Sri Lanka

Reducing
Rubella

The story of how this island nation safeguarded its people from rubella and congenital rubella syndrome
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Sri Lanka, one of the oldest democracies in South-East Asia, was memorably called by Winston Churchill "the pearl of the Indian Ocean" – an epithet as valid today as it was in the 1940s. The country has a proud history of leadership in the Region, especially in the health sector, and in the recent past eliminated malaria (September 2015), lymphatic filariasis (June 2016), and maternal and neonatal tetanus. Today, it has controlled the dreaded disease of rubella and associated CRS and stands poised on the verge of measles elimination.
FOREWORD

Sri Lanka has demonstrated that when the leaders of a country commit to health, the people reap rich dividends.

The country has made significant advances in controlling rubella and congenital rubella syndrome (CRS), two years ahead of the 2020 target set at the Sixty-sixth session of the Regional Committee in 2013.

This is, indeed, a dramatic achievement.

The rubella vaccine is not new to Sri Lanka – the country was an early adopter, introducing the rubella vaccine into the Expanded Programme on Immunization in 1996. Though there was a steady decline in rubella incidence in the subsequent decade, 2011 saw a spike in the number of reported cases. But Sri Lanka’s dynamic health system responded with rapid effect, changing vaccine protocol, sharpening reporting and surveillance and ensuring high immunization coverage through routine immunization and supplementary immunization activities.

As a result, the number of rubella cases dropped to zero by 2017.

Through strong and committed leadership, sound budgeting, steadfast cooperation between Sri Lanka’s health authorities and development partners, alongside the committed efforts of countless health workers and officials at the ground level, Sri Lanka has once again responded effectively to a public health problem.

I am confident that the country will continue on its path and greatly look forward to continuing to work with Sri Lanka to eliminate measles and other vaccine-preventable diseases in coming years. It is with great pleasure that I extend my congratulations to the leadership, health workers and people of Sri Lanka on their success in controlling rubella.

Dr Poonam Khetrapal Singh
Regional Director
WHO South-East Asia Region
9 Provinces

25 Districts

176 Private heath-care institutions

610 Government health-care institutions

21,443,921 Total population
Rubella, an infection so mild that almost half the people who get it do not even realize they have the disease. Yet, this apparently innocuous virus is the harbinger of lifelong misery when its host is a woman in early pregnancy. Though the woman recovers swiftly, the foetus in her womb has a 90% chance of being affected: miscarriage, stillbirths and debilitating birth defects are the long-term burdens this dreaded disease brings in its wake. Congenital rubella syndrome (CRS), caused by the infection that is transmitted from the mother to the foetus, is as pernicious as the symptoms of rubella in adults are mild.

The goddesses’ diseases, including measles and rubella, demanded invocations to the Goddess Pathminii, the keeper of women, children and the sick. At one time, this was the only safeguard people had against such infections. Fortunately, today they also have access to free and safe immunization.
### SIGNIFICANT EVENTS

**1994**
CRS outbreak (275 cases)

**1995**
CRS outbreak (212 cases)

**1996**
1st dose of rubella-containing vaccine introduced for women aged 16–44 years

**2002**
Rubella vaccination for 14-year-old girls at schools

**2003**
Catch-up MR campaign for 10–15-year-olds; school boys included in rubella vaccination

**2004**
Catch-up MR campaigns for 16–20-year-olds; case-based surveillance and zero reporting started

**2007**
Formats of case-based surveillance updated

**2010**
National Measles, Rubella laboratory accredited

**2011**
MCV1 replaced with MMR vaccine; schedule advanced from 9–12 months to 1 and 3 years

**2014**
Outbreak response measles vaccination for 6–11 -month-olds

**2015**
1st dose of MMR rescheduled to 9 months

**2017 onwards**
Zero cases of rubella

**2018**
Verification that Sri Lanka has adequately controlled rubella and CRS

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**MVC**: Measles-containing vaccine  
**CRS**: Congenital rubella syndrome  
**MMR**: Measles–mumps–rubella  
**MR**: Measles–rubella
Like other viruses, rubella too is highly contagious. Transmitted through direct contact, sneezes and droplets of saliva, this hardy organism can survive for many hours outside its human host, transferring from infected surfaces to a new host through contact or even simply riding on air. Once a person is infected, antibiotics offer no succour: an infected foetus remains at risk while the infected patient neither needs treatment nor suffers any great discomfort.

