

Supplemental Material to:

**Hubert Buyse, Carlota Vinals, Naveen Karkada, and Htay
Htay Han**

**The human rotavirus vaccine Rotarix™ in infants:
An integrated analysis of safety and reactogenicity**

Human Vaccines & Immunotherapeutics 2013; 10(1)
<http://dx.doi.org/10.4161/hv.26476>

www.landesbioscience.com/journals/vaccines/article/26476

ONLINE SUPPLEMENTARY MATERIAL

Table S1. Overview of the *Rotarix*™ double-blind, randomized, placebo-controlled studies included in this integrated clinical safety summary

Study ID (Phase)	Country	Age at vaccination (No. of doses)	Concomitant vaccination	HRV viral concentration	No. of subjects Vaccine (Placebo)	Ref
444563/003 (Phase II)	Finland	2, 4 months (2 doses)	None	$10^{4.7}$ ffu $10^{4.1}$ ffu $10^{4.7}$ ffu $10^{5.8}$ ffu	128 (64)	1
444563/004 (Phase II)	Finland	2, 4 months (2 doses)	None	$10^{4.7}$ ffu	270 (135)	2
444563/005 (Phase II)	USA, Canada	2, 4 months (2 doses)	DTPa, IPV, <i>S. pneumoniae</i> , Hib	$10^{5.2}$ ffu $10^{6.4}$ ffu	421 (108)	3
444563/006 (Phase II)	Brazil, Mexico, Venezuela	2, 4, months (2 or 3 doses) ^a	DTPw-HBV/Hib OPV deferred	$10^{4.7}$ ffu $10^{5.2}$ ffu $10^{5.8}$ ffu	1709 (567)	4
444563/007 (Phase II)	Singapore	3, 4 months (2 doses)	DTPa-IPV/Hib, HBV	$10^{4.7}$ ffu $10^{5.2}$ ffu $10^{6.1}$ ffu	1811 (653)	5
444563/013 (Phase II)	South Africa	6, 10, 14 weeks (3 doses) 10, 14 weeks (2 doses)	DTPw-HBV/Hib OPV	$10^{6.0}$ CCID ₅₀	379 (96)	6
444563/014 (Phase II)	South Africa	6, 10 weeks 10, 14 weeks (2 doses)	DTPa/Hib + OPV or DTPa/IPV/Hib	$10^{5.2}$ ffu $10^{5.6}$ ffu	297 (150)	7
444563/021 (Phase II)	Panama	2, 4, 6 months (3 doses)	DTPw-HBV/Hib OPV delayed	$10^{5.2}$ ffu	177 (25)	8

444563/022 (Phase II)	South Africa	6, 10, 14 weeks (3 doses)	DTPw-HBV/Hib + OPV	$10^{6.4}$ CCID ₅₀ $10^{6.5}$ CCID ₅₀	50 (50)	9
444563/023 (Phase III)	Argentina, Brazil, Chile, Columbia, Dominican Republic, Honduras, Mexico, Nicaragua, Panama, Peru, Venezuela, Finland	2, 3 to 4 months (2 doses)	Routine vaccinations per national schedule OPV deferred if used	$10^{6.5}$ CCID ₅₀	31673 (31552)	10
444563/024 (Phase III)	Brazil, Columbia, Panama, Argentina	2, 3 to 4 months (2 doses)	DTPw-HBV/Hib + OPV	$10^{6.0}$ CCID ₅₀	4376 (2192)	11
444563/028/029/030 (Phase III)	Singapore (028) Hong Kong (029) Taiwan (030)	2 or 3, 4 months (2 doses)	DTPa-IPV/Hib + HBV OPV deferred if used	$10^{6.0}$ CCID ₅₀	5359 (5349)	12
444563/033 (Phase III)	Mexico, Columbia, Peru	2, 4 months (2 doses)	DTPw-HBV/Hib OPV deferred	$10^{6.5}$ CCID ₅₀	730 (124)	13
102247/Rota-036 (Phase III)	Czech Republic Finland France Germany Italy Spain	3, 4 months 3, 5 months 2, 3 months 2, 3 months 3, 5 months 2, 4 months (2 doses)	DTPa-HBV-IPV/Hib ^b Meningitec in Spain Prevenar in France & Germany	$10^{6.5}$ CCID ₅₀	2646 (1348)	14
102248/Rota-037 (Phase III)	South Africa, Malawi	6, 10, 14 weeks (3 doses) 10, 14 weeks (2 doses)	DTPw-HBV/Hib + OPV	$10^{6.4}$ CCID ₅₀ $10^{6.5}$ CCID ₅₀	3298 (1641)	15
103477/Rota-039 (Phase III)	Thailand	2, 4 months (2 doses)	None	$10^{6.4}$ CCID ₅₀	174 (52)	16
103478/Rota-041 (Phase II)	Korea	2, 4 months (2 doses)	None	$10^{6.5}$ CCID ₅₀	103 (52)	17
103792/Rota-044	India	8, 12 weeks	OPV	$10^{6.0}$ CCID ₅₀	182 (181)	18

