IPV In Developing Countries

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IPV as a Supplement to OPV

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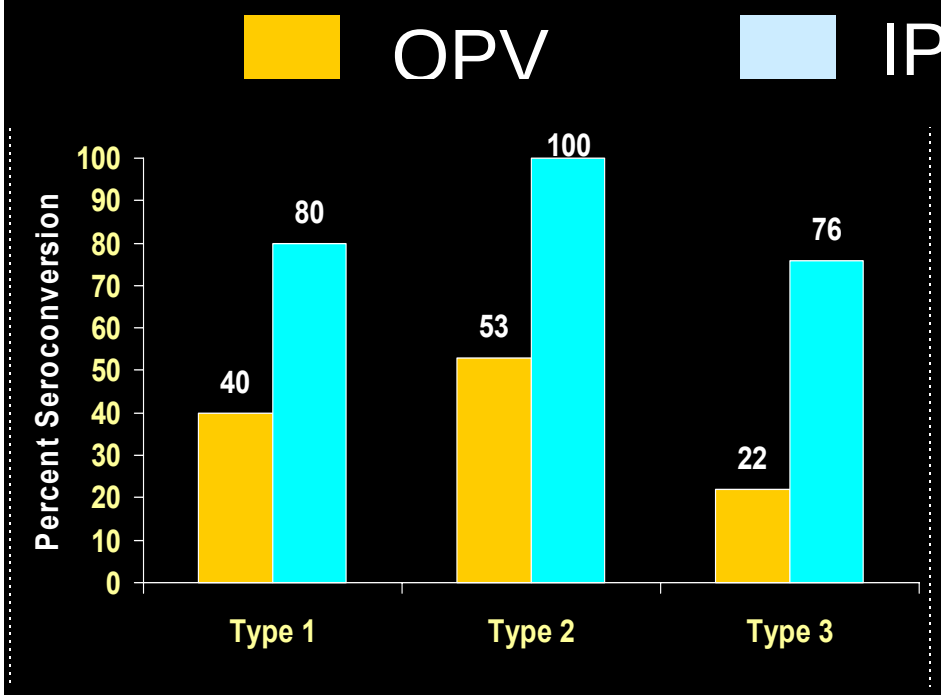
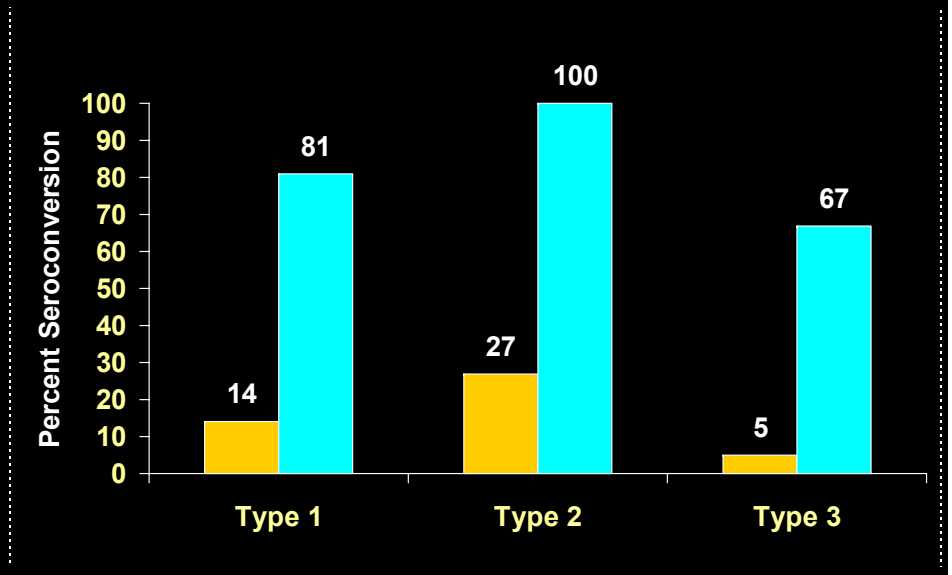
Percent Seroconversion after 1 Dose of OPV or IPV Among Seronegative* Children 6 or 9 Months of Age: Cote d'Ivoire



6 mo



9 mo

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Source: Morniere 1993;345:1545

Effect of Supplemental doses of IPV and OPV after 5 doses of tOPV on Type 3 Antibody Response: Oman

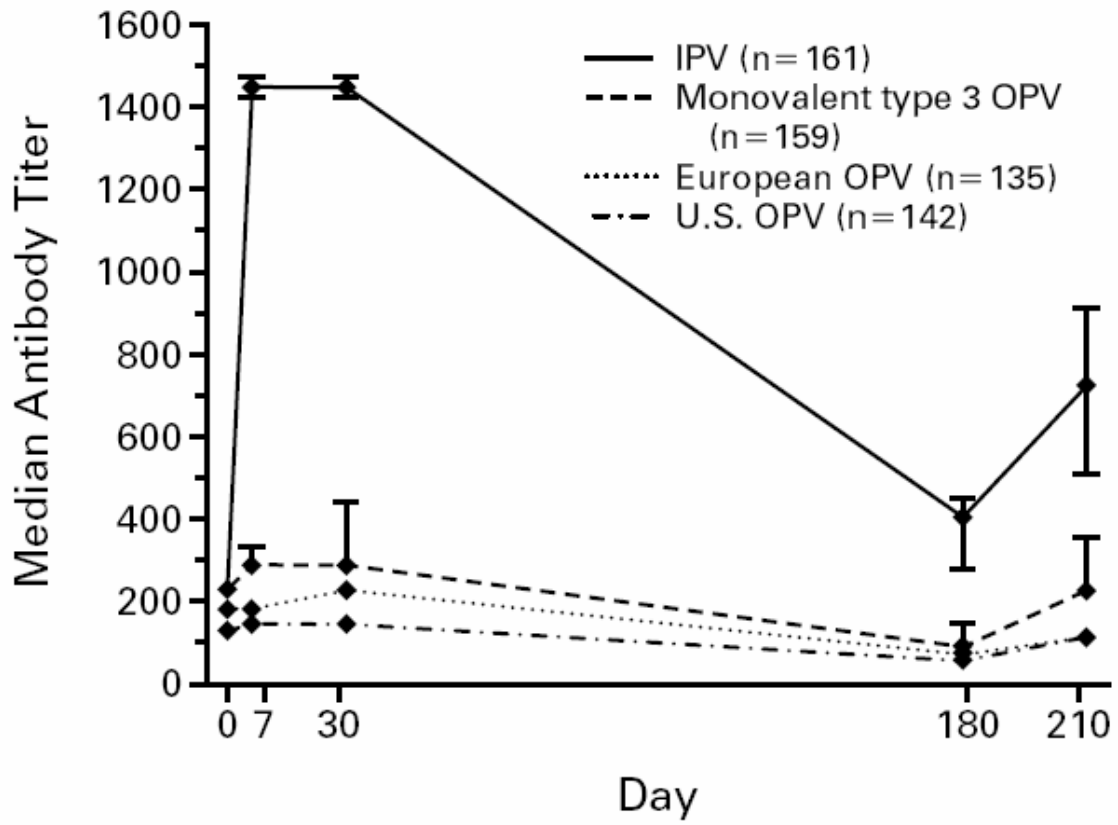

Figure 1. Median Serum Titers of Poliovirus Type 3 Antibody over Time in Infants in Oman Who Were Given a Supplemental Dose of Poliovirus Vaccine at Nine Months of Age, According to the Type of Vaccine.

