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(Article begins on next page)

1 Nation-wide measure of variability in HCMV, EBV and BKV DNA quantification among

2 centres involved in monitoring transplanted patients

$\begin{array}{c} 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \\ 10 \\ 11 \\ 12 \\ 13 \\ 14 \\ 15 \\ 16 \\ 17 \\ 18 \\ 19 \\ 20 \\ 21 \\ 22 \\ 23 \\ 24 \\ 25 \\ 26 \\ 27 \end{array}$	Isabella Abbate ^{a,1} , Antonio Piralla ^{b,1} , Agata Calvario ^c , Annapaola Callegaro ^d , Cristina Giraldi ^e , Giovanna Lunghi ¹ , William Gennari ^g , Giuseppe Sodano ^h , Paolo Ravanini ¹ , Pier Giulio Conaldi ¹ , Marialinda Vatteroni ^k , Aurelia Gaeta ¹ , Pierpaolo Paba ^m , Rossana Cavallo ⁿ , Fausto Baldanti ^{b.o.*} , Tiziana Lazzarotto ^p and the AMCLI - Infections in Transplant Working Group (GLaIT) ² ^a Laboratorio di Virologia, INMI L. Spallanzani, Roma ^b SS Virologia Molecolare, SC Microbiologia e Virologia, Fondazione IRCCS Policlinico San Matteo, Pavia ^c UOC Microbiologia e Virologia, Ospedali Riuniti, Bergamo ^c UO di Microbiologia e Virologia, P.O. Annunziata-A.O., Cosenza ¹ Laboratorio di Virologia, RCCS Ospedale Maggiore Policlinico Mangiagalli e Regina Elena, Milano ⁸ UO di Microbiologia e Virologia, Azienda Ospedaliero-Universitaria di Modena, Modena ^b UOC Microbiologia e Virologia, Azienda Ospedaliero-Universitaria di Modena, Modena ^b UOC Microbiologia e Virologia, Ospedale Maggiore della Carità, Novara ¹ Laboratorio di Virologia, Azienda Ospedaliero Universitaria Dismetti, Novara ¹ Laboratorio di Patologia Chinico Jisapienza, Roma ^m UOC Virologia, Azienda Ospedaliera Universitaria Pisana, Pisa ¹ UOC Virologia, Azienda Ospedaliero Tor Vergata, Roma ^m UOC Virologia a Virologia, AOU Città della Salute e della Scienza, Università di Torino ^o Sezione di Microbiologia, Dipartimento di Scienze Clinico-Chirurgiche, Diagnostiche e Pediatriche, Università degli studi di Pavia, Pavia ^p UO di Microbiologia, DIMES, Policlinico S. Orsola Malpighi, Università di Bologna, Bologna
28	*Corresponding author at: Department of Clinical, Surgical, Diagnostic and Pediatric Sciences,
29	University of Pavia, Viale Brambilla 74, Pavia, 27100, Italy. Fax: +39 0382 502599.
30	E-mail addresses: f.baldanti@smatteo.pv.it, fausto.baldanti@unipv.it (F. Baldanti).
31	
32	¹ Contributed equally
33	² Other participants in the GLaIT group along with their affiliation are listed in Appendix A.
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1 ABSTRACT

Background: Inter-laboratory variability in quantifying pathogens involved in viral disease after
transplantation may have a great impact on patient care, especially when pre-empitive strategies are
used for prevention.

Objectives: The aim of this study was to analyze the variability in quantifying CMV, EBV and
BKV DNA among 15 virology laboratories of the Italian Infections in Transplant Working Group
(GLaIT) involved in monitoring transplanted patients.

8 *Study Design:* Panels from international Quality Control programs for Molecular Diagnostics 9 (QCMD, year 2012), specific for the detection of CMV in plasma, CMV in whole blood (WB), 10 EBV and BKV were used. Intra- and inter-laboratory variability, as well as, deviation from QCMD 11 consensus values were measured.

12 Results: 100% specificity was obtained with all panels. A sensitivity of 100% was achieved for 13 EBV and BKV evaluation. Three CMV samples, with concentrations below 3 log₁₀ copies/ml, were 14 not detected by a few centers. Mean intra-laboratory variability (% CV) was 1.6 for CMV plasma 15 and 3.0 for CMV WB. Mean inter-laboratory variability (% CV) was below 15% for all the tested 16 panels. An higher inter-laboratory variability was observed for CMV WB with respect to CMV 17 plasma (3.0 vs 1.6% CV). The percentiles 87.7%, 58.6%, 89.6% and 74.7% fell within $\pm 0.5 \log_{10}$ 18 difference of the consensus values for CMV plasma, CMV WB, EBV and BKV panels, 19 respectively.

20 *Conclusions*: An acceptable intra- and inter-laboratory variability was observed in this study, in 21 comparison with international standards. However, further harmonization in viral genome 22 quantification is reasonable expectation for the future.

23 Keywords: multicenter evaluation; standardization; transplantation; CMV-DNA; EBV-DNA;
24 BKV-DNA

25

1 1. Background

2 Cytomegalovirus (CMV) and Epstein-Barr virus (EBV) are major causes of post-transplant viral 3 disease both in solid organ and hematopoietic stem cell transplantation, while Polioma BK virus 4 reactivation, with virus-associated nephropathy, represents the most frequent cause of graft loss 5 after renal transplantation [1,2]. The reliability and accuracy of viral load determination are 6 therefore critical for the management of transplant patients. In fact, virological monitoring of 7 transplanted patients is based on standardized protocols for genome quantification in order to apply 8 clinical cut-offs in pre-emptive approaches for disease prevention [3-6]. However, measurements of 9 viral load performed with commercially available assays might differ significantly, particularly 10 according to the extraction method used, which is a source of variability with different clinical 11 specimens. Finally, there is a need for an inter-laboratory comparison of results and evaluation of 12 individual assays with standardized panels, particularly with collaborative multicentre networks.

13

14 2. Objectives

The aim of this study was to analyze the variability obtained among 15 Italian virology laboratories, belonging to the Working Group for Transplantation (Gruppo di Lavoro Infezioni nel Trapianto, GLaIT) of the Italian Association of Clinical Microbiologists (Associazione Microbiologi Clinici Italiani, AMCLI). Therefore, panels from international Quality Control programs for Molecular Diagnostics (QCMD, year 2012), specific for the detection and quantification of CMV in plasma, CMV in whole blood (WB), EBV and BKV were used.

21

22 **3. Study design**

23 3.1. QCMD samples

The QCMD panels used in the study were: QCMD 2012 CMV plasma, QCMD 2012 CMV WB,
QCMD 2012 EBV and QCMD 2012 BKV-JCV. A number of samples with various amounts of the

different viruses suspended in an appropriate matrix and negative controls were tested in each
 panel. For a detailed description and composition of the panels see <u>www.qcmd.org</u>.