A few decades ago, there was no protection against rubella. Then in 1996, following outbreaks in the two previous years when 275 (1994) and 212 (1995) cases of CRS were reported across the country, the Government of Sri Lanka introduced rubella vaccination for women aged 16–44 years. The incidence of rubella greatly diminished but the virus was still potent and in 2011, there was a spike in the disease. More than 2.19 cases per 100 000 population mainly among adult males (in military camps) were reported. Although 2.19 cases per 100 000 population sounds negligible, it indicated an alarming rise in the percentage of cases. In the same year, two doses of the combined measles-mumps-rubella (MMR) vaccine were introduced as a part of routine immunization under the Expanded Programme on Immunization (EPI) for children aged 1 and 3 years. Although the incidence of rubella dropped considerably, the virus was still present in the population, wreaking havoc in the lives of the infected.

A country as committed to the health of its people as Sri Lanka certainly would not be complacent about the virus.
A clear example of leadership at work!

If a disease can be prevented, it must be prevented. This is the principle on which the Ministry of Health, Nutrition and Indigenous Medicine functions in ensuring that safe and timely vaccinations reach all people. The Ministry has committed funds in the national budget to ensure there is smooth functioning within the health system for this.
From its early years of Independence, the leadership in Sri Lanka has been committed to the good health of its people, a commitment that remains unchanged, even today. From 1952, when Sri Lanka was a low-income country, government-provided health care was free at the point of delivery and accessible to all, making the country well-recognized as a “welfare state”. As it transitioned to a middle-income country, its health-care system emerged as one of the best in the world and an example for other nations to emulate. The country has shown consistent progress in development indicators. In fact, in 2016, the Human Development Report ranked Sri Lanka at an impressive 73 out of 188 countries.

Political leadership in Sri Lanka is not about public statements or visibility campaigns but rather a quiet and sustained job that is prioritized in all the necessary ways. Hence, the political leadership’s high level of commitment to promoting good health in the country is evident from the fact that it has increased budgetary allocation for health from 1.8% of GDP to 3% of GDP. Budgetary commitment bolsters the EPI, with vaccines even having a separate line item in the annual national budget. Since as early as 2014, far in advance of most countries in the Region, 94% of the cost of vaccines and 93% of the costs for routine immunization were borne by the government.
We do not focus our efforts only on increasing the coverage of population immunized but also on taking care to ensure quality of health care delivery throughout the process. Hence, even at the level of antenatal care, a health worker is trained to confirm the rubella immunization status of a pregnant woman and provide immunization in case of need.

“Director General of Health Services
Planning is the cornerstone of any effective public health programme and Sri Lanka has ensured that it has clearly articulated and well communicated plans at all levels of the immunization effort. At the highest level, the country has an established national policy for measles elimination and rubella control and a comprehensive multi-year plan for immunization system strengthening. The Advisory Committee for Communicable Disease (ACCD), chaired by the Director General of Health Services (DGHS), is responsible for making evidence-based vaccine-related decisions. The Epidemiology Unit, Ministry of Health, implements the evidence-based decisions of ACCD and takes the responsibility of policy development, vaccine procurement, implementation, monitoring and evaluation. A national system to monitor adverse events following immunization (AEFI) and a national policy for health-care waste management, including waste from immunization activities, are in place, ensuring that each aspect of the immunization initiative is carefully and consistently defined. At subnational levels too, planning is given due importance and all 26 districts have updated microplans that include activities to raise immunization coverage and ensure immunization safety.

Sri Lanka has made steady progress over two decades, bringing the incidence of rubella from a high of 19 per million population in 1996 down to zero incidence reported in 2016.
A unique feature of the Sri Lankan health system is that there are no gatekeepers to the access of medical facilities. Hence, a citizen is free to walk into any health facility of his or her choice without the need of a referral from a lower level of facility.
The Epidemiology Unit of the Ministry of Health is responsible for the National Immunization Programme. There are nine provincial directors of health and 26 regional directors of health who carry the central programme to the provincial and regional levels. Below them are the medical officers of health (MOHs), who head 347 health areas and are responsible for the operational units at the field level. Under the regional directors, the regional epidemiologists coordinate and implement all immunization programmes at the district level. Sri Lanka’s strong community health services are based on the health unit system where each health unit has a defined catchment area. These are also known as MOH areas. Each area has an adequate number of field staff to support the MOH. The main focus of such units is mainly on maternal and child health, communicable disease control, environmental health, and prevention and health promotion strategies. The field staff of these units are the ones who implement immunization (childhood as well as at school) and disease surveillance and outbreak detection activities. In addition, all major curative care institutions also provide vaccination facilities that are accessible to all.