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Sutter et al. N Engl J med 2000;343:767

IPV for Primary Immunization

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Early India Studies

Seroconversion in tritypic seronegative infants

Interval between doses	No	Seroconverted to poliovirus		
		Type 1	Type 2	Type 3
4 weeks	45	45 (100%)	41 (91·1%)	41 (91·1%)
8 weeks	22	22 (100%)	22 (100%)	21 (95·5%)
Both groups	67	67 (100%)	63 (93·9%)	62 (92·5%)

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Krishnan et al BMJ 1982: 284: 64

India eIPV by Intervals

- 2 doses 4 wk intervals
- Types 1, 2 and 3 84%-100%
- Effects of age, intervals, maternal antibody

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Simoes et al Am J Dis Child. 1985 Oct;139(10):977-80

Percentage of Children with Neutralizing Titers ≥ 1:8, Kenya 1982

	eIPV x 2	OPV x 3	eIPV x 3
Type 1	94%	92%	100%
Type 2	88%	98%	100%
Type 3	97%	90%	98%

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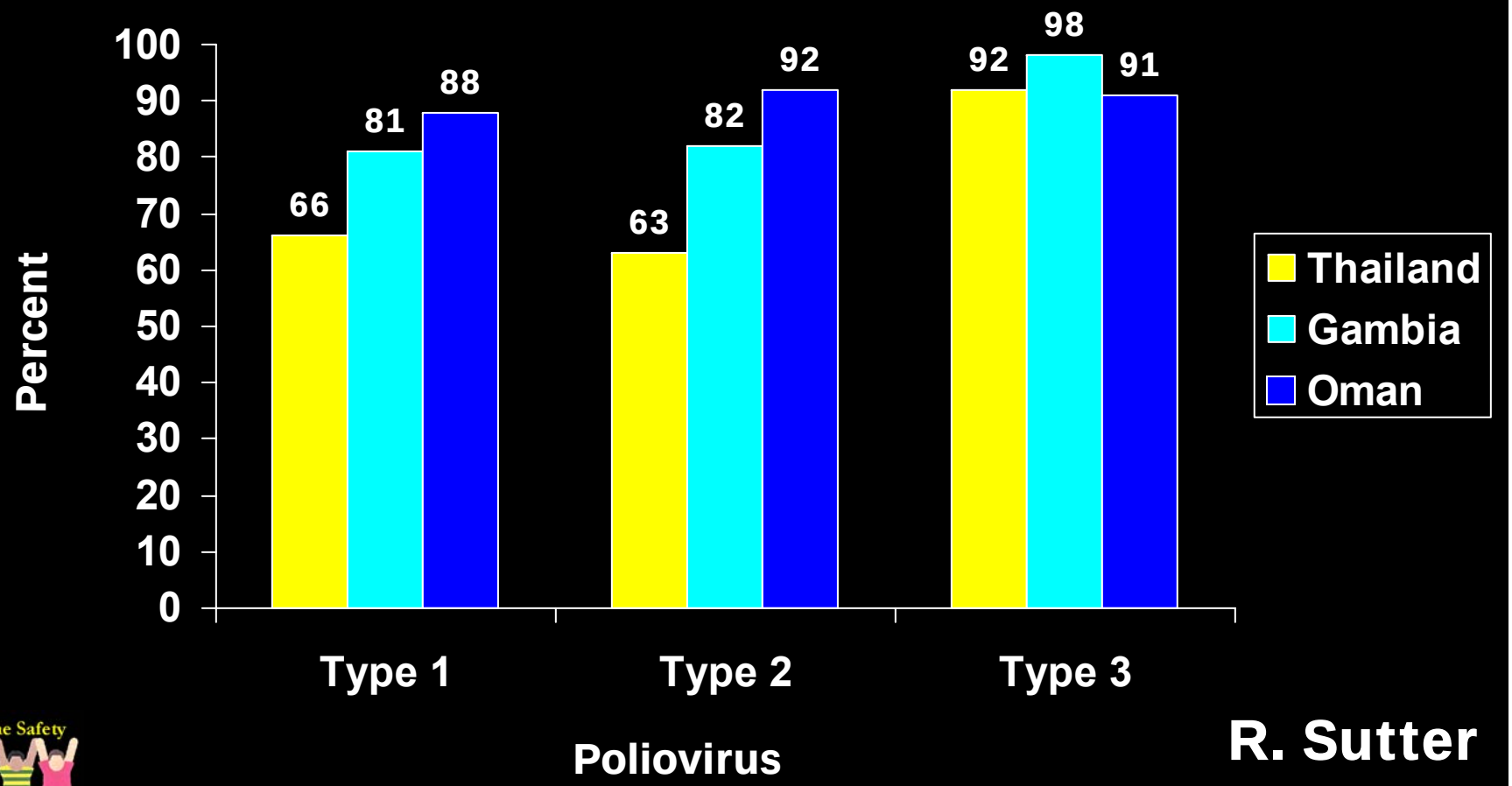
Kok PW, et al. Bulletin WHO 1992;70:93-103.

