisation programme would be vaccination of preschool and elementary school children of both sexes. It was reasoned that pregnant women could be protected from exposure to disease by eliminating disease in children. Secondary emphasis was placed on selective vaccination of women of child-bearing age. Ten years later, it appeared that this vaccine strategy has successfully prevented rubella epidemics. However, the reported decrease in rubella rates had occurred largely for children and not for the older age groups.

A recent Australian study³ on childhood deafness and the associated incidence of maternal rubella discussed the relationship between rubella and the severity of deafness. All degrees of deafness are more common in the years of high rubella incidence, but profound deafness shows the greatest increase. The authors conclude in their discussion that the recent reduction in rubella associated deafness appears to be a significant trend. A number of factors may have contributed to the fall in incidence; vaccination, and high natural immunity resulting from the outbreaks of the 1960's. Termination of pregnancy may also be of significance in these cases.

Summary

Immunisation programmes have obviously played a major role in reducing the number of women of child-bearing age at risk. As is demonstrated by this survey, 77 per cent of the women in the 15 to 29 years age group had received immunisation compared with 46 per cent of the 30 to 34 years age group. The latter group having missed out on the school immunisation programmes which commenced in 1970.

It must be remembered that rubella epidemics in children will still occur, the aim of 100 per cent immunisation should be pursued for all women of child-bearing age to prevent the resurgence of congenital rubella and to eliminate the potential for termination of pregnancy associated with maternal rubella.

References

1. Hambling M.H. Changes in the distribution of rubella antibodies in women of childbearing age during the first eight years of a rubella vaccination programme. *J. of Infection* 1980; 2:341.
2. Rubella surveillance — Atlanta, Ga.: Centre for Disease Control. Summary — May 1980.
3. Upfold L.J., Isepy J. Childhood deafness in Australia: Incidence and maternal rubella, 1949-1980. *Med. J. Aust.* 1982; 2:323.

APPENDIX II

TECHNICAL NOTE ON SAMPLING VARIABILITY

Estimation procedure

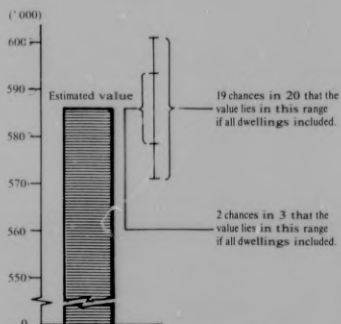
Estimates derived from the survey are obtained by using a complex ratio estimation procedure, which ensures that the survey estimates conform to an independently estimated distribution of the population by age and sex, rather than to the age and sex distribution within the sample itself.

Reliability of the estimates

2. Since the estimates in this publication are based on information obtained from occupants of a sample of dwellings they are subject to sampling variability; that is, they may differ from the figures that would have been produced if all dwellings had been included in the survey. One measure of the likely difference is given by the *standard error*, which indicates the extent to which an estimate might have varied by chance because only a sample of dwellings was included. There are about two chances in three that a sample estimate will differ by less than one standard error from the figure that would have been obtained if all dwellings had been included, and about nineteen chances in twenty that the difference will be less than two standard errors. Another measure of the likely difference is the *relative standard error*, which is obtained by expressing the standard error as a percentage of the estimate.

3. Space does not allow for the separate indication of the standard error of all estimates in this publication. A table of standard errors and relative standard errors for estimates of numbers of persons is given below (Table A). These figures will not give a precise measure of the standard error of a particular estimate but they will provide an indication of its magnitude. An example of the calculation and use of standard errors is as follows: Table I shows that the estimated number of females aged 15 to 34 years in Australia who have not obtained

immunisation against Rubella is 585,900. From Table A below it can be seen that the estimate has a standard error of about 7,500 and therefore there are about two chances in three that the value that would have been produced if all dwellings had been included in the survey will fall within the range 578,400 to 593,400, and about nineteen chances in twenty that the value will fall within the range 570,900 to 600,900. This example is illustrated in the following diagram.



Females aged 15 to 34 years in Australia who have not obtained immunisation against Rubella.

The size of the standard error in relation to the estimate indicates that the actual value could be greater or less (within standard error ranges) than the published figure.

TABLE A. STANDARD ERRORS OF ESTIMATES—PERSONS

Size of estimate	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Australia
	— Number —								per cent (a)
500						180			
800				310	320	230	310	300	
1,000				340	350	250	340	330	
1,500	600	610	410	500	410	300	410	390	560 37
2,000	700	700	570	460	490	330	470	440	650 33
2,500	780	780	630	510	540	340	510	480	730 29
3,000	850	850	690	550	590	380	550	510	800 27
3,500	920	910	740	590	630	410	590	540	860 25
4,000	980	970	780	620	660	460	620	560	920 23
5,000	1,100	1,100	860	680	730	500	680	610	1,000 20
6,000	1,200	1,200	930	730	790	530	740	650	1,100 18
10,000	1,500	1,400	1,200	900	970	640	750	750	1,400 14
20,000	2,000	1,900	1,500	1,200	1,300	810	1,200	910	2,000 10
50,000	3,000	2,700	2,200	1,600	1,800	1,100	1,700	1,100	2,900 5.8
100,000	3,900	3,500	2,800	2,100	2,200	1,300	2,100	1,300	3,900 3.9
200,000	5,000	4,400	3,600	2,600	2,700	1,500	2,600	1,500	5,100 2.6
500,000	6,900	5,800	4,800	3,300	3,500	2,000	3,400	2,000	7,200 1.4
1,000,000	8,500	7,000	5,900	4,000	4,200	2,500	4,100	2,500	9,100 0.9
2,000,000	10,000	8,400	7,000	4,800	5,000	3,000	4,800	3,000	11,000 0.6
5,000,000	12,000	10,000	8,400	5,800	6,000	3,600	5,800	3,600	15,000 0.3

(a) In this publication, estimates with a standard error of more than 30 per cent have not been published.

