



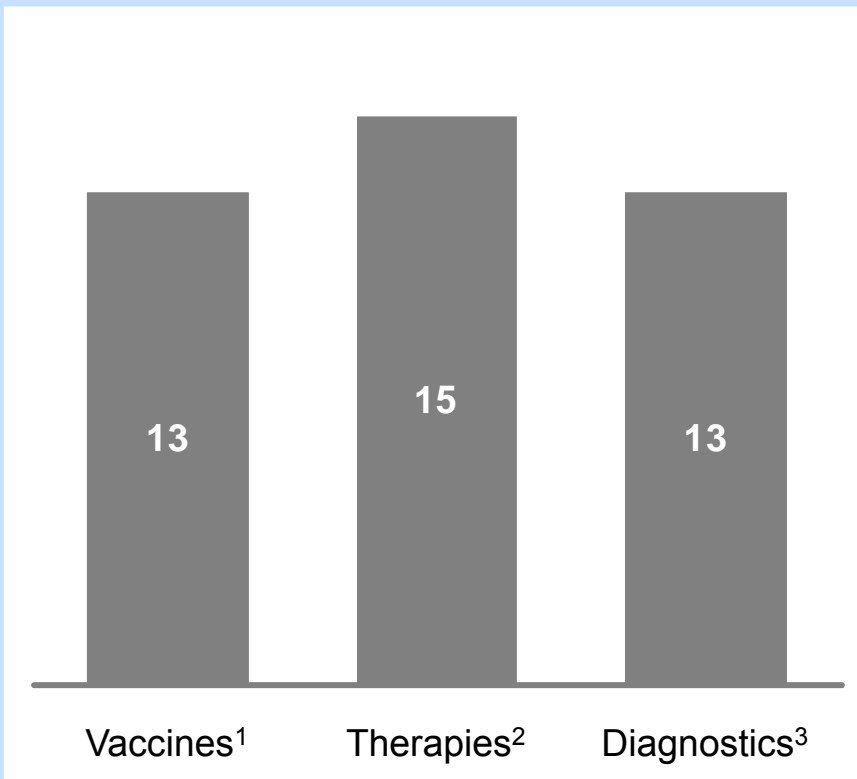
Ebola R&D Landscape of clinical candidates and trials

ANDi Meeting
November 2015

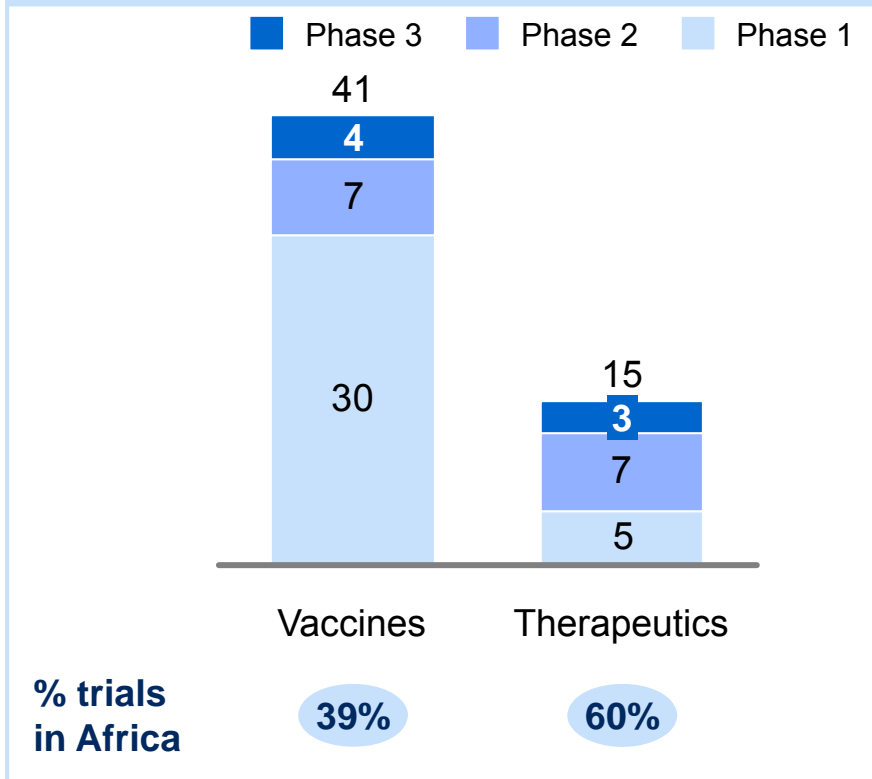
Based on findings in the WHO's Public report:
http://www.who.int/medicines/ebola-treatment/EbolaR_D_public-report_oct2015.pdf

High-level summary of Ebola clinical candidates during the 2014-2015 West African outbreak

Ebola vaccine, therapeutic, and diagnostic candidates in clinical development (2014-2015)



Clinical trials for Ebola vaccines and therapeutics⁴ (2014-2015)



1 Considering different vaccine combinations/variants as distinct

2 Including therapies only given under compassionate use

3 Products that have received FDA or WHO emergency use listing; up to 80 are in some stage of development

4 Based on triangulation from public sources and stakeholder interviews. If a trial spans multiple phases or is unclassified, classification here is based on the highest phase or the trial's primary outcomes

Guide to categories for clinical-stage vaccines

PRELIMINARY

Category	Vaccine	Manufacturer
A Vaccines with post-Ph. 1 trials	▪ ChAd3-EBOZ (monovalent)	▪ GSK
	▪ rVSV-ZEBOV	▪ Merck
	▪ Ad26.ZEBOV + MVA-BN-Filo	▪ Janssen ▪ Bavarian Nordic
B Alternative vaccine variants in Phase 1 trials	▪ ChAd3-EBOZ + MVA-EBOZ-EM	▪ GSK ▪ Emergent BioSolutions
	▪ ChAd3-EBOZ +MVA-BN-Filo	▪ GSK ▪ Bavarian Nordic
	▪ ChAd3-EBO (bivalent)	▪ Okairos ¹ /National Institutes of Health (NIH)
	▪ ChAd3-EBO (bivalent) + MVA-EBOZ-IDT	▪ Okairos ¹ /NIH ▪ IDT Biologika on behalf of NIH
	▪ ChAd3-EBOZ + Ad26.ZEBOV	▪ GSK, Janssen
C Other novel vaccines with planned, ongoing or completed Ph 1	▪ EBOV GP	▪ Novavax
	▪ rVSVN4CT1-EBOV GP	▪ Profectus
	▪ rVSVN4CT1-EBOV-SUDV-MARV	▪ Profectus
	▪ Ad5-EBOV	▪ Beijing Institute of Biotechnology, Tianjin Cansino Biotech
	▪ INO-4212	▪ Inovio

