



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE  
FOOD AND DRUG ADMINISTRATION  
BETHESDA, MARYLAND 20014

Page #1

SEP 15 1978

Our Reference Nos. 76-316, 77-303 and 77-304

Alan Gray, Ph.D.  
Merck Sharp & Dohme  
Division of Merck and Co., Inc.  
West Point, Pennsylvania 19486

Dear Dr. Gray:

This is to inform you that the amendments to your product license applications to include the use of the RA27/3 strain rubella virus grown in human diploid cells have been accepted for manufacture of the following products:

Rubella Virus Vaccine, Live  
Measles, Mumps and Rubella Virus Vaccine, Live  
Measles and Rubella Virus Vaccine, Live

We agree that the results of stability testing of vaccines prepared with the buffered sorbitol-gelatin diluent support your request for a longer dating period. Accordingly, your license applications for the three products are also amended to include the use of the diluent and a dating period of two years at 2°-8° C from date of issue.

Please continue to submit stability data as they become available.

Sincerely yours,

*for Paul Parkman*  
Harry M. Meyer, Jr., M.D.  
Director  
Bureau of Biologics

Summary No. 1  
of  
Clinical Investigative Studies  
of

Combined Live Measles Virus Vaccine (Moraten Line-ATTENUVAX)  
Jeryl Lynn Mumps Virus Vaccine (MUMPSVAX)  
RA 27/3 Rubella Virus Vaccine

for Purpose of Support for  
a License to Manufacture and Sell.



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M. R. Hilleman, Ph.D.

Prepared: April 27, 1978  
Merck Institute for Therapeutic Research  
West Point, Pennsylvania

Clinical Investigative Studies of Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

1. Background

On January 11, 1978, we submitted "Summary No. 2 of Clinical Investigative Studies of RA 27/3 Strain Live Rubella Virus Vaccine for Support for a License to Manufacture and Sell" to the Bureau. That summary showed the RA 27/3 rubella virus vaccine to be safe and highly effective in inducing rubella hemagglutination-inhibition (HI) antibodies in persons of various ages.

In extension of clinical tests with RA 27/3 strain rubella virus vaccine, studies were conducted to evaluate its immunizing capability when combined with live attenuated Moraten line measles virus vaccine (ATTENUVAX) and Jeryl Lynn mumps virus vaccine (MUMPSVAX). The present submission relates to clinical investigative studies of combined live measles-mumps-rubella (RA 27/3) virus vaccine.

All clinical studies were conducted under BB-IND-1016.

2. Lot Numbers of Vaccine Tested

Experimental lot prepared by Virus and Cell Biology Research, Merck Sharp and Dohme Research Laboratories:

621/C-D763

Consistency lots prepared by Merck Sharp and Dohme Biologics Manufacturing:

60664/C-E810

60665/C-E811

60666/C-E812

3. Serologic Testing

Serologic determinations were made in the laboratories of Virus and Cell Biology Research, Merck Institute, and in the Control Laboratories of the Merck Sharp and Dohme Division of Merck & Co.

The hemagglutination-inhibition (HI) test was used to determine both measles antibody response and rubella antibody response. Starting dilutions in these two tests were 1:5 and 1:8, respectively. The serum neutralization test was used to measure mumps antibody response with a starting dilution of 1:2.

#### 4. Clinical Studies

The clinical studies were conducted under the overall responsibility of Dr. Maurice R. Hilleman, Vice President, Virus and Cell Biology Research, Merck Institute for Therapeutic Research, West Point, Pennsylvania.

The clinical tests were carried out by five groups of workers:

- a. Dr. Robert E. Weibel, Director, Division of Preventive Medicine, Joseph Stokes, Jr. Research Institute, Children's Hospital of Philadelphia, Philadelphia, Pennsylvania
- b. Dr. Victor M. Villarejos, Director, Louisiana State University - International Center for Medical Research and Training, San Jose, Costa Rica
- c. Dr. Stephen J. Lerman, Director, Pediatric Infectious Disease Unit, Department of Pediatrics, The University of Nebraska Medical Center, Omaha, Nebraska
- d. Dr. Anne A. Gershon, Associate Professor, Department of Pediatrics, New York University Medical Center, New York, New York
- e. Dr. Robert W. McCollum and Dr. Dorothy M. Horstmann, Department of Epidemiology and Public Health, Yale University School of Medicine, New Haven, Connecticut

Clinical studies fall into two main categories:

	<u>Reference</u>
a. Comparison of M-M-R (RA 27/3) and M-M-R (HPV-77) vaccines in children	3, 4, 5, 6
b. Serologic and clinical responses to measles-mumps-rubella (RA 27/3) vaccine	1, 2, 7, 8

The clinical studies were carried out by the physicians at the locations in the individual study summaries to follow. The populations employed were defined with respect to age, location and other pertinent parameters necessary to permit analysis by statistical sampling procedures.

Subjects in the sampled groups were bled initially and again 6 to 8 weeks later. The sera were tested to define the initial serostatus and the subsequent antibody response.



Clinical surveillance was by two procedures. In studies by Drs. Weibel, Lerman, Gershon, and McCollum, the observations were recorded daily by the mother. The parent was asked to contact the physician should any significant or bothersome reaction occur. In the studies by Dr. Villarejos, observations were made on a routine basis by medical or paramedical personnel; physicians were notified of any significant illness which occurred subsequent to vaccination.

The data presented in the following sections are self explanatory. The detailed background records are on file in Virus and Cell Biology Research, Merck Institute for Therapeutic Research, West Point, Pennsylvania. These records are available for review at any time.

## 5. Clinical Study Summaries

### Reference 1 - Study 442 - Dr. Victor Villarejos

Details of the study plan are given in the clinical test protocol. The study was designed to measure antibody and clinical responses to the RA 27/3 rubella component when given alone or combined with mumps and/or measles vaccine. Findings presented in the summary tables indicate excellent antibody response to all components among children receiving live measles-mumps-rubella (RA 27/3) virus vaccine. No untoward clinical reactions were noted following vaccination.

### Reference 2 - Study 443 - Dr. Robert Weibel

Details of the study plan are presented in the clinical protocol. The purpose of the study was to measure antibody and clinical responses to the RA 27/3 rubella component when given alone or combined with measles and mumps virus components. Findings are presented in the summary tables. Each of the three viruses produced excellent antibody responses when administered in combined form. Both vaccines were well tolerated.

### Reference 3 - Study 459 - Dr. Stephen Lerman

Study 459 is being conducted in children to compare responses to HPV-77 and RA 27/3 rubella vaccines when given alone or combined with measles and mumps vaccines. Details of the study plan are given in the clinical test protocol. Preliminary findings presented in the summary tables show excellent antibody response to measles, mumps, and rubella components and lack of suppression when the three viruses are combined. Reaction rates were as expected.

### Reference 4 - Study 467 - Dr. Robert Weibel

Study 467 was conducted among children to compare responses to combined measles-mumps-rubella vaccines containing either the HPV-77 or RA 27/3 rubella component. Details of the study plan are given in the clinical test protocol, and study results are presented in the summary tables. Antibody responses to both vaccines were excellent, indicating no reduced affect on any component in combined form. Reaction rates were as expected for both vaccines.

Reference 5 - Study 473 - Dr. Robert McCollum

Study 473 is being conducted among children to compare responses to combined measles-mumps-rubella virus vaccines containing either the HPV-77 or RA 27/3 rubella component. Details of the study plan are given in the clinical test protocol. No results are available at this time.

Reference 6 - Study 484 - Dr. Anne Gershon

Study 484 is being conducted among children to compare responses to combined measles-mumps-rubella virus vaccines containing either the HPV-77 or RA 27/3 rubella component. Preliminary findings are presented in the report from Dr. Gershon. The study continues in progress.

Reference 7 - Study 511 - Dr. Victor Villarejos

Study 511 was conducted to measure antibody and clinical responses to three consecutive lots of combined measles-mumps-rubella vaccine containing the RA 27/3 rubella component. Details of the study plan are given in the clinical test protocol, and study results are presented in the summary tables. Responses to the rubella component were excellent. Seroconversion rates for measles and mumps were somewhat lower than expected, and the decreased seroconversion rates were attributed to some overheating of the vaccine during transport in the field. Reaction rates were comparable among the lots.

Reference 8 - Study 513 - Dr. Robert Weibel

Study 513 is being conducted to measure antibody and clinical responses to three consecutive lots of combined measles-mumps-rubella vaccine containing the RA 27/3 rubella component. Study details are given in the clinical protocol, and preliminary findings are given in the summary tables. To date, all three lots of vaccine have produced good antibody responses and have been well tolerated.

6. Overall Summary

The total numbers of vaccinations for which supporting data have been given are as follows:

<u>Lot #</u>	<u>No. Vacc.</u>	<u>No. Seroconverting/No. Triple Negatives (%)</u>		
		<u>Measles</u>	<u>Mumps</u>	<u>RA 27/3 Rubella</u>
621	480	143/150 (95)	145/150 (97)	150/150 (100)
60664	144	50/55 (91)	52/55 (95)	55/55 (100)
60665	104	37/39 (95)	37/39 (95)	38/39 (97)
60666	106	34/35 (97)	34/35 (97)	34/35 (97)
Total	834	264/279 (95)	268/279 (96)	277/279 (99)

The data show that combined live measles-mumps-rubella vaccine containing the RA 27/3 rubella virus component is safe and effective.

Summary of Clinical Tests of Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Study No.	Investigator	Lot No.	Age		No. Vacc.	Antibody Responses among Triple Seronegatives								Re.
						Measles			Mumps		RA 27/3 Rubella			
			Range	Mean (Yrs.)		No. Conv./ No. Seroneg. (%)	GMT	No. Conv./ No. Seroneg. (%)	GMT	No. Conv./ No. Seroneg. (%)	GMT			
442	Villarejos	621	10m- 7y	3.7	199	23/23 (100)	99	22/23 (96)	7	23/23 (100)	149	1		
443	Weibel	621	11m- 8y	1.7	105	65/69 (94)	56	66/69 (96)	8	69/69 (100)	133	2		
459	Lerman	60664	14m- 4y	1.6	41	13/14 (93)	62	13/14 (93)	17	14/14 (100)	269	3		
467	Weibel	621	11m- 7y	1.9	137	55/58 (95)	71	57/58 (98)	7	58/58 (100)	146	4		
473	McCollum	621										5		
484	Gershon	621	13m-15y		39							6		
511	Villarejos	60664	8m-11y	3.3	50	9/11 (82)	20	10/11 (91)	5	11/11 (100)	226	7		
		60665	11m- 7y	3.3	50	4/5 (80)	25	4/5 (80)	11	5/5 (100)	169			
		60666	11m-11y	4.2	50	2/2 (100)	28	2/2 (100)	8	2/2 (100)	256			
513	Weibel	60664	12m- 7y	1.7	53	28/30 (93)	70	29/30 (97)	19	30/30 (100)	256	8		
		60665	12m- 4y	1.5	54	33/34 (97)	70	33/34 (97)	23	33/34 (97)	200			
		60666	11m- 4y	1.4	56	32/33 (97)	66	32/33 (97)	26	32/33 (97)	251			
Totals			834			264/279 (95)	63	268/279 (96)	11	277/279 (99)	178			

Program: Study #442

Vaccine: Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine  
Lot No. 621/C-D763

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine  
Lot No. 622/C-D764

Live Attenuated Rubella (RA 27/3) Virus Vaccine  
Lot No. 579/C-D418

Responsible Clinical Investigator:

Victor M. Villarejos, M.D.  
Director  
Louisiana State University  
International Center for Medical  
Research and Training  
Apartado 10.155  
San Jose, Costa Rica

Study Location: Rivas, Nicaragua

Date Study Initiated: January 19, 1976

Date Study Completed: April 28, 1976

Study Procedure:

A total of 589 children, 10 months to 7 years of age, from the open population were included in the study. Each participant received a 0.5 ml subcutaneous dose of one of the three vaccines. Blood samples were obtained prior to and six weeks after vaccination.

Clinical Protocol - Study #442

Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine  
Live Attenuated Rubella (RA 27/3) Virus Vaccine

**Purpose:** To determine antibody and clinical responses to combined live measles-mumps-rubella (RA 27/3) virus vaccine, to combined live measles-rubella (RA 27/3) virus vaccine, and to live attenuated rubella (RA 27/3) virus vaccine.

**Vaccines:** a) Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot No. 621

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

b) Combined live measles-rubella (RA 27/3) virus vaccine  
Lot No. 622

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

c) Live attenuated rubella (RA 27/3) virus vaccine  
Lot No. 579

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial of vaccine should be reconstituted with 0.7 ml of sterile, pyrogen-free distilled water.

CAUTION: The combined vaccines contain egg protein and should not be given to persons with known sensitivity to egg, chicken, or chicken feathers. All three vaccines contain neomycin and should not be given to persons with sensitivity to neomycin. Persons with leukemia or other immunologic disorders and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccines stored at -20°C until used.

Keep dried vaccines at 4°C in transport.

Keep reconstituted vaccines on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of children 1 to 6 years of age.

Children receiving a given vaccine will have a negative history for vaccination with and illness caused by viruses represented in that vaccine. Children will be assigned to receive one of the three vaccines as follows:

<u>Vaccine</u>	<u>Vaccine Lot</u>	<u>No. Children</u>
measles-mumps-rubella	621	150-200
measles-rubella	622	150-200
rubella	579	150-200

Informed consent will be obtained from each child's parent or guardian prior to his participation in the study.

Each child will be bled (10-15 ml) immediately prior to vaccination and 6 weeks following vaccination.

Vaccine dose is 0.5 ml given subcutaneously.

Each child will be followed clinically for 42 days following vaccination. All local and systemic complaints will be recorded on the case report form.

<u>Schedule:</u>	<u>Time</u>	<u>Action</u>
	Day 0	Bleed 10-15 ml. Vaccinate 0.5 ml, subcutaneously.
	Days 0-42	Clinical follow-up for local and systemic reactions.
	Week 6	Bleed 10-15 ml.

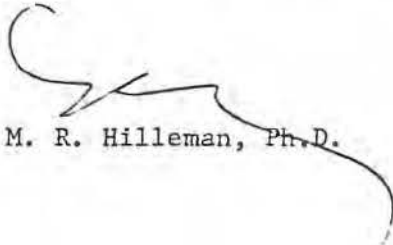
Laboratory: Remove sera from clot aseptically and store frozen at -20°C until shipped. It is imperative that sera are sterile to avoid interference with the serologic assay.

Serology: Circulating levels of antibody to each vaccine component will be determined for samples drawn before and after vaccination. Measles and rubella antibody levels will be determined by hemagglutination-inhibition test. Mumps antibody levels will be determined by serum neutralization test.

Clinical  
Forms: Attached.



- Adverse Reactions: Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Allen F. Woodhour, telephone (215) 699-5311, Ext. 5588.
- Unused Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pa. 19486.
- Shipping of Sera & Records:
- a) Send sera frozen within insulated containers which are supplied.
  - b) Send sera and records to Dr. Maurice R. Hilleman, Virus and Cell Biology Research, Merck Sharp & Dohme Research Laboratories, West Point, Pa. 19486.
  - c) Alert Dr. Hilleman by cable as soon as possible as to flight number, air bill, and date of arrival.



M. R. Hilleman, Ph.D.



# VACUNACIÓN CONTRA SARAMPION PAPERAS RUBÉOLA

Estudio No. \_\_\_\_\_  
(1-3)

NO. DEL CASO \_\_\_\_\_  
(4-9)

CT 2	Nombre Completo del Niño	Sexo (35) M F	Fecha de nacimiento (36-41) día mes año	(46-47)
CT 6 Dupe CT 2 (141) (54-59)	Dirección completa de Padres o Guardián:			
CT 2	INDIQUE SI INDIVIDUO HA:			
	S = Sarampión S (70)	P = Paperas P (71)	R = Rubéola R (72)	
	1. Tenido Enfermedad	1	1	Fecha de expuesto
	2. Sido Vacunado	2	2	Fecha de expuesto
	3. Estado Expuesto (Durante Últimas Cuatro Semanas)	3	3	Fecha de expuesto

## PERÍODO DE VACUNACIÓN O CONTROL

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No. de Lote _____ (49-51)		Fecha de primer sangrado (antes de vacunación) _____ (52-57)																																								
		Fecha de segundo sangrado (después de vacunación) _____ (58-63)																																								
<b>SEROLOGÍA</b> <table border="1"> <thead> <tr> <th colspan="4">SARAMPION</th> <th colspan="2">PAPERAS</th> <th colspan="4">RUBÉOLA</th> </tr> <tr> <th colspan="2">HI</th> <th colspan="2">Neut</th> <th colspan="2">Neut</th> <th colspan="2">HI</th> <th colspan="2">Neut</th> </tr> <tr> <th>Pre</th> <th>Post</th> <th>Pre</th> <th>Post</th> <th>Pre</th> <th>Post</th> <th>Pre</th> <th>Post</th> <th>Pre</th> <th>Post</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		SARAMPION				PAPERAS		RUBÉOLA				HI		Neut		Neut		HI		Neut		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post											Indique si el niño contrajo Sarampión clínico: 1 = Sí 2 = No Indique si el niño contrajo Paperas clínica: 1 = Sí 2 = No Indique si el niño contrajo Rubéola clínica: 1 = Sí 2 = No  CT 4 Fecha de comienzo: _____ Quién hizo diagnóstico? _____
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Otras quejas u observaciones clínicas:

Después de completadas, devuelva formas al: (Retenga copia rosa para sus archivos)

M. R. HILLEMANN, PhD, DSc

MERCK SHARP & DOHME RESEARCH LABS., WEST POINT, PENNSYLVANIA 19486

Firma del Médico:

Nombre del Médico (en letra de molde):

Fecha:

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(\*3957-0875)

PRECAUCIÓN: Use mecanografía o letra de molde. No escriba en esta forma si esta encima de otras formas NCR (semejantes a esta).

NOTA AL INVESTIGADOR:

1. No escriba en áreas oscuras
2. Asegure de llenar todos los blancos aplicables.

# VACUNACIÓN CONTRA SARAMPIÓN PAPELAS RUBÉOLA

## HOJA CLINICA

NO. DE CASO \_\_\_\_\_

FECHA DE VACUNACION \_\_\_\_\_  
 día / mes / año

**B**

NOMBRE: \_\_\_\_\_

DIA	FECHA	Temperatura	Malestar	Anorexia	Gastroenteritis	Irritabilidad	Cefalea	I. V. R. S.	Otitis	Conjuntivitis	Linfadenopatía*	Reacción Local* (Diámetro mm)	Exantema*	RASH*			Artralgia*	Artritis*	*Especifique tipo en esta sección
														Rubelliforme	Morbilliforme				
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Al terminar el estudio, devuelva copia blanca y copia amarilla de esta forma a, adjuntas a la forma "A" al: (Retenga copia color de rosa para sus archivos)

M.R. Hilleman, PhD, DSc  
 MERCK SHARP & DOHME RESEARCH LABORATORIES  
 WEST POINT, PENNSYLVANIA, 19486, U.S.A.

Firma del medico:

Nombre del medico (en letra de molde):

Fecha:

PRECAUCION: Papel carbón no es no. Use maquina de escribir o pluma esofografica con tinta negra. No escriba encima de otras formas "NCH". K Formas sumojuntas a estas. NOTA: No escriba en areas oscurecidas.

Table 1

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:												Initially Seropositive to:
			Measles-Mumps-Rubella			Measles-Mumps		Measles-Rubella		Mumps-Rubella		Measles Only	Mumps Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/Total		Conversions/ Total	Conversions/ Total	Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella	Mumps	Rubella				
10 Months	1	0													
11 Months	2	2	1/1	1/1	1/1			1/1	1/1						
1 Year	29	21	7/7	7/7	7/7			4/5	5/5	3/3	3/3		2/2	3/3	1
2 Years	18	15	3/3	3/3	3/3	1/1	1/1	4/4	4/4	2/3	3/3			3/3	1
3 Years	41	33	6/6	6/6	6/6	1/1	1/1	3/3	3/3	6/6	6/6			14/14	3
4 Years	39	34	2/2	2/2	2/2			5/5	5/5	7/8	8/8	1/1		15/15	3
5 Years	32	25	3/3	2/3	3/3			2/2	2/2	2/3	3/3	2/2		13/13	2
6 Years	36	28	1/1	1/1	1/1			8/8	8/8	2/2	2/2		1/1	15/15	1
7 Years	1	1						1/1	1/1						
Total	199	159	23/23 (100%)	22/23 (95.7%)	23/23 (100%)	2/2	2/2	28/29 (96.6%)	29/29 (100%)	22/25 (88.0%)	25/25 (100%)	3/3	3/3	63/63 (100%)	11
Mean Age:	3.7 Years														

## Overall Conversion Rates

Measles	Mumps	Rubella
56/57 (98.2%)	49/53 (92.5%)	140/140 (100%)

10/3/77

Table 2

Serological Findings Among Children Who Received Combined Live  
Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:				Initially Seropositive to:
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total	Conversions/Total	Conversions/Total	Conversions/Total	
1 Year	22	16	11/11	11/11		4/4	1
2 Years	20	16	7/9	9/9	2/2	3/3	2
3 Years	46	36	14/16	15/16	1/1	13/13	6
4 Years	40	31	5/5	5/5	2/2	20/20	4
5 Years	28	19	5/5	5/5	1/1	11/11	2
6 Years	37	24	7/8	8/8	4/4	9/9	3
Total	193	142	49/54	53/54	10/10	60/60	18
Mean Age: 3.7 Years			(90.7%)	(98.1%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Rubella
59/64 (92.2%)	113/114 (99.1%)

4/28/77

Table 3

Distribution of Fold Rises of Hemagglutination-Inhibition Antibody Titers Among Children Who Received Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seropositive			Initially Seronegative			
			Fold Rise		Total	No. Conv.	Failures	Total	Conv. Rate
			>4X	Indet.					
1 Year	13	10		1	1	9		9	9/9
2 Years	17	15		1	1	14		14	14/14
3 Years	30	24		2	2	22		22	22/22
4 Years	38	32	1	1	2	30		30	30/30
5 Years	42	29		3	3	26		26	26/26
6 Years	56	48		8	8	40		40	40/40
7 Years	1	0							
Total	197	158	1	16	17	141	0	141	100%
Mean Age: 4.3 Years									

4/28/77

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps and Rubella and Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Measles (HI)		Mumps (Neut.)		Rubella (HI)	
Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children
<5		<2	1	<8	
5		2	4	8	
10		4	4	16	
20	2	8	5	32	1
40	5	16	7	64	4
80	5	32	2	128	9
160	6			256	7
320	5			512	2
Total	23		23		23
Geometric Mean Titer	98.8		7.1		148.8

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children  
 Who Were Initially Seronegative to Measles and Rubella and Who Received  
 Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Measles (III)		Rubella (III)	
Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children
<5	5	<8	1
5		8	
10	1	16	
20	9	32	1
40	4	64	3
80	22	128	30
160	9	256	13
320	3	512	6
>640	1		
Total	54		54
Geometric Mean Titer	>48.7		151.2



Table 6

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Rubella and Who Received Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Rubella (HI)	
Post Vaccination Titer	No. of Children
<8	
8	
16	
32	2
64	20
128	70
256	41
<u>&gt;512</u>	8
Total	141
Geometric Mean Titer	<u>&gt;150.5</u>

Table 7

Maximum Temperatures Reported Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Maximum Temperature (°F, Oral)	Total Vaccinees (199 Children)						Initially Seronegative to: Measles, Mumps and Rubella (23 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	147 (73.9%)	138 (69.3)	160 (81.6)	130 (68.4)	137 (72.5)	83	18 (78.3)	20 (87.0)	23 (100.0)	14 (73.7)	16 (84.2)	16
99 - 100.9	51 (25.6)	57 (28.6)	35 (17.9)	59 (31.1)	52 (27.5)	109	5 (21.7)	3 (13.0)		5 (26.3)	3 (15.8)	7
101 - 102.2		2 (1.0)	1 (0.5)			3						
103 - 104.0	1 (0.5)	2 (1.0)		1 (0.5)		4						
Not Taken			3	9	10					4	4	

Patient # (b) (6)	Temperature	Days	Clinical Complaint	Serology					
				Measles	Mumps	Rubella			
	102.2	8	Upper Respiratory Illness, Malaise	>20	320	>8	32	<8	1024
	103.1	20	Irritability, Malaise	>20	160	>8	128	<8	64
	103.1	11	Tonsillitis, Anorexia, Headache, Malaise	>20	>640	<2	4	<8	128
	104.0	1	Irritability, Malaise		Serologies Not Done				
	104.0	5	Upper Respiratory Illness, Irritability, Anorexia, Malaise	>20	320	<4	16	<8	256

10/3/77

Table 8

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Maximum Temperature (°F, Oral)	Total Vaccinees (193 Children)						Initially Seronegative to: Measles and Rubella (54 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	146 (76.0)	135 (70.3)	138 (72.3)	123 (64.4)	114 (59.7)	67	42 (77.8)	35 (64.8)	39 (72.2)	38 (70.4)	35 (64.8)	23
99 - 100.9	46 (24.0)	56 (29.2)	53 (27.7)	68 (35.6)	77 (40.3)	124	12 (22.2)	19 (35.2)	15 (27.8)	16 (29.6)	19 (35.2)	31
102.0		1 (0.5)				1						
Not Taken	1	1	2	2	2	1						

Serology

Patient #	Temperature	Day	Clinical Complaint	Measles	Rubella
(b) (6)	102.0	5	Upper Respiratory Illness, Irritability, Malaise	>20, 160	>32, 256

4/28/77

Table 9

Maximum Temperatures Reported Among Children Who Received Live  
Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Maximum Temperature (°F, Oral)	Total Vaccinees (197 Children)						Initially Seronegative to: Rubella (141 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. With Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	162 (82.2%)	131 (66.5)	148 (75.1)	125 (64.4)	138 (71.5)	67	116 (82.3)	97 (68.8)	110 (78.0)	94 (67.6)	104 (74.8)	51
99-100.9	35 (17.8)	66 (33.5)	48 (24.4)	68 (35.1)	55 (28.5)	128	25 (17.7)	44 (31.2)	30 (21.3)	44 (31.7)	35 (25.2)	88
101 - 102.2			1 (0.5)	1 (0.5)		2			1 (0.7)	1 (0.7)		2
Not Taken				3	4					2	2	

Patient #	Temperature	Day	Clinical Complaint	Serology
(b) (6)	102.2	20	Upper Respiratory Illness, Anorexia, Malaise	<8, 128

4/29/77

Table 10  
Clinical Complaints Reported Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Clinical Complaint	Total Vaccinees (199 Children)						Initially Seronegative to: Measles, Mumps and Rubella (23 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Irritability	32 (16.1%)	9 (4.5)	2 (1.0)	4 (2.1)		39	5 (21.7)			1 (5.0)		5
Malaise	30 (15.1)	14 (7.0)	3 (1.5)	7 (3.6)	1 (0.5)	43	5 (21.7)	1 (4.3)		2 (10.0)		7
Headache		1 (0.5)	2 (1.0)			2						0
Upper Respiratory Illness	9 (4.5)	11 (5.5)	5 (2.5)	8 (4.1)	5 (2.6)	23	1 (4.3)	1 (4.3)	1 (4.3)	2 (10.0)	1 (5.0)	3
Otitis			2 (1.0)	3 (1.5)		3			1 (4.3)	1 (5.0)		1
Ophthalmopathy		1 (0.5)				1						0
Gastrointestinal Illness	13 (6.5)	7 (3.5)	2 (1.0)	5 (2.6)	1 (0.5)	22		1 (4.3)				1
Anorexia	5 (2.5)	3 (1.5)	2 (1.0)	5 (2.6)		13				1 (5.0)		1
Mild Dermatitis		1 (0.5)				1						0
Persons with Complaints:	49 (24.6)	22 (11.1)	11 (5.5)	19 (9.8)	6 (3.1)	73	6 (26.1)	2 (8.7)	1 (4.3)	4 (20.0)	1 (5.0)	10
Persons with No Complaints:	150 (75.4)	177 (88.9)	188 (94.5)	175 (90.2)	187 (96.9)	123	17 (73.9)	21 (91.3)	22 (95.7)	16 (80.0)	19 (95.0)	12
Negative Physician Surveillance				5	6					3	3	

Table 11

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Clinical Complaint	Total Vaccinees (193 Children)						Initially Seronegative to: Measles and Rubella (54 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post-Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Irritability	29 (15.1)	11 (5.7)	6 (3.1)	9 (4.7)	6 (3.1)	52	13 (24.1)	4 (7.4)	2 (3.7)	1 (1.9)	1 (1.9)	18
Malaise	33 (17.2)	21 (10.9)	15 (7.9)	15 (7.9)	7 (3.7)	65	12 (22.2)	8 (14.8)	4 (7.4)	2 (3.7)	1 (1.9)	18
Headache	4 (2.1)	3 (1.6)	2 (1.0)	2 (1.0)		9		1 (1.9)	1 (1.9)			1
Upper Respiratory Illness	1 (0.5)	9 (4.7)	8 (4.2)	8 (4.2)	1 (0.5)	21	1 (1.9)	5 (9.3)	2 (3.7)	1 (1.9)		6
Bronchitis			1 (0.5)	1 (0.5)		1			1 (1.9)	1 (1.9)		1
Otitis	1 (0.5)	2 (1.0)	2 (1.0)	1 (0.5)	1 (0.5)	6		2 (3.7)	1 (1.9)			3
Gastrointestinal Illness	5 (2.6)	7 (3.6)	6 (3.1)	4 (2.1)	3 (1.6)	23	1 (1.9)	2 (3.7)	1 (1.9)	1 (1.9)		5
Anorexia	5 (2.6)	4 (2.1)	6 (3.1)	4 (2.1)		17	2 (3.7)	1 (1.9)	1 (1.9)			4
Hepatitis	1 (0.5)	1 (0.5)				1						0
Asthma		1 (0.5)				1						0
Persons with Complaints:	36 (18.8)	24 (12.5)	17 (8.9)	18 (9.4)	8 (4.2)	70	13 (24.1)	9 (16.7)	4 (7.4)	3 (5.6)	1 (1.9)	19
Persons with No Complaints:	156 (81.3)	168 (87.5)	174 (91.1)	173 (90.6)	183 (95.8)	121	41 (75.9)	45 (83.3)	50 (92.6)	51 (94.4)	53 (98.1)	35
Negative Physician Surveillance:	1	1	2	2	2	1						



Table 12

Clinical Complaints Reported Among Children Who Received Live  
Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Clinical Complaint	Total Vaccinees (197 Children)						Initially Seronegative to: Rubella (141 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post-Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Irritability	22 (11.2)	4 (2.0)	3 (1.5)	5 (2.6)	2 (1.0)	32	15 (10.6)	4 (2.8)	2 (1.4)	2 (1.4)	1 (0.7)	23
Malaise	28 (14.2)	10 (5.1)	5 (2.5)	9 (4.6)	4 (2.1)	46	19 (13.5)	9 (6.4)	2 (1.4)	5 (3.5)	2 (1.4)	32
Headache	2 (1.0)	1 (0.5)		3 (1.5)	1 (0.5)	6	1 (0.7)			1 (0.7)		2
Upper Respiratory Illness	4 (2.0)	8 (4.1)	1 (0.5)	6 (3.1)	2 (1.0)	15	3 (2.1)	6 (4.3)	1 (0.7)	5 (3.5)	2 (1.4)	13
Otitis	2 (1.0)			2 (1.0)	1 (0.5)	4	1 (0.7)			1 (0.7)	1 (0.7)	2
Ophthalmopathy	1 (0.5)	1 (0.5)				1	1 (0.7)	1 (0.7)				1
Gastrointestinal Illness	5 (2.5)	6 (3.0)	1 (0.5)	1 (0.5)	1 (0.5)	11	4 (2.8)	5 (3.5)	1 (0.7)		1 (0.7)	8
Anorexia	7 (3.6)	1 (0.5)		5 (2.6)		13	4 (2.8)			4 (2.8)		8
Persons with Complaints:	35 (17.8)	18 (9.1)	7 (3.6)	16 (8.2)	7 (3.6)	60	23 (16.3)	14 (9.9)	4 (2.8)	10 (7.1)	5 (3.5)	43
Persons with No Complaints:	162 (82.2)	179 (90.9)	190 (96.4)	180 (91.8)	188 (96.4)	137	118 (83.7)	127 (90.1)	137 (97.2)	131 (92.9)	136 (96.5)	98
Negative Physician Surveillance				1	2							



# MEMO

To File  
From T. Schofield  
Subject Statistical Analysis - Study #442

Location

Date 2/2/78

Location

Analysis of variance was conducted on post titers of children who were initially seronegative to rubella who received rubella vaccine, lot #579 (Group 1), combined measles-mumps-rubella vaccine, lot #621 (Group 2), and combined measles-rubella vaccine, lot #622 (Group 3).

No significant difference exists among the three groups. Geometric mean titers were:

<u>Vaccine</u>	<u>GMT</u>
Rubella	150.5
MMR	143.4
MR	155.5

There is no significant difference in conversion rate among these three groups.



T.S.