Medical facilities are available and easily accessible with 610 government health care institutions distributed across the island. The 176 private ones, however, tend to be located mostly in urban centres. It is a credit to Sri Lanka’s public health care system that most of the population prefer to access government health care, as is seen from the fact that as early as 2007, more than 90% live births were delivered in government hospitals.¹ A testament to the free and high quality public health system of Sri Lanka.

Reported rubella cases fell from 364 (incidence of 19/million population) in 1999 to 96 cases (incidence of 5/million population) in 2002 and further to 10 cases (incidence of 0.6/million population) in 2014.

With regard to rubella and CRS, there has been a steady decline in confirmed cases.
STOPPING THE SPREAD OF THE VIRUS

Although there has been high coverage of rubella vaccine since its introduction into routine immunization in 1996 (provided through life-course vaccination to women of reproductive age), supplementary immunization activities (SIAs) have been conducted from time to time to close the immunity gap. The country conducted two SIAs in quick succession: a catch-up vaccination campaign in 2003 covered the 10–15-years age group and achieved coverage of 95% while the campaign in 2004 among those aged 16–20 years (coverage 72%) with MR vaccine further contributed to the development of population immunity to rubella. Reported immunization coverage with a single dose of a rubella-containing vaccine has been consistently high at more than 95% since 2000.

In addition, from 2002–2012, school-based adolescent rubella vaccination has been given at the age of 14 years, initially only to girls, with boys of the same age being included in 2004. This was discontinued when all children who had received MR vaccine at the age of 3 years in 2001 had reached the age of 14 years.

Another effective way in which rubella transmission was reduced was through the efforts of field health-care staff at the community level. Since 2000, they have been trained to ensure that when a new couple starts their family-life and is registered onto the “Eligible Couple Register”, all women of reproductive age are vaccinated against rubella. During history taking, if the field health-care staff find any woman who has not been vaccinated for rubella, they provide a dose of RCV (now MMR) at that time.
Routine and regular surveys to judge the immunization coverage help to identify weak areas where extra efforts may be needed to achieve the population coverage required for disease elimination/control. Therefore, every 2–3 years, EPI coverage surveys are conducted in select districts that have relatively low coverage or coverage variations due to population variability; are dependent on subjective knowledge; or are in need of data quality and coverage improvement. Cluster-based field-level house-to-house surveys in randomly selected areas are carried out by an independent group under the supervision of a national team. Immunization coverage assessment is done for each antigen among different age cohorts.

Annual reviews are undertaken in all 26 districts. Conducted by a national team from the Epidemiology Unit, these reviews are carried out to assess divisional- and field-level immunization coverage as well as age-appropriate vaccination coverage. District-level supervisors (i.e., regional epidemiologists) are responsible for ensuring follow-up action.
Although Sri Lanka has an efficient health delivery system and a well-costed vaccine plan, partnerships remain essential to ensuring the quality and sustainability of the health gains made in recent years. WHO is a significant partner in the country, providing technical support, monitoring assistance and sharing knowledge so that the country programme is well aligned with Regional and global goals and initiatives. It played a lead role in conducting the collaborative EPI-VPD review of 2015. UNICEF too brings global expertise to the immunization efforts in Sri Lanka, assisting in the planning and management of powerful campaigns like the 2011 mass immunization awareness campaign against 11 vaccine-preventable disease called ‘Let sleeping demons sleep’. It also regularly provides support for effective vaccine management assessment in the country. Gavi, the Vaccine Alliance, on the other hand, plays a slightly unique role in Sri Lanka, providing assistance in price negotiation so that the country can purchase vaccines, from its own funds, at competitive rates.

But international partnerships are not the only ones necessary for effective programme implementation. Inter- and intra-sectoral collaboration are essential features of large-scale public health initiatives that aim to eliminate diseases like measles and rubella in a short span of 5–7 years. Hence, communities play an active role in supporting government efforts, and empowered communities that participate in and demand health services are essential to the achievement of elimination goals as well as the larger aim of universal health coverage.
In 1941, Norman Gregg, an ophthalmologist recognized the link between an epidemic of congenital cataracts in Australia and intrauterine rubella, changing the categorization of the disease from a mild and harmless infection to a severe and dangerous one. An outbreak in Europe in the 1960s led to an expanded understanding that rubella not only affected organs like the heart, eyes and ears, but attacked almost every organ of the body, leading to severe and irreversible birth defects. Extensive study had led to the isolation of the rubella virus in the same decade and by 1968, a vaccine developed by Maurice Hilleman and his colleagues began to be distributed. Called the Edmonton–Enders vaccine, it is a combination measles–mumps–rubella (MMR) vaccine.