Seroprevalence to Poliovirus Types 1, 2, and 3 at 24 Weeks after IPV at 6, 10 and 14 Weeks, Thailand, Gambia, and Oman*



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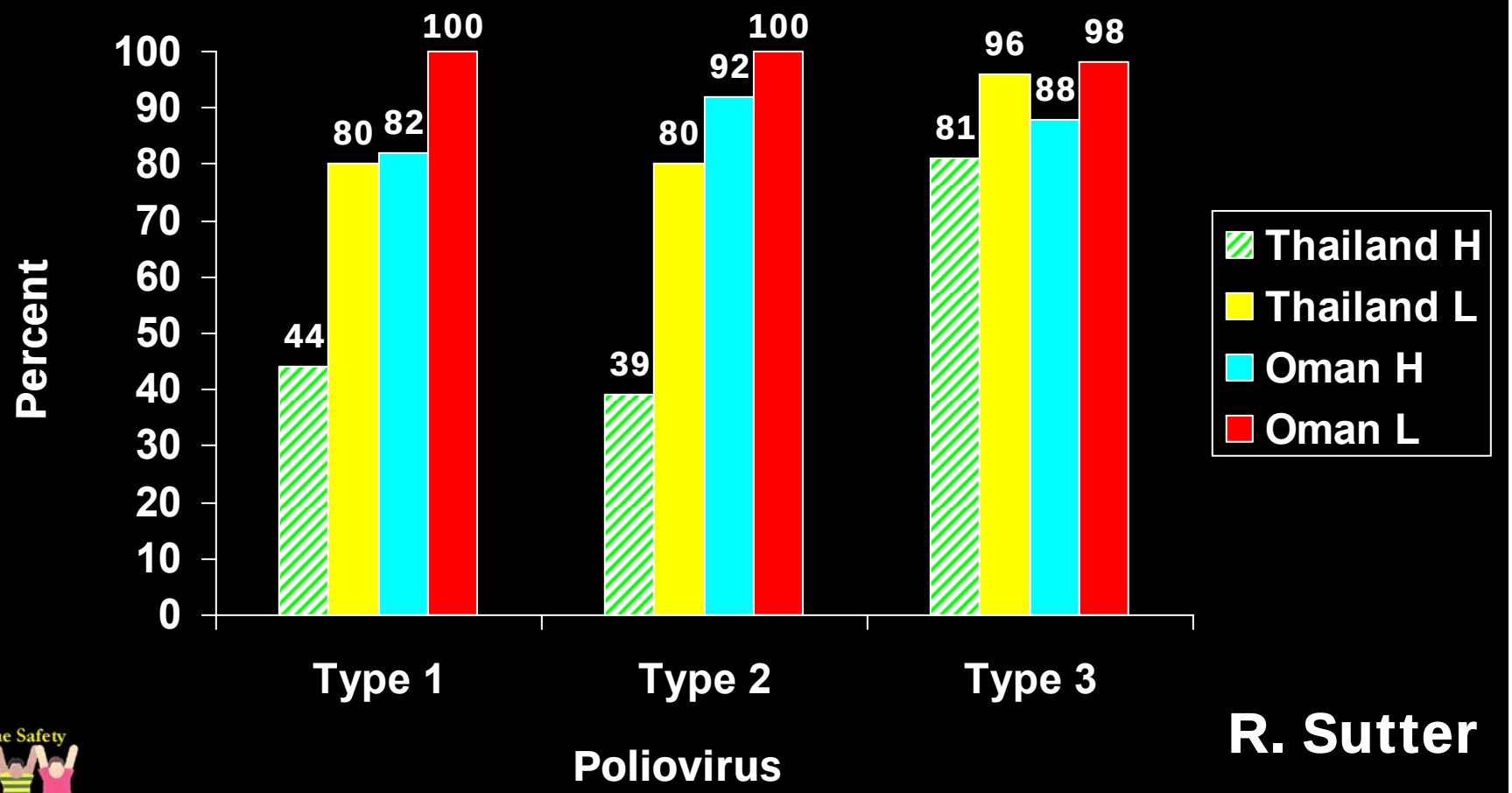
*WHO Collaborative Study Group on Oral and Inactivated Poliovirus Vaccine. J Infect Dis 1997;175(Suppl 1):S215-27

Seroconversion to Poliovirus Types 1, 2, and 3 after IPV at 6, 10, 14 by Maternal Antibody (H≥64, L<64), Thailand and Oman*



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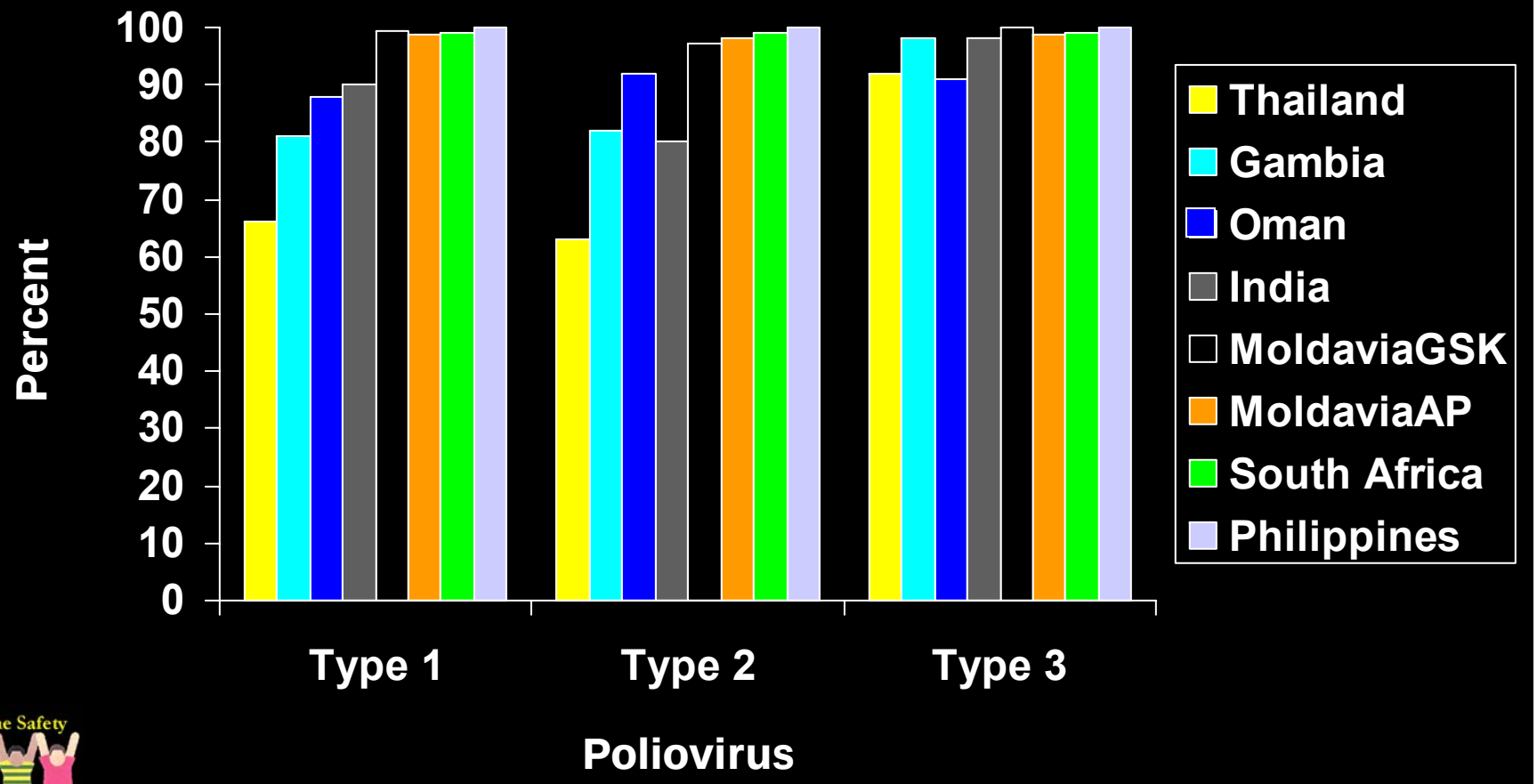
*WHO Collaborative Study Group on Oral and Inactivated Poliovirus Vaccine. J Infect Dis 1997;175(Suppl 1):S215-27

