

# HIV Viral Load Assays

## At-A-Glance Comparison

Since routine HIV viral load (VL) monitoring was added to the WHO guidelines for developing countries in 2013, the HIV viral load discussion has turned from, "Should we?" to "How can we?"

The good news is that a meta analysis published earlier this year by Sollis KA, Smit PW, Fiscus S, Ford N, Vitoria M, et al.<sup>1</sup> has identified six commercially available HIV viral load assays that are all of sufficient sensitivity to detect plasma VL of 1,000 copies/mL as a threshold to initiate investigations of treatment adherence or possible treatment failure. Drawing on that study and information from Médecins Sans Frontières (MSF)<sup>2</sup>, Load Zero Foundation has created this infographic to give clinicians an at-a-glance overview and comparison of those six commercially available HIV viral load assays.

## SENSITIVITY

Able to provide accurate detection of plasma HIV Viral Load at 1,000 copies/mL.

<b>ABBOTT</b>	RealTime HIV-1 Assay	✓
<b>BIOMÉRIEUX</b>	NucliSENS EasyQ® HIV-1 v2.0	✓
<b>CAVIDI</b>	ExaVir™ Load version 3.0	✓
<b>ROCHE</b>	COBAS® AmpliPrep / COBAS® TaqMan® HIV-1 Test, v2.0	✓
<b>SIEMENS</b>	VERSANT® HIV-1 RNA v3.0 Assay (bDNA)	✓
<b>SIEMENS</b>	VERSANT® HIV RNA v1.0 Assay (kPCR)	✓

"Since the results of our review indicate that all currently commercially available HIV VL assays can provide a reliably accurate measure of plasma VL 1000 c/mL, switching from the current WHO recommended threshold of 5,000 c/mL for investigations for treatment compliance or possible treatment failure to 1,000 c/mL would allow earlier detection of treatment failure, enable more targeted adherence interventions, and preserve the efficacy of ART."

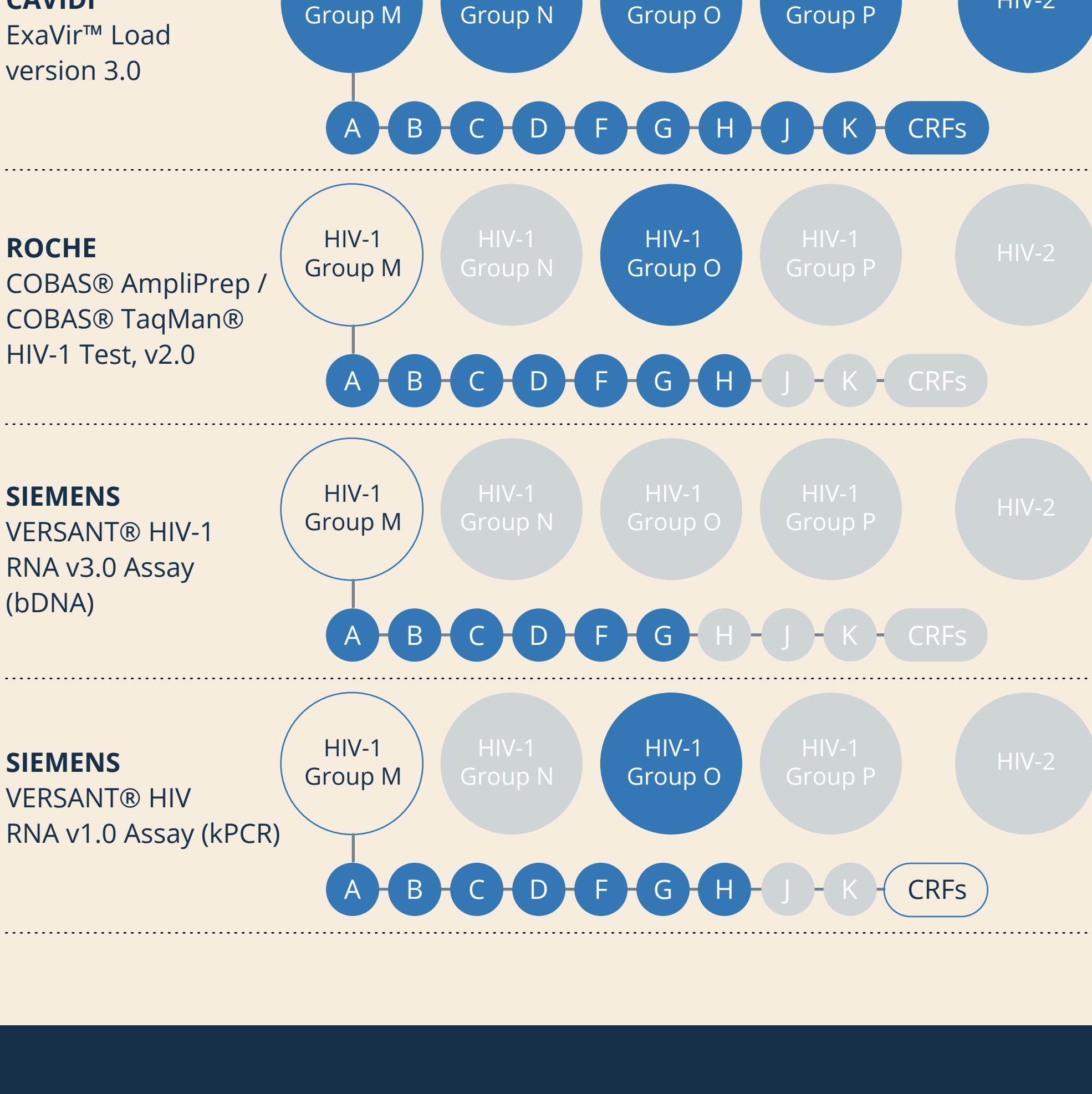
Sollis KA, Smit PW, Fiscus S, Ford N, Vitoria M, et al.

