SUPPLEMENTAL MATERIAL

Supplemental Table A
Summary of studies evaluating DBS for HIV and HTLV1

Disease, assay type, and country	Ref.	Number of samples/filter paper type	Test	Sensitivity (%)	Specificity (%)	Notes
HIV						
Sierra Leone	1	359 patients/ Whatman No. 3	Innotest (Diagnostics Pasteur)	100 (HIV1); 87.5 (HIV2)	100	DBS 2.3 times cheaper than venous blood collection.[1] Only one HIV-2 sample.
India	2	89 patients/ Whatman 903	Micro-ELISA (Vironostika); Western blot (BioRad)	100; 92	100; 100	OD declined after 6 days storage at 36.8°C and 70% humidity.
Zimbabwe	3	379 patients/ Whatman No. 3	Gel Particle Agglutination HIV1 and –2 (Serodia); Recombigen HIV1 and –2 ELISA (Trinity Biotech)	NR; NR	NR; NR	
The Gambia	4	200 patients/Whatman BFC 180	ICE HIV1.0.2 ELISA (Wellcozyme); HIV recombinant (Murex); ICE HIV2 ELISA GPA	NR	NR	Pooling of five DBS samples would not lead to any missed positives.
India	5	275 patients/ Whatman No. 3	Murex Ag/Ab ELISA (Murex Biotech)	100 (HIV1)	100	HIV1 and –2. Also tested on 12,617 patients for seroprevalence with overall sensitivity of 99.6% and specificity of 99.9% based on a subset of pooled samples evaluated by PCR (Amplicor HIV 1 v1.5; Roche).
Brazil	6	457 patients/ Whatman 903	Q-Preven HIV1 + –2 (Symbiosis Diagnostika)	100	99.6	> 4 weeks storage at 37°C and < 50% humidity; OD values started to decrease.
Rwanda	7	491 patients/ Whatman 903	Uni-Form 2 (Abbott); HIV-1.2.0 (bioMerieux)	100; 99.4	99.1; 99.1	DBS stored for 14 days; DBS stored for 30 days at ambient temperature.
HIV1 serology (p24)						
South Africa	8	141 patients/ Whatman No.1	Ultrasensitive p24 Ag ELISA (Perkin Elmer)	98.8	100	Only children included: 34 days to 12 years. After 6 weeks of storage, sensitivity dropped to 88.9%.
Tanzania, Switzerland	9	282 patients/ Whatman No. 3	HIV p24 Ag (Perkin Elmer)	84	100	Non-subtype D sensitivity: 93%; non-subtype C sensitivity: 94%.
South Africa	10	246 patients/ Whatman No. 3 and No. 1	Ultrasensitive p24 Ag ELISA (Perkin Elmer)	96.6 (W. No. 1); 98.3 (W.903)	100; 100	Desiccant improved sensitivity for storage > 6 weeks.
Dominican Republic, United States, Vietnam, Malawi, South Africa	11	617 patients/ Whatman 903	Modified Up24 Ag (Perkin Elmer)	94.4	100	Storage of > 30 months decreased sensitivity to 72.2% (39/54 samples).
Malawi	12	222 patients	ELISA Alliance HIV1 p24 without ELAST (Perkin Elmer)	84	98	Study only included clear positives and negatives.
HIV 1 NAAT (DNA)						
South Africa	13	800 patients/ Whatman 903	Amplicor HIV-1 DNA v1.5 PCR (Roche)	99	99.8	
South Africa	14	300 patients/ Whatman No.1	Amplicor HIV DNA v1.5 PCR (Roche)	100	99.6	On retesting false negatives, sensitivity increased to 100%.
South Africa	15	206 patients/ Whatman 903	Amplicor HIV-1DNA v1.5 PCR (Roche)	98.3	100	

(continued)