Seroprevalence to Poliovirus Types 1, 2, and 3 after IPV at 6, 10 and 14 Weeks by Country



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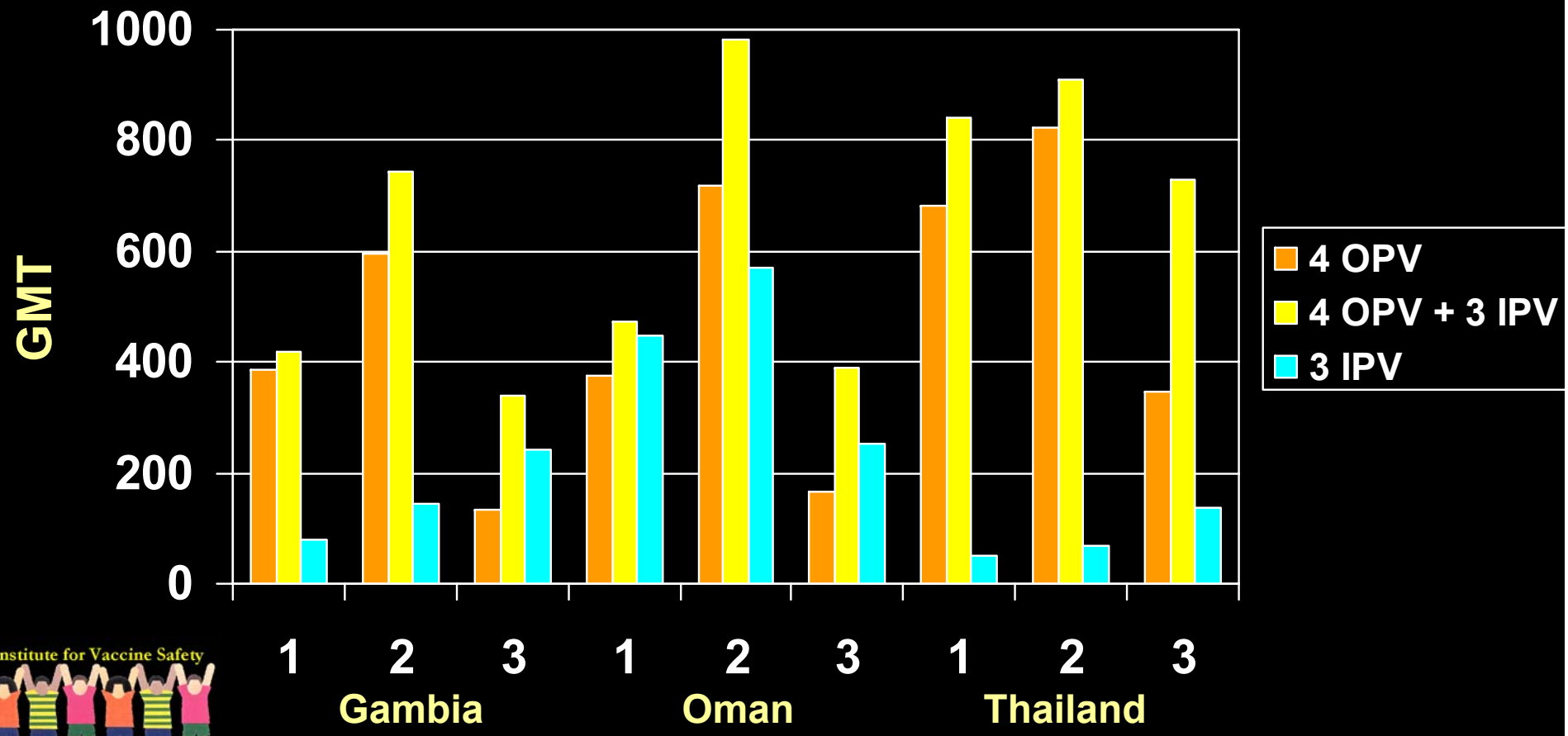
*Plotkin in Plotkin and Orenstein. Vaccines 4th ed 2004

Geometric Mean Titres of Serum Neutralizing Antibodies to Poliovirus Types 1,2 and 3 at 24 weeks of Age

