

**Annual Country Report
On Progress toward Measles and
Rubella Elimination in Nepal
(Reporting year 2021)
Submitted in June 2022**

NEPAL

Submitted by:

Chair of National Verification Committee

Signature: 

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Executive summary

The National Verification Committee for Measles and Rubella Elimination (NVCME)-Nepal concluded that:

- NVCME appreciated the actions taken by National Immunization Program (NIP) in 2021 to increase MR coverage and equity through routine immunization (RI) sessions to specifically address left-outs and drop-outs.
- Government of Nepal has demonstrated full commitment of measles and rubella elimination goal by continuing full budget allocation for two doses of MR vaccine (after end of GAVI support in Sep 2020), lifting policy barrier for routine childhood immunization ceiling from two years to five years of age and ensuring provision of immunization service to all eligible children through immunization act.
- In 2021, despite ongoing COVID-19 pandemic, Government of Nepal was able to achieve and maintain measles and rubella surveillance sensitivity. National Non-Measles Non-Rubella (NMNR) rate was 4.07 and all provinces NMNR rate was more than 2 per 100,000 population.
- National Public Health Laboratory (NPHL) continues to function with WHO accreditation and received Measles Rubella (MR) molecular training, conducted hands on training, and now NPHL has plan to initiate MR molecular sequencing.
- National Immunization Program (NIP) with WHO technical assistance conducted post campaign MR coverage survey in 2021. The result showed overall 84% national MR coverage with 87% in phase I and 81% in phase II. The phase II of the MR campaign was conducted in peak of COVID-19 pandemic which affected campaign implementation.
- In 2021, the number of measles outbreak decreased with small number confirmed measles cases and no measles related death. Since 2020, only one genotypes of measles virus (D8) has been detected. There was no rubella outbreak in 2021.

The National Verification Committee for Measles and Rubella Elimination- Nepal recommend that:

- NIP should implement all the recommendation made by sixth meeting of the SEA Regional verification commission for measles and rubella elimination.
- National Public Health Laboratory (NPHL) should initiate MR molecular laboratory for regular genotype and sequencing of confirmed measles cases to understand molecular epidemiology and document evidence of measles virus interruption.
- Accelerate progress towards measles rubella elimination through advocacy at provinces, developing and refining policy and operation guidelines, designing and implementing local innovative strategies.
- Advocate to municipality on MR elimination goal and their contribution on strengthening immunization and VPD surveillance.

Key definitions

- 1. Suspected case of measles or rubella** - A patient in whom a health-care worker suspects measles or rubella infection, or a patient with acute fever and maculopapular (non-vesicular) rash.
- 2. Laboratory-confirmed measles:** A suspected case of measles that has been confirmed by a proficient laboratory through detection of IgM in sera (or oral fluid) for measles in the laboratory by ELISA or virus isolation or through PCR in a WHO accredited laboratory.
- 3. Laboratory-confirmed rubella:** A suspected case of rubella that has been confirmed by a proficient laboratory through detection of IgM in sera (or oral fluid) for rubella in the laboratory by ELISA or virus isolation or through PCR in a WHO accredited laboratory.
- 4. Suspected case of Congenital Rubella syndrome (CRS):** An infant less than one 1 year of age in whom a health worker suspects CRS. A health worker should suspect CRS when an infant aged 0–11 months shows signs of heart disease and/or suspicion of hearing impairment and/or one or more of the following eye signs: white pupil (cataract), large eyeball (congenital glaucoma) or pigmentary retinopathy. A health worker should also suspect CRS when an infant's mother has a history of suspected or confirmed rubella during pregnancy, even when the infant shows no signs of CRS.
- 5. Laboratory- confirmed CRS:** An infant suspected of CRS who meets the laboratory criteria for CRS case confirmation.
- 6. Congenital rubella infection (CRI):** An infant who does not have clinical signs of CRS but has a positive rubella-specific immunoglobulin M (IgM) test, which is classified as having CRI.
- 7. Epidemiologically linked confirmed measles:** A suspected case of measles that has not been tested by a laboratory but was geographically and temporally related, with dates of rash onset occurring between 7 and 23 days apart to a laboratory-confirmed case; or in the event of a chain of transmission, to another epidemiologically confirmed measles case.
- 8. Epidemiologically linked confirmed rubella:** A suspected case of rubella that has not been tested by a laboratory but was geographically and temporally related, with dates of rash onset occurring between 12–23 days to a laboratory- confirmed case; or in the event of a chain of transmission, to another epidemiologically-confirmed rubella case.
- 9. Clinically compatible measles:** A case with fever and maculopapular (non-vesicular) rash and at least one of cough, coryza or conjunctivitis, for which no adequate laboratory specimen was tested, and which has not been linked epidemiologically to a laboratory-confirmed case of measles or another laboratory-confirmed communicable disease.
- 10. Clinically compatible rubella:** A case with fever and maculopapular (non-vesicular) rash and at least one of arthritis/arthralgia or lymphadenopathy, for which no adequate laboratory specimen was tested, and which has not been linked epidemiologically to a

laboratory confirmed case of rubella or another laboratory confirmed communicable disease.

11. Clinically compatible CRS: A case with presence of ≥ 2 clinical features from group A or ≥ 1 feature from group A and ≥ 1 feature from group B:

Group A – cataract(s), congenital glaucoma, congenital heart disease, hearing impairment, pigmentary retinopathy.

Group B – purpura, splenomegaly, microcephaly, mental retardation, meningoencephalitis, radiolucent bone disease, jaundice with onset within 24 h after birth.

12. Suspected Measles outbreak- A suspected measles outbreak is defined as five or more suspected measles cases from a ward or contiguous wards of the same rural or urban Municipality (local level) or adjoining 'local levels' as a rolling total over a period of 4 weeks.

13. Confirmed Measles outbreak: If two or more specimens collected from a suspected measles outbreak are positive for measles IgM and less than two specimens positive for rubella IgM, or measles virus is isolated/detected from any sample, the outbreak is classified as Measles outbreak

14. Confirmed Rubella outbreak: If two or more specimens collected from a suspected measles outbreak are positive for rubella IgM and less than two specimens positive for measles IgM, or rubella virus is isolated/detected from any sample the outbreak is classified as Rubella outbreak

15. Non-measles non-rubella discarded case: A suspected case (fever and maculopapular rash) that has been investigated and discarded as a non-measles and non-rubella case using: (a) laboratory testing in a proficient laboratory (IgM negative); or (b) epidemiological linkage to a laboratory-confirmed outbreak of another communicable disease that is neither measles nor rubella or (c) no laboratory specimens have been tested and the suspected case had neither cough, coryza or conjunctivitis

Section 1: The National Verification Committee (NVC)

1.1 National Verification Committee

Name of the committee:	National Verification Committee for Measles Elimination (NVCME)
Date of Formation:	20/08/2015
Date of reorganization:	N/A
Date of last meeting:	16 September 2021
Is it a standalone committee or has other verification/certification function also? Please elaborate:	NVCME is standalone committee for verification of measles elimination and rubella/CRS control. As per recent decision of MoHP, all immunization committees will report through National Immunization Advisory Committee (NIAC) – NITAG for Nepal. NIAC is mandated to perform these functions based on the National Immunization Act.

1.2 Members of the National Verification Committee (Please notify any changes)

	Name	Position/ classification/ (epidemiologist, PH expert, paediatrician etc)	Organization	Email address	Signature
1	Dr Govinda Prasad Ojha	Former Director General/Paediatrician	Department of Health Services, MoHP	ojhamu@gmail.com	
2	Dr Sarala Malla	Former Director-NPHL/Pathologist	National Public Health Laboratory (NPHL), MoHP	smalla504@gmail.com	
3	Dr Kedar Baral	Professor/ Public Health Expert	Patan Academy of Health Science	kedarbaral@pahs.edu.np	
4	Dr Ganesh Kumar Rai	President/ Paediatrician	Nepal Paediatric Society	drganeshrai@gmail.com	
5	Dr Arun Kumar Sharma	Professor/ Paediatrician	IOM, TUTH	docarunsharma@hotmail.com	

**1.3 Who provides secretariat support to NVC:
(name and address of contact person from the secretariat)**

Family Welfare Division (FWD) serves as secretariat to support NVC with technical support from WHO-Program for Immunization Preventable Disease (IPD) unit.

Mr. Sagar Dahal
Chief, Child Health and Immunization Service Section, FWD
Contact number (+977 9851193947)
Email address: dhlsagar76@gmail.com

1.4 General information on the activities of the National Verification Committee in 2021

Below, please provide a summary of the NVC activities in the year under review and current year to-date, including key issues addressed from the meetings and list any concerns that have arisen, including concerns from the NVC about the national programme, challenges in organizing and/or holding regular NVC meetings.

	Date	Activity/meeting topic	Agenda and Highlights/Challenges
1	9-11 Aug 2021	12 th SEAR-ITAG virtual meeting 9-11 Aug 2021	The objective of the meeting was to focus on the impact of the pandemic and measure taken to revive the performance of immunization and VPD surveillance following the pandemic, as well as on the deployment of COVID-19 vaccines in the region. <u>Country specific note:</u> ITAG appreciated the actions taken to increase coverage and equity through RI sessions to address left-outs and drop-outs, successful completion of MR SIA, introduction of rotavirus vaccine, application for typhoid conjugate vaccine introduction, reaching elderly population and improving cold chain space.
2	16 Sep 2021	Meeting of NVCME	The Agenda of the meeting were: <ul style="list-style-type: none"> • To conduct joint review of Annual country report on progress towards measles elimination and Rubella/CRS control 2020. • To share impact of COVID-19 pandemic on routine immunization and measles rubella surveillance • To share update on measles rubella laboratory surveillance activities

			<ul style="list-style-type: none"> To discuss tentative plan of NVC members for 2021/2022 <p>Highlights/Challenges:</p> <ul style="list-style-type: none"> Reviving immunization and surveillance activities to pre-pandemic level to catch-up missed children and sensitive surveillance sites to timely detect, report and investigate suspected measles and rubella cases. The formation of high-level committee for measles and rubella/CRS elimination has been delayed and may further be delayed because of Govt's competing priority with responding to the COVID-19 pandemic. <p>Key recommendations from NVCME to NIP:</p> <ul style="list-style-type: none"> Accelerate progress towards measles elimination in post COVID-19 pandemic time by reviving immunization and surveillance activities through developing and refining policy and operation guidelines and implementing innovative strategies based on local context. Identify and catch-up missed children due to COVID-19 pandemic by providing delayed vaccination schedule. Enhance measles elimination advocacy at municipality level by updating immunization micro-plan, sensitive measles surveillance and effective measles outbreak response plan. Increase access and equity to RI services through participatory community approach during implementation of routine immunization sessions' site, date, and time.
	1 Oct-30 Nov 2021	Review of progress and way forward on MR elimination activities in WHO SEA Region	<p>Recommendation from SEAR review committee:</p> <ul style="list-style-type: none"> Strengthen focus on districts with more than 10% decrease in MCV1 coverage. Support increased EPI monitoring and actions in poor performing areas. Expand the involvement of the private sector. Strengthen VPD surveillance. Develop and implement a cross-border strategy. Conduct and document formal rapid coverage assessment (RCA) after each outbreak.