Supplemental Table A
Continued

Disease, assay type, and country	Ref.	Number of samples/filter paper type	Test	Sensitivity (%)	Specificity (%)	Notes
Thailand	16	162 patients/ Whatman 903	Amplicor HIV-1 DNA v. 1.5 PCR (Roche)	100	100	
Tanzania	17	176 patients/ Whatman 903	Cobas AmpliPrep/ TaqMan DNA (Roche)	97	100	
Tanzania	18	325 patients/ Whatman 903	Amplicor HIV-1 DNA v1.5 PCR (Roche)	98.3	99.6	Same results for manual and automated methods.
HIV1 NAAT (RNA)						
Thailand	16	162 patients/ Whatman 903	Manual NucliSENS (bioMerieux)	100	100	On average, HIV1 VL was 0.4 log lower in DBS after correction of sample volume.
South Africa	19	235 patients/ Whatman 903	NucliSens EasyQ (bioMerieux)	100 (< 3 months); 100 (3–12 months)	95.6 < 3 months; 100 3–12 months	
Senegal	20	149 samples/ Whatman 903	NucliSens EASYQ HIV v1.2 (bioMerieux)	100	100	Age: 3 weeks to 24 months.
HIV1 NAAT DNA and RNA						
South Africa	15	800 patients/ Whatman 903	Cobas AmpliPrep/ TaqMan HIV-1 Qualitative (Roche)	99.7	100	LoD: 1,090 copies/mL.
Seven countries worldwide	21	291 samples/ Whatman 903	APTIMA HIV-1 RNA Qualitative Assay (Gen-Probe)	99.2	100	HIV1 LoD: 20–200 copies/mL in DBS potentially because of contribution of cellular RNA and DNA.
Tanzania	17	176 patients/ Whatman 903	RealTime HIV-1 Quantitative (Abbott)	100	99	Results at a threshold of > 1,000 copies/mL (100% for sensitivity and specificity at > 10,000).
United States	22	Spiked samples only/ Whatman 903	APTIMA HIV-1 RNA Qualitative Assay (Gen-Probe)	100	NR	For RNA vs. DNA at > 1,000 copies/mL (86% and 100% at > 10,000). LoD: 1 × 6-mm punch = 10,217 copies/mL; 1 spot (13 mm) = 2,384 copies/mL.
South Africa	23	494 patients/ Whatman 903	APTIMA HIV-1 RNA Qualitative Assay (Gen-Probe)	100	99.7	
United States	24	45 × 6 sets of samples/ Whatman 903	Real-Time HIV-1 Qualitative (Abbott)	NR	100	LoD 95% Probit was 3,085 IU/mL.
HTLV1 serology						
Japan, United Kingdom, South Africa	25	26 patients/ Whatman 903	Latex Agglutination Test, Serodia HTLV1, (Fujirebio)	100	100	Based on a reference panel of samples of known positives.
HTLV1 NAAT						
Japan	26	53 patients/ Whatman 903	In-house PCR	100	100	DNA remained detectable after 7 weeks storage at room temperature.

LoD = limit of detection; NR = not recorded; VL = viral load.

