Restraining Rubella

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Arogyaparama labha

"To keep the body in good health is a duty... otherwise we shall not be able to keep our mind strong and clear."
- Buddha

The ayuarogyasampatti is chanted every day by Buddhist monks to bestow blessings of longevity and health on the people. In Bhutan, one such recent blessing has been the control of rubella and congenital rubella syndrome in the country.
Bhutan has controlled rubella and congenital rubella syndrome (CRS), meeting the goal set at the Sixty-sixth session of the Regional Committee in 2013. That it has done so two years ahead of the 2020 target reflects the importance the country places on the health and wellbeing of its people.

Needless to say, a country’s size does not determine its ability to drive path-breaking change. By delivering another public health success, just a year after the elimination of endemic measles, Bhutan has proved that its health systems are comparable to the best in the Region, particularly with regard to immunization.

By ensuring high levels of immunization coverage, rubella and CRS cases, which were widespread, have similarly witnessed substantial reductions in case incidence and overall burden.

These achievements have been brought about through the inspired leadership of the Ministry of Health, as well as frontline health workers.

WHO and other development partners have provided significant support in strengthening health systems and ensuring that funding has been available as and where needed, allowing Bhutan to be among the first six countries of the Region to control rubella and CRS.

At this proud moment, I extend my warmest congratulations to His Majesty the King Jigme Khesar Namgyel Wangchuck and the people of Bhutan for their remarkable achievement.

Dr Poonam Khetrapal Singh
Regional Director
WHO South-East Asia Region
Bhutan is unique in the world, in that it measures the wellbeing of its citizens through the Gross National Happiness (GNH) index – a measure of human fulfilment that informs the government’s policies. Of the nine domains of GNH, the Bhutanese people are reported to be most satisfied in the area of health.
INTRODUCTION

Rubella. German measles. Three-day measles. Seemingly innocuous at first glance, rubella was first identified as a disease separate from measles and scarlet fever in the mid 18\textsuperscript{th} century. Its symptoms appear relatively mild, manifesting in low-grade fever, sore throat and a rash that starts on the face and spreads over the rest of the body. But for pregnant women, this supposedly mild infection poses a serious problem. Rubella during pregnancy can lead to a miscarriage or to serious birth defects such as heart problems, loss of hearing, loss of eyesight, intellectual disabilities and damage to the liver and spleen: conditions known as congenital rubella syndrome (CRS).

And yet this need not be. The Americas have already succeeded in eliminating rubella, as the infection is easily preventable with vaccination.

With the introduction of the Expanded Programme on Immunization (EPI) in 1979, the number of rubella cases in Bhutan showed a marked decline. However, rubella periodically raised its head with outbreaks reported as recently as 2003 and 2005 when more than 60 cases were reported in each year.

Read on to see how Bhutan rose to the challenge, and what this tiny mountainous nation has done to control and contain this seemingly mild disease which can have such devastating results.
SIGNIFICANT EVENTS

2002 – 2003
Febrile rash outbreaks across the country – of 201 serum samples tested, 35% were positive for rubella, across 77% of the districts

2003
Retrospective data research reveals widespread presence of CRS in the country

2004
Annual health conference in Thimpu recognizes rubella as “an urgent problem in the country”

2006
Rubella vaccine introduced into routine immunization (RI) programme. Nationwide measles and rubella immunization programme conducted

2007
Case-based surveillance begun

2015
Strengthened surveillance – mandatory reporting of rubella

2017
Only nine confirmed cases of rubella reported

2018
Verification that Bhutan has controlled rubella and CRS

The takin, a symbol of miraculous rebirth, is the national animal of Bhutan. Legend has it that this animal sprang to vitality through a divine miracle. Similarly, the control of rubella promises the children of Bhutan a life of vitality, free from the fear of CRS.
The endemic nature of rubella became clear in 2003, when a febrile rash outbreak occurred in districts across the country. Approximately 35% of the tested samples were confirmed positive for rubella; the incidences occurred in most of the districts. A retrospective data search conducted at the same time revealed the presence of CRS, and at the 2004 health conference in Thimphu the problems of rubella and CRS were extensively discussed. The introduction of the rubella vaccine was recommended, and this was further endorsed by experts from WHO Regional Office for South-East Asia (WHO-SEARO) in New Delhi and WHO headquarters in Geneva, who conducted field visits in the Region.