¹ Subsequently acquired by GSK

Guide to categories for clinical-stage therapies

PRELIMINARY

Category	Treatment	Manufacturer
D Therapies with recent formal trials examining efficacy	▪ ZMapp	▪ Mapp Biopharmaceutical
	▪ Favipiravir (Avigan)	▪ Toyama Chemical (subsidiary of Fujifilm)
	▪ TKM-130803	▪ Tekmira
	▪ Brincidofovir	▪ Chimerix
	▪ Convalescent Plasma	▪ N/A—not a commercialized product ▪ Cerus Corp.’s INTERCEPT system ² used in 3 trials
	▪ Interferon beta 1a	▪ Several ¹
E Therapies with Ph. 1 trials for the goal of treating Ebola	▪ BCX4430	▪ Biocryst
	▪ MIL77	▪ Institute of Basic Medical Sciences (IBMS) & MabWorks
F Therapies that have been given to humans outside of formal trials	▪ Amiodarone	▪ N/A—generic
	▪ Artesunate-amodiaquine	▪ N/A—generic
	▪ Atorvastatin + irbesartan (+/- clomifene)	▪ N/A—generic
	▪ FX06	▪ F4 Pharma
	▪ ZMAb	▪ Defyrus
	▪ Lamivudine	▪ N/A—generic ³

1 Product used in trial donated from Biogen; 2 Licensed in U.S. and Europe for acquired coagulopathy; 3 Marketed as Eпивir in the U.S. by GSK

NOTE: Information for earlier-stage candidates can be found at: http://www.who.int/medicines/ebola-treatment/cat_prioritization_drugs_testing/en/

DIAGNOSTICS

Emergency authorized products span a wide range of ease-of-use

PRELIMINARY

■ High
 ■ Medium
 ■ Low

Product	Manufacturer	Technology	Platform(s)	Other materials required ¹ .		Emergency list date ²		Sample
				Equip.	Other	WHO	FDA	
ReEBOV	Corgenix	Antigen lateral flow device	None	●	●	Feb 19, 2015	Feb 24, 2015	Blood, plasma
Xpert Ebola	Cepheid	rRT-PCR	GeneXpert	●	●	May 08, 2015	Mar 23, 2015	Venous blood
BioThreat-E	BioFire Defense	Multiplex rRT-PCR	FilmArray	●	●	N/A	Oct 25, 2014	Blood, urine
Liferiver	Shanghai ZJ BioTech	rRT-PCR	ABI 7500 Fast Dx, LightCycler 480 II, CFX96, SLAN 96	●	●	Apr 27, 2015	N/A	Blood
RealStar Filovirus	Altona Diagnostics	rRT-PCR	ABI 7500 Fast/SDS, Light Cycler 480 II, CFX96	●	●	Nov 25, 2014	N/A	Plasma
SQ Q Line Ebola Zaire Ag	SD Biosensor Inc.	Antigen lateral flow device	None	●	●	Sep 8, 2015	N/A	Blood, plasma, serum
RealStar Ebolavirus	altona Diagnostics	rRT-PCR	ABI 7500 Fast Dx, LightCycler, CFX96	●	●	N/A	Nov 10, 2014	Plasma
NGDS BT-E	BioFire Defense	Multiplex rRT-PCR	FilmArray	●	●	N/A	Oct 25, 2014	Blood, plasma, serum
LightMix	Roche	rRT-PCR	LightCycler 480 II, cobas Z 480	●	●	N/A	Dec 23, 2014	Whole blood
EZ1	US DoD	rRT-PCR	ABI 7500 Fast Dx, LightCycler, JBAIDS	●	●	N/A	Aug 05, 2014	Blood, plasma
CDC NP	CDC	rRT-PCR	ABI 7500 Fast Dx, CFX96	●	●	N/A	Oct 10, 2014	Blood, plasma, serum, urine
CDC VP40	CDC	rRT-PCR	ABI 7500 Fast Dx, CFX96	●	●	N/A	Oct 10, 2014	Blood, plasma, serum, urine
OraQuick	OraSure technologies Inc.	Antigen lateral flow device	None	●	●	N/A	July 31, 2015	Blood, plasma

1 Number of materials that are required but not provided with product - first column describes lab instruments/lab requirements and second describes reagents and consumables; 2 If multiple reauthorizations exist, original date is shown here

Reflections on the development of interventions

What went well

- The global community response, pragmatism and innovation
- Multiple different interventions designed and pursued
- Rapid scale up of interventions which were 'on the shelf' but untested

What went less well

- Unclear regulatory pathways on multiple levels
- Fragmented R&D funding even for lead candidates
- Complexities with incentivisation (e.g. no purchase commitment)

Gaps and key topics to resolve for 'next time'

Intervention development

- How do we stimulate more innovation in 'peace time' on high risk pathogens, including from researchers based in at risk regions (new funding models, incubators etc?)
- How do we change the existing market incentives so that we don't have vaccines like the Ebola one sitting on a shelf for 10 years (move innovation 'out of the lab')?
- Can we use the rapid testing model deployed in west Africa outside of crisis situations to speed approval and adoption of new, locally developed interventions?
- Can we establish and codify a more standardised approach to testing novel drugs, vaccines and clinical protocols in crisis situations to enable rapid roll out?

Regulation and Funding

- Clarification of regulatory pathway:
 - What lessons learned on fast tracking can be codified for the future?
 - What provisions can we make for the possibility that there are insufficient cases to complete the trial?
 - What guidelines/governance is needed to cover purchase of unlicensed vaccine for stockpiles?
- Can an Emergency preparedness fund be created to deploy where market failures exist for high risk viruses and pathogens

Supply

- For the current vaccine, how can we ensure there are sufficient quantities to secure we have vaccine if outbreak happens soon?
- How can we ensure long term availability and what is the mechanism (stockpile? locked in capacity?)

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PRELIMINARY

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Acronyms used

- Centers for Disease Control and Prevention (CDC)
- Centre National de Recherche et de Formation sur le Paludisme (CNRFP)
- Foundation for Innovative New Diagnostics (FIND)
- London School of Hygiene & Tropical Medicine (LSHTM)
- National Institute of Allergy and Infectious Diseases (NIAID)
- World Health Organization (WHO)

OUT

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- **Vaccines**
- Therapeutics
- Diagnostics

A VACCINES

Summary of candidate information for vaccines that have progressed past Phase 1 trials

PRELIMINARY

Vaccine candidates	Highest pre-clin. evidence	Early clinical evidence	Latest trials (next page) ⁴
ChAd3-EBOZ	<ul style="list-style-type: none"> 100% effective in 1 published NHP challenge study (n=8) [a] 	<ul style="list-style-type: none"> A published Phase 1 trial (n=60) in U.K [b] <ul style="list-style-type: none"> No SAEs Fever in 3% of vaccinees, resolved next day 235-469 GMT¹ Two additional Phase 1 trials with unpublished data in Mali (n=91), US n=20), and one Phase 1/2 in Switzerland (n=120) [c] 	<ul style="list-style-type: none"> Three ongoing/near-term Ph. 2 and/or 3 trials in W. Africa
rVSV-ZEBOV	<ul style="list-style-type: none"> 100% effective in 4 published NHP challenge studies (total n=37) [d,e,f,g] 	<ul style="list-style-type: none"> Two phase 1 trials in U.S. (n=40) published [h] <ul style="list-style-type: none"> No SAEs Fever in 30% of vaccinees, resolved next day 1300-4079 GMT² Four additional phase 1 trials in Europe and Africa (n=138) published [i] <ul style="list-style-type: none"> No SAEs Fever in 20% of total vaccines 13 cases of arthritis 1056-1970 GMT³ Two additional phase 1 trials that have not been published 	<ul style="list-style-type: none"> Four⁵ ongoing Ph 2 and/or 3 trials in W. Africa. Published interim results from ring vaccination [j]: <ul style="list-style-type: none"> 100% efficacy (p=0.0036) Possibly 1 vaccinerelated SAE, to be confirmed
Ad26. ZEBOV + MVA-BNFIlo	<ul style="list-style-type: none"> 100% effective in company publicized NHP challenge study (n=8) [l]. Manuscript submitted 	<ul style="list-style-type: none"> One Phase 1 trial (n=87) in U.K. has completed enrollment and manuscript is being finalized. Company-publicized interim analysis: [l] <ul style="list-style-type: none"> 3 groups receiving Ad26 as prime + MVA as boost; 2 groups receiving MVA as prime and Ad26 as boost No vaccine related SAEs Objective fever in 3 subjects (2 vaccinated, 1 placebo), resolved next day “robust” antibody response post Ad26 prime (97% responders at D28) further enhanced by boosting: 4274-10573 GMT⁶ One Ph 1 trial in US (n=128) completed enrollment, manuscript being prepared Two additional ongoing Phase 1 trials in Kenya & Ghana⁷ (n=84), Uganda & Tanzania (n=72) 	<ul style="list-style-type: none"> Two ongoing/near-term Ph.2 trials in Europe and Africa One multi-stage Ph. 3 trial planned in Sierra Leone