(Phase II)		(2 doses)	Deferred DTPw-HBV/Hib			
103992/Rota-045 (Phase II)	Bangladesh	12, 16 weeks (2 doses)	None OPV	$10^{6.5}$ CCID ₅₀ $10^{6.5}$ CCID ₅₀	196 (98)	19
104480/Rota-048 (Phase II)	Finland	2, 3 months (2 doses)	None	At least $10^{6.0}$ CCID ₅₀	200 (50)	20
106260/Rota-052 (Phase III)	Dominican Republic	2, 4 months (2 doses)	DTPa-HBV-IPV/Hib	At least $10^{6.0}$ CCID ₅₀	100 (100)	21
106481/Rota-054 (Phase III)	France, Portugal, Spain, Poland	6, 10/14 weeks (2 doses)	Routine vaccinations per national schedule	At least $10^{6.0}$ CCID ₅₀	670 (339)	22
107625/Rota-056 (Phase III)	Japan	6, 14 weeks (2 doses)	DTPa, HBV	At least $10^{6.0}$ CCID ₅₀	508 (257)	23
105722/Rota-051 (Phase II)	Vietnam	8, 12/16 weeks (2 doses)	DTPw, HBV, OPV	At least $10^{6.0}$ CCID ₅₀	297 (78)	24
109216/Rota-063 (Phase II)	Philippines	6, 10/14 weeks (2 doses)	DTPw, HBV, OPV	At least $10^{6.0}$ CCID ₅₀	300 (75)	24
112269/Rota-068 (Phase IV)	Korea	2, 4 months (2 doses)	DTPa, Hib, HBV, IPV	At least $10^{6.0}$ CCID ₅₀	508 (176)	25

^aA subset of 121 subjects in Brazil received 3 doses of study vaccine/placebo

^bSubjects in each country received 3 doses of DTPa-HBV-IPV/Hib with the first two doses co-administered with study vaccine or placebo, except in France where DTPa-IPV/Hib was co-administered with the second study vaccine/placebo dose

Table S2. Overview of cases of intussusception reported (total vaccinated cohort)

Group	Dose	Age at onset (weeks)	Sex	Day of onset	Duration (days)	Outcome
Human RV vaccine	1	12	Male	29	49	Recovered with sequelae
	1	14	Male	18	2	Recovered
	1	14	Male	6	5	Recovered
	2	11	Female	3	10	Recovered
	2	14	Female	22	4	Recovered
	2	18	Female	7	20	Fatal
	2	19	Male	8	7	Recovered
	2	20	Female	3	13	Recovered
	2	20	Female	17	7	Recovered
	2	21	Male	25	3	Recovered
	2	22	Male	16	4	Recovered
Placebo	1	9	Male	22	3	Recovered
	1	14	Female	16	17	Recovered
	2	16	Female	6	4	Recovered
	2	16	Female	9	6	Recovered
	2	19	Female	18	4	Recovered
	2	22	Female	28	12	Recovered
	2	24	Male	24	14	Recovered

