As stated earlier [1] it was decided in 2012 to revise IAP Immunization Timetable every year. The IAP Advisory Committee on Vaccines and Immunization Practices (ACVIP) has recently reviewed and revised the recommended immunization schedules for children aged 0 through 18 years to ensure that the schedule reflects recommendations based on recent evidence for licensed vaccines in the country. The mid-term meeting of the IAP ACVIP was held on 3rd and 4th August, 2013 in New Delhi. IAP ACVIP members and invited experts who attended the meeting are listed at the end of this paper. The aim of the meeting was to discuss and debate recent developments in the field, to revise recommendations for the IAP Immunization Timetable for the year 2013, and to issue recommendations for newly licensed vaccines in the country. Following the meeting, a draft of revised immunization schedule for the year 2013 was prepared and circulated among the meeting participants to arrive at a consensus.

Process for Issuing Recommendations

The detailed process behind issuing IAP recommendations on immunization is described earlier [1]. We reaffirm that the recommendations of IAP are primarily for the pediatricians in office practice. These recommendations provide guidelines to a pediatrician on how best to utilize available licensed vaccines in their office-practice settings. The members may use their own discretion while using them in a given situation within the framework suggested [2]. The existing national immunization schedule and government policies are also taken in to account while drafting recommendations.
AIMS AND OBJECTIVES

To revise IAP Immunization Timetable for the year 2013 and review and issue recommendations on the recently licensed pediatric vaccines.

RECOMMENDATIONS FOR IAP IMMUNIZATION TIMETABLE, 2013

The IAP ACVIP has issued recommendations for the IAP Immunization Timetable for the year 2013 that includes the following major changes from last year:

A. Pertussis Immunization

IAP ACVIP has now issued following recommendations on use of pertussis vaccines for office-practice in private health care:

Primary immunization: The primary infant series should be completed with 3 doses of whole-cell pertussis (wP) vaccines. Vaccination must start at 6 weeks. Acellular pertussis (aP) vaccines should be avoided for the primary series of infant vaccination until or unless there is a genuine compelling reason to use aP vaccine in a given child.

The recommendation on the use of wP vaccine in primary immunization series is based on the experience with wP vaccines in India and on demonstration of faster waning with aP vaccines in comparison to wP vaccines, and superior priming with wP vaccines than aP vaccines in studies conducted in the industrialized countries after recent resurgence of pertussis in many of these countries using aP vaccines. The evidences and reasons behind above recommendations are discussed in detail in IAP Position Paper on Pertussis immunization [3].

Boosters: The 1st and 2nd booster doses of pertussis vaccines should also be of wP vaccine. However, considering a higher reactogenicity, aP vaccine/combination can be considered for the boosters, if resources permit.

Choice of aP vaccines: Considering the strong evidence in favor of superiority of multicomponent (≥3) aP vaccines in comparison to one- and two-component aP vaccines from recent systematic reviews and meta-analysis [3], IAP unambiguously recommends that if any aP containing vaccine is used, it must at least have 3 or more components in the product, the more the better.

Tdap during pregnancy: Maternal immunization, particularly of pregnant women may be an effective approach to protect very young infants and neonates [3]. IAP ACVIP therefore now suggests immunization of pregnant women with a single dose of Tdap during the third trimester (preferred during 27 through 36 weeks gestation) regardless of number of years from prior Td or Tdap vaccination. Tdap has to be repeated in every pregnancy irrespective of the status of previous immunization (with Tdap). Even if an adolescent girl who had received Tdap one year prior to becoming pregnant will have to take it since there is rapid waning of immunity following pertussis immunization.

However, only single administration of Tdap is permitted to all adolescents. Persons aged 7 through 10 years who are not fully immunized with the childhood DTwP/DTaP vaccine series, should receive Tdap vaccine as the first dose in the catch-up series; if additional doses are needed, use Td vaccine. For these children, an adolescent Tdap vaccine is not required.

B. Rotavirus immunization

Administration schedule of monovalent rotavirus vaccine (RV1)

Monovalent (RV1) and pentavalent rotavirus (RV5) vaccines when started at 8 weeks of age and given at 2 or 3 dose schedule respectively, has been found to be highly effective in preventing rotavirus gastroenteritis [4]. WHO position paper [5] recommends that 1st dose of rotavirus vaccination should be given with 1st dose of DPT vaccination both for RV1 and RV5, which effectively means starting the schedule at 6 weeks in India. It is also known that if rotavirus vaccines are to be co-administered with OPV in a setting with an EPI vaccination schedule beginning at 6 weeks of age, the second dose of RV1 may not be sufficient to provide adequate immunity against severe rotavirus disease [6]. The IAP committee on Immunization has already expressed its concerns on the proper administration schedule of rotavirus vaccines, particularly two-dose schedule of RV1 in India in order to achieve higher yields in term of protective efficacy [1].

Several studies from South Africa, Vietnam, and Philippines have indicated that the older the infant when they receive the first dose of vaccine, the better the
immune response in terms of sero-conversion and GMCs [7]. The titers of circulating maternal antibody in the infants and OPV co-administration have a negative impact on the immune response of the first rotavirus vaccine dose (lower sero-conversion rates and reduced GMCs) [7]. It is a well known fact that first dose of RV1 administered at 6 weeks along with OPV is non-immunogenic. In a study conducted in South Africa, the seroconversion of first dose of RV1 when administered at 6 weeks along with OPV was found to be only 13%, whereas when the same dose was administered at 10 weeks along with IPV, the seroconversion rose to 43% [8]. In the same study, the anti-rotavirus IgA antibody sero-conversion rates were higher for the 10-14 weeks schedule (55-61%) compared to the 6-10 weeks schedule (36-43%) [7].

In Africa trial, the 2 dose and 3 dose schedule of RV1 starting at 6 weeks of age showed that vaccine efficacy against severe rotavirus diarrhea for the first year with 2 dose schedule was 58.7 (95% CI 35.7 -74) while for 3 dose schedule the same was 63.7 (95% CI 42.4 – 77.8) [8]. There was no difference on the first year efficacy of both the schedules in Malawi, but a definite gradient favoring 3-dose schedule in South Africa (81.5, 95% CI, 55.1-93.7 for 3-dose versus 72.2, 95% CI, 40.4-88.3 for 2-dose) [8]. However, when second year efficacy against severe rotavirus diarrhea was considered, there was significant difference in the efficacy of the two schedules in both the countries (85% for 3-dose versus 32% for 2-dose in South Africa, and 49% versus 18%, respectively in Malawi) [8-10].

