GAVI Vaccine Investment Strategy Project

Vaccine Portfolio Analysis

Applied Strategies
400 S. El Camino Real, Suite 375
San Mateo, CA 94402
www.appliedstrategies.com

October 29, 2008

Vaccine Portfolio Analysis

CONTENTS

Vaccine Options

POTENTIAL PORTFOLIO COMPONENTS

Disease (# of countries)*	**Strategy**
Cholera (31)	• 1-15yo Campaign Every 3 Years • 1-49yo Campaign Every 3 Years
HPV (60)	• Routine 10yo Female Vaccination
JE (13)	• Routine Infant Vaccination with boost after 12 mos + 1-15yo Catch-up Campaign
Rabies (49)	• Post-Exposure Prophylaxis
Rubella (46)	• Rapid Impact – Routine 1yo Vaccination with boost at 4yo + – 2-19yo Campaign + – 20-29yo WBCA Campaign • Delayed Impact – Routine 1yo Vaccination with boost at 4yo + – 15-39yo WBCA Campaign
Typhoid (24)	• Routine Infant Vaccination with boost after 12mos • Routine Infant Vaccination with boost after 12mos + 1-15yo Catch-up • 2-15yo Campaign Every 3 Years • 5-15yo Campaign Every 3 years

* *Countries expected to adopt in 2009-2020 time period, excluding countries that have already adopted*

Vaccine Options

CHOLERA

- Currently licensed vaccine products are not ideal for implementation in GAVI countries (potential need to revaccinate large cohorts every three years with a 2 dose regimen due to a limited duration of protection)
- Their value, including effectiveness, has varied depending on age cohort and country setting studied
- There is currently no expert consensus on endemicity and optimal vaccination strategy
- Compared to other investment options, cholera has a relatively low return on investment in terms of cost per death averted

GAVI Working Group recommendation:

- Cholera should remain a priority for the GAVI Alliance, but not be included in current portfolio options
- The Board should consider alternative investments in operational research ($6M indicative envelope proposed) to generate further knowledge regarding the most appropriate strategies for cholera vaccination strategy
- Industry should be encouraged to continue investment in cholera vaccine products that are appropriate for use the developing world

Vaccine Portfolio Analysis

CONTENTS

Portfolio Option ‘A’

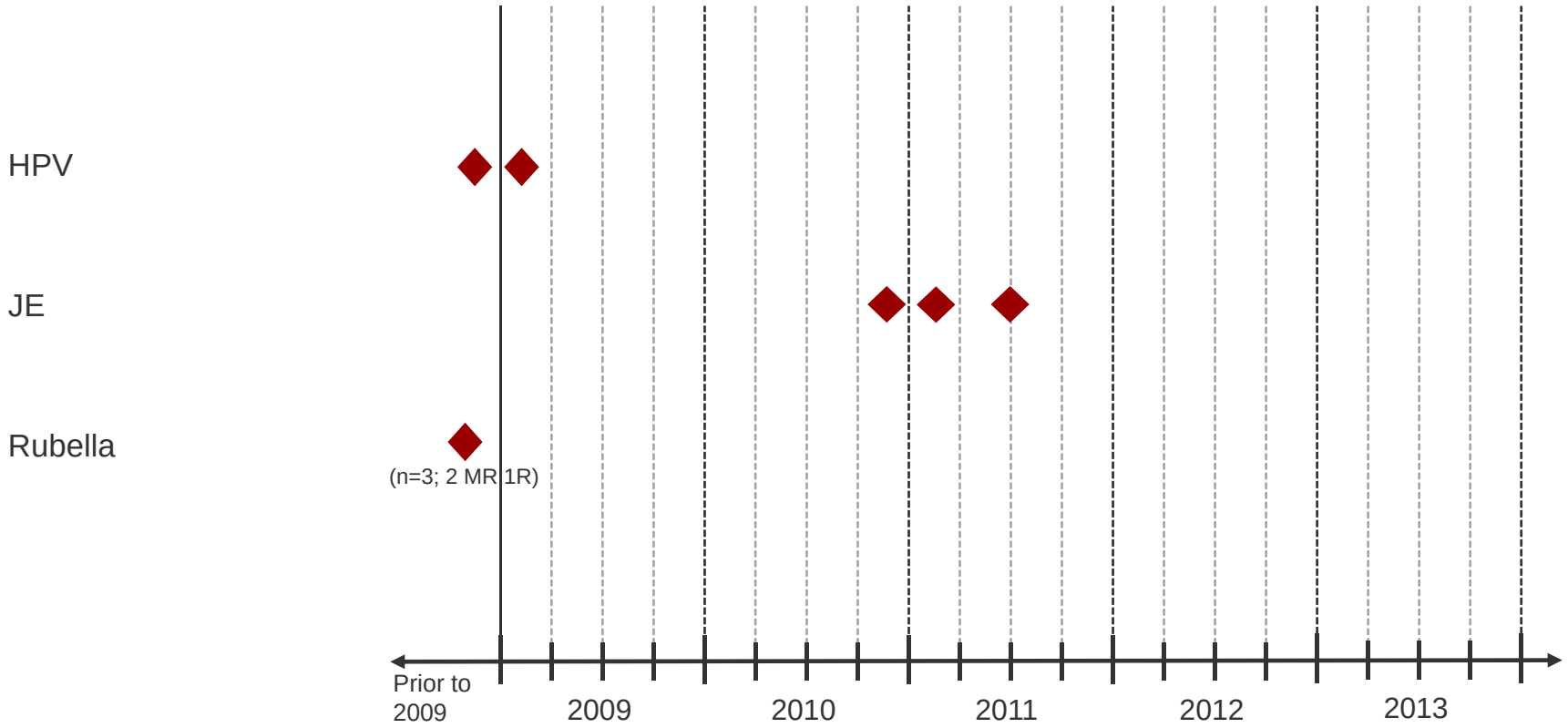
PORTFOLIO DEFINITION

Disease (# of countries)*	**Vaccination Strategy**	**Rationale**
HPV (60)	Routine 10yo Female Vaccination	• Supports maximize disease burden impact portfolio strategy theme • All diseases result in severe long-term sequelae • Proven safe and efficacious vaccines • SAGE recommendation current or pending • Consensus on vaccination strategy • All vaccines applicable to consensus vaccination strategy
JE (13)	Routine Infant Vaccination with boost after 12 mos + 1-15yo Catch-up Campaign	
Rubella (46) *Delayed Impact*	Routine 1yo Vaccination with boost at 4yo + 15-39yo WBCA Campaign	

* *Countries expected to adopt in 2009-2020 time period, excluding countries that have already adopted*

Portfolio Option ‘A’