3

4 3.2. Extraction and quantitative real-time PCR assays

5 Each sample was tested by each of the laboratories using commercial and in house methods 6 adopted for routinely virologic monitoring of transplanted patients (Table 1). Nucleic acid extraction was performed by the majority of the laboratories using automatic extraction with 7 8 commercial with sometimes in-house modifications; Real-time PCR amplification was carried out 9 by all the laboratories with commercially available kits, with only one exception. Quantitative 10 results were expressed as log₁₀ copies/ml for all three viruses tested. For positive samples detected 11 below the lowest limit of quantification, when a detected number of copies was not available, an 12 arbitrary value of half of the lowest limit of quantification was used.

13

14 3.3. Statistical analysis

Intra- and inter-laboratory variability was calculated, as well as, variation with respect to the QCMD consensus as the coefficient of variation (%CV). The Pearson correlation analysis and the Bland-Altman analysis were performed to examine the level of agreement between the 15 laboratories' results and the QCMD samples. Results were considered to be quantitatively discordant when the results of the Bland-Altman analysis were discordant by more than $\pm 0.5 \text{ Log}_{10}$ of the QCMD consensus values. Statistical analysis was performed using Graph Pad Prism software, version 5.00.288.

22

4. Results

The results obtained by the different GLaIT laboratories were analyzed to obtain a description of intra- and inter-laboratory variability and a quantitative comparison with respect to the consensus values reported by the different QCMD panels. 1 For each of the four panels tested (QCMD CMV plasma, CMV WB, EBV and BKV) no false 2 positive results were obtained by any of the GLaIT laboratories (specificity 100%). A sensitivity of 3 100% was achieved with the EBV and BKV evaluations. Concerning the CMV plasma panel, 4 sample #3 (2.24 \log_{10} copies/ml) was not detected by 1/15 (6.6%) centres and sample #4 (2.08 \log_{10} copies/ml) was not detected by 4/15 (26.6%) centres. For the CMV WB panel only sample #8 (2.58 5 6 \log_{10} copies/ml) was not detected by 4/13 (30.8%) centres. For the BKV/JCV panel, no cross 7 reactivity with the JCV virus was observed (6 samples) and all of the centres detected all the five 8 samples containing BKV.

9 The QCMD CMV plasma and WB panels contained duplicate samples to allow intra-laboratory 10 variability evaluation. The results indicated that the mean intra-laboratory % of the coefficient of 11 variation (CV) was 1.6 for CMV plasma and 3.0 for CMV WB.

In Table 2, for each sample the mean, standard deviation (SD), CV (%), median and range of log₁₀ copies/ml are reported. The mean SD for CMV plasma, CMV WB, EBV and BKV were respectively 0.27, 0.49, 0.25 and 0.37. The mean % CV for CMV plasma, CMV WB, EBV and BKV were respectively: 9.4%, 13.7%, 6.71% and 13.3%. The mean Delta log₁₀ for CMV plasma, CMV WB, EBV and BKV were respectively: 0.93, 1.40, 0.97 and 1.29. It should be emphasized that the variability was usually larger when considering samples with a virus concentration lower than 3 log₁₀ copies/ml.

19 In order to compare the results obtained by the different GLaIT laboratories with those of the 20 international quality control study, consensus values for each QCMD panel were extrapolated and 21 used for comparison. Significant correlations were observed in CMV WB, CMV plasma, EBV and 22 BKV panel results with the Spearman coefficient which ranged from 0.82 to 0.96 (data not 23 showed). Bland-Altman plots were used to describe the log₁₀ difference between the GLaIT 24 laboratory results and the consensus values (Figure 1). According to previous reports $[7-9], \pm 0.5$ 25 \log_{10} was considered an acceptable variability. In CMV the plasma panel, 114/130 (87.7%) of the determinations were within $\pm 0.5 \log_{10}$ difference, while in the CMV WB panel only 51/87 (58.6%) 26

were within $\pm 0.5 \log_{10}$ difference. In the CMV plasma panel, the majority of the discordant results (14/16, 87.5%) were observed in samples with a <3.0 log₁₀ DNA copies number (Figure 1A), while in the CMV WB panel discordant results were observed for all sample concentrations (Figure 1B). In the EBV panel (Figure 1C), 120/134 (89.6%) of the measurements were within a $\pm 0.5 \log_{10}$ difference, with no evident differences among different sample concentrations. In the BKV panel (Figure 1D), a total of 56/75 (74.7%) determinations fell within $\pm 0.5 \log_{10}$ difference; and for the EBV panel, no differences among the different sample concentrations were detected.

8

9 **5. Discussion**

10 Since significant inter-laboratory variability in quantifying CMV, EBV and BKV genomes may 11 impact the quality of transplanted patient care, especially when pre-empitive strategies are used for 12 prevention, initiatives aimed at harmonizing viral genome quantification among different 13 laboratories should always be encouraged. In fact, transplant centres collect patients from all 14 Italians regions while post-transplant monitoring may be carried out by local laboratories. To the 15 best of our knowledge, this is the first report which simultaneously measures variability in 16 quantifying CMV, EBV and BKV DNA which represent the three major viral pathogens 17 responsible for disease in solid organ transplantation.

18 Mission of the GLaIT group is to improve standardization of diagnostic procedures for 19 microbiological monitoring of solid organs and stem cell transplant recipients. Two different studies 20 aimed to measure variability in CMV and EBV DNA quantification have already been performed 21 [9,10]. Concerning CMV, the present study, in contrast with the 2009 report [9], takes into account 22 both CMV DNA quantification in plasma and WB. As for the former CMV study, no false positive 23 samples were obtained and a sensitivity of 100% was obtained in samples with a DNA load greater 24 than 3 \log_{10} copies/ml. Although in the past a variability of less than 1 \log_{10} was obtained only in 25 samples with a viral load greater than $3.7 \log_{10}$ copies/ml, the results reported here ranged from 0.93 to 1.40 log₁₀ variation for plasma and WB even when considering samples with concentrations 26

below 3.0 \log_{10} copies/ml. A greater variability was observed for CMV in WB with respect to plasma; this is in line with the more complex matrix represented by blood, where nucleic acid extraction is more laborious. At the same time, the CMV blood panel results, although more variable, display a greater linearity. Overall, the % accuracy measured fell within ±0.5 \log_{10} and ranged from 58.6% to 89.6%. This accuracy measured in a multicentre study is considered acceptable and is higher than those observed in a similar study including fewer centres (n=4) [11].