Most of the comparative studies with 2 versus 3 dose schedule have employed RV1 in 10, 14 weeks instead of recommended 6, 10 weeks schedule [8-11]. An immunogenicity study from India has shown that RV1 given in a 2 dose schedule, with 1st dose between 8 to 10 weeks and 2nd dose between 12 to 16 weeks is immunogenic and well tolerated in healthy Indian infants [12]. Pentavalent vaccine given in 3 doses has shown adequate immunogenicity in Indian infants when started at 6 weeks of age [13]. A 3-dose schedule of RV 116E starting at 8 weeks demonstrated a robust immune response [14]. Two ongoing studies in Pakistan and Ghana are studying the immunogenicity of 2 versus 3-dose schedule of RV1.

Considering all the above mentioned facts, the IAP ACVIP is of the opinion that if RV1 vaccine is to be administered in a 2-dose schedule, the first dose should start at 10 weeks of age instead of 6 weeks in order to achieve better immune response. The second dose can be administered at 14 weeks to fit with existing national immunization schedule. However 3-dose schedule of any rotavirus vaccine can start at 6 weeks of age with minimum interval of 4 weeks between the doses.

C. Typhoid vaccination

**Vi-polysaccharide conjugate typhoid vaccine (Typbar-TCV®) by Bharat Biotech:**

Typbar-TCV® is a Vi-capsular polysaccharide conjugate typhoid vaccine conjugated with tetanus toxoid. The manufacturer has used a dose of 25 μg/0.5 mL of Conjugate Vi Content polysaccharide which is the highest having been used in other trials as well on conjugate vaccine the world over.

According to the data submitted by the manufacturer, a phase IIa/IIb study revealed no difference in the GMTs between two doses (15μg/0.5 mL) and single (25 μg/0.5 mL) dose cohorts, and a single dose of 25 μg/0.5 mL showed excellent immune response (100% seroconversion). A phase III, randomized, multi-centric, controlled trial was conducted to evaluate the immunogenicity and safety of the test vaccine, Typhbar-TCV® in a total of 981 healthy subjects and compared with the typhoid vi capsular polysaccharide vaccine of the same manufacturer (Typbar®) having similar amount of antigen per dose. The study group receiving the test vaccine (Typhbar-TCV®) was divided into two cohorts i.e. ≥6 months to ≤2 years (327 subjects) and >2 years to <45 years (654 subjects). Cohort–I was single arm open label and all the subjects received single dose of the test vaccine. Cohort-II was randomized double blind trial and the subjects were recruited in to two groups who received single dose of either test vaccine (340 subjects) or reference vaccine (314 subjects).

**Immunogenicity results:** In cohort-I, 98.05% subjects showed seroconversion (≥4-fold titre rise) on day 42, and the geometric mean titres (GMTs) on day 0 and 42 were 9.44U/mL and 1952.03U/mL respectively. The GMTs were slightly higher in the >1-2 years than in 6m to <1 year age group while no difference was seen in seroconversion rates. In cohort-II, 97.29% and 93.11% subjects of test and reference vaccine groups respectively, were seroconverted (≥4-fold titer rise) on day 42. Whereas the GMTs on day 42 in the test and reference vaccine groups were 1301.44U and 411.11U, respectively (P=0.001). Both seroconversion and GMTs were higher in younger (>2 to <15 years) than older (15-45 years) age groups.

**Long-term immunogenicity:** The manufacturer has planned a 3-year follow-up for seroconversion data of phase III. So far, they have shared 18 months follow-up...
data which show significant waning of GMTs and seroconversion levels in both the cohorts from day 42 levels while 100% of subjects of test vaccine subjects were still seroprotected (the protective level: Vi antibody > 7.4 Elisa unit/mL). Similar trend was observed in the subgroup of cohort-II that received reference vaccine.

Safety issues: No serious adverse event was noted. The most common local and systemic events reported were pain at injection site and fever, respectively in both the cohorts. Fever was noticed in 10.0%, 4.28%, and 2.75% in cohort-I, test, and reference vaccine groups of cohort-II, respectively. None of the enrolled subjects were withdrawn from study for vaccine related adverse reaction. The manufacturer has indicated to follow all subjects for up to 12 weeks post vaccination.

The vaccine has been licensed by the Drug Controller General of India (DCGI) in August, 2013 for clinical use in India.

The IAP ACVIP has reviewed the above pivotal trial (unpublished) and considers it to be a promising vaccine, fulfilling the critical gap of providing protection under 2 years of age. However, before a slot is created for the vaccine in the existing IAP Immunization Timetable, the committee has pinpointed following issues to be addressed:

1. The researchers have used a Vi-PS typhoid vaccine from the same manufacturer as a reference vaccine above 2 years of age and have shown almost equal seroconversion and significantly higher GMTs with the new Vi PS-conjugate vaccine in children ≥2 years and adults, no comparative vaccine was used for the cohort consisting of children <2 years of age. Though it may be more difficult to identify a typhoid/non-typhoid vaccine that could be used to maintain a double blind design in this age group, a double-blind, randomized controlled trial would have been much more acceptable.

2. It seems quite encouraging that almost similar or higher level of seroconversion and GMTs were achieved below 2 years of age than in older children with the same vaccine, and significantly higher (>3 folds) GMTs were achieved with the test vaccine than the reference vaccine in older age group and adults. Another Vi-PS vaccine from a different manufacturer (Typhim-Vi® from Sanofi Pasteur) has demonstrated effectiveness in a large field trial in Kolkata, India [15]. The researchers have used a cut-off of >7.4 Elisa unit/mL as a serologic correlate for protection. However, it is still debatable and well known that there is no universally accepted absolute correlate of protection for typhoid disease or vaccine. Thus, there is need of a large field efficacy trial since seroconversion is not a direct proxy for ultimate clinical efficacy/effectiveness.

3. Though the test subjects below 2 years of age could maintain reasonably good seroconversion even after 18 months of follow-up, the GMTs waned significantly and were far below the level achieved after the first dose. Hence, there may be a need of a booster dose of the vaccine. The impact of booster dose on antibody titres and exact timing of the same can only be determined after a longer follow-up.

