VACCINES
PROGRESS AND CHALLENGES

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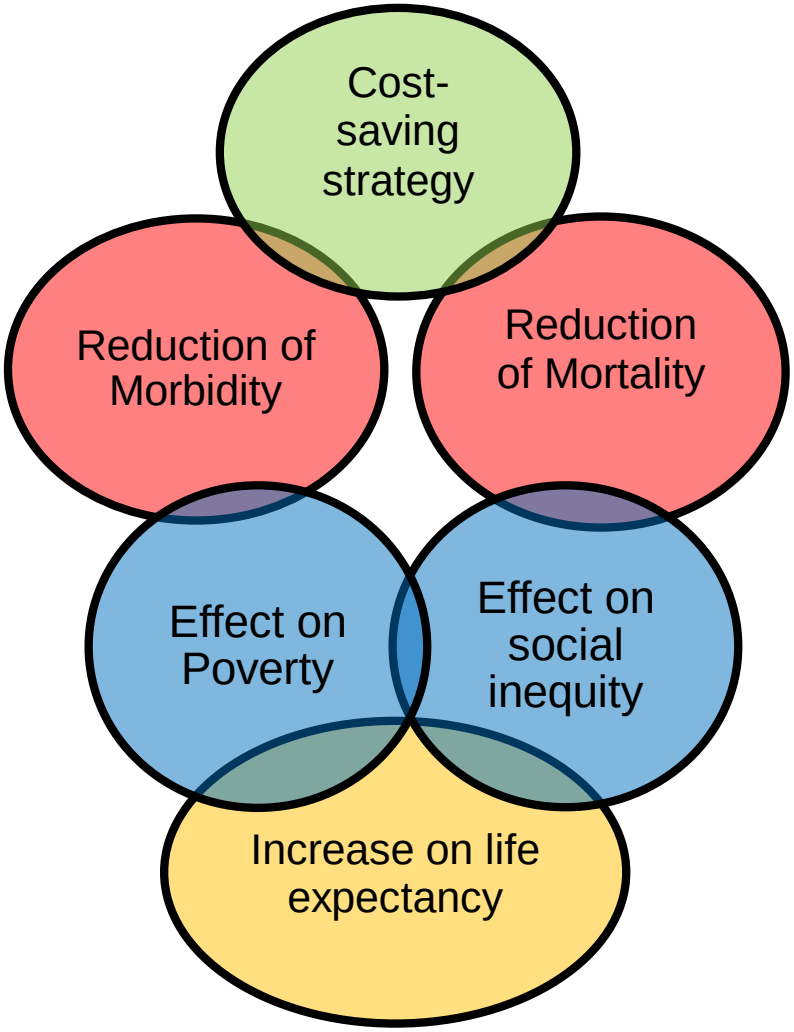
Conflicts of Interest

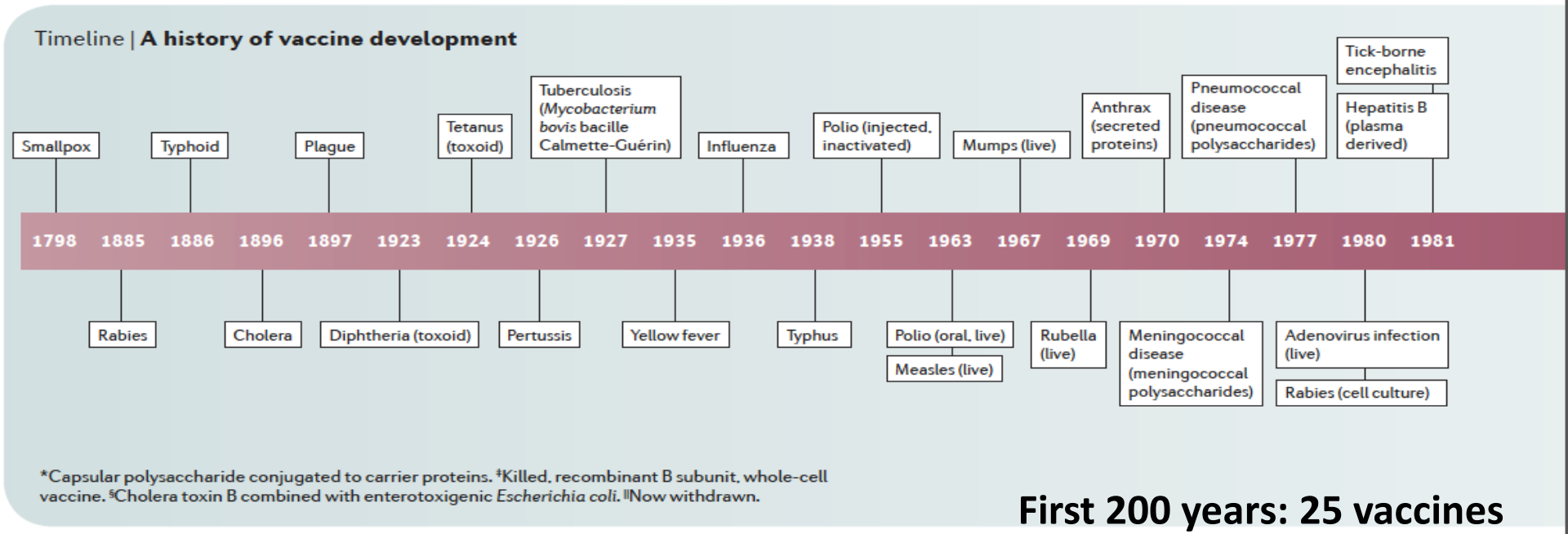
- Research grants for vaccine trials provided by Takeda, GSK, Sanofi, Janssen, Gilead, NIH and Gates Foundation
- Member of Advisory Boards for Takeda, GSK, Janssen
- Member of DSMB (Data Safety Monitoring Board) for Novavax and Janssen