Program: Study #443

Vaccine: Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine,  
Lot No. 621/C-D763

Live Attenuated Rubella (RA 27/3) Virus Vaccine,  
Lot No. 579/C-D418

Responsible Clinical Investigator:

Robert E. Weibel, M.D.  
Director, Division of Preventive Medicine  
Joseph Stokes, Jr. Research Institute  
Children's Hospital of Philadelphia  
34th Street and Civic Center Boulevard  
Philadelphia, Pennsylvania 19104

Study Location:

Children's Hospital of Philadelphia  
Darby Child Health Clinic, Darby, Pennsylvania  
G. Starkweather, M.D., Havertown, Pennsylvania

Date Study Initiated: October 28, 1975

Date Study Completed: January 20, 1977

Study Procedure:

A total of 194 children 10 months to 8 years of age from the open population were included in the study. One hundred ninety-one children received a 0.5 ml subcutaneous dose of one of two vaccines. Three children received a 1.0 ml subcutaneous dose of the combined live measles-mumps-rubella (RA 27/3) virus vaccine. Blood samples were obtained prior to and six weeks after vaccination.

Clinical Protocol - Study #443

Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Live Attenuated Rubella (RA 27/3) Virus Vaccine

**Purpose:** To determine antibody and clinical responses to combined live measles-mumps-rubella (RA 27/3) virus vaccine and to live attenuated rubella (RA 27/3) virus vaccine.

**Vaccines:** a) Combined live measles-mumps-rubella (RA 27/3) virus vaccine, lyophilized  
Lot No. 621

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

b) Live attenuated rubella (RA 27/3) virus vaccine, lyophilized  
Lot No. 579

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single-dose vials. Each vial of vaccine should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water.

**CAUTION:** The combined vaccine may contain egg protein and should not be given to persons with known sensitivity to egg, chicken or chicken feathers. Both vaccines contain neomycin and should not be given to persons with known sensitivity to neomycin. Persons with leukemia or other immunologic disorders and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccines stored at -20°C until used.

Keep dried vaccines at 4°C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

**Procedure:** Establish two groups of 50 to 100 children 1 to 6 years of age as follows:

<u>Group</u>	<u>Vaccine</u>	<u>No. Children</u>
Group 1	measles-mumps-rubella	50-100
Group 2	rubella	50-100

Children in Group 1 will have a negative history for vaccination and illness for measles, mumps, and rubella. Children in Group 2 will have a negative history for rubella vaccination and illness.


Informed consent will be obtained from each child's parent or guardian prior to his participation in the study.

Each child will be bled (10-15 ml) immediately prior to vaccination and 6 weeks following vaccination.

Vaccine dose is 0.5 ml given subcutaneously.

Each child will be followed clinically for 42 days following vaccination. All local and systemic complaints will be recorded on the case report form.

Schedule:	<u>Time</u>	<u>Action</u>
	Day 0	Bleed 10-15 ml. Vaccinate 0.5 ml, subcutaneously.
	Days 0-42	Clinical follow-up for local and systemic reactions.
	Week 6	Bleed 10-15 ml.
Serology:	Circulating levels of antibody before and after vaccination will be determined. Measles and rubella antibody levels will be determined by hemagglutination-inhibition test. Mumps antibody levels will be determined by serum neutralization test.	
Clinical Forms:	Attached.	
Adverse Reactions:	Any serious or alarming reaction, including death due to any cause during this investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Allen F. Woodhour, telephone (215) 699-5311, Ext. 5588.	
Unused Vaccine:	All unused vaccine should be returned immediately to the Virus and Cell Biology Laboratories of the Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.	

  
M. R. Hilleman, Ph.D.

# MEASLES-MUMPS-RUBELLA VACCINATION

FAMILY No. \_\_\_\_\_

CASE No. \_\_\_\_\_

CHILD'S NAME \_\_\_\_\_  
LAST FIRST MIDDLE

SEX \_\_\_\_\_ BIRTHDATE \_\_\_\_\_ AGE \_\_\_\_\_ HISTORY: MEASLES \_\_\_\_\_  
 MUMPS \_\_\_\_\_  
 RUBELLA \_\_\_\_\_

PARENTS NAME \_\_\_\_\_ TELEPHONE No. \_\_\_\_\_  
LAST FIRST MIDDLE

ADDRESS \_\_\_\_\_  
NUMBER STREET CITY STATE

LOCATION \_\_\_\_\_

PRE-VACCINATION \_\_\_\_\_

CLINICAL \_\_\_\_\_

I consent to have my child, named above, receive  
 live attenuated measles, mumps, rubella virus  
 vaccine.

SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

VACCINATION: VACCINE \_\_\_\_\_ LOT \_\_\_\_\_ BLEEDINGS \_\_\_\_\_  
12-15  
 1. DATE \_\_\_\_\_ VOL. \_\_\_\_\_ SITE \_\_\_\_\_ PRE-VACCINATION \_\_\_\_\_ CASE No. \_\_\_\_\_  
17-22 5-8  
 POST-VACCINATION \_\_\_\_\_  
29-34

BLEEDING DATE	SEROLOGY									CLINICAL SUMMARY						
	MEASLES			MUMPS			RUBELLA			POST VAC.	MAX. TEMP.	CODE	COMPLAINTS	CODE	CODE	
TEST	1	2	3	1	2	3	1	2	3	DAYS						
TECHNIQUE										0-4	27-30	31		37-33	34-35	
1.										5-12	31-39	40		41-42	43-44	
2.										13-18	45-48	49		50-51	52-53	
3.										19-28	54-57	58		59-60	61-62	
4.										COMMENTS:						
SUMMARY	PRE	POST		PRE	POST		PRE	POST								
MEASLES <input type="checkbox"/> DATE ONSET _____ CLINICAL MUMPS <input type="checkbox"/> RUBELLA <input type="checkbox"/> Isolation _____ Dx _____																

PHYSICIAN \_\_\_\_\_



# SYMPTOM RECORD

M-M-R Study No. \_\_\_\_\_

CHILD'S NAME \_\_\_\_\_ CASE NO. \_\_\_\_\_  
 (Last) (First) (Middle)

DAY	DATE	Temperature		NONE	RUNNY NOSE	SORE THROAT	COUGH	EAR ACHE	SWOLLEN GLANDS	SORE EYES	THROWING UP	DIARRHEA	STOMACH ACHE	RASH (describe)	SORE JOINTS	SORE ARM (at shot)	HEADACHE	HURTS ALL OVER	FEVER	WON'T EAT	COMMENTS
		<input type="checkbox"/> Rectal	<input type="checkbox"/> Oral (Check One)																		
0																					
1																					
2																					
3																					
4																					
5																					
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ver or unusual reaction develops, call:

DR. R. E. WEIBEL  
 Havertown, Pennsylvania — Phone: Hilltop 6-1110  
 OR  
 Children's Hospital of Philadelphia — EV 7-1309

PLEASE RETURN FOR FOLLOW-UP VISIT ON: \_\_\_\_\_

BE SURE TO BRING THIS RECORD ALONG WITH YOU.

Table 1

Serological Findings Among Children Who Received a 0.5 MI Dose of Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #443)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:												Initially Seropositive to:	
			Measles-Mumps-Rubella Conversions/Total			Measles-Mumps Conversions/Total		Measles-Rubella Conversions/Total		Mumps-Rubella Conversions/Total		Measles Only	Mumps Only	Rubella Only	Measles Mumps and Rubella	
			Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella	Mumps	Rubella	Conversions/ Total	Conversions/ Total	Conversions/ Total		
(Months) 11	8	6	6/6	6/6	6/6											
(Years) 1	68	64	48/52	50/52	52/52	0/1	1/1	7/7	7/7	2/2	2/2			2/2		
2	10	10	7/7	6/7	7/7	1/1	1/1			2/2	2/2					
3	5	5	3/3	3/3	3/3			1/1	1/1	1/1	1/1					
4	2	2								1/1	1/1	1/1				
5	3	3						1/1	1/1	2/2	2/2					
6	4	4								1/1	1/1			3/3		
7	1	0														
8	1	1														1
Total	102	95	64/68 (94.1%)	65/68 (95.6%)	68/68 (100%)	1/2	2/2	9/9	9/9	9/9	9/9	1/1		5/5		1
Mean Age:	1.7 Years															

## Overall Conversion Rate

Measles	Mumps	Rubella
75/80 (93.8%)	76/79 (96.2%)	91/91 (100%)

5/4/77



Table 2

Serological, Temperature and Clinical Findings for 3 Children Who Received a 1.0 Ml Dose  
of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #443)

Vaccinee No. (b) (6)	Age (Years)	Serology Results			Days Post-Vaccination	Maximum Temperature (°F, Oral)	Clinical Complaints
	3	Measles	Pre Post	>20 80	0-4 5-12	100.0 98.6	Gastrointestinal Illness Gastrointestinal Illness
		Mumps	Pre Post	>8 64	13-18 19-28	98.6 98.6	None Reported None Reported
		Rubella	Pre Post	>32 256	29-42	98.6	None Reported
	4	Measles	Pre Post	<5 20	0-4 5-12	99.4 100.0	None Reported Non-Specific Rash, Day 5
		Mumps	Pre Post	4 8	13-18 19-28	99.8 99.7	None None
		Rubella	Pre Post	<8 256	29-42	99.6	None
	1	Measles	Pre Post	<5 10	0-4 5-12	Not Taken Not Taken	Upper Respiratory Illness, Otitis Otitis
		Mumps	Pre Post	<2 4	13-18 19-28	98.6 98.6	None Reported None Reported
		Rubella	Pre Post	<8 32	29-42	98.6	None Reported

5/5/77

Table 3

Serological Findings Among Children Who Received a 0.5 Ml Dose of  
Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #443)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seropositive				Initially Seronegative			
			Fold Rise			Total	No. Conv.	Failures	Total	Conv. Rate
			2x	≥4x	Indet.					
(Months)										
10	1	1					1		1	1/1
11	8	8		1		1	7		7	7/7
(Years)										
1	42	41		3	3	6	35		35	35/35
2	13	12			4	4	8		8	8/8
3	11	11			4	4	7		7	7/7
4	9	9			3	3	6		6	6/6
5	3	3	1			1	2		2	2/2
6	1	1					1		1	1/1
7	1	0								
Total	89	86	1	4	14	19	67	0	67	100%
Mean Age: 1.9 Years										

5/4/77

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps and Rubella and Who Received a 0.5 ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #443)

Measles (III)		Mumps (Neut.)		Rubella (III)	
Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children
<5	4	<2	3	<8	
5		2	3	8	
10	2	4	16	16	1
20	9	8	26	32	2
40	13	16	8	64	18
80	20	32	11	128	19
160	12	64		256	25
320	7	128	1	512	3
640	1				
Total	68		68		68
Geometric Mean Titer:	57.0		8.2		136.1

5/4/77

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children  
Who Were Initially Seronegative to Rubella and Who Received a 0.5 ml Dose  
of Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #443)

Rubella (HI)	
Post-Vaccination Titer	No. of Children
<8	
8	
16	1
32	4
64	10
128	21
256	20
≥512	11
Total	67
Geometric Mean Titer:	≥159.1

5/5/77

Table 6

Maximum Temperatures Reported Among Children Who Received a 0.5 Ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #443)

Maximum Temperature (°F, Oral)	Total Vaccinees (102 Children)						Initially Seronegative to: Measles, Mumps, and Rubella (68 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	53 (60.9%)	52 (59.1)	71 (83.5)	60 (71.4)	55 (65.5)	32	40 (63.5)	39 (61.9)	52 (83.9)	43 (70.5)	41 (68.3)	23
99 - 100.9	26 (30.0)	22 (25.0)	12 (14.1)	15 (17.9)	20 (23.8)	31	18 (28.6)	14 (22.2)	8 (12.9)	10 (16.4)	14 (23.3)	23
101 - 102.9	7 (8.0)	13 (14.8)	1 (1.2)	5 (5.9)	7 (8.3)	21	5 (7.9)	9 (14.3)	1 (1.6)	4 (6.6)	4 (6.7)	14
103 - 104.9	1 (1.1)	1 (1.1)	1 (1.2)	3 (3.6)	2 (2.4)	6		1 (1.6)	1 (1.6)	3 (4.9)	1 (1.7)	4
105.0				1 (1.2)		1				1 (1.6)		1
Not Taken	15	14	17	18	18	11	5	5	6	7	8	3

5/5/77

Table 7

High Temperatures Reported Among Children Who Received a 0.5 Ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #443)

Vaccinee No.	Temperature (°F, Oral)	Days	Clinical Complaints	Serology					
				Measles		Mumps		Rubella	
				Pre	Post	Pre	Post	Pre	Post
(b) (6)	102.2	5	None Reported (Had Measles-Like Rash Days 7-10)	<5	160	<2	4	<8	64
	102.0	2, 5	URI	<5	20	<2	4	<8	256
	104.0	17	URI, Otitis, Ophthalmopathy, Anorexia, Allergic Rash						
	105.0	23	URI						
	104.0	24	URI						
	102.0	25	URI						
	103.0	27, 32	Teething						
	102.0	33	Teething						
	102.0	32	Anorexia	<5	40	<2	8	16	128
	102.0	10	None Reported	<5	40	<2	4	<8	64
	102.0	9	URI, Irritability, Gastrointestinal Illness	<5	20	<2	16	<8	512
	102.0	35-36	URI	<5	160	>8	>128	<8	256
	102.0	2	URI	<5	<5	<2	2	>32	32
	102.0	7	None Reported (Developed Measles-Like Rash on Day 12)	<5	80	>8	8	<8	128
	102.0	10	URI, Lymphadenopathy, Anorexia	<5	40	>8	8	<8	128
	103.0	7	URI, Otitis, Ophthalmopathy, Gastrointestinal Illness	<5	80	<2	4	<8	256
	102.0	8	URI, Otitis, Ophthalmopathy, Gastrointestinal Illness						
	103.0	28	URI, Otitis, Ophthalmopathy, Lymphadenopathy, Non-Specific Rash on Arms, Legs, Face	<5	80	<2	4	<8	128
	103.0	4	URI, Gastrointestinal Illness	QNS	QNS	QNS	QNS	<8	8
	102.0	0	URI, Anorexia	<5	80	>8	>128	<8	512
	103.0	20-21	Herpes Stomatitis, Anorexia	<5	40	<2	8	<8	256
	102.7	33	URI	<5	<5	<2	8	<8	256
	102.0	3-4	URI	<5	80	<2	8	<8	128
	103.0	24	Gastrointestinal Illness	<5	80	<2	32	<8	256
	103.5	38-42	Allergic Rash	NS	NS	NS	NS	NS	NS



Table 8

Maximum Temperatures Reported Among Children Who Received a 0.5 Ml Dose of  
Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #443)

Maximum Temperature (°F, Oral)	Total Vaccinees (89 Children)						Initially Seronegative to: Rubella (67 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	54 (70.0%)	53 (69.7)	57 (80.3)	55 (78.6)	57 (83.8)	40	38 (66.7)	37 (66.1)	40 (78.4)	37 (74.0)	37 (77.1)	26
99 - 100.9	19 (24.7)	17 (22.4)	11 (15.5)	8 (11.4)	10 (14.7)	25	16 (28.1)	14 (25.0)	9 (17.6)	8 (16.0)	10 (20.8)	21
101 - 102.9	4 (5.2)	5 (6.6)	2 (2.8)	5 (7.1)	1 (1.5)	10	3 (5.3)	4 (7.1)	1 (2.0)	3 (6.0)	1 (2.1)	8
103 - 104.9		1 (1.3)	1 (1.4)	1 (1.4)		3		1 (1.8)	1 (2.0)	1 (2.0)		3
105.0				1 (1.4)		1				1 (2.0)		1
Not Taken	12	13	18	19	21	10	10	11	16	17	19	8

5/6/77

Table 9

High Temperatures Reported Among Children Who Received a 0.5 Ml Dose of  
Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #443)

Vaccinee No. (b) (6)	Temperature (°F, Oral)	Days	Clinical Complaints	Serology	
				Pre	Post
	102.2	7-8	None Reported	<8	128
	102.0	23	Upper Respiratory Illness	<8	64
	102.0	36	Upper Respiratory Illness, Otitis, Lymphadenopathy, Myalgia	<8	128
	102.0	6	Upper Respiratory Illness	<8	128
	105.0	24	Pneumonia	<8	64
	102.1	9	Upper Respiratory Illness	>32	>1024
	102.0	18	None Reported		
	102.0	27	None Reported		
	103.0	18	Gastrointestinal Illness, Anorexia	<8	>1024
	104.0	27	Upper Respiratory Illness	<8	512
	103.0	12	Upper Respiratory Illness	<8	256

5/5/77

Table 10

Clinical Complaints Reported Among Children Who Received a 0.5 MI Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study 0443)

Clinical Complaint	Total Vaccinees (102 Children)					No. with Complaint	Initially Seronegative to: Measles, Mumps and Rubella (68 Children)					No. with Complaint
	Days Post-Vaccination						Days Post-Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Soreness at Injection Site	4 (4.2%)			1 (1.0)		5	2 (3.0)					2
Lymphadenopathy	2 (2.1)	3 (3.1)		2 (2.1)	2 (2.1)	6	1 (1.5)	1 (1.5)		2 (3.0)	2 (3.0)	3
Measles-Like Rash	1 (1.0)	9 (9.4)	6 (6.2)	1 (1.0)		11	1 (1.5)	7 (10.4)	5 (7.5)	1 (1.5)		9
Arthralgia			1 (1.0)	1 (1.0)		1			1 (1.5)	1 (1.5)		1
Myalgia		1 (1.0)				1		1 (1.5)				1
Irritability	3 (3.0)	3 (3.0)	1 (1.0)	1 (1.0)	1 (1.0)	4	2 (2.9)	2 (2.9)	1 (1.5)	1 (1.5)		3
Headache	2 (2.1)	2 (2.1)				2	2 (3.0)	2 (3.0)				2
Upper Respiratory Illness	38 (39.6)	37 (38.5)	24 (25.0)	35 (36.5)	32 (33.3)	64	28 (41.8)	27 (40.3)	20 (29.8)	25 (37.3)	20 (29.8)	46
Otitis	1 (1.0)	7 (7.3)	2 (2.1)	5 (5.2)	4 (4.2)	14	1 (1.5)	4 (6.0)	2 (3.0)	3 (4.5)	2 (3.0)	9
Ophthalmopathy	2 (2.1)	3 (3.1)	2 (2.1)	4 (4.2)	2 (2.1)	6	2 (3.0)	3 (4.5)	2 (3.0)	4 (6.0)	2 (3.0)	6
Gastrointestinal Illness	18 (18.7)	24 (25.0)	9 (9.4)	17 (17.7)	15 (15.6)	43	14 (20.9)	19 (28.4)	9 (13.4)	14 (20.9)	11 (16.4)	35
Anorexia	13 (13.5)	19 (19.8)	8 (8.3)	10 (10.4)	13 (13.5)	28	10 (14.9)	12 (17.9)	6 (9.0)	9 (13.4)	11 (16.4)	20
Fatigue				1 (1.0)		1				1 (1.5)		1
Rash-Chafing, Diaper, Heat, Herpes	4 (4.2)	4 (4.2)	1 (1.0)	4 (4.2)	5 (5.2)	12	3 (4.5)	4 (6.0)	1 (1.5)	3 (4.5)	3 (4.5)	9
Allergy, Asthma	1 (1.0)	2 (2.1)	3 (3.1)	2 (2.1)	3 (3.1)	6		1 (1.5)	2 (3.0)	1 (1.5)		3
Fever	1 (1.0)	1 (1.0)		2 (2.1)	1 (1.0)	4		1 (1.5)		1 (1.5)		2
Sudoresis	1 (1.0)					1	1 (1.5)					1
Teething	3 (3.0)			1 (1.0)	3 (3.0)	6	3 (4.4)			1 (1.5)	3 (4.4)	6
Persons with Complaints:	50 (52.1)	50 (52.1)	33 (34.4)	43 (44.8)	44 (45.8)	78	38 (56.7)	38 (56.7)	29 (43.3)	32 (47.8)	30 (44.8)	58
Persons with No Complaints:	46 (47.9)	46 (47.9)	63 (65.6)	53 (55.2)	52 (54.2)	18	29 (43.3)	29 (43.3)	38 (56.7)	35 (52.2)	37 (55.2)	9
Negative Physician Surveillance	6	6	6	6	6	6	1	1	1	1	1	1

Table 11

Clinical Complaints Reported Among Children Who Received a 0.5 Ml Dose of  
Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #443)

Clinical Complaint	Total Vaccinees (89 Children)						Initially Seronegative to: Rubella (67 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post-Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Soreness at Injection Site	7 (8.4%)					7	6 (9.5)					6
Lymphadenopathy		1 (1.2)		1 (1.2)	1 (1.2)	3		1 (1.6)		1 (1.6)	1 (1.6)	3
Rubella-Like Rash		2 (2.4)	1 (1.2)			3		2 (3.2)	1 (1.6)			3
Arthralgia	1 (1.2)				1 (1.2)	1	1 (1.6)				1 (1.6)	1
Myalgia	1 (1.2)		1 (1.2)	1 (1.2)	1 (1.2)	3	1 (1.6)		1 (1.6)	1 (1.6)	1 (1.6)	3
Irritability	1 (1.2)	3 (3.6)		1 (1.2)	2 (2.4)	5	1 (1.6)	3 (4.8)		1 (1.6)	2 (3.2)	5
Headache	3 (3.6)	2 (2.4)		2 (2.4)		6	3 (4.8)	1 (1.6)		2 (3.2)		5
Upper Respiratory Illness	30 (36.1)	23 (27.7)	13 (15.7)	14 (16.9)	15 (18.1)	45	24 (38.1)	18 (28.6)	9 (14.3)	12 (19.0)	12 (19.0)	37
Lower Respiratory Illness				1 (1.2)		1				1 (1.6)		1
Otitis	1 (1.2)	5 (6.0)	1 (1.2)	1 (1.2)	5 (6.0)	10	1 (1.6)	4 (6.3)	1 (1.6)	1 (1.6)	5 (7.9)	9
Ophthalmopathy	1 (1.2)	1 (1.2)	3 (3.6)	2 (2.4)	1 (1.2)	4	1 (1.6)	1 (1.6)	2 (3.2)	1 (1.6)	1 (1.6)	3
Gastrointestinal Illness	12 (14.5)	11 (13.3)	4 (4.8)	9 (10.8)	10 (12.0)	30	11 (17.5)	9 (14.3)	4 (6.3)	7 (11.1)	7 (11.1)	25
Anorexia	12 (14.5)	8 (9.6)	7 (8.4)	6 (7.2)	5 (6.0)	16	9 (14.3)	7 (11.1)	6 (9.5)	5 (7.9)	4 (6.3)	13
Fatigue			1 (1.2)			1			1 (1.6)			1
Rash-Chafing, Diaper, Heat	10 (12.0)	6 (7.2)	6 (7.2)	7 (8.4)	4 (4.8)	15	8 (12.7)	5 (7.9)	5 (7.9)	6 (9.5)	4 (6.3)	13
Allergy, Asthma	2 (2.4)	1 (1.2)	2 (2.4)	1 (1.2)	2 (2.4)	3	1 (1.6)	1 (1.6)	2 (3.2)	1 (1.6)	2 (3.2)	2
Fever					1 (1.2)	1					1 (1.6)	1
Depression		1 (1.2)				1		1 (1.6)				1
Teething		1 (1.2)	1 (1.2)	1 (1.2)	1 (1.2)	2		1 (1.6)	1 (1.6)	1 (1.6)	1 (1.6)	2
Impetigo, Mosquito Bites			1 (1.2)	1 (1.2)		2			1 (1.6)	1 (1.6)		2
Persons with Complaints:	50 (60.2)	37 (44.6)	29 (34.9)	31 (37.3)	31 (37.3)	65	39 (61.9)	30 (47.6)	24 (38.1)	27 (42.9)	26 (41.3)	53
Persons with No Complaints:	33 (39.8)	46 (55.4)	54 (65.1)	52 (62.7)	52 (62.7)	18	24 (38.1)	33 (52.4)	39 (61.9)	36 (57.1)	37 (58.7)	10
Negative Physician Surveillance:	6	6	6	6	6	6	4	4	4	4	4	4

Study Name - Combined Live Measles-Mumps-Rubella (RA 27-3) Virus Vaccine and Live Rubella (RA 27/3) Virus Vaccine

Study Number - Clinical Protocol - 443

Material - M-M-R Lot #621/C-D763  
Rubella Lot #579/C-D418

Initiated - October 28, 1975

Completed - January 20, 1977

### Medical Opinion

For 15 months 194 children (ages 10 months to 8 years) from the open population were enrolled in this study at Children's Hospital of Philadelphia, Philadelphia, Pennsylvania; Darby Health Clinic, Darby, Pennsylvania; and Dr. G. Starkweather's office, Havertown, Pennsylvania. Informed consent was obtained from the parent for each child and a blood sample was obtained from 184 children initially and approximately 6 weeks later. All vaccine was given subcutaneously in the arm. One hundred and two children (mean 1.7 years) received 0.5 ml. M-M-R; 3 (mean 2.7 years) received 1.0 ml. M-M-R; and 89 children (mean 1.9 years) received 0.5 ml. rubella vaccine. All but 12 parents returned report cards with daily temperatures and clinical observations for 42 days following administration of the vaccine. Parents were instructed to report high fevers and rash by telephone to R. E. W. and on follow-up were queried on recorded observations for greater detail.

Among susceptible and immune vaccinees temperature elevations were scattered randomly throughout the observation period with no greater association with either vaccine. Most temperature elevations probably reflect unrelated infection occurring among the vaccinees at various time periods. Upper respiratory and gastrointestinal infections were reported in about 55% and 40% of vaccinees respectively. Temperatures were not recorded on approximately 10% of the vaccinees. A faint measles-like rash occurred in 9 triple susceptible children receiving M-M-R and 3 susceptibles receiving rubella vaccine alone. Mild transient arthralgia was reported by the parent but not observed by a medical person in one M-M-R susceptible vaccinee, age 12 months, on day 17-20 (4 days); and one rubella susceptible vaccinee age 5 years on day one and 30 (2 days). No arthritis or adverse clinical reaction was reported.

Of 68 children initially susceptible to measles-mumps-rubella receiving 0.5 ml. M-M-R vaccine 94%, 96%, and 100% respectively, responded serologically with geometric mean titers as follows: measles (HI) 57.0; mumps (neut.) 8.2; and rubella (HI) 136.1. All 67 rubella susceptible vaccinees responded serologically with a geometric mean hemagglutination titer equal to or greater than 159.1. Of the three children receiving 1.0 ml. M-M-R, all susceptibles responded, however, one was initially immune to M-M-R and one to mumps.

Seroconversion of susceptible children to rubella vaccine alone or in combined M-M-R was 100% with comparable hemagglutination inhibiting geometric mean titers. Seroconversion rates and geometric mean titers to measles and mumps vaccine following M-M-R (RA 27/3) are similar to those following M-M-R (HPV-77) reported in earlier studies. Live RA 27/3 rubella virus vaccine alone or combined with live measles and live mumps virus vaccine induced measureable antibodies in all rubella susceptible vaccinees with no significant clinical reaction.

Jan 27, 1977 *Robert E. Weibel*  
Robert E. Weibel, M.D.



# MEMO

To File  
From T. Schofield  
Subject Statistical Analysis - Study #443

Location

Date 2/2/78

Location

Analysis of variance was conducted on post titers of children who were initially seronegative to rubella who received rubella vaccine, lot #579 (Group 1), and combined measles-mumps-rubella vaccine, lot #621 (Group 2).

No significant difference exists between these two groups. Geometric mean titers were:

<u>Vaccine</u>	<u>GMT</u>
Rubella	159.1
MMR	130.9

There is no significant difference in conversion rate among these two groups.



T.S.





# SYMPTOM RECORD

## RUBELLA Study No. \_\_\_\_\_

LD'S NAME \_\_\_\_\_ CASE NO. \_\_\_\_\_

(Last) (First) (Middle)

DAY	DATE	Temperature	NONE	RUNNY NOSE	SORE THROAT	COUGH	EAR ACHE	SWOLLEN GLANDS	SORE EYES	THROWING UP	DIARRHEA	STOMACH ACHE	RASH (describe)	SORE JOINTS	SORE ARM (at spot)	HEADACHE	HURTS ALL OVER	FEVER	WON'T EAT	COMMENTS
		<input type="checkbox"/> Rectal <input type="checkbox"/> Oral <i>(Check One)</i>																		
0																				
1																				
2																				
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with combination vaccines.

INFORMATION AND CONSENT FORM: Attached

REACTION REPORTING FORM: Attached

Stephen J. Lerman, M.D.  
Director - Pediatric Infectious Disease Unit  
University of Nebraska Medical Center

11/30/76

THE UNIVERSITY OF NEBRASKA MEDICAL CENTER  
42ND AND DEWEY AVENUE  
OMAHA, NEBRASKA 68105

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402/541-7350  
Hobart E. Wiltse, M.D., Ph.D.

NEONATOLOGY

402/541-7340  
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April 11, 1978

To: Measles-Mumps-Rubella Vaccine Study Participants

From: Jan Brunken RN  
Pediatric Infectious Disease Unit

Subject: March M-M-R Vaccine Study Progress Report

Here is the current breakdown of the numbers of children participating in the study to date (March 31):

	<u>Entered</u>	<u>Completed</u>
Zahller	9	9
Nelson/Rice	2	2
Wax/McAveney	13	13
Ellison/Glow/Oberst	2	2
Maragos	0	0
Pott. Co. Immun. Clinic	19	18
Offutt AFB	147	97
UNMC Pediatric Clinic	53	36
Cogley Clinic	11	7
UNMC-South Omaha Clinic	0	0
UNMC-5 North	1	1
Total	257	185

Our goal for the month of April is to pass the halfway mark of 275 children enrolled in the study!

Program: Study #459 - To evaluate and compare clinical and immunological responses to two combined measles-mumps-rubella virus vaccines and component vaccines of these.

Vaccine: Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot #60664/C-E810  
Combined live measles-mumps-rubella (HPV-77) virus vaccine  
M-M-R  
Live attenuated RA 27/3 rubella virus vaccine  
Lot #60151/C-E665  
Live attenuated HPV-77 + 5 duck embryo cell passages rubella virus vaccine  
MERUVAX  
Live measles virus vaccine  
ATTENUVAX  
Live mumps virus vaccine  
MUMPSVAX  
Rubella placebo

Responsible Clinical Investigator:

Stephen J. Lerman, M.D.  
Assistant Professor of Pediatrics  
and Medical Microbiology  
Director, Pediatric Infectious Disease Unit  
42nd Street and Dewey Avenue  
Omaha, Nebraska 68105

Study Locations:

F. Marshall Zahller, M.D., Omaha, Nebraska  
Larry Rice, M.D., Paul J. Nelson, M.D., Omaha, Nebraska  
James I. Wax, M.D., Omaha, Nebraska  
Joseph R. Ellison, M.D., Omaha, Nebraska  
George D. Maragos, M.D., Omaha, Nebraska  
Mark B. Horton, M.D., Outpatient Clinic, University of  
Nebraska Medical Center, Omaha, Nebraska  
Colonel James Hart, M.D., Burt Culpepper, M.D., Offutt Air  
Force Base, Omaha, Nebraska  
William J. McAveney, M.D., Omaha, Nebraska  
Donald T. Glow, M.D., Byron B. Oberst, M.D., Omaha  
Children's Clinic, Omaha, Nebraska  
Yuksel Inankur, M.D., Izzat Jabro, M.D., Dennis Jones, M.D.,  
C. Edwards, M.D., Jim Mulry, M.D., Anthony Romano, M.D.,  
Cogley Clinic, Council Bluffs, Iowa  
Pottawattamie County Immunization Clinic, Lee Martin Therapy  
Center, Council Bluffs, Iowa

Date Study Initiated: May 31, 1977

Date Study Completed: In Progress

Study Procedure:

To date, 257 children have entered the study. Each received a 0.5 ml subcutaneous dose of one of the vaccines. Blood samples were obtained on the day of vaccination and 6 weeks after vaccination, at which time each child received vaccine with those components not in the initial injection. Each child was followed 6 weeks for clinical complaints.



## COMPARISON OF MEASLES - MUMPS - RUBELLA (HPV-77:DE-5 and RA 27/3)

## VACCINES IN YOUNG CHILDREN

PURPOSE

This study will compare antibody and clinical responses in young children to live, attenuated measles, mumps, and rubella vaccines, given singly and together, utilizing either HPV-77:DE-5 or RA 27/3 as the rubella components.

BACKGROUND

HPV-77:DE-5 rubella vaccine was licensed in 1969 and is the most widely-used rubella vaccine in the United States. Although HPV-77:DE-5 vaccinees appear to be protected against viremia and fetal infection, HPV-77:DE-5 vaccine has been criticized because up to 80% of vaccinees may experience asymptomatic re-infection (antibody titer boost and pharyngeal virus excretion) on exposure to wild rubella virus. In comparison with natural rubella infection the serum antibody response to HPV-77:DE-5 is quantitatively and qualitatively diminished, and secretory antibody is lacking. RA 27/3 rubella vaccine has been proposed as a better immunizing agent because the serum and secretory antibody responses more closely resemble natural rubella infection, and because the rate of asymptomatic re-infection on exposure to wild rubella virus is almost as low as that seen in naturally immune subjects. In addition, RA 27/3 rubella vaccine, grown in human tissue culture, should obviate any problem of allergy to foreign protein. Both rubella vaccines have shown similar age-dependent rates of arthralgia and arthritis.