A mass immunization programme in March 2006 saw the setting up of 1495 immunization posts and a total of 332,041 children and women of childbearing age vaccinated – 98.17% of the target population, with the remaining 1.83% being unable to be vaccinated either because of sickness or pregnancy.

Since that initial mass immunization programme, the Ministry of Health has introduced RI against rubella, with children being given two doses of the rubella vaccine, one at nine months of age and the other at two years. A second mass immunization campaign was conducted in October/November 2017.

The concerted efforts of the Ministry of Health, from the strategic planning at the top levels to the implementation at the grass roots, has led to Bhutan being able to control rubella and CRS well before the target date of 2020.

In 2017, we attended to nine rubella cases compared to 350 in 2003. Most importantly, we no longer see any case of CRS.

- Tshewang Tamang, Department of Public Health
We are determined to create a ‘nation with the best health’. We, therefore, remain committed and continue to strive hard to ensure that Bhutanese, even in the remotest corners of our country, receive the very best health care available. I commend the hard work and dedication of our workers, whose efforts in carrying out the plans of the Ministry have led to the control of rubella in Bhutan.

- Dr Ugen Dophu, Secretary, Ministry of Health
Although Bhutan is a small country, it is deeply concerned with the well-being of its people and determined to ensure that their quality of life remains high. Bhutan was therefore at the forefront of the fight against measles, being one of the first countries in the Region to eliminate the disease in 2017, three years ahead of the regional goal. It has shown similar proactiveness against the rubella virus. The political and administrative leadership of Bhutan came together to forge a strong foundation to make good the guarantee that “[the State shall provide free access to basic public health services in both modern and traditional medicines” (Article 9 of the Constitution of Bhutan, 2008)]. Responding to the regional goal to eliminate measles and control rubella and CRS, the government put together a cohesive country strategy, aligned to the WHO guidelines, to control and then eliminate rubella. This was disseminated to the army of health-care workers and volunteers who administered and operationalized the plan, to the greater good of the entire nation.

Another example of the leadership’s commitment to health is seen in the establishment of the Bhutan Health Trust Fund (BHTF), which the Royal Government established with the support of WHO in May 1998. The BHTF aims, among other things, to ensure that there are sufficient funds to meet the annual expenditure on vaccines, essential drugs, needles and syringes. A unique feature of the Trust is that all donor contributions, regardless of whether they are large or small, are matched by a government contribution on a one-to-one basis.
Ensuring that the country has a coordinated and effective response in the effort to control rubella required a great deal of planning at both the macro and the micro levels. The leadership within the Ministry of Health, under the able guidance of the senior officials, formulated a national-level macroplan. Through the updated Expanded Programme of Immunization (EPI), steps were taken to reduce morbidity and mortality from vaccine-preventable diseases, including rubella, and a National Immunization Policy was established. Several immunization activities were consolidated with the launch of a comprehensive Multi-Year Plan (cMYP) 2014–2018.

The strategic guidelines set out by the Ministry of Health ensure the effectiveness of the National Immunization Policy and cover various aspects such as the identification of target groups and level of immunization coverage, documentation of childhood immunization, reaching the previously unreached and quality assurance of immunization programmes (cold chain and logistics, safety and safe disposal of vaccination waste). The policy has set the bar for quality performance, right from the centre to the thromde.* Detailed microplans ensure that effective, tailor-made community-level strategies are in place for the successful execution of the immunization programme.

Bhutan is also guided by WHO in acting on the Global Vaccine Action Plan (GVAP) and the “Strategic Plan for Measles Elimination, and Rubella and CRS Control in the South-East Asia Region”.

