

OVERVIEW

ON

Measles Vaccine

**at the Razi Vaccine and Serum
Research Institute**



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Current Products Portfolio

- ▶ Measles , Rubella , Mumps , MR, MMR
- ▶ OPV (Bopv1,3 and MOPV1)
- ▶ DTP, DT, TT
- ▶ ppd
- ▶ Sera : ATS, ADS,
- ▶ Polyvalent Anti Snake & Scorpion



Measles Virus

Paramyxovirus (RNA)

One antigenic type

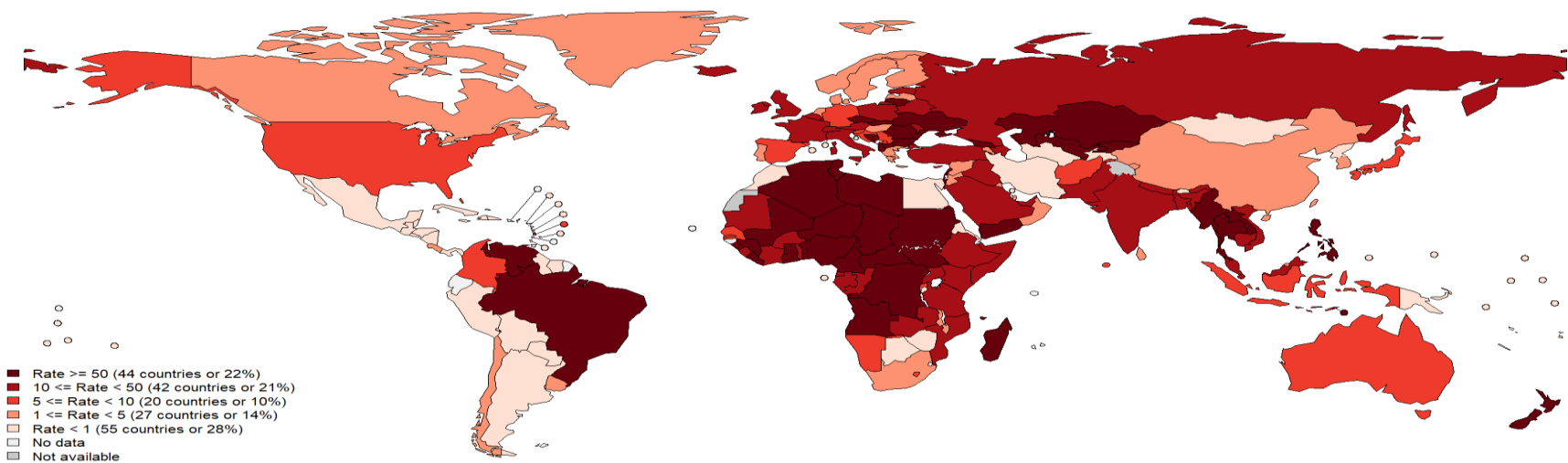
Hemagglutinin important surface antigen

Rapidly inactivated by heat and light



Measles Incidence Rate per Million (12M period)

Top 10**		
Country	Cases	Rate
Madagascar	151032	6066.87
Ukraine	78708	1771.16
Philippines	49419	478.31
India****	36251	27.38
Nigeria	27954	150.3
Brazil	18927	91.15
Kazakhstan	10696	594.63
DR Congo	9245	117.42
Yemen	9156	331.93
Thailand	7738	112.37



World Health Organization

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Data source: IVB Database

Disclaimer:
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Other countries with high incidence rates***

Country	Cases	Rate
Georgia	4710	1199.88
The Republic of North Macedonia	1902	913.89
Kyrgyzstan	2839	476.68
Israel	3442	420.17
Bosnia and Herzegovina	1399	397.8
New Zealand	1672	358.73

Measles cases from countries with known discrepancies between case-based and aggregate surveillance, as reported by country				
Country	Year	Cases in Case-based	Cases in Aggregate	Data Source for aggregate #s
DR Congo	2018	5597	67072	SITUATION EPIDEMIOLOGIQUE DE LA ROUGEOLE EN RDC, Week of 05/11/2019
	2019	7526	233,337	
Somalia	2018	131	9135	Somali EPI/POL Weekly Update Week 43
	2019	185	3616	

