

## IAP Perspectives on Measles and Rubella Elimination Strategies

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The Academy's Expert group on Immunization has discussed various issues pertaining to rubella vaccine introduction in to the Universal Immunization Program. Though the move to introduce rubella vaccine in to the UIP is laudable, the decision to overlook mumps seems inexplicable and illogical. Logistics also support the use of measles-mump and rubella (MMR) vaccine instead of measles-rubella (MR) vaccine. Regarding the timing of administration of MMR/MR vaccine, the academy recommends that the vaccine should be given early to have much higher coverage than introducing it late at the time of 1st booster of DPT. According to available evidence, both these vaccines (MMR/MR) can be given safely at different ages including at 9 months of age. The second dose should also be of the same antigen (MMR/MR) and be given along with 1st DPT booster at 16-24 months of age.

**Keywords:** *Measles mumps rubella vaccine, Prevention, Universal immunization program.*

**T**he Academy reviewed the recently circulated ICMR Expert Group Recommendations on Rubella vaccine [1] which includes: (i) Introduction of rubella vaccine as Measles-Rubella (MR) vaccine at the time of first DPT booster at 16-24 months of age in States having achieved more than 80% coverage of first dose of measles vaccine; (ii) a onetime catch up campaign of adolescent girls with rubella vaccine to offset potential increase in susceptible women in reproductive age group if children alone are vaccinated; and (iii) sentinel surveillance for congenital rubella syndrome (CRS) should be included in Measles-Rubella surveillance program [1].

The Indian Academy of Pediatrics Advisory Committee on Vaccines and Immunization Practices discussed various issues pertaining to rubella vaccine introduction in National Immunization Program (NIP). Key points that emerged after deliberations are discussed in this communication.

### OBJECTIVE OF THE INITIATIVE

Indian Academy of Pediatrics – based on their members' clinical experience and inputs – strongly supports elimination of not only measles and rubella, but also of mumps. The Academy believes that it is unethical to employ stand-alone measles vaccine today, when effective MR and MMR vaccines are available at an affordable price.

The Academy welcomes the Government of India, (GoI) decision of taking on at least two key infectious diseases, measles and rubella, simultaneously; though it

would have been ideal had mumps also been included in this initiative. The Academy also agrees with the GoI that the major concern is not rubella disease in childhood, but Congenital rubella syndrome (CRS) in infants born to mothers who catch rubella during pregnancy. Though cost and other logistics issues, and global focus may be hindrance to take on three instead of two significant illnesses right now, the ultimate need of the country is to target for elimination/control of all the three diseases instead of the two. Already the program managers have missed the opportunity of using at least a combined MR vaccine in previous special immunization activities conducted earlier in many states.

### THE DISEASE BURDEN AND THE COUNTRY'S NEED

The Academy believes that the burden of CRS and mumps is significant. Though exact community burden of CRS is lacking, a systematic review documented 17% susceptibility rate among pregnant women [2].

The burden of mumps is less specified and only sporadic outbreaks are reported [3-8]. However, based on the inputs and acceptance of mumps vaccination by our members, and the available data captured through the academy's own IDSurv portal [9], the Academy is confident that mumps also poses a significant burden. Hence, both CRS and mumps are eligible as targets for elimination and control. At the same time, the Academy urges the GoI/ICMR to take initiatives to strengthen ongoing rubella surveillance, initiate efforts to measure community burden of CRS, and invest in starting mumps surveillance all over the country.

**WHY IS MUMPS IMPORTANT?**

The Academy considers mumps to be as significant in terms of morbidity as rubella. complications of mumps are many, and can be profound – aseptic meningitis, encephalitis, orchitis, oophoritis, pancreatitis, deafness, transverse myelitis, facial palsy, ascending polyradiculitis and cerebellar ataxia. Like rubella, mumps in pregnancy can also give rise to fetal damage in the form of aqueductal stenosis leading to congenital hydrocephalus [10]. Incidence of serious complications has become more common in recent years [11]. Four Union Territories (Delhi, Goa, Pudduchury and Sikkim) are already using MMR in their UIP program. The coverage of MMR vaccine has been reported as 42%, 30% and 5% from Delhi, Chandigarh and Goa, respectively [12]. Kerala has become the latest entrant to start universal MMR vaccination in the state from 2014. By 2012, 132 of 194 WHO member states have introduced Rubella containing vaccine (RCV) in their National immunization programs, either as MR or MMR. Of these, 117 have RCV included in both routinely administered doses of measles-containing vaccine [13]. Logistics also support the use of MMR vaccine instead of MR because with the same effort, money and manpower, three common infectious diseases could be eliminated simultaneously – instead of two. Availability of an indigenous producer and supplier should also bolster our efforts to launch large scale vaccination drives against these diseases. While single

dose of rubella/rubella containing vaccines is sufficient to provide almost 100% protection against the disease, two or more doses of measles and mumps vaccines are needed to accord adequate protection [14].