The strength and pride of the health system in Bhutan are the health workers who put themselves on the frontline day after day and who translate the plans and programmes of the Ministry into action at the community level. Their alertness, perseverance and hard work have contributed immensely to the control of rubella in Bhutan.

- Dr Karma Lhazeen, Director, Department of Public Health, Ministry of Health

* A thromde is the third level of administration, akin to a municipality.
Bhutan has an interconnected, three-tier system of health care comprising three regional referral hospitals, district hospitals and the Basic Health Units (BHUs). The only National Referral Hospital is the autonomous Jigme Dorji Wangchuck Hospital, with the Mongar Regional Referral Hospital and Gelephu Regional Referral Hospital being the two referral hospitals functioning under the Ministry of Health. The government also factors in the high cost of referral abroad for health care, which is increasing annually (about Nu. 198.23 million for 1412 patients in 2016–2017 up from Nu. 109.65 million for 748 patients in 2009–2010).

There are 30 hospitals across Bhutan, all of which provide immunization services through immunization clinics. In addition, every district has a district health office, which is responsible for both curative and preventive health care. To provide health care in every corner of the country, there are also 210 BHUs and 49 subposts.

The BHUs are the bedrock of the health infrastructure. They provide primary health care, conduct outreach clinics for dispersed populations, run immunization clinics and undertake disease surveillance, including for measles and rubella.

Immunization activities at the national level are the responsibility of the EPI unit of the Department of Public Health, which operates under the Ministry of Health. Two bodies share responsibility for the surveillance of measles and rubella – the Vaccine-Preventable Disease (VPD) Surveillance Programme in the EPI Unit and the Measles, Rubella Laboratory, Royal Centre for Disease Control (RCDC), Ministry of Health. Disease surveillance and outbreak investigation have been greatly enhanced by the improved laboratory at RCDC in Serbithang. The entire health infrastructure of Bhutan works together to deliver its public health programmes.
At the heart of Bhutan’s successful health structure lies its partnership with other stakeholders. WHO and other UN agencies provide technical and financial support to the Ministry of Health in vaccine procurement, surveillance as well as training, manual development and relevant quality improvement.

Health for All, the goal set at Alma-Ata in 1978, underpins Bhutan’s efforts for universal health coverage, and great progress has been made towards achieving this goal. The Ministry actively encourages and empowers community participation in the health-care delivery system, placing a huge emphasis on collaboration and coordination, both within and between various sectors. Public-private partnerships to address health issues are encouraged.

Bilateral and multilateral cooperation are key to delivering the health-care goals of the Bhutanese government. Not only does such cooperation bring in valuable resources in the form of funds and expertise, but it also helps to ensure that the country programme is aligned with ongoing developments in the world. India provides support as the referral centre for health-care services that are not available in Bhutan. Other important partners include WHO, UNICEF, World Bank, Japan Committee “Vaccines for the World’s Children”, Organization of the Petroleum Exporting Countries (OPEC) and GAVI.

WHO has been working in close coordination with the Royal Government of Bhutan in delivering the mass immunization programme since the launch of EPI in 1979. As a technical agency, we have been providing assistance in health system strengthening and planning. Quality monitoring, data and surveillance will remain the key focus to ensure the gains made till date remain intact.

- Dr Rui Paulo de Jesus
Ag. WHO Country Representative
There are strong foundations for universal health coverage in Bhutan; there are legal and policy mandates for universal access to health care, underpinned by the GNH concept, and considerable government investment in the health sector since the early 1960s.

As per the National Health Accounts study, for the financial year 2015–16, the government share of current health expenditures was about 70%, which, as a share of GDP was around 3.71%: Donors contributed about 5% of current health expenditure while household contribution (out-of-pocket) was around 20%.
The vaccination process

In 1979, EPI was launched in Bhutan, and with it, the introduction of the measles vaccine for children aged 9 months. In 1987, the programme made advances with the establishment of the National Plan of Action for the Acceleration of EPI, as the government stepped-up its determination to ultimately control and eliminate all vaccine-preventable diseases from the country.

