Übersicht über systematische Übersichtsarbeiten zur Testgüte von HIV-Selbsttests, erstellt im Projekt „Ethik und Evidenz: Analyse und Förderung des medialen Diskurses zu diagnostischen Tests (MEDIATE)“ (Förderkennzeichen des Bundesministeriums für Bildung und Forschung: FKZ 01GP1771B)

Rapid overview of reviews:

Diagnostic test accuracy of HIV self-tests

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1. Introduction

1.1. Review Question

We summarized and assessed the existing evidence from systematic diagnostic test accuracy (DTA) reviews on HIV self-tests. HIV self-tests can be used by lay people at home to detect an HIV-infection with a small sample of oral fluid or blood from the finger. With this overview of DTA reviews we want to give a quick overview on the available systematic reviews on the diagnostic accuracy of HIV self-tests.

2. Materials and Methods

2.1. Searches

We performed searches for systematic reviews and meta-analysis in MEDLINE (via Pubmed) and the Cochrane Database of Systematic Reviews (complete strategies in the appendix) on the 18th of June 2019. We structured the strategy as suggested in the Cochrane DTA Handbook[1]: Indextest (HIV self-tests), Target Condition (HIV), Patient Description (people who use HIV self-tests).

2.2. Screening

Title and abstract screening as well as full text screening was performed by one reviewer in Endnote software.

2.3. Inclusion criteria

- **Condition or domain being studied:** HIV infections
- **Participants/population:** People who use HIV self-tests
- **Intervention(s), exposure(s):** HIV self-tests
- **Comparator(s)/control(s):** Standard diagnostic pathways such as immunoassay, western-blot, or rtPCR or tests supervised by medical professionals
- **Types of studies:** Published systematic reviews of diagnostic test accuracy, which are available as full texts or abstracts and that report diagnostic test accuracy parameters (i.e. sensitivity and/or specificity, proportion of false positives or false negatives).

We did not assess the risk of bias of the included studies.

2.4. Data extraction

- Bibliographic information + Month of publication
- Characteristics of included studies
- Type of test (index test(s), reference standard(s))
- Population details
- Results of meta-analysis/-es, pooled estimates
- Conclusions of the review authors

We summarized data in tables and narratively.

[1] https://methods.cochrane.org/sdt/handbook-dta-reviews, accessed 07.11.2019.

3. Results

We identified 99 references in two databases. After title and abstract screening the full texts of six studies were assessed. After full text screening we include two references. See PRISMA flow diagram in Figure 1 and list of references that were screened in full text in Table 1.