Notes: Based on data received 2019-11 and covering the period between 2018-10 and 2019-09 - Incidence: Number of cases / population* * 1,000,000 - * World population prospects, 2019 revision - ** Countries with the highest number of cases for the period - *** Countries with the highest incidence rates (excluding those already listed in the table above) - ****WHO classifies all suspected measles cases reported from India as measles clinically compatible if a specimen was not collected as per the algorithm for classification of suspected measles in the WHO VPD Surveillance Standards. Thus numbers might be different between what WHO reports and what India reports.

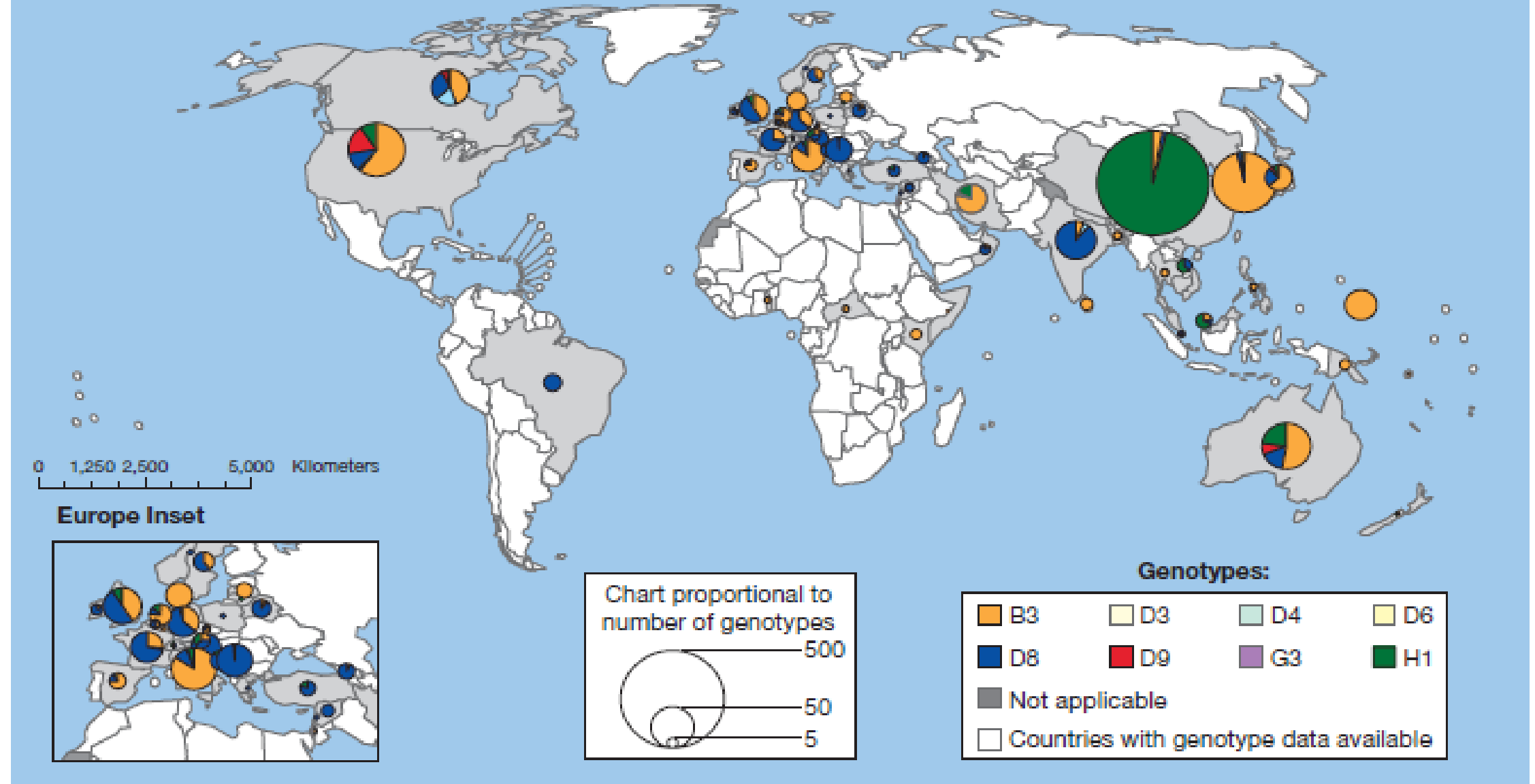
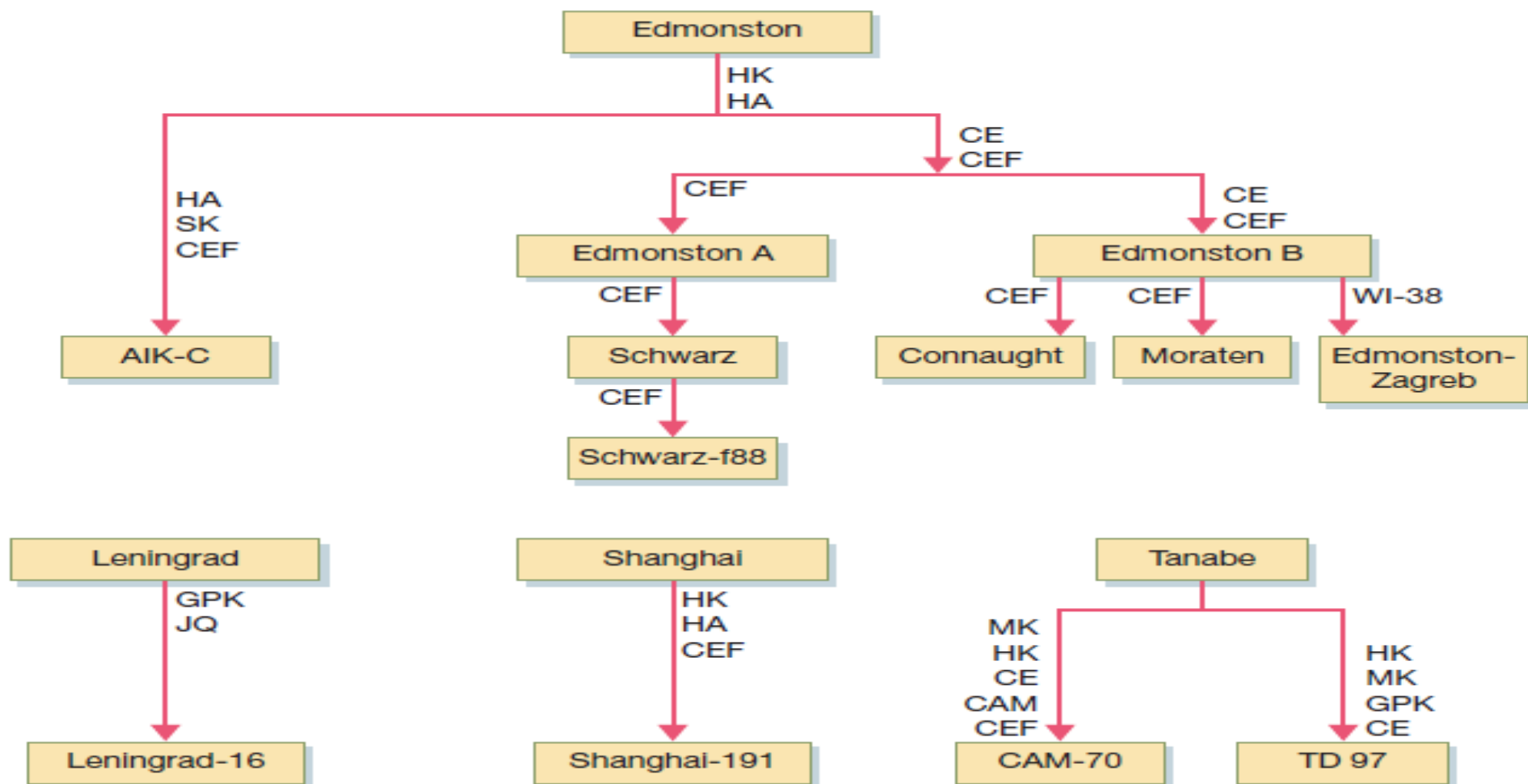


Figure 37.2. Worldwide distribution of measles virus genotypes, March 2014 to February 2015.

