

TAG RECOMMENDATIONS FOR MEASLES

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1999 Recommendations

TAG notes with satisfaction the great progress made towards achieving the eradication of measles in the Americas. Several countries, however, represent weak links that could jeopardize the achievement of this goal, and pose a serious threat of virus introduction to neighboring countries. To reduce the risk of measles outbreaks, PAHO should facilitate special inter-country meetings in high-risk areas to encourage the exchange of information and to help define and plan joint measles vaccination and surveillance activities.

TAG highlights the following areas of concern:

- The large number of susceptible children in Haiti and Guatemala places these countries at very high risk for large measles outbreaks. Efforts are urgently needed in both countries to conduct follow-up campaigns and achieve very high coverage.
- With measles virus circulation interrupted in most countries of the Americas, outbreaks provide a special opportunity for the entire Region to obtain information that can be used to prevent future outbreaks. Therefore, investigation reports from all outbreaks, including the 1998 outbreak in Argentina, should be made available to all countries. PAHO should assist in the collection and dissemination of this information throughout the Region.

Vaccination Strategies

- The full implementation of PAHO's recommended vaccination strategy in all countries of the Region is needed to assure the eradication of measles from the Americas.
- Routine vaccination of infants (keep-up vaccination) is a critical component of the PAHO measles eradication strategy. Efforts are needed to vaccinate ³ 95% of infants as soon as possible after their first birthday in every district of every country every year.
- Vaccine coverage must be monitored at the district level or geographic equivalent using appropriate denominators for the target population. Supplemental vaccination (mop-up) activities are needed in those districts that do not achieve 95% coverage. These activities may include door to door vaccination.
- Follow-up measles vaccination campaigns should be conducted when the estimated number of susceptible children 1-4 years of age approaches the number of children in one birth cohort. In most countries, these campaigns are

conducted every four years, but should be conducted sooner if needed (based on coverage obtained in routine programs and other epidemiologic information).

- In countries with rubella/CRS control programs, measles and rubella-containing vaccines should be used for routine infant vaccination, follow-up campaigns and outbreak response activities.
- Healthcare workers are at increased risk for being exposed to measles virus and for being a potential source of virus transmission in health facilities. Persons working in healthcare settings who have contact with children and persons with infectious diseases should be vaccinated against measles, regardless of disease history or vaccination status. Rubella containing vaccine should be used.

Outbreak response

- Recent experience from outbreaks in Latin America has demonstrated that certain groups of adults may be at increased risk for measles during an outbreak. These groups have also been responsible for sustaining measles outbreaks and for transmitting measles to susceptible persons of other age groups. Since the epidemiologic situation differs between countries, it is not possible to give blanket recommendations about which groups of adults to vaccinate in all countries. When measles virus circulation is suspected, consideration should be given to quickly vaccinate persons within the following groups: teachers, university students, military personnel and persons living/working within institutions such as prisons, large factories, work camps and chronic care medical facilities.
- To obtain information that can be used to prevent and control future outbreaks, appropriate investigations and analysis must be conducted for all measles outbreaks. Efforts are needed to determine sources of measles virus introduction, transmission patterns and specific risk factors for acquiring measles.
- Once measles virus circulation has been confirmed by positive measles IgM serology in several patients, it is not necessary to routinely collect blood specimens from every suspected case. Many suspected cases can be confirmed via epidemiological linkage to a laboratory-confirmed case.

Vaccine Stockpile

- PAHO should assure that a stockpile of measles containing vaccine is readily available to deal with emergency situations. Since many countries of the Americas are establishing rubella control/elimination goals, consideration should be given to having a stockpile of MR vaccine.

Surveillance and Laboratory

- Measles surveillance is critical for measuring progress towards the goal of measles eradication in the Americas and for detecting problem areas. Efforts are urgently needed to improve the quality of measles surveillance throughout the Region.
- To monitor progress toward the achievement of measles eradication, all countries should provide data on a weekly basis to the Region-wide measles eradication surveillance system (MESS). Each country should periodically have its measles surveillance system objectively evaluated using the standardized evaluation protocol developed by PAHO. Countries should constantly work to improve the quality of the reporting system.
- Virologic surveillance and molecular epidemiology can provide important information to an eradication program. Appropriate clinical specimens for viral isolation should be obtained from every chain of measles transmission. Urine, the most practical specimen to collect for measles virus isolation, should be obtained within 7 days of rash onset and forwarded to a reference laboratory capable of performing measles virus isolation.

2000 Recommendations

TAG urges the international community to accelerate measles control worldwide to reduce measles morbidity and mortality, and to minimize the risk of importations into countries free of indigenous measles transmission. Of special concern to the Americas are the countries of Japan, Germany, Italy and France as several recent measles importations have been traced to these countries. In view of the significant disease burden of measles (30% of the estimated 3 million global deaths due to vaccine-preventable diseases every year), TAG recommends that the Global Alliance for Vaccines and Immunization supports accelerated global measles control through explicit commitment and financial resources.