Figure 1: PRISMA flow diagramm

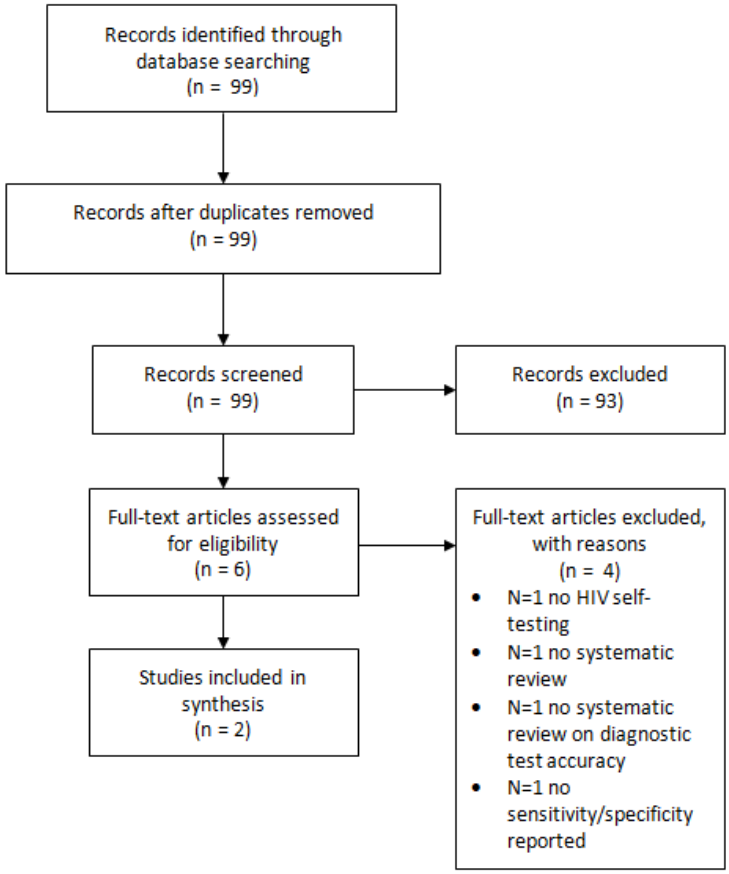


Table 1: References included in full text screening and reasons for exclusion.

Reference	Inclusion/Exclusion	Exclusion reason
Hutchinson 2006[1]	Exclusion	Only specimens were collected at home, testing itself not self-administered (n=1). (No HIV self-testing)
Krause 2013[2]	Exclusion	Sensitivity/Specificity not reported.
Pant Pai 2013[3]	Inclusion	--
Estem 2016[4]	Exclusion	The authors performed a selective literature review. (No systematic review)
Johnson 2017[5]	Exclusion	The authors do not report on diagnostic test accuracy of HIV self-testing.
Figueroa 2018[6]	Inclusion	--

3.1. Description of the included systematic reviews

Figueroa 2018 compared, the performance of HIV rapid diagnostic tests by approach (when used by self-testers or used by health-care workers) and by specimen (blood based self-test or oral fluid based self-test). Figueroa included 25 studies, of which most reported on blood based self-tests. Data on test accuracy was reported in 16 studies. For study details see Table 2.

The included studies showed an agreement between self-testers and healthcare workers between 85.4 % and 100 %. Most differences resulted from a wrong interpretation of the result (e.g. a reactive result as non-reactive or invalid). The test accuracy for the blood based test (4 studies) was higher among self-testers than for the oral fluid based test (11 studies), for details see Table 4.

Table 2: Study details from Figueroa 2018

Reference	**Figueroa 2018**		**Comments**
Month of Publication	April 2018		
Number of Included References	N=25		
Type of included studies	Interventional studies, observational studies.	N=2 interventional (RCTs); N=23 observational (n=3 cohort, n=18 cross-sectional, n=2 cross-sectional and qualitative).	
Test strategies to be compared	Unassisted vs. directly assisted HIV self-testing.	N=13 unassisted; N=11 directly assisted; N=1 both.	Unassisted: self-testers were provided only with manufacturers' instructions for use included in the kit. Directly assisted: self-testers received an in-person demonstration of how to do the test or to interpret the test result. All self-testers could assess assistance (telephone, internet, additional instructions like videos)
Index Test	Oral fluid-based or blood-based rapid diagnostic tests	N=15 oral; N=6 blood; N=4 both.	
Reference Standard	Testing done or verified by a health care worker (HCW) or both; checking by participant.	N=17 Retesting by HCW; N=1 verifying by HCW; N=1 retesting and verifying by HCW; N=6 other.	Comment: "other" includes "Participants Interpreted contrived pictures"; „Dried blood spot collection kit"; "Known PLHIV"
Participants	General population (GP), key population (KP), people living with HIV (PLHIV), pregnant women, Health Care Worker (HCW).	N=11 GP; N=2 KP; N=2 PLHIV; N=1 pregnant women; N=1 HCW, N=7 mixed, N=1 n/a.	Key Population: key population (men who have sex with men, sex workers, people who inject drugs, transgender people, and people in prisons or closed settings

Setting	Urban or rural in different countries of the world	N=20 urban; N=4 rural; N=1 mixed.	
Accuracy	sensitivity estimates were higher for blood-based rapid diagnostic tests (96.2–100%) than oral fluid-based rapid diagnostic tests (80–100%), as were specificity estimates (blood-based 99.5–100% vs oral fluid 95.1–100%)	N=15 studies evaluated sensitivity and specificity, n=1 only evaluated sensitivity.	