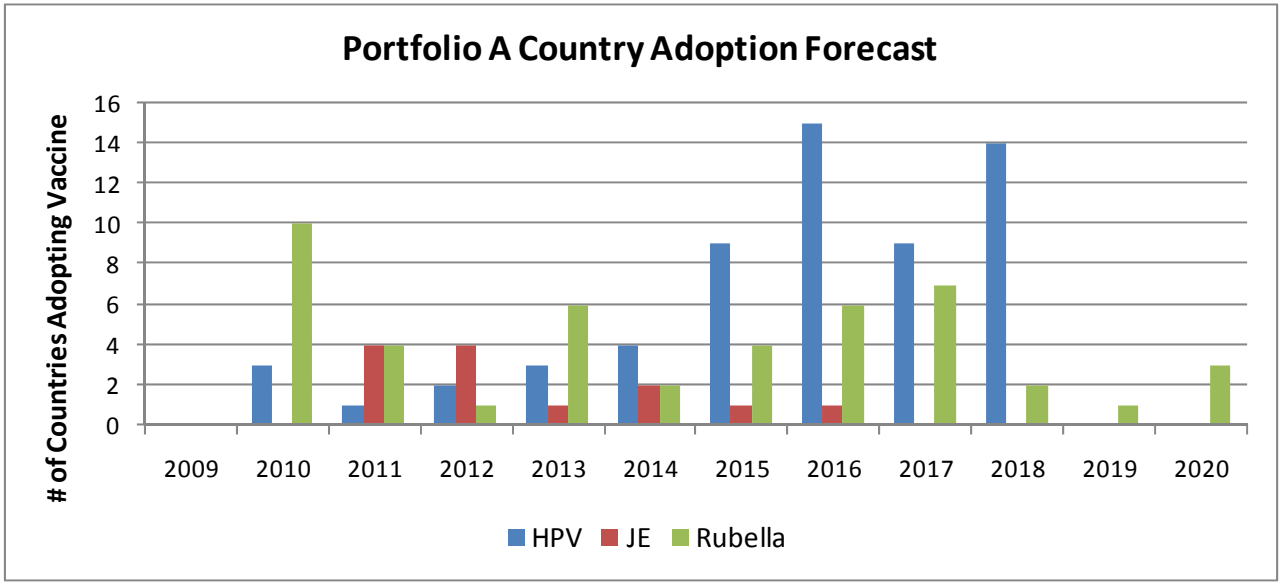
VACCINE AVAILABILITY



Portfolio Option ‘A’

ADOPTION FORECAST

Integrated Adoption Forecast 2009-2020

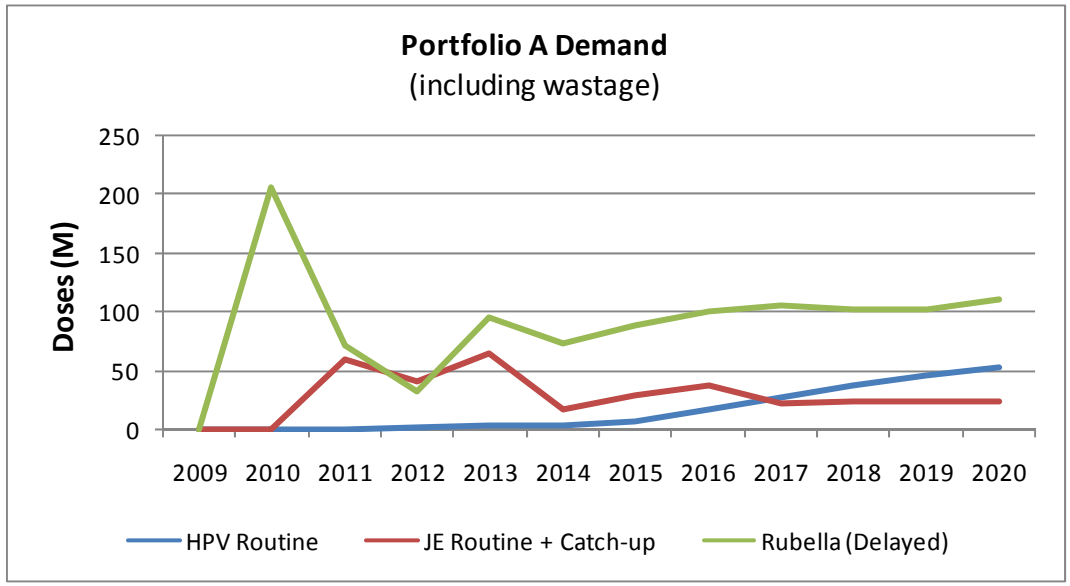


	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPV	0	3	1	2	3	4	9	15	9	14	0	0
JE	0	0	4	4	1	2	1	1	0	0	0	0
Rubella	0	10	4	1	6	2	4	6	7	2	1	3

Portfolio Option ‘A’

DEMAND FORECAST

Integrated Adoption Forecast 2009-2020



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPV Routine	0	0	1	1	3	4	6	17	26	37	46	52
JE Routine	0	0	2	7	11	15	17	20	22	23	24	24
JE 1-15 yo Catch-up	0	0	58	33	54	2	11	17	0	0	0	0
Rubella Routine	0	32	33	32	64	70	75	87	93	98	102	107
Rubella 15-39yo WCBA	0	175	40	1	31	3	14	13	14	4	0	3

Portfolio Option ‘A’

GAVI VACCINE COST FORECAST

Integrated Adoption Forecast 2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	3	7	11	25	35	59	125	184	250	263	300	**1,261**
JE *Routine + 1-15yo Catch-up*	0	0	290	175	208	42	58	63	33	35	35	35	**974**
Rubella *Delayed Impact Version*	0	74	25	11	33	24	30	33	36	34	34	36	**370**
Portfolio A Total	**0**	**77**	**322**	**197**	**266**	**102**	**146**	**221**	**252**	**318**	**332**	**372**	**2,606**
Portfolio A Cumulative	**0**	**77**	**399**	**596**	**862**	**964**	**1,110**	**1,331**	**1,583**	**1,901**	**2,233**	**2,606**	

Portfolio Option ‘A’

IMPLEMENTATION COST FORECAST

Integrated Adoption Forecast 2009-2020

Disease	Country Implementation Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV Routine	0	4	7	11	20	26	39	90	136	191	238	272	**1,033**
JE Routine + Catch-up	0	0	30	29	40	39	52	67	60	64	67	67	**516**
Routine + boost	*0*	*0*	*6*	*18*	*29*	*39*	*46*	*54*	*60*	*60*	*67*	*67*	*452*
1-15yo Catch-up	*0*	*0*	*24*	*11*	*11*	*1*	*6*	*12*	*0*	*0*	*0*	*0*	*64*
Rubella Delayed	0	66	30	16	42	36	44	50	57	55	56	59	**511**
Routine + boost	*0*	*14*	*16*	*16*	*32*	*35*	*38*	*45*	*49*	*53*	*56*	*58*	*413*
15-39yo WCBA	*0*	*51*	*13*	*0*	*10*	*1*	*5*	*4*	*8*	*2*	*0*	*1*	*97*
Total Country Costs	**$0**	**$69**	**$67**	**$57**	**$102**	**$102**	**$135**	**$206**	**$253**	**$311**	**$360**	**$398**	**$2,060**

Global Partner Implementation Costs ($M)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total ($M)
	$19	$48	$50	$49	$47	$44	$47	$51	$46	$46	$37	$20	**$503**

Portfolio Option ‘A’

METRIC SUMMARY

Integrated Adoption Forecast 2009-2020

Strategy	Total Vaccine Cost ($M)	GAVI Vaccine Cost ($M)	Country Vaccine Cost ($M)	Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted	Long-Term Sequelae	Country Imp Costs ($M)
HPV Routine 10yo Female Vaccination	$1,293	$1,261	$31	707	n/a	870	$1,784	$1,449	Severe	$1,033
JE Routine Infant Vaccination with boost after 12 mos + 1-15yo Catch-up Campaign	$1,034	$974	$60	140	93	765	$6,967	$1,274	Severe	$516
Rubella (delayed impact) Routine 1yo Vaccination with boost at 4yo + 15-39yo WBCA Campaign	$540	$370	$170	22*	13*	110*	$16,742*	$3,363*	Severe	$511
Portfolio ‘A’ Total	**$2,867**	**$2,606**	**$261**	**869**	**106**	**1,745**	**$2, 998**	**$1,493**	**n/a**	**$2,060**