Vaccination Strategies

- Following the successful implementation of a one-time nationwide vaccination campaign of all children ages 1-14 years (catch-up), TAG reaffirms the other components of the strategy to achieve, maintain and monitor the interruption of endemic measles transmission in the Region: (a) routine immunization of children 1 year of age (keep-up), and (b) a complementary vaccination campaign targeting all children ages 1-4 years, irrespective of prior vaccination history at least every four years (follow-up).
- It is necessary to achieve and verify a >95 percent coverage with measles-containing vaccines in all municipalities:
 - Routine vaccination coverage should be validated periodically either by house-to-house monitoring or by the comparison with the number of doses of DTP1 or BCG administered. The regularity of this monitoring activity is critical in densely populated areas.
 - Supplemental vaccination (mop-up) activities should be conducted in municipalities failing to reach 95% vaccination coverage. These activities should include door-to-door vaccination.
 - Countries should ensure that all campaigns are properly planned and have adequate supervision.
 - Vaccination coverage during all outreach efforts should be monitored through house-to-house visits.
- Ensure the collaboration, implementation and regular monitoring of school-entry laws requiring mandatory vaccination of children entering preschools and schools.
- In all countries, measles and rubella-containing vaccines (MMR or MR) should be used for routine infant vaccination. In countries with rubella/CRS control

programs, measles and rubella-containing vaccines should be used for follow-up campaigns and outbreak response activities.

- Countries should carry out periodic evaluations of the national immunization and surveillance programs using the PAHO recommended methodology.

Vaccine Availability

PAHO should assure that an adequate quantity of measles containing vaccine (MMR/MR) is readily available to deal with emergency situations, particularly at this time of increasing demands for vaccines in the world market.

1 Surveillance and Outbreak Investigation

- A reliable routine surveillance system and its regular validation through active search for cases should be in place, particularly in high-risk areas. Every opportunity should be taken to find cases, including during house-to-house vaccination, routine visits by health center staff, schools, and by special epidemiological reviews.
- Countries should integrate measles and rubella surveillance.
- Adequate investigation of all outbreaks should be performed. This includes the rapid investigation of all cases and contacts, identification of the source of cases including epidemiological links, risk factors, and the timely collection and analysis of specimens.
- Greater collaboration is required between laboratory and epidemiology units in all countries to assure that:
 - Serum samples are obtained at the first contact with the patient. In an outbreak, once measles has been confirmed, it is not necessary to routinely collect additional blood specimens.
 - Appropriate clinical specimens (urine or nasopharyngeal) for viral isolation should be obtained from every chain of measles transmission, and forwarded to a reference laboratory capable of performing measles virus isolation, and if necessary to determine the viral genotypes.
- Countries must ensure that all pending measles cases have a final classification within 30 days.
- All countries should provide data on a weekly basis to the region-wide measles eradication surveillance system, to monitor progress toward the achievement of measles eradication.

Criteria for Interruption of Indigenous Measles Transmission

- The principal method for assuring that indigenous transmission of measles has been interrupted is to demonstrate that the virus no longer circulates within a country that has a sensitive surveillance system and a documented high immunization coverage. Virologic surveillance with genotype determination should be in place. Also, if measles is introduced transmission should be limited by rapid and appropriate control activities.

2002 Recommendations

Recognizing the important advances made in the Americas towards the interruption of endemic measles transmission, and based on the lessons learned from recent outbreaks, TAG reaffirms its recommendations issued during the 2000 meeting.

- Vaccine program managers should identify areas at high-risk for outbreaks, such as those of extreme poverty, underserved, as well as densely-populated areas in the outskirts of large cities with high rural to urban migration, as well as border areas with high movement of people. Administrative vaccination coverage in these areas should be assessed using PAHO's standardized supervisory tools. Vaccination interventions should be implemented in areas with low coverage. In order to improve overall immunization coverage, countries should identify municipalities falling below the national average coverage and implement strategies to improve coverage in those areas. Efforts should include reducing missed opportunities, supplemental (mop-up) vaccination and other outreach efforts. Progress should be evaluated through regular supervision and validation of coverage levels through rapid house-to-house monitoring. Model demonstration projects should be undertaken to develop valid and operationally feasible methods to identify these high risk populations, and to develop effective means to improve coverage. The impact on center and community specific coverage levels should be assessed pre- and post- intervention. Results from these demonstration projects should be presented at the next TAG.
- Countries should especially target vaccination of health care workers who work in emergency rooms, or who see acutely ill patients, and other at-risk population groups based on a country's epidemiology. Special efforts should be made to better understand the epidemiology of measles importations, and factors that contribute to sustaining large outbreaks, including the chief settings of transmission.

2004 Recommendations

Recognizing that endemic measles virus transmission has likely been interrupted in the Americas, the TAG reaffirms the need for a continued commitment of health authorities and workers toward sustaining past achievements.