Pant Pai 2013 compared the test accuracy between supervised (i.e. with the help of medical staff) and unsupervised (i.e. without help, but with access to telephone or similar) use of blood based or oral fluid based tests. The test accuracy was only reported in 4 of the 21 included studies, a meta-analysis was not possible due to the lack of standardized reporting of outcomes. In those 4 studies only oral fluid based tests were examined. For study details see Table 3. The accuracy of the tests is indicated as "range" (i.e. values from to) in Table 4. The specificity was the same for supervised and unsupervised testing, but the sensitivity for unsupervised use was lower for a variety of reasons (e.g. noncompliance of the instructions).

Table 3: Study details from Pant Pai 2013

Reference	**Pant Pai 2013**		**Comments**
Month of Publication	April 2013		
Number of Included References	N=21		The flow chart in figure 1 shows n=17 included studies, in the results section the authors report n=20 included studies, in the narrative description of studies the y report n=21 included studies, in table 2 characteristics of n=21 studies are shown.

Type of included studies	Interventional and observational studies.	n=1 interventional (RCT);
		n=20 observational (n=14 cross-sectional or cohort studies;
		n=5 surveys;
		n=1 study in progress).	

Test strategies to be compared	Supervised self-testing vs. unsupervised self-testing:	n=14/21 supervised; n=7/21 unsupervised.	Assistance for self-testing varied across studies, e.g., understanding the conduct of self-testing, helping with result interpretation, counselling, and initiating linkages for confirmatory testing.

			In the unsupervised self-testing strategy (n = 7/21 studies, 33%), no assistance was offered by HCPs in the conduct and interpretation of self-tests, but counselling was available off-site (on the phone or over the Internet).

Index Test	Oral self-tests or finger-stick-based tests.	n =12/21 oral;
		n=3/21 finger-stick-based;
		n=2/21 both;
		n=4/21 n/a.
			Compare Table 2 in the publication.

Reference Standard	combination of conventional lab tests for HIV		Rapid tests or ELISA with p24 and/or Western blot depending on high- versus low-resource setting
Participants	Various.	HIV clinic attendees, HIV positive patients, MSM, STI clinic attendees, general (urban) population, emergency department, university students, attendees at rapid HIV testing site, health care professionals.	
Setting	Different countries of the world	N= 10 USA; N=3 Malawi; N=2 Singapore; N=2 Spain; N=1 Canada; N=1 India; N=1 Kenya; N=1 Netherlands.	
Accuracy	A high specificity (range: 99.8%–100%) was observed for both strategies, while a lower sensitivity was reported in the unsupervised (range: 92.9%–100%; one study) versus supervised (range: 97.4%–97.9%; three studies) strategy		No meta-analysis conducted due to lack of standardized reporting of primary and secondary outcomes. Accuracy was reported in n=5/21 included studies; Agreement and concordance between the self-tester and HCP could only be reported and computed for supervised testing strategies.

Table 4: Blood based test versus oral fluid based tests, pooled sensitivities and pooled specificities (range) from the two systematic reviews that were included

Figueroa 2018	
HIV self-test blood-based, (n=4 studies)	**HIV self-test oral fluid based, (n=11 Studien)**
Sens: 96,2 % - 100 % (range) Spec: 99,5 % - 100 % (range)	Sens: 80 % - 100 % (range) Spec: 95,1 % -100 % (range)
Pant Pai 2013	
HIV self-test oral fluid based, supervised (n=3 studies)	**HIV self-test oral fluid based, unsupervised (n=1 study)**
Sens: 97.4 % - 97.9 % (range) Spec: 99.8 % - 100 % (range)	Sens: 92.9 % -100 % (range) Spec: 99.8 % -100 % (range)

3.2. Accessibility of the included studies

Both included systematic reviews were published as open access articles and thus freely available. Both had a structured abstract that allows quick and easy screening of the content of the article. The abstracts did not contain a translation of the abstract in other languages than English or an easy to understand plain language summary.

4. Discussion and Conclusion

Both included systematic reviews show that HIV-self-tests are reliable and accurate in terms of test accuracy. Self-tests could be a possibility for individuals that would not have consulted a health professional (for reasons such as shame or the fear of discrimination) to learn about their HIV status and subsequently receive confirmatory testing and treatment. Self-tests could therefore be a means to support the United Nations 90-90-90 targets[2] with one goal being that by 2020 90 % of all people living with HIV should know their HIV status[3].