Measles Vaccines

- 1963** **Live attenuated and killed vaccines**
- 1965** **Live further attenuated vaccine**
- 1967** **Killed vaccine withdrawn**
- 1968** **Live further attenuated vaccine
(Edmonston-Enders strain)**
- 1971** **Licensure of combined measles-
mumps-rubella vaccine**
- 1989** **Two dose schedule**



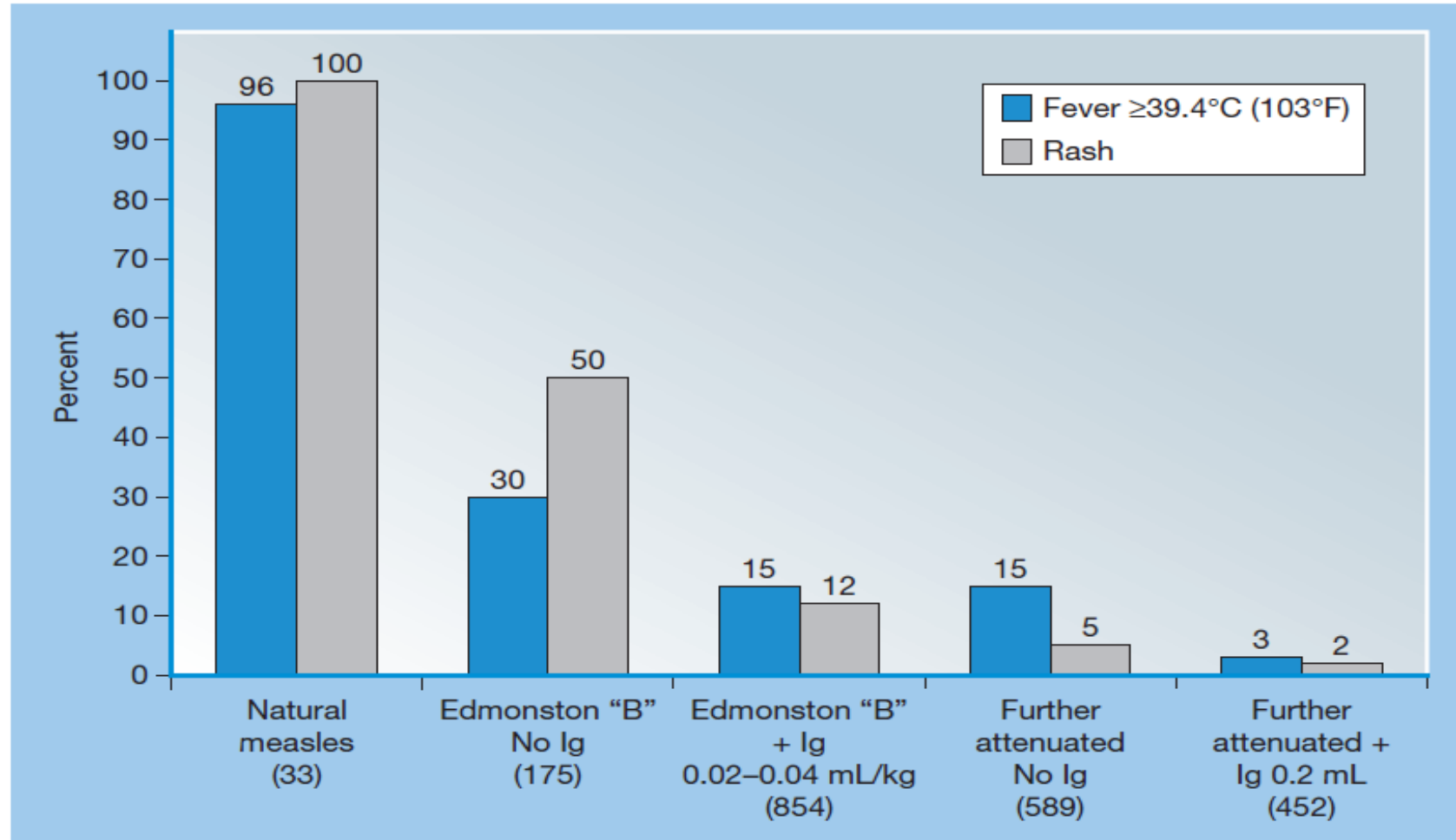


Figure 37.5. Incidence of fever and rash after natural measles infection and vaccination. The number of susceptibles is included in parentheses. Ig, immunoglobulin. (Modified from Krugman S, Giles JP, Jacobs AM, et al. *Studies with a further attenuated live measles-virus vaccine*. *Pediatrics*. 1963;31:919–928.)

The lowest clinical reactions to the AIK-C vaccine were compared to those of 5 other measles vaccine strain

TABLE 37.3 Measles Vaccine Manufacturers and Vaccine Strains Produced as of 2015

Manufacturer	Vaccine Strain
Merck (United States)	Moraten
SanofiPasteur (France)	Schwarz
GlaxoSmithKline (Belgium)	Schwarz
Government Pharmaceutical Organization (Thailand)	Schwarz
BioManguinhos (Brazil)	Schwarz
Takeda Pharmaceutical Company (Japan)	Schwarz F88
Serum Institute of India	Edmonston-Zagreb
Institute of Immunology (Croatia)	Edmonston-Zagreb
Research Foundation for Microbial Diseases of Osaka University (Japan)	CAM-70
BioFarma (Indonesia)	CAM-70
Kitasato Pharmaceutical Industry (Japan)	AIK-C ^a
The Razi State Serum Institute (Iran)	AIK-HDC/Schwarz
Moscow Plant of Biological Preparations (Russia)	Leningrad-16
Beijing Tiantan Institute of Biological Products (China)	Shanghai-191
Beijing Minhai Biotechnology Co., Ltd. (China)	Chang-47

TABLE 40.10 Incidence of Postvaccine Aseptic Meningitis Following Vaccination With MMR Vaccines Containing the Urabe Am9 Mumps Virus Strain

Manufacturer	Country (Dates Covered by Study)	Rate (N)	Type of Study and Surveillance
SANOFI PASTEUR			
Rebiere et al ⁴⁶⁸	France (1991–93)	1/28,400 (1/65,750) ^a	Retrospective: capture-recapture method