VACCINES

Vaccines will be supplied in single-dose, coded vials by Merck Sharp & Dohme. Measles (Attenuvax), mumps (Mumpsavax), rubella (Meruvax), and the combination of the three (M-M-R) are licensed products. RA 27/3 rubella virus was originally isolated in Dr. Stanley Plotkin's laboratory from the third



explant of the 27th fetus aborted because of rubella infection during the 1964 epidemic. It has been attenuated by (b) (4) in WI-38 human diploid fibroblast tissue culture.

The lot of vaccine to be used has been fully tested for potency and safety at the Merck Sharp & Dohme Research Laboratories. Vaccine dose is 0.5 ml. given subcutaneously. Dried vaccine should be stored at -20° C (freezer) until used. Reconstituted vaccine should be kept at 4° C (refrigerator), and unused rehydrated vaccine should be discarded after four hours.

#### STUDY POPULATION

Children one through four years of age who have a negative history of measles, mumps, and rubella, both disease and vaccination, will be recruited by their private or clinic physician at the time they are due to receive these vaccinations.

#### CAUTION

Any child in the following categories should not be vaccinated.

1. Known sensitivity to chicken or duck, chicken or duck eggs or feathers, or to neomycin.
2. Leukemia or other malignancies, immunologic disorders, immunosuppressive or steroid therapy.
3. Current febrile illness. (Children with non-febrile upper respiratory infection may be vaccinated).

#### STUDY PROCEDURE

After informed consent has been obtained, an 8-10 cc blood sample will be drawn and children will be randomly assigned to receive one of the following:

<u>Vaccine</u>	<u>No. of Children</u>
Measles-Mumps-HPV-77:DE-5 Rubella	150
Measles-Mumps-RA 27/3 Rubella	150
Measles	50
Mumps	50

<u>Vaccine</u>	<u>No. of Children</u>
HPV-77:DE-5 Rubella	50
RA 27/3 Rubella	50
Placebo	50
Total	550

The parent will be given a reaction reporting form and a thermometer and will be instructed in taking temperatures. They will be asked to take daily temperatures and record all symptoms which occur during the following six weeks.

Six weeks after vaccination, children will return for a second 8-10 cc. blood sample. At this time, reaction reporting forms will be reviewed with the parent and collected. All children will then receive the standard measles, mumps, and rubella vaccine to assure immunization for all three diseases.

#### SEROLOGIC STUDIES

Participating physicians will refrigerate blood samples which will be picked up by messenger three times a week. Serum will be separated, with an aliquot sent to Merck Sharp & Dohme for rubella precipitin antibody testing and the remainder retained for rubella and measles hemagglutination inhibition antibody and mumps neutralization antibody testing in the University of Nebraska Medical Center Virus Laboratory of Dr. Roberta White.

#### DATA ANALYSIS

We will compare symptoms (e.g. rash, fever, arthralgia), seroconversion rates and geometric mean titers in children who received combination vaccines, individual component vaccines, or placebo. We will look specifically for evidence of either enhanced reactogenicity or diminished serologic responsiveness

Table 1  
Seroconversions and Geometric Mean Titers for Children  
Who Were Initially Seronegative Prior to Vaccination (Study #459)

Vaccine	Age		Measles	Mumps	Rubella
	Range	Mean	No. Conv./Total (GMT)	No. Conv./Total (GMT)	No. Conv./Total (GMT)
ATTENUVAX	14m - 3y	1.5	6/6 (90)		
MUMPSVAX	14m - 4y	1.7		11/12 (12)	
RUBELLA (HPV-77)	14m - 2y	1.4			6/7 (95)
RUBELLA (RA 27/3)	14m - 4y	1.6			11/11 (199)
M-M-R (HPV-77)	14m - 4y	1.5	20/20 (77)	20/20 (14)	20/20 (111)
M-M-R (RA 27/3)	14m - 4y	1.6	13/14 (62)	13/14 (17)	14/14 (269)

Statistical nonparametric comparison shows no suppression of post-vaccination antibody titer of any component when administered in combined form with rubella RA 27/3 or HPV-77.

4/20/78

Table 2

Completed Serology for Children  
Receiving ATTENUVAX, Study #459

<u>Case #</u>	<u>Measles HI</u>	
	<u>Pre</u>	<u>Post</u>
(b) (6)	<5	80
	<5	
	<5	
	<5	
	<5	40
	<5	80
	<5	160
	<5	160
	<5	80

4/19/78

Table 3

Completed Serology for Children  
Receiving MUMPSVAX, Study #459

<u>Case #</u> (b) (6)	<u>Mumps Neut.</u>	
	<u>Pre</u>	<u>Post</u>
	<2	<2
	<2	>64
	<2	4
	<2	64
	<2	
	4	8
	<2	32
	<2	2
	<2	16
	2	8
	<2	8
	<2	16
	<2	32
	<2	8
	<2	16

4/19/78

Table 4

Completed Serology for Children  
Receiving Rubella (HPV-77), Study #459

<u>Case #</u> (b) (6)	<u>Rubella HI</u>	
	<u>Pre</u>	<u>Post</u>
		<8
	<8	
	<8	
		>512
	<8	128
	<8	>512
	<8	128
	<8	>512
	<8	32
	<8	>512
	<8	<8

4/19/78



Table 5

Completed Serology for Children  
Receiving Rubella (RA 27/3), Study #459

<u>Case #</u>	<u>Rubella HI</u>	
	<u>Pre</u>	<u>Post</u>
(b) (6)	<8	128
	<8	256
	<8	128
	<8	64
	<8	>512
	<8	64
	<8	>512
	<8	
	<8	>512
	256	>512
	<8	256
	<8	>512
	<8	64

4/20/78

Table 6

Completed Serology for Children  
Receiving M-M-R (HPV-77), Study #459

Case # (b) (6)	Measles HI		Mumps Neut.		Rubella HI	
	Pre	Post	Pre	Post	Pre	Post
	<5	160	<2	16	<8	256
	<5		<2		<8	
		64		160		8
	<5	>320	<2	8	<8	256
		160	<2			64
	<5	80	<2	4	<8	256
	<5	20	2	>64	<8	256
	<5	160	<2	>64	<8	64
	<5		<2		<8	
	<5	40	<2	64	<8	64
	<5	20	<2	16	<8	256
	<5	40	<2	32	<8	64
	<5	160	<2	16	<8	256
	<5	160	<2	16	<8	128
	<5	40	<2	4	<8	16
		80		32		64
	<5	80	<2	8	8	32
	QNS	QNS	QNS	QNS	<8	128
	<5	80	<2	QNS	<8	64
	QNS	120	QNS	32	<8	>512
	<5	80	<2	32	<8	256
	<5		<4*		<8	
	<5		<2		<8	
	<5	40	<2	16	<8	256
	<5	80	<2	8	<8	64
	<5		<2		<8	
	<5	80	<2	8	<8	>512
	<5		<2		<8	
	<5	160	2	>64	<8	128
	<5		QNS		<8	
	<5	40	<2	4	<8	32
	<5	160	<2	4	<8	64
	<5	160	<2	32	<8	128
	<5	40	<2	32	<8	>512
	<5	40	<2	32	<8	16

\* Toxicity at 1:2 level

4/20/78

Table 7

Completed Serology for Children  
Receiving M-M-R (RA 27/3), Study #459

Case #	Measles HI		Mumps Neut.		Rubella HI	
	Pre	Post	Pre	Post	Pre	Post
(b) (6)	<5	<5	<2	16	<8	256
	<5	160	<2	64	<8	256
	<5	20	8	8	<8	256
	<5	40	<2	<2	<8	256
	<5	80	<2	4	<8	128
	80	20	<2	4	<8	128
	<5	20	<2	16	<8	256
	<5	40	2	32	<8	>512
	<5	160	4	4	256	>512
	<5	20	QNS	8	<8	256
	<5	160	<2	16	<8	256
	<5	80	<4*	32	<8	128
	<5	80	QNS	<4*	<8	8
	<5	80	<2	>64	<8	>512
	<5	QNS	<2	QNS	<8	256
	<5	160	<2	32	<8	>512
	<5	160	<2	16	<8	256
	<5	>320	<2	16	<8	128
	<5	40	<2	8	<8	>512
		80		8		256
	<5	80	<2	>64	<8	>512
	80	80	QNS	16	32	>512
	<5	40	>64	>64	<8	256
	<5	40	<2	16	<8	256
	<5		16		<8	
	<5		<2		<8	
	QNS		QNS		<8	
	<5	QNS	<2	QNS	<8	8

\* Toxicity at 1:2 level

4/20/78

Table 8

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #459)

Maximum Temperature (°F, Oral)	Total Vaccinees (41 Children)					No. with Max. Temp.	Initially Seronegatives (16 Children)					No. with Max. Temp.
	Days Post Vaccination						Days Post Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	33 (80.5%)	32 (78.0)	34 (82.9)	32 (78.0)	30 (75.0)	17	13 (81.3)	12 (75.0)	14 (87.5)	10 (62.5)	13 (86.7)	7
99 - 100.9	7 (17.1)	3 (7.3)	2 (4.9)	4 (9.8)	3 (7.5)	4	3 (18.8)	2 (12.5)	1 (6.3)	3 (18.8)	1 (6.7)	2
101 - 102.9	1 (2.4)	5 (12.2)	3 (7.3)	3 (7.3)	5 (12.5)	14		2 (12.5)		2 (12.5)	1 (6.7)	5
103 - 104.9		1 (2.4)	2 (4.9)	2 (4.9)	1 (2.5)	6			1 (6.3)	1 (6.3)		2
Fever - No Temperature Taken					1 (2.5)							
Temperature Not Taken					1						1	

Case No. (b) (6)	Max. Temp.	Days	Clinical Complaint	Measles		Serology Mumps		Rubella	
	103.0	20-21	Upper Respiratory Illness, Gastrointestinal Illness	<5	160	<2	64	<8	256
	103.0	36	Gastrointestinal Illness						
	102.0	11-12	Upper Respiratory Illness, Gastrointestinal Illness						
	102.4	24-25	Upper Respiratory Illness, Nonspecific Rash, Anorexia						
	102.2	40-41	Upper Respiratory Illness, Ophthalmopathy, Anorexia, Irritability, Teething	<5	20	8	8	<8	256
	103.0	13-17	Upper Respiratory Illness, Anorexia						
	102.1	10-11	Upper Respiratory Illness, Anorexia	<5	80	<2	4	<8	128
	102.0	11-12	None	<5	20	QNS	8	<8	256
	103.0	5-12	Upper Respiratory Illness, Gastrointestinal Illness, Anorexia, Measles-Like Rash	<5	80	QNS	<4	<8	8
	102.0	39-42	Upper Respiratory Illness, Otitis, Gastrointestinal Illness						
	102.3	24	Upper Respiratory Illness, Anorexia	<5	80	<2	>64	<8	>512
	102.2	38-39	Anorexia	<5	QNS	<2	QNS	<8	8
	102.6	17-18	Upper Respiratory Illness, Gastrointestinal Illness, Anorexia	NS	80	NS	8	NS	256
	102.8	0-4	Upper Respiratory Illness, Ophthalmopathy, Anorexia, Herpes-Type Rash, Soreness at Injection Site	<5	40	>64	>64	<8	256
	104.5	15	Otitis	<5	40	<2	16	<8	256
	103.8	22	Upper Respiratory Illness, Gastrointestinal Illness, Anorexia						

Table 9

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #459)

Clinical Complaint	Total Vaccinees (41 Children)						Initially Seronegatives (16 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site: Soreness	2 (4.9%)					2						0
Systemic: Measles-Like Rash		4 (9.8)	2 (4.9)			5			1 (6.3)			1
Irritability	1 (2.4)	3 (7.3)	2 (4.9)		3 (7.5)	6	1 (6.3)				1 (6.7)	2
Anorexia	8 (19.5)	5 (12.2)	8 (19.5)	9 (22.0)	7 (17.5)	20	3 (18.8)	1 (6.3)	2 (12.5)	3 (18.8)	3 (20.0)	6
Disturbed Sleep		1 (2.4)				1		1 (6.3)				1
Upper Respiratory Illness	16 (39.0)	17 (41.5)	10 (24.4)	11 (26.8)	16 (40.0)	28	5 (31.3)	5 (31.3)	2 (12.5)	6 (37.5)	7 (46.7)	10
Otitis		2 (4.9)	1 (2.4)	3 (7.3)	3 (7.5)	8		1 (6.3)	1 (6.3)	2 (12.5)	1 (6.7)	4
Ophthalmopathy	3 (7.3)	1 (2.4)			3 (7.5)	7		1 (6.3)				1
Gastrointestinal Illness	9 (22.0)	9 (22.0)	6 (14.6)	10 (24.4)	9 (22.5)	24	3 (18.8)	1 (6.3)	2 (12.5)	5 (31.3)	3 (20.0)	10
Nonspecific Rash	2 (4.9)	4 (9.8)	2 (4.9)	3 (7.3)	3 (7.5)	5	1 (6.3)	2 (12.5)	2 (12.5)	2 (12.5)	1 (6.7)	3
Varicella				1 (2.4)		1				1 (6.3)		1
Allergy		1 (2.4)				1		1 (6.3)				1
Teething	1 (2.4)	3 (7.3)	1 (2.4)	1 (2.4)	2 (5.0)	4	1 (6.3)	1 (6.3)	1 (6.3)	1 (6.3)	1 (6.7)	1
Herpes-Type Rash	1 (2.4)					1						0
Persons with Complaint:	20 (48.8)	26 (63.4)	18 (43.9)	16 (39.0)	22 (55.0)	34	7 (43.8)	8 (50.0)	6 (37.5)	8 (50.0)	9 (60.0)	14
Persons with No Complaint:	21 (51.2)	15 (36.6)	23 (56.1)	25 (61.0)	18 (45.0)	7	9 (56.3)	8 (50.0)	10 (62.5)	8 (50.0)	6 (40.0)	2
Negative Surveillance					1						1	

Program: Study #467 - To compare antibody and clinical responses to combined live measles-mumps-rubella virus vaccine containing the RA 27/3 rubella virus strain or the HPV-77 duck rubella virus strain.

Vaccine: Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot #621/C-D763

Combined live measles-mumps-rubella (HPV-77) virus vaccine  
M-M-R

Responsible Clinical Investigator:

Robert E. Weibel, M.D.  
Director, Division of Preventive Medicine  
Joseph Stokes, Jr. Research Institute  
Children's Hospital of Philadelphia  
34th and Civic Center Boulevard  
Philadelphia, Pennsylvania 19104

Study Locations:

De La Wair Clinic, Wilmington, Delaware  
The Northeast Clinic, Wilmington, Delaware  
The Riverside Health Clinic, Riverside, New Jersey  
The Deborah Clinic, Browns Mill, New Jersey  
The Mt. Holly Clinic, Mt. Holly, New Jersey  
G. Starkweather, M.D., Havertown, Pennsylvania  
E. M. Craven, M.D., Wilmington Medical Center, Wilmington,  
Delaware  
James W. Williams State Service Center, Dover, Delaware  
Lankenau Hospital, Philadelphia, Pennsylvania  
Children's Clinic of Chester and Vicinity, Chester,  
Pennsylvania

Date Study Initiated: June 7, 1976

Date Study Completed: May 12, 1977

Study Procedure:

Two hundred seventy-five children, 10 months to 7 years of age, from the open population, were included in the study. Two hundred fifty-five children received a 0.5 ml subcutaneous dose of 1 of 2 vaccines. Twenty children received a 1.0 ml subcutaneous dose of combined live measles-mumps-rubella (RA 27/3) virus vaccine. Blood samples were obtained prior to and 6 weeks after vaccination from approximately one half of the children. Each child was followed 6 weeks for clinical complaints.



Clinical Protocol - Study #467

Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

**Purpose:** To compare antibody and clinical responses to combined live measles-mumps-rubella virus vaccine containing the RA 27/3 rubella virus strain or the HPV-77 duck rubella virus strain.

**Vaccines:** 1. Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot #621

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

2. Combined live measles-mumps-rubella (HPV-77 duck) virus vaccine  
Lot #0131V

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial of vaccine should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water.

**CAUTION:** Both vaccines contain egg protein and should not be given to persons with known sensitivity to chicken or duck, chicken or duck eggs or feathers. The vaccines also contain neomycin and should not be given to persons with sensitivity to neomycin. Persons with leukemia or other immunologic disorders and persons receiving immunosuppressive drugs should not be vaccinated. The vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccines stored at -20°C.

Keep dried vaccines at 4°C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

**Procedure:** The study population will consist of children 1 to 4 years old having a negative history of vaccination for and illness caused by measles, mumps and rubella. Children will be randomly assigned to receive one of the two vaccines as follows:

<u>Group</u>	<u>Vaccine</u>	<u>No. of Children</u>
Group 1	M-M-R (RA 27/3)	100-200 children
Group 2	M-M-R (HPV-77 duck)	100-200 children

Informed written consent will be obtained from each child's parent or guardian prior to his participation in the study.

Each child will receive a single 0.5 ml subcutaneous injection of one of the two combined live measles-mumps-rubella virus vaccines.

Bleeding samples (10-15 ml) will be obtained from approximately one-third of the study participants. They will be bled immediately prior to vaccination and 6-8 weeks following vaccination.

Each child will be followed clinically for 42 days following vaccination. All local and systemic complaints will be recorded on the case report form.

Schedule:	<u>Time</u>	<u>Vaccination and Follow-up</u> (All Children)	<u>Bleeding</u> (Approx. 1/3 of Children)
	Day 0	Vaccinate 0.5 ml, subcutaneously.	Bleed 10-15 ml.
	Days 0-42	Clinical follow-up for local and systemic reactions.	--
	Week 6-8	--	Bleed 10-15 ml.

Serology: Circulating levels of antibody before and after vaccination will be determined. Measles and rubella antibody levels will be determined by hemagglutination-inhibition test. Mumps antibody levels will be determined by serum neutralization test.

Clinical  
Forms: Attached.

Adverse  
Reactions: Any serious or alarming reaction, including death due to any cause during this investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Allen F. Woodhour, telephone (215) 699-5311, Ext. 5588.

Unused  
Vaccine: All unused vaccine should be returned immediately to the Virus and Cell Biology Laboratories of the Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.



M. R. Hilleman, Ph.D.

# SYMPTOM RECORD

M-M-R Study No. \_\_\_\_\_

CHILD'S NAME \_\_\_\_\_ CASE NO. \_\_\_\_\_  
 (Last) (First) (Middle)

DAY	DATE	Temperature		NONE	RUNNY NOSE	SORE THROAT	COUGH	EAR ACHE	SWOLLEN GLANDS	SORE EYES	THROWING UP	DIARRHEA	STOMACH ACHE	RASH (describe)	SORE JOINTS	SORE ARM (at shot)	HEADACHE	HURTS ALL OVER	FEVER	WON'T EAT	COMMENTS
		<input type="checkbox"/> Rectal	<input type="checkbox"/> Oral (Check One)																		
0																					
1																					
2																					
3																					
4																					
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or or unusual reaction develops, call:

DR. R. E. WEIBEL  
 Havertown, Pennsylvania — Phone: HIl110p 6-1110  
 OR  
 Children's Hospital of Philadelphia — EV 7-1309

PLEASE RETURN FOR FOLLOW-UP VISIT ON: \_\_\_\_\_

BE SURE TO BRING THIS RECORD ALONG WITH YOU.

**INSTRUCTIONS TO PARENT:**

1. Please fill in the date each day.
2. Please take temperature once daily at the same time and record exact thermometer reading.
3. If no symptoms are present, place a check (✓) under "NONE" beside that day's date.
4. If a symptom is present, place a check (✓) under it beside that day's date.
5. Describe other symptoms and any RASH in the space under "COMMENTS."
6. THIS IS VERY IMPORTANT INFORMATION. *Please do not misplace this card.*

# MEASLES-MUMPS-RUBELLA VACCINATION -

FAMILY No. \_\_\_\_\_

CASE No. \_\_\_\_\_

CHILD'S NAME \_\_\_\_\_  
LAST FIRST MIDDLE

SEX \_\_\_\_\_ BIRTHDATE \_\_\_\_\_ AGE \_\_\_\_\_ HISTORY: MEASLES \_\_\_\_\_  
MUMPS \_\_\_\_\_  
RUBELLA \_\_\_\_\_

PARENTS NAME \_\_\_\_\_  
LAST FIRST MIDDLE TELEPHONE No. \_\_\_\_\_

ADDRESS \_\_\_\_\_  
NUMBER STREET CITY STATE

LOCATION \_\_\_\_\_

PRE-VACCINATION \_\_\_\_\_

CLINICAL \_\_\_\_\_

I consent to have my child, named above, receive  
live attenuated measles, mumps, rubella virus  
vaccine.

SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_



VACCINATION: VACCINE \_\_\_\_\_

LOT 13-15

BLEEDINGS

1. DATE 17-22

VOL. \_\_\_\_\_

SITE \_\_\_\_\_

PRE-VACCINATION 17-22

CASE No. 5-8

POST-VACCINATION 29-34

BLEEDING DATE	SERDLOGY									CLINICAL SUMMARY					
	MEASLES			MUMPS			RUBELLA			POST VAC	MAX. TEMP.	CODE	COMPLAINTS	CODE	CODE
	1	2	3	1	2	3	1	2	3						
TEST										DAYS					
TECHNIQUE										0-4					
1.										5-12	27-30	31		32-33	34-35
2.										13-18	36-39	40		41-42	43-44
3.										19-28	45-48	49		50-51	52-53
4.										29-34	54-57	58		59-60	61-62
SUMMARY	PRE POST PRE			PRE POST			PRE POST			COMMENTS:					



Table 1

Serological Findings Among Children Who Received a 0.5 ml Dose of Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:								Initially Seropositive to:	
			Measles-Mumps-Rubella			Measles-Rubella		Mumps-Rubella		Mumps Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Rubella	Mumps	Rubella			
(Months) 11	8	7	6/7	7/7	7/7							
(Years) 1	63	32	29/30	30/30	30/30	0/1	1/1	1/1	1/1			
2	17	10	7/8	7/8	8/8			1/1	1/1	1/1		
3	11	6						1/1	1/1	3/3	2/2	
4	9	6	3/3	3/3	3/3	2/2	2/2					1
5	5	4	1/1	1/1	1/1	1/1	1/1			1/1		1
6	3	1									1/1	
7	1	0										
Total	117	66	46/49	48/49	49/49	3/4	4/4	3/3	3/3	5/5	3/3	2
Mean Age:	1.9 Years		(93.9%)	(98.0%)	(100%)							

## Overall Conversion Rates

Measles	Mumps	Rubella
49/53 (92.5%)	56/57 (98.2%)	59/59 (100%)

8/24/77

Table 2

Serological Findings Among Children Who Received a 1.0 ml Dose of Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:						Initially Seropositive to:
			Measles-Mumps-Rubella			Measles-Rubella		Mumps Only	Measles Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Rubella		
(Months) 11	1	1	1/1	1/1	1/1				
(Years) 1	11	8	7/7	7/7	7/7			1/1	
2	5	2				1/1	1/1	1/1	
3	1	0							
5	2	1	1/1	1/1	1/1				
Total	20	12	9/9	9/9	9/9	1/1	1/1	2/2	0
Mean Age:	1.7 Years		(100%)	(100%)	(100%)				

## Overall Conversion Rates

<u>Measles</u>	<u>Mumps</u>	<u>Rubella</u>
10/10	11/11	10/10
(100%)	(100%)	(100%)

8/24/77

Table 3

Serological Findings Among Children Who Received a 0.5 ml Dose of Combined  
Live Measles-Mumps-Rubella (HPV-77) Virus Vaccine, M-M-R (Study #467)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:									Initially Seropositive to: Measles Mumps and Rubella
			Measles-Mumps-Rubella			Measles-Rubella		Mumps-Rubella		Measles Only	Mumps Only	
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Rubella	Mumps	Rubella			
(Months)												
10	1	0										
11	2	2	1/2	1/2	2/2							
(Years)												
1	88	46	36/42	36/42	40/42	3/3	3/3				1/1	
2	19	10	3/3	2/3	3/3	2/2	2/2	1/1	1/1	1/1	2/2	1
3	12	6	4/4	4/4	3/4	1/1	1/1	1/1	1/1			
4	12	3	1/1	1/1	0/1	2/2	2/2					
5	3	2	1/1	1/1	1/1	1/1	1/1					
7	1	1										1
Total	138	70	46/53	45/53	49/53	9/9	9/9	2/2	2/2	1/1	3/3	2
Mean Age: 1.7 Years			(86.8%)	(84.9%)	(92.5%)							

## Overall Conversion Rates

Measles	Mumps	Rubella
56/63 (88.9%)	50/58 (86.2%)	60/64 (93.8%)

8/24/77

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps and Rubella, Who Received a 0.5 ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Measles (HAI)		Mumps (Neut.)		Rubella (HAI)	
Post Titer Distribution	Number of Children	Post Titer Distribution	Number of Children	Post Titer Distribution	Number of Children
<5	3	<2	1	16	1
5	2	2	8	32	1
10	2	4	11	64	11
20	4	8	8	128	22
40	9	>8	1	256	10
80	8	16	10	512	4
160	17	32	7		
320	4	64	3		
Total	49		49		49
Geometric Mean Titer	56.2		8.3		131.7

8/24/77

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps and Rubella, Who Received a 1.0 ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Measles (HAI)		Mumps (Neut.)		Rubella (HAI)	
Post Titer Distribution	Number of Children	Post Titer Distribution	Number of Children	Post Titer Distribution	Number of Children
160	4	2	2	64	1
320	4	4	5	128	2
640	1	8	1	256	3
		16	1	512	2
				1024	1
Total	9		9		9
Geometric Mean Titer	254.0		4.3		256.0

8/24/77

Table 6

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps and Rubella, Who Received a 0.5 ml Dose of Combined Live Measles-Mumps-Rubella (HPV-77) Virus Vaccine, M-M-R (Study #467)

Measles (HAI)		Mumps (Neut.)		Rubella (HAI)	
Post Titer Distribution	Number of Children	Post Titer Distribution	Number of Children	Post Titer Distribution	Number of Children
<5	7	<2	8	<8	4
5	2	2	9	8	9
20	2	4	14	16	7
40	6	8	9	32	11
80	14	>8	1	64	7
160	17	16	6	128	9
320	4	32	4	256	4
640	1	64	2	512	1
				1024	1
Total	53		53		53
Geometric Mean Titer	51.1		5.0		32.4

8/24/77



Table 7

Maximum Temperatures Reported Among Children Who Received a 0.5 ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Maximum Temperature (°F, Oral)	Total Vaccinees (117 Children)						Initially Seronegatives (61 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	61 (73.5%)	53 (64.6)	61 (75.3)	59 (73.8)	57 (72.2)	39	34 (77.3)	29 (69.0)	34 (79.1)	34 (81.0)	32 (78.0)	25
99 - 100.9	20 (24.1)	23 (28.0)	17 (21.0)	16 (20.0)	16 (20.3)	26	10 (22.7)	8 (19.0)	7 (16.3)	7 (16.7)	8 (19.5)	12
101 - 102.9	1 (1.2)	5 (6.1)	2 (2.5)	3 (3.8)	4 (5.1)	13		4 (9.5)	1 (2.3)	1 (2.4)		5
103 - 104.0	1 (1.2)	1 (1.2)	1 (1.2)	2 (2.5)	2 (2.5)	7		1 (2.4)	1 (2.3)		1 (2.4)	3
Not Taken	34	35	36	37	38	32	17	19	18	19	20	16

8/24/77

Table 8

High Temperatures Reported Among Children Who Received a 0.5 ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Patient No. (b) (6)	Max. Temp.	Time Period (Days)	Clinical Complaints	Serology					
				Measles		Mumps		Rubella	
				Pre	Post	Pre	Post	Pre	Post
	102.0	29-31	Upper Respiratory Illness	NS	NS	NS	NS	NS	NS
	102.0	3	Anorexia	NS	NS	NS	NS	NS	NS
	102.0	24-28	Upper Respiratory Illness, Gastro-intestinal Illness, Irritability						
	102.0	27	No Clinical Complaints	NS	NS	NS	NS	NS	NS
	103.0	26-29	Anorexia, Teething	NS	NS	NS	NS	NS	NS
	103.0	0-3	Upper Respiratory Illness	NS	NS	NS	NS	NS	NS
	103.2	9-11	Upper Respiratory Illness, Otitis, Lymphadenopathy, Ophthalmopathy, Gastrointestinal Illness, Anorexia, Soreness at Injection Site	<5	160	<2	32	<8	512
	104.0	22-23	Upper Respiratory Illness, Gastro-intestinal Illness, Headache	>20	40	2	4	>32	128
	103.6	40-41	Upper Respiratory Illness, Headache Anorexia	>20	80	<2	16	>32	128
	102.0	7-8	No Clinical Complaints	<5	80	<2	4	<8	128
	102.0	12	Upper Respiratory Illness, Ophthalmopathy	<5	<5	<2	8	<8	128
	103.0	30-33	Upper Respiratory Illness, Gastro-intestinal Illness	<5	10	<2	2	<8	128
	103.0	18	Upper Respiratory Illness, Teething	<5	5	<2	32	<8	256
	102.0	10-12	No Clinical Complaints	<5	40	<2	32	<8	256

8/24/77

Table 9

Maximum Temperatures Reported Among Children Who Received a 1.0 ml Dose of Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Maximum Temperature (°F, Oral)	Total Vaccinees (20 Children)						Initially Seronegatives (11 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	13 (76.5Z)	11 (64.7)	13 (81.3)	12 (70.6)	13 (76.5)	9	7 (70.0)	7 (70.0)	8 (80.0)	6 (60.0)	7 (70.0)	6
99 - 100.9	3 (17.6)	4 (23.5)	2 (12.5)	4 (23.5)	3 (17.6)	5	3 (30.0)	2 (20.0)	1 (10.0)	3 (30.0)	2 (20.0)	3
101.0		2 (11.8)			1 (5.9)	1		1 (10.0)			1 (10.0)	0
103.0	1 (5.9)		1 (6.3)	1 (5.9)		2			1 (10.0)	1 (10.0)		1
Not Taken	3	3	4	3	3	3	1	1	1	1	1	1

Patient No.	Max. Temp.	Time Period (Days)	Clinical Complaint	Measles	Mumps	Rubella
(b) (6)	103.0	0	No Clinical Complaint	NS	NS	NS
	103.0	13-15	No Clinical Complaint	<5	160	<2 4 <8 256
	103.0	22	No Clinical Complaint			

8/24/77

Table 10

Maximum Temperatures Reported Among Children Who Received a 0.5 ml Dose of Combined  
Live Measles-Mumps-Rubella (MPV-77) Virus Vaccine, M-M-R (Study #467)

Maximum Temperature (°F, Oral)	Total Vaccinees (138 Children)						Initially Seronegatives (70 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	73 (74.5%)	66 (68.0)	78 (81.3)	75 (78.1)	73 (78.5)	53	38 (76.0)	35 (70.0)	43 (86.0)	40 (80.0)	39 (81.3)	29
99 - 100.9	22 (22.4)	24 (24.7)	15 (15.6)	16 (16.7)	14 (15.1)	27	10 (20.0)	9 (18.0)	5 (10.0)	8 (16.0)	4 (8.3)	10
101 - 102.9	3 (3.1)	4 (4.1)	2 (2.1)	2 (2.1)	5 (5.4)	14	2 (4.0)	3 (6.0)	1 (2.0)		4 (8.3)	8
103 - 104.9		3 (3.1)	1 (1.0)	3 (3.1)	1 (1.1)	6		3 (6.0)	1 (2.0)	2 (4.0)	1 (2.1)	5
Not Taken	40	41	42	42	45	38	20	20	20	20	22	18

Patient No.	Max. Temp.	Time Period (Days)	Clinical Complaint	Measles	Mumps	Rubella
(b) (6)						
	102.0	5-6	Otitis	<5 320	<2 4	<8 16
	104.0	19-23	Upper Respiratory Illness, Nonspecific Viral Rash, Anorexia	<5 320	2 8	8 64
	103.0	34-39	Teething	<5 <5	<2 32	<8 1024
	103.0	8-10	No Clinical Complaints	<5 320	<2 8	<8 <8
	104.0	28	No Clinical Complaints			
	103.2	13-14	No Clinical Complaints	<5 640	<2 8	<8 256
	103.2	25	No Clinical Complaints			
	102.0	4-5	No Clinical Complaints	QNS 80	QNS 4	QNS 64
	102.0	27-36	Gastrointestinal Illness, Nonspecific Rash, Anorexia	<5 40	<2 >8	<8 32
	102.0	5-10	Upper Respiratory Illness, Anorexia	<5 160	<2 <2	<8 128
	102.0	15	Upper Respiratory Illness, Otitis	NS NS	NS NS	NS NS
	102.0	30-34	Upper Respiratory Illness	<5 40	<2 <2	<8 8
	102.4	1	No Clinical Complaints	<5 160	<2 32	<8 128
	103.0	7-12	Gastrointestinal Illness, Irritability, Anorexia, Teething	<5 160	<2 32	<8 32
	103.0	8-10	Ophthalmopathy	<5 160	<2 2	<8 32



