

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
	Real-time PCR		
1	Herpes simplex virus (HSV1-2)	HSV1, HSV2	RealStar HSV PCR Kit (altona)
2	Varicella zoster virus (VZV)	VZV	RealStar VZV PCR Kit (altona)
3	Epstein-Barr Virus (EBV)	EBV	RealStar EBV PCR Kit (altona)
4	Cytomegalovirus(CMV)	CMV	RealStar CMV PCR Kit (altona)
5	Human Herpes Virus 6 (HHV6)	HHV6A, HHV6B	RealStar HHV6 PCR Kit (altona)
6	Adenovirus	HAdV-A (HAdV12,31,18) ,HAdV-B1(HAdV,3,7), HAdV-B2(HAdV,35,11,55), HAdV-C (HAdV1,2,5,6),HAdV-D (HAdV37,19,), HAdV-E (HAdV4), HAdV-F (HAdV41), HAdV-G (HAdV52)	RealStar Adenovirus PCR Kit (altona)
7	John Cunningham virus (JCV)	JCV	RealStar JCV PCR Kit (altona)
8	West Nile virus (WNV)	WNV	RealStar WNV PCR Kit (altona)
9	Human Parvovirus B19	Human Parvovirus B19	RealStar Parvovirus B19 PCR Kit (altona)
10	Zika virus (Altona)	Zika virus	RealStar zikavirus PCR Kit (altona)
11	Malaria	<i>Plasmodium spp. (Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae, Plasmodium ovale, Plasmodium knowlesi)</i>	RealStar Malaria PCR Kit (altona)
12	Chikungunya	Chikungunya	RealStar Chikungunya PCR Kit (altona)
13	Filoviruses	Ebola virus, Marburg virus	RealStar Filoviruses PCR Kit (altona)
14	Crimean-Congo Hemorrhagic Fever (CCHFV)	CCHFV	RealStar CCHFV PCR Kit (altona)
15	HAV (Altona)	Hepatitis A virus	RealStar HAV RT-PCR Kit (altona)
16	Anthrax real-time PCR (Altona)	<i>Bacillus anthracis</i>	RealStar Anthrax PCR Kit (Altona)
17	Pan-Enteroviruses	Coxsackie A and B, echoviruses, polioviruses and enteroviruses 68-71, 74-78 and 93-94	Enteroviruses R-gene Real-time PCR Kit (R-gene)

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
18	Human Herpes Virus 7 (HHV7)	HHV7	CMV HHV6,7,8 R-gene Real-time PCR Kit (R-gene)
19	Human Herpes Virus 8 (HHV8)	HHV8	CMV HHV6,7,8 R-gene Real-time PCR Kit (R-gene)
20	Japanese Encephalitis virus	JEV	JEV real-time PCR (Zhianghai)
21	<i>Yersinia pestis</i> Real Time PCR Kit	<i>Yersinia pestis</i>	<i>Yersinia pestis</i> Real Time PCR Kit (genesig)
22	Rabies virus (RV)	Rabies virus	Rabies Real-time PCR (inhouse)
23	Nipah virus (NiV)	Nipah virus	Nipah Real-time PCR (inhouse)
24	Tick-Borne Encephalitis Virus	Tick-Borne Encephalitis Virus	Tick-Borne Real-time PCR (inhouse)
25	Human T-lymphotropic virus Type I	HTLV1,HTLV2	HTLV1&2 Real-time PCR (inhouse)
26	Chandipura virus (CHPV)	CHPV	CHPV Real-time PCR (inhouse)
27	Severe fever with thrombocytopenia virus (SFTV)	SFTV	SFTV Real-time PCR (inhouse)
28	MERS coronavirus	MERS	MERS Real-time PCR (inhouse)
29	Ebola virus (Zaire) (CDC protocol)	Ebola virus (Zaire)	Ebola virus (Zaire) Real-time PCR (in-house)
30	Zika virus (CDC)	Zika virus	Zika virus Real-time PCR (in-house CDC1)
31		Zika virus	Zika virus Real-time PCR (in-house CDC2)
32	H7N9 influenza (WHO protocol)	H7N9	H7N9 Real-time PCR (inhouse)
33	Flu typing (A/B/H1N1 2009)	FluA, FluB, H1N1	Anyplex FluA/B Typing Real-time Detection (Seegene)
34	Allplex Respiratory panel 1	Influenza A virus (Flu A), Influenza B virus (Flu B), Respiratory syncytial virus A (RSV A), Respiratory syncytial virus B (RSV B), Flu A-H1, Flu A-H1pdm09, Flu A-H3	Allplex Respiratory panel 1 (Seegene)