## HIV STRAINS DETECTED

● Detected  
○ Partially detected  
● Not detected

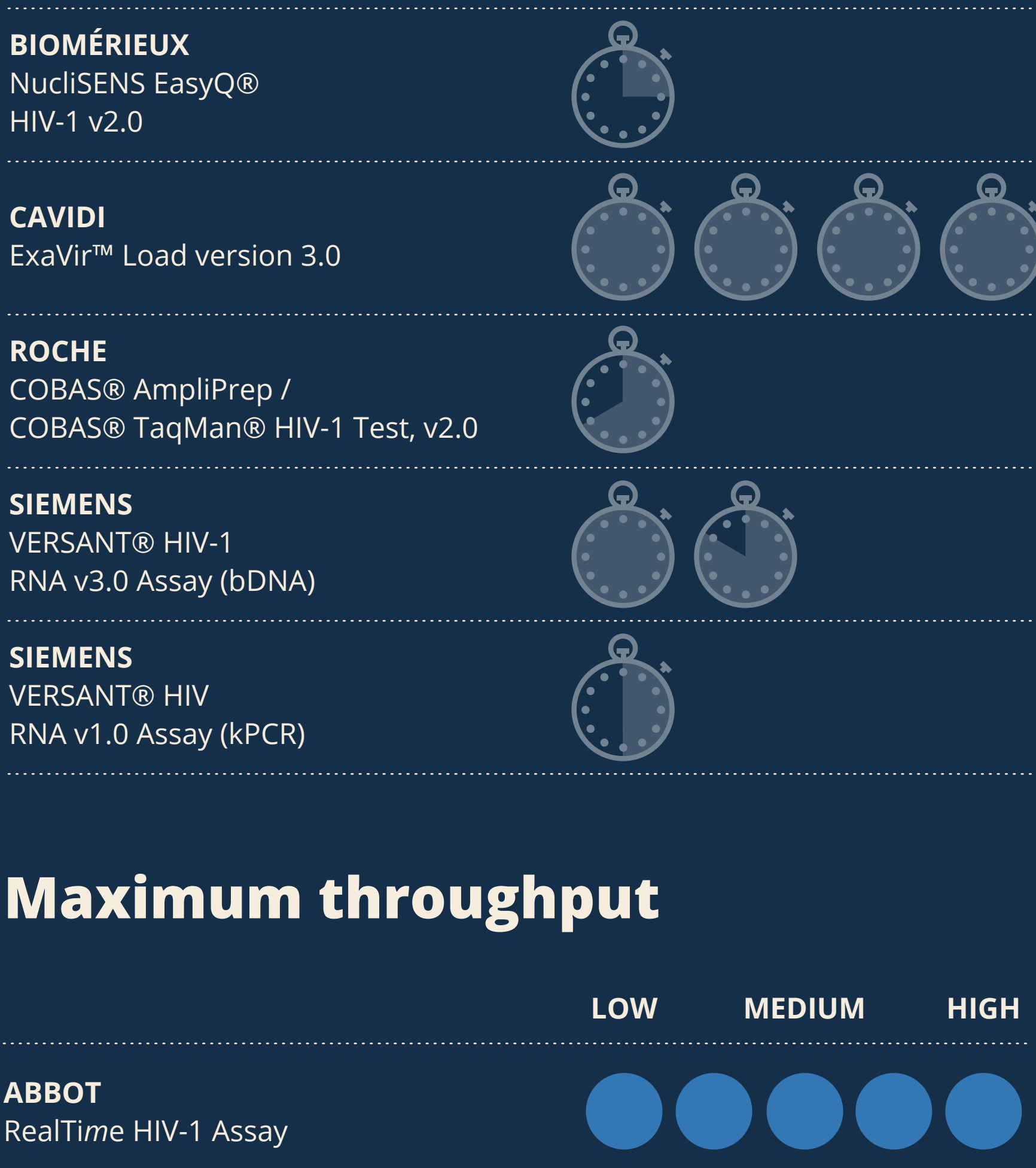
"Choice of technology platform should take into account the ability to detect HIV-1 subtypes in the target population."

Sollis KA, Smit PW, Fiscus S, Ford N, Vitoria M, et al.