- To avoid outbreaks, coverage rates with measles-containing vaccine must be maintained at >95% in all municipalities. Improving coverage with the first dose may be accomplished through implementation of specific strategies in high-risk districts. High-quality nationwide follow-up campaigns should also be conducted every 3 to 4 years in order to maintain population immunity. Additionally, supplemental immunization activities should target low-coverage municipalities and under-served or hard-to-reach population groups.
- To harmonize practices among countries, the TAG endorses the definitions of elimination, re-establishment of endemic transmission and imported/import-related cases recommended by the Meeting of the Ad-hoc Panel of Experts in Rubella and Measles held in Washington, D.C. in March 2004, cited in the PAHO EPI Newsletter (EPI Newsletter: Meeting of Ad-Hoc Panel of Experts in Rubella and Measles. April 2004, Vol. XXVI (2), <<http://www.paho.org/English/AD/FCH/IM/sne2602.pdf>>). (Annex 1).
- To guarantee transparency and foster mutual trust, the TAG encourages countries to share with PAHO's Immunization Unit information on all aspects of their immunization programs. Such information includes, but is not limited to, case-based surveillance, laboratory data, and vaccine coverage data.
- Three surveillance indicators are particularly critical: proportion of suspected measles cases with an adequate investigation, proportion of suspected cases with an adequate blood sample, and proportion of transmission chains with representative samples for viral isolation.
- An indicator for rate of febrile eruptive illnesses investigated should be established, based on the experience in the countries.
- PAHO should review logistical and other issues which are barriers to submitting samples in a timely fashion.
- The TAG recognizes the work of the Secretariat in updating the Measles Field Guide, as well as field guides for polio, rubella and other vaccine-preventable diseases, in 2004. The TAG encourages the use of these guides in training and updating the skills of health personnel.
- An ad-hoc group should be established to review past experience and to identify best practices in measles surveillance and vaccination.

2006 Recommendations

TAG recognizes the important efforts that countries have made towards maintaining measles eliminated in the Americas. In order to ensure its long-term sustainability in the absence of a global measles eradication goal, the following recommendations are made:

- Countries should identify municipalities with less than 95% coverage for measles-containing vaccine and devise strategies to reach and maintain coverage in the 95%– 100% range in every municipality.
- High-quality nationwide *follow-up* campaigns (achieving coverage >95% in every municipality) should be conducted every 3 to 4 years (earlier if a susceptible accumulation above 80% of a typical birth cohort has accumulated), irrespective of whether a second MMR dose is included in the national routine immunization schedule. Only where coverage >95% with each of the two MMR doses is guaranteed for all municipalities can the *follow-up* campaigns considered to be waived.
- The Vaccination Week in the Americas, targeting low-coverage municipalities and underserved or hard-to-reach population groups, present an excellent opportunity to reach unvaccinated children.
- Vaccination of at-risk professional groups, such as workers in the health care, transportation, and tourism sectors, is recommended and should be verified regularly through an established formal process.
- Any resident of the Americas traveling to areas with reported measles (or rubella) cases should be immune to measles (and rubella) before departure. Requesting proof of vaccination from incoming travelers is not advised.
- Integrated surveillance for measles/rubella should include private institutions, including those attended by tourists, to increase sensitivity and timely detection of imported cases.
- All indicators of measles/rubella surveillance need to be met and constantly monitored to ensure compliance when necessary and guarantee the quality and sensitivity of surveillance. In order to protect the Region against the consequences of importation, it is imperative that countries ensure measles coverage >95% in all municipalities and very sensitive and high quality surveillance data.
- The final report and recommendations of the Measles/Rubella Laboratory Network Meeting are endorsed by TAG. [During the measles session of the meeting, Uruguay presented data on an ongoing extensive mumps outbreak.

Given that data on this outbreak revealed new age groups at risk for mumps infections, TAG recommends PAHO conduct a regional assessment of the epidemiology of mumps in the Americas to be presented at the next TAG.]

Measles/Rubella Laboratory Network

TAG endorses all the recommendations of the pre-TAG meeting of the Measles/Rubella Laboratory Network that took place in Guatemala on the 23 July and highlights the following:

- Laboratory testing is an integral component of measles, rubella, and CRS surveillance and countries are strongly encouraged to incorporate laboratory costs into their surveillance budgets.
- Laboratories should establish a close working relationship with epidemiologic staff to make sure that adequate specimens are collected for serology and virus isolation, and data are recorded and reported in a timely and accurate manner. Laboratory personnel should participate in national committees to discuss final classification of measles/rubella cases.
- A virus genotype should be determined for all chains of transmission of measles and rubella and rigorous efforts should be undertaken to collect specimen accordingly.
- PAHO should continue to advocate with national governments and partner agencies for continued support to the measles/rubella laboratory network as a first line of defense against importations of measles from other regions and to support the elimination of rubella from the Americas.