** Includes CRS deaths and cases only*

Portfolio Option ‘A’

TOTAL PORTFOLIO COST

Integrated Adoption Forecast 2009-2020

Cost Component	Cost
GAVI Vaccine Cost ($M)	2,606
Country Vaccine Co-Pay Cost ($M)	261
Total Vaccine Cost ($M)	**$2,867**
Country Implementation Cost ($M)	2,060
Partner Associated Cost ($M)	503
TOTAL COST ($M)	**$5,430**

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
869	106	1,745	$2,998	$1,493

Vaccine Portfolio Analysis

CONTENTS

Portfolio Option ‘B’

PORTFOLIO DEFINITION

Integrated Adoption Forecast 2009-2020

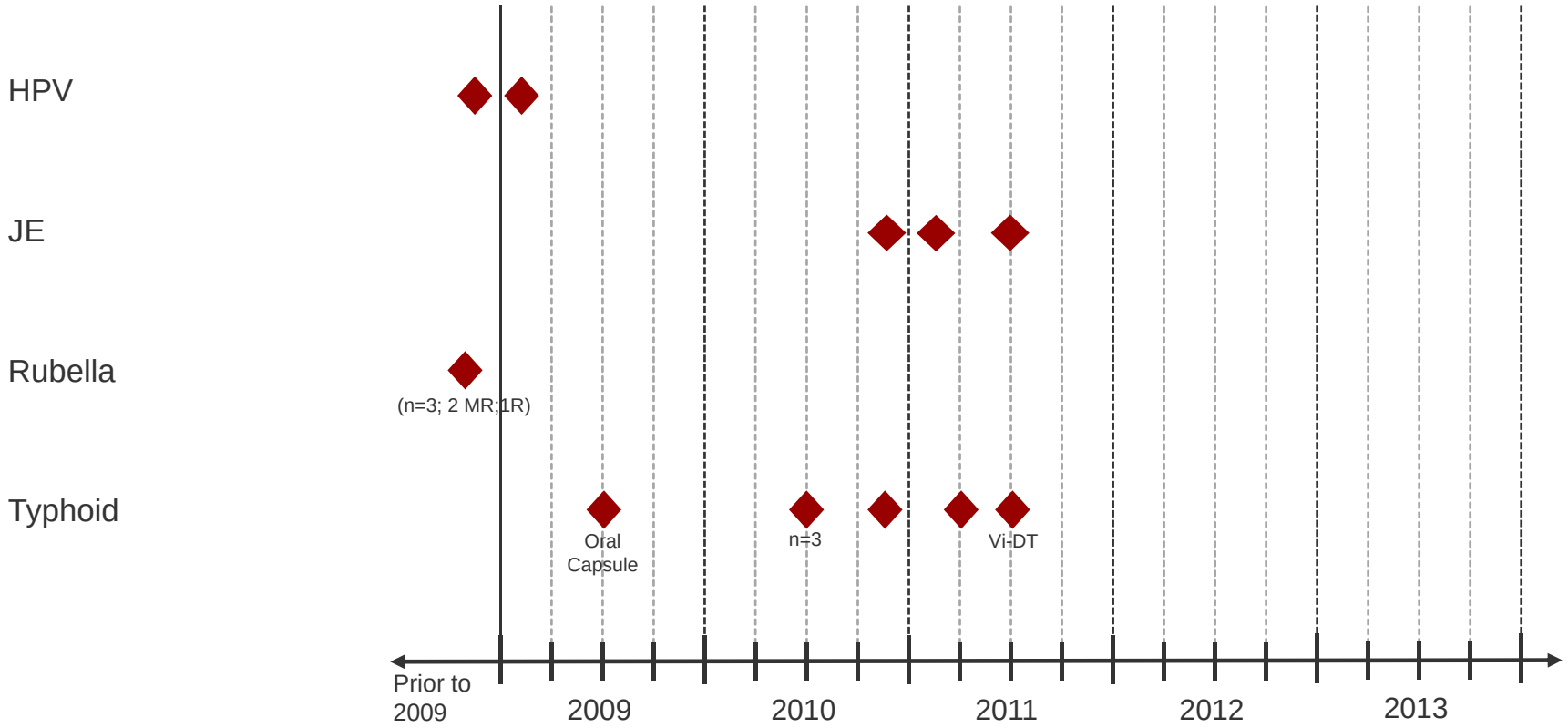
Strategy	Total Vaccine Cost ($M)	GAVI Vaccine Cost ($M)	Country Vaccine Cost ($M)	Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted	Long-Term Sequelae	Country Imp Costs ($M)
HPV Routine	$1,293	$1,261	$31	707	n/a	870	$1,784	$1,449	Severe	$1,033
JE Routine + Catch-Up	$1,034	$974	$60	140	93	765	$6,967	$1,274	Severe	$516
Rubella (delayed impact)	$540	$370	$170	22*	13*	110*	$16,742*	$3,363*	Severe	$511
PORTFOLIO ‘A’ TOTAL	**$2,867**	**$2,606**	**$261**	**869**	**106**	**1,745**	**$2,998**	**$1,493**	**n/a**	**$2,060**
Rabies PEP	$2,945	$2,882	$63	483	24	n/a	$5,970	n/a	Mild-None	$90
Rubella Rapid (incremental cost)	$344	$238	$106	52*	18*	307*	$4,577*	$775*	Severe (CRS)	$327
Typhoid Routine	$211	$182	$29	154	154	15,485	$1,182	$12	Mild-None	$643
Typhoid Routine + Catch-up	$529	$459	$70	178	160	18,093	$2,579	$25	Mild-None	$763
Typhoid 2-15yo Campaign	$443	$364	$79	39	8	4,248	$9,259	$86	Mild-None	$218
Typhoid 5-15yo Campaign	$510	$432	$78	36	n/a	3,855	$11,905	$112	Mild-None	$197

Deemed next best investment given health impact and return on GAVI investment

** Includes CRS deaths and cases only*

Portfolio Option ‘B’