NOTE - Different ELISA methods and reporting units have been used for the different vaccines hence the GMT numbers are not “readily” comparable. Taking this into account D28 immunogenicity after 1 dose of rVSV-ZEBOV and ChAd3-ZEBOV are similar

1 GMT of IgG responses at day 28 against EBOV GP using EC90 end-point titration ELISA, after subtraction of prevaccination responses, differs by treatment groups

2 Geometric mean titer of IgG responses at day 28 against Zaire-Kikwit GP using ELISA, differs by treatment groups









3 Geometric mean titer of antibody response at day 28 against ZEBOV GP using ELISA, differs by treatment groups

4 As these candidates are already in Ph. 2, ongoing Ph. 1 trials are not shown in detail; 5 The Guinea trial has two components; these are shown separately on the next page; 6 Geometric mean titer of IgG responses against EBOV GP corresponding to Day 28 schedule; 7 Pending approval in Ghana, Kenya completed enrollment (n=72)

SOURCE: Clinicaltrials.gov, Pan African Clinical Trials Registry (PACTR), Published academic studies, Public releases, stakeholder interviews

Summary of latest clinical trials for candidates in post-Ph. 1 (1/2)











Original design
Revised design

	Trial Description, Short-hand name	Design	Population	Location	Phase	Start date	End date ¹	Goal enroll ²	Current enroll ² /date	Trial Status	Publication Status ³
ChAd3-EBOZ (mono-valent)	▪ Safety and Immunogenicity in Adults	▪ Randomized, double-blind ▪ Immediate vs. placebo + delayed (6 mo) vaccination	Adults	West Africa ⁴	2	Jul 2015	Oct 2016	3,000		Currently recruiting	Intend to publish ⁵
	▪ Safety and immunogenicity in pediatrics	▪ Randomized, observer blind ⁶ ▪ Immediate Vx + Placebo (Meningococcal Vx) at 6 mo vs. Immediate placebo + Vx at mo. 6	Children	West Africa ⁷	2	Oct 2015	Mar 2017	600		Not yet recruiting	Intend to publish ⁵
Multiple Vaccines	▪ Safety, immunogenicity, and efficacy (PREVAIL I)	▪ Randomized, double-blind ▪ Placebo: 2 treatment arms (ChAd3-EBOZ or rVSV-ZEBOV), 1 placebo arm ▪ Ph. 2 includes close monitoring	Adults	Liberia 	2	Feb 2015	Apr 2016	1,500		Enrollment complete	Intend to publish
					600						
rVSV-ZEBOV	▪ Efficacy and safety (Ring vaccination)	▪ Cluster-randomized, open label ▪ Vaccinees are "rings" (contacts/contacts-of contacts) of confirmed Ebola cases ▪ Immediate vs. delayed (21 days) vaccination	Adults	Guinea 	3	Mar 2015	Feb 2016	10,000	>7651 As of Jul 20	Currently recruiting	Methods and interim results published Jul. 2015 [j, k]
	▪ Safety and Immunogenicity (in front-line workers, part of above trial)	▪ Non-random, open-label ▪ Single arm receiving vaccine	Adults	Guinea 	2	Mar 2015	Feb 2016	1,200 ⁸	1200 Aug 21	Currently recruiting	Plan to publish when follow-up complete
	▪ Efficacy, safety, & immunogenicity (STRIVE)	▪ Randomized, open-label ▪ Immediate vs. delayed (18-24 weeks) vaccination ▪ Safety sub-study in approx. 400 subjects ▪ Immunogenicity sub-study in approx. 500 subjects	Adults	Sierra Leone 	2/3	Apr 2015	Jun 2016	10,000 6,000	>8500 As of Sep 4	Currently recruiting; main trial enrollment completed Aug.	Intend to publish
	▪ Safety & immunogenicity of 3 consistency lots and a high-dose lot	▪ Randomized, double-blind ▪ 5 arms: 1 for each of the 3 consistency lots of Vx, 1 high-dose lot of Vx, 1 placebo	Adults	U.S.,  Canada,  U.K.,  Spain, 	3	Aug 2015	Jun 2016	1,125	1125 As of Sep 18	Currently recruiting	Intend to publish

1 Final data collection for primary outcome; 2 Total enrollment in all arms of study; 3 In a peer-reviewed journal
 4 Approved in Senegal, Mali, Nigeria, and seeking approvals in Cameroon, Ghana; 5 The publication steering committee will decide on scope and timelines of all publications derived from these studies in early 2016;
 6 until interim analysis; 7 Planned for Mali, Senegal, Ghana, Cameroon, Nigeria; 8 Additional 2,000 volunteers to be included for the safety database

Summary of latest clinical trials for candidates in post-Ph. 1 (2/2)

Original design
Revised design

Trial Description	Design	Popula- tion	Location	Phase	Start date	End date ¹	Goal enroll ²	Current en- roll ² /date	Trial Status	Publication Status ³
Ad26. ZEBOV + MVA-BN- Filo	<ul style="list-style-type: none"> Safety, Tolerability, and Immunogenicity 	<ul style="list-style-type: none"> Randomized, observer-blind Receive Ad26.Ebov or placebo, followed by MVA-BN-Filo or placebo Three groups (different timings for the second shot) 	Adults U.K.  France 	2	Jul 2015	July 2016	612	TBD TBD	Currently recruiting in UK	Intend to publish
	<ul style="list-style-type: none"> Safety, Tolerability, and Immunogenicity 	<ul style="list-style-type: none"> Randomized, observer-blind Receive Ad26.Ebov or placebo, followed by MVA-BN-Filo or placebo Healthy adults and elderly population divided into three groups (different timings for the second shot) Children and HIV+ subjects divided into 2 groups Staggered enrollment of special populations 	Adults (incl. HIV+ subjects) and children Ivory Coast, Burkina Faso, Kenya, Uganda, Ghana, Rwanda      	2	Oct 2015 ⁴	Aug 2016 (adult only)	1,188	0 Sep 25	Not yet recruiting	Intend to publish
	<ul style="list-style-type: none"> Safety, Immunogenicity, and efficacy (in stages) (EBOVAC-Salone) 	<ul style="list-style-type: none"> Open-label. An IDMC will give guidance on advancing through groups and stages Stage 1 + 2a: single arm receiving vaccine. Stage 2b: Extended safety & immunogenicity— design TBD 	Adults only (stage 1); Adults & children (stages 2a,2b) Sierra Leone 	2	Sep 2015 ⁴	Aug 2017	440 ⁵ TBD ⁶	0 Sep 25	Not yet recruiting	Intend to publish
		<ul style="list-style-type: none"> Open-label, cluster randomized This portion of trial depends on outbreak status and is currently on hold 	Adults & children Sierra Leone 	3	TBD	TBD	TBD	0 Sep 25	Not yet recruiting	Intend to publish, if this stage occurs