by Study Group, in the Gambia, Oman and Thailand



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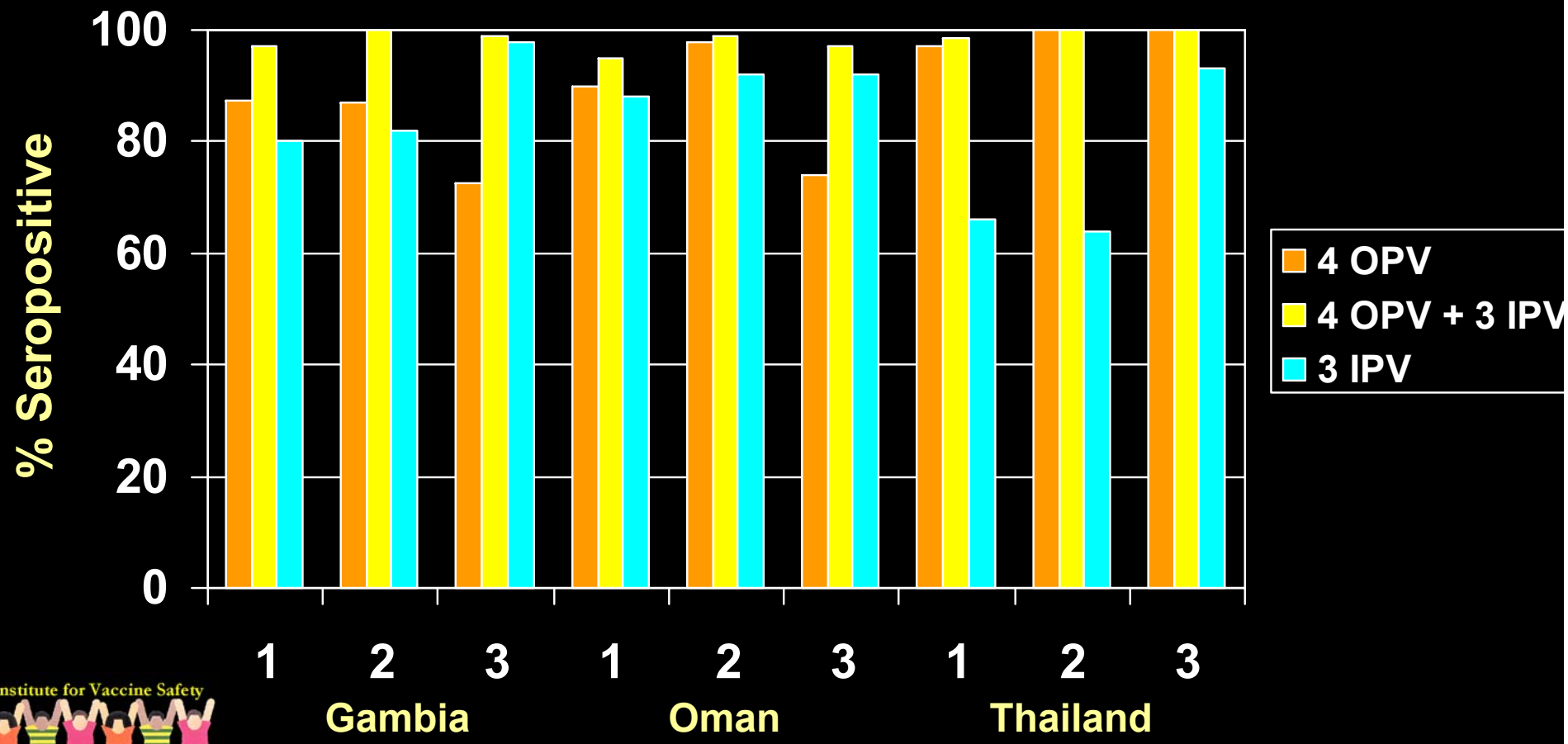
Source: WHO Bull 1996;74(3):260

Seroprevalence to Poliovirus Types 1,2 and 3 at 24 weeks of Age (10 wks after last dose) by Vaccination Schedule and Country



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Source: WHO Bull 1996;74(3):258

IPV Potency

Thailand, Gambia, and Oman

- IPV potency tested prior to shipping
  - 38, 10, 33 D and 42, 9, 34 D
- Pre-mixed liquid preparation
- No testing after shipping, or use in the field
- Cold chain:
  - Thailand: break (thunderstorm) with temp to 14º for 48 hrs
  - Panel concluded OK

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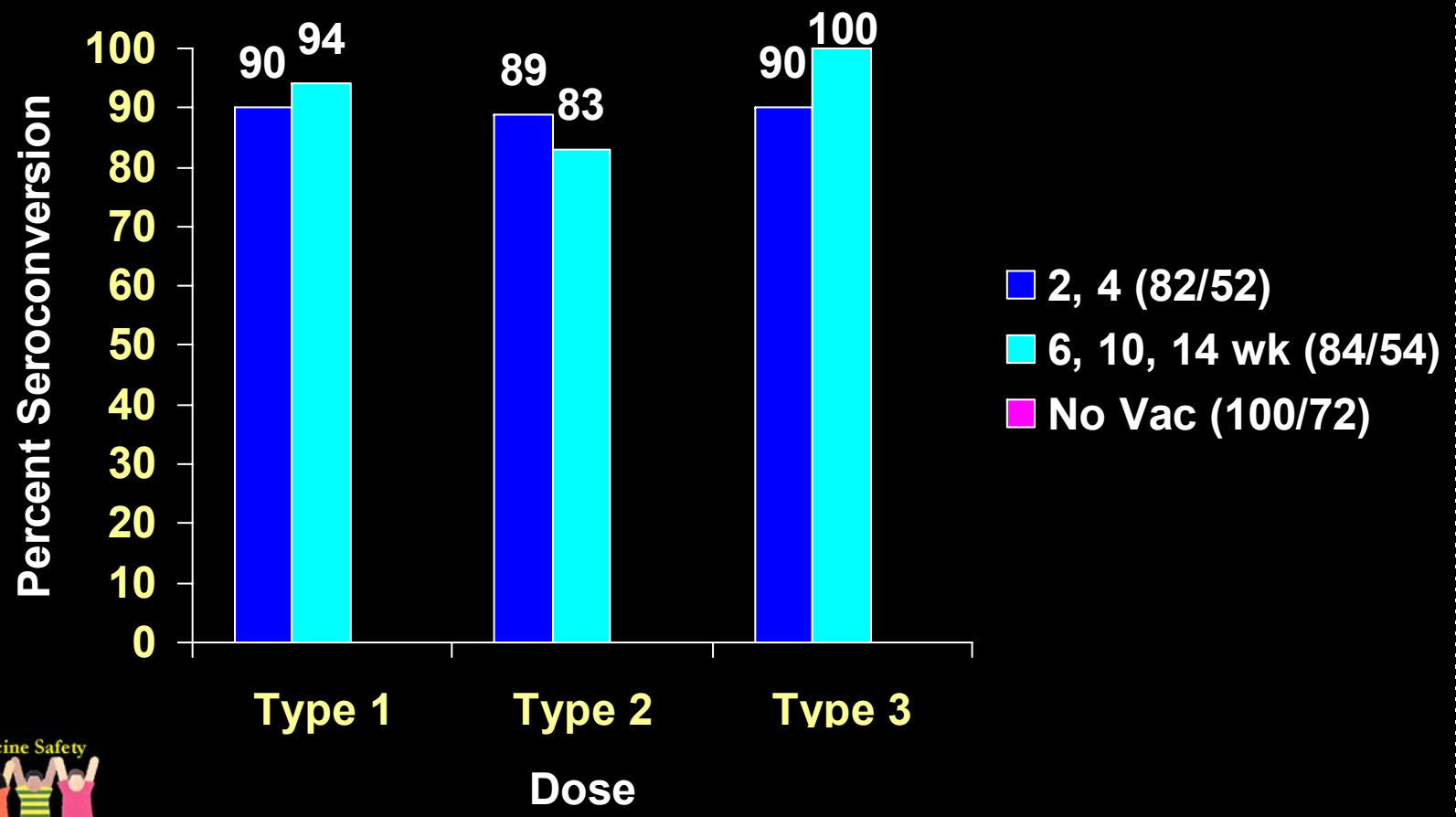
WHO Bull 1996; 74:253