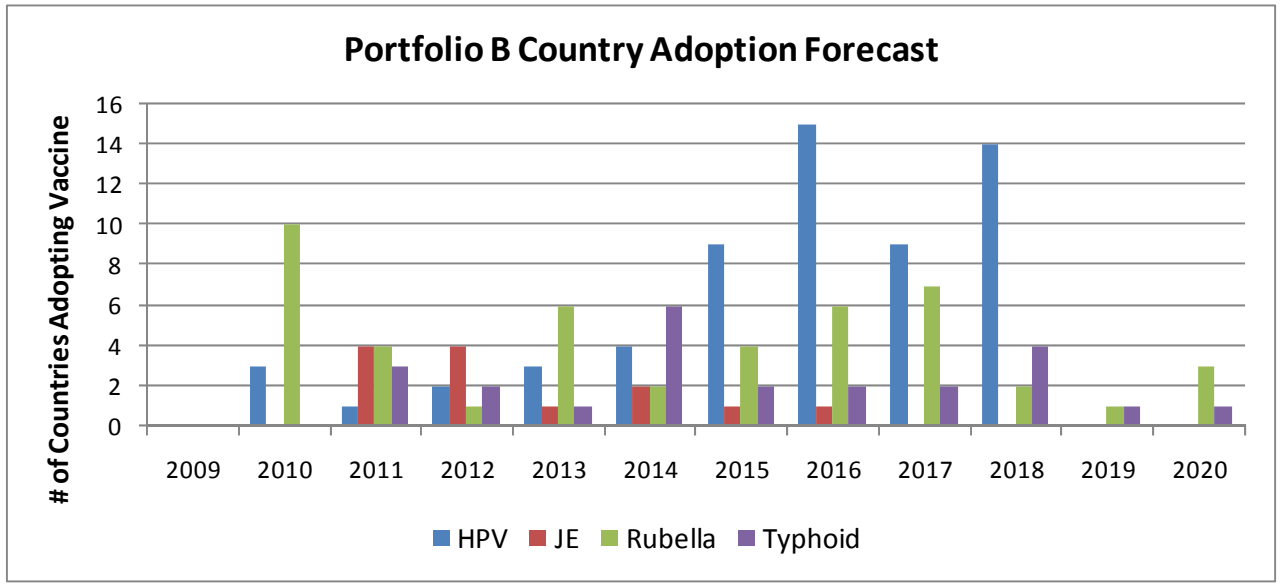
VACCINE AVAILABILITY



Portfolio Option ‘B’

ADOPTION FORECAST

Integrated Adoption Forecast 2009-2020

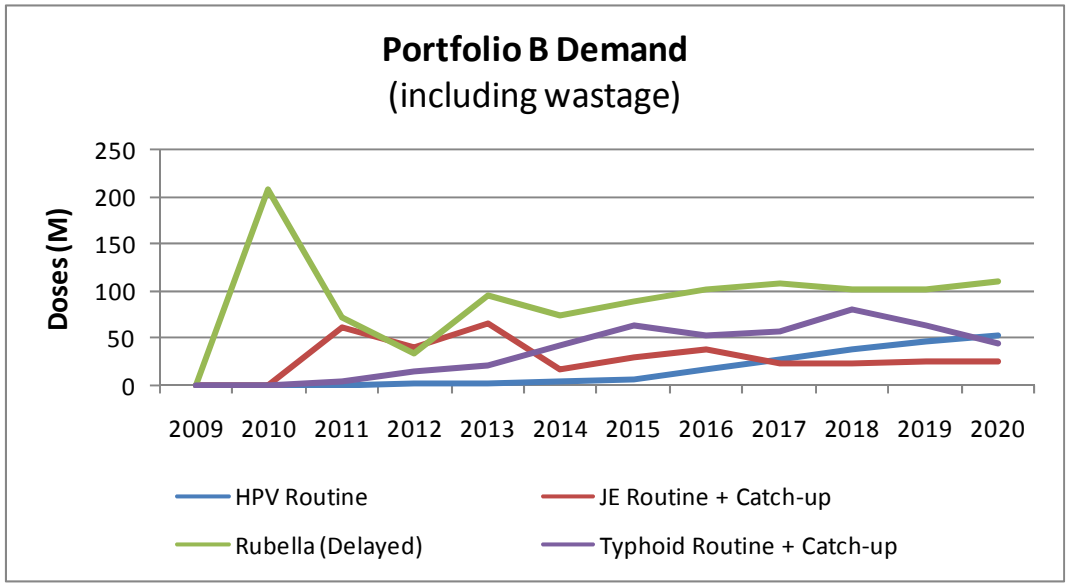


	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPV	0	3	1	2	3	4	9	15	9	14	0	0
JE	0	0	4	4	1	2	1	1	0	0	0	0
Rubella	0	10	4	1	6	2	4	6	7	2	1	3
Typhoid	0	0	3	2	1	6	2	2	2	4	1	1

Portfolio Option ‘B’

DEMAND FORECAST

Integrated Adoption Forecast 2009-2020



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPV Routine	0	0	1	1	3	4	6	17	26	37	46	52
JE Routine	0	0	2	7	11	15	17	20	22	23	24	24
JE 1-15yo Catch-up	0	0	58	33	54	2	11	17	0	0	0	0
Rubella Routine	0	32	33	32	64	70	75	87	93	98	102	107
Rubella 15-39yo WCBA	0	175	40	1	31	3	14	13	14	4	0	3
Typhoid Routine	0	0	1	3	5	9	14	20	25	30	34	38
Typhoid 1-15yo Catch-up	0	0	4	13	16	33	50	32	33	51	29	6

Portfolio Option ‘B’

GAVI VACCINE COST FORECAST

Integrated Adoption Forecast 2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	3	7	11	25	35	59	125	184	250	263	300	**1,261**
JE *Routine + 1-15yo Catch-up*	0	0	290	175	208	42	58	63	33	35	35	35	**974**
Rubella *Delayed Impact Version*	0	74	25	11	33	24	30	33	36	34	34	36	**370**
Typhoid *Routine + 1-15yo Catch-up*	0	0	9	20	21	59	66	38	77	82	45	42	**459**
Portfolio B Total	**0**	**77**	**331**	**217**	**287**	**161**	**213**	**259**	**328**	**401**	**377**	**414**	**3,065**
Portfolio B Cumulative	**0**	**77**	**408**	**625**	**912**	**1,073**	**1,286**	**1,545**	**1,873**	**2,274**	**2,651**	**3,065**	

Portfolio Option ‘B’

IMPLEMENTATION COST FORECAST

Integrated Adoption Forecast 2009-2020

Disease	Country Implementation Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV Routine	0	4	7	11	20	26	39	90	136	191	238	272	**1,033**
JE Routine + Catch-up	0	0	30	29	40	39	52	67	60	64	67	67	**516**
Routine + boost	*0*	*0*	*6*	*18*	*29*	*39*	*46*	*54*	*60*	*60*	*67*	*67*	*452*
1-15yo Catch-up	*0*	*0*	*24*	*11*	*11*	*1*	*6*	*12*	*0*	*0*	*0*	*0*	*64*
Rubella Delayed	0	66	30	16	42	36	44	50	57	55	56	59	**510**
Routine + boost	*0*	*14*	*16*	*16*	*32*	*35*	*38*	*45*	*49*	*53*	*56*	*58*	*413*
15-39yo WCBA	*0*	*51*	*13*	*0*	*10*	*1*	*5*	*4*	*8*	*2*	*0*	*1*	*97*
Typhoid Routine + Catch-up	0	0	8	19	26	52	68	78	111	132	129	139	**762**
Routine = boost	*0*	*0*	*3*	*10*	*19*	*34*	*51*	*71*	*90*	*108*	*122*	*135*	*642*
1-15yo Catch-up	*0*	*0*	*5*	*9*	*7*	*18*	*18*	*7*	*21*	*24*	*7*	*4*	*120*
Total Country Costs	**$0**	**$69**	**$75**	**$76**	**$128**	**$153**	**$203**	**$284**	**$364**	**$442**	**$490**	**$538**	**$2,823**

Global Partner Implementation Costs ($M)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total ($M)
	$19	$48	$55	$54	$51	$49	$50	$54	$49	$50	$39	$21	**$537**

Portfolio Option ‘B’