35	Allplex Respiratory panel 2	Adenovirus (AdV) Enterovirus (HEV) Parainfluenza virus 1 (PIV 1) Parainfluenza virus 2 (PIV 2) Parainfluenza virus 3 (PIV 3) Parainfluenza virus 4 (PIV 4) Metapneumovirus (MPV)	Allplex Respiratory panel 2 (Seegene)

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
36	Allplex Respiratory panel 3	Bocavirus (HBoV) Rhinovirus (HRV) Coronavirus NL63 (CoV NL63) Coronavirus 229E (CoV 229E) Coronavirus OC43 (CoV OC43)	Allplex Respiratory panel 3 (Seegene)
37	Allplex Respiratory panel 4	<i>Mycoplasma pneumoniae (MP)</i> <i>Chlamydia pneumoniae (CP)</i> <i>Legionella pneumophila (LP)</i> <i>Haemophilus influenzae (HI)</i> <i>Streptococcus pneumoniae (SP)</i> <i>Bordetella pertussis (BP)</i> <i>Bordetella parapertussis (BPP)</i>	Allplex Respiratory panel 4 (Seegene)
38	FTD Respiratory Pathogens 21	FluA, FluB, H1N1, Human rhinovirus, Human coronavirus 229E/NL63/OC43/HKU, Human parainfluenza virus 1/2/3/4, Human metapneumovirus A/B, Human bocavirus, <i>Mycoplasma pneumoniae</i> , Human respiratory syncytial virus A /B, Human enterovirus, Human adenovirus, Human parechovirus	FTD Respiratory pathogens 21 (Fast-Track)
39	FTD Respiratory Pathogens 33	FluA, FluB, H1N1, Human rhinovirus, Human coronavirus 229E/NL63/OC43/HKU, Human parainfluenza virus 1/2/3/4, Human metapneumovirus A/B, Human bocavirus, <i>Mycoplasma pneumoniae</i> , Human respiratory syncytial virus A /B, Human enterovirus, Human adenovirus, Human parechovirus, <i>Chlamydia pneumoniae</i> , <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> type B, <i>Staphylococcus aureus</i> , <i>Klebsiella pneumoniae</i> <i>Legionella spp.</i> , <i>Salmonella spp.</i> , <i>Pneumocystis jirovecii</i> , <i>Moraxella catarrhalis</i> , <i>Bordetella spp.</i> (except <i>Bordetella parapertussis</i>), <i>Haemophilus influenzae</i> , Influenza C (FluC)	FTD Respiratory pathogens 33 (Fast-Track)
40	FTD Flu differentiation	H3Nx, H5Nx, H7Nx, H1N1	FTD Flu differentiation (Fast-Track)
41	FTD Dengue Virus differentiation	Dengue 1,2,3,4	FTD Dengue differentiation (Fast-Track)
42	FTD Tropical Fever Core	Dengue, <i>Rickettsia spp.</i> , WNV, <i>Salmonella spp.</i> , Chikungunya, <i>Leptospira spp.</i> , <i>Plasmodium spp.</i>	FTD Tropical Fever Core (Fast-Track)
43	FTD Tropical Fever Asia	<i>B. mallei</i> / <i>B. pseudomallei</i> , Hantaan virus/Seoul virus, JEV, <i>Leishmania spp.</i>	FTD Tropical Fever Asia (Fast-Track)
44	FTD Tropical Fever Africa	<i>Brucella spp.</i> , Yellow fever virus, <i>S. pneumoniae</i> and <i>Coxiella burnetii</i>	FTD Tropical Fever Core (Fast-Track)
45	FTD zika/dengue/chik	Dengue virus, Chikungunya virus, zika virus	FTD zika/dengue/chik (Fast-Track)

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
46	Meningitis/Encephalitis (ME) Panel	<i>Escherichia coli</i> K1, <i>Haemophilus influenzae</i> , <i>Listeria monocytogenes</i> , <i>Neisseria meningitidis</i> , <i>Streptococcus agalactiae</i> , <i>Streptococcus pneumoniae</i> , Cytomegalovirus (CMV), Human herpesvirus (HHV6), Human parechovirus (HPeV), Varicella zoster virus (VZV), Enterovirus (EV), Herpes simplex virus 1 (HSV-1), Herpes simplex virus 2 (HSV-2), <i>Cryptococcus neoformans/gattii</i>	Film Array® Meningitis/Encephalitis (ME) Panel