1 Final data collection for primary outcome 2 Total enrollment in all arms of study 3 In a peer-reviewed journal 4 Pending Regulatory Approval
5 For stage 1+2a 6 For stage 2b

Summary of candidate information for alternative vaccine variants in Ph 1 clinical trials

PRELIMINARY










Vaccine+ Boost Candidate	Highest pre-clinical evidence	Early clinical evidence	Latest trials (next page)
ChAd3-EBOZ + MVA-EBOZ-EM	<ul style="list-style-type: none"> Vaccine and MVA boost 100% effective in 1 published NHP study (n=4) using researcher-produced MVA¹ [a] 	<ul style="list-style-type: none"> No completed studies 	<ul style="list-style-type: none"> Two Ph. 1s ongoing
ChAd3-EBOZ +MVA-BN-Filo		<ul style="list-style-type: none"> No completed studies 	<ul style="list-style-type: none"> Two Ph. 1s ongoing
ChAd3-EBO (bivalent)	<ul style="list-style-type: none"> Unboosted bivalent vaccine 50% or 100% effective (depending on dose range, total n=8) in 1 published NHP study [a] 	<ul style="list-style-type: none"> One published preliminary report (n=20) of an ongoing Ph. 1 trial in U.S. [m] <ul style="list-style-type: none"> No SAEs Fever in 2 pts, resolved by next day 331-2037 GMT² 	<ul style="list-style-type: none"> Two Ph. 1s ongoing
ChAd3-EBO (bivalent) + MVA-EBOZ-IDT			<ul style="list-style-type: none"> Two Ph. 1s ongoing
ChAd3-EBOZ + Ad26.ZEBOV	<ul style="list-style-type: none"> Two vaccines have been studied separately, but not as a booster combination 	<ul style="list-style-type: none"> No completed studies 	<ul style="list-style-type: none"> One Ph. 1s ongoing

1 MVA used in this study is similar to the manufactured MVA products, but not identical

2 Geometric mean titer of antibody response to Zaire GP at 4 weeks using ELISA, number differs by treatment groups

Summary of latest clinical trials for alternative vaccine variants in Ph 1 clinical trials

Original design
Revised design

	Trial Description, Short-hand name	Design	Population	Location	Phase	Start date	End date ¹	Goal enroll ²	Trial Status	Publication Status ³
ChAd3-EBOZ + MVA-EBOZEM	<ul style="list-style-type: none"> Safety and immunogenicity 	<ul style="list-style-type: none"> Non-random, open-label 1 group receives MVA-EBOZ only (two dose levels) 3 groups receive ChAd3-EBOZ followed by MVA-EBOZ different timings) 	Adults	U.K. 	1a	Apr 2015	Oct 2015	38	Enrollment complete Sep. 2015	Manuscript under development
	<ul style="list-style-type: none"> Safety and immunogenicity 	<ul style="list-style-type: none"> Randomized, open-label 2 groups: both receive ChAd3-EBOZ + MVA-EBOZ a week later, but vaccine administered differently 	Adults	Senegal 	1b	July 2015	Jan 2016	40	Enrollment complete	Manuscript under development
ChAd3-EBOZ + MVA-BN-Filo	<ul style="list-style-type: none"> Dose-escalating safety & immunogenicity 	<ul style="list-style-type: none"> Non-random, open-label 7 groups: different dosage levels and timings In 3 of these groups, a subset receive ChAd3-EBOZ only (no boost) 	Adults	U.K. 	1a	Sep 2014	Dec 2015	92	Enrollment complete Sep. 2015	Prelim. Results submitted
	<ul style="list-style-type: none"> Dose-escalating safety & immunogenicity (sub-study⁴) 	<ul style="list-style-type: none"> Randomized, double-blind 2 groups: following ChAd3-EBOZ, participants received MVA-BN-Filo or placebo 	Adults	Mali 	1b	Oct 2014	Sep 2015	52	Enrollment complete	Submitted
ChAd3-EBO (bivalent) ⁵	<ul style="list-style-type: none"> Dose-escalating safety, tolerability, and immunogenicity 	<ul style="list-style-type: none"> Non-random, open-label Part 1: 2 dosage groups of bivalent vaccine Part 2: 1 group receives high-dose bivalent Vx, 1 dose receives monovalent Vx (randomized dosage level), 2 group (from a prior trial) receive bivalent Vx boost 	Adults	U.S. 	1/1b	Aug 2014	Dec 2015	150	Enrollment complete	Prelim. Report published [m]; final report under development (NEJM)
	<ul style="list-style-type: none"> Safety, tolerability, and immunogenicity 	<ul style="list-style-type: none"> Randomized, open-label 1 group with: 2 subgroups receiving monovalent Vx and 2 subgroups receiving bivalent Vx 1 group (from a prior trial) receive bivalent Vx 	Adults	Uganda 	1b	Jan 2015	July 2016	90	Enrollment complete	Intend to publish
ChAd3-EBO (bivalent) + MVA-EBOZ-IDT	<ul style="list-style-type: none"> Dose, safety, and immunogenicity 	<ul style="list-style-type: none"> Randomized, open-label 7 groups: 2 receive MVA-EbolaZ only, 1 receives ChAd3-EBO +MVA-Ebola Z, 4 receive MVA-Ebola Z (and received ChAd3-EBO or -EBOZ in a prior trial) 	Adults	U.S. 	1/1b	Mar 2015	Dec 2016	160	Currently recruiting	Intend to publish
	<ul style="list-style-type: none"> Safety, tolerability, and immunogenicity 	<ul style="list-style-type: none"> Randomized, Double-blind All receive ChAd3-EBO (either low or high dose), followed by either MVA-EBOZ-IDT or placebo 	Adults	Mali 	1b	Mar 2015	Jan 2016	60	Enrollment complete	Manuscript under development
ChAd3-EBOZ + Ad26.ZEBOV	<ul style="list-style-type: none"> Safety and immunogenicity 	<ul style="list-style-type: none"> Randomized, open-label 2 groups receive ChAd3-EBOZ, then Ad26.ZEBOV 2 groups receive Ad26.ZEBOV, then ChAd3-EBOZ 	Adults	U.K. 	1	July 2015	Apr 2016	32	Currently recruiting	Intend to publish

¹ Final data collection for primary outcome; ² Total enrollment in all arms of study; ³ In a peer reviewed journal; ⁴ Sub-study here is part of larger Ph. 1 study (n=91) for ChAd3-EBOZ; ⁵ Trials also tested the monovalent ChAd3-EBOZ









Summary of other novel vaccines with planned, ongoing or completed Phase 1 studies