The Sixty-sixth National Assembly, meeting in February 1988, passed a resolution that all children and pregnant mothers should have access to immunization services and be fully vaccinated. Universal child immunization (UCI) was achieved in 1991, and immunization coverage continues to be maintained at high levels (around 96% of the target population in 2000) through routine immunization, periodic National Immunization Days and mop-up campaigns.

Following a rubella outbreak in 2003, the importance of controlling the disease was realized and the 2004 Health Conference recognized rubella as an “urgent problem”, recommending that the Ministry of Health consider introducing a rubella vaccine. Guidelines on measles and rubella (MR) were updated and the training of health workers began.
A massive immunization campaign that ran for 11 days in March 2006 saw the setting-up of 1495 immunization posts, and achieved a coverage of over 98% of the targeted population of children and women of childbearing age (15–44 years). Following the immunization campaign there has been a progressive decline in the incidence of rubella.

In 2016, the MR vaccine was replaced by the MMR vaccine, and Bhutan was on the home stretch.

**Rubella vaccine**

First recognized as a discrete entity by George Maton in 1814, it was Henry Veale who named the disease rubella in 1866, and over 80 years after that before the serious birth defects caused by maternal rubella were recognized.

The first rubella vaccine was developed by Maurice Hilleman, an American microbiologist and was licensed in 1969. In 1971 it was combined with the measles and mumps vaccines as the measles-mumps-rubella (MMR) vaccine.
When Bhutan set out on its journey to control the incidence of rubella and CRS, the target was to achieve this by the year 2020, in line with the goal set by the WHO Regional Office for South-East Asia. The definition of control was given as a fall of 95% from the 2008 level of incidence.

The Ministry of Health has initiated and maintains high immunization coverage and has a well-established surveillance system and planning in place in the event of an outbreak, but can we say that the ambitious target has been met?
Surveillance

Important though a robust programme of immunization is, on its own it is only half the battle for control of rubella. The other half is effective surveillance through which actionable information on the incidence of the disease can be collected. Fortunately for Bhutan, the Ministry of Health has established a meticulous system of surveillance, sparing no time, effort or resources to train personnel to the standards suggested by WHO.

A successful surveillance programme is a complex activity involving detection, notification and investigation of suspected cases. It begins with establishing standard case definitions and goes on to include routine daily and weekly reporting of suspected cases. Specimens must be collected from suspected cases and transported to a proficient laboratory for testing. Reporting, data analysis and subsequent action are all required within specified timelines.

Health-care workers at hospitals and BHUs have been trained to recognize and apply a set of uniform criteria to define rubella and CRS. This helps to create an accurate picture of the prevalence of the disease, and thereby to enable the formulation of strategies to contain it.

A National Early Warning Alert and Response Surveillance (NEWARS) system makes reporting to the Royal Centre for Disease Control (RCDC) easy, using a web-based online information system (NEWARIS). An SMS alert is also sent to the Vaccine-Preventable Disease Surveillance Office and other relevant authorities.
A good system of surveillance needs reliable laboratories where data can be analysed swiftly and accurately, so that action, both preventive and case management-related, can be quickly implemented.

The core responsibility to generate epidemiology information on public health and diseases, and to provide timely alerts and responses to outbreaks and epidemics/pandemics lies with the National Disease Surveillance and Epidemiology Unit of the Royal Centre for Disease Control. It conducts disease surveillance, conducts and coordinates the investigation of outbreaks, undertakes research and trains health professionals in field epidemiology and research.

More particularly, the National Measles, Rubella Laboratory at RCDC investigates suspected cases of rubella. Specimens are collected and delivered swiftly and safely to it through
controlled transportation with adequate cold chain maintenance. The National Measles, Rubella Laboratory provides facilities for the investigation of suspected measles and rubella cases for serology and virology for all of Bhutan, and was accredited by WHO in 2006. Genetic testing support is provided by the Regional Reference Laboratory in Thailand.

