with periodic clinical examinations, nasopharyngeal cultures for *H. influenzae* and serum samples. *H. influenzae* strains were isolated from all at some time during the study; while 8 had type b, usually associated with clinical illness. One child had meningitis at 40 months; bacterial inhibitory substance (BIS) was present only during and immediately after the acute illness. Serum from 5 other patients had BIS within 3–4 weeks; in 2, BIS was temporary while in 3 it persisted until age 5. 11 other children had temporary BIS, 7 associated with nontype b strains and 4 without any relationship to isolations of *H. influenzae*. 18/20 of the children had BIS at some time, but it persisted until age 5 in 7/20.

Cord blood serum from 6/20 showed BIS which was lost by age 2 years in all but 2 patients.

The inhibitory effect was entirely removed from serum by adsorption with heavily encapsulated bacterial cells and partially removed by adsorption with PRP.

An increase in opsonizing antibody to type b was noted also in association with *H. influenzae* strains.

Response of children immunized with meningococcal group C and group A polysaccharides. MARTHA L. LEPOW, IRVING GOLDSCHNEIDER, and EMIL C. GOTSCHLICH. *Univ. of Connecticut Sch. of Med. Hartford, Conn., and Rockefeller Univ., N. Y., N. Y.*

To date 60 children ages 1 to 9 years have been immunized with 25 or 50 micrograms of highly purified meningococcal group-specific polysaccharide. Thirty children received the group C antigen and 30 the group A antigen by subcutaneous injection. Three immunized children developed local zones of transient erythema up to 1.8 cm. in diameter within 24 hours of injection. There were no local or systemic reactions.

Humoral antibodies were measured by bactericidal, immunofluorescence, hemagglutination and quantitative radioimmunoprecipitation assays. Complete antibody studies on 50 of the children showed that all responded within 3 weeks of immunization with the production of specific IgG, IgM and IgA antibodies against the C or A antigen in amounts comparable to those produced by immunized adults. Bactericidal and hemagglutinating antibodies were demonstrated. There was no advantage of the 50 microgram dose over the 25 microgram dose.

Previous studies with the meningococcal group C antigen in more than 40,000 military recruits has established the effectiveness of this immunization in preventing systemic meningococcal disease. On the basis of results of the current study, it appears that immunization of children with the meningococcal group A and C vaccines would be safe and immunologically efficacious in the age group tested.

Altered reactivity to respiratory syncytial virus: Description of atypical RSV illness and prospective four year follow-up of children previously immunized with an inactivated vaccine. JERRY J. ELLER, VINCENT A. FULGINITI, DANIEL C. PLUNKET, and OTTO F. SIEBER, JR. *U.S. Army Med. Research and Nutrition Lab., and Univ. of Colo. Med. Ctr., Denver, Colo.* (Intr. by Henry Kempe).

Beginning in July 1966, 424 children ranging from 6 months to 7 years of age were immunized. Mild RSV illness was documented to occur later upon natural exposure to the wild virus in all age groups. Nineteen children in the youngest age group immunized (6–23 mos) were hospitalized with an atypical illness due to RSV. Eleven were hospitalized in 1966–67, 6 in 1967–68, and 2 in 1968–69. Two children had recurrent atypical illness during separate years. The illness was characterized by high fever and pneumonia with marked bronchiolitic wheezing. Chest films showed prominent multi-segmental infiltrates usually in several lobes. Associated lung complications included: lobar atelectasis, pneumothorax, pneumomediastinum, pneumopericardium, subcutaneous emphysema, and pleural effusions. A diffuse maculopapular rash was present on the neck, trunk and proximal extremitities of 8 (42%) vaccinees in contrast to 1 of 31 (3.2%) controls with hospitalized RSV illness ($\bar{X}^2 = 9.57$, $p < 0.01$). Of 9 hospitalized vaccinees available for prospective follow-up for 4 years from the time of immunization, 5 (55.6%) were diagnosed by allergists, independently of the investigators, as having either asthma (4) or allergic rhinitis (1). This was in contrast to a diagnosis of an atopic disorder made in 7 of 46 (15.2%) age-matched controls prospectively followed ($\bar{X}^2_c = 5.01$, $p < 0.10$).

Studies on immunization with three types of combined viral vaccines. ROBERT E. WEIBEL, JOSEPH STOKES, JR., VICTOR M. VILLAREJOS, JORGE A. ARGUEDAS G, EUGENE B. BUYNAK, and MAURICE R. HILLEMAN. *Sch. of Med., Univ. of Pennsylvania, Philadelphia, Pa., Louisiana State Univ., International Ctr. for Med. Res. and Training, San Jose, Costa Rica, and Merck Inst. for Therapeutic Res., West Point, Pa.*

Combined lyophilized Moraten measles, Jeryl Lynn mumps, and HPV 77 duck rubella vaccines were administered by a single injection to 715 children ages 7 months to 7 years, and susceptible to these viruses. The geometric mean antibody responses to the triple vaccine were comparable to those obtained with monovalent vaccines. The antibody seroconversion rate was 96% to measles by hemagglutination-inhibition tests, 95% to mumps neutralization tests and 94% to rubella hemagglutination-inhibition tests. Clinical reactions to the triple vaccine were no greater than those following measles vaccine given alone. Arthralgia and arthritis were not reported during the 28 day recording period. In children combined measles-mumps-rubella vaccine provides a *safe, simple* and economical means of immunizing against these three diseases. Similar findings were obtained in tests in 375 seronegative children given combined measles-rubella vaccine and in 415 seronegative children given combined mumps-rubella vaccine.

Persistent joint symptoms associated with HPV-77DK12 rubella vaccine. SPOTSWOOD L. SPRUANCE, LAWRENCE E. KLOCK, JR., and CHARLES B. SMITH. *Univ of Utah Sch. of Med., Univ. of Utah Med. Ctr., Salt Lake City, Utah* (Intr. by Lowell Glasgow).

The incidence and duration of joint complications were investigated in 2989 children who received the HPV-77DK12 rubella vaccine. Two hundred eighty-seven (287) children experienced joint symptoms within 45 days after vaccination. Two hundred twenty-five (225) of these children were contacted 6 months later and three were found to have had recurrences of symptoms.

Histories, physical examinations, and serologic studies were conducted on 11 children, including three from the study group, who manifested recurrent joint symptoms 6–9 months after receiving the dog kidney rubella vaccine. In all cases the original and the recurrent symptoms were in the knees. Symptomatic episodes were 1–4 days in duration and were characterized by pain and limitation of knee extension. On examination of the knees, abnormalities were observed in 5 children. These included limi-