IMPACT OF VACCINATION

“With the exception of potable water, no other strategies, not even the antibiotics, have induced a greater reduction on morbidity and mortality than vaccination”

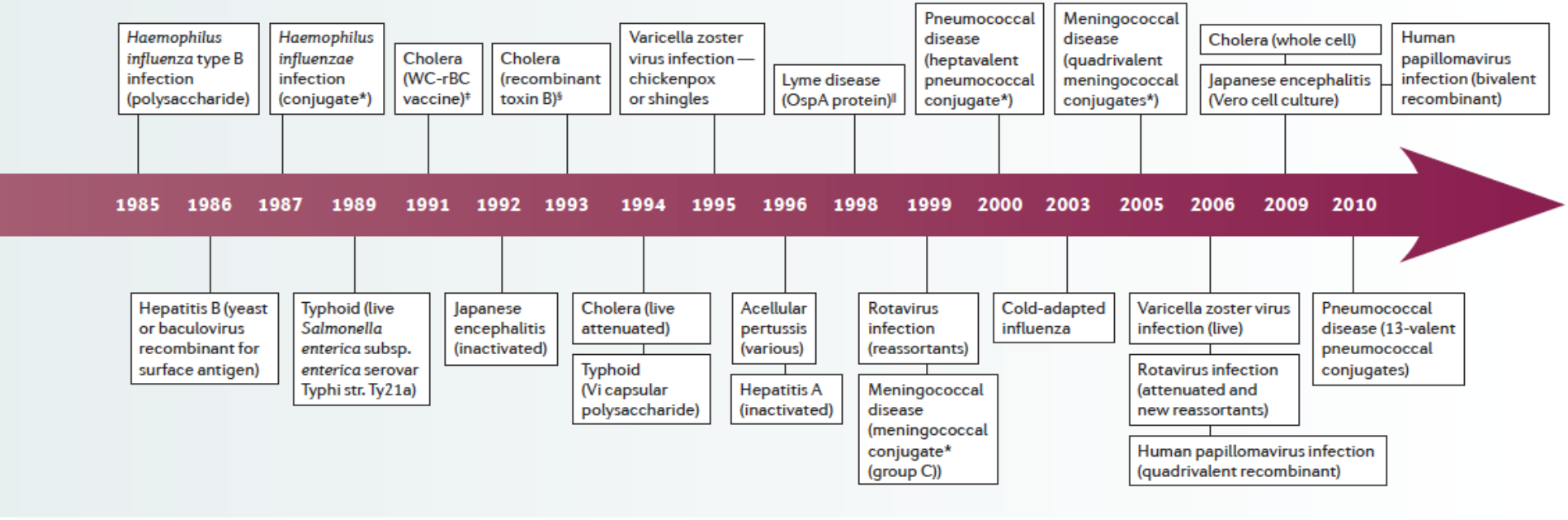


1. Plotkin *et al*. Ch 1 in Plotkin *et al*. Vaccines. 6th Edition, Elsevier Saunders, 2012; 2. WHO. Influenza. Available at: http://www.who.int/mediacentre/factsheets/2003/fs211/en/ (accessed November 2014); 3. Andre *et al*. WHO 2008;86(2):81–106; 4. Ehreth. *Vaccine* 2003;21:4105–17.