PRELIMINARY

Vaccine Candidate	Highest pre-clinical evidence	Early clinical evidence	Latest trials (next page)
EBOV GP	<ul style="list-style-type: none"> 100% effective in company publicized studies: 3 in NHP, (n=11) with full lethal controls; one in mice (n=9) [n,o] 	<ul style="list-style-type: none"> One ongoing Ph. 1 trial has in company publicized top-line results [p]: <ul style="list-style-type: none"> Well-tolerated Highly immunogenic 	<ul style="list-style-type: none"> One Ph. 1 trial ongoing
rVSVN4CT1-EBOV GP	<ul style="list-style-type: none"> 100% effective in published NHP study (n=4) [q] 	<ul style="list-style-type: none"> No completed Ph. 1 	<ul style="list-style-type: none"> One Ph. 1 trial ongoing
rVSVN4CT1-EBOV-SUDV-MARV	<ul style="list-style-type: none"> 100% effective in company publicized NHP study (n=10 challenged with Ebola) 	<ul style="list-style-type: none"> No completed Ph. 1 	<ul style="list-style-type: none"> One Ph.1 trial planned
Ad5-EBOV	<ul style="list-style-type: none"> 100% effective in unpublished guinea pig study [r] 100% protective (IM) in NHP challenge study (July 2015) - 2 dose ranges and 2 route of admin – IM and intra-nasal); Manuscript being prepared 	<ul style="list-style-type: none"> Ph. 1 trial with completed enrollment in China, Published prelim. results (n=120) [r]: <ul style="list-style-type: none"> No SAEs 18% had mild fever 683-1306 GMT¹ 	<ul style="list-style-type: none"> Two Ph. 1 trials completed One ongoing Ph. 1 trial for boost regimen One Ph. 2 planned
INO-4212	<ul style="list-style-type: none"> 100% effective in published study in protecting guinea pigs (n=15) and mice n=10) [s] Unpublished ongoing NHP challenge study 	<ul style="list-style-type: none"> No completed Ph. 1 	<ul style="list-style-type: none"> One Ph. 1 initiated May 2015

1 Antibody responses to Zaire strain glycoprotein, as measured as Geometric Mean Titers, at day 28, by ELISA; number varies by dose groups

Summary of latest trials for other novel vaccines

	Trial Description	Design	Population	Location	Phase	Start date	End date ¹	Goal enroll ²	Trial Status	Current enroll. ²	Publication Status ³
EBOV GP	<ul style="list-style-type: none"> Immunogenicity and safety 	<ul style="list-style-type: none"> Randomized, observer-blind 13 study arms, spanning different dosing, adjuvant, and placebo combinations 	Adults	Australia 	1	Feb 2015	Apr 2016	230	Enrollment complete	230 <i>Final Count</i>	TBD
rVSVN4CT 1-EBOV GP	<ul style="list-style-type: none"> Safety, tolerability, and immunogenicity 	<ul style="list-style-type: none"> Randomized, double-blind 3 dose-escalating cohorts each with an active and a placebo arm Receive one shot and another at 28 days 	Adults	U.S. 	1	Nov 2015	Jan 2016	39	Not yet recruiting	0 <i>Aug 31</i>	Intend to publish
rVSVN4CT 1-EBOV-SUDV-MARV	<ul style="list-style-type: none"> Safety, tolerability, and immunogenicity 	<ul style="list-style-type: none"> Randomized, double-blind 3 dose-escalating cohorts each with an active and a placebo arm Receive one shot and another at 28 days 	Adults	U.S. 	1	Mar 2016	June 2016	39	Not yet recruiting	0 <i>Aug 31</i>	Intend to publish
Ad5-EBOV	<ul style="list-style-type: none"> Safety, tolerability, and immunogenicity 	<ul style="list-style-type: none"> Randomized, double-blind 2 groups: 1 for low-dose vaccine, 1 for high-dose In each group, 40 receive vaccine, 20 receive placebo 	Adults	China 	1	Dec 2014	Feb 2015	120	Complete	120 <i>Final Count</i>	Prelim. Results published Mar 2015 [r]
	<ul style="list-style-type: none"> Safety and immunogenicity 	<ul style="list-style-type: none"> Randomized, double-blind Participants in above trial receive a second shot as a booster of what they previously received 	Adults	China 	1	Aug 2015	Nov 2015	120	Currently recruiting	110 <i>Aug 20</i>	Intend to publish
	<ul style="list-style-type: none"> Safety, side-effect profile, immunogenicity 	<ul style="list-style-type: none"> Non-randomized, open label 2 groups: 1 for low-dose vaccine, 1 for high-dose No placebo 	Adults	China 	1	Mar 2015	July 2015	61	Complete	61 <i>Final Count</i>	Intend to publish
	<ul style="list-style-type: none"> Extended safety and immunogenicity 	<ul style="list-style-type: none"> Randomized, double-blind 3 groups: 1 receive high dose Vx, 1 receive low-dose Vx, 1 receives placebo 	Adults	Sierra Leone 	2	Oct 2015	July 2016	600 (pending finalization)	Ethics committee approved; Pending regulatory approval	0 <i>Aug 20</i>	Intend to publish
INO-4212	<ul style="list-style-type: none"> Safety, tolerability and immunogenicity 	<ul style="list-style-type: none"> Non-randomized, open-label 5 groups: 1 receiving INO-4212, 3 receiving INO-4201 or INO-4202 (the components of INO-4212) <ul style="list-style-type: none"> Intramuscular and Inter-dermal, 1 receiving INO-4212 and INO-9012 as immune response boost All receive electroporation after Vx 	Adults	U.S. 	1	May 2015	Dec 2016	75	Currently recruiting	TBD	Intend to publish

¹ Final data collection for primary outcome; ² Total enrollment in all arms of study; ³ In a peer reviewed journal

Contents

- Vaccines
- **Therapeutics**
- Diagnostics

Guide to categories for clinical-stage therapies

PRELIMINARY

Category	Treatment	Manufacturer	Pages
D Therapies with recent formal trials examining efficacy	▪ ZMapp	▪ Mapp Biopharmaceutical	14-16
	▪ Favipiravir (Avigan)	▪ Toyama Chemical (subsidiary of Fujifilm)	
	▪ TKM-130803	▪ Tekmira	
	▪ Brincidofovir	▪ Chimerix	
	▪ Convalescent Plasma	▪ N/A—not a commercialized product ▪ Cerus Corp.’s INTERCEPT system ² used in 3 trials	
	▪ Convalescent Blood	▪ N/A--not a commercialized product	
	▪ Interferon beta 1a	▪ Several ¹	
E Therapies with Ph. 1 trials for the goal of treating Ebola	▪ BCX4430	▪ Biocryst	17-18
	▪ MIL77	▪ Institute of Basic Medical Sciences (IBMS) & MabWorks	
F Therapies that have been given to humans outside of formal trials	▪ Amiodarone	▪ N/A—generic	19
	▪ Artesunate-amodiaquine	▪ N/A—generic	
	▪ Atorvastatin + irbesartan (+/- clomifene)	▪ N/A—generic	
	▪ FX06	▪ F4 Pharma	
	▪ ZMAb	▪ Defyrus	
	▪ Lamivudine	▪ N/A—generic ³	