2009 Recommendations

TAG congratulates Member States and their health workers for the tremendous efforts made toward achieving and maintaining measles, rubella, and CRS elimination and for the rapid response to importations to the Americas. TAG also urges other regions to eliminate measles and rubella as a step towards eradication. In addition to the following recommendations, TAG encourages countries to continue to adhere to previous TAG recommendations regarding measles, rubella, and CRS surveillance, vaccination strategies, and laboratory issues.

Immunization Strategies

- Countries should routinely maintain high, homogenous coverage (>95%) by municipality through the administration of the 1st routine dose, monitor the accumulation of susceptibles, and continue the implementation of high quality nationwide *follow-up* campaigns to ensure the vaccination of the entire cohort as a second opportunity to give the first dose to those children that were missed by the routine program.
- In accordance with previous TAG recommendations, any resident of the Americas traveling to areas with reported measles or rubella cases should be immune to measles and rubella and provide proof of vaccination before departure.
- Only where coverage >95% with each of the two routine MMR doses is guaranteed for all municipalities can the *follow-up* campaigns be waived and, before introduction of routine MMR2, countries should determine a suitable age for administration of this dose, define an accurate denominator, implement a nominal registry, monitor coverage, and track defaulters.

Surveillance

- Countries should achieve an adequate level of preparedness by developing national plans for preparation and rapid response to an importation and potential outbreaks.
- Countries should actively involve the private sector in measles, rubella, and CRS surveillance to support the rapid detection of importations and response to outbreaks and to strengthen immunization activities.
- Countries should guarantee the full integration of measles and rubella surveillance systems and ensure the completion and continuous monitoring of the recommended standardized measles/rubella surveillance indicators to attain high-quality surveillance, emphasizing high risk and "silent" areas.
- Countries that have reported the last rubella and CRS cases should implement

activities, such as active case searches and monitoring of virus excretion of identified CRS cases, in order to document and verify the interruption of endemic virus transmission.

- TAG reiterates the previous recommendation to increase sensitivity and quality of the CRS surveillance system by strengthening sentinel site reporting.

Laboratory

Documentation that elimination of measles and rubella has been achieved requires that each national laboratory produces the highest quality surveillance data possible. The final report and recommendations of the Measles/Rubella Laboratory Network Meeting are endorsed by TAG.

- Laboratories must be fully certified according to the current WHO and PAHO LabNet standards.
- Countries should establish priorities for obtaining viral samples with emphasis on, for example, border areas, industrial areas, areas with frequent foreign travel, and contacts with a high likelihood of exposure.
- Laboratory and epidemiologic teams from each country should use the specific PAHO laboratory testing guidelines for classification of sporadic measles and rubella cases according to their needs.
- Measles, rubella, and CRS cases should be classified only after the laboratory and epidemiologic teams have reviewed all laboratory results and epidemiologic data.
- Laboratories should attempt to establish a genetic baseline of rubella and measles viruses through characterization of endemic cases or archival samples (serum, oral fluid, nasopharyngeal swab, and tissue), starting with the year 2000.
- Laboratories/countries should establish the means to support CRS case confirmation and monitoring of virus shedding by CRS cases.

Regional Plan of Action for Documenting and Verifying Elimination

TAG endorses the regional plan of action for the documentation and verification of measles, rubella, and CRS elimination in the Region of the Americas. The plan of action provides an opportunity to place immunization programs as a high-ranking priority on the political agenda of countries and strengthen vaccination activities and surveillance systems.

- In accordance with PAHO Resolution CSP27.R2, countries should establish a national commission and develop a plan of action for the documentation and verification of measles, rubella, and CRS elimination, which includes a realistic timetable for goal completion.
- Countries should complete the analysis and evaluation of the following key

components of the documentation process as described in the regional plan of action:

- Analysis of coverage with the measles-rubella vaccine in population cohorts aged
 - <40 years.
 - Epidemiology of measles, rubella, and CRS and the impact of vaccination strategies.
 - Quality and efficiency of integrated measles, rubella, and CRS surveillance.
 - Analysis of virologic epidemiology and verification of the absence of endemic measles and rubella virus strains (through viral detection) in all countries of the Americas.
 - Sustainability of national immunization programs to maintain measles and rubella elimination.
- Countries should prepare and implement a national plan of action for the verification of measles, rubella, and CRS elimination, with technical cooperation from PAHO and the international Expert Committee.

2011 Recommendations

- TAG encourages countries to continue to adhere to previous TAG recommendations to maintain measles, rubella, and CRS elimination and for the rapid response to importations to the Americas. These recommendations include reaching coverage $\geq 95\%$ of first and second (routine or in campaign) measles-rubella vaccine doses in all municipalities, strong integrated measles-rubella surveillance, and enhanced CRS sentinel site reporting.
- Countries should continue to ensure that resources are available to support surveillance and laboratory activities.
- TAG urges countries reporting measles cases and outbreaks to conduct detailed epidemiological and virological analysis to fully characterize the cases and outbreaks.
- TAG calls upon the other Regions of the world and the WHO to implement strong measures for the control of current measles outbreaks and to further advance their control and elimination initiatives. TAG also supports country requests to include the topic of a global measles and rubella eradication goal in the discussion at the next World Health Assembly.
- National commissions, in collaboration with ministries of health, should continue to implement a national plan of action for the documentation of measles, rubella, and CRS elimination, with technical cooperation from PAHO and the IEC.
- Countries should complete the analysis and evaluations of key components included in the regional plan of action and submit their final country report to the IEC by December 2011.
- The TAG endorses all of the recommendations that resulted from the annual Meeting of Measles and Rubella Laboratory Network (Annex 1).