“Quality control is an important part of ensuring vaccine safety. It is therefore mandatory for all vaccines used in Sri Lanka to be licensed by the National Medicines Regulatory Authority (NMRA).”

Ministry of Health official
If an open, unused vial of MMR vaccine remains, once all children planned for immunization on a particular day have been covered, adults (up to the age of 45 years) without a proper record of MR immunization can be vaccinated, after taking all required safety precautions.

Extrapolated from the letter written on 5 June 2017 by Dr J.M.W. Jayasundara Bandara, Former DGHS, Ministry of Health
With a country goal to achieve and sustain measles-, rubella- and CRS-free status in Sri Lanka, much work needed to be done. To ensure that everyone involved in service delivery was aligned to the national goal, in June 2017 the Director General of Health Services, Ministry of Health, sent a letter regarding the measles, rubella and CRS elimination initiative to health personnel at all levels, ranging from the Provincial Directors of Health Services to the MOHs. The letter highlighted the key issues from the strategic plan for 2017–2020. High coverage (>95%) with two doses of the MR vaccine to maintain herd immunity; a revised and broadened case definition for measles and rubella to make surveillance more sensitive; rigorous monitoring of diseases with strengthened disease surveillance including laboratory confirmation of all suspected cases of measles, rubella and CRS were some of the key actions that needed to be implemented across the country. To ensure that the new strategies were correctly understood and implemented at all levels, Sri Lanka’s already well-trained health-care staff were given refresher training on the updated measles-rubella elimination strategies.

The public health inspector and field-level MOHs from the Ministry of Health routinely conduct contact tracing and exhaustive case-based investigation, which entails identifying all possible cases of measles and rubella and close follow-up of people with whom the infected person has made contact. Sri Lanka has been following a new strategy since 2017 where extensive vaccination is undertaken in such cases to cover even adults who are detected as unprotected. An even more rigorous regime is followed for any laboratory-confirmed case. In this situation, all children under 15 years of age in 50 surrounding households of the same locality or within 1 km radius are to be screened and vaccinated in addition to vaccination of all those who had been in contact with a confirmed case.

Clearly, Sri Lanka was determined to eliminate the virus.
The WHO Regional Office for South-East Asia has set the year 2020 as the rubella and CRS control target for the Region.

Sri Lanka has high immunization coverage and an established surveillance system for timely detection and investigation, and an outbreak preparedness plan. Since WHO’s definition of rubella and CRS control seeks a 95% reduction from 2008 levels of the infection, can we now say that the country has achieved the target?
Surveillance is the keen-eyed sentinel that ensures no case of rubella goes undetected, acting as an early alarm system to prevent the virus from creeping back into the population. Through surveillance, the disease can be detected and practical information collected. Zero results are the score that all surveillance efforts hope for as they meticulously scan all suspected cases and file daily reports on their findings – an effort that takes time as well as human and financial resources. At the same time, ensuring that data quality is maintained is a key requirement. The national programme of vaccination and surveillance is implemented and monitored by medical epidemiologists. The competency of these public health specialists and the promptness with which they undertake the whole process contribute to the success of maintaining effective vaccination and surveillance at each centre.

Surveillance is a complex activity. It involves detection, notification and investigation of suspected cases using standard case definitions; collecting, shipping and testing specimens at a proficient laboratory, with timely reporting of results; linking laboratory
and surveillance data; adequately reporting; analysing data; and taking action on the data. Rubella and CRS are notifiable diseases in Sri Lanka and included in the routine surveillance system. It is included in the sentinel site zero weekly notification system with other VPDs for ensuring active notification. In addition to all these, the timeliness and completeness of reporting are closely monitored by the Central Epidemiology Unit.

The most basic tools for surveillance are a set of uniform criteria that define the disease. These help public health officials to classify and count cases consistently across reporting areas. Sri Lanka has strengthened its surveillance through training of health-care workers at all levels of the system. In 2017, it also broadened the definition of a suspected rubella case to a more sensitive surveillance case definition of fever and rash. Health centres notify suspected measles cases to their respective MOHs and further escalate it through the regional epidemiologist at the district level to the Central Epidemiology Unit. Through the use of a real time web-based data receiving system (e-surveillance), early identification of geographical clustering on a weekly basis, in addition to case-based early notification system, has been made possible.