1 Product used in trial donated from Biogen; 2 Licensed in U.S. and Europe for acquired coagulopathy; 3 Marketed as Epivir in the U.S. by GSK

NOTE: Information for earlier-stage candidates can be found at: http://www.who.int/medicines/ebola-treatment/cat_prioritization_drugs_testing/en/

Summary of candidate information for therapies/procedures in trials examining efficacy








PRELIMINARY

	Highest pre-clinical evidence	Early clinical evidence	Latest trials (next page) ¹
ZMapp	<ul style="list-style-type: none"> 100% survival in one published NHP study (n=18) [t] 	<ul style="list-style-type: none"> Ph. 1 in healthy volunteers planned but not yet started 	<ul style="list-style-type: none"> One clinical endpoint study ongoing
Favipiravir	<ul style="list-style-type: none"> 100%² survival in mice (n=11) [u,v] 	<ul style="list-style-type: none"> No Ph. 1 for goal of treating Ebola Phase 1 and 2 studies for influenza <ul style="list-style-type: none"> Safe and well tolerated Statistically and clinically beneficial effect on influenza symptoms and cessation of viral shedding 	<ul style="list-style-type: none"> One Ph. 2 trial ongoing. Informally shared interim results (Feb. 2015, xn=80) show [w,x] <ul style="list-style-type: none"> Unlikely to be effective in patients who start treatment with very high viral load (CT<20) Possible efficacy for patients who begin treatment with CT ≥20
TKM-130803	<ul style="list-style-type: none"> siRNA has 67 or 100% survival in NHP (n=10)³ [y, z] 	<ul style="list-style-type: none"> Incomplete safety assessment in healthy subjects Ph. 1 (using different formulation, TKM-100802) terminated, results not published 	<ul style="list-style-type: none"> One Ph. 2 trial has completed enrollment
Brincidofovir	<ul style="list-style-type: none"> No animal studies. Company-publicized in vitro activity against Ebola [aa] 	<ul style="list-style-type: none"> No Ph. 1 for goal of treating Ebola Studied for other indications, some gastrointestinal side effects 	<ul style="list-style-type: none"> One Ph. 2 trial was stopped
Convalescent plasma (CP)	<ul style="list-style-type: none"> Although human plasma hasn't been studied, related studies show: <ul style="list-style-type: none"> 100% in NHP (n=3), using igG⁴ [ab] 0% in NHP (n=4) using whole blood transfusion[ac] 	<ul style="list-style-type: none"> No completed Ph. 1 for goal of treating Ebola Safely used to treat other diseases in past 50 years 8 patients received whole blood transfusion in published informal study, 7 survived [ad] One patient received human sera (and interferon) in published informal study and survived [ae] 	<ul style="list-style-type: none"> One Ph. 2/3 CP trial ongoing in Sierra Leone One Ph 2/3 trial in Guinea – enrollment stopped
Convalescent blood			<ul style="list-style-type: none"> One Ph. 1/2 trial of CP with enrollment paused in Liberia One Ph. 2 trial of Convale- CP ongoing in U.S. One unclassified trial of whole blood
Interferon beta 1a	<ul style="list-style-type: none"> Published NHP study shows significantly delayed death (0% survival) [af] 	<ul style="list-style-type: none"> No Ph. 1 for goal of treating Ebola Approved for other indications One patient received interferon (and human sera) in published informal study and survived [ae] 	<ul style="list-style-type: none"> One Ph 1/2 ongoing

1 As these candidates are in efficacy trials, Ph. 1 trials are not shown in detail; 2 If administered within 6 days post-infection; 3 Survival differed by study groups (different number of treatments); 4 study used IgG (post-fractionation), human plasma has not been studied in NHP;

Summary of clinical trials examining efficacy (1/2)







Revised Design Original Design

	Trial Description	Design	Population	Location	Phase	Viral load ¹	Start date	End date ²	Goal enroll. ³	Current enroll ³ / date	Trial Status	Publication Status ⁴
ZMapp	Safety and efficacy study (PREVAIL II)	<ul style="list-style-type: none"> Randomized, open-label 2 arms: ZMapp+optimized Std of Care vs. oSOC only oSOC includes Favipiravir in Guinea 	Adults & children	U.S., Liberia, Sierra Leone, Guinea ⁵	Clinical endpoint study	 ⁶	Feb 2015	TBD ⁷	200 ⁸	~60 Aug 01	Currently recruiting	Intend to publish (once study completes)
Favipiravir	Safety and efficacy in reducing mortality (JIKI)	<ul style="list-style-type: none"> Non-random, open-label Single arm, historical controls 	Adults & children	Guinea 	2		Dec 2014	Jun 2015 <i>(estimated⁹)</i>	225 ⁹	126 As of Aug 2015	Enrollment ongoing ⁹	Intend to publish
TKM-130803	Safety and efficacy (RADIPE-TKM)	<ul style="list-style-type: none"> Non-random, open-label Single arm, historical controls 	Adults	Sierra Leone 	2		Mar 2015	Jun 2015	upto 100	TBD Final	Trial completed Jun 2015 (reached statistical endpoint)	Submitted
Brincidofovir	Safety and efficacy (RAPIDE-BCV)	<ul style="list-style-type: none"> Non-random, open-label Single arm, historical controls 	Adults & children	Liberia 	2		Jan 2015	Jan 2015	140	4 Final	Trial stopped (manufacturer withdrew) Jan 2015	Submitted

1 Viral load is an outcome; 2 Final data collection for primary outcome; 3 Total enrollment in all arms of study; 4 In a peer reviewed journal; 5 Study began in Guinea in July 2015 with Guinean MoH and INSERM as new partners; 6 Viral load may be tested but not required; 7 will enroll until DSMB advises to stop; 8 No fixed original goal enrollment, as study design is adaptive; 9 Clinicaltrials.gov accessed Oct 21

Summary of clinical trials examining efficacy (2/2)

■ Revised Design ■ Original Design

	Trial Description	Design	Population	Location	Phase	Viral load ¹	Start date	End date ²	Goal enroll. ³	Current enroll ³ / date	Trial Status	Publication Status ⁴
Convalescent plasma (CP)	Safety and efficacy of CP for early EVD in Sierra Leone	<ul style="list-style-type: none"> Non-random (based on CP availability), open-label 2 arms: Control is crystalloid infusion 	Adults & children	Sierra Leone 	2/3	✓	Mar 2015	After outbreak end	130 ⁵ 300	4 Aug 7	Currently recruiting	Manuscript under development
	Safety and efficacy of CP for EVD in Guinea	<ul style="list-style-type: none"> Non-random (based on CP availability), open-label 2 arms: Control is SOC only⁶ 	Adults ⁷ & children	Guinea 	2/3	✓	Feb 2015	Oct 2015	130 200	102 Final	Enrollment stopped	Submitted
	Safety and efficacy of CP for EVD in Liberia	<ul style="list-style-type: none"> Non-random (based on CP availability), open-label 2 arms: Control is SOC only 	Adults & children	Liberia 	1/2	✓	Nov 2014	May 2015 ⁸	70	>6 Jul 17	Enrollment paused	TBD
	Safety and efficacy of INTERCEPT Plasma from convalescent donors	<ul style="list-style-type: none"> Non-random, open-label Single arm receiving Transfusion Study also enrolling donors to collect plasma 	Adults & children	U.S. 	2	✓	Dec 2014	Dec 2015	12	0 Aug 23	Currently recruiting	Intend to publish
Convalescent whole blood	Efficacy of blood transfusions ⁹	<ul style="list-style-type: none"> Non-random (depends on blood avail.and consent), open-label 2 arms: Control is SOC only 	Adults & children	Sierra Leone 	N/A ¹⁰	✓	Nov 2014	Feb 2015	100	71 Jun 29	Enrollment finished, analyzing results	Manuscript under development
Interferon beta 1a	Safety and Efficacy of IFN β-1a in Ebola patients ⁸	<ul style="list-style-type: none"> Non-random, open-label Single arm, historical controls 	Adults only	Guinea 	1/2	✓	Mar 2015	After outbreak end	30 50	<30 Jun 18	Actively enrolling	Manuscript under development