Percent Serologic Response to Polioviruses after IPV by Schedule: Cuba



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Source:New Eng J Med 356 1536;2007

Fecal Viral Excretion One Week After OPV Challenge by Immunization Schedule: Cuba

IPV	Percent	Quant.*
• 6, 10, 14 wks	94	2890
• 2, 4, mo.	97	2340
• No vaccine	91	7700

*$TCID_{50}$/.2 gm

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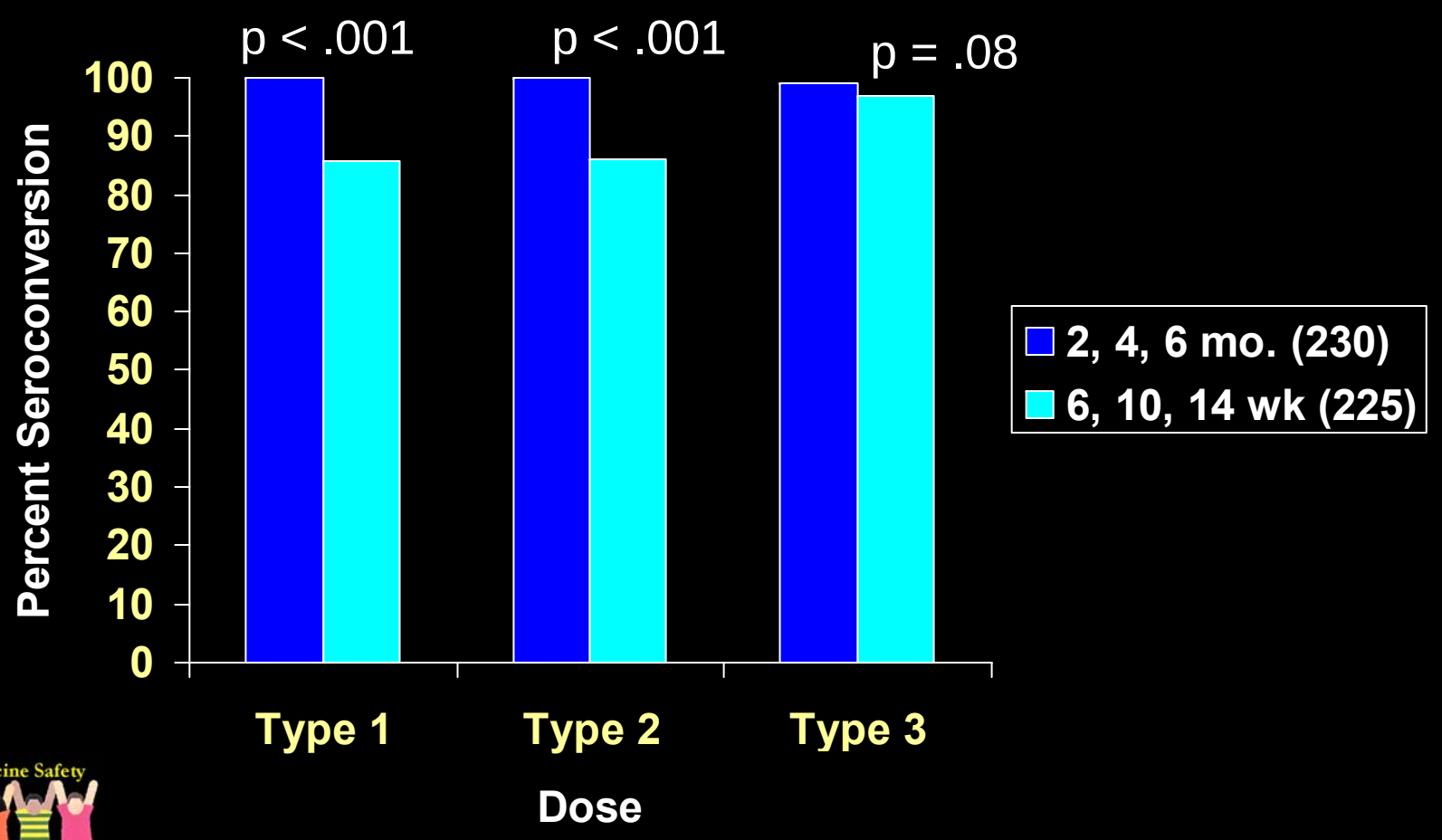
Source:New Eng J Med 356 1536;2007

Percent Seroconversion One Month after IPV by Schedule: Puerto Rico



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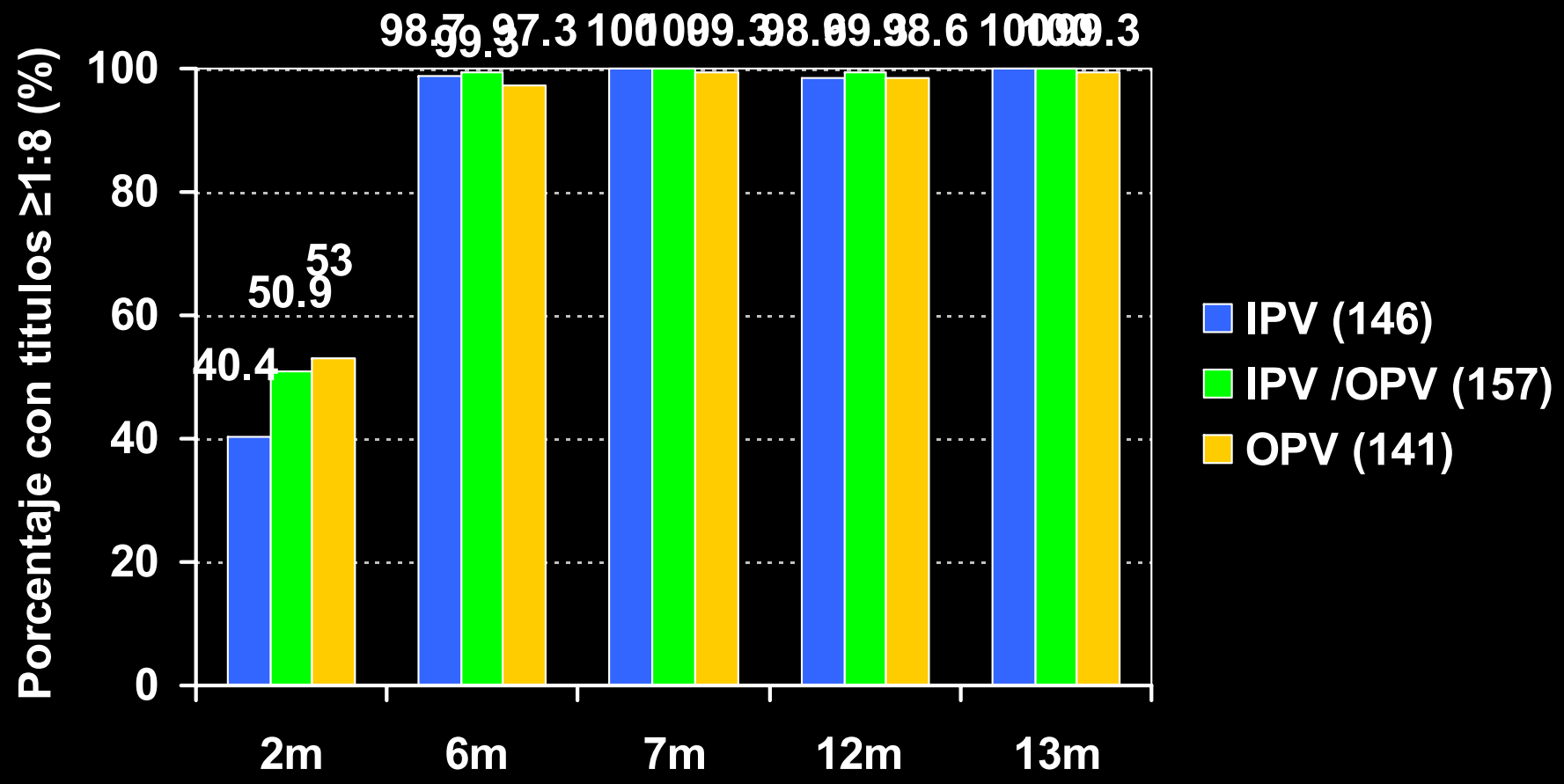
Source: Dayan et al. J Inf Dis 2007;195:12