Annex 1 (Draft recommendations)

Documentation of elimination of measles, rubella, and CRS in the Region of the Americas

- Laboratories should collect and evaluate laboratory data required for documentation and maintenance of national elimination goals for measles, rubella, and CRS.
 - In the next 6-10 months, national laboratories should seek advice from RRLs and GSLs on case classification when necessary and, after discussions with these laboratories, submit appropriate specimens to RRLs or other

network laboratories for additional testing. This should include confirmation of positive IgM results when necessary, and additional testing, such as RT-PCR, avidity, which may not be available in the national laboratory. Laboratories should use the PAHO Laboratory Guidelines and the checklist for sporadic cases (Appendix the Lab Guidelines) for guidance on determining the need for additional testing.

- A plan of action for testing should be developed which will be used to test samples for sporadic cases and outbreaks and monitor the maintenance of elimination. RRLs and the regional laboratory coordinator will develop a plan of action. It is anticipated that this plan will include establishing molecular diagnostics in most national laboratories and performing specialized testing in specific network laboratories through a defined referral system.
- Develop strategies to strengthen communication between the measles and rubella laboratory and public health epidemiology units. Laboratories should take appropriate steps to develop organizational arrangements necessary for the documentation and maintenance of national elimination goals for measles, rubella, and CRS. These include coordinated case classification using all available epidemiologic and laboratory data through direct discussions between epidemiology and laboratory teams regarding all available data. Laboratory and epidemiological staff should meet at least once a month to reconcile data, identify data omissions and decide on any further specimen collection and testing required for the classification of cases.
- In order to verify measles, rubella and CRS elimination every lab in the network should monitor all the indicators referring to the lab as described in the components of the Plan of Action for the documentation and verification of the elimination.

Laboratory Management

- PAHO headquarters should work with RRLs and GSL to manage the laboratory network in the Americas. PAHO will continue to manage kit distribution and other essential organizational activities, and facilitate and support essential technical activities in RRLs and GSL such as accreditation of laboratories and development and evaluation of testing protocols.
- Because of the demand for laboratory support for regional documentation and verification of measles, rubella and CRS, and because of the compressed timeline that network laboratories will require to receive the additional training and support needed to establish new testing procedures and strategies, PAHO

should support a laboratory coordinator dedicated to measles, rubella and CRS for at least a period of 2 years.

- PAHO, the GSL and RRLs should work to improve communications between the network laboratories and develop methods to rapidly disseminate information regarding new methods, recent outbreaks, and changes in testing procedures. PAHO should consider developing a newsletter that can be distributed to the laboratories. In addition, periodic web based meetings should be held with laboratory staff, epidemiologists, RRLs, CDC, and PAHO to discuss case classification. Ad hoc meetings should also be considered for consultation on complex case classifications.
- A meeting of the regional and sub-regional reference laboratories should take place in 2011.

Challenges for the diagnosis of measles, rubella, and CRS in low incidence settings

- Laboratories should be aware of important information on case classification other than the results of laboratory testing, including timing of the use of various diagnostic tests and the effectiveness of diagnostic tests in specific situations (e.g. PPV of 1 and multiple defect suspected CRS cases). Laboratories should bring this type of information to discussions with epidemiologic teams concerning case classification.
- Laboratories should achieve and maintain the level of technical expertise necessary to maintain laboratory surveillance capacity to monitor measles, rubella, and CRS elimination. This expertise should include molecular testing. To facilitate this, PAHO will support a regional laboratory training workshop at FIOCRUZ in August 2011 and another workshop at a location to be determined in the first quarter of 2012.
- National laboratories with sufficient capacity are encouraged to use molecular tests, especially real time RT-PCR for measles and rubella to aid in case confirmation.
- The validated avidity test for measles IgG that is performed at the CDC is not available in commercial format. Laboratories should send samples requiring measles avidity testing to CDC after consultation with PAHO and CDC. To facilitate this process, laboratories should use the checklist developed by CDC to help determine the need for avidity testing. The CDC avidity test will be transferred to other RRLs if there is an increased demand for testing or to improve turnaround time.
- The avidity test for rubella IgG is commercially available, and PAHO, the RRLs and GSLs should conduct a workshop or meeting to standardize the methods

and the interpretations of results and to develop a specimen referral protocol as well as a quality control program for the laboratories that are performing avidity testing.