First 200 years: 25 vaccines

Last 25 years: 25 vaccines



Impact of the Immunization Program in The Americas

Morbilidad

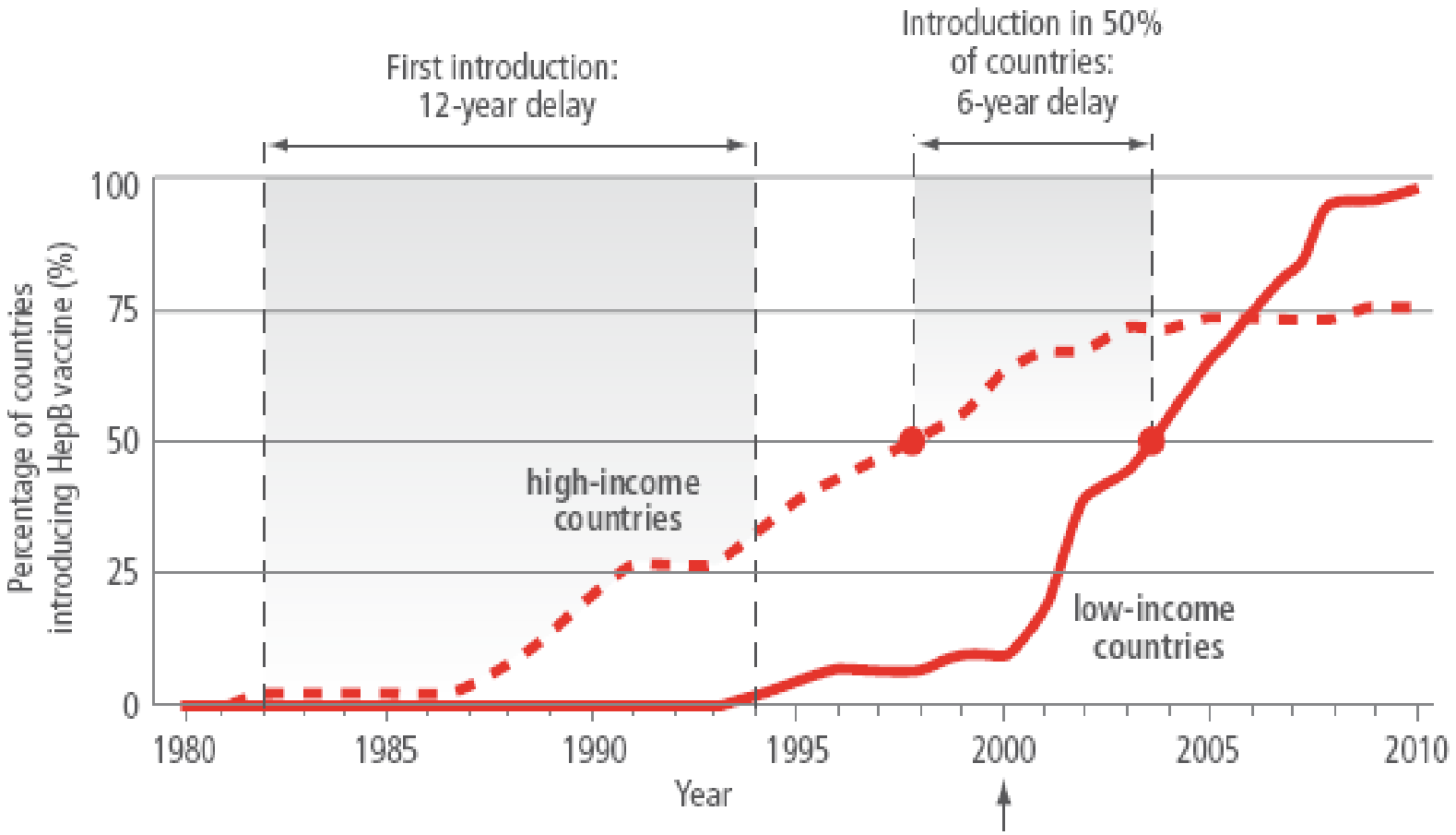
Enfermedad	# Casos antes de la vacuna	# Casos despues de la vacuna	
Polio	2.989 (1980)	0 (2014)	**100%**
Rubéola endémica	125.056 (1997)	0 (2014)	**100%**
Síndrome rubéola congénita	80 (2000)	0 (2014)	**100%**
Difteria	5.570 (1980)	9 (2014)	**99%**
Tétanos neonatal	803 (1980)	10 (2014)	**99%**
Sarampión	257.790 (1980)	1.996 (2014)	**99%**

Mortalidad

Enfermedad	# Muertes antes de la vacuna	# Muertes despues de la vacuna	
Polio	18 (1980)	0 (2014)	**100%**
Sarampión	950 (1990)	0 (2014)	**100%**
Tétanos neonatal	116 (1996)	3 (2014)	**97%**
Rotavirus	15,000 (2004)*	7,238 (2014)*	**52%**

*** Estimados OPS en 2014; Fuente: OPS-OMS/UNICEF (cortesía: Dra. María Luisa Avila)**

History of the Introduction of new vaccines in the world



WHO, Vaccine Introduction Database

Current decision-making in the LA Region

In the past:

- Ministry of Health (epidemiologists, public health specialists, PAHO representatives)
- Media, Government, Manufacturer lobby

Currently (same plus):

- Robust EPI programs + PAHO Revolving Fund
- Advisory Board on Practices of Immunization
- Academic Societies (Pediatrics, ID, PH, OB-GYN)
- Participation of countries in vaccine multicenter trials

Vaccines in the LA Region

In all countries:

- BCG (at birth), DTPa-w + Hib-HB-IPV (bOPV), HA (1-2 doses), MMR (2 doses), Pneumococcus (3+1, 2+1), Influenza, Rotavirus (2-3 doses): **14 diseases**

In many countries:

- Varicella (1-2 doses), HPV (2-3 doses, age cohort)

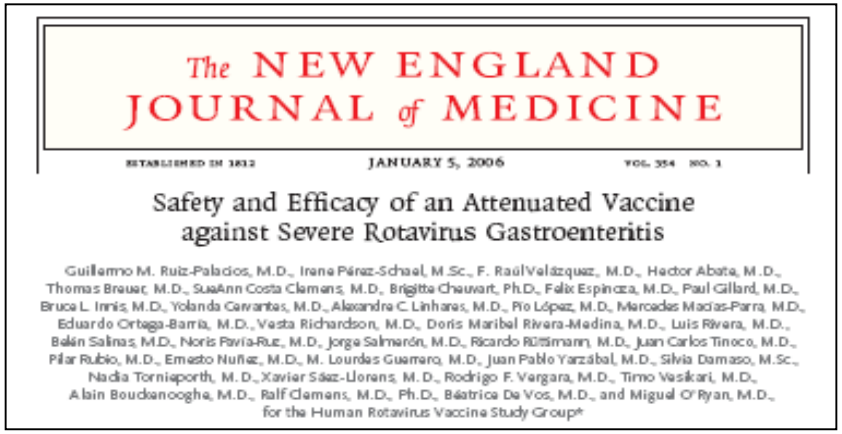
In some countries:

- Meningococcus A-C-Y-W (B?), YF, Dengue, Cholera

Relevant Vaccination Achievements in the Region

- Poliomyelitis eradicated in 1991
- Indigenous measles eliminated in 2002
- Congenital rubella syndrome eliminated in 2010
- First region in incorporating universal rotavirus vaccination
- Pioneer vaccine trials in many LA countries: rotavirus, pneumococcus, meningococcus, HPV, influenza, hepatitis A, pertussis, varicella, yellow fever, dengue, polio, norovirus, and now RSV

Paper of the year 2006, Lancet



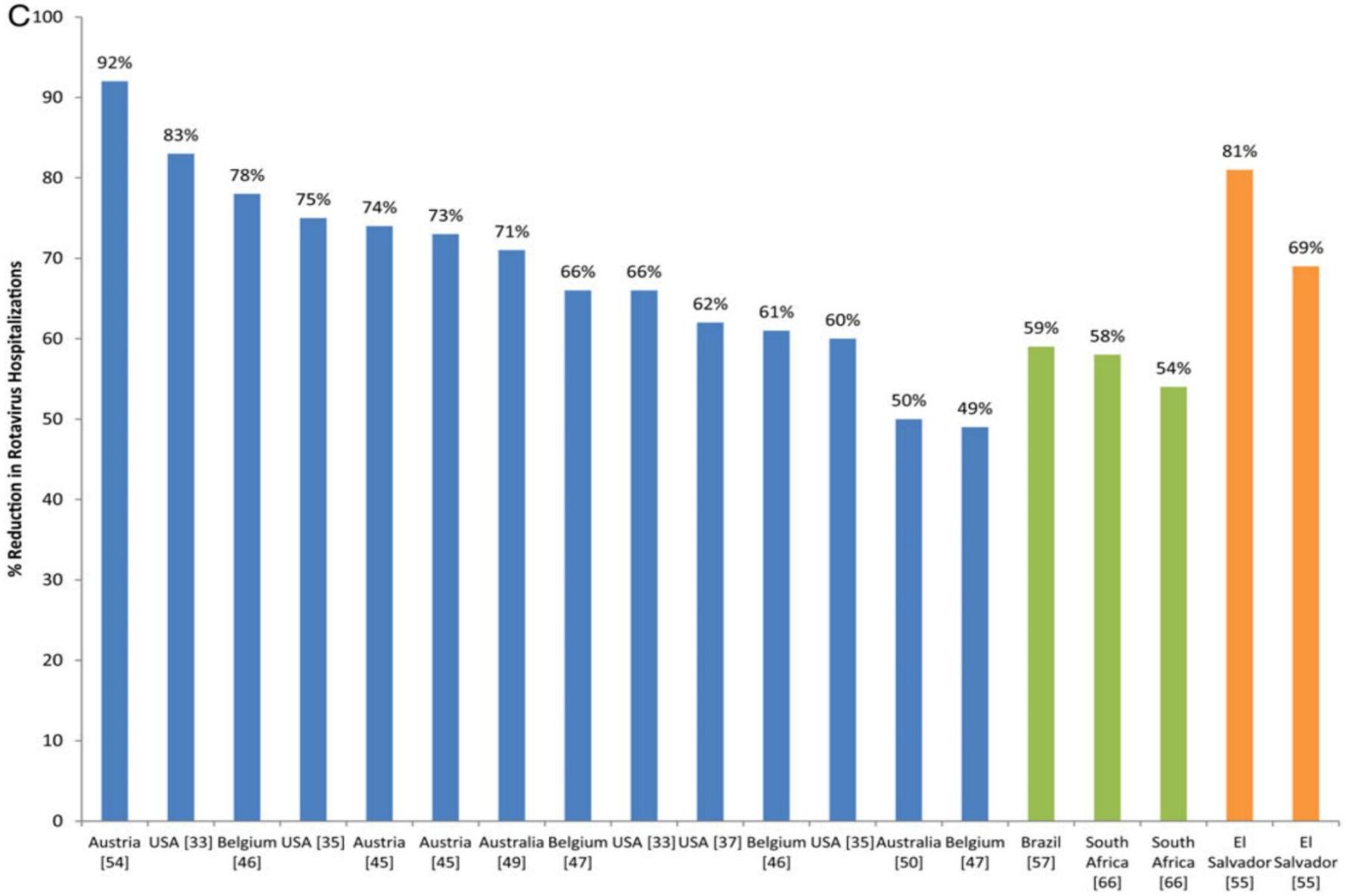
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JANUARY 5, 2006 VOL. 354 NO. 1

Safety and Efficacy of an Attenuated Vaccine against Severe Rotavirus Gastroenteritis