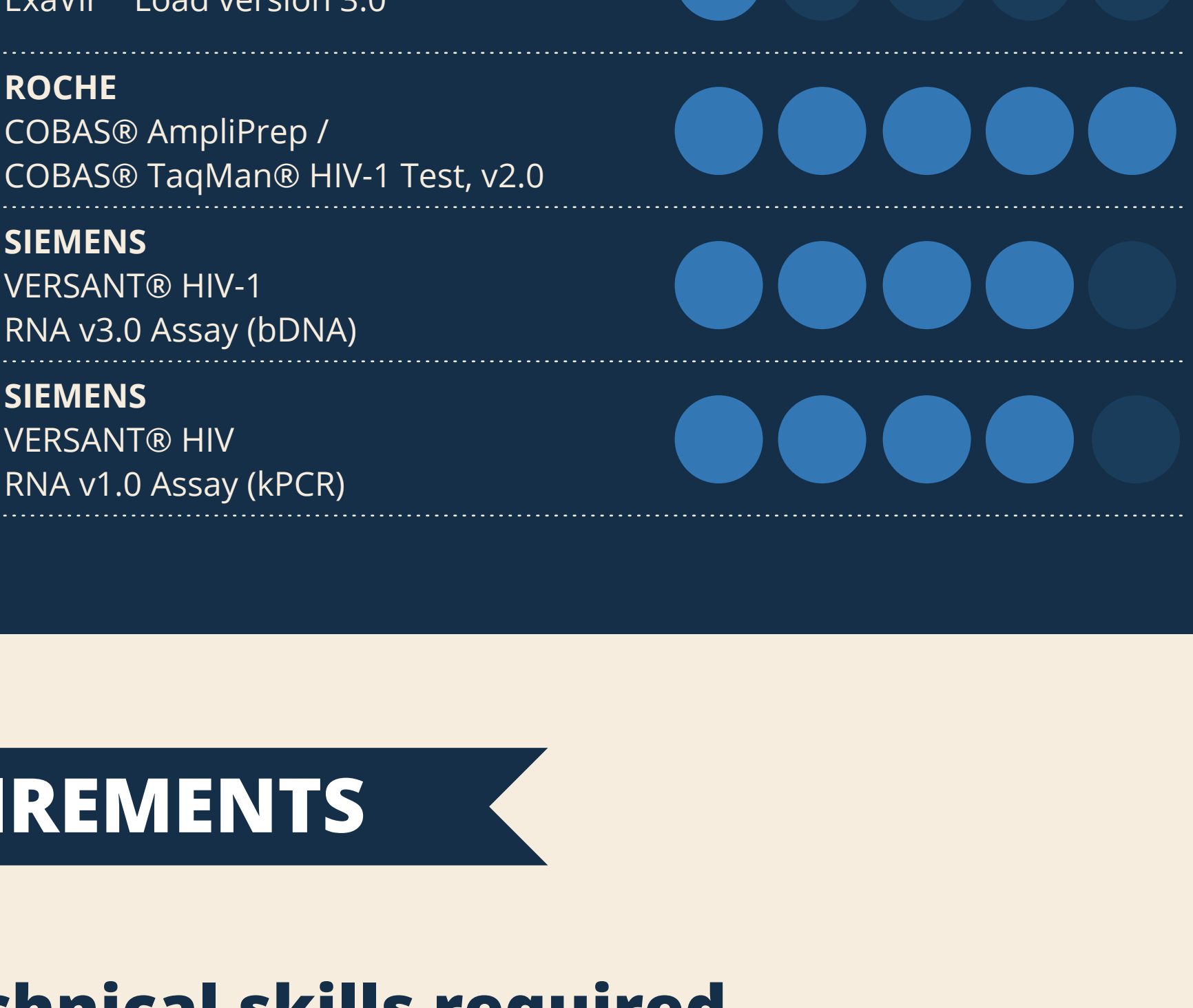


## OPERATION

### Maximum time to result

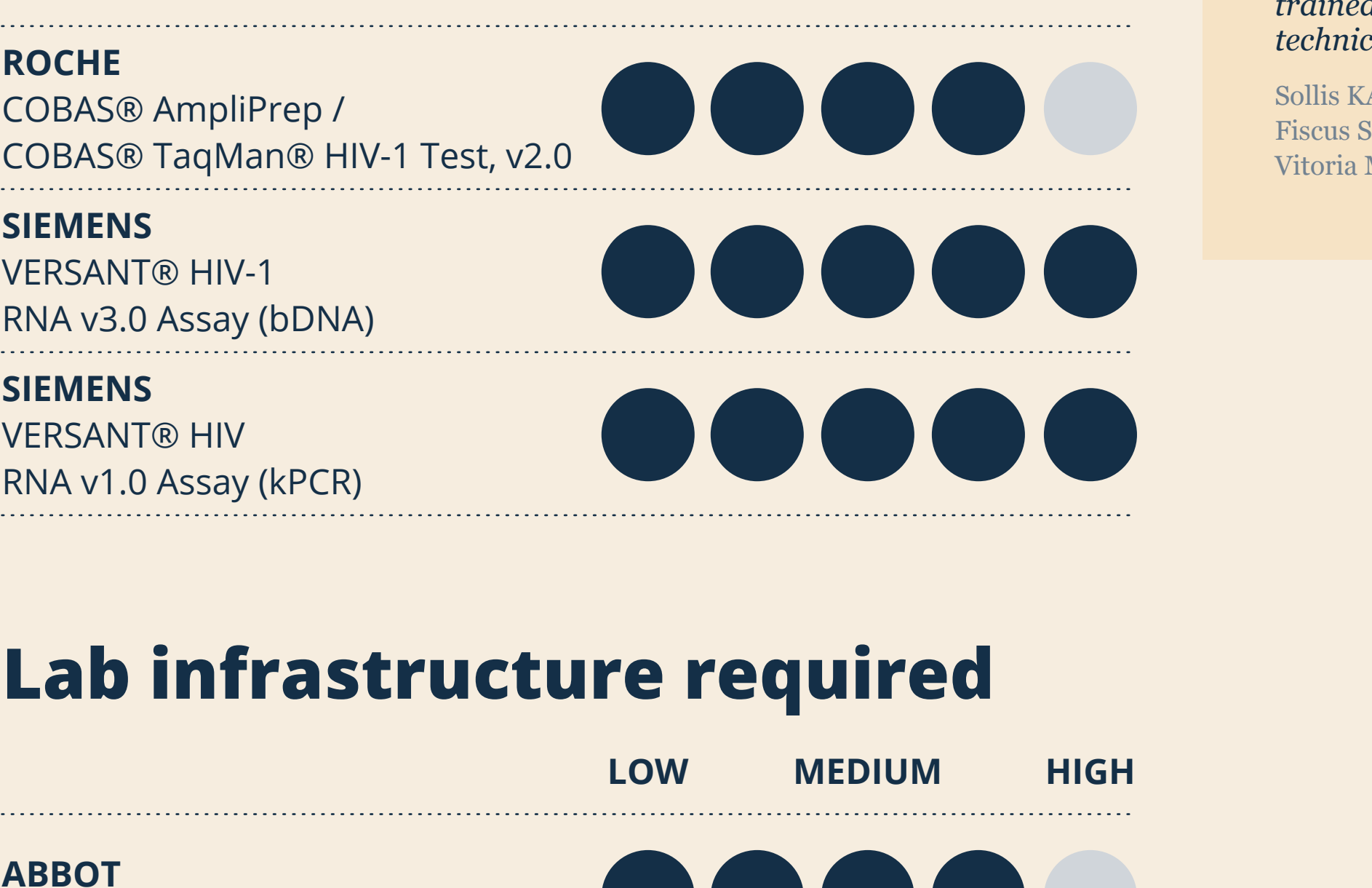


### Maximum throughput



## REQUIREMENTS