METRIC SUMMARY

Integrated Adoption Forecast 2009-2020

Strategy	Total Vaccine Cost ($M)	GAVI Vaccine Cost ($M)	Country Vaccine Cost ($M)	Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted	Long-Term Sequelae	Country Imp Costs ($M)
HPV Routine	$1,293	$1,261	$31	707	n/a	870	$1,784	$1,449	Severe	$1,033
JE Routine + Catch-Up	$1,034	$974	$60	140	93	765	$6,967	$1,274	Severe	$516
Rubella (delayed impact)	$540	$370	$170	22	13	110*	$16,742	$3,363	Severe	$511
Typhoid Routine + Catch-up	$529	$459	$70	178	160	18,093	$2,579	$25	Mild-None	$763
PORTFOLIO ‘B’ TOTAL	**$3,396**	**$3,065**	**$331**	**1,046**	**266**	**19,838**	**$2,929**	**$155**	**n/a**	**$2,823**

** Includes CRS deaths and cases only*

Portfolio Option ‘B’

TOTAL PORTFOLIO COST

Integrated Adoption Forecast 2009-2020

Cost Component	Cost
GAVI Vaccine Cost ($M)	3,065
Country Co-Pay Cost ($M)	331
Total Vaccine Cost ($M)	**$3,396**
Country Implementation Cost ($M)	2,823
Partner Cost ($M)	537
TOTAL COST ($M)	**$6,756**

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
1,046	266	19,838	$2,929	$155

Vaccine Portfolio Analysis

CONTENTS

Portfolio Option ‘C’

PORTFOLIO DEFINITION

Integrated Adoption Forecast 2009-2020

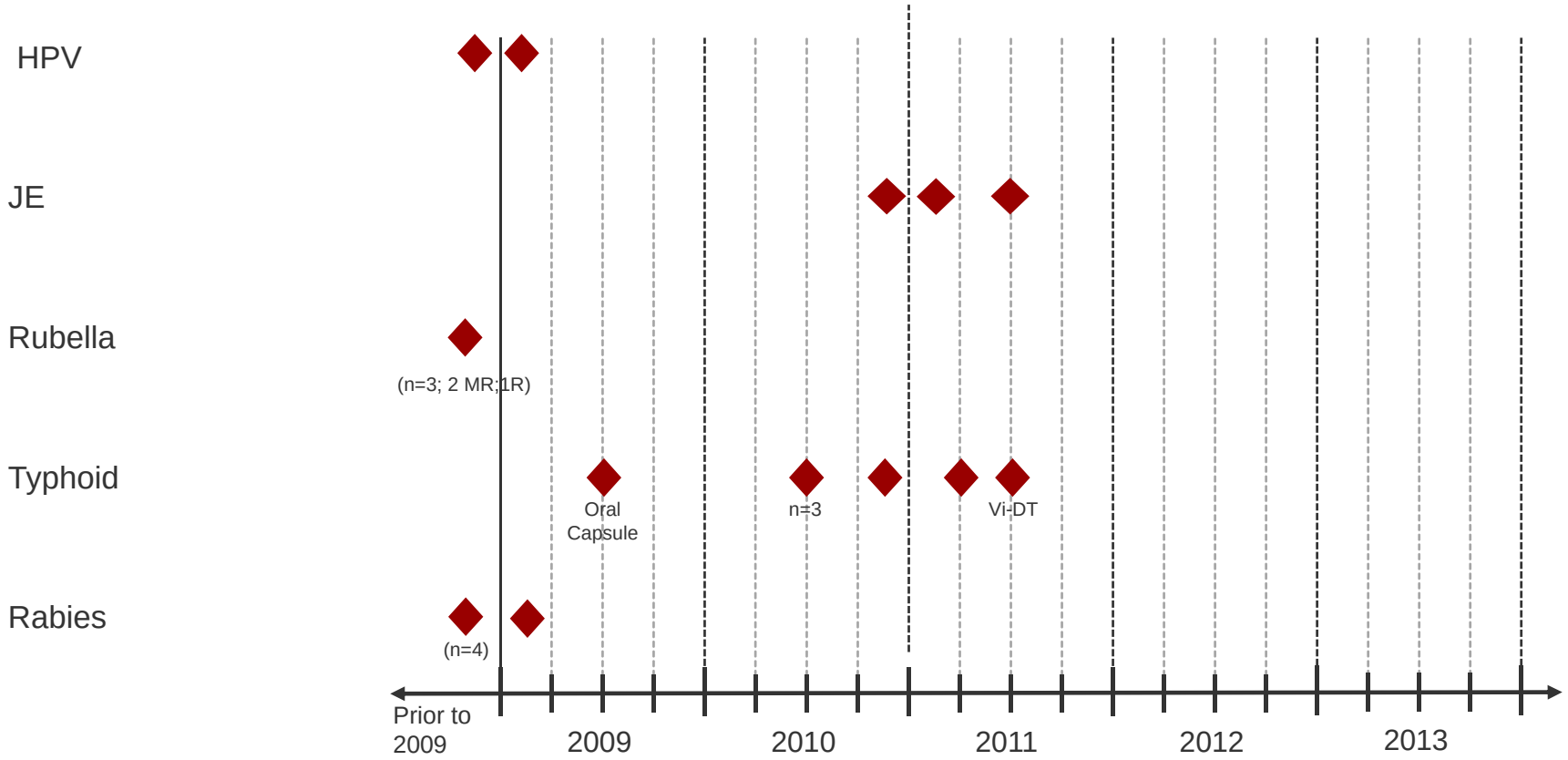
Strategy	Total Vaccine Cost ($M)	GAVI Vaccine Cost ($M)	Country Vaccine Cost ($M)	Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted	Long-Term Sequelae	Country Imp Costs ($M)
HPV Routine	$1,293	$1,261	$31	707	n/a	870	$1,784	$1,449	Severe	$1,033
JE Routine + Catch-Up	$1,034	$974	$60	140	93	765	$6,967	$1,274	Severe	$516
Rubella (delayed impact)	$540	$370	$170	22	13	110*	$16,742	$3,363	Severe	$511
Typhoid Routine + Catch-up	$529	$459	$70	178	160	18,093	$2,579	$25	Mild-None	$763
PORTFOLIO ‘B’ TOTAL	**$3,396**	**$3,065**	**$331**	**1,046**	**266**	**19,838**	**$2,929**	**$155**	**n/a**	**$2,823**
Rabies PEP	$2,945	$2,882	$63	483	24	n/a	$5,970	n/a	Mild-None	$90
Rubella Rapid (incremental)	$344	$238	$106	52*	18*	307*	$4,577*	$775*	Severe (CRS)	$327

Deemed worthwhile investment if GAVI funds available

** Includes CRS deaths and cases only*

Portfolio Option ‘C’

VACCINE AVAILABILITY



Portfolio Option ‘C’