References for Table S1

1. Vesikari T, Karvonen A, Korhonen T, Espo M, Lebacq E, Forster J, et al. Safety and immunogenicity of RIX4414 live attenuated human rotavirus vaccine in adults, toddlers and previously uninfected infants. *Vaccine* 2004;22:2836-42; PMID:15246619; <http://dx.doi.org/10.1016/j.vaccine.2004.01.044>
2. Vesikari T, Karvonen A, Puustinen L, Zeng SQ, Szakal ED, Delem A, De Vos B. Efficacy of RIX4414 live attenuated human rotavirus vaccine in Finnish infants. *Pediatr Infect Dis J* 2004;23:937-43; PMID:15602194
3. Dennehy PH, Brady RC, Halperin SA, Ward RL, Alvey JC, Fischer FH Jr, et al. Comparative evaluation of safety and immunogenicity of two dosages of an oral live attenuated human rotavirus vaccine. *Pediatr Infect Dis J* 2005;24:481-8; PMID:15933555
4. Salinas B, Pérez Schael I, Linhares AC, Ruiz Palacios GM, Guerrero ML, Yarzábal JP, et al. Evaluation of safety, immunogenicity and efficacy of an attenuated rotavirus vaccine, RIX4414: A randomized, placebo-controlled trial in Latin American infants. *Pediatr Infect Dis J* 2005;24:807-16; PMID:16148848
5. Phua KB, Quak SH, Lee BW, Emmanuel SC, Goh P, Han HH, et al. Evaluation of RIX4414, a live, attenuated rotavirus vaccine, in a randomized, double-blind, placebo-controlled phase 2 trial involving 2464 Singaporean infants. *J Infect Dis* 2005;192(Suppl 1):S6-16; PMID:16088807; <http://dx.doi.org/10.1086/431511>
6. Steele AD, Reynders J, Scholtz F, Bos P, de Beer MC, Tumbo J, et al. Comparison of 2 different regimens for reactogenicity, safety, and immunogenicity of the live attenuated oral rotavirus vaccine RIX4414 coadministered with oral polio vaccine in South

African infants. J Infect Dis 2010;202:S93-100; PMID:20684724;

<http://dx.doi.org/10.1086/653550>

7. Steele AD, De Vos B, Tumbo J, Reynders J, Scholtz F, Bos P, et al. Co-administration study in South African infants of a live-attenuated oral human rotavirus vaccine (RIX4414) and poliovirus vaccines. Vaccine 2010;28:6542-8; PMID:18786585;
<http://dx.doi.org/10.1016/j.vaccine.2008.08.034>
8. GlaxoSmithKline. Result Summary for 444563/021. Available at: http://www.gsk-clinicalstudyregister.com/result_detail.jsp?protocolId=444563%2F021&studyId=3DD3B482-0C98-4EDF-89D1-9F73AA28F5C7&compound=Rotavirus+Vaccine. Accessed June 2013.
9. Steele AD, Madhi SA, Louw CE, Bos P, Tumbo JM, Werner CM, et al. Safety, reactogenicity, and immunogenicity of human rotavirus vaccine RIX4414 in human immunodeficiency virus-positive infants in South Africa. Pediatr Infect Dis J 2011;30:125-30; PMID:20842070; <http://dx.doi.org/10.1097/INF.0b013e3181f42db9>
10. Ruiz-Palacios GM, Perez-Schael I, Velazquez FR, Abate H, Breuer T, Clemens SC, et al. Safety and efficacy of an attenuated vaccine against severe rotavirus gastroenteritis. N Engl J Med 2006;354:11-22; PMID:16394298;
<http://dx.doi.org/10.1056/NEJMoa052434>
11. Tregnaghi MW, Abate HJ, Valencia A, Lopez P, Da Silveira TR, Rivera L, et al. Human rotavirus vaccine is highly efficacious when coadministered with routine expanded program of immunization vaccines including oral poliovirus vaccine in Latin America. Pediatr Infect Dis J 2011;30:e103-8; PMID:21378594;
<http://dx.doi.org/10.1097/INF.0b013e3182138278>

12. Phua KB, Lim FS, Lau YL, Nelson EA, Huang LM, Quak SH, et al. Safety and efficacy of human rotavirus vaccine during the first 2 years of life in Asian infants: randomised, double-blind, controlled study. *Vaccine* 2009;27:5936-41; PMID:19679216; <http://dx.doi.org/10.1016/j.vaccine.2009.07.098>.
13. López P, Herrera JFG, Cervantes Y, Costa Clemens SA, Aguirre F, Yarzabal JP, et al. Three consecutive production lots of the human monovalent RIX4414 G1P[8] rotavirus vaccine, Rotarix induce a consistent immune response in Latin American infants. 4th World Congress of the World Society for Pediatric Infectious Diseases, Warsaw, Poland, 1-4 September 2005.
14. Vesikari T, Karvonen A, Prymula R, Schuster V, Tejedor JC, Cohen R, et al. Efficacy of human rotavirus vaccine against rotavirus gastroenteritis during the first 2 years of life in European infants: randomised, double-blind controlled study. *Lancet* 2007;370:1757-63; PMID:18037080; [http://dx.doi.org/10.1016/S0140-6736\(07\)61744-9](http://dx.doi.org/10.1016/S0140-6736(07)61744-9)
15. Madhi SA, Cunliffe NA, Steele D, Witte D, Kirsten M, Louw C, et al. Effect of human rotavirus vaccine on severe diarrhea in African infants. *N Engl J Med* 2010;362:289-98; PMID:20107214; <http://dx.doi.org/10.1056/NEJMoa0904797>
16. Kerdpanich A, Chokephaibulkit K, Watanaveeradej V, Vanprapar N, Simasathien S, Phavichitr N, et al. Immunogenicity of a live-attenuated human rotavirus RIX4414 vaccine with or without buffering agent. *Hum Vaccin* 2010;6:254-62; PMID:20220306; <http://dx.doi.org/10.4161/hv.6.3.10428>
17. Kim JS, Kim C-H, Cha S-H, Chang J-K, Lee K-J, Ahn J-M, et al. Immunogenicity and reactogenicity profile of oral, live-attenuated human rotavirus vaccine, RIX4414