### Technical skills required



"Monitoring HIV VL is often not performed in resource-limited settings because the assays are costly, and require sophisticated, expensive laboratory equipment and trained technicians"

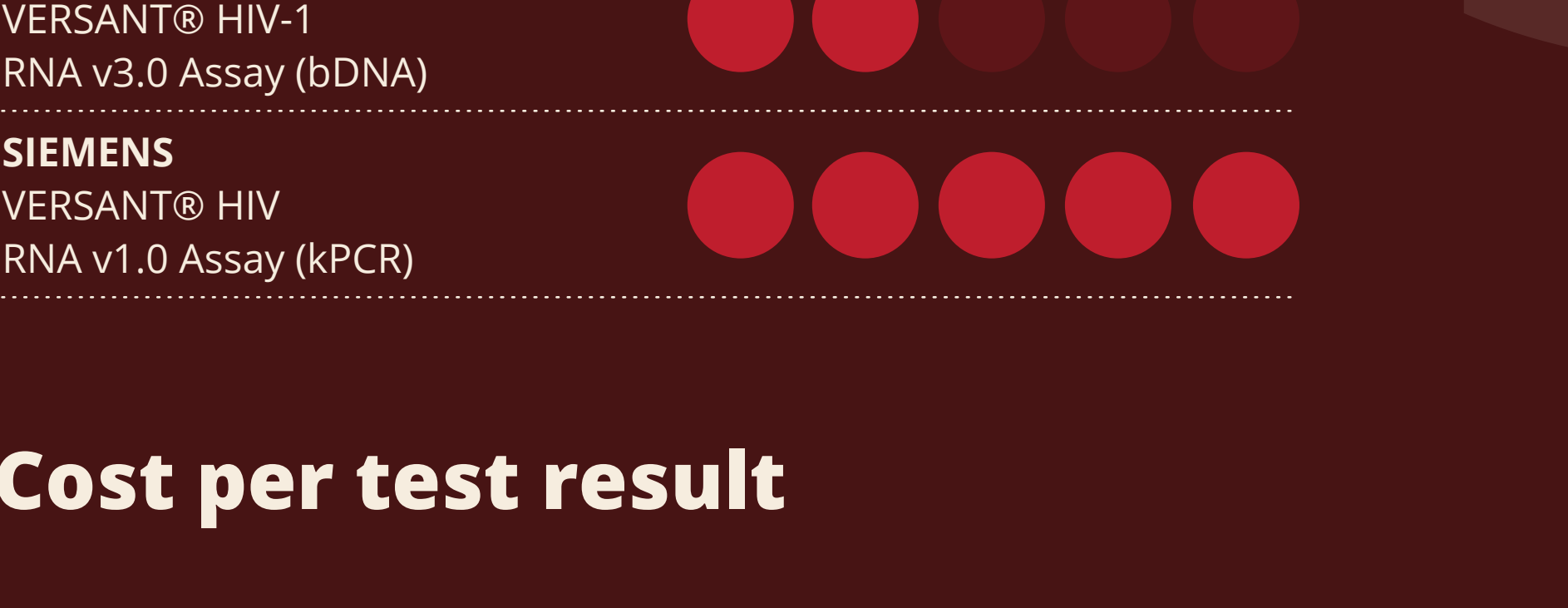
Sollis KA, Smit PW, Fiscus S, Ford N, Vitoria M, et al.