Table 11

Clinical Complaints Reported Among Children Who Received a 0.5 ml Dose of Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Clinical Complaint	Total Vaccinees (117 Children)						No. with Complaint	Initially Seronegatives (61 Children)						No. with Complaint
	Days Post Vaccination					Days Post Vaccination								
	0-4	5-12	13-18	19-28	29-42	0-4		5-12	13-18	19-28	29-42			
Soreness at Injection Site	2 (2.2)	1 (1.1)	1 (1.1)			3	1 (2.1)	1 (2.1)	1 (2.1)			2		
Lymphadenopathy		2 (2.2)		1 (1.1)		3		2 (4.3)		1 (2.1)		3		
Measles-Like Rash	1 (1.1)	5 (5.6)	3 (3.4)			7	1 (2.1)	4 (8.5)	1 (2.1)			5		
Headache		1 (1.1)		1 (1.1)	1 (1.1)	3		1 (2.1)				1		
Irritability	4 (4.4)	4 (4.5)		1 (1.1)		8	3 (6.3)	1 (2.1)				4		
Fever-Temperature Not Reported	1 (1.1)	1 (1.1)				2		1 (2.1)				1		
Anorexia	10 (11.1)	12 (13.5)	6 (6.7)	7 (8.0)	6 (6.8)	23	5 (10.4)	7 (14.9)	4 (8.3)	2 (4.3)	1 (2.1)	11		
Flush					1 (1.1)	1						0		
Disturbed Sleep	2 (2.2)					2						0		
Myalgia	1 (1.1)					1	1 (2.1)					1		
Upper Respiratory Illness	15 (16.7)	29 (32.6)	17 (19.1)	20 (22.7)	31 (35.2)	53	6 (12.5)	13 (27.7)	9 (18.8)	9 (19.1)	10 (21.3)	22		
Otitis	1 (1.1)	2 (2.2)	2 (2.2)	1 (1.1)	1 (1.1)	2		1 (2.1)	1 (2.1)			1		
Ophthalmopathy		5 (5.6)	4 (4.5)	3 (3.4)	4 (4.5)	9		3 (6.4)	3 (6.3)	2 (4.3)	1 (2.1)	4		
Gastrointestinal Illness	9 (10.0)	15 (16.9)	10 (11.2)	12 (13.6)	13 (14.8)	31	4 (8.3)	12 (25.5)	6 (12.5)	7 (14.9)	4 (8.5)	16		
Nonspecific Rash	1 (1.1)	1 (1.1)	1 (1.1)	1 (1.1)	4 (4.5)	6		1 (2.1)				1		
Poison Ivy		1 (1.1)	1 (1.1)			1						0		
Allergy		1 (1.1)		1 (1.1)		2		1 (2.1)		1 (2.1)		2		
Teething	1 (1.1)	4 (4.5)	4 (4.5)	2 (2.3)	2 (2.3)	10	1 (2.1)	2 (4.3)	2 (4.2)			5		
Negative Surveillance	27	28	28	29	29	27	13	14	13	14	14	13		
Persons with Complaint:	30 (33.3)	44 (49.4)	28 (31.5)	30 (34.1)	37 (42.0)	56	12 (25.0)	21 (44.7)	14 (29.2)	14 (29.8)	13 (27.7)	25		
Persons with No Complaint:	60 (66.7)	45 (50.6)	61 (68.5)	58 (65.9)	51 (58.0)	33	36 (75.0)	26 (55.3)	34 (70.8)	33 (70.2)	34 (72.3)	23		

Table 12

Clinical Complaints Reported Among Children Who Received a 1.0 ml Dose of Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #621/C-D763 (Study #467)

Clinical Complaint	Total Vaccinees (20 Children)						Initially Seronegatives (11 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Soreness at Injection Site	1 (5.9%)					1	1 (10.0)					1
Lymphadenopathy	1 (5.9)					1	1 (10.0)					1
Arthralgia			1 (5.9)			1						0
Measles-Like Rash			1 (5.9)			1			1 (10.0)			1
Irritability	1 (5.9)	1 (5.9)				1	1 (10.0)	1 (10.0)				1
Fever - Temperature Not Reported				1 (5.9)		1				1 (10.0)		1
Anorexia			1 (5.9)	1 (5.9)		2			1 (10.0)			1
Upper Respiratory Illness	4 (23.5)	5 (29.4)	2 (11.8)	4 (23.5)	1 (5.9)	8	1 (10.0)	1 (10.0)		2 (20.0)		4
Otitis			1 (5.9)	1 (5.9)	1 (5.9)	1			1 (10.0)	1 (10.0)	1 (10.0)	1
Gastrointestinal Illness	3 (17.6)		1 (5.9)	1 (5.9)		4	2 (20.0)		1 (10.0)			2
Impetigo				1 (5.9)		1				1 (10.0)		1
Negative Surveillance	3	3	3	3	3	3	1	1	1	1	1	1
Persons with Complaint:	7 (41.2)	6 (35.3)	5 (29.4)	5 (29.4)	2 (11.8)	9	3 (30.0)	2 (20.0)	2 (20.0)	3 (30.0)	1 (10.0)	5
Persons with No Complaint:	10 (58.8)	11 (64.7)	12 (70.6)	12 (70.6)	15 (88.2)	8	7 (70.0)	8 (80.0)	8 (80.0)	7 (70.0)	9 (90.0)	5



Table 13

Clinical Complaints Reported Among Children Who Received a 0.5 ml Dose of Combined  
Live Measles-Mumps-Rubella (MMV-77) Virus Vaccine, M-M-R (Study #467)

Clinical Complaint	Total Vaccinees (138 Children)					No. with Complaint	Initially Seronegatives (70 Children)					No. with Complaint
	Days Post Vaccination						Days Post Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	7 (6.9%)					7	3 (5.7)					3
Soreness	6					6	2					2
Soreness and Induration	1					1	1					1
Systemic:												
Measles-Like Rash		5 (5.0)	2 (2.0)			5		1 (1.9)				1
Headache	1 (1.0)		1 (1.0)		2 (2.0)	2					1 (1.9)	1
Irritability	3 (3.0)	4 (4.0)	2 (2.0)	3 (3.0)		9	2 (3.8)	1 (1.9)		1 (1.9)		4
Anorexia	11 (10.9)	17 (16.8)	5 (5.0)	6 (5.9)	4 (4.0)	24	6 (11.3)	9 (17.0)	1 (1.9)	3 (5.7)	3 (5.7)	14
Flush	1 (1.0)					1						0
Disturbed Sleep		1 (1.0)				1						0
Myalgia	2 (2.0)					2	1 (1.9)					1
Upper Respiratory Illness	18 (17.8)	19 (18.8)	15 (14.9)	18 (17.8)	24 (23.8)	45	10 (18.9)	9 (17.0)	6 (11.3)	7 (13.2)	8 (15.1)	20
Otitis	1 (1.0)	4 (4.0)	2 (2.0)	1 (1.0)	1 (1.0)	7	1 (1.9)	2 (3.8)				3
Ophthalmopathy	2 (2.0)	3 (3.0)		1 (1.0)	2 (2.0)	6	2 (3.8)	2 (3.8)				4
Gastrointestinal Illness	15 (14.9)	12 (11.9)	5 (5.0)	5 (5.0)	6 (5.9)	27	7 (13.2)	3 (5.7)	3 (5.7)	2 (3.8)	4 (7.5)	11
Rash-Nonspecific	1 (1.0)	3 (3.0)	5 (5.0)	3 (3.0)	4 (4.0)	12	1 (1.9)	1 (1.9)	4 (7.5)	1 (1.9)	1 (1.9)	6
Varicella				1 (1.0)	1 (1.0)	1						0
Other*	1 (1.0)	1 (1.0)				2	1 (1.9)					1
Genitourinary Infection				1 (1.0)	1 (1.0)	1						0
Allergy	2 (2.0)	2 (2.0)		1 (1.0)		3	2 (3.8)	2 (3.8)				2
Teething		2 (2.0)	4 (4.0)	5 (5.0)	2 (2.0)	8		1 (1.9)		1 (1.9)	2 (3.8)	3
Negative Surveillance	37	37	37	37	37	37	17	17	17	17	17	17
Persons with Complaint:	36 (35.6)	41 (40.6)	24 (23.8)	26 (25.7)	30 (29.7)	57	20 (37.7)	18 (34.0)	9 (17.0)	10 (18.9)	12 (22.6)	27
Persons with No Complaints	65 (64.4)	60 (59.4)	77 (76.2)	75 (74.3)	71 (70.3)	44	33 (62.3)	35 (66.0)	44 (83.0)	43 (81.1)	41 (77.4)	26

\* Includes ingested lighter fluid and bloody nose.

# MEMO

To File Location Date 9/27/77  
From T. Schofield Location W26-285  
Subject Statistical Analysis - Study #467

Significant differences in seroconversion rates for measles, mumps, and rubella and clinical reaction rates among three groups of vaccinees were investigated. The groups were those who received a 0.5 ml dose of combined live measles-mumps-rubella (RA 27/3) virus vaccine (Group 1), those who received a 1.0 ml dose of the same (Group 2), and those who received a 0.5 ml dose of combined live measles-mumps-rubella (HPV-77) virus vaccine (Group 3).

Significant difference exists in the mumps seroconversion rate among these groups. 56 out of 57 (98.2%) converted in Group 1, 11 out of 11 (100.0%) in Group 2, and 50 out of 58 (86.2%) in Group 3. No significant differences exist for other rates.

Analysis of variance was performed on post-titer values of triple-negative vaccinees. The log transformation was used. Significant differences among the groups existed for all three components. Multiple comparisons showed the following:

- a) For measles, children in Group 2 (GMT = 254.0) had significantly greater post titer (in the log scale) than did those in Group 1 (GMT = 56.2) and those in Group 3 (GMT = 51.1);
- b) For mumps, children in Group 1 (GMT = 8.3) had significantly greater post titer than did those in Group 2 (GMT = 4.3) and those in Group 3 (GMT = 5.0);
- c) For rubella, children in Group 1 (GMT = 131.7) and Group 2 (GMT = 256.0) had significantly greater post titer than did those in Group 3 (GMT = 32.4).



T.S.  
6801



## CLINICAL SUMMARY

Study Name - Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Study Number - Clinical Protocol - 467

Material - Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot #621/C-D763

Combined live measles-mumps-rubella (HPV-77) virus vaccine  
Lot #0131V

Purpose - To compare clinical and antibody responses to combined live measles-mumps-rubella virus vaccine containing the RA 27/3 rubella virus strain or the HPV-77 duck rubella virus strain.

Time Period of  
Observation - Initiated: June 7, 1976; completed: May 12, 1977

### Medical Opinion

At the following locations: Burlington County Health Care Clinics-Riverside Clinic, Zurbrugg Memorial Hospital, Riverside, New Jersey, Browns Mills Clinic, Deborah Hospital, Browns Mills, N.J., Mount Holly Clinic, Mt. Holly, N.J.; Delaware State Health Clinics, Dover Delaware and the DeLaWar Clinic and Northeast Clinic, Wilmington, Delaware; Elizabeth M. Craven, M.D., Pediatric Clinics, Wilmington Medical Center, Wilmington, Delaware; The Lankenau Hospital Pediatric Clinic, Philadelphia, Pa.; and George A. Starkweather, M.D.'s office, Havertown, Pa.; 275 children, 10 months to seven years of age were enrolled in this study with parental consent. Two-hundred fifty-five children received a 0.5 ml. subcutaneous dose of either vaccine. Inadvertently, twenty children received a 1.0 ml. subcutaneous dose of combined measles-mumps-rubella (RA 27/3) virus vaccine. Each child received a report card and the parents were encouraged to record local and systemic reactions for 42 days. Paired blood samples were obtained prior to and 6 weeks following vaccination from 148 of 275 (54%) children to perform measles hemagglutination inhibition, mumps neutralization and rubella hemagglutination inhibition tests.

Measles-mumps-rubella (RA 27/3) virus vaccine was given to 137 children, ages 11 months to 7 years (mean age 1.9 years) with 78 paired sera, seropositive to m-m-r in two and seronegative as follows: m-m-r 58, measles-rubella 5, mumps-rubella 3, mumps 7, rubella 3 - 13 m-m-r seronegatives had only a pre-injection serology test. Measles-mumps-rubella (HPV-77) virus vaccine was given to 138 children, ages 10 months to seven years (mean age 1.7 years) with 70 paired sera seropositive to m-m-r in 2 and seronegative as follows: m-m-r 53, measles-rubella 9, mumps-rubella 2, measles 1, mumps 3 - 17 m-m-r seronegatives had only a pre-injection serology tested. Seroconversion rates for triple seronegatives were similar to the overall seroconversion rates which are as follows with the geometric mean titers: m-m-r (RA 27/3) vaccine 0.5 ml. dose; measles 49/53 (92.5%, 56.2); mumps 56/57 (98%, 8.3); rubella 59/59 (100%, 131.7); m-m-r RA 27/3 vaccine 1.0 dose; measles 10/10 (254); mumps 11/11 (4.37); rubella 10/10 all 100% (256); m-m-r HPV-77 vaccine 0.5 ml. dose; measles 56/63 (88.9%, 51.1); mumps 50/58 (86.2%, 50) rubella 60/64 (98.8%, 32.4).

Medical Opinion (cont.)

The seroconversion rates and geometric mean titers are greater following 0.5 ml. m-m-r RA 27/3 than 0.5 ml. m-m-r HPV as follows: measles - 92.5% vs. 88.8%, 56.2 vs. 51.1; mumps - 98.2% vs 86.2%, 8.3 vs. 5.0; rubella - 100% vs. 93.8%, 131.7 vs. 32.4. The difference in the mumps seroconversion rates, mumps geometric mean titers and rubella geometric mean titers are statistically significant. Interestingly, all (11) measles vaccine failures were less than 15 months of age (2-11, 6-12, 2-13, 1-14 months) and may be related to the persistence of maternal antibody. This pattern was not observed in previous studies. Two of 4 rubella failures (13 months) and 4 of 8 mumps failures were less than 15 months old (1-11, 2-12, 1-13 months).

Clinical report cards were returned on 202 of 275 (73%) of vaccinees with no significant vaccine related clinical reaction reported. Temperature elevations were similar among both vaccine groups with no definite pattern during the observation period. Most temperature elevations are related to intercurrent infection with minimal vaccine related fever occurring between days 5 and 12. Injection site soreness was rarely reported in each group. Measles-like rash was reported in m-m-r RA 27/3 vaccinees as follows: 0.5 ml. - 7, 1.0 ml. - 1, and in 5 m-m-r HPV vaccinees. No arthralgia or arthritis were reported. Lymphadenopathy was reported by 4 m-m-r RA 27/3 vaccinees only. Non-specific complaints were similar in both groups.

Comparing combined m-m-r RA 27/3 vaccine with m-m-r HPV-77 vaccine reveals no difference in the mild clinical complaints and temperature elevations reported but a greater seroconversion rate and geometric mean titer to all three viruses following m-m-r RA 27/3 vaccine. Although both vaccines are excellent for immunization, m-m-r RA 27/3 combined vaccine is superior and recommended.



Robert E. Weibel, M.D.  
October 5, 1977

REW:ceb

Reference No. 5

Clinical Protocol - Study #473

Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Program: Testing of combined live measles-mumps-rubella vaccines in children.

Purpose: To evaluate and compare clinical and immunological responses to two measles-mumps-rubella virus vaccines.

Vaccines: 1. Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot #621/C-D763

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

2. Combined live measles-mumps-rubella (HPV-77, duck) virus vaccine  
Lot #2127V or 2209V

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial of vaccine should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water.

CAUTION: Both vaccines may contain egg protein and should not be given to persons with known sensitivity to chicken or duck, chicken or duck eggs or feathers. The vaccines also contain neomycin and should not be given to persons with sensitivity to neomycin. Persons with leukemia or other immunologic disorders and persons receiving immunosuppressive drugs should not be vaccinated. The vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccine stored at  $-20^{\circ}$  C.

Keep dried vaccines at  $4^{\circ}$  C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of children 1 to 10 years of age who have a negative history of vaccination for and illness caused by measles, mumps and rubella. The children will be assigned to receive one of the two vaccine as follows:



Clinical Protocol - Study #473  
 Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Procedure: (continued)	Group	Vaccine	No. of Persons
	1	M-M-R (HPV-77 + 5 duck)	up to 200 children
	2	M-M-R (RA 27/3)	up to 200 children

Informed written consent will be obtained from a parent or guardian of each child prior to his participation in the study.

Each child will be bled (10-15 ml) immediately prior to vaccination and 6-8 weeks following vaccination. Each child will receive 0.5 ml of vaccine given subcutaneously.

Each child will be followed clinically for occurrence of local and systemic reactions within 6 weeks following vaccination. Observations should include special notation for rash, nodes, arthralgia, arthritis, fever, malaise, and anorexia. The person(s) observing reactions should not know which preparation the child received.

## Schedule:

Time	Action
Day 0	Bleed 10-15 ml. Vaccinate 0.5 ml, subcutaneously.
Days 0-42	Clinical follow-up for local and systemic reactions.
Weeks 6-8	Bleed 10-15 ml.

Laboratory: Remove serum from clot aseptically and store frozen at  $-20^{\circ}$  C.

Serology: Levels of circulating antibody before and after vaccination will be determined. Measles and rubella antibody levels will be determined by hemagglutination-inhibition test. Mumps antibody levels will be determined by serum neutralization test.

Clinical  
Forms: Attached.

Adverse  
Reactions: Any serious or alarming reaction, including death due to any cause during this investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Arlene McLean, telephone (215) 699-5311, Ext. 6383.

Clinical Protocol - Study #473  
Combined Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Unused

Vaccine: All unused vaccine should be returned immediately to the Virus and Cell Biology Laboratories of the Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.



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M. R. Hilleman, Ph.D.

Yale University New Haven, Connecticut 06510

SCHOOL OF MEDICINE  
*Department of Epidemiology  
and Public Health*  
60 College Street

October 12, 1977

Dr. Arlene McClaine  
Merck Institute For Therapeutic  
Research  
West Point, Pennsylvania

Dear Doctor McClaine:

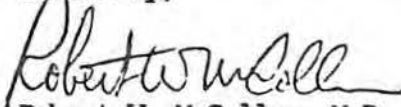
As a follow-up to our recent telephone conversation, I submit the following information about our current participation in studies concerned with comparisons of HPV-77 DE<sub>c</sub> and RA27/3 live attenuated rubella virus vaccines (b) (4), (b) (6). Our studies in children have now been approved at all levels in each of the various pediatric clinic settings, but have not yet been started. After several prolonged difficulties in filling the position of central coordinator, we now have a good person whose interest, capabilities and prior record give both Dr. Horstmann and me a feeling of reassurance about essential features of recruitment and follow-up of eligible participants. We anticipate a vast improvement in the studies, both qualitative and quantitative.

To date

(b) (4), (b) (6)  
(b) (4), (b) (6)

I will send you a progress report on the (b) (4), (b) (6) after our new organizational effort has begun to bear fruit.

Sincerely,

  
Robert W. McCollum, M.D.  
Chairman

RWM/fn

# SYMPTOM RECORD

M-M-R STUDY NO. \_\_\_\_\_

AME \_\_\_\_\_ (Last) \_\_\_\_\_ (First) \_\_\_\_\_ (Middle) CASE NO. \_\_\_\_\_

DAY	DATE	Temperature		NONE	RUNNY NOSE	SORE THROAT	COUGH	EAR ACHE	SWOLLEN GLANDS	SORE EYES	VOMITING	DIARRHEA	NAUSEA	* RASH	* SORE JOINTS	* SORE ARM (at shot)	HEADACHE	ACHINESS	FEVER	LOSS OF APPETITE	*Describe	COMMENTS
		<input type="checkbox"/> Rectal	<input type="checkbox"/> Oral (Check One)																			
0																						
1																						
2																						
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ever or unusual reaction develops, call:

PLEASE RETURN FOR FOLLOW-UP VISIT ON: \_\_\_\_\_

BE SURE TO BRING THIS RECORD ALONG WITH YOU.

**INSTRUCTIONS:**

1. Please fill in the date each day.
2. Please take temperature once daily at the same time and record exact thermometer reading.
3. If no symptoms are present, place a check ( ✓ ) under "NONE" beside that day's date.
4. If a symptom is present, place a check ( ✓ ) under it beside that day's date.
5. Describe other symptoms and any RASH in the space under "COMMENTS."
6. THIS IS VERY IMPORTANT INFORMATION. *Please do not misplace this card.*



# MEASLES - MUMPS - RUBELLA

Study No. \_\_\_\_\_ (1-3)

Case No. \_\_\_\_\_ (5-9)

CT 2	Name	Sex (35)	Birthdate (36-41)			(46-47)
		M F	mo	day	yr	

Address \_\_\_\_\_

Indicate if this child:

☐ had disease      Did child develop clinical disease: 1 = YES 2 = NO

☐ been vaccinated      Date of onset: \_\_\_\_\_

☐ been exposed      Comments: \_\_\_\_\_

Date of exposure \_\_\_\_\_      Diagnosed by: \_\_\_\_\_

☐ (48) Vaccinee      ☐ Control      Date of Vaccination \_\_\_\_\_      Bleeding Dates: \_\_\_\_\_ (58-63)

Lot No. \_\_\_\_\_ (49-51)      \_\_\_\_\_ (52-57)      \_\_\_\_\_ (70-75)

CT 3	DAY	DATE	Temperature		Malaise	Anorexia	Gastrointestinal	Irritability	Headache	Upper Respiratory	Illness	Otitis	Conjunctivitis	Lymphadenopathy	Local Reaction*	Erythema*	Rash*				Arthralgia	Arthritis	*Specify (Type, Location)
			Oral	Rectal													51	52	11	32			
	0																						
	1																						
	2																						
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Please return completed forms to: (Retain PINK copy for your files)

M. R. HILLEMANN, PhD, DSc  
MERCK SHARP & DOHME RESEARCH LABORATORIES  
WEST POINT, PENNSYLVANIA, 19406, U.S.A.

Physician's Signature \_\_\_\_\_ Date \_\_\_\_\_

Physician's Name (Type or Print) \_\_\_\_\_



**Program:** Study #484 - To evaluate and compare clinical and immunological responses to two combined live measles-mumps-rubella virus vaccines.

**Vaccine:** Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot #621/C-D763

Combined live measles-mumps-rubella (HPV-77) virus vaccine  
M-M-R

**Responsible Clinical Investigator:**

Anne Gershon, M.D.  
8th Floor North 16  
Bellevue Hospital  
1st Avenue and East 27th Street  
New York, New York 10016

**Study Location:** New York, New York

**Date Study Initiated:** December 23, 1976

**Date Study Completed:** In Progress

**Study Procedure:**

Sixty-three children, 13 months to 15 years of age, and one adult, have been included in the study thus far. Thirty received a 0.5 ml subcutaneous dose of one of the two vaccines. Thirty-four children received a 1.0 ml subcutaneous dose of combined live measles-mumps-rubella (RA 27/3) virus vaccine. Blood samples were obtained on day of vaccination and 8-12 weeks after vaccination. Each child was followed 6 weeks for clinical complaints. The study continues in progress.



# NEW YORK UNIVERSITY MEDICAL CENTER

School of Medicine

550 FIRST AVENUE, NEW YORK, N.Y. 10016

AREA 212 679-3200

CABLE ADDRESS: NYUMEDIC

Department of Pediatrics

December 19, 1977

Arlene McLean, Ph.D.  
Merck Sharp & Dohme  
Research Laboratories  
West Point, PA  
19486

Dear Arlene,

Enclosed is a follow-up on the progress report I sent you in August. I have simply updated the tables because they really tell the whole story. If you want anything more detailed than this, please let me know.

With best regards.

Sincerely yours,

Anne A. Gershon, M.D.  
Associate Professor  
Dept. of Pediatrics

AAG/mac  
Enclosure

MMR Study: Children 1-15 years old

12/19/77

	RA 27/3	HPV 77
<u>Number vaccinated</u>	<u>39</u>	<u>25</u>
Number vaccinated with follow-up serum specimens	13	7
Number susceptible	13/13	7/7
Number with seroconversion	13/13	7/7
Number with reaction	0/13	0/7
Reactions (none)		



# NEW YORK UNIVERSITY MEDICAL CENTER

School of Medicine

350 FIRST AVENUE, NEW YORK, N.Y. 10016

AREA 212 679-1200

CABLE ADDRESS: NYUMEDIC

Department of Pediatrics

August 17, 1977

Maurice R. Hilleman, Ph.D.  
Director  
Virus & Cell Biology Research  
Merck Sharp & Dohme  
West Point, Pennsylvania 19486

Dear Dr. Hilleman,

I am enclosing a progress report on our study of rubella vaccines RA 27/3 vs HPV 77, in adults and children. We are continuing to immunize and more data should be forthcoming.

With best regards.

Sincerely yours,

Anne A. Gershon, M.D.  
Associate Professor  
Dept. of Pediatrics

AAG/mac  
Enclosure

cc: Dr. Arlene McLean ✓

2. Infants and children were given rubella RA 27/3 or HPV 77 in combination with their regular measles and mumps vaccine (MMR). The ages of the subjects ranged from 13 months to 15 years. Informed parental consent was obtained. At the time of MMR immunization a blood sample was obtained to determine the child's immune status with regard to rubella. A second blood sample was obtained approximately 8-12 weeks after MMR immunization for rubella HI titer.

The subjects who received HPV 77 rubella vaccine in MMR received the standard dose of vaccine. Those who received RA 27/3 rubella vaccine in MMR received double the usual dose of vaccine. All vaccines were given by subcutaneous injection.

Thirty four children received RA 27/3 rubella vaccine as MMR. There has been follow-up on 5 of these subjects so far. All have developed rubella HI antibody with a titer of 1:128 or 1:256. No reactions to the vaccine have been reported. Follow-up on more of these vaccine recipients will be obtained with time.

Seventeen children and 1 adult received HPV 77 rubella vaccine as MMR. To date follow-up has been obtained on 3 of these children; additional follow-ups are expected to be forthcoming. Of the 3 who have been followed, one had an initial rubella HI titer of  $\geq 32$  at immunization and an HA

titer of 1:128 after vaccination. Two children had titers which were <1:8 at vaccination and increased to 1:16 and 1:32 after vaccination.





# NEW YORK UNIVERSITY MEDICAL CENTER

School of Medicine

550 FIRST AVENUE, NEW YORK, N.Y. 10016

AREA 212 679-3200

CABLE ADDRESS: NYUMEDIC

Department of Pediatrics

October 3, 1977

Dr. Arlene McClean  
Merck Sharp and Dohme  
Research Laboratories  
West Point, Pennsylvania 19486

Dear Dr. McClean,

Please find enclosed an information sheet given to the mothers of children receiving the M-M-R vaccine. They are asked to record any reactions to the vaccine and return the slip to the doctor in the Pediatric Clinic. This information is given to Dr. Judy Wallin, who is supervising the study in the Pediatric Clinic at Bellevue Hospital. She keeps this information and we are informed via "word of mouth" with regard to these reactions.

I apologize for the confusion.

Thank you.

Sincerely yours,

Maura Caruth  
Secretary to Dr. Anne Gershon  
Dept. of Pediatrics

INFORMATION FOR MOTHERS

Baby's Name \_\_\_\_\_

Date of Vaccination \_\_\_\_\_

Your baby has just received a measles-mumps-rubella vaccination. He/she will probably have no symptoms afterward. If you think the baby is having a reaction, please take the baby's temperature. Write down any problems the baby is having:

YES

NO

Fever

Rash

Joint pain

Swelling  
Where?

If the baby seems sick please telephone Dr. Gershon or Dr. Reese at 561-3612 between 9 AM-5 PM. If the baby is sick on a weekend or at night take him/her to the PES. They will contact a doctor for you.

These vaccines are safe and an important part of your baby's health care to prevent disease.

We will contact you in 2 months by telephone or letter about drawing a second blood sample from your baby. There will be no charge for the second blood drawing. It will tell you whether your baby is immune to measles and German measles (rubella) because of the vaccination.

PLEASE SAVE THIS LETTER AND BRING IT BACK TO CLINIC WITH YOU

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# NEW YORK UNIVERSITY MEDICAL CENTER

School of Medicine

350 FIRST AVENUE, NEW YORK, N.Y. 10016

AREA 212 679-1200

CABLE ADDRESS: NYUMEDIC

Department of Pediatrics

September 21, 1976

Arlene A. McLean, Ph.D.  
Merck Sharp & Dohme  
Research Laboratories  
Division of Merck & Co., Inc.  
West Point, Pennsylvania 19486

Dear Dr. McLean:

Enclosed is a copy of the revised consent form for measles-mumps-rubella RA 27/3 vaccine, and a letter from the Chairman of the Human Use Committee granting approval of the consent.

I hope we can have the new vaccine soon.

Many thanks.

Sincerely yours,

*Anne A. Gershon*

Anne A. Gershon, M.D.  
Associate Professor  
Department of Pediatrics

AAG:rr  
Enclosure



# NEW YORK UNIVERSITY MEDICAL CENTER

School of Medicine

550 FIRST AVENUE, NEW YORK, N.Y. 10016

TELEPHONE 212-679-1200

FACILE ADDRESS: NYUMEDIC

Department of Pediatrics

## STUDY OF MEASLES - MUMPS - RUBELLA VACCINE

In the United States, measles, mumps and rubella (German measles) vaccine should be given to babies between the ages of 12 months - 15 months. These vaccines are important because they provide babies and children with long-lasting immunity to measles, mumps and rubella (German measles).

Many clinics are now giving babies a combined measles-mumps-rubella vaccine in one injection. Our clinic has recently received a new vaccine which contains regular measles-mumps vaccine combined with a new, unlicensed rubella vaccine called RA-27. This RA-27 vaccine has been used experimentally in many children (in Europe) and it seems to produce better antibodies than the one which is now licensed for use in the United States.

Our study is designed to see how good this experimental rubella RA-27 vaccine really is. It is combined with the measles-mumps vaccine so that your child will only have to have one injection. We will also have to obtain a small sample of blood (5 ml or about a teaspoonful) before and eight weeks after the vaccine is given.

The known side effects of this type of vaccine are very few and occur only rarely in children. The side effects are fever, rash, and joint pain. Should any of these occur they will disappear after a few days without any treatment.

If you would like your child to receive the measles-mumps-RA-27-rubella vaccine you should sign this sheet in the space provided for your signature. Your child does not have to participate in this study if you do not want him (her) to. In that case your child should receive regular measles-mumps-rubella vaccine in our clinic. Should you decide to have your child participate in this study, his (her) participation will be kept strictly confidential.

---

SIGNATURE

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WITNESS

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DATE

NAME OF P.I. OR PROJECT DIRECTOR <b>Anne A. Gershon, M.D.</b>	SOCIAL SECURITY NO. (b) (6)	DEPARTMENT <b>Pediatrics</b>	CODE
TITLE OF PROGRAM <b>Measles - Rubella Vaccine Trial</b>			
OF SPONSOR		GRANT OR CONTRACT NO.	
TYPE OF PROGRAM: <input checked="" type="checkbox"/> RESEARCH, <input type="checkbox"/> EDUCATION & TRAINING, <input type="checkbox"/> FELLOWSHIP, <input type="checkbox"/> OTHER (EXPLAIN)		N.Y.U.M.C. A/C #	

## PART IVA HUMAN SUBJECTS (CONTINUED)

- A. List specific procedures to be used which involve human subjects or human materials; detail potential hazards and indicate the probability that they may occur. If procedure is heretofore untried, and hazards are not known, so indicate.
- B. Describe the benefit to the subject or advancement of knowledge that will balance the risk involved.
- C. Indicate measures proposed to minimize risk and, if applicable, methods for preserving confidentiality and rights of the subjects.

PROTOCOL

- A. 1. Venipuncture before and 8 weeks after vaccine is given. No appreciable hazard. 5 ml or less blood will be obtained.
2. Measles-rubella vaccine. No appreciable hazard. Measles component is a licensed product routinely given to infants of this age. Rubella vaccine is unlicensed in the United States, but has been widely given to children in Europe. Side effects from this vaccine are very few in children and similar in rate of occurrence to the rubella vaccine which is licensed in the United States. Possible side effects are rash, fever and joint pains all of which are transient. In a recent study conducted by Merck, the following side effects were observed. Those receiving licensed rubella vaccine: 24. rash - 0, arthralgia - 0, adenopathy - 0. Those receiving RA-27 rubella vaccine: 26. rash - 3, arthralgia - 1, adenopathy - 0.
- B. Benefit to patient - Infant will be immunized against rubella and measles with only one injection and one clinic visit. RA-27 rubella vaccine may provide better immunity than the presently licensed rubella vaccine.
- C. Sterile technique will be used at all times and the identity of the patient will not be revealed in any publications concerning this study.



# MEASLES - RUBELLA VACCINATION

Study No. (1-3)

Case No. (5-9)

<b>CT 3</b>	Name _____	Sex (30) M F	Birthdate (20-41) mo. day yr	(45-47)
Address _____				
<p>Indicate if this child:</p> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> had disease  <input type="checkbox"/> been vaccinated  <input type="checkbox"/> been exposed            Date of exposure _____         </div> <div>           Did child develop clinical disease: 1 = YES 2 = NO            Date of onset: _____            Comments: _____            Diagnosed by: _____         </div> </div>				
<div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Vaccinee (48)            Lot No. (49-51) _____         </div> <div> <input type="checkbox"/> Control            Date of Vaccination _____            (52-57)         </div> <div>           Bleeding Dates: _____            (58-63)            _____            (70-75)         </div> </div>				

CT 3	DAY	DATE	Temperature		Malaise	Anorexia	Gastrointestinal	Irritability	Headache	Upper Respiratory Illness	Otitis	Conjunctivitis	Lymphadenopathy	Local Reaction*	Eruption	Rash		Arthralgia	Arthritis	*Specify (Type, Location)
			Oral	Rectal												Rubella-like rash				
			24		16	25	08	15	14	01	03	08	05	12	50	51	11	32		
0																				
1																				
2																				
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4																				
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Please return completed forms to: (Retain PINK copy for your files) <b>M. R. HILLEMANN, PhD, DSc</b> <b>MERCK SHARP &amp; DOHME RESEARCH LABORATORIES</b> <b>WEST POINT, PENNSYLVANIA, 19406, U.S.A.</b>	Physician's Signature _____ Physician's Name (Type or Print) _____ Date _____
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**Program:** Study #511 - To measure antibody and clinical responses to three consecutive lots of combined measles-mumps-rubella virus vaccine.