			<ul style="list-style-type: none"> Expand further the MR laboratory network to meet the 2023 elimination target. Another 2–3 MR laboratories are needed at the provincial level to conduct serological tests. A laboratory is also required to be set up in the western part of the country. Strengthen laboratory capacity for molecular testing (genotyping and sequencing). Upgrade NPHL to the status of a reference laboratory for Nepal to conduct molecular testing. Devise innovative methods for timely collection and transport of specimens from hard to-reach areas to the MR laboratory network.
	12-14 Nov 2021	Monitoring Coverage Evaluation Survey- MR-SIA 2020	NVC chair and two NVC members visited selected survey sites during implementation of coverage survey evaluation, participated in meetings with local health authority, enumerators, provided inputs on various technical aspects of survey and supervised coverage evaluation survey to ensure quality of survey findings.

1.5 NVC plan including activities, timeline, and expected outcomes for next year

	Activity	Timeline	Expected outcomes
1	Advocacy at province and local government on measles elimination and rubella/CRS control	Jan- Dec 2022	<ul style="list-style-type: none"> MR coverage will increase and no major gap/difference between MR first dose and second dose coverage. Discarded Non-measles Non-rubella case of ≥ 2 per 100,000 population will be reported from all districts. Municipality will review measles case-based surveillance sites in their respective catchment areas and plan to increase and or expand VPD reporting units and measles case-based surveillance sites.

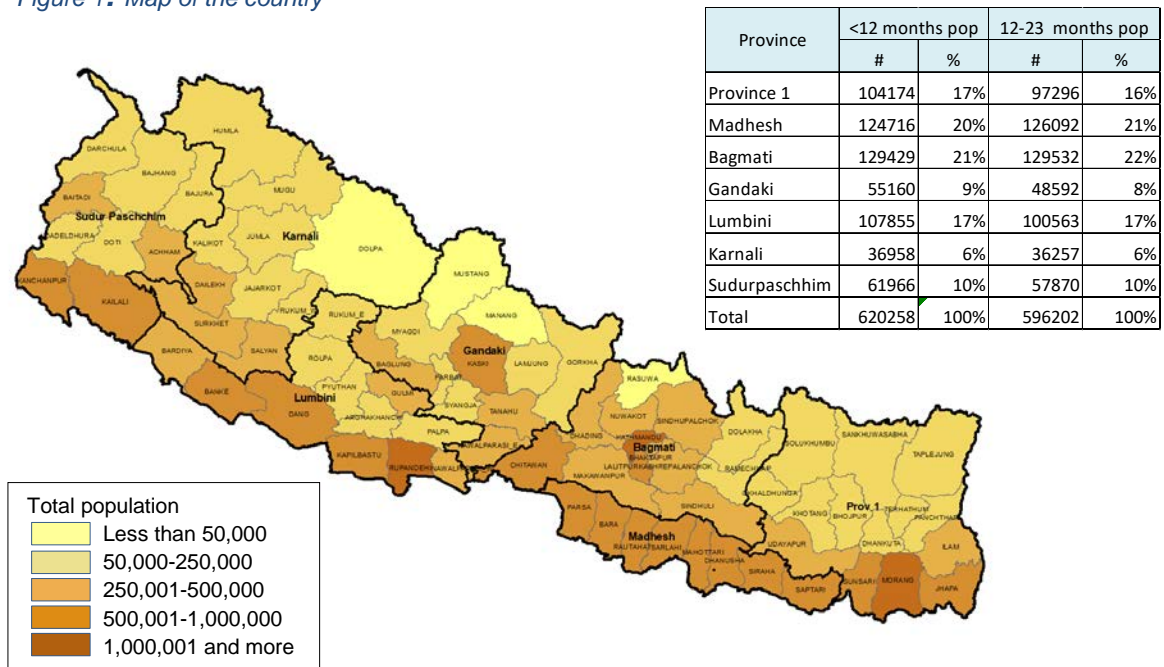
2	Participate in Typhoid Conjugate Vaccine(TCV) Campaign- Launching, briefing meeting, monitoring of session sites, RCM and debriefing meetings.	April 2022	<ul style="list-style-type: none"> • Districts/municipalities monitored will achieve >95% TCV coverage during campaign and in routine immunization. • Children 15-23 months identified as missed during TCV campaign will receive full RI immunization including both measles rubella first dose and second dose. • Monitor immunization session sites to provide corrective feedback and identify missed children with MR doses.
4	Supervision field visit of priority districts/municipalities based on programmatic measles risk assessment.	Jan- Dec 2022	Districts/municipalities will take corrective action to increase MR coverage, maintain sensitive MR surveillance and develop specific action plan to mitigate immunization and surveillance gaps.
5	Participate and advocate on measles elimination to provinces during National/Provincial VPD surveillance workshops.	June, Dec 2022	Both Federal and provincial health authorities will be abreast of National MR elimination goal and take appropriate strategic measures to address programmatic gaps and challenges.
6	Meeting with Director General of Health and other high level authorities to discuss achievement and provide independent feedback to further enhance and accelerate program performance.	June-Dec 2022	High-level health authorities will acknowledge feedback and recommendation of expert committee members to achieve national MR elimination goal.

Section 2: Country demography

2.1 Map of the country down to third administrative unit (with population size information)

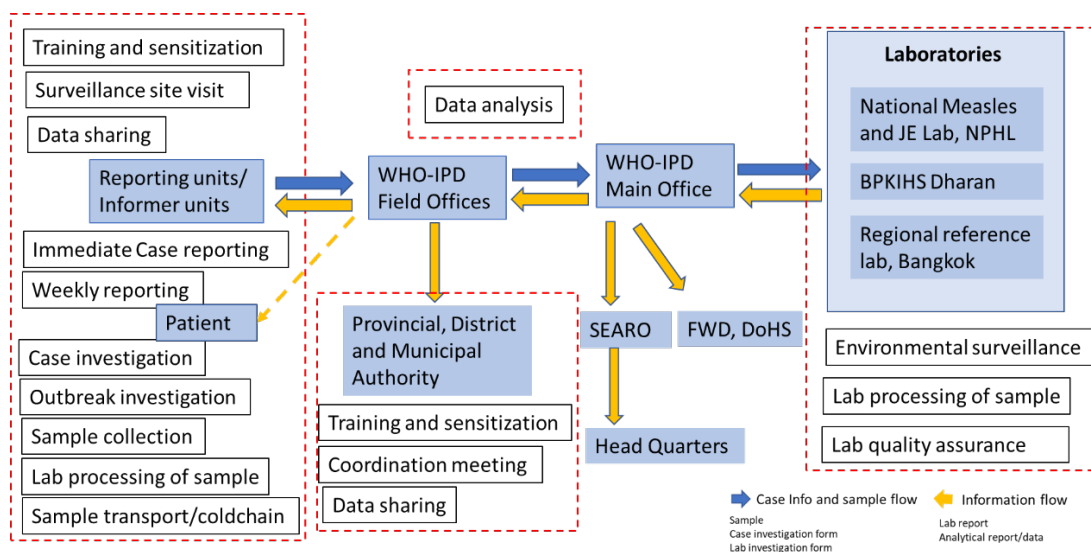
Source – HMIS, DoHS. Population estimate for FY 77/78

Figure 1: Map of the country



2.2 Description of the primary health care structure of the country (including infectious disease reporting system with focus on measles and rubella surveillance)

Figure 2: WHO-IPD Surveillance Network, Activities and Reporting Mechanism



2.3 Population demography for 2021 (Data Source: HMIS)

Total Population:	30,201,100
Under one population:	620,258
Under five populations:	3,028,588
Under fifteen populations:	8,636,335
Women of reproductive age group:	8,774,228
Identified hard-to-reach /migratory/at risk population: (Explain why they are hard-to-reach)	<p>High risk districts have population groups scattered in very small pockets in some parts of the country and varies over time.</p> <p>The actual numbers and geographic locations are assessed and acted upon at the local level by the immunization programme.</p>
Under-1 mortality (geographical variations if any)	25 (per 1000 live birth) *
Under-five mortality (geographical variations if any)	28 (per 1000 live birth) *

Source *- Multiple Indicator Cluster Survey 2019. This is the most recent data source available in Nepal.

Section 3: History of Measles and Rubella Elimination in the country

a) Vaccine Introduction

Date of Introduction of Measles and Rubella Vaccination in National Immunization Program:

MCV-1	MCV-2	RCV-1	RCV-2
1988	2015	2013	2015

b) Schedule of MCV and RCV

Mention current schedule for 2021 and history of change in schedule with years:

Vaccine	Vaccine type (M/MR/MMR)	Age of administration	Remarks
MCV-1	MR	9 months	Being implemented all over the country. Private sector is also providing MR vaccine with same schedule Few private hospitals in Major Metro cities also provide MMR.
MCV-2	MR	15 months	
RCV-1	MR	9 months	
RCV-2	MR	15 months	

c) Laboratory supported Surveillance activities

a) Year- case based surveillance started:

- a. Measles - 2007
- b. Rubella- 2007

b) Year when fever and rash surveillance started:

- a. Is measles and /or rubella part of Mandatory Notifiable Diseases to Public Health Program? If yes, since when?

Fever and rash surveillance started from 2010.

It has been proposed in public health act – yet to be endorsed by ministry of health population.

c) Number of accredited Measles Rubella laboratories in the year of reporting? With accreditation done within last 12 months.

Number of MR laboratories	Number of MR Laboratories with accreditation done within last 12 months	Numbers of MR laboratories with accreditation done more than 12 months ago
National Public Health Laboratory	March 2021	Feb 2020
BP Koirala Institute of Health Science*	March 2021	Feb 2020

Note: As physical assessment was not possible due to COVID-19 situations, internal audit was considered valid as physical assessment and lab accreditation status was maintained.

- d) Provide information on the role of private and commercial laboratories in measles and rubella laboratory testing and diagnosis

Not significant. To our knowledge, private labs in Nepal are not offering measles IgM test. Some labs might be offering rubella as part of TORCH screening.

- e) Year when CRS surveillance started: 2014

- f) Type of CRS surveillance: (Sentinel site/Community Based/ Case-based/etc)

Sentinel surveillance sites- Four (4) sites in Kathmandu-

- Kanti Children Hospital,
- Tribhuvan University Teaching Hospital
- Patan Academy of Health Sciences
- Tilganga Eye Hospital.