### Lab infrastructure required

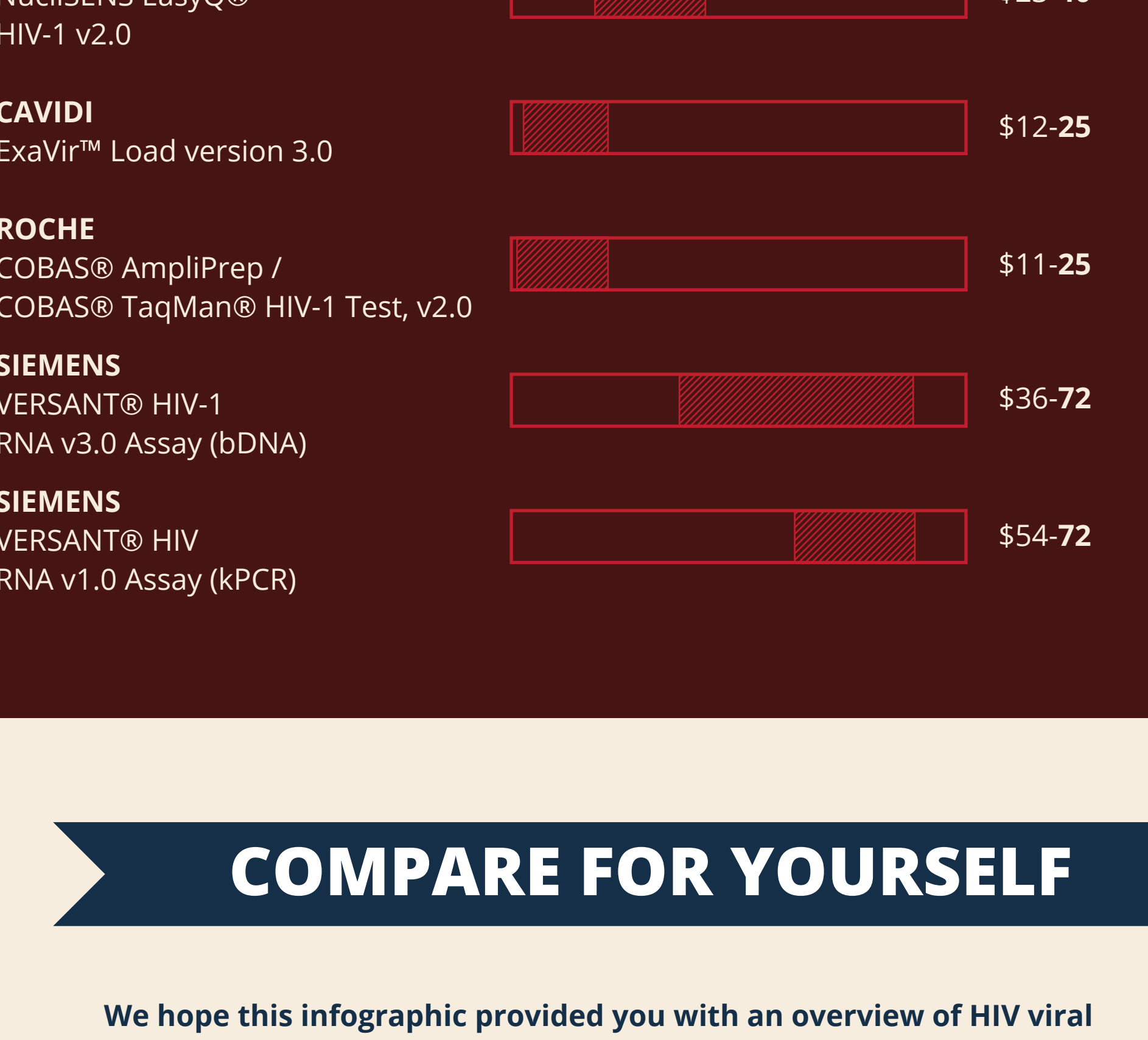


## COSTS

### Maximum instrument cost



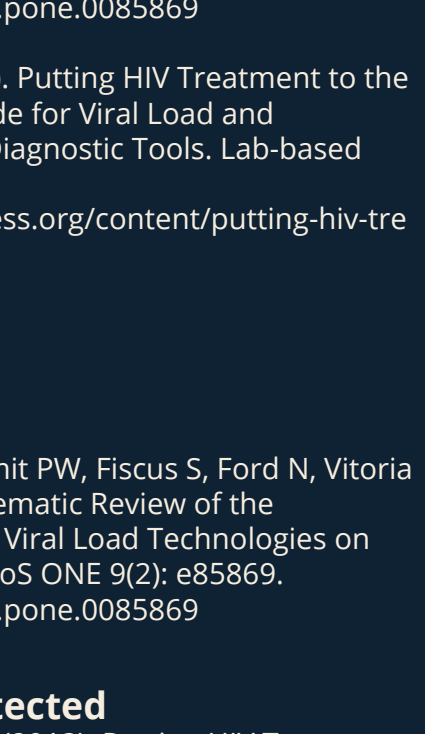
### Cost per test result



## COMPARE FOR YOURSELF

We hope this infographic with an overview of HIV viral load monitoring options. We encourage you to check out these reports for an in-depth review of all the options.

- **Systematic Review of the Performance of HIV Viral Load Technologies in Plasma.** Sollis KA, Smit PW, Fiscus S, Ford N, Vitoria M, et al. (2014). PLoS ONE 9(2): e85869. doi:10.1371/journal.pone.0085869
- **Putting HIV Treatment to the Test: A Product Guide for Viral Load and Point-of-Care CD4 Diagnostic Tools.** Médecins Sans Frontières (2013). <http://www.msfnetwork.org/content/putting-hiv-treatment-test>



BE A HERO IN THE FIGHT AGAINST HIV.

### About the Load Zero Foundation

The Load Zero Foundation is a non-profit organization committed to helping end the most devastating humanitarian crisis and global health security threat of our time - HIV. We do this by funding HIV viral load testing specifically designed for the developing world.