**Vaccine:** Combined live measles-mumps-rubella (RA 27/3) virus vaccine, lyophilized

Lot #60664/C-E810

Lot #60665/C-E811

Lot #60666/C-E812

**Responsible Clinical Investigator:**

Victor M. Villarejos, M.D.  
Director  
Louisiana State University  
International Center for Medical  
Research and Training  
Apartado 10.155  
San Jose, Costa Rica

**Study Location:** Nicaragua

**Date Study Initiated:** July 4, 1977

**Date Study Completed:** September 14, 1977

**Study Procedure:**

One hundred fifty children, 8 months to 11 years of age, were included in the study. Each received a 0.5 ml subcutaneous dose of combined live measles-mumps-rubella virus vaccine. Blood samples were obtained on day of vaccination and 6 weeks after vaccination. Each child was followed 6 weeks for clinical complaints.

Clinical Protocol - Study #511

Combined Live Measles-Mumps-Rubella (RA 27/3)

Virus Vaccine

**Program:** Combined live measles-mumps-rubella virus vaccine

**Purpose:** To measure antibody and clinical responses to three consecutive lots of vaccine.

**Vaccine:** Combined live measles-mumps-rubella virus vaccine, lyophilized,  
Lot. No. 60664/C-E810  
Lot. No. 60665/C-E811  
Lot. No. 60666/C-E812

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be reconstituted with 0.7 ml of sterile, pyrogen-free distilled water which is supplied in prefilled syringes.

CAUTION: The vaccine contains egg protein and should not be given to persons with known sensitivity to chicken or duck, chicken or duck eggs or feathers. The vaccine contains neomycin and should not be given to persons sensitive to neomycin. Persons with leukemia or other immunologic disorder and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccine should not be given to persons with a febrile respiratory illness or other active febrile infection.

Keep dried vaccine stored at -20° C until used.

Keep dried vaccine at 4° C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

**Procedure:** The study population will consist of up to 150 children with a negative history for vaccination and illness caused by measles, mumps and rubella viruses. The children should range from 1 to 6 years of age.

Approximately 25 to 50 children will receive each of the three vaccine lots.

Informed written consent will be obtained from a parent or guardian of each child who participates in the study.

Clinical Protocol - Study #511  
Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Procedure:  
(Continued)

Each child will receive a 0.5 ml subcutaneous injection of vaccine.

Bleeding samples (10-15 ml) will be obtained from each child immediately before and 6 weeks after vaccination.

Each child will be followed clinically for local and systemic complaints occurring within 6 weeks after vaccination. Observations should include special notation for rash, nodes, arthralgia, arthritis, fever, malaise and anorexia. All complaints should be recorded on the case report form.

Schedule:

Time	Action - All Persons
Day 0	Bleed 10-15 ml Vaccinate 0.5 ml, subcutaneously
Days 0-42	Clinical follow-up for local and systemic complaints
Week 6	Bleed 10-15 ml

Laboratory:

Remove serum from clot aseptically and store frozen at -20° C until shipped. It is imperative that sera are sterile to avoid interference with the serologic assay.

Serology:

Levels of circulating measles and rubella antibodies will be determined by hemagglutination-inhibition test. Levels of mumps antibody before and after vaccination will be determined by serum neutralization test.

Clinical Forms: Attached.

Adverse

Reactions:

Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Arlene A. McLean, telephone (215) 699-5311, Ext. 6383.

Clinical Protocol - Study #511

Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Unused Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.

Shipping of

- Sera & Records:
1. Send sera frozen within insulated containers which are supplied.
  2. Send sera and records to Dr. Maurice R. Hilleman, Virus & Cell Biology Research, Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.
  3. Alert Dr. Hilleman by cable as soon as possible regarding flight number, air bill and date of arrival.

  
M. R. Hilleman, Ph.D.

Estudio No. \_\_\_\_\_  
(1-3)

# OBSERVACIONES CLINICAS

No. Del Caso \_\_\_\_\_  
(5-9)

CT 2	Nombre completo del niño:	(35)	Fecha de nacimiento (36-41)		(46-47)
		F	día mes año		
Dirección completa de Padres o Guardián:					

☐ VACUNADO NO. de LOTE \_\_\_\_\_ (49-51) FECHAS de SANGRIA \_\_\_\_\_ SEROLOGIA \_\_\_\_\_  
☐ CONTROL (48) FECHA de VACUNACION \_\_\_\_\_ (52-57) \_\_\_\_\_ (56-63) \_\_\_\_\_  
 \_\_\_\_\_ (70-75) \_\_\_\_\_

Dia	Fecha	Temperatura		Malestar	Anorexia	Gastroenteritis	Irritabilidad	Cafelea	I.V.R.S.	Otitis	Conjuntivitis	Linfadenopatía	Reaccion Local*	RASH*		Artralgia	Artritis	* Especifique tipo en esta seccion
		Oral	Rectal											Rubelliforme	Morbilliforme			
		24		16	25	08	15	14	01	03	06	05	12	51	52	11	32	
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Al terminar el estudio, devuelva copia blanca y copia amarilla de esta forma (Retenga copia color de rosa para sus archivos) <b>M. R. HILLEMANN, PhD, DSc</b> <b>MERCK SHARP &amp; DOHME RESEARCH LABORATORIES</b> <b>WEST POINT, PENNSYLVANIA, 19486, U.S.A.</b>	Firma del medico:	
	Nombre del medico (en letra de molde):	Fecha:



Table 1

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #511)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:												Initially Seropositive to:
			Measles-Mumps-Rubella			Measles-Mumps		Measles-Rubella		Mumps-Rubella		Measles Only	Mumps Only	Rubella Only	Measles, Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/Total		Conversions/Total	Conversions/Total	Conversions/Total	
Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella	Mumps	Rubella	Total	Total	Total	Total			
(Months)															
8	1	1						1/1	1/1						
9	1	1								1/1	1/1				
10	2	2						1/1	1/1					1/1	
11	3	1	1/1	1/1	1/1										
12	2	2	0/1	1/1	1/1			0/1	1/1						
13	3	3	1/1	1/1	1/1			1/1	1/1			0/1			
14	2	2	2/2	2/2	2/2										
17	2	1						0/1	1/1						
18	2	2								1/1	1/1			1/1	
21	1	1												1/1	
(Years)															
2	10	8	2/2	2/2	2/2			1/2	2/2					3/3	1
3	6	6	1/1	1/1	1/1	1/1	1/1			1/1	1/1			3/3	
4	2	2											1/1	1/1	
5	4	4	1/2	1/2	2/2					1/1	1/1		1/1		
6	1	1												1/1	
7	2	2	1/1	1/1	1/1			1/1	1/1						
8	2	2												1/1	1
9	2	2												2/2	
11	2	1						1/1	1/1						
Total	50	44	9/11	10/11	11/11	1/1	1/1	6/9	9/9	4/4	4/4	0/1	2/2	14/14	2
Mean Age:	3.3 Years		(81.8%)	(90.9%)	(100%)	(100%)	(100%)	(66.7%)	(100%)	(100%)	(100%)		(100%)	(100%)	

## Overall Conversion Rates

Measles	Mumps	Rubella
16/22	17/18	38/38
(72.7%)	(94.4%)	(100%)



Table 2

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #511)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:												Initially Seropositive to: Measles, Mumps and Rubella
			Measles-Mumps-Rubella			Measles-Mumps		Measles-Rubella		Mumps-Rubella		Measles Only	Mumps Only	Rubella Only	
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/Total		Conversions/ Total	Conversions/ Total	Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella	Mumps	Rubella				
(Months)															
11	1	1								1/1	1/1				
12	2	1	1/1	1/1	1/1										
13	1	1						1/1	1/1						
14	2	2								1/1	1/1			1/1	
16	1	1						0/1	1/1						
17	1	1								0/1	1/1				
18	3	3	1/1	1/1	1/1			1/1	1/1	1/1	1/1				
21	1	1								1/1	1/1				
(Years)															
2	9	9	1/2	1/2	2/2			1/1	1/1	1/1	1/1			5/5	
3	7	7								4/4	4/4	1/1		2/2	
4	7	6	1/1	1/1	1/1	1/1	1/1			2/2	2/2			2/2	
5	8	8						1/1	1/1	1/1	1/1			6/6	
6	6	5											1/1	3/3	1
7	1	1												1/1	
Total	50	47	4/5	4/5	5/5	1/1	1/1	4/5	5/5	12/13	13/13	1/1	1/1	20/20	1
Mean Age:	3.3 Years		(80.0%)	(80.0%)	(100%)	(100%)	(100%)	(80.0%)	(100%)	(92.3%)	(100%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Mumps	Rubella
10/12	18/20	43/43
(83.3%)	(90.0%)	(100%)

Table 3

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #511)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:										Initially Seropositive to:
			Measles-Mumps-Rubella			Measles-Rubella		Mumps-Rubella		Measles Only	Mumps Only	Rubella Only	Measles, Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/	Conversions/	Conversions/	
			Measles	Mumps	Rubella	Measles	Rubella	Mumps	Rubella	Total	Total	Total	
(Months)													
11	1	1										1/1	
13	1	1										1/1	
17	1	1				1/1	1/1						
19	1	1						1/1	1/1				
(Years)													
2	8	8	1/1	1/1	1/1			0/1	1/1	1/1	1/1	1/1	3
3	8	8						2/2	2/2			4/4	2
4	11	11				2/2	2/2	3/3	3/3			4/4	2
5	8	8	1/1	1/1	1/1			2/4	4/4		1/1	1/1	1
6	4	4									1/1	2/2	1
7	5	4						1/1	1/1		1/1	1/1	1
9	1	1										1/1	
11	1	1										1/1	
Total	50	49	2/2	2/2	2/2	3/3	3/3	9/12	12/12	1/1	4/4	17/17	10
Mean Age:	4.2 Years		(100%)	(100%)	(100%)	(100%)	(100%)	(75.0%)	(100%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Mumps	Rubella
6/6	15/18	34/34
(100%)	(83.3%)	(100%)

1/27/78

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps, and Rubella, Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #511)

Measles (HI)	
Post-Titer Distribution	Number of Children
< 5	2
5	
10	1
20	3
40	1
80	3
160	1
Total 11	
Geometric Mean Titer: 20.5	

Mumps (Neut)	
Post-Titer Distribution	Number of Children
< 2	1
2	3
4	2
8	3
16	1
32	1
Total 11	
Geometric Mean Titer: 4.8	

Rubella (HI)	
Post-Titer Distribution	Number of Children
128	4
256	5
> 512	2
Total 11	
Geometric Mean Titer: > 225.7	

1/27/78

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps, and Rubella, Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #511)

Measles (HI)	
Post-Titer Distribution	Number of Children
<5	1
5	
10	
20	
40	3
80	
160	1
Total	5
Geometric Mean Titer: 25.2	

Mumps (Neut)	
Post-Titer Distribution	Number of Children
<2	1
2	
4	1
8	1
16	
32	
✓ 64	2
Total	5
Geometric Mean Titer: 10.6	

Rubella (HI)	
Post-Titer Distribution	Number of Children
128	3
256	2
Total	5
Geometric Mean Titer: 168.9	

1/27/78

Table 6

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps, and Rubella, Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #511)

Measles (HI)	
Post-Titer Distribution	Number of Children
20	1
40	1
Total	2
Geometric Mean Titer: 28.3	

Mumps (Neut)	
Post-Titer Distribution	Number of Children
8	2
Total	2
Geometric Mean Titer: 8.0	

Rubella (HI)	
Post-Titer Distribution	Number of Children
256	2
Total	2
Geometric Mean Titer: 256.0	

1/27/78



Table 7

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #511)

Maximum Temperature (°F, Oral)	Total Vaccinees (50 Children)					No. with Max. Temp.	Initially Seronegatives (13 Children)					No. with Max. Temp.
	Days Post Vaccination						Days Post Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	48 (96.0%)	44 (88.0)	45 (90.0)	47 (94.0)	50 (100)	35	12 (92.3)	13 (100)	10 (76.9)	13 (100)	13 (100)	9
99 - 100.9	2 (4.0)	6 (12.0)	5 (10.0)	3 (6.0)		15	1 (7.7)		3 (23.1)			4

1/31/78



Table 8

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #511)

Maximum Temperature (°F, Oral)	Total Vaccinees (50 Children)						Initially Seronegatives (6 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	47 (94.0%)	42 (84.0)	47 (94.0)	45 (90.0)	48 (96.0)	31	6 (100)	5 (83.3)	6 (100)	5 (83.3)	6 (100)	4
99 - 100.9	3 (6.0)	8 (16.0)	3 (6.0)	3 (10.0)	2 (4.0)	19		1 (16.7)		1 (16.7)		2

1/31/78

Table 9

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #511)

Maximum Temperature (°F, Oral)	Total Vaccinees (50 Children)						Initially Seronegatives (2 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	50 (100%)	40 (80.0)	47 (94.0)	50 (100)	47 (94.0)	36	2 (100)	2 (100)	2 (100)	2 (100)	2 (100)	2
99 - 100.9		10 (20.0)	3 (6.0)		3 (6.0)	14						0

1/31/78

Table 10

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #511)

Clinical Complaint	Total Vaccinees (50 Children)						Initially Seronegatives (13 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Headache	1 (2.0%)	1 (2.0)	1 (2.0)	1 (2.0)		4						0
Irritability	5 (10.0)	8 (16.0)	6 (12.0)	5 (10.0)		18	2 (15.4)	3 (23.1)	3 (23.1)	1 (7.7)		7
Malaise	7 (14.0)	9 (18.0)	4 (8.0)	4 (8.0)		17	3 (23.1)	3 (23.1)	3 (23.1)	2 (15.4)		7
Anorexia		1 (2.0)		1 (2.0)		2				1 (7.7)		1
Upper Respiratory Illness	2 (4.0)	6 (12.0)	3 (6.0)	1 (2.0)		9			2 (15.4)			2
Lower Respiratory Illness	1 (2.0)	1 (2.0)				1	1 (7.7)	1 (7.7)				1
Gastrointestinal Illness	1 (2.0)	3 (6.0)	1 (2.0)	4 (8.0)	2 (4.0)	7			1 (7.7)	2 (15.4)	1 (7.7)	3
Persons with Complaint:	7 (14.0)	9 (18.0)	7 (14.0)	8 (16.0)	2 (4.0)	21	3 (23.1)	3 (23.1)	4 (30.8)	2 (15.4)	1 (7.7)	8
Persons with No Complaint:	43 (86.0)	41 (82.0)	43 (86.0)	42 (84.0)	48 (96.0)	29	10 (76.9)	10 (76.9)	9 (69.2)	11 (84.6)	12 (92.3)	5

Table 11

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #511)

Clinical Complaint	Total Vaccinees (50 Children)						Initially Seronegatives (6 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Headache	2 (4.0%)	1 (2.0)	4 (8.0)	2 (4.0)		8			1 (16.7)			1
Irritability	2 (4.0)	9 (18.0)	4 (8.0)	5 (10.0)	3 (6.1)	18		1 (16.7)		1 (16.7)		2
Malaise	2 (4.0)	7 (14.0)	2 (4.0)	3 (6.0)		12		1 (16.7)		1 (16.7)		2
Anorexia		1 (2.0)				1						0
Upper Respiratory Illness	2 (4.0)	4 (8.0)				4						0
Lower Respiratory Illness		1 (2.0)	1 (2.0)			1						0
Gastrointestinal Illness	1 (2.0)	3 (6.0)	2 (4.0)	1 (2.0)		5						0
Persons with Complaint:	2 (4.0)	11 (22.0)	7 (14.0)	6 (12.0)	3 (6.1)	20	0	1 (16.7)	1 (16.7)	1 (16.7)	0	3
Persons with No Complaint:	48 (96.0)	39 (78.0)	43 (86.0)	44 (88.0)	46 (93.9)	30	6 (100)	5 (83.3)	5 (83.3)	5 (83.3)	5 (100)	3
Negative Surveillance	0	0	0	0	1	0	0	0	0	0	1	0

Table 12

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #511)

Clinical Complaint	Total Vaccinees (50 Children)					No. with Complaint	Initially Seronegatives (2 Children)					No. with Complaint
	Days Post Vaccination						Days Post Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Headache		2 (4.0%)	4 (8.0)			6			1 (50.0)			1
Irritability	1 (2.0)	9 (18.0)	3 (6.0)	1 (2.0)	2 (4.0)	12						0
Malaise	2 (4.0)	6 (12.0)	4 (8.0)		3 (6.0)	13			1 (50.0)			1
Anorexia	1 (2.0)	3 (6.0)	1 (2.0)			5						0
Upper Respiratory Illness	1 (2.0)	2 (4.0)				2						0
Lower Respiratory Illness		1 (2.0)				1						0
Otitis	1 (2.0)					1						0
Gastrointestinal Illness	1 (2.0)	1 (2.0)	1 (2.0)			2						0
Persons with Complaint:	2 (4.0)	11 (22.0)	6 (12.0)	1 (2.0)	3 (6.0)	17	0	0	1 (50.0)	0	0	1
Persons with No Complaint:	48 (96.0)	39 (78.0)	44 (88.0)	49 (98.0)	47 (94.0)	33	2 (100)	2 (100)	1 (50.0)	2 (100)	2 (100)	1

1/31/78



# MEMO

To File

Location

Date 2/6/78

From T. Schofield

Location

Subject Statistical Analysis - Study #511, Combined Live Measles-Mumps-Rubella  
Virus Vaccine

Significant differences in seroconversion rates for measles, mumps, and rubella and clinical reaction rates among vaccinees receiving three lots of combined live measles-mumps-rubella vaccine were investigated. Lots of vaccine were:

Lot #60664/C-E810

Lot #60665/C-E811

Lot #60666/C-E812

No significant differences exist among the three lots with respect to these rates.

Analyses of variance were performed on post-titer values of children who were initially seronegative to the individual components. The log transformation was used in each analysis. No significant differences exist among the groups (lots) for any of the three components.

A multivariate analysis was performed on post-titer values of triple-negative vaccinees. Again, the log transformation was applied. There was no significant difference among the groups.



T.S.  
6801





Program: Study #513 - To measure antibody and clinical responses to three consecutive lots of combined measles-mumps-rubella virus vaccine.

Vaccine: Combined live measles-mumps-rubella (RA 27/3) virus vaccine, lyophilized

Lot #60664/C-E810

Lot #60665/C-E811

Lot #60666/C-E812

Responsible Clinical Investigator:

Robert E. Weibel, M.D.  
Director, Division of Preventive Medicine  
Joseph Stokes, Jr. Research Institute  
Children's Hospital of Philadelphia  
34th Street and Civic Center Boulevard  
Philadelphia, Pennsylvania 19104

Study Locations:

Lankenau Pediatric Clinic, Philadelphia, Pennsylvania  
G. A. Starkweather, M.D., Havertown, Pennsylvania  
Elizabeth M. Craven, M.D., Wilmington, Delaware  
Pediatric Medical Associates, Havertown, Pennsylvania  
Children's Hospital of Philadelphia, Philadelphia, Pennsylvania

Date Study Initiated: June 15, 1977

Date Study Completed: In Progress

Study Procedure:

One hundred sixty-three children, 11 months to 7 years of age, have been included in the study thus far. Each received a 0.5 ml subcutaneous dose of combined live measles-mumps-rubella virus vaccine. Blood samples were obtained on day of vaccination and 6 weeks after vaccination. Each child was followed 6 weeks for clinical complaints. The study continues in progress.

Clinical Protocol - Study #513

Combined Live Measles-Mumps-Rubella (RA 27/3)

Virus Vaccine

Program: Combined live measles-mumps-rubella virus vaccine

Purpose: To measure antibody and clinical responses to three consecutive lots of vaccine.

Vaccine: Combined live measles-mumps-rubella virus vaccine, lyophilized,  
Lot. No. 60664/C-E810  
Lot. No. 60665/C-E811  
Lot. No. 60666/C-E812

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be reconstituted with 0.7 ml of sterile, pyrogen-free distilled water which is supplied in prefilled syringes.

CAUTION: The vaccine contains egg protein and should not be given to persons with known sensitivity to chicken or duck, chicken or duck eggs or feathers. The vaccine contains neomycin and should not be given to persons sensitive to neomycin. Persons with leukemia or other immunologic disorder and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccine should not be given to persons with a febrile respiratory illness or other active febrile infection.

Keep dried vaccine stored at  $-20^{\circ}$  C until used.

Keep dried vaccine at  $4^{\circ}$  C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of up to 150 children with a negative history for vaccination and illness caused by measles, mumps and rubella viruses. The children should range from 1 to 6 years of age.

Approximately 25 to 50 children will receive each of the three vaccine lots.

Informed written consent will be obtained from a parent or guardian of each child who participates in the study.

Clinical Protocol - Study #513  
Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine

Procedure:  
(Continued)

Each child will receive a 0.5 ml subcutaneous injection of vaccine.

Bleeding samples (10-15 ml) will be obtained from each child immediately before and 6 weeks after vaccination.

Each child will be followed clinically for local and systemic complaints occurring within 6 weeks after vaccination. Observations should include special notation for rash, nodes, arthralgia, arthritis, fever, malaise and anorexia. All complaints should be recorded on the case report form.

Schedule:

Time	Action - All Persons
Day 0	Bleed 10-15 ml Vaccinate 0.5 ml, subcutaneously
Days 0-42	Clinical follow-up for local and systemic complaints
Week 6	Bleed 10-15 ml

Serology:

Levels of circulating measles and rubella antibodies will be determined by hemagglutination-inhibition test. Levels of mumps antibody before and after vaccination will be determined by serum neutralization test.

Clinical Forms: Attached.

Adverse  
Reactions:

Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Arlene A. McLean, telephone (215) 699-5311, Ext. 6383.

Unused Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.

  
M. R. Hilleman, Ph.D.

# SYMPTOM RECORD

RUBELLA STUDY NO. \_\_\_\_\_

NAME \_\_\_\_\_ (Last) \_\_\_\_\_ (First) \_\_\_\_\_ (Middle) CASE NO. \_\_\_\_\_

DAY	DATE	Temperature		NONE	RUNNY NOSE	SORE THROAT	COUGH	EAR ACHE	SWOLLEN GLANDS	SORE EYES	VOMITING	DIARRHEA	NAUSEA	RASH	SORE JOINTS	SORE ARM (at shot)*	HEADACHE	ACHINESS	FEVER	LOSS OF APPETITE	* Describe	COMMENTS
		<input type="checkbox"/> Rectal	<input type="checkbox"/> Oral (Check One)																			
INSTRUCTIONS ON REVERSE SIDE																						
0																						
1																						
2																						
3																						
4																						
5																						
6																						
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42																						

If fever or unusual reaction develops, call: \_\_\_\_\_

PLEASE RETURN FOR FOLLOW-UP VISIT ON: \_\_\_\_\_

BE SURE TO BRING THIS RECORD ALONG WITH YOU.

TR4818-0477(DOM) (\*4818-0477) (\*4273-0476)R



# REGISTRATION

Study No. \_\_\_\_\_  
(1-3)

Case No. \_\_\_\_\_  
(5-9)

CT 2	Name	Sex (35) M F	Birthdate (36-41) mo day yr	(46-47)
	Address			Telephone

Date of Vaccination _____ (54-59)		Pre _____		Bleeding Dates:		SEROLOGY:	
Lot No. _____ (49-51)		Post _____					
Dose & Route _____ (45)							

INDICATE IF THIS CHILD:

Had disease	<input type="checkbox"/> measles	<input type="checkbox"/> mumps	<input type="checkbox"/> rubella
Been vaccinated	<input type="checkbox"/> measles	<input type="checkbox"/> mumps	<input type="checkbox"/> rubella
Been exposed	<input type="checkbox"/> measles	<input type="checkbox"/> mumps	<input type="checkbox"/> rubella
Date of exposure	_____	_____	_____

## INSTRUCTIONS FOR COMPLETING SYMPTOM RECORD (Reverse side):

1. Please fill in the date each day.
2. Please take temperature once daily at the same time and record exact thermometer reading.
3. If no symptoms are present, place a check (✓) under "NONE" beside that day's date.
4. If a symptom is present place a check (✓) under it beside that day's date.
5. Describe other symptoms and any RASH in the space under "COMMENTS."
6. THIS IS VERY IMPORTANT INFORMATION. *Please do not misplace this card.*

Please return completed forms to: <b>M. R. HILLEMANN, PhD, DSc</b> <b>MERCK SHARP &amp; DOHME RESEARCH LABORATORIES</b> <b>WEST POINT, PENNSYLVANIA, 19486, U.S.A.</b>	Physician's Signature	Date
	Physician's Name (Type or Print)	

Table 1

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #513)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:							Initially Seropositive to:
			Measles-Mumps-Rubella			Measles-Rubella		Measles Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/	Conversions/	
			Measles	Mumps	Rubella	Measles	Rubella	Total	Total	
(Months)										
12	2	2	2/2	2/2	2/2					
14	8	8	5/5	5/5	5/5	3/3	3/3			
15	21	20	11/12	11/12	12/12	6/6	6/6	2/2		
16	4	4	2/2	2/2	2/2	2/2	2/2			
17	7	7	6/6	6/6	6/6	1/1	1/1			
18	2	2				2/2	2/2			
19	1	1	1/1	1/1	1/1					
20	2	2	1/2	2/2	2/2					
21	1	0								
(Years)										
3	1	1				1/1	1/1			
4	1	1							1/1	
5	1	1				1/1	1/1			
6	1	1							1/1	
7	1	0								
Total	53	50	28/30	29/30	30/30	16/16	16/16	2/2	2/2	0
Mean Age:	1.7 Years		(93.3%)	(96.7%)	(100%)	(100%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Mumps	Rubella
46/48	29/30	48/48
(95.8%)	(96.7%)	(100%)

1/27/78



Table 2

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #513)

Age (Months)	No. Vacc.	No. Serol. Tested	Initially Seronegative to:								Initially Seropositive to:
			Measles-Mumps-Rubella			Measles-Mumps		Measles-Rubella		Measles Only	Measles Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella		
12	2	2	2/2	2/2	2/2					1/1	
13	1	1									
14	5	5	4/4	4/4	4/4			1/1	1/1		
15	21	21	15/15	14/15	15/15	2/2	2/2	4/4	4/4		
16	7	7	3/3	3/3	3/3	1/1	1/1	3/3	3/3		
17	4	4	3/3	3/3	3/3			1/1	1/1		
19	2	1	0/1	1/1	0/1						
20	1	0									
21	3	3	1/1	1/1	1/1	1/1	1/1	1/1	1/1		
22	3	3	3/3	3/3	3/3						
(Years)											
2	2	2	1/1	1/1	1/1						1
4	3	1	1/1	1/1	1/1						
Total	54	50	33/34	33/34	33/34	4/4	4/4	10/10	10/10	1/1	1
Mean Age:	1.5 Years		(97.1%)	(97.1%)	(97.1%)	(100%)	(100%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Mumps	Rubella
48/49	37/38	43/44
(98.0%)	(97.4%)	(97.7%)

1/27/78

Table 3

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #513)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:									Initially Seropositive to:	
			Measles-Mumps-Rubella			Measles-Mumps		Measles-Rubella		Measles Only	Mumps Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/ Total	Conversions/ Total	Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella				
(Months)													
11	1	1	1/1	1/1	1/1								
12	1	1	1/1	1/1	1/1								
13	1	0											
14	6	6	5/5	5/5	5/5	1/1	1/1						
15	26	25	18/19	18/19	18/19	1/1	1/1	4/4	4/4			1/1	
16	9	7	4/4	4/4	4/4			2/2	2/2	1/1			
17	4	3	1/1	1/1	1/1	1/1	1/1			1/1			
19	2	2	1/1	1/1	1/1					1/1			
20	1	1						1/1	1/1				
23	2	2						2/2	2/2				
(Years)													
2	1	1									1/1		
4	2	2	1/1	1/1	1/1			1/1	1/1				
Total	56	51	32/33	32/33	32/33	3/3	3/3	10/10	10/10	3/3	1/1	1/1	0
Mean Age:	1.4 Years		(97.0%)	(97.0%)	(97.0%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Mumps	Rubella
48/49	36/37	43/44
(98.0%)	(97.3%)	(97.7%)

1/27/78

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps, and Rubella, Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #513)

Measles (HI)	
Post-Titer Distribution	Number of Children
<5	2
5	
10	
20	1
40	7
80	8
160	8
≥320	4
Total	30
Geometric Mean Titer: ≥70.2	

Mumps (Neut)	
Post-Titer Distribution	Number of Children
<2	1
2	
4	2
8	6
16	7
32	6
64	4
≥64	4
Total	30
Geometric Mean Titer: ≥19.2	

Rubella (HI)	
Post-Titer Distribution	Number of Children
16	1
32	1
64	
128	6
256	9
≥512	13
Total	30
Geometric Mean Titer: ≥256.0	

1/27/78

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps, and Rubella, Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #513)

Measles (HI)	
Post-Titer Distribution	Number of Children
<5	1
5	
10	
20	6
40	2
80	16
160	4
>320	5
Total	34
Geometric Mean Titer: >70.3	

Mumps (Neut)	
Post-Titer Distribution	Number of Children
<2	1
2	2
4	1
8	3
16	7
32	8
64	5
>64	7
Total	34
Geometric Mean Titer: >22.6	

Rubella (HI)	
Post-Titer Distribution	Number of Children
<8	1
8	
16	
32	1
64	3
128	6
256	12
>512	11
Total	34
Geometric Mean Titer: >200.4	

1/27/78

Table 6

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps, and Rubella, Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #513)

Measles (HI)	
Post-Titer Distribution	Number of Children
<5	1
5	
10	2
20	5
40	5
80	8
160	6
≥320	6
Total	33
Geometric Mean Titer: <u>65.8</u>	

Mumps (Neut)	
Post-Titer Distribution	Number of Children
<2	1
2	1
4	1
8	2
16	7
32	8
64	3
≥64	10
Total	33
Geometric Mean Titer: <u>25.9</u>	

Rubella (HI)	
Post-Titer Distribution	Number of Children
<8	1
8	
16	
32	
64	3
128	1
256	14
≥512	14
Total	33
Geometric Mean Titer: <u>250.7</u>	

1/27/78

Table 7

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #513)

Maximum Temperature (°F, Oral)	Total Vaccinees (53 Children)						Initially Seronegatives (30 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	30 (60.0%)	22 (44.0)	36 (72.0)	27 (54.0)	31 (62.0)	17	18 (60.0)	11 (36.7)	20 (66.7)	14 (46.7)	18 (60.0)	9
99 - 100.9	17 (34.0)	22 (44.0)	13 (26.0)	19 (38.0)	17 (34.0)	21	10 (33.3)	15 (50.0)	9 (30.0)	13 (43.3)	11 (36.7)	12
101 - 102.9	2 (4.0)	5 (10.0)		3 (6.0)	2 (4.0)	10	1 (3.3)	3 (10.0)		3 (10.0)	1 (3.3)	8
103 - 104.0	1 (2.0)			1 (2.0)		2	1 (3.3)					1
Fever - Temp. Not Taken		1 (2.0)	1 (2.0)			0		1 (3.3)	1 (3.3)			0
Not Taken	3	3	3	3	3	3	0	0	0	0	0	0

Case #	Max. Temp.	Days	Clinical Complaint	Serology		
				Measles	Mumps	Rubella
(b) (6)	102.0	42	Anorexia, Teething	<5	80	2 32 <8 >512
	102.2	33-35	Gastrointestinal Illness, Irritability, Anorexia, Fatigue	<5	>320	<2 32 <8 256
	102.6	7-10	Gastrointestinal Illness, Anorexia, Teething	<5	160	<2 16 <8 256
	102.4	6-8	Sores on Face	<5	160	<2 32 <8 256
	102.0	5	No Clinical Complaints	<5	80	2 64 <8 256
	102.0	8-9	Gastrointestinal Illness	<5	40	<2 8 <8 256
	103.0	20-25	Upper Respiratory Illness	<5	40	2 >64 <8 256
	102.0	18-20	Upper Respiratory Illness	<5	80	<2 16 <8 256
	104.0	0-4	Upper Respiratory Illness, Irritability, Anorexia	<5	80	<2 64 <8 128



Table 8

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #513)

Maximum Temperature (°F, Oral)	Total Vaccinees (54 Children)						Initially Seronegatives (34 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	34 (66.7%)	28 (54.9)	37 (72.5)	35 (68.6)	37 (72.5)	18	22 (64.7)	18 (52.9)	22 (64.7)	22 (64.7)	22 (64.7)	11
99 - 100.9	14 (27.5)	15 (29.4)	14 (27.5)	14 (27.5)	12 (23.5)	21	9 (26.5)	11 (32.4)	12 (35.3)	12 (35.3)	10 (29.4)	16
101 - 102.9	2 (3.9)	7 (13.7)		2 (3.9)	1 (2.0)	10	2 (5.9)	4 (11.8)			1 (2.9)	5
103 - 104.0		1 (2.0)			1 (2.0)	2		1 (2.9)			1 (2.9)	2
Fever - Temp. Not Taken	1 (2.0)					0	1 (2.9)					0
Not Taken	3	3	3	3	3	3	0	0	0	0	0	0