However, test accuracy alone does not guarantee a successful use of a self-test. Other important aspects are for example acceptance in the target population, accessibility of the test or usability. Because of the possibility that lay people misinterpret the results of a test, good instructions or the possibility to get further help is important.

[2] https://www.unaids.org/en/resources/909090

[3] The other 2 goals are: By 2020, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy. By 2020, 90% of all people receiving antiretroviral therapy will have viral suppression.

5. Appendix

5.1. Search strategies

Table 1: strategy MEDLINE (via) Pubmed

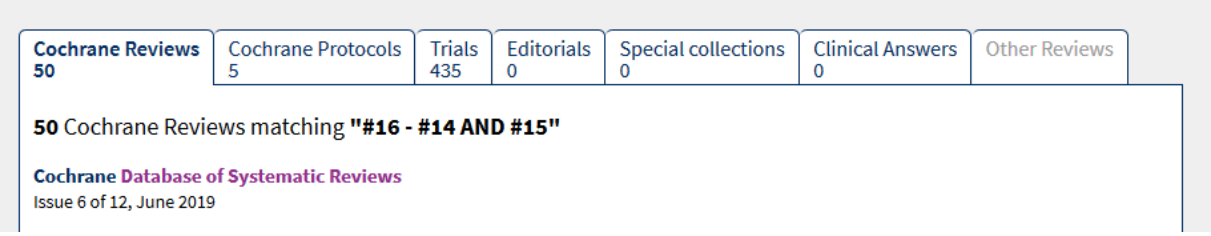
Search	Query	Items found	Aspect
#28	(#11 AND #16 AND #24) Filters: Systematic Reviews; Meta-Analysis; Review	44	
#27	(#11 AND #16 AND #24) Filters: Systematic Reviews; Meta-Analysis	15	
#26	(#11 AND #16 AND #24) Filters: Systematic Reviews	14	
#25	(#11 AND #16 AND #24)	660	
#24	(#19 OR #23)	190,113	Patient Description
#23	(#20 OR #21 OR #22)	9,034	
#22	self-test*[tw]	1,395	
#21	self evaluation*[tw]	7,644	
#20	self care diagnostic*[tw]	69	
#19	(#17 OR #18)	186,009	
#18	Diagnostic Self Evaluation/	7,349	
#17	Self Care/	180,725	
#16	(#12 OR #15)	384,157	Target Condition
#15	(#13 OR #14)	341,618	
#14	HIV[tw]	341,618	
#13	HIV infection*[tw]	207,879	
#12	HIV Infections/	287,005	
#11	(#4 OR #10)	256,814	Index Test
#10	(#5 OR #6 OR #7 OR #8 OR #9)	52,920	
#9	HIV self-test [tw]	106	
#8	HIV self-test*[tw]	301	
#7	rdt*[tw]	1,950	
#6	HIV rapid diagnostic test*[tw]	32	
#5	diagnostic test*[tw]	51,998	
#4	(#1 OR #2 OR #3)	218,527	
#3	Serologic Tests/	181,286	
#2	Reagent Kits, Diagnostic/	19,651	
#1	Diagnostic Tests, Routine/	20,604	

Table 5: Search strategy Cochrane Library, Search date 18.06.2019

ID	Search	Hits	Aspect
#1	HIV rapid diagnostic test	244	Index Test
#2	HIV self-test	1073	
#3	#1 OR #2	1232	
#4	MeSH descriptor: [HIV Infections] explode all trees	11135	Target Condition
#5	HIV	24671	
#6	#4 OR #5	24912	
#7	MeSH descriptor: [Self Care] explode all trees	5270	Patient Description
#8	MeSH descriptor: [Diagnostic Self Evaluation] explode all trees	161	
#9	#7 OR #8	5420	
#10	self care diagnostic	3138	
#11	self-test	22343	

#12	#10 OR #11	23330	
#13	#9 OR #12	27628	
#14	#3 AND #6 AND #13	1073	
#15	HIV:ti	14295	
#16	#14 AND #15	490	Total number of References in 3 Databases, for number of identified Cochrane Reviews see Screenshot below.

Figure 2: Number of hits in the databases of the Cochrane Library



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