[www.loadzerofoundation.org](http://www.loadzerofoundation.org)  
Follow us on Twitter: @LoadZeroFoundat

## References

- Sollis KA, Smit PW, Fiscus S, Ford N, Vitoria M, et al. (2014) Systematic Review of the Performance of HIV Viral Load Technologies in Plasma Samples. PLoS ONE 9(2): e85869. doi:10.1371/journal.pone.0085869
- MSF Access (2013). Putting HIV Treatment to the Test: A Product Guide for Viral Load and Point-of-Care CD4 Diagnostic Tools. Lab-based Viral Load, 33-53. Depicted in 5 levels: L-L/M/M/M-H/H; <50/100/150/200/>250 based on the following data:
  - Abbott - RealTime HIV-1 assay (Page 33); Throughput: 21-93 samples/run; 48-288 samples/day as H
  - bioMérieux - NucliSENS EasyQ HIV-1 v2.0 (Page 38); Throughput: MiniMAG: Up to 144 specimens/day for runs of 21; 2 MiniMAG at the same time; Easy MAG: Up to 168 extractions per shift - Lysis on board workflow / Up to 240 extractions - Lysis in tube workflow; EasyQ: Up to 192 samples/run as H/H
  - Caviidi - ExaVir Load (Page 41); Throughput: 30 samples/run = 30-60 samples/2day or <150/week as L
  - Roche - COBAS AmpliPrep/COBAS TaqMan HIV-1 monitor version 2.0 (Page 47); Throughput: Taqman 48 (21 samples/run; 20-100 tests/day); Taqman 96 (63 samples/run; 100-250 tests/day) as H
  - Siemens - VERSANT HIV-1 RNA 3.0 Assay (bDNA) (Page 50); throughput: 12-168 patient samples/run as MH
  - Siemens - VERSANT HIV-1 RNA 1.0 Assay (kPCR) (Page 52); Throughput: 89 patient samples/run, 172 patient samples/shift as MH

for Cobas AmpliPrep COBAS TaqMan 96 with docking station. Preferably 2 dedicated areas for Cobas AmpliPrep COBAS TaqMan 48 option as MH

- Siemens - VERSANT HIV-1 RNA 3.0 Assay (bDNA) (Page 50); Laboratory Set-up: Single room technology as H
- Siemens - VERSANT HIV-1 RNA 1.0 Assay (kPCR) (Page 52); Laboratory Set-up: System concept supports either 1- or 2-room technologies as H

**Maximum instrument cost**  
Source: MSF Access (2013). Putting HIV Treatment to the Test: A Product Guide for Viral Load and Point-of-Care CD4 Diagnostic Tools. Lab-based Viral Load, 33-53.  
Depicted in 5 levels: \$\$\$/\$\$\$/\$\$\$\$/\$\$\$\$\$/\$\$\$\$\$\$ = \$5,000/\$10,000/\$100,000/\$100,000/\$50,000/0-200,000/>200,000 based on the maximum indicated cost in USD.  
Extrapolated costs: In some cases, total equipment costs for the assay was not provided. In those cases, we summed the costs of the components provided, as indicated below:  
• Abbott - RealTime HIV-1 assay (Page 34); Instrument cost: MAX calculated from m2000sp cost and m2000 Real Time System (120,000 + 38,000) = \$158,000  
• bioMérieux - NucliSENS EasyQ HIV-1 v2.0 (Page 39); Instrument cost: MAX calculated from Easy MAG 48 extractions/run, Easy Q (48 extractions/run), Strip centrifuge (220v), UPS converters UPS APC 1500 VA EU, Printer LEXMARK E260DN 230v and bioMérieux OBS Puncher (49,000+95,000 + 1,500 + 1,200 + 320 + 2,000) = \$149,020  
• Roche - COBAS AmpliPrep/COBAS TaqMan HIV-1 monitor version 2.0 (Page 48); Instrument cost: MAX calculated from Cobas AmpliPrep (72 samples/run) and Cobas TaqMan96 Analyser with docking station Taqman 96 (63 samples/run; 100-250 tests/day) (100,000 + 260,000) = \$360,000  
\* Note: Some assays included equipment components for which pricing was not provided and, therefore, is not reflected in these calculations.

**Cost per test result**  
Source: MSF Access (2013). Putting HIV Treatment to the Test: A Product Guide for Viral Load and Point-of-Care CD4 Diagnostic Tools. Lab-based Viral Load, 33-53.