Joinville-Bera et al ⁴⁶⁹	France (1989–92)	1/121,951	Retrospective: passive surveillance; 4 of 54 cases with laboratory confirmation of mumps virus in CSF
Dos Santos et al ³¹¹	Brazil (1996)	0/2179	Randomized double-blind clinical trial in children 6 to 12 years old
GLAXOSMITHKLINE			
Furesz et al ⁴⁷⁰	Canada (1986–90)	1/62,000	Retrospective: passive surveillance; 8 cases with virologic confirmation
Dourado et al ⁴⁷¹	Brazil (1997)	1/14,000 (452,344)	Prospective: passive surveillance of hospital admissions for meningitis; 32 cases identified
Miller et al ¹⁸⁰	UK (1991–92)	1/12,400 (49,585)	Retrospective: computerized hospital records for children ages 12–23 months with meningitis; 4 cases identified
SANOFI PASTEUR OR GLAXOSMITHKLINE^b			
Miller et al ⁴⁷²	UK (1990–91)	1/11,000 (78,300)	Retrospective: CSF evaluation in children discharged with diagnosis of meningitis within 15 to 35 days after MMR vaccination; 4 of 13 cases virus positive
Farrington et al ⁴⁷³	UK (1988–93)	1/15,000 (77,200)	Retrospective: linkage of vaccination records and hospital discharge for meningitis; 5 cases identified
JAPAN MINISTRY OF HEALTH AND WELFARE OR BIKEN			
Fujinaga et al ⁴⁷⁴	Japan (1989)	1/336 (11,750)	Retrospective: passive surveillance; 35 cases identified
Sugiura et al ⁴⁷⁵	Japan (1989)	1/6,564 (630,157)	Retrospective: surveillance by physicians; 96 cases with viral confirmation
Ueda et al ³⁶⁷	Japan (1990–93)	1/905 (5430)	Prospective: active surveillance by parents; 6 cases identified
Ueda et al ³⁶⁷	Japan (1990–93)	0/566 (566)	Prospective: active surveillance by parents; physician confirmed
MANUFACTURER NOT SPECIFIED			
Maguire et al ⁴⁷⁶	UK (1990–91)	1/61,000 (est. 1,650,000)	Prospective: passive surveillance by physicians with active follow up by laboratory or clinical confirmation; 7 definite cases, 17 probable cases
Colville et al ⁴⁷⁷	UK (1988–91)	1/3,800 doses	Retrospective: 6 virologically confirmed cases in a small population
Al Mazrou et al ⁴⁷⁸	Saudi Arabia (2000)	1/295,000 (est. 2,000,000)	Prospective: active surveillance following booster vaccination in a “catch-up” campaign; 6 cases confirmed