- Recognizing that laboratory confirmation of CRS cases requires an understanding of the timing of various diagnostic tests relative to the appearance of markers of disease; laboratories should become familiar with this timing and with managing receipt of specimens from sources outside the rash and fever surveillance network such as neonatologists and pediatricians. Laboratories need to report findings to the epidemiologic teams in the country.

Molecular epidemiology

- Laboratories should encourage collection of samples for virus detection in an attempt to obtain genetic information from at least 80% of confirmed outbreaks of measles and rubella.
- Timely reporting of genotype information and sequence data are essential for rapid confirmation of viral importation. NLs that are performing sequencing should report measles sequences to and rubella genotype information to the WHO database. RRLs performing sequence analysis for NLs should submit the sequence information to MeaNS and the WHO database after obtaining permission from the NL. It is important that all relevant epidemiological data be included with the sequence information so that the submitting laboratory can submit complete reports. Laboratories are reminded of the need to share sequence data within at least 2 months of sample collection and that this performance indicator is monitored in the WHO accreditation process.
- Future training workshops should include activities to increase the regional capacity for sequencing and sequence analysis in addition to molecular diagnostic techniques.
- Molecular epidemiologic data are often limited for countries in the region, especially for rubella viruses. Nevertheless, laboratories must seek to use such data to the extent possible in support of documentation of elimination of measles, rubella, and CRS as required by the Plan of Action.

Quality Control

- Laboratories should continue to perform quality control for serologic testing as required for WHO accreditation. National labs are strongly encouraged to provide a proficiency testing program for any sub national labs in their country.
- The WHO accreditation process is an important component of the quality control process and laboratory results to support documentation of elimination must be provided by an accredited laboratory. Laboratories should be accredited on

an annual basis either by paper accreditation or by a site visit. PAHO should conduct site visits to the NLs and RRLs on a rotating basis so that all laboratories are visited once every 3 years. A priority list of laboratories to be reviewed should be developed in consultation with PAHO, RRLs and GSLs. PAHO will conduct site visits in 4 countries by the end of 2011.

- Sub-national laboratory (SNL) proficiency testing is a critical measure of the quality of the laboratory surveillance program in countries which have SNLs, but identifying sufficient volumes of IgM positive samples has been a challenge in many countries. Efforts should be made globally to collect large volumes of IgM positive measles and rubella serum for use in the SNL LabNet in the region and support RRLs in the region to produce a SNL proficiency testing panel. \
- In many countries, the SNLs perform a critical role in surveillance for measles and rubella by conducting a large volume of the primary serologic testing. However, successfully, managing a network of SNLs requires a substantial effort from the NL. To document these management activities, the WHO accreditation checklist for NLs should be modified to include a summary of the performance of each SNL and a description of the management activities performed by the NL.
- Laboratories in the PAHO network should work with the LabNet laboratories in other regions to develop a quality control program for molecular testing.
- Laboratories are strongly encouraged to use the standard PCR controls and standardized kits provided by CDC for molecular testing and confirmation of viral isolation.
- Laboratories should document any suspected problems with the performance of the Siemens kits for detection of IgM to measles and rubella. The laboratory coordinator, in consultation with the GSL and RRLs, will develop a protocol to assist laboratories with monitoring assays performance. Problems with assay performance should also be reported to WHO/HQ and CDC.

2012 Recommendations

- The TAG endorses and urges countries to implement the Emergency Plan of Action to maintain the elimination of measles, rubella and CRS in the Americas, as stated in Resolution CSP28.R14 of the Pan American Sanitary Conference 2012.

2013 Recommendations

- The TAG commends countries for their efforts in maintaining measles and rubella elimination and encourages countries to continue implementing its previous recommendations in order to maintain the elimination of measles, rubella and CRS.
- TAG endorses the IEC recommendations, made at the fourth joint meeting with representatives of the national commissions, and urges countries to implement them and to submit their final verification reports by 01 December 2013.
- With the goal of achieving the highest MMR2 coverage possible, administration of the MMR2 vaccine is recommended at 15-18 months, and can be given simultaneously with other vaccines, such as the first DPT booster.
- Countries should continue to verify vaccination status at school entry and immunize children who have not been vaccinated with MMR2.
- Countries should continue with high-quality follow-up vaccination campaigns in order to guarantee a high level of immunity, while the Region continues with the verification process and vaccination coverage >95% has been achieved with two doses of MMR or MR in the routine program.
- PAHO Governing Bodies and Member States should continue advocating for measles and rubella elimination in global forums such as the World Health Assembly considering that importations of the virus pose a challenge for maintaining elimination in the Americas.
- PAHO should support country efforts to systematize the lessons learned from the recent measles outbreaks and to share them with other countries of the Americas as well as with the rest of the world.