Supplemental Table B
Summary of studies evaluating DBS for Hepatitis viruses

Disease, assay type, and country	Ref.	Number of samples/filter paper type	Test	Sensitivity (%)	Specificity (%)	Notes
HCV serology						
United Kingdom	27	573 patients/ Whatman 903	Ortho HCV 3.0 (Ortho Diagnostics)	99.2	100	Adjusting cutoff can improve sensitivity.
Australia	28	183 patients/ Whatman 903	Monolisa anti-HCV PLUS Version 2 EIA (Bio-Rad)	100	100	Choice of elution buffer influences OD value.
France	29	200 patients/ Whatman 903	Ortho HCV 3.0 (Ortho Diagnostics)	99	98	
HAV serology						
Spain	30	298 patients/ Whatman 2992	IMx ELISA (Abbott)	91.3	99.3	
Brazil	31	74 patients/ Whatman 903	Bioelisa HAV-EIA (Biokit)	100	100	Humoral response to vaccination also investigated using DBS.
HBV (HBsAg)						
Gambia	32	209 patients/ Whatman BFC180	Determine HBsAg (Abbott)	96	100	Also performed α-foetoprotein tests on DBS samples for hepatocellular carcinoma.
Brazil	33	133 patients/ Whatman 903	ETI-MAK4 (DiaSorin)	97.6	96.7	
HBV (anti-HBc)						
Brazil	33	155 patients/ Whatman 903	ETI-AB-COREK PLUS (DiaSorin)	90.5	92.6	Storage at −20°C gave lowest OD variation, suggesting best storage condition.
HBV (anti-HBs)						
Brazil	33	134 patients/ Whatman 903	ETI-AB-AUK-3 (DiaSorin)	78	97.3	
HCV NAAT						
Italy	34	53 samples/ Whatman 903	Versant HCV TMA (Bayer)	100	> 95	HCV RNA stable at room temperature for 11 months.
France	29	200 patients/ Whatman 903	Cobas Taqman HCV (Roche)	97	NR	HCV RNA is susceptible to degradation; store DBS at −20°C.
HEV NAAT						
Sudan	35	89 patients/ Whatman	In-house PCR	84	88	Multiple tests are necessary for HEV to obtain high sensitivity.
Sudan	35	92 patients/ Isocode Stix	In-house PCR	93	96	HEV viremia detectable for > 39 days after onset of jaundice.

Supplemental Table C

Summary of studies evaluating DBS for herpesviruses, measles, and rubella

Disease, assay type, and country	Ref.	Number of samples/filter paper type	Test	Sensitivity (%)	Specificity (%)	Notes
CMV serology						
United States	36	75 patients/ Whatman 903	CMV IgG (Diamedix)	93	94	
EBV serology						
Indonesia	37	150 patients/ Whatman 903	In-house IgA ELISA	80; 96	100; 93.6	Second number indicates performance on venous blood instead of capillary blood.
Indonesia	37	150 patients/ Whatman No. 3	In-house IgA ELISA	75; 89	97; 97	Second number indicates performance on venous blood instead of capillary blood.
HSV serology						
United States	38	22 patients/ Whatman No. 3	Herpeselect (Focus)	NR	NR	
Measles serology						
Australia	39	216 patients/ Whatman 903	Enzygnost IgM (Dade-Behring)	90.2	98.8	
Australia	40	98 patients/ Whatman 903	Enzygnost IgG (Dade-Behring)	96.2	92	DBS OD values were adjusted (OD = 1.28) to correlate with matching serum samples.
Uganda	41	588 patients/ Whatman 903	Enzygnost IgM (Dade-Behring)	98.7	88.9	2–5 weeks after rash, collected samples were 100% sensitive and specific.
Rubella serology						
Peru	43	87 post-vaccination samples/Whatman 903	Captia IgM (Sanofi); Wampole IgG (Alere)	NR; NR	NR; NR	94% concordance (four DBS and three serum indeterminate results); 93% concordance (two DBS and four serum indeterminate results).
Australia	44	88 patients/ Whatman 903	Enzygnost IgM (Dade-Behring)	96	100	
Peru	42	273 patients/ Whatman 903	Enzygnost IgM (Dade-Behring); Enzygnost IgG (Dade-Behring)	98; 99	97; 98	
United Kingdom	45	73 samples; 79 samples/ Whatman 903	Enzygnost IgG (Dade-Behring); IgG ELISA (Diesse)	NR; NR	NR; NR	
CMV NAAT						
Italy	46	195 patients/ Whatman 903	CMV Early Oligo Mix (Bioline-Amplimedical)	100	100	LoD 4,000 copies/mL whole blood.