7 It should be underlined that in the present CMV quantification analysis, in contrast with previous 8 studies, all of the laboratories, with only one exception, used a commercial real-time PCR method 9 and only three different real-time methods were used. These real-time methods were however 10 associated with a variety of different manual or automated commercial and in house modified 11 protocols for nucleic acid extraction. It is reasonable to suppose that much of the variability 12 observed among the different quantifications was associated with the extraction procedures, rather 13 than the PCR amplification. This was also the case for EBV and BKV DNA determinations, where 14 as for CMV DNA, no false positive results were obtained for any samples. In the present study, the 15 best results (lower variability) were obtained with the EBV DNA panel. However, no direct 16 comparison can be made with the previous EBV study [10] due to the different composition of the 17 panels used for the evaluation. For BKV DNA, no cross reactivity was observed for samples 18 positive for the other Poliomavirus (JCV), included in the same QCMD panel and, although this 19 represents the first study by our group on quantification of this virus, an acceptable level of 20 variability was achieved. International standards are available since 2011 for CMV DNA and 2012 21 for EBV DNA [12, 13]; this represents an opportunity to improve harmonization in CMV and EBV 22 genome quantification.

In conclusion, the results of this multicentre study indicate that CMV, EBV and BKV DNAemia are quantified with acceptable variability using a variety of extraction volumes and protocols with different commercial and in-house molecular protocols.

1	Competing interests
2	None declared.
3	
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7	
8	Ethical approval
9	None. All experiments were performed with samples made available by QCMD 2012.
10	
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14	
15	Appendix A. AMCLI-Infections in the Transplant Working Group (GLaIT) - list of other
16	participants.
17	
18	Maria Rosaria Capobianchi (Laboratorio di Virologia, INMI L. Spallanzani, Roma).
19	Maria Luisa Scarasciulli (Laboratorio di Virologia, U.O.C. Microbiologia e Virologia, Policlinico
20	di Bari, Bari).
21	Francesca Greco (UO di Microbiologia e Virologia, P.O. Annunziata-A.O., Cosenza).
22	Erminio Torresani (Laboratorio di Virologia, IRCCS Ospedale Maggiore Policlinico Mangiagalli
23	e Regina Elena, Milano).
24	Fabio Rumpianesi (UO di Microbiologia e Virologia, Azienda Ospedaliero-Universitaria di

25 Modena, Modena).

- Daniele Di Carlo (Laboratorio di Patologia Clinica, Microbiologia e Virologia ISMETT,
 Palermo).
- 3 Carlo Federico Perno (UOC Virologia Molecolare, Policlinico Fondazione Tor Vergata, Roma).
- 4 Cristina Costa (SC Microbiologia e Virologia, A.O. Città della Salute e della Scienza, Università
 5 di Torino).
- 6 Liliana Gabrielli, Giulia Piccirilli (UO di Microbiologia, Policlinico S. Orsola Malpighi,
 7 Bologna).
- 8

1 **References**

- [1] J.A. Fishman. infection in solid-organ transplant recipients. N. Engl. J. Med. 357 (2007) 26012614.
- 4 [2] H. H. Hirsch, P. Randhawa and the AST Infectious Diseases Community of Practice. BK
 5 Polyomavirus in solid organ transplantation. Am. J. Transplant. 13(S4) (2013) 179-188.
- [3] R. Raymund. R.R. Razonable, R.T. Hayden. Clinical utility of viral load in management of
 cytomegalovirus infection after solid organ transplantation. Clin. Microbiol. Rev. 26 (2013)
 703-727.
- 9 [4] M.L. Gulley and W. Tang. Using Epstein-Barr viral load assays to diagnose, monitor, and
 10 prevent posttransplant lymphoproliferative disorder. Clin. Microbiol. Rev. 23 (2010) 350-366.
- 11 [5] B.H. Chung, Y.A. Hong, H.G. Kim, I.O. Sun, S.R. Choi, H.S. Park, S.H. Lee, B.S. Choi, C.W.
- Park, Y.J. Choi, Y.S. Kim, C.W. Yang. Clinical usefulness of BK virus plasma quantitative
 PCR to prevent BK virus associated nephropathy. Transpl. Int. 25 (2012) 687-695.
- 14 [6] S. Hassan, C. Mittal, S. Amer, F. Khalid, A. Patel, R. Delbusto, L. Samuel, G. Alangaden, M.
 15 Ramesh. Currently recommended BK virus (BKV) plasma viral load cutoff of ≥4 log10/mL
 16 underestimates the diagnosis of BKV-associated nephropathy: a single transplant center
 17 experience. Transpl. Infect. Dis. 16 (2014) 55-60.
- [7] X.L. Pang, J.D. Fox, J.M. Fenton, G.G. Miller, A.M. Caliendo, J.K. Preiksaitis for the
 American Society of Transplantation Infectious Diseases Community of Practice; Canadian
 Society of Transplantation. Interlaboratory comparison of cytomegalovirus viral load assays.
 Am. J. Transplant. 9 (2009) 258-268.
- [8] J.K. Preiksaitis, X.L. Pang, J.D. Fox, J.M. Fenton, A.M. Caliendo, G.G. Miller for the
 American Society of Transplantation Infectious Diseases Community of Practice.
 Interlaboratory comparison of Epstein-Barr virus viral load assays. Am. J. Transplant. 9 (2009)
 269-279.