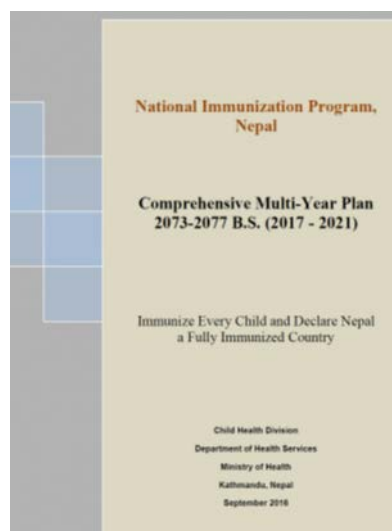
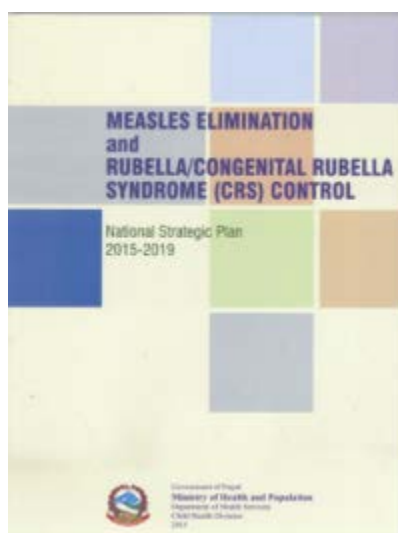
Section 4: Measles and Rubella Elimination activities in the country

a) Country Goal and target on measles and rubella elimination:

- In SEA RC-72 (2019) country committed to Measles and Rubella elimination by 2023 adopting the 'Strategic Plan for Measles and Rubella Elimination 2020-2024'.
- Country achieved Rubella and CRS control in 2018 two years ahead of regional goal- more than 95% reduction of rubella cases compared to baseline in 2008.

b) National Strategic Plan for Measles and Rubella Elimination (period covered, single or as part of cMYP/National Health Plan etc.): (please attach a copy)

National Strategic Plan 2015-2019 exists and incorporated in cMYP/National Health Plan, Nepal (2017-2021)



c) Recent key activities to interrupt measles and rubella virus transmission (with focus on mitigating the impact of COVID-19 pandemic):

- In the year 2021, MR first dose coverage-90% (WUENIC) increased compared to FY 2020- 87%. MR second dose coverage improved from 73% to 87% in fiscal year 2021 (source WUENIC). The previously wide gap between MR1 and MR2 national coverage (WUENIC) is decreased from 15 % point in 2020 to 3% point in 2021.
- Maintained sensitive measles rubella surveillance with National NMNR rate 4.07/100,000 population. In 2021, both National NMNR rate and all provincial NMNR rate was >2/100,000 population and only a district named Dolpa (mountain district with total population less than 50,000) was silent in suspected measles case reporting.
- In 2021, WHO IPD surveillance field network conducted 28 district level VPD workshops and 203 sub-district level VPD workshops in 53 districts and trained more than 5000 health staffs from both public and private institution.

- Vaccine preventable diseases (VPD) are reported to WHO IPD field offices by both government health facilities and private medical sectors. WHO IPD surveillance network get notification of suspected measles cases from weekly reporting units, informers, and case-based measles surveillance (CBMS) sites. WHO IPD surveillance network has 704 weekly zero reporting unit in 479 municipalities (64%) and 613 case- based measles surveillance sites in 387 municipalities (52%). There is scope to increase reporting units in 100% municipalities.
- Continuous monitoring of health services at health facility level and ensured routine immunization logistics reach district cold room and session sites.
- Monthly HMIS data analysis and tracking of immunization coverage with focus on number of children required to be vaccinated every month and VPD case reporting. HMIS reporting rate increased to 90%.
- Quick immunization assessment for “Age-appropriate vaccination status” of children (6 weeks to 23 months) was conducted by independent monitors in 831 communities across the country monitoring 7645 children in 2021. The three primary reasons for not receiving age-appropriate vaccination (N=1028) were service delivery, service uptake and knowledge gap. Service delivery includes one or more of the reasons: vaccination site too far, vaccinator not available, vaccines not available, syringes or other supplies not available. Service uptake includes one or more of the reasons: child not at home, child sick, fear of AEFI, parents decide to go session site later or next month and Knowledge gap include one or more of the reasons: mother does not know age for vaccination of different vaccine, mother does not know total number of contacts for complete immunization, mother does not know immunization session site etc.
- 62 out of 77 districts declared full immunization (data as of Feb 2022).
- National Immunization Program (Family Welfare Division) circulated letters to all provinces in strengthening VPD case reporting including expected number of non-measles non-rubella cases by district.
- Ensured timely supplies of MR diagnostic kits both at National Public Health Laboratory (NPHL) and sub-national lab (BPKIHS-Dharan).
- In 2021, NPHL laboratory technical staffs received MR molecular training with support from WHO SEARO and successfully completed MR practice panel test. NPHL has plan to establish MR molecular lab by end of June 2022 and initiate molecular testing by Q4,2022.

d) Update on strategies and procedures towards elimination:

Please indicate in the table below any programmatic changes related to measles, rubella, and CRS in your country in the year of reporting (with special reference to COVID-19 pandemic).

<p>On Strategies (changes or new strategies)</p>	<p>*National Immunization Program (NIP) monitored continuity of health services including scheduled RI sessions. No interruption of scheduled RI sessions during COVID-19 pandemic reporting year 2021.</p> <p>*Enhanced AEFI management: Reporting of routine AEFI case</p>
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	<p>was strengthened through cascade of COVID-19 training at subnational level. 13000 AEFI kits distributed for COVID-19 vaccination.</p> <p>*With the support of GAVI, replacement of cold chain equipment through cold chain equipment optimization platform (CCEOP) to strengthen supply chain and sustainably strengthen immunization and equity. 1200 cold chain equipment being deployed from 2019 and will be completed in 2022 in four phases in Nepal.</p> <p>*Independent monitoring- Since 2018, concurrent immunization supervision and monitoring has been conducted at community level through independent monitors, SMO network, program staffs and immunization and VPD committee members producing real-time data for corrective action. In 2021, 7645 children aged 6 weeks to 23 months were monitored for age-appropriate vaccination in 831 communities across the country.</p> <p>*Sub National risk analysis – All (4) outbreaks were reviewed on an ongoing basis for rapid outbreak response immunization. Data triangulation linking subnational level surveillance data, immunization coverage data and routine immunization monitoring data as well other information done regularly, and action undertaken (proper case management, education to local community, reviewed micro plan with underserved community, cold chain verification etc).</p>
<p>On Routine immunization schedule</p>	<p>No change in RI schedule. Emphasis on achieving, sustaining, and accelerating MR first and second dose coverage and decreasing gap between two coverage.</p>
<p>On Surveillance and reporting</p>	<p>NIP and NVC members reviewed measles case-based surveillance sites by municipality including private sectors reporting sites. VPD weekly reporting unit (n=704) are functional in 479 municipalities (64%) and case- based measles surveillance sites (n=613) functional in 387 municipalities (52%).</p> <p>Private sectors reported 24% of the total suspected measles cases (non-outbreak) during 2021.</p>
<p>Other</p>	<p>Measles/rubella surveillance depends heavily on GPEI funded WHO SMO network. The cessation of GPEI funding will affect the quality of MR surveillance unless alternate source of funding and donors identified to support the SMO network.</p> <p>To accelerate progress towards measles and rubella elimination, National Polio Transition Plan need to be endorsed and implemented to provide continued technical assistance by GPEI funded SMO network to national immunization program.</p>

e) Status and actions taken towards the recommendations made by NVC in the previous year

In 2021, due to ongoing COVID-19 pandemic, NVC chair and members could not conduct planned periodic supervision field visits of priority measles risk districts. However, NVC chair and members conducted supervision field visit of MR coverage survey in Nov 2021. NVC chair and members physically participated in NVCME meeting-16 Sep 2021 to review and finalized annual country report to RVC. The important programmatic recommendations from NVCME meetings were as follows:

- Accelerate progress towards measles rubella elimination in post-COVID-19 pandemic time through developing and refining policy/operational guidelines and implementing innovative strategies based on local context.
- Identify and catch-up missed children due to COVID-19 pandemic by providing delayed vaccination schedule.
- Enhance measles rubella elimination advocacy at municipality level by updating immunization micro-plan, sensitive measles surveillance and effective measles outbreak response plan.
- Increase access and equity to routine immunization services through participatory community approach during formation of routine immunization sessions'- site, date, and time.

The steps taken toward the recommendations made by NVC were as follows:

- National Immunization Program (NIP) ensures continuation of RI sessions and included RI strengthening strategies in all COVID-19 training sessions at all subnational levels.
- Reviewed Monthly HMIS data and tracking of immunization coverage with focus on number of children required to be vaccinated every month including VPD case reporting from district.
- NIP took an opportunity during provincial and federal annual program review to present, discuss and develop local strategies on identifying and catching-up missed children due to COVID-19 pandemic through delayed vaccination schedule.
- In 2021, NIP provided refresher VPD training to more than 5000 health staffs from 28 district level and 203 sub-district level VPD workshops. Program division also circulated letters to all provinces in strengthening VPD case reporting including number of expected non-measles non-rubella cases by districts. Therefore, National NMNR rate was 4.07 and all province NMNR rate was more than 2 per 100,000 population. Only one mountain district, Dolpa, was silent in suspected measles case reporting.

f) Status and actions taken towards the recommendations made by SEA-RVC on its 6th meeting (virtual) 27-29 Sep 2021.

As per 6th SEA-RVC meeting's note on country classification, Nepal is endemic in measles and rubella. The key observations were:

- High political commitment to RI during COVID-19 pandemic
- Removal of policy barrier to vaccinating children <5 years (previously restricted to children <2 years).
- MR SIA conducted amidst COVID-19 pandemic vaccinating 2.6 million under five children. Rubella transmission has been at low levels and interruption of transmission may have been achieved following the recent MR campaign.

Recommendation/Additional information requested by RVC:

- Evaluate coverage of the recently conducted MR SIA at sub-national level and take actions to close any gaps on coverage identified post MR-SIA.
- Program shall put effort to consider further differentiated strategies to reach high-risk population groups (such as the underserved ethnic group that constituted 95% of measles outbreak cases in 2020).
- Strengthen the country capacity on molecular detection and genotyping of measles and rubella cases specially in the border areas.
- Enhance accountability at subnational level in the context of recent decentralized health system in the new federal structure

The steps taken toward the recommendations made by RVC were as follows:

- NIP, with technical assistance from WHO IPD, conducted MR SIA coverage survey evaluation in 2021. The overall result showed 84% national MR coverage with 87% in phase I and 81% in phase II. The phase II of the MR campaign was conducted in peak of COVID-19 pandemic which affected program implementation thereby decreasing coverage.
- Program division coordinated with local health authorities and partners to identify missed children and report any suspected cases of fever and rash. Recently, NVC members, conducted visit of these underserved ethnic group during Typhoid Conjugate Vaccination (TCV) campaign to identify if any children have missed TCV campaign doses and sensitize local health authorities and municipality on importance of vaccination.
- National Public Health Laboratory (NPHL) under technical guidance from WHO SEARO received training on MR molecular test, performed various laboratory exercise on MR molecular training, received molecular equipment, establish separate MR molecular lab in NPHL lab and plan to initiate MR molecular testing by end of 2022.
- NIP has been continuously providing formal and informal technical guidance and program feedback to province and local health authorities to enhance program accountability and ownership of RI program.
- NIP has been conducting annual provincial review meeting with focus on zero dose children and strengthen surveillance performance.