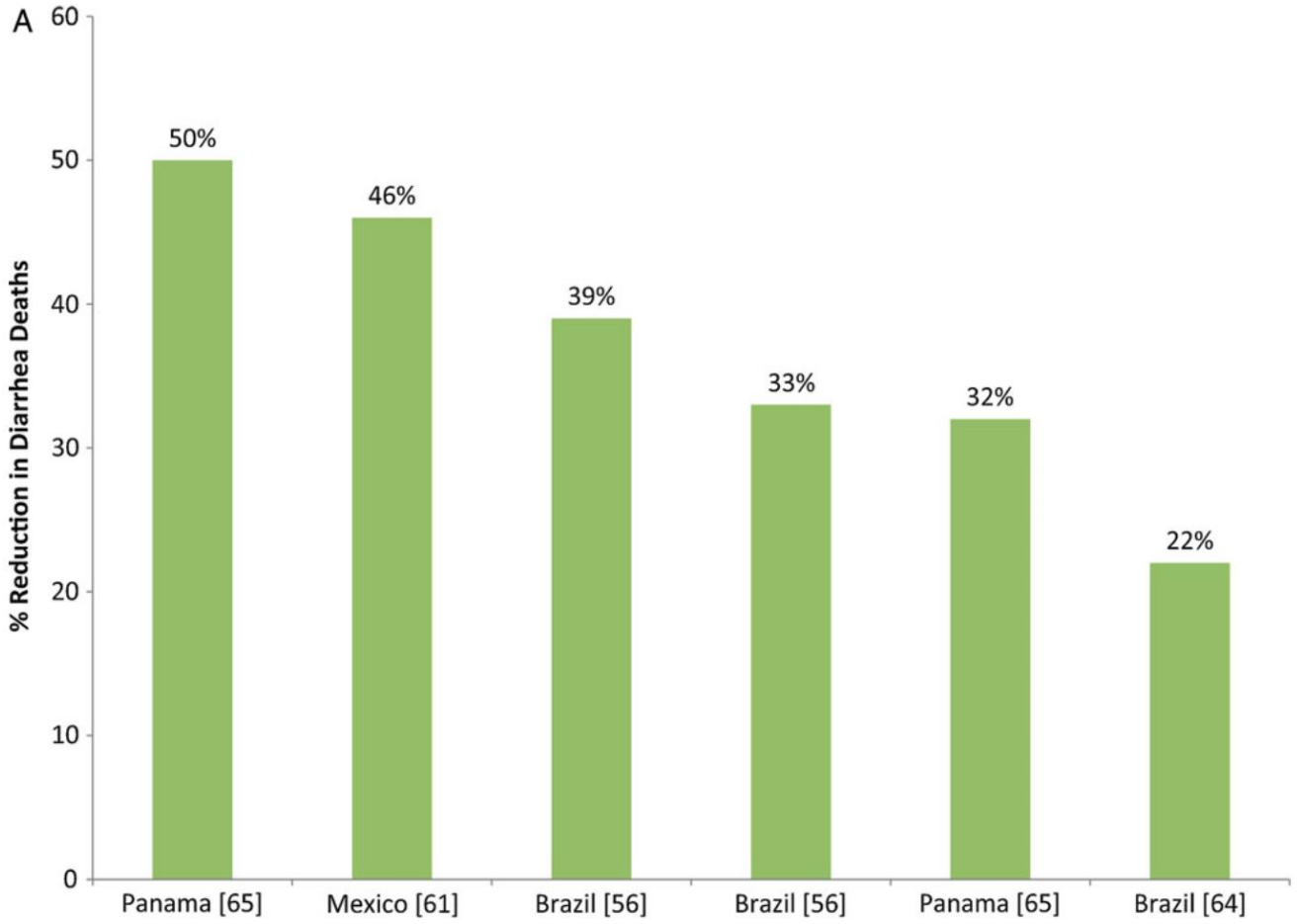
Guillermo M. Ruiz-Palacios, M.D., Irene Pérez-Schael, M.Sc., F. Raúl Velázquez, M.D., Hector Abate, M.D., Thomas Breuer, M.D., SueAnn Costa Clemens, M.D., Brigitte Cheuvart, Ph.D., Felix Espinoza, M.D., Paul Gillard, M.D., Bruce L. Innis, M.D., Yolanda Cervantes, M.D., Alexandre C. Linhares, M.D., Pio López, M.D., Mercedes Macías-Parra, M.D., Eduardo Ortega-Barría, M.D., Vesta Richardson, M.D., Doris Maribel Rivera-Medina, M.D., Luis Rivera, M.D., Belén Salinas, M.D., Noris Pavía-Ruz, M.D., Jorge Salmerón, M.D., Ricardo Rüttimann, M.D., Juan Carlos Tinoco, M.D., Pilar Rubio, M.D., Ernesto Nuñez, M.D., M. Lourdes Guerrero, M.D., Juan Pablo Yarzábal, M.D., Silvia Damaso, M.Sc., Nadia Tornieporth, M.D., Xavier Sáez-Llorens, M.D., Rodrigo F. Vergara, M.D., Timo Vesikari, M.D., Alain Bouckenooghe, M.D., Ralf Clemens, M.D., Ph.D., Béatrice De Vos, M.D., and Miguel O'Ryan, M.D., for the Human Rotavirus Vaccine Study Group*

Reduction of hospitalizations by rotavirus diarrhea in children <5 years after vaccine introduction



Tate JE et al. Clin Infect Dis 2014: 1291-1301

Reduction in deaths caused by Rotavirus GE in Children <5 years after vaccine introduction



Tate JE et al. Clin Infect Dis 2014: 1291-1301

Original Article

National legislation and spending on vaccines in Latin America and the Caribbean

Michael McQuestion[a,d,*], Ana Gabriela Felix Garcia[b], Cara Janusz[b], and Jon Kim Andrus[c]

- **Period 1980-2015**
- **1980: only 2 countries with vaccination laws**
- **2003: 9 countries**
- **2011: 27 (92% of the whole region population)**
- **Impact: Increased investment on vaccines, reduction of vaccine introduction gaps, decreased infant hospitalization and mortality**