4. The vaccine is licensed to be given at age 6 months and above. The manufacturers have recommended single dose of the vaccine at 9 months of age along with measles vaccine. However, the committee believes there is a need of studying interference with measles vaccine given to the subjects at 9 months before a universal recommendation is made. Similar studies are needed with MMR vaccine before recommending a booster of the vaccine at 15 months along with the former.

5. The new Vi-PS conjugate vaccine was found more than twice reactogenic (in term of fever) in children <2 years than older children and adults and almost 3 times more reactogenic in younger age group than the reference vaccine in older age group. However, the reactogenicity was almost similar as expected with any other vaccines given to infants. Nevertheless, the committee thinks there is a need to monitor the reactogenicity profile of the vaccine more closely and in higher number of subjects after licensure.

IAP recommendations for use

Considering the typhoid epidemiology in the country and analyzing the available data of the vaccine, IAP recommends the new Vi-PS conjugate vaccine below one year of age, preferably between 9-12 months (minimum age 6 months). Since the incompatibility data with measles vaccine is not available, it would be prudent to maintain an interval of at least 4 weeks with the former. The committee believes there is a definite need of a booster dose during second year of life; however, the available data is insufficient to specify exact timing of the same. The committee stresses the need of large scale field effectiveness trials in real life settings to establish superiority of the product over the existing Vi-PS vaccines, and to ascertain translation of
higher GMTs and better seroconversion rates in to greater protection.

D. Japanese Encephalitis vaccination

Live Attenuated SA-14-14-2 Vaccine

The IAP ACVIP reviewed the performance of SA-14-14-2 JE vaccine in India since its launch in 2006. Though this vaccine is not available in private market for office use, the committee deemed it necessary to respond to frequent queries from members on the critical issue of a need of 2nd dose (booster dose) of the vaccine.

The committee reviewed the efficacy of this vaccine in India. A small case–control study from Lucknow, India found an efficacy of 94.5% (95% CI, 81.5 to 98.9) after a single dose of this vaccine within 6 months after its administration [16]. However, data from post marketing surveillance (PMS) in India (ICMR unpublished study) showed that protective efficacy of the vaccine in India is not as high as that seen in Nepal. According to the study, sero-conversion rates at 28 days after vaccination were 73.9% and 67.2% in all individuals and in those who were nonimmune pre-vaccination, respectively. The protective efficacy of the vaccine at one year was 43.1% overall and 35% for those who were non-immune pre-vaccination, respectively [17]. Preliminary results of a recent case control study show an unadjusted protective effect of 62.5% in those with any report of vaccination [23]. According to this report, the JE vaccine efficacy has been around 60% in Uttar Pradesh and around 70% in Assam.

Inactivated Vero cell culture-derived SA 14-14-2 JE vaccine (JE-VC), (IXIARO® and JEEV®)

(i) IXIARO® by Intercell AG: This is an inactivated vaccine (JE-VC) derived from the attenuated SA 14-14-2 JEV strain propagated in Vero cells. This vaccine has been evaluated in several clinical trials in adults and children in India and in several other countries [18-20] IXIARO® has now been approved by US FDA and EU for use in children from the age of 2 months onwards [21, 22]. There is no efficacy data for IXIARO®, and the vaccine has been licensed in pediatric age group especially for travelers to Asian countries on the basis of a Phase III RCT conducted in the Philippines [23], and favourable interim data from a second Phase III trial in EU, U.S. and Australia [24]. The safety profile of the test vaccine was good, and its local tolerability profile was more favorable than that of the mouse brain vaccines [23].

(ii) JEEV-the Indian variant of IC51, IXIARO: Biological E. Ltd. has launched a vaccine for the endemic markets under the trade name JEEV® based on Intercell’s technology and has already been WHO prequalified. In 2011, the BE Ltd. India conducted a multi-centric open label randomized controlled phase II/III study to evaluate safety and immunogenicity of JEEV® vaccine in ~450 children (≥1 to <3-year old) and compared to control Korean Green Cross Mouse Brain Inactivated (KGCC) vaccine (unpublished). This study demonstrated seroconversion (SCR) of 56.28% on day 28 and 92.42% on day 56 in JEEV® vaccinated group. Non-inferiority of JEEV® established against control in terms of proportion of subjects seroconverted. GMTs in JEEV® group were significantly higher than GMTs achieved in KGCC-JE vaccine group (218 vs 126). There was no significant difference between the groups in proportion of subjects’ seroprotected, and in proportion of subjects reporting adverse events between groups. JEEV® has been licensed by Drug Controller General of India for use in prevention of JE virus infection in children and adult population on the basis of its ability to induce JEV neutralizing antibodies as a surrogate for protection.

Inactivated Vero cell culture-derived Kolar strain, 821564XY, JE vaccine (JENVAC®)

JENVAC® is a Vero cell culture derived, inactivated, adjuvanted and thiomersal containing vaccine developed by Bharat Biotech International Limited (BBIL). The original virus strain used in the vaccine was isolated from a patient in the endemic zone in Kolar, Karnataka, India by National Institute of Virology (NIV), Pune and later transferred to BBIL for vaccine development.

A Phase II/III, randomized, single blinded, active controlled study to evaluate the immunogenicity and safety of the vaccine was conducted among 644 healthy subjects. Out of 644 subjects 212 were between the age of ≤50 to >18 years, 201 subjects were between the age of ≤18 to >6 years and 231 subjects were between the age of ≤6 to >1 years. Subjects received two doses of the test vaccine or a single dose of a reference vaccine (Live attenuated, SA 14-14-2 Chinese vaccine) as the first dose and a placebo as the second dose.

The results revealed that even a single dose of the test vaccine was sufficient to elicit the immune response. On 28th day, the subjects who had received a single dose were 98.67% seroprotected and 93.14% seroconverted (4 fold) for ≤50 - ≥1 years, whereas the corresponding figures for the reference vaccine were 77.56% and 57.69%, respectively (p-value <0.001). There was no statistically significant difference in all
the 3 groups. The seroconversion (93.14% and 96.90%) and seroprotection (98.67% and 99.78%) percentages on the 28th and 56th day were not significantly different and similarly, no statistically significant difference in these rates was noted amongst different age groups. Higher GMTs were achieved in younger age groups. After the second dose of the test vaccine, the GMTs increased exponentially from day 28 (145) to day 56 (460.5) in ≤50 - ≥1 years. However, there was waning of both seroconversion and GMTs in both the test vaccine and reference vaccine groups at 18 months. All the subjects were followed up for 56±2 days. There was no serious adverse event or adverse event of any special interest noted in the study.