Percent With Antibody ≥1:8 by Age Guatemala Type 1

2, 4, 6, 12 mo schedule



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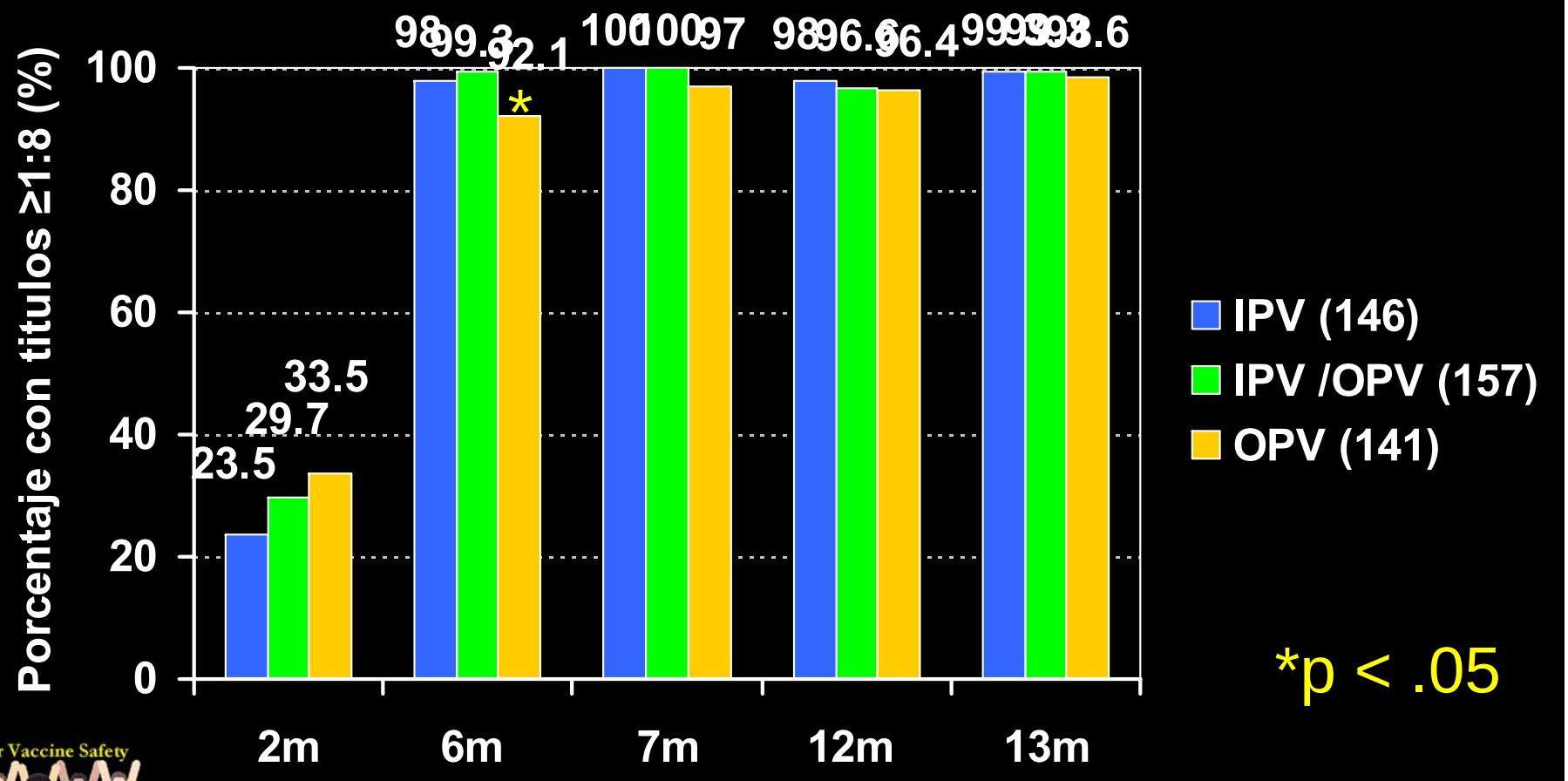
Asturias EJ, et al. J Infect Dis 2007;196