“All hospitals where specialist paediatricians or physicians are available are sentinel sites for active surveillance of measles, rubella and CRS and weekly zero reporting. As an infection control nursing officer at a sentinel hospital, I am expected to maintain the appropriate registers and actively search for such cases by visiting medical, paediatric and other relevant wards. We must not allow a single case of infection to go unreported.”

- Infection Control Nurse Officer
We receive test samples of all pregnant women who cannot give a history of rubella vaccination. This is very significant in responding to possible foetal infection in case a positive result is obtained.

Laboratory technician at NMRL
Laboratory activities are key to controlling and eliminating the rubella virus. Molecular epidemiology analyses the genetic profile of the virus in an infected person. Like fingerprints, these are unique, but when the laboratory finds a pattern that is close, it can draw linkages between the cases and track its origin and movement across borders. This helps surveillance track the movement of the virus from place to place.

Virus detection and genotype identification are the domain of the National Measles, Rubella laboratory at the Medical Research Institute in Colombo. The laboratory was accredited in 2010, although laboratory testing has been available since 1994. It was strengthened by incorporating epidemiological surveillance in 2001, since when the laboratory has been conducting serological surveys of all suspected measles and rubella cases with sensitive surveillance. Great care is taken to collect specimens from all suspected cases of rubella, and ensure swift and safe delivery to the National Measles, Rubella Laboratory through controlled transportation with adequate cold chain maintenance. The laboratory is equipped for virus detection with molecular assays, in any possible cases or in chains of transmission.

**Genetic testing support is provided by the Regional Reference Laboratory in Thailand.**
National Certification Committee for Polio Eradication and Measles, Rubella, Congenital Rubella Syndrome Elimination (NCCPE & MRCE) was formed after the existing NCCPE was reorganized in 2015. It ensures that the requirements for documentation and genotyping to prove that transmission of the virus has been interrupted and high quality surveillance have been met.

The NVC is assured and confident that Sri Lanka’s robust immunization programme meets the three criteria of documentation – 95% reduction in rubella and CRS cases since 2008; presence of a high-quality surveillance system that is sensitive and specific enough to detect endemic rubella cases; and other adequate evidence that supports the control of rubella/CRS in the country. It is thus eligible for the certification and status from WHO as a nation that has met the goal set in 2013 for reduction of rubella and control of CRS.

Gihin ennam rubella!*

And so, on 2 August, 2018, the South-East Asia Regional Verification Commission for Measles Elimination and Rubella/CRS Control verified that Sri Lanka has adequately controlled rubella and CRS. This committed nation has once again shown that it is capable of maintaining its leadership role in health care and providing a model for other nations to emulate.

* translated as ‘Goodbye rubella!’
Sri Lanka has shown that a sustained and focused approach to health care can ensure long-term gains for its people. While leadership, planning and implementation worked together in building the public health success of rubella and CRS control, some specific lessons emerged.

**Long-term health stewardship builds a strong programme.** The commitment of successive leaders to providing adequate support for immunization has ensured financial security and sustainability to the programme.

**Planning pays dividends.** Detailed plans made for every level ensured alignment with the national plan. It has enabled efficient use of resources – human, financial and material – and prevented both overlap of responsibilities and “falling between the cracks”. Clarity of roles was ensured.

**Established health systems are possible even in low- and middle-income countries.** In Sri Lanka, the focus on creating a quality health system has ensured adequate and well-trained personnel, supported by a well-built infrastructure, delivering a high quality public health programme to citizens across the country and making public health care the preferred method of health-seeking for most citizens.
The success of tomorrow is based not only on the achievements of today, but also on ongoing and tireless vigilance. The rubella virus has subsided but it has not been eradicated. Vigil has to be maintained to ensure that the immunity built against rubella is maintained. Even when Sri Lanka has been verified for controlling rubella and CRS, the high coverage of the MMR vaccine must be maintained, always above 95%, but the closer to 100% coverage, the better. Hawk-eyed surveillance and continued testing of suspected cases are crucial to preventing the disease from making a come-back. The guard cannot be let down. Not today, not tomorrow, and not for the generations to come.
Moving towards a rubella-free nation –
Sri Lanka, the land of joy and victory!