**IAP Recommendations for use**

The vaccination against JE is not recommended for routine use, but only for individuals living in endemic areas.

*Live Attenuated SA-14-14-2 Vaccine:* After analyzing the recent Indian efficacy/effectiveness data, the academy thinks there is a need of a second dose of the vaccine to provide more complete and sustained protection. First dose of the vaccine can be administered at 9 months along with measles vaccine and second at 16 to 18 months at the time of 1st booster of DTP vaccine.

**JEEV® by Biological E. Ltd:** The committee believes that although Biological E. India Ltd. has used the same strain, adjuvant and technology in production of JEEV® as used by Intercell AG in development of IXIARO®, the two vaccines cannot be treated as the same product. Considering the proven efficacy and safety profile of its parent vaccine in many countries over past many years, and demonstration of good seroprotection in Indian trial, the committee endorses use of this vaccine in India and recommends a primary schedule of 2 doses of 0.25mL for children aged ≥1- ≤3 years and 2 doses of 0.5mL for children >3 years, adolescents and adults administered intramuscularly on days 0 and 28. However, the long term persistence of protective efficacy and need of boosters are still undetermined. In February 2011, ACIP approved recommendations for a booster dose of JE-VC (IXIARO®) in adults.

**JENVAC® by BBIL:** The committee reviewed the data provided by the manufacturer on the clinical trials of JENVAC® in India. Although it lacks the experience of multinational trials of IXIARO® in different settings, nevertheless the results of a pivotal phase II/III study conducted in India appear satisfactory for issuing recommendations for clinical use. The committee recommends two doses of the vaccine (0.5 ml each) administered intramuscularly at 4 weeks interval for the primary immunization series for office practice starting from 1 year of age. Since appreciable waning was noted in both seroconversion and seroprotection rates, and GMTs were also waned significantly, there is definitely a need of booster dose at later stage. The exact timing of the booster along with feasibility of single dose for primary series can be determined only after obtaining the long term follow-up data.

**E. Meningococcal vaccination**

**Meningococcal conjugate vaccines (MCVs)**

Currently two different types of meningococcal conjugate vaccines (MCVs) are licensed in India. The first which is now readily available in private market also, is a quadrivalent vaccine Menactra® from Sanofi Pasteur, and another a monovalent serogroup A vaccine from Serum Institute of India (SII).

**Quadrivalent meningococcal polysaccharide-protein conjugate vaccine (MenACWY-D, Menactra®)**

This is a quadrivalent (A,C,W135,Y) meningococcal conjugate vaccine using diphtheria toxin as carrier protein (A,C,W135,Y-D), and was licensed in US in 2005. However, it is licensed in India only in 2012 for use among persons aged 2 through 55 years. In 2011, ACIP recommended a two-dose series of this vaccine for use in children aged 9-23 months. It contains 4 μg each of A, C, Y and W-135 polysaccharide conjugated to 48 μg of diphtheria toxoid. A single dose of 0.5 mL IM is recommended. Recent estimates of the effectiveness of MenACWY-D, the first licensed quadrivalent vaccine suggest that within 3 to 4 years after vaccination, effectiveness is 80% to 85% [25, 26]. It is associated with minor local side effects such as pain, and swelling. Guillain-Barré Syndrome was noted as a possible but unproven risk in some adolescents following immunization [27]. Interference with PCV13 immune responses was noted when MenACWY-D and PCV13 were administered simultaneously in patients with asplenia. Hence, it is now recommended that at least one month interval should be kept between PCV13 and MenACWY-D, and PCV13 should be administered first [27].

**Monovalent serogroup A conjugate vaccine (PsA–TT, MenAfriVac®)**

Meningococcal Group A Conjugate Vaccine is a lyophilized vaccine of purified meningococcal A polysaccharide covalently bound to tetanus toxoid (TT) which acts as a carrier protein. It contains 10 μg of group
IAP Recommended Immunization Schedule 2013 for Children Aged 0-18 years (with range)

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<td>Meningococcal</td>
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<td>Cholera 1 &amp; 2</td>
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<td>Japanese Encephalitis</td>
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</tbody>
</table>

- This schedule includes recommendations in effect as of November 2013.
- These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars.
Footnotes: Recommended Immunization Schedule for Persons Aged 0 through 18 Years — IAP, 2013

1. General instructions:
   - Vaccination at birth means as early as possible within 24 to 72 hours at birth or, at latest, at 12 months of age.
   - Whenever multiple vaccinations are to be given simultaneously, they should be given within 24 hours. If simultaneous administration is not feasible due to some reason, the recommended age in weeks/months/years must be completed weeks/months/years.
   - Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible.
   - The use of a combination vaccine generally is preferred over separate injections of its individual component vaccines.
   - When two or more live parenteral/intramuscular vaccines are not administered on the same day, they should be given at least 28 days (4 weeks) apart; this rule does not apply to live oral vaccines.
   - If given ≤4 weeks apart, the vaccine given 2nd should be repeated.
   - The minimum interval between 2 doses of inactivated vaccines is usually 4 weeks (exception: DTaP).
   - Vaccine doses administered up to 4 days before the minimum interval or age can be counted as valid (exception: DTaP). If the vaccine is administered ≥5 days before minimum period it is counted as an extra dose.
   - Any number of antigens can be given on the same day.
   - Changing needles between drawing vaccine into the syringe and injecting the syringe is not necessary.
   - Different vaccines should not be mixed in the same syringe unless specifically licensed and labeled for such use.
   - Patients should be observed for an allergic reaction for 15 to 20 minutes after receiving immunization(s).
   - When necessary, 2 vaccines can be given in the same limb at a single visit.
   - The anterolateral aspect of the thigh is the preferred site for 2 simultaneously IF injections because of its greater muscle volume.
   - The distance separating the 2 injections is arbitrary but should be at least 1 inch so local reactions are unlikely to overlap.
   - Although most experts recommend "assistance" by gently palpating the syringe before the injection is given, there is no evidence to document the necessity for this procedure. If blood appears after negative pressure, the needle should be withdrawn and another site should be selected using a new needle.
   - A previous immunization with a dose that was less than the standard dose or one administered by a nonstandard route should not be counted, and the person should be re-immunized as appropriate for age.