**TIMING OF THE FIRST DOSE OF RUBELLA CONTAINING VACCINE**

The Academy supports that at least 80% coverage must be achieved to offset any presumed epidemiological shift of rubella (and mumps), and consequently higher incidence of congenital complications. Regarding the timing of administration of MMR/MR vaccine, the Academy believes the vaccine should be given early to have much higher coverage than introducing it late at the time of first booster of DTP. This is to be noted that the measles vaccine coverage at 9 months is 74.1% and the coverage of DPT booster at 18 months is 41.4% only – according to UNICEF’s Coverage Evaluation Survey of 2009. According to available evidence, both MMR and MR vaccines can be given safely at 9 months of age (**Table I**) [15-21]. Most important thing is to achieve minimum 80% coverage of childhood vaccination which will not allow virus to circulate freely and infect women of child bearing age thus avoiding any inadvertent epidemiological shift. Hence, it is of paramount importance to provide first dose of the vaccine (MMR/MR) at 9 month of age in place of measles vaccine to attain high coverage. The second dose should also be of the same antigens, (MMR or MR) and be given along

**TABLE I** SUMMARY OF STUDIES EVALUATING SEROCONVERSION AFTER MEASLES, MUMPS AND RUBELLA VACCINES ADMINISTERED AT DIFFERENT AGES

Place, Year	Ages/age groups (mo)	Seroconversions at different age groups		
		Measles	Mumps	Rubella
South Africa, 1990 [15]	9, 15	Better at 9 mo groups	Similar in both groups	Similar in both
Italy, 1993 [16]	10-12,15-24	Similar, but lower GMTs at 9-12 mo	Similar, but lower GMTs at 9-12 mo	Similar,
Vellore, 1994 [17]	9, 12, 15	Lower at 9 mo (80%) than at 12 & 15 mo (95%)	Lower at 9 mo (75%) than at 12 & 15 mo (92%)	Similar (92%) at all the three age groups
Brazil, 1997 [18]	9,15	Similar in both groups	Similar in both groups	GMTs higher in 15 mo age group
Germany, 2000 [19]	9-11, 12-14 or 15-17	Lower seroconversion in 1 & 3 groups only (84.8%, 100%)	Similar in all the groups	Similar in all the groups
New Delhi, 2003 [20]	9-10,15-18	Similar (92%) in each group)	Similar (100% vs. 96%)	Similar (98% vs. 94%)
Singapore, 2007 [21]	9,12	Similar (>92%) in each group)	Similar	Similar

GMT: Geometric mean titers; \*Seroconversion of varicella along with measles, mumps and rubella was also studied.

with first DPT booster at 16-24 months of age. These recommendations also confirm to the SAGE guidelines [13] which include (i) for countries introducing or using rubella vaccine, it is strongly recommended that this be given in combination with the first dose of measles containing vaccine (MCV) (as MR or MMR); (ii) in countries using RCV and a two-dose schedule of MCV, both doses should be of the same formulation [13].

#### OPERATIONAL ISSUES

The Academy believes that though minimum is 80%, we must aim at achieving a very high coverage (>95%) with MMR/MR vaccine in the NIP. The target age should be based on our ultimate objective, “Control” vs. “Elimination”. At the time of introduction of vaccine, one time campaign to vaccinate adolescent girls with rubella vaccine is a proven strategy, but we need to explore all avenues to cover the whole susceptible pediatric population. There is a need to have large special immunization activities to cover young children, school children (at entry) and adolescents. No doubt, this will pose unprecedented burden on health infrastructure and machinery, but we must remain positive and avoid speculating about the low quality/low coverage. Our past experience with measles catch-up campaigns has shown that it is possible to achieve very high coverage of more than 80% in states.

For control, the target age groups should be from 9 months to 15 years (following introduction in NIP). Further decision to expand shall be guided by the epidemiology of the disease (age distribution, seroprevalence data, age-specific fertility rates, susceptibility data of women of child bearing age, and maternal age distribution of CRS). For elimination, we must target all the above age groups along with expansion of target age of coverage beyond 15 years. They should include special immunization activities targeting adults (up to 40 yrs of age). Further age groups for inclusion in target age for these activities will depend on sero-epidemiology data. Here, both the sexes, must be included for vaccination.

Regarding coverage of adolescent girls and children in other age groups who are not covered with these antigens, school-based vaccination programs, could also be a good modality. Many adolescent girls’ oriented activities are now being introduced through ICDS, including iron folic acid and nutrition programs. MR/MMR vaccine can also be introduced through that system.

In conclusion, the Academy thinks that reaching all children with measles vaccine gives us an opportunity to

also reach them with rubella and mumps, in a combined vaccine. Congenital rubella syndrome can be prevented, and the Academy fully supports efforts to prevent infant and childhood disability and the associated health, social and economic costs. By preventing measles, rubella and mumps together we produce significant savings for our country and communities.

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