Case #	Max. Temp.	Days	Clinical Complaint	Serology					
				Measles		Mumps		Rubella	
(b) (6)	102.0	8-9	Irritable	NS	NS	NS	NS	NS	NS
	102.0	7-9	Gastrointestinal Illness	<5	80	<2	16	<8	32
	102.6	2-8	Gastrointestinal Illness, Nonspecific Rash	<5	80	<2	64	<8	256
	104.0	3-8	Upper Respiratory Illness, Ophthalmopathy, Gastrointestinal Illness, Anorexia	<5	20	<2	32	<8	256
	103.0	28-34	Teething	<5	80	<2	>64	<8	>512
	102.2	4-11	Upper Respiratory Illness	<5	40	<2	2	<8	256

1/27/78

Table 9

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #513)

Maximum Temperature (°F, Oral)	Total Vaccinees (56 Children)						Initially Seronegatives (33 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	31 (57.4%)	22 (40.7)	37 (68.5)	32 (59.3)	26 (48.1)	15	15 (45.5)	9 (27.3)	19 (57.6)	14 (42.4)	11 (33.3)	5
99 - 100.9	20 (37.0)	22 (40.7)	16 (29.6)	22 (40.7)	21 (38.9)	24	16 (48.5)	16 (48.5)	14 (42.4)	19 (57.6)	19 (57.6)	19
101 - 102.9	3 (5.6)	7 (13.0)			6 (11.1)	14	2 (6.1)	6 (18.2)			2 (6.1)	8
103 - 104.0		1 (1.9)			1 (1.9)	1		1 (3.0)			1 (3.0)	1
Fever - Temp. Not Taken		2 (3.7)	1 (1.9)			0		1 (3.0)				0
Not Taken	2	2	2	2	2	2	0	0	0	0	0	0

Case #	Max. Temp.	Days	Clinical Complaint	Serology					
				Measles		Mumps		Rubella	
(b) (6)	102.0	12-13	Herpes-Type Rash	<5	40	<2	32	<8	256
	104.0	8-9	Measles-Like Rash, Anorexia	<5	80	<2	>64	<8	64
	103.0	42	Upper Respiratory Illness, Non-Specific Rash, Anorexia						
	102.0	30-35	Gastrointestinal Illness	NS	NS	NS	NS	NS	NS
	102.0	0-7	No Clinical Complaints	<5	80	<2	16	<8	128
	102.2	1-4	Upper Respiratory Illness, Ophthalmopathy, Anorexia	<5	40	<2	16	<8	256
	102.2	10	Upper Respiratory Illness, Otitis	<5	80	<2	64	<8	256
	102.0	1-3	Upper Respiratory Illness, Headache, Anorexia, Soreness at Injection Site	NT	NT	NT	NT	NT	NT

1/27/78

Table 10

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60664/C-E810 (Study #513)

Clinical Complaint	Total Vaccinees (53 Children)						Initially Seronegatives (30 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	2 (3.9%)					2	1 (3.3)					1
Soreness	2					2	1					1
Systemic:												
Arthralgia	1 (2.0)	1 (2.0)				1						0
Measles-Like Rash		6 (11.8)	1 (2.0)	1 (2.0)		6	4 (13.3)	1 (3.3)	1 (3.3)			4
Headache		1 (2.0)				1						0
Irritability	4 (7.8)	2 (3.9)	1 (2.0)	2 (3.9)	2 (3.9)	8	4 (13.3)	2 (6.7)	1 (3.3)	2 (6.7)	1 (3.3)	7
Anorexia	4 (7.8)	3 (5.9)	1 (2.0)	2 (3.9)	5 (9.8)	10	2 (6.7)	2 (6.7)		2 (6.7)	3 (10.0)	7
Disturbed Sleep			1 (2.0)		1 (2.0)	1						0
Fatigue		1 (2.0)			1 (2.0)	1	1 (3.3)				1 (3.3)	1
Myalgia	1 (2.0)	1 (2.0)				1						0
Upper Respiratory Illness	9 (17.6)	12 (23.5)	7 (13.7)	12 (23.5)	11 (21.6)	25	4 (13.3)	7 (23.3)	6 (20.0)	7 (23.3)	8 (26.7)	14
Otitis				1 (2.0)		1				1 (3.3)		1
Ophthalmopathy	1 (2.0)	1 (2.0)		1 (2.0)	1 (2.0)	2	1 (3.3)			1 (3.3)	1 (3.3)	1
Gastrointestinal Illness	12 (23.5)	11 (21.6)	2 (3.9)	4 (7.8)	5 (9.8)	18	9 (30.0)	9 (30.0)	1 (3.3)	3 (10.0)	4 (13.3)	15
Nonspecific Rash	5 (9.8)	4 (7.8)	4 (7.8)	6 (11.8)	8 (15.7)	15	2 (6.7)	4 (13.3)	4 (13.3)	5 (16.7)	5 (16.7)	10
Sores on Face		1 (2.0)				1	1 (3.3)					1
Allergy	1 (2.0)		1 (2.0)			2	1 (3.3)		1 (3.3)			2
Teething	2 (3.9)	4 (7.8)	1 (2.0)	2 (3.9)	3 (5.9)	9	1 (3.3)	4 (13.3)	1 (3.3)	2 (6.7)	1 (3.3)	7
Herpes-Type Rash		1 (2.0)		1 (2.0)		2	1 (3.3)			1 (3.3)		2
Persons with Complaint:	24 (47.1)	27 (52.9)	12 (23.5)	18 (35.3)	19 (37.3)	39	14 (46.7)	19 (63.3)	9 (30.0)	12 (40.0)	13 (43.3)	25
Persons with No Complaint:	27 (52.9)	24 (47.1)	39 (76.5)	33 (64.7)	32 (62.7)	12	16 (53.3)	11 (36.7)	21 (70.0)	18 (60.0)	17 (56.7)	5
Negative Surveillance	2	2	2	2	2	2	0	0	0	0	0	0



Table 11

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60665/C-E811 (Study #513)

Clinical Complaint	Total Vaccinees (54 Children)						Initially Seronegatives (34 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	2 (3.8%)					2	2 (5.9)					2
Soreness	1					1	1					1
Erythema and Soreness	1					1	1					1
Systemic:												
Lymphadenopathy	2 (3.8)	1 (1.9)				3	1 (2.9)	1 (2.9)				2
Measles-Like Rash		5 (9.6)	4 (7.7)	1 (1.9)		7		3 (8.8)	2 (5.9)			4
Irritability	4 (7.7)	6 (11.5)	1 (1.9)	1 (1.9)	2 (3.8)	9	4 (11.8)	4 (11.8)		1 (2.9)	2 (5.9)	7
Malaise	1 (1.9)	1 (1.9)				1	1 (2.9)	1 (2.9)				1
Anorexia	5 (9.6)	5 (9.6)	3 (5.8)	2 (3.8)	4 (7.7)	13	3 (8.8)	4 (11.8)	2 (5.9)	1 (2.9)	3 (8.8)	9
Disturbed Sleep	1 (1.9)	1 (1.9)	1 (1.9)			2	1 (2.9)	1 (2.9)				1
Fatigue	2 (3.8)					2	2 (5.9)					2
Upper Respiratory Illness	10 (19.2)	9 (17.3)	5 (9.6)	10 (19.2)	11 (21.2)	25	4 (11.8)	6 (17.6)	4 (11.8)	6 (17.6)	7 (20.6)	15
Otitis	2 (3.8)	2 (3.8)	2 (3.8)	1 (1.9)	1 (1.9)	4	2 (5.9)	1 (2.9)	1 (2.9)	1 (2.9)	1 (2.9)	2
Ophthalmopathy	1 (1.9)	3 (5.8)		1 (1.9)	1 (1.9)	5	1 (2.9)	2 (5.9)		1 (2.9)	1 (2.9)	4
Gastrointestinal Illness	9 (17.3)	10 (19.2)	5 (9.6)	4 (7.7)	6 (11.5)	18	6 (17.6)	7 (20.6)	3 (8.8)	3 (8.8)	5 (14.7)	11
Nonspecific Rash	4 (7.7)	3 (5.8)		2 (3.8)	2 (3.8)	7	3 (8.8)	3 (8.8)		2 (5.9)	2 (5.9)	6
Allergy	1 (1.9)					1	1 (2.9)					1
Teething	1 (1.9)	1 (1.9)	1 (1.9)	3 (5.8)	3 (5.8)	4	1 (2.9)	1 (2.9)		1 (2.9)	1 (2.9)	2
Persons with Complaint:	24 (46.2)	26 (50.0)	18 (34.6)	21 (40.4)	18 (34.6)	36	16 (47.1)	18 (52.9)	11 (32.4)	13 (38.2)	12 (35.3)	23
Persons with No Complaint:	28 (53.8)	26 (50.0)	34 (65.4)	31 (59.6)	34 (65.4)	16	18 (52.9)	16 (47.1)	23 (67.6)	21 (61.8)	22 (64.7)	11
Negative Surveillance:	2	2	2	2	2	2	0	0	0	0	0	0

Table 12

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot #60666/C-E812 (Study #513)

Clinical Complaint	Total Vaccinees (56 Children)						Initially Seronegatives (33 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	4 (7.4%)					4	3 (9.1)					3
Soreness	4					4	3					3
Systemic:												
Lymphadenopathy				1 (1.9)		1				1 (3.0)		1
Measles-Like Rash		6 (11.1)	2 (3.7)	1 (1.9)		8		4 (12.1)	2 (6.1)	1 (3.0)		6
Headache	1 (1.9)					1						0
Irritability	4 (7.4)	4 (7.4)	3 (5.6)	3 (5.6)	2 (3.7)	8	2 (6.1)	3 (9.1)	2 (6.1)	3 (9.1)	2 (6.1)	5
Anorexia	6 (11.1)	9 (16.7)	1 (1.9)	2 (3.7)	11 (20.4)	20	4 (12.1)	5 (15.2)			9 (27.3)	13
Disturbed Sleep	1 (1.9)	2 (3.7)				2	1 (3.0)	2 (6.1)				2
Fatigue		1 (1.9)		1 (1.9)		1		1 (3.0)		1 (3.0)		1
Myalgia				1 (1.9)	2 (3.7)	2				1 (3.0)	1 (3.0)	1
Upper Respiratory Illness	13 (24.1)	19 (35.2)	13 (24.1)	14 (25.9)	15 (27.8)	30	10 (30.3)	12 (36.4)	9 (27.3)	11 (33.3)	12 (36.4)	20
Otitis	1 (1.9)	2 (3.7)		2 (3.7)	2 (3.7)	5		1 (3.0)		2 (6.1)	2 (6.1)	3
Ophthalmopathy	2 (3.7)	1 (1.9)		1 (1.9)	1 (1.9)	4	1 (3.0)			1 (3.0)	1 (3.0)	2
Gastrointestinal Illness	6 (11.1)	4 (7.4)	4 (7.4)	5 (9.3)	7 (13.0)	18	4 (12.1)		3 (9.1)	4 (12.1)	3 (9.1)	12
Nonspecific Rash	4 (7.4)	8 (14.8)	6 (11.1)	7 (13.0)	6 (11.1)	19	3 (9.1)	5 (15.2)	4 (12.1)	4 (12.1)	4 (12.1)	13
Sore from Venipuncture	1 (1.9)					1	1 (3.0)					1
Teething		3 (5.6)	2 (3.7)	3 (5.6)	3 (5.6)	5		3 (9.1)	2 (6.1)	3 (9.1)	2 (6.1)	4
Herpes-Type Rash		1 (1.9)				1		1 (3.0)				1
Persons with Complaint:	27 (50.0)	33 (61.1)	22 (40.7)	24 (44.4)	25 (46.3)	41	20 (60.6)	22 (66.7)	16 (48.5)	19 (57.6)	17 (51.5)	27
Persons with No Complaint:	27 (50.0)	21 (38.9)	32 (59.3)	30 (55.6)	29 (53.7)	13	13 (39.4)	11 (33.3)	17 (51.5)	14 (42.4)	16 (48.5)	6
Negative Surveillance	2	2	2	2	2	2	0	0	0	0	0	0

# MEMO

To File

Location

Date 2/6/78

From T. Schofield

Location

Subject Preliminary Statistical Analysis - Study #513, Combined Live Measles-Mumps-Rubella Virus Vaccine

Significant differences in seroconversion rates for measles, mumps, and rubella and clinical reaction rates among vaccinees receiving three lots of combined live measles-mumps-rubella vaccine were investigated. Lots of vaccine were:

Lot #60664/C-E810

Lot #60665/C-E811

Lot #60666/C-E812

A significant difference exists among the three lots in the incidence of non-specific rash. 15 out of 53 exhibited diaper, heat, or contact rash (28.3%) who received Lot #60664/C-E810; 7 out of 54 (12.9%) who received Lot #60665/C-E811; and 19 out of 56 (33.9%) who received Lot #60666/C-E812. No other rates were significant.

Analyses of variance were performed on post-titer values of children who were initially seronegative to the individual components. The log transformation was used in each analysis. No significant differences exist among the groups (lots) for any of the three components.

A multivariate analysis was performed on the post-titer values of triple-negative vaccinees. Again, the log transformation was applied. There was no significant difference among the groups.



T.S.  
6801





Summary No. 1  
of  
Clinical Investigative Studies  
of

Combined Live Measles Virus Vaccine (Moraten Line-ATTENUVAX)  
RA 27/3 Rubella Virus Vaccine

for Purpose of Support for  
a License to Manufacture and Sell.



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M. R. Hilleman, Ph.D.

Prepared: August 11, 1978  
Merck Institute for Therapeutic Research  
West Point, Pennsylvania

Clinical Investigative Studies of Combined Live  
Measles-Rubella (RA 27/3) Virus Vaccine

1. Background

In a separate submission, "Summary No. 2 of Clinical Investigative Studies of RA 27/3 Strain Live Rubella Virus Vaccine for Support of a License to Manufacture and Sell," dated January 11, 1978, and in Addendum No. 1 to that submission dated June 26, 1978, the RA 27/3 strain rubella virus vaccine was shown to be safe and highly effective in eliciting an antibody response in persons of various ages.

In extension of clinical tests with RA 27/3 rubella virus vaccine, studies were conducted to evaluate its immunizing capability when combined with live attenuated Moraten measles virus vaccine (ATTENUVAX). The present submission relates to clinical investigative studies of combined live measles-rubella (RA 27/3) virus vaccine.

All clinical studies were conducted under BB-IND-1015, Combined Live Measles-Rubella (RA 27/3) Virus Vaccine.

2. Lot Numbers of Vaccine Tested

Experimental lot prepared by Virus and Cell Biology Research,  
Merck Sharp and Dohme Research Laboratories:

622/C-D764

Consistency lots prepared by Merck Sharp and Dohme Biologics Manufacturing:

62343/C-F021

62344/C-F022

62345/C-F023

3. Serologic Testing

Serologic determinations were made in the laboratories of Virus and Cell Biology Research, Merck Institute, and in the Control Laboratories of the Merck Sharp and Dohme Division of Merck and Co.

The hemagglutination-inhibition (HI) test was used to determine rubella antibody response. The starting dilution was 1:8.

In most cases, measles antibody determinations were by HI assay with a starting dilution of 1:5. Where noted, sera were retested by serum neutralization test at a starting dilution of 1:2.

#### 4. Clinical Studies

The clinical studies were conducted under the overall responsibility of Dr. Maurice R. Hilleman, Vice President, Virus and Cell Biology Research, Merck Institute for Therapeutic Research, West Point, Pennsylvania.

The clinical tests were carried out by three groups of workers:

- a. Dr. Robert E. Weibel, Director, Division of Preventive Medicine, Joseph Stokes, Jr. Research Institute, Children's Hospital of Philadelphia, Philadelphia, Pennsylvania
- b. Dr. Victor M. Villarejos, Director, Louisiana State University - International Center for Medical Research and Training, San Jose, Costa Rica
- c. Dr. Louis Z. Cooper, Director, Pediatric Service, The Roosevelt Hospital, New York, New York

Clinical studies fall into two main categories:

	<u>Reference</u>
a. Comparison of measles-rubella (RA 27/3) and measles-rubella (HPV-77) vaccines	2
b. Serologic and clinical responses to measles-rubella (RA 27/3) vaccine	1, 3, 4

The clinical studies were carried out by the physicians at the locations in the individual study summaries to follow. The populations employed were defined with respect to age, location and other pertinent parameters.

Subjects were bled initially and again 6 to 8 weeks later. The sera were tested to define the initial serostatus and the subsequent antibody response.

Clinical surveillance was by two procedures. In studies by Drs. Weibel and Cooper, the observations were recorded daily by the mother. The parent was asked to contact the physician should any significant or bothersome reaction occur. In the studies by Dr. Villarejos, observations were made on a routine basis by medical or paramedical personnel; physicians were notified of any significant illness which occurred subsequent to vaccination.

The data presented in the following sections are self-explanatory. The detailed background records are on file in Virus and Cell Biology Research, Merck Institute for Therapeutic Research, West Point, Pennsylvania. These records are available for review at any time.

## 5. Clinical Study Summaries

### Reference 1 - Study 442 - Dr. Victor Villarejos

Details of the study plan are given in the clinical test protocol. The study was designed to measure antibody and clinical responses to the RA 27/3 rubella component when given alone or combined with mumps and/or measles vaccine. Findings presented in the summary tables indicate excellent antibody response to both virus components among children receiving combined live measles-rubella (RA 27/3) virus vaccine. No significant clinical reactions were noted following vaccination.

### Reference 2 - Study 470 - Dr. Louis Cooper

This study is being conducted among children to compare responses to HPV-77 and RA 27/3 rubella vaccines when given alone or combined with live measles virus vaccine. Details of the study plan are given in the clinical test protocol, and results, to date, are presented in the summary tables. The study continues in progress.

### Reference 3 - Study 512 - Dr. Victor Villarejos

Study 512 was conducted to measure antibody and clinical responses to three consecutive lots of combined measles-rubella vaccine containing the RA 27/3 rubella component. Study details are given in the clinical protocol. Findings presented in the summary tables indicate excellent antibody response to both components of all three lots of vaccine. No significant clinical reactions were noted.

### Reference 4 - Study 514 - Dr. Robert Weibel

Study 514 is being conducted to measure antibody and clinical responses to three consecutive lots of combined measles-rubella vaccine containing the RA 27/3 rubella component. Details of the study plan are given in the clinical test protocol and results are presented in the summary tables. All three lots showed excellent antibody response while no significant clinical reactions were noted.

## 6. Overall Summary

The total numbers of vaccinations for which supporting data have been given are as follows:

<u>Lot #</u>	<u>No. Vacc.</u>	<u>No. Seroconverting/No. Double Negatives (%)</u>	
		<u>Measles</u>	<u>RA 27/3 Rubella</u>
622	216	59/64 (92)	63/64 (93)
62343	107	46/50 (92)	50/50 (100)
62344	105	45/45 (100)	45/45 (100)
62345	100	49/50 (98)	50/50 (100)
Unknown	30	26/28 (93)	28/28 (100)
Totals	558	225/237 (95)	236/237 (99)

The data show that combined live measles-rubella vaccine containing the RA 27/3 rubella virus component is safe and effective.

Summary of Clinical Tests of Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Study No.	Investigator	Lot No.	Age		No. Vacc.	Antibody Responses among Double Negatives						Reference No.
						Measles		Rubella				
			Range	Mean (Yrs.)		No. Conv./ No. Seroneg. (%)	GMT	No. Conv./ No. Seroneg. (%)	GMT			
442	Villarejos	622	1 - 6y	3.7	193	49/54 (91)	49	53/54 (98)	151	1		
470	Cooper	622	14m- 6y	2.0	23	10/10 (100)	57	10/10 (100)	274	2		
512	Villarejos	62343	10m- 9y	4.4	60	12/15 (80)	17	15/15 (100)	308	3		
		62344	11m- 8y	4.3	60	18/18 (100)	40	18/18 (100)	376			
		62345	13m- 6y	4.1	55	16/17 (94)	70	17/17 (100)	289			
514	Weibel	62343	13m- 3y	1.4	47	34/35 (97)	80*	35/35 (100)	312	4		
		62344	14m- 4y	1.8	45	27/27 (100)	78	27/27 (100)	367			
		62345	13m- 4y	1.4	45	33/33 (100)	114	33/33 (100)	415			
		Unknown	13m-10y	1.7	30	26/28 (93)	51*	28/28 (100)	371			
		Totals			558	225/237 (95)	60	236/237 (99)	287			

\* GMT based on Measles HI results only.

Program: Study #442

Vaccine: Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine  
Lot No. 621/C-D763

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine  
Lot No. 622/C-D764

Live Attenuated Rubella (RA 27/3) Virus Vaccine  
Lot No. 579/C-D418

Responsible Clinical Investigator:

Victor M. Villarejos, M.D.  
Director  
Louisiana State University  
International Center for Medical  
Research and Training  
Apartado 10.155  
San Jose, Costa Rica

Study Location: Rivas, Nicaragua

Date Study Initiated: January 19, 1976

Date Study Completed: April 28, 1976

Study Procedure:

A total of 589 children, 10 months to 7 years of age, from the open population were included in the study. Each participant received a 0.5 ml subcutaneous dose of one of the three vaccines. Blood samples were obtained prior to and six weeks after vaccination.



Clinical Protocol - Study #442

Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine  
Live Attenuated Rubella (RA 27/3) Virus Vaccine

**Purpose:** To determine antibody and clinical responses to combined live measles-mumps-rubella (RA 27/3) virus vaccine, to combined live measles-rubella (RA 27/3) virus vaccine, and to live attenuated rubella (RA 27/3) virus vaccine.

**Vaccines:** a) Combined live measles-mumps-rubella (RA 27/3) virus vaccine  
Lot No. 621

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

b) Combined live measles-rubella (RA 27/3) virus vaccine  
Lot No. 622

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

c) Live attenuated rubella (RA 27/3) virus vaccine  
Lot No. 579

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial of vaccine should be reconstituted with 0.7 ml of sterile, pyrogen-free distilled water.

CAUTION: The combined vaccines contain egg protein and should not be given to persons with known sensitivity to egg, chicken, or chicken feathers. All three vaccines contain neomycin and should not be given to persons with sensitivity to neomycin. Persons with leukemia or other immunologic disorders and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccines stored at -20°C until used.

Keep dried vaccines at 4°C in transport.

Keep reconstituted vaccines on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of children 1 to 6 years of age.

Children receiving a given vaccine will have a negative history for vaccination with and illness caused by viruses represented in that vaccine. Children will be assigned to receive one of the three vaccines as follows:

<u>Vaccine</u>	<u>Vaccine Lot</u>	<u>No. Children</u>
measles-mumps-rubella	621	150-200
measles-rubella	622	150-200
rubella	579	150-200

Informed consent will be obtained from each child's parent or guardian prior to his participation in the study.

Each child will be bled (10-15 ml) immediately prior to vaccination and 6 weeks following vaccination.

Vaccine dose is 0.5 ml given subcutaneously.

Each child will be followed clinically for 42 days following vaccination. All local and systemic complaints will be recorded on the case report form.

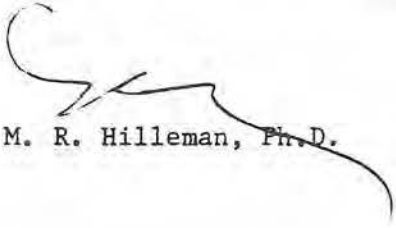
<u>Schedule:</u>	<u>Time</u>	<u>Action</u>
	Day 0	Bleed 10-15 ml. Vaccinate 0.5 ml, subcutaneously.
	Days 0-42	Clinical follow-up for local and systemic reactions.
	Week 6	Bleed 10-15 ml.

Laboratory: Remove sera from clot aseptically and store frozen at -20°C until shipped. It is imperative that sera are sterile to avoid interference with the serologic assay.

Serology: Circulating levels of antibody to each vaccine component will be determined for samples drawn before and after vaccination. Measles and rubella antibody levels will be determined by hemagglutination-inhibition test. Mumps antibody levels will be determined by serum neutralization test.

Clinical Forms: Attached.

- Adverse Reactions: Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Allen F. Woodhour, telephone (215) 699-5311, Ext. 5588.
- Unused Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pa. 19486.
- Shipping of Sera & Records:
- a) Send sera frozen within insulated containers which are supplied.
  - b) Send sera and records to Dr. Maurice R. Hilleman, Virus and Cell Biology Research, Merck Sharp & Dohme Research Laboratories, West Point, Pa. 19486.
  - c) Alert Dr. Hilleman by cable as soon as possible as to flight number, air bill, and date of arrival.



M. R. Hilleman, Ph.D.





# VACUNACIÓN CONTRA SARAMPIÓN PAPERAS RUBÉOLA

## HOJA CLINICA

NO. DE CASO \_\_\_\_\_

**B**

FECHA DE VACUNACION \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 día mes año

NOMBRE: \_\_\_\_\_

DIA	FECHA	Temperatura	Malestar	Anorexia	Gastroenteritis	Irritabilidad	Cefalea	I. V. R. S.	Otitis	Conjuntivitis	Linfadenopatía*	Reaccion Local* (Dímetro mm)	Exantema*	RASH*		Artralgia*	Artritis*	*Especifique tipo en esta sección
														Rubelliforme	Morbiliforme			OTRAS REACCIONES
		24	16	25	08	15	14	01	03	06		12	50	51	52	11	32	
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Al terminar el estudio, devuelva copia blanca y copia amarilla de esta forma, adjuntas a la forma "A" al: (Retenga copia color de rosa para sus archivos)

M.R. Hilleman, PhD, DSc  
 MERCK SHARP & DOHME RESEARCH LABORATORIES  
 WEST POINT, PENNSYLVANIA, 19486, U.S.A.

Firma del medico:

Nombre del medico (en letra de molde):

Fecha:

PRECAUCION: Papel carbón no es negro. No escriba encima de otras copias. No escriba en áreas oscuras.

Table 1

Serological Findings Among Children Who Received Combined Live  
Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:				Initially Seropositive to:
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
1 Year	22	16	11/11	11/11		4/4	1
2 Years	20	16	7/9	9/9	2/2	3/3	2
3 Years	46	36	14/16	15/16	1/1	13/13	6
4 Years	40	31	5/5	5/5	2/2	20/20	4
5 Years	28	19	5/5	5/5	1/1	11/11	2
6 Years	37	24	7/8	8/8	4/4	9/9	3
Total	193	142	49/54	53/54	10/10	60/60	18
Mean Age: 3.7 Years			(90.7%)	(98.1%)	(100%)	(100%)	

## Overall Conversion Rates

<u>Measles</u>	<u>Rubella</u>
59/64 (92.2%)	113/114 (99.1%)



Table 2

Serological Findings Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:												Initially Seropositive to: Measles Mumps and Rubella
			Measles-Mumps-Rubella			Measles-Mumps		Measles-Rubella		Mumps-Rubella		Measles Only	Mumps Only	Rubella Only	
			Conversions/Total			Conversions/Total		Conversions/Total		Conversions/Total		Conversions/ Total	Conversions/ Total	Conversions/ Total	
			Measles	Mumps	Rubella	Measles	Mumps	Measles	Rubella	Mumps	Rubella				
10 Months	1	0													
11 Months	2	2	1/1	1/1	1/1			1/1	1/1						
1 Year	29	21	7/7	7/7	7/7			4/5	5/5	3/3	3/3		2/2	3/3	1
2 Years	18	15	3/3	3/3	3/3	1/1	1/1	4/4	4/4	2/3	3/3			3/3	1
3 Years	41	33	6/6	6/6	6/6	1/1	1/1	3/3	3/3	6/6	6/6			14/14	3
4 Years	39	34	2/2	2/2	2/2			5/5	5/5	7/8	8/8	1/1		15/15	3
5 Years	32	25	3/3	2/3	3/3			2/2	2/2	2/3	3/3	2/2		13/13	2
6 Years	36	28	1/1	1/1	1/1			8/8	8/8	2/2	2/2		1/1	15/15	1
7 Years	1	1						1/1	1/1						
Total	199	159	23/23 (100%)	22/23 (95.7%)	23/23 (100%)	2/2	2/2	28/29 (96.6%)	29/29 (100%)	22/25 (88.0%)	25/25 (100%)	3/3	3/3	63/63 (100%)	11
Mean Age:	3.7 Years														

## Overall Conversion Rates

Measles	Mumps	Rubella
56/57 (98.2%)	49/53 (92.5%)	140/140 (100%)

10/3/77

Table 3

Distribution of Fold Rises of Hemagglutination-Inhibition Antibody Titers Among Children Who Received Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seropositive			Initially Seronegative			
			Fold Rise		Total	No. Conv.	Failures	Total	Conv. Rate
			>4X	Indet.					
1 Year	13	10		1	1	9		9	9/9
2 Years	17	15		1	1	14		14	14/14
3 Years	30	24		2	2	22		22	22/22
4 Years	38	32	1	1	2	30		30	30/30
5 Years	42	29		3	3	26		26	26/26
6 Years	56	48		8	8	40		40	40/40
7 Years	1	0							
Total	197	158	1	16	17	141	0	141	100%
Mean Age: 4.3 Years									

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children  
 Who Were Initially Seronegative to Measles and Rubella and Who Received  
 Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Measles (HI)		Rubella (HI)	
Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children
<5	5	<8	1
5		8	
10	1	16	
20	9	32	1
40	4	64	3
80	22	128	30
160	9	256	13
320	3	512	6
>640	1		
Total	54		54
Geometric Mean Titer	>48.7		151.2

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles, Mumps and Rubella and Who Received Combined Live Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Measles (HI)		Mumps (Neut.)		Rubella (HI)	
Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children	Post-Vaccination Titer	No. of Children
<5		<2	1	<8	
5		2	4	8	
10		4	4	16	
20	2	8	5	32	1
40	5	16	7	64	4
80	5	32	2	128	9
160	6			256	7
320	5			512	2
Total	23		23		23
Geometric Mean Titer 98.8			7.1		148.8

Table 6

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Rubella and Who Received Live Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Rubella (HI)	
Post Vaccination Titer	No. of Children
<8	
8	
16	
32	2
64	20
128	70
256	41
>512	8
Total	141
Geometric Mean Titer	>150.5

Table 7

Maximum Temperatures Reported Among Children Who Received Combined  
Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Maximum Temperature (°F, Oral)	Total Vaccinees (193 Children)						Initially Seronegative to: Measles and Rubella (54 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	146 (76.0)	135 (70.3)	138 (72.3)	123 (64.4)	114 (59.7)	67	42 (77.8)	35 (64.8)	39 (72.2)	38 (70.4)	35 (64.8)	23
99 - 100.9	46 (24.0)	56 (29.2)	53 (27.7)	68 (35.6)	77 (40.3)	124	12 (22.2)	19 (35.2)	15 (27.8)	16 (29.6)	19 (35.2)	31
102.0		1 (0.5)				1						
Not Taken	1	1	2	2	2	1						

Serology

<u>Patient #</u>	<u>Temperature</u>	<u>Day</u>	<u>Clinical Complaint</u>	<u>Measles</u>	<u>Rubella</u>
(b) (6)	102.0	5	Upper Respiratory Illness, Irritability, Malaise	>20 160	>32 256

4/28/77



Table 8

Maximum Temperatures Reported Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Maximum Temperature (°F, Oral)	Total Vaccinees (199 Children)						Initially Seronegative to: Measles, Mumps and Rubella (23 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	147 (73.9%)	138 (69.3)	160 (81.6)	130 (68.4)	137 (72.5)	83	18 (78.3)	20 (87.0)	23 (100.0)	14 (73.7)	16 (84.2)	16
99 - 100.9	51 (25.6)	57 (28.6)	35 (17.9)	59 (31.1)	52 (27.5)	109	5 (21.7)	3 (13.0)		5 (26.3)	3 (15.8)	7
101 - 102.2		2 (1.0)	1 (0.5)			3						
103 - 104.0	1 (0.5)	2 (1.0)		1 (0.5)		4						
Not Taken			3	9	10					4	4	

Patient #	Temperature	Days	Clinical Complaint	Serology					
				Measles		Mumps		Rubella	
(b) (6)	102.2	8	Upper Respiratory Illness, Malaise	>20	320	>8	32	<8	1024
	103.1	20	Irritability, Malaise	>20	160	>8	128	<8	64
	103.1	11	Tonsillitis, Anorexia, Headache, Malaise	>20	>640	<2	4	<8	128
	104.0	1	Irritability, Malaise			Serologies Not Done			
	104.0	5	Upper Respiratory Illness, Irritability, Anorexia, Malaise	>20	320	<4	16	<8	256

10/3/77

Table 9

Maximum Temperatures Reported Among Children Who Received Live  
Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Maximum Temperature (°F, Oral)	Total Vaccinees (197 Children)						Initially Seronegative to: Rubella (141 Children)					
	Days Post-Vaccination					No. with Max. Temp.	Days Post-Vaccination					No. With Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	162 (82.2%)	131 (66.5)	148 (75.1)	125 (64.4)	138 (71.5)	67	116 (82.3)	97 (68.8)	110 (78.0)	94 (67.6)	104 (74.8)	51
99-100.9	35 (17.8)	66 (33.5)	48 (24.4)	68 (35.1)	55 (28.5)	128	25 (17.7)	44 (31.2)	30 (21.3)	44 (31.7)	35 (25.2)	88
101 - 102.2			1 (0.5)	1 (0.5)		2			1 (0.7)	1 (0.7)		2
Not Taken				3	4					2	2	