Section-5 Lines of evidence for progress towards measles and rubella elimination

Evidence-1 Detailed description of the current and past epidemiology of measles, rubella, and congenital rubella syndrome (CRS)

a) Incidence and Genotype in the entire population

(Last 7 years) Data Source: Surveillance data, WHO-IPD

Measles	2015	2016	2017	2018	2019	2020	2021
# Confirmed cases	273	284	99	260	431	388	143
Incidence per 1000,000 pop	9.85	9.22	3.39	8.96	14.65	13.02	4.73
Genotypes	D4, D8	D8	-	D8	D4, D8	D8	-
Laboratory Confirmed outbreaks	5	13	1	7	8	11	4

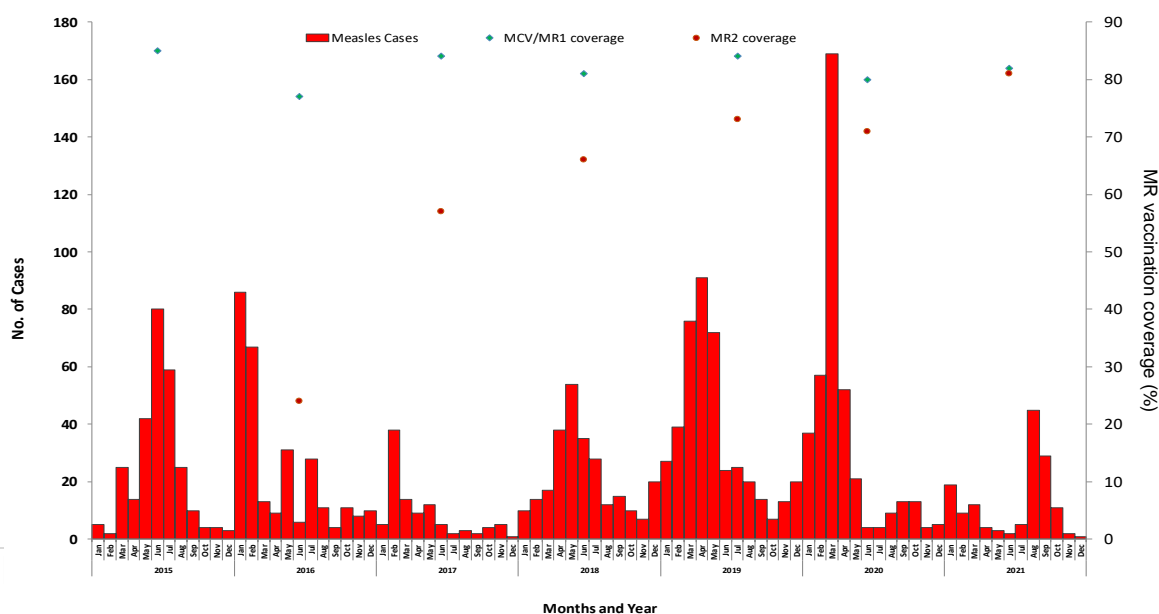
Rubella	2015	2016	2017	2018	2019	2020	2021
# Confirmed cases	9	22	22	34	44	37	44
Incidence per 1000,000	0.32	0.77	0.77	1.17	1.5	1.24	1.46
Genotypes	-	-	-	-	-	-	-
Laboratory Confirmed outbreaks	0	0	0	0	0	-	-

CRS	2015	2016	2017	2018	2019	2020	2021
Confirmed cases	0	0	0	0	1	0	0

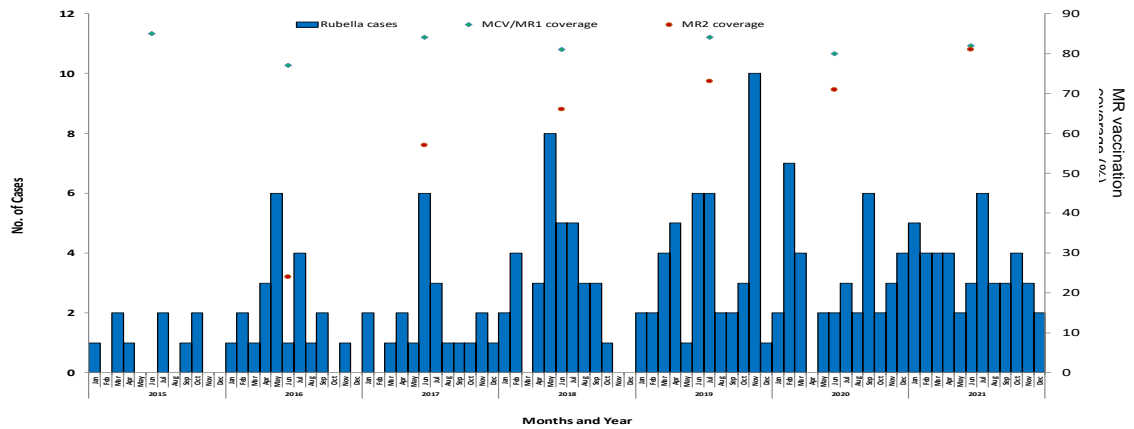
b) Epidemic curve for cases of measles, rubella and CRS for the period 2015-2021 (separate curves)

Data Source: Surveillance data, WHO-IPD, Nepal data as of Dec 2021

Measles

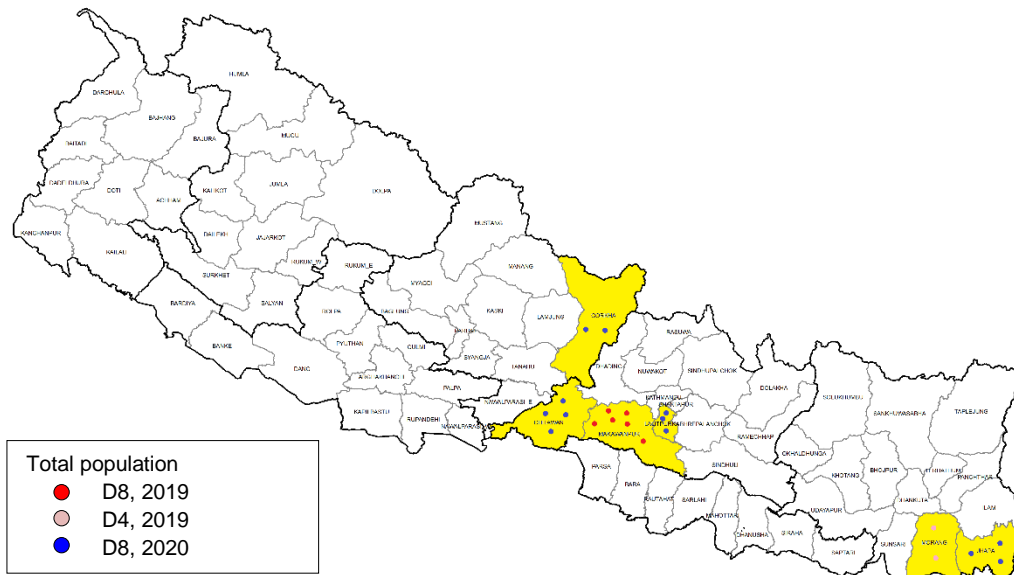


Rubella



Source: WHO IPD

C. Spot map on the genotypes of measles and rubella (2019 and 2020)



Source: WHO IPD

c) Number of suspected cases investigated for measles and rubella in 2021

(in the year of reporting)

Data Source: Surveillance data, WHO-IPD

Initial diagnosis of suspected case	Total suspected cases	Classified as Confirmed case*	Clinically compatible	Discarded
Measles and/or rubella	1417	141 Measles and 44 Rubella	2 clinically compatible measles	1230
CRS	5	0	0	5

* To include laboratory-confirmed and epidemiologically linked.

d) Number of measles, rubella and CRS cases, classification by origin of infection in 2021

Data Source: Surveillance data, WHO-IPD

Measles	Laboratory-confirmed	Epidemiologically linked	Clinically compatible	Total
Imported				
Import-related				
Endemic	81	60	2	143
Unknown				
Rubella	Laboratory-confirmed	Epidemiologically linked	Clinically compatible	Total
Imported				
Import-related				
Endemic	44	0	0	44
Unknown				

In countries that have been verified as eliminated measles or interrupted transmission, description on the reasons for discard of suspect cases.

Reason Discarded

	Vaccine associated	Other Rash fever disease	Clinical description incorrect	Others
Percent suspect cases discarded				

Discarded cases:

Please provide qualitative description of how cases were discarded.

Clinically Measles compatible cases:

Please provide description of how these cases were evaluated and outcome of evaluation.

Clinically Rubella compatible cases:

Please provide description of how these cases were evaluated and outcome of evaluation.

e) Age and vaccination status

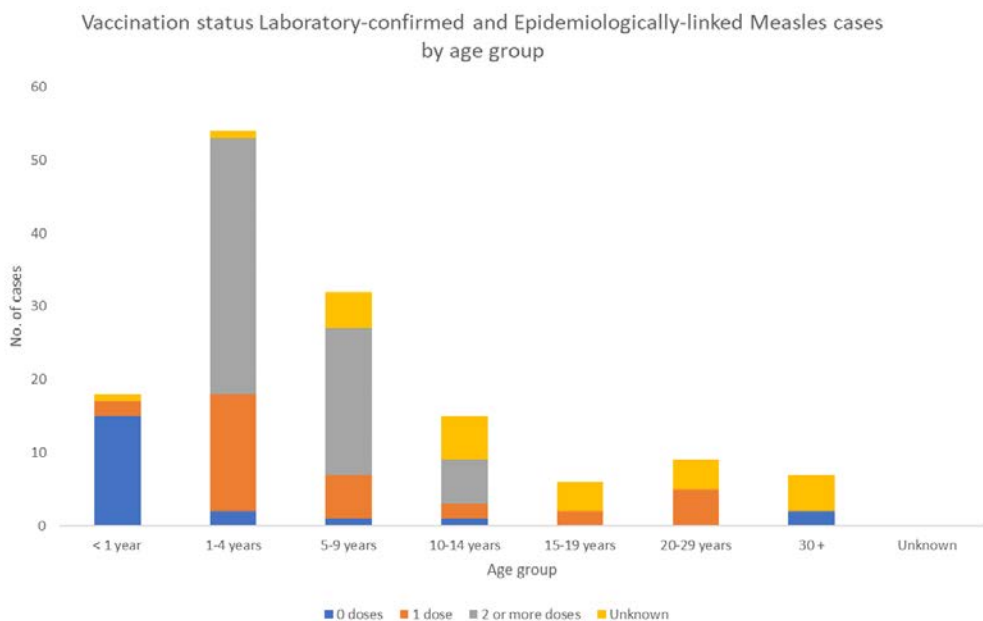
(of laboratory-confirmed and epidemiologically-linked cases of measles and rubella, excluding imported cases for the year of reporting). Year: 2021

Measles	< 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30 +	Unknown	Total
0 doses	15	2	1	1	0	0	2	0	21
1 dose	2	16	6	2	2	5	0	0	33
2 or more doses	0	35	20	6	0	0	0	0	61
Unknown	1	1	5	6	4	4	5	0	26
Total	18	54	32	15	6	9	7	0	141

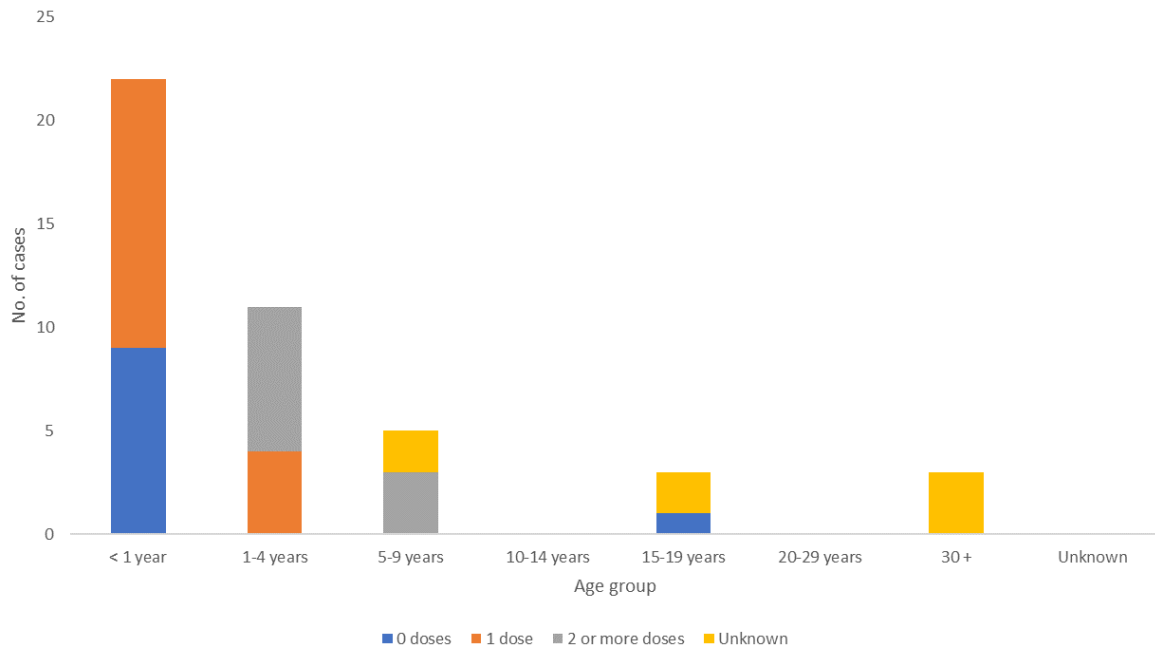
Rubella	< 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30 +	Unknown	Total
0 doses	9	0	0	0	1	0	0	0	10
1 dose	13	4	0	0	0	0	0	0	17
2 or more doses	0	7	3	0	0	0	0	0	10
Unknown	0	0	2	0	2	0	3	0	7
Total	22	11	5	0	3	0	3	0	44