- [9] D. Lilleri ,T. Lazzarotto, V. Ghisetti ,P. Ravanini,M.R. Capobianchi, F. Baldanti, G. Gerna
 SIV-AMCLI Transplant Surveillance Group. Multicenter quality control study for human
 cytomegalovirus DNAemia quantification. New Microbiol. 32 (2009) 245-253.
- [10]I. Abbate, M. Zanchetta, M. Gatti, L. Gabrielli, S. Zanussi, M.G. Milia, T. Lazzarotto, R.
 Tedeschi, V. Ghisetti, M. Clementi, A. De Rossi, F. Baldanti, M.R. Capobianchi. Multicenter
 comparative study of Epstein-Barr virus DNA quantification for virological monitoring in
 transplanted patients. J. Clin. Virol. 50 (2011) 224-229.
- 8 [11]J. Rychert, L. Danziger-Isakov, B. Yen-Lieberman, G. Storch, R. Buller, S.C. Sweet, A.K.
 9 Mehta, J.A. Cheeseman, P. Heeger, E.S. Rosenberg, J.A. Fishman. Multicenter comparison of
 10 laboratory performance in cytomegalovirus and Epstein-Barr virus viral load testing using
 11 international standards. Clin. Transplant. 28 (2014) 1416-1423.
- [12] J.F. Fryer, A.B. Heath, R. Anderson, P.D. Minor and the collaborative study group.
 Collaborative study to evaluate the proposed 1st WHO International Standard for human
 cytomegalovirus (HCMV) for nucleic acid amplification (NAT)-based assays. WHO ECBS
 Report (2010); WHO/BS/10.2138.
- [13] J.F. Fryer, A.B. Heath, D.E. Wilkinson, P.D. Minor and the collaborative study group.
 Collaborative study to evaluate the proposed 1st WHO International Standard for Epstein-Barr
 virus (EBV) for nucleic acid amplification (NAT)- based assays. WHO ECBS Report (2011);
 WHO/BS/11.2172.
- [14] M. Furione, V. Rognoni, E. Cabano, F. Baldanti. Kinetics of human cytomegalovirus (HCMV)
 DNAemia in transplanted patients expressed in international units as determined with the
 Abbott RealTime CMV assay and an in-house assay. J. Clin. Virol. 55 (2012) 317-322.
- [15]F. Baldanti, M. Gatti, M. Furione, S. Paolucci, C. Tinelli, P. Comoli, P. Merli, F. Locatelli.
 Kinetics of Epstein-Barr virus DNA load in different blood compartments of pediatric
 recipients of T-cell depleted HLA-haploidentical stem cell transplantation. J. Clin. Microbiol.
 46 (2008) 3672-3677.

[16] B.K. Saundh, S. Tibble, R. Baker, K. Sasnauskas, M. Harris, A. Hale. Different patterns of BK
 and JC polyomavirus reactivation following renal transplantation. J. Clin. Pathol. 63 (2010)
 714-718.

1 Figure Legend

Figure 1. Bland-Altman plots are used to describe the Log difference between the GLaIT
laboratory results and QCMD consensus values. A (CMV plasma panel), B (CMV WB panel),
C (EBV panel) and D (BKV panel).

Table 1. Methods for viral DNA extraction and quantification.