	Conventional PCR		
1	Diarrhea ACE Detection		
	Diarrhea-V	Group A rotavirus (RotV), Enteric adenovirus (AdV), Norovirus GI/GII (NoV-GI/GII), Astrovirus (AstV)	Seeplex Diarrhea-V ACE Detection (Seegene)
	Diarrhea-B1	<i>Salmonella spp.</i> , <i>Shigella spp.</i> , <i>Vibrio spp.</i> , <i>Campylobacter spp.</i> , <i>Clostridium difficile</i> Toxin B,	Seeplex Diarrhea-B1 ACE Detection (Seegene)
	Diarrhea-B2	<i>Clostridium perfringens</i> , <i>Yersinia enterocolitica</i> , <i>Aeromonas spp.</i> , <i>E. coli</i> H7:O157, Verocytotoxin-producing <i>E. coli</i> (VTEC)	Seeplex Diarrhea-B2 ACE Detection (Seegene)
2	PneumoBacter ACE Detection	<i>Mycoplasma pneumoniae</i> , <i>Legionella pneumophila</i> , <i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Bordetella pertussis</i> , <i>Chlamydia pneumoniae</i>	Seeplex PneumoBacter ACE Detection (Seegene)
3	Meningitis-B ACE Detection	<i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> type b, <i>Neisseria meningitidis</i> , Group B <i>streptococcus</i> , <i>Listeria monocytogenes</i>	Seeplex Meningitis B ACE Detection (Seegene)
4	Rabies virus (RV)	Rabies virus	Conventional RT- PCR (inhouse)
5	Zika virus (Nested PCR)	Zika virus	Hemi-nested PCR (in-house)
6	16s rRNA Bacterial Detection	Universal Bacteria Detection	Edwards KJ, Logan JM, Langham S, Swift C, Gharbia SE. Utility of real-time amplification of selected 16S rRNA gene sequences as a tool for detection and identification of microbial signatures directly from clinical samples. Journal of medical microbiology. 2012 May 1;61(5):645-52.

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
	R&D test		Reference
1	Bartonella henselae conventional	Bartonella henselae	Angelakis E, Roux V, Raoult D, Rolain JM. Real-time PCR strategy and detection of bacterial agents of lymphadenitis. Eur J Clin Microbiol Infect Dis. 2009;28:1363-68.
2	Coxiella burnetii conventional PC	Coxiella burnetii	Bruin AD, Groot AD, Heer LD, et al. Detection of Coxiella burnetii in complex matrices by using multiplex quantitative PCR during a major Q fever outbreak in the Netherlands. Appl Environ Microbiol. 2011;77(18):6516-23.
3	HTLV-1 conventional PCR	Human T-cell lymphotropic virus type 1	Ramirez E, Cartier L, Villota C, Fernandez J. Genetic characterization and phylogeny of human T-cell lymphotropic virus type 1 from Chile. Virus Res. 2002;84:135-49.
4	Neisseria meningitidis serogrouping multiplex PCR	Neisseria meningitidis	Taha MK, Alonso JM, Cafferkey M, Caugant DA, Clarke SC, Diggle MA, et al. Interlaboratory comparison of PCR-based identification and genogrouping of Neisseria meningitidis. J Clin Microbiol. 2005;43(1):144-49.
5	Ganciclovir-resistant CMV conver	Cytomegalovirus	Javad Hosseini SM, Nemati E, Behzadian F, et al. Evaluation of ganciclovir resistant in cytomegalovirus infection of renal transplant recipients in Tehran. Transplant Proc. 2015; 47(4): 1140-42. 2. Erice A. Resistant of human cytomegalovirus to antiviral drugs. Clin Microbiol Rev. 1999; 12(2):286-97.