Rubella (Distribution by GENDER)	< 1 year	1-4 years	5-9 years	10-14 years	15-19 years	20-29 years	30 +	Unknown	Total
Male	14	6	3	0	2	0	1	0	26
Female	8	5	2	0	1	0	2	0	18
Others									
Unknown									
Total	22	11	5	0	3	0	3	0	44

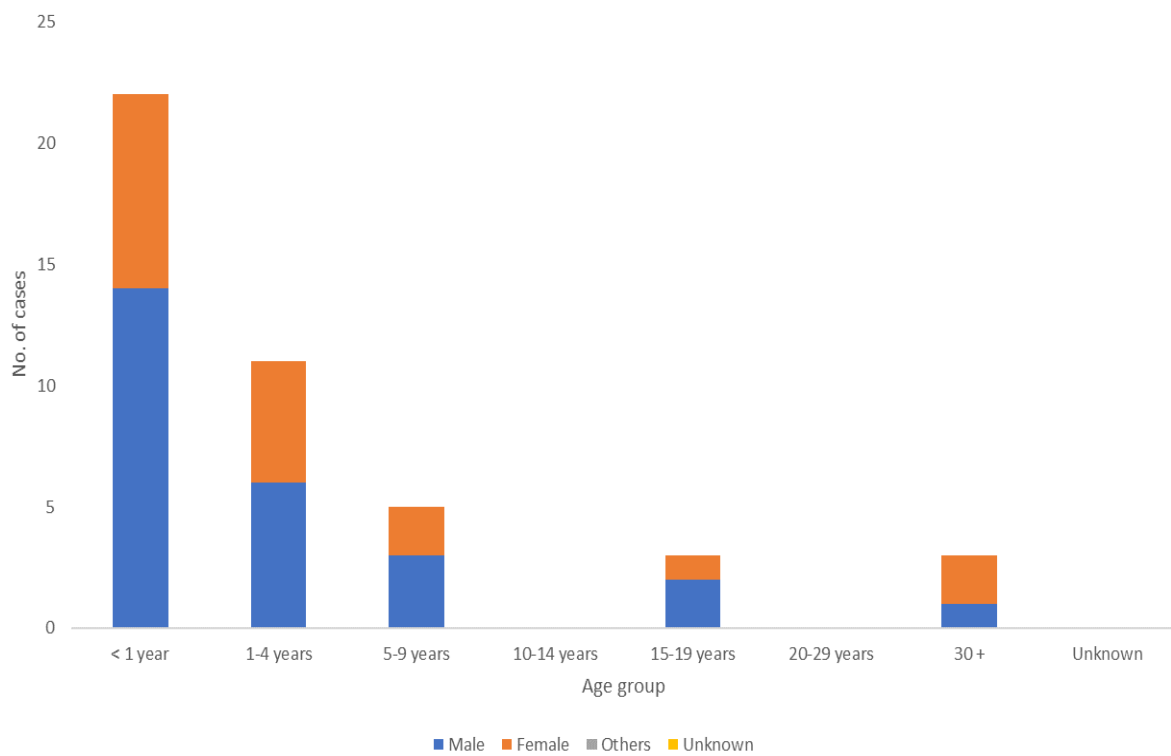
f) Prepare stack-bar graphs for the above tables



Vaccination status Laboratory-confirmed and Epidemiologically-linked Rubella cases by age group



Vaccination status Laboratory-confirmed and Epidemiologically-linked Rubella cases by Gender



g) Measles and rubella cases at sub-national level

Please complete the following tables for each territory at 2nd subnational administrative level (equivalent to a district) for the year in review (2021):

Data Source: Surveillance data, WHO-IPD

Number of all measles cases (classified as laboratory-confirmed or epidemiologically-linked), regardless of origin:

Administrative territory	Population size	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
ACHHAM	289956									1				1
ARGHAKHANCHI	202615							1						1
BAITADI	267249								1		1			2
BANKE	615728			1							1			2
BARDIYA	483674									1				1
BHAKTAPUR	374215			1	2									3
BHOJPUR	153653					1								1
CHITWAN	705474					1					2			3
DAILEKH	300261			1										1
DANG	655761			1							1			2
DHANUSHA	847800	10	1	1										12
GORKHA	244668		1			1								2
GULMI	254115	1								1				2
JAJARKOT	200510								23	6				29
JHAPA	933778	1		1										2
KAILALI	962091			1	1									2
KANCHANPUR	535075								1					1
KAPILVASTU	675964	1							2					3
KASKI	593047	1												1
LALITPUR	580399	1												1
MAHOTTARI	715083			1										1
MAKWANPUR	464613			1					1					2

MUGU	64651		1											1
NAWALPARASI_E	355460		1											1
NAWALPARASI_W	378282								1					1
PALPA	247024							1						1
PARSA	723304					1								1
PYUTHAN	243187	1		1				1						3
RAUTAHAT	854640					1				1				2
RUKUM_E	58687		1											1
RUKUM_W	171361	1												1
RUPANDEHI	1081131	1	1				1	2	5	2		1		13
SALYAN	274565						2	13	13	1				29
SARLAHI	903458		1											1
SINDHUPALCHOK	294555									1				1
SIRAHA	707934		1	1							1			3
SOLUKHUMBU	101969			1										1
SUNSARI	923607	1												1
SYANGJA	248374										1			1
TANAHU	347679		1		1									2
UDAYAPUR	358790						1		1					2
Total	19394387	19	9	12	4	3	2	5	45	29	10	2	1	141

Data Source: Surveillance data, WHO-IPD

Number of all rubella cases (classified as laboratory-confirmed or epidemiologically linked), regardless of origin for 2021:

Administrative territory (division)	Population size	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
BAITADI	267249	1												1
BARDIYA	483674							1						1
BHAKTAPUR	374215		1	1	2					1		1		6
CHITWAN	705474			1							1			2
DHANKUTA	171526				1									1
DHANUSHA	847800							1						1
ILAM	313208	1												1
JAJARKOT	200510			1					1					2
KAILALI	962091			1										1
KALIKOT	161109						1			1				2
KAPILVASTU	675964										1			1
KHOTANG	171360										1			1
MAHOTTARI	715083						1	1						2
MAKWANPUR	464613							1						1
MORANG	1102227	1				2								3
MUGU	64651		1											1
NAWALPARASI_E	355460	1												1
NAWALPARASI_W	378282	1												1
NUWAKOT	287955												2	2

PALPA	247024				1									1
PARBAT	148434											1		1
RAUTAHAT	854640							1						1
ROLPA	238565		1											1
RUPANDEHI	1081131							1	1					2
SALYAN	274565							1						1
SANKHUWASABHA	155531						1					1		2
SARLAHI	903458		1											1
SURKHET	423137								1	1				2
SYANGJA	248374										1			1
Grand Total	13277310	5	4	4	4	2	3	7	3	3	4	3	2	44

Data Source: Surveillance data, WHO-IPD

h) (Include all suspected measles rubella outbreak that happened in the year of reporting-2021.

Please note that each outbreak or chain of transmission should report only one genotype. If more than one genotype is reported for an outbreak, this refers to more than one chain of transmission and should be described as a separate outbreak in the table. Please include an additional descriptive paragraph for each outbreak – including the setting, age distribution and immunization status of cases, the identified immunity gap(s), an outbreak curve, and measures taken to eliminate this gap in similar populations to prevent future outbreaks. If maps of cases or epidemic curves are available, please include. Any other epidemiological presentation or analysis that will help illuminate the measles virus transmission is welcomed.

Measles:

Outbreak ID	Name of the affected 1st admin. level (sub-national)	Date of onset of the first case	Date of onset of the last case or “ongoing”	Total number of cases in 2021	Genotype, variant lineage (named strain)	MeaNS sample ID	Virus/first case by origin (Imported/not-imported)	Remarks
MSL-OBR-NEP-PR1-DAK-21-01	Dhankuta	22-06-2021	24-06-2021	5			NA	Discarded
MSL-OBR-NEP-PR2-DAN-21-01	Dhanusha	03-01-2021	07-0-0221	10			NA	confirmed
MSL-OBR-NEP-PR2-SAR-21-01	Sarlahi	25-02-2021	10-03-2021	5			NA	Discarded
MSL-OBR-NEP-PR4-KAS-21-01	Kaski	11-04-2021	27-04-2021	6			NA	Discarded
MSL-OBR-NEP-PR4-SYG-21-01	Syangja	22-11-2021	28-11-2021	12			NA	Discarded
MSL-OBR-NEP-PR4-TAN-21-01	Tanahu	31-05-2021	04-06-2021	11			NA	Discarded
MSL-OBR-NEP-PR5-RUP-21-01	Rupandehi	28-08-2021	25-10-2021	5			NA	confirmed
MSL-OBR-NEP-PR6-JJK-21-01	Jajarkot	01-08-2021	26-09-2021	29			NA	confirmed
MSL-OBR-NEP-PR6-SAL-21-01	Salyan	26-07-2021	21-10-2021	28			NA	confirmed

Rubella:

Outbreak ID	Name of the affected 1st admin. level (sub-national)	Date of onset of the first case	Date of onset of the last case or "ongoing"	Total number of cases in 2019	Genotype	RubenNS sample ID	Virus/first case by origin (Imported/not-imported)	Total number of pregnant women affected

Evidence-2 Molecular epidemiology should be analysed to document viral transmission patterns and the duration of circulation of viruses of specific lineages

For the genotyping and molecular evidence that supports interruption of measles and rubella virus transmission outcomes, the following should be included:

- a) genotype and number of measles and rubella virus strains identified by year and month, for all years since genotyping became available, but with a focus on the most recent five years in support of achieving measles and rubella elimination. (refer to Section 5 (a) for this information)
- b) Other information such as genotyping of cases by date of onset, and phylogenetic trees should be included, when available. (for at least last one to three years)

If case is part of an outbreak, it should be reported in section on *Outbreaks*) Please ONLY include cases here that are not part of an outbreak

Data Source: Surveillance data, WHO-IPD

Case ID/ Outbreak ID	1st admin. Level (subnational)	Date of onset of rash (in outbreak for Index case)	MeaNS or RubeNS ID	Genotype and variant lineage	Origin, if known (imported or not imported)	Tested in WHO accredited lab (Yes/No)