Journal of Public Health Policy 2017; 38:3–15

Factors contributing to a successful immunization program within the PAHO Region

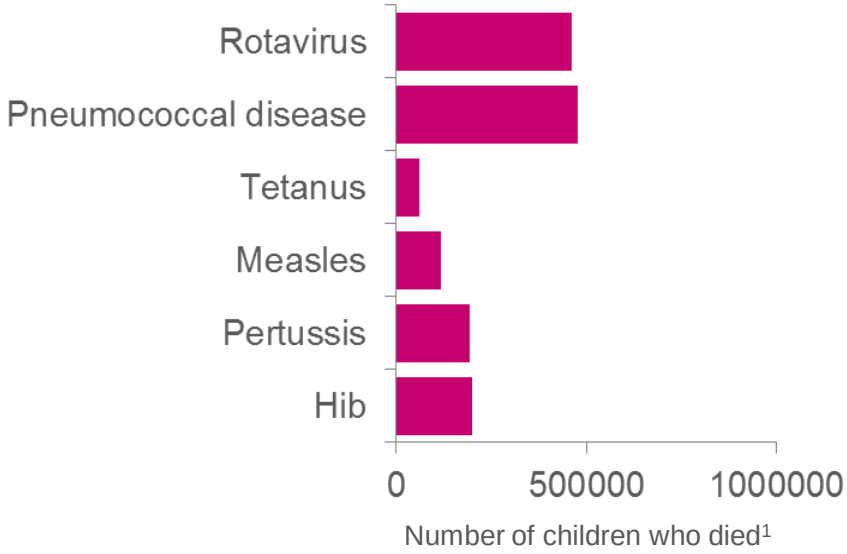
- Commitment of member countries to immunization as a priority
- Immunization considered a critical intervention in public health
- Investment on vaccination viewed as a social product but also as a long-term direct and indirect saving strategy
- Better understanding of society about the value of considering immunization as part of a right and responsability
- Considering a strong immunization program as an integral part of a well-functioning health system
- Encouraging sustainable access to funding, quality supply and innovative technologies
- Promotion of local and regional research to characterize burden of diseases, investigation of new vaccines, and cost-benefit analysis

Challenges in the field of vaccinology

1 in 5 of all children who die before the age of five lose their lives to vaccine-preventable diseases[1]

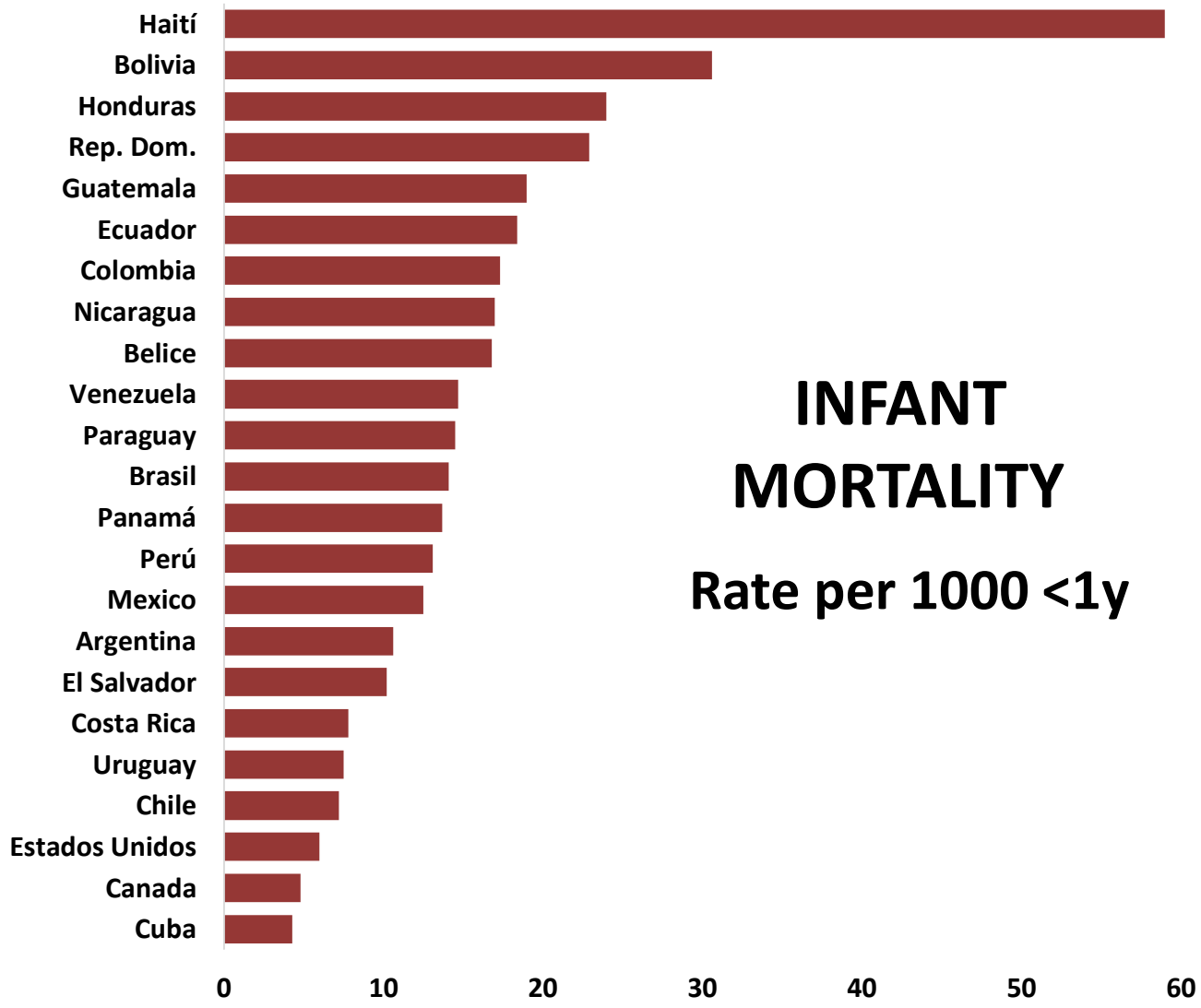
In 2011 alone, 1.5 million children under 5 years of age died from **vaccine-preventable** diseases[1]