1 Viral load is an outcome; 2 Final data collection for primary outcome; 3 Total enrollment in all arms of study; 4 In a peer reviewed journal; 5 Goal of 12 cases for rich sampling (increased PK/PD and biomarker investigation); 6 Historical controls will be used if needed, as all enrolled so far have been in treatment arm; 7 Including pregnant women; 8 Unless enrollment resumes (pending outbreak status); 9 Not a publically registered trial; 10 No phase classification given;



Summary of candidate information for therapies/procedures in early-clinical-stage trials

PRELIMINARY

	Highest pre-clinical evidence	Early clinical evidence	Latest trials (next page)
BCX 4430	<ul style="list-style-type: none"> 100% (n=6, 25 mg/kg BID) or 67% effective (n=6, 16 mg/kg BID) in company-publicized NHP study (Rhesus macaques) when treatment initiated within 2 hrs of infection with EBOV [ag] Not effective in NHP (cynomolgus macaques) at 16 mg/kg BID (n=6) when initiated at 48 hr post infection [ah] 100% effective in mice (n=10) [ai] 	<ul style="list-style-type: none"> Single ascending dose portion of phase 1 study completed 	<ul style="list-style-type: none"> One Ph. 1 study ongoing
MIL77	<ul style="list-style-type: none"> MIL77 appears at least as effective as ZMapp in a limited number of NHP; manuscript in preparation 	<ul style="list-style-type: none"> No completed Ph. 1 Also given under compassionate use to 2 Ebola patients in U.K. and Italy 	<ul style="list-style-type: none"> One Ph. 1 study planned

Summary of trials for therapies/procedures in early clinical stages

■ Original Design
■ Revised Design

	Trial Description	Design	Population	Location	Phase	Start date	End date ¹	Goal enroll. ²	Current Enroll. ²	Trial Status	Publication Status ³
BCX 4430	Safety, tolerability, and Pharmacokinetics	<ul style="list-style-type: none"> Randomized, double-blind Part 1 (single dose): 6 ascending dose cohorts. Per cohort, 6 subjects receive drug, 2 receive placebo Part 2 (multiple dose): Up to 4 ascending dose cohorts. Per cohort, 8 subjects receive drug, 2 receive placebo 	Adults only	 U.K.	1	Dec 2014	Dec 2015	88	~48 <i>As of Aug 14</i>	Currently Recruiting Part 1 complete	Manuscript under development
MIL77	Safety, tolerability, and Pharmacokinetics	<ul style="list-style-type: none"> Randomized, open-label, 3 dose-escalation groups 	Adults only	 China	1	<i>Dates TBD—trial pending regulatory approval</i>		32	0 <i>As of Aug 19</i>	Not yet recruiting, IND submitted	Intend to publish

1 Final data collection for primary outcome
2 Total enrollment in all arms of study
3 In a peer reviewed journal

Summary of other therapies used in the outbreak

PRELIMINARY

	Treatment	Description of use	Comments
Therapies with approved compassionate use or historical observational studies	Amiodarone	<ul style="list-style-type: none"> Compassionate use in 65 patients in Lakka, Sierra Leone 	<ul style="list-style-type: none"> Reported mortality of 63% Known toxic side effects One Ph. 2/3 trial was planned but did not launch
	Artesunate-amodiaquine (ASAQ)	<ul style="list-style-type: none"> Non-random, informal trial in Liberia During a shortage of the firstline anti-malarial, some patients were prescribed ASAQ 	<ul style="list-style-type: none"> 64-65% (total n=257) of those not receiving ASAQ died 51% (total n=71) of those receiving ASAQ died
	ZMAb	<ul style="list-style-type: none"> Given to 4 patients under compassionate use 	<ul style="list-style-type: none"> Results not known
	FX06	<ul style="list-style-type: none"> Given to 2 patients under compassionate use 	<ul style="list-style-type: none"> 1 treated patient survived
Therapies that lack sufficient details on protocol and/or results	Atorvastatin + irbesartan (+/- clomifene)	<ul style="list-style-type: none"> Reportedly given to ~100 patients under compassionate use in Sierra Leone 	<ul style="list-style-type: none"> Non-verified mortality rate of 2% No formal documentation of treatment results
	Lamivudine	<ul style="list-style-type: none"> Given to 15 patients under compassionate use in Liberia 	<ul style="list-style-type: none"> No clinical confirmation of Ebola in treated patients Non-verified mortality rate of 13%

Contents

- Vaccines
- Therapeutics
- **Diagnostics**

DIAGNOSTICS

Diagnostic products with FDA and/or WHO emergency use authorization

Technology:

- PCR
- Antigen lateral flow device

	Product	Manufacturer	Targets	Manufacturer Claims			Independent evaluation results			Time to result (hrs)
				LOD	Sensitivity	Specificity	LOD	Sensitivity	Specificity	
FDA EUA and WHO EUAL	ReEBOV	Corgenix	ZEBOV	1 million PFU/ml	78-96%	73-91%	211 million copies/ml ¹	91.8%	84.6%	<0.5
	Xpert Ebola	Cepheid	ZEBOV	232.4 copies/ml	90-100%	100%	1,340-4,230 copies/ml	n/a	n/a	1.5
	BioThreat-E	BioFire	ZEBOV	600,000 PFU/ml	96%	100%	4,059 copies/ml ¹	n/a	n/a	1.25
WHO EUAL only	Liferiver	Shanghai BioTech	ZEBOV + 3 other EV	n/a	n/a	n/a	42,300 copies/ml	n/a	n/a	<4-6
	RealStar Filovirus	Altona	ZEBOV + 4 other EV	1.39 ² copies/mL	n/a	n/a	1 PFU/ml ³	n/a	n/a	<4-6
	SQ Q Line Ebola Zaire Ag	SD Biosensor Inc.	ZEBOV	n/a	n/a	n/a	31.3 ng/ml ⁴ 3.9 ng/ml ⁵ 62.5 ng/ml ⁶	84.9%	99.7%	<0.5
FDA EUA only	RealStar Ebolavirus	Altona	ZEBOV + 4 other EV	1 PFU/ml	100%	100%	n/a	n/a	n/a	<4-6
	NGDS BT-E	BioFire	ZEBOV	10,000 PFU/ml	87-92%	100%	n/a	n/a	n/a	1.25
	LightMix	Roche	ZEBOV	4,781 PFU/ml	97.8%	100%	n/a	n/a	n/a	4-6
	EZ1	US DoD	ZEBOV	1,000-5,000 PFU/ml ⁷	100%	100%	n/a	n/a	n/a	4-6
	CDC NP	CDC	ZEBOV	30 TCID50 / reaction	98-100% ⁸	100%	n/a	n/a	n/a	4-6
	CDC VP40	CDC	ZEBOV	30 TCID50 / reaction	100%	94-100% ⁸	n/a	n/a	n/a	4-6
	OraQuick	OraSure technologies Inc.	ZEBOV + 2 other EV	1,640,000 TCID50/mL ⁹ 1.06 ng/test ¹⁰	84%	98%	n/a	n/a	n/a	<0.5