Evidence-3 Quality of surveillance and monitoring systems for measles, rubella and CRS

Data Source: Surveillance data, WHO-IPD

a) Standard indicators

Measles/Rubella	Target	2019	2020	2021
Proportion of surveillance units reporting measles and rubella data to the national level on time, even in the absence of cases	≥80%	89	90	88
Proportion of suspected cases with adequate investigation initiated within 48 hours of notification	≥80%	99	100	99
Reporting rate of non-measles non-rubella cases at national level	≥2/100,000	5.53	3.21	4.07
Percentage of confirmed cases for which source of transmission is classified as endemic, imported or importation-related or unknown.	≥80%	14.65	13.02	4.73
Proportion of second administrative level units reporting at least two non-measles non-rubella case per 100 000 population per 12 months	≥80%	96	93	96
proportion of suspected cases with adequate specimen collection for detecting acute measles and/or rubella infection collected and tested in a proficient laboratory (outbreak excluded)	≥80%	100	100	100
Proportion of laboratory-confirmed outbreaks with specimens adequate for detecting measles virus which is collected and tested in an accredited laboratory	≥80%	100	100	100
Proportion of specimens received at the laboratory within 5 days of collection	≥80%	60	69	78
Proportion of immunoglobulin M (IgM) results reported to national public health authorities by the laboratory within 4 days of specimen receipt	≥80%	35	61	79
Proportion of virology results reported to national public health authorities by the laboratory within 2 months of specimen receipt	≥80%	N/A	N/A	N/A

CRS	Target	2019	2020	2021
Annual rate of suspected CRS cases at the national level	≥ 1 per 10,000 live births	13	0	5
Proportion of suspected CRS cases with the key data points completed ¹	$\geq 80\%$	100	-	100
Proportion of suspected cases with adequate blood specimen tested for laboratory confirmation (IgM/ IgG, PCR) in an accredited laboratory	$\geq 80\%$	100	-	100
Proportion of confirmed cases with adequate specimen tested for virus detection	$\geq 80\%$	-	-	0
Proportion of confirmed cases with at least two negative tests for virus detection/isolation after three months of age, with at least a one-month interval between tests	$\geq 80\%$	-	-	-
Proportion of confirmed CRS cases detected within three months of birth	$\geq 80\%$	-	-	-
Proportion of specimens (serologic or virologic) received at the laboratory within 5 days of collection	$\geq 80\%$	62	-	100
Proportion of serologic results reported by the laboratory within 4 days of receiving the specimen	$\geq 80\%$	0	-	0

b) Supplementary data on describing surveillance quality:

Countries without systems in place to collect the necessary data required for the above indicators may be asked to submit additional evidence to demonstrate measles and rubella surveillance sensitivity and quality.

Countries where substantial numbers of measles or rubella cases present in the private sector may be required to submit additional evidence to demonstrate that these cases are captured by the national surveillance systems and that laboratory results are confirmed by an accredited laboratory.

¹ Includes all key data points except travel history of mother

Measles-rubella case-based surveillance is the gold standard for measles-rubella surveillance. To cross-check that system, the NVC should identify all other surveillance systems (i.e., EWAR, IDSR, others) that also report rash-fever cases.

To allow the RVC better interpretation of reported data on surveillance performance, a description of the algorithm for testing of laboratory specimens should be noted in the report. For example, in most countries, sera will be taken and tested for measles IgM first and then for rubella IgM if negative for measles IgM. However, some countries do parallel testing for measles and rubella (testing specimens for both viruses) or the testing protocol may be modified if there is an ongoing rubella outbreak.

Examples of supplementary data include the median time to case notification, the number of generations before notification to public health, findings from active and retrospective case searches, review of dedicated surveillance sentinel sites and the results of detailed outbreak field investigations. Active searches should be considered in high-risk communities, areas with high arboviral disease activity, silent areas, areas in which the surveillance indicators are not measured and areas with low vaccination coverage. If few cases are identified in this manner, then the claim that surveillance is performing well is supported. For countries with a significant private health care sector, additional evidence should be submitted to demonstrate that cases identified in the private sector are included in national surveillance data. Findings from any recent evaluation of surveillance should be provided, with assessments of the quality of the laboratories that conduct testing.

If supplementary data or methods were used to evaluate surveillance performance, please describe below:

Measles and Rubella

- Active case searches are regularly conducted in silent and low performing districts.
 - Active case searches are also conducted in high-risk areas as indicated by recent outbreak, low RI coverage, high dropout and left out children etc.
 - At present, there are 613 case-based measles surveillance sites in country covering 52% municipalities (387). WHO IPD network are exploring potential health facilities (government/private) to incorporate in weekly reporting site.
 - Suspected measles samples are tested for measles IgM first and then for rubella IgM, if negative for measles IgM.
 - National Immunization Programme is providing periodic feedback to subnational level for strengthening surveillance and case reporting.
 - WHO IPD network is conducting periodic VPD surveillance training to existing reporting sites and expanding new sites through VPD training. SMO conduct periodic review of reporting units and classify reporting unit as high priority, medium priority, and low priority sites.
-

c) Laboratory testing and molecular epidemiology of measles and rubella viruses in 2021

(Data Source....)

Test	Number of cases tested	Positive	Negative	Pending-Inconclusive
Measles IgM	1398	81	1300	17
Measles RT-PCR				
Measles virus isolation				
Measles genotyping available				
Rubella IgM	1317	44	1263	10
Rubella RT-PCR				
Rubella virus isolation				
Rubella genotyping available				

Evidence-4 High population immunity presented as a birth cohort analysis, including evidence on adults and underserved, migrant and refugee groups

a. Routine Immunization Coverage

(Data Source- WUENIC, HMIS)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
MRCV1 (WUENIC)	86	88	86	86	88	85	83	90	91	92	87	90
MRCV2 (WUENIC)	NA	NA	NA	NA	NA	NA	25	59	69	76	73	87
Survey (MCV1)	88	94	93	NA	94	90	NA	NA	NA	NA	NA	99.3*
Survey (MCV2)	NA	NA	NA	NA	NA	NA	NA	NA	51	NA	NA	96*
% districts w/ >95% coverage of MRCV1 ² (HMIS)	17	25	22	25	22	8	4	12	12	14	10	21
% districts w/ >95% coverage of MRCV2 ² (HMIS)								1	1	4	2	10

Note *- MR 1st dose and MR 2nd dose coverage was assessed among 12-59 months old and 18- 59 months old vaccination card holder children respectively during post campaign coverage survey 2021.

Qualitative assessment of RI coverage and Any DQA or efforts to ensure data quality in last 2-3 years? Comment on the quality of survey or estimation or porting of the coverage

In 2021, WHO hired Independent monitors conducted quick community assessment for age-appropriate vaccination status of children aged 6 weeks to 23 months. Total 7645 children were monitored in 831 risk communities. 87% of the monitored children received age-appropriate vaccination. The primary reasons for not receiving age-appropriate vaccination in 13% (N-1028) were service delivery, service uptake and knowledge gap. Service delivery includes one or more of the reasons: vaccination site too far, vaccinator not available,

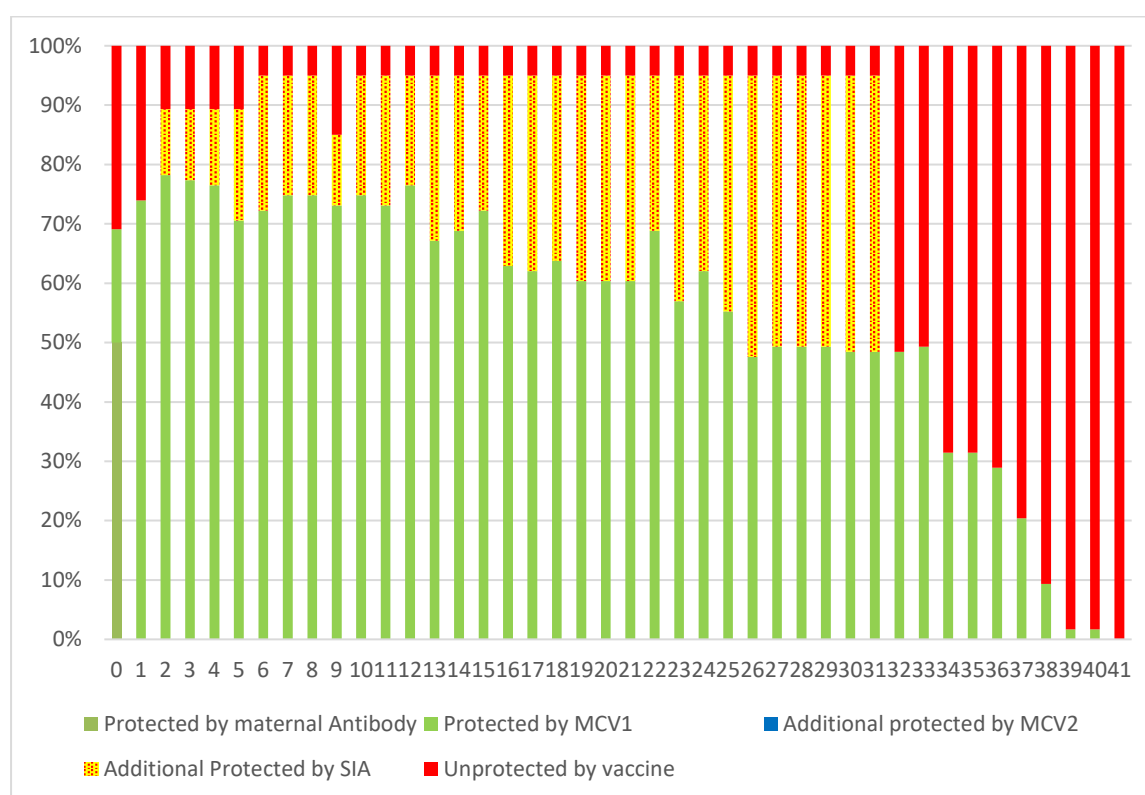
² Service Statistics/Administrative data

vaccines not available, syringes or other supplies not available. Service uptake includes one or more of the reasons: child not at home, child sick, fear of AEFI, parents decide to go session site later or next month and Knowledge gap include one or more of the reasons: mother does not know age for vaccination of different vaccine, mother does not know total number of contacts for complete immunization, mother does not know immunization session site etc.

Routine data quality assessment was conducted in five districts (Pyuthan, Dhading, Morang, Dhanusa and Tanahu), selected based on reported administrative coverage. The qualitative assessment showed inadequate use of data for action/decision making and gap in Monitoring and Evaluation structure for data review process.

b. Immunity profile by birth cohort

Immunity Profile against Measles through vaccination-2021



The above graph is based on SEARO latest template for deriving immunity profile with following assumption:

1. Vaccination Coverage for the year represents the coverage for the birth cohort of the year
2. The same child is reached by both MCV1 and MCV2
3. MCV1 given at 9 months as 85% effectiveness and MCV2 given at 15-24 months have 95% effectiveness
4. If protection by MCV1 is more than by MCV2, the protection by MCV1 is considered as final proportion of birth cohort protected
5. If protection with MCV2 is more than MCV1, additional protection by MCV2 is calculated by subtracting MCV2 protected – MCV1 protected
6. If SIA is conducted, the additional protection from SIA is calculated in similar manner as in case of MCV2.