6	Parechovirus real-time PCR	Parechovirus	Cabrerizo M, Calvo C, Rabella N, Munoz-Almagro C, Del Amo E, Perez-Ruiz M, et al. Design and validation of a real-time RT-PCR for the simultaneous detection of enteroviruses and parechoviruses in clinical samples. J Virol Methods. 2014; 208:125-28.
7	Bacteria & fungal real-time PCR	Gram-positive bacteria, gram-negative bacteria, Mycobacterium and fungi	Han H, Hu Z, Sun S, Yao F, Yan X, Zhang X, et al. Simultaneous detection and identification of bacteria and fungi in cerebrospinal fluid by TaqMan probe-based real-time PCR. Clin Lab. 2014; 60(8):1287-93.
8	Oseltamivir-resistant influenza conventional PCR	Influenza A virus	Chidiow GR, Harnett GB, Williams SH, Tempone SS, Speers DJ, Hurt AC, et al. The detection of oseltamivir-resistant pandemic influenza A/H1N1 2009 viruses using a real-time RT-PCR assay. Journal of virological methods. 2010; 169(1):47-51.
9	Thogotovirus conventional PCR	Thogotovirus	Lwande OW, Lutomiah J, Obanda V, Gakuya F, Mutisya J, Mulwa F, et al. Isolation of tick and mosquito-borne arboviruses from ticks sampled from livestock and wild animal hosts in Ijara District, Kenya. Vector-Borne and Zoonotic Diseases. 2013; 13(9):637-42.

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
	Family PCR		
1	Adenoviruses	Human adenoviruses (HAdVs) [6 species from A to F with 51 serotypes], Human adenovirus A (HAdV-A), Human adenovirus B (HAdV-B), Human adenovirus C (HAdV-C), Human adenovirus D (HAdV-D), Human adenovirus E (HAdV-E), Human adenovirus F (HAdV-F)	PREDICT protocol
2	Alphaviruses	Chikungunya (CHK), Venezuelan Equine Encephalitis (VEE), Eastern Equine Encephalitis (EEE), Western Equine Encephalitis (WEE), Semliki Forest (SF), Sindbis virus (SIN), Rose River (RR)	PREDICT protocol
3	Arenaviruses	Lymphocytic choriomeningitis virus (LCMV), Lassa virus (LASV), Tacaribe virus (TCRV) Pichinde virus (PICV)	PREDICT protocol
4	Astroviruses	Human astrovirus, Bovine astrovirus, Feline astrovirus, Mink astrovirus, Ovine astrovirus, Porcine astrovirus	PREDICT protocol
5	Bocaviruses	Four species of human bocaviruses (HBoV1 -4), Bovine parvoviruses, Canine minute viruses	PREDICT protocol
6	Bunyaviruses	1) Orthobunyavirus: Potosi virus (POTV), Northway virus (NORV), Main Drain virus (MDV) Kairi virus (KRIV) 2) Nairovirus 3) Phlebovirus: Rift Valley fever virus (RVFV), Sandfly fever Naples virus (SFNV) 4) Hantavirus 5) Tospovirus Crimean-Congo hemorrhagic fever virus (CCHFV)	PREDICT protocol
7	Enteroviruses	All known human EV. Main: Poliovirus (Human enterovirus C serotypes (PV-1, PV-2, PV-3), Human coxsackievirus (CV), Human enterovirus 70 (EV-70), EV-71, Human rhinovirus A	PREDICT protocol
8	Filoviruses	Genus Ebolavirus and Marburgvirus 1) Genus Ebolavirus [Bundibugyo virus (BDBV; previously BEBOV), Reston virus (RESTV; previously REBOV), Sudan virus (SUDV; previously SEBOV), Tai Forest virus (TAFV; previously CIEBOV), Ebola virus (EBOV; previously ZEBOV)] 2) Genus Marburgvirus [Marburg virus (MARV), Ravn virus (RAVV)]	PREDICT protocol

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
9	Flaviviruses	Dengue virus group: Dengue serotype 1-4, Kedougou (KEDV), Japanese encephalitis virus group: Japanese encephalitis (JEV), St Louis encephalitis (SLEV), Usutu (USUV), West Nile (WNV)	PREDICT protocol