^aRate of 1/28,400 is based on an estimate of 116 cases of postvaccine aseptic meningitis by the capture-recapture method. The actual number of observed cases was 46, and no virus isolation was carried out. The rate calculation using the number of observed cases is 1:65,750.

^bAt the time of the study, Urabe Am9 vaccines manufactured by both Sanofi Pasteur (then Aventis Pasteur) and GlaxoSmithKline were licensed, and it is not possible to relate occurrence of postvaccine aseptic meningitis to a specific vaccine.
CSF, cerebrospinal fluid; MMR, measles, mumps, rubella; UK, United Kingdom.

Measles Vaccine

Time line vaccine In IRAN

development of the live attenuated measles vaccine by Enders and his colleagues in 1960

1. measles vaccination in 1967
2. first local production in 1967 at the Razi Institute using the Sugiyama strain
3. By the end of 1972, approximately 5 million children received this vaccination

By the end of 1975, over 7.5 million children from 9 months to 5 years of age were vaccinated

From 1967 to 1976, the Razi institute produced more than 12,000,000 dose vaccine

Development of a New Measles Vaccine in Iran

1. in 1973 at the Kitasato Institute in Japan with cooperation of IRAN (Razi) marked the beginning of research that made available the new live attenuated measles vaccine (MV), AIK-C. The strain was named AIK to represent the three countries that collaborated to develop it.



AIK STRINE

90% of children develop protective antibody levels when given 1 dose of MVat 9 months of age, whereas 90 - 95% respond when vaccinated at 12 months

From the time of the vaccine licensure in 1963 until the end of 2020, over 120 million doses of the measles vaccine were produced at the Razi institute in Iran.

annual incidence of measles over the period of 1967 – 1976 was 150,000 - 500,000, and the mortality was 5 - 10%

The successful and high-quality local measles vaccine resulted in < 1 case per million residents during 2004 -2009.

Recent surveys have revealed a greater than 92% seropositivity in Iranian children



- 2003 : Iranian campaign : World's largest vaccination operation. Measles and Rubella (MR) vaccine was administered to more than 33 million people aged between 5 and 25 years, in less than one month : Decline in measles incidence due to the vaccination. Ref. : [Bahman Pourabbas et al Efficacy of measles and rubella vaccination one year after the nationwide campaign in Shiraz, Iran; Int.ernational Journal of Infectious Diseases \(2008\) 12, 43—46.](#)

■

MR vaccine was used extensively in mass immunization campaigns in various countries in Latin America, Southern Europe, Central Asia, East Asia and Western Asia



The elimination of measles in Iran

In 2019, when the Eastern Mediterranean region WHO was experiencing its greatest upsurge in measles cases, Iran received a certificate for measles elimination in October 2019. Iran, with a population of approximately 82 million, is the third country in the Eastern Mediterranean region that has achieved the status of measles elimination, after Oman and Bahrain, both of which have a relatively small population. However, without sustained attention

Iran also received the certification for rubella elimination in May, 2019. The number of rubella cases had dramatically decreased from 1154 cases in 2000, to 33 cases in 2018.