2. Specific Instructions:

1. BCG Vaccine
   - Routine Vaccination:
     - Minimum age: birth
   - Catch-up Vaccination:
     - Should be given at birth or at first contact

2. Hepatitis B (HepB) Vaccine
   - Routine Vaccination:
     - Minimum age: birth
   - Catch-up Vaccination:
     - May be given up to 5 years

3. Poliovirus Vaccine
   - Routine Vaccination:
     - Birth dose of OPV is usually not needed after 24 months.
     - IPV is in place of OPV if IPV is unfeasible, minimum 3 doses.
     - Additional doses of OPV or IPV are needed.
     - IPV: Minimum age: 6 months.
   - IPV: 2 instead of 3 doses can also be used if primary series started at 2 weeks and the interval between the doses is kept ≥4 weeks.
   - No child should leave your facility without polio vaccination (IPV or OPV) indicated by the schedular.

4. Diphtheria and Tetanus Toxoids and Pertussis (DTaP) Vaccine
   - Routine Vaccination:
     - Minimum age: 6 weeks
     - The first booster (4th dose) may be administered as early as 12 months, provided at least 6 months have elapsed since the third dose.
     - DTaP vaccine combinations should preferably be avoided for the primary series.
     - DTaP may be preferred to DTwP in children with history or evidence of adverse reactions after previous doses of DTwP or children with neurologic disorders.
   - First and second boosters may also be of DTaP. However, considering a higher reactogenicity, DTaP can be considered for the booster dose.
   - If any "acellular pertussis" containing vaccine is used, it must at least have 3 or more components in the product.

   Catch-up Vaccination:
   - Catch-up schedule: the 2nd childhood booster is not required if the last dose has been given beyond the age of 4 years.
   - Catch-up after 7 years: DTwP,Td at ≥9 months, 10, and ≥14 years.
   - Catch-up after 6 years: DTwP,Td at ≥3 years, 4, and ≥10 years.
   - Catch-up after 5 years: DTwP,Td at ≥2 years, 3, and ≥7 years.
   - Catch-up after 4 years: DTwP,Td at ≥1 year, 2, and ≥5 years.
   - Catch-up after 3 years: DTwP,Td at ≥6 months, 7, and ≥1 years.
   - Catch-up after 2 years: DTwP,Td at ≥3 months, 4, and ≥8 months.
   - Catch-up after 1 year: DTwP,Td at ≥9 months, 10, and ≥14 years.
   - Catch-up after 6 months: DTwP,Td at ≥9 months, 10, and ≥14 years.
   - Catch-up after ≤6 months: DTwP,Td at ≥9 months, 10, and ≥14 years.

5. Tetanus and Diphtheria Toxoids and a Cellular Preservative Vaccine
   - Routine Vaccination:
     - Minimum age: 7 years (AdoBac® is approved for 11-64 years by ACIP and 6-64 years by FDA, while Boostrix® for 10 years and older by ACIP and 10 years and older by FDA in US).
     - Administration 1 dose of Td to all adolescents aged 11 through 12 years.
     - Tetap vaccine: One dose of Td vaccine to pregnant mothers and adolescents during each pregnancy (preferred during 27 through ≥36 weeks gestation) regardless of number of years from prior Tdap vaccination.

6. Pneumococcal vaccines
   - Routine Vaccination:
     - Primary series includes Hib conjugate vaccine at ≥5 months, 10, 14 years with a booster at ≥15 years old.

7. Hib conjugate vaccine
   - Routine Vaccination:
     - Minimum age: 11 years
     - Both PCV13 and PCV7 are licensed for children from ≤5 years of age (although the exact labeling details may vary by country), ACIP does not recommend use of PCV13 alone.

8. Haemophilus influenzae Type b (Hib) Conjugate Vaccine
   - Routine Vaccination:
     - Minimum age: 5 years
     - Primary series includes Hib conjugate vaccine at ≥5 months, 10, 14 years with a booster at ≥15 years old.

9. Pneumococcal polysaccharide vaccine (PPSV23)
   - Routine Vaccination:
     - Minimum age: 2 years
     - Not recommended for routine use in healthy individuals.

10. Pneumococcal conjugate vaccine (PCV)
    - Routine Vaccination:
      - Minimum age: 6 months
      - Primary series includes PCV13 or PCV7 to all healthy children aged ≥24 months who are not completely vaccinated for their age.

For PCV13: Catch-up in 6-24 months; 2 doses 4 weeks apart; and 1 booster; 12-23 months; 2 doses 4 weeks apart 24-30 months; ≥24 single dose.

For PCV11: Catch-up in 6-24 months; 2 doses 4 weeks apart; and 1 booster; 12-23 months; 2 doses 6 weeks apart; ≥24 single dose.

Vaccination of persons with high-risk conditions:
- PCV7 and pneumococcal polysaccharide vaccine (PPSV23) both are used in certain high-risk groups of children.
- For children aged ≥24 months with certain underlying medical conditions, administer 1 dose of PCV13 if ≥3 doses of PCV were received previously, or 2 doses of PCV13 at least 6 weeks apart if fewer than 3 doses of PCV were received previously.
- For children aged ≥24 months with certain underlying medical conditions, administer 1 dose of PCV13 if ≥3 doses of PCV were received previously, or 2 doses of PCV13 at least 6 weeks apart if fewer than 3 doses of PCV were received previously.

Pneumococcal conjugate vaccine (PCV13): 1 dose at ≥2 years.

HIV-infected HIV-infected children: 2 doses at ≥2 years.

Haemophilus influenzae Type b (Hib) Conjugate Vaccine
- Routine Vaccination:
  - Minimum age: 6 weeks
  - Primary series includes Hib conjugate vaccine at ≥6 weeks, 10, 14 years with a booster at ≥14 years old.

Hib conjugate vaccine:
- Routine Vaccination:
  - Minimum age: 2 years
  - Primary series includes Hib conjugate vaccine at ≥2 years, 10, 14 years with a booster at ≥14 years old.

Hib conjugate vaccine:
- Routine Vaccination:
  - Minimum age: 6 weeks
  - Primary series includes Hib conjugate vaccine at ≥6 weeks, 10, 14 years with a booster at ≥14 years old.

Hib conjugate vaccine:
- Routine Vaccination:
  - Minimum age: 6 weeks
  - Primary series includes Hib conjugate vaccine at ≥6 weeks, 10, 14 years with a booster at ≥14 years old.