The NIP looks at vaccination status of NMNR cases to understand immunity gaps in the community by taking the NMNR cases as a proxy for a larger community sample. The NIP regularly triangulates data from – VPD surveillance, measles routine coverage (HMIS), routine immunization monitoring. NIP also assess districts by programmatic measles risk assessment. These findings are fed back to provinces. The surveillance and immunization gaps are also fed back to community and health facilities through health coordinator for prompt corrective action. The local health authority is pushing up coverage of measles rubella second dose through innovative strategies of full immunization declaration program. Hence, MR2 coverage has improved from 73% (2020) to 87% (2021) (WUENIC).

c. Additional evidence on immunity profile

Are additional data available for determining immunization coverage or population immunity in the year of review? (e.g., results from rapid coverage monitoring, coverage surveys or seroprevalence studies, when applicable) should be included in the report. For published studies or final written reports, references may be appended to this report.

No additional data available for determining immunity profile.

	Serological (S) or coverage (C) studies/surveys	Targeted territory or subpopulation	Results
1			
2			
3			

d. Converge at sub-national level (2nd administrative level or equivalent to district) in 2021

SN	District	Population under 1	Population 12-23 months	Coverage 1 st Dose (%)	Coverage 2 nd Dose (%)
1	ACHHAM	6049	5692	89	95
2	ARGHAKHANCHI	4647	3836	72	88
3	BAGLUNG	6417	5423	69	83
4	BAITADI	5679	5213	88	93
5	BAJHANG	4609	4418	85	81
6	BAJURA	3152	3124	92	84
7	BANKE	12375	12244	92	92
8	BARA	16069	16956	97	81
9	BARDIYA	10169	9469	80	87
10	BHAKTAPUR	7190	7557	83	73
11	BHOJPUR	3201	3017	77	81
12	CHITAWAN	14633	13878	72	74
13	DADELHURA	3380	3117	83	88

14	DAILEKH	6020	5976	93	85
15	DANG	14003	12767	89	94
16	DARCHULA	3010	2857	75	79
17	DHADING	7583	6916	74	78
18	DHANKUTA	3696	3328	70	77
19	DHANUSA	16977	16879	105	92
20	DOLAKHA	4041	3623	67	74
21	DOLPA	834	860	85	79
22	DOTI	4860	4056	95	108
23	GORKHA	5447	4688	77	89
24	GULMI	5797	4824	76	94
25	HUMLA	1147	1195	114	94
26	ILAM	6441	6179	62	62
27	JAJARKOT	3945	4016	104	91
28	JHAPA	19884	18197	80	88
29	JUMLA	2463	2537	89	82
30	KAILALI	19776	18985	77	77
31	KALIKOT	3101	3249	108	92
32	KANCHANPUR	11451	10408	80	86
33	KAPILBASTU	13476	13478	103	103
34	KASKI	12184	11716	70	71
35	KATHMANDU	43066	46140	59	51
36	KAVREPALANCHOK	8307	7963	83	83
37	KHOTANG	3627	3346	82	87
38	LALITPUR	11175	11715	71	59
39	LAMJUNG	3775	3315	65	75
40	MAHOTTARI	14674	14119	99	85
41	MAKWANPUR	9422	9211	82	81
42	MANANG	99	135	37	35
43	MORANG	22823	21696	77	75
44	MUGU	1229	1307	104	101
45	MUSTANG	216	230	75	70
46	MYAGDI	2402	2140	74	84
47	NAWALPARASI EAST	7900	6726	77	92
48	NAWALPARASI WEST	7776	7558	83	86
49	NUWAKOT	5995	5657	74	76
50	OKHALDHUNGA	3248	2949	70	75
51	PALPA	5555	4716	71	87
52	PANCHTHAR	4206	3843	74	74
53	PARBAT	3290	2849	63	74
54	PARSA	13509	14724	96	86
55	PYUTHAN	5541	4619	83	104
56	RAMECHHAP	4480	4064	60	69
57	RASUWA	929	890	103	105
58	RAUTAHAT	16335	17274	101	74

59	ROLPA	5240	4595	97	110
60	RUKUM EAST	1208	1071	101	114
61	RUKUM WEST	3769	3387	97	103
62	RUPANDEHI	22068	21386	90	92
63	SALYAN	5790	5369	87	95
64	SANKHUWASABHA	3260	3047	75	82
65	SAPTARI	14666	14132	96	89
66	SARLAHI	17628	18141	86	71
67	SINDHULI	6500	6124	82	80
68	SINDHUPALCHOK	6108	5794	78	79
69	SIRAHA	14858	13867	97	92
70	SOLUKHUMBU	2076	2018	81	82
71	SUNSARI	19024	18213	76	71
72	SURKHET	8660	8363	90	93
73	SYANGJA	5615	4732	71	85
74	TANAHU	7815	6639	61	72
75	TAPLEJUNG	2745	2565	72	77
76	TERHATHUM	2175	1949	62	69
77	UDAYAPUR	7768	6949	74	82

(Source: HMIS)

Note: MRCV second dose coverage is slightly higher than first dose in few Hilly and mountain districts due to one or more of the following reasons:

- Cohort of children who received MR first dose in previous fiscal year received MR second dose in the concerned year.
- RI monitoring activity by independent monitors to assess age-appropriate vaccination may have identified previously missed children for MR second dose
- Delayed vaccination schedules endorsed by government has also allowed children to receive MR second dose from 15 months to 24 months and beyond till 59 months.
- Seasonal and occupational in-country migration of family to major cities of Hilly districts.

e. High risk population groups

Please describe any changes regarding status or movements of high-risk population groups during the reporting year, if applicable. (describe why they are labelled as high-risk group)

There is no National data on movement of population in the country.

NIP viewed community and ethnic group with documentation of immunization gap, increased laboratory confirmed measles and rubella cases in 2021. These community and pockets of population were taken as high-risk group and followed-up by surveillance network.

NIP periodically review measles surveillance and immunization data, conduct programmatic measles risk assessment, and share update to provinces for strengthening measles rubella surveillance activities at sub-national level.

f. Actions taken to improve the level of immunization coverage in selected territories and/or in high-risk subpopulations in the year under review with focus on impact of COVID-19:

Local level updated micro-plan including hard-to- reach areas.

Local health facility conducts selective RI sessions in hard-to-reach areas during month of Baisakh (April-May) as Immunization month.

Local health facility review and submit monthly immunization coverage to municipality, identify missed and drop-out children in municipality.

g. Supplemental immunization activities (SIA)

Were supplementary immunization activities with measles/rubella – containing vaccine conducted in the year under review (please check the appropriate box)?

YES NO

If supplementary immunization activities were done, please summarize results in the table below and complete the SIA Technical Report form for the most recent SIA if not yet done.

Please fill the SIA information since 2021

SIA conducted as national or subnational	Vaccine (M, MR, MMR)	Dates (start-end)	Age (range) of target group	Target population size	Coverage achieved (%)	% sub-national units w/ $\geq 95\%$ coverage

- a. **Qualitative assessment of most recent SIA.** According to administrative coverage and monitoring results (if done), provide qualitative assessment of SIA that was conducted. Indicate whether there were any geographic clusters and/or high-risk groups where coverage was less than 90%.

In 2021, WHO hired Independent monitors conducted quick community assessment for age-appropriate vaccination status of children aged 6 weeks to 23 months. Total 7645 children were monitored in 831 risk communities. 87% of the monitored children received age-appropriate vaccination. The primary reasons for not receiving age-appropriate vaccination in 13% (N-1028) were service delivery, service uptake and knowledge gap. Service delivery includes one or more of the reasons: vaccination site too far, vaccinator not available, vaccines not available, syringes or other supplies not available. Service uptake includes one or more of the reasons: child not at home, child sick, fear of AEFI, parents decide to go session site later or next month and Knowledge gap include one or more of the reasons: mother does not know age for vaccination of different vaccine, mother does not know total number of contacts for complete immunization, mother does not know immunization session site etc.

Routine data quality assessment was conducted in five districts (Pyuthan, Dhading, Morang, Dhanusa and Tanahu), selected based on randomly selected reported based on performance (good performing- 2 districts, low performing 3 districts). The qualitative assessment showed inadequate use of data for action/decision making and gap in Monitoring and Evaluation structure for data review.

Evidence-5 Accountability

Please consider the following points while writing this section

- *Documented evidence of national plans and financing for achieving and sustaining measles and rubella elimination, including routine immunization, SIAs and/or outbreak response activities, and epidemiologic and laboratory-based surveillance. Such evidence may be reflected in comprehensive multiyear plans, annual work plans and others.*

Government of Nepal has listed immunization as a basic health services to be available to all free of cost.

Government included full budget support for MR doses in annual work plan after the end of GAVI support by September 2020.

NIP also provided annual budget support to provinces and district to continue periodic training of health workers on strengthening RI including update of health facility micro-plan. "Strengthening RI session" agenda is a part of annual district level health facility training.

NIP conducted periodic surveillance review and provided feedback to provinces and municipality for strengthening measles rubella surveillance.

- *Documented evidence of monitoring and reviewing progress of the above plans.*

NIP conducted annual review meeting in all provinces and provided recommendation and feedback to provinces and districts for strengthening RI and measles rubella surveillance activities.

All provinces conducted district level review meetings at all 77 districts.

NVCME members conducted supervision field visit of MR Coverage survey in 2021, reviewed program data, progress, and recommended NIP on accelerating measles elimination activities.

Local government/municipality regularly conducted RI session monitoring.

Independent monitors are deployed in areas known or likely to have program gap on RI. The detection of zero dose children identified during community monitoring for age-appropriate vaccination status and surveillance data are routinely feedback to concerned local levels/municipality through WHO IPD SMO network.

- *Evidence of immunization system security as indicated by*
 - *secured funding for vaccine procurement (e.g., a line item in the national budget for vaccine procurement and Programme implementation);*

NIP has secured funding for vaccine procurement as outlined in government Annual workplan.

- o *evidence of vaccine demand forecasting and vaccine stock management; and*

NIP has been successfully conducting vaccine demand forecasting and vaccine stock management with support from partners (UNICEF, GAVI).

- o *standard operating procedures at each level of the programme (e.g., a checklist for conducting an immunization session).*

NIP has developed a standard RI session monitoring checklist for each level of the programme. WHO hired Independent monitors and SMO provide a copy of RI session monitoring to local health facility/local municipality health coordinator to provide update on any un/under immunized and zero dose children in the community. This activity is also supported by WHO Nepal.

- *Documented evidence of capacity for outbreak preparedness, investigation, analysis, and rapid outbreak response, at national and subnational levels. For example, does the country have an Emergency Operations Centre? Are the Rapid Response Teams available at national and subnational levels? Is budgeted importation and outbreak preparedness and response plan available?*

Yes, country has capacity for outbreak preparedness, investigation, analysis, and rapid outbreak response. Rapid response team exist both in federal and province level. However, there is rapid turnaround of human resources and municipality need periodic technical assistance in capacity building for prompt outbreak response. At the federal and provincial level, the country have a network of hub and satellite hospitals and Health Emergency Operation centres which comes into function in mega disasters and big outbreaks.