Percent With Antibody ≥1:8 by Age Guatemala Type 3

2, 4, 6, 12 mo schedule



*p < .05

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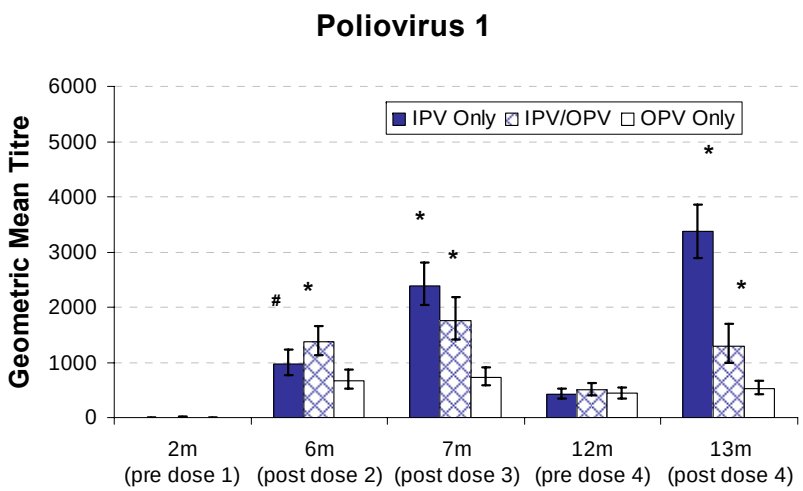
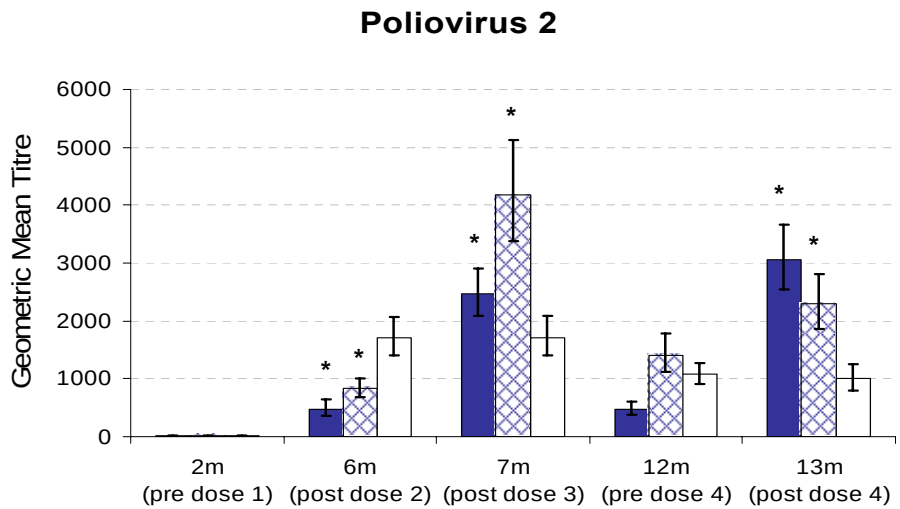
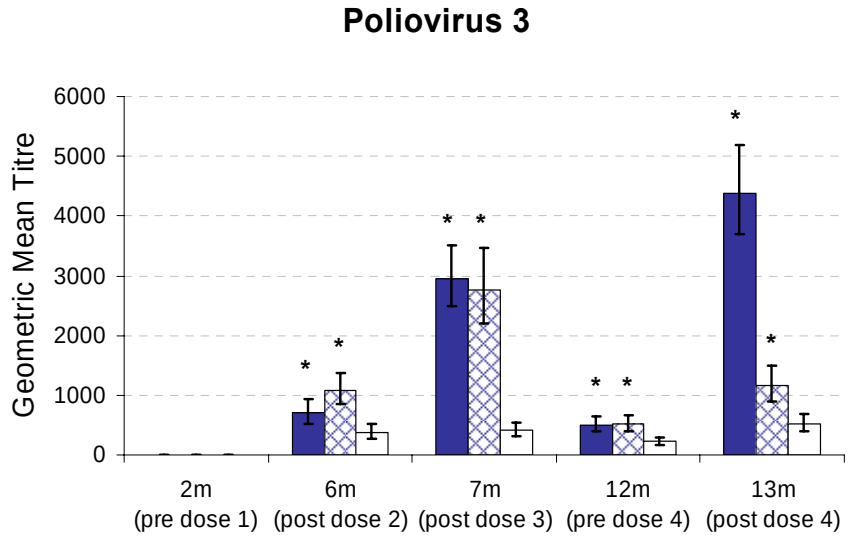
Asturias EJ, et al. J Infect Dis 2007;196

Geometric Mean Antibody Titers by Age, Type and Schedule: Guatemala







* p<0.01 for GMT comparisons with OPV only

\# p<0.05 for GMT comparisons with OPV only

Asturias EJ, et al. *J Infect Dis 2007;196*

Efficacy/effectiveness of IPV using Case/control method Senegal and India

Senegal:

- 1 dose VE = 36% (0,67)
- 2 doses VE = 89% (62,97)

India:

- IPV 3 doses = 92%
- OPV 3 doses = 66%

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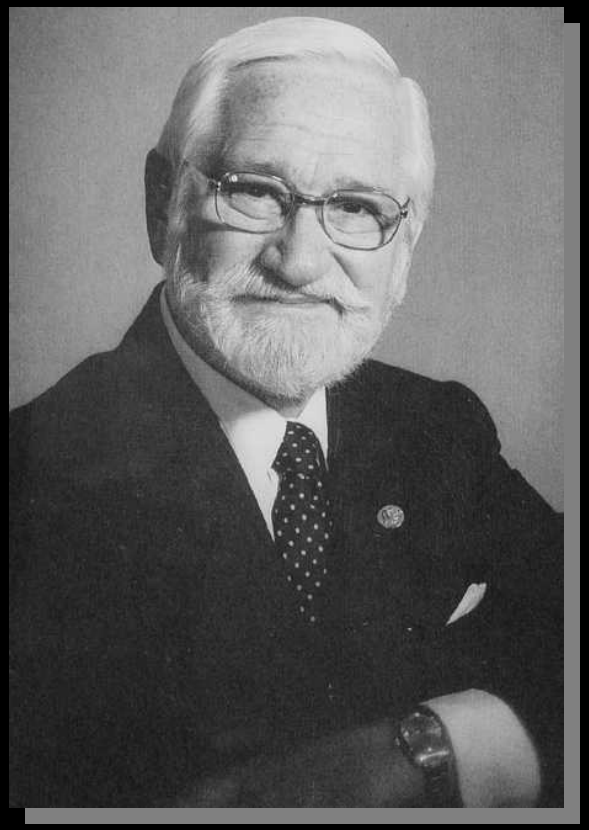
Robertson et al. Lancet 1988;I:987-99
Jacob John

Conclusions



~~or~~

and

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Conclusions

1. 6, 10, 14 week schedule highly effective*
2. 2, 4, 6 month somewhat more effective
3. 6, 10, 14 week schedule suboptimal for Hib, Pneumo, and Mening vaccines
4. IPV is more effective than OPV for the individual child in some developing country settings
5. IPV and OPV can be given together
6. Sequential IPV-OPV is a good transition to all IPV

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*except in Thailand