Instrument Protocol CAV 1 QLA Symphony DSP vinus/pathogen (modified) 200 (20 for WB) CMV Alert Red-Time, LITechGroup ABI Prian 7500 3 QLA Symphony DSP vinus/pathogen (modified) 1000 1100 CMV Alert Red-Time, LITechGroup ABI Prian 7500 4 NucliSUSE LawMag genetic 2.01 and specific 2.0 for WB 500 (200 for WB) 55 (55 for WB) in house PCR (unruget USS)[14] ABI Prian 7500 5 standard genetic 2.01 000 100 CMV Alert Red-Time, EITechGroup ABI Prian 7500 7 NucliSUSS LawMag genetic 2.01 000 W1 100 (200 for WB CMV Alert Red-Time, EITechGroup ABI Prian 7500 9 NucliSUSS LawMag genetic 2.01 000 (200 for WB 200 for WB CMV Alert Red-Time, EITechGroup ABI Prian 7500 9 NucliSUSS LawMag genetic 2.01 000 (200 for WB 200 for WB CMV Alert Red-Time, EITechGroup ABI Prian 7500 10 OLA Symphony boost 200 for WB 000 (200 for WB CMV Alert Red-Time, EITechGroup ABI Prian 7500 10 OLA Sy	Virus Center target #		Nucleic acid extraction		Input volume (µl)	Output volume (µl)	Amplification method	Real-time PCR instrument
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2 NuckSFNN FasyMag genet: 2.0.1 25 (25 for WB) CMV Aler Real-Time, FIJTechforong ABI Prism 7300 3 QLA Symphony penet: 2.0.1 mappeding 51 (55 for WB) CMV Aler Real-Time, FIJTechforong ABI Prism 7300 4 NuckSENS EasyMag genetic: 2.0.1 000 CMV WB CMV WB Mappeding 6 x-ractor gene UV light HeID NAA Cobe 000 CMV WB CMV WB Mappeding ABI Prism 7500 7 NuckSINS EasyMag generic 2.0.1 000 FWB CMV WB CMV WB Mappeding ABI Prism 7500 9 NuckSINS EasyMag generic 2.0.1 000 for WB 200 for WB CMV WB CMV W LIT: MCB Kit, LIT: HCHCorong ABI Prism 7500 10 QLA Symphony generic 2.0.1 000 for WB 000 for WB CMV WA Rent Real-Time, FIT: Echforong ABI Prism 7500 10 QLA Symphony DSF virus-pathogen and DSP DNA for WB 500 (200 for WB) CMV Aler Real-Time, FIT: Echforong ABI Prism 7500 11 QLA Symphony DSF virus-pathogen 500 (200 for WB) 55 (5	CMV	1	QIA Symphony	DSP virus/pathogen (modified)	400 (200 for WB)	90 (90 for WB)	CMV Trender Affigene	Stratagene xp3000
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4 NucliSENS EsayMag genetic 2.0.1 and specific 2.0 for WB 500 (200 for WB) 515 (55 for WB) in bouse PCR (arget USR)[14] ABI Prion 7300 6 x-tractor genetic VV light His DNA Corbet 400 60 CMV VILITE MGR KR, ELITEchGroup ABI Prion 7300 7 NucliSENS EsayMag genetic 2.0.1 500 CMV VILITE MGR KR, ELITEchGroup ABI Prion 7300 7 NucliSENS EsayMag genetic 2.0.1 500 CMV VILITE MGR KR, ELITEchGroup ABI Prion 7300 8 NucliSENS EsayMag genetic 2.0.1 1000 (200 for WB) 2016 for WB CMV VILITE MGR KR, ELITEchGroup ABI Prion 7300 10 QLA Symphory DSP Vincypathogen and DSP DNA for WB 500 (200 for WB) CMV ADI Real "Time, ELITEchGroup ABI Prion 7300 12 NucliSENS EsayMag genetic 2.0.1 500 (100 for WB) CMV ALIET MGR KR, LLITEchGroup ABI Prion 7300 13 NucliSENS EsayMag genetic 2.0.1 500 (100 for WB) CMV ALIET MGR KR, LLITEchGroup ABI Prion 7300 14 NucliSENS EsayMag genetic 2.0.1 500 (100 for WB) CMV ALIET MGR KR, LLITEchGroup ABI Prio		3	QIA Symphony	DSP virus/pathogen (modified)	1000	110	CMV ELITe MGB Kit, ELITechGroup	ABI Prism 7300
5 NuclSENS BasyMa Person 2001 inclsens Person Person 2001 100 50 CMV LTP KGB KE, ELTrechGroup CMV LTP KGB KE, ELTrechGroup CMV ELTR KGB KE, ELTrechGroup Person 2001 ABI Prism 7300 7 NuclSENS BasyMa QLA Symphory generic 2.0.1 500 VP VE Person 2001 CMV ELTR KGB KE, ELTrechGroup Person 2001 ABI Prism 7300 8 NuclSENS BasyMa QLA Symphory generic 2.0.1 000 (2016 rW) Person 2001 CWV ELTR KGB KK, ELTrechGroup Person 2001 ABI Prism 7300 10 QLA Symphory DSP vinus/puthogen and DSP DNA for WB S00 (2016 rW) 900 (50 rW) CVW VELTEr KGB KK, ELTrechGroup ABI Prism 7300 ABI Prism 7300 11 QLA Symphory DSP vinus/puthogen and DSP DNA for WB S00 (2016 rW) 500 (2016 rW) CVW VELTEr KGB KK, ELTREchGroup ABI Prism 7300 ABI Prism 7300 12 NucLSENS BasyMa generic 2.0.1 S00 (2016 rW) S01 (2016 rW) CVW VELTEr KGB KK, ELTREchGroup ABI Prism 7300 ABI Prism 7300 13 NucLSENS BasyMa generic 2.0.1 S00 (2016 rW) S1 (S16 rW) CWV VELTE KGB KK, ELTREchGroup ABI Prism 7300 ABI Prism 7300 14 NucLSENS BasyMa generic 2.0.1 S00 (2016 rW) S1 (S16 rW) CWV VELTE KGB KKK, ELTREchGroup ABI Prism 7300		4	NucliSENS EasyMag	generic 2.0.1 and specific 2.0 for WB	500 (200 for WB)	55 (55 for WB)	in house PCR (target US8)[14]	ABI Prism 7300
FRACUT gene UV light Hist DNA Cobet 400 60 CMV Alter Real-Time, ELTrechGroup ABI Prism 7300 7 NacldSPNS FasyMa 8 generic 2.0.1 500 50 CMV ELTR MGR KH, ELTrechGroup ABI Prism 7300 8 NacldSINS EasyMa 9 generic 2.0.1 400 (200 fer WB 9 200 for WB 9 CMV ELTR MGR KH, ELTrechGroup ABI Prism 7300 1 OLAS Strap EasyMa 9 generic 2.0.1 400 (200 fer WD 900 for WB) CMV Alert Real-Time, ELTrechGroup ABI Prism 7300 1 OLAS Strap EasyMa 9 Septem 2.0.1 500 (100 for WB) 500 (100 for WB) CMV ELTR MGR KH, ELTrechGroup ABI Prism 7300 1 OLASSTNS EasyMa 9 specific 2.0 (nordfiel for WB) 500 (100 for WB) SCM VH ELTR MGR KH, ELTREchGroup ABI Prism 7300 1 MackISINS EasyMa 9 generic 2.0.1 500 (100 for WB) SCM VH ELTR MGR KH, ELTREchGroup ABI Prism 7300 1 MackISINS EasyMa 9 generic 2.0.1 500 (100 for WB) SCM VH ELTR MGR KH, ELTREchGroup ABI Prism 7300 1 MackISINS EasyMa 9 generic 2.0.1 500 (100 for WB) SCM For WH ELTRECHGR MB ST For WH ELTRECHGR MB		5	NucliSENS EasyMag	generic 2.0.1	100	50	CMV ELITe MGB Kit, ELITechGroup	ABI Prism 7300
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6x-tractor gene UV lightHelix DNA Corbet40060EBV Alert Real-Time, ELITechgroupABI Prism 73007NucliSENS EasyMaggeneric 2.0.150050EBV Alert Real-Time, ELITechgroupABI Prism 73008NucliSENS EasyMaggeneric 2.0.1100025EBV Alert Real-Time, ELITechgroupABI Prism 730010NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730011NucliSENS EasyMaggeneric 2.0.1100060EBV Alert Real-Time, ELITechgroupABI Prism 730012NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730015Manual extractionQlAarnp blood mini kit200100EBV Regene Argene-BiomerieuxABI Prism 73002NucliSENS EasyMaggeneric 2.0.125025BKV Trender AffigeneStratagene xp30004NucliSENS EasyMaggeneric 2.0.1200100BKV ELITe MGB KIT, ELITechgroupABI Prism 73003QLA SymphonyDSP virus/pathogen (modified)1000110BKV ELITe MGB KIT, ELITechgroupABI Prism 73004NucliSENS EasyMaggeneric 2.0.150055in house PCR (arget rage Tergin)[16]ABI Prism 7300 <td></td> <td>5</td> <td>NucliSENS EasyMag</td> <td>generic 2.0.1</td> <td>100</td> <td>100</td> <td>EBV ELITe MGB Kit, ELITechgroup</td> <td>ABI Prism 7300</td>		5	NucliSENS EasyMag	generic 2.0.1	100	100	EBV ELITe MGB Kit, ELITechgroup	ABI Prism 7300
7NucliSENS EasyMag generic 2.0.150050EBV ELITe MCB Kit, ELITechgroupABI Prism 75008NucliSENS EasyMag generic 2.0.1100025EBV Alert Real-Time, ELITechgroupABI Prism 730010NucliSENS EasyMag generic 2.0.1100025EBV Alert Real-Time, ELITechgroupABI Prism 730011NucliSENS EasyMag 		6	x-tractor gene UV light	Helix DNA Corbet	400	60	EBV Alert Real-Time, ELITechgroup	ABI Prism 7300