Supplemental Table D

Summary of key studies evaluating the diagnosis of infectious diseases on filter paper using samples other than whole blood

Sample type	Notes	Refs.
Bone marrow		
Visceral leishmaniasis PCR	PCR positive in 34 of 35 dried bone marrow samples from patients clinically suspected of having visceral leishmaniasis.	47
Serum		
Hepatitis A IgM, IgG, and PCR Hepatitis C PCR HIV ELISA	Hepatitis A IgM and IgG ELISAs were both 100% sensitive and specific compared with serum. HIV ELISA was able to detect infections of less than 6-months duration with a sensitivity of 83%. Hepatitis A PCR was 92.3% sensitive and 100% specific, and Hepatitis C PCR was 100% sensitive and specific compared with serum, although with a very small sample size. Both Hepatitis A and C showed a 10-fold drop in viral load after 4 weeks of storage at room temperature.	48–50
Plasma		
HIV quantitative PCR	Good correlation was observed in all three studies between whole plasma and dried plasma spots and also between DBS and dried plasma. HIV RNA was more stable stored on paper at room temperature than as whole liquid plasma, and it was stable for more than 1 year.	51–53
Buffy coat		
HIV proviral DNA PCR	100% concordance of proviral DNA extracted from dried buffy coat spots with DNA extracted from whole blood.	54
Skin lesion samples		
Cutaneous leishmaniasis PCR on dried skin exudates Leprosy PCR on slit skin smears	Leishmaniasis sensitivity ranged from 92.3% to 100% and specificity was up to 100% using PCR compared with PCR performed directly on tissue samples. Filter paper was comparable with PCR on tissue and superior to microscopy and culture. Leishmania speciation was also successfully performed; 116 of 192 multibacillary leprosy patients were positive on FTA Elute paper. Equivalent to standard method of storage in 70% ethanol.	55–58
Breast milk		
HIV quantitative PCR	No statistical difference between viral load in dried breast milk and breast milk in lysis buffer (gold standard).	51
Sputum		
HIV PCR Measles PCR HHV 6 and 7 PCR Tuberculosis PCR Malaria (*P. falciparum*) PCR *Pneumocystis jirovecii* PCR	Low sensitivity for the detection of HIV RNA in saliva compared with whole blood. Dried saliva was less sensitive than whole saliva and nose/throat swab for measles by PCR; 67% of serologically confirmed cases were positive by PCR. Sensitivity and specificity for HHV 6 and 7 were comparable with whole saliva samples. *M. tuberculosis* PCR sensitivity was 82%, and specificity was 96% (greater than microscopy). DNA was detected even after 6 months of storage at room temperature. Thickest parts of purulent sputum must be applied to paper. Malaria DNA was detectable in saliva and urine. Sensitivity was poor compared with microscopy. Refinements to methods were required. Induced sputum and brochoalveolar lavage dried on paper had similar sensitivity and specificity of 67% and 90–91%, respectively, compared with direct PCR.	59–64
Cervical sample		
HPV PCR	Two studies reported excellent concordance of 94–100% between filter paper and cervical smear or cytobrush samples.[65,66] Banura and others[67] found low agreement with a κ of only 0.18. HPV DNA was stable for 1 year at room temperature.	65–67
Stool		
Vibrio cholerae culture *Enterocytozoon bieneusi* PCR Adenovirus 40 and 41 PCR Norovirus PCR Rotavirus PCR	There was no significant difference between filter paper and standard transport medium for culture of *V. cholerae* after 14 days of storage when kept moist. Viral enteric pathogens are all readily stored and identified by PCR from filter paper after up to 4 months. The use of SDS/EDTA-impregnated paper inactivates the pathogens.	68–72
Urine		
CMV PCR	90% concordance with direct urine DNA extraction and PCR.	73
Cerebrospinal fluid		
Streptococcus pneumoniae and *Haemophilus influenzae* PCR Neurocysticercosis ELISA	Sensitivity and specificity for *S. pneumoniae* and *H. influenzae* were 92% and 70% and 99% and 100%, respectively. There was good correlation in genome counts between liquid and dried CSF. High specificity of > 90% but low sensitivities of 52–63% were seen depending on the type of paper used.	74, 75