2014 Recommendations

- TAG recommends that the PAHO Secretariat review, with the Brazilian authorities, the epidemiological data and the outbreak response in order to identify opportunities to halt the epidemic as soon as possible.
- To this end, TAG urges Brazilian authorities to present the most updated data and outbreak response to both the TAG and IEC members.
- TAG suggests the Brazilian government consider PAHO's availability and readiness to provide any type of assistance to interrupt the measles virus transmission in the country.
- PAHO Secretariat should lead a further in-depth examination of the epidemiology of and response to recent outbreaks to better understand transmission patterns and age- distribution of cases, use of MR vs. MMR vaccines in outbreak response, the usefulness of dose 0 at 6 months of age in addition MMR1 at 12 months of age and MMR2 at 18 months of age during outbreaks.
- All countries need to maintain their capacity to respond rapidly and decisively to outbreaks. In order to anticipate the spread of an outbreak, thorough outbreak investigation is critical in order to define geographical areas and age ranges to be targeted. Outbreak responses must be aggressive and timely to halt secondary transmission.
- All countries should also review their measles/rubella surveillance performance and vaccination coverage levels to identify areas of vulnerability. Specifically and within the context of the 2014 FIFA World Cup, countries should implement additional surveillance actions (i.e., active searches) to document the absence of measles and rubella cases.
- TAG reemphasizes previous recommendations that coverage of at least 95% with 2 doses of measles-containing vaccines in all districts and in all countries is needed to maintain elimination. If 95% coverage is not reached with two doses, countries should continue to conduct periodic follow-up campaigns.
- TAG reissues its 2013 recommendation to lower the age for the second MR-containing vaccine dose to 18 months and use school entry requirements as a platform to monitor MR-containing vaccine vaccination status.

2015 Recommendations

- TAG recognizes the efforts of Brazil in the face of the ongoing outbreak of measles. Nonetheless, TAG urgently calls on the Government to take decisive measures to end the outbreak of measles in Ceara. Following the last confirmed measles case in Ceara, the government will need to document the interruption of measles virus circulation in the affected areas, in accordance with the verification criteria established by PAHO.
- TAG urges countries to fully implement the currently recommended surveillance indicators, in order to have a sensitive and timely surveillance system, which produces reliable and consistent data.
- TAG recommends vaccinating infants 6-11 months of age in outbreak situations. (This dose will be considered to be a "zero dose"). These infants should then receive the first dose of measles-rubella-mumps (MMR) containing vaccine when they reach 1 year of age, and a second dose according to the country's national schedule, preferably at 18 months of age.
- TAG strongly recommends that WHO-Geneva raise progress towards the global elimination of measles as a resolution at the next World Health Assembly (WHA), to strengthen the commitment of the other regions in achieving the goals of the Global Vaccine Action Plan (GVAP).

2017 Recommendations

- TAG urges Member States to prepare to implement the Plan of Action for the Sustainability of Measles and Rubella Elimination (2018-2023) following its adoption by the Pan American Sanitary Conference in September 2017.
- TAG emphasizes the importance of achieving and sustaining vaccination coverage $\geq 95\%$ with two doses of measles and rubella vaccine.
- Member States should adhere to the previously recommended schedule that includes the second dose of the measles and rubella vaccine at the age of 18 months.
- TAG urges Member States to introduce the second dose of measles-containing vaccine (MCV), if they have not already done so. The two-dose series must be complemented by periodic follow-up vaccination campaigns as needed to close the immunity gaps.
- TAG emphasizes the need to strengthen the surveillance of fever and rash for measles and rubella and integrate it with that of dengue, Zika, Chikungunya viruses, and other illnesses that use the same syndromic definition, taking into account the epidemiology of such diseases in each country.
- Member States should continue building capacity for the early detection of imported cases and subsequent rapid response.
- TAG urges Member States to conduct risk assessments and identify susceptible populations that should be targeted with vaccination interventions, such as follow-up MR vaccination campaigns when indicated. These activities should minimize or mitigate the risk of importation and subsequent reestablishment of measles and rubella in the Region.

2018 Recommendations

Update on the Epidemiological Measles Situation and Implications for Measles Elimination in the Americas (March)

- TAG urges countries reporting measles outbreaks to obtain high-level political commitment to ensure the mobilization of the financial and technical resources needed for an adequate response to prevent the reestablishment of endemic disease. This recommendation is particularly important for Venezuela because one year of endemic transmission is rapidly approaching. In addition, neighboring countries are already being affected. A high-quality, nation-wide mass vaccination campaign in Venezuela is urgently needed to stop transmission before the one-year cut-off for preventing re-emergence of endemic transmission (30 June) and to prevent exportations of measles virus to other countries.
- TAG urges countries to maintain measles immunization coverage levels $\geq 95\%$ in all states and municipalities/districts. TAG also reminds countries of the importance of periodic follow-up vaccination campaigns to close any immunity gaps identified in their populations.
- TAG urges countries/territories to rapidly respond to the importation of measles and rubella cases to prevent the reestablishment of endemic disease transmission.
- TAG reminds countries/territories of the importance of having an emergency measles-rubella vaccine stockpile to enable an adequate response to outbreaks.