(Rotarix™) in Korean infants. 4th World Congress of the World Society for Pediatric Infectious Diseases, Bangkok, Thailand, 15-18 November 2007

18. Narang A, Bose A, Pandit AN, Dutta P, Kang G, Bhattacharya SK, et al. Immunogenicity, reactogenicity and safety of human rotavirus vaccine (RIX4414) in Indian infants. *Hum Vaccin* 2009;5:414-9; PMID:19276664; <http://dx.doi.org/10.4161/hv.5.6.8176>
19. Zaman K, Sack DA, Yunus M, Arifeen SE, Podder G, Azim T, et al. Successful co-administration of a human rotavirus and oral poliovirus vaccines in Bangladeshi infants in a 2-dose schedule at 12 and 16 weeks of age. *Vaccine* 2009;27:1333-9; PMID:19162114; <http://dx.doi.org/10.1016/j.vaccine.2008.12.059>
20. Vesikari T, Karvonen A, Bouckenooghe A, Suryakiran PV, Smolenov I, Han HH. Immunogenicity, reactogenicity and safety of the human rotavirus vaccine RIX4414 oral suspension (liquid formulation) in Finnish infants. *Vaccine* 2011;29:2079-84; PMID:21238572; <http://dx.doi.org/10.1016/j.vaccine.2011.01.004>
21. Rivera L, Peña LM, Stainier I, Gillard P, Cheuvart B, Smolenov I, et al. Horizontal transmission of a human rotavirus vaccine strain--a randomized, placebo-controlled study in twins. *Vaccine* 2011;29:9508-13; PMID:22008819; <http://dx.doi.org/10.1016/j.vaccine.2011.10.015>
22. Omenaca F, Sarlangue J, Szenborn L, Nogueira M, Suryakiran PV, Smolenov IV, et al. Safety, reactogenicity and immunogenicity of the human rotavirus vaccine in preterm European Infants: a randomized phase IIIb study. *Pediatr Infect Dis J* 2012;31:487-93; PMID:22228231; <http://dx.doi.org/10.1097/INF.0b013e3182490a2c>
23. Kawamura N, Tokoeda Y, Oshima M, Okahata H, Tsutsumi H, Van Doorn LJ, et al. Efficacy, safety and immunogenicity of RIX4414 in Japanese infants during the first

two years of life. Vaccine 2011;29:6335-41; PMID:21640780;

<http://dx.doi.org/10.1016/j.vaccine.2011.05.017>

24. Anh DD, Carlos CC, Thiem DV, Hutagalung Y, Gatchalian S, Bock HL, et al. Immunogenicity, reactogenicity and safety of the human rotavirus vaccine RIX4414 (RotarixTM) oral suspension (liquid formulation) when co-administered with expanded program on immunization (EPI) vaccines in Vietnam and the Philippines in 2006-2007. Vaccine 2011;29:2029-36; PMID: 21256876; <http://dx.doi.org/10.1016/j.vaccine.2011.01.018>
25. Kim JS, Bae CW, Lee KY, Park MS, Choi YY, Kim KN, et al. Immunogenicity, reactogenicity and safety of a human rotavirus vaccine (RIX4414) in Korean infants: a randomized, double-blind, placebo-controlled, phase IV study. Hum Vaccin Immunother 2012;8:806-12; PMID:22699440; <http://dx.doi.org/10.4161/hv.19853>