10	Hantaviruses	Hantaan virus (HTNV), Dobrava-Belgrade virus (DOBV), Seoul virus (SEOV), New York virus (NYV), Puumala virus (PUUV), Sin nombre virus (SNV), Tula virus (TULV)	PREDICT protocol
11	Henipaviruses	Hendra virus, Nipah virus	PREDICT protocol
12	Influenzases A	All Influenza A. The influenza A virus subtypes that have been confirmed in humans, ordered by the number of known human pandemic deaths, are: <ul style="list-style-type: none"> • H1N1 caused "Spanish flu" and the 2009 swine flu outbreak • H2N2 caused "Asian flu" in the late 1950s • H3N2 caused "Hong Kong flu" in the late 1960s • H5N1 considered a global influenza pandemic threat through its spread in the mid-2000s • H7N7 has unusual zoonotic potential • H1N2 is currently endemic in humans and pigs • H9N2, H7N2, H7N3, H5N2, and H10N7. 	PREDICT protocol
13	Lyssaviruses	All 7 lyssaviruses genotypes: Rabies virus, Lagos Bat virus (LBV), Mokola virus (MOKV), Duvenhage virus (DUVV), European Bat Lyssavirus 1 (EBLV1), European Bat Lyssavirus 2 (EBLV2), Australian Bat Lyssavirus (ABLV)	PREDICT protocol
14	Orbiviruses	58 reference strains, including prototype Changuinola, Orungo, Eubenangee, Wongorr, Great Island, Corriparta, and Umatilla viruses, Bluetongue virus (BTV), Epizootic hemorrhagic disease virus (EHDV)	PREDICT protocol
15	Orthopoxviruses	Vaccinia virus (VACV), Cowpox virus (CPXV), Horsepox virus (HPXV), Monkeypox virus (MPXV), Variola virus (VARV)	PREDICT protocol
16	Paramyxoviruses	Human parainfluenza virus 1/2/3/4, Henipavirus, Nipah virus	PREDICT protocol

	Test name	Virus / Bacteria	ชุดตรวจ/Reference
17	Parapoxviruses	Bovine papular stomatitis virus (BPSV), Orf virus (ORFV), Pseudocowpox virus (PCPV), Parapox of red deer in New Zealand (PVNZ)	PREDICT protocol
18	Phleboviruses	Rift Valley Fever virus (RVFV), Toscana (TOSV), Sandfly fever virus-Sicilian (SFSV),- Naples (SFNV), Punta Toro virus (PTV), Aguacate virus (AGUV)	PREDICT protocol
19	Polyomaviruses	JC virus (JCPyV), Human polyomavirus (HPyV), BK polyomavirus (BKPvV),	PREDICT protocol
20	Retroviruses	Lentivirus genus, HIV, SIV and new HIV and SIV variants	PREDICT protocol
21	Rhabdoviruses	Genus Cytorhabdovirus; type species: Lettuce necrotic yellows virus Genus Dichorhabdovirus; type species: Orchid fleck virus Genus Ephemerovirus; type species: Bovine ephemeral fever virus Genus Lyssavirus; type species: Rabies virus Genus Novirhabdovirus; type species: Infectious hematopoietic necrosis virus Genus Nucleorhabdovirus; type species: Potato yellow dwarf virus Genus Perhabdovirus; type species: Perch rhabdovirus Genus Sigmavirus; type species: Drosophila melanogaster sigmavirus Genus Tibrovirus; type species: Tibrogargan virus Genus Vesiculovirus; type species: Vesicular stomatitis Indiana virus	PREDICT protocol
22	Seadornaviruses	Banna virus (BAV), Kadipiro virus (KDV) and Liao ning virus (LNV)	PREDICT protocol
23	Coronaviruses	Alpha and Beta –coronavirus (CoV); HumanCoV-229E, HCoV-NL63, HCoV-OC43, HCoV-HKU1, SARS-CoV, MERS CoV, Novel CoV	PREDICT protocol
24	Herpesviruses 1-8	Human herpesvirus 1-8: Herpes simplex virus 1 (HSV1), HSV2, Varicella-zoster virus (HHV-3, VZV), Epstein-Barr virus (HHV-4, EBV), Human cytomegalovirus (HHV-5, CMV), Human herpesvirus 6 (HHV-6), HHV7, HHV8	PREDICT protocol