Supplemental Table E

References of excluded in-house assays

In-house assay	Refs.
HIV	50, 76–95
Hepatitis B and C	77, 96–98
CMV	99–106
Measles	107–109
Rubella	110

Supplemental Table F

STARD checklist for reporting of studies of diagnostic accuracy with suggested additions for filter paper and body fluid evaluation studies (version August 2012)

Section and topic	Item	
Title/abstract/keywords	1	Identify the article as a study of diagnostic accuracy (recommend MeSH heading sensitivity and specificity).
Title/abstract/keywords	2	Make use of terminology (i.e., DBS, dried serum spots, dried urine spots, dried fluid spots, etc.) or samples type X dried on filter paper.
Introduction	3	State the research questions or study aims, such as estimating diagnostic accuracy or comparing accuracy between sample types or across participant groups.
Methods		
Participants	4	The study population: the inclusion and exclusion criteria, setting, and locations where data were collected.
Participants	5	Participant recruitment: was recruitment based on presenting symptoms, results from previous tests, or the fact that the participants had received the index tests or the reference standard?
Participants	6	Participant sampling: was the study population a consecutive series of participants defined by the selection criteria in items 3 and 4? If not, specify how participants were further selected.
Participants	7	Data collection: was data collection planned before the index test and reference standard were performed (prospective study) or after (retrospective study)?
Participants	8	Sample collection: state which filter paper was used (including catalogue number, manufacturer and weight), which and how fluids were obtained and spotted onto filter paper, and the drying period before storage.
Test methods	9	The reference standard and its collection, storage, and transportation details. If reference sample was not performed with the same tests or manner as the index sample, provide detailed rationale.
Test methods	10	The index sample and its collection, storage, and transportation details. Provide detailed rationale for discordances in methods between index and reference test.
Test methods	11	Sample processing: state the time and storage conditions (humidity control and temperature) at the field, during transportation, and at the laboratory, preferably in a tabled manner.
Test methods	12	Punching method with reference to source or manufacturer and cleaning procedure if used.
Test methods	13	Technical specifications of material and methods involved, including how and when measurements were taken, and/or cite references for index tests and reference standard.
Test methods	14	Definition of and rationale for the units, cutoffs, and/or categories of the results of the index sample and the reference standard.
Test methods	15	For quantitative or numerical test results, indicate the calculation methods and rationale of the index and reference standard.
Test methods	16	The number, training, and expertise of the persons executing and reading the index sample and the reference standard.
Test methods	17	Whether the readers of the index tests and reference standard were blind (masked) to the results of the other test; describe any other clinical information available to the readers.
Statistical methods	18	Methods for calculating or comparing measures of diagnostic accuracy and bias (e.g., Bland Altman) and the statistical methods used to quantify uncertainty (e.g., 95% confidence intervals).
Statistical methods	19	Methods for calculating test reproducibility and lower limit of detection if done.
Statistical methods	20	For quantitative test outcomes, the mean and range of results for index and reference tests.
Results		
Participants	21	When study was performed, including beginning and end dates of recruitment.
Participants	22	Clinical and demographic characteristics of the study population (at least information on age, sex, and spectrum of presenting symptoms).
Participants	23	The number of participants satisfying the criteria for inclusion who did or did not undergo the index tests and/or the reference standard; describe why participants failed to undergo either test (a flow diagram is strongly recommended).
Test results	24	Time interval between the index tests and the reference standard and any treatment administered in the interval.
Test results	25	Distribution of severity of disease (define criteria) in those participants with the target condition; other diagnoses in participants without the target condition.
Test results	26	A cross-tabulation of the results of the index tests (including indeterminate and missing results) by the results of the reference standard; for continuous results, the distribution of the test results by the results of the reference standard.
Test results	27	Any adverse events from performing the index tests or the reference standard.
Estimates	28	Estimates of diagnostic accuracy and measures of statistical uncertainty (e.g., 95% confidence intervals).
Estimates	29	For quantitative test outcomes, estimates of diagnostic accuracy and measures of statistical uncertainty (e.g., 95% confidence intervals) by quantitative grouped ranges (e.g., 1,000–5,000 copies/mL).
Estimates	30	How indeterminate results, missing data, and outliers of the index tests were handled.
Estimates	31	Estimates of variability of diagnostic accuracy between subgroups of participants, readers, or centers if done.
Estimates	32	Estimates of test reproducibility if done.
Discussion	33	Discuss the clinical applicability of the study findings.