Hib conjugate vaccine:
- Routine Vaccination:
  - Minimum age: 6 weeks
  - Primary series includes Hib conjugate vaccine at ≥6 weeks, 10, 14 years with a booster at ≥14 years old.

Hib conjugate vaccine:
- Routine Vaccination:
  - Minimum age: 6 weeks
  - Primary series includes Hib conjugate vaccine at ≥6 weeks, 10, 14 years with a booster at ≥14 years old.

Hib conjugate vaccine:
- Routine Vaccination:
  - Minimum age: 6 weeks
  - Primary series includes Hib conjugate vaccine at ≥6 weeks, 10, 14 years with a booster at ≥14 years old.
10. Measles
Routine Vaccination:
- Minimum age: 12 months
- Administer the first dose of MRV vaccine at age 12 through 18 months, and the second dose at 4 through 6 years.
- The second dose may be administered before age 4 years, provided at least 4 weeks have elapsed since the first dose.
- Catch-up Vaccination: Ensure that all school-aged children and adolescents who have not received 2 doses of MMR vaccine: the interval between the 2 doses is at least 4 weeks.
- One dose if previously vaccinated with only one dose.

11. Mumps and Rubella (MMR) Vaccine
Routine Vaccination:
- Minimum age: 12 months
- Administer the first dose of MMR vaccine at age 12 through 18 months, and the second dose at age 4 through 6 years.
- The second dose may be administered before age 4 years, provided at least 4 weeks have elapsed since the first dose.
- Catch-up Vaccination: Ensure that all school-aged children and adolescents have had 2 doses of MMR vaccine: the interval between the 2 doses is at least 4 weeks.
- One dose if previously vaccinated with only one dose.

12. Varicella Vaccine
Routine Vaccination:
- Minimum age: 12 months
- Administer the first dose of Varivax at age 12 through 16 months and the second dose at age 4 through 6 years.
- The second dose may be administered before age 4 years, provided at least 4 weeks have elapsed since the first dose.
- Catch-up Vaccination: Ensure that all school-aged children and adolescents with varicella exposure have received 2 doses of Varivax: the interval between the 2 doses is at least 4 weeks.
- One dose if previously vaccinated with only one dose.

13. Hepatitis A (HepA) Vaccines
Routine Vaccination:
- Minimum age: 12 months
- Start the 2-dose HepA vaccine series for children aged 12 through 23 months; separate the 2 doses by 6 to 12 months.
- Two doses of both killed and live Hepatitis A vaccines as of now.
- Catch-up Vaccination: Administer dose 2 at least 6 months apart to unvaccinated persons.
- For catch-up vaccination, 4 doses of Hepatitis A antibody are recommended: in children older than 10 years as at this age the estimated positive rates exceed 90%.

14. Typhoid Vaccines
Routine Vaccination:
- Both ViPS (polysaccharide) and ViPS conjugate vaccines are available.
- Minimum ages: ViPS (polysaccharide) vaccines: 2 years; ViPS (Typhoserv): 6 months.
- Vaccine schedule: ViPS (polysaccharide) vaccines: single dose at 2 years; revaccination every 3 years; no evidence of hyporesponsiveness on repeat revaccination (for ViPS conjugate vaccine).
- ViPS conjugate vaccine (Typhoserv): Single dose at 9-12 months and a booster during second year of life.
- ViPS conjugate vaccine (Pediclinic): data are not sufficient to recommend ViPS conjugate vaccine.
- Greater experience and more robust data with ViPS polysaccharide vaccines; whereas there is limited experience with ViPS conjugate vaccines.
- Catch-up Vaccination: Recommended throughout the adolescent period, i.e. 18 years.

15. Influenza Vaccine
Routine Vaccination:
- Minimum age: 6 months for infant inactivated influenza vaccines (IV)
- Recommended for the vaccination of persons at higher risk of complications: for persons aged 65 years and above.
- First-time vaccination: 6 to 12 months to 9 years: two doses 1 month apart; 9 years and above: single dose
- Annual revaccination with single dose.
- Dose (IV): 0.5 ml; 0.25 ml; and above 0.5 ml.
- For children aged 6 months through 8 years: For the 2012-13 season, administer 2 doses (separated by at least 6 weeks) to children who are receiving influenza vaccine for the first time.
- At the currently available IVIs in the country contain the “Shandong” strain.

16. Human Papillomavirus (HPV) Vaccines
Routine Vaccination:
- Minimum age: 9 years
- HPV16 [Cervarix] and HPV2 [Cervarix] are recommended: in a 3-dose series for females aged 11 or 12 years.
- HPV can also be given in a 3-dose series for males aged 11 or 12 years, but not yet licensed for use in males in India.
- The vaccine series can be started beginning at age 9 years.
- Administer the second dose 1 to 2 months after the first dose and the third dose between the 24th and 30th weeks after the first dose.
- Catch-up Vaccination: Administer the vaccine series to females (either HPV4 or HPV2) at age 13 through 15 years if not previously vaccinated.
- Use recommended routine dosing intervals (see above) for vaccine series catch-up.

17. Meningocecal Vaccine
Recommended only for certain high-risk groups of children, during outbreaks, and international travelers, including students going for study abroad to Hajj and sub-Saharan Africa.
Both Meningocecal vaccine conjunctivitis (Quadravalent MenACWY-D, MenB, and Menegace) are recommended: in India.
Conjugate vaccines are recommended: in poliovaccines due to their potential for herd protection and their increased immunogenicity, particularly in children <2 years of age.
As of today, quadravalent conjugate and poliovacines are recommended: only for children 2 years and above.
Menoflax Group A conjugate vaccine, Penta-TT can be used in children <1 year of age.

18. Cholera Vaccine
Recommended only for individuals in high-risk communities, recommended only for the vaccination of persons residing in highly endemic areas and traveling to areas where risk of transmission is very high.
Recommended only for individuals in high-risk communities, recommended only for the vaccination of persons residing in highly endemic areas and traveling to areas where risk of transmission is very high.
Dose: 2.0 ml intramuscular (IM) in the anterolateral thigh or deltoid (preferred in children and infants) (HDCV, Cholera Vaccine (DCCV), Cholera Vaccine (DCCV), Cholera Vaccine (DCCV), Cholera Vaccine (DCCV), Cholera Vaccine (DCCV), Cholera Vaccine (DCCV), Cholera Vaccine (DCCV).