8 NucliSENS EasyMag generic 2.0.1 400 60 EBV Alert Real-Time, ELITechgroup ABI Prism 7300 9 NucliSENS EasyMag generic 2.0.1 500 55 EBV ELITe MGB Kit, ELITechgroup ABI Prism 7300 10 NucliSENS EasyMag generic 2.0.1 500 55 EBV ELITe MGB Kit, ELITechgroup ABI Prism 7300 12 NucliSENS EasyMag generic 2.0.1 500 60 EBV Alert Real-Time, ELITechgroup ABI Prism 7300 13 NucliSENS EasyMag generic 2.0.1 500 55 EBV Alert Real-Time, ELITechgroup ABI Prism 7300 13 NucliSENS EasyMag generic 2.0.1 500 55 EBV Alert Real-Time, ELITechgroup ABI Prism 7300 14 NucliSENS EasyMag generic 2.0.1 500 55 EBV Alert Real-Time, ELITechgroup ABI Prism 7300 2 NucliSENS EasyMag generic 2.0.1 200 100 EBV R-gene Argene-Biomerieux ABI Prism 7300 2 NucliSENS EasyMag generic 2.0.1 250 25 BKV Alert Real-Time, ELITechgroup ABI Prism 7300 2 NucliSENS EasyMag generic 2.0.1 000		7	NucliSENS EasyMag	generic 2.0.1	500	50	EBV ELITe MGB Kit, ELITechgroup	ABI Prism 7500
9NucliSENS EasyMag generic 2.0.1generic 2.0.1100025EBV Alert Real-Time, ELITechgroup ABI Prism 7300ABI Prism 730010NucliSENS EasyMag generic 2.0.1generic 2.0.1100060EBV Alert Real-Time, ELITechgroupABI Prism 730012NucliSENS EasyMag generic 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730013NucliSENS EasyMag generic 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730014NucliSENS EasyMag generic 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730015Manual extractionQIAamp blood mini kit200100EBV R-gene Argene-BiomerieuxABI Prism 73002NucliSENS EasyMag generic 2.0.125025BKV Alert Real-Time, ELITechgroupABI Prism 73003QIA SymphonyDSP virus/pathogen (modified)40090BKV Trender AffigeneStratagene xp30004NucliSENS EasyMag generic 2.0.125025BKV Alert Real-Time, ELITechgroupABI Prism 73004NucliSENS EasyMag generic 2.0.150055in house PCR (target Iarget Tregion)[16]ABI Prism 73004NucliSENS EasyMag generic 2.0.11000110BKV ELITE MGB KIT, ELITechGroupABI Prism 73005NucliSENS EasyMag generic 2.0.150055in house PCR (target Iarget Tregion)[16]ABI Prism 73006x-tractor gene UV light Helix DNA Corbet40060BKV ELITE MGB KIT, ELITechGroup <td< td=""><td></td><td>8</td><td>NucliSENS EasyMag</td><td>generic 2.0.1</td><td>400</td><td>60</td><td>EBV Alert Real-Time, ELITechgroup</td><td>ABI Prism 7300</td></td<>		8	NucliSENS EasyMag	generic 2.0.1	400	60	EBV Alert Real-Time, ELITechgroup	ABI Prism 7300
10NucliSENS EasyMag generic 2.0.1generic 2.0.155055EBV ELITe MGB Kit, ELITechgroup (ELITe hgroup)ABI Prism 730011NucliSENS EasyMag generic 2.0.1spcific 2.0500100EBV Alert Real-Time, ELITechgroup (ELITechgroup)ABI Prism 730013NucliSENS EasyMag generic 2.0.150055EBV Alert Real-Time, ELITechgroup (ELITechgroup)ABI Prism 730014NucliSENS EasyMag generic 2.0.150055EBV Alert Real-Time, ELITechgroup (ELITechgroup)ABI Prism 730015Manual extractionQIAamp blood mini kit200100EBV R-gene Argene-BiomerieuxABI Prism 73002NucliSENS EasyMag generic 2.0.125025BKV Alert Real-Time, ELITechgroup (BKV ELITe MGB KIT, ELITechgroup)ABI Prism 73003QIA Symphony USP virus/pathogen (modified)40090BKV ELITe MGB KIT, ELITechGroup (BKV ELITe MGB KIT, ELITechGroup)ABI Prism 73004NucliSENS EasyMag generic 2.0.125025BKV Alert Real-Time, ELITechGroup (ABI Prism 7300)ABI Prism 73005NucliSENS EasyMag generic 2.0.11000100BKV ELITe MGB KIT, ELITechGroup (ABI Prism 7300)ABI Prism 73006x-tractor gene UV light Helix DNA Corbet40060BKV ELITe MGB KIT, ELITechGroup (ABI Prism 7300)7NucliSENS EasyMag generic 2.0.150055BKV ELITe MGB KIT, ELITechGroup (ABI Prism 7300)8NucliSENS EasyMag generic 2.0.15055BKV ELITe MGB KIT, ELITechGroup <td></td> <td>9</td> <td>NucliSENS EasyMag</td> <td>generic 2.0.1</td> <td>1000</td> <td>25</td> <td>EBV Alert Real-Time, ELITechgroup</td> <td>ABI Prism 7300</td>		9	NucliSENS EasyMag	generic 2.0.1	1000	25	EBV Alert Real-Time, ELITechgroup	ABI Prism 7300
11NucliSENS EasyMaggeneric 2.0.1100060EBV Alert Real-Time, ELITechgroupABI Prism 730012NucliSENS EasyMaggeneric 2.0.1500100EBV ELITe MGB Kitt, ELITechgroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730015Manual extractionQIA symphonyDSP virus/pathogen (modified)40090BKV Trender AffigeneStrategen xp30002NucliSENS EasyMaggeneric 2.0.125025BKV Alert Real-Time, ELITechgroupABI Prism 73003QIA SymphonyDSP virus/pathogen (modified)1000110BKV ELITe MGB KIT, ELITechGroupABI Prism 73004NucliSENS EasyMaggeneric 2.0.150055in house PCR (target large T region)[16]ABI Prism 73005NucliSENS EasyMaggeneric 2.0.11000100BKV ELITe MGB KIT, ELITechGroupABI Prism 73006x-tractor gene UV lightHelix DNA Corbet40060BKV ELITe MGB KIT, ELITechGroupABI Prism 73007NucliSENS EasyMaggeneric 2.0.150050BKV ELITe MGB KIT, ELITechGroupABI Prism 73007NucliSENS EasyMaggeneric 2.0.150050BKV ELITe MGB KIT, ELITechGroupABI Prism 73006NucliSENS EasyMaggeneric 2.0.150050BKV ELITe MGB KIT, ELITechGroup		10	NucliSENS EasyMag	generic 2.0.1	500	55	EBV ELITe MGB Kit, ELITechgroup	ABI Prism 7300
12NucliSENS EasyMagspecific 2.0500100EBV ELITe MGB Kit, ELITechgroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730015Manual extractionQIAamp blood mini kit200100EBV R-gene Argene-BiomerieuxABI Prism 7300BKV1QIA SymphonyDSP virus/pathogen (modified)40090BKV Trender AffigeneStratagene xp30002NucliSENS EasyMaggeneric 2.0.125025BKV Alert Real-Time, ELITechgroupABI Prism 73003QIA SymphonyDSP virus/pathogen (modified)1000110BKV ELITe MGB KIT, ELITechGroupABI Prism 73004NucliSENS EasyMaggeneric 2.0.150055in house PCR (target large T region)[16]ABI Prism 73005NucliSENS EasyMaggeneric 2.0.11000100BKV ELITe MGB KIT, ELITechGroupABI Prism 73006x-tractor gene UV lightHelix DNA Corbet40060BKV ELITe MGB KIT, ELITechGroupABI Prism 73007NucliSENS EasyMaggeneric 2.0.140060BKV ELITe MGB KIT, ELITechGroupABI Prism 73008NucliSENS EasyMaggeneric 2.0.140060BKV ELITe MGB KIT, ELITechGroupABI Prism 73008NucliSENS EasyMaggeneric 2.0.150055BKV Q-PCR Alert Kit, ELTechGroupABI Prism 73009NucliSENS EasyMaggeneric 2.0.1100060Light mix Polyomaviruses IC and BK (TibMolBiol) <td></td> <td>11</td> <td>NucliSENS EasyMag</td> <td>generic 2.0.1</td> <td>1000</td> <td>60</td> <td>EBV Alert Real-Time, ELITechgroup</td> <td>ABI Prism 7300</td>		11	NucliSENS EasyMag	generic 2.0.1	1000	60	EBV Alert Real-Time, ELITechgroup	ABI Prism 7300
13NucliSENS EasyMag 14generic 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730014NucliSENS EasyMag 15generic 2.0.150055EBV Alert Real-Time, ELITechgroupABI Prism 730015Manual extractionQIA symphonyDSP virus/pathogen (modified)40090BKV Trender AffigeneStratagene xp30002NucliSENS EasyMag 3generic 2.0.125025BKV Alert Real-Time, ELITechgroupABI Prism 73003QIA SymphonyDSP virus/pathogen (modified)1000110BKV ELITe MGB KIT, ELITechGroupABI Prism 73004NucliSENS EasyMag 		12	NucliSENS EasyMag	specific 2.0	500	100	EBV ELITe MGB Kit, ELITechgroup	ABI Prism 7300