ADOPTION FORECAST

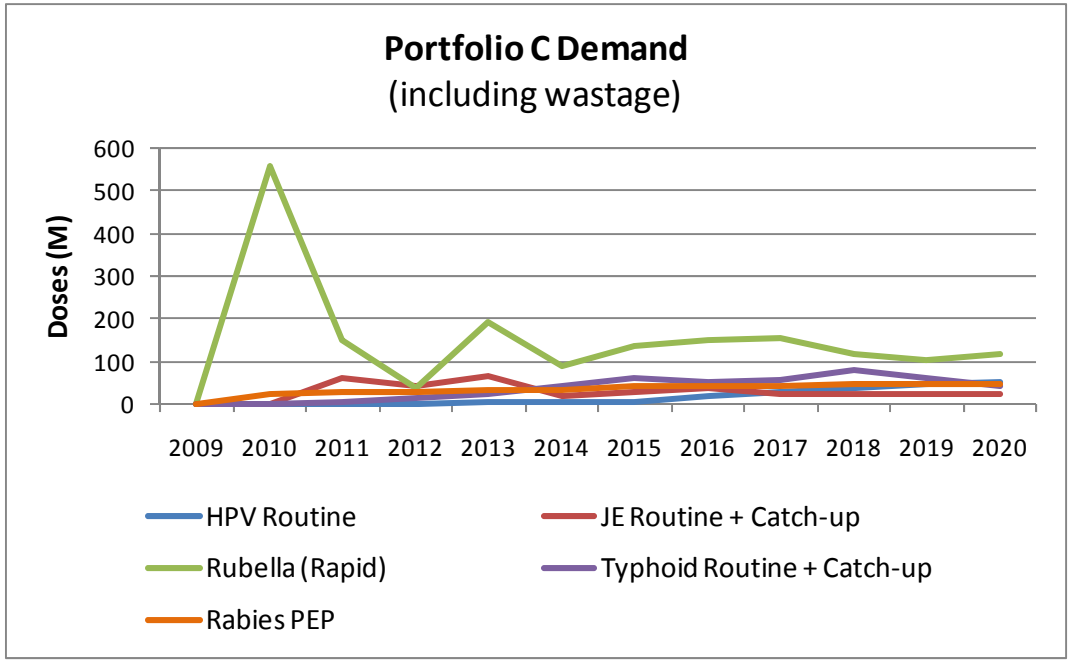
Integrated Adoption Forecast 2009-2020

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPV	0	3	1	2	3	4	9	15	9	14	0	0
JE	0	0	4	4	1	2	1	1	0	0	0	0
Rubella	0	10	4	1	6	2	4	6	7	2	1	3
Typhoid	0	0	3	2	1	6	2	2	2	4	1	1
Rabies	0	9	10	3	9	9	4	2	1	2	0	0

Portfolio Option 'C'

DEMAND FORECAST

Integrated Adoption Forecast 2009-2020



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
HPV Routine	0	0	1	1	3	4	6	17	26	37	46	52
JE Routine	0	0	2	7	11	15	17	20	22	23	24	24
JE 1-15yo Catch-up	0	0	58	33	54	2	11	17	0	0	0	0
Rubella Routine	0	32	33	32	64	70	75	87	93	98	102	107
Rubella 1-19yo Catch-up	0	406	88	4	106	14	50	53	53	15	0	9
Rubella 20-29yo WCBA	0	119	26	1	22	2	10	9	10	3	0	2
Typhoid Routine	0	0	1	3	5	9	14	20	25	30	34	38
Typhoid 1-15yo Catch-up	0	0	4	13	16	33	50	32	33	51	29	6
Rabies PEP	0	24	26	27	31	34	39	41	42	44	45	45

Portfolio Option ‘C’

GAVI VACCINE COST FORECAST

Integrated Adoption Forecast 2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	3	7	11	25	35	59	125	184	250	263	300	**1,261**
JE *Routine + 1-15yo Catch-up*	0	0	290	175	208	42	58	63	33	35	35	35	**974**
Typhoid *Routine + 1-15yo Catch-up*	0	0	9	20	21	59	66	38	77	82	45	42	**459**
Rabies PEP	0	223	244	244	250	270	276	281	277	278	268	272	**2,882**
Rubella *Rapid Impact Version*	0	191	51	12	66	29	45	50	52	39	34	39	**608**
Portfolio C Total	**0**	**417**	**599**	**463**	**570**	**436**	**504**	**556**	**622**	**683**	**646**	**689**	**6,185**
Portfolio C Cumulative	**0**	**417**	**1,017**	**1,480**	**2,050**	**2,485**	**2,989**	**3,545**	**4,167**	**4,850**	**5,496**	**6,185**	

Portfolio Option ‘C’

IMPLEMENTATION COST FORECAST

Integrated Adoption Forecast 2009-2020

Disease	Country Implementation Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV Routine	0	4	7	11	20	26	39	90	136	191	238	272	**1,033**
JE Routine + Catch-up	0	0	30	29	40	39	52	67	60	64	67	67	**516**
Routine + boost	*0*	*0*	*6*	*18*	*29*	*39*	*46*	*54*	*60*	*60*	*67*	*67*	*452*
1-15yo Catch-up	*0*	*0*	*24*	*11*	*11*	*1*	*6*	*12*	*0*	*0*	*0*	*0*	*64*
Typhoid Routine + Catch-up	0	0	8	19	26	52	68	78	111	132	129	139	**762**
Routine + boost	*0*	*0*	*3*	*10*	*19*	*34*	*51*	*71*	*90*	*108*	*122*	*135*	*642*
1-15yo Catch-up	*0*	*0*	*5*	*9*	*7*	*18*	*18*	*7*	*21*	*24*	*7*	*4*	*120*
Rabies PEP	0	5	6	6	7	8	9	10	10	10	10	10	90
Rubella Rapid	0	200	60	17	110	42	65	71	90	62	57	64	**838**
Routine + boost	*0*	*14*	*16*	*16*	*32*	*35*	*38*	*45*	*49*	*53*	*56*	*39*	*414*
2-19yo Catch-up	*0*	*151*	*35*	*1*	*71*	*6*	*23*	*23*	*35*	*8*	*0*	*4*	*357*
20-29yo WCBA	*0*	*35*	*9*	*0*	*7*	*1*	*4*	*3*	*6*	*1*	*1*	*1*	*67*
Total Country Costs	**$0**	**$209**	**$111**	**$83**	**$203**	**$166**	**$233**	**$315**	**$406**	**$460**	**$501**	**$553**	**$3,241**

Global Partner Implementation Costs ($M)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total ($M)
	$20	$56	$64	$59	$57	$55	$53	$56	$51	$53	$39	$21	**$584**

Portfolio Option ‘C’

METRIC SUMMARY

Integrated Adoption Forecast 2009-2020

Strategy	Total Vaccine Cost ($M)	GAVI Vaccine Cost ($M)	Country Vaccine Cost ($M)	Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted	Long-Term Sequelae	Country Imp Costs ($M)
HPV Routine	$1,293	$1,261	$31	707	n/a	870	$1,784	$1,449	Severe	$1,033
JE Routine + Catch-Up	$1,034	$974	$60	140	93	765	$6,967	$1,274	Severe	$516
Typhoid Routine + Catch-up	$529	$459	$70	178	160	18,093	$2,579	$25	Mild-None	$763
Rabies PEP	$2,945	$2,882	$63	483	24	0	$5,970	n/a	Mild-None	$90
Rubella Rapid	$884	$608	$276	74*	31*	417*	$8,222*	$1,459*	Severe	$838
PORTFOLIO ‘C’ TOTAL	**$6,684**	**$6,185**	**$499**	**1,582**	**308**	**20,145**	**$3,910**	**$307**	**n/a**	**$3,240**

** Includes CRS deaths and cases only*

Portfolio Option ‘C’

TOTAL PORTFOLIO COST

Integrated Adoption Forecast 2009-2020

Cost Component	Cost
GAVI Vaccine Cost ($M)	6,185
Country Co-Pay Cost ($M)	499
Total Vaccine Cost ($M)	**$6,684**
Country Implementation Cost ($M)	3,241
Partner Cost ($M)	584
TOTAL COST ($M)	**$10,509**

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
1,582	308	20,145	$3,910	$307