Patient #	Temperature	Day	Clinical Complaint	Serology
(b) (6)	102.2	20	Upper Respiratory Illness, Anorexia, Malaise	<8 128

4/29/77

Table 10

Clinical Complaints Reported Among Children Who Received Combined  
Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot No. 622/C-D764 (Study #442)

Clinical Complaint	Total Vaccinees (193 Children)						Initially Seronegative to: Measles and Rubella (54 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post-Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Irritability	29 (15.1)	11 (5.7)	6 (3.1)	9 (4.7)	6 (3.1)	52	13 (24.1)	4 (7.4)	2 (3.7)	1 (1.9)	1 (1.9)	18
Malaise	33 (17.2)	21 (10.9)	15 (7.9)	15 (7.9)	7 (3.7)	65	12 (22.2)	8 (14.8)	4 (7.4)	2 (3.7)	1 (1.9)	18
Headache	4 (2.1)	3 (1.6)	2 (1.0)	2 (1.0)		9		1 (1.9)	1 (1.9)			1
Upper Respiratory Illness	1 (0.5)	9 (4.7)	8 (4.2)	8 (4.2)	1 (0.5)	21	1 (1.9)	5 (9.3)	2 (3.7)	1 (1.9)		6
Bronchitis			1 (0.5)	1 (0.5)		1			1 (1.9)	1 (1.9)		1
Otitis	1 (0.5)	2 (1.0)	2 (1.0)	1 (0.5)	1 (0.5)	6		2 (3.7)	1 (1.9)			3
Gastrointestinal Illness	5 (2.6)	7 (3.6)	6 (3.1)	4 (2.1)	3 (1.6)	23	1 (1.9)	2 (3.7)	1 (1.9)	1 (1.9)		5
Anorexia	5 (2.6)	4 (2.1)	6 (3.1)	4 (2.1)		17	2 (3.7)	1 (1.9)	1 (1.9)			4
Hepatitis	1 (0.5)	1 (0.5)				1						0
Asthma		1 (0.5)				1						0
Persons with Complaints:	36 (18.8)	24 (12.5)	17 (8.9)	18 (9.4)	8 (4.2)	70	13 (24.1)	9 (16.7)	4 (7.4)	3 (5.6)	1 (1.9)	19
Persons with No Complaints:	156 (81.3)	168 (87.5)	174 (91.1)	173 (90.6)	183 (95.8)	121	41 (75.9)	45 (83.3)	50 (92.6)	51 (94.4)	53 (98.1)	35
Negative Physician Surveillance:	1	1	2	2	2	1						

Table 11

Clinical Complaints Reported Among Children Who Received Combined Live  
Measles-Mumps-Rubella (RA 27/3) Virus Vaccine, Lot No. 621/C-D763 (Study #442)

Clinical Complaint	Total Vaccinees (199 Children)						Initially Seronegative to: Measles, Mumps and Rubella (23 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Irritability	32 (16.1%)	9 (4.5)	2 (1.0)	4 (2.1)		39	5 (21.7)			1 (5.0)		5
Malaise	30 (15.1)	14 (7.0)	3 (1.5)	7 (3.6)	1 (0.5)	43	5 (21.7)	1 (4.3)		2 (10.0)		7
Headache		1 (0.5)	2 (1.0)			2						0
Upper Respiratory Illness	9 (4.5)	11 (5.5)	5 (2.5)	8 (4.1)	5 (2.6)	23	1 (4.3)	1 (4.3)	1 (4.3)	2 (10.0)	1 (5.0)	3
Otitis			2 (1.0)	3 (1.5)		3			1 (4.3)	1 (5.0)		1
Ophthalmopathy		1 (0.5)				1						0
Gastrointestinal Illness	13 (6.5)	7 (3.5)	2 (1.0)	5 (2.6)	1 (0.5)	22		1 (4.3)				1
Anorexia	5 (2.5)	3 (1.5)	2 (1.0)	5 (2.6)		13				1 (5.0)		1
Mild Dermatitis		1 (0.5)				1						0
Persons with Complaints:	49 (24.6)	22 (11.1)	11 (5.5)	19 (9.8)	6 (3.1)	73	6 (26.1)	2 (8.7)	1 (4.3)	4 (20.0)	1 (5.0)	10
Persons with No Complaints:	150 (75.4)	177 (88.9)	188 (94.5)	175 (90.2)	187 (96.9)	123	17 (73.9)	21 (91.3)	22 (95.7)	16 (80.0)	19 (95.0)	12
Negative Physician Surveillance				5	6					3	3	

10/3/77



Table 12

Clinical Complaints Reported Among Children Who Received Live  
Attenuated Rubella (RA 27/3) Virus Vaccine, Lot No. 579/C-D418 (Study #442)

Clinical Complaint	Total Vaccinees (197 Children)						Initially Seronegative to: Rubella (141 Children)					
	Days Post-Vaccination					No. with Complaint	Days Post-Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Irritability	22 (11.2)	4 (2.0)	3 (1.5)	5 (2.6)	2 (1.0)	32	15 (10.6)	4 (2.8)	2 (1.4)	2 (1.4)	1 (0.7)	23
Malaise	28 (14.2)	10 (5.1)	5 (2.5)	9 (4.6)	4 (2.1)	46	19 (13.5)	9 (6.4)	2 (1.4)	5 (3.5)	2 (1.4)	32
Headache	2 (1.0)	1 (0.5)		3 (1.5)	1 (0.5)	6	1 (0.7)			1 (0.7)		2
Upper Respiratory Illness	4 (2.0)	8 (4.1)	1 (0.5)	6 (3.1)	2 (1.0)	15	3 (2.1)	6 (4.3)	1 (0.7)	5 (3.5)	2 (1.4)	13
Otitis	2 (1.0)			2 (1.0)	1 (0.5)	4	1 (0.7)			1 (0.7)	1 (0.7)	2
Ophthalmopathy	1 (0.5)	1 (0.5)				1	1 (0.7)	1 (0.7)				1
Gastrointestinal Illness	5 (2.5)	6 (3.0)	1 (0.5)	1 (0.5)	1 (0.5)	11	4 (2.8)	5 (3.5)	1 (0.7)		1 (0.7)	8
Anorexia	7 (3.6)	1 (0.5)		5 (2.6)		13	4 (2.8)			4 (2.8)		8
Persons with Complaints:	35 (17.8)	18 (9.1)	7 (3.6)	16 (8.2)	7 (3.6)	60	23 (16.3)	14 (9.9)	4 (2.8)	10 (7.1)	5 (3.5)	43
Persons with No Complaints:	162 (82.2)	179 (90.9)	190 (96.4)	180 (91.8)	188 (96.4)	137	118 (83.7)	127 (90.1)	137 (97.2)	131 (92.9)	136 (96.5)	98
Negative Physician Surveillance				1	2							





Program: Study #470 - To evaluate and compare clinical and immunological responses to two rubella vaccines, administered alone and in combination with measles virus vaccine.

Vaccine: Combined live measles-rubella (RA 27/3) virus vaccine  
Lot #662/C-D764

Combined live measles-rubella (HPV-77) virus vaccine  
M-R-VAX

Live attenuated RA 27/3 rubella virus vaccine  
Lot #579/C-D418  
Lot #60664/C-E668

Responsible Clinical Investigator:

Louis Z. Cooper, M.D.  
Director, Pediatric Service  
The Roosevelt Hospital  
428 West 59th Street  
New York, New York 10019

Study Location: New York, New York

Date Study Initiated: June 25, 1976

Date Study Completed: In Progress

Study Procedure:

Fifty-four children, 11 months to 18 years of age, have been included in the study thus far. Thirty-six received a 0.5 ml subcutaneous dose of combined live measles-rubella virus vaccine; eighteen received a 0.5 ml subcutaneous dose of live attenuated RA 27/3 rubella virus vaccine. Blood samples were obtained immediately prior to vaccination and six weeks after vaccination from a sample of the population. Each child was followed 6 weeks for clinical complaints. The study continues in progress.

Addendum #1

Clinical Protocol - Study #470

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Purpose of

Addendum: To permit vaccination with monovalent RA 27/3 or HPV-77 duck rubella virus vaccines.

Vaccines:

1. Combined live measles-rubella (RA 27/3) virus vaccine  
Lot #622/C-D764

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water without preservative.

2. Combined live measles-rubella (HPV-77 duck embryo) virus vaccine  
Lot #0619W

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water without preservative.

3. Live HPV-77 duck embryo rubella virus vaccine  
Lot #0406W

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water without preservative.

4. Live RA 27/3 rubella virus vaccine  
Lot #60640/C-E668

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water without preservative.

Addendum #1  
Clinical Protocol - Study #470  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Vaccines: CAUTION: Both combined vaccines and the HPV-77 duck rubella virus vaccine contain egg protein and should not be given to persons with known sensitivity to chicken or duck, chicken or duck eggs or feathers. All of the vaccines contain neomycin and should not be given to persons sensitive to neomycin. Persons with leukemia or other immunologic disorder and persons receiving immunosuppressive drugs should not be vaccinated. The vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccines stored at -20°C.

Keep dried vaccines at 4°C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of children 1 to 6 years old having negative histories for vaccination and illness caused by measles and/or rubella. Children will receive one of the four vaccines as follows:

<u>Group</u>	<u>Vaccine</u>	<u>No. of Children</u>
1	Measles-rubella (RA 27/3)	Up to 500
2	Measles-rubella (HPV-77 duck)	Up to 500
3	HPV-77 duck rubella	Up to 200
4	RA 27/3 rubella	Up to 200

Informed written consent will be obtained from a parent or guardian of each child participating in the study.

Each child will receive a single 0.5 ml subcutaneous injection of one of the four vaccines.

Bleeding samples (10-15 ml) will be obtained from approximately one-third of the study participants. Samples will be drawn immediately before and 6-8 weeks following vaccination.

Each child will be followed clinically for 42 days after vaccination. All local and systemic complaints will be recorded on the case report form.

Addendum #1

Clinical Protocol - Study #470

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Schedule:

Time	Vaccination and Follow-Up (All Children)	Bleeding (Approx. 1/3 of Children)
Day 0	Vaccinate 0.5 ml, subcutaneously.	10-15 ml
Days 0-42	Clinical follow-up for local and systemic reactions.	--
Week 6-8	--	10-15 ml

Laboratory: Remove serum from clot aseptically and store frozen at -20°C.

Serology: Circulating levels of measles and rubella antibodies before and after vaccination will be determined by hemagglutination-inhibition test.

Clinical

Form: Attached.

Adverse

Reactions: Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Allen F. Woodhour, telephone (215) 699-5311, Ext. 5588.

Unused

Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.



M. R. Hilleman, Ph.D.

Clinical Protocol - Study #470

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Purpose: To compare antibody and clinical responses to combined live measles-rubella virus vaccine containing the RA 27/3 rubella virus strain or the HPV-77 duck rubella virus strain.

Vaccine: 1. Combined live measles-rubella (RA 27/3) virus vaccine  
Lot #622 or Lot #623

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in two-dose vials. Each vial of vaccine should be rehydrated with 1.2 ml of sterile, pyrogen-free distilled water.

2. Combined live measles-rubella (HPV-77 duck) virus vaccine  
Lot #2412T

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial of vaccine should be rehydrated with 0.7 ml of sterile, pyrogen-free distilled water.

CAUTION: Both vaccines contain egg protein and should not be given to persons with known sensitivity to chicken or duck, chicken or duck eggs or feathers. The vaccines also contain neomycin and should not be given to persons with sensitivity to neomycin. Persons with leukemia or other immunologic disorders or persons receiving immunosuppressive drugs should not be vaccinated. The vaccines should not be given to persons with any febrile respiratory illness or other active febrile infection.

Keep dried vaccines stored at -20°C.

Keep dried vaccines at 4°C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of children 1 to 6 years old having negative histories for vaccination and illness caused by measles and rubella. Children will be randomly assigned to receive one of the two vaccines as follows:

<u>Group</u>	<u>Vaccine</u>	<u>No. of Children</u>
1	measles-rubella (RA 27/3)	up to 500 children
2	measles-rubella (HPV-77 duck)	up to 500 children

Informed written consent will be obtained from each child's parent or guardian prior to participating in the study.

Each child will receive a single 0.5 ml subcutaneous injection of one of the two combined live measles-rubella virus vaccines.

Bleeding samples (10-15 ml) will be obtained from approximately one-third of the study participants. They will be bled immediately prior to vaccination and 6-8 weeks following vaccination.

Each child will be followed clinically for 42 days after vaccination. All local and systemic complaints will be recorded on the case report form.

Schedule:

Time	Vaccination and Follow-up (All Children)	Bleeding (Approx. 1/3 of Children)
Day 0	Vaccinate 0.5 ml, subcutaneously.	10-15 ml
Days 0-42	Clinical follow-up for local and systemic reactions.	--
Week 6-8	--	10-15 ml


Laboratory: Remove serum from clot aseptically and store frozen at -20°C.

Serology: Circulating levels of measles and rubella antibodies before and after vaccination will be determined by hemagglutination-inhibition test.

Clinical  
Form: Attached.

Adverse  
Reactions: Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Allen F. Woodhour, telephone (215) 699-5311, Ext. 5588.

Unused  
Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pa. 19486.



M. R. Hilleman, Ph.D.



# MEASLES - RUBELLA VACCINATION

Study No. (1-3)

Case No. (5-9)

CT 2	Name	Sex (20) M F	Birthdate (35-41) mo day yr	(46-47)
Address				
Indicate if this child:				
<input type="checkbox"/> had disease		Did child develop clinical disease: 1 = YES 2 = NO		
<input type="checkbox"/> been vaccinated		Date of onset: _____		
<input type="checkbox"/> been exposed		Comments: _____		
Date of exposure _____		Diagnosed by: _____		
(48) <input type="checkbox"/> Vaccinee <input type="checkbox"/> Control		Date of Vaccination		Bleeding Dates: _____
Lot No. (49-51)		(52-57)		(58-63)
				(70-75)

CT 3	DAY	DATE	Temperature		Malaise	Anorexia	Gastrointestinal	Irritability	Headache	Upper Respiratory Illness	Otitis	Conjunctivitis	Lymphadenopathy	Local Reaction*	Erythema	Rash Rubella like rash	Arthralgia	Arthritis	*Specify (Type, Location)
			Oral	Rectal															OTHER REACTIONS
	0		24		16	25	03	15	14	01	03	06	05	12	50	51	11	32	
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	42																		

Please return completed forms to: (Retain PINK copy for your files)

M. R. HILLEMANN, PhD, DSc  
MERCK SHARP & DOHME RESEARCH LABORATORIES  
WEST POINT, PENNSYLVANIA, 19486, U.S.A.

Physician's Signature

Physician's Name (Type or Print)

Date

Table 1

Serological Findings Among Children Who Received Combined Live  
Measles-Rubella (RA 27/3) Virus Vaccine, Lot #622/C-D764 (Study #470)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:		Initially Seropositive to:
			Measles-Rubella		Measles and Rubella
			Conversions/Total		
			Measles	Rubella	
Not Given	1	1			1
(Months)					
14	4	1	1/1	1/1	
15	3	1	1/1	1/1	
16	3	0			
17	1	1	1/1	1/1	
18	1	1	1/1	1/1	
(Years)					
2	6	3	3/3	3/3	
4	2	2	1/1	1/1	1
5	1	1	1/1	1/1	
6	1	1	1/1	1/1	
Total	23	12	10/10	10/10	2
Mean Age:	2.0 Years		(100%)	(100%)	

## Overall Conversion Rates

<u>Measles</u>	<u>Rubella</u>
10/10	10/10
(100%)	(100%)

5/18/78

Table 2

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (HPV-77) Virus Vaccine, M-R-VAX (Study #470)

Age	Total No. Vacc.	No. Serol. Tested	Initially Seronegative to:				Initially Seropositive to:
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total		Conversions/	Conversions/	
			Measles	Rubella	Total	Total	
(Months)							
11	1	0					
14	2	0					
15	2	2	2/2	2/2			
16	2	2	1/1	1/1	1/1		
21	1	1				1/1	
(Years)							
4	1	1			1/1		
5	1	1	1/1	1/1			
7	1	1	1/1	1/1			
9	1	1					1
18	1	1	1/1	1/1			
Total	13	10	6/6	6/6	2/2	1/1	1
Mean Age:	4.1 Years						

## Overall Conversion Rates

<u>Measles</u>	<u>Rubella</u>
8/8	7/7
(100%)	(100%)

10/6/77

Table 3

Distribution of Fold Rises of Hemagglutination Inhibition Antibody Titers Among Children Who Received Live Attenuated RA 27/3 Rubella Virus Vaccine, Lot #579/C-D418 (Study #470)

Age (Years)	No. Vacc.	No. Serol. Tested	Initially Seropositive	Initially Seronegative					
			Total	Paired Sera				Pre-Vacc. Sera Only	Total
				No. Conv.	No. Fail.	Total	Conv. Rate		
1	6	0							
2	2	2		2		2	2/2		2
4	1	1		1		1	1/1		1
5	1	1						1	1
Total	10	4	0	3	0	3	100%	1	4
Mean Age = 2.1 Years									

4/3/78

Table 4

Distribution of Fold Rises of Hemagglutination Inhibition Antibody Titers Among Children Who Received Live Attenuated RA 27/3 Rubella Virus Vaccine, Lot #60664/C-E668 (Study #470)

Age (Years)	No. Vacc.	No. Serol. Tested	Initially Seropositive		Initially Seronegative
			Paired Sera		Total
			$\geq 4x$ Rise	Total	
1	7	0			
5	1	1	1	1	
Total	8	1	1	1	0
Mean Age: 1.8 Years					

4/3/78

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles and Rubella, Who Received Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #622/C-D764 (Study #470)

Measles (HI)	
Post-Titer Distribution	Number of Children
10	1
20	1
40	2
80	5
160	
>320	1
Total 10	
Geometric Mean Titer: <u>&gt;56.6</u>	

Rubella (HI)	
Post-Titer Distribution	Number of Children
128	3
256	3
>512	4
Total 10	
Geometric Mean Titer: <u>&gt;274.4</u>	

5/18/78



Table 6

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles and Rubella, Who Received Combined Live Measles-Rubella (HPV-77) Virus Vaccine, M-R-VAX (Study #470)

Measles (HI)	
Post Titer Distribution	Number of Children
20	1
40	2
80	1
160	1
<u>&gt;320</u>	1
Total	6
Geometric Mean Titer: <u>&gt;71.3</u>	

Rubella (HI)	
Post Titer Distribution	Number of Children
128	2
256	1
<u>&gt;512</u>	3
Total	6
Geometric Mean Titer: <u>&gt;287.3</u>	

10/6/77

Table 7

Distribution of Post-Vaccination Antibody Titers Among Initially Seronegative Children  
Who Received Live Attenuated RA 27/3 Rubella Virus Vaccine, Lot #579/C-D418 (Study #470)

Rubella (HI)	
Post-Titer Distribution	Number of Children
256	1
<u>&gt;</u> 512	2
Total	3
Geometric Mean Titer: <u>&gt;</u> 406.4	

1/5/78

STUDY #470

Thus far, two children in the study have exhibited clinical complaints:

CASE NO. - (b) (6)

AGE - 4 Years

VACCINE - Measles-Rubella (RA 27/3)

CLINICAL COMPLAINT - Rubella-Like Rash, Days 2-3

SEROLOGY -

Rubella HI	32	<u>&gt;512</u>
Measles HI	<u>&gt;320</u>	160

CASE NO. - (b) (6)

AGE - 15 Months

VACCINE - Measles-Rubella (RA 27/3)

CLINICAL COMPLAINT - Upper Respiratory Illness, Day 3

SEROLOGY -

Rubella HI	NS	128
Measles HI	NS	20

1/5/78

Program: Study #512 - To measure antibody and clinical responses to three consecutive lots of combined measles-rubella virus vaccine.

Vaccine: Combined live measles-rubella (RA 27/3) virus vaccine, lyophilized,

Lot #62343/C-F021

Lot #62344/C-F022

Lot #62345/C-F023

Responsible Clinical Investigator:

Victor M. Villarejos, M.D.  
Director  
Louisiana State University  
International Center for Medical  
Research and Training  
Apartado 10.155  
San Jose, Costa Rica

Study Location: Nicaragua

Date Study Initiated: October 11, 1977

Date Study Completed: November 26, 1977

Study Procedure:

One hundred seventy-five children, 10 months to 9 years of age were included in the study. Each received a 0.5 ml dose of combined live measles-rubella virus vaccine. Blood samples were obtained on day of vaccination and 6 weeks after vaccination. Each child was followed 6 weeks for clinical complaints.

Clinical Protocol - Study #512

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Program: Combined live measles-rubella virus vaccine

Purpose: To measure antibody and clinical responses to three consecutive lots of vaccine.

Vaccine: Combined live measles-rubella virus vaccine, lyophilized,

Lot no. 62343/C-F021

Lot no. 62344/C-F022

Lot no. 62345/C-F023

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be reconstituted with 0.7 ml of sterile, pyrogen-free distilled water which is supplied in prefilled syringes.

CAUTION: The vaccine should not be given to persons with known sensitivity to neomycin, chicken, eggs or feathers. Persons with leukemia or other immunologic disorder and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccine should not be given to persons with a febrile respiratory illness or other active febrile infection.

Keep dried vaccine stored at -20°C until used.

Keep dried vaccine at 4°C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of up to 150 children with a negative history for vaccination and illness caused by measles and rubella viruses. The children should range from 1 to 6 years of age.

Informed written consent will be obtained from a parent or guardian of each child who participates in the study.

Each child will receive a 0.5 ml subcutaneous injection of one of the three vaccine lots.

Bleeding samples (10-15 ml) will be obtained from each child immediately before and 6 weeks after vaccination.

Clinical Protocol - Study #512  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Procedure: Each child will be followed clinically for local and systemic  
(continued) complaints occurring within 6 weeks after vaccination. Observations should include special notation for rash, nodes, arthralgia, arthritis, fever, malaise and anorexia. All complaints should be recorded on the case report form.

Schedule:

Time	Action - All Persons
Day 0	Bleed 10-15 ml Vaccinate 0.5 ml, subcutaneously
Days 0-42	Clinical follow-up for local and systemic complaints
Week 6	Bleed 10-15 ml

Laboratory: Remove serum from clot aseptically and store frozen at  $-20^{\circ}\text{C}$  until shipped. It is imperative that sera are sterile to avoid interference with the serologic assay.

Serology: Levels of circulating measles and rubella antibodies will be determined by hemagglutination-inhibition test.

Clinical Forms: Attached.

Adverse

Reactions: Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Arlene A. McLean, telephone (215) 699-5311, Ext. 6383.

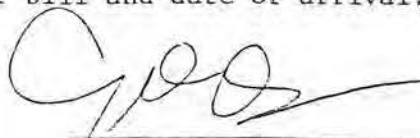
Unused Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.

Shipping of

Sera & Records: 1. Send sera frozen within insulated containers which are supplied.

2. Send sera and records to Dr. Maurice R. Hilleman, Virus & Cell Biology Research, Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.

3. Alert Dr. Hilleman by cable as soon as possible regarding flight number, air bill and date of arrival.



M. R. Hilleman, Ph.D.



Estudio No. \_\_\_\_\_  
(1-3)

## OBSERVACIONES CLÍNICAS

No. Del Caso \_\_\_\_\_  
(5-9)

CT 2	Nombre completo del niño:	Sexo(35) M F	Fecha de nacimiento (36-41) día mes año	(46-47)
	Dirección completa de Padre o Guardián:			

☐ VACUNADO NO. de LOTE \_\_\_\_\_ (49-51) FECHAS de SANGRIA \_\_\_\_\_ SEROLOGIA \_\_\_\_\_  
☐ CONTROL (48) FECHA de VACUNACION \_\_\_\_\_ (52-57) \_\_\_\_\_ (56-63) \_\_\_\_\_  
 \_\_\_\_\_ (70-75) \_\_\_\_\_

Dia	Fecha	Temperatura		Malestar	Anorexia	Gastroenteritis	Irritabilidad	Cafelea	I.V.R.S.	Otitis	Conjuntivitis	Linfadenopatía	Reacción Local*	RASH*		Artralgia	Artritis	* Especifica tipo en esta sección
		Oral	Rectal											Rubelliforme	Morbiliforme			
		24		16	25	08	15	14	01	03	06	05	12	51	52	11	32	
0																		
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Al terminar el estudio, devuelva copia blanca y copia amarilla de esta forma a  
(Retenga copia color de rosa para sus archivos)

M. R. HILLEMANN, PhD, DSc  
MERCK SHARP & DOHME RESEARCH LABORATORIES  
WEST POINT, PENNSYLVANIA, 19486, U.S.A.

Firma del médico:

Nombre del médico (en letra de molde):

Fecha:

Table 1

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #512)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:			Initially Seropositive to:	
			Measles-Rubella		Measles Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
10	1	1	0/1	1/1			
12	1	1	1/1	1/1			
13	2	2	1/2*	2/2			
16	1	1				1/1	
21	1	1	1/1	1/1			
23	1	1			1/1		
(Years)							
2	7	6	1/2**	2/2		4/4	
3	9	7	3/3	3/3		4/4	
4	6	6	1/1	1/1		5/5	
5	12	11	1/1	1/1	1/1	6/6	3
6	9	9	1/1	1/1		7/7	1
7	7	7	2/2	2/2	1/1	2/2	2
8	2	2				2/2	
9	1	1				1/1	
Total	60	56	12/15	15/15	3/3	32/32	6
Mean Age:	4.4 Years		(80.0%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

Measles	Rubella
15/18	47/47
(83.3%)	(100%)

\* Antibody titer QNS,2 by serum neutralization.

\*\* Antibody titer QNS,4 by serum neutralization.

3/23/78

Table 2

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #512)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:				Initially Seropositive to:
			Measles-Rubella		Measles Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
11	1	1	1/1	1/1			
13	3	3	2/2	2/2			1
17	1	1				1/1	
22	1	1				1/1	
(Years)							
2	4	2	1/1	1/1			1
3	9	9	3/3	3/3		4/4	2
4	9	8	3/3	3/3	0/1	3/3	1
5	14	14	1/1	1/1		8/8	5
6	16	14	6/6	6/6	1/1	3/3	4
7	1	1	1/1	1/1			
8	1	1				1/1	
Total	60	55	18/18	18/18	1/2	21/21	14
Mean Age:	4.3 Years		(100%)	(100%)	(50.0%)	(100%)	

## Overall Conversion Rates

Measles	Rubella
19/20	39/39
(95.0%)	(100%)

Table 3

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/C-F023 (Study #512)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:				Initially Seropositive to:
			Measles-Rubella		Measles Only	Rubella Only	Measles Mumps and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
13	1	1				1/1	
14	1	1	1/1	1/1			
17	2	2				2/2	
20	1	1	1/1	1/1			
22	1	0					
(Years)							
2	3	3	2/2	2/2		1/1	
3	9	8	3/3	3/3	1/1	4/4	
4	14	12	4/4	4/4	0/1	7/7	
5	12	11	3/3	3/3		6/6	2
6	11	8	2/3	3/3		5/5	
Total	55	47	16/17	17/17	1/2	26/26	2
Mean Age:	4.1 Years		(94.1%)	(100%)	(50.0%)	(100%)	

## Overall Conversion Rates

Measles	Rubella
17/19	43/43
(85.5%)	(100%)

8/11/78

Table 4

Distribution of Post-Vaccination Antibody Titers Among Children  
 Who Were Initially Seronegative to Measles and Rubella, Who Received  
 Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #512)

Measles (HI)	
Post-Titer Distribution	Number of Children
<5	3*
5	
10	
20	4
40	6
80	2
Total	15
Geometric Mean Titer:	17.4

Rubella (HI)	
Post-Titer Distribution	Number of Children
32	1
64	
128	1
256	5
>512	8
Total	15
Geometric Mean Titer:	>308.0

3/23/78

\* Two cases post-positive by serum neutralization.

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children  
 Who Were Initially Seronegative to Measles and Rubella, Who Received  
 Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #512)

Measles (HI)	
Post-Titer Distribution	Number of Children
5	1
10	1
20	3
40	8
80	3
160	1
>320	1
Total	18
Geometric Mean Titer:	>40.0

Rubella (HI)	
Post-Titer Distribution	Number of Children
128	1
256	6
>512	11
Total	18
Geometric Mean Titer:	>376.3

3/23/78



Table 6

Distribution of Post-Vaccination Antibody Titers Among Children  
 Who Were Initially Seronegative to Measles and Rubella, Who Received  
 Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/C-F023 (Study #512)

Measles (HI)	
Post-Titer Distribution	Number of Children
<5	1
5	
10	
20	2
40	2
80	5
160	5
>320	2
Total	17
Geometric Mean Titer: $\geq 69.9$	

Rubella (HI)	
Post-Titer Distribution	Number of Children
128	4
256	6
>512	7
Total	17
Geometric Mean Titer: $\geq 289.3$	

8/11/78

Table 7

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #512)

Maximum Temperature (°F, Oral)	Total Vaccinees (60 Children)						Initially Seronegatives (15 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	50 (83.3%)	43 (71.7)	45 (75.0)	42 (70.0)	41 (68.3)	20	14 (93.3)	14 (93.3)	11 (73.3)	11 (73.3)	11 (73.3)	8
99 - 100.9	10 (16.7)	17 (28.3)	14 (23.3)	18 (30.0)	19 (31.7)	39	1 (6.7)	1 (6.7)	4 (26.7)	4 (26.7)	4 (26.7)	7
101 - 101.9			1 (1.7)			1						0

3/23/78

Table 8

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #512)

Maximum Temperature (°F, Oral)	Total Vaccinees (60 Children)						Initially Seronegatives (19 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	47 (78.3%)	29 (48.3)	41 (68.3)	35 (58.3)	33 (55.0)	14	15 (78.9)	5 (26.3)	13 (68.4)	11 (57.9)	12 (63.2)	4
99 - 100.9	13 (21.7)	31 (51.7)	19 (31.7)	25 (41.7)	27 (45.0)	46	4 (21.1)	14 (73.7)	6 (31.6)	8 (42.1)	7 (36.8)	15

Table 9

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/C-F023 (Study #512)

Maximum Temperature (°F, Oral)	Total Vaccinees (55 Children)						Initially Seronegatives (17 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	44 (80.0%)	27 (49.1)	33 (60.0)	33 (60.0)	38 (69.1)	8	12 (70.6)	8 (47.1)	8 (47.1)	11 (64.7)	10 (58.8)	3
99 -100.9	10 (18.2)	27 (49.1)	22 (40.0)	21 (38.2)	17 (30.9)	44	5 (29.4)	9 (52.9)	9 (52.9)	5 (29.4)	7 (41.2)	13
101 - 101.9	1 (1.8)	1 (1.8)		1 (1.8)		3				1 (5.9)		1

8/11/78

Table 10

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #512)

Clinical Complaint	Total Vaccinees (60 Children)						Initially Seronegatives (15 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Headache			1 (1.7%)			1						0
Irritability				1 (1.7)	1 (1.7)	1						0
Malaise			1 (1.7)			1						0
Upper Respiratory Illness	2 (3.3)	1 (1.7)	2 (3.3)	3 (5.0)	2 (3.3)	7				1 (6.7)		1
Gastrointestinal Illness		2 (3.3)	2 (3.3)	2 (3.3)	2 (3.3)	5		1 (6.7)		1 (6.7)	1 (6.7)	2
Persons with Complaint:	2 (3.3)	3 (5.0)	4 (6.7)	5 (8.3)	4 (6.7)	12	0	1 (6.7)	0	2 (13.3)	1 (6.7)	3
Persons with No Complaint:	58 (96.7)	57 (95.0)	56 (93.3)	55 (91.7)	56 (93.3)	48	15 (100)	14 (93.3)	15 (100)	13 (86.7)	14 (93.3)	12

Table 11

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #512)

Clinical Complaint	Total Vaccinees (60 Children)						Initially Seronegatives (19 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Headache				1 (1.7%)		1						0
Malaise		1 (1.7)		3 (5.0)	2 (3.3)	4						0
Upper Respiratory Illness	1 (1.7)	3 (5.0)	2 (3.3)	3 (5.0)	3 (5.0)	6	1 (5.3)	1 (5.3)				1
Gastrointestinal Illness	1 (1.7)	3 (5.0)	1 (1.7)		1 (1.7)	4	1 (5.3)	1 (5.3)				1
Persons with Complaint:	2 (3.3)	6 (10.0)	3 (5.0)	3 (5.0)	4 (6.7)	10	2 (10.5)	2 (10.5)	0	0	0	2
Persons with No Complaint:	58 (96.7)	54 (90.0)	57 (95.0)	57 (95.0)	56 (93.3)	50	17 (89.5)	17 (89.5)	19 (100)	19 (100)	19 (100)	17

3/23/78



Table 12

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/C-F023 (Study #512)

Clinical Complaint	Total Vaccinees (55 Children)						Initially Seronegatives (17 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Malaise		1 (1.8%)	2 (3.6)	1 (1.8)		2						0
Anorexia		1 (1.8)	1 (1.8)			1						0
Upper Respiratory Illness	2 (3.6)	3 (5.5)	3 (5.5)	4 (7.3)	2 (3.6)	8				2 (11.8)	1 (5.9)	2
Gastrointestinal Illness	2 (3.6)	3 (5.5)	3 (5.5)		1 (1.8)	6	1 (5.9)	1 (5.9)	1 (5.9)		1 (5.9)	3
Persons with Complaint:	3 (5.5)	6 (10.9)	6 (10.9)	3 (5.5)	2 (3.6)	14	1 (5.9)	1 (5.9)	1 (5.9)	2 (11.8)	2 (11.8)	5
Persons with No Complaint:	52 (94.5)	49 (89.1)	49 (89.1)	52 (94.5)	53 (96.4)	41	16 (94.1)	16 (94.1)	16 (94.1)	15 (88.2)	15 (88.2)	12

8/11/78

# MEMO

To File Location Date 8/14/78  
From T. Schofield Location  
Subject Statistical Analysis - Study #512

No significant differences exist in seroconversion rates for measles and rubella or clinical reaction rates among three lots of combined measles-rubella (RA 27/3) virus vaccine.