14NuclišENS EasyMag Bgeneric 2.0.150055EBV Alert Real-Time, ELT echgroup EBV R-gene Argene-BiomerieuxABI Prism 7300 ABI Prism 7500BKV1QIA Symphony VuclišENS EasyMag BDSP virus/pathogen (modified)40090BKV Trender AffigeneStratagene xp3000 ABI Prism 73003QIA Symphony VuclišENS EasyMag Bgeneric 2.0.125025BKV Alert Real-Time, ELTTechgroupABI Prism 7300 ABI Prism 73004NuclišENS EasyMag Bgeneric 2.0.150055in house PCR (target large T region)[16]ABI Prism 7300 ABI Prism 73005NuclišENS EasyMag Bgeneric 2.0.11000100BKV ELITe MGB KIT, ELITechGroupABI Prism 7300 ABI Prism 73006x-tractor gene UV light Helix DNA Corbet40060BKV ELITe MGB KIT, ELITechGroupABI Prism 7300 ABI Prism 73007NuclišENS EasyMag Bgeneric 2.0.150050BKV ELITe MGB KIT, ELITechGroupABI Prism 7300 ABI Prism 73008NuclišENS EasyMag Bgeneric 2.0.16060BKV ELITe MGB KIT, ELITechGroupABI Prism 7300 ABI Prism 73009NuclišENS EasyMag Bgeneric 2.0.150055BKV Q-PCR Alert Kit, ELITechGroupABI Prism 7300 ABI Prism 730010NuclišENS EasyMag Bgeneric 2.0.150055BKV Q-PCR Alert Kit, ELITechGroupABI Prism 730011NuclišENS EasyMag Bgeneric 2.0.150055BKV Q-PCR Alert Kit, ELITechGroupABI Prism 73001		13	NucliSENS EasyMag	generic 2.0.1	500	55	EBV Alert Real-Time, ELITechgroup	ABI Prism 7300
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4NucliSENS EasyMaggeneric 2.0.150055in house PCR (target large T region)[16]ABI Prism 73005NucliSENS EasyMaggeneric 2.0.11000100BKV ELITe MGB KIT, ELITechGroupABI Prism 73006x-tractor gene UV lightHelix DNA Corbet40060BKV ELITe MGB KIT, ELITechGroupABI Prism 73007NucliSENS EasyMaggeneric 2.0.150050BKV ELITe MGB KIT, ELITechGroupABI Prism 75008NucliSENS EasyMaggeneric 2.0.140060Light mix Polyomaviruses JC and BK (TibMolBiol)Lightcycler 2.09NucliSENS EasyMaggeneric 2.0.1100025BKV Q-PCR Alert Kit, ELITechGroupABI Prism 730010NucliSENS EasyMaggeneric 2.0.1100060BKV Alert Real-Time, ELITechGroupABI Prism 730011NucliSENS EasyMaggeneric 2.0.1100060BKV Alert Real-Time, ELITechGroupABI Prism 730012NucliSENS EasyMaggeneric 2.0.1100060BKV Alert Real-Time, ELITechGroupABI Prism 730012NucliSENS EasyMaggeneric 2.0.150055BKV Alert Real-Time, ELITechGroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 7300<		3	QIA Symphony	DSP virus/pathogen (modified)	1000	110	BKV ELITe MGB KIT, ELITechGroup	ABI Prism 7300
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7NucliSENS EasyMag generic 2.0.1generic 2.0.150050BKV ELITe MGB KIT, ELITechGroup ABI Prism 7500ABI Prism 75008NucliSENS EasyMag generic 2.0.1generic 2.0.140060Light mix Polyomaviruses JC and BK (TibMolBiol)Light cycler 2.09NucliSENS EasyMag generic 2.0.1generic 2.0.1100025BKV Q-PCR Alert Kit, ELITechGroupABI Prism 730010NucliSENS EasyMag generic 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730011NucliSENS EasyMag specific 2.090060BKV Alert Real-Time, ELITechGroupABI Prism 730012NucliSENS EasyMag specific 2.0500100BKV ELITe MGB KIT, ELITechGroupABI Prism 730013NucliSENS EasyMag specific 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMag generic 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMag generic 2.0.150055BKV ELITE MGB KIT, ELITechGroupABI Prism 730015Manual extractionOlAamp blood mini kit200100IC primers a probe + BKV R-gene Arcene-BiomerianyABI Prism 7500		6	x-tractor gene UV light	Helix DNA Corbet	400	60	BKV ELITe MGB KIT, ELITechGroup	ABI Prism 7300
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9NucliSENS EasyMaggeneric 2.0.110025BKV Q-PCR Alert Kit, ELITechGroupABI Prism 730010NucliSENS EasyMaggeneric 2.0.150055BKV LITe MGB KIT, ELITechGroupABI Prism 730011NucliSENS EasyMaggeneric 2.0.1100060BKV Alert Real-Time, ELITechGroupABI Prism 730012NucliSENS EasyMagspecific 2.0500100BKV ELITe MGB KIT, ELITechGroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITE MGB KIT, ELITechGroupABI Prism 730015Manual extractionOlAamp blood mini kit200100IC primers a probe + BKV R-gene Arcene-BiomerianyABI Prism 7500		8	NucliSENS EasyMag	generic 2.0.1	400	60	Light mix Polyomaviruses IC and BK (TibMolBiol)	Lightcycler 2.0
10NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730011NucliSENS EasyMaggeneric 2.0.1100060BKV Alert Real-Time, ELITechgroupABI Prism 730012NucliSENS EasyMagspecific 2.0500100BKV ELITe MGB KIT, ELITechGroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730015Manual extractionOlAamp blood mini kit200100IC primers - probe + BKV R-gene - Arcene-BiomerientABI Prism 7500		9	NucliSENS EasyMag	generic 2.0.1	1000	25	BKV O-PCR Alert Kit. ELITechGroup	ABI Prism 7300
11NucliSENS EasyMaggeneric 2.0.1100060BKV Alert Real-Time, ELITechgroupABI Prism 730012NucliSENS EasyMagspecific 2.0500100BKV ELITe MGB KIT, ELITechGroupABI Prism 730013NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730014NucliSENS EasyMaggeneric 2.0.150055BKV ELITe MGB KIT, ELITechGroupABI Prism 730015Manual extractionOlAamp blood mini kit200100IC primers - probe + BKV R-gene - Arcena-BiomerianyABI Prism 7500		10	NucliSENS EasyMag	generic 2.0.1	500	55	BKV ELITE MGB KIT ELITEChGroup	ABI Prism 7300
12 NucliSENS EasyMag specific 2.0.1 500 100 BKV ELITe MGB KIT, ELITechGroup ABI Prism 7300 13 NucliSENS EasyMag generic 2.0.1 500 55 BKV ELITe MGB KIT, ELITechGroup ABI Prism 7300 14 NucliSENS EasyMag generic 2.0.1 500 55 BKV ELITe MGB KIT, ELITechGroup ABI Prism 7300 15 Manual extraction OIAamp blood mini kit 200 100 IC primers - probe + BKV R-gene Arcene-Biomeriany ABI Prism 7500		11	NucliSENS EasyMag	generic 2.0.1	1000	60	BKV Alert Real-Time, ELITechgroup	ABI Prism 7300
13 NucliSENS EasyMag generic 2.0.1 500 55 BKV ELITe MGB KIT, ELITechGroup ABI Prism 7300 14 NucliSENS EasyMag generic 2.0.1 500 55 BKV ELITe MGB KIT, ELITechGroup ABI Prism 7300 15 Manual extraction OIAamp blood mini kit 200 100 IC primers - probe + BKV R-gene Arcene Biomeriany ABI Prism 7500		12	NucliSENS EasyMag	specific 2.0	500	100	BKV ELITE MGB KIT ELITEChGroup	ABI Prism 7300
14 NuclisENS EasyMag generic 2.0.1 500 55 BKV ELITE MGB KIT, ELITechGroup ABI Prism 7300 15 Manual extraction OIA amp blood mini kit 200 100 IC primers - probe + BKV R-gene Arcene Arcen		13	NucliSENS FacyMag	generic 2.0.1	500	55	BKV FLITE MGB KIT FLITEchGroup	ABI Prism 7300
15 Manual extraction OIA amp blood mini kit 200 100 IC primers - probe \pm RKV R-gene Argene Argene Riomeriany ARI Prism 7500		14	NucliSENS FasyMag	generic 2.0.1	500	55	BKV FLITE MGB KIT FLITEchGroup	ABI Prism 7300
		15	Manual extraction	OIAamp blood mini kit	200	100	IC primers - prohe + BKV R-gene Argana Biomoriaux	ABI Prism 7500