Moving Forward with Monitoring the Sustainability of Measles, Rubella, and Congenital Rubella Syndrome Elimination in The Americas

- TAG reiterates its recommendation that countries should prepare and implement the Plan of Action for the Sustainability of Measles and Rubella Elimination, for the period 2018-2023 endorsed by PAHO Member States in September 2017.
- TAG also recommends the establishment of an independent TAG working group of experts to monitor the sustainability of measles, rubella and CRS elimination in the Region of the Americas.

Update on the Epidemiological Measles Situation and Implications for Measles Elimination in the Americas (July)

- TAG reiterates its previous recommendation to the Venezuelan health authorities, to act decisively to control the current epidemic and prevent further exportation of the measles virus to other countries in the Region. There is an

urgent need to achieve high and homogeneous vaccination coverage levels among populations younger than 15 years of age, as well as to intensify outbreak control measures in high-risk municipalities, those located in border areas, and among indigenous communities (e.g. Warao, Yanomami and Wayuu populations).

- TAG urges Brazil to respond decisively and efficiently to the current measles outbreak to interrupt measles virus transmission and its spread to other parts of the country and to the rest of the Region. There is a serious risk of the re-establishment of endemic transmission in Brazil within seven months if a more aggressive response is not implemented immediately.
- Given the threats to measles elimination in the Americas, TAG urges countries/territories to reinforce measles and rubella surveillance, intensify vaccination activities to achieve coverage levels greater than 95% with two doses of the measles-rubella containing vaccines among all children under five years of age and respond rapidly to imported cases. Countries must urgently implement the Plan of Action for the Sustainability of Measles and Rubella Elimination endorsed by PAHO Member States in September 2017.
- TAG reminded countries of the importance of vaccinating at-risk populations that do not have proof of vaccination, such as health personnel, airports, tourism and transportation staff, and migration services, among others.

2019 Recommendations

Monitoring and Re-verifying Measles, Rubella and Congenital Rubella Syndrome (CRS) Elimination in the Americas

- TAG expresses serious concern about ongoing measles outbreaks in the Region and urges the affected countries to take urgent action to interrupt measles transmission and stop further spread of the virus.
- TAG strongly encourages the global community to set a target and develop a program for the global eradication of measles and rubella and calls on countries of the Americas and PAHO, in partnership with other Regions, to advocate for establishing this at the next meeting of the World Health Assembly in 2020.
- TAG endorses the proposed regional framework for the monitoring and re-verification of measles and rubella elimination. The standard, sensitive measles case definition should be used in all countries of the Region. Endemic countries will have to document absence of measles virus transmission for more than one year, to meet re-verification criteria.
- TAG strongly urges Member States to achieve 95% vaccination coverage levels at all administrative levels for the two recommended doses of measles and rubella vaccines and ensure high quality surveillance and rapid response. Follow-up campaigns should be conducted based on risk assessments.

2021 Recommendations

Regional Update in Measles/Rubella Elimination in the Region of the Americas

- The TAG expresses concern that large declines in MMR coverage have led to a rapidly expanding pool of susceptible persons across the Region, which, coupled with the loosening of physical distancing measures, points to an impending measles epidemic that will likely involve several countries.
- The TAG calls on governments in the Americas to take urgent corrective actions to ensure 95% coverage with two doses of the MMR vaccine among children younger than two, to meet the standards of high-performing surveillance, and to conduct periodic follow-up and targeted campaigns for vulnerable populations and cohorts of older age groups.
- Countries are urged to ensure that the Region of the Americas once again achieves and sustains WHO's target of eliminating measles and rubella.
- Whenever possible, countries should conduct high-quality, multi-antigen follow-up campaigns that are adequately supported by human and financial resources.
- The TAG calls on WHO to establish a global target to support eliminating measles and rubella. Without such a target, it is becoming increasingly more difficult to sustain Measles and Rubella Elimination (MRE) in the Americas.
- The TAG recognizes the hard work and commitment of those countries that have already conducted campaigns to control outbreaks and follow-up campaigns.
- It is essential for Brazil to fully control the ongoing measles outbreak and prevent future resurgences.
- Both WHO and PAHO should mobilize political commitment to address the ongoing measles outbreak in Brazil. The first step should be to advocate for reactivating the Brazilian NITAG, which was disbanded in 2019. The NITAG can provide strong and independent technical recommendations to respond to the COVID-19 pandemic, end the measles outbreak, and prevent future outbreaks of VPDs.
- The TAG recommends that countries strengthen their national capacity for rapid

response to virus importations outbreak by using e-learning courses in outbreak management. It also recommends that countries conduct training in risk assessment analysis for implementing tailored interventions at the local level.

- The TAG appreciates the critical role of the Regional Commission for Monitoring and Reverification of Measles, Rubella, and Congenital Rubella Syndrome Elimination and encourages it to continue its essential function. The commission will continue to work closely with the TAG to monitor progress and the status of MRE in the Americas.
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