Vaccine Portfolio Analysis

CONTENTS

Portfolio Option Summary

COST SUMMARY

Integrated Adoption Forecast 2009-2020

Cost Component	Portfolio Option 'A'	Portfolio Option 'B'	Portfolio Option 'C'
GAVI Vaccine Cost ($M)	2,606	3,065	6,185
Country Co-Pay Cost ($M)	261	331	499
Total Vaccine Cost ($M)	**$2,867**	**$3,396**	**$6,684**
Country Implementation Cost ($M)	2,060	2,823	3,241
Partner Cost ($M)	503	537	584
TOTAL COST ($M)	**$5,430**	**$6,756**	**$10,509**

Portfolio Option Summary

METRIC SUMMARY

Integrated Adoption Forecast 2009-2020

Metric	Portfolio Option 'A'	Portfolio Option 'B'	Portfolio Option 'C'
Total Projected Deaths Averted (x1000)	869	1,046	1,582
Total Projected Deaths Averted <5yo (x1000)	106	266	308
Total Cases Averted (x1000)	1,745	19,838	20,145
GAVI Cost per Death Averted ($)	$2,998	$2,929	$3,910
GAVI Cost per Case Averted ($)	$1,493	$155	$307

Portfolio Option Summary

PORTFOLIO SUMMARY

Integrated Adoption Forecast 2009-2020

Metric	Portfolio Option 'A'	Portfolio Option 'B'	Portfolio Option 'C'
GAVI Vaccine Cost ($M)	2,606	3,065	6,185
Country Vaccine Co-Pay Cost ($M)	261	331	499
Total Vaccine Cost ($M)	$2,867	$3,396	$6,684
Total Projected Deaths Averted (x1000)	869	1,046	1,582
Total Projected Deaths Averted <5yo (x1000)	106	266	308
Total Cases Averted (x1000)	1,745	19,838	20,145
GAVI Cost per Death Averted ($)	$2,998	$2,929	$3,910
GAVI Cost per Case Averted ($)	$1,493	$155	$307

Vaccine Portfolio Analysis

CONTENTS

Metric Summary by Strategy

Strategy	Total Vaccine Cost ($M)	GAVI Vaccine Cost ($M)	Country Vaccine Cost ($M)	Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted	Country Imp Costs ($M)
Cholera 1-15yo Campaign Every 3 Years	$1,480	$1,227	253	130	33	6,654	$9,462	$184	$425
Cholera 1-49yo Campaign Every 3 Years	$3,198	$2,659	$538	132	10	6,046	$20,075	$440	$888
HPV Routine 10yo Female Vaccination	$1,293	$1,261	$31	707	n/a	870	$1,784	$1,449	$1,033
JE Routine Infant Vaccination with boost after 12 mos + 1-15yo Catch-up Campaign	$1,034	$974	$60	140	93	765	$6,967	$1,274	$516
Rabies Post-Exposure Prophylaxis	$2,945	$2,882	$63	483	24	n/a	$5,970	n/a	$90
Rubella (rapid impact) Routine 1yo Vaccination with boost at 4yo + 2-19yo Campaign + 20-29yo WBCA Campaign	$884	$608	$276	74*	31*	417*	$8,222*	$1,459*	$838
Rubella (delayed impact) Routine 1yo Vaccination with boost at 4yo + 15-39yo WBCA Campaign	$540	$370	$170	22*	13*	110*	$16,742*	$3,363*	$511
Rubella Incremental From Delayed to Rapid	$344	$238	$106	52*	18*	307*	$4,577*	$775*	$327
Typhoid Routine Infant Vaccination with boost after 12mos	$211	$182	$29	154	154	15,485	$1,182	$12	$643
Typhoid Routine Infant Vaccination with boost after 12mos + 1-15yo Catch-up	$529	$459	$70	178	160	18,093	$2,579	$25	$763
Typhoid 2-15yo Campaign Every 3 Years	$443	$364	$79	39	8	4,248	$9,259	$86	$218
Typhoid 5-15yo Campaign Every 3 Years	$510	$432	$78	36	n/a	3,855	$11,985	$112	$197

** Includes CRS deaths and cases only*

Vaccine Portfolio Analysis

CONTENTS

Portfolio Option 'A'

GAVI VACCINE COST FORECAST

Without India

Integrated Adoption Forecast

2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	3	7	11	25	35	59	95	132	178	183	201	**929**
JE *Routine + 1-15yo Catch-up*	0	0	290	175	208	42	58	63	33	35	35	35	**974**
Rubella *Delayed Impact Version*	0	17	19	5	21	12	17	21	23	21	21	23	**198**
Portfolio A Total	**0**	**20**	**316**	**191**	**254**	**89**	**134**	**179**	**188**	**233**	**239**	**259**	**2,100**
Portfolio A Cumulative	**0**	**20**	**336**	**526**	**780**	**869**	**1,003**	**1,182**	**1,369**	**1,602**	**1,841**	**2,100**	

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
667	100	1,460	$3,149	$1,439

Portfolio Option 'B'

GAVI VACCINE COST FORECAST

Without India

Integrated Adoption Forecast

2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	3	7	11	25	35	59	95	132	178	183	201	**929**
JE *Routine + 1-15yo Catch-up*	0	0	290	175	208	42	58	63	33	35	35	35	**974**
Rubella *Delayed Impact Version*	0	17	19	5	21	12	17	21	23	21	21	23	**198**
Typhoid *Routine + 1-15yo Catch-up*	0	0	9	20	21	59	66	38	37	38	36	33	**356**
Portfolio B Total	**0**	**20**	**324**	**211**	**275**	**149**	**200**	**216**	**225**	**271**	**275**	**292**	**2,456**
Portfolio B Cumulative	**0**	**20**	**344**	**555**	**830**	**978**	**1,178**	**1,394**	**1,619**	**1,890**	**2,165**	**2,456**	

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
818	238	16,725	$3,005	$147

Portfolio Option ‘C’

GAVI VACCINE COST FORECAST

Integrated Adoption Forecast

Without India

2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	3	7	11	25	35	59	95	132	178	183	201	**929**
JE *Routine + 1-15yo Catch-up*	0	0	290	175	208	42	58	63	33	35	35	35	**974**
Typhoid *Routine + 1-15yo Catch-up*	0	0	9	20	21	59	66	38	37	38	36	33	**356**
Rabies PEP	0	37	56	58	83	105	129	141	140	145	140	142	**1,176**
Rubella *Rapid Impact Version*	0	49	44	6	54	16	33	37	39	25	21	26	**350**
Portfolio C Total	**0**	**90**	**405**	**270**	**391**	**258**	**344**	**374**	**381**	**420**	**415**	**437**	**3,785**
Portfolio C Cumulative	**0**	**90**	**495**	**765**	**1,156**	**1,414**	**1,758**	**2,132**	**2,513**	**2,933**	**3,348**	**3,785**	

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
1,058	259	16,911	3,578	224

Portfolio Option Summary

PORTFOLIO SUMMARY
Without India

Integrated Adoption Forecast
2009-2020

Cost	Portfolio Option 'A'	Portfolio Option 'B'	Portfolio Option 'C'
GAVI Vaccine Cost ($M)	2,100	2,456	3,785
Country Vaccine Co-Pay Cost ($M)	179	234	329
Total Vaccine Cost ($M)	$2,279	$2,690	$4,114
Total Projected Deaths Averted (x1000)	667	818	1,058
Total Projected Deaths Averted <5yo (x1000)	100	238	259
Total Cases Averted (x1000)	1,460	16,725	16,911
GAVI Cost per Death Averted ($)	$3,149	$3,005	$3,578
GAVI Cost per Case Averted ($)	$1,439	$147	$224