19. Japanese Encephalitis (JE) Vaccine
Routine Vaccination:
- Recommended only for individuals in high-risk communities, recommended only for the vaccination of persons residing in highly endemic areas and traveling to areas where risk of transmission is very high.
- Two doses of JE vaccine are licensed in India: one, live attenuated, cell culture derived SA-14-14-2, and two inactivated JE vaccines, namely live vaccine cell culture derived SA-14-14-2 (JE vaccine [LIVE]) and live vaccine cell culture derived, BHK-21/40 JE vaccine [LIVE] (JE vaccine) (Bharat Biotech).
- Live attenuated, cell culture derived SA-14-14-2: recommended: 1 dose at age 9 months along with measles vaccine and second at 16 to 18 months along with DTP booster.
- Not available in the private market for use.
- Inactivated vaccine is licensed (LIVE) by Bharat Biotech.

20. Rabies Vaccine
- Only modern tissue culture vaccines (MTCVs) and MRC vaccines are recommended: for post-exposure prophylaxis in India.
- Post-exposure prophylaxis is recommended: following a significant contact with dogs, cats, cows, buffaloes, sheep, goats, pigs, horses, donkeys, monkeys, mongoose, bees, cats, and dogs.
- Rabies is not required: post-exposure prophylaxis in India.
- MTCVs are recommended: for all categories I, II, III, and IV.
- Dose: 1.0 ml intramuscular (IM) in the anterolateral thigh or deltoid (preferred in children and infants) (HDCV, Cholera Vaccine (DCCV), Cholera Vaccine (DCCV), Cholera Vaccine (DCCV)).
# IAP Immunization Time Table 2013

## I. IAP recommended vaccines for routine use

<table>
<thead>
<tr>
<th>Age (completed weeks/ month/year)</th>
<th>Vaccines</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth</td>
<td>BCG, OPV 0, Hep-B 1</td>
<td>Administer these vaccines to all newborns before hospital discharge</td>
</tr>
<tr>
<td>6 weeks</td>
<td>DTP, DTwP 1, IPV 1, Hep-B 2, Hib 1, Rotavirus 1, PCV 1</td>
<td>Polio: All doses of IPV may be replaced with OPV if administration of the former is unfeasible. Additional doses of OPV on all supplementary immunization activities (SIAs). Hib: Two doses of IPV instead of 3 for primary series if started at 8 weeks, and 8 weeks interval between the doses. Rotavirus: 2 doses of RV1 and 3 doses of RV5. RV1 should be employed in 10 &amp; 14 week schedule, instead of 6 &amp; 10 week. 10 &amp; 14 week schedule of RV1 is found to be far more immunogenic than existing 8 &amp; 10 week schedule.</td>
</tr>
<tr>
<td>10 weeks</td>
<td>DTwP 2, IPV 2, Hib 2, Rotavirus 2, PCV 2</td>
<td>Rotavirus: If RV1 is chosen, the first dose should be given at 10 weeks</td>
</tr>
<tr>
<td>14 weeks</td>
<td>DTwP 3, IPV 3, Hib 3, Rotavirus 3, PCV 3</td>
<td>Rotavirus: Only 2 doses of RV1 are recommended at present. If RV1 is chosen, the 2nd dose should be given at 14 weeks</td>
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<tr>
<td>6 months</td>
<td>OPV 1, Hep-B 3</td>
<td>Hepatitis-B: The final (third or fourth) dose in the HepB vaccine series should be administered no earlier than age 24 weeks and at least 16 weeks after the first dose.</td>
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<tr>
<td>9 months</td>
<td>OPV 2, Measles</td>
<td>Measles vaccine ideally should not be administered before completing 270 days or 5 months of life</td>
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<tr>
<td>12 months</td>
<td>Hep-A 1</td>
<td>Hepatitis A: For both killed and live hepatitis-A vaccines, 2 doses are recommended as of now</td>
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<tr>
<td>15 months</td>
<td>MMR 1, Varicella 1, PCV Booster</td>
<td>Varicella: The risk of breakthrough varicella is lower if given 15 months onwards</td>
</tr>
<tr>
<td>16 to 18 months</td>
<td>DTwP, DTaP B1, IPV B1, Hib B1</td>
<td>The first booster (4th dose) may be administered as early as age 12 months, provided at least 6 months have elapsed since the third dose. DTP: First &amp; second boosters should preferably be of DTwP. Considering a higher reactogenicity of DTwP, DTaP can be considered for the boosters.</td>
</tr>
<tr>
<td>18 months</td>
<td>Hep-A 2</td>
<td>Hepatitis A: For both killed and live hepatitis-A vaccines, 2 doses are recommended as of now</td>
</tr>
<tr>
<td>2 years</td>
<td>Typhoid 1</td>
<td>Typhoid: Typhoid revaccination every 3 years, if Vi polysaccharide vaccine is used.</td>
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<tr>
<td>4 to 6 years</td>
<td>DTwP B2/DTaP B2, MMR 3, Varicella 2, Typhoid 2</td>
<td>MMR: The 2nd dose can be given at anytime 4-8 weeks after the 1st dose. Varicella: The 2nd dose can be given at anytime 3 months after the 1st dose.</td>
</tr>
<tr>
<td>10 to 12 years</td>
<td>Td/mTd HPV</td>
<td>TdP: is preferred to Td followed by Td every 10 years. HPV: Only for females, 3 doses at 0, 1-2 (depending on brands) and 6 months.</td>
</tr>
</tbody>
</table>

## II. IAP recommended vaccines for High-risk* children

(Vaccines under special circumstances):
1. Influenza Vaccine,
2. Meningococcal Vaccine,
3. Japanese Encephalitis Vaccine
4. Cholera Vaccine,
5. Rabies Vaccine,
6. Yellow Fever Vaccine,
7. Pneumococcal Polysaccharide vaccine (PPSV 23)

*High-risk category of children:
- Congenital or acquired immunodeficiency (including HIV infection)
- Chronic cardiac, pulmonary (including asthma if treated with prolonged high-dose oral corticosteroids), hematologic, renal (including nephrotic syndrome), liver disease and diabetes mellitus
- Children on long term steroids, immunosuppressive or radiation therapy
- Diabetes mellitus, Cerebrospinal fluid leak, Cochlear implant, Malignancies,
- Children with functional/ anatomic asplenia/ hypoplasia
- During disease outbreaks
- Laboratory personnel and healthcare workers
- Travelers
A polysaccharide conjugated to 10-33 μg tetanus toxoid, with alum as adjuvant and thiomersal as preservative [28]. The vaccine is licensed in India since 2009 and prequalified by WHO in 2010, but surprisingly, the company has not launched this inexpensive vaccine (costing around half a cent to African nations) in India so far. It has been used in large campaigns in Burkina Faso, Mali, and Niger and is being progressively introduced in other countries of the African meningitis belt [28].