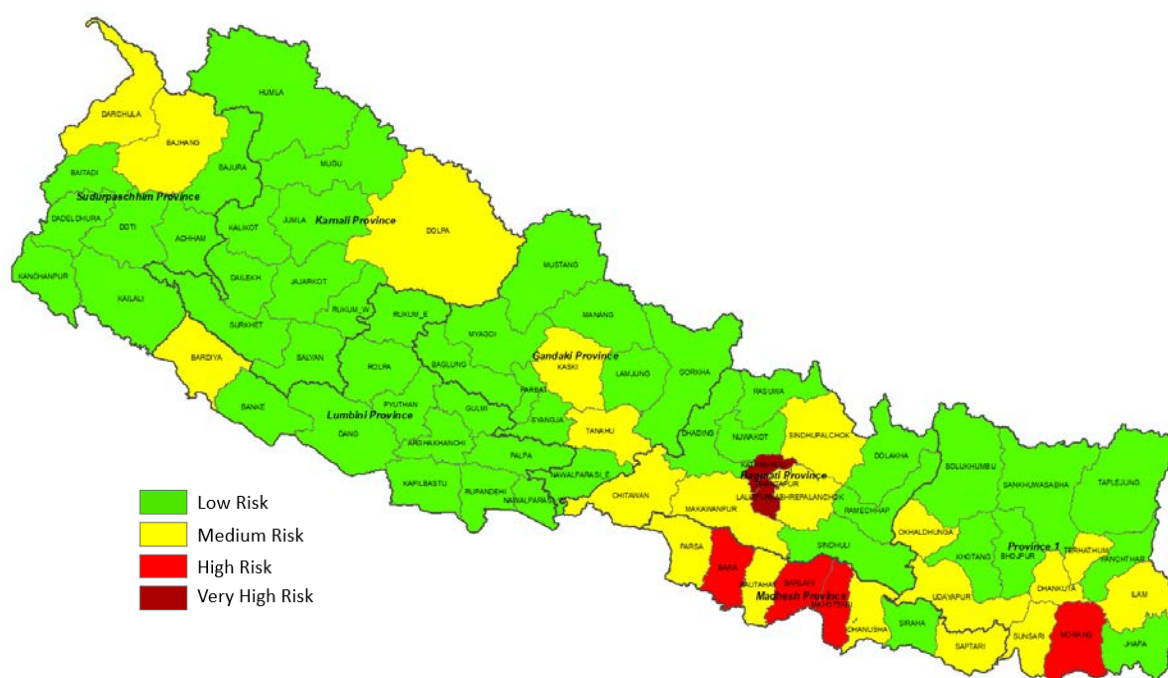
Written programmatic risk assessments that incorporate at a minimum population immunity, surveillance, and ethno-demographic data at subnational levels.

Sub-national risk assessment for measles and rubella transmission

(Use the tool to identify number of very high risk, high risk, medium risk, and low risk districts in the country) — Provide a map for the risk assessment

Measles Programmatic Risk Assessment- year 2022

	Risk Status	# of Districts	Population proportion
1.	Very High Risk	2	2854425
2.	High Risk	4	3560070
3.	Medium Risk	21	9239486
4.	Low Risk	50	14547119



SECTION 6: Validation, comments, conclusions and recommendations provided by NVC including key challenges faced

Comments of NVC on the two essential criteria

- (1) Documentation of the interruption of endemic measles, or rubella, virus transmission for a period of at least 36 months from the last-known endemic case

It is inapplicable in current context. Endemic measles transmission exists in the country.

- (2) The presence of a high-quality, laboratory supported surveillance system that is sensitive and specific enough to detect, notify and investigate suspected outbreaks in a timely manner, classify cases as confirmed or discarded as well as classify based on by source (imported or import-related cases).

Government of Nepal has established laboratory supported measles rubella surveillance system for detecting both sporadic measles cases and outbreak cases. The case-based measles surveillance (CBMS) sites (613) exist in all metro and sub-metro cities of country and 52% (387) of municipalities have at least one CBMS site. In 2021, private sectors reported 24% of total suspected measles cases (non-outbreak). The community and health workers are actively engaged in reporting suspected measles cases through

technical assistance from partner (WHO IPD). The surveillance indicators and updates are regularly feedback to subnational level from NIP through FWD. The periodic VPD surveillance workshop supported by partner (WHO IPD) have further enhanced technical capacity at local level to detect, notify and investigate suspected outbreak in a timely manner. At present, National Public Health Laboratory (NPHL) is conducting MR molecular practice test. NPHL has plan to initiate MR molecular test by end of 2022. Therefore, cases have not been classified by source.

MR reporting sites are still not present in 48% municipalities and there is scope to incorporate private sectors in the MR reporting sites.

Comments of NVC on the five lines of evidence

- (1) A detailed description of the current and past epidemiology of measles, rubella and congenital rubella syndrome (CRS);

In 2020, NIP detected 11 confirmed measles outbreaks from eight districts of the country including cluster of four outbreaks in Dhading district of Bagmati Province. In Dhading cluster, two measles related death occurred, and affected age group not targeted by MR SIA. This outbreak was spreading and disproportionately affecting underserved community in contiguous municipalities. Therefore, NIP responded to this outbreak vaccinating 6m-15 years children achieving 97% coverage.

In 2021, NIP detected four sporadic measles outbreaks from four districts of different provinces of the country. There were no cluster of outbreaks and no reported measles related mortality. Case-based measles surveillance sites reported 1417 suspected cases out of which 141 were measles and 44 rubella cases. The incidence rate of confirmed measles cases decreased from 13.02 (2020) to 4.73 in 2021. Out of the 141 measles cases- 81 were laboratory confirmed measles case, 60 were epidemiologically linked and 2 were clinically compatible cases. All rubella cases were laboratory confirmed. 25% (11) of rubella case were in age group 1-4 years.

- (2) Molecular epidemiology analysed to document viral transmission patterns and the duration of circulation of viruses of specific lineages;

At present, molecular epidemiology analysis to document viral transmission patterns is not applicable. NPHL laboratory technical staffs received MR molecular training (virtual) with support from SEARO in 2021. NPHL has been conducting practice test and working under guidance from SEARO. NPHL plan to initiate MR molecular by end of 2022.

- (3) Quality of surveillance and monitoring systems for measles, rubella and CRS; The MR surveillance sensitivity has been maintained both at national and subnational level. The national Non-measles Non-Rubella rate (NMNR) in 2021 was 4.07 per 100,000 population and all provinces NMNR rate were above 2.

For CRS, NIP is conducting sentinel site-based CRS surveillance. Currently, four CRS sentinel surveillance exist in Kathmandu Valley. NIP has plan to expand CRS sites to other tertiary hospitals of major cities. After expansion of CRS sites to all major cities, population-based indicator may need to be rationalized. It is anticipated that CRS would also be at very low levels in line with very low levels of rubella transmission.

- (4) Population immunity presented as a birth cohort analysis, including evidence on adults, and underserved, migrant and refugee groups.

We have shown above an analysis of NMNR cases to assess population immunity gap. There is an immunity gap mainly in above 5-year-old children. This immunity gap showed change in measles disease epidemiology and NIP need to conduct surveillance and immunization review to identify cause of this immunity gap and apply catch-up vaccination as needed.

- (5) Accountability.

Immunization program is the number one priority program of Government of Nepal. Country has a strong accountability and ownership of immunization program as per below mention points:

Immunization services is listed as a basic health services free of cost. Government of Nepal has included full budget support for MR vaccine procurement in annual work plan after end of GAVI support in Sep 2020.

NIP lifted the policy barrier for routine childhood immunization ceiling from two years to five years of age. Now, children in Nepal can receive routine vaccine even beyond traditional two years of age, if routine doses are missed.

The NIP comprehensive multiyear plan (cMYP) 2017-2021 included measles elimination goal by 2023 in line with regional MR elimination goal. At present, Government of Nepal is developing next cMYP for immunization program guided by Immunization Agenda 2030, Measles and Rubella strategic framework 2021-2030 and regional vaccine action plan (RVAP).

Local government ensures that every child receive all antigen of routine immunization through unique program- "Full immunization declaration" by identify un/under vaccinated children and providing opportunity to complete immunization schedule.

Conclusion:

(Circle one of the following classifications to the country)

<i>MEASLES Classification</i>	<i>RUBELLA Classification</i>
Endemic- Nepal is endemic with moderate disease transmission	Endemic- Endemic with low transmission
Eliminated	Eliminated
Verified	Verified
Re-established transmission	Re-established transmission

Key Lessons learnt

- National Immunization Program demonstrated political commitment for measles rubella elimination program by ensuring budget allocation for procurement of MR vaccines, lifting policy barriers from two to five years and enactment of immunization act to ensure provision of immunization services as a right of every citizen.
- Country has been able to maintain sensitive measles rubella surveillance achieving high discarded non-measles non-rubella rate above 2 per 100,000 population and ensuring prompt detection and respond to every suspected measles outbreak. In 2021, there were no major outbreak and no documented measles related mortality from any case-based surveillance sites and informers.
- NIP has been able to achieve high MR coverage in post COVID-19 year (2021) through periodic immunization training, review meetings and supervision/monitoring of priority districts. In 2021, 16 out of 77 districts achieved more than 95% MR coverage (first dose) and gap between MR first dose and MR second dose is only 3% (WUENIC).
- NIP conducted nationwide Typhoid conjugate vaccine (TCV) campaign in April 2022 providing one dose of TCV to all children 15 months to 15 years. TCV campaign was used as an opportunity to identify missed children with routine MR doses and to provide full immunization.
- National Public Health Laboratory (NPHL) is conducting MR molecular practice test and plan to initiate MR molecular test by end of 2022.
- NIP has been critically reviewing measles elimination activities and plan to enhance elimination through provincial level advocacy meetings in 2022.

Key issues and challenges

- Government of Nepal is fully committed to achieve measles rubella elimination by 2023. However, MR coverage and MR surveillance activity is not a priority of local government. Therefore, Measles Rubella Elimination advocacy at all level is a critical component in achieving MR elimination goal.
- Measles case reporting unit exist in 52% of municipalities and limited numbers of private institutions are engaged in MR surveillance activities.

- In 2021, Measles Rubella (MR) coverage increased compared to pandemic year- 2020, but MR coverage have not reached expected 95% coverage in all districts and municipalities.
- Measles case-based surveillance sites exist only in 52% of total municipalities and 22% of the CBMS sites are private health facilities. In 2021, private sectors reported 24% of the total suspected measles cases (non-outbreak).
- Significant number of lab-confirmed measles and rubella cases detected among vaccinated children aged 1-4 and 5-9 years.
- Laboratory testing for Measles rubella does not exist in all provinces. There is no provision of alternate testing tools for confirmation of measles rubella in the country.

Key Recommendations from NVC to NIP

- Accelerate MR elimination strategy through advocacy meeting at provinces, municipalities/local levels by building subnational capacity on case detection, outbreak preparedness, outbreak response/recovery and root cause analysis to identify programmatic gaps to prevent future outbreak.
- Close gap in MR coverage by expanding vaccination efforts in vulnerable communities through resource mobilization and updating local micro-plan.
- Local health authorities should systematically involve private sectors in measles elimination goal. This activity should be incorporated in national MR strategic plan.
- Strengthen existing subnational lab and expand sub-national labs in other provinces as well. Ensure, suspected measles samples are collected from remote and hard to reach areas through alternate laboratory tool (dry blood spot).

Annexes

Please include the following documents as annex

Annex-1 -Most recent cMYPANational Immunization Strategy or equivalent

Annex-2- Most recent National Measles and rubella elimination National Strategy or equivalent document

Annex-3- Most recent National Measles, rubella and CRS surveillance guidelines

Annex-4- Most recent Case and outbreak Investigation forms used for measles, rubella and CRS surveillance

Annex-5- Outbreak investigation report for the most recent large outbreak of measles and/or rubella including key lessons learnt