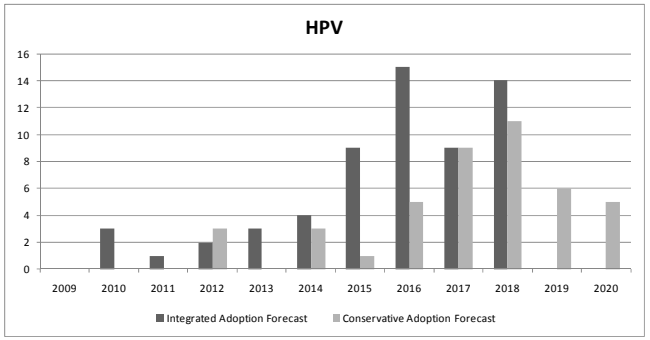
Vaccine Portfolio Analysis

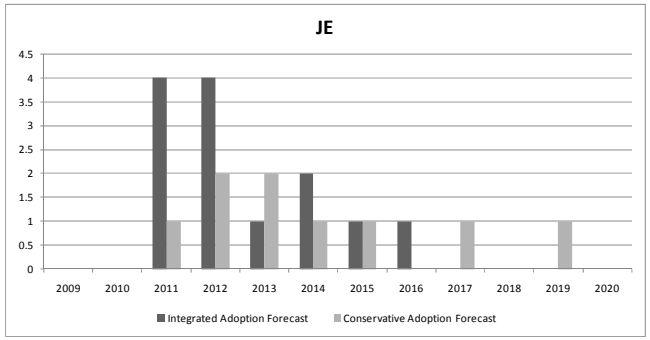
CONTENTS

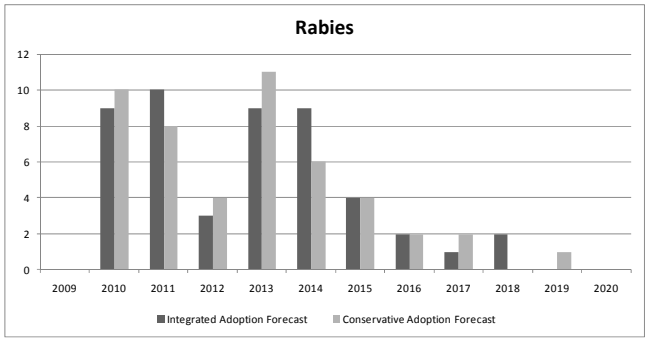
Portfolio Analysis

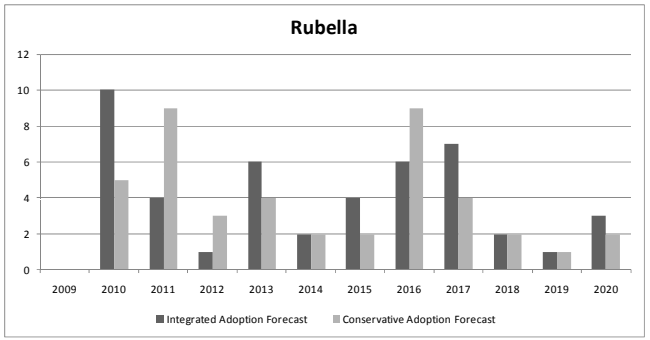
COUNTRY ADOPTION FORECAST

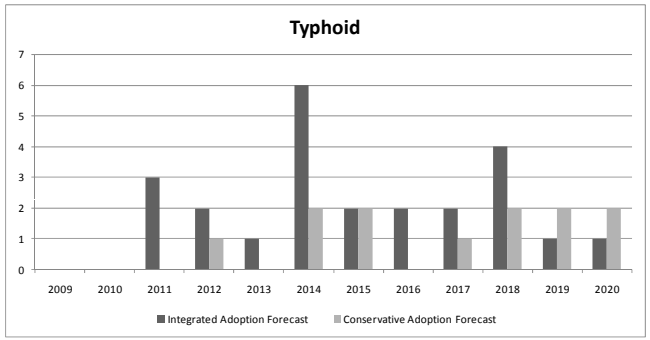
Integrated vs. Conservative Forecast 2009-2020











Portfolio Option ‘A’

GAVI VACCINE COST FORECAST

Conservative Adoption Forecast 2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	0	0	2	4	8	12	15	21	31	47	67	**208**
JE *Routine + 1-15yo Catch-up*	0	0	4	32	57	7	62	9	37	13	81	19	**320**
Rubella *Delayed Impact Version*	0	10	74	10	22	17	22	32	31	31	31	33	**314**
Portfolio A Total	0	10	78	45	82	33	96	57	89	75	160	118	**842**
Portfolio A Cumulative	0	10	88	133	215	248	344	400	489	564	724	842	

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
200	46	572	$4,207	$1,471

Portfolio Option 'B'

GAVI VACCINE COST FORECAST

Conservative Adoption Forecast 2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	0	0	2	4	8	12	15	21	31	47	67	**208**
JE *Routine + 1-15yo Catch-up*	0	0	4	32	57	7	62	9	37	13	81	19	**320**
Rubella *Delayed Impact Version*	0	10	74	10	22	17	22	32	31	31	31	33	**314**
Typhoid *Routine + 1-15yo Catch-up*	0	0	0	9	11	5	7	6	7	19	29	31	**123**
Portfolio B Total	0	10	78	54	93	38	102	62	96	93	189	149	**965**
Portfolio B Cumulative	0	10	88	142	235	273	375	438	534	627	816	965	

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
240	80	4,617	$4,023	$209

Portfolio Option ‘C’

GAVI VACCINE COST FORECAST

Conservative Adoption Forecast 2009-2020

Disease	GAVI Vaccine Procurement Costs ($M)												Total ($M)
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
HPV *Routine Immunization*	0	0	0	2	4	8	12	15	21	31	47	67	**208**
JE *Routine + 1-15yo Catch-up*	0	0	4	32	57	7	62	9	37	13	81	19	**320**
Typhoid *Routine + 1-15yo Catch-up*	0	0	0	9	11	5	7	6	7	19	29	31	**123**
Rabies PEP	0	73	155	236	229	245	244	256	269	267	261	266	**2,499**
Rubella *Rapid Impact Version*	0	32	198	15	46	22	27	58	47	36	33	34	**546**
Portfolio C Total	0	105	357	294	346	287	352	343	380	365	451	417	**3,695**
Portfolio C Cumulative	0	105	461	755	1,102	1,388	1,740	2,083	2,463	2,828	3,279	3,695	

Deaths Averted (x1000)	<5 Deaths Averted (x1000)	Cases Averted (x1000)	GAVI Cost ($)/ Death Averted	GAVI Cost ($)/ Case Averted
718	117	4,906	5,149	753

Portfolio Option Summary

PORTFOLIO SUMMARY

Conservative Adoption Forecast

2009-2020

Metric	Portfolio Option 'A'	Portfolio Option 'B'	Portfolio Option 'C'
GAVI Vaccine Cost ($M)	842	965	3,695
Country Vaccine Co-Pay Cost ($M)	175	193	351
Total Vaccine Cost ($M)	1,017	1,158	4,047
Total Projected Deaths Averted (x1000)	200	240	718
Total Projected Deaths Averted <5yo (x1000)	46	80	117
Total Cases Averted (x1000)	572	4,617	4,906
GAVI Cost per Death Averted ($)	$4,207	$4,023	$5,149
GAVI Cost per Case Averted ($)	$1,471	$209	$753