1 As performed by BNITM; 2 As claimed by manufacturer per WHO report; 3 As demonstrated in FDA EUA testing; 4 Recombinant ZEBOV GP; 5 Recombinant ZEBOVNPs; 6 Recombinant ZEBOV VP40; 7 1,000 PFU/ml with live-virus spiked in Trizol-inactivated whole blood and 5,000 PFU/ml with Trizol inactivated whole blood or plasma; 8 Lower value for contrived urine specimens and 100% for contrived whole blood specimens; 9 For Zaire Ebola inactivated Virus; 10 Using recombinant VP40 antigen;

DIAGNOSTICS

Emergency authorized products span a wide range of ease-of-use

PRELIMINARY

■ High
 ■ Medium
 ■ Low

Product	Manufacturer	Technology	Platform(s)	Other materials required ¹ .		Emergency list date ²		Sample
				Equip.	Other	WHO	FDA	
ReEBOV	Corgenix	Antigen lateral flow device	None	●	●	Feb 19, 2015	Feb 24, 2015	Blood, plasma
Xpert Ebola	Cepheid	rRT-PCR	GeneXpert	●	●	May 08, 2015	Mar 23, 2015	Venous blood
BioThreat-E	BioFire Defense	Multiplex rRT-PCR	FilmArray	●	●	N/A	Oct 25, 2014	Blood, urine
Liferiver	Shanghai ZJ BioTech	rRT-PCR	ABI 7500 Fast Dx, LightCycler 480 II, CFX96, SLAN 96	●	●	Apr 27, 2015	N/A	Blood
RealStar Filovirus	Altona Diagnostics	rRT-PCR	ABI 7500 Fast/SDS, Light Cycler 480 II, CFX96	●	●	Nov 25, 2014	N/A	Plasma
SQ Q Line Ebola Zaire Ag	SD Biosensor Inc.	Antigen lateral flow device	None	●	●	Sep 8, 2015	N/A	Blood, plasma, serum
RealStar Ebolavirus	altona Diagnostics	rRT-PCR	ABI 7500 Fast Dx, LightCycler, CFX96	●	●	N/A	Nov 10, 2014	Plasma
NGDS BT-E	BioFire Defense	Multiplex rRT-PCR	FilmArray	●	●	N/A	Oct 25, 2014	Blood, plasma, serum
LightMix	Roche	rRT-PCR	LightCycler 480 II, cobas Z 480	●	●	N/A	Dec 23, 2014	Whole blood
EZ1	US DoD	rRT-PCR	ABI 7500 Fast Dx, LightCycler, JBAIDS	●	●	N/A	Aug 05, 2014	Blood, plasma
CDC NP	CDC	rRT-PCR	ABI 7500 Fast Dx, CFX96	●	●	N/A	Oct 10, 2014	Blood, plasma, serum, urine
CDC VP40	CDC	rRT-PCR	ABI 7500 Fast Dx, CFX96	●	●	N/A	Oct 10, 2014	Blood, plasma, serum, urine
OraQuick	OraSure technologies Inc.	Antigen lateral flow device	None	●	●	N/A	July 31, 2015	Blood, plasma

1 Number of materials that are required but not provided with product - first column describes lab instruments/lab requirements and second describes reagents and consumables; 2 If multiple reauthorizations exist, original date is shown here

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PRELIMINARY

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Acronyms used

- Centers for Disease Control and Prevention (CDC)
- Centre National de Recherche et de Formation sur le Paludisme (CNRFP)
- Foundation for Innovative New Diagnostics (FIND)
- London School of Hygiene & Tropical Medicine (LSHTM)
- National Institute of Allergy and Infectious Diseases (NIAID)
- World Health Organization (WHO)

ID numbers for trials detailed in this report (in order of appearance)

ChAd3-EBOZ	NCT02485301 & PACTR201504001092179
	NCT02548078 & PACTR201507001154522
Multiple vaccines	NCT02344407
	PACTR201503001057193
rVSV-ZEBOV	NCT02378753 & PACTR201502001037220
	NCT02503202
Ad26.ZEBOV + MVA- BN-Filo	NCT02416453
	NCT02564523
	NCT02509494 & PACTR201506001147964
ChAd3-EBOZ+ MVA- EBOZ-EM	NCT02451891
	NCT02485912
ChAd3- EBOZ + MVA- BN-Filo	NCT02240875
	NCT02267109
ChAd3-EBO (also cAd3- EBOZ)	NCT02231866
	NCT02354404
ChAd3 EBO + MVA- EBOZ-IDT	NCT02408913
	NCT02368119
Chad3-EBOZ + Ad26.ZEBOV	NCT02495246

EBOV GP	NCT02370589
rVSVN4CT1-EBOV GP	No protocol online
rVSVN4CT1-EBOV- SUDV-Marv	No protocol online
	NCT02326194
Ad5-EBOV	NCT02533791
	NCT02401373
	No protocol online
INO-4212	NCT02464670
ZMapp	NCT02363322
Favipiravir	NCT02329054
Tekmira (tkm-130803)	PACTR201501000997429
Brincidofovir	NCT02271347; PACTR201411000939962
	ISRCTN13990511
Convalescent plasma	NCT02342171
	NCT02333578
	NCT02295501
Convalescent whole blood	No protocol online
Interferon beta 1a	No protocol online
BCX 4430	NCT02319772
MIL77	No protocol online

References for vaccine candidates (1/3)

PRELIMINARY

Candidate	Source letter and citation	Date
ChAd3 vaccines	NIAID: "Ebola Vaccine Trial Opens in Liberia"	Feb 2015
	NIAID: "NIAID/GSK Experimental Ebola Vaccine Appears Safe, Prompts Immune Response"	Nov 2014
	NIAID: "Rapid and Durable Protection Against Ebola Virus With New Vaccine Regimens"	Sep 2014
	"Reflections on Clinical Research" by E. Higgs at Gates Global Partners Forum	May 2015
	"Update on Ph. 1 Program", GSK presentation at WHO	Jan 2015
	a. Stanley et al, "Chimpanzee adenovirus vaccine generates acute and durable protective immunity against Ebola virus challenge," Nature Medicine.	Sep 2014
	b. Rampling et al, "A Monovalent Chimpanzee Adenovirus Ebola Vaccine – Preliminary Report," New England Journal of medicine and supplementary appendix	Jan 2015
	c. "GSK/NIH Ebola Vaccine Development," GSK update to FDA (http://www.fda.gov/downloads/AdvisoryCommittees/CommitteesMeetingMaterials/BloodVaccinesandOtherBiologics/VaccinesandRelatedBiologicalProductsAdvisoryCommittee/UCM448003.pdf)	May 2015
	Supplementary Appendix to Rampling et al 2015	Jan 2015
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