SUPPLEMENTAL APPENDIX 1: REVIEW OF THE CLINICAL USE OF FILTER PAPER IN INFECTIOUS DISEASES DRAFT PROTOCOL

Review team. Pieter W. Smit, Ivo Elliott, Rosanna W. Peeling, David Mabey, and Paul N. Newton.

Review objectives. *Primary objective*. To assess the use of dried blood spots (DBS) for the diagnosis or surveillance of infectious diseases.

Secondary objective. To assess the practical aspects and implications of using DBS compared with non-filter paper samples.

Tertiary objective. To assess the use of filter paper for diagnosis or surveillance for samples other than whole blood and animal pathogens.

PICOS

Participants. Studies evaluating the use of DBS as a replacement for a gold standard sample (e.g. plasma, serum, and whole blood) for any infectious disease diagnostic or surveillance assay.

Interventions (diagnostic assays adapted for DBS samples). Where a well-recognized commercially available technology exists for the diagnosis or surveillance of infectious diseases with DBS samples, the technology was used, and in-house assays were excluded.

Reference standard/comparators. The same commercially available technology for the diagnosis or surveillance of infectious diseases with gold standard samples (e.g., plasma, serum, and whole blood).

Outcomes. Include studies evaluating DBS for quantitative as well as qualitative analysis of nucleic acid testing against plasma samples (DNA and RNA single- or double-stranded) for the purpose of diagnosing/detecting infection.

Include studies evaluating DBS for Ab/Ag detection as diagnostics, cutoff determination, and protocol development (combined with commercially available assays).

Study design. Include evaluative studies using an acceptable reference technology and comparative studies.

Other. Include English language only from 1980 to present.

IDENTIFYING RESEARCH EVIDENCE

Search strategy. Databases: MEDLINE and EMBASE.

Search terms. Search terms for MEDLINE and EMBASE:

Ti,ab = keyword (title and abstract)

Mp= keyword (free text)

1. "dried blood".ti,ab
2. "blood spot*".ti,ab
3. DBS.mp
4. "filter paper".ti,ab,
5. "Guthrie filter".ti,ab
6. "filter card*".ti,ab
7. "whatman paper".ti,ab
8. "FTA*".ti,ab
9. "Flinders Associates Technology"
10. "Guthrie paper". ti,ab
11. "dried serum*".ti,ab
12. "serum spot*".ti,ab
13. "filter card*".ti,ab
14. "filter disc*" .ti,ab
15. "filter disk*" .ti,ab
16. "blotting paper".ti,ab
17. "Guthrie card".ti,ab
18. "Isocode stix".ti,ab

The following disorders and tests are commonly performed using DBS samples and were excluded: congenital hypothyroidism, phenylketonuria, cystic fibrosis, sickle cell disease, Tay–Sachs disease, hemoglobinopathies, galactosidase, spinal muscular atrophy, isovaleric acidaemia, maple syrup urine, cholesterol, triglycerides, HbA1c, human growth hormone, insulin, and mercury. Other key words often associated with the search terms but not relevant to this review were also excluded: MRI, MR, CT, PET, N-glycan, pharmacokinetic, and pharmacodynamic.