4. As the standard errors in the table show, *the smaller the estimate the higher is the relative standard error*. Very small estimates would thus be subject to such high standard errors (relative to the size of the estimate) as to detract seriously from their value for most reasonable uses. In this publication, only estimates with relative standard errors less than 30 per cent are considered sufficiently reliable for most purposes. Estimates with relative standard errors greater than 30 per cent have not been shown and although figures for these components can in some cases be derived by subtraction, they should not be regarded as reliable.

5. The reliability of an estimated percentage or rate computed by using sample data for both numerator and denominator, depends upon both the size of the numerator and the size of the denominator. However, the relative standard error of the estimated percentage will generally be lower than the relative standard error of the estimate of the numerator. The relative standard errors of the numerator can be determined from Table A.

Approximate standard errors of rates or percentages may be derived by first obtaining the relative standard error of the number of persons corresponding to the numerator of this rate or percentage and then applying this figure to the estimated rate or percentage. An example of this calculation is as follows: Table 1 shows that the percentage of females who are immunised is 69.5 per cent and the numerator of this percentage is 1,726,600. By interpolation from Table A the standard error of the numerator is approximately 10,500, which is a relative standard error of 0.6 per cent. The standard error of 69.5 per cent can then be approximated by:

Percentage x Relative standard error

$$= 69.5 \times \frac{0.6}{100.0}$$

$$= 0.4$$

Therefore there are two chances in three that the percentage that would have been obtained if all dwellings had been included in the survey is in the range 69.1 to 69.9 per cent and about nineteen chances in twenty that it is in the range 68.7 to 70.3 per cent.

6. Published figures may also be used to estimate the difference between two survey estimates (estimates of numbers, rates or percentages). Such a figure is itself an estimate and is therefore subject to sampling error. The

sampling error of the difference between two survey estimates depends on the standard errors of the original estimates and on the relationship (correlation) between the two original estimates. An approximate standard error of the difference between two estimates (x-y) may be calculated by the following formula:

Standard error (x-y)

$$= \sqrt{[\text{Standard error (x)}]^2 + [\text{Standard error (y)}]^2}$$

While this formula will only be exact for differences between separate and uncorrelated (unrelated) characteristics of sub-populations, it is expected to provide a good approximation for all differences likely to be of interest in this publication.

An example of the use of the above formula is as follows: The difference between the estimates of the number of females in Australia who were immunised at school or by the Doctor (Table 5).

$$1,124,900 - 395,700 = 729,200$$

The standard error of this estimate can be calculated as follows. From Table A the standard errors of each of the two original estimates can be approximated as 9,300 and 6,500 respectively. Therefore the standard error of the difference 729,200 is given by:

Standard error (difference)

$$= \sqrt{(9,300)^2 + (6,500)^2}$$

$$= 11,300 \text{ (rounded to nearest 100)}$$

Thus there are about two chances in three that the difference that would have been obtained, if all dwellings had been included in the survey is within the range 717,900 to 740,500 and about nineteen chances in twenty that this difference is between 706,600 and 751,800.

7. The imprecision due to sampling variability, which is measured by the standard error, should not be confused with inaccuracies that may occur because of imperfections in reporting by interviewers and respondents. Inaccuracies of this kind are referred to as the *non-sampling error*, and they may occur in any enumeration, whether it be a full count or only a sample. Every effort is made to reduce the non-sampling error to a minimum by careful design of questionnaires, intensive training and supervision of interviewers and efficient operating procedures.

APPENDIX III

SURVEY QUESTIONNAIRE, MARCH 1983

Introduction

The extract which follows shows the Rubella immunisation survey questions that were asked of all females aged 15 to 34 years. Questions for the usual monthly labour force survey and for a supplementary survey on persons in the labour force (including discouraged job seekers), and other topics were included elsewhere in the questionnaire.

2. The questions have been included to assist in interpretation of the tables, but it should be borne in mind that the questions are asked by interviewers who have been specially trained and have written instructions on the use of the questionnaire.

88. HAS EVER RECEIVED AN INJECTION AGAINST RUBELLA, THAT IS GERMAN MEASLES?	
Yes	☐ 1
No (Go to Q.91)	☐ 2
Don't know - this person answering for self (Go to Q.92)	☐ 3
Don't know - someone else answering for this person (Go to Q.92)	☐ 4
89. WHERE DID GO TO RECEIVE THIS INJECTION?	
School	☐ 1
Doctor	☐ 2
Local Council/health centre,	☐ 3
Work/University/other Tertiary Inst.	☐ 4
Other	☐ 5
Don't know - this person answering for self	☐ 6
Don't know - someone else answering for this person	☐ 7

90. Go to Q.92	
91. WHAT IS THE MAIN REASON HAS NOT BEEN GIVEN THIS INJECTION?	
(Specify)	
.....	
Had rubella/German measles	☐ 1
Blood test showed person was immune	☐ 2
Can't have/don't want children	☐ 3
Absent when given at school	☐ 4
Never bothered/never thought about it/no reason	☐ 5
Other	☐ 6
Don't know	☐ 7