In 2017, 449 suspected cases were tested for rubella, of which nine cases were laboratory confirmed. Along with testing, virology profiling is run on the blood samples, which detects the type and source of the virus. Such testing has great relevance to determine if the virus is imported or endemic.

Molecular epidemiology analyses the unique 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 locate its origin and movement across borders. This helps surveillance track the movement of the virus from place to place.

My mother had rubella when she was expecting my baby brother, 35 years ago. Tragically, he was born with Down’s syndrome. When my mother heard that a vaccine against rubella was available, she insisted that I and my sister be vaccinated.

- Mrs Wangmo, 48-years-old from Tashigang
Controlling a potentially devastating disease such as rubella and CRS, and doing so well ahead of the target, is indeed an occasion for celebration. Able leadership, coordinated and consistent efforts to ensure delivery of a quality programme and the commitment and consistent vigilance of health staff across the spectrum needed to come together to ensure this spectacular success. The country was ready and now the only thing left was the official confirmation that Bhutan had indeed controlled rubella.

Verifying the success

Formed on 29 September 2015, the National Verification Committee (NVC) for Elimination of Measles, Rubella and CRS is an independent body with five committee members. Their mandate is to monitor population-level immunity gaps, paying attention to border areas, difficult geographical locations and nomadic populations, so that the required coverage of over 95% is met.

The NVC, once satisfied, awaits confirmation based on independent evaluation by the Regional Verification Commission (RVC) on Elimination and Rubella/Congenital Rubella Syndrome Control. At a meeting in New Delhi held between 31 July 2018 and 2 August 2018, the RVC certified that Bhutan has controlled rubella and CRS.
And so the target has been achieved, and rubella has been controlled in Bhutan. The Bhutanese government has shown great determination, grit and innovation in its public health programmes, and can justifiably feel proud of itself. But this is only the first step – total elimination of rubella and CRS are the next goals for this courageous mountain kingdom.
LESSONS LEARNT

The best systems in the world are ineffective without a good health force to implement them. In the response to control rubella, there was a synergy between leadership, planning and implementation that served to energize the entire populace, building common cause in breaking the transmission chain of the rubella virus. Some specific learnings that emerged are:

**Dynamic leadership is key.** With commitment and the will to effect change at the highest levels, it is possible to galvanize ordinary people and make a real difference.

**Planning matters.** It is an old adage that failing to plan is planning to fail. In Bhutan, meticulous planning at every level, from national to local, ensures that all areas are aligned to the national plan, and there is clarity of roles and responsibilities.

**Community engagement and support are indispensable.** Mobilizing communities and enthusing them to share ownership of the initiative create an ecosystem of demand for vaccination that leads to high coverage. Local leaders, influencers and media play an important role in this.

**Coordination is necessary.** Working seamlessly together, we achieve more. From the collection of specimens in a BHU to its transportation to the lab in Thimphu, from planning at the national level to action on the ground at the grassroots level, a coordinated approach is essential to efficiently manage the process of controlling rubella or administering any successful public health programme.
Information-sharing works. No part of the system can work in isolation, no matter how individually useful it may be. The Bhutanese experience has shown that the swift flow of information between the centre and the remotest outpost and vice versa is pivotal. Cross-border sharing of information also plays a vital part in the eventual control and eradication of rubella on a global scale.
Rubella has been controlled but not eliminated, and so the fight continues. This tiny, virulent virus remains in the shadows, ready to seize any opportunity to strike again. The high coverage of the MMR vaccine must be maintained, with the goal of reaching more than 95% coverage, generation after generation. Constant vigilance and continued prompt testing of suspected cases, combined with an aggressive management of import-related cases, are critical to ensure that Bhutan remains free from the scourge of rubella, now and in the future.
Bhutan –
healthy, happy and moving towards a rubella-free nation