Date. 1980 to present.

Language. English.

Publication type/status. Published works in peer-reviewed journals.

Study selection.

Stage 1: screening of titles/abstracts against inclusion criteria.

Titles and abstracts, where available, will be screened and either accepted, rejected as not relevant, or rejected because of failure to meet inclusion criteria (if so, the reason will be specified).

Stage 2: full papers obtained and assessed against inclusion criteria. Papers will be either accepted or rejected because of failure to meet inclusion criteria, and the reason will be specified.

Full papers will be independently assessed by two members of the review team, and results will be cross-checked and combined.

Inclusion criteria.

Evaluation or comparison of performances of commercially available (where they exist and are well-recognized) DNA/RNA assays with DBS and reference sampling methods.

Evaluation or comparison of performances of commercially available (where they exist and are well-recognized) antibody/antigen assays with DBS and reference sampling methods.

Any human pathogen.

Evaluations based on human clinical or reference materials.

Exclusion criteria.

Not an evaluation study or not having a correct reference sample or reference method.

In-house developed assays, except where no well-recognized, commercially available assays exist.

Full article not accessible.

Studies with other primary aims than evaluation of DBS with reference samples (but keep these articles for review of practical aspects and implications of filter paper use).

Studies related to drug resistance screening, genotyping, sequencing, and other non-diagnostic evaluations.

Studies using filter paper for non-whole blood samples (urine, stool, cervical swabs, serum, plasma, saliva, cerebrospinal fluid, etc.; but include for separate discussion).

Animal pathogens (but include for separate discussion).

Any non-infectious diseases included in neonatal screening programs.

Data extraction
General information
Date of data extraction
Identification features of the study
Record number
Author
Article title
Citation
Study characteristics
Aim/objectives of the study
Disease
Filter paper type
Participant/sample characteristics
Characteristics of population from which samples were drawn
Age
Sex
Number of samples
Sample country/region of origin
Sample type (finger prick/EDTA)
DBS storage
At research site
At laboratory
Type of reference sample
DBS quality check performed?
Technology
Name and manufacturer of assays under evaluation
Extraction method
Extraction volume/adjustments
Extraction kit/method used
Detection method
If quantitative, adjusted for DBS sample input?
Outcome data/results
Unit of assessment/analysis
Outcomes
NA
Mean pathogen load ± SD
Range of pathogen load
Correlation (*r*)
Bias (mean difference)
Sensitivity, cutoff
Specificity, cutoff
Percent CV index test, reference test
Serology
Sensitivity, cutoff
Specificity, cutoff
Cutoff adjusted for DBS?
Titer lower limit of detection
For each pre-specified outcome
Reported (yes/no)
Definition used in study
Additional outcomes reported
Details of any additional relevant outcomes reported

Practical aspects and implications of filter paper. To fulfill the second objective of this review, the following information will be collected from publications combined with our experience.

All articles excluded after stage 1 are reviewed that fulfill the criteria: provide a better understanding of DBS samples regarding card types, filter paper characteristics, collection, storage, extraction, environmental effects, stability, punch methods, cost compared with reference methods, transportation, policy and regulations, recommendations made by leading organizations (WHO and CDC), and other related topics that could improve understanding of filter paper.

Data extracted
General information
Date of data extraction
Identification features of the study
Record number
Author
Article title
Citation
Assay details
Disease
DBS topic
Results
Key findings

Use of filter paper for non-whole blood samples. To fulfill the third objective of this review, the following information will be collected from publications.

All articles that are excluded at stage 1 can be included; make use of alternative samples stored on filter paper, such as serum, plasma, stool, urine, CSF, etc.

Data extracted
General information
Date of data extraction
Identification features of the study
Record number
Author
Article title
Citation
Study details
Disease
Sample type
DBS topic
Assay details
Extraction method
Detection method
Results
Sensitivity
Specificity
Key findings

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