'There remains an **urgent need** to reach all children with life-saving vaccines'[2]



1. WHO. Global Immunization Data. http://www.who.int/immunization/monitoring_surveillance/global_immunization_data.pdf (accessed January 2017);
2. Gates Foundation. Vaccine Delivery. http://www.gatesfoundation.org/What-We-Do/Global-Development/Vaccine-Delivery (accessed January 2017

The risk to die in early infancy shows important differences among countries within the PAHO region….



source: OPS/OMS, Health Information Platform for the Americas (PLISA), June 2017

Vaccination along the people life span

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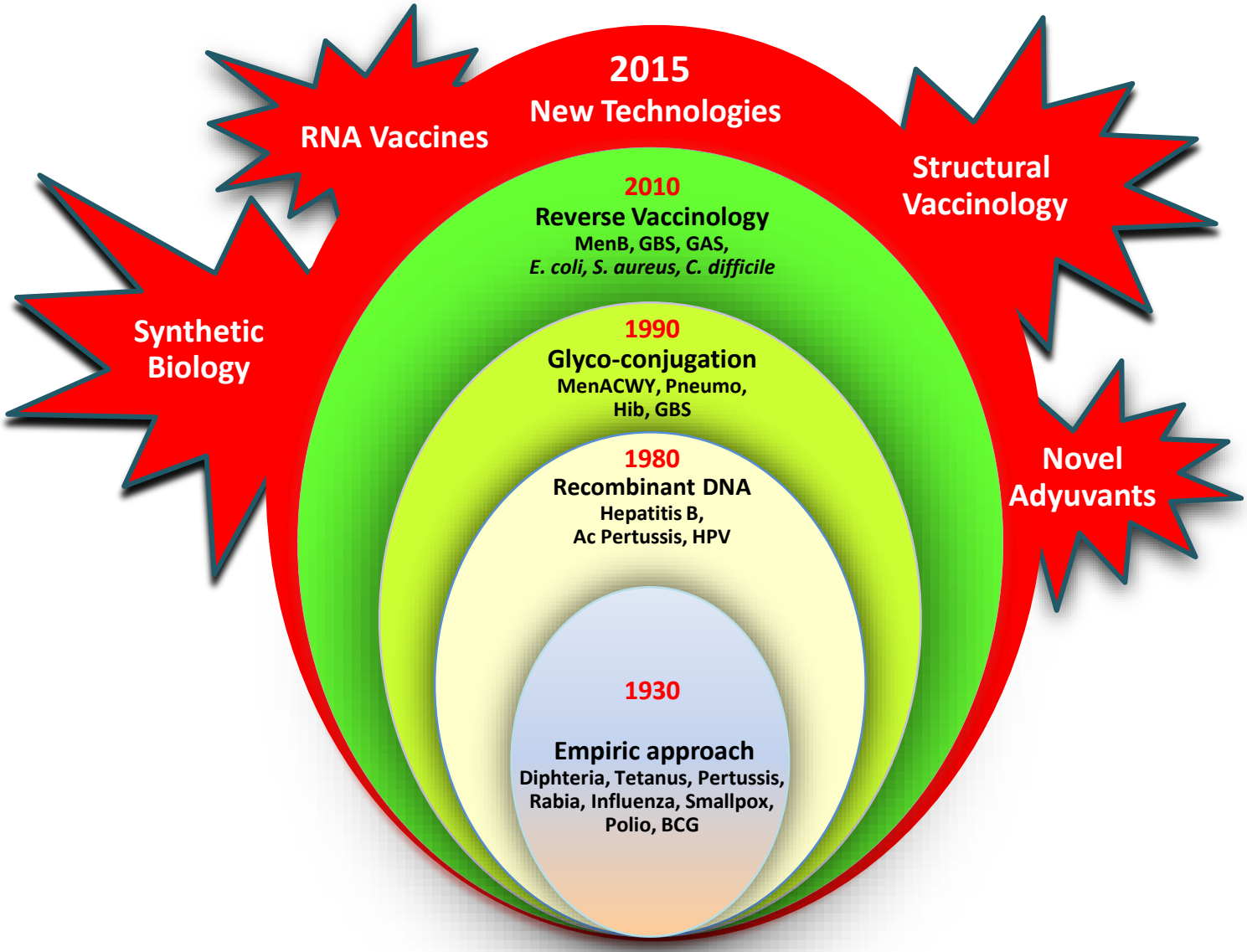
1. CDC, 2016. http://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-child-combined-schedule.pdf
2. ECDC, 2016. http://vaccine-schedule.ecdc.europa.eu/pages/scheduler.aspx
3. CDC, 2016. http://www.cdc.gov/vaccines/schedules/downloads/adult/adult-schedule.pdf
4. Rappuoli R *et al. Nat Rev Immunol* 2011;11:865–872; 5.
5. CDC, 2016. Guidelines for vaccinating pregnant women. http://www.cdc.gov/vaccines/pregnancy/hcp/guidelines.html