It should be administered as a single intramuscular injection of 0.5 mL to individuals 1-29 years of age [28]. The possible need for a booster dose has not yet been established. Persons who have previously received a meningococcal A polysaccharide-containing vaccine can be vaccinated with the conjugate vaccine.

The single intramuscular dose induces functional antibody titres against meningococcal serogroup A which are significantly higher and more persistent than those induced by a corresponding polysaccharide vaccine [29-31]. The immune response seems to persist for a long time. The vaccine has also got a very good safety profile. There is moderate level of evidence for protection of children against Group A meningococcal disease in both children >12 months to <5 years, and in individuals ≥5 years old [32]. Furthermore, the vaccine has demonstrated a great effectiveness when used in Africa in campaigns.

**IAP position on use of meningococcal vaccines in India**

The current epidemiology and burden of meningococcal diseases (MD) in India do not justify routine use of meningococcal vaccines. Meningococcal vaccines are recommended only for certain high-risk conditions and situations as enumerated below in children aged 2 years or more (3 months or older if risk of meningococcal disease is high, e.g. outbreaks/ close household contact). Conjugate vaccines are preferred over polysaccharide vaccines due to their potential for herd protection and their increased immunogenicity, particularly in children <2 years of age.

Sporadic outbreaks of meningococcal disease have been recorded for last many decades in India. These outbreaks, particularly the larger epidemics have almost universally been caused by serogroup A meningococci [33]. The committee believes that the new affordable serogroup A-containing monovalent conjugate vaccine manufactured by SII should have a critical role in containing future epidemics. The Academy urges the Indian manufacturer to make this vaccine available in the country also. The quadrivalent MenACWY-D should be employed in individuals having certain high-risk conditions and situations (mentioned below) and amongst international travelers.

**IAP recommendations on dosage in different categories:** IAP now recommends the use of MCVs in different categories as per following description:

**A. During disease outbreaks:** Polysaccharide vaccines can be used to control outbreaks in countries where limited economic resources or insufficient supply restrict the use of MCVs [28]. However, due to the limited efficacy of polysaccharide vaccines in children <2 years of age, conjugate vaccines should be used for protection of those aged 12–24 months, particularly for Men A disease. Since majority of documented outbreaks in India are caused by Men A, monovalent MCV, like PsA-TT should be employed in mass vaccination.

**B. Vaccination of persons with high-risk conditions/ situations**

(i) **Children with terminal complement component deficiencies:** A two-dose primary series of MCV administered 8–12 weeks apart is recommended for persons aged 24 months through 55 years with persistent deficiencies of the late complement component pathway. A booster dose should be administered every 5 years. Children who receive the primary series before their seventh birthday should receive the first booster dose in 3 years and subsequent doses every 5 years.

(ii) **Children with functional/ anatomic asplenia/ hyposplenemia (including sickle cell disease):** Administer 2 primary doses of either MCV with at least 8 weeks between doses for individuals aged 24 months through 55 years. Vaccination should ideally be started two weeks prior to splenectomy.

(iii) **Persons with Human Immunodeficiency Virus:** Administer two doses at least 8 weeks interval.

(iv) **Laboratory personnel and healthcare workers:** who are exposed routinely to Neisseria meningitides in solutions that may be aerosolized should be considered for vaccination. A single dose of MCV is recommended. A booster dose should be administered every 5 years if exposure is ongoing.

(v) **Adjunct to chemoprophylaxis:** in close contacts of patients with MD (health care workers in contact with secretions, household contacts, day care contacts) single dose of appropriate group MCV is recommended.
C. International travelers

(i) Students going for study abroad: (mandatory in most universities in the USA) Some institutions have policies requiring vaccination against MD as a condition of enrollment. Persons aged ≤21 years should have documentation of receipt of a MCV not more than 5 years before enrollment. In US, ACIP recommends routine vaccination of all adolescents with single dose of MCV4 at age 11-12 years, with a booster dose at age 16 years (available online at http://www.cdc.gov/vaccines/pubs/acip-list.htm). For further details, follow the catch-up recommendations for meningococcal vaccination of the destination country.

(ii) Hajj pilgrims: Vaccination in the 3 years before the date of travel is required for all travelers to Mecca during the annual Hajj. The quadrivalent vaccine is preferred for Hajj pilgrims and international travelers as it provides added protection against emerging W-135 and Y disease in these areas. A single dose 0.5 ml IM is recommended in age group 2-55 years.

(iii) Travelers to countries in the African meningitis belt: A single dose of monovalent or quadrivalent vaccine is recommended. Conjugate vaccine is preferred to polysaccharide vaccine. A booster dose of MCV is needed if the last dose was administered 5 or more years previously.

F. Poliovirus immunization

No change is made to the existing polio immunization schedule. However, in the comment section of Table 1 and in the footnotes after Figure 1, extra-emphasis is given to the need of vaccinating all eligible children with polio vaccines, IPV or OPV. The Academy is committed to polio eradication initiative in the country. This is to reaffirm again that the current IAP recommendations on polio immunization are one suggested way to the practitioners on how to best utilize available polio vaccines (OPV and IPV) in their office practices. However, they may use the polio immunization schedule as suggested by the Universal Immunization Program (UIP), if it is not feasible to follow IAP schedule. The members/pediatricians are advised to encourage administration of all OPV doses during the ongoing campaigns, NIDs or SNIDs of GoI/NPSP.

G. Other changes

(i) Figures 1 and 2 of earlier schedule [1] are now combined to illustrate recommended immunization schedule with range for persons aged 0 through 18 years.

(ii) The footnotes of the two figures have also now been merged. The recommendations contained in the footnotes section is now divided in to two broad subheads, ‘routine vaccination’ and ‘catch-up vaccination’ wherever applicable.

(iii) The footnotes section of all the recommended vaccines is updated and revised with addition of new information on many vaccines.

Conflicts of interests: None. Funding: None.

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REFERENCES