Multivariate analysis of variance was performed on post-titer values for children who were initially seronegative to both measles and rubella by the HI test. The log transformation was used. While sample sizes were small, a significant difference exists between the measles HI titers for children who received Lot #62343/C-F021 and children who received Lot #62345/C-F023. No other differences could be determined. Geometric mean titers were:

	<u>Measles</u>	<u>Rubella</u>
Lot #62343/C-F021 (n=15)	17.4	308.0
Lot #62344/C-F022 (n=18)	40.0	376.3
Lot #62345/C-F023 (n=17)	69.9	289.3



T.S.



Program: Study #514 - To measure antibody and clinical responses to three consecutive lots of combined measles-rubella virus vaccine.

Vaccine: Combined live measles-rubella virus vaccine, lyophilized

Lot #62343/C-F021

Lot #62344/C-F022

Lot #62345/C-F023

Responsible Clinical Investigator:

Robert E. Weibel, M.D.  
Director, Division of Preventive Medicine  
Joseph Stokes, Jr. Research Institute  
Children's Hospital of Philadelphia  
34th Street and Civic Center Boulevard  
Philadelphia, Pennsylvania 19104

Study Locations:

Pediatric Medical Associates, Havertown, Pennsylvania  
Lansdale Medical Group, Lansdale, Pennsylvania  
Geisinger Medical Center, Danville, Pennsylvania  
G. F. Schultheis, Jr., M.D. and W. W. Holm, M.D.,  
King of Prussia, Pennsylvania  
G. A. Starkweather, M.D., Havertown, Pennsylvania  
Children's Clinic of Chester and Vicinity, Chester,  
Pennsylvania

Date Study Initiated: September 9, 1977

Date Study Completed: May 13, 1978

Study Procedure:

One hundred sixty-seven children, 13 months to 12 years of age, were included in the study. Each received a 0.5 ml subcutaneous dose of combined live measles-rubella virus vaccine. Blood samples were obtained on day of vaccination and 6 weeks after vaccination. Each child was followed 6 weeks for clinical complaints.

Clinical Protocol - Study #514

Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Program: Combined live measles-rubella virus vaccine

Purpose: To measure antibody and clinical responses to three consecutive lots of vaccine.

Vaccine: Combined live measles-rubella virus vaccine, lyophilized,

Lot no. 62343/C-F021  
Lot no. 62344/C-F022  
Lot no. 62345/C-F023

Vaccine dose is 0.5 ml given subcutaneously.

The vaccine is supplied in single dose vials. Each vial should be reconstituted with 0.7 ml of sterile, pyrogen-free distilled water which is supplied in prefilled syringes.

CAUTION: The vaccine should not be given to persons with known sensitivity to neomycin, chicken, eggs or feathers. Persons with leukemia or other immunologic disorder and persons receiving immunosuppressive drugs should not be vaccinated. Also, the vaccine should not be given to persons with a febrile respiratory illness or other active febrile infection.

Keep dried vaccine stored at -20°C until used.

Keep dried vaccine at 4°C in transport.

Keep reconstituted vaccine on ice. Discard unused vaccine 4 hours after rehydration.

Procedure: The study population will consist of up to 150 children with a negative history for vaccination and illness caused by measles and rubella viruses. The children should range from 1 to 6 years of age.

Informed written consent will be obtained from a parent or guardian of each child who participates in the study.

Each child will receive a 0.5 ml subcutaneous injection of one of the three vaccine lots.

Bleeding samples (10-15 ml) will be obtained from each child immediately before and 6 weeks after vaccination.

Clinical Protocol - Study #514  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine

Procedure: Each child will be followed clinically for local and systemic  
(continued) complaints occurring within 6 weeks after vaccination. Observations should include special notation for rash, nodes, arthralgia, arthritis, fever, malaise and anorexia. All complaints should be recorded on the case report form.

Schedule:


Time	Action - All Persons
Day 0	Bleed 10-15 ml Vaccinate 0.5 ml, subcutaneously
Days 0-42	Clinical follow-up for local and systemic complaints
Week 6	Bleed 10-15 ml

Serology: Levels of circulating measles and rubella antibodies will be determined by hemagglutination-inhibition test.

Clinical Forms: Attached.

Adverse Reactions: Any serious or alarming reaction, including death due to any cause during the investigation, whether related or not related to the test material, must be reported immediately to Merck & Co., Inc., through Dr. Maurice R. Hilleman, telephone (215) 699-5311, Ext. 5532, or in his absence, Dr. Arlene A. McLean, telephone (215) 699-5311, Ext. 6383.

Unused Vaccine: All unused vaccine should be returned immediately to Merck Sharp & Dohme Research Laboratories, West Point, Pennsylvania 19486.

  
\_\_\_\_\_  
M. R. Hilleman, Ph.D.

# SYMPTOM RECORD

RUBELLA STUDY NO. \_\_\_\_\_

N. \_\_\_\_\_ (Last) \_\_\_\_\_ (First) \_\_\_\_\_ (Middle) CASE NO. \_\_\_\_\_

DAY	DATE	Temperature <input type="checkbox"/> Rectal <input type="checkbox"/> Oral (Check One)	NONE	RUNNY NOSE	SORE THROAT	COUGH	EAR ACHE	SWOLLEN GLANDS	SORE EYES	VOMITING	DIARRHEA	NAUSEA	* RASH	SORE JOINTS	SORE ARM (at shot)*	HEADACHE	ACHINESS	FEVER	LOSS OF APPETITE	* Describe	COMMENTS
INSTRUCTIONS ON REVERSE SIDE																					
0																					
1																					
2																					
3																					
4																					
5																					
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40																					

If fever or unusual reaction develops, call:

PLEASE RETURN FOR FOLLOW-UP VISIT ON: \_\_\_\_\_

BE SURE TO BRING THIS RECORD ALONG WITH YOU.



THE JOSEPH STOKES, JR. RESEARCH INSTITUTE  
THE CHILDREN'S HOSPITAL OF PHILADELPHIA  
UNIVERSITY OF PENNSYLVANIA  
34TH & CIVIC CENTER BLVD.  
PHILADELPHIA, PA. 19104

ROBERT E. WEIBEL, M.D., DIRECTOR  
DIVISION OF PREVENTIVE MEDICINE

(215) EV 7-6000  
(215) EV 7-1309

November 10, 1977

Arlene A. McLean, Ph.D.  
Director, Biologics Evaluation & Analysis  
Merck Sharp & Dohme Research Laboratories  
West Point, Pennsylvania 19486

RE: Clinical Protocol - Study #514  
Combined Live Measles-Rubella Vaccine

Dear Arlene:

At the conclusion of the first thirty vaccinees (b)(6) at Pediatric Associates it was noted by Dr. Al Carlson that the lot number on the last vial C-F022 did not correspond with the lot required on the work sheet. After a thorough review of the situation it can not be determined when the lot of vaccine not corresponding to the record was given. This information must be considered in the evaluation of all clinical and serologic records from these vaccinees.

The following steps have been taken to prevent the recurrence of this situation:

1. In addition to the color code for each lot, as now used, the required vaccine lot will be placed on the study registration sheet in the required color of the lot.
2. Each lot will be placed in a separate color coded box rather than in a single box with color coded areas as now used.

These changes have been instituted to insure the accuracy of the records.

Sincerely,



Robert E. Weibel, M.D.

REW:ceb

cc: Alfred Carlson, M.D.  
Karen Campbell, R.N.

Table 1

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #514)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:			Initially Seropositive to:	
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
13	1	0					
14	8	8	7/8	8/8			
15	17	16	13/13*	13/13	3/3		
16	8	8	8/8	8/8			
17	2	2	2/2	2/2			
18	3	3	2/2	2/2	1/1		
19	1	0					
20	1	1			1/1		
21	1	1				1/1	
23	1	1	1/1	1/1			
(Years)							
2	3	3	1/1	1/1	2/2		
3	1	1				1/1	
Total	47	44	34/35	35/35	7/7	2/2	0
Mean Age:	1.4 Years		(97.1%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

<u>Measles</u>	<u>Rubella</u>
41/42	37/37
(97.6%)	(100%)

\* One sample pair tested by serum neutralization.

8/11/78

Table 2

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #514)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:			Initially Seropositive to:	
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
14	5	5	5/5	5/5			
15	16	16	12/12	12/12	3/4		
16	6	4	2/2	2/2	2/2		
17	5	4	2/2	2/2	1/2		
18	5	5	4/4	4/4	1/1		
19	1	1	1/1	1/1			
21	2	1	1/1	1/1			
(Years)							
2	2	1			1/1		
4	1	0					
8	1	1				1/1	
12	1	1				1/1	
Total	45	39	27/27	27/27	8/10	2/2	0
Mean Age:	1.8 Years		(100%)	(100%)	(80.0%)	(100%)	

## Overall Conversion Rates

Measles	Rubella
35/37	29/29
(94.6%)	(100%)

6/27/78

Table 3

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/C-F023 (Study #514)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:			Initially Seropositive to:	
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
13	1	1	1/1	1/1			
14	7	6	5/5	5/5	1/1		
15	13	13	11/11	11/11	2/2		
16	14	14	9/9	9/9	4/4	1/1	
17	4	4	3/3	3/3	1/1		
18	2	2	1/1	1/1	1/1		
21	1	1	1/1	1/1			
(Years)							
2	2	1	1/1	1/1			
4	1	1	1/1	1/1			
Total	45	43	33/33	33/33	9/9	1/1	0
Mean Age:	1.4 Years		(100%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

<u>Measles</u>	<u>Rubella</u>
42/42	34/34
(100%)	(100%)

6/27/78

Table 4

Serological Findings Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot # Unknown (Study #514)

Age	No. Vacc.	No. Serol. Tested	Initially Seronegative to:				Initially Seropositive to:
			Measles-Rubella		Measles Only	Rubella Only	Measles and Rubella
			Conversions/Total		Conversions/ Total	Conversions/ Total	
			Measles	Rubella			
(Months)							
13	2	2	1/2	2/2			
14	5	5	5/5	5/5			
15	18	18	16/17*	17/17	1/1		
17	1	1	1/1	1/1			
18	1	1	1/1	1/1			
(Years)							
2	1	1				1/1	
7	1	1	1/1	1/1			
10	1	1	1/1	1/1			
Total	30	30	26/28	28/28	1/1	1/1	0
Mean Age:	1.7 Years		(92.9%)	(100%)	(100%)	(100%)	

## Overall Conversion Rates

<u>Measles</u>	<u>Rubella</u>
27/29	29/29
(93.1%)	(100%)

\* One sample pair tested by serum neutralization.

8/11/78

Table 5

Distribution of Post-Vaccination Antibody Titers Among Children Who Were Initially Seronegative to Measles and Rubella, Who Received Combined Live Measles-Rubella (RA 27/3) Virus Vaccine (Study #514)

	Post-Titer Distribution	Number of Children			
		Lot #62343/C-F021	Lot #62344/C-F022	Lot #62345/C-F023	Lot # Unknown
Measles (HI)	<5	1			2
	5				1
	10				1
	20		2	1	2
	40	12	10	4	5
	80	9	6	12	8
	160	6	5	9	5
	≥320	6	4	7	3
	Total	34	27	33	27
	Geometric Mean Titer:	≥79.5*	≥78.0	≥114.3	≥50.9*
Rubella (HI)	64	1		1	1
	128	5	2		4
	256	12	9	7	2
	≥512	17	16	25	21
	Total	35	27	33	28
	Geometric Mean Titer:	≥312.1	≥366.7	≥415.0	≥371.1

\* One titer determined by serum neutralization not included in calculation of G.M.T.

8/11/78



Table 6

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #514)

Maximum Temperature (°F, Oral)	Total Vaccinees (47 Children)						Initially Seronegatives (38 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	30 (66.7%)	15 (33.3)	30 (66.7)	28 (63.6)	22 (50.0)	12	27 (75.0)	13 (36.1)	25 (69.4)	27 (75.0)	20 (55.6)	11
99 - 100.9	13 (28.9)	22 (48.9)	13 (28.9)	14 (31.8)	15 (34.1)	14	8 (22.2)	17 (47.2)	9 (25.0)	7 (19.4)	9 (25.0)	9
101 - 102.9		7 (15.6)	2 (4.4)	1 (2.3)	5 (11.4)	15		5 (13.9)	2 (5.6)	1 (2.8)	5 (13.9)	13
103 - 104.0	2 (4.4)	1 (2.2)		1 (2.3)	2 (4.5)	4	1 (2.8)	1 (2.8)		1 (2.8)	2 (5.6)	3
Not Taken	2	2	2	3	3	2	2	2	2	2	2	2

Case # (b) (6)	Max. Temp.	Days	Clinical Complaint	Serology			
				Measles		Rubella	
	102.2	35-38	Upper Respiratory Illness, Gastrointestinal Illness, Nonspecific Rash, Teething	<5	80	<8	>512
	102.0	9-11	Upper Respiratory Illness, Otitis, Anorexia	<5	160	<8	>512
	103.0	10	None	<5	80	<8	>512
	103.4	29-31	Upper Respiratory Illness, Nonspecific Rash				
	102.0	13-14	Teething	<5	80	<8	256
	103.0	3-6	Upper Respiratory Illness	<5	<5	<8	256
	102.0	41-42	Upper Respiratory Illness, Irritability, Anorexia, Myalgia	<5	40	<8	>512
	104.0	7-10	Measles-Like Rash	<5	40	<8	>512
	103.0	32-36	Lower Respiratory Illness, Gastrointestinal Illness				
	102.0	8-12	Upper Respiratory Illness, Lymphadenopathy	<5	>320	<8	>512
	103.2	25-35	Irritable, Viral Infection, Non-Specific Rash, Anorexia	<5	>320	<8	256
	103.0	0-4	Non-Specific Rash, Anorexia	<5	>320	8	64

8/11/78

Table 7

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #514)

Maximum Temperature (°F, Oral)	Total Vaccinees (45 Children)						Initially Seronegatives (32 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	21 (48.8%)	13 (30.2)	28 (65.1)	25 (59.5)	22 (52.4)	9	17 (56.7)	10 (33.3)	21 (70.0)	18 (62.1)	15 (51.7)	7
99 - 100.9	21 (48.8)	21 (48.8)	14 (32.6)	12 (28.6)	18 (42.9)	20	13 (43.3)	13 (43.3)	9 (30.0)	8 (27.6)	12 (41.4)	14
101 - 102.9	1 (2.3)	8 (18.6)	1 (2.3)	2 (4.8)	2 (4.8)	10		6 (20.0)		2 (6.9)	2 (6.9)	7
103 - 104.6		1 (2.3)		3 (7.1)		4		1 (3.3)		1 (3.4)		2
Not Taken	2	2	2	3	3	2	2	2	2	3	3	2

Case # (b) (6)	Max. Temp.	Days	Clinical Complaint	Serology	
				Measles	Rubella
	102.7	5-9	Upper Respiratory Illness, Ophthalmopathy, Gastrointestinal Illness	<5 160	32 >512
	103.0	18-19	Upper Respiratory Illness		
	104.6	22-25	Upper Respiratory Illness, Gastrointestinal Illness	<5 160	8 >512
	103.0	18-23	Upper Respiratory Illness, Gastrointestinal Illness, Nonspecific Rash, Anorexia	<5 40	<8 >512
	103.0	10-11	Upper Respiratory Illness	<5 40	<8 >512
	102.2	10	Upper Respiratory Illness, Gastrointestinal Illness, Irritability, Anorexia	<5 40	>512 >512
	102.0	4-6	Upper Respiratory Illness, Myalgia	<5 <5	128 >512
	102.0	3-10	Irritability	<5 >320	<8 >512

6/27/78

Table 8

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/C-P023 (Study #514)

Maximum Temperature (°F, Oral)	Total Vaccinees (45 Children)						Initially Seronegatives (33 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	26 (59.1%)	14 (31.8)	25 (56.8)	21 (47.7)	24 (54.5)	13	22 (66.7)	11 (33.3)	19 (57.6)	17 (51.5)	18 (54.5)	10
99 - 100.9	16 (36.4)	17 (38.6)	16 (36.4)	19 (43.2)	15 (34.1)	13	11 (33.3)	13 (39.4)	11 (33.3)	13 (39.4)	10 (30.3)	10
101 - 102.9	1 (2.3)	5 (11.4)	2 (4.5)	2 (4.5)	4 (9.1)	13		2 (6.1)	2 (6.1)	1 (3.0)	4 (12.1)	8
103 - 104.8		4 (9.1)				4		4 (12.1)				4
105.0		1 (2.3)				1		1 (3.0)				1
Fever - No Temperature	1	3	1	2	1			2	1	2	1	
Not Taken.	1	1	1	1	1							

Case # (b) (6)	Max. Temp.	Days	Clinical Complaint	Serology			
				Measles		Rubella	
	102.2	39	Upper Respiratory Illness, Gastrointestinal Illness, Anorexia	<5	160	<8	>512
	102.0	5-11	None	<5	40	32	>512
	105.0	5-7	Upper Respiratory Illness, Otitis, Anorexia	<5	160	<8	256
	104.2	10-11	Upper Respiratory Illness, Gastrointestinal Illness, Headache	<5	160	<8	>512
	104.8	4-9	Upper Respiratory Illness, Otitis, Irritable, Anorexia	<5	>320	<8	256
	104.0	8-14	Upper Respiratory Illness, Gastrointestinal Illness, Anorexia	<5	>320	<8	>512
	102.4	1	None	<5	80	8	256
	104.0	5-7	Upper Respiratory Illness, Anorexia	<5	160	<8	>512
	102.0	7-11	Gastrointestinal Illness, Measles-Like Rash	<5	80	<8	>512

6/27/78

Table 9

Maximum Temperatures Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot # Unknown (Study #514)

Maximum Temperature (°F, Oral)	Total Vaccinees (30 Children)						Initially Seronegatives (28 Children)					
	Days Post Vaccination					No. with Max. Temp.	Days Post Vaccination					No. with Max. Temp.
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
<99	20 (66.7%)	18 (60.0)	22 (73.3)	19 (63.3)	16 (53.3)	11	18 (64.3)	16 (57.1)	20 (71.4)	17 (60.7)	15 (53.6)	10
99 - 100.9	10 (33.3)	6 (20.0)	7 (23.3)	9 (30.0)	10 (33.3)	9	10 (35.7)	6 (21.4)	7 (25.0)	9 (32.1)	9 (32.1)	8
101 - 102.9		4 (13.3)	1 (3.3)	1 (3.3)	3 (10.0)	7		4 (14.3)	1 (3.6)	1 (3.6)	3 (10.7)	7
103 - 104.0		2 (6.7)		1 (3.3)	1 (3.3)	3		2 (7.1)		1 (3.6)	1 (3.6)	3

Case #	Max. Temp.	Days	Clinical Complaint	Serology	
				Measles	Rubella
(b) (6)	103.4	21-22	Upper Respiratory Illness, Otitis, Gastrointestinal Illness, Anorexia	<5 160	<8 >512
	102.1	16-17	Upper Respiratory Illness	<5 10	<8 128
	104.0	6-10	Measles-Like Rash	<5 40	<8 >512
	103.0	32-36	Bronchitis, Gastrointestinal Illness		
	103.0	7-12	Gastrointestinal Illness, Measles-Like Rash	<5 40	<8 >512
	102.0	10-11	Gastrointestinal Illness, Anorexia	<5 80	<8 256

6/27/78

Table 10

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62343/C-F021 (Study #514)

Clinical Complaint	Total Vaccinees (47 Children)						Initially Seronegatives (38 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	2 (4.3%)					2	2 (5.4)					2
Soreness	1					1	1					1
Erythema and Soreness	1					1	1					1
Systemic:												
Lymphadenopathy	1 (2.2)	1 (2.2)				2	1 (2.7)					1
Measles-Like Rash		2 (4.3)				2	1 (2.7)					1
Irritability	5 (10.9)	5 (10.9)	1 (2.2)	3 (6.7)	2 (4.4)	10	5 (13.5)	3 (8.1)		2 (5.4)	1 (2.7)	8
Anorexia	9 (19.6)	13 (28.3)	6 (13.0)	7 (15.6)	8 (17.8)	22	8 (21.6)	12 (32.4)	5 (13.5)	6 (16.2)	5 (13.5)	18
Disturbed Sleep		1 (2.2)		2 (4.4)	2 (4.4)	3		1 (2.7)		2 (5.4)	2 (5.4)	3
Fatigue	2 (4.3)	2 (4.3)	1 (2.2)			4	2 (5.4)	1 (2.7)				3
Myalgia		1 (2.2)	1 (2.2)		1 (2.2)	1		1 (2.7)	1 (2.7)		1 (2.7)	1
Upper Respiratory Illness	19 (41.3)	22 (47.8)	20 (43.5)	16 (35.6)	18 (40.0)	35	16 (43.2)	19 (51.4)	17 (45.9)	13 (35.1)	14 (37.8)	28
Otitis		2 (4.3)	3 (6.5)	1 (2.2)		4		2 (5.4)	3 (8.1)	1 (2.7)		4
Ophthalmopathy	1 (2.2)		2 (4.3)	2 (4.4)		3	1 (2.7)		2 (5.4)	2 (5.4)		3
Gastrointestinal Illness	7 (15.2)	6 (13.0)	4 (8.7)	7 (15.6)	9 (20.0)	19	7 (18.9)	5 (13.5)	3 (8.1)	7 (18.9)	7 (18.9)	15
Nonspecific Rash	4 (8.7)	3 (6.5)	1 (2.2)	4 (8.9)	5 (11.1)	9	3 (8.1)	2 (5.4)	1 (2.7)	4 (10.8)	5 (13.5)	7
Other*	2 (4.3)				1 (2.2)	3	2 (5.4)				1 (2.7)	3
Viral Infection					2 (4.4)	2					1 (2.7)	1
Teething		2 (4.3)	1 (2.2)	3 (6.7)	5 (11.1)	8		2 (5.4)	1 (2.7)	3 (8.1)	5 (13.5)	8
Persons with Complaint:	27 (58.7)	29 (63.0)	25 (54.3)	23 (51.1)	23 (51.1)	40	23 (62.2)	24 (64.9)	20 (54.1)	19 (51.4)	17 (45.9)	32
Persons with No Complaint:	19 (41.3)	17 (37.0)	21 (45.7)	22 (48.9)	22 (48.9)	6	14 (37.8)	13 (35.1)	17 (45.9)	18 (48.6)	20 (54.1)	5
Negative Surveillance	1	1	1	2	2	1	1	1	1	1	1	1

\*Includes nosebleed, bruise from venipuncture, and ulcers on tongue.



Table 11

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62344/C-F022 (Study #514)

Clinical Complaint	Total Vaccinees (45 Children)					No. with Complaint	Initially Seronegatives (32 Children)					No. with Complaint
	Days Post Vaccination						Days Post Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Lymphadenopathy		1 (2.3%)				1		1 (3.3)				1
Measles-Like Rash		3 (7.0)	2 (4.7)			4		2 (6.7)	2 (6.7)			3
Headache	1 (2.3)	3 (7.0)	1 (2.3)		1 (2.3)	4		2 (6.7)				2
Irritability	1 (2.3)	2 (4.7)	1 (2.3)			3	1 (3.3)	1 (3.3)				2
Anorexia	3 (7.0)	4 (9.3)	4 (9.3)	3 (7.0)	3 (7.0)	14	3 (10.0)	2 (6.7)	3 (10.0)	3 (10.0)	1 (3.3)	9
Fatigue	2 (4.7)		1 (2.3)			2	2 (6.7)		1 (3.3)			2
Myalgia	2 (4.7)	3 (7.0)	2 (4.7)	1 (2.3)	1 (2.3)	5	1 (3.3)	2 (6.7)	1 (3.3)	1 (3.3)		3
Upper Respiratory Illness	20 (46.5)	17 (39.5)	16 (37.2)	18 (41.9)	14 (32.6)	32	11 (36.7)	10 (33.3)	11 (36.7)	13 (43.3)	10 (33.3)	21
Otitis		1 (2.3)	1 (2.3)		2 (4.7)	3		1 (3.3)	1 (3.3)		2 (6.7)	3
Ophthalmopathy	2 (4.7)	4 (9.3)	2 (4.7)	1 (2.3)	1 (2.3)	6	2 (6.7)	3 (10.0)	2 (6.7)	1 (3.3)	1 (3.3)	5
Gastrointestinal Illness	5 (11.6)	12 (27.9)	7 (16.3)	10 (23.3)	7 (16.3)	21	3 (10.0)	7 (23.3)	4 (13.3)	7 (23.3)	3 (10.0)	13
Nonspecific Rash	4 (9.3)	7 (16.3)	7 (16.3)	9 (20.9)	5 (11.6)	13	1 (3.3)	3 (10.0)	4 (13.3)	6 (20.0)	2 (6.7)	8
Varicella					1 (2.3)	1						0
Other*	1 (2.3)		1 (2.3)			2			1 (3.3)			1
Teething	2 (4.7)	3 (7.0)	2 (4.7)	1 (2.3)	3 (7.0)	8	1 (3.3)	2 (6.7)	1 (3.3)	1 (3.3)	2 (6.7)	5
Persons with Complaint:	25 (58.1)	30 (69.8)	23 (53.5)	21 (48.8)	20 (46.5)	35	15 (50.0)	19 (63.3)	15 (50.0)	15 (50.0)	12 (40.0)	23
Persons with No Complaint:	18 (41.9)	13 (30.2)	20 (46.5)	22 (51.2)	23 (53.5)	8	15 (50.0)	11 (36.7)	15 (50.0)	15 (50.0)	18 (60.0)	7
Negative Surveillance:	2	2	2	2	2	2	2	2	2	2	2	2

\* Includes soreness at site of venipuncture and ulcers on tongue.

6/27/78



Table 12

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot #62345/G-F023 (Study #514)

Clinical Complaint	Total Vaccinees (45 Children)						Initially Seronegatives (33 Children)					
	Days Post Vaccination					No. with Complaint	Days Post Vaccination					No. with Complaint
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	1 (2.3%)					1	1 (3.0)					1
Soreness	1					1	1					1
Systemic:												
Measles-Like Rash		4 (9.1)	1 (2.3)			4		3 (9.1)	1 (3.0)			3
Headache	1 (2.3)	2 (4.5)	1 (2.3)	2 (4.5)		2	1 (3.0)	2 (6.1)	1 (3.0)	2 (6.1)		2
Irritability	1 (2.3)	2 (4.5)	1 (2.3)		1 (2.3)	4		2 (6.1)	1 (3.0)		1 (3.0)	3
Anorexia	6 (13.6)	11 (25.0)	3 (6.8)	6 (13.6)	9 (20.5)	17	5 (15.2)	9 (27.3)	2 (6.1)	4 (12.1)	6 (18.2)	13
Fatigue		1 (2.3)				1		1 (3.0)				1
Myalgia			1 (2.3)		1 (2.3)	1			1 (3.0)		1 (3.0)	1
Upper Respiratory Illness	14 (31.8)	25 (56.8)	20 (45.5)	24 (54.5)	19 (43.2)	38	10 (30.3)	19 (57.6)	14 (42.4)	18 (54.5)	13 (39.4)	29
Otitis	1 (2.3)	4 (9.1)	3 (6.8)	2 (4.5)	2 (4.5)	6		3 (9.1)	2 (6.1)	2 (6.1)	1 (3.0)	5
Ophthalmopathy	1 (2.3)	3 (6.8)	1 (2.3)			3	1 (3.0)	1 (3.0)	1 (3.0)			1
Gastrointestinal Illness	7 (15.9)	12 (27.3)	7 (15.9)	5 (11.4)	10 (22.7)	23	5 (15.2)	9 (27.3)	4 (12.1)	3 (9.1)	7 (21.2)	15
Nonspecific Rash	4 (9.1)	5 (11.4)	3 (6.8)	3 (6.8)	3 (6.8)	11	2 (6.1)	3 (9.1)	2 (6.1)	2 (6.1)	3 (9.1)	8
Teething	1 (2.3)	1 (2.3)		2 (4.5)	2 (4.5)	5		1 (3.0)		2 (6.1)	2 (6.1)	4
Persons with Complaint:	22 (50.0)	32 (72.7)	26 (59.1)	27 (61.4)	25 (56.8)	41	16 (48.5)	25 (75.8)	19 (57.6)	21 (63.6)	19 (57.6)	31
Persons with No Complaint:	22 (50.0)	12 (27.3)	18 (40.9)	17 (38.6)	19 (43.2)	3	17 (51.5)	8 (24.2)	14 (42.4)	12 (36.4)	14 (42.4)	2
Negative Surveillance	1	1	1	1	1	1						

6/27/78

Table 13

Clinical Complaints Reported Among Children Who Received  
Combined Live Measles-Rubella (RA 27/3) Virus Vaccine, Lot # Unknown (Study #514)

Clinical Complaint	Total Vaccinees (30 Children)					No. with Complaint	Initially Seronegatives (28 Children)					No. with Complaint
	Days Post Vaccination						Days Post Vaccination					
	0-4	5-12	13-18	19-28	29-42		0-4	5-12	13-18	19-28	29-42	
Injection Site:	2 (6.7%)					2	2 (7.1)					2
Erythema	1					1	1					1
Soreness	1					1	1					1
Systemic:												
Lymphadenopathy		1 (3.3)				1		1 (3.6)				1
Measles-Like Rash		4 (13.3)	2 (6.7)			4		4 (14.3)	2 (7.1)			4
Headache		1 (3.3)				1		1 (3.6)				1
Irritability	2 (6.7)	2 (6.7)	1 (3.3)	1 (3.3)	2 (6.7)	4	2 (7.1)	2 (7.1)	1 (3.6)	1 (3.6)	2 (7.1)	4
Anorexia	1 (3.3)	3 (10.0)	2 (6.7)	5 (16.7)	5 (16.7)	9	1 (3.6)	2 (7.1)	2 (7.1)	4 (14.3)	4 (14.3)	8
Fatigue				1 (3.3)	1 (3.3)	1				1 (3.6)	1 (3.6)	1
Upper Respiratory Illness	18 (60.0)	14 (46.7)	11 (36.7)	13 (43.3)	19 (63.3)	26	18 (64.3)	13 (46.4)	11 (39.3)	12 (42.9)	18 (64.3)	24
Lower Respiratory Illness					1 (3.3)	1					1 (3.6)	1
Otitis				1 (3.3)		1				1 (3.6)		1
Ophthalmopathy	1 (3.3)	2 (6.7)	2 (6.7)			3	1 (3.6)	2 (7.1)	2 (7.1)			3
Gastrointestinal Illness	3 (10.0)	6 (20.0)	3 (10.0)	5 (16.7)	5 (16.7)	14	3 (10.7)	5 (17.9)	3 (10.7)	5 (17.9)	5 (17.9)	13
Nonspecific Rash	1 (3.3)	1 (3.3)	1 (3.3)		3 (10.0)	5	1 (3.6)	1 (3.6)	1 (3.6)		3 (10.7)	5
Bell's Palsy				1 (3.3)		1				1 (3.6)		1
Teething	2 (6.7)		3 (10.0)	3 (10.0)	1 (3.3)	7	2 (7.1)		3 (10.7)	3 (10.7)	1 (3.6)	7
Persons with Complaint:	21 (70.0)	20 (66.7)	13 (43.3)	17 (56.7)	22 (73.3)	28	21 (75.0)	18 (64.3)	13 (46.4)	16 (57.1)	20 (71.4)	26
Persons with No Complaint:	9 (30.0)	10 (33.3)	17 (56.7)	13 (43.3)	8 (26.7)	2	7 (25.0)	10 (35.7)	15 (53.6)	12 (42.9)	8 (28.6)	2

# MEMO

To File Location Date 8/14/78  
From T. Schofield Location  
Subject Statistical Analysis - Study #514

Significant differences in seroconversion rates for measles and rubella and clinical reaction rates among vaccinees receiving three lots of combined measles-rubella (RA 27/3) vaccine were investigated. Lots of vaccine were:

Lot #62343/C-F021  
Lot #62344/C-F022  
Lot #62345/C-F023

No significant differences exist among the three lots for any of these rates.

The groups (lots) were investigated for statistical differences in post-vaccination titer among vaccinees who were initially seronegative to both measles and rubella by the HI test. Multivariate analysis of variance was run in conjunction with the Kruskal-Wallis k-sample test on the individual components. No significant differences could be determined among the three lots of vaccine.

*TS.*

T.S.