Vaccines: from empiric approaches to modern technologies



Finco O and Rappuoli R. *Frontiers in Immunology.* 2014; 5:1-6

Vaccination threatenings

- Social, economic and political variabilities among countries of the region
- Low immunization coverage in many communities within countries
- Poor immunization strategies in adolescents, adults and pregnant women
- Risk of disease reemergence (low coverage), importation (polio, diphteria, measles, yellow fever) or new infections (dengue, chikungunya, zika)
- Poor compromise of media to inform properly about benefits of vaccines (many fake news about adverse events)
- Unification of message among vaccine scientists and advocates: “vaccines do not save lives, vaccination does”

“If you want to go fast walk alone, if you want to go further walk together”

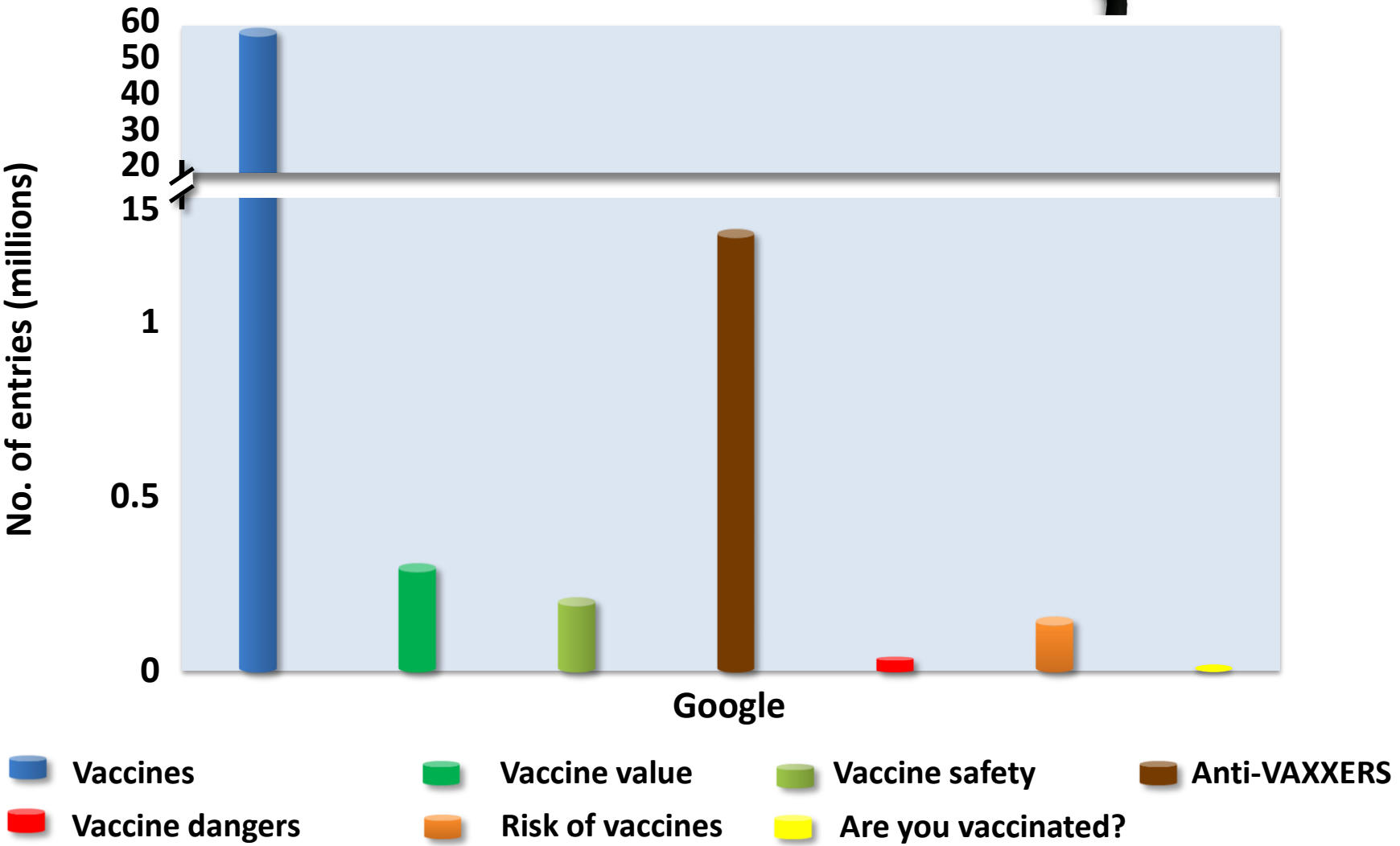
nature
International journal of science

WORLD VIEW · 16 OCTOBER 2018

The biggest pandemic risk? Viral misinformation

A century after the world's worst flu epidemic, rapid spread of misinformation is undermining trust in vaccines crucial to public health, warns Heidi Larson.

Google 2017: Vaccine entries



VACCINATION FOR ANTI-VAXXERS