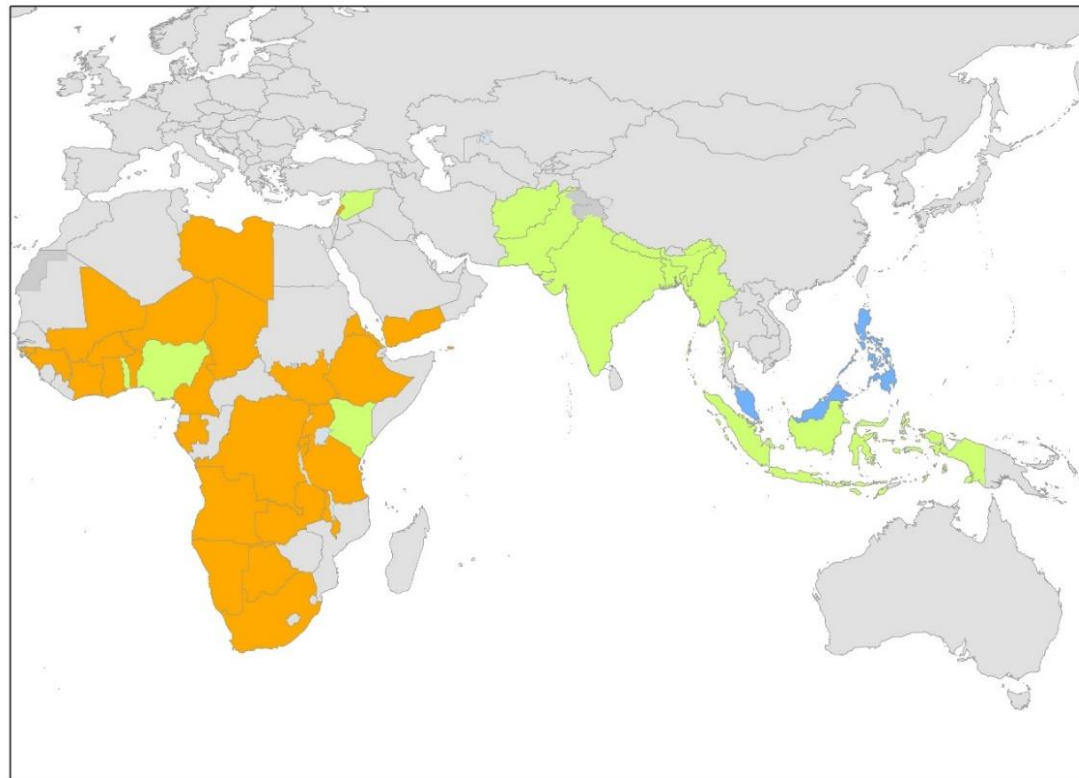
Impact of Covid-19

MASS VACCINATION CAMPAIGNS - 3 MONTH-PAUSE:

Campaigns (polio, measles..) put on hold in > 35 countries

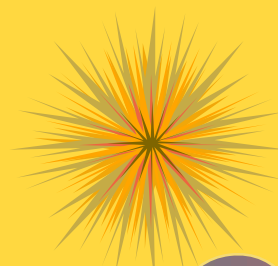
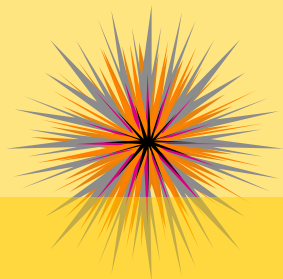
At least **80 million children under one at risk** of polio, measles, diphtheria, etc..

POLIO RESOURCES REPURPOSED TO
SUPPORT RESPONSE TO COVID-19
PLANNING NOW TO









THANK YOU