OCMV 2012 papel	Sampla	No. of	$Mean \pm SD$	Inter-lab. CV	Median	Range
QUNIV 2012 panel	Sample	values	(Log copies/ml)	(%)	(Log copies/ml)	(Log copies/ml)
CMV plasma	CMV12-01	15	4.43±0.17	3.93	4.43	4.12-4.65
	CMV12-02	15	3.82 ± 0.29	7.56	3.89	3.29-4.36
	CMV12-03	14	2.19±0.33	12.65	2.17	1.56-2.53
	CMV12-04	11	2.05 ± 0.46	19.56	2.00	1.28-2.35
	CMV12-05	15	3.24 ± 0.48	14.84	3.40	2.04-3.66
	CMV12-06	15	3.43±0.21	6.19	3.47	2.98-3.80
	CMV12-07	15	3.46±0.18	5.15	3.50	3.16-3.70
	CMV12-09	15	3.80±0.21	5.60	3.83	3.29-4.14
	CMV12-10	15	2.74 ± 0.26	9.30	2.72	2.18-3.14
CMV WB	CMV12-01	13	3.82 ± 0.59	15.33	3.78	2.78-4.56
	CMV12-02	13	4.83±0.57	11.90	4.96	3.89-5.50
	CMV12-03	13	3.01±0.43	13.95	3.09	2.32-3.65
	CMV12-04	13	3.85 ± 0.54	14.06	3.82	3.15-4.51
	CMV12-05	13	3.03±0.41	13.03	3.08	2.38-3.54
	CMV12-07	13	4.55 ± 0.50	10.91	4.44	3.84-5.17
	CMV12-08	9	2.63 ± 0.44	16.57	2.73	1.81-3.05
EBV	EBV12-01	15	2.52 ± 0.30	11.92	2.56	1.97-3.16
	EBV12-02	15	3.57 ± 0.24	6.89	3.59	3.22-4.20
	EBV12-03	15	4.93±0.25	5.12	4.87	4.59-5.53
	EBV12-04	15	4.55±0.23	5.17	4.53	4.26-5.12
	EBV12-05	15	4.12±0.23	5.61	4.11	3.80-4.68
	EBV12-06	15	4.26±0.21	5.10	4.20	3.98-4.77
	EBV12-07	15	4.58±0.23	5.19	4.49	4.32-5.21
	EBV12-08	15	3.26±0.23	7.02	3.23	2.81-3.81
	EBV12-09	15	3.09 ± 0.26	8.33	3.10	2.52-3.72
BKV	BK12-02	15	3.58 ± 0.38	10.59	3.64	2.92-4.19
	BK12-03	15	2.43 ± 0.34	14.54	2.43	1.81-2.90
	BK12-07	15	1.72 ± 0.48	26.25	1.76	0.90-2.35
	BK12-08	15	4.64±0.39	8.51	4.66	3.81-5.26
	BK12-12	15	5.14 ± 0.34	6.58	5.15	4.35-5.56

Table 2. Summary of quantitative performance for CMV plasma, CMV WB, EBV and BKV panels.